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EFFECTS OF NEW PUBLIC TRANSPORTATION SYSTEMS IN TEXAS

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Texas Transportation Institute
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ABSTRACT

This report presents the results of an evaluation of the short-term effects of implementing new public transportation systems in Kerrville, Port Arthur and Midland, Texas. Major emphasis was placed on identifying the personal and travel characteristics of those groups of individuals which use the transit services on a regular basis. In addition, the effects of the new transit systems on energy conservation, traffic congestion and the demand for parking were also identified, as were the effects on retail establishments and other providers of transportation services. Input from community leaders and the general public was also sought on the effects of the new transit systems. Finally, a set of generalized guidelines for use in planning and implementing new public transportation systems in other small Texas cities was developed based on the experiences in Kerrville, Port Arthur and Midland.

Key Words: Public Transportation, Transit, Fixed-Route Service, Demand-Responsive Service, Transportation Disadvantaged, Transit Dependent, Mobility

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Port Arthur Transit System

James A. Johnson, Executive Director
Doris Velazquez, Operational Supervisor
MIDTRAN

J. Louis Odle, City Manager
City of Kerrville, Texas

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SUMMARY

Today, many of the smaller urban areas of Texas are seriously considering implementing new public transportation systems. The potential social and economic benefits to be derived from operating a new transit system are many. In addition to providing increased mobility to those persons who do not have regular access to private vehicles, public transit is also frequently credited with the ability to conserve energy, reduce traffic congestion and increase retail trade. However, because the costs of operating even a small transit system are high, an extensive evaluation of the true benefits to be derived from implementing new public transportation systems must be made. Furthermore, because the major portion of transit operating expenses are paid out of public funds, it has become even more important to determine the extent to which a new public transportation system can be expected to accomplish its acclaimed benefits to the community.

Recently, 3 new public transportation systems have been implemented in the State of Texas. These systems, located in the Cities of Kerrville, Port Arthur and Midland, have experienced varying degrees of success and public acceptance. While service has continued to gain support in Port Arthur and Midland, service in Kerrville was terminated after 7 months of operation. A detailed evaluation of these 3 systems was performed to determine the short-term effects of implementing new transit systems in smaller urban areas of Texas. Generalized planning guidelines for implementing new transit systems in other communities were also developed based on the transit operating experiences in Kerrville, Midland and Port Arthur.

Transit System Characteristics

The Port Arthur Transit System, which began operation in May 1979, operates four 25-passenger minibuses along 8 fixed-routes on 1-hour headways.

Service is provided from 6:15 a.m. to 6:15 p.m. Monday through Friday and from 8:15 a.m. to 6:15 p.m. Saturdays. By the end of its third fiscal year (after 29 months of operation) the Port Arthur Transit System was averaging 944 passenger-trips per day. The cost of providing this service (expressed on a per unit basis) averaged $1.81 per passenger, $2.55 per vehicle-mile and $35.33 per vehicle-hour. Transit revenues covered only about 15% of the operating costs which left an operating deficit of $1.54 per passenger, $2.17 per vehicle-mile or $30.02 per vehicle-hour to be covered by public subsidy.

The MIDTRAN service, which became operational in February 1980, began by operating 4 minibuses along 5 fixed-routes. Four months later, the 5 fixed-routes were replaced by 5 flex-routes in an effort to increase ridership. Because a substantial increase in ridership did not materialize 3 of the 5 flex-routes were terminated in favor of providing demand-responsive service. Today, 1 bus currently operates along the 2 flex-routes on 1-hour headways from 8:30 a.m. to 4:30 p.m. Monday through Friday. Six other buses and 7 vans are also used to provide demand-responsive transportation service from 8:30 a.m. to 4:00 p.m. Monday through Friday. By the end of MIDTRAN's second fiscal year (after 19 months of operation) the system was averaging slightly more than 500 passenger-trips per day. The cost of providing the flex-route and demand-responsive service (on a per-unit basis) averaged $3.55 per passenger, $1.51 per vehicle-mile and $21.09 per vehicle-hour. Farebox revenues were effective in offsetting about 23% of those costs which left a deficit of $2.75 per passenger, $1.17 per vehicle-mile and $16.31 per vehicle-hour to be subsidized by public funding sources.

The KERRTRAN operation, which utilized 3 minibuses along 3 fixed-routes, provided service on 1-hour headways from 6:45 a.m. to 6:45 p.m. Monday through Friday and from 9:00 a.m. to 7:00 p.m. on Saturdays. Service began in August 1980, but was terminated 7 months later due to a lack of ridership. During

its 7 months of service, KERRTRAN averaged about 70 passenger-trips per day. The operating costs averaged $7.34 per passenger or about $1.30 per vehicle-mile. Only 4% of the operating costs were recovered from farebox revenues; therefore, a subsidy of $7.03 per passenger and $1.25 per vehicle-mile was required.

Selected Transit User Characteristics and Mobility Needs

On-board transit user surveys performed in Port Arthur and Midland revealed that the new transit systems in these 2 cities have made significant contributions toward providing mobility to those individuals who do not have regular access to a private vehicle. Defining a transit dependent rider as one who does not possess a valid drivers license or one who does not own or have access to a private vehicle, it was determined that about 87% of the Port Arthur Transit weekday riders, 84% of the Saturday riders and 50% of the MIDTRAN weekday riders surveyed would be considered transit dependent. The importance of bus service to these individuals is demonstrated by the 12.1% of the Port Arthur weekday riders, the 11.5% of the Saturday riders and the 13.1% of the MIDTRAN weekday riders who indicated that they would not have been able to make their present trip if not for the availability of transit service. An additional 77.8% of the Port Arthur Transit weekday users, 78% of the Saturday users and 60.7% of the MIDTRAN weekday riders would have had to rely on less convenient or more expensive means, if not for transit service.

Effect on Energy Use, Traffic Congestion and the Demand for Parking

Because the vast majority of transit trips are being made by transit dependent riders, very few automobiles have been removed from the roadways and it was, therefore, determined that the effect of MIDTRAN and the Port Arthur

Transit System on energy use, traffic flow and parking demand has been slight (if any). The same conclusions can also be reached about KERRTRAN's brief operation.

Effect on Retail Trade

A survey of selected retail merchants revealed that the implementation of new transit service in Kerrville, Port Arthur and Midland has probably had only a very slight effect in increasing retail sales in the respective cities. While the majority of merchants from all 3 cities cited increases in business volumes, few attributed much (if any) of that increase to the new bus service in their city.

Effect on Other Providers of Transportation Services

Taxicab Operations

The effect of the new transit systems on taxicab operations in Kerrville, Port Arthur and Midland has been mixed. In Kerrville and Port Arthur, taxi operators reported that either no change or a slight increase in the demand for service has occurred since the implementation of transit service in their communities. On the other hand, the taxi operator in Midland viewed the new transit system as his competitor and held the system responsible for about a 3% loss in business.

Social Service Agencies Providing Transportation

The effect of the new transit systems on social service agencies who provide transportation was also mixed. Again, in Kerrville and Port Arthur, the implementation of transit service had little or no effect on current transportation programs. In Midland, however, most all of the agencies who had provided their own transportation prior to the implementation of transit service,

now rely on MIDTRAN to provide that service for them. The reason for the MIDTRAN operation having a different effect on taxi operatons and social services agencies lies in the fact that it provides primarily door-to-door (rather than fixed-route) service.

Conclusions

The findings of this study were not surprising as the literature review conducted at the outset of the study revealed that other small urban areas across the country have had similar experiences in implementing new transit systems. As stated previously, the new transit systems in Midland, Port Arthur and Kerrville have not had dramatic effects (if any) on conserving energy, reducing traffic congestion or increasing retail trade. In addition, the overall riderships are low and the differences between operating costs and revenues are high. Nevertheless, these new transit systems have played substantial roles in providing the non-driving segments of the populations with greater mobility, convenience and flexibility of travel. Furthermore, surveys indicated that the provision of public transportation to those who cannot drive has the support of both community leaders and the residents of Kerrville, Midland and Port Arthur.

IMPLEMENTATION STATEMENT

The type of quantitative information presented in this report should be of immediate use to the cities of Port Arthur, Midland and Kerrville, Texas in determining the impacts of the new transit systems in their communities. This information will also be of interest and value to those cities in Texas which are currently addressing the issue of providing public transportation in their areas. Finally, the data and planning guidelines set forth in this report should be useful to the state in responding to requests for information from other cities in the state interested in implementing public transportation services.

DISCLAIMER

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INTRODUCTION

In recent years many of the smaller urban areas throughout the State of Texas have been faced with the problems of increasing traffic congestion, the high price of gasoline, an inadequate supply of downtown parking and declining retail trade. In addition, concern has been expressed about providing increased mobility to the transportation disadvantaged (that segment of the population which does not have regular access to private means of transportation due to age, income or physical limitations). In order to alleviate some or all of these problems, many cities are now seriously considering implementing new public transportation systems. Such systems involve rather extensive start-up costs requiring substantial federal and state financial assistance.

The local costs involved in providing public transportation (both initial and on-going) can also be staggering to small city budgets. Furthermore, to what extent those new public transit systems can reasonably be expected to solve community problems is unclear.

In order to provide transportation planners, city officials and other decision-makers with detailed information on the communitywide effects of implementing public transportation in smaller urban areas, Texas Transportation Institute undertook a research project to evaluate the effects of new public transportation systems in Texas. The study began with a literature review to identify related research performed in the United States. Next, a detailed evaluation of the effects of the 3 new transit systems in Texas was conducted. Finally, planning guidelines based on the results of the literature review and evaluation of the new Texas transit properties were developed. These guidelines should provide other cities in the state with the means for determining the feasibility of implementing public transportation in their communities.

BACKGROUND

In recent years public transportation has been credited with providing many community benefits including:

- Conserving energy,
- Reducing traffic congestion,
- Reducing the demand for parking,
- Strengthening central business districts (CBD's),
- Increasing employment and shopping opportunities for families without automobiles, and
- Providing increased mobility for those individuals who cannot drive because of age, income or physical limitations.

Today, many view transit as a necessary public service which is vital to the economic and social well-being of a community and its residents. However, little quantitative data are available concerning the precise nature and extent of community benefits derived from implementing public transportation (1)*.

Review of Related Research

To begin the study of the effects of new public transportation systems in smaller urban areas, selected characteristics of small transit systems (those which operate less than 25 buses) were reviewed and compared to the average for all transit operations. These comparisons were made using the recently released National Urban Mass Transportation (UMTA) Section 15 reporting data (2). The information presented in Table 1 shows that small transit systems tend to depend proportionally less on farebox revenue and more on state and federal funding to cover the cost of providing transit service.

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*Numbers in parentheses refer to references listed at the end of this report.

Table 1: Characteristics of Small Transit Systems
Compared to Average For All Transit Systems

System Characteristics	Small Systems (≤25 buses)		All Systems	
Percent of Total Revenue				
Passengers fares for transit service	32.6		37.6	
Local cash grants and reimbursements	20.7		21.1	
State cash grants and reimbursements	12.7		8.1	
Federal cash grants and reimbursements	25.7		20.9	
Taxes levied by transit systems	0.7		6.6	
Other	7.6		5.7	
Total	100.0		100.0	
Percent Total Operating Expense				
Operators' salaries and wages	34.7		35.9	
Other salaries and wages	14.2	59.5	20.0	79.6
Fringe benefits	10.6		23.7	
Service	7.0		2.1	
Fuel and lubricants	8.1		5.6	
Tires and tubes	1.5		0.9	
Other materials and supplies	7.4		5.4	
Utilities	1.1		0.8	
Casualty and liability costs	6.5		3.6	
Purchased Transportation	6.6		0.6	
Other	2.4		1.4	
Total	100.0		100.0	
Selected Performance Indicators				
Total operating cost per vehicle-hour	$24.70		$26.70	
Total operating cost per vehicle-mile	1.57		2.19	
Total operating cost per passenger	1.50		.63	
Total passengers per revenue-hour	16.6		46.80	

Source: Reference 2

Table 1 also shows that small systems spend proportionally the same as the average for operators' salaries and wages. However, small systems spend less for other salaries and wages and fringe benefits. This results in a significantly lower percentage of the budget being devoted to labor costs.

The performance indicators listed in Table 1 show that it is not substantially less expensive to provide a vehicle-hour of service in a small transit system; however, the cost per vehicle-mile is lower due to the higher operating speeds possible in smaller urban areas. Also noteworthy is the fact that the number of passengers per revenue-hour for small systems is far below the average for all systems. The result is that the smaller systems experience a higher cost per passenger.

While the national Section 15 data are useful in understanding how small transit system characteristics compare to the average for all systems, they do not provide information as to the impact of transit on small cities. Therefore, to obtain information on the effects of transit, it is necessary to review case studies of individual systems. Several case studies were found to provide useful information.

Small City Transit Characteristics: An Overview (3) is a study sponsored by the Urban Mass Transportation Administration that investigated the characteristics of transit in 13 smaller American cities ranging in population from 9,500 to 170,000. Table 2 presents a listing of the cities studied, their population and the types of transit services provided.

Another study, The Xenia, Ohio Model Transit Service Demonstration Project: Transit and Paratransit Services for a Small Urban Area (4), presents an evaluation of the effects of a public transportation service demonstration project in Xenia, Ohio. The project began in July 1974 with the implementa- of an emergency fixed-route transit system after the city had been struck by

Table 2: Cities Included in Small City Transit Study

City	Population of Service Area	Type of Service
Amherst, MA	17,000	Fixed-Route
Ann Arbor, MI	16,000	Dial-A-Ride
Bremerton, WA	35,000	Subscription Buses and Fixed-Route
Chapel Hill, NC	32,000	Fixed-Route
East Chicago, IL	47,000	Fixed-Route
El Cajon, CA	60,000	Shared-Ride Taxi
Eugene, OR	170,000	Fixed-Route
Evansville, IN	139,000	Fixed-Route
Merced, CA	30,000	Dial-A-Ride
Merrill, WI	9,500	Route Deviation
Sudbury, MA	13,500	Fixed-Route
Westport, CT	28,500	Fixed-Route
Xenia, OH	28,600	Fixed-Route

Source: Reference 3.

a tornado which had destroyed or disabled an estimated 4,000 automobiles. The operation of the fixed-route system continued until December 1977. It was then replaced by a paratransit service which continued into 1978. During the course of the demonstration, several other types of public transportation services were also tested including jitney and shared-ride taxi.

The Impact of New Transit Service in Johnson City, Tennessee (1) is a third major source of information. This study performed by the Transportation Center at the University of Tennessee evaluated the impacts of a 12-bus fixed-route transit system in the city of 39,000 population.

Performance of Various Transit Service Concepts

Fixed-Route Transit - In the UMTA small city transit study (3), it was found that fixed-route transit in small urban areas performs most efficiently when most of the travel is related to a few major activity centers such as a downtown area, or railroad station or a school campus. For example, the fixed-route system provided in the university town of Amherst was able to achieve the relatively high ridership of 85 passengers per hour.

It was also determined that the more efficient fixed-route systems used "loop" routes to provide maximum geographic coverage. In addition, the use of timed, central transfer points where all routes converge was found to improve productivity and the quality of service. By providing such a transfer point, passengers can reach any destination with a maximum of one transfer. Also, since all buses converge at the scheduled times and do not depart again until all have arrived, the wait time for transferring is minimal and no walk is required.

Demand-Responsive Transit - Various forms of demand-responsive, or para-transit, service have been widely used throughout the nation. The names attached to these services, such as dial-a-ride, dial-a-bus, or shared-ride taxi refer to the mechanism used to provide the service. From the user's point of view, these door-to-door services are essentially identical in that the user calls in to request service, waits to be picked up, and is transported to his destination, while other passengers may be picked up or dropped off en route.

The UMTA small city transit study (3) determined that demand-responsive forms of transit were the best alternatives for small cities without concentrated activity centers. These systems also performed best in meeting the special transportation needs of the elderly and the handicapped who had difficulty in walking to a bus stop and waiting for a bus.

Ridership - Because each urban area and the transit service provided to that area is different, transit ridership will vary considerably from place to place. For those systems evaluated in the UMTA study (3), the highest ridership was found on the university-community fixed-route services and the lowest was on the demand-responsive and route-deviation systems (Table 3). For example, the comprehensive city-wide, fixed-route transit service in Eugene had an average weekday ridership of 10,500 passengers. The university town of Chapel Hill experienced an even higher ridership -- 13,500 passengers on an average weekday during the school year. While the ridership of most of the other fixed-route systems studied were considerably lower than those of Eugene and Chapel Hill, they were, nevertheless, higher than those of the demand-responsive systems. The one exception to this finding was Sudbury's fixed-route system which, with its average ridership of 170 passengers per weekday, ranked lower than any of the demand-responsive systems.

In all of the services studied, except Sudbury, ridership grew significantly following the introduction service. In all of the services except Chapel Hill, ridership at least doubled during the first year of operation. The reason Chapel Hill's ridership failed to grow no more than it did was possibly because soon after the system was implemented it reached capacity during peak periods. It is similarly possible that the other services at capacity would have had further ridership increases had the service capacities been expanded.

In Xenia, Ohio (4), approximately 1,645 passengers were carried by the fixed-route transit system each weekday following the tornado in July 1974. By July 1975, however, that figure dropped to 1,028 passengers. Another sharp decline in ridership was experienced with the discontinuation of the fixed-route system and the implementation of the paratransit service. Average ridership for the paratransit service only reached about 159 passengers each

Table 3: Average Weekday Ridership for Fixed-Route, Route-Deviation and Demand-Responsive Systems

Transit System	Average Weekday Ridership
Fixed-Route Systems	
Amherst	10,200 (school year) 5,400 (summer)
Bremerton	2,248
Chapel Hill	13,500 (school year) 4,000 (summer)
East Chicago	1,050
Eugene	10,500
Evansville	3,500
Sudbury	170
Westport	1,400
Xenia	900
Route-Deviation System	
Merrill	228
Demand-Responsive Systems	
Ann Arbor	180
El Cajon	600
Merced	330

Source: Reference 3.

weekday. Much of this decrease in ridership can be explained by the higher fare charged for the dial-a-ride service, as the overall level-of-service of the two systems was judged comparable.

The fixed-route transit service in Johnson City (1) averaged 940 daily trips during the first month of operation. Nine months later, the average daily ridership had grown to 1,235, an increase of 31%. The highest week of ridership was the week of March 3, 1980, with an average 1,400 passengers. This peak coincided with the opening of a new section of a shopping mall.

Cost per Passenger of Providing Transit Service - Generally speaking, the cost per passenger for the provision of transit service was found to be higher for the demand-responsive transit systems. Costs ranged from $ .75 to $1.75 per rider for these systems compared to $ .35 to $1.25 for the fixed-route systems (3). The lowest cost per passenger, however, occurred in cities where the systems used non-unionized and part-time labor. This type of labor arrangement was most often associated with "taxi-type" demand-responsive operations.

In Xenia, Ohio (4), the cost per passenger during the operation of the fixed-route system was $1.28 compared to $2.12 for the dial-a-ride service. The total monthly deficit, however, was lower for the dial-a-ride because of the higher fare charged and the reduced number of miles operated. In summary, the fixed-route system operated at a lower cost per passenger, but at a much higher total deficit (over $30,000 per month). The dial-a-ride was found to be more viable because it operated at a more "politically acceptable" total deficit of $10,000 per month.

The fixed-route system in Johnson City (1) provided service at a cost of $.94 per passenger during its first 8 months of operation. The operating deficit for that same time period averaged $18,500 per month.

Effects of New Public Transportation Systems

Effect on Automobile Ownership - In the UMTA small city transit study (3) the City of Westport was the only community in which a reduction in automobile ownership was noted. Approximately 20% of the commuters who use transit to get to and from the railroad station reported they have been able to eliminate one family car as a result of the transit service.

The findings of the Xenia, Ohio project (4), show that approximately 90% of the persons who lost cars in the tornado had replaced them within one year and auto ownership returned to pretornado levels in subsequent years. These findings suggest that the transit service in Xenia did not have a long-term effect in reducing automobile ownership.

The Johnson City report (1) concluded that with more than 90% of the bus riders being defined as captive, most persons with automobiles available for travel continued to rely on the comfort and convenience of these private vehicles to meet their transportation needs.

Effect on Traffic Congestion - The UMTA small city transit report (3) did not indicate what effect (if any) the implementation of transit service has had on traffic volumes in any of the 13 cities studied.

In Xenia, Ohio (4), figures on the percentage of total trips served by transit revealed that the service did not have any long-term effect on the reduction of traffic congestion. Following the tornado in 1974, approximately 47,000 trips were made each weekday, of which 1,645 or 3.45% were made by transit. By July 1975, the trips by transit dropped to 1,028 or 2.03% of 50,528 total weekday trips. At both of these dates, a little over 50% of the transit riders were reported to have been diverted automobiles drivers and passengers. However, when the fixed-route service was replaced with the para-transit service, ridership dropped drastically to an average of 159 riders per

day, or about 0.3% of the total trips. It was therefore concluded that any long-term effect on traffic volumes was very small.

In Johnson City (1), "before" and "after" traffic count data were analyzed at selected locations along bus routes in order to detect any changes in street traffic volumes caused by the diversion of auto drivers to transit. These data, however, proved inconclusive as traffic counts at most all locations had started to decline before the bus service began. Bus ridership data were also used to detect any possible changes in traffic volumes, and it was concluded that "even if it were assumed that all bus riders have shifted from automobiles to the bus, the number of automobiles removed from a particular roadway is very small" (1). In fact, it was estimated that no more than 15 or 20 cars could have been removed from a particular street during the peak rush hour by auto drivers switching to transit. The effect on traffic flow was described as "amount imperceptible."

Effect on Parking Demand - A reduction in parking demand was reported in the UMTA small city transit study (3) at such places as university campus lots, downtown parking areas and the limited parking area at the Westport rail station. In most instances the reduction in parking demand at the university campuses was probably more the result of university imposed restrictions than the implementation of the transit services. However, the Chapel Hill transit service has been credited with eliminating the need to build additional parking facilities at the University of North Carolina.

In Johnson City (1), estimating the effect on parking was complicated by seasonal fluctuations in parking demand. A review of transit trip data and conversations with parking officials revealed that there was no significant long-term effect on parking. A similar conclusion was also reached in the Xenia, Ohio report (4).

Effect on Energy Use - In the last 10 years, a considerable amount of literature has been produced on the energy efficiency of transit. These studies were either based on in-depth investigations of individual situations or on assumptions of average vehicle occupancies to estimate the regional and national energy efficiency of transit.

In all of these studies, only direct energy consumption is considered. Indirect energy use, such as the energy used to manufacture buses or automobiles, is not included. To consider all indirect energy use would be a highly complex task and beyond the scope of this project.

The Transportation Research Board (TRB)Report 43 (5) concluded that the greatest fuel savings can be made by shifting travel to small, fuel efficient cars. The savings realized from switching to more fuel efficient autos could exceed 30% of the total direct transportation energy by 1990. It was also estimated that an increase in carpooling could result in an additional 1.9% to 4.9% fuel savings. Urban bus transport, on the other hand, is estimated to produce a savings of 0.8% and this amount, only if there is a 600% increase in transit capital investment.

The extremely low energy savings potential of transit is a result of travel by transit only representing about 1.8% of total travel (5). Therefore, even large percentage increases in transit patronage have only a small effect on the total passenger transportation energy use.

Stuntz and Hirst (6) also found that urban mass transportation has a small role in the national effort to conserve energy. Their study used the potential energy savings of transit in conjunction with several transit improvement demonstration projects to conclude that "it is clear that transit cannot

contribute substantially to the reduction of petroleum imports -- improving transit alone is likely to attract few drivers from their automobiles: Most of the increase in transit ridership will come from non-automobile drivers and will save no energy."

An analysis of the energy saving potential in work trips was performed by Jerome Lutin (7). Lutin developed a model to determine the energy consumed for work trips. Independent variables in the model included total work trips within a county, total work trips between counties, trip length, mode and energy consumed per vehicle-mile. Lutin concluded that an energy savings of 25% was possible by increasing the fuel efficiency of automobiles. He also determined that the energy savings potential from an increased use of carpools was significant, and carpooling would have the least impact on lifestyles. Transit was found to have a small energy savings potential due to the low percentage of total trips being served by transit and the generally low load factors. A strong relationship was found between transit load factors and population density. This led to the conclusion that the greatest transit energy efficiency is obtained in counties with high population densities where transit operates for long trips between areas of high population concentrations.

A report prepared for the Environmental Protection Agency in 1976 (8) used 8 case studies to evaluate the value of transit in decreasing energy use. One major finding was that bus service improvement programs, such as route extensions, improved service frequencies, new bus lines and demand actuated services may reduce load factors, and, therefore, result in net increases in energy consumption. the report also concluded that effect of transit improvement programs on energy consumption is reduced even further when carpoolers switch to transit.

All of the studies reviewed thus far have dealt with measuring the overall effect that all transit operations have had on national energy consumption. The contribution of small city transit to this effect can also be estimated.

Table 4 presents selected operating statistics for small city transit and what percentage of the total market share they represent. Two primary conclusions can be made from the information in this table. First, small city transit constitutes a very small market share of the total (only 0.7% of all transit trips and 0.8% of the passenger-miles of national transit travel). Second, low vehicle load factors are indicated since small transit properties produce 2.5% of the total bus-miles but only 0.8% of the total passenger-miles of travel.

Table 4: Small City Transit Operating Statistics

Operating Statistics	All Systems	Small Systems Only
Vehicles Operated on average weekday	34,711	865.0 (2.5%)
Total annual vehicle-miles (thousands)	1,328,942.5	32,812.0 (2.5%)
Total annual unlinked trips (millions)	4,565.8	34.4 (0.7%)
Total annual passenger-miles (millions)	12,778.6	98.6 (0.8%)

Source: Reference 2.

In the TRB Report 43 (5) it was estimated that bus transit trips constituted 1.8% of the total trips under 30 miles. The Federal Highway Administration (FHWA) reported in its publication Highway Statistics 1979 (9) that bus and street car travel accounted for approximately 2.0% of the national total. Using the higher figure of 2.0%, small city transit then is 0.7% of 2.0% or

about 0.014% of the total national urban travel. Even if the number of trips made on small transit systems were increased by a factor of 10, they would still only represent about 0.14% of national travel. It is clear from these data that small city transit is not likely to be a major factor in total national energy use.

The fuel efficiency of small city transit as compared to the fuel efficiency of travel by private auto is also of interest. The information in Table 5 can be used to determine the fuel efficiency of small transit systems.

Table 5 shows quite a low average bus occupancy (3.0) for small transit systems and a 12.9 average occupancy for systems which operate over 1000 buses. These figures are low because a bus typically only reaches its passenger carrying capacity for a short time in only one operating direction during peak periods. Midday, night and weekend service often have low occupancies. Also, buses usually carry only a few passengers toward the end of the routes and there are some miles of deadhead service.

The low passenger-miles per gallon statistics are consistant with the low bus occupancy figures. The passenger-miles per gallon figure increases dramatically in systems of over 1000 buses in size due to higher load factors.

These data suggest that a passenger-miles per gallon performance from 12 to 8 is typical of smaller transit systems. It is interesting to note that a person driving alone in a full-size car would achieve about the same fuel efficiency as has been recorded for small transit systems.

In addition, a review of case studies of small city transit reveals that not all of the passenger-miles recorded on buses actually result in reductions in automobile vehicle-miles. In the Xenia, Ohio study (4), it was found that only about 50% of the bus riders formerly drove or were auto passengers. In Johnson City, Tennessee (1), the evaluation of the new 12-bus system revealed

Table 5: Transit System Fuel Consumption and Related Statistics

Statistic	Transit System Size (by Number of Vehicles Operated)						
	Under 25	25-49	50-99	100-249	250-499	500-999	1000 & Over
Revenue-Miles (thousands)	32,422	61,586	78,993	196,116	138,281	279,721	536,547
Passenger-Miles (thousands)	98,200	302,500	422,700	1,405,300	1,261,300	2,319,400	6,912,600
Average bus Occupancy	3.0	4.9	5.35	7.16	9.1	8.29	12.9
Gallons of Diesel and Gasoline Fuel consumed (thousands)	7,900	16,700	23,400	47,300	42,400	72,700	155,000
Passenger-Miles per Gallon of Fuel	12.4	18.1	18.1	29.7	29.7	31.9	44.6

Source: Reference 2.

that more than 90% of the trips made on the transit system were made by captive riders. It was estimated that the bus service replaced no more than 1,000 daily vehicle-miles of auto driving which was less than the vehicle-miles added by the new transit service.

The energy efficiency of dial-a-ride services was evaluated in a report by William R. Hershey (10). An analysis of 3 Michigan dial-a-rides was performed taking into consideration the amount of fuel consumed by the dial-a-rides and the amount of energy that would have been consumed had the dial-a-rides not been available for those trips. The result of this analysis was that direct energy consumption increased by an estimated 20% with the implementation of the 3 dial-a-ride services. Hershey, therefore, concluded that dial-a-rides in typical installations do not save fuel.

In summary, it has been determined that small city transit services do not save energy. Furthermore, small transit systems represent such an insignificant portion of national travel that even with the implementation of new systems, small city transit still could not make a major contribution toward national energy conservation efforts even if such systems were fuel efficient.

Effect on Retail Sales - Reliable data concerning the effect of new transit service on retail sales are difficult to collect as merchants do not routinely collect information on how their customers travel to and from their stores. Also, changes in the regional and national economies result in changes in local sales volumes which obscure the effect of transit service.

In the UMTA small city transit study (3), increases in downtown retail sales were reported in Eugene and Westport. Westport also reported an increase in the use of community facilities as a result of the transit service.

In the Xenia, Ohio study (4), a detailed evaluation of the effort on retail sales was not performed. The report did estimate, however, that the

effect of the new service on travel patterns and community development was slight.

An evaluation of the effect of new transit service on retail sales was performed in Johnson City. This evaluation was difficult, however, as it coincided with a downturn in the economy with most merchants experiencing declining sales. When 97 merchants were asked what had caused changes in their business volume, most cited changes in the national economy and seasonal variations. Only one merchant specifically mentioned the new bus service. When then asked directly if the bus service has had an effect on sales volumes, 11% of the respondents from noncentral areas on the bus routes answered "yes," 25% of the mall merchants responded "yes," and 28% of the CBD merchants said "yes." Most often a 1% to 10% increase in business was cited.

Effect on other Providers of Transportation Services - One of the major concerns in implementing new public transportation service is how that service will affect existing providers of transportation.

Taxi Companies - In the UMTA study of small city transit (3), it was reported that taxi companies lost revenue as a result of transit service competition in Ann Arbor, Merced and Westport. In fact, the taxi operations in Merced and Westport sued the transit systems in their respective cities. In Westport, the threat of a taxi company lawsuit forestalled the introduction of a demand-responsive service in the off-peak morning hours.

In Xenia, the taxi company claimed that the implementation of public tansportation service seriously reduced the demand for taxi service. The company claimed that its revenue decreased from $54,000 per year before the public transportation project started to $5,100 per year after project implementation. An investigation into the allegations revealed that the company was forced to reduce taxi operations due to tornado damage to their vehicles. This

reduction in service accounted for part of the decrease in revenue. In addition, the financial losses claimed by the company lacked adequate documentation. Nevertheless, the Xenia, Ohio report (4) did conclude that although other factors were involved in the taxi company's financial loss, it appears that a substantial loss in business caused by transit service competition did occur.

In Johnson City, Tennessee, one of the city's two cab companies went out of business after the implementation of transit service. The owner of that operation felt that the new transit service was in part responsible for his business failure. Results from a Johnson City Transit on-board survey revealed that the new bus service may, indeed, have reduced the demand for taxi service to some extent. Approximately 10% of the weekday riders and 9.7% of the weekend riders reported that their prior mode of transportation for making that trip was by taxi. Since the system averaged 1,235 riders per day, it can be estimated that about 120 riders may have been diverted from taxis (if the answers to the survey questionnaire were accurate).

Social Service Agencies - No formal attempt was made to evaluate the effect of new transit service on social service agencies providing transportation in either the UMTA small city transit study (3) or the Xenia, Ohio study (4).

In the Johnson City, Tennessee report (1), eight social service agencies were identified as providng transportation services directly to clients. Services provided by most of the agencies consist of transporting clients between their homes and the agencies' facilities. Some of the agencies, however, also transport clients to shopping areas and various social activities.

When questioned as to how the new transit service has affected the transportation services they provide, most of the agencies still felt the need to

expand and operate their own transportation programs in order to serve their clients better. Four of the agencies questioned stated that while they knew of a few persons who were utilizing the new bus service, the majority of their clients required door-to-door service and/or special care.

All of the agencies expressed an interest in coordinating their services with the Johnson City transit service. The Senior Citizen's Center in particular estimated that the bus service could relieve the center of some of its transportation obligations and costs. One of their 3 vehicles would always have to be maintained, however, to provide transportation for special outings and night events which occur after public transit service hours of operations. Personnel at the Senior Citizen's Center indicated the availability of public transportation did not appear to have increased the number of clients who visited the center. However, they stated that the bus service has made it possible for those members who are active to come to the center more frequently. It also provided those members with greater flexibility in their arrival and departure times.

Effect on Mobility - The UMTA study of small city transit (3) concluded that the primary positive effect of implementing transit service was increasing the mobility of senior citizens and other persons who had previously used more inconvenient or expensive (expensive to the user) modes of transportation. Transit service was also reported to have benefited mothers by relieving them of much of the burden of chauffering their children to different activities around town.

During the Xenia, Ohio service demonstration project (4), the transit system provided a valuable public service following the tornado disaster. As time went on, however, the public became less dependent on the service. Throughout the project, persons under the age of 18 comprised from 30% to 50% of the total ridership. Also, throughout the project, about 30% of the transit riders listed their previous mode of transportation as walk.

Thus, it can be inferred that a major benefit of the new transit service was to provide transportation to young people who had previously walked to their destinations. Increased mobility in Xenia can also be measured by the number of new trips that were made possible because of transit. These new trips comprised approximately 17% of the total trips made during the fixed-route phase of the operation but only about 7% during the paratransit phase of service. Only 11 new trips per weekday were reported for the paratransit service.

The Johnson City study (1) also concluded that a major community benefit of the new transit service was to increase mobility. In this study, it was estimated that about 150 (11%) of the weekday riders and 200 (16%) of the weekend riders did not make the trip before the bus service was implemented. Most of the new weekend trips were for shopping purposes while most of the new weekday trips were for school purposes. However, work trips also made up 24% of the new weekday trips which indicate that the bus service may have had some effect on making job opportunities more accessable.

In addition, the implementation of bus service in Johnson City has meant existing trips could be made more frequently due to greater mobility and flexibility of travel. It was estimated that between 500 and 600 trips which previously were made using another mode could now be made more frequently due to the availability of transit service. The Johnson City report (1) concluded by stating:

> With more than 90% of the JCT bus riders classified as captive, the bus service meets the needs of the traditional transit markets -- the young, the old and economically disadvantaged. In this group the bus wervice has meant a great deal . . . . To the residents of the Veterans Administration Hospital, the bus system offers an attractive opportunity to travel to the CBD and the mall; to the elderly, it provides the ability to be moreself-sufficient in traveling to the Senior Citizen's Center, shopping attractions and medical facilities; and to

the young, it offers more independence in traveling to and from various recreational and activity centers. In general, the JCT service has offered its users greater opportunities and fullfillment in everyday life through increased mobility.

Summary

Based on the findings of the literature review, the greatest community benefit derived from implementing new public transportation systems in smaller urban areas was to provide greater mobility, convenience and flexibility in travel to those segments of the population that cannot use private vehicles for travel. In a few cases, the implementation of public transportation services also had a very small effect on increasing retail sales, reducing the demand for parking and reducing automobile ownership. In addition, it appears that opportunities may exist for coordinating social service agency transportation with public transportation services.

On the other hand, small city transit was not found to conserve energy. In fact, in some cases, a net increase in fuel consumption resulted from the implementation of public transportation. In addition, the availability of new transit service, by reducing the demand for taxi service, had a negative effect on taxi operators in several of the cities studied.

In conclusion, although the implementation of new public transportation systems did not always solve the energy, congestion, parking or economic problems in the cities studied, they nevertheless were credited with performing a public service to those individuals who do not have regular access to private modes of transportation. These transit systems were also viewed as valuable reserve or backup transportation for other community residents who are not transit dependent.

DEVELOPMENT OF NEW TRANSIT SERVICE IN KERRVILLE, PORT ARTHUR AND MIDLAND, TEXAS

In the last few years, 3 new public transportation systems have been implemented in the State of Texas. These systems, located in the Cities of Kerrville, Port Arthur and Midland (Figure 1), have experienced varying degrees of success and public acceptance. While service has continued to gain support in Port Arthur and Midland, service in Kerrville was terminated after 7 months of operation. A detailed evaluation of these 3 systems was performed to determine the effects of new transit systems on communities in Texas. The results of this evaluation are presented in the following chapters.

Development of KERRTRAN

The City of Kerrville, located in Kerr County, has experienced a constant growth in population during the last few years. Census figures for 1970 showed Kerrville to have a population of 12,672. By 1977, that figure increased to approximately 16,000 and it was projected to exceed 33,000 by 1995 (11).

Much of Kerrville's growth and prosperity can be attributed to the 3 major hospital facilities in the city. In 1977, these hospitals employed approximately 1 out of every 5 working residents (11). Good health care facilities along with the beauty of the Texas hillcountry have made Kerrville a popular area for retirement. In turn, the retirement community and numerous recreational facilities nearby have brought in trade, services and new construction to the community.

Kerrville's popularity as a retirement center has resulted in a higher than average growth rate of elderly residents. In fact, the ratio of persons age 65 years and over has increased from 14.3% in 1960 to over 27% in 1970

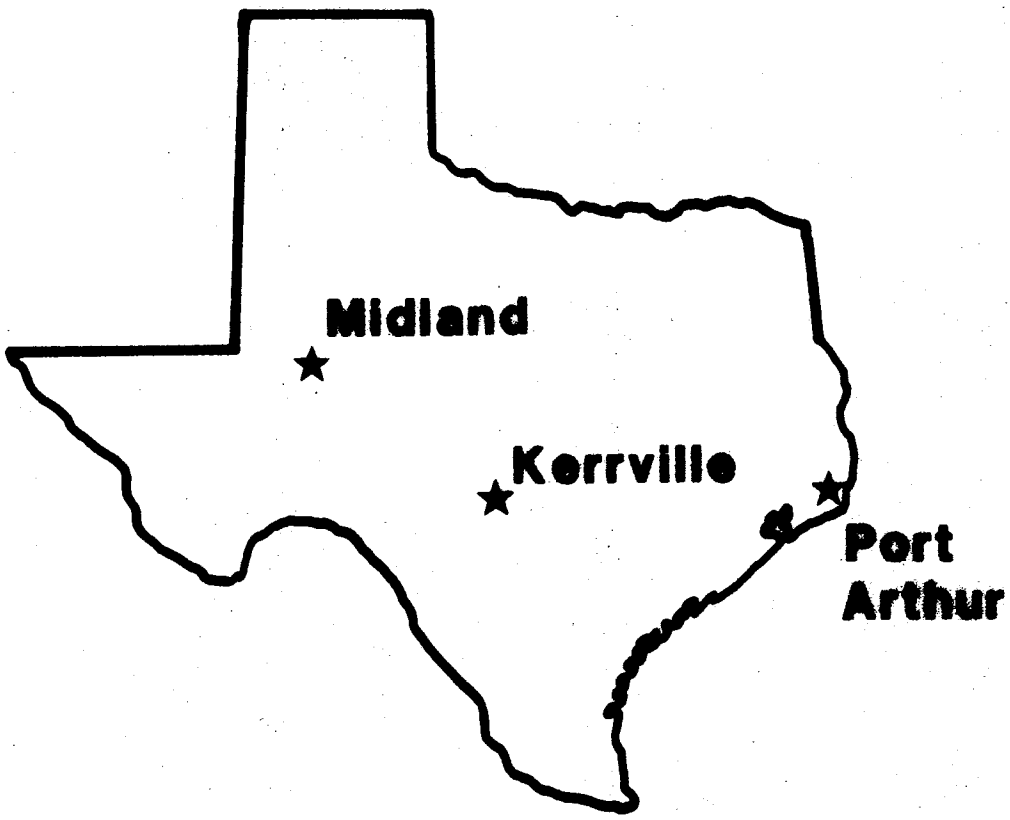


Figure 1: Locations of New Public Transportation Systems in Texas

(The average ratio of persons 65 years and over for the State was 8.9% in 1970). Estimates in 1977 placed Kerrville's elderly population at 28% or greater (11).

Typically, a significant proportion of a community's elderly population does not have regular access to private vehicles and, therefore, must rely on family and friends or various modes of public transportation to take them to and from important community destinations. Such was thought to be the case in Kerrville and in June 1977, the City Council discussed the implementation of public transportation services to meet the needs of the many retired persons of the community. Because monetary and planning assistance for public transportation was available through the State Department of Highways and Public Transportation (SDHPT), the Council requested the SDHPT to conduct a comprehensive transit study for Kerrville to determine the transit needs of the community (if any).

The study began in August 1977 when postcard survey questionnaires were mailed out to approximately 6,000 Kerrville residents along with their August water bills. During the weeks that followed, 1,845 surveys were returned for a 30% response. Of those responding, 1,516 or 82% were in favor of a transit system for the city. When asked how often they would utilize the service, if implemented, 282 (16%) reported that they would ride the bus daily, 972 (56%) would ride several times per month and 497 (28%) would never ride. In addition to the 972 who would ride often and the 282 who would ride daily, a reported 1,550 other persons living at the addresses surveyed would also ride the bus if service was provided (11).

Along with the results of the survey, pertinent socioeconomic characteristics of the population were also analyzed as part of the transit development study. Using 1970 Census data, the study listed 77% of Kerrville's 12,672 population as White, 6% as Black and the remaining 17% as persons of various

other races. Based on a 1977 population estimate of 16,000 persons and an area of 7.8 square miles, the density of Kerrville was calculated as approximately 2,050 per square mile (11).

The 1970 median family income for the City of Kerrville was reported to be $6,951. This figure is significantly lower (about 22%) than the median family income of $8,486 for the state. The median income for Kerrville's Black families was about $4,903, about 8% lower than the median for the state. Census data also indicated that 13.1 of Kerrville's families (as compared to 14.6% of the state's families) earned incomes below the poverty level (11).

The low income, ethnicity, density and age characteristics of the population were all important considerations in determining possible transit needs of the community. In addition, other pertinent items such as neighborhood composition, land use and land use trends, economic activities and existing transportation services were also analyzed as part of the study. Based on the findings of these analyses, the survey results and a review of various public transportation alternatives, a conventional fixed-route transit system was recommended. The system would utilize 2 minibuses on 3 routes and would run according to fixed schedules with 30-minute headways. A total of 17.25 route-miles were planned. Cost/revenue estimates for the operation were developed based on a 10-hour day, 308 operating days per year and assuming a 40¢ fare for service.

In December 1977, after much discussion, the Kerrville City Council passed a resolution authorizing the SDHPT to proceed with an application for the funding of the proposed 2 bus/3 route system. An Urban Mass Transportation Administration (UMTA) Section 3 grant application was submitted in February 1979 and approval was received 7 months later. Although the city had second thoughts on whether or not to accept the UMTA grant, a resolution for acceptance was passed in March 1979.

In January 1980, a second survey, utilizing the same format as the first, was conducted by the city staff with assistance from the state. The purpose of this survey was to update the previous survey and obtain information which could be used to determine the best routings and schedules for the new system. During the second survey, 5,250 questionnaires were mailed out with 1,394 (26.5%) of the residents responding. The results of the second survey showed that there was a potential ridership of 2,612 persons or 14.12% of Kerrville's population (11).

After careful analyses of the survey results, various transit alternatives and the cost of providing various services, the decision was made to implement a 3-bus/3-route transit system to operate on 1-hour headways.

Development of the Port Arthur Transit System

The City of Port Arthur, Texas, located in Jefferson County, is one of the 3 cities which makes up the area in southeast Texas known as the Golden Triangle. The Port Arthur area is reported to be one of the world's leading petrochemical centers. Petroleum processing, shipbuilding, shipping and varied manufacturing are major enterprises in the community.

In the 1950's, Port Arthur was among 26 cities in the state which had public transportation systems. During the decades that followed, all but 18 of the cities abandoned transit system operations for one reason or another. In Port Arthur's case, a combination of spiraling costs, a driver's wage disagreement and a subsequent strike forced ATE Management and Service Company to shut down the operation of the city-subsidized, 13-bus system in 1970.

At the time the city's transit service was terminated, the 1970 Census (12) listed Port Arthur's population at 57,371, a figure which is about

14% lower than the 1960 population figure of 66,676. In 1970, approximately 59.7% of Port Arthur's population was listed as White, 40.1% was Black and the remaining 0.2% were persons of other races. Persons age 65 years and over comprised about 10.6% of the total population.

The median family income for the City of Port Arthur was listed as $7,841 (as compared to the state's median of $8,486). The median income for Black families was $5,803, about $2,000 lower than the city's as a whole (12). Additional census income data showed that approximately 15.0% of Port Arthur's families had incomes which fell below the poverty level (12).

A review of this census data indicated Port Arthur to have a rather sizable proportion of low income and elderly residents -- persons which typically are in need of transportation services.

In response to this problem, Revolution Resurrection, Inc., a corporation of predominantly black churches, began the operation of 1-bus, "pay as you can" system in 1972 to provide transportation service to the needy. Bus drivers were paid a nominal wage and the system continued operation on a limited basis for 3 years.

In 1975, the church leaders went before the city council and requested that the city assume the responsibility for providing transit service. In October 1975, the council approved the development of a new public transportation system that would link low income residential areas with the city's major activity centers. The city commissioned Alan M. Voorhies and Associates,Inc. to conduct a study of the community's transit needs.

A 5-bus, limited,fixed-route transit system of 3 segments totaling 22.5 miles was proposed. The system was scheduled to begin operation in late 1978 and a daily ridership level of between 700 and 800 persons was predicted to occur within the first 3 months of operation.

In June 1976, an UMTA Section 5 Capital Improvement and Operating Assistance grant application was submitted for the funding of the new system. Approval of the $725,910 grant was received in September 1977.

The city then contracted with the American Transit Corporation (ATC), a transit management firm, to supervise the implementation and operation of the transit system. A resident General Manager from ATC began supervision of the start-up operation in March 1979.

Development of MIDTRAN

The City of Midland is located in an area of West Texas which was once covered by a vast, prehistoric inland sea known as the Permian. It was for this sea that the petroleum-rich Permian Basin that surrounds Midland is named. The archeological remains of "Midland Minnie," a woman who lived in the area 20,000 years ago, indicate that Midland may have been one of the earliest settlements in North America (13).

Present-day Midland experienced a very slow growth until 1923, when the discovery of oil near Big Lake triggered a boom. After the discovery of oil, Mildand's population continued to double each decade from 1920 to 1960. Today, Midland's economic base is still petroleum, as the area produces about one-fifth of the total crude oil, gas liquids and natural gas in the United States. Midland is headquarters for more than 700 oil companies and related firms (13). Along with the many petrochemical complexes in the area, Midland is also a major wholesaling, banking, medical, educational and agricultural center for the West Texas region.

Like Port Arthur, Midland was once served by public transit, however, that service was discontinued in 1954. Then, in the 1970's, interest in public transportation was rekindled.

In 1970, the population of Midland numbered 59,463. Approximately 89% of the city's residents were White and 10.8% were Black. The remaining 0.2% were persons of other races. Persons aged 65 and over comprised a total of 5.2% of the city's population (12).

Median family income for Midland was listed as $10,602 which is about 25% higher than the median of $8,490 for the state. For Black families in Midland, median income was $5,803, which is also slightly higher than the median of $5,330 for the state's Black families. Data also indicated that 9.6% of Midland's families (as compared to 14.6% of the state's families) had incomes below the poverty level (12).

By 1975, Midland's population had grown to 62,950 and the city covered an area of 33.6 square miles, for a population density of 1,874 persons per square mile. Also during this time period, numerous high-rise office buildings were being planned and constructed in the central business district (CBD) to house the many oil-related administrative activies. Along with this growth in the CBD came traffic congestion and parking problems.

In order to alleviate some of the congestion and parking problems and provide increased mobility to the non-driving segment of the population, a transit system was proposed. Initially a transit service was operated by several local businessmen. Later, it was to the advantage of the city (and the businessmen) for the city to take over operation of the system. Transit development studies and surveys were conducted to determine the feasibility of implementing a city operated transit system. Low income, ethnicity, population density and age characteristics were important considerations in determining the transit needs of the community as were characteristics of the city's labor force and locations of major activity centers.

After careful consideration of the various transit alterntives and their costs, a system of 4 fixed-routes was proposed. An UMTA Section 5 grant

application for the purchase of transit coaches and other related start-up equipment was submitted and approval was received on September 1, 1979.

Summary

A summary of population and demographic characteristics for the cities of Kerrville, Port Arthur and Midland is presented in Table 6, along with type of transit system proposed based on the analysis of these characteristics (and the results of various transit studies and surveys).

Table 6: Summary of Population and Demographic Characteristics of Kerrville, Port Arthur and Midland

Characterisitic	Kerrville	Port Arthur	Midland	Texas
Land Area (sq. mile), 1975	7.8[1]	49.0	33.6	262,134.0
Population, 1975	16,000[1]	53,557	62,950	12,244,678
Population per Sq.mile, 1975	2,050[1]	1,093	1,874	47
Population, 1970	12,672	47,371	57,463	11,198,655
White, Percent	77.0	59.7	89.0	87.1
Black, Percent	6.0	40.1	10.8	12.5
Persons of Other Races Percent	17.0	0.2	0.2	18.4
Persons 65 Years and Over, Percent	27.0	10.6	5.2	8.4
Median Family Income - All Families	$ 6,951	$ 7,841	$10,602	$ 8,486
Median Family Income - Black Families	$ 4,903	$ 7,803	$ 5,232	$ 5,330
Families with Incomes Below Poverty Level, Percent	13.1	15.0	9.6	14.7
Transit System Proposed for for Implementation	3 buses on 3 fixed-routes	4 buses on 8 fixed-routes	4 buses on 5 fixed-routes	----------
Year in Which System was Implemented	1980	1979	1980	

[1] 1977 Estimate
Source: References 11 and 12.

CHARACTERISTICS OF KERRTRAN, MIDTRAN AND THE PORT ARTHUR TRANSIT SYSTEM

Characteristics of KERRTRAN

Upon receipt of an UMTA Section 3 grant in the amount of $300,783, 3 new 20-passenger GMC Superior 800 buses were ordered and plans were made for the construction of bus maintenance and office facilities to house KERRTRAN's operation. Three fixed-routes, which covered a total of 29.7 miles, were planned in order to provide service to most areas of Kerrville. KERRTRAN's buses were received in early August and construction of the bus maintenance facility and offices was completed a short time later.

On August 11, 1980, KERRTRAN began operation and for the first time in Kerrville's history, fixed-route transit service was offered to the general public. A total of 10 persons were responsible for the operation of KERRTRAN.

1 Transit Supervisor

1 Secretary

1 Diesel Mechanic

5 Full-Time Drivers

2 Part-Time Drivers

During the first 3 months of operation, KERRTRAN operated on 1-hour headways from 6:45 a.m. to 6:45 p.m. Monday through Friday and from 9:00 a.m. to 7:00 p.m. on Saturdays. The service utilized 3 buses on 3 routes with 1 leased 15-passenger van in reserve to proved back-up service in case of roadcalls.

Route #1, the Orange Route, basically served the north part of Kerrville from W. Water and Main Streets north to the Kerrville city limits. Route #2, the Blue Route, also served the north part of town, but covered that area south of W. Water and Main Streets and extended to the Guadalupe River. Route #3, the Green Route, provided service to the southern portion of Kerrville. A route map showing these 3 routes is presented in Figure 2.

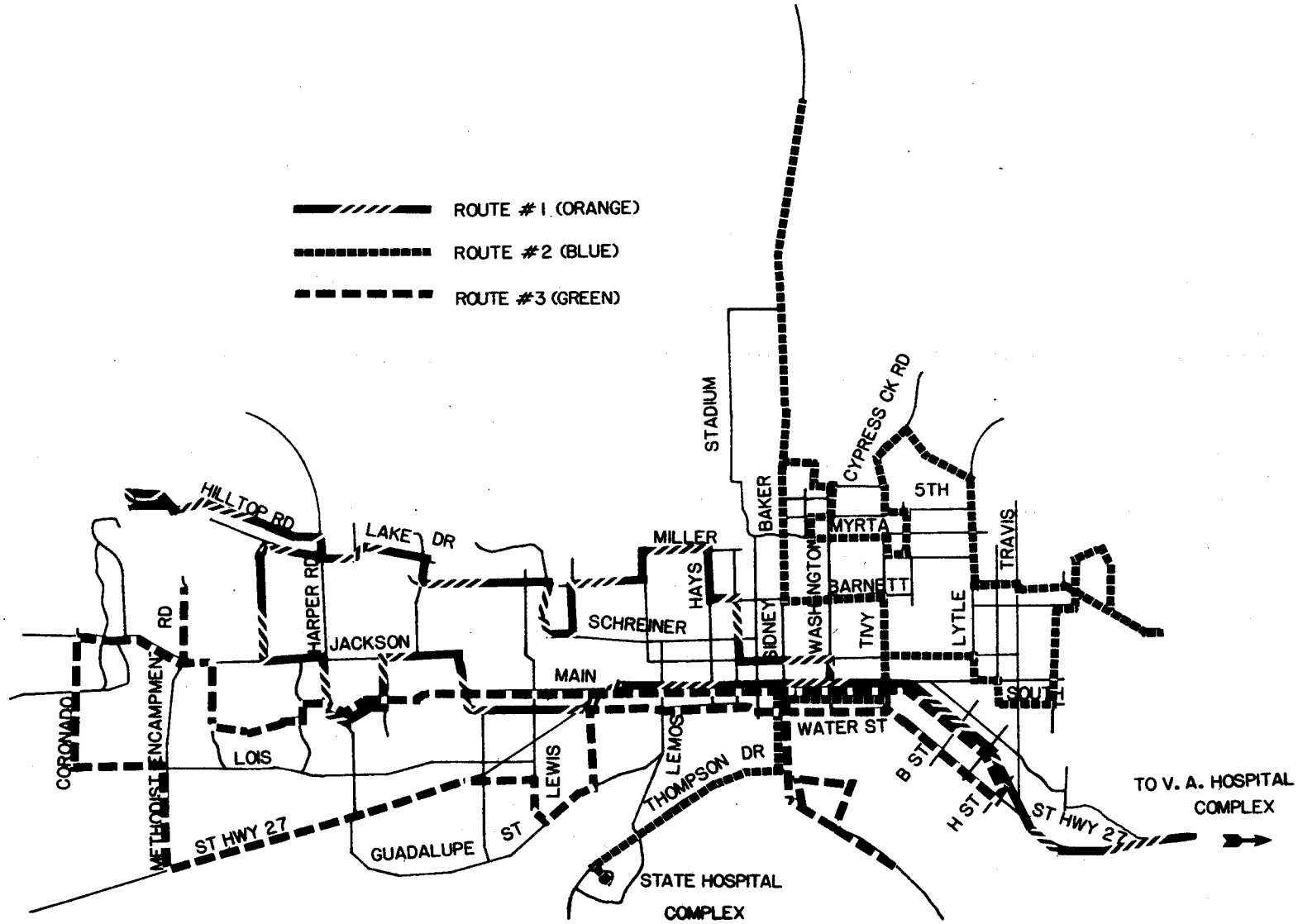


Figure 2: KERRTRAN Route Map

The fare for transit service was as follows.

60¢ - Normal Fare

50¢ - Shoppers Special (Book of 20 = $10.00)

45¢ - Commuters Special (Book of 50 = $22.50)

30¢ - Senior Citizens (65 and over)

30¢ - High School Students (18 and Under)

FREE - Age 5 and Under When Accompanied by Parent

Persons who wished to transfer from one route to another were required to pick up a transfer upon boarding the bus and paying their fare. There was no charge for the transfers, but they were valid for the day of issue only. Transfers were allowed to any bus route except the one from which the transfer was issued.

Originally, the State and the Veterans Administration Hospitals were not included on any of KERRTRAN's routes. However, a Section 18 grant for the purchase of 2 additional vehicles had been submitted and approval was expected at any time. These additional vehicles would be used to incorporate the State and Veterans Administration Hospital complexes into the then existing bus routes.

During the first few months of service, KERRTRAN received numerous inquiries from persons wishing to travel to and from the State and Veterans Administration Hospitals. Also during this time period, KERRTRAN learned that the Section 18 grant had been turned down by the Department of Labor pending additional documentation. The required information was completed and the grant was then resubmitted, but because of this delay, the Section 18 funds would not be available until March 1981 at the earliest. In light of these new developments, it was felt that transit service would be enhanced and ridership would increase if the State and Veterans Administration Hospitals could

be worked into the present route structure using the vehicles currently available. With the assistance of the 2 hospitals' directors, a survey was conducted to determine how much demand for service to these hospitals actually existed. Replies to the survey indicated that 78 persons would ride to the State Hospital and 66 persons would ride to the Veterans Administation Hospital daily for a total of 144 riders or 288 one-way trips. As the daily ridership from August 11 through October 31, 1980 had averaged only 69 passenger-trips, the possible ridership gain of 288 additional trips was encouraging. Route and schedule changes were, therefore, recommended and these changes went into effect November 17, 1981. KERRTRAN's revised hours of operation were from 5:45 a.m. to 6:20 p.m. Monday through Friday and 9:00 a.m. to 6:20 a.m. on Saturdays. The Blue and Green Routes were revised to include the State Hospital complex and the Orange Route would provide service to both the State and the Veterans Administration Hospitals.

After 1 week of operating under the new routes and schedules, there was no apparent increase in ridership. Therefore, on November 24, 1980, letters were mailed to those persons who had listed their adddresses on the survey replies to notify them that the service they had requested to the State and Veterans Administration Hospitals was now being offered. The letter also inquired as to the reason why they were not utilizing the new service. Only one reply to this letter was received and ridership did not increase.

In addition to the regular fixed-route service, KERRTRAN also provided charter service upon request. KERRTRAN buses were utilized on three different occasions during the time period from August through December, 1980 and generated a total of $961.50 for these services.

Ridership

During KERRTRAN's 7 months of operation, the system carried 9,982 revenue-rides. Ridership during the first month of operation averaged only 89 passengers per day (including transfers and free passes). That figure continued to drop during the months that followed. Then, in an effort to attract more riders, route and schedule changes were made to include the State and Veterans Administration Hospital complexes. These changes went into effect November 17, 1980, but did not result in any noticeable gain during the months that followed.

Table 7 presents KERRTRAN's ridership by fare payment class for the first 6 months of operation. As this table indicates, the vast majority of KERRTRAN's fares were in the 30¢ senior citizen and student category. In addition to the 9,188 revenue and free pass rides, there were also 1,059 transfers which suggest that a significant proportion of the transit riders used the bus to get to all parts of the service area.

Table 7: KERRTRAN Ridership Distribution by the Payment Class (8/80 - 1/81)

Fare Classification	Percent of Total (n=9,188)[1]
Normal Fare (60¢)	0.4
Shoppers Special (50¢)	4.1
Commuters Special (45¢)	4.5
Senior Citizens and Students (30¢)	85.9
Free Passes	5.0
TOTAL	100.0

[1]Does not include transfers

A review of KERRTRAN's ridership records showed that the total number of passenger-trips made each month remained fairly constant during the system's brief operation (Figure 3). The highest monthly ridership recorded was 1,874 passenger-trips while the lowest recorded was 1,517, which represents only a 357 passenger-trip fluctuation between the highest and lowest monthly figures.

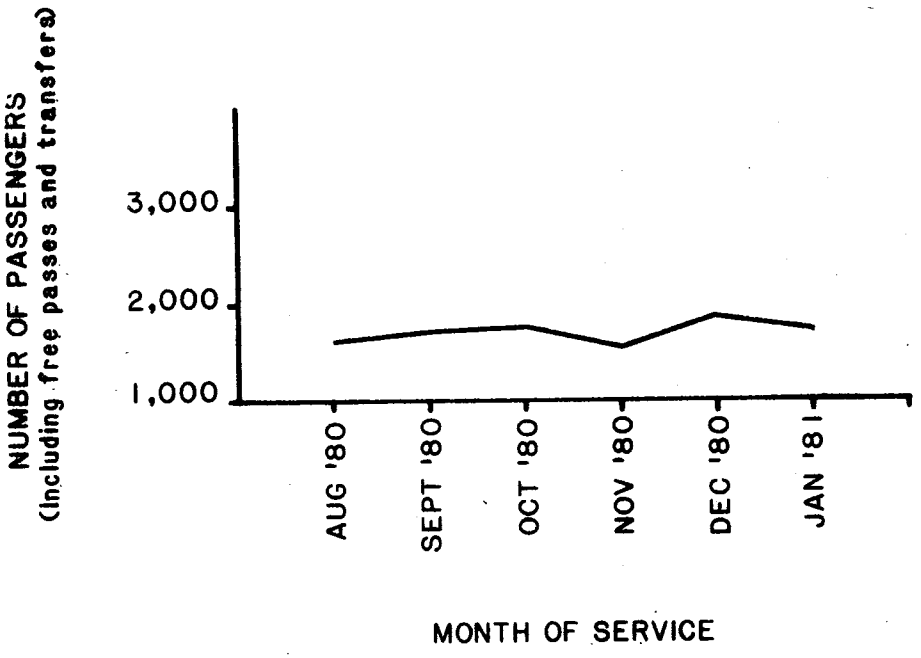


Figure 3: KERRTRAN Ridership by Month of Service

Ridership trends by day of week were also examined. Very little difference was found in the levels of ridership from one weekday to the next and average Saturday ridership was only slightly higher than weekday levels (Table 8).

Table 8: Average Ridership by Day of Week

Day of Week	Average Ridership
Monday	67
Tuesday	65
Wednesday	65
Thursday	67
Friday	71
Saturday	77

Ridership figures by time of month also showed little variation. On the whole, daily ridership averaged 68 passengers during the first part of each month, while ridership toward the end of each month averaged 65 passengers.

December 1980 ridership counts by route showed that after route and schedule changes were made to include the State and Veterans Administration Hospitals, Route 3 was estimated to carry between 19% and 45% of the daily ridership with the remainder being divided evenly among Routes 1 and 2 (14).

Cost/Revenue Breakdown

Table 9 presents a cost/revenue estimate for the KERRTRAN operation from August 1980 through January 1981. According to the transit system's operating records, KERRTRAN carried 10,247 passengers and operated a total of 57,757 vehicle-miles which averages 0.18 passengers per vehicle-mile. KERRTRAN provided this service at a cost of approximately $7.34 per passenger or $1.30 per vehicle-mile. Farebox revenue covered only 4% of the costs (about $.31 per passenger or $.05 per vehicle-mile).

KERRTRAN ran at an estimated deficit of $12,000 per month which was paid by the City of Kerrville. Thus, an operating subsidy of $7.03 per passenger

Table 9: Cost/Revenue Statistics for KERRTRAN

Cost/Revenue Items	Total (8/80-1/81)
Costs	$75,166[1]
Revenue	$ 3,166
Deficit	$72,000[1]
No. of Passenger-Trips	10,247[2]
No. of Vehicle-Miles	57,757
No. of Vehicle-Hours	NA
Cost/Passenger	$7.34
Cost/Vehicle-Mile	$1.30
Cost/Vehicle-Hour	NA
Revenue/Passenger	$ .31
Revenue/Vehicle-Mile	$ .05
Revenue/Vehicle-Hour	NA
Deficit/Passenger	$7.03
Deficit/Vehicle-Mile	$1.25
Deficit/Vehicle-Hour	NA

[1] Estimate
[2] Includes Revenue Passengers, Transfers and Free Passes

Note: NA = Not Available

or $1.25 per vehicle-mile of service was required to keep the system in operation.

Termination of KERRTRAN

The City of Kerrville has a high percentage of older residents and, therefore, was thought to have a need for transit service. For a variety of reasons, however, the ridership never did materialize. approximately 700 riders per day were expected to utilize the system, but once implemented, the

service only attracted an average of 69 passengers per day (only 10% of the projected number). The probable reasons for this lack of ridership are as follows:

- Auto-Oriented Population - Although a small percentage of Kerrville's families have incomes below the poverty level, the vast majority of the families are able to afford and depended on private means of transportation. This is evident by the results of the first survey conducted by the city and the SDHPT which showed that 50% of the respondents were 1-car families and 4% were 2-car families. After KERRTRAN was implemented, these families continued to rely on the comfort and convenience of their cars.

- Inconvenience of Transit - Because of Kerrville's small size, travel from one end of the community to the other can usually be accomplished in less than 15 minutes. Travel by transit, however, took much longer, sometimes as much as an hour. The reasons for the lengthy travel times by transit were the length of the routes and the fact that the buses ran in one direction only. This meant that a transit trip from Point A to Point B might take only 10 minutes, but the return trip from Point B to Point A would take 50 minutes. In addition,most residential areas of Kerrville do not have sidewalks, which made walking to a bus stop more difficult, particularly for elderly residents.

- Too Much Competition - Another one of KERRTRAN's problems was its competition. Dietert Claim, a social service agency, provides door-to-door service to the elderly free of charge. In addition, Kerrville has a taxi company which operates as many vehicles as KERRTRAN. Dietert Claim and the taxi company were able to offer faster, more convenient service than KERRTRAN.

- Inaccurate Survey Results and Projections - Ridership projections based on the results of the February 1977 survey, the January 1979 and the November 1980 questionnaire at the State and V.A. Hospitals proved to be inaccurate. Respondents who indicated that they would utilize the service did not do so after the service was implemented. Only about 10% of the projected ridership ever materialized.

- Population Too Small - Finally, the City of Kerrville, with a population of 15,276, scattered 10 miles along the Guadalupe River, was felt to be too small to support a 3-bus/3-route transit system.

No significant problems with personnel, equipment, or maintenance facilities were experienced, although the leased van was put into service frequently when one of the buses was taken out of service for repairs.

Because of KERRTRAN's problems, ridership was extremely low which meant that revenue was also low and the deficit was high. The projected monthly deficit of $6,000 for a 2-bus system escalated to approximately $12,000 for the

3-bus system. Although the Section 18 Operating Grant (if recieved) would cover one-half of the operating deficit, the Kerrville City Administration felt that the total cost was too great for the limited benefits received. KERRTRAN was, therefore, officially terminated by Council action on February 13, 1981.

Characteristics of the Port Arthur Transit System

In the fall of 1977, 5 new 25-passenger Chance minibuses, along with other related capital equipment was purchased under a $725,910 Section 5 grant. In addition, a portion of the grant money also went to rehabilitate a transit service center which was donated to the transit system by the City of Port Arthur as an in-kind match. All transit system maintenance functions and personnel are based in this center, which is located in downtown Port Arthur across the street from City Hall.

On May 29, 1979, fixed-route transit service was offered to the general public for the first time in almost 10 years. With the implementation of the transit system, Port Arthur became the first city in Texas to successfully reinstate a service it was once forced to abandon.

Operating on 1-hour headways, transit service is available from 6:15 a.m. to 6:15 p.m. Monday through Friday and from 8:15 a.m. to 6:15 p.m. on Saturdays. Initially, 4 buses were operated along 8 routes with only one bus in reserve. In July 1980, however, it became necessary to lease 2 additional buses from ATC in order to guarantee that 4 buses would always be in service when scheduled.

All 4 buses are scheduled to depart from the downtown transfer point (adjacent to City Hall) at 6:15 a.m. each weekday and 8:15 a.m. each Saturday and return at 15 minutes after every hour until service ends at 6:15 p.m. When the buses depart from the downtown transfer point, the outbound trips are

designated as Routes 1, 3, 5 and 7 until they reach their end points. These routes then become Routes 2, 4, 6 and 8 (the reverse of Routes 1, 3, 5 and 7 respectively) on their inbound trips back to City Hall (Figure 4). In this way, 2-directional service is provided.

Another feature of the routing is that all routes connect with other routes at the City Hall transfer station. Route 2 connects to Route 5, Route 4 to Route 7, Route 6 to Route 1 and Route 8 to Route 3. Thus, riders are able to travel from one route to its connecting route without transferring to another bus.

When transit service began in 1979, the intersecting route structure was such that most major activity centers within the city were accessible by transit. These major activity generators included the Port Arthur City Hall, Jefferson City Shopping Center, St. Mary's Hospital, Park Place Hospital and Lamar University at Port Arthur. Later, Routes 3 and 4 were extended about a mile to include service to the Port Arthur Public Library.

The fare for transit service when PAT began operation in May 1979 follows.

Adult Fare (Ages 13 to 59) . . . . . 30¢

Senior Citizens (60 Years or Older) . . . 20¢

Handicapped . . . . . 15¢

Students (Age 5 to 12) . . . . . 15¢

Children Under 5 Years . . . . . FREE

Transfers . . . . . FREE

These fares were in effect until July 1980, when escalating operational costs necessitated a fare increase. The revised fare structure, which went into effect on July 14, 1980, is presented below.

Adult Fare (Ages 19 to 59) . . . . . 40¢

Senior Citizens (60 Years or Older) . . . 20¢

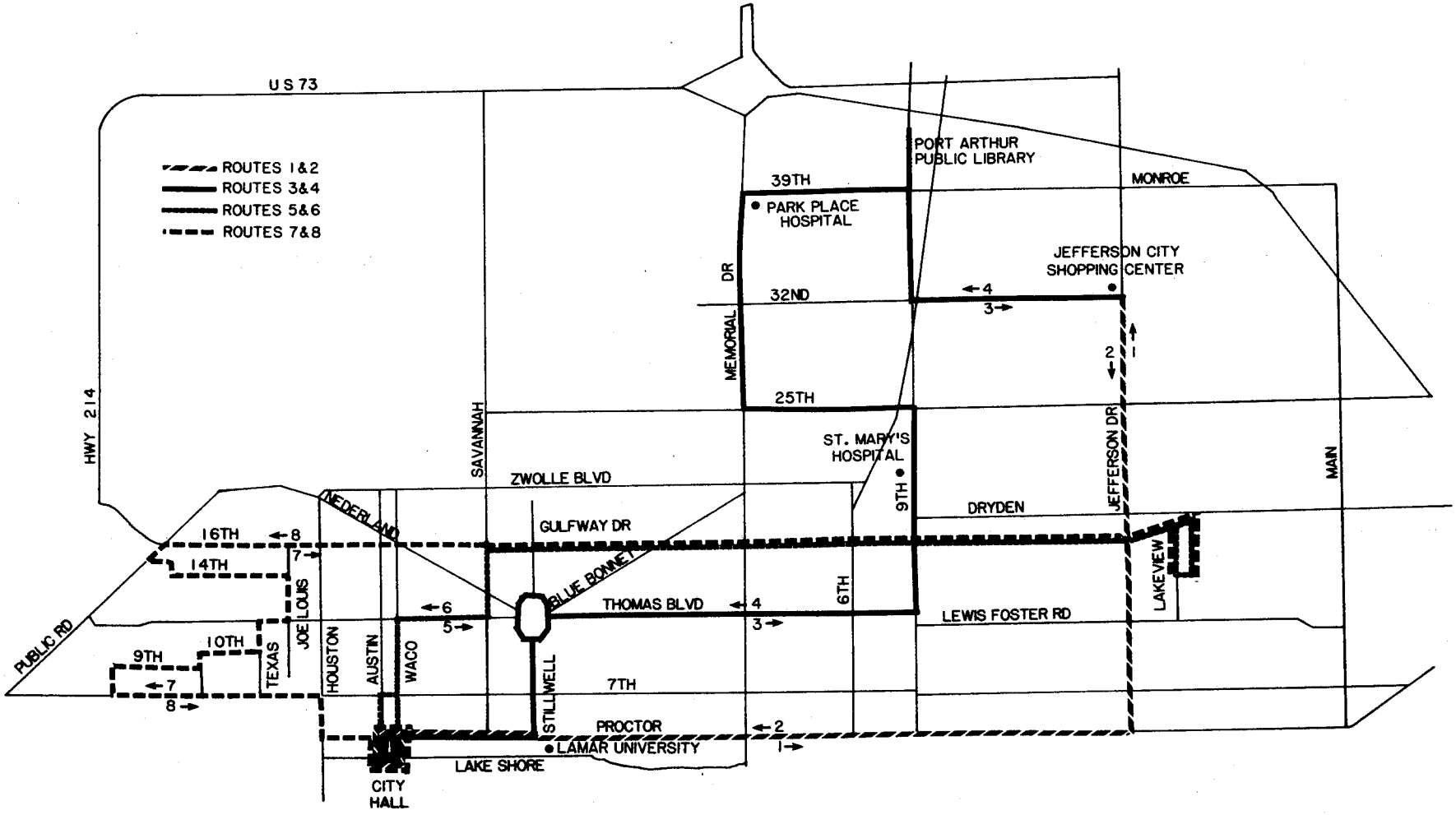


Figure 4: Port Arthur Transit Route Map

Handicapped . . . . . 20¢

Students (Age 5 to 18) . . . . . 20¢

Children Under 5 Years . . . . . FREE

Transfers . . . . . FREE

As indicated above, transfers from one bus to another are issued free of charge. Transfers are available from the driver when boarding the bus but are valid for one hour only. Transfers can be made whenever routes intersect. It is a PAT policy, however, that transfers cannot be used on the same route from which they were issued; nor shall passengers use transfers to travel back to the same vicinity from which they started.

The Port Arthur Transit System operates as a department of the City of Port Arthur and all transit system personnel, except the general manager, are employees of the City. At the end of fiscal year 1980-81 (September 30, 1981), transit system personnel included the following 18 emplyees.

1 General Manager

1 Secretary

1 Clerk/Typist/Dispatcher

1 Senior Equipment Mechanic

1 Equipment Service Worker (Full-Time)

1 Equipment Service Worker (Part-Time)

10 Drivers (Full-Time)

2 Drivers (Part-Time)

Ridership

By the end of fiscal year (FY) 1978-79, after 4 full months of operation, the Port Arthur Transit System had carried 86,238 passengers. Records show that ridership has grown steadily from an average of 634 passengers per day

during FY 1978-79 to 904 passengers per day in FY 1979-80, an increase of almost 43%. By the end of the 1980-81 fiscal year, average daily ridership had reached 944 passengers, which represents only a slight increase (4%) over the previous year but a substantial increase (49%) over the first fiscal year of operation.

Figure 5 presents Port Arthur Transit's ridership by month for the first 3 fiscal years of operation (June 1979 through September 1981). As Figure 5 indicates, monthly ridership has fluctuated from a low of 18,287 passengers in September 1979 to a high of 26,599 passengers in May 1980. Several of the months in which ridership was lower than usual were months when adverse weather conditions were experienced. One day of service was lost in July 1979 and another is September 1980 due to flooding and damage caused by tropical storms. In addition, the lower ridership levels in July, August and September 1980 were possibly the result of a fare increase which went into effect July 14, 1980.

A review of ridership levels by time of month revealed that ridership on all routes tends to be about 25% higher at the beginning of each month. Transit personnel feel that this is probably due to the passengers having just received paychecks, social security checks or welfare benefits and are, therefore, making more trips to shop and pay bills.

Riderships figures by individual route indicate that Routes 4, 7 and 8 are the most heavily utilized. Together, these 3 routes transport almost half of the ridership on all 8 routes combined (15).

Cost/Revenue Breakdown

Based on financial and operating data collected, a cost/revenue breakdown for the first 3 fiscal years of service was developed and is presented in Table 10. By the end of its third fiscal year,the Port Arthur Transit System

Figure 5: Port Arthur Transit System Ridership by Month of Service

Table 10: Cost/Revenue Statistics for the Port Arthur Transit System

Cost/Revenue Items	FY 78-79 (5/79-9/79)	FY 79-80 (10/79-9/80)	FY 80-81 (10/80-9/81)	TOTAL (5/79-9/81)
Costs	$178,305	$470,072	$534,935	$1,183,312
Revenue	$ 15,139	$ 67,587	$ 95,305	$ 178,031
Deficit	$163,166	$402,485	$439,630	$1,005,281
No. of Passengers[1]	85,238	277,604	289,034	652,876
No. of Vehicle-Miles	67,764	198,194	198,068	464,026
No. of Vehicle-Hours	4,840	14,328	14,322	33,490
Cost/Passenger	$ 2.07	$ 1.69	$ 1.85	$ 1.81
Cost/Vehicle-Mile	$ 2.63	$ 2.37	$ 2.70	$2.55
Cost/Vehicle-Hour	$36.84	$32.80	$27.35	$35.33
Revenue/Passenger	$ .18	$ .24	$ .33	$ .27
Revenue/Vehicle-Mile	$ .22	$ .34	$ .48	$ .38
Revenue/Vheicle-Hour	$ 3.13	$ 4.71	$ 6.65	$ 5.31
Deficit/Passenger	$ 1.89	$ 1.45	$ 1.52	$ 1.54
Deficit/Vehicle-Mile	$ 2.41	$ 2.03	$ 2.22	$ 2.17
Deficit/Vehicle-Hour	$33.71	$28.09	$30.70	$30.02

[1]Includes transfers, charters and courtesy passes.

had carried a total of 652,876 passengers while covering 464,026 vehicle-miles during 33,490 vehicle-hours of service. These figures indicate that service was being provided at an overall average of 1.4 passengers per vehicle-mile or 19.5 passengers per vehicle-hour. The cost of providing this service totaled $1,183,312.

On a year to year basis, the cost of providing service has shown an increase each year. The number of passengers transported and, thus, the revenue for service has also increased steadily while the number of vehicle-miles and vehicle-hours operated has remained fairly constant. The result is that the

average deficit per passenger has dropped from $1.89 during FY 78-79 to $1.45 in FY 79-80. The deficit per vehicle-mile also dropped from $2.41 in FY 78-79 to $2.03 in FY 79-80 as did the deficit per vehicle-hour, from $33.71 to $28.09. In FY 80-81, however, the 41% increase in revenue was not enough to offset the 14% increase in costs. Therefore, the operating deficit per passenger rose to $1.52, the deficit per vehicle-mile increased to $2.22 and the deficit per vehicle-hour reached $30.70 during FY 80-81. The federal government and the City of Port Arthur shared equally in the funding of PAT's operating deficits.

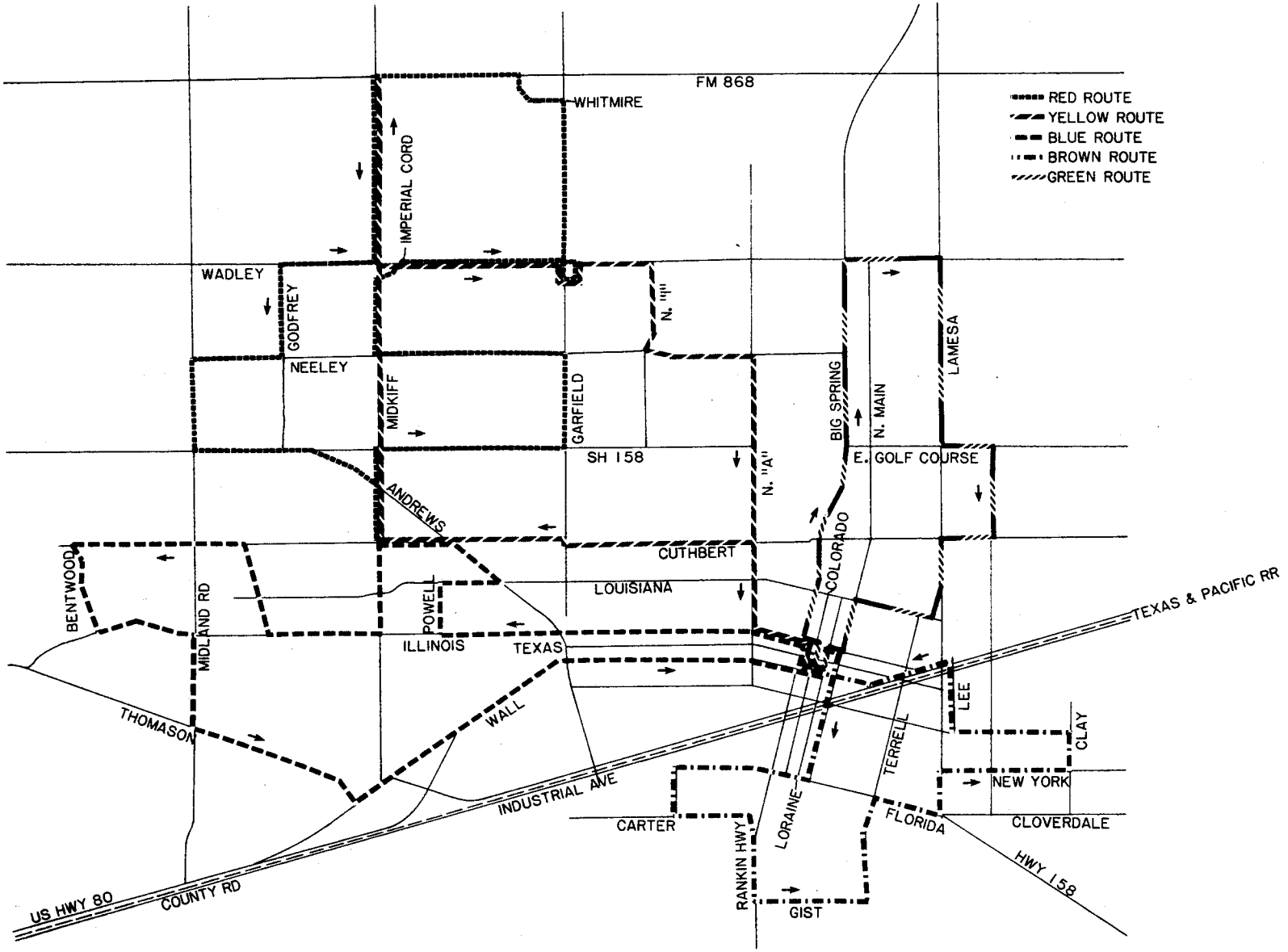
Characteristics of MIDTRAN

On September 1, 1979, an UMTA Section 5 grant in the amount of $184,800 was approved for the purchase of MIDTRAN's vehicles and other related start-up equipment. Seven small transit coaches were purchased under this grant which included four 20-passenger buses, two 12-passenger (and wheelchair lift equipped) buses, and one 24-passenger bus. The City of Midland donated maintenance space and office facilities to house the MIDTRAN vehicles and personnel. These facilities are located at the city's vehicle maintenance garage in east Midland. Maintenance of the MIDTRAN fleet is done separately from other city vehicles, however.

Originally, 5 fixed-routes were planned to provide service to virtually all parts of Midland. These routes, designated as the Red, Blue, Yellow, Green and Brown Routes, were put into service on January 5, 1980. Four buses operated along the 5 routes on 1-hour headways (Note: The Green and Brown Routes were combined and together they were served by 1 bus.) The fixed-routes were in operation Monday through Friday from 5:30 a.m. to 9:00 a.m. and then again from 4:00 p.m. to 6:00 p.m. The time period from 9:00 a.m. to 4:00 p.m. was used to provide demand-responsive service.

Due to the lack of ridership, MIDTRAN's fixed-route service lasted only 4 months. At that time, flex-routes were implemented to take the place of the fixed routes (Figure 6). Flex-route service differed from the fixed-route service in that under the flex system, buses could be requested to deviate from their routes in order to pick up or let off passengers. No significant increases in ridership were experienced as a result of switching to the flex system, however. In fact, because they were requested to deviate considerable distances from their routes, buses had difficulty in adhering to their schedules and this in turn led to passenger complaints. Therefore, the decision was made to close down the Red Route in April 1980. Two months later, the Blue and Yellow Routes were also terminated. The Green and Brown Routes, which serve east Midland, were the only flex-routes to remain in service. One bus currently operates along the Green and Brown Routes on 90-minute headways from 8:30 a.m. to 4:30 p.m. Upon request, the flex-route bus will deviate up to 2 blocks to pick up or let off passengers and then will return to that point along the route which it left.

The remainder of MIDTRAN's vehicles are used to provide demand-responsive service Monday through Friday from 8:30 a.m. to 4:00 p.m. The various demand-responsive, door-to-door services provided included subscription service with local businesses to transport employees to and from work; medical transportation service to take passengers to and from doctors' offices and various health care facilities; private school contract service to transport students to and from school; and social service agency transportation where MIDTRAN provides transportation for various social service agencies. Demand-responsive buses can travel to any location within the Midland city limits. Generally speaking, medical transportation demand-response service is provided on a "when needed" basis whereby passengers are usually able to get service the



Note: Only the Green and Brown Flex-Routes Are Currently Operational.

Figure 6: MIDTRAN Route Map

same day it is requested. All other demand-responsive services require passengers to call in a request for service by 3:30 p.m. the day before service is desired.

By the end of fiscal year 1981 (ending September 30, 1981) MIDTRAN had 7 buses and 7 vans in service. One bus was used on the flex-routes, 2 buses were used to provide general demand-responsive transportation, and 2 vans were used for medical transportation purposes. The remaining vehicles were used to provide transportation for various social service agencies and organizations, including the Mental Health Mental Retardation Center, the YMCA, the Department of Human Resources, Apache Flats and Casa de Amigos (a United Way organization).

Functioning as part of the City of Midland, MIDTRAN's staff is as follows.

1 Executive Director

1 Operations Supervisor

1 Secretary

1 Clerk/Typist

2 Mechanics

12 Drivers

(Note: MIDTRAN's fleet currently consists of 11 transit buses and 10 vans. The number of drivers has also increased from 12 to 19.)

The fares for MIDTRAN transit services are as follows.

Regular "Street" Fare (Board and Depart Bus Along Route)	$ .75
Regular Fare for 1-Way Door-to-Door Service (Flex-Route Deviation or Demand-Responsive)	$ 1.75
Senior Citizens and Handicapped "Street" Fare, with MIDTRAN ID	FREE
Senior Citizens and Handicapped Fare for 1-Way Door Door-to-Door Service, with MIDTRAN ID	$ .40

Senior Citizens and Handicapped Fare for 1-Way Door-to-Door Service, without MIDTRAN ID	$ .80
Monthly Subscription Door-to-Door Service (1-Way)	$15.50
Monthly Subscription Door-to-Door Service (2-Way)	$31.00
Transfers (Between Flex-Routes Only)	FREE

In addition to flex-route and demand-responsive service, MIDTRAN also provides charter service. Charter service is currently utilized 7 days a week for a variety of purposes including dinner parties, conventions, Girl and Boy Scout camps, real estate tours, and bowling leagues, to name a few. MIDTRAN charters can also go into Odessa and anywhere in Midland or Ector counties.

At one time, early in MIDTRAN's operation, transit service was provided to the Midland-Odessa Airport. This service was discontinued, however, due to complaints from local taxi operators who felt MIDTRAN represented unfair competition.

A Saturday flex-route and demand-responsive service was also implemented for a short period of time during the 1981-82 winter months. The Green and Brown flex-routes operated from 10:00 a.m. to 6:00 p.m. and demand-responsive service was available from 8:30 a.m. to 3:00 p.m. All Saturday service was discontinued, however, as Saturdays generated less than 30% of the average weekday ridership.

Ridership

During its first 8 months of service (February - September 1980), MIDTRAN carried almost 67,000 passengers. Ridership grew slowly from an average of 352 daily passengers in February to 393 daily trips in September, with the overall average for that fiscal year being 398 trips. During the next 12 months of service, average daily ridership continued to increase. By the end of FY 80-81, average daily ridership was up to 503 passengers, an increase of

26% over the previous year and a 43% increase over the first month's ridership. This increase during the second fiscal year is due in part to changes in the type of service offered and also because MIDTRAN had more vehicles in operation.

Figure 7 presents MIDTRAN's monthly ridership statistics for the first 2 fiscal years of service. While the total number of passenger-trips has fluctuated from one month to the next, there has nevertheless been a continual upward trend in ridership; the highest month being June 1980 with 12,338 passenger-trips.

Generally speaking, approximately 60 to 65% of MIDTRAN's passengers utilize the demand-responsive services. Charters account for an additional 3% and the remaining 32 to 37% are served by the 2 flex-routes.

No apparent fluctuations in ridership by day of the week or by time of the month have been recorded. Ridership has been noted to drop during adverse weather conditions, however. When extremely hot or cold temperatures occur, or when ice and snow cover the streets, many passengers will postpone their medical, shopping or recreational trips until the weather conditions improve.

Cost/Revenue Breakdown

Table 11 presents a cost/revenue breakdown for the MIDTRAN operation covering that period of time from February 1980 through September 1981. By the end of the first fiscal year (after 8 months of service), MIDTRAN records show that the system had carried 66,925 passengers while operating a total of 189,882 vehicle-miles and 13,077 vehicle-hours. This averages out to .35 passengers per vehicle-mile and 5.1 passengers per vehicle-hour of service. These low passenger per vehicle-mile and vehicle-hour figures are due to the door-to-door nature of the majority of services provided. MIDTRAN provided this service at a cost of $3.59 per passenger. The cost per vehicle-mile of

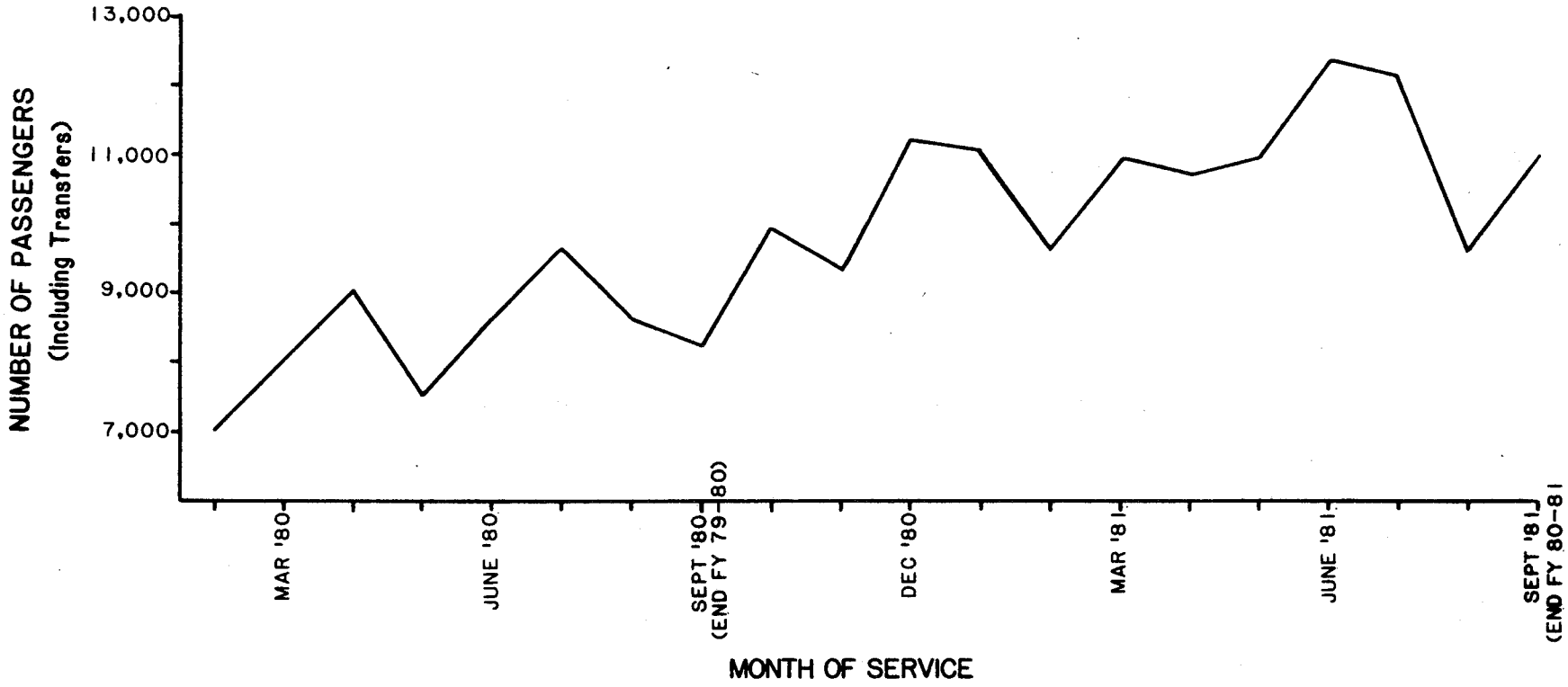


Figure 7: MIDTRAN Ridership by Month of Service

Table 11: Cost/Revenue Statistics for MIDTRAN

Cost/Revenue Items	FY 79-80 (2/80-9/80)	FY 80-81 (10/80-9/81)	TOTAL (2/80-9/81)
Costs	$240,570	$452,570	$693,140
Revenue	$ 39,335	$117,695	$157,030
Deficit	$201,235	$334,875	$536,110
No. of Passengers[1]	66,925	128,296	195,221
No. of Vehicle-Miles	189,822	270,372	460,194
No. of Vehicle-Hours	13,077	19,789	32,866
Cost/Passenger	$ 3.59	$ 3.53	$ 3.55
Cost/Vehicle-Mile	$ 1.27	$ 1.67	$ 1.51
Cost/Vehicle-Hour	$18.40	$22.87	$21.09
Revenue/Passenger	$ .59	$ .92	$ .80
Revenue/Vehicle-Mile	$ .21	$ .44	$ .34
Revenue/Vehicle-Mile	$ 3.01	$ 5.95	$ 4.78
Deficit/passenger	$ 3.00	$ 2.61	$ 2.75
Deficit/Vehicle-Mile	$ 1.06	$ 1.23	$ 1.17
Deficit/Vehicle-Hour	$15.39	$16.92	$16.31

[1]Includes Transfers

service during FY 79-80 average $1.27 and cost per vehicle-hour came to $18.40 The amount of revenue collected covered approximately 16% of the costs leaving a deficit of $3.00 per passenger, $1.06 per vehicle-mile or $15.39 per vehicle-hours.

In FY 80-81, the cost per passenger fell slightly while the revenue per passenger rose. The final result was a decline in the deficit per passenger from $3.00 in FY 79-80 to $2.61 in FY 80-81. The cost per vehicle-mile and cost per vehicle-hour rose 31% and 24% respectively during FY 80-81. The revenue per vehicle-mile and vehicle-hour also increased, but this increase was

not sufficient to cover the increase in costs. Thus, the deficit per vehicle-mile increased from $1.06 in FY 79-80 to $1.23 in FY 80-81 (a 16% increase). The deficit per vehicle-hour increased from $15.39 in FY 79-80 to $16.31 in FY 80-81 (a 6 % increase). The federal government funds 50% of MIDTRAN's operating deficit while the City of Midland picks up the other 50%.

Summary

Table 12 presents a summary of the characteristics of the KERRTRAN, MIDTRAN and Port Arthur Transit System operations. Total monthly ridership for the 3 transit systems are summarized in Figure 8 and cost/revenue breakdowns are presented in Table 13.

Table 12: Summary of Transit System Characteristics as of September 31, 1981

Transit System Characteristic	KERRTRAN	Port Arthur Transit	MIDTRAN
Initial Start-Up Capital Grant	Section 3 $300,783	Section 5 $725,910	Section 5 $184,800
Number of Vehicles Operating	3 20-pass. buses 1 leased van	5 25-pass. buses 2 leased vans	4 20-pass. buses 2 12-pass. buses 1 24-pass. bus 7 vans
Type of Service Offered	3 Fixed-Routes & Charter	8 Fixed-Routes & Charter	2 Flex-Routes, Demand-Response & Charter
Normal Hours of Service	6:45 a.m. - 6:45 p.m. M-F and 9:00 a.m. - 7:00 p.m. Saturday	6:15 a.m. - 6:15 p.m. M-F and 8:15 - 6:15 p.m. Saturday	Flex: 8:30 a.m. - 4:30 p.m. M-F; D-R: 8:30 a.m. - 4:00 p.m. M-F
Fare Structure	Normal - 60¢ Shop. Special - 50¢ Commuter - 45¢ Sen. Citizen - 30¢ Students - 30¢ 5 and Under - FREE Transfers - FREE	Adult - 40¢ Sen. Citizen - 20¢ Handicapped - 20¢ Students - 20¢ 5 and Under - FREE Transfers - FREE	Regular - 75¢ Door-to-Door - $1.75 E&H Regular w/ID - FREE E&H Door-to-Door w/ID - 40¢ E&H Door-to-Door w/o ID - 80¢ Monthly Door-to-Door (1-Way) - $15.50 Monthly Door-to-Door (2-Way) - $31.00 Transfers - FREE
Number of Employees	10	18	18

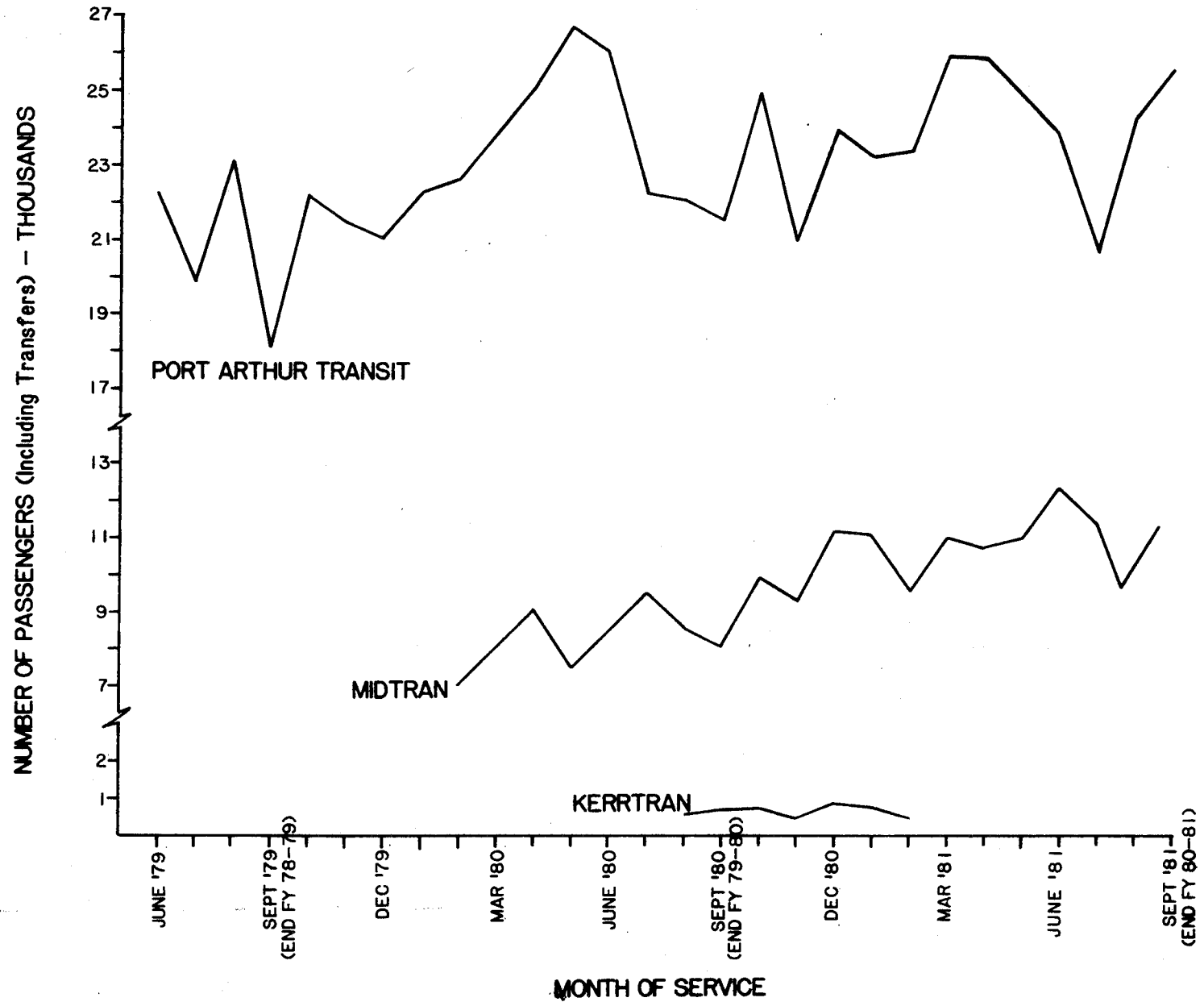


Figure 8: Summary of Ridership Statistics for KERRTRAN, MIDTRAN and Port Arthur Transit System

Table 13: Summary of Cost/Revenue and Related Items for KERRTRAN, MIDTRAN and the Port Arthur Transit System as of 9/31/81

Cost/Revenue Item	KERRTRAN (8/80-1/81)	Port Arthur Transit (5/79-9/81)	MIDTRAN (2/80-9/81)
Costs	$75,166[1]	$1,183,312	$693,140
Revenue	$ 3,166	$ 178,031	$157,030
Deficit	$72,000[1]	$1,005,281	$536,110
No. of Passenger-Trips[2]	10,247	652,876	195,221
No. of Vehicle-Miles	57,757	464,026	460,194
No. of Vehicle-Hours	NA	33,490	32,866
Passengers/Vehicle-Mile	0.18	1.41	.42
Passengers/Vehicle-Hour	NA	19.49	5.94
Cost/Passenger	$7.34	$ 1.81	$ 3.55
Cost/Vehicle-Mile	$1.30	$ 2.55	$ 1.51
Cost/Vehicle-Hour	NA	$35.33	$21.09
Revenue/Passenger	$ .31	$ .27	$ .80
Revenue/Vehicle-Mile	$ .05	$ .38	$ .34
Revenue/Vehicle-Hour	NA	$ 5.31	$ 4.78
Deficit/Passenger	$7.03	$ 1.54	$ 2.75
Deficit/Vehicle-Mile	$1.25	$ 2.17	$ 1.17
Deficit/Vehicle-Hour	NA	$30.02	$16.31

[1] Estimate
[2] Includes Revenue Passengers, Transfers and Free Passes

Note: NA = Not Available

TRANSIT USER CHARACTERISTICS AND MOBILITY NEEDS

One of the most important reasons for implementing the new transit systems in Kerrville, Port Arthur and Midland was to provide increased mobility to those persons in the communities who do not have regular access to private means of transportation. In order to better understand the mobility needs of the communities at large, two separate surveys were performed. A transit user survey was conducted on board transit vehicles in Port Arthur and Midland (KERRTRAN was no longer in service at the time of this survey) and a household survey of the Kerrville, Port Arthur and Midland residents was also conducted. The purpose of this chapter is to document the results of the MIDTRAN and Port Arthur Transit onboard user surveys. Information in this chapter includes not only socioeconomic characteristics of the transit users surveyed, but also travel characteristics and mobility needs. The results of the household survey are presented in a subsequent chapter.

Port Arthur Transit User Survey

In an effort to learn more about the characteristics and trip-making patterns of the Port Arthur Transit System users, on-board surveys were conducted on Thursday, January 7, 1982 and on the following Saturday, January 9, 1982. The weekday survey began with the 7:15 a.m. outbound trips from the City Hall transfer station and continued until 12:15 p.m. In this way, a sample of both the morning peak and mid-day service was obtained. The Saturday survey was conducted between the hours of 9:15 a.m. and 2:15 p.m. to sample typical morning peak and mid-day service on Saturdays. All 4 buses on all 8 routes were included in both surveys and, for each bus surveyed, a 100% sample was taken. A detailed description of the survey procedures and a copy of the survey instrument used are included in Appendix A.

MIDTRAN User Survey

MIDTRAN user characteristics and trip-making patterns were also identified through a survey conducted on board selected MIDTRAN vehicles. On Thursday, February 11, 1982, on-board surveys were performed on MIDTRAN's Green and Brown Flex-Routes. In addition, 3 demand-response vehicle operations were also surveyed. These included 1 bus which was used for medical transportation purposes and 2 other general demand-response buses. Surveys of the 2 demand-response buses began at 5:30 a.m. and continued until 8:30 a.m. Passengers on the medical transportation bus were surveyed between the hours of 8:30 a.m. and 12:30 p.m., while the Green and Brown Flex-Routes were surveyed from 8:30 a.m. to 10:30 a.m. and then again from 12:30 p.m. to 3:30 p.m. These hours and types of services surveyed were selected to provide a well rounded representative sample of the different types of service provided by MIDTRAN. A 100% sample of riders on each transit vehicle was taken. No Saturday Survey was conducted in Midland as MIDTRAN's Saturday service had been discontinued by the time these surveys were conducted. The survey procedures, along with copies of the flex-route and demand-response questionnaires used in the survey, are presented in Appendix A.

Transit User Survey Response

A total of 312 survey questionnaires were completed during the weekday Port Arthur Transit on-board survey and an additional 228 surveys were completed during the Saturday survey. In Midland, 90 surveys were completed during the weekday survey. The total number of returned questionnaires represents about 30% of the weekday and Saturday ridership (excluding transfers) in Port Arthur and about 20% of the average weekday revenue-paying ridership in Midland.

As with any survey of this nature, many of the questionnaires were found to be incomplete, in that not every question was answered. Thus, the sample size for specific areas of information varies from item to item. For analysis purposes, data from the surveys were grouped into 3 categories: the Port Arthur Transit weekday survey, the Port Arthur Transit Saturday survey and the MIDTRAN weekday survey. (Note: MIDTRAN flex-route and demand-response survey data were grouped together as all but 4 flex-route passengers surveyed had requested route deviations. Therefore, the flex-route service provided that day, like the demand-response service, was of a door-to-door nature).

Personal Characteristics

To obtain a profile of MIDTRAN and Port Arthur Transit users, questions were asked concerning age, sex, education, occupation, income and household size. This information is summarized below.

Age

In terms of age, the weekday Port Arthur Transit users tend to be slightly older than the Saturday users (Figure 9). MIDTRAN weekday users, on the other hand, were found to be much older than either the Port Arthur Transit weekday or Saturday users. This is likely due to the Port Arthur Transit System being utilized by children for trips to school during the week and for trips to shopping and recreational facilities on Saturdays, while MIDTRAN transports very few school children. The median age of the Port Arthur Transit weekday and Saturday users is approximately 32 and 29 years respectively. The median age for the MIDTRAN weekday users is 46 years.

Sex

Table 14 summarizes the distribution of transit riders by sex. The vast majority (71%) of the weekday transit users in Port Arthur are female. Female

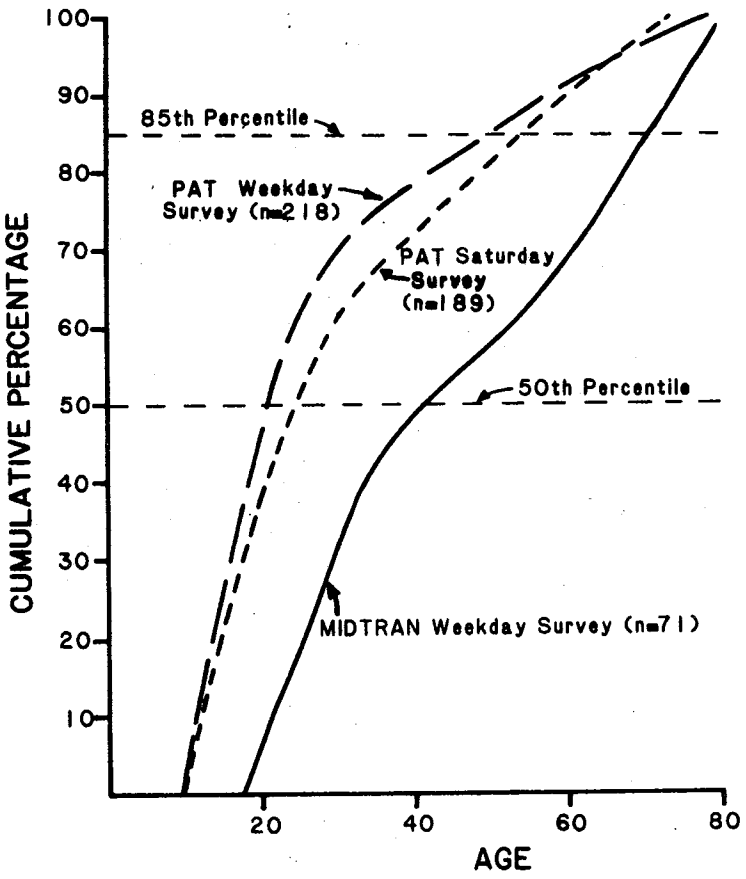


Figure 9: Cumulative Frequency Distribution, Age of MIDTRAN and Port Arthur Transit User

transit riders comprise an evan larger segment of the Port Arthur Saturday ridership (78.3%). In Midland, the percentage of female cransit users is higher yet (85.2%).

Table 14: Sex of MIDTRAN and Port Arthur Transit Users, Percentage

Sex	Port Arthur Transit Weekday (n=221)	Port Arthur Transit Saturday (n=189)	MIDTRAN Weekday (n=81)
Male	29.0%	21.7%	14.8%
Female	71.0%	78.3%	85.2%

Occupation

In both the MIDTRAN and Port Arthur surveys, riders were asked to list their present occupation in as specific terms as possible. They were also asked to specify if retired, unemployed, student or housewife. The responses to the question concerning occupation were grouped into 13 categories. The results of this grouping are presented in Table 16.

Table 16: Occupations of MIDTRAN and Port Arthur Transit Users, Percentage

Occupation	Port Arthur Transit Weekday Survey (n=190)	Port Arthur Transit Saturday Survey (n=162)	MIDTRAN Weekday Survey (n=71)
Unemployed	7.9%	11.7%	1.4%
Housewife	13.2%	15.4%	18.3%
Student	33.6%	39.5%	2.8%
Retired	8.9%	6.8%	5.7%
Private Household Worker	3.2%	3.7%	8.5%
Laborer	3.2%	6.8%	1.4%
Operative	3.2%	1.3%	5.6%
Service Worker	14.2%	9.9%	5.6%
Craftsman	2.6%	1.2%	5.6%
Clerical	4.2%	1.9%	28.2%
Sales	3.7%	1.2%	2.8%
Managerial	0.5%	------	8.5%
Professional	1.6%	0.6%	5.6%
Total	100.0%	100.0%	100.0%

Of the weekday transit users in Port Arthur, the highest percentages were in the student, service worker, and housewife categories, with 33.6%, 14.2% and 13.2% respectively. An even higher percentage of students (39.5%) and housewives (15.4%) were recorded during the Saturday survey in Port Arthur with unemployed persons, at 11.7%, ranking third.

Education

Data on the educational level of transit riders in Port Arthur and Midland are presented in Figure 10. Only minor differences were recorded between the education of the weekday and Saturday transit users in Port Arthur. Midland weekday transit riders, on the other hand, were found to have a higher level of education than those of Port Arthur. In Midland, approximately 40.5% of the riders have completed high school and an additional 45% have had at least some college. In Port Arthur, 35% of the weekday and Saturday users have completed high school and an additional 12.4% have attended college.

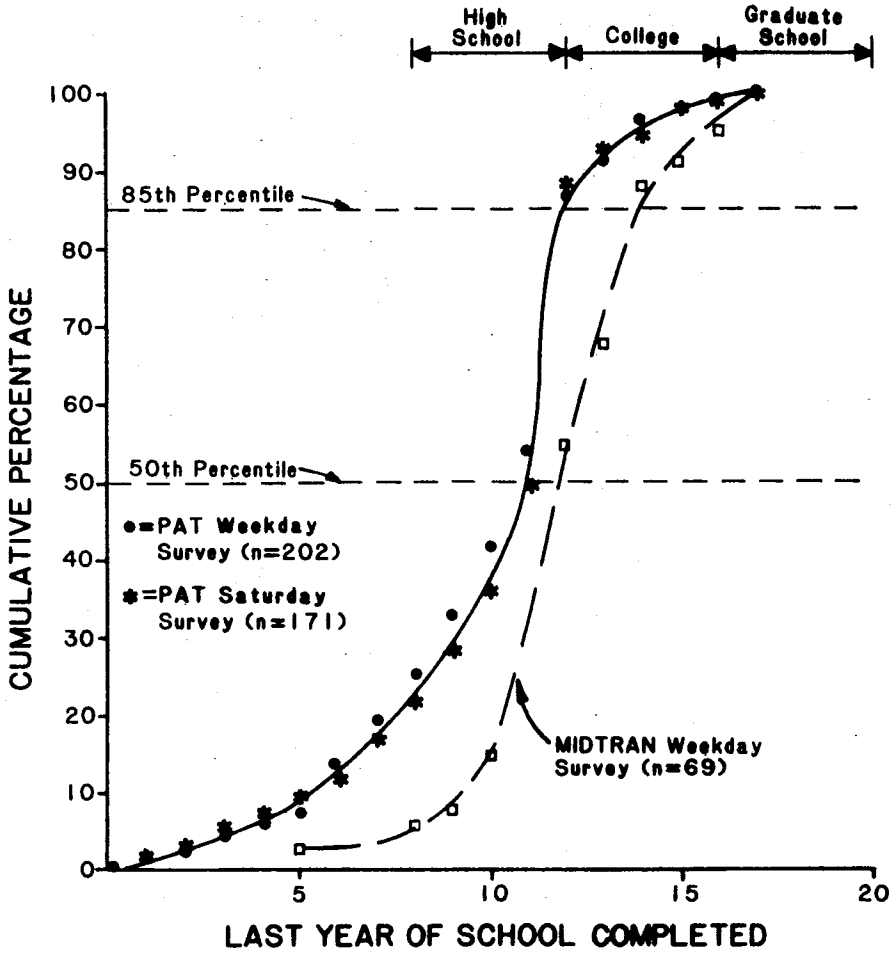


Figure 10: Cumulative Frequency Distribution, Education of MIDTRAN and Port Arthur Transit Users

Table 17: Household Size of MIDTRAN and Port Arthur Transit Users, Percentage

Number of Persons in Household	Port Arthur Transit Weekday Survey (n=211)	Port Arthur Transit Saturday Survey (n=182)	MIDTRAN Weekday Survey (n=77)
1	12.3%	8.8%	26.0%
2	17.1%	12.6%	35.0%
3	18.0%	17.0%	9.1%
4	18.0%	15.4%	20.8%
5	10.4%	17.0%	6.5%
6	9.4%	10.4%	2.6%
7+	14.8%	18.8%	-----
Average	4.0 persons	4.7 persons	2.5 persons

Among those individuals surveyed during the Port Arthur Transit weekday survey, 61.5% had household incomes below $10,000 per year (Table 18). The percentage of Saturday transit users in the same category was slightly lower (57.5%). In Midland, about 46.5% of the weekday riders had annual family incomes of less than $10,000. Approximately 22.5% had incomes of over $30,000, which indicates that a significant percentage of MIDTRAN users could be riding the bus by choice rather than out of necessity.

Table 18: Household Income Levels of MIDTRAN and Port Arthur Transit Users, Percentage

Annual Household Income	Port Arthur Transit Weekday Survey (n=143)	Port Arthur Transit Saturday Survey (n=146)	MIDTRAN Weekday Survey (n=71)
Less than $10,000	61.5%	57.5%	46.5%
$10,000 - $20,000	29.0%	19.9%	21.1%
$20,000 - $30,000	5.3%	15.8%	9.9%
More than $30,000	4.2%	6.8%	22.5%

In Midland, the distribution of riders by occupational classification was considerably different. Clerical workers, which comprised 28.2% of the total weekday users surveyed, ranked the highest, followed by housewives with 18.3% of the total. Unlike Port Arthur, Midland students made up a very small percentage of the total ridership, only about 2.8%.

Household Size

Studies show that household size is interrelated with income, auto ownership and auto availability. A specific family income may be considered adequate or inadequate depending on how many individuals that income must support. Similarly, the number of vehicles owned by a family may be considered adequate or inadequate depending on the number of family members who must use them.

Data on household size of the transit users is presented in Table 17. As this table indicates, the average family size of both the Port Arthur weekday and Saturday users is much larger than that of the MIDTRAN weekday users. Approximately 70% of the Port Arthur weekday users and 78.6% of the Saturday users had 3 or more persons in their households, while only 39% of MIDTRAN's weekday users had 3 or more persons in their households.

Household Income

The importance of a transit system to its users can be related to their household income. A family's income level may affect the travel options of its members by determining whether or not the family can afford to purchase and operate an automobile. If they cannot afford an auto, then family members must rely on public transportation to take them to and from important community destinations (such as school, work, shopping or medical facilities).

Travel Characteristics

To better understand travel patterns and service usage of the transit riders, a series of questions were asked concerning how they arrived at the bus stop, the length time required to travel to the bus stop and for what purpose was the trip by transit being made. Riders were also asked how long they have been utilizing the service, how often they use the service and what might encourage them to use the service more often. Their responses to these and other related questions are discussed below.

Access to Transit

In Port Arthur, the vast majority of the weekday users (96.5% of 310 riders surveyed) walked to the bus stop where they caught the bus. Less than 1% drove or used a taxi to get to the stop and only 1.6% (5 individuals) rode as a passenger in a car to the stop. Of those who walked to a bus stop, 81.2% were able to travel to the stop in 5 minutes or less, 13.8% in 6 to 10 minutes and 5% had to walk for more than 10 minutes to reach their stop.

The majority of the Saturday transit userss in Port Arthur (94.2% of 226 riders surveyed) also walked to their stop. Approximately 3.1% drove to the stop, 1.8% took a taxi and 0.9% (2 individuals) rode as a passenger in a car. Of the Saturday transit riders who had walked to the bus stop, 75.5% reached the stop in 5 minutes or less, 12.9% took 6 to 10 minutes, and 11.6% walked for more than 10 minutes to reach the stop.

In Midland, all of the demand-response passengers were picked up at their doors. Of the 17 flex-route passengers,76.4% had requested route deviations so they, too, were picked up at their doors. Only 11.8% (2 individuals) walked to a bus stop along the route and an additional 11.8% (2 individuals) rode as a passenger in a car to a stop. Of the 2 persons who walked, 1 took 1 minute and the other took 10 minutes to reach the stop.

Trip Purpose

Studies have shown that the purpose for which a trip by transit is being made can provide some indication of how important transit service is to its users. Trip purpose data can also provide insight as to what aspects of its users' lives are dependent on the service being available. Table 19 presents trip purpose data from the MIDTRAN and Port Arthur Transit surveys.

Table 19: Trip Purpose of MIDTRAN and Port Arthur Transit Users, Percentage

Trip Purpose	Port Arthur Transit Weekday Survey (n=282)	Port Arthur Transit Saturday Survey (n=188)	MIDTRAN Weekday Survey (n=87)
Home	20.9%	29.3%	9.2%
Work	26.6%	8.0%	70.1%
School	29.8%	3.2%	5.7%
Shopping	11.0%	44.1%	-----
Medical/Dental Facility	4.3%	0.5%	5.7%
Social/Rec. Facility	1.0%	4.3%	8.0%
Bank/Personal Business	2.5%	1.6%	-----
Other	3.9%	9.0%	1.1%

In Port Arthur, school trips, at 29.8% of the total, accounted for the largest percentage of weekday trips, followed by work trips (26.6%) and trips home (20.9%). Of the 20.9% (59 individuals) who were traveling home, 28.8% were returning from work, 22% from school, 22% from shopping, 11.9% from bank or other personal business, 5.1% from medical or dental facilities and 10.2% from other locations.

The Port Arthur Saturday survey revealed that the majority of transit riders surveyed (44.1%) were traveling to a shopping facility. The next highest

percentage (29.3%) were traveling home. Of the 29.3% (55 individuals) who were traveling home, 40% had come from a shopping facility, 25.5% from work, 20% from school, 1.8% from a social/recreational facility and the remaining 12.7% had come from other locations.

In Midland, 70.1% of the weekday riders were using the MIDTRAN service to travel to work. An additional 9.2% were going home and 8% were traveling to a social/recreational facility. The remaining 12.7% were traveling to school, medical/dental facilities or other destinations. Of those 8 individuals who were traveling home, 5 were returning from work, 1 from school and 2 from medical/dental facilities.

The results of the trip purpose survey data indicate that those persons surveyed used the Port Arthur Transit System primarily for traveling to and from school or work during the week and to and from shopping facilities on Saturdays. MIDTRAN was used primarily for weekday work trips.

Length of Time Using Transit Service

Transit riders in both Port Arthur and Midland were asked how long they have used the transit service. Their responses are presented in Figure 11 At the time of the survey, the Port Arthur Transit System had been in operation approximately 31 months and MIDTRAN had been providing service for 24 months. Approximately 26% of the Port Arthur Transit weekday users and 21% of the Saturday riders indicated that they have used the system since it began operation. About 21% of MIDTRAN's riders have also used that service since it began operation. Overall, the length of transit usage for the Port Arthur Transit weekday riders averaged 15.4 months, while the Saturday riders averaged 13.2 months and MIDTRAN weekday riders averaged 12.2 months.

Frequency of Transit Usage

Transit users were also asked how often they used the transit service.

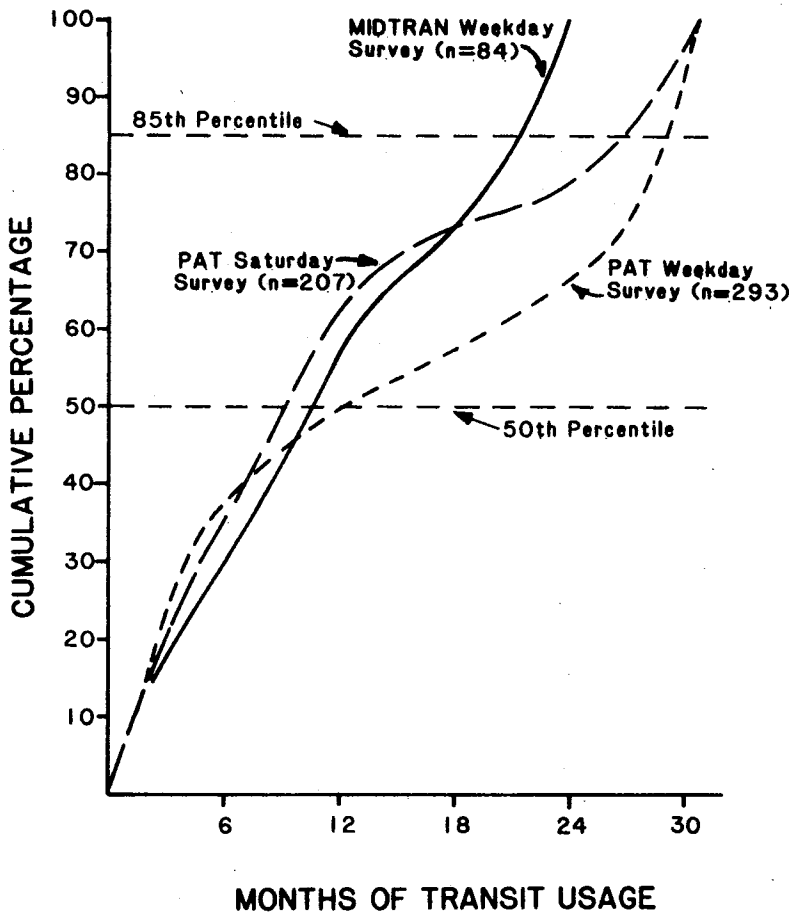


Figure 11: Cumulative Frequency Distribution, Length of Use of Transit Service

Responses to this question are presented in Table 20. The large majority of weekday users surveyed in both Port Arthur and Midland ride the bus almost every day, which coincides with the large majority of weekday users who listed their trip purpose as traveling to work or school. It also appears that a large number of Port Arthur's weekday users use the service on Saturdays as well.

Table 20: Frequency of Transit Usage, Percentage

Frequency of Use	Port Arthur Transit Weekday Survey (n=292)	Port Arthur Transit Saturday Survey (n=220)	MIDTRAN Weekday Survey (n=89)
Almost Every Day	75.0%	47.3%	88.7%
About Once a Week	12.0%	29.5%	10.1%
Once or Twice a onth	6.2%	12.3%	1.2%
Seldom	6.8%	10.9%	-----

In addition to frequency of use, passengers were also asked which of several possible improvements would encourage them the use the service more often. Their answers are summarized in Table 21.

The one improvement the majority of weekday and Saturday users would like to see is later evening service , while transit riders in Midland would like to see more frequent weekday and Saturday service.

Transit Dependency

Vehicle Ownership - For most families, an automobile (van or truck) serves most, if not all of their transportation needs. If a family does not own some type of vehicle, then its members must rely on friends, relatives, taxis or public transit to meet their transportation needs. The number of vehicles owned by a family can give a reasonably good indication of the family's

Table 21: Incentives to Use Transit Service More Often, Percentage

Incentives to Use Service More Often	Port Arthur Transit Weekday Survey (n=277)	Port Arthur Transit Saturday Survey (n=213)	MIDTRAN Weekday Survey (n=63)
Later Evening Service	30.3%	24.9%	11.1%
More Frequent Weekday Service	22.4%	18.8%	27.0%
More Frequent Saturday Service	6.1%	15.5%	28.6%
Offer Service on Sundays	11.6%	19.3%	4.7%
More Bus Routes	26.4%	15.9%	12.7%
Other	3.2%	5.6%	15.9%

Note: Saturday Service in Midland had been discontinued just prior to the on-board weekday survey due to a lack of ridership.

dependence on transit for trips to work, school, shopping or other important activities, In Port Arthur, 44.4% of the weekday transit users and 38.7% of the Saturday users surveyed reported that no vehicles were owned by their households. In Midland, 26% of those surveyed did not have a family car.

Vehicle Availability - While the number of vehicles owned provides a good indication of the transit dependency of those who do not own vehicles, it does not provide any indication of whether or not an individual whose household does own a vehicle has that vehicle available to make a particular trip. Therefore, in addition to asking how many vehicles their households have, users were also asked if one of those vehicles was available to make that particular transit trip. Approximately 74.5% of the Port Arthur Transit weekday users and 56.9% of the Saturday users reported than no car was available. About 54.2% of MIDTRAN's users indicated that they did not have use of a vehicle for that particular trip.

Possession of a Valid Drivers License - A third important factor in determining transit dependency is whether or not a person has a drivers license.

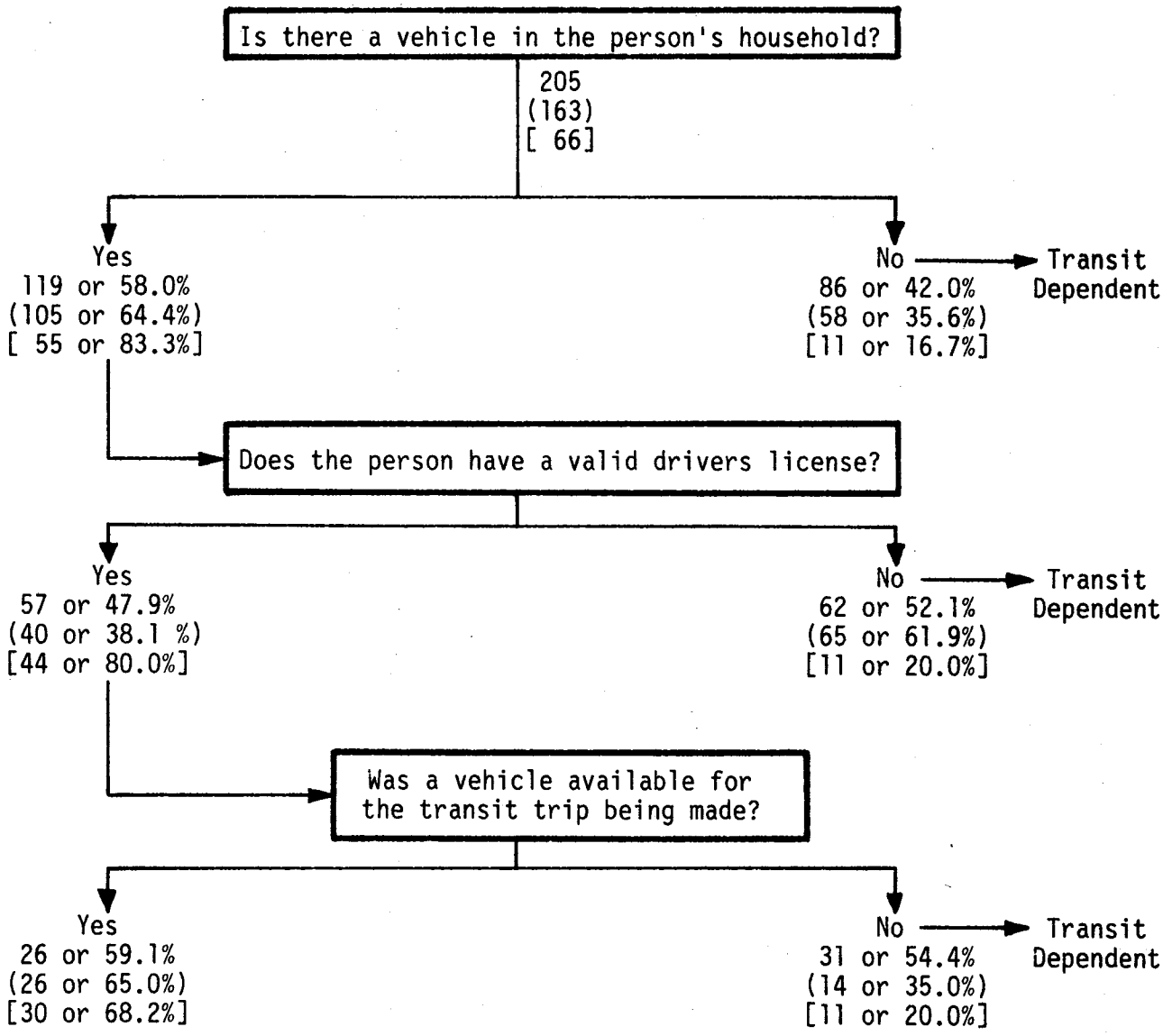
Without a valid drivers license, an individual is technically not eligible to drive even though a vehicle may be available for use. More then 58% of the weekday transit users and 67% of the Saturday users in Port Arthur did not have a valid drivers license, while only about 38% of MIDTRAN's riders had no license.

Considered separately, vehicle ownership, vehicle availability and possession of a drivers license can each give some indication of transit dependency. However, when these 3 factors are combined, a much more accurate picture is obtained (Figure 12). A respondent can then be considered transit dependent if any one of the following applies: a) the person's family does not own a vehicle, b) the person does not have a valid drivers license, or c) no vehicle was available for the trip. Using this criteria, 87.3% of the Port Arthur Transit weekday riders, 84% of the Saturday riders and 50% of the MIDTRAN weekday riders surveyed could be considered transit dependent (Figure 12). The relationship between the number of vehicles in the household, possession of a drivers license and vehicle availability for the transit users surveyed is further identified in Tables 22, 23, and 24.

Importance of Transit Service to Its Users

Mode of Travel if No Transit Service Was Available - The data presented in the previous paragraphs indicated that a substantial proportion of the transit riders surveyed did not have access to private means of transportation for one reason or another. The availability of transit was, therefore, very important to these individuals in that it has offered them increased mobility. Just how important this service is to its users is reflected by how these riders would have had to make their trips if the service had not been avail-

Table 25 presents the various ways the users would have made their trips if there had been no bus service.



Legend: 00 = PAT Weekday Survey
(00) = PAT Saturday Survey
[00] = MIDTRAN Weekday Survey

Note: The development of this figure was based on survey responses from those individuals who answered all 3 questions relating to vehicle ownership, vehicle availability and possession of drivers license.

Figure 12: Transit Dependency of MIDTRAN and Port Arthur Transit Riders

Table 22: Transit Dependency Characteristics for Port Arthur Weekday Transit Riders

Number of Vehicles in Household	Have a Valid Drivers License				Do Not Have a Valid Drivers License				Total	
	Vehicle Available		No Vehicle Available		Vehicle Available		No Vehicle Available			
	Number	%	Number	%	Number	%	Number	%	Number	%
0	4	13.4	30	49.2	5	26.3	47	49.5	86	42.0
1	10	33.3	21	34.4	7	36.8	30	31.6	68	33.2
2	6	20.0	6	9.8	3	15.8	15	15.8	30	14.6
3+	10	33.3	4	6.6	4	21.1	3	3.1	21	10.2
Total	30	100.0	61	100.0	19	100.0	95	100.0	205	100.0

Note: The development of this table was based on survey responses from those riders who answered all 3 questions relating to vehicle ownership, vehicle availability and possession of drivers license.

Table 23: Transit Dependency Characteristics for Port Arthur Saturday Transit Riders

Number of Vehicles in Household	Have a Valid Drivers License				Do Not Have Valid Drivers License				Total	
	Vehicle Available		No Vehicle Available		Vehicle Available		No Vehcile Available			
	Number	%	Number	%	Number	%	Number	%	Number	%
0	6	18.8	9	39.1	10	28.6	33	45.2	58	35.6
1	11	34.4	8	34.8	10	28.6	22	30.2	51	31.3
2	4	12.5	2	8.7	9	25.7	9	12.3	24	14.7
3+	11	34.3	4	17.4	6	17.1	9	12.3	30	18.4
Total	32	100.0	23	100.0	35	100.0	73	100.0	163	100.0

Note: The development of this table was based on survey respones from those riders who answered all 3 questions relating to vehicle ownership, vehicle availability and possession of drivers license.

Table 24: Transit Dependency Characteristics for MIDTRAN Weekday Riders

Number of Vehicles in Household	Have a Valid Drivers License				Do Not Have a Valid Drivers License				Total	
	Vehicle Available		No Vehicle Available		Vehicle Available		No Vehicle Available			
	Number	%	Number	%	Number	%	Number	%	Number	%
0	0	0.0	2	12.5	0	0.0	9	47.4	11	16.7
1	16	53.3	13	81.3	1	100.0	5	26.3	35	53.0
2	9	30.0	1	6.2	0	0.0	4	21.1	14	21.2
3+	5	16.7	0	0.0	0	0.0	1	5.2	6	9.1
Total	30	100.0	16	100.0	1	100.0	19	100.0	66	100.0

Note: The development of this table was based on survey-responses from those riders who answered all 3 questions relating to vehicle ownership, vehicle availability and possession of drivers license.

Table 25: Mode of Travel for Transit Users Had Transit Service Not Been Available
Percentage

Mode of Travel if No Transit Service Available	Port Arthur Transit Weekday Survey (n=239)	Port Arthur Transit Saturday Survey (n=200)	MIDTRAN Weekday Survey (n=84)
Drive Myself	10.1%	10.5%	26.2%
Someone Else Would Drive Me	36.8%	39.0%	33.3%
Take a Taxi	22.6%	23.0%	17.9%
Walk	15.5%	11.5%	4.7%
Could Not Make This Trip	12.1%	11.5%	13.1%
Other	2.9%	4.5%	4.8%

Only about 10% of both the weekday and Saturday Port Arthur Transit riders would have been able to drive themselves to their destinations. The remaining 77%-78% would have been forced to rely on someone else to drive them, take a taxi, walk or find another mode. Approximately 11.5% of the Saturday riders and 12.1% of the weekday riders could not have made the trip at all. In Midland, although a higher percentage of riders (26.2%) would have been able to drive themselves, there was nevertheless a significant percentage (13.1%) that would not have been able to make the trip at all of not for the availability of transit service.

Expanded Employment Opportunities - One of the most significant benefits of transit service to its users is the wider choice of employment opportunities available as a result of the increased mobility afforded by transit. When asked if the bus service has allowed them to work at a location to which they previously had no transportation, more than half of all the users surveyed answered "yes" (Table 26).

Table 26: Increased Employment Opportunities as a Result of Transit Service Availability, Percentage

Has Bus Service Made More Work Locations Available?	Port Arthur Transit Weekday Survey (n=232)	Port Arthur Transit Saturday Survey (n=180)	MIDTRAN Weekday Survey (n=74)
Yes	62.9%	56.1%	51.4%
No	37.1%	43.9%	48.6%

Increased Shopping Opportunities

In addition to providing access to more job opportunities, transit service has also provided its riders with access to more shopping facilities as indicated in Table 27.

Table 27: Increased Shopping Opportunities as a Result of Transit Service Availability, Percentage

Has Bus Service Made More Shopping Locations Available?	Port Arthur Transit Weekday Survey (n=249)	Port Arthur Transit Saturday Survey (n=193)	MIDTRAN Weekday Survey (n=69)
Yes	78.7%	77.2%	42.0%
No	21.3%	22.8%	58.0%

When asked if the availability of transit service has resulted in them spending more dollars shopping 35% of Port Arthur Transit's weekday users, 28.7% of the Saturday users and 17.6% of the MIDTRAN weekday users surveyed responded "yes" (Table 28).

General User Attitude Toward Transit Service

Each person who completed a survey questionnaire was given the opportunity to evaluate the transit service being provided. When asked how they would rate their satisfaction with the bus service overall, 80.4% of the Port Arthur Transit weekday users, 84.7% of the Saturday riders and 90.3% of the

Table 28: More Spending As a Result of Transit Service Availability, Percentage

Has Transit Service Resulted in You Spending More Dollars Shopping?	Port Arthur Transit Weekday Survey (n=246)	Port Arthur Transit Saturday Survey (n=188)	MIDTRAN Weekday Survey (n=74)
Yes	35.0%	28.7%	17.6%
No	39.8%	41.0%	67.6%
Not Sure	25.2%	30.3%	14.8%

MIDTRAN weekday users indicated that they were satisfied with the existing transit service. Only a very small percentage of the riders rated the service as being unsatisfactory (Table 29).

Table 29: MIDTRAN and Port Arthur Transit User Attitude Toward Transit Service, Percentage

Satisfaction With Bus Service Overall	Port Arthur Transit Weekday Survey (n=225)	Port Arthur Transit Saturday Survey (n=196)	MIDTRAN Weekday Survey (n=82)
Satisfactory	80.4%	84.7%	90.3%
Neutral	18.7%	11.7%	7.3%
Unsatisfactory	0.9%	3.6%	2.4%

Summary

The results of the on-board transit user surveys conducted in Port Arthur and Midland have demonstrated that these 2 transit systems provide mobility to those individuals who do not have access to a private vehicle on a regular basis. Defining a transit dependent rider as one who does not possess a valid drivers license or one who does not own or have access to a private vehicle, it was determined that 87.3% of the Port Arthur Transit weekday riders, 84% of the Saturday riders and 50% of the MIDTRAN weekday riders surveyed would

be considered transit dependent. The importance of bus service to these individuals is demonstrated by the 12.1% of the Port Arthur weekday riders, the 11.5% of the Saturday riders and the 13.1% of the MIDTRAN weekday riders who would not have been able to make the trip if not for the availability of transit service. An additional 77.8% of the Port Arthur Transit weekday users, 78% of the Saturday users and 60.7% of the MIDTRAN weekday riders would have had to rely on less convenient or more expensive means (more expensive to the user).

The majority of trips being made on both systems are by females who are utilizing the service on a regular basis to travel to work, school or shopping facilities. Many of these individuals are now able to work and shop at locations to which they previously had no transportation. These riders also indicated they are spending more money shopping as a result of having the transit service available.

EFFECT OF NEW TRANSIT SYSTEMS IN TEXAS ON ENERGY USE, TRAFFIC FLOW AND PARKING DEMAND

Because the implementation of a new public transit system involves transporting more persons in fewer vehicles (as compared to individuals driving alone in private vehicles), a decrease in traffic along the corridors served by the transit system is often thought to result. In addition, other potential benefits including an energy savings and a reduction in the demand for parking at major activity centers along the bus routes, should also occur. The extent to which these community benefits have actually been realized by the implementation of new transit systems in Kerrville, Port Arthur and Midland is discussed below.

Effect on Energy Use

Results from the on-board user surveys performed in Port Arthur and Midland showed that approximately 87.3% of Port Arthur Transit weekday riders, 84% of the Saturday riders and 50% of the MIDTRAN weekday riders can be defined as transit dependent in that they either do not own or have access to a private vehicle or they do not possess a drivers license. The provision of transit service to these people has had a significant effect on increasing their mobility, but has not had an effect on energy conservation as these persons were not switching from private vehicles to public transit.

When questioned about how they would have made their transit trip if the service had not been available, only 10.1% of the Port Arthur Transit weekday riders and about 26.5% of the MIDTRAN weekday riders would have driven a private vehicle to their destinations. An additional 36.8% of the Port Arthur Transit weekday riders, 39% of the Saturday riders and 33.3% of MIDTRAN's weekday riders would have traveled to their destinations as passengers in private vehicles.

Based on average daily ridership figures for that time period and assuming that 25% of those persons who would ride with someone else to make a trip would actually cause extra vehicular travel, roughly 225 weekday trips and 115 Saturday trips in Port Arthur and about 260 weekday trips in Midland were by bus rather than by private vehicle.

From origin-destination data collected during the on-board surveys, it was estimated that the average weekday and Saturday transit trip lengths in Port Arthur were 3.74 miles and 5.04 miles respectively. In Midland, the average trip length was estimated at 6.23 miles. Multiplying the number of trips which were made by transit rather than by auto times the average trip lengths, it is estimated that the bus service has replaced about 830 private vehicle-miles of travel each weekday and about 590 private vehicle-miles each Saturday in Port Arthur and about 1,620 private vehicle-miles of travel per day in Midland. The total number of private vehicle-miles of travel replaced is not significantly higher than the average number of bus-miles of travel added by the daily operation of the transit service (roughly 670 bus-miles operated each weekday and 555 bus-miles operated each Saturday in Port Arthur and about 1,150 bus-miles operated each weekday in Midland).

Assuming a fuel efficiency of 6 miles per gallon for the transit coaches and a (conservative) fuel efficienty of 10 miles per gallon for private vehicles, the amount of fuel consumed to provide the bus service is actually higher than that amount which would have been consumed had the trips been made by private vehicle (Table 30).

The number of private vehicle-miles of travel saved by transit would have to be more than 18% to 56% higher to result in any energy savings whatsoever. Furthermore, even if the number of private vehicle-miles of travel saved should increase dramatically, the amount of energy saved by MIDTRAN and the Port Arthur Transit System would still not be significant.

Table 30: Fuel Consumption Comparison

Daily Feul Consumption	Port Arthur Weekday	Port Arthur Saturday	Midland Weekday
Average No. of Private Veh.-Mi. Saved by Transit÷10 MPG=Gals. of Fuel That Would Have Been Consumed	830÷10= 83 gal.	590÷10= 59 gal.	1,620÷10= 162 gal.
Average No. of Bus-Miles Added by Providing Transit Service÷6 MPG= Gal. of Fuel Actually Consumed	670÷6= 112 gal.	555÷6= 93 gal.	1,150÷6= 192 gal.

In Kerrville, on-board survey information was not available to determine KERRTRAN's effect on energy conservation as the service had been discontinued a year before the surveys were conducted. However, an examination of operating records showed that KERRTRAN did not have any effect in conserving energy.

Even if it were assumed that 100% of KERRTRAN's 74 daily passengers had shifted from driving private vehicles to transit and the average trip length was 5.5 miles, only 407 private vehicle-miles of travel would have been saved, which is less than the 420 average daily bus-miles which were added as a result of providing the service. Considering that KERRTRAN vehicles averaged 6.9 miles per gallon and private vehicles probably average 10 miles per gallon (or better), transporting 74 persons each day by KERRTRAN buses used 1½ times as much fuel as would have been used had each of the passengers driven alone in a private vehicle.

Effect on Traffic Flow

A review of average daily ridership for the KERRTRAN, MIDTRAN and Port Arthur Transit operations revealed that even if it were assumed that all of

the bus riders have shifted from private vehicles to transit, the number of private vehicles removed from a particular roadway would be very small. For example, the average ridership on the heaviest Port Arthur route was 175 riders per day or about 25 to 30 riders during the peak hour of transit use. Considering the fact that most of the riders do not own or have access to an automobile, the number of private vehicles removed from a particular roadway could not be more than 10 to 15 during 1 hour. Thus the effect on traffic flow would be almost imperceptable. Even if 30 vehicles were removed in an hour, the effect would still be very small.

Effect on Parking Demand

In all 3 cities, visits were made to parking areas at major activity centers along the bus routes such as shopping centers and malls, hospitals, and downtown areas. In most every instance, ample parking was available. Considering the high number of riders transported who do not own or have access to a private vehicle, it is doubtful that the transit systems could have had much effect on increasing the availability of parking. What is more likely the case is that there was ample parking before the transit systems were implemented.

The one exception to this finding was the Midland CBD where leased parking for downtown employees is not readily available at low cost. Conversations with parking attendents at several downtown lots revealed that the lots had been operating at full capacities for several years. Because "several years" would encompass both "before and after" the implementation of MIDTRAN, any change in demand which was a result of MIDTRAN would be difficult to demine. However, the MIDTRAN service may be credited with providing transportation to those individuals who are unable to lease a parking space either because of availability or high cost. As the cost of 2-way MIDTRAN subscription

service at $31.50 per month is less than the lost of downtown parking which ranges from $45 to $65 per month (when available), the MIDTRAN service can provide a more affordable alternative to driving a private vehicle and paying fuel, oil, vehicle maintenance and parking costs.

Summary

Because the vast majority of trips are being made by transit dependent riders, the effect of MIDTRAN and the Port Arthur Transit System on energy use, traffic flow and parking demand has not been substantial. The implementation of these new systems has provided their riders with increased mobility and greater flexibility of travel, however. The same conclusions can also be reached about KERRTRAN's brief operation.

EFFECT ON RETAIL TRADE

In order to determine the possible effect of new transit service on retail trade, a selected group of retail merchants in Kerrville, Port Arthur and Midland was surveyed. A total of 117 businesses in Kerrville, 130 in Port Arthur and 190 in Midland were mailed survey questionnaires which asked about their business volumes and what effect (if any) the new transit service has had on their businesses. In each of the 3 cities, retail merchants were selected from the downtown (CBD) area, shopping centers and malls, and non-centralized shopping areas such as strip commercial developments. These businesses were located at both inside and outside the bus route coverage area. (Note: In Midland, because of the door-to-door nature of the demand-response service offered by MIDTRAN, virtually every retail store in the city is accessible by bus).

A total of 121 responses to the survey were received: 45 from Kerrville, 50 from Midland and 26 from Port Arthur businesses. This resulted in a response rate of 38.5% from Kerrville, 26.3% from Midland and 20% from Port Arthur. (Note: A total of 8 out of 45 responses in Kerrville and 4 out of the 26 responses in Port Arthur were from merchants located outside the transit service area).

Copies of the questionnaires and a description of the survey procedures used are presented in Appendix B. The number and types of businesses that responded to the retail merchants survey in each city are presented in Table 31.

Perceived Changes in Business

Retail merchants in each city were asked a series of questions concerning changes in their respective businesses which have occurred since the implementaion of transit service. Their responses to these questions follow.

Table 31: Number and Types of Businesses That Participated in the Retail Merchant Survey

Type of Business	Kerrville	Port Arthur	Midland
Camera	1	--	2
Clothing	9	2	13
Food and Drugs	--	1	1
Gifts	2	--	5
Jewelry and Gifts	5	3	2
Electronics	1	1	2
Fans and Clocks	--	--	2
Needlework	1	1	1
Variety Department Store	1	2	2
Flowers and Gifts	3	2	1
Books and Stationery	2	--	1
Shoes	--	2	1
Picture Frames	1	1	1
Paint and Decorating Supplies	2	2	2
Liquor	1	--	2
Sporting Goods	1	1	--
Drugs and Variety	3	2	1
Furniture and Appliances	2	--	--
Records and Tapes	--	1	1
Miscellaneous Retail	9	5	10
Total	44	26	50

Changes in Business Volumes

In both Midland and Port Arthur, retail merchants were asked how much of an increase or decrease was there in their businesses that month, as compared

to the same month in 1979 (before bus service was implemented). Merchants in Kerrville were asked how much of an increase or decrease they experienced during the 7 months KERRTRAN was in operation. Their responses are presented in Table 32. In Kerrville, more than 65% of those responding to the survey indicated that no change in business volumes had taken place. An additional 24.4% indicated that they had experienced an 11% to 20% increase in business during that time period. In Port Arthur, about 17% of the retail merchants reported that there had been no change in business volume and slightly less than 25% reported an increase of between 1% and 10%. In Midland, about 20% indicated thay they had experienced an increase of 11% to 20% and a slightly largely percentage reported a 21% to 40% increase in business volume. Few retail merchants in the cities reported a decrease in business.

Cause of Change in Business Volume

After specifying the percentage of increase or decrease in business, retail merchants in all 3 cities were asked to identify what they thought to be the cause of that increase or decrease. More than 20 reasons were listed as being the causes of an increase or decrease in business (Table 33). The implementation of bus service, however, was only mentioned once in Kerrville and once in Port Arthur. Nine different reasons for a decrease (or no change) in business were mentioned, but bus service being available (or not available) to their stores was not listed even once (Table 33).

When merchants were specifically asked what percentage of the increase or decrease experienced coule be attributed to the new bus service in their city, 92% of the Kerrville merchants, 82% of the Port Arthur merchants and 69% of the Midland merchants who experienced an increase reported the 0% of that increase was due to the implementation of transit service. The remaining 8% in Kerrville, 18% in Port Arthur and 31% in Midland indicated that between 1

Table 32: Changes in Business Volumes Reported by Kerrville, Port Arthur and Midland Retail Merchants

Change in Business Volume	Kerrville	Port Arthur	Midland
Increase in Business			
1% to 10%	2 (4.9%)	4 (23.5%)	3 (8.6%)
11% to 20%	10 (24.4%)	2 (11.8%)	7 (20.0%)
21% to 40%	1 (2.4%)	2 (11.8%)	8 (22.8%)
41% to 60%	-------	1 (5.9%)	4 (11.4%)
61% to 80%	-------	1 (5.9%)	2 (5.7%)
81% to 100%	-------	1 (5.9%)	2 (5.7%)
More than 100%	-------	-------	3 (8.6%)
Decrease in Business			
1% to 10%	-------	1 (5.9%)	2 (5.7%)
11% to 20%	1 (2.4%)	-------	1 (2.9%)
21% to 40%	-------	1 (5.9%)	-------
More than 40%	-------	1 (5.9%)	-------
No Change	27 (65.9%)	3 (17.5%)	3 (8.6%)
Total	41 (100.0%)	17 (100.0%)	35 (100.0%)

and 10% of their increase was due to the bus service. None of the merchants (inside or outside the bus route coverage area) in any of the 3 cities reported that the bus service (or the lack of bus service) has contributed to their decrease in business.

Effect on Area Business in General

Merchants were also asked if bus service has had an effect on area business in general. Only 4 (9.5%) of the 42 merchants in Midland and 6 (14.3%)

Table 33: Causes of Increases in Business Volumes

Cause	Kerville (n=11)	Port Arthur (n=7)	Midland (n=31)
Not Sure			1 (3.2%)
More Customers in Mall			7 (22.6%)
City Growth	1 (9.0%)		14 (45.1%)
Surge in Economy	1 (9.0%)	1 (14.2%)	4 (12.9%)
More Established Business	1 (9.0%)	1 (14.2%)	3 (9.7%)
More Advertising		2 (38.6%)	5 (16.1%)
Better Merchandizing		3 (42.9%)	3 (9.7%)
Customer Awareness of Store			4 (12.9%)
Oil Business			2 (6.5%)
High Activity in Building			1 (3.2%)
New Location		1 (14.2%)	1 (3.2%)
Charge Higher Prices	1 (9.0%)	1 (14.2%)	1 (3.2%)
Opened New Department		1 (14.2%)	1 (3.2%)
Bus Service	1 (9.0%)	1 (14.2%)	
Offer Customers Good Service	2 (18.1%)	2 (28.6%)	
Normal Growth	4 (36.3%)		
Public Acceptance of Product			1 (3.2%)
Inflation		2 (28.6%)	
Growth in Immediate Vicinity			1 (3.2%)
Better Management		1 (14.2%)	1 (3.2%)
Adequate Parking			1 (3.2%)
Increased Inventory		1 (14.2%)	
Remodeled Store		1 (14.2%)	

Note: Several merchants mentioned more than one cause of an increase in business. Therefore, percentages do not add up to 100%.

of the 42 merchants in Kerrville who responded to this question answered "yes." A slightly higher number in Port Arthur, 8(35.8%) out of 25 merchants also responded "yes." Those merchants who had reported that bus service has had an effect on area business were then asked if that effect was positive or negative and what was the magnitude. In Midland, 3 of the 4 merchants

Table 34: Causes of Decreases or No Change in Business Volumes

Cause	Kerrville (n=1)	Port Arthur (n=8)	Midland (n=4)
Market is Flooded			1 (25.0%)
Slowdown in Oil Business			1 (25.0%)
Store Not Open as Long			1 (25.0%)
Taxes			1 (25.0%)
Reagan Administration		1 (12.5%)	
Carter Administration		1 (12.5%)	
Strikes		5 (62.5%)	
Recession	1 (100.0%)	5 (62.5%)	1 (25.0%)
Weather		1 (12.5%)	

Note: Several merchants mentioned more than one cause of a decrease or no change in business. Therefore, percentages do not add up to 100%.

answered that the effect of bus service on area business was positive. One indicated that business was slightly better and the other 2 were not sure about the magnitude of the positive effect. One merchant in Midland responded that the bus service has had a negative effect on area business in that shoplifting has increased. In Kerrville, 5 of the 6 indicated that bus service had a positive effect and the remaining one was not sure if the effect was positive or negative. Three of the 5 who indicated a positive effect said the bus service offered customers and elderly residents with another means of transportation to area businesses. One merchant stated that area business was slightly better due to the bus service and the other merchant did not specify the magnitude. Of the 8 retail merchants in Port Arthur who had stated that bus service has had an effect on area business in general, 5 said that effect

was positive. Four of those merchants indicated that the bus service provided store employees and customers with another means of transportation to the area and one merchant mentioned that business was slightly better. One merchant in Port Arthur felt that the effect of bus service in the area was negative due to an increase in shop lifting.

Customer and Employee Utilization of Transit Service

Customer Utilization

Retail merchants in all 3 cities were asked what percentage of their customers travel to and from their place of business by bus. They were also asked to estimate what percentage of these bus riding customers are new customers. Their responses are presented in Table 35. As this table indicates, the highest customer utilization of transit service has occurred in Port Arthur where 13 (50%) of the 26 merchants reported that between 1% and 5% of their customers are utilizing transit to get to their businesses. Their response corresponds to the high percentage of transit users who surveyed in Port Arthur who had listed their trip purpose as shopping. Five of the 13 merchants felt that none of these bus riding customers were new to their stores. However, 6 merchants indicated that between 10% and 50% were new customers and another 5 merchants responded that between 51% and 100% of these bus riding customers were new customers.

Employee Utilization

When asked the number of their employees who traveled to and from work on the bus, all 42 merchants in Kerrville indicated that none of their employees had utilized KERRTRAN for work trips during the 7 months the service was in operation. In Midland, 42 out of 44 merchants also indicated that none of their employees take the bus to work. Two, however, said that they have 1 employee who rides MIDTRAN to work. In Port Arthur, 22 of the 25 merchants

Table 35: Customer Utilization of KERRTRAN, MIDTRAN and the Port Arthur Transit System

Customer Utilization of Transit	Kerrville	Port Arthur	Midland
Percent of Customers Who Arrive by Bus			
0%	37 (84.1%)	10 (38.5%)	28 (62.2%)
1% to 5%	6 (13.6%)	13 (50.0%)	14 (31.1%)
6% to 10%	1 (2.3%)	3 (11.5%)	3 (6.7%)
Percent of Bus Riding Customers Who Are New Customers			
0%	4 (57.1%)	5 (31.3%)	4 (23.5%)
10% to 50%	1 (14.3%)	6 (37.4%)	7 (41.2%)
51% to 100%	2 (28.6%)	5 (31.3%)	6 (35.3%)

who responded reported that none of their employees ride the bus to work and the remaining 3 merchants indicated they had 1 employee each who travels to work on a Port Arthur Transit bus.

Coordination of Business With Transit

Almost all of the merchants who responded to the survey in all 3 cities indicated they had not done anything to coordinate their retail businesses with the new transit service. Their reasons for not coordinating included not knowing enough about the schedules or the service,people who ride the bus were not likely to shop at their stores and nobody rides (or rode) the bus. Only 1 out of the 8 merchants in Kerrville and 1 out of the 4 merchants in Port Arthur who were located outside the bus service area mentioned that they did not coordinate because they were located too far from the bus routes. Of those few who have attempted to coordinate, 3 mentioned that they posted bus

schedules in their stores and the manager of a drug store in Kerrvill indicated that while KERRTRAN was in operation, he had prescription orders sent out to customers on the KERRTRAN buses. The same 2 merchants in Midland and Port Arthur who indicated earlier that shoplifting had increased as a result of the new bus service also mentioned that they coordinated with the new service by increasing the security at their stores.

Recommended Service Changes

When merchants were asked what changes could be made in the present (or past) bus service to make it more beneficial to businesses in their area, their responses were somewhat surprising. In Kerrville and Port Arthur, where 12 merchants who responded to the survey were located outside the bus route coverage area, not one merchant mentioned that implementing a route to serve their area would have benefited retail trade (Table 36). Then, in Midland, where MIDTRAN can provide customers with door-to-door service to any store in town, 14 (70%) of the merchants suggested that a bus route to their area of town would be beneficial.

General Attitude Toward Transit Service

After responding to questions regarding the effect of the new transit system on retail trade, merchants in Kerrville, Port Arthur and Midland were given the opportunity to express their opinions concerning such issues as whether or not the city in question should operate a bus system, whether or not taxes should be used to subsidize the operation of the system and what is the major reason (if any) for providing transit service. Table 37 summarizes their response to these and other related questions. As this table indicates, the majority of merchants from Port Arthur felt that the city should operate a bus service, while the majority in Kerrville felt that the city should not

Table 36: Recommended Changes in Bus Service to Enhance Area Business

Service change	Kerrville	Port Arthur	Midland
Don't know	2 (11.1%)	4 (50.0%)	1 (5.0%)
Bus route closer to area stores			14 (70.0%)
More promotion of service	6 (33.4%)		5 (25.0%)
Service should be discontinued	2 (11.1%)	2 (25.0%)	
Construct bus shelters		1 (12.5%)	
More frequent service	2 (11.1%)	1 (12.5%)	
Wait 20 years for service	2 (11.1%)		
Need shorter routes	4 (22.2%)		

operate a service and the majority in Midland were unsure of whether or not bus service should be provided. In all 3 cities, most merchants did not want to subsidize the transit service with tax dollars and in Port Arthur and Midland, the majority of respondents indicated that MIDTRAN and the Port Arthur Transit system should not be expanded if that expansion will cost the city more. When asked what is the one major reason to operate a bus service, the majority in all 3 cities indicated providing transportation to those who cannot drive was the single most important reason. In Midland, a significant number (15 or 36.6%) mentioned that reducing traffic congestion was the one major reason, while 8 (21.6%) of the merchants in Kerrville indicated that there was no reason to have service. It is interesting to note that only 1 merchant in Kerrville and 1 in Port Arthur mentioned improving the local economy as the primary reason for having transit service.

In the final question of the retail merchants survey, merchants were given a list of possible community expenditures and were asked to identify which of those they thought were important to enhance business in their areas.

Table 37: Merchants' Attitudes Toward the Provision and Funding of Transit Service

Question	Kerrville	Port Arthur	Midland
Should the City Operate a Transit Service?			
Yes	9 (29.9%)	14 (53.9%)	22 (51.1%)
No	24 (55.8%)	5 (19.2%)	6 (14.0%)
Not sure	10 (23.3%)	7 (26.9%)	15 (34.9%)
Should the City Use Taxes to Subsidize the Operation of the System?			
Yes	7 (16.3%)	4 (16.6%)	16 (36.4%)
No	28 (65.1%)	10 (41.7%)	17 (38.6%)
Not sure	8 (18.6%)	10 (41.7%)	11 (25.0%)
Should the Present System Be Expanded if it Will Cost the City More?			
Yes		4 (15.4%)	12 (27.9%)
No		13 (50.0%)	18 (41.9%)
Not sure		9 (34.6%)	13 (30.2%)
What is the Major Reason to Operate a Transit Service?			
Save energy	2 (5.4%)		4 (9.8%)
Reduce traffic congestion	4 (10.8%)		15 (36.6%)
Provide transportation for those who cannot drive	22 (59.5%)	20 (87.0%)	21 (51.2%)
Improve the local economy	1 (2.7%)	1 (4.3%)	
No reason to have bus service	8 (21.6%)	2 (8.7%)	1 (2.4%)

Their responses are summarized in Table 38. In all 3 cities, the provision of bus service was either at the bottom or close to the bottom of the list.

Summary

The implementation of new transit service in Kerrville, Port Arthur and Midland has probably had only a very slight effect in increasing retail sales in the respective cities. While the majority of merchants cited increases in

Table 38: Important Community Expenditures to Enhance Area Business

Expenditure	Kerrville (n=38)	Port Arthur (n=22)	Midland (n=43)
Police protection	14 (36.8%)	18 (81.8%)	22 (51.2%)
Fire protection	10 (26.3%)	9 (44.6%)	12 (27.9%)
Building rehabilitation	13 (34.2%)	5 (22.7%)	1 (2.3%)
Bus service	7 (18.4%)	5 (22.7%)	10 (23.3%)
Beautification	18 (47.4%)	8 (36.4%)	10 (23.3%)
Increase parking availability	15 (39.5%)	1 (4.5%)	15 (34.9%)
Improve condition of streets	12 (31.6%)	12 (54.5%)	34 (79.1%)
Other	3 (7.9%)	2 (9.1%)	3 (7.0%)

Note: Most merchants indicated more than one community expenditure. Therefore, percentages do not add up to 100%.

business volumes, few attributed much (if any) of that increase to the new bus service in their city. In addition, few merchants made any effort to attract bus riders to their stores. Finally, the availability of parking at most locations throughout the cities may have also discouraged customers from riding a bus to shop when using a private vehicle is more convenient.

EFFECT ON OTHER PROVIDERS OF TRANSPORTATION

In order to determine the effect of new transit systems on other providers of transportation, interviews were held with owners of local taxicab companies and representatives of various social service agencies providing transportation in Kerrville, Midland and Port Arthur.

Effect on Taxicab Operations

Kerrville

One taxicab company, Busy Bee Taxi, currently operates 3 vehicles in Kerrville. When questioned about the effect of KERRTRAN on his business, the owner of Busy Bee replied that the transit system had very little effect on his operation. He further indicated that what small effect KERRTRAN did have on his business was a positive effect in that the demand for taxi service had actually increased a small amount just after KERRTRAN began operation. He attributed this slight increase to persons riding a KERRTRAN bus to shopping centers and other locations and then taking a taxi home.

Midland

Two companies currently provide a taxicab service in Midland. As repeated attempts to contact the owner of United Cab Company (both in person and by telephone) had failed, a questionnaire and a stamped return envelope was mailed to him at the address of his company. No reply was received. The owner of Yellow-Checker Cab was contacted successfully, however. Yellow-Checker Cab owns and operates 14 vehicles. When questioned about the effect of MIDTRAN on his comany's operation, the owner stated that MIDTRAN has definitely cost him business. Furthermore, it angered him to think that his tax dollars were being used to subsidize his competition. Approximately 70% of Yellow-Checker Cab's business is out-of-town visitors and the remaining 30% is from local

customers. The owner felt that MIDTRAN has cost his company about 10% of its regular riders, which is about 3% of its total volume of business. He went on to state that, initially, his company lost quite a few of its regular customers to MIDTRAN, but as time went by, most have gone back to using his taxi service as they were displeased with the unreliability of the MIDTRAN service. He is no longer very upset about the competition from MIDTRAN as his 3% loss is not nearly as large as he first imagined it would be. He also indicated that although MIDTRAN provides door-to-door service, their 24-hour advance notice requirement has effectively eliminated them from most of the market for taxi service.

Port Arthur

A total of 6 taxicab operations and 1 limousine service currently operates in Port Arthur. Como Taxi Service, which has been in business for more than 60 years, operates 7 vehicles. The owner of Como Taxi Service stated that the Port Arthur Transit System is a very good and a much needed service for the poor people of Port Arthur. He also stated that he did not feel that his company was in competition with the transit system. In fact, his business has increased slightly since the implementation of the transit service, as he now has customers who request service from their homes to the nearest bus stop.

The owner of Matthews Taxi, which operates 3 vehicles, also indicated that the Port Arthur Transit System is an asset to the community. He, too, feels that the transit system has not cost him business as the transit system serves an entirely different market.

Gulf Port Taxi Service currently has 3 vehicles in operation. The owner of Gulf Port Taxi indicated that the transit service has probably cost him

some business, but his main competition is from the numerous other cab-companies in town. Overall, he was supportive of the Port Arthur Transit System as it provides poor people with inexpensive transportation.

The owner of Longhorn Taxi (a 4-vehicle operation) and Jet Taxi (a 5-vehicle operation) both stated that there had been no change (either way) in business since the Port Arthur Transit System began operation. Like the other operators, both of these owners also stated that bus riders cannot afford cab fare and the transit system, therefore, serves a different market.

A & B Limousine Service, which operates 1 Cadillac limousine, was also contacted. The owner of this service stated that his operation served an entirely different market from either transit service or taxi service and, therefore, his business was not affected by either.

One other taxicab company, City Taxi - Yellow Cab, was also contacted, but the owner of this company had no comments about the Port Arthur Transit System or its effect on the demand for taxi service as his business had only been in operation for a few months. Attempts were made to contact 4 other taxi operations listed in the telephone directory but none of these 4 responded to telephone calls and visits to the addresses listed indicated that these operations had gone out of business.

Effect on Social Service Agencies Who Provide Transportation

Kerrville

Only one social service agency, Dietert Claim, was found to provide any type of transportation service to its clients. Dietert Claim is involved in a number of programs to aid elderly residents of Kerrville. The agency provides recreational activities for senior citizens at the Dietert Claim Center and also operates a lunch program, a thrift shop and a store where senior

citizens can sell hand-made goods to the public. In addition, Diertert Claim operates a transportation program in which 4 station wagons are used to transport elderly and handicapped persons to health care facilities or to the Dietert Claim Center to participate in the lunch program or other activities. On the average, about 75 different individuals are transported each day. The implementation of KERRTRAN was said to have had no effect at all on the transportation services provided by Dietert Claim, nor were any of the Dietert Claim volunteers aware of any clients who used KERRTRAN to get to the activity center.

Port Arthur

Three social service agencies in Port Arthur were found to provide transportation services. The most extensive transportation service is provided by the Senior Citizens Services which offers transportation service to elderly and handicapped residents of Port Arthur. The Senior Services Transportation will provide service to anywhere within the City of Port Arthur, but cannot provide service to or from Groves, Port Neches, Nederland or Griffin Park. Riders must request transportation 24 hours in advance. A total of 7 vans are used to provide service: 2 vans offer transportation to and from Nutrition Cities, 2 are used for medical transportation purposes, 1 is used to transport clients to and from the Adult Day Care Center and the other 2 are used for miscellaneous trips to shopping centers, supermarkets, etc. Conversations with Senior Citizens Services personnel revealed that the Port Arthur Transit System has not had any effect on the operation of their transportation program. Because the purpose of their program is to supplement the service provided by the Port Arthur Transit System; the Senior Citizens Services provides door-to-door service for the elderly and handicapped residents who are unable to use the transit system because of age or physical limitations.

The United Board of Missions, a Christian organization with 45 church sponsors, also operates a transportation program (in addition to about 300 other programs). Three station wagons transport an estimated 100 elderly clients per month to doctors, grocery stores, utility offices, the Department of Human Resources and various other locations. The only restriction on travel is that no shopping trips (except shopping trips to supermarkets) can be made. In those cases where clients are not well enough to take care of their own business or grocery shopping needs,the driver of the vehicle will make the trips for them. The implementation of the Port Arthur Transit System has not had any effect on the transportation services provided by the United Board of Missions as this organization provides door-to-door transportation only to those who are unable to use of afford the conventional fixed-route transit system. However, the Port Arthur Transit service has provided several United Board volunteers with transportation to and from the organization's headquarters which is located about a block from a bus route.

The Mental Health Mental Retardation (MHMR) Day Service also provides a very limited transportation service. The primary function of MHMR Day Service is the operation of day programs for persons who have recently been released from mental institutions to help orient them back into the community so that they can begin to lead normal lives again. The only transportation service provided by the MHMR is the operation of 1 vehicle to transport those clients who need treatment, but have absolutely no means of traveling to and from the Day Center on their own. About 17 clients currently utilize the MHMR service for daily transportation to and from the Day Center. MHMR personnel indicated that the Port Arthur Transit System has definitely helped many of their clients reach the center and has thus reduced the number of trips made by their agency's vehicle. The MHMR indicated that the expansion of the transit service would be of even more help to many others that now use the MHMR vehicle.

There will always be a need to operate the MHMR vehicle, however, to serve those persons who either live too far from a bus route or live in a neighboring community not served by the Port Athur Transit.

Midland

In Midland, unlike Kerrville and Port Arthur, the implementation of new transit service has had a dramatic effect on the transportation programs of social service agencies. A total of 8 agencies provided some type of transportation prior to the implementation of MIDTRAN. Today, all of these agencies have been able to coordinate most or all their transportation needs with the MIDTRAN system. This coordination has been possible because of the door-to-door nature of the MIDTRAN demand-responsive service.

The Midland Senior Citizens Center, which provides social and recreational activities for persons age 55 years and over, had 1 bus with which it transported its clients to and from the center. That bus ceased operation 3 months before MIDTRAN began operation. Another bus, which was furnished by Casa de Amigos, provided transportation for an additional 5 months before it was discontinued. The operation of both of these buses was terminated because the funding for them ended. The Senior Citizens Center was, therefore, without transportation services for several months until MIDTRAN began providing service. MIDTRAN currently transports about 10 persons to the center each day. These 10 persons are "all day regulars" at the center and they comprise about half of the total number of persons using the center at any one time. MIDTRAN has basically replaced the transportation service the Senior Citizens Center had lost due to a lack of funding. The MIDTRAN service has been very well received by the center's regular users who appreciate having transportation to the center available to them once again. In a few instances, an occasional user of MIDTRAN will complain to the center about the wait for a bus or that

the bus missed them. The director of the center suspects that most of these problems are the fault of the clients (rather than MIDTRAN) as many of the clients are hard of hearing and cannot hear the MIDTRAN bus honk when it has arrived at their homes. Overall, the Senior Citizens Center and its clients are quite satisfied with the MIDTRAN service.

The Midland Cerebral Palsy Center also uses the MIDTRAN service during the summer months to transport several of the older children who come to their center for treatment. About 4 children utilize the service daily to reach the center. Prior to MIDTRAN, these children were transported to and from the center by their parents. (During the school year, the school district provides them with transportation to the center.) The Cerebral Palsy Center indicated that they were very satisfied with the MIDTRAN service.

The Midland Community Center for Mental Health, which once provided its own transportation service, has transferred the operation of their 2 vans to MIDTRAN. Approximately 20 mentally retarded persons and 15 to 25 mentally ill persons are transported to and from the center each day. These persons represent about 2/3 of those individuals who require daily treatment at the center. No problems have been encountered and the center and its clients are quite pleased with the service being provided by MIDTRAN.

Prior to the implementation of MIDTRAN, Casa de Amigos operated 3 vans to transport clients to various community agencies. Casa de Amigos is funded by private donations, the United Way and local churches. The agency offers a wide range of services including a senior citizens center, afternoon tutoring sessions for school children in need of special help, and counseling and referral services to underprivileged people with personal problems. The implementation of the MIDTRAN service has enabled Casa de Amigos to retire 2 of its 3 vans. It was necessary to retain 1 van, however, to provide short notice transportation as MIDTRAN requires notice 24 hours in advance. Most of

the people who were previously transported in Casa de Amigo vans are now transported by the MIDTRAN service. Approximately 90% of the people who visit the center arrive by MIDTRAN. This translates into about 100 persons per day, of which about 45 to 50 are senior citizens. Only a few complaints regarding MIDTRAN's indirect routing have been received at the center. Overall, the center is very satisfied with service provided by MIDTRAN.

The YMCA in Midland is yet another organization which utilizes the MIDTRAN service. MIDTRAN is currently being used by the YMCA to transport children to after school educational and recreational programs at the YMCA building. MIDTRAN buses carry from 70 to 90 children to these YMCA progams each day. The YMCA also operates 6 vans and a couple of these vans are used to transport an additional 20 to 30 children to these after school programs. The director of the YMCA indicated that MIDTRAN does a good job, but since the YMCA can provide its own transportation at a lower cost, the MIDTRAN service will probably only be used to carry the overflow. In this way, the YMCA does not have to expand its transportation services for what might be only a temporary increase in demand. The director further stated that he has had some communication problems with MIDTRAN and, occasionally, several children who should have been transported to the YMCA are left behind. MIDTRAN was not blamed for the situation, however, as he felt that occasional communication problems are normal when 2 separate agencies are involved in the operation of a project. Overall, the YMCA has been very pleased with the MIDTRAN service.

The Department of Human Resources (DHR) currently uses the MIDTRAN service to transport approximately 2,000 registered Medicaid clients to various health care facilities for treatment. Before MIDTRAN began operation, the DHR contracted with Community Action to provide medical transportation. Each month, the Community Action was paid a flat fee to transport Medicaid clients.

That fee was based on an estimate of demand rather than how many clients were actually being transported. The Community Action went out of business shortly before MIDTRAN began operation and there was a period of time when the DHR Medicaid clients were without transportation services. During that period of time, one of Midland's taxi operators was contacted about providing medical transportation. The owner of that company was not interested, however, as he had previously contracted with another state agency and had experienced difficulty in getting paid for services already rendered. This delay in payment caused severe cash flow problems for his company and he, therefore, was not interested in doing business with another state agency.

MIDTRAN now provides medical transportation for approximately 100 DHR Medicaid clients each month. The DHR prints tickets and distributes them to qualified recipients in books of 10. Each time a client uses a MIDTRAN bus, he deposits a ticket in the farebox. MIDTRAN saves these tickets and then sends them back to the DHR at the end of each month along with a bill based on the number of tickets collected. The DHR has been pleased with the performance of MIDTRAN and feels that MIDTRAN is providing better service at a lower cost than that which was provided by the Community Action.

Apache Flats, which operates 2 group homes for mentally retarded persons, also uses the MIDTRAN service. A total of 25 out of the 28 persons who live in these homes commute to and from work or school daily on MIDTRAN buses. Apache Flats is then billed on a monthly basis for the transportation provided by MIDTRAN. Prior to the implementation of MIDTRAN, transportation was provided by Apache Flats personnel using 2 vans owned by the agency. These vans are now being used primarily to transport clients to recreational activities. Apache Flats credits MIDTRAN with saving the agency both staff time and operating costs on their vans. Furthermore, the service provided by MIDTRAN has been very good.

The Permian Basin Mental Health Mental Retardation Center Operates a sheltered workshop for 30 mentally retarded adults. MIDTRAN provides these individuals with transportation to and from the workshop, and also transports mentally retarded custodial crews to work sites. The Permian Basin MHMR is then billed monthly for the service provided by MIDTRAN. Prior to the implementation of MIDTRAN, the agency had operated 2 vans of its own, but has since leased the vehicles to MIDTRAN to operate. The MHMR is very satisfied with MIDTRAN service and credits MIDTRAN with increasing the number of mentally retarded adults they are able to successfully place in permanent jobs. Before MIDTRAN, many good employment opportunities for their mentally retarded clients could not be accepted because of inadequate or unreliable transportation service.

Summary

The effect of the new transit systems on taxicab operations in Kerrville, Port Arthur and Midland has been mixed. In Kerrville and Port Arthur, taxi operators reported that either no change or a slight increase in the demand for service has occurred since the implementation of transit service in their communities. On the other hand, the taxi operator in Midland viewed the new transit system as his competitor and held the system responsible for about a 3% loss in business.

The effect of the new transit systems on social service agencies who provide transportation was also mixed. Again, in Kerrville and Port Arthur, the implementation of transit service had little or no effect on current transportation programs. In Midland, however, most all of the agencies who had provided their own transportation prior to the implementation of transit service now rely on MIDTRAN to provide that service for them.

The reason for the MIDTRAN operation having a different effect on taxi operations and social services agencies lies in the fact that it provides primarily door-to-door (rather than fixed-route) service.

COMMUNITY LEADERS' OPINIONS OF THE EFFECTS OF NEW TRANSIT SYSTEMS

In addition to seeking the opinions of retail merchants and other providers of transportation services concerning the effects of new transit systems, various community leaders in the Cities of Kerrville, Midland and Port Arthur were also asked to express their opinions on how the new transit systems have affected their communities.

Survey questionnaires were distributed to 30 city and county officials in Kerrville and Kerr County, 26 officials in Port Arthur and Jefferson County and 40 officials in Midland and Midland County. Those in each area who received questionnaires included elected, appointed and administrative officials. A total of 14 officials from Kerrville, 13 from Port Arthur and 25 from Midland returned their questionnaires for a response rate of 46.6% from Kerrville, 50.0% from Port Arthur and 62.5% from Midland. Copies of the questionnaires and a more detailed description of the survey procedures are presented in Appendix C.

The survey of community leaders began by asking the officials in Kerrville, Midland and Port Arthur a series of questions which related to the operation, funding and expansion of the new transit systems in their communities. Their responses to these questions are presented in Table 39. As this table indicates, the majority of community leaders surveyed in Port Arthur and Midland indicated that their cities should operate a transit system and that the cities should use tax dollars to subsidize the operation of that system. The majority did not feel the system should be expanded if it will cost the cities more money, however. In Kerrville, probably due to the failure of KERRTRAN, the majority of officials responded that the city should not operate a transit system or use tax revenue to support that system.

Table 39: Community Leaders Opinions on the Operation of the New Transit Systems

Issue	Kerrville	Port Arthur	Midland
Do you think the city should operate a new bus service?			
Yes	3 (21.4%)	9 (75.0%)	14 (58.4%)
No	10 (71.4%)	3 (25.0%)	8 (33.3%)
Not sure	1 (7.2%)		2 (8.3%)
Do you think the city should use the tax revenue to subsidize the operation of the bus service			
Yes	4 (28.6%)	9 (69.2%)	11 (47.8%)
No	10 (71.4%)	4 (30.8%)	10 (43.5%)
Not Sure			2 (8.7%)
Do you think the precent system should be expanded if it will cost the city more money?			
Yes	Does	5 (38.4%)	5 (20.8%)
No	not	6 (46.2%)	15 (62.5%)
Not sure	apply	2 (15.4%)	4 (16.7%)

The next set of questions asked of community leaders in each city dealt with the possible effect of the new transit systems on energy conservation, traffic congestion and retail trade. Officials were also asked about the transit system's effect on helping the transportation disadvantaged (senior citizens, handicapped people, low income families) reach important community destinations. Their opionions on these issues are presented in Tables 40 and 41. As figures in these tables suggest, most of the officials in Kerrville, do not think that KERRTRAN was effective in saving energy, reducing traffic congestion or increasing retail business. The majority of Kerrville's

Table 40: Community Leaders' Opinions on the Effect of the New Transit System on Energy Conservation and Traffic Congestion

Question	Kerrville	Port Arthur	Midland
Does (did) the bus service help to conserve energy?			
Yes		6 (46.1%)	12 (48.0%)
No	14 (100.0%)	5 (38.5%)	10 (40.0%)
Not sure		2 (15.4%)	3 (12.0%)
If "yes", is (was) the effect			
Significant		2 (40.0%)	3 (27.3%)
Insignificant		3 (60.0%)	6 (54.5%)
Not sure			2 (18.2%)
Does (did) the bus service help to reduce traffic congestion?			
Yes	1 (7.1%)	2 (15.4%)	12 (48.0%)
No	13 (92.9%)	9 (69.2%)	12 (48.0%)
Not sure		2 (15.4%)	1 (4.0%)
If "yes", is (was) the effect:			
Significant			1 (10.0%)
Insignificant		1 (100.0%)	7 (70.0%)
Not sure	1 (100.0%)		2 (20.0%)

officials also indicated the system did not do much to help the mobility needs of the transportation disadvantaged.

In Midland and Port Arthur, on the other hand, a greater number of officials (which constituted a slight majority) responded that the Port Arthur Transit System and MIDTRAN have helped to conserve energy, although most indicated that the effect was insignificant.

On the issue of traffic, Port Arthur officials generally indicated that the transit system has not reduced traffic congestion. Officials in Midland

Table 41: Community Leaders' Opinions on the Effect of the New Transit System on Business and Mobility Needs

Question	Kerrville	Port Arthur	Midland
Does (did) the two bus service help the business community?			
Yes	1 (7.1%)	10 (76.9%)	16 (64.0%)
No	12 (85.8%)	2 (15.4%)	6 (24.0%)
Not sure	1 (7.1%)	1 (7.7%)	3 (12.0%)
If "yes", is (was) the effect:			
Significant		6 (60.0%)	4 (26.7%)
Insignificant	1 (100.0%)	3 (30.0%)	8 (53.3%)
Not sure		1 (10.0%)	3 (20.0%)
Does (did) the bus service help the transportation disadvantaged reach important community destinations?			
Yes	4 (28.6%)	11 (84.6%)	21 (84.0%)
No	8 (57.1%)	1 (7.7%)	1 (4.0%)
Not sure	2 (14.3%)	1 (7.7%)	3 (12.0%)
If "yes", is (was) the effect:			
Significant		7 (70.0%)	14 (70.0%)
Insignificant	4 (100.0%)	2 (20.0%)	5 (25.0%)
Not sure		1 (10.0%)	1 (5.0%)

were evenly divided on whether or not MIDTRAN helped to reduce traffic congestion. Those who did indicate that MIDTRAN may have helped the traffic situation did not feel that the contribution was significant, however.

On the average, Midland and Port Arthur officials felt that the new transit systems have had positive effects on the business communities, although the majority of those in Midland indicated that the effect was not significant. The vast majority of officials in both Midland and Port Arthur also felt that MIDTRAN and the Port Arthur Transit System have played substantial

roles in helping to increase the mobility of the elderly, the handicapped and the low income residents of their cities.

In addition to asking questions which related to the effects of the new transit systems in their cities, officials were also asked to indicate their opinions on a wide range of subjects which dealt with the goals and objectives they felt that the transit system in their city should be used to achieve. For each statement, officials were asked to circle the number which most accurately represented their opinions.

The first set of statements read, the bus service "should be used to achieve results in the following areas:" A list of 7 possible areas was provided and officials were asked to indicate on a scale of 1 (strongly disagree) to 5 (strongly agree) the extent to which they agreed or disagreed with achieving results in each area. Their opinions on this series of statements are summarized in Table 42. As Table 42 indicates, officials in all 3 cities most strongly agreed that providing transportation to those who cannot drive is the most important result to be achieved by the transit system in their communities.

Next, officials were asked to circle the number which best indicates the importance they placed upon providing various citizen groups with public transportation. Four groups were listed and the respondents rated each on a scale of 1 (not important) to 5 (very important). These survey results are summarized in Table 43. From the responses summarized in this table, local officials placed the greatest importance on providing a bus service for the transportation disadvantaged. Providing bus service for work commuters was rated as less important and transportation for housewives and school children was least important.

Officials in Kerrville, Midland and Port Arthur were then asked to indicate the extent to which they agreed or disagreed with providing transit

Table 42: Relative Importance of the Transit System Achieving Results in Various Areas

Possible Results	Overall Rating[1]			Significance Level[2]
	Kerrville (n=90)	Port Arthur (n=84)	Midland (n=151)	
Provide transportation to those who cannot drive	3.64	4.23	4.04	Most Significant
Promote expanded choices of housing to those dependent on transit service	2.79	3.15	3.57	
Extend the labor market by increasing job opportunities available to workers	2.71	3.39	3.46	
Offer increased potential for redevlopment of core areas	2.93	3.53	3.14	Intermediate Significance
Attract new business to the city	2.79	3.31	3.09	
Encourage growth in underdeveloped areas	2.38	3.31	3.22	
Strengthen the social and economic ties between the city and surrounding areas	2.64	2.77	2.82	

[1] Each result was rated on a scale of 1 (strongly disagree) to 5 (strongly agree).
[2] To test statistically significant differences in the reponses, a Duncan's multiple range test for variable rank was performed to identify significantly different means. The responses fill into the general significance levels shown in the table.

dependent families with public transportation to various community locations. Eight different types of locations were specified and respondents were to circle a number on a scale of 1 (strongly disagree) to 5 (strongly agree) depending on how strongly they agreed or disagreed with transit dependent families having public service transportation available to that particular location.

Table 43: Relative Importance of Providing Transit Various Citizen Groups with Public Transportation

Citizen Group	Overall[1]			Significance Level[2]
	Kerrville (n=13-14)	Port Arthur (n=13)	Midland (n=23-25)	
Transportation disadvantaged (e.g., senior citizens, handicapped people, low income families)	3.79	4.54	4.40	Most Significant
Work commuters	3.43	4.00	3.64	Intermediate Significance
Housewives	2.71	3.31	2.47	
School children	2.69	3.00	2.00	Least Significant

[1] Each citizen group was rated on a scale of 1 (not important) to 5 (very important).
[2] To test statistically significant differences in the responses, a Duncan's multiple range test for variable rank was performed to identify significantly different means. The responses fell into the general significance levels shown in the table.

Officials were also asked to express opinions concerning providing bus service to the same community locations to families which are not totally dependent on public transportation. The results of these 2 sets of questions are summarized in Table 44. As the overall ratings in this table suggests, community leaders in all 3 cities place the greatest importance on providing public transportation to those families which are totally dependent on the service. The locations to which it is most important that service be provided included health care facilities, work location and shopping facilities. Least important locations to provide service to were community organizations, schools and social/recreational facilities.

For the last set of statements, community leaders in Kerrville, Port Arthur and Midland were asked to express their opinions on the existing (or past) transit service. Five statements concerning the quality and quantity of service were listed. For each statement, respondents were to indicate the

Table 44: Relative Importance of Providing Transit Dependent and Not Transit Dependent Families with Bus Service to Various Community Locations

Community Location	Overall Rating[1]			Significance Level[2]
	Kerrville (n=12-13)	Port Arthur (n=12-13)	Midland (n=23-25)	
Transit Dependent Familes Should Be Provided with Bus Service to:				
Health care facilities	3.53	4.25	4.04	A
Place of employment	3.38	4.00	3.96	A
Shopping facilities	3.38	4.15	3.54	A B
Government facilities	3.31	3.77	3.58	A B C
Religious facilities	3.46	3.15	3.21	B C D
Community organizations	3.15	3.31	3.00	C D
Schools	3.17	3.00	2.82	D
Social & recreational facilities	3.00	3.23	2.75	D
Families Not Totally Dependent on Transit Should Be Porvided with Bus Service to:	(n=13-14)	(n=13)	(n=23-25)	
Place of employment	2.93	3.31	3.29	A
Health care facilities	3.00	3.08	3.25	A B
Government facilities	2.85	3.15	2.92	A B C
Shopping facilities	2.93	3.15	2.75	A B C
Religious facilities	2.85	2.54	2.58	B C
Community organizations	2.69	2.84	2.42	C
Schools	3.00	2.54	2.30	C
Social & recreational facilities	2.54	2.69	2.36	C

[1] Each location was rated on a scale of 1 (strongly disagree) to 5 (strongly agree).

[2] To test statistically significant differences in the responses, a Duncan's multiple range test for variable rank was performed to identify significantly different means. The responses fell into the general significance levels shown in the table. Significance level A is most significant, levels B and C are of intermediate significance and level D is least significant. Those means with the same letter are not significantly different.

degree to which they agreed or disagreed with the statement by circling a number from 1(strongly disagree) to 5(strongly agree). Their responses are

summarized in Table 45. It is of interest to note that there was no significant difference is the level to which officials agreed or disagreed with each of the statements; all generally agreed that quality and quantity of transit service is (or was) adequate, with the officials in Port Arthur in slightly stronger agreement.

Table 45: Overall Rating of Quality and Quantity of Bus Service Provided

Factor	Overall Rating[1]			Significance Level[2]
	Kerrville (n=13-14)	Port Arthur (n=12-13)	Midland (n=22-23)	
The days and hours of service	3.69	3.77	3.09	
Time between most locations is (was) adequate	3.14	4.08	2.95	
Frequency of services is (was)	3.07	3.92	3.00	Most Significant
The overall quality of service is (was) adequate	3.54	3.15	3.04	
The bus service serves (served) enough areas	3.50	2.08	2.91	

[1] Each factor was rated on a scale of 1 (strongly disagree) to 5 (strongly agree).
[2] To test the statistically significant differences in the responses, a Duncan's multiple range test for variable rank was performed to identify significantly different means. The responses fell into only 1 signficance level.

Summary

Generally speaking, community leaders from both Port Arthur and Midland viewed the new transit system in their city as a necessary public service which should be supported by tax revenue. Greatest concern was expressed toward providing transit dependent families with public transportation to important community locations, such as health care facilities, work locations and shopping facilities. Although most agreed that the new transit systems had

not made significant contributions toward conserving energy, reducing traffic congestion or increasing retail business, they nevertheless felt the transit sytems have had a significant effect on increasing the mobility of transit dependent individuals.

In Kerrville, community officials also placed a high importance on providing transit service to those who do not have private means of transportation. The vast majority of Kerrville's residents do have regular access to private vehicles, however and as the extremely low ridership levels on KERRTRAN would suggest, those few individuals who do not have regular access to a private vehicle have other means of reaching important community locations. Although the quality and quantity of the KERRTRAN service was judged to be adequate, officials from Kerrville felt that the KERRTRAN operation had not helped to conserve energy, reduce traffic congestion or increase retail trade. Furthermore, officials felt that the system had not helped the transportation disadvantaged to any great extent.

MOBILITY NEEDS OF THE COMMUNITIES AT LARGE

In order to better understand the mobility needs of the general public, household surveys were performed in Kerrville, Port Arthur and Midland. An address listing was obtained for each of the 3 cities, and a random sample of addresses was selected. A total of 2,000 addresses from Midland, 1,850 addresses from Port Arthur and 1,000 addresses from Kerrville were selected. An initial mail-out was performed and a follow-up mail-out was also performed to increase the response rates to satisfactory levels. A total of 769 surveys from Midland, 663 surveys from Port Arthur and 510 surveys from Kerrville were received which resulted in a response rate 38.5% from Midland, 35.8% from Port Arthur and 51.0% from Kerrville. Copies of the survey instrument and a more detailed description of the survey procedures used are presented in Appendix D.

Personal Characteristics

To obtain a profile of the adult population in Kerrville, Port Arthur and Midland, questions were asked concerning age, sex, education, occupation, income and household size. This information is summarized in Table 46. As this table suggests, respondents from Midland were generally younger and more educated than those from Kerrville and Port Arthur. In addition, approximately 58.5% of the respondents from Midland were employed in white collar professions (clerical, sales, managerial and professional categories) and almost 60% had annual household incomes in excess of $30,000. In Port Arthur, on the other hand, a much higher percentage of the respondents listed their occupations as housewife (28.1%) and retired (26.3%). There were also fewer white collar workers and more blue collar workers in Port Arthur. In Kerrville, the average age of the respondents, 59, was 6 years older than that of Port

Table 46: Personal Characteristics of Household Survey Respondents as Compared to Characteristics of Transit Users.

Characteristics	Kerrville	Port Arthur		Midland	
	Household Survey	Household Survey	Transit User Survey	Household Survey	Transit User Survey
Age (years)	(n=470)	(n=629)	(n=407)	(n=471)	(n=71)
50th Percentile	62	55	22	48	40
80th Percentile	77	71	54	65	70
Mean	59	53	30	47	46
Sex	(n=487)	(n=641)	(n=410)	(n=753)	(n=81)
Male	41.5%	39.6%	25.6%	45.0%	14.8%
Female	58.5%	60.4%	74.4%	55.0%	85.2%
Years of Education	(n=499)	(n=594)	(n=373)	(n=723)	(n=69)
50th Percentile	12	11	11	14	12
80th Percentile	14	15	12	16	14
Mean	13	12	11	14	13
Occupation	(n=462)	(n=621)	(n=352)	(n=731)	(n=71)
Unemployed	1.1%	2.9%	9.7%	.3%	1.4%
Housewife	14.1%	28.1%	14.2%	19.4%	18.3%
Student	1.5%	2.7%	36.4%	1.4%	2.8%
Retired	46.1%	26.3%	8.0%	12.0%	5.7%
Household Worker	.4%	.3%	3.4%	.6%	8.5%
Laborer	1.3%	3.1%	4.8%	.7%	1.4%
Operative	.6%	1.1%	2.3%	.7%	5.6%
Service Worker	4.8%	4.5%	12.2%	3.8%	5.6%
Craftsman	2.8%	5.1%	2.0%	2.6%	5.6%
Clerical	6.5%	6.6%	3.1%	9.3%	28.2%
Sales	2.6%	3.2%	2.6%	6.4%	2.8%
Managerial	2.6%	4.0%	.3%	12.2%	8.5%
Professional	15.6%	12.0%	1.0%	30.6%	5.6%
Annual Income	(n=421)	(n=555)	(n=315)	(n=669)	(n=71)
Less than $10,000	27.1%	26.3%	59.7%	9.6%	46.5%
$10,000 to $20,000	29.7%	24.1%	24.8%	12.9%	21.1%
$20,000 to $30,000	19.5%	24.9%	10.1%	18.2%	9.9%
More than $30,000	23.7%	24.7%	5.4%	59.3%	22.5%
Persons in Household	(n=478)	(n=638)	(n=393)	(n=851)	(n=77)
1	23.6%	17.4%	10.7%	18.6%	26.0%
2	47.3%	40.0%	15.0%	39.2%	35.0%
3	11.5%	15.4%	17.6%	18.4%)	9.1%
4	12.8%	13.8%	16.8%	15.3%	20.8%
5+	4.8%	13.7%	39.9%	8.5%	9.1%

Arthur and 12 years older than that of Midland. The percentage of respondents who indicated that they were retired (46.1%) was also correspondingly higher than that of Port Arthur or Midland.

Travel Characteristics

Vehicle Ownership and Availability

Because vehicle ownership and availability provides a good indication of the degree to which individuals must rely on public transit, a series of questions were asked concerning whether or not respondents possess a valid drivers license, the number of vehicles in their households and how many days per week one of the vehicles is available for them to drive. Their responses are summarized in Table 47.

Table 47: Eligibility to Drive, Vehicle Ownership and Vehicle Availability Characteristics, Percentages

Question	Kerrville	Port Arthur	Midland
Possess a Valid Drivers License	(n=488)	(n=640)	(n=752)
Yes	93.9%	87.8%	96.3%
No	6.1%	12.2%	3.7%
Number of Vehicles in Household	(n=488)	(n=640)	(n=752)
0	3.9%	5.5%	1.6%
1	38.2%	35.2%	24.4%
2	42.1%	42.7%	43.8%
3+	15.8%	16.6%	30.2%
Number of Days/Week Vehicle is available	(n=.482)	(n=637)	(n=754)
0	2.6%	6.6%	2.6%
1 to 6	3.3%	4.7%	3.4%
7	94.1%	88.7%	94.0%

The figures in Table 47 indicate that the vast majority of the respondents from both Kerrville and Midland possess a valid drivers license, own at least one vehicle and have at least one vehicle available to drive 7 days a week. In Port Arthur, however, higher percentages of the respondents do not possess a valid drivers license, do not own a private vehicle and/or do not have access to a vehicle any day of the week. These statistical findings coincide with the Midland and Port Arthur on-board surveys in which a significantly higher percentage of MIDTRAN's users had a valid drivers license, owned at least one vehicle and had at least one vehicle available to drive for that particular trip by transit.

Use of the Transit System

Another series of questions asked in the Kerrville, Port Arthur and Midland household surveys dealt with the respondents use of the transit system in their city. The purpose of this series of questions was to determine the reasons why the occasional users and the non-users do not (or did not) take advantage of the transit system in their community more often.

The first question of the series asked respondents how often do (or did) they ride a bus. Approximately 90% of those in Kerrville and Midland and about 81% of those in Port Arthur answered "never" (Table 48). Following that question, respondents in Port Arthur and Midland were asked if they know enough about the service currently being provided to confidently use is if they should choose to do so. Approximately 63% of those in Port Arthur and 78% of those in Midland did not (Table 48). These responses suggest that the average adult resident in those 2 communities does not have a high level of knowledge concerning the service available and perhaps more promotion is needed.

Table 48: Knowledge and Use of the Transit Service Available, Percentage

Question	Kerrville	Port Arthur	Midland
How often do (did) you ride a bus?	(n=500)	(n=651)	(n=760)
Regularly	1.4%	5.1%	3.0%
Occassionally	8.6%	14.3%	6.1%
Never	90.0%	80.6%	90.0%
Know how to use the bus service?	---	(n=603)	(n=709)
Yes	Not	37.0%	22.3%
No	Applicable	63.0%	77.7%

Next, those respondents who are (or were) not regular users of the fixed-route and flex-route transit services were asked to indicate their reasons for not using the services regularly. Midland respondents were also asked to indicate the reasons for not using the MIDTRAN demand-responsive service regularly. Their responses are presented in Tables 49 and 50.

As would be expected, the majority of respondents from all 3 cities indicated that they would rather drive than ride a bus. In addition, 33% of those in Midland indicated that the demand-responsive service was too expensive. A significant percentage from all 3 cities also indicated that another reason for not using the bus was that their work requires them to have a car available during the day. These individuals who need to have their autos available during the work day would not be primary candidates for using the transit service. However, those who do not need an auto for work can be considered potential users of the systems. For that reason, respondents were then asked to indicate what might encourage them to use the transit service more often. In all 3 cities, the responses "more bus routes" and "nothing" were the most popular answers (Table 51).

Table 49: Reasons for Not Using the Fixed-Route or Flex-Route Transit Service Regularly, Percentage

Reason	Kerrville (n=493)	Port Arthur (n=600)	Midland (n=734)
Schedule times too inconvenient	20.1%	12.6%	10.2%
Buses don't run often enough	9.7%	10.5%	6.4%
Travel time is too long	17.6%	13.2%	9.0%
Live too far from a stop	26.6%	24.2%	4.8%
Need car for work	19.9%	23.3%	39.0%
Buses don't go where needed	20.3%	29.8%	13.1%
Rather drive	52.9%	62.5%	59.7%
Other	10.5%	6.0%	10.2%

Note: Many respondents listed more than one reason. Therefore, percentages do not add up to 100%.

Table 50: Reasons for Not Using the MIDTRAN Demand-Responsive Service Regularly, Percentage

Reason	Midland (n=694)
Reservations required too far in advance	12.3%
Service is too expensive	33.1%
Travel time is too long	8.2%
Need car for work	41.4%
Rather drive	61.2%
Don't know how to use service	5.5%
Other	3.7%

Note: Many respondents listed more than one reason. Therefore, percentages do not add up to 100%.

Table 51: Incentives to Use the Transit Service More Often, Percentage

Incentive	Kerrville (n=334)	Port Arthur (n=475)	Midland (n=489)
Later evening service	6.0%	10.3%	7.8%
More frequent weekday service	15.3%	8.4%	15.3%
More frequent Saturday service	3.6%	2.3%	3.7%
Offer service on Sundays	3.3%	6.5%	2.2%
More bus routes	28.7%	38.3%	17.2%
Service outside the city	5.1%	3.2%	3.7%
More information	3.0%	1.5%	5.7%
Nothing	30.8%	27.6%	39.9%
Other	4.2%	1.9%	4.5%

These answers are not surprising in that the percentage of persons who would like to see more bus routes corresponds to the percentages who indicated previously that they did not use the transit regularly because either they lived too far from the nearest bus stop or the bus did not go where they needed it to go. In addition, many of those who responded that nothing would encourage them to use the service more often had indicated previously that their work required them to have a vehicle available during the day.

Public Opinion on Operating, Funding and Expanding the New Transit Systems

Following the questions concerning their use of the KERRTRAN, MIDTRAN and Port Arthur Transit systems, respondents in Kerrville, Port Arthur and Midland were asked their opinions concerning the operation, funding and expansion of the new transit systems. Their opinions are presented in Table 52. A slight majority of respondents from Kerrville and substantial majorities from Midland

Table 52: Public Opinion on the Issues of Operating, Funding, and Expanding the New Transit Systems, Percentage

Issue	Kerrville	Port Arthur	Midland
Do you think the city should operate a bus service?	(n=493)	(n=653)	(n=759)
Yes	37.7%	71.3%	66.0%
No	32.1%	12.4%	14.5%
Not sure	30.2%	14.5%	19.5%
Do you think the city should use tax revenue to subsidize the operation of the bus service?	(n=487)	(n=643)	(n=758)
Yes	18.3	32.5%	29.0%
No	51.7%	35.8%	36.3%
Not sure	30.0%	31.7%	34.7%
Do you think the present system should be expanded if it will cost the city more money?		(n=642)	(n=733)
Yes	Does	29.1%	24.3%
No	not	39.9%	35.9%
Not sure	apply	31.0%	35.8%

and Port Arthur indicated that they thought their cities should operate a bus service. The majority of respondents from each city did not think the operation of the system should be subsidized with tax revenue, however. Furthermore, on the subject of service expansion, the majority of those from Port Arthur and Midland either expressed mixed feelings or indicated that the present systems should not be expanded if that expansion will cost the cities more money. Those responses reflect a "want the service, but don't want to have to pay for it" attitude on the part of a great many of the individuals surveyed.

Major Reason to Provide Transit Service

Next, respondents from Kerrville, Port Arthur and Midland were asked to indicate the one major reason their community should have a bus service. Like the majority of those who responded to the retail merchants and community leader surveys, the majority of those who responded to the household survey indicated that providing transportation to those who cannot drive is the most important reason to provide transit service (Table 53). In Midland, a significant percentage also answered that reducing traffic congestion was the one most important reason for service.

Table 53: Public Opinion on the Major Reasons to Provide Transit Service, Percentage

Major Reason	Kerrville (n=463)	Port Arthur (n=631)	Midland (n=729)
Save energy	11.0%	9.7%	9.5%
Reduce traffic congestion	9.7%	4.7%	32.1%
Provide transportation for those who cannot drive	62.0%	78.3%	50.5%
Improve the local economy	2.6%	3.2%	1.8%
No reason to provide service	13.8%	4.1%	5.7%
Other	.9%		.4%

Public Opinion on the Effects of the New Transit Systems

Respondents to the household survey in Kerrville, Port Arthur and Midland were also given the chance to express their opinions on the effects they think the new transit systems have had on energy conservation and traffic congestion. Their responses are presented in Table 54. On the issue of energy conservation, reaction was mixed. A large percentage of the respondents (46.3%) from Port Arthur felt that the Port Arthur Transit System has helped to conserve

Table 54: Public Opinion on the Effect of the New Transit System on Energy conservation and Traffic Congestion

Question	Kerrville	Port Arthur	Midland
Does (did) the bus service help to conserve energy?			
Yes	71 (14.8%)	296 (46.3%)	251 (33.5%)
No	247 (51.5%)	166 (26.0%)	201 (26.8%)
Not sure	162 (33.7%)	177 (27.7%)	298 (39.8%)
If "yes," is (was) the effect:			
Significant	18 (31.6%)	122 (47.8%)	64 (28.8%)
Insignificant	11 (19.3%)	28 (11.0%)	63 (28.4%)
Not sure	28 (49.1%)	105 (41.2%)	95 (42.8%)
Does (did) the bus service help to reduce traffic congestion?			
Yes	55 (11.5%)	195 (30.8%)	185 (24.7%)
No	309 (64.8%)	278 (43.9%)	322 (43.1%)
Not sure	113 (23.4%)	160 (25.3%)	241 (32.2%)
If "yes," is (was) the effect:			
Significant	18 (43.9%)	106 (61.6%)	63 (28.2%)
Insignificant	12 (29.3%)	22 (12.8%)	54 (32.7%)
Not sure	11 (26.8%)	44 (25.6%)	48 (29.1%)

energy; 47.8% of those who indicated that the system has helped, thought its effect on energy conservation was significant. On the other hand, the majority of respondents (51.5%) from Kerrville said KERRTRAN did not help to conserve energy, and many respondents (39.8%) from Midland were not sure if the MIDTRAN service has conserved energy or not. With regard to reducing traffic congestion, about 65% of the respondents from Kerrville and about 43% from Port Arthur and Midland thought that the transit system has (or had) not helped to reduce traffic congestion.

Respondents in all 3 cities were also asked about the new transit systems' effects on the business communities in their areas. Again, their answers were mixed (Table 55). The majority in Port Arthur felt that the transit service has helped the business community. In fact, about 27% of the respondents in Port Arthur felt that the new system's effect had been significant. About 42.9% from Kerrville thought that transit service had not helped the business community and 41.4% from Midland were unsure.

Table 55: Public Opinion on the Effect of the New Transit System on Business

Question	Kerrville	Port Arthur	Midland
Does (did) the bus service help the business community?			
Yes	102 (21.6%)	356 (56.1%)	257 (34.7%)
No	204 (42.9%)	134 (21.1%)	177 (23.9%)
Not sure	169 (35.5%)	145 (22.8%)	306 (41.4%)
If "yes," is (was) the effect:			
Significant	36 (44.4%)	171 (54.8%)	112 (48.7%)
Insignificant	19 (23.5%)	44 (14.1%)	37 (16.1%)
Not sure	26 (32.1%)	97 (31.1%)	81 (35.2%)

Summary

The majority of respondents from all 3 cities indicated that they are able to and would rather drive a private vehicle than ride a bus. However, a significant percentage in Kerrville (38%), and substantial majorities in Midland and Port Arthur (66% and 71% respectively) were nevertheless in favor of their cities operating a transit system. The major reason listed for operating such a system was to provide transportation to those who cannot drive. The majority of respondents in Port Arthur (56.1%) also felt that the transit

system has helped the business sector, and 46.3% of those respondents felt that transit had helped to conserve energy.

MAJOR FINDINGS AND CONCLUSIONS

The possible social and economic benefits to be derived from operating a transit system are well known to transportation planners and other decision-makers. In addition to providing increased mobility to those persons who do not enjoy easy access to private vehicles, public transit is also frequently credited with the ability to conserve energy, reduce traffic congestion, and increase retail activity. Today, many view public transit as an indispensable public service that is vital to the economic and social well-being of a community. However, with rapidly rising transit labor and operating costs, careful and thorough assessments of the true benefits to be derived from implementing new public transportation systems are being sought by policy-makers before fore decisions are made. Furthermore, because the major portion of transit operating expenses are paid out of public funds, it has become even more important to determine the extent to which public transit accomplishes its acclaimed benefits to society (1).

The 3 new public transportation systems in Kerrville, Port Arthur and Midland, Texas have provided 3 excellent case studies of the potential benefits to be derived from implementing a new transit system in a small urban community in Texas. This report has attempted to identify the short-term effects of implementing the fixed-route transit service in Kerrville and Port Arthur and flex-route and demand-responsive transit service in Midland. Major emphasis was placed on identifying the personal and travel characteristics of those segments of the populations which use the services on a regular basis. In addition, the effects on energy conservation, traffic congestion and parking demand were also identified, as were the effects on retail establishments and on other providers of transportation services. Finally, input from community leaders and the general public was sought on the effects of the new transit systems.

Benefits to the Transit Users

As in all small cities in Texas and the United States, the predominant mode of travel in Kerrville, Port Arthur and Midland is the private vehicle. The implementation of transit service in these communities did little to alter this situation. KERRTRAN averaged less than 70 passenger-trips per day during its 7 months of operation. MIDTRAN's ridership was up to 503 passenger-trips per day after 19 months of operation and the Port Arthur Transit System averaged 944 passenger-trips per day by the end of 29 months of service. Assuming these 70, 503 and 944 daily one-way passenger-trips were made by 35, 201, and 472 different passengers then the new transit systems in Kerrville, Midland and Port Arthur were serving the transportation needs of less than 1% of their city's population. Furthermore, on-board surveys conducted in Port Arthur and Midland could identify only 24 weekday users and 20 Saturday users in Port Arthur and 22 weekday users in Midland who have shifted from private vehicles to transit.

With approximately 87% of the Port Arthur Transit weekday riders, 84% of the Saturday riders and 50% of the MIDTRAN weekday riders defined as being transit dependent, the transit systems in these cities primarily serve the traditional transit markets -- the young, the old, and the economically disadvantaged. MIDTRAN also serves another market -- the physically and/or mentally handicapped. To these groups of individuals, the availability of transit service has meant that they no longer have to rely on family and friends to meet their travel needs. The transit service has provided them with a convenient and economical transportation alternative. For many, the transit service has also opened up new employment and shopping opportunties.

Effects on Other Sectors of the Community

Because the vast majority of transit riders are transit dependent (rather than riders by choice) very few automobiles have been removed from the roadways. As a result, the implementation of the new transit systems have had little or no effect on reducing traffic congestion or reducing the demand for parking. In addition, it was also determined that the new transit systems have not conserved energy. Retail merchants surveyed also reported that the increase in retail trade has been slight (if any).

While the implementation of MIDTRAN has had a slight negative effect on one taxi operator, taxi operators in Kerrville and Port Arthur reported that the systems in their cities have not resulted in any loss of business. In fact, a few operators stated that their businesses had actually increased slightly.

The effect of the new transit systems on social service agencies providing transportation in Kerrville and Port Arthur has been negligible. In Midland, however, because of the door-to-door nature of the service, MIDTRAN has been able to take over most of the transportation functions these agencies had to provide prior to the implementation of MIDTRAN.

The findings of this study were not surprising as the literature review conducted at the outset of the study revealed that other small urban areas across the county have had similar experiences in implementing new transit systems. As stated previously, the new transit systems in Midland, Port Arthur and Kerrville have not had dramatic effects (if any effects at all) on conserving energy, reducing traffic congestion or increasing retail trade. In addition, the overall riderships are low and the differences between operating costs and revenues are high. Nevertheless, the new transit systems in Port Arthur and Midland have played substantial roles in providing the non-driving segments of the populations with greater mobility, convenience and

flexibility of travel. Furthermore, surveys indicated that the provision of public transportation to those who cannot drive has the support of both community leaders and the residents of Midland and Port Arthur. In Kerrville, the provision of public transit to those who do not have private means of transportation also has the support of both the community leaders and the local residents. The vast majority of Kerrville's residents do have regular access to private vehicles, however, and as the extremely low ridership levels on KERRTRAN would suggest, those few individuals who do not have regular access to a private vehicle have other means of reaching important community locations.

PLANNING GUIDELINES BASED ON EXPERIENCES IN KERRVILLE, PORT ARTHUR, MIDLAND AND OTHER SMALL COMMUNITIES

The lessons to be learned from the implementation of new public transportation services in Kerrville, Port Arthur and Midland are many. Therefore, a few generalized guidelines for planning and implementing new transit systems in other small urban communities were developed, based on these experiences in in these 3 small cities and the experiences of other small urban areas. While the guidelines presented in this chapter do not represent a complete list of all the factors to be considered when planning a new transit system, they nevertheless touch on some of the more important issues.

Experience has shown that transit systems in small communities with little roadway congestion and few parking problems are used primarily by persons with limited mobility -- those who do not own or have access to a private vehicle and those who cannot drive because of age or physical limitations. Therefore, it is important that a new transit system be planned with the special transportation needs of this group of individuals in mind. This group of transportation disadvantaged persons will usually represent only a small proportion of a community's population. Thus, the utilization of the transit service will be low. For example, it was determined that the transit systems in Kerrville, Midland and Port Arthur served less than 1% of the total populations of their communities.

Unlike the transit systems in large cities such as Houston and Dallas, the transit service provided in a smaller urban area may not be utilized extensively for work trips. Other trip purposes such as shopping and travel to and from health care facilities may be more important. Therefore, more frequent service during morning and evening peak periods may not be necessary.

in a smaller urban area. Special commuter-oriented services such as park-and-ride or express bus service would also not be necessary. However, a subscription type service to and from a major employment center may be warranted in some areas such as Midland where it has been determined that a sufficient number of riders would utilize the service. Routes and schedules for the new transit service should be planned with the locations and operating hours of the major generators to be served in mind. These generators incude health care facilities, shopping centers, social service agencies, schools and universities, and major employers. Because it is not usually practical to cover all areas of town equally, the initial routes should be developed to provide service to and from those areas which hold the greatest potential for ridership,such as low income areas. Subsequent route expansions can then be based on the ridership of previous segments. Radical adjustments to the routes and schedules should be avoided, if possible. In time, however, it may be necessary to make such changes if ridership levels are extremely low. Such was the case in both Kerrville and Midland. Although KERRTRAN was not successful in increasing ridership after route and schedule changes were intituted, MIDTRAN underwent several radical changes and finally was successful in increasing ridership when it terminated all but 2 flex-routes and began providing the remainder of service on a demand-responsive basis.

In addition, the route structure and schedule of the new transit system should be easy to understand and remember without constantly having to refer to transit route maps and time tables. It has been determined that the more efficient fixed-route systems used "loop" routes which provide for maximum geographic coverage, yet are easy to understand. In addition, the use of timed, central transfer points where all routes converge was also found to improve productivity and the quality of service. By providing such a point,

as has been done in Port Arthur, passengers can usually reach any destination with a maximum of one transfer. Also, since all buses converge at the scheduled times and do not depart again until all have arrived, the wait time for transferring passengers is minimal and no walk is required. Furthermore, if the system is set up such that all routes connect to (and become) other routes at the transfer point, many passengers can travel from one route to its connecting route without transferring to another bus.

A system of routes which provides for 2-directional service is also very desirable. One of the biggest complaints from respondents to the Kerrville household survey was that while it may have taken only 10 minutes to travel from Point A to Point B on a KERRTRAN bus, the return trip from Point B back to Point A took as long as 50 minutes because the buses ran along the routes in 1 direction only.

In addition, a transit system which operates on clock-face headways is also preferable as users will always know when to expect the bus no matter what the hour of the day.

A transit marketing program for the new system should also be implemented to acquaint residents with the features of new transit service Possible promotional techniques might include bus displays at local shopping centers and schools, free rides on special occasions and advertisements in the local news media. Distribution of easy-to-understand route maps and schedules and a special telephone number to call for information about the service have also been found to be effective marketing tools. Special fares to encourage ridership from specific groups such as students and elderly residents should also be considered. In addition, books of tickets sold at a slight discount can be effective in encouraging ridership by making the method of fare payment more convenient.

The costs involved in providing a new transit service even with small buses and nonunionized labor is not low by any means. In Kerrville, the cost per passenger averaged $7.34 and the cost per vehicle-mile averaged $1.30 during its 7 months of operation. In Midland, the cost per passenger averaged $3.55, the cost per vehicle-mile averaged $1.51 and the cost per vehicle-hour averaged $21.09 during the first 19 months of service. Average costs in Port Arthur were also high -- $1.81 per passenger, $2.55 per vehicle-mile and $35.33 per vehicle-hour during the first 29 months of service. Farebox revenue only covered about 4% of the costs in Kerrville, about 15% in Port Arthur and about 23% of the costs in Midland which left substantial deficits in all 3 cities to be covered by public subsidies. If a community is seriously concerned about the economics of the transit operation, a flex-route/demand-responsive service such as that provided by MIDTRAN is slightly less expensive than a conventional fixed-route service such as that provided by the Port Arthur Transit System. Should demand-responsive service also prove to be too expensive to provide, other public transportation alternatives, such as shared-ride taxi should be thoroughly investigated.

The implementation of a new transit system may also compete with local taxicab operators and, therefore, affect their businesses adversely. This is especially true where the transit service provided is primarily of a door-to-door nature as in the case of Midland. Because this possibility does exist, opportunities to maximize coordination of the taxi service with the transit service should be investigated.

Generally, the implementation of new transit service will not eliminate the need for social service agency transportation functions, although opportunies do exist for the coordination of services, especially where the transit system provides door-to-door service as does MIDTRAN.

One last planning guideline based on the experience of KERRTRAN operation is that a city with a population of only 15,000 residents, most of whom own at least one private vehicle, should not be considered a prime candidate for fixed-route transit service -- even if 27% of its residents are elderly. Although many Kerrville residents had indicated that they would use the transit service they did not, in fact, give up the comfort and convenience of their private vehicles to ride a bus.

Finally, it should be remembered that although the implementation of a new transit system in a small urban community is not likely to have a significant effect on conserving energy, reducing traffic congestion or increasing retail trade, that system (if properly planned) should provide a vital public service for those individuals without access to private vehicles.

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APPENDICES

Appendix A - Survey Instruments and Procedures Used in the MIDTRAN and Port Arthur Transit User Surveys

Appendix B - Survey Instruments and Procedures Used in the Kerrville, Port Arthur and Midland Retail Merchants Surveys

Appendix C - Survey Instruments and Procedures Used in the Kerrville, Port Arthur and Midland Community Leaders Opinion Surveys

Appendix D - Survey Instruments and Procedures Used in the Kerrville, Port Arthur and Midland Household Surveys

APPENDIX A

SURVEY INSTRUMENTS AND PROCEDURES USED IN THE MIDTRAN AND PORT ARTHUR TRANSIT ON-BOARD SURVEYS

In order to obtain more information about the characteristics and trip-making patterns of the transit users, on-board surveys were conducted in Midland and Port Arthur. Approaches for undertaking on-board surveys are presented in TTI Research Report 1052-4. Because a representative sample of patrons provides responses highly similar to those of the total ridership, a 30% sample of the daily users was selected for the on-board surveys. In Port Arthur, on-board surveys were conducted on Thursday, January 7, 1982 and on the following Saturday, January 9, 1982. In Midland, on-board surveys were conducted on Thursday, February 11, 1982. A Saturday survey was not conducted in Midland as MIDTRAN had just recently discontinued its Saturday service. Copies of the questionnaires used in the on-board surveys are presented at the end of this appendix.

To obtain a reliable sample of both weekday and Saturday transit users, buses for sampling were chosen at both peak and off-peak periods.

Confidence intervals for the on-board survey sample can be generated based on estimated responses to one item on the questionnaire. The single item, "Do you have a current drivers license?" was selected for determining the potential confidence levels of the on-board sample. Assuming that 40% of the Port Arthur Transit weekday users answered "yes" and 60% answered "no," the standard error associated with this response can be estimated using the following equation:

$$S = \sqrt{\frac{PQ}{n}}$$

Where P,Q = the population parameters for the binomial. If 40% of those surveyed responded "yes" to the survey question described above 60% said "no," P and Q are 40 and 60 respectively.

n = the number of cases in the sample.

S = the standard error, indicating the extent to which the sample estimates will be distributed around the population parameter.

Thus, based on the responses from the Port Arthur Transit weekday survey (n=300), the standard error would be computed as shown below:

$$S = \sqrt{\frac{.40 \times .60}{300}} = 0.028 \text{ or } 2.8\%$$

That is, if 40% of the users surveyed possess a current drivers license, then the true percentage of total users which possess a current drivers license is likely to be within 2.8 percentage points of 40%. More precisely, in 95 out of every 100 samples, the sample value should be within 2.8 percentage points of the true population value, so the odds are 95:5 that the true population value here is between 37.2% (40% - 2.8%) and 42.8% (40% + 2.8%). Given the other indeterminacies always associated with surveys, a sampling error of 3% is quite reasonable (16).

A total of 312 survey questionnaires were actually completed during the weekday Port Arthur Transit on-board survey and an additional 228 surveys were completed during the Saturday survey. In Midland, 90 surveys were completed during the weekday survey. The total number of returned questionnaires represents about 30% of the weekday and Saturday ridership (excluding transfer) in Port Arthur and about 20% of the average weekday revenue paying ridership in Midland.

Port Arthur Transit User Survey

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

Please take a few minutes to answer the following questions. Your answers will help us to understand your transit needs and how well the present bus service responds to these needs. You need not sign your name, so all information will be completely confidential. Please return completed survey forms to the survey taker.

1. **When you boarded this bus, where were you coming from?**

____Home	____Medical or dental facility
____Work	____Social or recreational facility
____School	____Bank or other personal business
____Shopping	____Other (specify)_____

2. **Where did you board this bus?** Bus stop at _____
(nearest street intersection)

3. **How did you get to the bus stop?**

____Walked	____Transferred from another bus
____Drove my car	____Taxi
____Rode as a passenger in a car	____Other (specify)_____

4. **How long did it take you to get to the bus stop?** _____minutes

5. **Where will you get OFF this bus?** Bus stop at _____
(nearest street intersection)

6. **After getting off this bus, how will you get to your final destination?**

____Walk ____Transfer to another bus ____Other (specify)_____

7. **Where are you going after leaving this bus (or the one you will transfer to later)?**

____Home	____Medical or dental facility
____Work	____Social or recreational facility
____School	____Bank or other personal business
____Shopping	____Other (specify)_____

8. **How long will it take you to get to your final destination from this bus (or the one you will transfer to later)?** _____minutes

9. **How long have you used the PAT bus service?** _____months

10. **How often do you use a PAT bus?**

____Almost every day	____Once or twice a month
____About once a week	____Seldom

11. **Which ONE of the following would encourage you to use the bus service more often?**

____Later evening service	____Offer service on Sundays
____More frequent weekday service	____More bus routes
____More frequent Saturday service	____Other (specify)_____

(OVER)

12. **Has the PAT bus service allowed you to work at a location to which you previously had no transportation?** ____Yes ____No

13. **Has the PAT bus service allowed you to shop at locations to which you previously had no transportation?** ____Yes ____No

14. **Has the PAT bus service resulted in you spending more dollars shopping?**

____Yes ____No ____Not Sure

15. **Do you have a drivers license?** ____Yes ____No

16. **How many vehicles are there in your household?** _____

17. **Could you have used one of these vehicles to make this trip?** ____Yes ____No

18. **If this bus service were not available, how would you make this trip?**

____Drive myself ____Walk

____Someone else would drive me ____Could not make this trip

____Take a taxi ____Other (specify)_____

19. **How would you rate your satisfaction with the PAT bus service overall?**

____Satisfactory ____Neutral ____Unsatisfactory

20. **How many persons are there in your household (including yourself)?** _____

21. **What is your age?** _____ 22. **What is your sex?** ____Male ____Female

23. **What is your current occupation, in as specific terms as possible? (Also, please specify if retired, unemployed, student or housewife.)** _____

24. **How many years of school have you completed?** _____

25. **What is your annual household income?**

____Less than $10,000 ____$20,000 to $30,000

____$10,000 to $20,000 ____Over $30,000

26. **Other comments or suggestions:** _____

_____

_____

_____

_____

_____

THANK YOU FOR YOUR COOPERATION

MIDTRAN Flex-Route User Survey

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

Please take a few minutes to answer the following questions. Your answers will help us to understand your transit needs and how well the present bus service responds to these needs. You need not sign your name, so all information will be completely confidential. Please return completed survey forms to the survey taker.

1. When you boarded this bus, where were you coming from?

____Home
____Work
____School
____Shopping
____Medical or dental facility
____Social or recreational facility
____Bank or other personal business
____Other (specify)_____

2. Where did you board this bus? _____
(nearest street intersection)

3. Where will you get OFF this bus? _____
(nearest street intersection)

4. Where are you going after leaving this bus (or the one you will transfer to later)?

____Home
____Work
____School
____Shopping
____Medical or dental facility
____Social or recreational facility
____Bank or other personal business
____Other (specify)_____

5. How long have you used the MIDTRAN service? _____ months

6. How often do you use the MIDTRAN service?

____Almost every day
____About once a week
____Once or twice a month
____Seldom

7. Which ONE of the following would encourage you to use the bus service more often?

____Later evening service
____More frequent daytime service
____More frequent Saturday service
____Offer service on Sundays
____More bus routes
____Other (please specify)_____

8. Has the MIDTRAN bus service allowed you to work at a location to which you previously had no transportation? ____Yes ____No

9. Has the MIDTRAN bus service allowed you to shop at locations to which you previously had no transportation? ____Yes ____No

10. Has the MIDTRAN bus service resulted in you spending more dollars shopping?

____Yes ____No ____Not Sure

11. Do you have a current valid driver's license? ____Yes ____No

(OVER)

12. How many vehicles in operating condition are there in your household? _____

13. Could you have used one of these vehicles to make this trip? ____Yes ____No

14. If this bus service were not available, how would you make this trip?

____Drive myself ____Walk

____Someone else would drive me ____Could not make this trip

____Take a taxi ____Other (specify)_____

15. How would you rate your satisfaction with the MIDTRAN bus service overall?

____Satisfactory ____Neutral ____Unsatisfactory

16. How many persons are there in your household (including yourself)? _____

17. What is your age? _____ 22. What is your sex? ____Male ____Female

18. What is your current occupation, in as specific terms as possible? (Also, please specify if retired, unemployed, student or housewife.) _____

19. What is the highest level of school you have completed? _____

20. What is your annual household income?

____Less than $10,000 ____$20,000 to $30,000

____$10,000 to $20,000 ____Over $30,000

21. Other comments or suggestions: _____

_____

_____

_____

_____

THANK YOU FOR YOUR COOPERATION

MIDTRAN User Survey

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

Please take a few minutes to answer the following questions. Your answers will help us to understand your transit needs and how well the present bus service responds to these needs. You need not sign your name, so all information will be completely confidential. Please return completed survey forms to the survey taker.

1. **When you boarded this bus, where were you coming from?**

____Home
____Work
____School
____Shopping
____Medical or dental facility
____Social or recreational facility
____Bank or other personal business
____Other (specify)_____

2. **Where did you board this bus?** _____
(nearest street intersection)

3. **How did you get there?**

____Walked
____Drove my car
____Rode as a passenger in a car
____Taxi
____Transferred from another bus
____Bus picked me up at my door
____Other (specify)_____

4. **If you boarded at a bus stop, how long did it take to get to that bus stop?**
_____minutes

5. **Where will you get OFF this bus?** _____
(nearest street intersection)

6. **After getting off this bus, how will you get to your final destination?**

____Walk
____Transfer to another bus
____Bus delivers me to door of destination
____Other (specify)_____

7. **Where are you going after leaving this bus (or the one you will transfer to later)?**

____Home
____Work
____School
____Shopping
____Medical or dental facility
____Social or recreational facility
____Bank or other personal business
____Other (specify)_____

8. **If the bus does not take you directly to your destination, how long will it take you to get there from where this bus (or the one you will transfer to later) lets you off?** _____minutes

9. **How long have you used the MIDTRAN service?** _____months

10. **How often do you use the MIDTRAN service?**

____Almost every day
____About once a week
____Once or twice a month
____Seldom

11. **Which ONE of the following would encourage you to use the bus service more often?**

____Later evening service ____Offer service on Sundays

____More frequent daytime service ____More bus routes

____More frequent Saturday service ____Other (please specify)_____

12. **Has the MIDTRAN bus service allowed you to work at a location to which you previously had no transportation?** ____Yes ____No

13. **Has the MIDTRAN bus service allowed you to shop at locations to which you previously had no transportation?** ____Yes ____No

14. **Has the MIDTRAN bus service resulted in you spending more dollars shopping?**

____Yes ____No ____Not Sure

15. **Do you have a current valid driver's license?** ____Yes ____No

16. **How many vehicles in operating condition are there in your household?** _____

17. **Could you have used one of these vehicles to make this trip?** ____Yes ____No

18. **If this bus service were not available, how would you make this trip?**

____Drive myself ____Walk

____Someone else would drive me ____Could not make this trip

____Take a taxi ____Other (specify)_____

19. **How would you rate your satisfaction with the MIDTRAN bus service overall?**

____Satisfactory ____Neutral ____Unsatisfactory

20. **How many persons are there in your household (including yourself)?** _____

21. **What is your age?** _____ 22. **What is your sex?** ____Male ____Female

23. **What is your current occupation, in as specific terms as possible? (Also, please specify if retired, unemployed, student or housewife.)** _____

24. **What is the highest level of school you have completed?** _____

25. **What is your annual household income?**

____Less than $10,000 ____$20,000 to $30,000

____$10,000 to $20,000 ____Over $30,000

26. **Other comments or suggestions:** _____

_____

_____

_____

_____

THANK YOU FOR YOUR COOPERATION

APPENDIX B

SURVEY INSTRUMENTS AND PROCEDURES USED IN THE KERRVILLE, PORT ARTHUR AND MIDLAND RETAIL MERCHANTS SURVEYS

In order to determine the possible effects of new transit service on retail activity, a selected group of retail merchants in Kerrville, Port Arthur and Midland was surveyed. A total of 117 business in Kerrville, 130 in Port Arthur and 190 in Midland were mailed survey questionnaires which asked about their business volumes and what effect (if any) the new transit service has had on their business. These merchants were contacted by mail rather than by personal interview in order to reach as many merchants as possible.

In each city, retail establishments were selected from the CBD area, shopping center and malls and non-centralized shopping areas such as strip commercial developments along the bus routes. In addition, a small group of merchants located in Kerrville and Port Arthur outside the bus route coverage area in Kerrville and Port Arthur were also mailed questionnaires. The purpose of surveying this group of merchants was to determine if they perveived not having transit service available to their establishments as detrimental to their businesses. (Note: In Midland, because of the door-to-door nature of the demand-response service offered by MIDTRAN, virtually every retail store in the city is accessible by bus.) The number of establishments surveyed by type of location is presented in Table B-1.

Copies of the survey instruments along with the cover letters sent with each are included at the end of this appendix.

A total of 121 responses to the survey were received: 45 from Kerrville, 50 from Midland and 26 from Port Arthur businesses. This resulted in a response rate of 38.5% from Kerrville, 26.3% from Midland and 20% from Port Arthur.

Table B-1: Locations of Businesses Surveyed in Kerrville, Port Arthur and Midland

Location	Kerrville	Port Arthur	Midland
CBD	31	30	20
Shopping Centers/Malls	32	29	130
Noncentral Shopping Areas	39	53	67
Shopping Areas Outside bus Route Coverage Area	15	18	---
TOTAL	117	130	190

COMMISSION
ROBERT H. DEDMAN, CHAIRMAN
A. SAM WALDROP
JOHN R. BUTLER, JR.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

ENGINEER-DIRECTOR
MARK G. GOODE

Cooperating Agency:

Urban Mass Transportation Administration

IN REPLY REFER TO FILE NO.

Dear Retail Merchant:

A limited number of retail merchants in the Kerrville area are being asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of this study is to determine what effect the KERRTRAN bus service had on retail business while it was in operation from August 1979 to February 1980.

Since we have included only a small number of businesses in this survey, your participation is essential to insure the success of the project. Information obtained from the survey will only be used in the form of summaries of the responses received from all participants. Your individual response will remain confidential. Please complete the attached survey form and return it in the stamped envelope at your earliest convenience.

Thank you for your time and assistance in this important undertaking.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

Kerrville Retail Merchant Survey

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

This questionnaire is designed to be easy to complete and should take no more than 5 minutes of your time. All answers to the questions will remain confidential. Please return the completed form in the stamped envelope at your earliest convenience.

Business Name _____

Address _____ Telephone _____

Number of years at present location _____

Nature of business _____

Name of person providing information _____ Title _____

1. **What are the current hours and days your establishment is open for business?** _____

_____

2. **How many square feet of floor space do you have in this establishment?** _____

3. **How many persons does your business currently employ?** _____

4. **Do you think there is adequate parking available for your customers?**

____Yes ____No

If "no," why not? _____

_____

5. **What percentage of your customers would you estimate are:**

working in the vicinity? ____%

residents of the vicinity? ____%

coming from outside the vicinity? ____%

Total 100 %

6. **In general, how much of an increase or decrease was there in your business during the months KERRTRAN was in operation (August 1979 through February, 1980)?**

____% Increase ____% Decrease

What do you think was the cause of the increase or decrease? _____

_____

How much of the increase/decrease do you think was due to the new bus service? ____%

7. **During the 7 months KERRTRAN was in operation, what percentage of your customers would you estimate came to your place of business by bus?** ____%

What percentage of these bus-riding customers would you estimate were new customers? ____%

(OVER)

8. **During the 7 months KERRTRAN was in operation, do you think the bus service had an impact on area business?**

_____Yes ____No ____Not Sure

Was that impact positive or negative and what was the magnitude? _____

_____

_____

9. **How many of your employees took the bus to work?** _____

10. **Did you do anything to coordinate your business with the new transit service?**

____Yes ____No

What did you do, or why did you not coordinate with the transit service? _____

_____

_____

11. **What changes would you have made in the present bus service to make it more beneficial to the business in this area?** _____

_____

_____

12. **Do you think the City of Kerrville should reconsider operating a bus service?**

____Yes ____No ____Not Sure

13. **Do you think the City of Kerrville should use tax revenue to subsidize the operation of the bus service?** ____Yes ____No ____Not Sure

14. **In your opinion, what is the <u>one</u> major reason Kerrville should have a bus service?**

____Save energy

____Reduce traffic congestion

____Provide transportation to those who cannot drive

____Improve the local economy

____Other (specify)_____

15. **In the following list, what would you perceive as being important community expenditures to ensure that business in this area is enhanced?**

____Police protection ____Beautification

____Fire protection ____Increase parking availability

____Building rehabilitation ____Improve condition of streets

____Bus service ____Other (specify)_____

COMMENTS AND SUGGESTIONS

THANK FOR YOUR COOPERATION

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

IN REPLY REFER TO FILE NO.

Cooperating Agencies:

Port Arthur Transit System
Urban Mass Transportation Administration

Dear Retail Merchant:

A limited number of retail merchants in the Port Arthur area are being asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of this study is to determine what effect the Port Arthur Transit service has had on retail business since it began operation in May 1979.

Because we have included only a small number of businesses in this survey, your participation is essential to insure the success of the project. Information obtained from the survey will only be used in the form of summaries of the responses received from all participants. Your individual response will remain confidential. Please complete the attached survey form and return it in the stamped envelope at your earliest convenience.

Thank you for your time and assistance in this important undertaking.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

Port Arthur Retail Merchant Survey

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

This questionnaire is designed to be easy to complete and should take no more than 5 minutes of your time. All answers to the questions will remain confidential. Please return the completed form in the stamped envelope at your earliest convenience.

Business Name _____

Address _____ Telephone _____

Number of years at present location _____

Nature of business _____

Name of person providing information _____ Title _____

1. **What are the current hours and days your establishment is open for business?** _____

   _____

2. **How many square feet of floor space do you have in this establishment?** _____

3. **How many persons does your business currently employ?** _____

4. **Do you think there is adequate parking available for your customers?**

   ____Yes ____No

   If "no," why not? _____

   _____

5. **What percentage of your customers would you estimate are:**

   working in the vicinity? ____%

   residents of the vicinity? ____%

   coming from outside the vicinity? ____%

   Total 100 %

6. **In general, how much of an increase or decrease was there in your business this month, compared with the same month in 1979 (before bus service)?**

   ____% Increase ____% Decrease

   What do you think was the cause of the increase or decrease? _____

   _____

   How much of the increase/decrease do you think was due to the new bus service? _____%

7. **What percentage of your customers would you estimate come to your place of business by bus?** ____%

   What percentage of these bus-riding customers would you estimate are new customers (since May 1979)? ____%

8. **Do you think the new bus service has had an impact on area business?**

____Yes ____No ____Not Sure

Is that impact positive or negative and what is the magnitude? _____

_____

_____

9. **How many of your employees take the bus to work?** _____

10. **Have you done anything to coordinate your business with the new transit service?**

____Yes ____No

What have you done, or why have you not coordinated with the transit service? _____

_____

_____

11. **What changes would you make in the present bus service to make it more beneficial to the business in this area?** _____

_____

_____

12. **Do you think the City of Port Arthur should operate a bus service?**

____Yes ____No ____Not Sure

13. **Do you think the City of Port Arthur should use tax revenue to subsidize the operation of the bus service?** ____Yes ____No ____Not Sure

14. **Do you think the present system should be expanded if it will cost the city more money?** ____Yes ____No ____Not Sure

15. **In your opinion, what is the <u>one</u> major reason Port Arthur should have a bus service?**

____Save energy

____Reduce traffic congestion

____Provide transportation to those who cannot drive

____Improve the local economy

____Other (specify)_____

16. **In the following list, what would you perceive as being important community expenditures to ensure that business in this area is enhanced?**

____Police protection ____Beautification

____Fire protection ____Increase parking availability

____Building rehabilitation ____Improve condition of streets

____Bus service ____Other (specify)_____

COMMENTS AND SUGGESTIONS

THANK FOR YOUR COOPERATION

COMMISSION
ROBERT H. DEDMAN, CHAIRMAN
A. SAM WALDROP
JOHN R. BUTLER, JR.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

ENGINEER-DIRECTOR
MARK G. GOODE

IN REPLY REFER TO
FILE NO.

Cooperating Agencies:

MIDTRAN
Urban Mass Transportation Administration

Dear Retail Merchant:

A limited number of retail merchants in the Midland area are being asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of this study is to determine what effect the MIDTRAN flex-route and demand-responsive bus service has had on retail business since it began operation in January 1980.

Because we have included only a small number of businesses in this survey, your participation is essential to insure the success of the project. Information obtained from the survey will only be used in the form of summaries of the responses received from all participants. Your individual response will remain confidential. Please complete the attached survey form and return it in the stamped envelope at your earliest convenience.

Thank you for your time and assistance in this important undertaking.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

Midland Retail Merchant Survey

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

This questionnaire is designed to be easy to complete and should take no more than 5 minutes of your time. All answers to the questions will remain confidential. Please return the completed form in the stamped envelope at your earliest convenience.

Business Name _____

Address _____ Telephone _____

Number of years at present location _____

Nature of business _____

Name of person providing information _____ Title _____

1. **What are the current hours and days your establishment is open for business?** _____

_____

2. **How many square feet of floor space do you have in this establishment?** _____

3. **How many persons does your business currently employ?** _____

4. **Do you think there is adequate parking available for your customers?**

____Yes ____No

If "no," why not? _____

_____

5. **What percentage of your customers would you estimate are:**

working in the vicinity? ____%

residents of the vicinity? ____%

coming from outside the vicinity? ____%

Total 100 %

6. **In general, how much of an increase or decrease was there in your business this month, compared with the same month in 1979 (before bus service)?**

____% Increase ____% Decrease

What do you think was the cause of the increase or decrease? _____

_____

How much of the increase/decrease do you think was due to the new bus service? ____%

7. **What percentage of your customers would you estimate come to your place of business by bus?** ____%

What percentage of these bus-riding customers would you estimate are new customers (since January 1979)? ____%

(OVER)

8. **Do you think the new bus service has had an impact on area business?**

____Yes ____No ____Not Sure

Is that impact positive or negative and what is the magnitude? _____

_____

_____

9. **How many of your employees take the bus to work?** _____

10. **Have you done anything to coordinate your business with the new transit service?**

____Yes ____No

What have you done, or why have you not coordinated with the transit service? _____

_____

_____

11. **What changes would you make in the present bus service to make it more beneficial to the business in this area?** _____

_____

_____

12. **Do you think the City of Midland should operate a bus service?**

____Yes ____No ____Not Sure

13. **Do you think the City of Midland should use tax revenue to subsidize the operation of the bus service?** ____Yes ____No ____Not Sure

14. **Do you think the present system should be expanded if it will cost the city more money?** ____Yes ____No ____Not Sure

15. **In your opinion, what is the <u>one</u> major reason Midland should have a bus service?**

____Save energy

____Reduce traffic congestion

____Provide transportation to those who cannot drive

____Improve the local economy

____Other (specify)_____

16. **In the following list, what would you perceive as being important community expenditures to ensure that business in this area is enhanced?**

____Police protection ____Beautification

____Fire protection ____Increase parking availability

____Building rehabilitation ____Improve condition of streets

____Bus service ____Other (specify)_____

COMMENTS AND SUGGESTIONS

THANK FOR YOUR COOPERATION

APPENDIX C

SURVEY INSTRUMENTS AND PROCEDURES USED IN THE KERRVILLE, PORT ARTHUR AND MIDLAND COMMUNITY LEADERS OPINION SURVEYS

In addition to seeking the opinions of retail merchants and other providers of transportation services concerning the effects of new transit systems, various community leaders in the cities of Kerrville, Midland and Port Arthur were also asked to express their opinions on how the new transit systems have affected their communities.

A total of 30 officials in the Kerrville area, 40 officials in the Midland area and 26 officials in the Port Arthur area received questionnaires. In each of the 3 cities, those officials who were asked to participate in the survey included:

- Mayors
- City Managers
- City Council Members
- City Secretaries
- City Attorneys
- City Traffic Engineers
- Planning and Zoning Commission Members
- Directors of Planning
- Directors of Public Services
- Directors of Housing
- County Judges
- County Attorneys
- County Commissioners
- Justices of the Peace
- District Clerks
- Sherriffs

These officials were contacted by mail rather than by personal interview in order to reach as many community leaders as possible. Copies of the survey instruments along with the letter sent with each are presented at the end of this appendix. A total of 14 officials from Kerrville, 13 from Port Arthur and 25 from Midland returned their questionnaires for a response rate of 46.6% from Kerrville, 50% from Port Arthur and 62.5% from Midland.

COMMISSION
ROBERT H. DEDMAN, CHAIRMAN
A. SAM WALDROP
JOHN R. BUTLER, JR.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

ENGINEER-DIRECTOR
MARK G. GOODE

Cooperating Agency:

Urban Mass Transportation Administration

IN REPLY REFER TO FILE NO.

Dear Local Official:

A number of city officials in Kerrville are being asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of the study is to determine what effect the KERRTRAN bus service had on the City of Kerrville while it was in operation from August 1979 to February 1980. Since you are recognized as a key policy-maker and leader in your community, we believe your input to this effort will be extremely valuable.

We are distributing this survey by mail, rather than contacting you personally, so that we can reach as many local officials as possible. Information obtained from the survey will only be used in the form of summaries of the responses received from all participants. Your individual response will be held in strict confidence. Please complete the attached survey form and return it in the enclosed envelope at your earliest convenience.

Thank you for your time and assistance in this important undertaking. We welcome any additional comments or suggestions you might have regarding public transportation in Kerrville.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

Kerrville Community Leader Opinion Survey

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

This questionnaire is designed to be easy to complete and should take no more than 5 minutes of your time. All answers to the questions will remain confidential. Please return the completed form in the stamped envelope at your earliest convenience.

Name (Optional)_____

Position_____ Telephone_____

1. **Do you think the City of Kerrville should operate a bus service?**

   ____Yes ____No ____Not sure

2. **Do you think the City of Kerrville should use tax revenue to subsidize the operation of the bus service?**

   ____Yes ____No ____Not sure

During the 7 months KERRTRAN was in operation (August 1979 through February 1980):

3. **Do you think the bus service helped to conserve energy?**

   ____Yes ____No ____Not sure

   If "yes," was the effect: ____Significant ____Insignificant ____Not sure

4. **Do you think the bus service helped to reduce traffic congestion?**

   ____Yes ____No ____Not sure

   If "yes," was the reduction: ____Significant ____Insignificant ____Not sure

5. **Do you think the bus service helped the business community of Kerrville?**

   ____Yes ____No ____Not sure

   If "yes," was the effect: ____Significant ____Insignificant ____Not sure

6. **Do you think the bus service helped the transportation disadvantaged (e.g., senior citizens, handicapped people, low income families) reach important community locations?**

   ____Yes ____No ____Not sure

   If "yes," was the effect: ____Significant ____Insignificant ____Not sure

7. **In your opinion, why was KERRTRAN not more successful in attracting a larger ridership?**

   _____

   _____

   _____

For each of the statements below, please circle the number which most accurately represents your opinion.

8. A public transportation system should be used to achieve results in the following areas:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Extend the labor market by increasing job opportunities available to workers	1	2	3	4	5
Attract new business to the city	1	2	3	4	5
Encourage growth in underdeveloped areas	1	2	3	4	5
Promote expanded choices of housing for those dependent on transit service	1	2	3	4	5
Offer increased potential for redevelopment of core areas	1	2	3	4	5
Provide transportation to those who cannot drive	1	2	3	4	5
Strengthen the social and economic ties between the city and surrounding areas	1	2	3	4	5

9. For each citizen group, circle the number which best indicates the importance you place upon providing that group with public transportation.

	Not Important		Neutral		Very Important
Work commuters	1	2	3	4	5
School children	1	2	3	4	5
Housewives	1	2	3	4	5
Transportation disadvantaged (e.g., senior citizens, handicapped people, low income families)	1	2	3	4	5

10. Any family totally dependent upon public transportation in the City of Kerrville should have services available to and from:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Schools	1	2	3	4	5
Place of employment	1	2	3	4	5
Shopping facilities	1	2	3	4	5
Health care facilities	1	2	3	4	5
Social & recreational facilities	1	2	3	4	5
Religious facilities	1	2	3	4	5
Community organizations	1	2	3	4	5
Government facilities	1	2	3	4	5

11. Any family not totally dependent upon public transportation in the City of Kerrville should have services available to and from:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Schools	1	2	3	4	5
Place of employment	1	2	3	4	5
Shopping facilities	1	2	3	4	5
Health care facilities	1	2	3	4	5
Social & recreational facilities	1	2	3	4	5
Religious facilities	1	2	3	4	5
Community organizations	1	2	3	4	5
Government facilities	1	2	3	4	5

12. What is your opinion of the service provided by KERRTRAN during its 7 months of operation?

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
The overall quality of service was adequate	1	2	3	4	5
The bus service served enough areas	1	2	3	4	5
Frequency of service was adequate	1	2	3	4	5
Travel time between most locations was adequate	1	2	3	4	5
The days and hours of service (M-F from 5:45 a.m. to 6:20 p.m., Sat. from 9:00 a.m. to 6:20 p.m.) was adequate	1	2	3	4	5

13. In your opinion, what ONE improvement would have resulted in people utilizing the bus service more often? *(Check one answer only)*

____Later evening service
____More frequent weekday service
____More frequent Saturday service
____Offer service on Sundays
____More bus routes
____Other (specify)_____

14. Do you have any additional comments regarding the service provided by KERRTRAN or reasons why the service was not more successful? _____

_____

_____

_____

_____

_____

_____

THANK YOU FOR YOUR COOPERATION

COMMISSION
ROBERT H. DEDMAN, CHAIRMAN
A. SAM WALDROP
JOHN R. BUTLER, JR.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

ENGINEER-DIRECTOR
MARK G. GOODE

IN REPLY REFER TO
FILE NO.

Cooperating Agencies:

Port Arthur Transit System
Urban Mass Transportation Administration

Dear Local Official:

A number of city officials in Port Arthur are being asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of the study is to determine what effect the Port Arthur Transit System has had on the City of Port Arthur. Since you are recognized as a key policy-maker and leader in your community, we believe your input to this effort will be extremely valuable.

We are distributing this survey by mail, rather than contacting you personally, so that we can reach as many local officials as possible. Information obtained from the survey will only be used in the form of summaries of the responses received from all participants. Your individual response will be held in strict confidence. Please complete the attached survey form and return it in the enclosed envelope at your earliest convenience.

Thank you for your time and assistance in this important undertaking. We welcome any additional comments or suggestions you might have regarding public transportation in Port Arthur.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

Port Arthur Community Leader Opinion Survey

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

This questionnaire is designed to be easy to complete and should take no more than 5 minutes of your time. All answers to the questions will remain confidential. Please return the completed form in the stamped envelope at your earliest convenience.

Name (Optional)_____

Position_____ Telephone_____

1. **Do you think the City of Port Arthur should operate a bus service?**

   ____Yes ____No ____Not sure

2. **Do you think the City of Port Arthur should use tax revenue to subsidize the operation of the bus service?**

   ____Yes ____No ____Not sure

3. **Do you think the present system should be expanded if it will cost the city more money?**

   ____Yes ____No ____Not sure

4. **Do you think the bus service has helped to conserve energy?**

   ____Yes ____No ____Not sure

   If "yes," has the effect been: ____Significant ____Insignificant ____Not sure

5. **Do you think the bus service has helped to reduce traffic congestion?**

   ____Yes ____No ____Not sure

   If "yes," has the reduction been: ____Significant ____Insignificant ____Not sure

6. **Do you think the bus service has helped the business community of Port Arthur?**

   ____Yes ____No ____Not sure

   If "yes," has the effect been: ____Significant ____Insignificant ____Not sure

7. **Do you think the bus service has helped the transportation disadvantaged (e.g., senior citizens, handicapped people, low income families) reach important community locations?**

   ____Yes ____No ____Not sure

   If "yes," has the effect been: ____Significant ____Insignificant ____Not sure

For each of the statements below, please circle the number which most accurately represents your opinion.

8. The Port Arthur Transit System should be used to achieve results in the following areas:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Extend the labor market by increasing job opportunities available to workers	1	2	3	4	5
Attract new business to the city	1	2	3	4	5
Encourage growth in underdeveloped areas	1	2	3	4	5
Promote expanded choices of housing for those dependent on transit service	1	2	3	4	5
Offer increased potential for redevelopment of core areas	1	2	3	4	5
Provide transportation to those who cannot drive	1	2	3	4	5
Strengthen the social and economic ties between the city and surrounding communities	1	2	3	4	5

9. For each citizen group, circle the number which best indicates the importance you place upon providing that group with public transportation.

	Not Important		Neutral		Very Important
Work commuters	1	2	3	4	5
School children	1	2	3	4	5
Housewives	1	2	3	4	5
Transportation disadvantaged (e.g., senior citizens, handicapped people, low income families)	1	2	3	4	5

10. Any family totally dependent upon public transportation in the City of Port Arthur should have services available to and from:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Schools	1	2	3	4	5
Place of employment	1	2	3	4	5
Shopping facilities	1	2	3	4	5
Health care facilities	1	2	3	4	5
Social & recreational facilities	1	2	3	4	5
Religious facilities	1	2	3	4	5
Community organizations	1	2	3	4	5
Government facilities	1	2	3	4	5

11. Any family not totally dependent upon public transportation in the City of Port Arthur should have services available to and from:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Schools	1	2	3	4	5
Place of employment	1	2	3	4	5
Shopping facilities	1	2	3	4	5
Health care facilities	1	2	3	4	5
Social & recreational facilities	1	2	3	4	5
Religious facilities	1	2	3	4	5
Community organizations	1	2	3	4	5
Government facilities	1	2	3	4	5

12. What is your opinion of the existing Port Arthur Transit service?

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
The overall quality of the existing service is adequate	1	2	3	4	5
The present bus service serves enough areas	1	2	3	4	5
Frequency of service (1 hour headways) is adequate	1	2	3	4	5
Travel time between most locations is adequate	1	2	3	4	5
The present days and hours of service (M-F from 6:15 a.m. to 6:15 p.m., Sat. from 8:15 a.m. to 6:15 p.m.) is adequate	1	2	3	4	5

13. In your opinion, what ONE improvement would result in people utilizing the bus service more often? *(Check one answer only)*

____Later evening service
____More frequent weekday service
____More frequent Saturday service
____Offer service on Sundays
____More bus routes
____Other (specify)_____

14. Do you have any additional comments or suggestions regarding the service provided by the Port Arthur Transit System? _____

_____

_____

_____

THANK YOU FOR YOUR COOPERATION

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

Cooperating Agencies:

MIDTRAN
Urban Mass Transportation Administration

IN REPLY REFER TO FILE NO.

Dear Local Official:

A number of city officials in Midland are being asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of the study is to determine what effect the MIDTRAN flex-route and demand-responsive bus service has had on the City of Midland. Since you are recognized as a key policy-maker and leader in your community, we believe your input to this effort will be extremely valuable.

We are distributing this survey by mail, rather than contacting you personally, so that we can reach as many local officials as possible. Information obtained from the survey will only be used in the form of summaries of the responses received from all participants. Your individual response will be held in strict confidence. Please complete the attached survey form and return it in the enclosed envelope at your earliest convenience.

Thank you for your time and assistance in this important undertaking. We welcome any additional comments or suggestions you might have regarding public transportation in Midland.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

Midland Community Leader Opinion Survey

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

This questionnaire is designed to be easy to complete and should take no more than 5 minutes of your time. All answers to the questions will remain confidential. Please return the completed form in the stamped envelope at your earliest convenience.

Name (Optional)_____

Position_____ Telephone_____

1. **Do you think the City of Midland should operate a bus service?**

   ____Yes ____No ____Not sure

2. **Do you think the City of Midland should use tax revenue to subsidize the operation of the bus service?**

   ____Yes ____No ____Not sure

3. **Do you think the present system should be expanded if it will cost the city more money?**

   ____Yes ____No ____Not sure

4. **Do you think the bus service has helped to conserve energy?**

   ____Yes ____No ____Not sure

   If "yes," has the effect been: ____Significant ____Insignificant ____Not sure

5. **Do you think the bus service has helped to reduce traffic congestion?**

   ____Yes ____No ____Not sure

   If "yes," has the reduction been: ____Significant ____Insignificant ____Not sure

6. **Do you think the bus service has helped the business community of Midland?**

   ____Yes ____No ____Not sure

   If "yes," has the effect been: ____Significant ____Insignificant ____Not sure

7. **Do you think the bus service has helped the transportation disadvantaged (e.g., senior citizens, handicapped people, low income families) reach important community locations?**

   ____Yes ____No ____Not sure

   If "yes," has the effect been: ____Significant ____Insignificant ____Not sure

For each of the statements below, please circle the number which most accurately represents your opinion.

8. The MIDTRAN bus service should be used to achieve results in the following areas:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Extend the labor market by increasing job opportunities available to workers	1	2	3	4	5
Attract new business to the city	1	2	3	4	5
Encourage growth in underdeveloped areas	1	2	3	4	5
Promote expanded choices of housing for those dependent on transit service	1	2	3	4	5
Offer increased potential for redevelopment of core areas	1	2	3	4	5
Provide transportation to those who cannot drive	1	2	3	4	5
Strengthen the social and economic ties between the city and surrounding areas	1	2	3	4	5

9. For each citizen group, circle the number which best indicates the importance you place upon providing that group with public transportation.

	Not Important		Neutral		Very Important
Work commuters	1	2	3	4	5
School children	1	2	3	4	5
Housewives	1	2	3	4	5
Transportation disadvantaged (e.g., senior citizens, handicapped people, low income families)	1	2	3	4	5

10. Any family totally dependent upon public transportation in the City of Midland should have services available to and from:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Schools	1	2	3	4	5
Place of employment	1	2	3	4	5
Shopping facilities	1	2	3	4	5
Health care facilities	1	2	3	4	5
Social & recreational facilities	1	2	3	4	5
Religious facilities	1	2	3	4	5
Community organizations	1	2	3	4	5
Government facilities	1	2	3	4	5

11. Any family not totally dependent upon public transportation in the City of Midland should have services available to and from:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
Schools	1	2	3	4	5
Place of employment	1	2	3	4	5
Shopping facilities	1	2	3	4	5
Health care facilities	1	2	3	4	5
Social & recreational facilities	1	2	3	4	5
Religious facilities	1	2	3	4	5
Community organizations	1	2	3	4	5
Government facilities	1	2	3	4	5

12. What is your opinion of the existing MIDTRAN service?

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
The overall quality of the existing service is adequate	1	2	3	4	5
The present bus service serves enough areas	1	2	3	4	5
Frequency of service is adequate	1	2	3	4	5
Travel time between most locations is adequate	1	2	3	4	5
The present days and hours of service is adequate	1	2	3	4	5

13. In your opinion, what ONE improvement would result in people utilizing the bus service more often? *(Check one answer only)*

____Later evening service ____Offer service on Sundays

____More frequent weekday service ____More bus routes

____More frequent Saturday service ____Other (specify)_____

14. Do you have any additional comments or suggestions regarding the service provided by MIDTRAN? _____

_____

_____

_____

_____

_____

_____

THANK YOU FOR YOUR COOPERATION

APPENDIX D

SURVEY INSTRUMENTS AND PROCEDURES USED IN THE KERRVILLE, PORT ARTHUR AND MIDLAND HOUSEHOLD SURVEYS

In order to better understand the mobility needs of the general public, household surveys were performed in Kerrville, Port Arthur and Midland. Using a Cole's Directory for the Cities of Port Arthur and Midland and a telephone directory for the City of Kerrville, a random sample of addresses was selected. In addition, a reconnaissance of apartment complexes and mobile home parks was also required in each city to obtain specific names and unit or lot numbers for these dwellings.

A total of 2,000 names and addresses from Midland, 1,850 names and addresses from Port Arthur and 1,000 names and addresses from Kerrville were selected. The number of individuals surveyed represented about 5% of the adult populations of Midland and Port Arthur and about 10% of the adult populations of Kerrville. A higher percentage of Kerrville residents was required in order to insure the sample size would be statistically reliable. Copies of the household surveys along with the cover sheet sent with each is included at the end of this appendix.

Confidence intervals for the household survey were developed using a sample of 500 (minimum) returned, completed questionnaires for Kerrville (50% of the individuals surveyed). The confidence intervals can be based on a single survey questin, "Do you think the City of Kerrville should reconsider operating a bus service?" Assuming that 30% of the Kerrville residents responded "yes" and 70% answered "no" or "not sure," the standard error associated with this response can be estimated using the equation:

$$S = \sqrt{\frac{PQ}{n}}$$

where, P,Q = the population parameters for the binomial. If 30% of those surveyed answered "yes" to the survey question, and 70% answered "no" or "not sure," P and Q are 30 and 70 respectively.

n = the number of cases in the sample.

S = the standard error, indicating the extent to which the sample estimates will be distributed around the population parameter.

Thus, based on the estimated responses to the Kerrville houseehold survey (n=500), the standard error would be computed as shown below:

$$S = \sqrt{\frac{.30 \times .70}{500}} = 0.020 \text{ or } 2\%$$

That is, if 30% of those surveyed indicated that the City of Kerrvile should reconsider operating a transit system, then the true percentage of Kerrville's population which is in favor of that proposal is likely to be within 2 percentage points of 30%. More precisely, in 95 out of every 100 samples, the sample value should be within 2 percentage points of the true population value, so the odds are 95:5 that the true population value here is between 28% (30% - 2%) and 32% (30% + 2%). For this type of survey, a sampling error of 3% is quite reasonable (16); therefore, a 2% sampling error is quite acceptable. Because of the large simple sizes of the Port Arthur and Midland surveys (1,850 and 2,000 respectively), the sampling error for these 2 surveys will be even lower.

After the initial mail-out and 1 follow-up mail-out, a total of 769 surveys from Midland, 663 surveys from Port Arthur and 510 surveys from Kerrville were received which resulted in a response rate of 38.5% from Midland, 35.8% Port Aurthur and 51.0% from Kerrville.

COMMISSION
ROBERT H. DEDMAN, CHAIRMAN
A. SAM WALDROP
JOHN R. BUTLER, JR.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

ENGINEER-DIRECTOR
MARK G. GOODE

Cooperating Agency:

Urban Mass Transportation Administration

IN REPLY REFER TO FILE NO.

Dear Resident:

A limited number of households in the Kerrville area are being asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of this study is to obtain information about your household's use of the KERRTRAN city bus service which operated from August 1980 through February 1981.

Since we have included only a small number of households in this survey, your participation is essential to insure the success of the project. Please complete the attached survey form and return it in the enclosed envelope at your earliest convenience.

Thank you for your time and assistance in this important undertaking. Your participation will assist in determining the transportation needs of the residents of Kerrville and why the KERRTRAN bus service was not more successful in meeting these needs.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

COMMISSION
ROBERT H. DEDMAN, CHAIRMAN
A. SAM WALDROP
JOHN R. BUTLER, JR.

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

ENGINEER-DIRECTOR
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Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

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Enclosures

COMMISSION
ROBERT H. DEDMAN, CHAIRMAN
A. SAM WALDROP
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STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

ENGINEER-DIRECTOR
MARK G. GOODE

Cooperating Agency:

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IN REPLY REFER TO
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Your cooperation is greatly appreciated.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

KERRTRAN Household Survey

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

This questionnaire is designed to be easy to complete and should take no more than 5 minutes of your time. All answers to the questions will remain confidential. Please return the completed form in the stamped envelope at your earliest convenience.

1. **How often did you ride a KERRTRAN bus?**

____Regularly ____Occasionally ____Never

2. **If you were not a regular bus user, what were your reasons?** *(Check all that apply.)*

____Bus schedule times were inconvenient
____Buses did not run often enough
____Traveling by bus took too long
____I live too far from the nearest bus stop
____My work requires that I have a car available during the day
____Buses did not go where I needed to go
____I would rather drive my car
____Other (specify)_____

3. **Which ONE of the following might have encouraged you to use the bus more often?**

____Later evening service ____Offer service on Sundays
____More frequent weekday service ____More bus routes
____More frequent Saturday service ____Other (specify)_____

4. **Do you think the City of Kerrville should reconsider operating a bus service at a later date?**

____Yes ____No ____Not sure

5. **Do you think the City of Kerrville should use tax revenue to subsidize the operation of the bus service?**

____Yes ____No ____Not sure

6. **In your opinion, what is the ONE major reason Kerrville should have a bus service?**

____Save energy
____Reduce traffic congestion
____Provide transportation to those who cannot drive
____Improve the local economy
____Other (specify)_____

(OVER)

KERRTRAN Household Survey

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

This questionnaire is designed to be easy to complete and should take no more than 5 minutes of your time. All answers to the questions will remain confidential. Please return the completed form in the stamped envelope at your earliest convenience.

1. **How often did you ride a KERRTRAN bus?**

____Regularly ____Occasionally ____Never

2. **If you were not a regular bus user, what were your reasons?** *(Check all that apply.)*

____Bus schedule times were inconvenient
____Buses did not run often enough
____Traveling by bus took too long
____I live too far from the nearest bus stop
____My work requires that I have a car available during the day
____Buses did not go where I needed to go
____I would rather drive my car
____Other (specify)_____

3. **Which ONE of the following might have encouraged you to use the bus more often?**

____Later evening service ____Offer service on Sundays
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____More frequent Saturday service ____Other (specify)_____

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____Yes ____No ____Not sure

6. **In your opinion, what is the ONE major reason Kerrville should have a bus service?**

____Save energy
____Reduce traffic congestion
____Provide transportation to those who cannot drive
____Improve the local economy
____Other (specify)_____

(OVER)

7. During the seven months KERRTRAN was in operation:

   a. Do you think the bus service helped to conserve energy?

   ____Yes ____No ____Not sure

   If "yes," was the effect: ____Significant ____Insignificant ____Not sure

   b. Do you think the bus service helped to reduce traffic congestion?

   ____Yes ____No ____Not sure

   If "yes," was the reduction: ____Significant ____Insignificant ____Not sure

   c. Do you think the bus service helped the business community of Kerrville?

   ____Yes ____No ____Not sure

   If "yes," was the effect: ____Significant ____Insignificant ____Not sure

8. Do you have a current drivers license? ____Yes ____No

9. How many vehicles are there in your household? _____

10. How many days per week is one of these vehicles available for you to drive? _____

11. How many persons are there in your household (including yourself)? _____

12. What is your age? _____

13. What is your sex? ____Male ____Female

14. What is your current occupation, in as specific terms as possible? (Also, please specify if retired, unemployed, student or housewife.) _____

15. How many years of school have you completed? _____

16. What is your annual household income?

____Less than $10,000 ____$20,000 to $30,000

____$10,000 to $20,000 ____Over $30,000

COMMENTS AND SUGGESTIONS

THANK YOU FOR YOUR COOPERATION

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

Cooperating Agencies:

Port Arthur Transit System
Urban Mass Transportation Administration

IN REPLY REFER TO FILE NO.

Dear Resident:

A limited number of households in the Port Arthur area are being asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of this study is to obtain information about your household's use of the Port Arthur Transit System service.

Since we have included only a small number of households in this survey, your participation is essential to insure the success of the project. Please complete the attached survey form and return it in the enclosed envelope at your earliest convenience.

Thank you for your time and assistance in this important undertaking. Your participation will assist in determining the transportation needs of the residents of Port Arthur and how the present Port Arthur Transit service can be improved to better meet these needs.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

Cooperating Agencies:

Port Arthur Transit System
Urban Mass Transportation Administration

IN REPLY REFER TO FILE NO.

Dear Resident:

A few weeks ago, a limited number of households in the Port Arthur area were asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of this study is to obtain information about your household's use of the Port Arthur Transit System service.

Since we have included only a small number of households in this survey, your participation is essential to insure the success of the project. If you have already completed the survey, we wish to thank you for your time and assistance in this important undertaking. If you did not respond previously, please complete the enclosed survey form and return it in the stamped envelope at your earliest convenience.

Your cooperation is greatly appreciated.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

Port Arthur Transit Household Survey

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

This questionnaire is designed to be easy to complete and should take no more than 5 minutes of your time. All answers to the questions will remain confidential. Please return the completed form in the stamped envelope at your earliest convenience.

1. How often do you ride a Port Arthur Transit bus?

____Regularly ____Occasionally ____Never

2. Do you know enough about the Port Arthur Transit bus service currently being provided to confidently begin using it tomorrow? ____Yes ____No

3. If you are not a regular bus user, what are your reasons? *(Check all that apply.)*

____Bus schedule times are inconvenient
____Buses do not run often enough
____Traveling by bus takes too long
____I live too far from the nearest bus stop
____My work requires that I have a car available during the day
____Buses do not go where I need to go
____I would rather drive my car
____Other (specify)_____

4. Which ONE of the following might encourage you to begin using the bus more often?

____Later evening service ____Offer service on Sundays
____More frequent weekday service ____More bus routes
____More frequent Saturday service ____Other (specify)_____

5. Do you think the City of Port Arthur should operate a bus service?

____Yes ____No ____Not sure

6. Do you think the City of Port Arthur should use tax revenue to subsidize the operation of the bus service?

____Yes ____No ____Not sure

7. Do you think the present system should be expanded if it will cost the city more money?

____Yes ____No ____Not sure

8. In your opinion, what is the ONE major reason Port Arthur should have a bus service?

____Save energy
____Reduce traffic congestion
____Provide transportation to those who cannot drive
____Improve the local economy
____Other (specify)_____

(OVER)

9. Do you think the bus service has helped to conserve energy?

____Yes ____No ____Not sure

If "yes," has the effect been: ____Significant ____Insignificant ____Not sure

10. Do you think the bus service has helped to reduce traffic congestion?

____Yes ____No ____Not sure

If "yes," has the reduction been: ____Significant ____Insignificant ____Not sure

11. Do you think the bus service has helped the business community of Port Arthur?

____Yes ____No ____Not sure

If "yes," has the effect been: ____Significant ____Insignificant ____Not sure

12. Do you have a current drivers license?

____Yes ____No

13. How many vehicles are there in your household? _____

14. How many days per week is one of these vehicles available for you to drive? _____

15. How many persons are there in your household (including yourself)? _____

16. What is your age? _____

17. What is your sex? ____Male ____Female

18. What is your current occupation, in as specific terms as possible? (Also, please specify if retired, unemployed, student or housewife.) _____

19. How many years of school have you completed? _____

20. What is your annual household income?

____Less than $10,000 ____$20,000 to $30,000

____$10,000 to $20,000 ____Over $30,000

COMMENTS AND SUGGESTIONS

THANK YOU FOR YOUR COOPERATION

COMMISSION
ROBERT H. DEDMAN, CHAIRMAN
A. SAM WALDROP
JOHN R. BUTLER, JR.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

ENGINEER-DIRECTOR
MARK G. GOODE

Cooperating Agencies:

MIDTRAN
Urban Mass Transportation Administration

IN REPLY REFER TO
FILE NO.

Dear Resident:

A limited number of households in the Midland area are being asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of this study is to obtain information about your household's use of the MIDTRAN flex-route and demand-responsive bus service.

Since we have included only a small number of households in this survey, your participation is essential to insure the success of the project. Please complete the attached survey form and return it in the enclosed envelope at your earliest convenience.

Thank you for your time and assistance in this important undertaking. Your participation will assist in determining the transportation needs of the residents of Midland and how the present MIDTRAN service can be improved to better meet these needs.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
AUSTIN, TEXAS 78763

Cooperating Agencies:

MIDTRAN
Urban Mass Transportation Administration

IN REPLY REFER TO FILE NO.

Dear Resident:

A few weeks ago, a limited number of households in the Midland area were asked to participate in a study undertaken by the Texas Transportation Institute, The Texas A&M University System. The purpose of this study is to obtain information about your household's use of the MIDTRAN flex-route and demand-responsive bus service.

Since we have included only a small number of households in this survey, your participation is essential to insure the success of the project. If you have already completed the survey, we wish to thank you for your time and assistance in this important undertaking. If you did not respond previously, please complete the enclosed survey form at your earliest convenience.

Your cooperation is greatly appreciated.

Sincerely,

Phillip L. Wilson
State Transportation Planning Engineer

PLW:jem
Enclosures

MIDTRAN Household Survey

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

This questionnaire is designed to be easy to complete and should take no more than 5 minutes of your time. All answers to the questions will remain confidential. Please return the completed form in the stamped envelope at your earliest convenience.

1. **How often do you ride a MIDTRAN bus?**

____Regularly ____Occasionally ____Never

2. **Do you know enough about the MIDTRAN flex-route and demand responsive bus service currently being provided to confidently begin using it tomorrow?** ____Yes ____No

3. **If you are not a regular bus user of the MIDTRAN flex-route bus service, what are your reasons?** ***(Check all that apply.)***

____Flex-route bus schedule times too inconvenient
____Flex-route buses do not run often enough
____I live too far from the flex-route to take advantage of the service
____Flex-route buses do not go where I need to go
____Traveling by flex-route bus takes too long
____My work requires that I have a car available during the day
____I would rather drive my car
____Other (specify)_____

4. **If you are not a regular user of the MIDTRAN demand-responsive bus service, what are your reasons?** ***(Check all that apply.)***

____Demand-responsive service requires reservations too far in advance
____Demand-responsive service is too expensive
____Traveling by demand-responsive bus takes too long
____My work requires that I have a car available during the day
____I would rather drive my car
____Other (specify)_____

5. **Which <u>ONE</u> of the following might encourage you to begin using the bus more often?**

____Later evening service ____Offer service on Sundays
____More frequent weekday service ____More bus routes
____More frequent Saturday service ____Other (specify)_____

6. **Do you think the City of Midland should operate a bus service?**

____Yes ____No ____Not sure

7. **Do you think the City of Midland should use tax revenue to subsidize the operation of the bus service?**

____Yes ____No ____Not sure

(OVER)

8. **Do you think the present system should be expanded if it will cost the city more money?**

____Yes ____No ____Not sure

9. **In your opinion, what is the <u>ONE</u> major reason Midland should have a bus service?**

____Save energy
____Reduce traffic congestion
____Provide transportation to those who cannot drive
____Improve the local economy
____Other (specify)_____

10. **Do you think the bus service has helped to conserve energy?**

____Yes ____No ____Not sure

If "yes," has the effect been: ____Significant ____Insignificant ____Not sure

11. **Do you think the bus service has helped to reduce traffic congestion?**

____Yes ____No ____Not sure

If "yes," has the reduction been: ____Significant ____Insignificant ____Not sure

12. **Do you think the bus service has helped the business community of Midland?**

____Yes ____No ____Not sure

If "yes," has the effect been: ____Significant ____Insignificant ____Not sure

13. **Do you have a current drivers license?**

____Yes ____No

14. **How many vehicles are there in your household?** _____

15. **How many days per week is one of these vehicles available for you to drive?** _____

16. **How many persons are there in your household (including yourself)?** _____

17. **What is your age?** _____

18. **What is your sex?** ____Male ____Female

19. **What is your current occupation, in as specific terms as possible? (Also, please specify if retired, unemployed, student or housewife.)** _____

20. **How many years of school have you completed?** _____

21. **What is your annual household income?**

____Less than $10,000 ____$20,000 to $30,000
____$10,000 to $20,000 ____Over $30,000

COMMENTS AND SUGGESTIONS

THANK YOU FOR YOUR COOPERATION