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The Lift: Special Needs Transportation in Portland, Oregon

Crain and Associates, Menlo Park, CA

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16. Abstract This is an interim report covering Portland, Oregon's Special Needs Transportation (SNT) project - the Lift - during its first year of operation. The purposes of this UMTA Service and Methods Demonstration (SMD) is to: 1) test a transit operator's ability to provide specialized service to handicapped and elderly persons, and coordinate this service with the contracting social service agencies; 2) test the cost-effectiveness and value to social service agencies and users of the automated fare collection equipment; 3) determine the demonstration's impact on the target group; and 4) assess the service's impact on the social service agencies which contract with the Tri-County Metropolitan Transportation District of Oregon (Tri-Met) for Lift service for their clients. The Portland demonstration addresses three SMD objectives: 1) to increase the area coverage of transit services; 2) to increase the utilization (passengers per hour) of transit vehicles; and 3) to improve the mobility of transit dependents. This report presents time-series data as well as analysis of the project's workability, cost-effectiveness, and impact on all project participants. The report points out that the Lift service has raised public awareness concerning the problems of the transportation handicapped. However, experience with the Lift so far, suggests that the major issue of the second year of this demonstration project is whether or not it is cost-effective for a transit operator to provide transportation to the elderly and handicapped market.					
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UMTA/TSC Project Evaluation Series

**The Lift: Special Needs
Transportation in Portland,
Oregon**

**Interim Report
June 1978**

Service and Methods Demonstration Program



**U.S. DEPARTMENT OF TRANSPORTATION
Urban Mass Transportation Administration
and Transportation Systems Center**

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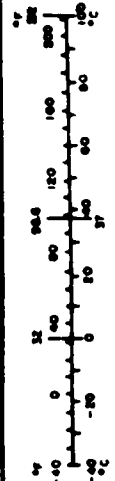
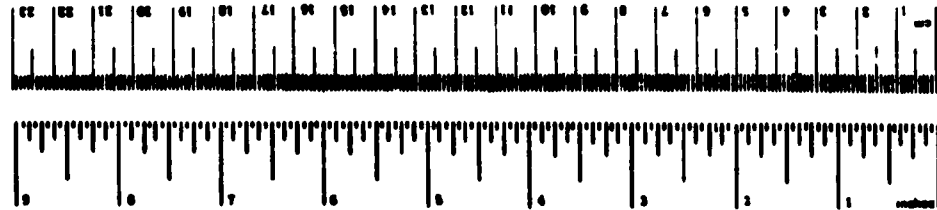
PREFACE

Current federal regulations require that public transportation services be designed to benefit handicapped and elderly persons. As part of this emphasis, the Urban Mass Transportation Administration - together with local support from the City of Portland and the State of Oregon - is sponsoring a Service and Methods Demonstration (SMD) to test a specialized service which provides curb-to-curb transportation for handicapped and elderly persons. This interim report covers the Portland project - the LIFT - during its first year of operation.

The work was performed by Crain & Associates of Menlo Park, CA. Tom Cooper, Pamela Bloomfield and Sydwell Flynn jointly conducted the fieldwork, performed data analysis, and wrote the report. Geoff Creighton edited the report. Peter FitzGerald performed various technical analyses and provided assistance to the authors during the preparation of the report. Jane Van Dusen, Jane Falk, and Barbara Law typed the review draft. Don Kendall was the technical monitor at TSC. The authors wish to thank Dennis Chapman, Special Needs Transportation Coordinator, and the Citizens Advisory Committee for their contributions to the evaluation effort.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures		Approximate Conversions from Metric Measures						
Symbol	When You Know	Multiply by	To Find	Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH								
m	meters	2.5	inches	mm	millimeters	0.04	inches	m
cm	centimeters	0.4	inches	cm	centimeters	2.5	inches	cm
dm	decimeters	0.1	inches	dm	decimeters	3.9	inches	dm
m	meters	1.1	yards	m	meters	1.1	yards	m
km	kilometers	0.6	miles	km	kilometers	0.6	miles	km
AREA								
m ²	square meters	1.1	square yards	m ²	square meters	1.1	square yards	m ²
cm ²	square centimeters	0.16	square inches	cm ²	square centimeters	1.6	square inches	cm ²
dm ²	square decimeters	0.16	square inches	dm ²	square decimeters	1.6	square inches	dm ²
m ²	square meters	2.5	square yards	m ²	square meters	2.5	square yards	m ²
MASS (weight)								
g	grams	0.035	ounces	g	grams	0.035	ounces	g
kg	kilograms	2.2	pounds	kg	kilograms	2.2	pounds	kg
ton	metric tons (1000 kg)	1.1	short tons	ton	metric tons (1000 kg)	1.1	short tons	ton
VOLUME								
ml	milliliters	0.03	fluid ounces	ml	milliliters	0.03	fluid ounces	ml
l	liters	1.1	quarts	l	liters	1.1	quarts	l
cl	centiliters	0.34	gallons	cl	centiliters	0.34	gallons	cl
dl	deciliters	0.26	gallons	dl	deciliters	0.26	gallons	dl
l	liters	0.26	gallons	l	liters	0.26	gallons	l
m ³	cubic meters	35	cubic feet	m ³	cubic meters	35	cubic feet	m ³
km ³	cubic kilometers	1.3	cubic yards	km ³	cubic kilometers	1.3	cubic yards	km ³
TEMPERATURE (heat)								
°C	Celsius temperature	1.8	Fahrenheit temperature	°C	Celsius temperature	1.8	Fahrenheit temperature	°C
°F	Fahrenheit temperature	0.5	Celsius temperature	°F	Fahrenheit temperature	0.5	Celsius temperature	°F



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1. EXECUTIVE SUMMARY

The Portland Special Needs Transportation Demonstration, the LIFT, is a project in which Tri-Met (the regional transit authority), in coordination with local social service agencies, provides curb-to-curb transportation service to eligible handicapped and elderly clients on an advance reservation basis. Tri-Met schedules rides on a fleet of 15 lift-equipped buses operated by Tri-Met, supplemented by transportation provided through a Tri-Met contract with local private providers. Fares are \$3.00 per trip for agency-affiliated passengers, with the \$3.00 paid by the sponsoring agency, and \$.50 per trip for eligible general passengers, with the fare paid by the passengers.

This report covers the first year of the two-year demonstration, from December 1976 to December 1977. During this time, the LIFT project experienced gradual but steady growth in terms of client registration and trips delivered. Because of the interim nature of this report, many findings are tentative. Operational changes, some of which are based on this report, are anticipated, and these will undoubtedly impact future results. This report documents the following conclusions regarding the LIFT demonstration:

1. The LIFT has had a significant impact on a small number of transportation handicapped persons in Portland. Out of the 4300 persons registered, approximately one-quarter actually use the LIFT during a given month; most riders appear to use the LIFT infrequently; i.e., for one or two roundtrips per month. Users generally report that the service has provided them with increased convenience in their trip-making; and a significant proportion of users reported that they would not have been able to make certain trips if the LIFT service were not available.

2. As of October 1977, the LIFT system (buses as well as private providers) was delivering roughly 325 trips per day; 16% of these trips serve wheelchair-bound passengers.
3. The LIFT has been moderately successful in registering eligible clients from the target markets. Twenty percent of the 22,000 transportation handicapped people in Portland are registered for LIFT service. Penetration of the wheelchair and escort-assisted segments is significantly higher.
4. At the present time, the LIFT has not penetrated the agency market to the extent anticipated. Agencies and organizations other than the Area Agency on Aging and the Public Welfare Division account for only 3.1% of all clients registered for LIFT service. The LIFT has managed to execute contracts with those public agencies and organizations sponsoring most of the special transportation trips in the City (with the exception of school trips). However, in some cases, very few of the contracting agencies' clients have been registered for service and fewer still actually use the service.
5. The results to date in Portland indicate that the LIFT is not a cost-effective way of providing transportation services to elderly and handicapped clients. The average trip cost is estimated to be \$8.92. Among the factors contributing to the high cost per trip are: high capital and labor costs; inflexible work rules; an inordinate amount of effort devoted to the scheduling and dispatch function; a low, unaggregated demand; and various operational inefficiencies.

6. The taxi service used to supplement LIFT bus service proved to be less expensive than the LIFT: the cost of transporting the "average" passenger by private means was \$6.77 compared with \$8.92 for the LIFT. Despite the obvious economies of using taxi service, particularly for many to many trips, a 13(c) agreement between Tri-Met and the union limited the amount of trips that could be provided by private providers to 800-900 per month.
7. From a cost perspective, it appears that there may be significant drawbacks to a public transit operator's providing this special needs transportation service. The high labor costs, inflexible work rules, and high capital cost can be attributed to the fact that the service is being provided by the public transit agency rather than a private non-profit or for-profit provider. The analysis shows that labor and capital costs are much lower for local special transportation providers offering similar service.
8. Level of service to the target markets has been only fair. Analysis of dispatch records shows that the LIFT buses have averaged over 12 minutes late for pick-up, with a significant percentage more than 30 minutes late. This is somewhat balanced by delivery time performances that are much closer to target.
9. Most agencies and non-profit organizations contracting for LIFT service are generally pleased with the service and with their coordination with Tri-Met; however, scheduling and reliability problems experienced with the LIFT in recent months appear to have increased the level of dissatisfaction of the contracting agencies and organizations.

10. LIFT clients are very satisfied with the courtesy and helpfulness of the LIFT drivers, with the mechanics of boarding the LIFT buses, and using their Special Needs Bus Passes, and with the experience of riding with strangers. Client dissatisfaction appears to center around the noise level on the LIFT buses, the comfort of the ride, the difficulty of scheduling rides on certain days, and the reliability of the service.
11. The LIFT has had a significant community impact in that it has raised public awareness regarding the needs of the transportation handicapped and has demonstrated public commitment to solving these problems.
12. The demonstration was intended to provide an operational test of automatic fareboxes (formally called Automated Fare Identification Recorders, or AFIRs) which were designed to record and store trip and passenger information from the passengers' identification cards so that this data could later be computer processed for accounting and billing purposes. It was hypothesized that these automatic fareboxes would facilitate the agency billing process by eliminating human errors in fare collection and billing and cutting the costs of performing the fare collection/accounting/billing function. To date this operational test has not been possible because of electrical and mechanical farebox failure.

2. INTRODUCTION

2.1 OVERVIEW

The Portland Special Needs Transportation (SNT) demonstration project—the LIFT—provides curb-to-curb transportation services for elderly and handicapped persons living in the Portland city limits who cannot use the regular transit system and who do not have access to alternate means of private transportation. Service is provided by the Tri-County Metropolitan Transportation District of Oregon (Tri-Met). The 15 vehicles used are medium-sized diesel buses equipped with a retractable lower step, wheelchair lifts, and two-way radios.

All rides are prescheduled. The LIFT provides service to the general public and to clients of social service organizations and public agencies which have contracted with Tri-Met for service. Passengers arrange for service by calling the Tri-Met Control Room directly, or by calling their sponsoring agency which, in turn, calls Tri-Met. Eligible riders are issued a Special Needs Bus Pass which they display to the driver upon boarding the bus. Cost of the ride is shared by the passenger and Tri-Met, or the sponsoring agency and Tri-Met.

The specific purposes of the demonstration are to:

1. Test a transit operator's ability to provide special service to a special group and coordinate this service with the social service agencies involved,
2. Test the cost-effectiveness and value to social service agencies and users of the automated fare collection equipment,
3. Determine the demonstration's impact on the target group,
4. Assess the service's impact on the social service agencies which contract with Tri-Met for LIFT service for their clients.

2.2 PROJECT OBJECTIVES

2.2.1 Service and Methods Demonstration Objectives

The Portland demonstration addresses three SMD objectives:

1. To increase the area coverage of transit services,
2. To increase the utilization (passengers per hour) of transit vehicles, and
3. To improve the mobility of transit dependents.

The objective of increasing the area of coverage is indirectly addressed by adding demand-responsive capability and fully accessible vehicles to existing transit capabilities. This allows people who previously did not have accessible transportation to use the service. The vehicle utilization objective is addressed by promoting agency coordination, providing subscription rides, and giving group rides priority over individual trips. The objective of improving the mobility of transit dependents is addressed in that the project provides a very personalized transportation service to the target group.

2.2.2 Grantee Objectives

The Special Needs Transportation project is part of Tri-Met's regional effort to provide good transportation services for the handicapped and elderly and to evaluate which is the best method, over the long run, to provide these services. The project comes at a time when comprehensive federal regulations have been enacted which require that transit companies make special efforts to provide service for handicapped and elderly persons. It is the intention of Tri-Met's Board of Directors that the SNT project, in coordination with other local special transportation programs, satisfy all applicable laws and regulations. A second Tri-Met objective is to determine the applicability of automated fare collection equipment for regular transit use.

In order to monitor project performance, Tri-Met has developed some performance measures in the areas of cost, customer satisfaction, ridership volumes, and client impact. Data on these measures are gathered periodically and analyzed to determine overall system feasibility.

2.3 ORGANIZATIONAL ROLES

The Portland project is funded under a U.S. Department of Transportation, Urban Mass Transportation Administration (UMTA) Services and Methods Demonstration (SMD) grant. The project is being staffed and implemented by the Tri-County Metropolitan Transportation District (Tri-Met), Portland, Oregon. DAVE Systems installed and provided training for the scheduling/dispatch operation. The Transportation Systems Center (TSC) of the U.S. Department of Transportation is responsible for evaluation of the project. Crain & Associates is acting as a contractor to TSC for the evaluation effort. Crain & Associates has coordinated with Tri-Met for its on-site evaluation and data collection efforts. Transportation services are being provided by Tri-Met's fleet of 15 Mercedes-Benz diesel buses, which were specially purchased for the demonstration project.

The funding and timing of the grant through December, 1978 are as follows:

Funding

Federal	\$ 916,768	
Local		
Tri-Met	510,000	
City of Portland	}	
Agency Contracts		349,848
State of Oregon		
TOTAL	\$1,776,616	

Timing

Date of Grant Award	7/75
Actual Start Date	12/76
Planned Termination Date	12/78

2.4 PROJECT ISSUES AND INNOVATIONS

The provision of special transportation service to handicapped and elderly persons is an area in which most public transit systems have little if any experience. Thus, establishing such a system on a city-wide basis, as in the Portland demonstration, will pose many questions or issues as the project progresses. This section will discuss the issues to be examined by the demonstration in three broad categories:

1. The project's workability,
2. Its productivity or cost-effectiveness, and
3. Its impacts on all groups involved.

Project innovations relating to these issues will also be discussed.

2.4.1 Workability

Specific issues concerning the workability of the Special Needs Transportation Project are:

1. Do the eligibility criteria and ride prioritization system constitute an effective and useful way of controlling demand and restricting the service to those who are transportation handicapped?
2. How effective is the role of the Citizen's Advisory Committee in channeling community input into Tri-Met policy-making regarding the LIFT?
3. How effective was the role of market research in project planning and implementation?
4. What is the degree of organizational cooperation between the transit operator and the contracting social service agencies?
5. How effective and useful is the automated fare collection equipment and accompanying reporting and billing system?
6. How applicable is the automated fare collection equipment to regular transit service?

2.4.1.1 Eligibility Criteria and Ride Prioritization - A pre-demonstration household survey¹ indicates that the incidence of transportation handicapped persons in Portland is 5.75% or about 22,000 persons. Since the unconstrained transit demand of this population greatly exceeds the capacity of the LIFT (which at present has a theoretical capacity of 850 trips per day), it is important to control or curtail demand in a fair and effective way in order to match the capacity of the system to supply services.

There are a number of ways to curtail transportation demand: increase the price for trips; limit the level of transit service to certain areas, days or hours; restrict the size of the vehicle to be used; allow trips only for certain purposes; require pre-scheduling vs demand-responsive service; or restrict the target market and limit use by degree of handicap. In the Portland project, eligibility criteria based on a functional definition of "handicap" were developed to ensure that service is made available to those who really need it. Only those persons who meet these criteria may use the LIFT. However, since it was anticipated that the demand for service of those certified as eligible will still be greater than the system can accommodate, a ride prioritization system was also developed. This project innovation bases service availability on a priority ranking based on trip purpose, number of passengers in the trip, and destination. (Eligibility criteria and the system of ride prioritization are described further in Section 4.1.1.)

Other issues of concern in the LIFT project include:

1. How fair are these restraints on LIFT demand for both clients and the contracting agencies? Do they control demand to a desired level or are they too restrictive?
2. Do agency personnel who register people for LIFT service feel the eligibility criteria work as an effective screening device?

¹Results of this random survey of 5,688 Portland households are contained in Incidence Rates and Travel Characteristics of the Transportation Handicapped in Portland, Oregon, U. S. Department of Transportation, Washington, D.C., Report No. UMTA-OR-06-0004-77-1, April 1977.

3. How workable is the ride prioritization system from the dispatcher's point of view? Is it actually being used as a method of curtailing demand?

2.4.1.2 Citizens Advisory Committee - The original demonstrations application which Tri-Met submitted to UMTA included provisions for establishing an advisory committee which would include handicapped and elderly members. It was Tri-Met's intent that the advisory committee assist Tri-Met personnel in the design and operation of the project, and also make recommendations for future expansion or modification of LIFT service. However, no citizen advisors were involved in drafting the demonstration grant proposal. This raises the following questions:

1. At what point should citizen involvement begin?
2. How did the Portland community and, specifically, the handicapped and elderly population respond to the concept of establishing a special transit system to meet their needs? Were they asked?
3. Once citizen input was solicited, how were committee members chosen?
4. Were all affected parties represented?
5. How effective are the committee's inputs?
6. Are committee members an ongoing group throughout the demonstration, or is there a high turn-over of members?

2.4.1.3 The Role of Market Research - Tri-Met was anxious to avoid errors which seem to have plagued other demand-responsive systems; in particular they wished to ensure that no service was promised which could not actually be delivered. Thus the first questions to be answered were:

1. What is the incidence of transportation handicapped persons within the city of Portland?

2. What type of system best suits their travel needs?
3. What is their current travel behavior?

To answer these questions, a comprehensive household survey was conducted to search out and interview transportation handicapped persons, i.e., those persons who are unable to use Portland's fixed route bus service. Based on this definition, the survey's intent was not to determine the medical reason for a person's incapacities, but rather, whether he/she can or cannot use conventional public transportation. Thus, a functional rather than medical definition of handicapped was employed. Eight specific activities often required when a person attempts to use a conventional, fixed route, fixed schedule transit system were defined. During the survey, any household members who indicated a problem with any of the eight activities were interviewed in depth about the severity of their transportation dysfunction and their travel behavior, and asked to evaluate six different transit modes (ranging from fixed route systems to door-to-door bus service with a lift) according to their own physical ability to use them. Results of this survey were reported on in a special report, Incidence Rates and Travel Characteristics of the Transportation Handicapped in Portland, Oregon.*

An innovation of the Portland demonstration was to base service design on these research data and on a functional rather than medical definition of handicapped. These data were available to both Tri-Met and DAVE Systems, with whom Tri-Met contracted to design the LIFT service. Some pertinent issues are:

1. How useful were these data during the planning phase of the project?
2. To what extent were they used in determining eligibility and level of service?
3. How accurately do the data predict travel demand and behavior of transportation handicapped persons?

*See footnote, page 8.

2.4.1.4 Organizational Cooperation Between Transit Operator and Contracting Social Agencies - The concept of organizational cooperation is not a new one. In fact, federal statutes and regulations pertaining to social service agency transportation programs generally contain specific requirements for coordination. However, most agency transportation projects continue to operate side-by-side, with little effort towards avoiding duplication or fragmentation of service. Typically, each agency has its own vehicles, staff, facilities and budget. And although the value of a coordinated transportation effort (increased service capacity, improved vehicle productivity and operating efficiency, etc.) is generally apparent to those involved in providing transportation services, the barriers to such coordinative efforts are also substantial. These include differing eligibility restrictions, franchise and labor problems, accounting problems, turf problems (i.e., preserving agency identity and control), and amount of available funds.

An innovation of the Portland demonstration is that the transit company becomes the coordinating agent. Tri-Met contracts with social service agencies which have a need for handicapped and/or elderly transportation. The agencies register their own clients for service and arrange for their trips*, a procedure which allows agencies to maintain their identity with and control of client trips. Clients registered for service must meet the eligibility criteria developed by Tri-Met. Tri-Met also provides the vehicles, drivers and a centralized billing system. These inter-related activities all require a substantial amount of coordination. Issues related to this aspect of LIFT service include:

1. How have Portland agencies and public organizations responded to this new, transit-provided service? Are they anxious or reluctant to contract for service?

*Passengers who are not connected with an agency call Tri-Met directly to arrange their trips.

2. What is the impact of LIFT service on agency transportation policies and on their clients' trip making?
3. What portion of agency trips are served by the LIFT?
4. Does the service meet the needs of their particular clients?
5. Do they approve of their mediatory role between Tri-Met and the client?
6. Has the centralized billing system worked satisfactorily?
7. Is Tri-Met satisfied with cooperation they receive from agencies? Were they inundated by institutional problems? Was the bureaucracy of large state-run agencies an impediment?
8. In sum, was the LIFT system able to avoid many of the problems that have plagued other efforts at coordinating agency transportation?

2.4.1.5 Automated Fare Collection and Billing System - Each of the LIFT's 15 buses is equipped with an automatic fare identification recorder (AFIR). Each passenger is issued a Special Needs Bus Pass; once the system is fully operational, passengers will insert their passes in the AFIR upon boarding and deboarding the bus. Information collected and stored each day in the AFIRs will be computer processed to generate the required bills, daily and monthly reports, and operating statistics needed for analysis.

An innovation of this project is to test the cost-effectiveness and value to Tri-Met, social agencies and users of the automated equipment. Thus, some questions to be answered are:

1. Is the automated fare collection and billing system cost-effective?
2. What are its benefits?
3. Is it accurate?
4. How reliable are these electronic recorders?
5. Is maintenance a problem?
6. Are the social agencies satisfied with the billing system?
Is Tri-Met?

Specifically, there are questions about using this type of equipment with transportation handicapped persons. For the automated fare system to work, over 90% of the riders must remember to bring their Special Needs Bus Pass each time for use with the AFIRs. In a project such as this, a high proportion of riders are elderly persons. Will they remember to carry their passes with them for each LIFT trip? What about wheelchaired persons? Since they board the bus at the rear by means of a lift, how are their passes inserted in the AFIR at the front of the bus? Will this involve extra driver time? Will such problems hamper the driver's efficiency?

It should be pointed out that few of these questions are answerable at this point in the project's history. As of this writing, the AFIRs are not fully operational, and all necessary trip information is still being recorded manually by the drivers.

2.4.1.6 Applicability of Automated Fare Collection Equipment to Regular Transit Service - The automatic fare identification recorders (AFIRs) will be tested on the 15 LIFT buses. If they prove to be satisfactory for this specialized service, would it be beneficial to Tri-Met to adopt such a system for their regular transit service? An automated fare collection system would save driver time and seemingly increase vehicle productivity. Since the driver would be handling little (if any) money, there would be less risk of burglary. There would be the added cost of issuing the bus passes which must be inserted in the AFIR. If bus riders are then billed on a monthly basis, comparable to being billed by the phone company, will they pay their bills? What are the possibilities of fraud in such a system?

Of course, very few of these questions will be answered by the Portland demonstration. However, if the AFIRs prove to be operational and cost-effective in the demonstration system, that would be a first step toward the possibility of their being used on a larger scale.

2.4.2 Cost-Effectiveness

The second general issue of concern in the Portland demonstration is the cost-effectiveness of providing specialized transportation. Cost-related issues are:

1. What is the total cost per passenger trip?
2. What are the cost/revenue ratios?
3. What is the productivity per vehicle hour?
4. What is productivity per platform hour?
5. What proportion of these costs is for labor?
6. How much are costs influenced by the requirement to pay union-scale wages?
7. What other factors influence LIFT costs?
8. How cost-effective is the LIFT operation compared with known alternative ways of providing specialized transportation to handicapped and elderly persons?
9. Does the LIFT system cost less than the one it replaced, that is, the proliferated system of social service agency transportation?

2.4.3 Project Impacts

The third general issue of concern in the demonstration has to do with project impacts. Whom does the project affect and in what ways are they affected? The Portland Special Needs Transportation project impacts four different groups:

1. The elderly and handicapped who use the system;
2. Social agencies and non-profit organizations which serve handicapped and elderly persons;
3. Tri-Met, the transit operator providing the service; and
4. Private transportation providers contracting with Tri-Met.

2.4.3.1 Impacts on Clients - The LIFT provides transportation service for persons who are unable to use the regular bus system because of a physical or mental condition.

1. How much has the trip-making of this target group increased as a result of LIFT service?
2. Are these actually "new" trips or do they simply reflect a trip shift from a less convenient or more costly mode of transportation?
3. If the LIFT does provide an increase in trip-making, what benefits does this provide the riders in terms of increased opportunities and convenience?
4. Are indirect benefits provided to friends and relatives of LIFT riders?

2.4.3.2 Impacts on Social Service Agencies - To provide for the needs of their clients, many social service agencies have been forced into the business of providing transportation for clients. This may be done in a variety of ways: enlisting the aid of volunteer drivers, operating their own van or car with a paid driver, purchasing transportation services for their clients or reimbursing clients for transit or taxi fares, and staff members using their own cars to transport clients.

1. Have those agencies which were engaged in para-transit activities and now have contracted with the LIFT for transportation service been able to get out of the transportation business?
2. Has the new service freed them, in terms of time and personnel, to concentrate in other needed areas, or are there new demands for paper work, coordination, scheduling?
3. Are there cost savings involved?
4. For all agencies, including those who had not previously provided transportation, how effective is the LIFT service? Does it get their clients where they need to go? Are clients

better able to avail themselves of agency services?
Has the number of clients for a specific program (such as, for example, offering nutritional hot meals at a central location) increased due to LIFT service?

2.4.3.3 Impacts on Tri-Met - In providing service to this specialized group of handicapped and elderly persons, Tri-Met enters a new arena of service.

1. What has been the impact of the project on management?
2. What has been the impact on accounting and finance personnel?
3. How effective is the computerized billing and reporting system for Tri-Met's needs?
4. How effective is communication between administrative, planning and operating personnel?
5. What new procedures (accounting, paperwork) are required of Tri-Met because of the federal grant?

2.4.3.4 Impacts on Private Transportation Providers - Taxis and wheelchair vans are used to provide service when they are more cost-effective than using a LIFT bus; as, for example, for a single passenger going a long distance. Tri-Met has contracted with two taxi companies and one wheelchair van company to provide this service.

1. How much has this new service increased business for these companies?
2. Has it caused any change in their level of operating efficiency?
3. Has it increased paperwork and accounting problems?
4. Are the drivers asked to give special help to these handicapped and elderly riders?

2.4.4 Summary

The Portland demonstration will provide some information on most of the issues cited above. The workability of the project is described in Chapters 4-6 of this report; the cost-effectiveness of the project is analyzed in Chapter 7; and the project's impacts are examined in Chapter 8.

A broader issue which overlaps the three areas cited above is the workability of a transit operator's providing specialized transportation service to handicapped and elderly persons. The need for this type of service is known to exist; however, that need has not been met in a city-wide, comprehensive manner as this project proposes to do. Moreover, that need has been met, to date, primarily by human service agencies. Many of these agencies have been forced into the transportation business because no suitable alternative was available. These agencies are frequently dissatisfied with their present transportation posture. A common complaint is that the operation is inefficient and therefore expensive. Programs for the elderly, for example, may have no coordinative efforts with handicapped programs; thus, duplicate services are offered to a single client. One logical solution to these problems is to have a central carrier providing transportation services for all (or a selected set of) agencies. In addition, this carrier can provide service for handicapped and elderly persons who are not affiliated with a social service agency. The Portland project tests the workability of a transit operator's ability to provide such a service and to coordinate its efforts with social service agencies serving the transportation handicapped. The sum of the evidence relating to each of the previously-cited issues will determine whether, in fact, such a concept is workable.

2.5 EVALUATION OVERVIEW

2.5.1 Approach

The project sponsors are concerned with two broad categories of questions in evaluating the LIFT project:

1. How well does the system perform in providing special needs transportation service?
2. What are the nature, magnitude, and distribution of the transportation benefits and impacts?

This section will describe seven data sources used during the evaluation to gather information regarding these questions. Data from the predemonstration household survey were used throughout the evaluation to interpret data from the sources described below.

2.5.1.1 On-Board Surveys of Users - These surveys provide information on how LIFT service has affected the travel behavior of its riders and how the passengers rate system performance. In the future, their opinions about the automated fare equipment will also be solicited. Three on-board surveys have been conducted to date: in April, July, and December, 1977.

Past survey experience indicates that comparing results between large-scale surveys entails a considerable risk, regardless of their statistical accuracies. There always appear to be exogenous factors that are not controllable, and thus tend to confuse such comparisons. To obtain an accurate picture of how LIFT service is affecting travel behavior, it was decided to conduct more frequent, smaller sample surveys and to interpret the results as time-series data rather than to conduct large-scale surveys. A series of on-board surveys will be conducted about every three months; in each survey about 100 people will be interviewed. It is hoped that quarter-by-quarter comparisons will show trends in user behavior and will allow a determination of travel pattern changes; i.e., is LIFT service allowing its riders to make "new" trips or have they simply shifted to the LIFT from less convenient or more costly modes of transportation?

2.5.1.2 Follow-up Interviews - Follow-up interviews with a small sample of those surveyed during the on-board surveys are conducted to check the reliability and accuracy of the information gathered in the on-board surveys, and to provide some qualitative information in order to enrich understanding of the statistical survey results. Because of their small number, these follow-up interviews are not intended to be statistically significant; however, they are intended to describe how LIFT services have affected the lives of specific persons. Ten to twenty follow-up interviews were conducted following each on-board survey.

2.5.1.3 Certification Data - Data of a socio-economic nature are gathered on each client for the purpose of granting the applicant eligibility to use the service. (A patron registration application is contained in Chapter 4.) These data are then key-punched (minus any specific client identifiable information such as the client's name and address) and computer-processed to provide information about the population that is using LIFT service and to analyze project demand and impact. To date, 4277 of these certification interviews have been tabulated; these are reported on in Chapters 6 and 8.

2.5.1.4 Operational Performance and Cost Data - Operational data consist of a wide variety of quantitative information available about riders (who is using and how often), trips (length, purpose, origin/destination, travel time), performance and cost (passengers per vehicle mile and per vehicle hour, reliability, ratio of subsidy to operating cost, administrative costs, etc.), and agencies (number of clients using service, number of registrants, subsidy paid, etc.). These data are currently being gathered manually; in time they will be provided by the computerized data collection and reporting system.

There has been an ongoing analysis of the operational data available since the project began.

2.5.1.5 Agency Interviews - Social service agencies and non-profit organizations within Portland may contract with Tri-Met for the LIFT to provide transportation services for agency clients who meet Tri-Met's eligibility criteria. The agency surveys are conducted with contracting agencies three times during the evaluation: before the project begins, at an interim point, and at the project's completion. Their purpose is to provide information on how these agencies were attempting to meet their clients' transportation needs before LIFT services were available; any improvements the LIFT service provides agencies in terms of cost, distribution and amount of trips, and freeing the agency to concentrate on other types of service; and agency perceptions of how the LIFT system deals with operational and accountability problems.

Fourteen agencies were interviewed as part of the "before" survey and twelve agencies were interviewed during the interim survey. Agencies that did provide transportation service before LIFT service began as well as those which did not were interviewed. The samples are not intended to be statistically representative of all types of social agencies.

2.5.1.6 Tri-Met Survey - This survey consists of a series of semi-structured interviews with the management, dispatch staff, drivers, and other personnel within Tri-Met who are associated with the LIFT project. These interviews are intended to solicit relevant Tri-Met opinions and attitudes and should provide insight into the effectiveness and efficiency with which the LIFT service is provided. Two surveys are planned: one at an interim point, and one at the completion of the project.

There has been one Tri-Met survey at this point in the evaluation. This included interviews with the Special Transportation Coordinator, Tri-Met's Director of Finance, the Project Accountant, the Advertising and Promotion Manager in charge of

marketing the LIFT, and the Legislative Relations and Press Relations Manager.

2.5.1.7 Survey of Private Transportation Providers - Two taxi companies and one wheelchair van company are under contract with Tri-Met to provide rides for LIFT clients when necessary. Interviews are conducted with personnel from all three companies to determine the impact of LIFT service on their operations and their record-keeping systems.

2.5.1.8 Non-User Survey - This is a second-year evaluation task. Approximately 350 non-users will be interviewed to determine their reasons for not using LIFT service, some idea of their trip purposes and patterns, and their socioeconomic characteristics. Interviewees will come from three sources: persons identified as transportation handicapped in the pre-demonstration survey who are not registered for service, registrants who are non-users, and non-users identified by community organizations. There will also be a survey of agencies who do not intend to contract for LIFT service for their clients.

2.5.1.9 Pre-Demonstration Survey - The previously cited report, Incidence Rates and Travel Characteristics of the Transportation Handicapped in Portland, Oregon, provided data on the numbers and characteristics of the transportation handicapped population within the target area. These data were used to provide a background to and framework for the analysis of LIFT impacts on the target population. The survey results were also useful to local planners in setting up the LIFT system.

2.5.2 Scope of Report

This report covers the first phase of the Portland Special Needs Transportation project from the fall of 1976, when registration of LIFT clients first began, through the fall of 1977. Some data are presented for the months of November and December 1977 where this information exists and is accurate. Generally

there were no significant operational changes between October and December of 1977; therefore, the findings presented in this report can be considered representative of the first full year of operations.

The report addresses each of the issues mentioned in Section 2.3. Chapters 2 and 3 set the stage for the analysis by outlining the issues and analysis procedures, and by describing the demonstration setting. Chapter 4 describes the project operation and recounts the project's evolution from pre-implementation through the fall of 1977. Chapters 5 and 6 then deal with the demand and supply of the Special Needs Transportation service, respectively. Chapter 7 analyzes the economics of the LIFT system, and Chapter 8 assesses the project's impact on clients, social service agencies, and Tri-Met. Finally, Chapter 9 summarizes the conclusions reached in the report and presents, for planning purposes, information for comparing the LIFT with two other modes available in Portland for transporting handicapped and elderly people: taxis and private non-profit providers.

All survey materials and discussion guides used to gather demonstration data are contained in the appendices of this report.

3. DEMONSTRATION SETTING

3.1 GEOGRAPHIC AND DEMOGRAPHIC CHARACTERISTICS OF PORTLAND

The city of Portland, Oregon is the demonstration project site. The largest city in the state, Portland is located on the Oregon-Washington border, across the Columbia River from Vancouver, and covers an area of 89 square miles. Much of the city is on level terrain; however, elevations vary from a few feet above sea level to 1,073 feet, at the top of Council Crest. The average elevation is 175 feet.

Portland has a very definite winter rainfall climate. The winter season is characterized by relatively mild temperatures (43° on average), cloudy skies, and almost daily rains; in the summer months, temperatures average 65° and precipitation is infrequent. Snowfalls are generally short-lived; most years are completely free of snow.

The population of the Portland Standard Metropolitan Statistical Area (SMSA) is 1,109,100,* approximately 41% of the total state population. (The SMSA includes Clackamas, Multnomah, and Washington counties in Oregon and Clark County in Washington; see Figure 3-1.) The population of the city of Portland, the service area of the demonstration, is approximately 385,000. The rate of population growth of the Portland area exceeds that of the nation; Portland is the fastest growing population center in the Pacific Northwest.

The city has an uncommonly high percentage of residents over 65 years of age: 14.7%, as compared with the national percentage of 10% who are 65 or over. The percentage of work-disabled Portland residents is comparable to that of other cities: 7%. (Approximately 96% of Portland's residents are white; the rest are Spanish-speaking, native American, and Black.)

*As of July, 1976.

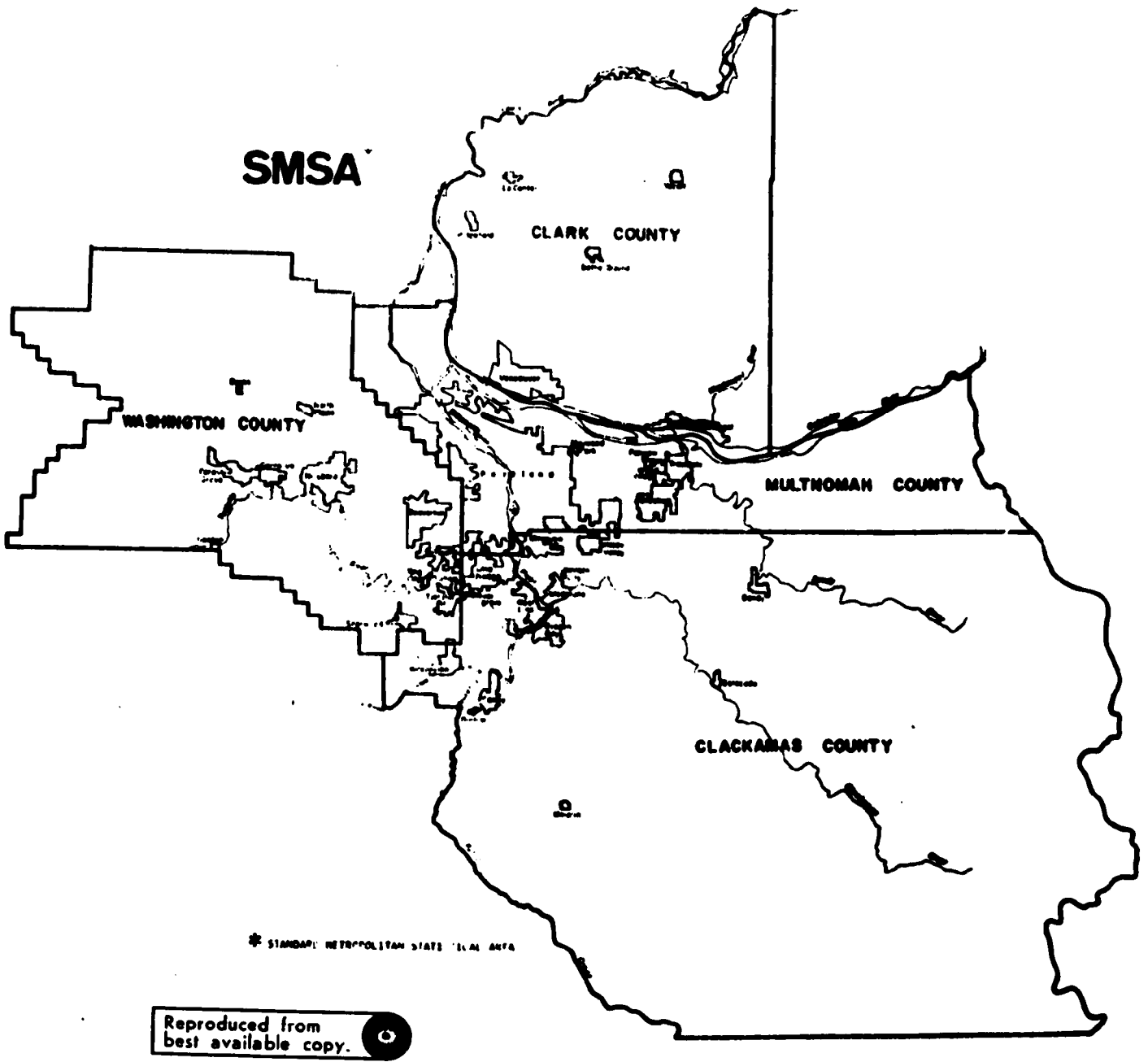


FIGURE 3-1.

PORTLAND STANDARD METROPOLITAN STATISTICAL AREA

According to recent research, the median income in Portland is \$13,315. The rate of increase in the cost of living is often lower than that of other cities on the West Coast. The employment category with the largest portion of the work force is that of wholesale and retail trade; manufacturing ranks second, and services, third. Industries whose impact on the labor market is significant include forest products, food processing, primary metals, chemicals, fabricated metals, machinery, transportation equipment, textiles and apparel, furniture and electrical equipment. The unemployment rate for 1976 averaged 8.7% of the labor force in the Portland SMSA.

3.2 TRANSPORTATION CHARACTERISTICS OF PORTLAND

Portland, which is located 65 miles inland from the Pacific Ocean, is one of the world's largest fresh water ports. The city is served by four transcontinental railroads (Burlington Northern, Milwaukie Road, Southern Pacific and Union Pacific), two interstate bus lines (Trailways and Greyhound), and nine airlines. Highways, freeways and expressways radiate in all directions from the Portland area; these include portions of the interstate freeways connecting Oregon with all states in the country. Over 90% of the Oregon interstate system is now open to traffic, including all of Interstate Highway 5, which connects Oregon with Washington and California. Major additions to the Oregon freeway system are now under construction in East Multnomah County.

Downtown Portland is laid out in a grid pattern with short (200-foot long) blocks; most downtown streets are one-way, with parking lanes on both sides. Five bridges across the Willamette River lead directly into downtown, connecting it with the eastern and northern parts of the city. In the first half of 1973, 147,000 vehicles entered downtown on an average day; this number may have decreased slightly since then.

The local mass transit system is operated by the publicly-owned and -operated Tri-County Metropolitan Transportation District of Oregon (Tri-Met), which provides public bus transportation throughout Clackamas, Multnomah and Washington counties. Tri-Met operates 515 buses on 66 bus routes; the fares are moderately low (40¢). During peak hours, buses operate at five to twenty minute intervals; during off-peak hours, most buses operate on fifteen to sixty minute schedules, although buses in some sparsely-populated areas operate less frequently. The hours of operation vary with the particular route. In addition to scheduled service, Tri-Met offers charter bus service.

According to recent analyses performed by Tri-Met staff, Tri-Met ridership characteristics are as follows:

Grade school children	4%
High school students	10%
Senior and disabled citizens	12%
Adult rides	74%

Those over 65, disabled, or legally blind may pay only 10¢ during weekday non-rush hours (9AM to 3PM) and ride free of charge on weekends and evenings (after 7PM). To qualify for these fare reductions, passengers must present to the driver either a Medicare card or an Honored Citizen Card, available at Tri-Met's Customer Assistance Office. Passengers holding either card may also avail themselves of Tri-Met's Senior Escort Program, which provides senior citizens with an escort and individual bus-riding instruction, free of charge, on weekdays from 9AM to 3PM; arrangements must be made 24 hours in advance. More than 70,000 Honored Citizen Cards have been issued since the program began. In addition, Tri-Met has designated the 288 square block downtown Portland area as "Fareless Square"; passengers boarding and leaving the buses within Fareless Square may ride free of charge at all times.

Tri-Met is currently constructing a \$16 million transit mall in the downtown area of the city. The Portland Mall will run eleven blocks on S.W. Fifth and Sixth Avenues, from Burnside to Madison Street, providing two exclusive lanes for buses, one lane for other vehicular traffic, and convenient pedestrian access. It is estimated that the mall will triple the people-carrying capacity of Fifth and Sixth Avenues by separating auto, bus and pedestrian traffic; thus, it will serve as the central axis of the public transit system. General pedestrian traffic will be separated from bus-loading areas, where 31 protected passenger shelters and 8 trip-planning kiosks will provide seating as well as complete route and schedule information for all Tri-Met lines. This project is scheduled for completion in 1978. The Urban Mass Transportation Administration (UMTA) is contributing \$12,692,732 (80%) to the Mall project; Tri-Met is contributing \$3,173,183 (20%).

Aside from farebox revenues, Tri-Met's major sources of income are federal grants* and tax on gross payrolls in the Tri-county area; the current rate is five-tenths of 1% (.005). Exempt organizations include political subdivisions, educational and religious institutions, and financial and insurance companies.

The demonstration service area is also served by two major taxi companies, which collectively operate 320 taxicabs; the latter furnish approximately 1,200,000 passenger-trips per year.

*Federal funds are received from the U.S. Department of Transportation. Federal dollars from the Urban Mass Transportation Administration (UMTA) pay 80% of the cost for capital items such as buses, passenger shelters, and the construction of the Portland Mall. In addition, the federal government provides monies in varying formulas for transportation planning, special projects like the LIFT, and approximately four million dollars a year operating subsidy.

3.3 THE TRANSPORTATION HANDICAPPED MARKET

3.3.1 Characteristics of the Transportation Handicapped

The Portland project, an exemplary demonstration within UMTA's Service and Methods Demonstration Program, pertains specifically to the SMD objective of improving transportation services for "transportation handicapped" persons. The latter are defined in the UMTA regulations as those who "are unable, without special facilities or special planning or design, to utilize mass transportation facilities and services as effectively as persons who are not so affected." In the predemonstration household survey of this population in Portland, 11,500 persons were screened for transportation handicaps and 471 persons were interviewed. Data from this survey show:

1. Approximately 22,138 (5.75%) Portland citizens are transportation handicapped.* Of these, 12,320 (3.2%) are estimated to be severely transportation handicapped, and 9,818 (2.55%) are estimated to be moderately transportation handicapped.
2. Handicap incidence increases dramatically with age: the incidence among persons 65 years of age and over is 27.5%.
3. Of those who are severely transportation handicapped:
 - a. 67% are elderly,
 - b. 67% are female,
 - c. 60% have annual household incomes of less than \$5,000,

*More precisely, the target market of the demonstration project consists of those functionally transportation handicapped (TH) persons who are dependent upon public transportation and cannot afford to use taxis exclusively. The target group, then, can be assumed to be smaller in number than the TH group; otherwise, however, the target market can be assumed to resemble the TH market; i.e., to exhibit similar travel characteristics. A more detailed discussion of the target market is found in Chapter 5.

- d. 25% live alone,
 - e. 50% live in households owning one or more automobiles,
 - f. 25% are licensed to drive,
 - g. 55% usually or always have access to automobile transportation,
 - h. 7% are employed, and
 - i. 2% are seeking employment.
4. The most prevalent health problems of those classified as transportation handicapped, in order of frequency, are as follows: arthritis, orthopedic problems, visual impairment, heart ailment, and stroke. About 50% use one or more aids; i.e., support canes, help provided by another person, walker, wheelchair, and crutches, in that order of prevalence.

Table 3-1 summarizes the demographic characteristics of Portland's elderly and transportation handicapped populations.

3.3.2 Travel Patterns of the Transportation Handicapped

With regard to the travel patterns of the elderly and transportation handicapped in Portland, the survey (cited above) revealed the following:

1. Able-bodied elderly persons make 1.4 one-way non-walking trips per day, whereas the moderately transportation handicapped make 1.2 trips per day, and the severely transportation handicapped make 0.8 trips per day. The national average of trips per day made by the general public is 2.2. Figure 3-2 provides a graphic comparison of these findings.

TABLE 3-1 DEMOGRAPHICS OF ELDERLY AND HANDICAPPED*

	ABE		MTH		STH	
	%	Std. Dev:	%	Std. Dev:	%	Std. Dev:
Female	61.7 ^a	3.0	69.1	3.4	67.4	2.6
Male	38.3	3.0	30.9	3.4	32.6	2.6
10-15 Years of Age	na	na	1.1 ^b	0.8	0.6 ^b	0.4
16-20 " " "	na	na	0.0	?	2.5	0.9
21-59 " " "	na	na	17.7	2.8	22.8	2.5
60-64 " " "	na	na	10.8	2.3	6.6	1.4
65+ " " "	100	?	70.4	3.3	67.4	2.6
\$0-\$4,999 Household Income	40.3	3.2	63.9 ^c	3.7	58.7	3.0
\$5,000-\$9,999 Household Income	36.1	3.1	21.3	3.1	19.9	2.4
\$10,000-\$14,999 " "	11.6	2.1	7.7	2.1	9.8	1.8
\$15,000-\$24,999 " "	7.7	1.7	3.6	1.4	8.7	1.7
\$25,000+ " "	4.3	1.3	3.6	1.4	2.9	1.0
1 Person in Household	33.3	2.9	54.0	3.6	27.8	2.5
2 Persons in Household	54.2	3.0	30.7	3.4	37.2	2.7
3 " " "	7.0	1.5	3.2	1.3	12.0	1.8
4 " " "	1.5	0.7	2.1	1.0	6.9	1.4
5+ " " "	1.1	0.6	1.6	0.9	2.2	0.8
Institutionalized Persons	2.6 ^d	1.0	7.4	1.9	12.3	1.9
Licensed to Drive	56.2	3.0	38.4	3.6	25.3	2.5
0 Autos in Household ^e	31.1	2.8	51.9	3.6	50.8	2.8
1 " " "	52.7	3.0	36.0	3.5	32.5	2.6
2 " " "	15.8	2.2	9.5	2.1	13.2	1.9
3 " " "	0.4	0.4	2.6	1.2	3.5	1.0
0 Drivers in Household ^f	30.8	2.8	51.3	3.6	50.2	2.8
1 " " "	41.4	3.0	33.9	3.4	29.7	2.6
2 " " "	26.4	2.7	13.2	2.5	14.8	2.0
3+ " " "	1.5	0.7	1.6	0.9	5.3	1.3
Auto Always Available ^g	57.4	3.0	37.1	3.5	36.2	2.7
Auto Usually Available	16.3	2.2	14.5	2.6	19.7	2.3
Auto Sometimes Available	13.3	2.0	25.3	3.2	25.2	2.5
Auto Never Available	13.0	2.0	23.1	3.3	18.8	2.2
Drive Daily ^h	41.0	3.9	34.2	5.3	27.6	4.5
Drive Frequently	36.0	3.8	35.2	5.4	33.7	4.7
Drive Weekly	5.6	1.8	3.8	2.2	6.1	2.4
Drive Occasionally	17.4	3.0	26.6	5.0	32.7	4.7

*From the previously cited predemonstration survey (see pg. 9).

TABLE 3-1. DEMOGRAPHICS OF ELDERLY AND HANDICAPPED (cont.)

	ABE		MTH		STH	
	%	Std. Dev.	%	Std. Dev.	%	Std. Dev.
Working Full Time	6.3	1.5	9.6	2.1	5.2	1.3
Working Part Time	9.6	1.8	3.7	1.4	1.6	0.7
Student	0.4	0.4	1.6	0.9	2.3	0.8
Keeping House	3.3	1.1	1.6	0.9	6.5	1.4
Retired--Not Looking	80.1	2.4	82.4	2.8	82.6	2.2
Unemployed--Looking	0.4	0.4	1.1	0.8	1.9	0.8
1 Year at Address	7.4	1.6	12.8	2.4	11.2	1.8
1-3 Years at Address	10.0	1.8	9.0	2.1	13.4	1.9
3-5 Years at Address	7.4	1.6	10.1	2.2	9.9	1.7
5-10 Years at Address	11.2	1.9	10.1	2.2	11.5	1.8
10-15 Years at Address	10.4	1.9	11.2	2.3	12.8	1.9
15+ Years at Address	53.5	3.0	46.8	3.6	40.9	2.8

^a61.7% of able-bodied elderly are female.

^bThis age distribution is from the 10% survey sample.

^c63.9% of moderately handicapped live in households having total incomes of less than \$5,000. Persons in institutions supplied their own personal income. Note that 14% of those interviewed refused to supply this information.

^d2.6% of able-bodied elderly live in "institutions" rather than "households."

^eIncludes persons living in institutions.

^fIncludes persons living in institutions.

^g"Auto available" means as a driver or as a passenger.

^gDrivers only.

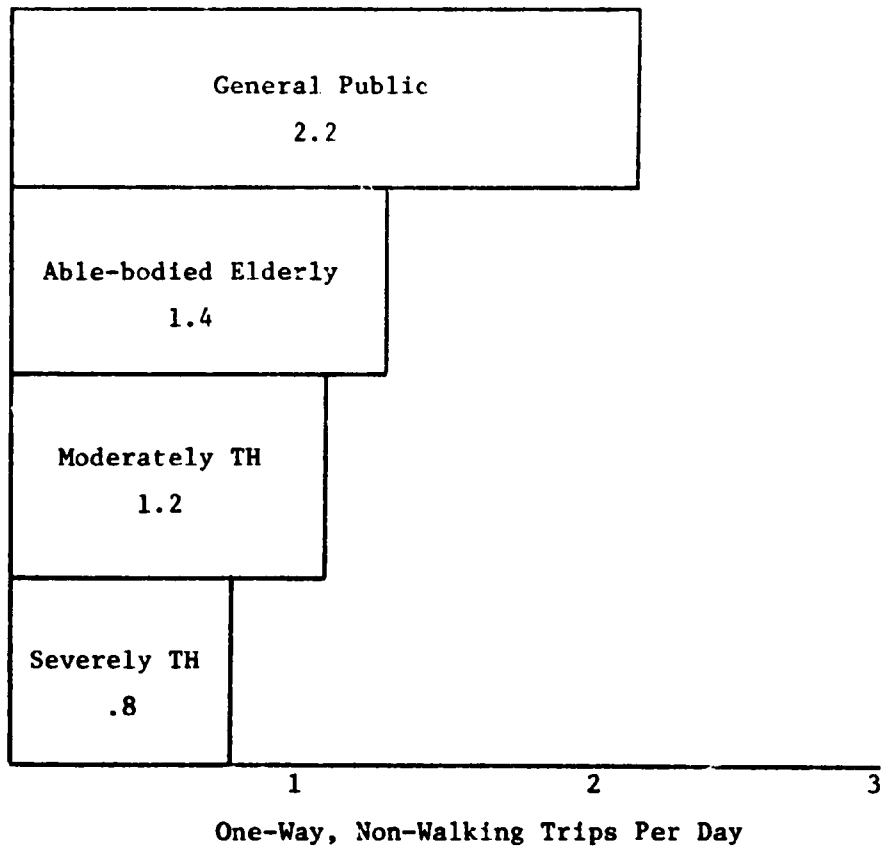


FIGURE 3-2. TRIP RATES

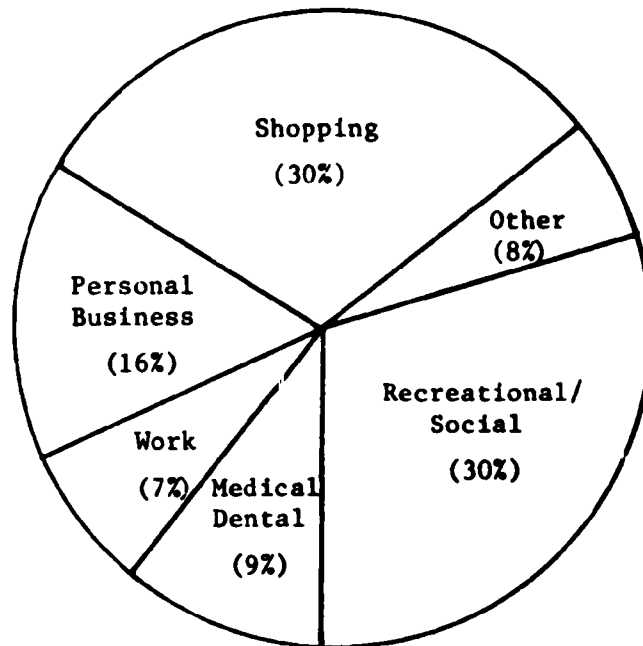
2. About 11% of the transportation handicapped group use wheelchairs or walkers; the trip-making rate of this group (0.5) is lower than that of the severely transportation handicapped group (0.8). The former group also makes fewer "optional"—e.g., recreational—trips. Table 3-2 shows a breakdown of trip rates according to demographic variables such as sex, age, and income.
3. The most common trip purposes of the transportation handicapped are shopping, recreational/social activities, personal business, medical/dental appointments,

TABLE 3-2. TRIP RATES VERSUS DEMOGRAPHIC VARIABLES*

	ABE	MTH	STH
Overall			
Trips per Day	1.4	1.2	0.8
Total Trips, 48 Hours	768	463	520
Male	1.7	1.3	0.8
Female	1.2	1.2	0.9
10-15 Years of Age	N.A.		
16-20 " " "	N.A.	N.A.	1.3
21-59 " " "	N.A.	1.8	1.2
60-64 " " "	N.A.	1.3	0.8
65+ " " "	1.4	1.1	0.7
\$0-\$5,000 Income	0.9	1.0	0.7
\$5,000-\$10,000 Income	1.6	1.4	1.0
\$10,000-\$15,000 "	1.3	1.6	0.6
\$15,000-\$25,000 "	2.4	2.7	1.6
\$25,000 + Income	0.4	2.8	1.1
Driver's License	1.8	1.9	1.3
No Driver's License	0.9	0.8	0.7
Auto Always Available	1.8	1.9	1.1
Auto Usually Available	1.1	0.8	0.8
Auto Sometimes Available	0.8	0.8	0.7
Auto Never Available	0.7	0.9	0.4

*From the previously cited predemonstration survey.

and work; their relative proportions are illustrated below:



4. The automobile is used for over 75% of all trips; the severely transportation handicapped ride as passengers rather than drivers more frequently (51% of the time) than the moderately transportation handicapped (32% of the time). About 20% of the moderately transportation handicapped trips and 10% of the severely transportation handicapped trips are made on the present bus service. In addition, lower-income transportation handicapped persons tend to use buses and taxis disproportionately more than the transportation handicapped population as a whole.

4. PROJECT OPERATIONS AND DEVELOPMENT

4.1 PROJECT DESCRIPTION

All Portland residents who are physically or mentally unable to use regular bus service and who do not have access to alternate means of private transportation are eligible for Special Needs Transportation or LIFT service. People using wheelchairs, walkers, and crutches automatically qualify.

Service is provided by a fleet of 15 Mercedes-Benz diesel buses equipped with wheelchair lifts, tie-downs and a retractable lower step. Twelve of the vehicles accommodate eight passengers and two wheelchairs; three vehicles accommodate six passengers and four wheelchairs. All of the buses are equipped with two-way radios. Rides are dispatched from the Special Needs Control Room, a separate operating unit within Tri-Met's Operations Division. During the demonstration period, LIFT operations are closely coordinated with the Planning Department. Bus operators are Tri-Met drivers who volunteered for the LIFT. They were selected, in part, on the basis of their safety records and their desire and/or special experience in working with handicapped and elderly persons. Drivers received a DAVE Systems special training course on how to handle problems of the TH before service began.

Service is provided from 7 AM to 7 PM, Monday through Friday, is only available to residents of the city of Portland, and operates principally within the Portland city limits.

The LIFT service carries three types of passengers:

1. **Agency-Sponsored Passengers:** This passenger is sponsored by a public agency which has agreed to a contract with Tri-Met for LIFT service. Rides are \$3.00 per one-way trip. No fare is required from the passenger.

2. Affiliated Passengers: This passenger is affiliated with a non-profit organization which has also agreed to a contract with Tri-Met for LIFT service. Billings are sent to the organization at \$2.00 per ride; Tri-Met provides the additional \$1.00 cost per ride as a partial subsidy.
3. General Passengers: This passenger is neither affiliated with an organization nor sponsored by a public agency. General passengers pay a cash fare of 50¢ per one-way trip on the LIFT. The cash fare is deposited in a farebox similar to those currently used on Tri-Met's regular buses.

There is, in fact, little if any difference between agency-sponsored and affiliated passengers. Both groups are clients of an agency which has contracted with Tri-Met for LIFT service. The second designation, the affiliated passenger, was created to benefit small, non-profit organizations with limited funding sources. These organizations are billed at a rate of \$2.00 per client ride rather than the agency rate of \$3.00. Additionally, it should be noted that many agency-sponsored passengers also ride as general passengers for trips not covered by their sponsoring agency. For example, a client of the Welfare Division might ride as an agency-sponsored passenger for a medical trip (the only type of trip paid for by the Welfare Division) and also ride as a general passenger for shopping trips, paying the 50¢ cash fare.

Agency-sponsored and affiliated clients are registered (certified as eligible) by the contracting agency. At this time a Patron Registration Application (see Figure 4-1) is filled out for each client. This form provides information on handicap, mobility aids used, reasons why the person cannot use public transit, and demographic information. General passengers apply for registration materials, fill out the required information themselves, and have the application verified by one of the following types of individuals:

1. Medical professional (physician or nurse),
2. Physical or occupational therapist,
3. Social service agency representative,
4. Teacher,
5. Counselor, or
6. Social worker or case worker.

Persons who do not know anyone who can verify their applications are asked to call the Tri-County Community Council for help.

All certified passengers receive a Special Needs Bus Pass, a plastic card similar to a credit card, shown in Figure 4-2. Bus passes come in two colors: general passengers who deposit a cash fare are issued blue passes; all others have orange passes. This color coding lets the drivers know which passengers will be depositing cash fares and which will not. The first of the seven digits on the card signifies the type of passenger: agency-sponsored, affiliated, or general. The second digit indicates any special aids the passenger needs. This allows the dispatcher to schedule appropriate space for wheelchair persons and provide the extra seating needed for those who must travel with an attendant. The remaining five digits are used to identify the registrant.*

The Lift provides passengers with curb-to-curb service and driver assistance in getting on and off the bus. Many passengers are given assistance beyond the curb to and from their homes.** Upon boarding the bus each passenger displays his or

*As discussed in Chapter 5, many registrants have registered as both general passengers and agency passengers and therefore have two or more ID cards.

**The contract between Tri-Met and the agencies served states that "the agency shall hold Tri-Met and its employees harmless from, and shall indemnify Tri-Met and its employees for any and all claims for damages suffered or allegedly suffered as a direct or indirect result of providing such assistance."


SPECIAL NEEDS BUS PASS

Agency: _____

Issued by: _____

Name: _____

Address: _____

CARD NUMBER **13 01567** 

Signature _____

- This card is the property of Tri-Met and must be returned upon request.
- This card entitles the holder to request special-needs transportation from the agency coordinator shown on the front. Service may not always be available if demand is great.
- This card is not transferable.
- Show card to driver when you board, and pay cash fare shown on front for each one-way trip.

FOR YOUR RETURN TRIP CALL 238-4822

FIGURE 4-2.
SPECIAL NEEDS BUS PASS

her bus pass to the driver and deposits a fare, if appropriate. The driver manually records the passenger's ID number on a control sheet which already contains information (conveyed by the control room to the driver) about the passenger's origin and destination. This information is keypunched each day and stored on a diskette. These data are then used to produce daily, weekly, or monthly reports covering operations, cost, billing, etc.*

All rides are scheduled 48 hours in advance. To arrange for service, agency-sponsored and affiliated passengers call their sponsoring agency, which, in turn, calls the LIFT in accordance with Tri-Met scheduling procedures. General passengers call Tri-Met directly to arrange for service. Passengers are supplied with the phone number (on reverse side of bus pass) and instructions on how to call for their return trip. Return trips are provided on both a prescheduled and demand-responsive basis. All rides are manually scheduled by a staff of five dispatchers from Tri-Met's Control Room. The control room includes a large wall map of the service area, radio console, and the required data collection and scheduling equipment.

Services are also provided by two taxi companies and a private wheelchair transportation firm. This alternative is used when it is a more cost-effective method than using a LIFT bus. A taxi would be used, for example, to transport a single passenger going a very long distance when this trip could not be grouped with others. Taxis are dispatched to pick up and deliver LIFT clients in the following way: one of the dispatchers places an order with the taxi company, relaying the

*In the future this record-keeping function will be taken over by the Automatic Fare Identification Recorders (AFIR's) which have been installed on each of the buses but are not yet operational. Passengers will insert their Special Needs Bus Passes in the AFIR upon boarding and deboarding the bus, eliminating the need for manual records.

necessary pick-up/delivery information and a purchase order number. At the time the rider is to be picked up, the taxi radios the necessary information to one of its drivers. The driver records information on a special sales draft, which is delivered to the taxi office grouped with other similar invoices, and forwarded to Tri-Met at the end of the month.

4.1.1 Eligibility Criteria and Ride Prioritization

There are approximately 22,000 people* in Portland who have difficulty using or cannot use regular bus service. The unconstrained trip demand of this group could not possibly be met by the LIFT. From the predemonstration survey we know that TH people make 1.4 trips per day. Applying this trip rate to the TH population and assuming that one-tenth of all TH trips could be diverted to the LIFT, we would have an unconstrained daily demand of $1.4 \text{ trips per day} \times 22,000 \text{ TH} \div 10 = 3,080$ trips per day. Operating personnel optimistically estimated that the 15 LIFT buses could serve 850 trips per day. Analysis in this report shows that a more realistic daily capacity is less than 500 trips per day. Therefore, potential demand for the service is as much as six times the available transportation supply.

Due to the anticipated imbalance between demand and supply Tri-Met took three measures to manage the demand:

1. Developed a two-day advance reservation policy,
2. Developed eligibility criteria, and
3. Implemented a ride rationing or prioritization scheme.

These actions were approved by the Citizens Advisory Committee.

The eligibility criteria are presented in Figure 4-3. These criteria are based on a functional rather than a medical definition of handicap to ensure that LIFT service is only available to people who really need it. A person, for example,

*Data from predemonstration survey.

Registration will be limited to those mobility disadvantaged persons of all ages who are physically or mentally unable to access the regular transit system and cannot use an automobile, and who meet both of the following criteria. (Those persons who need a wheelchair, walker, or crutches in order to travel are automatically eligible.)

- A. Are transportation disadvantaged in one or more of the following categories:
 - a. Unable¹ to get on or off a regular public transit bus;
 - b. Unable to walk from home to the nearest bus stop;
 - c. Unable to wait standing for more than 10 minutes;
 - d. Unable to move in crowds;²
 - e. Unable to read information signs;³
 - f. Unable to grasp coins, tickets or handles;
 - g. Unable to understand and follow transit directions;
 - h. Unable to utilize a regular public transit bus in the performance of life-sustaining activities; and
- B. Are unable to drive a car or do not have access to a vehicle for transportation.

1

The word "unable" means that performing the function is absolutely impossible or causes severe and continuing pain. It does not mean discomfort or occasional pain.

2

Difficulty keeping balance in a regular transit bus is not considered a transit disadvantage since federal regulations require seats for the handicapped near the entrance of all buses.

3

This does not include foreign language problems.

FIGURE 4-3
ELIGIBILITY CRITERIA FOR LIFT PASSENGERS

who has lost an arm and would be considered handicapped by a medical definition may have no problem using regular bus service and is not considered transportation handicapped by this functional definition.

Ride prioritization is based on several factors: trip purpose or need, length of trip, number of persons served, and location of facility to be served. A priority system based on need alone can result in low efficiency and high cost per rider because it does not allow for discretionary trips which might be completed with little effect upon the level of service. For example, visiting a friend in the hospital (moderate need) can be combined with a trip by a neighbor for a medical appointment at the same hospital (urgent need). On the other hand, providing only group trips, for example, would tend to eliminate many critical trip needs. Thus a two-dimensional approach to the priority-ranking problem that categorizes trip priority not only by need but also by number of people served was recommended. This system attempts to serve those with the greatest need and at the same time keep trip cost to a manageable level. It was developed through the joint efforts of Tri-Met and DAVE Systems and is shown in Figure 4-4.

Five levels of need and five levels of magnitude were developed which yield a total of 25 combinations. Each combination can be ranked in terms of priority. Highest priority is accorded regularly scheduled medical trips taken by many passengers to the same facility. This, for example, might be people with chronic conditions visiting Bess Kaiser Hospital for a weekly check-up. Second priority is for regularly scheduled income-producing work or school trips taken by many passengers to the same facility. This, for example, could be a group of students sponsored by the State Vocational Rehabilitation Division taking regularly scheduled courses at Portland Community College. Third priority is given to life-support activities (shopping, collecting Social Security checks, etc.) by a number of people traveling to the same facility, such

as a shopping center. This system continues, allowing for 25 levels of priority. Lowest priority is given to social and recreational trips over three miles in length, to diverse destinations.

4.1.2 Organizational Structure

The organizational structure of the Special Needs Transportation Project is shown in Figure 4-5. The General Manager's office has overall responsibility for the project. The Finance Department distributes operational results, prepares a monthly budget summary, and bills agencies. The Special Transportation Coordinator monitors all schedules for implementation of the program and calls to the attention of appropriate parties any problems which may be developing; he is Tri-Met's contact with the Citizens Advisory Committee (CAC), UMTA, TSC, consultants, and any agencies that contract for LIFT service. He works directly with agency personnel to negotiate contracts and to work out any client-related problems. He also oversees promotional activities. The Superintendent of Special Transportation is in charge of operations and reports directly to Tri-Met's Director of Operations. As a matter of practice, operational discussions are worked out between him and the Special Transportation Coordinator. His duties include responsibility for day-to-day operation of LIFT service and other contract carriers, management of personnel and equipment, and maintenance and scheduling. The Schedule Department provides computer-related assistance.

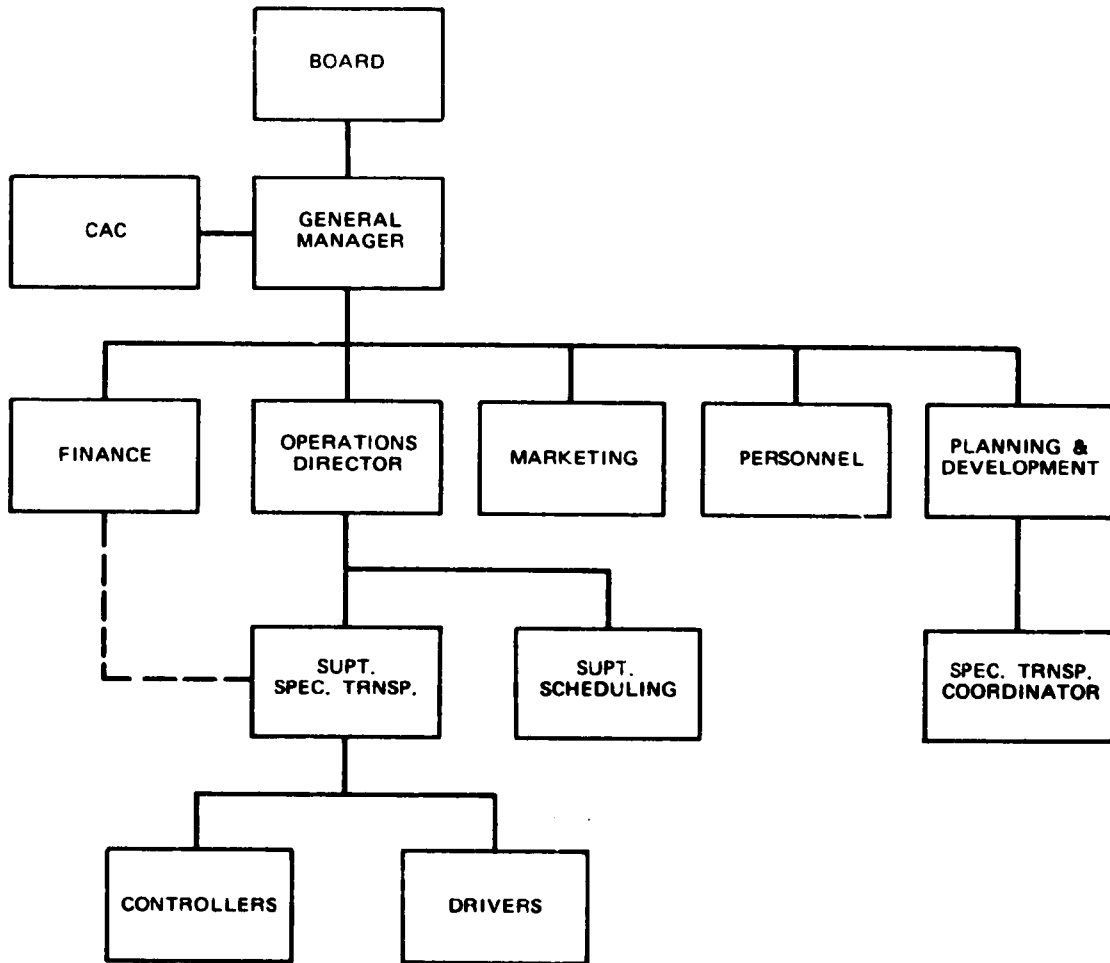


FIGURE 4-5 ORGANIZATIONAL CHART

4.2 PROJECT EVOLUTION

In July, 1973, Tri-Met adopted a resolution to "undertake planning efforts to consider provision of specialized transportation services for the disadvantaged elderly and handicapped residents of the tri-county area." Providing service to the handicapped and elderly population of Portland had been a concern of the city for some time. In 1972, the City Council approved funds to study the problems of the mobility disadvantaged. Based on the results of the study, the City Council appropriated \$20,000 which was combined with a grant from the State of Oregon early in 1974; this grant became the basis for a Special Transportation Unit within the City of Portland's Human Resources Bureau (HRB). The Unit aimed at coordinating the efforts of 40 agencies that had been identified as providing transportation to handicapped and elderly persons. Initially only nine agencies were involved in the consortium; this number eventually increased to 15 agencies.

However in October 1974, in keeping with its policy to operate as few programs as possible, the Human Resources Bureau made the decision to contract out services then being provided by the City's Special Transportation Unit. The contract was awarded to Special Mobility Services (SMS), a private non-profit transportation project. SMS was not able to provide all the necessary transportation and, thus, Metro Mobility (MM) came into being.

It was within this context of fragmented and overlapping transportation services to the elderly and handicapped that Tri-Met, with the cooperation of Portland's Bureau of Human Resources, stated their intention in a proposal to UMTA to "demonstrate the viability of transit company operated, demand-responsive special transportation . . . combining the resources and transit expertise of Tri-Met with the resources and social service expertise of the Bureau of Human Resources of the City of Portland."*

*From Demonstration Grant Proposal, March, 1975.

To allow for citizen input, Tri-Met held a public hearing on February 19, 1975 at the Multnomah County Courthouse in Portland, a month prior to submitting the proposal. There was some criticism that the public hearing came too late in the planning stage, as the basic design of the system outlined in the proposal (door-to-door service using specially-equipped vehicles) had already been determined. In all, 29 persons testified, representing the following offices or organizations:

- Governor's Office
- State Senator
- County Commissioner
- Mayor of Portland
- Tri-County Community Council
- Architectural Barriers Council (2)
- Bureau of Human Resources (3)
- Jewish Community Center
- Guidance Clinic
- Taxi cab companies (2)
- Handicapped groups (3)
- Senior Citizen groups (11)
- No affiliation (1)

The speakers pledged support for the proposed service and expressed concerns about the following: area and time of service, duration of project, coordination with existing services, role of cab companies, overlapping of coordinative efforts, cost of rides, and eligibility criteria.

The proposal was submitted in March, 1976 and led to a federal grant in July for a three year demonstration project. Most of fiscal year 1976 was devoted to formulating a work program for the project, investigating vehicle types, investigating the available technology in automatic fare boxes, and developing vehicle specifications. Bids were requested for the automated fare collection equipment, the management information system and the vehicles. Tri-Met also contracted with a firm to develop

the manual scheduling and dispatching operation.*

As an innovation of the project, service design was to be based on market research. Thus, in February and April of 1976, a comprehensive "before" household survey was conducted to measure the incidence rate of transportation handicapped people -- those who could not use regular bus service -- their pre-demonstration transportation behavior, and their attitudes, perceptions and problems relative to traveling within Portland. In May 1976, results of this survey were given to Tri-Met and DAVE Systems so they could begin to design the demonstration system based on the research and a functional definition of transportation handicapped.**

Initial plans on certification, system performance standards, and fare collection hardware were developed in July. It also became apparent at this time that the automatic fare boxes would not be ready by the time LIFT Service was scheduled to begin. This situation necessitated operating a manual fare collection and trip recording system during the early months of operation; however, as a consequence, it allowed an evaluation of the manual system versus the automatic system.

A Citizens Advisory Committee was formed. Five of the eleven member committee are handicapped and/or senior citizens. The other members represent organizations or interests that work with the target population. The Committee first met on August 12, 1976, and continues to meet monthly. Because of the importance

*The Mitre Corporation was selected to help write specifications for the equipment, and to serve as an intermediary consultant to select the two companies which would provide the hardware and software and to integrate their efforts. Scope Electronics of Reston, Virginia was selected to provide the Automatic Fare Identification Recorders (AFIR's) and Boeing Computer Service to develop the software for the AFIR's. Mercedes-Benz was selected to provide the vehicles, Motorola to equip the buses with two-way radios, and the Environmental Equipment Corporation to retrofit the buses with wheelchair lifts. DAVE Systems of La Habra, California was selected to develop a scheduling and dispatching system for the 15-bus system.

**Results are contained in the previously cited report; see note on page 9.

of the Committee's role in the planning process, a more detailed description of its formation and role is given in Section 4.3.1.

Early in August, DAVE Systems submitted their report describing preliminary eligibility, registration and priority criteria. Deciding who would be eligible to ride the LIFT was considered a critical aspect of the program since the potential demand for special needs transportation greatly exceeds the capacity of the system. Eligibility was based on inability to use regular bus service and lack of alternative transportation. An approach to the priority-ranking problem was recommended which categorizes trip-priority not only by need but also by the number of people who are served. (See Section 4.1.1.) These eligibility criteria and service priorities were reviewed by the Citizens Advisory Committee and approved by Tri-Met's Board of Directors in October.

By September 1976, the control room equipment had been specified and purchased, and a computer software contractor who would design the system for processing of billing and management information, selected. Tri-Met adopted a fare of \$3.00 for agency clients, slightly less than the amount SMS had charged for comparable service. General passenger fare was \$3.50. In both cases, Tri-Met paid for the difference between trip cost and fare collected.

Publicity regarding LIFT Services had, at this point, been primarily channeled to potential contracting public agencies or non-profit organizations, not to the general public. This was in keeping with Tri-Met's policy of developing LIFT ridership in a controlled, gradual manner to insure that promised service was delivered reliably and professionally. This policy and general efforts at marketing LIFT services are described further in Section 4.3.2.

As a result of the agency-directed publicity, during September the first contract was signed between Tri-Met and the City of Portland Human Resources Bureau to provide service for eight Area Agency on Aging (AAA) contracting agencies throughout the

city.* Tri-Met's Special Needs Coordinator conducted a training session for personnel of these eight agencies on how to register their clients for LIFT service. The issue of confidentiality arose at this point, and a policy statement was worked out between AAA personnel and Tri-Met. The policy stated that information compiled on clients shall be used solely for the purpose of providing social services and that no client identifiable information shall be disclosed without the individual's informed consent. Once this issue of confidentiality was resolved, the process of registering clients was begun.

The first edition of a Special Needs Newsletter -- prepared to inform any interested parties of the current status of the project -- was distributed in September to over 120 public and government officials, local organizations and individuals concerned with the handicapped and elderly, the media, and any private citizen who requested it.

In November 1976, Tri-Met invited open competitive bids from taxi companies and companies providing wheelchair transportation to provide supplemental transportation services for LIFT clients for trips which would be non-productive or uneconomical for the LIFT buses to serve. The taxi contract was awarded to Portland's two largest companies, who had submitted their bid as a joint venture. The contract for supplemental wheelchair transportation was awarded to the only company to submit a bid.

The first five of fifteen buses arrived in October and the dispatch room was readied for operation. An additional nine buses arrived in November and the Citizens Advisory Committee was invited for a pre-demonstration ride on one of the buses and a tour of the dispatching facilities. The training of 18 drivers and five controllers was conducted during the second and third

*The eight AAA centers within the city of Portland provide information, referral and counseling services to persons over 60, for the purpose of promoting client independence. Centers with group facilities sponsor such activities as dances, potlucks, card games, craft programs and tours.

weeks of December, and LIFT service began Monday, December 20th, 1976. At this time, 1,315 people were registered for LIFT service.

In its first two weeks of operation (December 20-31), the LIFT provided 898 trips to the elderly AAA clients. Demand for service these first two weeks was lower than expected, probably due to the Christmas Season (e.g., on Christmas Eve day there were only 39 requests for service) as well as a general hesitancy on the part of many handicapped and elderly persons to switch to a new and unknown system. No complaints were received, there were a number of letters of commendation, and the general feeling was that the LIFT was off to a good start.

During January contracts for LIFT service were signed with four agencies: Volunteers of America, Department of Vocational Rehabilitation, Goodwill Industries and the Crippled Childrens Division of the University of Oregon Health Sciences Center.

The marketing of LIFT services to general passengers, those individuals not connected to any agency or organization, began in March. Interested parties could write or call Tri-Met or come by in person to pick up a registration packet which contained a description of the LIFT, eligibility criteria, and an application form. By the end of April, 4,000 registration packets had been mailed; however, only 450 general passengers had been registered as eligible for service. The low return rate was caused, in part, by the requirement for verification of disability

Four additional agency contracts were signed with the Muscular Dystrophy Association, the State of Oregon Welfare Division, Child Neurology Clinic and Westside Schools (for mentally retarded adults) bringing the total of agencies that had contracted for LIFT service as of May 1977 to nine.

The first on-board survey of LIFT passengers was conducted

in April. One hundred forty-six passengers were interviewed about their current travel behavior and perceptions of LIFT Service. Ridership at this point was almost exclusively composed of elderly AAA clients. (Results of this and subsequent surveys are discussed in Chapter 8.)

General passengers were integrated into the system in May; and during that month, the LIFT provided 731 trips for general passengers, 16% of the total trips provided in May. The LIFT was now providing 220 trips a day or approximately 4,500 trips a month.

Ridership continued to climb steadily for the next two months; by the end of July, it had reached approximately 6,400 rides per month or 320 rides per day. Slightly less than 4,000 (unduplicated) persons had now been registered for service; this included approximately 400 additional general passengers, bringing their total registration to approximately 900. To stimulate additional registration of general passengers, a special promotional campaign was initiated by the Special Transportation Coordinator. The campaign consisted of a direct mailing of 15-20,000 brochures and 2,500 posters to local agencies and social organizations whose clients might be eligible for LIFT service.

4.3 PROJECT IMPLEMENTATION ACTIVITIES

This section will discuss specific features of the project in greater detail than was done in the previous section (Project Evolution), and also discuss problems encountered in implementing the project.

4.3.1 Citizens Advisory Committee

Tri-Met's original demonstration application, submitted to UMTA in March 1975, stated that "an advisory committee will be established which will include three at-large handicapped

and elderly community members (at least one member from each category), three social service agency members and one member representing Tri-Met, the City of Portland and CRAG (Columbia Region Association of Governments)."

The role of the Citizens Advisory Committee was conceived as an important one from the very start. Committee members would be involved in the design of the program, assist during the operation of the LIFT, and make recommendations for future expansion or modification of the LIFT. The particular responsibilities for the committee were contained in the charge to the committee by the General Manager on July 6, 1976.

Committee members, selected by open nomination, were persons who 1) directly represented handicapped and elderly persons, and 2) represented social service agencies and other organizations who provide services to the target group. In July 1976, the General Manager of Tri-Met sent letters to 22 individuals and organizations inviting their recommendations for the Citizens Advisory Committee. In addition, the Special Transportation Coordinator requested prospective committee members from an additional 10 organizations. The Special Transportation Coordinator then talked personally with all applicants suggested for committee membership to impress upon them the importance of the task and the time required to serve on the committee, and to request from them, if selected, a commitment to the project.

An attempt was made to balance committee membership between persons with technical expertise and those with none, between those connected with organizations and those with no organizational affiliation, and between those who will actually purchase services (individuals, agencies) and those who will not.

Tri-Met selected eleven persons to serve on the committee. Of these eleven, five were elderly and/or handicapped themselves. In addition, members were appointed to represent the following organizations:

City of Portland Bureau of Human Resources
Area Agency on Aging
United Cerebral Palsy Association
State Vocational Rehabilitation Division
The Multnomah Association of Retarded Citizens
The Columbia Region Association of Governments (CRAG)
Oregon Architectural Barriers Council
Crippled Childrens Division,
University of Oregon Health Sciences Center
Buck Ambulance Company
Neighborhood House (City of Portland Area Agency on Aging)
PACT Senior Service Center (City of Portland Area
Agency on Aging)

The Committee first met on August 10, 1976. During the months of August through October, the Committee met an average of three times a month and spent the vast majority of its time reviewing proposals for service design submitted by Tri-Met. These proposals included eligibility criteria, ride prioritization, fare policy, registration of general passengers, marketing strategy and program identification, and the service goals and criteria for evaluation of the program. During these first months, the Committee's input was invaluable. Its effectiveness showed in the following areas:

1. The Committee pinpointed areas where Tri-Met's initial policies may have been in error. For example, the original eligibility criteria stated that the service was for persons who were unable to use regular, fixed-route bus service. The Committee suggested the addition "if cannot use bus for life-support activities." This, then, would allow a person to use the service who can walk to and get on a regular bus, but cannot carry packages and thus needs the specialized door-to-door service the LIFT provides.
2. The Committee pinpointed problem areas not anticipated by Tri-Met. For example, the decision to exclude income

as a basis for eligibility was made by Tri-Met in large part because of input from Committee discussions.

3. The Committee sensitized Tri-Met personnel to concerns of handicapped and elderly persons.
4. Finally, the Committee provided a sounding-board for members of the handicapped and elderly community concerned about the LIFT.

The LIFT started operation on December 20, 1976. Since that time, the activities of the Committee have been primarily involved with monitoring the operations of the LIFT and suggesting ways in which to improve service provided. Each month, the Special Transportation Coordinator of Tri-Met, who provides staff support to the Committee, reports on service during the previous month and solicits suggestions from the Committee.

Another important function of the Committee during the operational phase is that of assisting in the evaluation, both short-term and long-term, of the LIFT. This included reviewing questionnaires for on-board surveys conducted on the LIFT; many of the Committee's suggestions were incorporated into the final survey forms.

A third critical function of the Committee is to provide input to Tri-Met as to the future of the LIFT after the end of the demonstration period, and the relationship of the LIFT to other Tri-Met programs for the elderly and handicapped in the tri-county area.

There are some questions about whether the Committee became involved in the overall planning process early enough to have a significant impact on determining the nature of service to be provided. Their first meeting was held four months before service began. No citizens' group was involved in writing the grant application (March, 1975) which basically designed the system; nor was there any citizen input into the comprehensive, pre-demonstration household survey (e.g., regarding questionnaire content, best methodology for reaching handicapped and elderly, etc.).

In retrospect, the failure to elicit their participation at an earlier point in the planning process was probably a mistake, in view of the invaluable role the Committee has played since the project's inception.

4.3.2 Marketing the LIFT

The marketing strategy adopted by Tri-Met to promote its LIFT service was, first, to accurately identify the target population to be served, and then to gradually provide service to those who needed it. Tri-Met was most concerned that it not commit the same error that seemed to have been committed by other Dial-A-Ride programs in the country: promising more than could be delivered. Situations such as those experienced by the Santa Clara County Dial-A-Ride -- where 80,000 phone calls were received for the first day of service in response to massive publicity -- were to be avoided at all costs. The policy was one of gradual, controlled system growth rather than explosive growth which could threaten the system's ability to operate.

LIFT service was planned and implemented in a highly-charged political atmosphere in which the issue of special transportation was becoming a major community cause. Local organizations and their spokespeople had easy access to the local Portland media to promote the cause of the equal rights of the handicapped in general and special transportation in particular. Because the LIFT program had been in planning for at least a year and a half, expectations were high.

In early August, 1976, several prominent handicapped individuals walked, or were wheeled, from Portland to Salem, the state capital, in an effort to dramatize the lack of transportation facilities usable by the handicapped. In a meeting with the Director of the State Department of Human Resources, one of the Governor's highest appointees, their message was clearly delivered: a higher and more intensive effort by government at all levels

to increase transportation facilities for the handicapped was a must. Interest in the LIFT program, still in the planning stages, was heightened. Local units of government, including the Portland City Council, expressed concern as to the starting day of the LIFT project.

However, in order to pursue its policy of controlled system growth, Tri-Met refrained from extensive promotional efforts which had characterized other demand-responsive systems. Prior to implementation, information on the LIFT was primarily channelled to potential contracting public agencies or non-profit organizations. Specifically, the decision to delay the availability of LIFT service for general passengers -- those not affiliated with agencies or organizations -- was directly related to the controlled growth strategy.

In September, 1976, Tri-Met began publishing Special Needs News, a newsletter prepared to inform various public agencies, local organizations and individuals concerned with handicapped and elderly persons about the current status of the project. The only general publicity generated by Tri-Met prior to the start of the LIFT and in its early months of operation related to actions taken by local governmental jurisdictions in approving funding for the LIFT and the two-week training course for LIFT drivers in early December. On December 20, 1976, the LIFT began actual operation with no mention in the public press;* however, it carried every passenger sponsored by the City of Portland's Area Agency on Aging who requested service. This low-keyed approach continued through the first two and one-half months of LIFT service.

The company retained by Tri-Met to do advertising and marketing for its fixed route system suggested the name "The LIFT" for this specialized service, and designed special stylized lettering to communicate the sensation of being uplifted. This lettering

*There had been several articles of a purely descriptive nature in The Oregonian and the Oregon Journal.

was accompanied by the international accessibility symbol and became the system's logo. LIFT buses are orange, the lettering on the side of each bus is purple, and the international accessibility symbol is green.

In March, Tri-Met began to publicize the availability of LIFT service to general passengers, those people not connected to an agency or organization. A Rider's Guide was printed. Details of how interested parties could register for service were published in the Special Needs News. As of April Tri-Met had distributed 4,000 registration packets in response to requests from potential general passengers.

Service for general passengers began on May 2, 1977 and by the end of June accounted for 29% of all trips. Although this ratio of general passengers to agency-sponsored passengers was considered acceptable at this point, Tri-Met was aware that the pre-demonstration household survey data indicated that most potential LIFT users would be general passengers rather than agency-sponsored or affiliated passengers. Thus, in July an increased marketing effort was made to reach additional potential general passengers. A packet was mailed to 2,000 locations in the city of Portland, publicizing the LIFT and the purposes for which it could be used. Packets consisting of a display poster, general information brochure and a letter explaining LIFT service were sent to every doctor's office in the city of Portland, hospitals and clinics, and neighborhood associations. Individuals were encouraged to display the poster and to request additional materials through use of a prepaid reply card.

The return rate of the reply cards was 9% as of September 1. Additional information distributed in response to these requests amounted to 20,000 information brochures and 250 posters. By the end of September, general passengers accounted for 38% of all rides taken on the LIFT; by December their share of rides had risen to 46%.

4.3.3 Contract Negotiations Between Tri-Met and Social Service Agencies

In January 1976, Tri-Met conducted a brief review of potential subscribers to the LIFT project, gathering information from five agencies about transportation services and costs. At this time, initial value judgments were made concerning the agencies toward which Tri-Met should aim its services.

The Special Transportation Coordinator used the information in the above review when he first began contacting potential contracting agencies. His emphasis, initially, was to contact those state and federal agencies with the biggest number of clients and with established funding mechanisms to cover client transportation costs. However, all Portland agencies which inquired about service were considered as potential clients. An example of this is Goodwill Industries, a private corporation, which had not previously contracted for any kind of transportation services.

At the present time, 19 agencies have contracted for LIFT service. They range from the City of Portland Human Resources Bureau, whose Area Agency on Aging clients now account for almost half of LIFT ridership, to the Child Neurology Clinic, which currently has only two children registered for service.

The Special Transportation Coordinator is responsible for negotiating the contract between Tri-Met and each of the contracting agencies. The following are his observations on the negotiating process:

1. All agencies contacted were initially enthusiastic over the prospect of contracting with Tri-Met for transportation services; however, they did not necessarily hasten to work out and sign such an agreement. Thus, the contract negotiator must constantly take the initiative in such negotiations, particularly by helping agency personnel to maneuver through their own bureaucracy, and to foresee and avoid problems which would have the effect of delaying service.

2. Contract negotiations should start at a sufficiently high level within the agency organization so that responsibility for decision-making filters down. This is far more efficient than initiating efforts with personnel at a low level in the hierarchy and having to work up the ladder. When negotiations are taking place with a top administrator within the organization, problems which come up can be worked out fairly quickly. However, if negotiations are begun at a low level within the organization's structure, each change must be approved by someone higher up the ladder. This process is extremely time-consuming and frustrating.
3. Communication should be facilitated between all possible players involved in the negotiating process -- particularly communication between the administrative and legal departments of an organization. Some state agencies are assigned an Assistant District Attorney whom they may consult regarding contractual matters. However, because the agency must pay for such consultation, they frequently ignore this service. Administrators who are making legal judgments without adequate legal knowledge may create unnecessary problems and costly and time-consuming changes in the contract may be required. Such a rewrite rarely yields substantive changes in the actual content.
4. Contracts should not be negotiated through the political process. Any contracts signed with a City agency must, of course, meet the approval of all members of the City Council. However, if issues which arise are worked out in public meetings, changes may be made which are not germane to the problem. This situation can be avoided if there is an intentional effort on the part of the contract negotiator to make himself/herself available to the political persons involved in order to work out any

strong objections they may have in advance of the public meeting. This allows differences to be resolved more efficiently.

5. It is helpful for the contract negotiator to have a legal background. It gives the negotiator authority to speak in legal matters with persons at low levels of administration and serves to give him/her credibility with those persons at higher levels of administration. It is also invaluable in dealing with other lawyers. Since it places both parties on an equal footing, the negotiator can ward off demands for unnecessary changes in the contract.

4.3.4 Operational Problems

LIFT service began on December 20, 1976 using ten of its fifteen buses. Tri-Met had decided to start service with ten drivers, anticipating that initial start-up problems and the need for drivers to familiarize themselves geographically (since they would be picking up passengers on small back streets with which the drivers were unfamiliar) would allow the system to keep ten drivers at a good, productive level. However, Tri-Met misjudged the demand for LIFT services in these early months of operation. The slow start may have been due to the fact that opening day was five days before Christmas, perhaps not the best time to begin a new service for this particular target group. Also, early ridership was made up entirely of Area Agency on Aging clients, and these elderly clients were perhaps hesitant to try a new and unknown system. Whatever the reasons, the start was slower than anticipated: there were not enough riders to keep ten buses operational, and this resulted in a high vehicle cost per hour due to labor costs paid for driver standby time. Union regulations require that each driver is guaranteed a full day's work. Thus Tri-Met cannot employ extra drivers when demand is

high, during morning hours, and fewer drivers when demand is low, during afternoon hours.

It would have been possible to transfer some of these LIFT drivers back to Tri-Met's regular, fixed-route system, but in the interest of keeping morale high, the decision was made to keep all ten drivers on LIFT service. This decision, however, seems to run contrary to a principal advantage of having such service provided by a transit operator, namely, that the size of the transit company allows a flexibility and shuffling of personnel between the fixed-route and special system.

The lack of grouped rides is a major problem and one which contributes to the high cost per passenger trip (See Section 7.2.1.). The ride prioritization system discussed earlier gives top priority to regularly scheduled trips taken by many passengers to the same facility; the requirement that rides be scheduled 48 hours in advance is to facilitate the grouping of such rides. However, such trips have failed to materialize; most trips are one-to-one, a single passenger being carried to a single destination.

The automated fare collection equipment (AFIR) has caused a number of problems. Early in the planning stage it became apparent that the fare boxes would not be ready by the time LIFT service was scheduled to begin. This necessitated developing a manual system for recording trip data during the early months of operation but had the advantage of allowing a comparison between the manual and automatic systems. As of October, 1977, AFIRs had been installed on all the LIFT buses but as yet have not been sufficiently reliable to use exclusive of the manual system. The automated equipment continues to break down because of design fault; its sensitive electronic equipment is not able to function properly in the jerky, erratic bus environment. This will be explained in detail in Chapter 6.

The software component of the system was to produce daily, weekly or monthly reports covering operations, cost, billing and statistical analysis. However, the required reports were not pro-

duced until July, seven months after the start of service, because initial programming was done incorrectly. This was due to a lack of coordination between the hardware and software contractors* and the fact that there was no pre-existing program. Hardware problems cited earlier also caused delays. Tri-Met is considering severing their relationship with Boeing, the software contractor, as they now have internal programming and hardware capability to produce the needed data. An in-house system may prove to be more efficient particularly as regards special statistical analyses which were difficult to obtain from the Boeing system.

4.3.5 Integration of SNT System with Other Transit Services

Federally-subsidized programs for the elderly and handicapped have been characterized by increased consultation with and involvement of private operators in the recent past. Foremost among the documents delineating this federal concern are the UMTA regulations for the transportation of the elderly and the handicapped (promulgated April 30, 1976), and the proposed UMTA paratransit policy (promulgated October 20, 1976). In addition, the UMTA regulations governing the 16 (b)(2) program require consultation with affected private operators prior to the purchase of vehicles under this program.

Since the inception of the LIFT system, Tri-Met has involved private operators to the maximum extent possible. The original grant application provided for alternate service to be furnished by taxis or private buses during the hours and days the LIFT did not operate; this service was to be provided to major destinations in Portland at a slightly higher cost than the LIFT bus. This configuration was altered in the latter stages of project planning

*An intermediary consultant -- the Mitre Corporation -- had been hired specifically to help select and integrate the efforts of the hardware and software contractors.

and implementation; under the revised arrangement, private operators were to provide supplemental transportation services for trips which would be non-productive or uneconomical for the LIFT buses to serve. These trips generally consist of a single passenger riding a long distance.

Tri-Met let two subcontracts for supplemental services: one for taxi service, and one for service provided by a wheelchair transportation van, the latter to be used for people who, because they are confined to electric wheelchairs, cannot get in and out of taxis.

For both subcontracts, Tri-Met invited open competitive bids from all eligible carriers in the service area for these supplemental services. In the case of the taxi contract, the three taxi companies serving the Portland area were invited to bid. Of these, the two larger companies, Broadway and Radio Cab Companies, submitted the only bid as a joint venture, and were awarded the contract on this basis. In the case of the smaller supplemental contract for services on a wheelchair transportation van, only one of ten potential bidders responded, the Buck Ambulance Company; its winning bid was awarded the contract at a substantial discount to Tri-Met.

A potential problem of how to interface with the private providers existed with the LIFT. A mechanism had to be designed so that the LIFT Control Room could communicate quickly with dispatchers for the private providers in order to facilitate instantaneous and efficient ride referrals. With the help of DAVE Systems, of La Habra, California, forms were designed to accomplish this. In addition to communicating trip origin and destination information to the taxi/wheelchair transportation company dispatcher, the forms and procedures designed also allow for easy approximation of charges by the LIFT Control staff, thereby facilitating financial planning.

Central to the cooperative arrangement between Tri-Met and the private providers assisting the LIFT are two supplemental

13c agreements between Tri-Met and the Amalgamated Transit Union (ATU), Local 757, which is the exclusive bargaining agent for Tri-Met employees. These Supplemental 13c agreements provided that an initial \$50,000 (and subsequent \$5,000) out of the LIFT Demonstration monies could be used for transportation services not provided by ATU employees. This \$55,000 amounts to about 10% of the funds devoted to the operation of the LIFT buses. Without these agreements, all labor would have to have been provided by ATU employees, and would have pushed the costs of provided LIFT services higher.

5. PROJECT DEMAND CHARACTERISTICS

5.1 INTRODUCTION

After one year of operation, the LIFT is providing approximately 325 rides per day for transportation handicapped persons. To meet this level of demand, Tri-Met is operating twelve of its fifteen specially-equipped buses. Registration of clients and project use has risen steadily since the project began. This chapter discusses the numbers and types of persons who have registered, and project ridership trends.

5.2 REGISTRATION

After twelve months of registration, 4277 unduplicated persons have been registered for LIFT service. In comparison, the number of persons in Portland who have difficulty using regular bus service - based on a pre-demonstration household survey - is estimated to be 22,000 persons*. Using this figure as a basis for determining how many of the target population are being served, market penetration in terms of registrants after one year of operation is 19% of the transportation handicapped population (1% of the total population of Portland). However, many persons identified as transportation handicapped in the pre-demonstration survey are able to provide for their own transportation needs, and thus do not require LIFT service. The precise number of this group is not known, but can be estimated from the survey data. When asked how frequently an auto was available (either as a driver or as a passenger) for needed trips, 54% of those surveyed responded "always" or "usually". If this group (approximately 12,000 persons) were subtracted from the total transportation handicapped group, a more realistic target market figure of 10,000 would result, and the overall market penetration would be 42%.

*5.75% of Portland's population of 385,000.

Data showing registration trends were not gathered. However, conversations with Tri-Met staff reveal that after an initial rush, the registration rate remained steady for several months, increased when general passengers were introduced to the service, and has remained steady at about 20 per week ever since.

5.2.1 Demographics

Of the 4,277 persons registered for LIFT service, 3,130 or 73% are agency-sponsored passengers, 4 or .01% are affiliated passengers, and 1,143 or 27% are general passengers—i.e., persons not sponsored by or affiliated with an agency. Registration of general passengers has been in progress for seven months, somewhat over half of the total registration period. To allow for comparisons among these three groups, most of the figures and tables which follow will be broken down by type of passenger. (Because of their small number, affiliated passengers will be aggregated with agency-sponsored passengers.) There are no data at this time to allow for comparison of users and non-users of the project.

Table 5-1 gives the age and sex distribution of the registered group. Figures from the pre-demonstration household survey of handicapped and elderly persons is given for comparison.

Three out of four persons registered for LIFT service are over 65 years of age. The average age for all registrants is 71; the average age of general passengers is four years less than that of agency passengers. In both groups females outnumber males more than two to one.

A comparison of the registered group with Portland's transportation handicapped population as a whole shows that the age and sex profile of both groups is very similar. This indicates that the LIFT service is not "missing" a particular group in its marketing efforts, at least as far as age and sex are concerned; however, based upon registration data it appears that the LIFT is serving the elderly segment more than the non-elderly.

TABLE 5-1.

REGISTERED CLIENTS BY AGE AND SEX (%)

<u>Age Group</u>	<u>Agency-Sponsored</u> n=3134	<u>General</u> n=1143	<u>All</u> <u>Clients</u> n=4277	<u>Pre-Demo</u> <u>Survey (4/76)</u> n=522
Under 10	0.2	2.5	0.9	*
10-15	0.2	0.9	0.4	0.8
16-20	0.4	1.0	0.6	1.2
21-59	12.0	18.0	13.6	20.3
60-64	8.4	6.0	7.5	8.7
65 and over	78.9	71.7	77.0	68.9
Mean Age	72.5	68.5	71.4	
<u>Sex</u>				
Males	29.8	28.2	29.4	31.7
Females	70.2	71.8	70.6	68.3

*Children under 10 were not interviewed in the pre-demonstration survey.

5.2.2 Inability to Use Public Transit

To be eligible for LIFT service, riders must be physically or mentally unable to use the regular transit system. At the time clients are registered for LIFT service they are asked to indicate why they are unable to use regular transit. Table 5-2 gives a breakdown of these responses. (Some people mentioned more than one reason why they were unable to use regular transit.)

The most frequently mentioned reasons—"unable to get on and off the regular bus," "unable to walk to bus stop," "unable to wait standing for more than 10 minutes," and "unable to use the bus for life-sustaining activities"—indicate that the majority of registrants' transportation handicaps stem from restrictions on mobility. This is more true of the general passenger than the agency passenger: two out of three general

passengers registered reported that they were unable to get on and off the bus or that they could not walk to the bus stop, and almost half said they could not wait standing for more than 10 minutes.

TABLE 5-2.
REASONS WHY REGISTRANTS CANNOT USE REGULAR TRANSIT

	<u>% of Total Passengers</u> n=4277	<u>% of Agency Passengers</u> n=3134	<u>% of General Passengers</u> n=1143	<u>Pre-Demo Survey*</u> n=522
1. Unable to get on and off bus	56%	53%	63%	62%
2. Unable to walk to bus stop	54	49	66	77
3. Unable to wait standing for 10 minutes	43	40	49	73
4. Unable to use bus for life-sustaining activities	30	35	17	NA
5. Unable to move in crowds	19	19	19	64
6. Unable to read information signs	13	12	15	35
7. Unable to understand or follow transit directions	11	12	9	23
8. Unable to grasp coins, tickets, handles	4	4	4	17

* Of the persons classified as transportation handicapped in this survey, figures in this column indicate the percentage of persons who stated they had "great difficulty" with or were unable to perform this function.

5.2.3 Health Problem

Table 5-3 gives the incidence of specific health problems. The figures show that the general passenger, on the average, seems to have a higher incidence of specific mobility-limiting disabilities than agency passengers. This is consistent with data showing that a higher percentage of general passengers require more mobility aids than do agency passengers (see Table 5-4). It is also consistent with the data on the reasons people gave for not being able to use regular transit: these data indicated that mobility-related reasons were much more prevalent among the general passenger group (see Table 5-2).

5.2.4 Mobility Aids Used

Table 5-4 gives figures on the type of mobility aid used and indicates that the general passenger relies more heavily on an escort than the agency passenger.

5.2.5 Comparison of Numbers of Registered Wheelchair, Walker, and Escort Persons with Their Respective Populations in Portland

Table 5-5 presents figures on the number of people in Portland who rely on certain types of mobility aids, and indicates what percentage of these persons have been registered for LIFT service. The pre-demonstration data do not correspond precisely with the registration data presented in Table 5-4, since different categories are used. Thus the registration categories of "wheelchair" and "wheelchair and escort" are aggregated under the single designation "wheelchair."

TABLE 5-3.
HEALTH PROBLEM (%)*

<u>Health Problem</u>	<u>Agency-Sponsored</u>	<u>General</u>	<u>All Clients</u>
Orthopedic Problem	11.3%	15.2%	12.3%
Visual Impairment	11.1	15.2	12.2
Heart Ailment	9.3	16.1	11.1
Arthritis	6.7	15.0	8.9
Emotional and Mental Problems	7.0	6.5	6.9
Hearing Problems	3.8	6.9	4.6
Stroke	3.4	6.2	4.2
Respiratory Problems	3.3	3.9	3.5
Spinal Cord Injury	2.0	4.6	2.7
Diabetic	1.8	3.4	2.2
Speech Impairment	1.5	2.5	1.7

* All other health problems had incidence rates below 2.0%.

TABLE 5-4.
MOBILITY AID USED (%)

<u>Type of Mobility Aid</u>	<u>Agency-Sponsored</u>	<u>General</u>	<u>All Clients</u>
No aid used	63.2%	54.3%	60.8%
Accompanied by escort	14.5	18.1	15.4
Walker or crutches	7.8	7.4	7.7
Wheelchair	8.4	8.4	8.4
Wheelchair & escort	6.1	11.7	7.6

TABLE 5-5.
 COMPARISON OF CERTAIN REGISTRANTS
 WITH THEIR CORRESPONDENT POPULATIONS
 IN PORTLAND, BY MOBILITY AID

<u>Mobility Aid</u>	<u>Pre- Demonstration Data*</u>		<u>Registration Data</u>		<u>Percent Registered By Lift</u>
	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Wheelchair	.36	1386	27	1146	83
Walker or crutches	.45	1733	8	340	20
Accompanied by escort	.30	1155	18	764	66
Totals	1.11	4274	54	2250	

*Figures based on Portland population of 385,000 and are factored from the incidence rates obtained in the pre-demonstration survey.

The data indicate that the LIFT is serving 83% of those persons in Portland who must rely on a wheelchair to get around. This figure seems quite high and might be an overstatement; however, there are several possible reasons why this could be an accurate measurement. First, wheelchaired persons are those with the most severe mobility problems, and one would expect them to be the group of people most inclined to register for service tailored to meet their special needs. Secondly, promotion for the LIFT focused on the wheelchair-bound passenger (e.g., the logo on the LIFT buses is the international sign for a wheelchair person) and thus may have attracted more LIFT registrants. Third, there may be wheelchaired people who generally are able to provide for their own transportation needs who have registered for LIFT service as a "rainy day" measure for times when their usual mode of transportation is unavailable. As a group they would be more likely to take such action than, say, people who require crutches to get around; the physical condition of persons who use crutches allows them greater flexibility in choosing alternate transportation modes.

Finally, the reader should be aware that the small proportions derived from the sample data (e.g., .36% of the people in Portland use wheelchairs) have high standard errors -- on the order of 2/3 of the proportions -- and therefore extrapolations from these proportions are uncertain.

Market penetration among the severely transportation handicapped is approximately the same as for the population as a whole. The pre-demonstration survey data broke down those persons identified as transportation handicapped (TH) into two groups by severity of handicap: moderately TH and severely TH. The severely TH group comprised 3.2% of Portland's population, or 12,300 persons. This classification was based on the reported difficulty these persons had performing eight transit-related functions. There are no comparable data for those registered to use LIFT service. However, if those who must use a wheelchair or walker or be accompanied by an escort are used as an index of a severe transportation handicap (realizing this would exclude some severely TH persons and, possibly, wrongly categorize others as severely TH), 2250 registrants fall in the severely TH group. These figures, then, indicate that LIFT service has registered, roughly, 18% of the severely transportation handicapped population of Portland. (However, again it must be stated that many persons identified as transportation handicapped in the survey are able to provide for their own transportation needs and are not potential LIFT clients.)

5.2.6 Client Affiliation

Table 5-6 shows client agency affiliation. AAA affiliated clients comprise the largest segment of registrants but are less than half of total registrants. General passengers now account for slightly over one-fourth of all registered persons. General passenger registration is increasing faster than agency passenger registration.

TABLE 5-6.
PASSENGER AFFILIATION

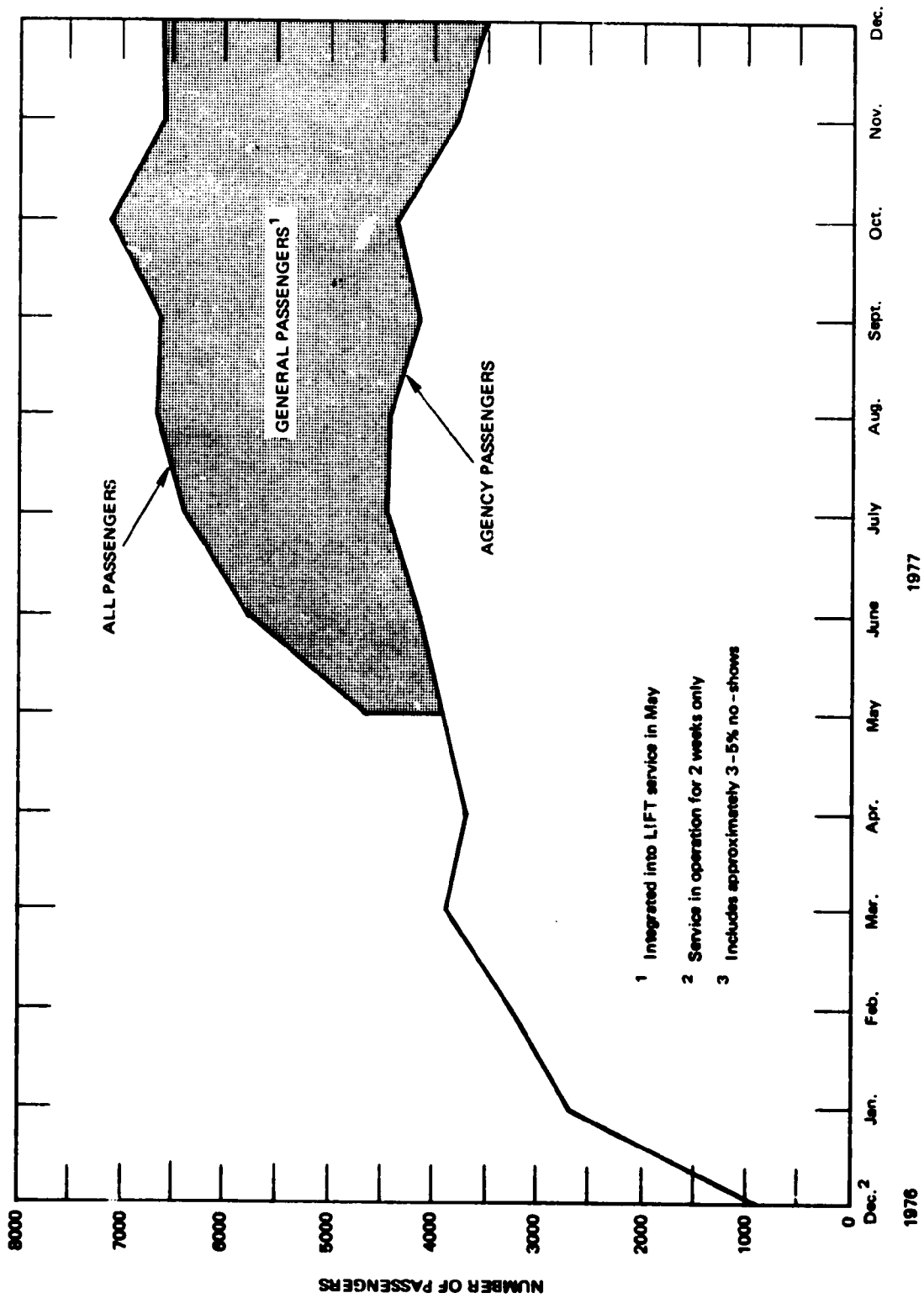
	<u>n</u>	<u>% of Total Registered</u>
Area Agency on Aging	1897	44.3
Public Welfare	1096	25.6
General Passenger (no agency affiliation)	1151	26.9
Vocational Rehabilitation	26	.6
University of Oregon Health Sciences Center	21	.5
Muscular Dystrophy Association	22	.5
Volunteers of America	4	.1
Child Neurology Clinic	2	0.0
Metropolitan Family Services	58	1.4
	<u>4277</u>	<u>99.9</u>

5.3 PROJECT RIDERSHIP

5.3.1 Volumes

Figure 5-1 shows the growth in ridership over the first year of the project.

The data show that after a brief leveling off in April, ridership began a steady climb in May with the integration of the general passenger into LIFT ridership. Ridership has leveled off again during the late fall and winter months.



- 1 Integrated into LIFT service in May
- 2 Service in operation for 2 weeks only
- 3 Includes approximately 3-5% no-shows

FIGURE 5-1 PROJECT RIDERSHIP BY MONTH³

Table 5-7 shows the number and proportion of rides provided each month by taxi. The taxi mode is used when it is a more cost-effective mode than using a LIFT bus, e.g. for many-to-many trips from origins that are not close to normal LIFT routes and when the LIFT buses are behind schedule and taxis must be substituted.

TABLE 5-7.
TAXI RIDERSHIP BY MONTH

	<u>Number of Trips</u>	<u>% of All Trips</u>
January, 1977	14	0.5
February	0	-
March	19	0.5
April	25	6.7
May	287	6.2
June	551	9.6
July	986	15.4
August	780	11.7
September	876	13.2
October	888	12.4
November	773	11.8
December	702	10.6

There is a ceiling on the number of taxi trips that can be delivered each month. According to the agreement between Tri-Met and the labor union, up to \$55,000 of the demonstration funds can be spent on taxi (non-union) services. Since taxi trips are running about \$5.50 apiece, approximately 10,000 trips will be allowed. This works out to about 830 trips per month, or about 40 per day.

5.3.2 Handicap Classification

The identification number of each passenger is recorded for each trip made on the LIFT. The second digit of this number indicates whether or not the rider uses a mobility aid and the type of aid used. Table 5-8 presents trips taken during September, 1977 by mobility aid used. Two-thirds of LIFT riders do not require an aid; those using a wheelchair comprise 17% of all trips. During the first year of operation wheelchair trips have averaged 15% of all LIFT trips.

TABLE 5-8.

RIDERSHIP BY MOBILITY AID USED: SEPTEMBER 1977

	<u>n</u>	<u>%</u>
No aid used	4151	64.7
Accompanied by attendant	675	10.5
Walker or crutches	511	8.0
Wheelchair	645	10.1
Wheelchair and attendant	432	6.7
Total	<u>6414</u>	

5.3.3 Frequency of Use

Approximately 25% of all persons who are registered with the LIFT use the service at least once during a given month. The average trip-making rate for all passengers is three one-way trips per week. General passengers average a higher trip rate per week (3.8) than do agency passengers (2.8). These data are based on actual trip records for the month of September. These September trip records were the latest available at the time of the report and were representative of the data available from the months of June, July, and August, the other months examined.

Table 5-9 gives a frequency distribution of the trips taken by LIFT riders during September, 1977. During this month about two-thirds of the riders made 1-5 one-way trips;

thus most riders use LIFT service infrequently. Trip frequency data for September were also similar to other months sampled.

TABLE 5-9
TRIP FREQUENCY: SEPTEMBER 1977

<u>Number of Trips Made</u>	<u>% of Riders This Month</u>
1-5	65.4
6-10	19.7
11-15	6.2
16-20	2.5
21-25	1.4
26-30	1.3
31-35	1.0
36-40	1.4
41-45	1.0
46-50	0.1
51-55	0.1

5.3.4 Time of Day, Days of Week, and Period of Month

The trip ticket kept on each trip provided by LIFT service gives information on day of service, pick-up time, and delivery time. These tickets were sampled in order to determine the number of trips by time of day, day of week, and period of the month.

Table 5-10 gives a distribution of trips by day of week for all passengers and for wheelchair users as a subgroup. The data show that ridership is lowest on Monday and highest on Thursday and Friday. There is little difference between the passengers as a whole and the wheelchair group.

TABLE 5-10.
TRIP FREQUENCY BY DAY OF WEEK*
(Percent)

	<u>All Passengers</u>	<u>Wheelchair Passengers</u>
Monday	14.6	15.6
Tuesday	18.0	19.4
Wednesday	21.0	21.7
Thursday	24.0	21.3
Friday	22.4	22.0

*Data analyzed covered a four-month period, June through September, 1977.

Figure 5-2 gives a distribution of trips by time of day. The peak period for LIFT service is between 9 AM and 4 PM; three-fourths of all trips occur within this time period.

Analysis of the operating data for a four-month period shows there is very little difference in ridership by time of the month.

5.3.5 Trip Purpose

Information on ridership by trip purpose was derived from on-board surveys and is presented in Section 8.1. The major trip destinations were the major medical and shopping centers scattered throughout the city.

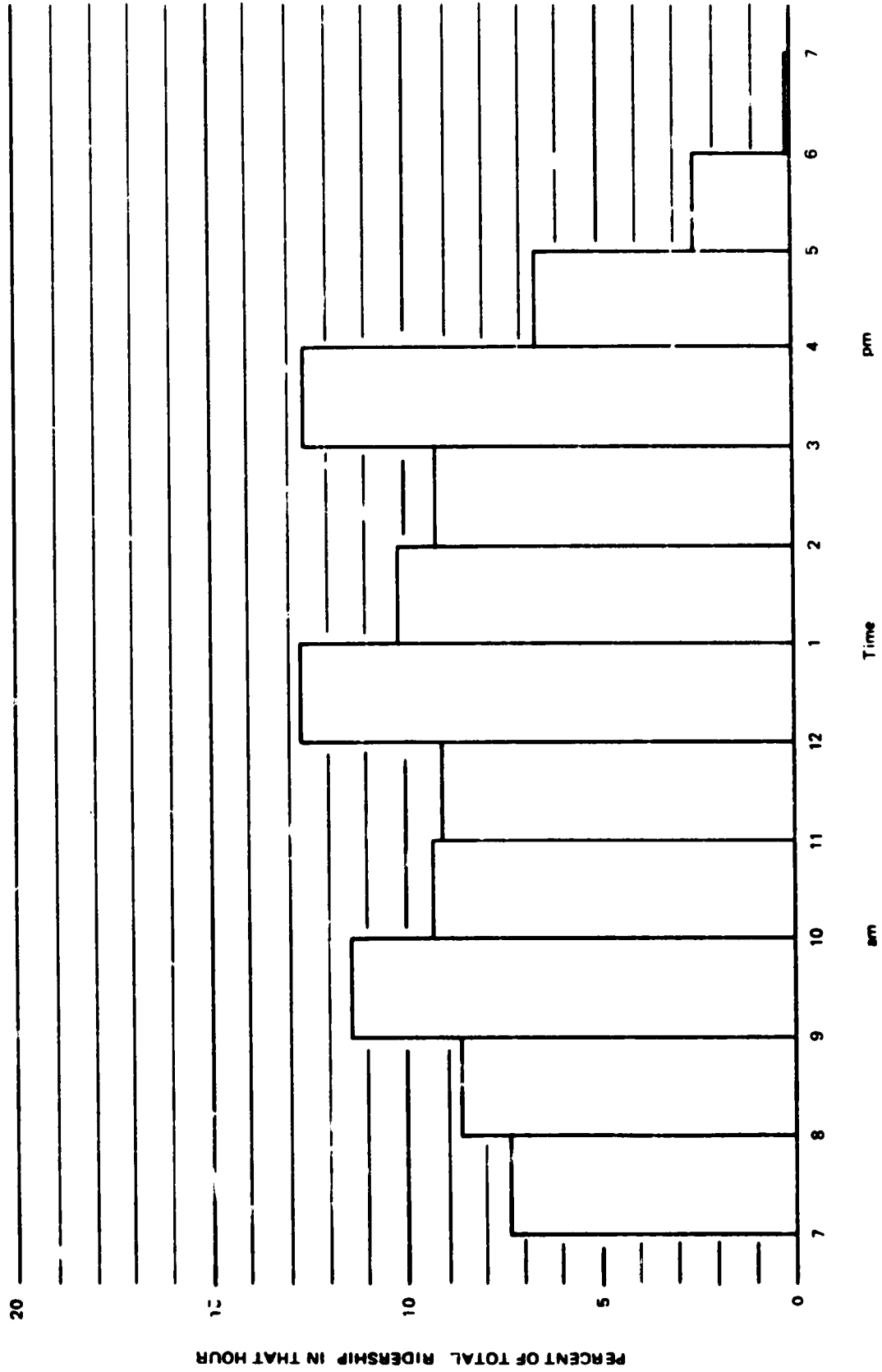


FIGURE 5-2 RIDERSHIP BY TIME OF DAY

6. SERVICE SUPPLY

6.1 INTRODUCTION

This chapter of the report covers the supply of special transportation services to the handicapped and elderly markets in Portland. The following topics are addressed:

1. Coverage by area and time;
2. Pricing, including comparisons with other modes available in Portland;
3. Analysis of equipment, including some analysis of client perceptions;
4. Description and analysis of the scheduling procedure;
5. Analyses of service reliability, trip time, and travel speed; and
6. Comparison of LIFT and taxi service.

The analysis includes the impact of demand on service supply where the data are available.

Most of the data used in this chapter derive from samplings of dispatch trip tickets that are used to record the name and passenger ID of the passenger, the requested and actual pick-up times, the requested and actual delivery times, and the origin and destinations for each trip. As it turned out, this data source is misleading for two major reasons: 1) tour trips which include several people leaving from a common origin and traveling to a common destination are only counted as one trip, even though there may be several passengers, and 2) there were systematic errors in the recording of times on the tickets; i.e., the error rate for afternoon trips was much higher than that for morning trips and consequently more afternoon trips were elimin-

ated from the sample. The absence of tour trips, estimated to be about 10% of all trips, has the effect of making information on trip times (by day and time of day) less reliable than if the population sample consisted of a trip ticket for each trip.

In order to estimate the effect of the erroneous data in the afternoons, it is necessary, first, to understand how the sample was constructed. The procedure for choosing sample trips was to select every n th trip from the entire population of SNT trips for four months. If an error was found (i.e., if there was less than complete information on scheduled and actual pick-up and delivery), the instruction was to take the next ticket stub in the sequence and record the data on that ticket. This procedure was intended to yield a representative picture of LIFT demand, reliability, and trip times. From cross checking with other data, we know that afternoon trips were undersampled with this procedure. The reason for this undersampling is that afternoon "return" trips are not time-stamped when the request for pick-up is called in or are stamped erroneously. This may be due to dispatcher error and difficulty with the stamping machine, particularly during hectic parts of the day.

The effect of undersampling afternoon return trips is that 1) distribution of demand by time of day is altered, and 2) statistics regarding the overall reliability and trip length will be affected to the extent that afternoon trips are different from morning trips.

A second sample was conducted in order to determine pick-up times by hour of the day. The sampling procedure, which used less stringent rejection criteria, yielded a realistic estimate of demand by time of day. Figure 5-2 was constructed from the sample.

Throughout this section the data reported will be interpreted in light of the possible sample bias that exists. In general, however, we feel that the data obtained give an accurate picture of service supply.

6.2 COVERAGE

During the weekday hours of 7 AM to 7 PM, the LIFT was providing, as of mid-December 1977, 96 bus hours of service per day. Figure 6-1 illustrates how these 96 bus hours of service are distributed over the 12-hour day. This figure indicates that the number of buses available for service ranges from a low of one bus during the 6:30 PM to 7 PM time-period to 12 buses during the 2 PM to 3 PM period. On average, there are eight vehicles in service at any one time. Therefore, the average availability of service expressed in terms of the ratio of square miles to number of vehicles in service is about one vehicle for each 12 square miles covered.

To supplement LIFT bus coverage, the SNT project used taxis for slightly over 10% of total trips delivered during the fall months of the project. As described earlier, these were typically used to 1) help meet peak load situations when the LIFT was behind schedule and 2) serve those trips where the origin or destination was out of the way and/or could not be easily grouped. This taxi supplement to LIFT service served to increase coverage capability.

There was a limit of about 40 taxi trips per day that could be provided in accordance with the terms of the agreement with the union (pursuant to 13c regulations) which stipulated that no more than \$55,000 could be spent during the year on taxi service. If this agreement had not been in effect the SNT service would undoubtedly have made further use of cabs for the many-to-many trips.

6.3 PRICING

As reported in Chapter 4, the fare costs assumed for passenger trips on the LIFT varied according to the type of passenger. These fares were lower than those on transportation modes used before LIFT service began. Table 6-1 compares costs

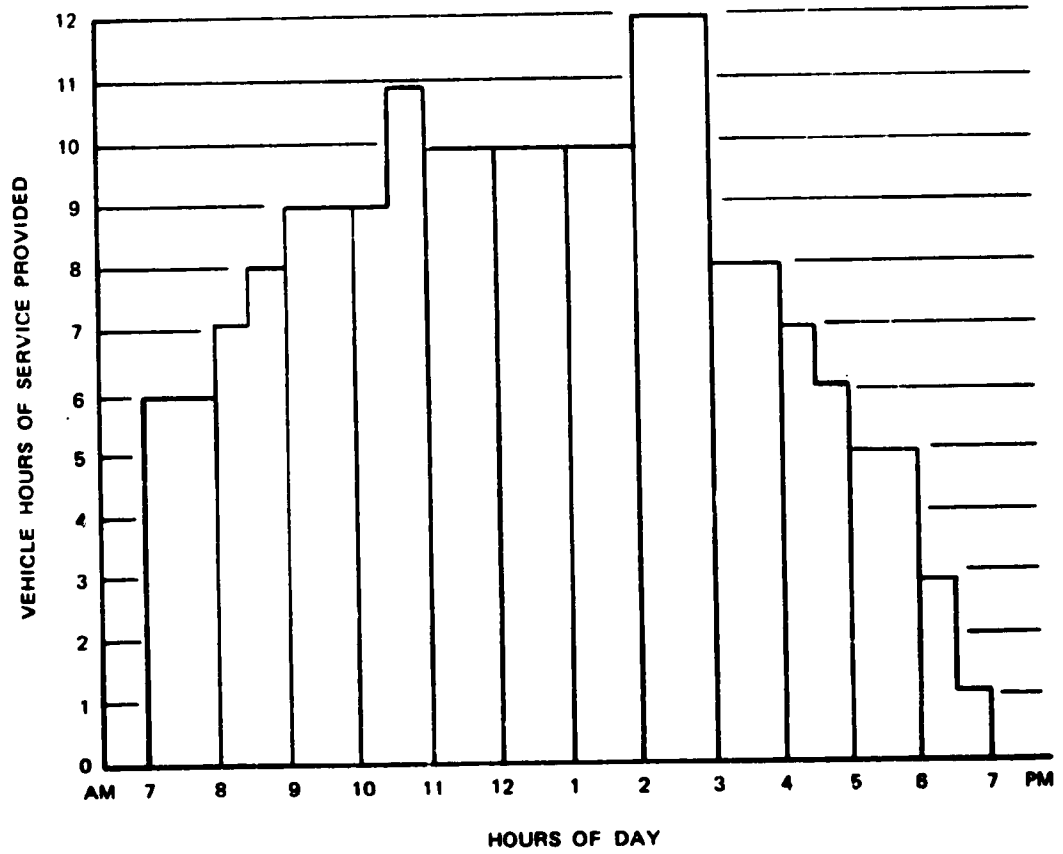


FIGURE 6-1 SERVICE BY HOUR OF DAY

assumed by different parties by different passenger-mode combinations. For LIFT trips the costs to the passenger and the agency were fixed, regardless of trip length, hour of service, or type of vehicle (taxi or LIFT). To this point in the demonstration very few "affiliated" passengers have registered and therefore over 99% of all trips are for either agency passengers or general passengers.

TABLE 6-1.
TRIP COST FUNDING BY PASSENGER TYPE

<u>Passenger Mode</u>	<u>Trip Cost Assumed By</u>		
	<u>Passenger</u>	<u>Agency</u>	<u>Tri-Met</u>
Agency Passenger—LIFT	0	\$3.00	Balance of trip costs
General " "	50¢	0	Balance of trip costs
Affiliated " "	0	\$2.00	Balance of trip costs
Agency Passenger—SMS*	0	\$3.00-\$4.00	0
Agency Passenger— Buck Chair Car	0	over \$10.00	0
Independent Passenger— Buck Chair Car	0	over \$10.00	0

*Special Mobility Service, a private non-profit transportation project.

In Portland, the price of transportation must be related to two distinct types of markets: 1) the agency market for transportation for its clients and 2) the individual passenger market. The agency demand is, of course, derived from its clients' demand; however, as shown earlier, the agency assumes part of the cost of client trips and, in this sense, can be considered a consumer of transportation services.

The \$3.00 price of LIFT trips to agencies is a decrease in cost to the agency for most agency trips. AAA agencies, which consume about half of all LIFT trips, had contracted for \$10,000 worth of transportation service per month from

Special Mobility Services (SMS) prior to the beginning of LIFT service in December of 1976. Based on the number of trips served (from 2,500 to 3,300 trips per month), the cost per passenger trip, which was completely covered by the AAA agencies, fluctuated from \$3.00 up to \$4.00. Thus the savings to AAA agencies using LIFT service are 0 to \$1.00 per trip over the previous contracting system. Buck Chair Car charged over \$10.00 for its wheelchair service.

Passengers' fare savings with the LIFT are substantial. An October sample of LIFT origins and destinations showed an average trip length by the most expeditious routes of about 4.3 miles. This trip would cost a passenger \$5.20 in a regular taxi. Wheelchair passengers requiring a vehicle with a lift could have purchased a trip of 4.3 miles from Buck Ambulance for over \$10.00. A private automobile one-way trip of 4.3 miles would cost about 65¢, assuming a 15¢ per mile operating cost. By comparison, LIFT agency passengers pay nothing and general passengers pay only 50¢.

The relatively low LIFT general passenger fare has been seen as a benefit by all passengers. In fact, many agency clients have registered as general passengers to take advantage of the low-cost transportation under those circumstances in which agencies will not assume the cost of trips: 10% of the 4,500 registrations are dual registrations. Another possible, but unsubstantiated occurrence is that some agencies are suggesting that some clients pay the 50¢ general passenger fare rather than have the agency assume the \$3.00 per trip agency cost, so that the agency can provide more trips to other clients. We doubt that this is prevalent, but the incentives that would encourage this are certainly evident.

One new pricing feature to be tested in the second year of the demonstration is the group fare. Under this concept agencies will be charged \$1.50 per client trip when the following conditions are met:

1. Group rides are scheduled three days in advance;
2. The group contains five eligible passengers; and
3. All members of the group must be capable of being served by one LIFT bus and must have either a common origin, a common destination, or both.

The intent of this new fare policy is to increase ridership and improve the productivity and efficiency of LIFT service. At the time of this report, no agencies have used this option.

6.4 SCHEDULING OF SERVICE

One important feature of the LIFT service is the two-day advance scheduling for rides. It was planned that this two-day advance notice would both restrict the demand that was expected to outstrip supply and provide enough advance notice so that trips could be grouped into productive tours. In practice, the anticipated two-day advance planning has stretched into a much longer period—as much as five days when the weekend is considered. Many agencies complained that they were not able to schedule necessary client trips because it is difficult for clients to plan that far ahead. Many clients are simply not able to plan that far ahead because they are not aware of their trip needs (e.g., a quasi-emergency medical appointment) or because they are not mentally capable of planning that far in advance. Similarly, general passengers are not entirely satisfied with the scheduling of trips because of the long lead times required.

The foregoing discussion refers mainly to the first leg of a round trip. Scheduling for the return trip presents even bigger problems. On-board surveys indicate that about half of the LIFT trips are for medical purposes. It is difficult to specify when the return leg of this type of trip will be made. Therefore, LIFT controllers have instructed passengers to "call in" when they are ready to be picked up for the return trip. Obviously this largely unpredictable demand is particularly difficult to group or coordinate with already scheduled trips. The result is often that the person expecting a return trip has no clear idea when the bus will come (even when a promised pick-up time is stated), and service to the individual with the firmly scheduled trip is not timely. Client perceptions of timeliness of service are reported in Section 8.2.3.

DAVE Systems, which designed the LIFT dispatch and control system, evaluated LIFT operations during November and recommended a computer-assisted scheduling system to improve productivity and reliability.

6.5 EQUIPMENT

This section reviews the equipment and relates problems encountered during the first few months of operations, as well as user perceptions of the equipment and how they relate to the transportation service.

6.5.1 Rolling Stock

LIFT buses, as stated in Chapter 4, are Mercedes Benz diesel buses, equipped with radios and retrofitted with lifts. Generally, Tri-Met is pleased with their operation. However, the following observations are relevant:

1. The bus engines make a great deal of noise. In the on-board surveys passengers frequently mention this problem. In the third on-board survey only 43% of all riders said that the noise level was "satisfactory." (See Chapter 8.) Drivers agree that the engines are noisy but seem to accept this as unavoidable.
2. The jerking motion the bus makes when shifting gears (they have automatic transmissions) is unpleasant to many riders. This jerking motion is more pronounced on hills, and buses must traverse many hills in Portland to reach their destinations. The wheelchair passengers who are tied down and facing the front are less susceptible to this jerking motion than the side-seated ambulatory passengers. Table 8-4 in Chapter 8 shows that although people are generally satisfied with the comfort of the ride, the percentage reporting that the comfort of the ride is "satisfactory" has declined since the first on-board survey in July 1977.
3. The wheelchair lifts seem to need repair fairly frequently, primarily because of problems with the hydraulic system that propels them. Also the retractable step in the front of the buses have needed repair more frequently than expected, according to drivers and control room personnel.
4. The "hands-free" Motorola radios that were originally ordered have not been delivered due to contractual problems.

6.5.2 AFIRs: Automated Fare Identification Recorders

The automated fare collection equipment described in Chapter 4 was intended to be a major innovation in the Portland demonstration. It is intended to provide the following data on each trip: passenger I.D. #, time on, time off, date, travel time, zone on, zone off (or mileage on, mileage off), and total mileage. These data were to be used in billing agencies and in analysis of client trip-making. To date, the automated fare boxes have not been operational due to electrical and mechanical difficulties. Some of the difficulties included:

1. Interface problems between the microprocessor in the farebox and the Boeing system. The Boeing software could not accept data from the farebox properly.
2. Failure of farebox on/off switches. Scope Electronics replaced these switches early in the project.
3. Lack of a mechanism for transmitting odometer readings from the buses to the fareboxes. Farebox recording of odometer information depends upon an AC electrical signal from a "zero-speed sensor" associated with the brake retarder mechanism. These brake retarder mechanisms were not installed on all buses at first.
4. Inadequate grounding in the buses. In LIFT buses several mechanisms (e.g., the lift, the retractible lower front step, etc.) operate from the buses' electrical system. This excessive load on the electrical system contributed to a grounding problem which in turn led to a malfunction in the fareboxes.

Tri-Met now expects the AFIR equipment to be fully operational by the end of January.

6.6 RELIABILITY, TRIP DURATION, AND TRAVEL SPEED

In order to gauge system reliability, a simple random sample of 2500 dispatch stubs was taken from the months of April, May, and October. From each stub the following times were noted: scheduled pick-up time, actual pick-up time, scheduled delivery, and actual delivery. In the instances where information on the dispatch ticket was not complete (well over half the time) the procedure was to use the next completed stub in the pile being sampled. These data were intended to give measures of system reliability and trip length. The sample should also have yielded information on distribution of the trips by time of day and by days of the week.

This first selection of trip tickets resulted in significant undersampling of afternoon trips, particularly late afternoon trips. Apparently the recording of data on these tickets is incomplete, possibly because there is no scheduled delivery time until the individual calls in to be picked up, and therefore the dispatch people do not record this return pick-up information.

In any event, a second sample of approximately 1300 trips was drawn. In this sample incomplete tickets were accepted as long as they had any pick-up time data at all on them. Thus it was possible for most tickets to show the promised pick-up time, actual pick-up time and the difference between promised and actual pick-up (delay in pick-up).

6.6.1 Reliability

The data from this sample indicated that, on average, the LIFT was 12 minutes late per pick-up for the day. Figure 6-2 shows that lateness increased during mornings and peaked between 9 and 10, when the LIFT averaged over 20 minutes late for pick-ups. This degree of lateness decreased substantially during the 11:00 to 1:00 time period, to about 10.5 minutes. For the rest of the day, delay in pick-up fluctuated, but declined to an average low of 5.7 minutes late during the 4:00 to 5:00 hour.

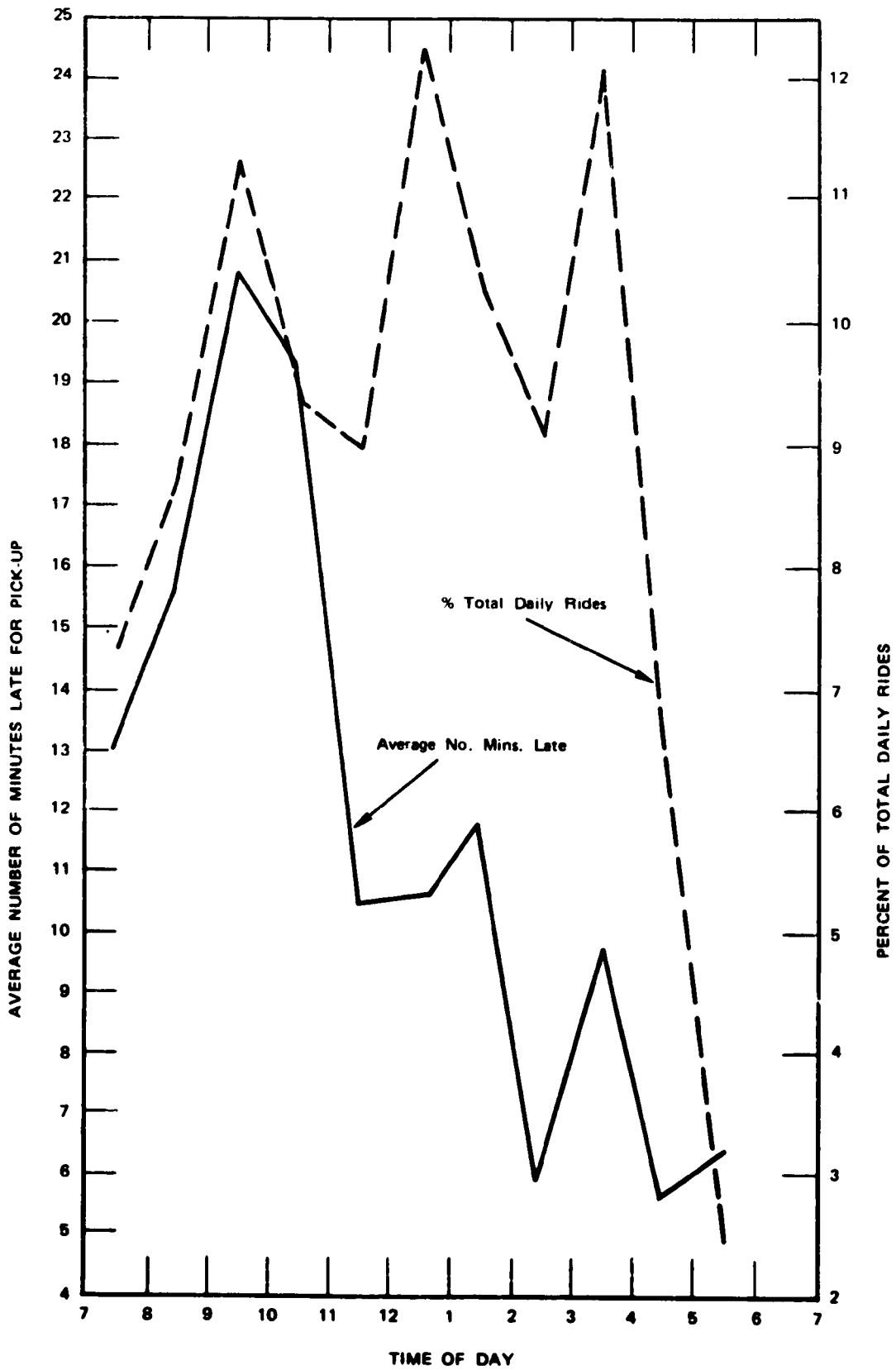


FIGURE 6-2 LIFT RELIABILITY BY TIME OF DAY COMPARED WITH DEMAND

Figure 6-2 also depicts the level of demand by hour of the day. This shows that the peaks in demand generally coincide with the peaks in delay in pick-up, although the overall relationship between reliability and demand is not a close one after 11 AM. Of course, the number of bus hours available during a given hour should influence reliability. Figure 6-1 indicates that between 10:30 and 3:00 the LIFT deploys an average of 10.4 vehicles per hour to meet the heavy demand during these times. During this time period the coverage/demand ratio is higher than during the first three hours of daily service when reliability is relatively poor. This higher coverage during peak times undoubtedly explains the relative improvement in reliability.

Figure 6-3, which shows the LIFT's on-time performance, indicates that about 45% of all pick-ups are made within 10 minutes of the scheduled time. The average lateness of 12.6 minutes is influenced by a significant number of extremely late trips. The skewed distribution shows that 10% of all pick-ups are more than 40 minutes late and over 30% are more than 20 minutes late.

The reader should keep in mind that, while pick-up times seem poor, the LIFT controllers are also aware of delivery times, and it is these delivery times which controllers focus on in the dispatch process. Although data on delivery times come from the first sample and therefore oversample morning and early afternoon trips, the information that does exist suggests that the LIFT has a much better performance with respect to delivery. The mean delivery time was 7.7 minutes early; however, approximately 13% of all trips were 20 minutes or more late in delivery according to the distribution shown. This lateness is likely to be slightly overstated because the sample systematically excluded late afternoon trips when the pick-up and delivery times were closer to target.

The conclusion suggested by LIFT performance with respect to pick-up and delivery schedules is that there is a significant amount of slack in the scheduling process, i.e. controllers schedule pick-ups well in advance of the client's appointment, work,

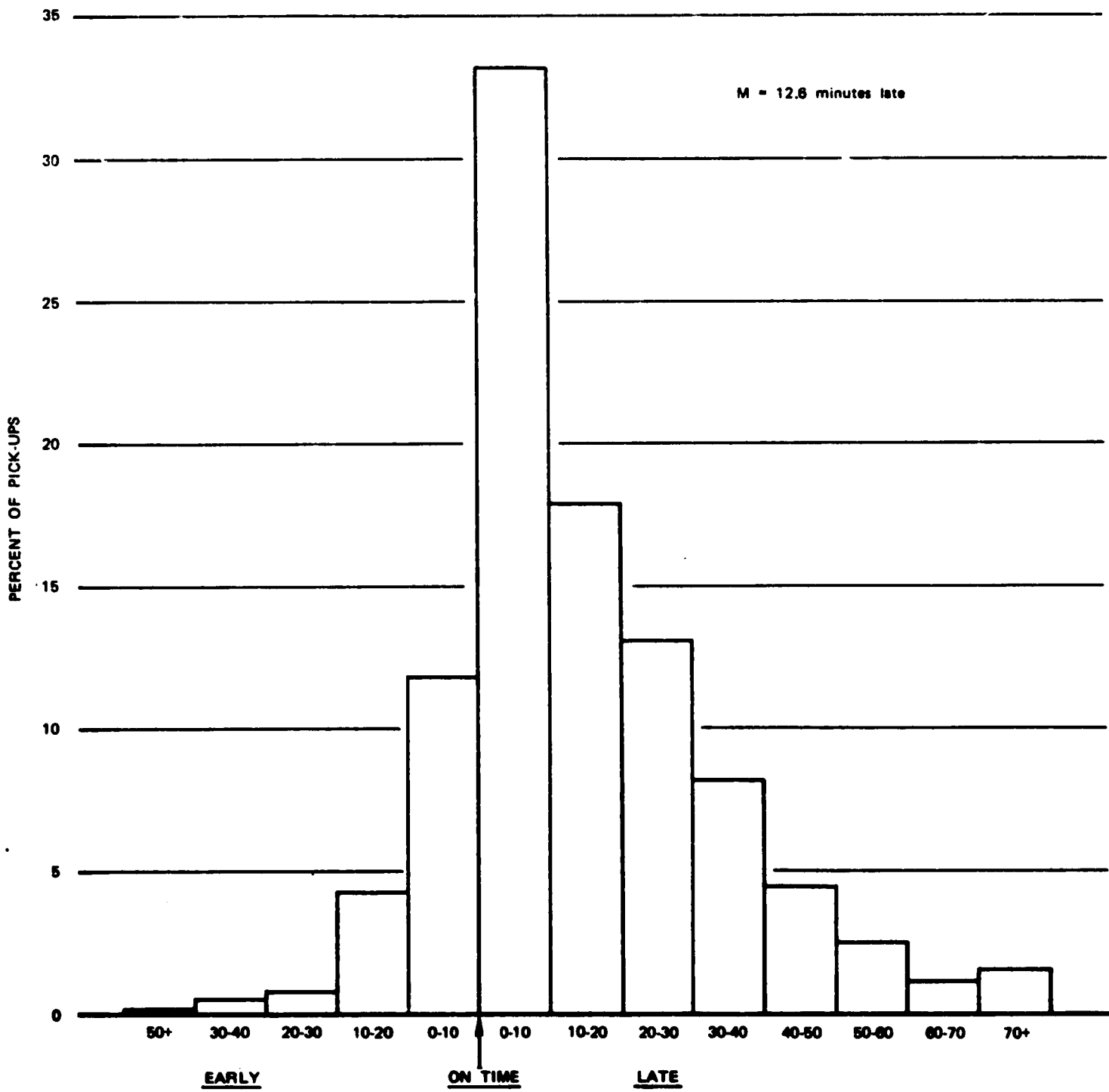


FIGURE 6-3 LIFT PICK-UP PERFORMANCE

or meeting time so that he or she will not be late. This slack, however, means that the passenger must devote a larger portion of his or her time to travel because of the uncertainty about pick-ups and delivery.

In summary, during the first few months of operation the LIFT's reliability has not been outstanding. Pick-ups average 12 minutes late, with 18% more than 30 minutes late. Although deliveries average 7.7 minutes ahead of schedule, the slack time between requested pick-up and actual delivery indicates that the traveler must devote a significant amount of his or her time waiting for the LIFT to pick them up and actually making the trip.

6.6.2 Trip Time and Travel Speed

Data from the second survey of trip ticket data showed that the average trip time was 22 minutes. Figure 6-4 shows that there is a wide range of travel time around this mean. Some trips are as short as one minute and others are longer than an hour. About one-fourth of all trips are 40 minutes or longer.

From a random sampling of LIFT origins and destinations in October, it was found that the trip length in miles was about 4.3 miles if a traveler were driving. Therefore, effective travel speed from origin to destination is 11.7 miles per hour. The LIFT, of course, deviates from its course to pick up and drop off other passengers, so it actually covers much more than the 4.3 miles calculated between origins and destinations. Nevertheless, the 11.7 mph figure is presented here so that the reader can compare it with the taxi and private automobile, which would average about 20 mph. The LIFT is roughly six-tenths as fast as personalized taxi, auto, or wheelchair van transportation.

6.7 COMPARISON OF LIFT AND TAXI SERVICE

The following discussion delineates comparative service aspects of the LIFT bus and privately owned taxicabs for the

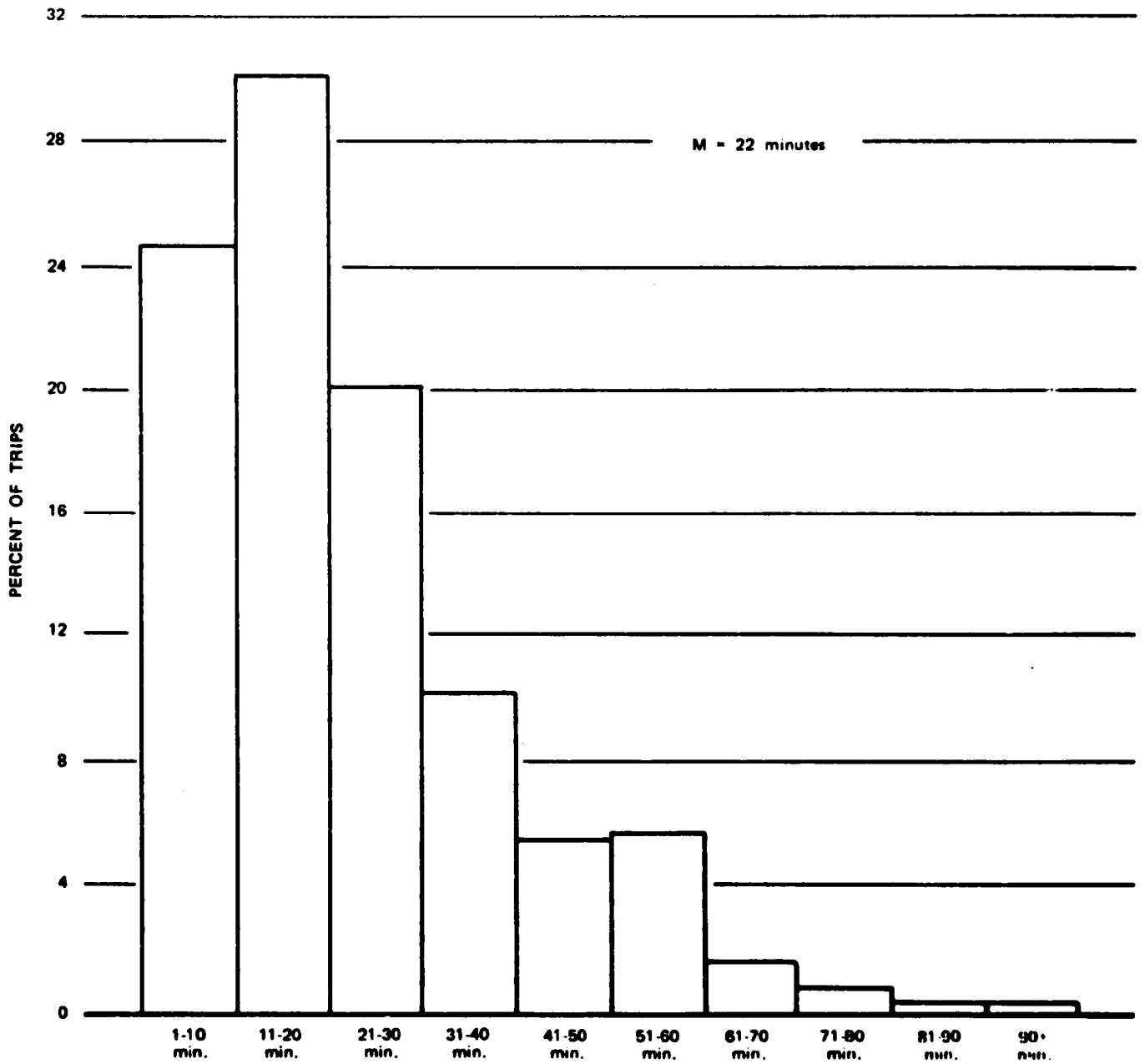


FIGURE 6-4 DISTRIBUTION OF TRAVEL TIMES

special needs transportation market. The purpose of this analysis is to 1) provide a benchmark for assessing LIFT service performance during the first year of the demonstration, and 2) provide transportation policy makers and planners with information that is useful in assessing the available special transportation options.

Scheduling for LIFT buses and taxis under the present program is handled by the LIFT control room, since there is no difference between the scheduling convenience afforded LIFT and taxicab riders. However, the clients must often modify their trip times to meet the LIFT's scheduling requirements, whereas taxicabs, for the most part, will agree to make pick-ups at any time the client wants. Therefore, the taxicab is potentially superior to the LIFT in terms of affording the client more scheduling flexibility.

Consumer prices for taxicab and LIFT bus in the SNT system are identical. However, the average total cost of providing a trip on the LIFT, including the cost to all levels of government, is higher on the LIFT than on taxicabs. This is discussed more fully in Chapter 7.

Level-of-service comparisons between the taxicab and LIFT buses are difficult because the LIFT is an advance reservation service, and taxicabs are typically demand-responsive. Within the SNT system where both taxicabs and LIFT buses are advance reservation, however, comments from riders who are familiar with both modes suggest that taxis are more reliable in terms of picking people up on time.

Travel time for the two modes also differs significantly. Average travel time on the LIFT was about 22 minutes per trip. Although there are no comparable taxi travel times, if we assume a 20 mph average speed and an average trip length of 4.3 miles (the average distance between origins and destinations on the LIFT, without deviations to pick up other passengers), then the average taxi travel time would be about 13 minutes for the same trip. For an average trip of slightly over four miles, the taxi

would take about 15 minutes less travel time.

A comparison of client perception of LIFT and taxicab features shows that clients feel the taxicab offers a more comfortable ride. The LIFT is preferred in terms of ease of entering the vehicle and driver helpfulness and courtesy. These findings are discussed in more detail in Section 8.2.4.

7. LIFT SYSTEM ECONOMICS AND OPERATING PERFORMANCE

7.1 INTRODUCTION

This chapter of the report analyzes the efficiency of LIFT operations by presenting and analyzing cost, revenue, and operating data for the first 11 months of operation from December 1976 through October 1977. These results are then compared with data on the system of social service agency transportation programs which the LIFT supplanted. Since the LIFT system is not yet static, this chapter formulates some projections regarding future system efficiency. Throughout this section, the analysis will show the dynamics underlying cost, revenue, and operating figures. Cost figures for LIFT buses and supplemental taxi service are supplied separately.

Two sets of operating cost figures are developed for the LIFT, one which includes finance and depreciation charges and one that does not. Those figures which include the finance and depreciation charges may be more useful at the local level, where the transportation community is faced with the task of comparing the total cost of alternative means of providing the special needs transportation service.

7.2 COST DERIVATIONS

7.2.1 LIFT Cost

Table 7-1 derives LIFT operating costs for the month of October 1977, the eleventh month of operations and a month that is representative of LIFT operating performance for the year.

TABLE 7-1.
DERIVATION OF LIFT SYSTEM COSTS

<u>LIFT BUSES</u>	<u>\$</u>	<u>%</u>
1. October Operations Cost Statement: LIFT	\$44,000	79%
2. Additions made by Crain & Associates to reflect costs not accounted for:		
a) Rental for space for bus parking and maintenance	500	
b) Insurance @\$1,000/Operating vehicle/year	1,000*	
c) Payroll & Cost Accounting, Personnel & Administrative Overhead connected with <u>operations</u> personnel	500	
d) Mechanic Labor	<u>300</u>	<u>4%</u>
3. TOTAL OPERATING COST	\$46,300	83%
Per Passenger Trip (6,259 one-way LIFT trips)	\$7.40	
4. Depreciation		
a) 15 Buses @ \$50,000 = \$750,000 straight line over 16.7 years (200 mos.)	3,750	
b) Radio Equipment @ \$25,000 straight-line over 8.3 years (100 mos.)	<u>250</u>	7%
5. Finance Charge		
a) \$662,500 capital cost @ 10%/year (12 mos.)	<u>5,500</u>	<u>10%</u>
6. TOTAL LIFT COST	<u>\$55,800</u>	100%
Per Passenger Trip (6,259 one-way LIFT trips)	\$8.92	
 <u>TAXI COSTS</u>		
Per passenger trip (888 passenger trips)	<u>\$ 4,040</u>	
	\$5.69	

*Figure supplied by Sharon Beelart of Tri-Met Finance Department.

During October, 12 LIFT buses were deployed on a daily basis; one bus was reserved as a back-up and two buses were in maintenance. Thus the practical deployment of a 15 bus fleet is seen to be 12 vehicles, at one time. During October, 26,073 bus miles were driven.

As Table 7-1 shows, the operating cost data from Tri-Met's accounting reports have been adjusted upwards slightly to reflect more realistic figures for property rental, to include an insurance figure, to include administrative overhead in connection with personnel and billing, and to add in maintenance labor. These adjustments add \$2,300 a month or about 5% to Tri-Met operational costs, bringing the total operating cost to \$46,300 for October. At this figure, the average cost of the 6,259 one-way trips delivered on the LIFT buses in October was \$7.40 per trip. In subsequent analyses of time-series data, the \$2,300 adjustment will be added to Tri-Met reported cost figures.

The \$3,750 depreciation figure for buses is based upon a total \$650,000 of capitalized expenses for 15 buses, or \$50,000 for each bus. The \$50,000 figure represents the sum of an initial capital cost of \$42,500 per bus plus an estimated \$7,500 for a one-time major overhaul during the 200-month useful life of the bus. Straight-line depreciation is assumed for the sake of simplicity. Depreciation on the radio equipment is based upon an assumed useful life of 100 months (half the life of the bus), and amounts to \$250 per month. Total depreciation then is \$4000 per month.

The finance charge estimate of \$5,500 per month is based upon an assumed 10% charge per year on capitalized expenditures of \$662,500. This \$662,500 capital cost is based upon the initial capital outlays of \$42,500 apiece for 15 buses and \$25,500 for radios for all buses.

7.2.2 Taxi Costs

An important component of the Portland Special Needs Transportation service is the adjunct taxi service. The LIFT dispatch room contracts with the two major local taxi operators (Broadway and Radio Cab companies) and a local ambulance company to furnish transportation to clients for whom it is impractical to arrange LIFT service. Typically these taxi trips are many-to-many trips from origins that are not close to normal LIFT routes.

Trip records for the month of October indicate that 888 passenger trips were delivered by taxi. The total cost of these trips was \$4040, and the cost per trip was \$5.69. These data are shown on Table 7-1. The average trip length for taxis during October was 5.8 miles; therefore, cost per mile was close to \$1.00.

To make a comparison of LIFT and private, for-profit costs it is necessary to base the comparison on similar clientele and trips. At present, the taxicabs transport only about half the percentage of wheelchair passengers transported by the LIFT buses. Therefore, in order to compare the private sector and LIFT service costs, we will assume that 17% of the LIFT wheelchair trips would have to be provided by the wheelchair van type of service. In this case, the cost of a taxi trip would be \$1.00 for the flag drop and \$.90 per mile, and the cost of a wheelchair van is \$10 per trip plus \$.60 per mile. A five-mile trip is assumed. The taxi and wheelchair van rates for this distance would be \$5.50 and \$13.00, respectively.

The cost of transporting the "average" passenger by private means would be:

$$\begin{aligned} y &= (\text{Non-wheelchair percentage} \times \text{taxi cost}) + \\ &\quad (\text{wheelchair percentage} \times \text{wheelchair van cost}) \\ &= (.83 \times \$5.50) + (.17 \times \$13) \\ &= \$6.77 \end{aligned}$$

The comparable figure for LIFT operations is \$8.92 per trip. This figure incorporates the capital and financing costs of LIFT operations, which are already included in the taxi fare.

Thus, cost per average trip is \$2.00 less on the private system, when all costs are considered. In fact, the full private sector cost is roughly 60¢ less than the operating cost of the LIFT service.

7.3 BREAKDOWN OF COSTS BY COST CATEGORY

Table 7-2 breaks down "controllable" trip costs into personnel, materials, and services components. The personnel costs used in calculating labor cost components included taxes and fringe benefits. The table indicates that almost 90% of the total operating cost of a LIFT trip is accounted for by personnel costs, and about 50% of the total operating cost is for the vehicle operators. The control/dispatch function consumed about 25% of total operating cost.

Table 7-3 is similar to Table 7-2, but adds the depreciation and finance charge cost categories, bringing the total trip cost to \$8.92. It is interesting to note that capital-related charges constitute about 17% of the cost of the average LIFT trip. Capital costs are covered more fully in Section 7.5.1.

7.4 TIME-SERIES OPERATING DATA

7.4.1 Cost per Trip Trends

Since the LIFT began operation in December of 1976, ridership has grown steadily, unit operating costs have declined, and productivity has leveled off at about 3.0.* Table 7-4 reports the operating data from the first 10 full months of operations. In January 1977, the first full month of operations, total ridership was 2716 LIFT trips and total costs were \$35,983. By October 1977, total costs had grown by about 30% to \$46,300, but the

*Passengers per vehicle hour.

TABLE 7-2.
BREAKDOWN OF LIFT OPERATING COSTS

	<u>Percent of Trip Cost*</u>	<u>Dollar Cost Per Trip</u>
1. Personnel Costs		
Operators	53%	3.93
Controllers	26	1.93
Administration	11	.81
Mechanics	<u>1</u>	<u>.05</u>
Total Personnel Cost	91%	\$ 6.72
2. Materials and Services		
Repairs and maintenance	3%	.22
Rental of facilities	2	.11
Fuel	2	.15
Insurance	2	.16
Phone	<u>1</u>	<u>.04</u>
Total Materials and Services	10%	\$.68
 Total	 101%**	 \$ 7.40

*To nearest whole percent

**Due to rounding

TABLE 7-3.

BREAKDOWN OF TOTAL LIFT COSTS

	<u>% of Trip Cost</u>		<u>\$ Cost Per Trip</u>	
1. Personnel Costs				
Operators	44%		\$ 3.93	
Controllers	22		1.93	
Administration	9		.81	
Mechanics	<u>1%</u>	76	<u>\$.05</u>	6.72
2. Materials and Services				
Repairs and maintenance	3%		\$.22	
Rental of facilities	1		.11	
Fuel	2		.15	
Insurance	2		.16	
Phone	<u>*%</u>	8	<u>\$.04</u>	.68
3. Capital Costs				
Depreciation	7%		\$.64	
Finance charges	<u>10%</u>	17	<u>\$.88</u>	1.52
Total Costs		101%^{**}		\$8.92

*Less than .5%

**Due to rounding

TABLE 7-4.
LIFT COST AND OPERATING STATISTICS

	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct
Trips	893	2716	3265	3859	3695	4391	5215	5426	5889	5737	6259
Vehicle Miles	4886	13,441	14,583	18,875	16,808	19,380	20,362	20,474	24,694	23,116	26,073
Vehicle Hours	792	1448	1559	1765	1679	1683	1800	1764	2049	1885	2060
Total Cost	\$15,655	\$35,983	\$37,682	\$43,085	\$39,611	\$42,367	\$45,835	\$43,872	\$47,577	\$44,897	\$46,300
Cost per Trip	\$17.53	\$13.25	\$11.54	\$11.16	\$10.72	\$9.65	\$8.79	\$8.09	\$8.08	\$7.83	\$7.40
Cost per Veh.Mi.	\$3.20	\$2.68	\$2.58	\$2.28	\$2.36	\$2.19	\$2.25	\$2.14	\$1.93	\$1.94	\$1.78
Cost per Veh.Hr.	\$19.77	\$24.85	\$24.17	\$24.41	\$23.59	\$25.17	\$25.46	\$24.87	\$23.22	\$23.82	\$22.48
Productivity	1.1	1.9	2.1	2.2	2.2	2.6	2.9	3.1	2.9	3.0	3.0
Average Trip Length		5.5 mi.	4.9 mi.	4.5 mi.	4.9 mi.	5.0 mi.	5.5 mi.	5.6 mi.	5.7 mi.	6.1 mi.	4.2 mi.
Veh. Mi./ Veh. Hr.		6.2	9.3	9.4	10.7	10.0	12.2	12.7	11.5	11.9	12.7

number of LIFT trips delivered had more than doubled to 6259. Consequently, per trip costs declined from \$13.25 in January to \$7.40 in October.

The steady decline in the cost per trip can be attributed to initial start-up costs and the relatively fixed administrative and controller costs. Initially, the LIFT required a large number of buses (six to eight) and drivers to cover the 93 square mile area, even though the demand alone did not warrant that number of vehicles. The high start-up costs were also due to the usual front-end training costs (primarily labor hours) as well as a higher than average number of driver, dispatch, and agency scheduling errors, due to lack of experience with the system. These start-up costs have disappeared as operating personnel have gained more experience with the system. Also the administrative and dispatch costs are spread over a higher volume of trips, thereby reducing their contribution to individual trip costs.

7.4.2 Cost per Vehicle Mile

Cost per vehicle mile has declined from \$2.68 in January of 1977 to \$1.78 in October. The near-doubling in the vehicle miles of service delivered between January and October with only a 30% increase in total system cost is one reason for the decline in cost per vehicle mile. Also, the average trip length declined from 4.9 miles to 4.2 miles as bus coverage increased, during the period.

7.4.3. Cost per Vehicle Hour

Table 7-4 shows that the cost per vehicle hour of service, which declined from \$24.85 in January to \$22.48 in October, has not declined as dramatically as the other measures of cost per output. This is because vehicle coverage has not increased in proportion to the increase in the number of trips delivered. As of December, 1977, the LIFT utilized 12 vehicles at peak times

and averaged only eight vehicles per service hour over the course of a service day. As discussed earlier, coverage in the early stages of the demonstration was around six vehicles per service hour.

7.4.4 Cost per Passenger Mile

Operating costs per passenger mile are derived from a sample of trip distances (direct origin to destination travel distance, not including detours). This sample showed that the average LIFT trip length was about 4.3 miles. Using the \$7.40 operating cost per passenger trip figure, we find that the operating cost per passenger mile (direct route) is roughly \$1.70.

7.4.5 Vehicle Utilization (Passengers/hour)

Figure 7-1 illustrates productivity (passengers transported per vehicle hour) over the first 11 months of the project. These data indicate that productivity climbed steadily until it peaked at 3.1 in July. Since that time, vehicle productivity has averaged 3.0 passengers per vehicle hour.

This 3.0 productivity is considered low for demand-responsive transportation, which typically averages between five and ten passengers per vehicle hour. However, the reader should keep in mind that there are limits to this type of specialized service: the clients not only require more assistance in boarding and unboarding (particularly wheelchair passengers) but are also less likely to be ready at pick-up times. Also, the drivers must drive more slowly for the more infirm clients than they would for fully able-bodied persons.

Another factor contributing to productivity figures is the large area, 89 square miles, covered by the service. A coverage ratio of one vehicle for eight square miles compares with one taxicab per square mile for the local taxi companies. Deadhead times are therefore longer than they would be if more vehicles were available and, consequently, productivity is lower. Also, the hilly terrain and the widely dispersed trip attractors make for slower travel speeds and larger trip times than might normally be expected.

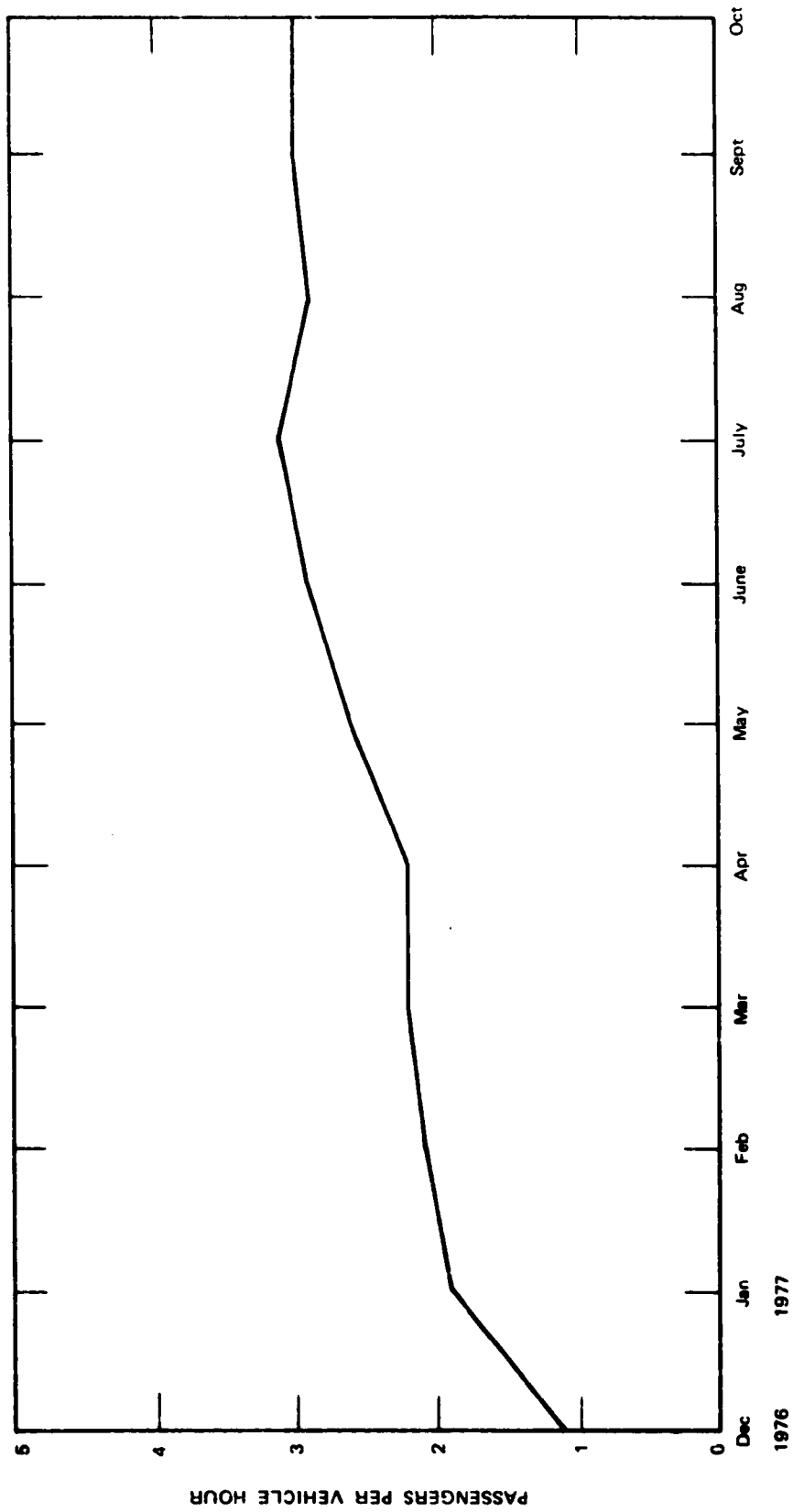


FIGURE 7-1 VEHICLE UTILIZATION (PASSENGERS/HOUR) BY MONTH

Furthermore, characteristics of the trips delivered tend to lower productivity. About 50% of the trips delivered have been many-to-many medical trips; whereas the expected high number of subscription shopping and recreational tours have not materialized. Furthermore, the average trip length, between four and five miles, is much longer than had been anticipated.

Finally, there is an oversupply of vehicles at certain times of the day and days of the week. Therefore, some vehicles are idle at times, and the ratio of passengers to vehicle hours is depressed.

7.5 EXPLANATION OF HIGH LIFT OPERATING COSTS

Section 7.2.1 explained that total per trip operating costs of LIFT service averaged \$7.40 and total costs including finance and depreciation are running at \$8.92. These high unit costs are attributable to relatively low productivities and high input costs. This section explains the factors underlying the low productivities and high costs of inputs. It also analyzes the extent to which these factors can be related to Tri-Met in its role as a public transit operator.

7.5.1 High Capital and Finance Costs

The first explanation is the high capital cost. Capital and finance charges amount to about 17% of the total cost of a LIFT trip, or \$1.52 per trip (see Table 7-3.). By comparison, the U.S. Federal Highway Administration measures depreciation on an automobile at about 5¢ per mile or 25¢ for a five-mile trip.* Finance charges would be about 2¢ per mile for a cab. Thus the total capital-related cost charge per trip for a five-mile taxicab trip would be 35¢ versus \$1.47 for the LIFT.

*U.S. Bureau of the Census, Statistical Abstract of the United States: 1976. (97th edition.) Washington, D.C., 1976.

7.5.2 Restricted Demand

A second explanation relates to the restricted nature of the demand. The LIFT serves only handicapped and elderly while other demand-responsive services, by serving a broader cross-section of demand, are able to increase coverage, thereby lessening deadheading. Also, an unrestricted market generates higher demand; and, as discussed earlier, LIFT per trip costs decreased dramatically as ridership grew.

7.5.3 Labor Costs and Inflexible Work Rules

Labor costs for LIFT operators are high at about \$7.96 per hour plus about \$1.75 per hour of payroll-related expenses, yielding a total per hour cost of \$9.71. (This figure does not include administrative costs.) Although comparable hourly labor costs for taxis were not available, we can assume that they would be lower: on the order of \$7.00 per hour in Portland. Thus, the Tri-Met labor rate is probably at least 40% higher than that available in the private sector market place. Moreover, the five controllers are paid \$.50¢ per hour more than the drivers; therefore, to the extent that these costs are above the market rate, the LIFT total operating costs are higher than necessary. As of the end of the year the LIFT drivers' schedule was as shown in Figure 7-2., with 96 total hours of service a day. According to union work rules, this schedule was fixed; and each LIFT driver must be guaranteed a 40 hour week.

Table 7-5 shows the trip demand by weekday for the months of June, July, August and September. The percentages are adjusted to reflect the fact that there were two Monday holidays and that there were only 17 Mondays and Tuesdays but 18 Wednesdays, Thursdays and Fridays during this time. If we assume that on Thursdays, the busiest day, the LIFT transports 340 passengers (the average for that day for the four months) in 96 vehicle hours, then productivity for this day is 3.5.

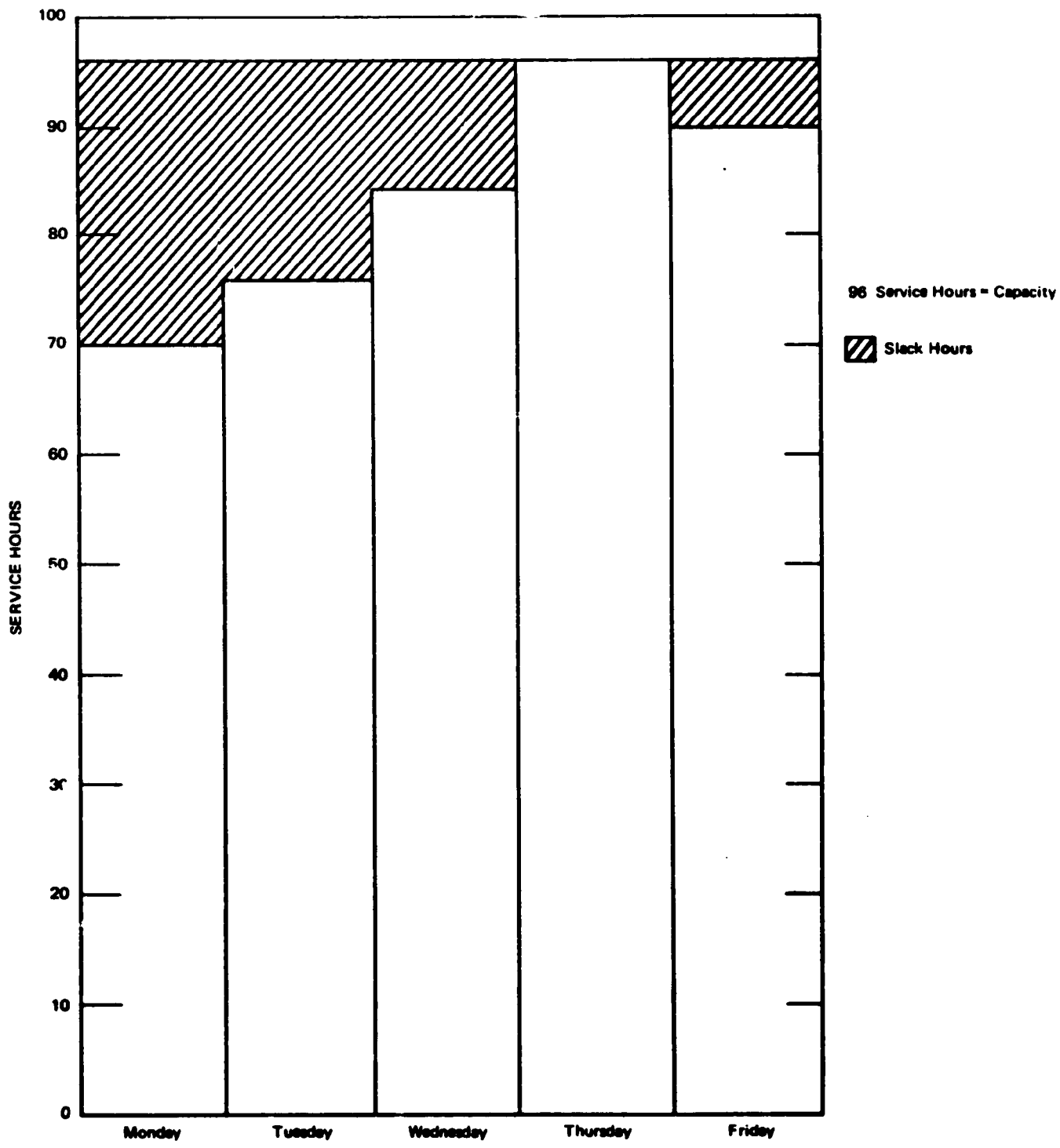


FIGURE 7-2 DRIVER SLACK TIME BY DAY OF WEEK

TABLE 7-5.
DISTRIBUTION OF TRIPS FOR 4 MONTHS

		<u>% of Weekly Trips</u>
15	Monday	16.9
17	Tuesday	18.3
18	Wednesday	20.2
18	Thursday	23.1
18	Friday	21.6

Figure 7-2 illustrates the slack time available in the other days of the week. Assuming that 340 trips per day could be delivered each day at a 3.5 productivity rate, the figure indicates that there are 64 slack vehicle hours in a week, or about 13% of the total available vehicle hours. Thus, the inflexibility caused by the union work rules has forced management into a peak-load staffing situation. In order to meet the peak travel on Thursday, management has had to overstaff for the other days of the week. The hours provided, in this example, total at least 15% more than needed to meet demand. Similar inflexibilities exist during the day when the vehicle hours do not match actual demand. Although an individual driver's shift within the hour of the day is fixed in the short run, management can change it on a week's notice, according to Tri-Met officials. This gives management the flexibility of responding to long-term trends within the service day; however, day-to-day modifications in driver schedules cannot be made. Altogether, it is estimated that driver hours allocated to the LIFT are at least 20% more than needed to provide the service.

This conservative 20% statistic in itself is not necessarily cause for alarm. Other providers probably overstaff (although to a lesser extent) in order to meet peak load demand. However, in Tri-Met's case, in contrast to that of other transit operators such as taxi companies, the organization assumes the full risk

and cost of slack time in that the drivers are guaranteed a wage regardless of the demand. On the other hand, taxi drivers only get paid when they are transporting passengers.

7.5.4 Dispatch Level of Effort

Aside from the wage rate paid controllers, it appears that the level of activity devoted to the coordinated scheduling is high at 40 hours per day for a 12-hour operating day. As shown in Table 7-2, this dispatch function accounts for 26% of the October operating LIFT costs, or approximately \$1.93 per trip. By contrast, the private taxi companies which schedule over 1000 trips per day typically provide dispatching service with one person at a cost of less than 20¢ per trip. In this case the dispatch costs are spread over a larger number of trips and will therefore be somewhat lower; but the labor devoted to the function is much less. Thus, it appears that the time involved in prioritizing and scheduling trips and dispatching the vehicles constitutes one of the costliest aspects of the LIFT service.

7.5.5 Operating "Areas for Improvement"

DAVE Systems, which reviewed the operations in late November, found the following areas for improvement in the operation:

1. "Return" calls are not prescheduled and for this reason cannot be worked into productive tours.
2. Lack of aggressive scheduling in terms of "negotiating" workable times results in less productive tours.
3. Actual driver shifts may not accurately match demand levels. This inefficient scheduling of capacity results in lower productivity as well as possible lower levels of service.
4. Drivers, particularly back-up drivers, frequently do not know addresses in residential neighborhoods. This slows service and decreases productivity.

5. Subscription tours should be marketed to increase productivity.

Improvement in these areas could lead only to minor increases in system efficiency.

7.5.6 Level of Demand

The final reason for high costs explored here is the lower than expected demand. Section 7.4.1 showed that as demand increased, unit costs tended to decrease more than proportionately due to the rather fixed nature of many of the costs (i.e., dispatch and scheduling, administration) and due to the economies of scale incurred as coverage increases. Thus, raising demand to capacity levels is critical to lowering costs and improving productivities.

Total LIFT demand has not materialized as expected for several reasons, including the following:

1. The service has not been able to sign as many agency contracts as had been anticipated. This is detailed in Chapter 8.
2. Among those registered, demand has not materialized as expected. During September, for example, only 1000 persons were served out of a registered population of over 4200. The persons who were served averaged only three trips per month.
3. Related to the above, the high volume subscription tours for shopping and the like have been "crowded out" by the high proportion of medical trips. People have been "educated" to rely on the LIFT, for the most part, for high priority trips.
4. Finally, Tri-Met intentionally followed a gradual, measured approach to introducing the LIFT service in order to maintain high service standards for LIFT agencies and clients and in order to avoid the gap, characteristic of several Dial-a-Ride programs, between expectations and performance. Consequently,

registration and demand are less than they might have been with a more rapid introduction of the service. This gradual introduction of the service should not have an adverse impact on ultimate demand levels, however,

7.6 TRI-MET'S ROLE IN THE PROVISION OF THE SNT SERVICE: IMPACT ON COST

One issue of particular concern in this demonstration is Tri-Met's ability to provide a coordinated service at a reasonable cost. This section attempts to assess the degree to which the high costs of LIFT service can be attributed to Tri-Met's role as a public operator.

The previous section showed that the approximate \$8.92 total cost per trip figure could be explained by the following factors:

1. Relatively high capital cost and finance charges;
2. Restricted nature of the demand;
3. High labor costs and inflexible work rules;
4. High dispatch costs;
5. Various operational inefficiencies -- a minor contributor to the high cost; and
6. Low level of demand.

Of these factors entering into the high cost, perhaps only 3 and 4 above can be directly related to the fact that the service is being provided by the public transit operator. As discussed earlier, the union salary and wage cost at close to \$10 per hour is higher than comparable wage rates for drivers in the Portland area. The work rules assuring eight hours of work per day per person and making shifts in schedule difficult or impossible also contribute to the lower productivity.

The high capital costs might be considered indirectly related to the fact that a public rather than a private operator provided the service. The total cost of the LIFT buses is estimated at

\$50,000 apiece for a total front-end investment of \$750,000. These buses were expected to last 16 years. Assuming a 10% interest rate and using present value analysis, it can be shown that the LIFT would have to generate almost \$100,000 per year in revenues, just to cover these fixed capital costs. This \$100,000 in revenues amounts to over 30,000 \$3.00 trips just to cover capital costs. And capital costs, as shown in Table 7-3, are a small part of total trip costs.

This is not to say that Tri-Met should not have undertaken the LIFT project or that the project should expect to generate enough revenue to break even. The regular bus operation in Portland only recovers about 30% of its cost from revenues, approximately the same as the LIFT operation. However, it does illustrate that the fleet of buses is expensive and that the private sector, because of the built-in incentives to keep costs down, might have found a cheaper way to provide the service.

7.7 REVENUE AND COST RECOVERY

Revenues generated from LIFT operations from December, 1976, through September, 1977, amounted to approximately \$125,000. Figure 7-3 shows that revenue per month has steadily increased along with ridership: in December, 1976, revenue was only \$2,688; yet, by October, 1977, revenue had climbed to \$14,541. Figure 7-3 also shows the general passenger revenue has increased steadily since the general passengers began traveling on the LIFT in May of 1977. General passenger revenue as a percent of total revenue has increased from 3%, in May, 1977, to over 9%, in October, 1977. The increase in the number of general passengers has tended to decrease the average fare collected by Tri-Met from the \$3.00 per passenger agency fare, which prevailed from December through April, to about \$2.00 average fare as of October, 1977.

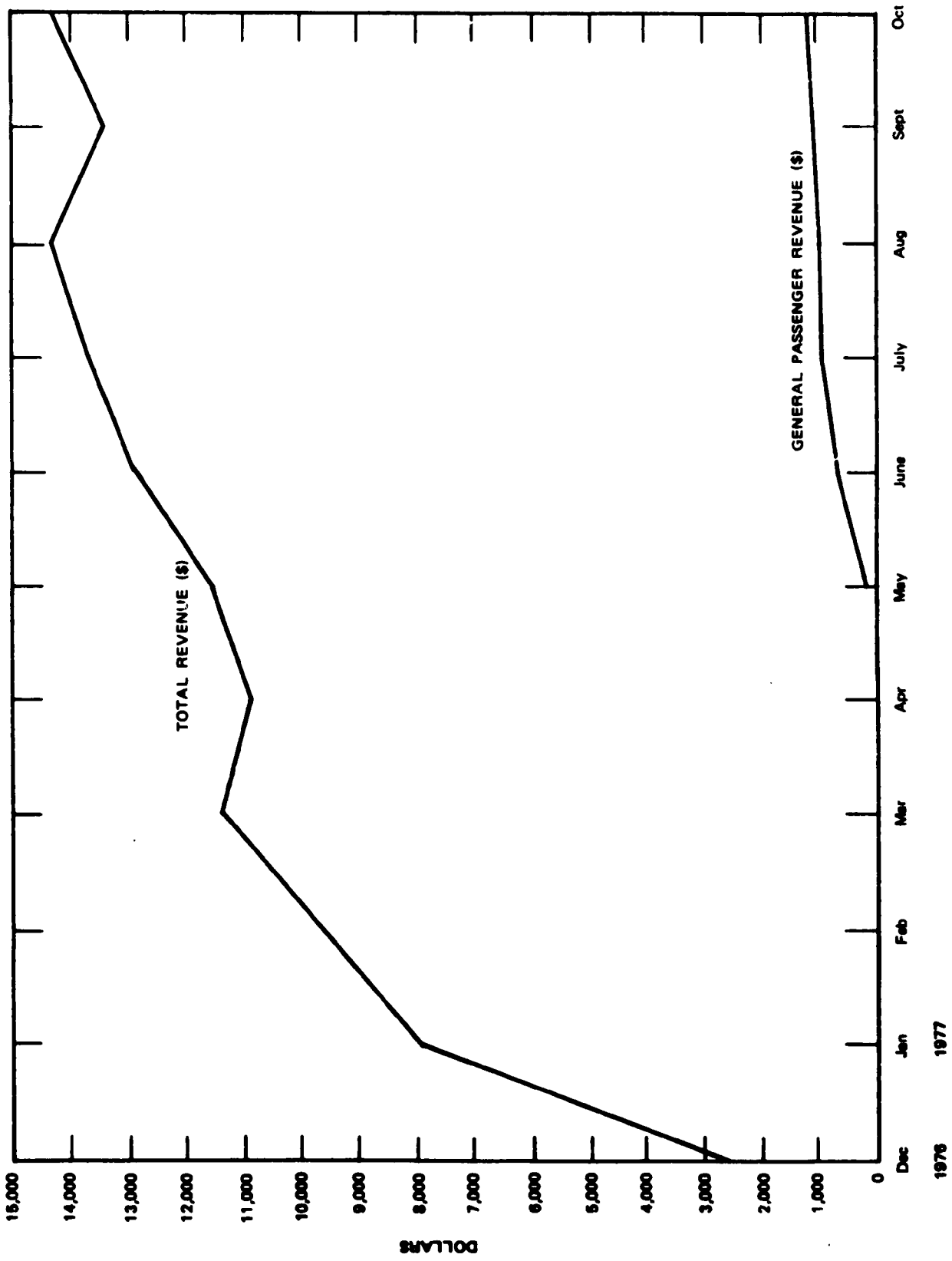


FIGURE 7-3 LIFT REVENUES

Figure 7-4 shows revenue as a percentage of cost over the length of project operations. As the figure indicates, revenue has been increasing as a percentage of cost from 22% in December of 1976 to 30% as of September 30, 1977. The highest point on the curve in Figure 7-4 occurred in July when revenues accounted for 32% of operating costs. The revenue/cost ratio appears to be leveling out at between 30% and 35%. At 35% the Tri-Met subsidy cost per passenger trip, calculated on the basis of operating costs, would be \$4.81.

7.8 COMPARISON OF LIFT COSTS WITH SOCIAL SERVICE AGENCY COSTS

One purpose of the demonstration was to examine the degree to which coordination and consolidation resulted in cost savings in provision of special transportation services. This section compares the costs to contracting agencies before and after the LIFT became available. Agency pre-LIFT and LIFT costs are analyzed further in Chapter 8 of this report.

To date, the LIFT has had the greatest impact on the AAA agencies, which consist of eight senior citizen centers that are operated by the City of Portland Department of Human Resources. By the summer and fall of 1976, the eight AAA agencies provided or contracted for approximately 4,000 passenger trips per month, or 48,000 trips per year. During 1975 and 1976, the bulk of the AAA trips were contracted to Special Mobility Services (SMS) - a private, nonprofit transportation coordinating service. According to SMS staff, the number of trips serviced in this manner fluctuated up to a high of 3,500 a month, down to 3,000 and then 2,500 by the summer of 1977. One reason cited for the fluctuation was a change in financing regulations by the Bureau of Human Resources. The cost per passenger trip fluctuated from \$3.00 up to \$4.00. A service contract for actual cost (approximately \$10,000 per month) was in effect, regardless of the number of trips provided. In December, the LIFT began providing the

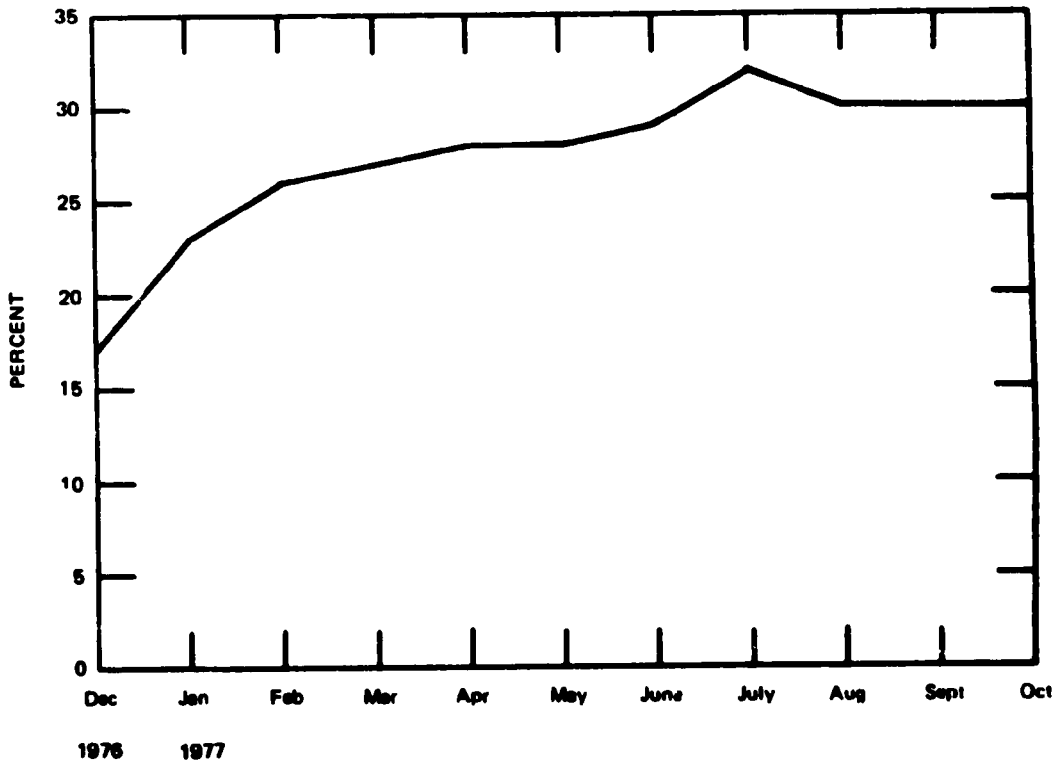


FIGURE 7-4 REVENUE AS A PERCENTAGE OF COST

old SMS trips on the basis of a \$3.00 per trip contract with a maximum allocation of \$10,000 per month (i.e., 3,333 trips).

Metro Mobility, a private nonprofit agency using volunteers, provides service similar to the LIFT to AAA agencies among others. This agency transports about 3100 passengers per month (37,200 per year) with two station wagons and five 15-passenger vans with lifts. Table 7-6 gives a breakdown of their total operating costs, assuming a \$3.50 per hour rate for volunteers.

TABLE 7-6.

COST BREAKDOWN FOR METRO MOBILITY

		<u>\$ Annually</u>	<u>% of Total Cost</u>
1. OPERATIONS			
	Actual expenses	120,000	
	Volunteers		
	@ \$3.50/hr	60,000	
		\$180,000	86%
2. DEPRECIATION		20,000 ^a	10
3. FINANCE CHARGES		10,000 ^b	5
	TOTAL COST	<u><u>\$210,000</u></u>	<u>101%</u> ^c

COST PER TRIP (37,000 trips per year) = \$5.65

COST PER TRIP excluding charge for
volunteers = \$4.03

^a Based upon \$100,000 acquisition cost for 2 station wagons and 5 buses and \$20,000 in major repairs over a six-year life span.

^b 10% of \$100,000 capital cost.

^c Does not add to 100% due to rounding.

Thus, the LIFT cost to agencies is less than the pre-LIFT transportation cost to agencies only because of the financial arrangements whereby Tri-Met assumes \$5.77 of the cost of a trip. Table 7-7 summarizes the results discussed in this section.

TABLE 7-7.

AGENCY AND GOVERNMENT COST PER TRIP BY TRANSIT PROVIDER*

	<u>Agency Cost</u>	<u>Total Cost</u>
LIFT buses	\$3.00	\$8.92
Supplemental taxi service	\$3.00	\$5.69
Special Mobility Services	\$3.00-4.00	\$3.00-4.00
Metro Mobility	\$4.03	\$4.03

*This assumes that the trips being provided are roughly equivalent.

As shown above, the true government cost of LIFT service is more than twice the cost of service provided before the LIFT began operations. However, as discussed in Chapter 8, the total impact in terms of number of special needs transportation trips delivered has increased because of the additional subsidy funds available.

7.9 PROJECTED SYSTEM EFFICIENCY

There is still some uncertainty about the ultimate cost of LIFT operations. Chapter 8 shows that there is plenty of untapped demand for the service. Furthermore, DAVE Systems, which evaluated LIFT operations, feels that overall system productivity can improve—if more subscription tours are served and if certain operational improvements are implemented. The purpose of this section is to explore the cost effects of increased demand and improved productivity.

Figure 7-5 depicts a least squares power curve, AA', illustrating the relationship between cost per trip (y axis)

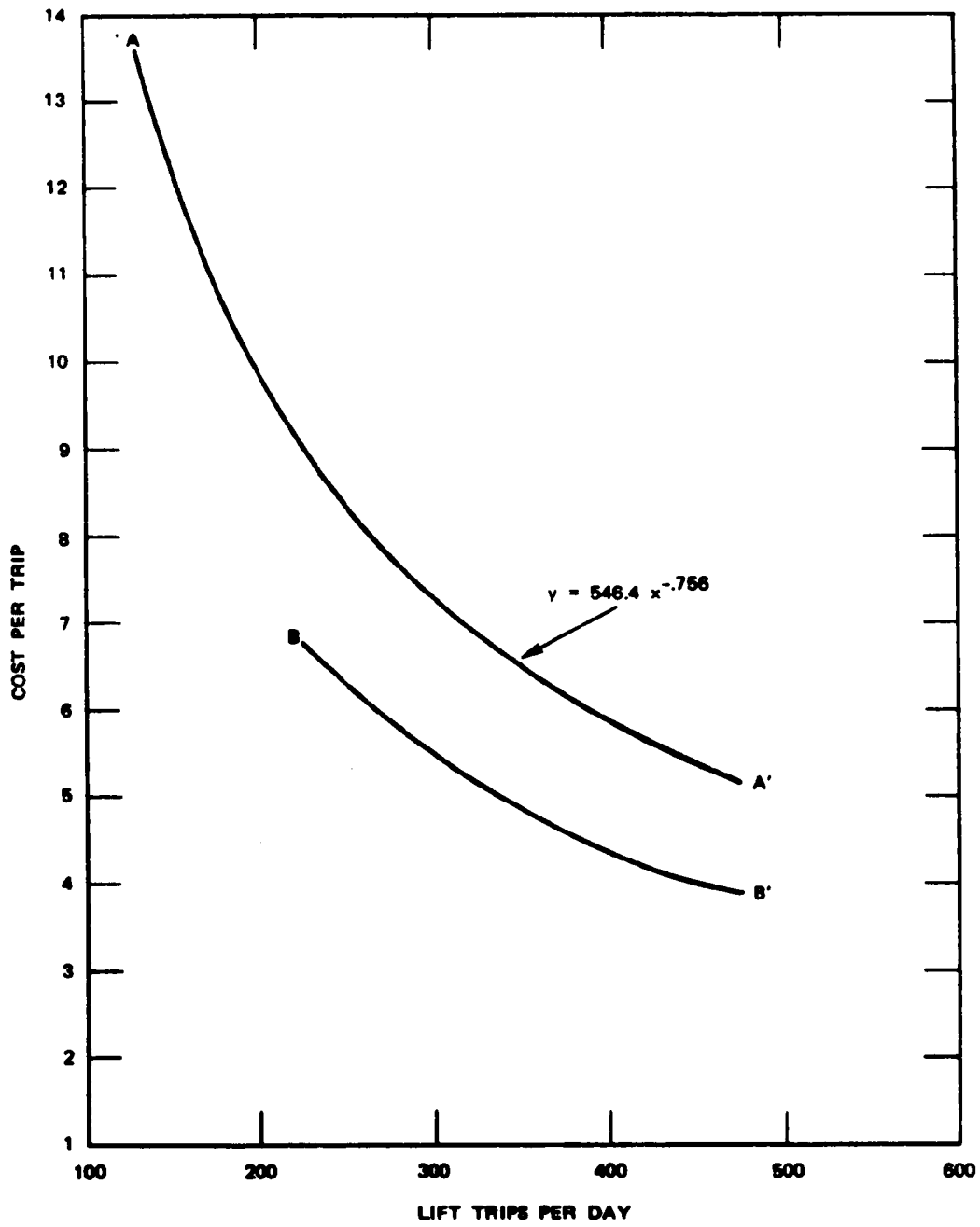


FIGURE 7-5 LIFT COST - VOLUME RELATIONSHIPS

and number of trips in the LIFT system. Data used to estimate this curve are from monthly data from January through October 1977 (10 months). The equation of this line is $y = 546.4 x^{-.756}$ and the $r^2 = .99$, indicating that a high degree of the variation is explained by the equation.

The curve indicates that there is increased efficiency as more trips per day are offered but that these efficiencies accrue at a decreasing rate. This increased efficiency and decreased cost are to be expected because as demand grows and costs stay relatively fixed, slack (i.e., unproductive driver and dispatcher time) would decrease, deadheading would be reduced, more riders would be served in a given hour, and therefore more passengers would be transported for a given expenditure of resources. As demand approaches system capacity, the incremental efficiencies are harder to come by (e.g., it becomes more and more difficult to add another trip to a relatively full schedule) and the rate of decrease in cost per trip diminishes. Assuming that the curve constructed from the January through October data can be used to predict costs with increased demand, a movement from 300 to 350 trips per day would decrease operating costs from \$7.40 per trip to \$6.50.

Note that the demand used to construct curve AA' was composed of mostly many-to-many types of trips. We know this from the on-board surveys which show a high proportion of medical trips throughout the project's history (see Section 8.2.2). Medical trips are typically difficult to group into productive tours because individual appointment times and treatment times do not coincide.

Curve BB' illustrates the cost effects of a shift in the nature of the demand from a predominately many-to-many type of demand to a more grouped demand such as might occur if more subscription tours were organized or if individual medical trips could be better coordinated into group rides. The hypothetical shift in the nature of the demand depicted in BB' results in a productivity increase from 3.0 to 4.0. The operational

explanation of this increase is that the driver is now picking up more groups of riders than before, when he was transporting more individuals; however, the resources utilized remain roughly the same as in AA'. Curve BB' assumes that the underlying dynamics of the system are unchanged; i.e., as volume of the more aggregated demand increases, system slack is decreased and economies accrue in the same manner as before.

This analysis shows that productivity increases and consequent decreases in cost per trip will occur as demand increases, regardless of the type of demand. On curve AA' productivity increases and unit costs decrease as more system slack is used, as individual trips are grouped, and as dispatching and scheduling efficiencies occur. In this case, system decrease in cost per trip is due to an increase in unaggregated demand per unit of resources expended. Curve BB' shows costs that might occur if the type of demand served shifted toward a more grouped type and system economies occurred. In other words, curve BB' assumes a one-third increase in load factor. This curve illustrates that such an increase in aggregated demand would lower trip costs substantially.

7.10 SECOND-YEAR IMPROVEMENTS IN OPERATIONAL PERFORMANCE

During the second year of the demonstration the following initiatives will be (or have been) taken to improve operational performance and thereby lower cost per trip:

1. Implement a special group fare of \$1.50 per trip. This fare is intended to encourage group ridership and is applicable to groups of five or more with a common origin or destination or both. These group trips must be scheduled three days in advance.
2. Increase supervision of the dispatch and control function, in order to promote efficient tours.

3. Increase demand by increasing registration and promoting riding among those already registered.
4. Tighter scheduling of drivers to match demand.

8. PROJECT IMPACTS

8.1 INTRODUCTION

Central to an evaluation of the Special Needs Transportation Project in Portland are the project's impacts on all participants.* Clearly, the project's impacts upon users of the service, elderly and handicapped persons who cannot use the regular transit system and lack access to alternate means of transportation, are critical to the success of the demonstration; thus, increased LIFT ridership is heavily dependent upon user satisfaction, as well as a number of other variables. Through a series of on-board surveys and follow-up interviews with LIFT bus riders and taxi riders served by the Special Needs Transportation project, the following impacts on LIFT clients were examined:

1. Trip purposes served by the LIFT system;
2. Client assessments of various features of the LIFT, including prescheduling, timeliness of the vehicles, driver courtesy, comfort of the ride, and so forth;
3. Client evaluations of the supplemental taxi service furnished by the LIFT;
4. Client alternatives to the LIFT service, and the cost, convenience, and acceptability of such alternatives, relative to the LIFT; and
5. Trends in user travel behavior, in terms of trip frequency and trip purposes.

The social service agencies and non-profit organizations contracting with Tri-Met for LIFT service constitute a secondary

*Chapter 5 provides a detailed discussion of the breakdown by agency affiliation, age, sex, and mobility limitations of those registered to use the LIFT as of mid-October, 1977.

group upon which the demonstration has a direct impact. Underlying the demonstration is the central premise that special transportation service can be delivered more efficiently and effectively with close cooperation and coordination among agencies, organizations, and the transit operator. Thus, if the LIFT system is to attain a satisfactory level of demand for the service, agencies must be willing to register their clients and schedule client appointments with the LIFT. As of mid-October, 1977, agency passengers constituted 73 percent of total ridership on the LIFT system; the impact of the service on agencies, then, constitutes a second critically important area of analysis.

Three sets of agency surveys will have been conducted by the end of the demonstration period: the "before" surveys, conducted before the start of the LIFT service; the "interim" surveys, conducted after the service has operated for a certain period of time; and the final surveys, which will be conducted at the project's completion. This section will examine and compare the findings yielded by the agency "before" and "interim" surveys. The "before" and "interim" surveys consisted of structured, face-to-face interviews with knowledgeable personnel in selected agencies and organizations which have contracted with Tri-Met for LIFT service. The original intent of these surveys, as delineated in the Portland SNT Project Evaluation Plan, was to focus on:

1. Improvements, if any, in the agencies' transportation costs;
2. The impacts of the LIFT on the transportation services furnished by the agencies;
3. The impacts of the LIFT on the core services offered by agencies; and
4. The way in which the Special Needs Transportation (SNT) system deals with the operational and accountability

problems involved in consolidating human services transportation.

Appendix D contains a list of the agencies interviewed. The two surveys in combination were designed to examine such specific variables as:

1. The types of transportation service provided to clients by the agency;
2. The effect of the LIFT on the agency's ability to service client transportation needs;
3. Agency client demand for transportation services, including the LIFT;
4. The cost to the agency of providing transportation services, including the LIFT;
5. Agency financing of transportation services;
6. Scheduling and administrative problems imposed by the LIFT on the agencies;
7. Client perceptions of the LIFT; and
8. Suggestions of agency personnel regarding potential improvements to the LIFT service.

Not all of these variables are relevant or readily measurable for all contracting agencies and organizations. For example, in the case of the eight Area Agency on Aging agencies, AAA is billed directly for the costs of the LIFT rides delivered to clients from the nine AAA agencies. Therefore, the budgets of these agencies have not been directly affected by the LIFT, except in those instances when an agency decides to subsidize a client not eligible for the AAA subsidy to ride the LIFT as a general passenger. Moreover, Table 8-1 shows that some of the contracting agencies and organizations subsidize only one or two LIFT clients; the impact of the LIFT on their transportation costs has been

TABLE 8-1

AGENCY CLIENTS REGISTERED WITH THE LIFT

<u>Contracting Agency or Organization*</u>	<u># Clients Registered</u>	<u>% of Total Registration</u>
Area Agency on Aging	1897	44.3
Metropolitan Family Services	58	1.4
State of Oregon Vocational Rehabilitation Division	26	0.6
University of Oregon Health Sciences Center	21	0.5
Volunteers of America, Inc.	4	0.1
Good Samaritan Child Neurology Clinic	2	-0-
State of Oregon Public Welfare Division	1096	25.4
Muscular Dystrophy Association	22	0.5
General Passengers	<u>1151</u>	<u>26.9</u>
	<u>4277</u>	<u>99.8</u>

*As of mid-October, 1977. Note that some agencies and organizations under contract for LIFT service have no clients registered with the LIFT.

minimal. It should also be noted that some contracting agencies or organizations never did furnish transportation service to their clients; thus, in some cases the LIFT has replaced social agency transportation, while in other cases the LIFT is replacing taxis, relatives and friends as the primary means of transportation utilized by the clients of these agencies and organizations. In short, the agency before and interim surveys did not yield a great deal of "hard" data regarding agencies' pre-LIFT and present transportation costs, nor did the surveys measure, in quantitative terms, the impact of the LIFT on the agencies' ability to furnish transportation service.

However, the before and interim surveys did elicit a number of comments, criticism, and suggestions from agency personnel regarding the LIFT service. While such findings are necessarily qualitative and subjective in nature, they are, nonetheless, of value; as agencies constitute the primary link between Tri-Met and the LIFT target population, the reactions of agency personnel to the LIFT will greatly affect Tri-Met's ability to increase agency ridership on the service.

The Tri-Met operating and administrative personnel assigned to the LIFT service constitute a third group affected by the demonstration project. The drivers and dispatch staff represent the LIFT service to the two client groups: LIFT riders, and contracting agencies; thus, the attitudes of Tri-Met operating personnel will greatly affect the effectiveness of the communications among all participants in the system. In addition, the reporting and billing system accompanying the automated fare collection equipment affects Tri-Met administrative personnel as well as the agencies and organizations billed by Tri-Met.

Therefore, during July and August, 1977, a number of semi-structured interviews with Tri-Met's management, dispatch staff, drivers and other LIFT personnel within Tri-Met were conducted; the intent of these interviews was to elicit the opinions of

the personnel involved with the LIFT service regarding the efficiency and effectiveness of the service.

Finally, the private transportation providers under contract with Tri-Met constitute the fourth major group upon which the Special Needs Transportation System has a potential impact. Interviews with personnel from Broadway and Radio Cab Companies and Buck Ambulance Company were conducted in order to determine the impacts of the LIFT service as reflected by total company billings, driver attitudes, and other aspects of company operations.

Copies of all survey and interview materials used to assess project impacts on clients, agencies, Tri-Met personnel, and the contracting private transportation providers are contained in the Appendices of this report.

8.2 CLIENT IMPACTS

8.2.1 Trip Frequency of LIFT Clients

In order to determine the average trip frequencies of LIFT passengers, all LIFT trips made during June, July, August, and September of 1977 were analyzed. The results of this analysis are as follows:

1. The unduplicated number of people riding the LIFT during a given month constitutes approximately 25% of the total number of people registered with the LIFT.
2. On average, these passengers make approximately three one-way trips per week on the LIFT.
3. General passengers take more trips per week, on average, than agency passengers, as the data from a representative month - September - illustrate:

TABLE 8-2.
MEAN TRIP FREQUENCY BY WEEK, SEPTEMBER 1977
(One-way Trips Per Week)

<u>Weeks</u>	<u>All Passengers</u>	<u>Agency Passengers</u>	<u>General Passengers</u>
Week 1	3.49	3.24	4.01
Week 2	2.94	2.58	3.77
Week 3	3.01	2.69	3.71
Week 4	3.09	2.77	3.73
Weekly Mean	2.99	2.82	3.81

As general passengers make more regular work trips than agency passengers, the higher overall trip rate exhibited by general passengers is to be expected.

4. Most people appear to use the LIFT infrequently, i.e., for one or two round-trips per month. A much smaller number of people use the LIFT on a frequent, regular basis; this group makes 10-20 round-trips each month. Finally, there appear to be a handful of extremely frequent LIFT riders who might be considered marginal abusers of the service. For example, during July 1977 one person made 65 one-way LIFT trips, and two people made over 75 such trips.* Similarly, the August data reveal that one individual rode the LIFT 75 times and another rode over 75 times.

Figure 8-1 constitutes a percentage frequency distribution of the trips taken by LIFT riders in September 1977. Note that over 90% of those riding the LIFT that month made 1-15 one-way trips, or 1-7 round-trips, during the month.

*Trips numbering over 75 were combined into one category in the analysis.

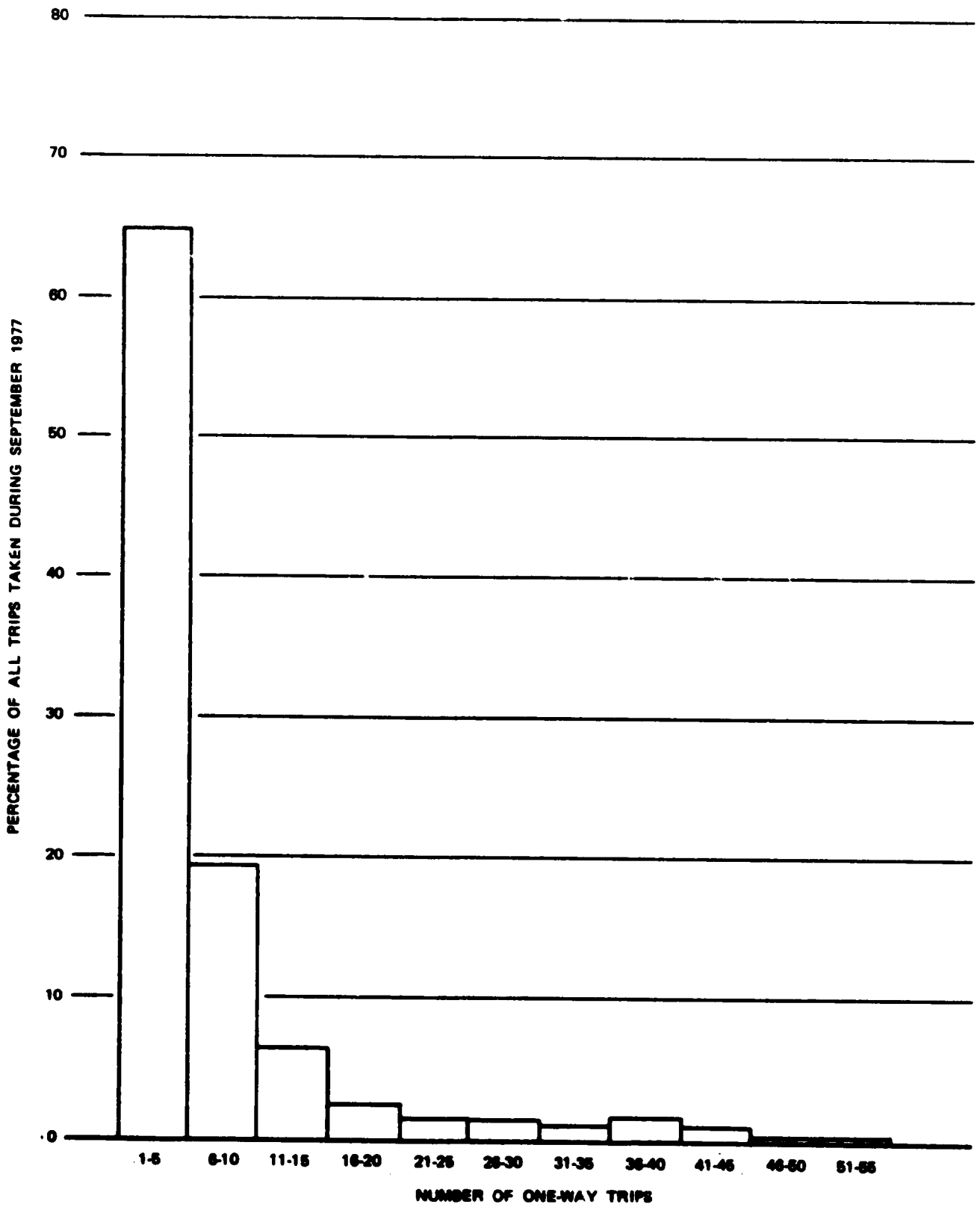


FIGURE 8-1 TRIP FREQUENCY PER MONTH: SEPTEMBER 1977

8.2.2 Trip Purposes Served

The on-board surveys revealed that the most common trip purposes of LIFT clients were medical/dental visits, social/recreational activities, and shopping. However, Figure 8-2 shows the changes in usage patterns which had occurred by the time of the third on-board survey; particularly noteworthy are the 17% decrease in usage of the LIFT for shopping, and the 9% increase in usage of the LIFT to go to work. These changes are largely attributable to the general passengers, who constituted 43% of the second and third on-board survey samples. Table 8-3 shows the variations in trip purpose between agency and general passengers sampled in the third on-board survey.

TABLE 8-3. TRIP PURPOSES

<u>Trip Purposes</u>	<u>%* Agency-Sponsored Passengers</u>	<u>%* General Passengers</u>
Medical/Dental	73%	33%
Social/Recreational	7	9
Shopping	5	4
Work	3	29
Personal Business	12	20
Other	2	4
No Answer	-	-

*Does not add to 100% due to rounding.

8.2.3 Client Assessments of LIFT Features

In the three on-board surveys, LIFT passengers were asked to rate eleven features of the LIFT. In the first survey, they were asked to rate each feature as being "Satisfactory" or "Unsatisfactory"; for the second and third on-board surveys, this

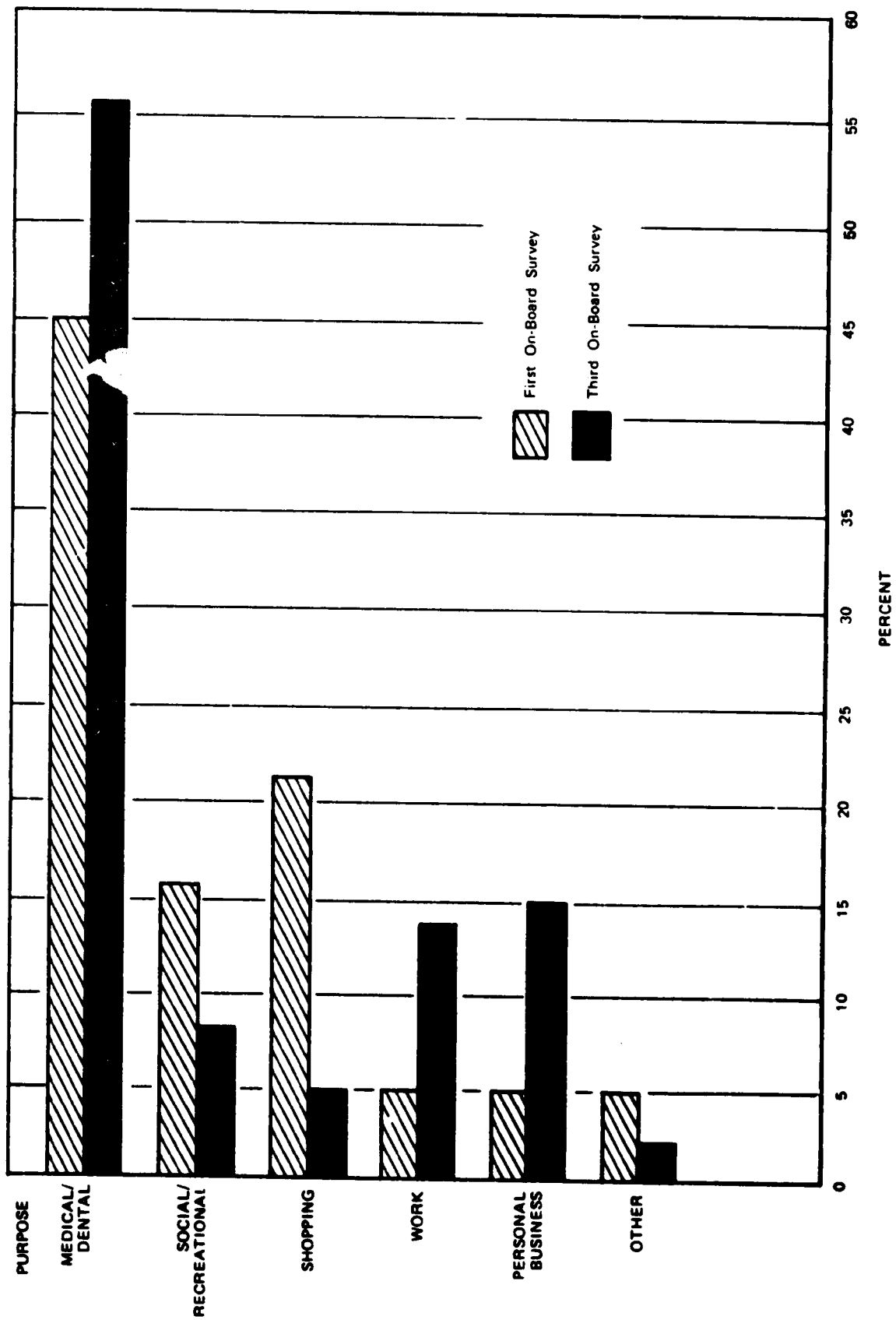


FIGURE 8-2 USER TRIP PURPOSES

question format was changed to "Satisfactory" or "Needs Improvement" in an attempt to overcome clients' reluctance to make negative comments about a service they clearly appreciate. Table 8-4 shows the results of the three surveys.

LIFT clients sampled in the three surveys were nearly unanimous in their satisfaction with the mechanics of boarding the LIFT bus and using their Special Needs Bus Passes, with the courtesy and helpfulness of the LIFT drivers, and with the experience of riding with strangers. Dissatisfaction with the noise level on the LIFT remained at approximately the same level during the first two surveys, then increased. Negative ratings of the timeliness and scheduling problems associated with the LIFT increased dramatically since the first on-board survey. Part of this increase may have been attributable to the change in the question format discussed above; however, the enrollment of general passengers and the steadily-increasing usage of the LIFT are also likely to account for timing and scheduling problems which were not as prominent at the time of the first on-board survey.

Clients were also asked an open-ended question regarding the features they most liked or disliked. The door-to-door service furnished by the LIFT was often cited by clients in praise of the service; several clients also mentioned their appreciation for drivers who helped them with groceries. The lateness of the LIFT buses, especially for return trips, was the negative feature most often mentioned by clients, especially those interviewed in the second on-board survey. The length and bumpiness of the ride were also cited fairly frequently.

On the basis of clients' responses to the three on-board surveys, it seems possible that current LIFT riders would make more trips if certain features of the LIFT service were changed or added. In all surveys, clients were asked if they would make more trips on the LIFT, given a series of hypothetical situations

TABLE 8-4.

CLIENT SATISFACTION

<u>Features</u>	<u>% Users Rating LIFT Service Features As "Satisfactory"</u>		
	<u>First Survey</u>	<u>Second Survey</u>	<u>Third Survey</u>
1. Calling in advance for a ride	89%	82%	79%
2. Planning your trip time to fit when a bus can come for you	88	70	86
3. Getting picked up on time	90	62	72
4. Getting up onto the bus	96	98	95
5. Using your Special Needs Bus Pass	94	100	98
6. Courtesy & helpfulness of the drivers	97	97	99
7. Riding on the bus with people you don't know	97	97	98
8. Comfort of the ride	81	74	71
9. Noise level on bus	53	55	43
10. Length of time you spend on the bus	91	77	86
11. Waiting time for return trip	85	69	75

(e.g., "Would you make more trips on the LIFT if you didn't have to call for service so far ahead of time?"). Table 8-5 compares some of the responses yielded by the three surveys; in general, the largest proportions of passengers said that they would make more LIFT trips if the service ran on Saturdays and Sundays, and if they did not have to schedule their rides so far in advance.

However, these data should be interpreted with caution. If the respondents have commented favorably on the service (as most did), then they may have said that they would ride more often in order to be consistent with their previous responses. Furthermore, peoples' responses regarding their intended future behavior are not always reliable predictors of their actual behavior. Therefore, the figures probably overstate the increase in ridership that would result from a changed condition. However, they do show several areas where changes could lead to increased ridership. Changing service times to include weekends and later weekday hours and improving and shortening the information/scheduling process appear to be two such areas.

TABLE 8-5.

CHANGED SERVICE CONDITIONS THAT COULD
LEAD TO INCREASED LIFT RIDERSHIP

<u>Condition</u>	<u>% Saying They Would Ride More Often</u>		
	<u>1st Survey</u>	<u>2nd Survey</u>	<u>3rd Survey</u>
1. Service ran Saturdays	55%	49%	42%
2. Service ran Sundays	43	38	40
3. Service ran later in the day	26	35	30
4. Client didn't have to call for service so far in advance	52	36	44
5. There was better information on service	28	18	48

8.2.4 Client Evaluations of Taxi Service Furnished by the LIFT

In certain instances, as when a LIFT client's pick-up point and destination cannot readily be integrated into the LIFT bus schedules, Tri-Met contracts for taxi service for the client. (This procedure is discussed in greater detail in Section 8.5.) Telephone interviews were conducted with 100 LIFT clients who had ridden in a LIFT-sponsored taxi very recently. Overall, taxi riders were generally pleased with the taxi service they had received, as Table 8-6 shows.

TABLE 8-6. TAXI RIDER SATISFACTION

<u>FEATURES</u>	<u>% TAXI RIDERS RATING TAXI SERVICE FEATURES AS:</u>		
	<u>Satisfactory</u>	<u>Needs Improvement</u>	<u>Not Applicable</u>
1. Calling in advance for a ride	85%	15%	--
2. Getting picked up on time	74	18	8
3. Getting into the taxi	87	12	1
4. Using your Special Needs Bus Pass*	97	2	1
5. Courtesy and helpfulness of the drivers	80	19	1
6. Comfort of the ride	95	4	1
7. Waiting time for return trip	60	25	15**

*Almost all of those interviewed said they had not used their passes; thus, the overwhelmingly favorable response to this question is somewhat misleading.

**These clients did not ride the taxi home.

When compared with the results of the second on-board survey of LIFT riders, Table 8-6 shows that:

1. Taxis score significantly higher than the LIFT on the comfort of the ride.
2. The LIFT received significantly higher ratings on driver courtesy and helpfulness, and on ease of entering the vehicle.
3. The two modes received similar evaluations on calling in advance for the ride, waiting to be picked up for the ride, and waiting to be picked up for return trips.

It should be noted that some of those who complained of the difficulty of entering the taxi use wheelchairs; these people expressed a clear preference for the LIFT, which does not require them to transfer into and out of their wheelchairs. Others who preferred the LIFT for these reasons complained that the taxi drivers did not provide adequate assistance from the curb into the taxi. To some extent, then, client perceptions of the ease of entering the vehicle are reflected in their evaluations of driver courtesy and helpfulness.

In addition, the third finding is consistent with the fact that the client calls Tri-Met to schedule a trip and, after the trip purpose has been completed, to notify Tri-Met that he or she is ready to be picked up for the return trip home. This procedure is followed regardless of whether the client is to be picked up by the LIFT bus or by a LIFT-sponsored taxi. Therefore, since the client may not call directly for taxi service, there is likely to be a delay before the taxi arrives to take the client home.

When asked to compare the experience of taking the taxi provided by Tri-Met with the experience of riding the LIFT bus, the taxi riders surveyed responded as follows:

1. The largest group (39%) preferred taxis to the LIFT buses. Of these, about half cited the punctuality, reliability, and shorter travel time of taxis; the other half talked in terms of comfort of the ride,

maintaining that taxis are less noisy and bumpy than the LIFT.

2. The next largest group (31%) had no preference. Most of these people expressed strong appreciation for both services, although some talked in terms of a trade-off. (For example: "The taxi is more comfortable, but the LIFT drivers are pleasanter than the taxi drivers.") A few clients were critical of both modes.
3. Of the rest*, 22% preferred the LIFT buses to the taxis. Some of these clients used wheelchairs and, as noted earlier, found it difficult to transfer from the wheelchair to the taxi seat. The rest preferred the LIFT because of the drivers, who were perceived as friendlier, more courteous, and more helpful with escort and packages than the taxi drivers.

In sum, LIFT clients appear to be favorably disposed toward taxis as a means of transportation. If the taxi drivers were as consistently pleasant and helpful in providing escort assistance as the LIFT drivers appear to be, the level of satisfaction exhibited by taxi riders would probably be even higher.

8.2.5 Perceived Alternatives to the LIFT

For the majority of LIFT passengers, the LIFT appears to increase the convenience of making regularly scheduled trips to doctors, dentists, grocery stores, work, and the like. In addition, the LIFT enables a significant proportion of LIFT riders to make trips they otherwise would not have made.

The three on-board surveys conducted in April, July, and December of 1977 (contained in Appendix A), yielded the following findings regarding perceived alternatives to the LIFT.

*Of the taxi riders surveyed, 9% had never ridden the LIFT bus and therefore could not compare the two modes.

1. When asked how they would make a given trip if the LIFT were not available, those clients who said they would make the trip using a different mode of transportation generally regarded the latter as being less convenient for them. Table 8-7 compares the overall responses to this question: the slight increase in the proportion of passengers who would still make the trip seems reasonable in light of the fact that 19% of the general passengers in the second survey and 29% of those in the third survey were using the LIFT to go to work.
2. The survey data indicate that if the LIFT were not available, the proportion of LIFT users who would make a particular trip would vary according to the type of trip. Table 8-8 illustrates this variation, using the data from the first on-board survey. These data indicate that two out of three medical trips (67%) would still be made via another mode; on the other hand, social/recreational trips would be curtailed relative to the other types of trips. Apparently, trips for the most critical purposes would be more likely to occur than trips for less pressing needs. Those who would still make the trip said they would rely heavily on friends and relatives, taxis, the bus, and agency transportation.
3. The importance of the LIFT to wheelchair-bound passengers was confirmed by the results of the third on-board survey: fully 46% of those in wheelchairs said they would not have taken the trip if the LIFT were not available. This finding is consistent with the response of wheelchair-bound passengers when asked how they had made most of their trips before the LIFT service was available: they had relied much more heavily on the Care-Car and Medi-Car services -- which are comparatively expensive -- than non-wheelchair passengers.

TABLE 8-7

PREDICTED TRAVEL BEHAVIOR IF THE
LIFT WERE NOT AVAILABLE

	<u>April</u> <u>First Survey (%)</u>	<u>July</u> <u>Second Survey (%)</u>	<u>December</u> <u>Third Survey (%)</u>
Would switch to a different mode of transportation	52	65	67
Would not make trip at all	36	23	24
Don't know	12	12	8

TABLE 8-8
 PREDICTED TRAVEL BEHAVIOR IF THE LIFT WERE NOT AVAILABLE,
 BY TYPE OF TRIP¹

Type of Trip	Would Still Make Trip ²	Alternative Mode of Trip ³							No Answer
		Friend or Relative	Taxi	Bus	Agency	Personal Auto	Walk		
Medical/Dental	67% (44)	7%	39%	18%	25%	5%	-	7%	
Shopping	38% (12)	42%	17%	25%	8%	-	8%	-	
Personal Business	75% (3)	33%	33%	-	-	-	-	33%	
Social/Recreational	25% (6)	17%	-	33%	33%	-	19%	-	
Work	71% (5)	-	20%	-	-	60%	-	20%	
Other	38% (5)	-	20%	-	40%	-	-	40%	

¹ 75 (52%) of the 144 persons who answered the questions about alternative travel modes said they would make their trip by an alternative mode. The table shows the alternative mode people would use, by type of trip. Due to small sample size for some trips, standard errors of the percentages will be large.

² Numbers in parentheses indicate the number who said they would still make the trip.

³ Figures show the percentage of those who said they would still make trip. Some rows do not add to 100% due to rounding.

Overall, the ten follow-up interviews* corroborated the above findings. Those clients who perceived themselves as having alternatives to the LIFT emphasized that the LIFT saved them money; those whom the LIFT enabled to make trips they were previously unable to make indicated that they felt more independent, and that they had gained access to goods and services previously unavailable. For many clients, the LIFT service replaced taxi service as their most frequent mode of transportation; some clients indicated that their reliance on taxis had forced them to forego other necessities which the LIFT service now enables them to afford. In addition, a number of people indicated that they made more trips on the LIFT than before because of the cost savings to them.

The lessened reliance on friends and relatives for transportation and the resulting sense of increased independence and mobility constituted a clear advantage of the LIFT for many of those interviewed. One woman said that without the LIFT, she wouldn't "get out" to socialize, that the LIFT has "brightened her life." Another said that she was "not as lonesome any more", that she felt "better all around, keeping active and motivated." Such comments were typical, as was that of the woman who said that the LIFT enabled her to visit her husband in the nursing home more frequently than would be possible without the LIFT service.

Finally, clients frequently described the LIFT's impact in terms of increased access to goods and services, especially groceries. A number of clients stated that they "ate better" as a result of the LIFT: one said that he could buy groceries for less money at a store which was outside his neighborhood but accessible via the LIFT; another said that she could now select her own groceries, whereas she had relied on a friend or relative to do her grocery shopping before. In addition, two clients said that the LIFT enabled them to do volunteer work several days a week at Volunteers of America.

*Appendix B contains a discussion of the follow-up interview technique.

8.3 IMPACTS ON AGENCIES

8.3.1 Agency Profile

As of August 1977, 18 agencies and organizations were under contract with Tri-Met for LIFT service. Of these, eight were AAA agencies, two were state agencies (Public Welfare Division and Vocational Rehabilitation Division), and the rest consisted of various non-profit organizations. Table 8-9 constitutes a list of contracting agencies as of August 1977.

TABLE 8-9.

AGENCIES AND ORGANIZATIONS UNDER CONTRACT FOR THE LIFT SERVICE

Area Agency on Aging:

1. Gresham Senior Adult Center
2. Hollywood Senior Center
3. Neighborhood House
4. Northwest Pilot Project
5. Friendly House Senior Center
6. Peninsula Project ABLE
7. Senior Adult Service Center
8. PACT Senior Service Center
9. Metropolitan Family Service
10. State of Oregon Vocational Rehabilitation Division
11. Goodwill Industries of Oregon*
12. University of Oregon Health Sciences Center
13. Volunteers of America, Inc.
14. Good Samaritan Child Neurology Clinic
15. State of Oregon Public Welfare Division
16. Westside Schools
17. Muscular Dystrophy Association
18. Veterans Administration Hospital

*As of the beginning of October, Goodwill Industries had not yet sponsored any LIFT clients.

However, only two agencies -- AAA and the Public Welfare Division -- utilize the LIFT service to an appreciable extent. The LIFT billings for September 1977, shown in Table 8-10 below, are typical of the LIFT usage patterns of the agencies and organizations under contract to Tri-Met.

TABLE 8-10.

LIFT BILLINGS, SEPTEMBER 1977

<u>Passenger Affiliation</u>	<u>One-Way Trips</u>		<u>Revenue</u>
	<u>#</u>	<u>%</u>	
Area Agencies on Aging (AAA)	3,337	50%	\$10,475
Public Welfare Division	359	5	1,077
Vocational Rehabilitation	152		492
Crippled Childrens' Division	73	4	237
Muscular Dystrophy Association	2		4
Unaffiliated (General Passenger)	<u>2,700</u>	<u>41</u>	<u>1,320</u>
Total	6,623	100%	\$13,605

The Area Agency on Aging (AAA) centers within the City of Portland provide information, referral and counseling services to clients over 60, for the purpose of promoting client independence. The types of services furnished include transportation, housing aid, homemaker service, escort service, legal aid, meal-on-wheels, home health and telephone reassurance, and, in some cases, group recreational activities. Centers with group facilities sponsor such activities as dances, potlucks, card games, craft programs and tours.

AAA clients fall into two categories: "limited access" clients, who have incomes below the poverty level, suffer from isolation, and live within the service area; and "open access" clients, who have incomes above the poverty level, can benefit from the AAA centers' activities, and live within the service

area. Only limited access clients are subsidized by AAA to ride the LIFT.

All AAA trips are funded by Title III of the Older Americans Act and constitute many-to-many service, primarily for medical and shopping purposes. By the end of 1977, the LIFT was furnishing approximately 3,900 AAA trips per month, or 47,000 AAA trips per year.

8.3.2 LIFT Impact on Agency Transportation and Core Services

As noted in the preceding section, the LIFT has had the largest impact by far upon the eight senior citizen centers funded by AAA. Prior to the demonstration, during 1975 and 1976, the majority of AAA-funded trips were contracted out to Special Mobility Services (SMS), a private, non-profit transportation coordinating service. According to SMS representatives, the number of trips furnished to AAA clients by SMS fluctuated from a high of 3,500 per month, down to 3,000 and then to 2,500 by the summer of 1977. This fluctuation was due, in part, to changes in the financing regulations set by the State Bureau of Human Resources: a service contract for actual cost (approximately \$10,000 per month) was in effect which disregarded the number of trips provided: the cost per passenger trip fluctuated over this time period from \$3.00 to \$4.00.

Beginning in July, 1976, the trips previously contracted to SMS (and provided by SMS) began to be contracted through Tri-Met. During the months of July through October, the average was 2,500 trips a month. This leaves approximately 1,500 trips (out of the total 3,500 trips) a month which were provided by the individual agencies via Metro Mobility (another contracted-for, private transportation service) agency-owned vehicles, and paid drivers, staff, or volunteers. Table 8-11 presents the data for each agency by type of transportation.

In December 1976, the LIFT began providing the old SMS trips on the basis of a \$3 per trip contract with AAA, with a

TABLE 8-11. FALL 1976
PORTLAND AAA TRANSPORTATION BY MODE*

	SMS1		MM2		Own Vehicle ³		Staff ⁴		Vol. ⁴		Total ⁴	
	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.
PACT	650	7800	165	1980					2	24	817	9800
SASC	600	7200	30	360			8	90			638	7650
NPPA - Able	450	5400			375	4500			75	900	900	10800
FHSSC	220	2650			100	1200	25	300			345	4150
Hollywood	200	2400					8	100			208	2500
SW Neighborhood	155	1860	25	300	6	70	100	1200	50	600	330	3960
NW Pilot	175	2100	30	360	375	4500			75	900	655	7860
MFS	30	360					40	480	80	960	150	1800
Totals (rounded)	2500	30000	250	3000	850	10200	175	2100	275	3300	4050	48500
		(62%)		(6%)		(21%)		(4%)		(7%)		(100%)
				(68%)						(11%)		

* From "before" agency interviews

1 Sample date: July-Oct. 1976

2 Sample date: Sept. 1976

3 Sample date: Sept. 1976 and Nov. 1976

4 Estimates, various months

TABLE 8-12. FALL 1977
 PORTLAND AAA TRANSPORTATION BY MODE*

	LIFT		MM		Own Vehicle		Staff		Vol.		Total	
	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.	Mo.	Yr.
PACT	665	7980	30	360					5	60	700	8400
SASC	850	10200	30	360			20	240			900	10800
NPPA - Able	720	8640	4	48	210	2520			50	600	984	11808
FHSSC	210	2500	2	24	150	1800	50	600			412	4944
Hollywood	150	1800	14	168			40	480			204	2448
SW Neighborhood	185	2220	20	240	10	120	30	360	15	180	260	3120
NW Pilot	360	4320	0		82	984			140	1680	582	6984
MFS	150	1800	0				40	480	90	1080	280	3360
Totals	3290	39480	100	1200	452	5424	180	2160	300	3600	4322	51864
		(76%)		(2%)		(11%)		(4%)		(7%)		(100%)
		78%										
1977	=	3200	100	450	180	300	4322					
-1976	=	-2500	-250	-850	-175	-275	-4050					
Difference	=	700	-150	-400	5	25	272					
		550										

* From December, 1977 agency interviews

maximum allocation of \$10,000 per month (i.e., 3,333 trips). Table 8-12 presents the comparable data for the fall of 1977, one year later. A comparison of the two tables reveals the following LIFT impacts on AAA transportation:

1. Collectively, the eight AAA agencies have increased the number of trips provided monthly by approximately seven percent.
2. Provision of trips by staff has remained constant, and the number of trips provided by volunteers has increased by nine percent.
3. The number of trips provided by agency vehicles decreased to almost half of the previous year's figure, but no vehicles have been eliminated.
4. All trips provided by SMS, and some trips provided by Metro Mobility, have been switched to the LIFT, which accounts for three quarters of AAA trips now, and has reached the contract level of \$10,000 per month.

In general, then, the contract with Tri-Met allowed the individual AAA agencies to increase the contracted number of trips, regardless of cost, since the price was fixed at \$3.00 per trip. This allowed some "own vehicle" trips to be shifted as well as an overall increase in trips provided. The "Portland" Metro Mobility trips had to be shifted under the terms of the contract with Tri-Met.* Thus, increased transportation has been provided, with some savings in price, to the AAA agencies. However, this finding is eclipsed by the fact that Tri-Met has

*Tri-Met's contract with AAA explicitly prohibits the latter from purchasing SMS service. (Non-AAA agencies may do so, however.) Metro Mobility, a City-operated special transportation service consisting of four vehicles, also has a contract with Tri-Met; under the terms of this contract, Metro Mobility provides transportation service to elderly and handicapped persons only in those portions of Eastern Multnomah County not serviced by the LIFT.

subsidized the agency trips in excess of 50%; that is, the agencies are not paying the real cost of the trips. If they had to do so, the previous arrangements with SMS, MM, their own vehicles, etc., would be more cost-effective. In short, the LIFT has added to the transportation capacity of the AAA agencies. However, it does not appear to have achieved cost-effective coordination of agency transportation.

In general, those non-AAA agencies with staff cars and vans appear to utilize their own vehicles to the same extent now that the LIFT is available as they did before. However, some agency representatives indicated that their usage of taxi service to transport clients had decreased due to the availability of the LIFT. The State Public Welfare Division, the State Vocational Rehabilitation Division, and the Muscular Dystrophy Association were among the agencies citing this LIFT impact.

While almost every agency representative interviewed expressed some degree of appreciation and support for the LIFT service, most said that the latter had not fundamentally altered their clients' usage of their core services. However, a few AAA agencies indicated that their clients' usage of their services had, in fact, increased due to the LIFT, and three agencies* stated flatly that the LIFT was transporting clients who otherwise would have been unable to take advantage of their core services.

The effect of the LIFT on agency transportation has been to increase the number of trips they have been able to provide. No agency vehicles have been eliminated. Many trips previously delivered by less expensive sources (e.g., Metro Mobility, SMS) have been diverted to the LIFT.

8.3.3 Agency Perceptions of the LIFT Service

When interviewed in July of 1977, most administrators of the AAA agencies expressed strong enthusiasm for the LIFT; their

*The Senior Adult Service Center, the Good Samaritan Child Neurology Clinic, and Volunteers of America, Inc.

overall attitude toward Tri-Met drivers, dispatchers, and management was very favorable. In addition, AAA agency administrators generally expressed satisfaction with the mechanics of registering clients for the LIFT, scheduling LIFT rides, and completing the LIFT-related paperwork required by AAA each month. Most complaints regarding the LIFT centered around the chronic lateness of the buses (which are 30 minutes late, on average, according to agency staff) and Tri-Met's failure to contact the agencies when problems arise (e.g., when the LIFT client is not waiting at the pick-up point). The questions of whether or not drivers were supposed to provide escort assistance to clients, and correspondingly, whether or not agencies must provide escort workers to accompany clients, also arose frequently in discussions with agency administrators. The following remarks by AAA agency personnel were representative:

"The Tri-Met people are super."

"Most clients are much more positive about the LIFT than they expected to be."

"The older people have gradually been educated to call in their requests well ahead of time."

"Some clients are joining our center just to get the LIFT pass."

By December 1977, dissatisfaction with the LIFT service had increased among the AAA agencies. From interviews with the contracting agencies, it is apparent that the LIFT cannot meet the total transportation needs of the agencies; at present levels of service, the need for non-LIFT trips will continue at the current volume. The 48-hour to 10-day reservation period required by the LIFT is of major concern to the central contractor for the eight AAA agencies, who indicated that the agencies will demand that higher priority be accorded their clients if they are to pay the "full cost."*

Thus, the AAA agencies interviewed in December made the following general comments with respect to the LIFT:

*The irony is, of course, that the \$3 per trip paid by AAA covers less than half of the trip cost to Tri-Met. Thus, the LIFT and Tri-Met are confronted with the impossible task of providing the expected level of service at a high cost while recovering sufficient revenue from the agencies.

"The initial pick-up reliability can be okay, but the return pick-up reliability is very bad -- up to two or two and a half hours."

"Taxi service is more reliable."

"The LIFT is a source of tremendous frustration right now; they're not able to accept any more rides."

"Trying to coordinate an escort is a problem with such a wide-ranging pick-up time."

"The publicity about the 48-hour notice is misleading."

"Clients get nervous when the pick-up time can range from 15 minutes to one and a half hours before an appointment."

"There is a definite need for agency back-up transportation for the LIFT."

The Division of Public Welfare (DPW) of the State of Oregon has five branches within the LIFT service area. These branches serve varying types of clientele: for example, one serves predominantly elderly and disabled clients, whereas the clients of another consist mainly of mothers receiving ADC assistance. DPW subsidizes LIFT trips for medical purposes only; DPW clients account for approximately 25.4% of all persons registered with the LIFT.

According to DPW staff, the LIFT service has decreased taxi usage. Staff expressed support for the LIFT concept; however, several problems with the LIFT were cited:

1. Many clients can't get to the waiting area. (This is an example of the recurrent confusion over whether the service is curb-to-curb or door-to-door. DPW assumes the former, whereas other participating agencies assume the latter, thereby putting the drivers in the position of having to escort clients to and from their doors without official sanction or recognition of their efforts.)

2. Even when DPW calls Tri-Met 48 hours in advance, Tri-Met has often been too booked to schedule their rides, according to staff members.
3. About two-thirds of the rides shown on the computer print-out received from Tri-Met by DPW were not ordered by DPW, according to staff members. One possible explanation for this relates to the Special Needs bus passes: some clients who hold two cards (an agency card and a welfare card) may have presented the wrong card to the LIFT driver.

The Vocational Rehabilitation Division (VRD) of the State of Oregon subsidizes LIFT transportation for clients who use the service to attend a training program or course of study. The availability of the LIFT has decreased VRD's usage of taxi service; client LIFT usage was expected to increase further in September, due to the start-up of academic programs. However, a number of factors currently inhibit LIFT usage by VRD clients, according to VRD staff:

1. One problem relates to the scheduling of client rides on the LIFT. This function is performed by the counselors, who are difficult to reach by telephone; thus, while a client may attempt to schedule his or her ride 48 hours in advance, the counselor may not be available to perform this function until after the 48-hour deadline has passed. Moreover, the counselors are not accustomed to scheduling rides; when using taxi service counselors authorize rides and the clients themselves call for service. Also, counselors react negatively to the paperwork required to register clients for the LIFT; they tend not to do so unless the LIFT is the only feasible means of transportation for the client.
2. Many trips taken by VRD clients, such as job interviews and emergency medical appointments, are difficult to schedule 48 hours in advance.

3. The long wait times imposed by the LIFT on frequent occasions pose "real problems" for paraplegics and quadriplegics. Moreover, clients who have lost salary or missed exams because of the lateness of the LIFT are unwilling to rely on the LIFT on a regular basis; instead, they have made transportation arrangements with relatives and friends.
4. Some clients have complained that they feel unsafe on the LIFT; they say that the wheelchair lift has experienced numerous mechanical failures, that the wheelchair tie-downs aren't secure, and that the ride is bumpy.

The smaller non-profit organizations contracting with the LIFT generally seemed well-pleased with the service. For example, for Westside Schools, whose clients are severely retarded adults, the LIFT service has largely replaced volunteer transportation. (The program also operates a 15-passenger van.) Problems with the LIFT concern the wide span of time which clients must allow in scheduling LIFT trips; the LIFT often arrives very early or late, making it difficult for the clients' parents to plan. Nevertheless, program staff say that the LIFT's administrative problems are outweighed by the trouble spared the parents, who must otherwise drive the clients themselves. (As the clients are adults, many of their parents are quite elderly.) Staff members also suggested that education of the clients' parents regarding the LIFT might result in increased LIFT usage.

Another small non-profit organization, the Muscular Dystrophy Association, also finds the service useful. On the whole, according to MDA staff, the LIFT makes it easier to serve clients requiring regular transportation, as MDA can now contract with one provider rather than multiple providers. However, lateness has become a real problem, and return trips generally entail very long waits. More clients would be able to ride the LIFT if:

1. It ran on schedule;
2. Service extended beyond the city limits to the Tri-County area; and/or
3. Service were provided in the evening hours and on weekends.

In sum, the agencies and organizations contracting with the LIFT have experienced certain problems, such as vehicle lateness, the confusion over whether or not LIFT drivers are to escort clients to their doors, and the difficulty of scheduling rides on busy days. Despite the unequivocal statements by some agencies that the LIFT was providing an indispensable service to a number of their clients, the level of dissatisfaction with the LIFT among agencies contracting for LIFT service appears to be increasing.

8.4 IMPACTS ON TRI-MET

8.4.1 Impacts on Operating Personnel

The drivers for the LIFT buses were a carefully selected group. From the total population of 800 drivers, 170 volunteered for the LIFT service; of those, 20 were selected. Through negotiations with the union, Tri-Met arranged to select the LIFT drivers on the basis of five criteria; safety record, absenteeism record, sick leave abuse, passenger complaints and seniority. Despite the fact that the seniority criterion was accorded the least emphasis in the selection process, the union agreed to the criteria in an effort to assist the LIFT program in its initial phases, according to the director of LIFT operations.

Initially, the LIFT drivers experienced a number of problems. For example, although they were thoroughly familiar with the city of Portland, they did not always know precisely where to go when picking up and dropping off passengers, even though some

of them had been taxi drivers before working for Tri-Met; this situation caused scheduling delays. Another problem concerned the use of the radio: for the radio to be functional, dispatchers must use a variety of abbreviations, such as "J.C.C." for Jewish Community Center; this vernacular was confusing to drivers at first. A third start-up problem related to driver morale. Most drivers were unprepared for the experience of dealing for a full day with disabled people; and in fact, some drivers have been on the verge of quitting their jobs as a result, according to the director of operations.

Many of the LIFT drivers interviewed by Crain & Associates expressed satisfaction with their shift from driving regular Tri-Met buses to driving LIFT buses: they find that the LIFT clientele are more appreciative, their schedules are less pressured, and the overall job is more psychologically satisfying. However, the drivers also articulated a number of issues which concern them. The problems mentioned most frequently included the following:

1. The wheelchair lift apparatus often fails to operate correctly.
2. The diesel engines are very noisy.
3. The air-conditioning equipment in the LIFT buses often malfunctions; also, the air vent is located near the roof of the bus so that the cool air fails to circulate through the bus satisfactorily.
4. Due to lack of available maintenance expertise, drivers often have to repair their own buses.*
5. LIFT drivers do not receive overtime pay nearly as frequently as the regular Tri-Met drivers, due to the limited hours of operation of the LIFT.

*Each driver is assigned to a specific bus.

6. Agencies often fail to notify Tri-Met of ride cancellations; thus, LIFT drivers waste time on unnecessary trips.
7. Tri-Met's official curb-to-curb policy is at odds with the needs of the LIFT clients and with the actual behavior of the LIFT drivers.

This last issue affects the agencies contracting for LIFT service as well as LIFT clients and drivers, and therefore merits further elaboration. According to Tri-Met regulations, the Special Needs Transportation service -- otherwise known as the LIFT -- provides curb-to-curb service; drivers are expected to assist passengers onto the buses and off again at their destinations. LIFT drivers are not required to provide escort assistance to passengers, i.e., to assist them from their homes to the curb and vice versa. According to LIFT drivers, they are only insured on the sidewalk and within the LIFT buses; they enter passengers' homes (to drop off groceries, and so forth) at their own risk. Nevertheless, on-board survey data show that a significant proportion (at least 50%) of LIFT riders require escort assistance from their doors to the LIFT bus.

This situation appears to have created a fair amount of confusion and ill will among LIFT drivers, passengers and agency personnel. Most drivers do seem to provide the additional escort assistance when required, despite the official Tri-Met curb-to-curb policy. Accordingly, many agencies schedule rides for clients requiring such assistance, without providing a client escort. However, other agencies, such as the Department of Public Welfare (DPW), assume that the LIFT provides only curb-to-curb service. Because many DPW clients cannot get to the waiting area for the LIFT bus, alternative means of transportation are generally sought by DPW staff for these clients.

Several LIFT drivers have expressed frustration over the conflicting expectations held by Tri-Met, agencies, and passengers. Their frustration also stems from the significant delays which the provision of door-to-curb escort assistance often entails: one driver was observed wheeling an overweight handicapped man up a steep concrete ramp into his home; the process took at least ten minutes over and above the time involved in unstrapping the client, lowering the wheelchair LIFT, and so forth. The escort function, then, creates unforeseen scheduling delays in picking up and delivering passengers. Thus, a driver may spend ten or fifteen minutes assisting an elderly, handicapped woman with groceries to her door -- an action which, as noted earlier, is not considered by Tri-Met to be part of the driver's job -- and then arrive twenty minutes late at the next pick-up point, and be rebuked for lateness by the distraught passenger waiting there. The same agencies which fail to provide escorts for passengers requiring door-to-curb assistance often complain vehemently about the lateness of the LIFT buses; they are not aware that the two issues are closely related.

It is likely that the amount of driver escort assistance now being provided to LIFT clients has an impact on vehicle productivity as well as on the lateness of the vehicles. Therefore, it would seem to merit close examination by Tri-Met staff.

8.4.2 Impacts on Administrative Personnel

8.4.2.1 Accounting and Finance - With the exception of payroll, all administrative records are maintained manually by the Accounting Department. Tri-Met is in the process of setting up a data systems management function (a data systems project director was recently hired); thus, all Tri-Met accounts will soon be computerized. In the meantime, however, the LIFT requires a time-consuming data gathering effort at the end of each month. In order to be able to publish monthly departmental cost statements, the Finance

Department needs revenue and trip information by the 10th of the following month. As a result, a shadow management information system has evolved. The secretary in the dispatch office manually collects all the necessary billing and trip information, and forwards it to the Finance Department. The computer-based printout, which follows a few days later, is used to verify the manually-derived figures; this procedure is the reverse of the intended method. In addition, the computerized billing and the manual tabulations have never, to this point, exactly coincided. Although the billing is based on the computer printouts and not on the manual tabulations, the Finance Department would prefer that the monthly cost statements be more accurate.

According to the project accountant for the LIFT, another problem concerns the difficulty of keeping track of the federal demonstration grant, which requires that separate project accounts be kept. For example, it has been necessary to keep track of all postage expenditures; this procedure has cost almost as much as the LIFT postage itself.

Agencies accept the computer printout they receive from Tri-Met as the billing document, according to Tri-Met staff; apparently, the agency records are not sufficient to double-check Tri-Met's bills. So far there have been no late payments, although some agencies take longer than others.

Some Tri-Met staff members feel that the taxi operators, Broadway and Radio Cab Companies, are not geared up to handle the large volume of charges, that their record-keeping capabilities are inadequate to process all the paperwork. Problems seem to arise when the drivers' trip sheets do not match the dispatcher's record or Tri-Met's records; for example, according to Tri-Met's records, some people have ridden in taxis, but their rides have not been billed to Tri-Met by the taxi companies. Some of these problems arise because clients are not aware of how the system works. For example, a client who has been transported to

a hospital by Broadway Cab and is ready to leave might simply call the cab again, assuming that the return trip will be paid for by Tri-Met. This conflicts with the dispatch and coordination procedures that have been worked out between Tri-Met and the taxi company, whereby the client calls Tri-Met and Tri-Met notifies the taxi company that the client is ready. In other instances, drivers may not accurately record all of the information needed for a bill. Tri-Met staff expect these problems to be worked out as more experience is gained with the billing procedures.

The Director of Finance expressed the view that the LIFT planners should have worked more closely with the Accounting and Finance Departments at the start of the LIFT demonstration. Instead, according to the director, the planning for the demonstration was carried on almost exclusively within the Planning Department; as a result, the budget projections initially developed were inaccurate; for example, the initial plans did not accurately project driver wages. At present, however, there is closer coordination among these functions.

8.4.2.2 Marketing - When the LIFT project began, the advertising and promotion manager was given responsibility for overseeing development of the logo and paint design for the LIFT service, developing the LIFT brochures and user's guides, and updating the brochures and advertising posters that were sent to all agencies. The LIFT did not constitute a major burden for the Marketing Department: since the entire Tri-Met marketing program is broken out into projects, the LIFT is simply regarded as another project, and not a very big one at that. Furthermore, no advertising is purchased for the LIFT; however, according to staff estimates, approximately \$1500 worth of air time for LIFT publicity has been donated free of charge through televised public service announcements. In addition, radio stations have publicized the LIFT service via 20-second announcements. The public response to this type of advertising has been good, according to marketing staff.

In recent months, the Customer Service Department has assumed much of the responsibility for furnishing LIFT information to general passengers who require training in the use of the LIFT. Agency passengers have generally received such instruction from their respective agencies.

8.4.2.3 Legislative and Press Relations - The manager of LIFT legislative and press relations writes press releases and monthly newsletters for the LIFT; the LIFT newsletter is sent to all agencies and organizations who have contracted with Tri-Met for LIFT service. Legislators and neighborhood associations are also contacted; they publicize the LIFT in their own newsletters. In this way, the LIFT receives broad exposure. Nevertheless, maintaining a high level of public exposure on the LIFT service is difficult, according to staff members, since the latter is not characterized by recurrent "attention-getting" events.

8.5 IMPACTS ON PRIVATE TRANSPORTATION PROVIDERS

8.5.1 Introduction

The LIFT contracts with three private companies for transportation service: Broadway Cab Company, Radio Cab Company, and Buck Ambulance Company. The two taxi providers are employed in those cases when taxi transportation is more cost-effective than LIFT bus transportation, as when a client's trip cannot readily be combined with other trips scheduled for a given LIFT bus. By contract with Tri-Met, the two taxi companies, through a joint venture, provide service to the LIFT on alternate months—Broadway one month, Radio the next, etc. Service is provided at their standard meter rate (they also charge \$9.00/hour for wait time) and includes other basic provisions such as insurance and licensing. The ambulance company operates three wheelchair vans, each of which is equipped to carry up to four wheelchairs; these are hired by the LIFT in those instances when the client whose trip cannot readily be accommodated by the LIFT bus is wheelchair-bound and therefore unable to transfer

from the wheelchair to the seat of a taxi.

The operational history and experience with the private operators providing supplemental special transportation services to the LIFT have been very positive, according to Tri-Met staff. During the first months of the project, ride referral to the private providers was minimal. Specifically, between the start of LIFT service on December 20, 1976 and April 30, 1977, only 58 rides were referred by the LIFT controllers to private operators. However, with the advent of service to general passengers on May 2, and an increase in usage by clients of the Public Welfare Division, referrals jumped to 283 rides in May, 583 rides in June, and 986 rides in July. In general, the private providers handled the quantum leaps and ride referrals from Tri-Met well during the summer of 1977. Operational reliability and timeliness were generally good; although, as with any transportation system, the private providers were sometimes late. However, the number of complaints received by the LIFT on the performance of the private providers has been minimal.

8.5.2 Broadway Cab Company

Broadway Cab Company has 103 vehicles, all of which are operated by driver/owners; 17 vehicles are kept in reserve. Taxi rates are \$1.00 for the flag drop and \$.90 per mile.

The procedure for dispatching taxis to pick up and deliver LIFT clients works in the following way: one of the dispatchers places an order with the taxi company; the order lists the pick-up information, delivery information, and passenger information. In addition, the invoice number, in the upper right hand corner of Figure 8-3, is relayed over the phone to the taxi company. The taxi company copies down all the required information by hand. Then, at the time the client is to be picked up, the dispatch unit at the taxi company radios the necessary information to the taxi closest to the pick-up point; this taxi picks up the client.

SUBCONTRACTOR SPECIAL-NEEDS TRANSPORTATION

INVOICE NO.: _____

DATE	ORDER TIME	CONTRACTOR COMPANY
ORDERED BY	TAKEN BY	

Item	PICK-UP INFORMATION				DELIVERY INFORMATION				PASSENGER					
	Address	Actual Time	Agreed Time	SEQ	SEQ	Agreed Time	Address	Name	Hand	N/P	N/S	Reg'n. Number	CARD	FARE
A														
B														
C														
D														
E														
F														

Vehicle No.: _____	End Mileage: _____	Base Charge: \$ _____
Driver: _____	Start Mileage: _____	Mileage Charge: \$ _____ (if applicable)
Dispatched by: _____	Trip Mileage: _____	Extras: \$ _____
Time: _____	Meter Fare or Mileage Charge: \$ _____	No Shows: \$ _____
Extras (list): _____		Fares Collected \$ [_____]
		Invoice Amount: \$ _____

Form 31-423

ORIGINAL TO TRI-MET

FIGURE 8-3. DISPATCHER ORDER FORM

The driver records certain information on a special sales draft; included on the sales draft are the invoice number, starting mileage, ending mileage, date, address, and fare for the trip. When the client is ready to make his or her return trip home, the client calls Tri-Met, which calls the taxi company; the driver again records the necessary information. At the end of the day, these sales drafts are delivered to the taxi office where they are grouped with other appropriate invoices and stored. Then, at the end of the month, the invoices and the sales drafts are forwarded to Tri-Met.

According to Broadway personnel, the taxi drivers carry their parcels and packages and escort them to and from their doors when necessary. In such cases, the standard waiting charge of \$9.00 per hour is applied. Apparently, however, some difficulties in collecting client fares have arisen: some LIFT clients are confused by the fare policy and, as a result, fail to bring sufficient money to pay for the taxi ride. In such cases, taxi operators have been providing the ride anyway. Also, when general passengers ride the LIFT, they have occasionally forgotten the 50¢ fare; the drivers have at times still delivered passengers under these circumstances.

According to Broadway staff, the billing procedure is causing some problems at Broadway for two reasons: their bookkeeping procedures are not very sophisticated, and the general public is not educated as to how to schedule a ride on LIFT service. For example, a client who has been taken to a certain destination by taxi will often simply call the taxi back when ready, thereby end-running the dispatch procedure. Also, drivers sometimes do not record all the information they need to bill Tri-Met. The operations people feel that this will all work out in time, but their current feeling is one of relief that they only have to work for Tri-Met every other month. Of the total number of calls per day serviced by Broadway Cab (1200-1400), the LIFT trips constitute less than 5%, or approximately 40 per day.

Nevertheless, the Broadway Cab personnel feel, on the whole, that the service has been a boon to them; they believe that on balance, the number of trips obtained through the contract with Tri-Met far exceeds the number of trips lost due to the availability of the LIFT. They estimate that many of the trips being delivered by Tri-Met to handicapped and elderly persons, either through the taxi service or through the LIFT, are new trips: i.e., trips that would not have been made before the LIFT was available.

8.5.3 Radio Cab Company

Radio Cab Company is collectively owned and operated by 195 cab owner/drivers; many of the 112 cabs serving the Portland metropolitan area are owned by two owner/drivers. As noted above, Radio Cab alternates with Broadway Cab in providing back-up taxi service to the LIFT every other month. Radio Cab's rates are the same as those of Broadway: \$1.00 is charged for the flag drop and an additional \$.90 for each mile; \$9.00 per hour is charged for waiting time in heavily congested traffic and similar circumstances. However, Radio Cab Company does not charge Tri-Met for time spent providing door-to-curb or curb-to-cab escort assistance to LIFT clients. According to a spokesman for the company, few of the LIFT clients served use wheelchairs or are otherwise severely handicapped; consequently, the amount of escort required by most clients is minimal.

Approximately 105 of Radio Cab's total fleet operate within the city limits of Portland. Although a few drivers are prevented by physical limitations (e.g., a "bad back") from serving LIFT clients, all but these few participate in the SNT system. As the company has transported many clients for the County's welfare division in the past, the drivers are well-accustomed to transporting disabled people. Few drivers have complained about the LIFT clients.

According to the company spokesman, the present system of coordination with Tri-Met is 98% efficient; in August, for example, Radio Cab billed Tri-Met for rides to LIFT clients totaling \$5,000; only two of those rides involved discrepancies between Tri-Met's records and those of Radio Cab. By agreement with Tri-Met, Radio Cab charges the latter the basic \$1.00 flag drop charge for "no-shows"; the incidence of "no-shows" among LIFT clients is no greater (or less) than among the general public, according to company personnel.

On the whole, the company is very pleased with their participation in the LIFT system. The scheduled LIFT rides are blending well with the cab's regular business, the drivers have no complaints about the LIFT clients, and the billing and record-keeping procedures have not proved unduly burdensome. The company would be very willing to serve LIFT clients every month rather than just every other month.

8.5.4 Buck Ambulance Company

As discussed earlier in this report, Tri-Met also contracts with the Buck Ambulance Company for wheelchair van service to be provided to wheelchair-bound LIFT clients who are unable to transfer from their wheelchairs to taxis. The company's main business is its ambulance division, which operates 35 ambulances. In addition, Buck operates three wheelchair-equipped vans, each of which can carry up to four wheelchairs. The service operates 24 hours per day, seven days per week; its peak periods are weekdays from 8 AM to 5 PM.

Regular rates for the wheelchair vans are \$10.00 for pick-up and \$.60 per mile; however, under the terms of the contract with Tri-Met, Buck charges Tri-Met only \$4.80 for pick-up and \$.45 per mile for each one-way trip. According to company personnel, the rates charged to Tri-Met do not cover transportation costs; however, the company is eager to obtain as much LIFT business as possible,

thereby increasing its visibility while serving the needs of the handicapped population in Portland.

The dispatch procedure is similar to that employed by the taxi companies: Tri-Met calls Buck to schedule a ride, at which time Buck takes down the pick-up point and destination, the invoice number and the passenger's name and Tri-Met identification number. Tri-Met also tells Buck whether or not the client is a general passenger; if so, Buck collects \$.50 from the client and deducts that amount from the client fare billed to Tri-Met. The van drivers provide door-to-door service without extra charge.

As of November 1977, Buck had only provided wheelchair van transportation to LIFT clients for three months, and monthly billings had not been great: \$22.21 for the month of September (three clients served), and \$45.06 for the month of October (six clients served). According to Buck personnel, Tri-Met rarely gives Buck advance notice of LIFT rides, and thus far, Buck provides no LIFT rides on a regularly-scheduled basis. Nevertheless, the company has experienced no significant problems coordinating with the Tri-Met dispatch unit, managing the necessary paperwork, or billing Tri-Met. (The company is used to working for governmental entities: the County Welfare Department accounts for 30-35% of Buck's ambulance and wheelchair van business.)

The availability of the LIFT and of Metro Mobility have caused a drop in business for the company, according to Buck personnel. Therefore, they would like very much to increase their Tri-Met billings and, if possible, to receive more advance notice for the rides furnished to LIFT clients.

9. SUMMARY AND CONCLUSIONS

9.1 INTRODUCTION

This final chapter addresses the three major issues raised in the introduction to this report: the impacts of the demonstration on all participants, the cost-effectiveness of the LIFT system and the workability of a special needs transportation project coordinated by a public transit operator. Within the analytical framework of these three areas, the findings contained in the foregoing chapters are summarized below. The final section of this chapter compares the LIFT service with two alternative modes of providing special needs transportation: (1) taxi service and (2) service furnished by a non-profit transportation provider such as Special Mobility Services (SMS) or Metro Mobility. The intent of this comparison is to formulate a set of criteria by which to assess alternative transportation modes, and to draw some tentative conclusions regarding the three alternatives examined.

9.2 IMPACTS

9.2.1 Impacts on Clients

Almost 4300 persons have been registered for LIFT service. They comprise 19% of Portland's estimated 22,000 persons who have difficulty using regular bus service; they comprise a substantially higher percentage of those persons within this group who would actually use LIFT service because alternative forms of transportation are not available to them. LIFT clients come from all age groups; however, as expected, three-fourths are over 65 years of age. Approximately 325 trips are being provided per day; 16% of these trips serve wheelchair passengers.

Approximately one-quarter of those registered for LIFT service actually use the LIFT during a given month. Most people appear to use the LIFT infrequently, i.e., for one or two round-trips per month. A much smaller number use the LIFT on a regular basis, and a handful of LIFT clients, who can be considered marginal abusers of the service, ride 75 or more times in a month.

The on-board surveys revealed that the most common trip purposes of LIFT clients were medical/dental visits, social/recreational activities, and shopping. General passengers tend to use the LIFT less for medical/dental visits, and more for work trips, than agency passengers. Clients surveyed were nearly unanimous in their satisfaction with the mechanics of boarding the LIFT bus and using their Special Needs Bus Passes, with the courtesy and helpfulness of the LIFT drivers, and with the experience of riding with strangers. Dissatisfaction with the noise level on the LIFT buses has increased since April 1977, as have negative assessments of the timeliness and scheduling problems associated with the LIFT.

LIFT clients who ride LIFT-sponsored taxis appear to prefer taxis to LIFT buses, due to the punctuality, shorter travel time, and comfort of taxis. However, the LIFT received higher ratings than taxis on driver courtesy and helpfulness, and on ease of entering the vehicle. Overall, LIFT clients appear to be favorably disposed toward taxis as a means of transportation.

9.2.2 Impacts on Agencies

The LIFT has had the largest impact upon the eight senior citizen centers funded by the Area Agency on Aging (AAA): these centers account for approximately 50% of all trips furnished by the LIFT in a given month. These trips consist of many-to-many service, primarily for medical and shopping purposes. Although the LIFT has added to the transportation capacity of

the AAA agencies, it does not appear to have achieved cost-effective coordination of agency transportation.

In general, those non-AAA agencies with staff cars and vans appear to utilize their own vehicles to the same extent now that the LIFT is available as they did before. While most agencies said the LIFT had not fundamentally altered their clients' usage of their core services, a few stated that the LIFT was transporting clients who otherwise would have been unable to take advantage of their core services.

Between July and December of 1977, dissatisfaction with the LIFT service increased among the AAA agencies; their complaints, like those of LIFT clients, have centered around scheduling and reliability problems. In any case, it is apparent that the LIFT cannot meet the total transportation needs of the agencies at present levels of service; the need for non-LIFT trips is likely to continue at the current volume.

Clients of the Division of Public Welfare (DPW) of the State of Oregon account for approximately 25.4% of all persons registered with the LIFT. DPW staff have expressed support for the LIFT concept but have experienced problems with the LIFT scheduling and billing procedures. Similarly, the State Vocational Rehabilitation Division (VRD) has not used the LIFT as much as anticipated, due to scheduling problems, chronic lateness of LIFT buses, and other client complaints.

In sum, the agencies and organizations contracting with the LIFT have experienced certain problems, such as vehicle lateness, the confusion over whether or not LIFT drivers are to escort clients to their doors, and the difficulty of scheduling rides on busy days. Despite the unequivocal statements by some agencies that the LIFT was providing an indispensable service to a number of clients, many agencies contracting for LIFT service appear to be increasingly dissatisfied with certain aspects of the service.

9.2.3 Impacts on Tri-Met

The LIFT drivers, who were carefully selected from a larger volunteer pool of Tri-Met drivers, appear to be generally satisfied with their shift from Tri-Met buses to LIFT buses: they find the LIFT clientele more appreciative, their schedules less pressured, and their overall job more psychologically satisfying. The main issues of concern for LIFT drivers include the frequent mechanical failures of the LIFT buses, the failure on the part of agencies contracted for LIFT service to notify Tri-Met of ride cancellations, and, perhaps most salient of their concerns, the conflict between Tri-Met's official curb-to-curb policy and the needs and expectations of LIFT riders.

Administrative personnel responsible for LIFT records have experienced some difficulties in gathering and tabulating the necessary monthly data for the demonstration project: the planned computerization of all Tri-Met accounts is expected to alleviate these problems. LIFT marketing personnel have received a very favorable public response to LIFT publicity, with the help of donated public service announcements over the local television stations. Nevertheless, according to Tri-Met staff, it is difficult to maintain a high level of public exposure for the LIFT because LIFT service is generally not characterized by recurrent, attention-getting events.

9.2.4 Impacts on Private Transportation Providers

Two taxi companies and one wheelchair van company are under contract to Tri-Met to provide back-up transportation service to LIFT clients. Both Broadway and Radio Cab Companies feel that the LIFT service has brought them more business than they lost due to client shifts from taxis to the LIFT. While Broadway has experienced some bookkeeping and billing problems, Radio Cab Company has encountered no such problems and would be very willing to serve LIFT clients every month rather than

just every other month. Buck Ambulance Company, which operates three wheelchair-equipped vans, would also like to increase their Tri-Met billings, since the LIFT has caused a drop in company business. In addition, Tri-Met rarely gives Buck advance notice of LIFT rides, a situation which reduces the efficiency of the company's dispatch procedure.

9.3 COST-EFFECTIVENESS

The results to date in Portland indicate that operation of a special needs transportation service by a transit operator in coordination with social service agencies is not a cost-effective way of providing transportation services to handicapped and elderly clients. As of October, 1977, the average total cost per passenger trip for a LIFT trip was \$8.92 and the average operating cost, \$7.40. Operating cost per vehicle mile was \$1.78 and subsidy cost per vehicle mile was \$5.77.

LIFT costs are high because of expensive labor and capital inputs as well as a low, unaggregated demand. Demand levels are critical because of the high level of fixed costs which must be spread over the number of trips delivered. The LIFT has not been able to generate sufficient demand from social service agency clients, primarily because many agencies that were expected to contract with the LIFT to provide service to their clients have not done so. Furthermore, the demand that has been generated has consisted of the many-to-many type of trip that is costly to deliver.

Factors contributing to the high cost of service include: \$750,000 of front-end capital cost; a fully-loaded labor rate of close to \$10 per hour, which is expensive for Portland; significant labor (5 people) needed to staff the dispatch office; inflexible work rules making it difficult for management to schedule efficiently; and various operational inefficiencies.

Many of the factors contributing to high costs can be attributed to the fact that the service is being provided by the public transit operator rather than by a private operator. The negotiated personnel costs for LIFT operators and controllers are estimated to be 30-40% above the private sector rate. Furthermore, the negotiated work rules limiting management's discretion in assigning shifts would not be as stringent in the private sector. The capital costs are over twice as high as those paid by the non-profit Metro Mobility, a local transportation agency providing service similar to that of the LIFT. It is possible that these costs would not be as high if the public agency were concerned with a return on the investment. Moreover, when the LIFT scheduling is compared to that of a private taxi operator, which often employs one dispatcher per eight-hour period to handle over 1,000 trips per day, it appears that there must be a more efficient way of handling the LIFT process. Presumably a private operator who had more incentive to discover scheduling efficiencies would have cut the cost of this function.

Comparison of the LIFT with its precursors points up the extent of the cost differentials. For similar trips at comparable (or even better) service levels, Metro Mobility charges \$5.65 per trip; the taxi cost would be \$6.77 (for exclusive riding); and Special Mobility Services charges up to \$4.25 per trip.

These early results, although discouraging, should not be considered final results. DAVE Systems has recently reviewed project operations and made many suggestions that, if implemented, could improve productivity and lower costs. One major goal of the second year of the demonstration will be to lower costs. However, given the constraints cited above, it is doubtful that the LIFT can be as cost-effective as known available alternatives in the Portland area.

9.4 WORKABILITY

This section summarizes briefly the findings regarding certain aspects of LIFT operations.

The registration process encountered few problems during the project year. The income eligibility criterion was dropped after project start-up; overall, there have been few, if any, complaints about the registration criteria or procedures. In fact, the LIFT staff are concerned that some people who do meet the criteria feel that they do not and therefore have not registered. Due to the absence of heavy demand, the formal system of ride prioritization developed by DAVE Systems has not been fully tested.

One operational problem has been the significant proportion (10%) of duplicate registrations. In such cases, clients may be paying the lower general passenger fare for agency-supported trips. In these instances, Tri-Met would assume most of the cost of the trip and the agencies, none of the cost. However, at present, this potential problem appears to be under control.

The eleven-member Citizens Advisory Committee convened in August 1976 and has met monthly since that time. Their input was particularly valuable during the early planning months when members reviewed proposals for service design. Their unique perspective allows them to pinpoint problems and suggest changes which otherwise might be missed. The Committee has functioned smoothly with little turn-over in its membership. In retrospect, considering the valuable insights they have contributed, the Committee should have been convened earlier in the project's history (i.e., during pre-implementation planning and proposal-writing).

In terms of agency coordination with Tri-Met, the LIFT system has operated relatively smoothly since the demonstration began. Although contract negotiations ran into difficulties

in a few cases, for the most part the contract process has proved workable. Most agencies and non-profit organizations contracting with Tri-Met are generally pleased with the service and with their coordination with Tri-Met; however, scheduling and reliability problems experienced in recent months appear to have increased the level of dissatisfaction of the contracting agencies and organizations. Section 8.3 of Chapter 8, "Project Impacts," contains a detailed discussion of the LIFT's impacts on agency costs, ability to provide special transportation, provision of core services, and perceptions of the Tri-Met. In addition, Chapter 7, "Productivity and Economics," furnishes a discussion of the significant costs of coordinated scheduling and dispatch.

9.5 COMPARISON OF LIFT SERVICE WITH ALTERNATIVE TRANSPORTATION MODES

The purpose of this section is to compare the LIFT with alternative modes of providing special needs transportation in order to assist planners and decision-makers in determining the best method of providing this service in the future. This analysis first lists criteria by which to judge alternatives and then evaluates three alternative modes, including the LIFT, against these criteria. These alternative modes are the LIFT, taxi service, and a prototypical non-profit provider such as SMS or Metro Mobility.

The six broad criteria used in this analysis are cost, level of service, impact on the handicapped and elderly, cost recovery, feasibility and community impact. Multiple measures are used to assess certain alternatives. In all cases we will assume that the conditions are identical for each mode, with the LIFT as a standard. For example, to calculate the cost recovery ratio we will assume that an average fare of \$2.00 derives from the mix of agency (\$3.00) and general passenger (50¢) fares experienced on the LIFT.

Table 9-1 displays in summary form the data on the alternative modes. Where there is discussion in the report covering a mode's performance with respect to a criterion, the relevant chapter is listed in brackets ([]).

Table 9-1 shows that the LIFT is, at this point, more costly than either the taxi or a non-profit provider such as SMS. One way to consider the consequences of this high cost is to calculate the additional number of trips that could be provided by taxis and other services with a fixed amount of funds. From this perspective we can see that the non-profit provider could deliver twice as many trips, and taxis about one-third more trips, with the same amount of funds.

Comparison with respect to level of service again shows that taxis and private providers are superior to the LIFT. Taxis have more vehicles available over twice as many service hours; in addition, service reliability, trip time, comfort of ride, and scheduling are better. However, the LIFT exhibits two advantages: the LIFT drivers are very well-liked, and vehicle accessibility is excellent due to the retractable lower front step and wheelchair lift. It is assumed here that level of service for the private providers would be similar to that of the LIFT except for a possible improvement in reliability.

It is difficult to compare the LIFT service impact with that of the two alternatives presented. Chapter 8 reports that the LIFT has not been able to penetrate the agency market for client trips. However, this is a reflection of the institutional relationships in Portland rather than the service itself. Therefore, we have simply listed LIFT capacity, in terms of trips per day, (not counting taxi trips scheduled by the LIFT) and taxi capacity to give an indication of the potential market impact. It is assumed, again, that the non-profit providers would have the same impact as the LIFT. Capacity of the non-profit sector is not known.

TABLE 9-1.
COMPARISON OF SPECIAL NEEDS TRANSPORTATION ALTERNATIVES
ALTERNATIVES

<u>CRITERIA AND MEASURES</u>	<u>LIFT</u> (Current System)	<u>TAXI</u>	<u>OTHER</u> <u>PRIVATE PROVIDERS</u>
1. COST			
Cost per Trip	\$8.92 [7]	\$6.67(exclusive ride)[7] \$5.67(estimate for shared ride) 7	\$4.25 [7]
Cost per Vehicle Mile	\$1.78 [7]	\$1.00 [7]	\$.85 [7]
2. LEVEL OF SERVICE			
Coverage, Time	7AM-7PM; Mon-Fri [6]	24 hrs per day, 7 days per week [6]	Daytime hours
Coverage, Space	1 Vehicle for 8 sq. mi. [6]	1 Vehicle/sq. mi. (estimate) [6]	-
Scheduling Convenience	Difficult: 2-5 Day Adv. Reservation [4]	Excellent: Demand-Responsive [4]	Difficult: 2-5 Day Advance Reservation
Reliability	Fair [6]	Good	Good
Accessibility	Excellent [6,8]	Good [6,8]	Excellent
Comfort of Ride	Fair [8]	Good [8]	Good
Driver Escort/Friendliness	Excellent [8]	Good [8]	Good

**TABLE 9-1. (cont.)
COMPARISON OF SPECIAL NEEDS TRANSPORTATION ALTERNATIVES**

<u>CRITERIA AND MEASURES</u>	<u>ALTERNATIVES</u>		
	LIFT (Current System)	TAXI	OTHER PRIVATE PROVIDERS
2. LEVEL OF SERVICE (cont.)			
Trip Time (average)	22 minutes [6]	--	--
Travel Speed (average)	12 MPH [6]	20 MPH [6]	--
Passenger Fare	0 - Agency pass. [6] 50¢ - Gen. pass. [6]	Same as for LIFT	Same as for LIFT
Agency Fare	\$3.00 [6]	\$3.00 [6]	\$3.00 [6]
3. IMPACT ON HANDICAPPED AND ELDERLY			
Potential Rides per Day	450 [7]	1000 (estimate)	--
Trip Purposes That Can Be Efficiently Served	Grouped Trips, e.g., Shopping & Recreation- al Tours [8]	Individualized Trips, e.g., Medical & Per- sonal Business [8]	Same as LIFT
4. COST RECOVERY RATIO	22% [7]	30% [7]	47% [7]
5. FEASIBILITY			
Administrative Ease	Complex	Little Difficulty	Moderate Difficulty
Union/Management Impact	Significant	None	None
6. COMMUNITY IMPACT	Significant	Less than LIFT	Less

From the feasibility perspective, the current LIFT coordinated scheduling appears to be more complex and costly than the dispatch procedures employed by taxis and private operators. The computerized billing system has also contributed to operational problems encountered by the LIFT. The union/management aspect of the LIFT operation poses financial constraints that are not present in the taxi industry where drivers are owners or in the private special transportation services where many workers are volunteers.

The LIFT has had a significant community impact by raising the level of public awareness concerning the transportation problems of the transportation handicapped. Also, centralizing the special needs transportation function with Tri-Met has demonstrated public commitment to this problem. It is doubtful that these effects could have been realized if either taxis or private providers had undertaken the project.

The foregoing discussion and analysis points out that there are clearly more efficient ways of providing special needs transportation service to those who need it. However, it also shows that the LIFT has raised public awareness concerning the problems of the transportation handicapped. A sensible option for future special transportation programs would be a system that: 1) capitalizes, to the extent possible, on the cost-effectiveness and level of service superiority of the private providers; and 2) maintains the visibility of the special needs transportation function.

9.6 IMPLICATIONS FOR SECOND YEAR OF DEMONSTRATION

Experience with the LIFT so far suggests that the major issue of the second year of this demonstration project is whether or not it is cost-effective for a transit operator to provide transportation to the handicapped and elderly market. Tri-Met's efforts (and the second-year evaluation) will focus on reducing

system costs (through operational improvements listed in Chapter 7) and on capitalizing on the potential government-wide savings that interagency coordination can possibly afford.

Related to the cost-effectiveness issue is the demand issue. Demand is far below expected levels and Tri-Met is committed to improving demand levels. A survey of potentially eligible clients who are not using LIFT service should provide an understanding of why people do not use the service. This information should enable Tri-Met to market the service more effectively in the second year, thereby increasing demand.

9.7 TRANSFERABLE FINDINGS

The results so far suggest the following transferable findings:

1. A transit agency such as Tri-Met is able to operate a special needs transportation service effectively; i.e., there are no insurmountable organizational problems arising from regular fixed-route service and a special handicapped and elderly service being provided by the same company.
2. Preliminary indications are that providing such service through a public transit agency is not cost-effective.
3. Market research shows that this type of special transportation service provides significant benefits for a small number of people. It has a dramatic impact on the lives of regular users; however, the user group is relatively small when compared with the eligible population.
4. Agencies have a favorable impression of the transportation service and feel that, by and large, it meets their clients' trip needs. However, few agencies have curtailed their own transportation systems, so the total effect of the LIFT has been to increase the supply of special needs transportation available.

APPENDIX A
LIFT ON-BOARD SURVEY

1. I.D. Number
2. Date _____ Time _____ AM PM
3. Driver assistance (by observation):
 Getting from door to bus Yes No
 Getting on bus Yes No
4. Trip Purpose: Shop Med/Dent Pers. Bus. Soc/Rec. Church Work
 Other _____

CIRCLE ONE:

NE SE

NW SW

5. How often do you make this trip?
 Frequently Weekly Occasionally Monthly
 (2 x's/wk+)
6. What appeals most to you about the LIFT service?

7. What do you dislike most about the LIFT service?

8. What types of transportation have you used during this past week?

	<u>Number of times used</u>	
None	_____	
Driven an auto	_____	
Driven by friend or relative	_____	
Agency provided (other than LIFT)	_____	<u>Confidence</u>
LIFT	_____	1
Taxicab	_____	2
Bus	_____	3
Walked	_____	
Other (specify)	_____	

9. How were you making most of your trips before the LIFT service started?

- | | | | | |
|--------------------------|-----------------------------|--------------------------|----------------------|-------------------|
| <input type="checkbox"/> | Special Mobility Service | <input type="checkbox"/> | Care Car or Medi Car | |
| <input type="checkbox"/> | Metro Mobility | <input type="checkbox"/> | Taxi | <u>Confidence</u> |
| <input type="checkbox"/> | Agency car or van | <input type="checkbox"/> | Bus | 1 |
| <input type="checkbox"/> | Friend or relative drove me | <input type="checkbox"/> | Walked | 2 |
| | | <input type="checkbox"/> | Other _____ | 3 |

10. If the LIFT service were not available, how would you have made this trip?

- | | | |
|--------------------------|----------------------------------|---|
| <input type="checkbox"/> | Would not take trip | 1 |
| <input type="checkbox"/> | Don't know | 2 |
| <input type="checkbox"/> | Would switch to a different mode | 3 |

If switch--

- | | | | |
|-------------|--------------------------|------------------|---|
| Mode: _____ | <input type="checkbox"/> | Same convenience | 1 |
| | <input type="checkbox"/> | Less convenience | 2 |
| | <input type="checkbox"/> | Don't know | 3 |

Would you have taken this trip at the same time?

- | | | |
|--------------------------|-------------------------------|---|
| <input type="checkbox"/> | Same time | 1 |
| <input type="checkbox"/> | Different and that's OK | 2 |
| <input type="checkbox"/> | Different and less convenient | 3 |
| <input type="checkbox"/> | Don't know | |

Would you have taken this trip to the same place?

- | | | |
|--------------------------|-------------------------------|---|
| <input type="checkbox"/> | Same place | 1 |
| <input type="checkbox"/> | Different and that's OK | 2 |
| <input type="checkbox"/> | Different and less convenient | 3 |
| <input type="checkbox"/> | Don't know | |

11. (By observation) Number of other passengers on bus with this person.

_____ (Number)

TRI-MET SURVEY

IT WILL TAKE ONLY A FEW MINUTES TO COMPLETE THIS BRIEF QUESTIONNAIRE. YOUR RESPONSES WILL PROVIDE VALUABLE INFORMATION TO TRI-MET.

- A. PLEASE TELL US WHETHER YOU FEEL THE FOLLOWING THINGS ABOUT THE LIFT SERVICE ARE SATISFACTORY OR NEED IMPROVEMENT.

	SATISFACTORY	NEEDS IMPROVEMENT
1. CALLING IN ADVANCE FOR A RIDE	<input type="radio"/>	<input type="radio"/>
2. PLANNING YOUR TRIP TIME TO FIT WHEN A BUS CAN COME FOR YOU	<input type="radio"/>	<input type="radio"/>
3. GETTING PICKED UP ON TIME	<input type="radio"/>	<input type="radio"/>
4. GETTING UP ONTO THE BUS	<input type="radio"/>	<input type="radio"/>
5. USING YOUR SPECIAL NEEDS BUS PASS	<input type="radio"/>	<input type="radio"/>
6. COURTESY AND HELPFULNESS OF THE DRIVERS	<input type="radio"/>	<input type="radio"/>
7. RIDING ON THE BUS WITH PEOPLE YOU DON'T KNOW	<input type="radio"/>	<input type="radio"/>
8. COMFORT OF THE RIDE	<input type="radio"/>	<input type="radio"/>
9. NOISE LEVEL ON THE BUS	<input type="radio"/>	<input type="radio"/>
10. LENGTH OF TIME YOU SPEND ON THE BUS	<input type="radio"/>	<input type="radio"/>
11. WAITING AROUND FOR THE BUS ONCE YOU COMPLETE THE PURPOSE OF YOUR TRIP	<input type="radio"/>	<input type="radio"/>

- B. WOULD YOU LIKE TO TAKE MORE TRIPS ON THE LIFT THAN YOU DO NOW?
 YES NO MAYBE

APPENDIX B

DISCUSSION FORMAT FOR FOLLOW-UP INTERVIEWS

The following is a follow-up interview discussion guide used to obtain more in-depth data from people who had been surveyed during the first Portland On-Board Survey. The On-Board Survey was conducted between April 18 and April 22 and the follow-up interviews between May 2 and May 21.

Three broad topics were discussed with the respondents during the follow-up interviews:

1. Client profile, including:
 - o With whom they live;
 - o Transportation needs and present activities (include here trips they generally make, i.e., places, mode, frequency and transportation needs); and
 - o Description of the nature of their transit dependence: handicaps, problems, etc.
2. Corroboration of questionnaire contents regarding alternative plans if the Lift had not been available.

You can start with a statement like the following:

"When (someone) last spoke with you, you were riding the LIFT to go to _____. I would like to find out more about why you wanted to make that trip that day and what you would have done if the LIFT had not been available. You said that ----" . . . (only prompt the respondent, don't relay to them exactly what they said. Let them tell the story.)

People tend to respond to this alternative trip question at different levels. Our purpose in the case study is to probe to a deeper level (if possible) and to check the first survey to see if that initial response was fairly accurate.

3. What the LIFT has meant to them, e.g.: how has "quality of life" changed?

Some possible responses are:

- Get out more
- Make trips I would not have been able to make
- Save money
- Socializing
- New Activities (describe)

APPENDIX C

TRI-MET TAXI RIDER TELEPHONE SURVEY

Hello. My name is _____, and I'm calling on behalf of Tri-Met. I understand that you rode in a taxi today in place of a LIFT bus, and I'd like to ask you a few questions about your taxi ride. Your responses will enable us to improve transportation services to you and others who ride in taxis.

Now I'd like to ask your opinion about some aspects of your taxi ride today.

A. Can you tell me whether the following aspects of the taxi ride you took today were satisfactory, or whether they need improvement?

	<u>Satisfactory</u>	<u>Needs Improvement</u>	<u>Client Remarks</u>
1. Calling in advance for your ride	<input type="radio"/>	<input type="radio"/>	_____
2. Getting picked up on time	<input type="radio"/>	<input type="radio"/>	_____
3. Getting into the taxi	<input type="radio"/>	<input type="radio"/>	_____
4. Using your Special Needs Bus Pass	<input type="radio"/>	<input type="radio"/>	_____
5. Courtesy and helpfulness of the taxi drivers	<input type="radio"/>	<input type="radio"/>	_____
6. Comfort of the ride	<input type="radio"/>	<input type="radio"/>	_____
7. Waiting for the taxi to pick you up after you have completed your trip purpose	<input type="radio"/>	<input type="radio"/>	_____

B. How would you compare the experience of taking the taxi provided by Tri-Met with the experience of riding the Tri-Met LIFT bus?

Thanks very much for your help.

APPENDIX D
"BEFORE" AGENCY SURVEY
PORTLAND AGENCY INTERVIEW
(Pre-Demonstration)*

1. Agency Name _____
Address _____
Contacted Person _____

2. General Description of Agency:
 - (a) General Function _____

 - (b) Type and number of social service programs offered _____

3. Client population served:
 - (a) Characteristics or definitions _____

 - (b) Number of persons served _____

 - (c) Number of enrolled clients (if different) _____

 - (d) Average number clients attending agency sponsored events _____

4. Relationship of Transportation Services to Agency Function:
 - (a) Is transportation a problem in providing services for your clients?
_____ Major problem _____ Minor problem _____ No problem

 - (b) What are your specific transportation problems?

*This form serves as a discussion guide for face-to-face agency interviews.

(c) Does lack of transportation limit the trips your clients are taking?

_____ Yes _____ No _____ Don't know

(d) How adequately does public transportation serve client needs?

(e) Why are you in the transportation business? How does it enhance your provision of services? _____

5. Transportation Resources

(a) How does your agency provide transportation services for your clients?

_____ No transportation provided

_____ Clients reimbursed for travel costs:

Public Charter Private
_____ Transit _____ Bus _____ Taxi _____ Vehicle _____ Other

_____ Purchased services:

Public Charter Private
_____ Transit _____ Bus _____ Taxi _____ Vehicle _____ Other

_____ Agency owned vehicle(s)

_____ Other agency vehicle(s)

_____ Volunteer drivers use own vehicle:

Number volunteers _____, Pay for gas? _____^{No} Yes, How much per
mile? _____

_____ Other _____

(b) If agency owns or borrows vehicles:

Number of vehicles: _____ Own _____ Borrowed

Type of vehicle, e.g., 5 passenger sedan

- (1) _____
- (2) _____
- (3) _____
- (4) _____

Are any equipped for wheelchair users? _____

Primary Uses

- (1) _____
- (2) _____
- (3) _____
- (4) _____

When used, when idle? _____

Allow other agency to use? _____

6. Demand for Transportation Services

What Mode?

	Public Transit	Charter Bus	Taxi	Agency Vehicle	Private Vehicle
(a) # one-way person trips/week					
(b) # psgrs. provided w/service per wk/mo					
(c) Psgr. miles or average trip length					
(d) # Psgrs. elderly or handicapped					

7. Cost of Services

(a) How much do you budget for transportation services each year? _____

(b) If agency has vehicles...

	1	2	3	4	5
Purchase price					
Total operating cost/ vehicle mile					

Fuel _____

Insurance _____

Oil _____

Licensing _____

Tires _____

Labor _____

Maintenance _____

Depreciation _____

How are these costs financed?

Continuing: _____

Limited: _____

8. Agency Attitudes toward Provision of Transportation Services

(a) How do you rate the overall efficiency of your services?

(b) Do you feel there is overlap between what you and other agencies are doing? _____

(c) What are your feelings about the administrative hassle involved? _____

(d) Are you able to get your clients where they need to go on time? _____

(e) What percentage of your clients are you able to provide services for? _____

9. How would you rate client satisfaction regarding the transportation services you provide? _____

AGENCIES AND ORGANIZATIONS SURVEYED

The "Before" Survey

PACT Senior Service Center
Senior Adult Service Center
Peninsula Project Able
Friendly House Senior Center
Hollywood Senior Center
Neighborhood House
Northwest Pilot Project
Metropolitan Family Services
Gresham Senior Center
Vocational Rehabilitation Division, State of Oregon
University of Oregon Health Sciences Center, Crippled
Children's Division
Goodwill Industries
Public Welfare Division, State of Oregon
Veterans Administration

The "Interim" Survey

PACT Senior Service Center
Senior Adult Service Center
Northwest Pilot Project
Metropolitan Family Services
Gresham Senior Center
Vocational Rehabilitation Division, State of Oregon
University of Oregon Health Sciences Center, Crippled
Children's Division
Public Welfare Division, State of Oregon
Volunteers of America
Muscular Dystrophy Association
Westside Schools
Child Neurology Clinic, Good Samaritan Hospital

APPENDIX E
"INTERIM" AGENCY SURVEY
PORTLAND AGENCY INTERVIEW*

1. Agency Name _____
Address _____
Contacted Person _____

2. General Description of Agency:
 - (a) General Function _____

 - (b) Type and number of social service programs offered _____

3. Client population served:
 - (a) Characteristics or definitions _____

 - (b) Number of persons served _____

 - (c) Number of enrolled clients (if different) _____

 - (d) Average number clients attending agency sponsored events _____

4. Relationship of Transportation Services to Agency Function:
 - (a) Is transportation a problem in providing services for your clients?
_____ Major problem _____ Minor problem _____ No problem

 - (b) What are your specific transportation problems?

*This form serves as a discussion guide for face-to-face agency interviews.

(c) Does lack of transportation limit the trips your clients are taking?

Yes No Don't Know

(1) How adequately does public transportation serve client needs now that the LIFT is available?

Three horizontal lines for handwritten response.

5. Transportation Resources:

(a) How does your agency provide transportation services for your clients?

No transportation provided

Clients reimbursed for travel costs:

Public Charter Private
Transit Bus Taxi Vehicle Other

Purchased services:

Public Charter Private
Transit Bus Taxi Vehicle Other

Agency owned vehicle(s)

Other agency vehicle(s)

Volunteer drivers use own vehicle:

Number volunteers, Pay for gas? No Yes How much per mile?

Staff members use own vehicle:

Number staff, Pay for gas? No Yes How much per mile?

(b) If agency owns or borrows vehicles:

Number of vehicles: Own Borrowed

Type of vehicle, e.g., 5 passenger sedan

- (1)
(2)
(3)

Are any equipped for wheelchair users? _____

Primary Uses

(1) _____

(2) _____

(3) _____

% Used, % Idle? _____

Allow other agency to use? _____

6. Demand for Transportation Services

What Mode?

	Public Transit	Charter Bus	Taxi	Agency Vehicle	Private Vehicle	LIFT
(a) # one-way person trips/week						
(b) # psgrs. provided w/service per wk/mo						
(c) Psgr. miles or average trip length						
(d) # Psgrs. elderly or handicapped						

7. Cost of Services:

(a) How much do you budget for transportation services each year? _____

Capital Costs? _____ Operating Costs? _____

Administrative Costs? _____

(b) How are these costs financed?

Continuing: _____

Limited: _____

How much do you spend on the LIFT? _____

Transportation profile:

	Before LIFT	Now
\$ Spent on Transportation		
# Passenger-trips Provided		
# Clients Served		

If you have more than one source of funding, have you experienced any accounting problems paying for the LIFT?

(c) Is your funding limited to providing trips for a specific purpose? Age group? Income group? _____

(d) If agency has vehicles...

	1	2	3	4	5
Purchase price					
Total operating cost/ vehicle mile					

Fuel _____ Insurance _____ Maintenance _____
 Oil _____ Licensing _____ Depreciation _____
 Tires _____ Labor _____

8. Agency Attitudes toward Provision of Transportation Services:
 Now that the LIFT is available:
 (a) How do you rate the overall efficiency of your services?
 (Scale: 1 = inefficient, 5 = efficient)

(b) Is there an overlap between what you and other agencies are doing? _____

(c) What are your feelings about the administrative hassle involved? _____

Specific problems with the Lift:

How does the agency interact with the clients to plan the LIFT trips?

Mechanics: _____

Prescheduling: _____

Coordination with the dispatch unit: _____

(d) Are you able to get your clients where they need to go on time? _____

(e) What percentage of your clients are you able to provide services for? _____

9. How would you rate client satisfaction regarding the transportation services you provide? _____

10. Client perceptions of the LIFT: _____

Specific problems: _____

11. Has your clients' usage of your agency's services increased due to the LIFT? _____

12. (a) Agency perceptions of Tri-Met:
- (b) Agency assessment of the LIFT reporting and billing system:
- (c) Agency perceptions of the amount of paperwork entailed by the LIFT:
13. If/when LIFT usage increases, and the LIFT priority system rules out some lower priority client trips, how will such an eventuality affect your clients and programs?
14. Agency suggestions for improving LIFT service:

APPENDIX F

TRI-MET PERSONNEL INTERVIEWED

**Dennis Chapman, Special Needs Transportation Coordinator;
Thomas King, formerly General Manager; Steven McCarthy, Assistant
General Manager; Dallas Jackson, Superintendent of LIFT Operations;
William Gregg, Director of Finance; Sharon Beelart, LIFT Project
Accountant; Adela Kretzinger, Advertising and Promotion Manager;
Pamela Durham, Legislation and Press Relations Manager.**

11. Management's assessment of the ease and efficiency of dispatch, recording, billing, and record-keeping procedures required by the SNT system:

12. Driver perceptions of SNT procedures:

13. Driver perceptions of SNT clients:

14. Overall comments:

APPENDIX H

NEW TECHNOLOGY

The work performed under this contract, while not leading to any new technology, has made use of existing methodologies as required to complete a comprehensive analysis of findings available on the implementation and operation of the demonstration project. These findings will be useful to other communities throughout the United States in the planning and design of improved public transportation services.

550 Copies