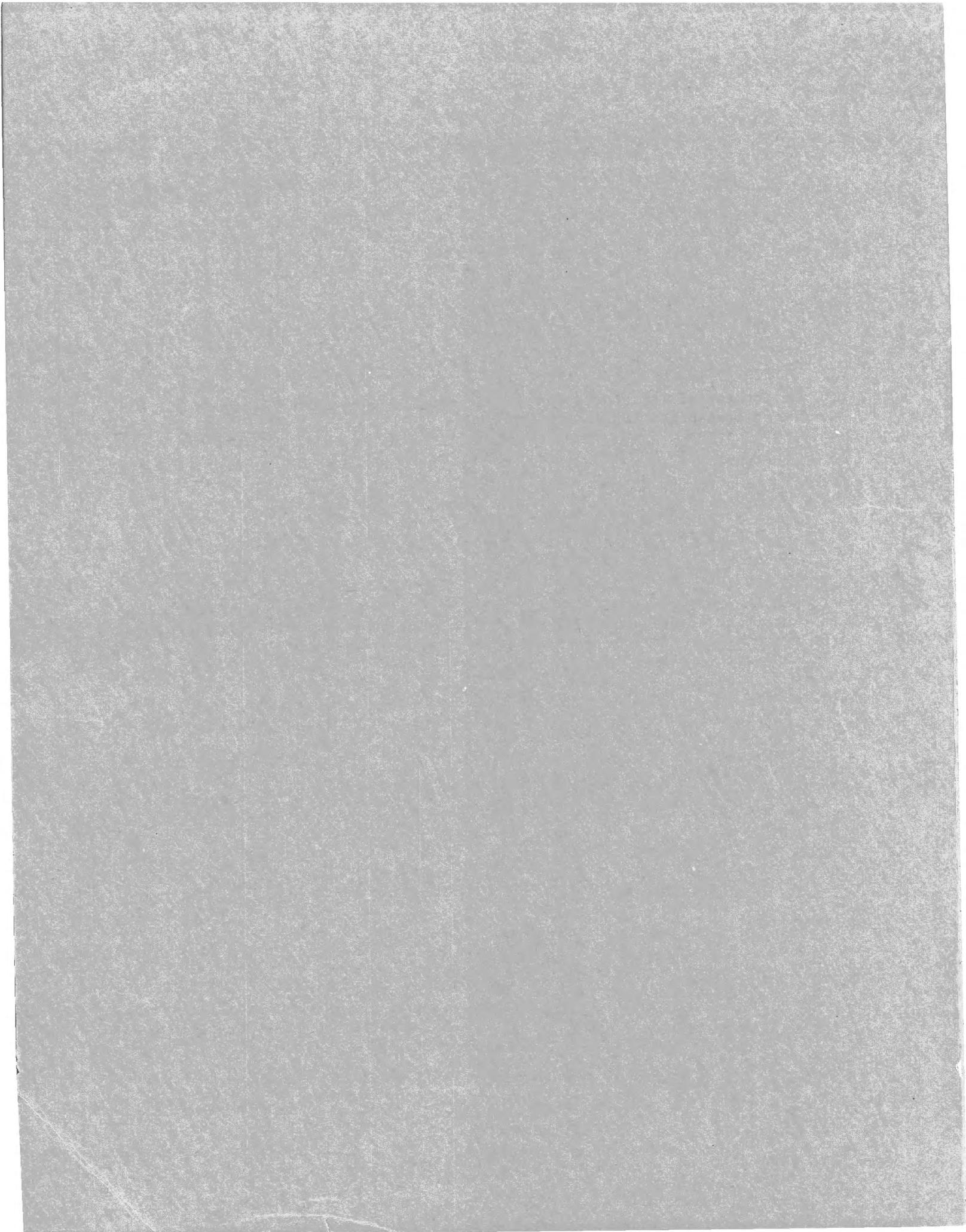


**phase-in  
of accessible  
buses**

**six case studies**



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16. Abstract <p>This report presents the results of six case studies and a literature review of the current status of planning activities for phasing accessible buses into fixed-route transit service. It summarizes the activities undertaken by transit systems currently providing accessible fixed-route service or intending to implement the service in the near future. Six case study systems — those in Champaign-Urbana, Illinois; Los Angeles, California; Milwaukee, Wisconsin; St. Louis, Missouri; Santa Clara County, California; and Washington, D.C. — are discussed in detail in appendices to this report.</p> <p>This is the first interim report to be prepared under a study entitled "Planning for the Phase-In of Fixed-Route Accessible Buses." The study is being conducted to prepare a manual for use by transit operators and Metropolitan Planning Organizations for planning fixed-route accessible bus service.</p>					
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REPORT NO.  
UMTA-IT-09-9010-80-1

PLANNING FOR THE PHASE-IN  
OF FIXED-ROUTE ACCESSIBLE BUSES

*INTERIM REPORT NO. 1*

REVIEW OF ACCESSIBLE TRANSIT SERVICES

TRANSPORTATION CONSULTING DIVISION  
BOOZ, ALLEN & HAMILTON INC.  
PHILADELPHIA, PENNSYLVANIA

*a n d*

SYNERGY  
NORTHRIDGE, CALIFORNIA

*JANUARY 1980*

*Prepared for*

U.S. DEPARTMENT OF TRANSPORTATION  
URBAN MASS TRANSPORTATION ADMINISTRATION  
OFFICE OF PLANNING ASSISTANCE  
WASHINGTON, D.C. 20590



## FOREWORD

Many transit systems are currently planning to implement accessible buses into their fixed-route operation. To assist them, UMTA's Office of Planning Assistance has initiated a study entitled "Planning for the Phase-In of Fixed-Route Accessible Buses." The study is being conducted to develop a manual for use by transit operators and Metropolitan Planning Organizations in planning for these services so as to minimize service disruption and maximize mobility benefits.

This document represents the first interim report from this study. It presents a review of the current status of the various planning activities undertaken by the transit systems which are currently operating accessible buses in fixed-route service as well as those which intend to do so in the near future. The review of current planning activities included detailed investigation of six case study systems, telephone interviews with other accessible transit system operators, and a review of the existing literature on the subject of accessible fixed-route transit. We believe this review will be of great value to transit operators and planners who are planning the phase-in of accessible buses into their own transit systems.

Additional copies of this report are available from the National Technical Information Service (NTIS), Springfield, Virginia 22161. Please reference UMTA-IT-09-9010-80-1 on the request.



Charles H. Graves, Director  
Office of Planning Assistance (UPM-10)  
Urban Mass Transportation Administration  
U.S. Department of Transportation  
Washington, D.C. 20590

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We wish to express our appreciation to those who have provided detailed information regarding the current status of accessible bus operations and planning. Staff members at the six case study systems deserve special mention.

These systems include:

- . Champaign-Urbana Mass Transit District -  
Urbana, Illinois
- . Southern California Rapid Transit District -  
Los Angeles, California
- . Milwaukee County Transit System (Milwaukee  
Transportation Services, Inc.) - Milwaukee,  
Wisconsin
- . Bi-State Development Agency - St. Louis,  
Missouri
- . Santa Clara County Transit District--  
San Jose, California
- . Washington Metropolitan Area Transit Authority -  
Washington, D. C.

We sincerely wish to thank the management of these systems and other individuals who generously contributed their time and participated in the review of the drafts of the case study system profiles.

A special thanks is extended to Eileen Koc, our Project Director in UMTA's Office of Planning Assistance, for her assistance in guiding the project, reviewing the draft reports, and making thoughtful suggestions for improving the report.

Finally, we would like to thank the members of the study review panel for their attention to the study materials and their support and cooperation. The panel members are:

- . Helena Barnes - American Public Transit Association, Washington, D. C.
- . Natalio Diaz - Metropolitan Council of the Twin Cities Area, St. Paul, Minnesota
- . Connie Garber - Massachusetts Coordinated Transportation Project, West Springfield, Massachusetts
- . Richard Heddinger - Consumer, Washington Metropolitan Area Transit Authority, Washington, D. C.
- . Thomas O'Brien - Massachusetts Bay Transportation Authority, Boston, Massachusetts
- . William Volk - Champaign-Urbana Mass Transit District, Urbana, Illinois
- . David Warren - Metropolitan Transit Authority of Harris County, Houston, Texas
- . Linda King - Tacoma Transit System, Tacoma, Washington

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CHAPTER 1  
STUDY PURPOSE AND APPROACH

This research program, sponsored by the Urban Mass Transportation Administration of the U.S. Department of Transportation, is being conducted to develop a guidance manual for use by transit operators and Metropolitan Planning Organizations (MPO) in planning for the phase-in of fixed-route accessible buses.

The need for such a guidance document became evident when many transit systems across the country began planning for fixed-route accessible services. Earlier attempts to satisfy the travel needs of the handicapped centered on specialized transportation services. This only partially addressed their needs. Furthermore, this approach did not offer an opportunity to the handicapped community to be in the mainstream of the social, cultural and economic environment enjoyed by able-bodied persons. To eliminate discriminatory practices which limited the activities of handicapped persons, the United States Congress included assurances of equality in the Rehabilitation Act of 1973 — Section 504 of this law prohibits discrimination on the basis of handicap in any program receiving Federal assistance. To comply with the spirit and intent of this section, the U.S. Department of Transportation published its Final Rule for implementing Section 504, which was effective on July 2, 1979. This rule further underscores the need for this study.

This chapter of the report briefly describes some of the requirements of the DOT 504 Regulation and how the output of

this research program will aid the transit systems and Metropolitan Planning Organizations in achieving the regulatory objectives. It also describes the approach to be followed in the conduct of this study.

### 1.1 Section 504 Regulation<sup>1</sup> and Its Relationship to This Study

As a result of the U.S. Department of Transportation's Final Rule implementing Section 504 of the Rehabilitation Act of 1973, transit systems receiving Federal funds are required to achieve program accessibility within a specified time frame. Of the several elements included in the program accessibility requirements, the one which is closely related to this study is the requirement that at least one-half of the peak-hour fixed-route bus service be accessible to wheelchair users.<sup>2</sup> During off-peak hours, transit systems are required to use accessible vehicles before inaccessible vehicles. Additionally, all new fixed-route buses of any size for which solicitations are issued after July 2, 1979 must be accessible to handicapped persons, including wheelchair users.

These provisions of the regulation will require a gradual phasing-in of accessible buses into fixed-route service so as to achieve program accessibility by July 1, 1989 at the latest. The phase-in activities will, of course, continue beyond

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<sup>1</sup> Title 49, Code of Federal Regulations, Part 27, published in Federal Register, Volume 44, No. 106, Page 31,441 on May 31, 1979.

<sup>2</sup> When the term "wheelchair users" is used in the regulation, the Department also intends that accessibility be provided to persons whose handicap is not severe enough to require the use of a wheelchair, e.g., persons who use crutches or walkers.

July 1, 1989 until all fixed-route vehicles are made accessible. This later time frame will be based on the transit system's individual vehicle replacement and expansion programs.

All urbanized areas receiving Federal funds will be submitting their Transition Plans (by July 1, 1981 for multi-modal systems) which describe their selected strategy and timetable for meeting the program accessibility requirements. The transit systems will be conducting detailed planning activities as their target dates for the phasing-in approach. This study, which is scheduled for completion in August 1980, will provide much needed guidance for the planning and implementation of such services with the goal of maximizing mobility for handicapped persons until full accessibility is achieved.

## 1.2 Study Approach

Since the intent of this study is to prepare a manual for use by the Metropolitan Planning Organizations and transit operators in planning for the phase-in of accessible fixed-route services, the scope of this research study covers a broad range of topics — from estimating demand by wheelchair users to the subsequent evaluation of services after implementation. Moreover, since the manual is intended for day-to-day use, the emphasis is on developing practical guidance. To that end, the study is divided into twelve tasks which can be broadly summarized in four phases:

- . Phase I - deals with the review of current experience in planning and operation of fixed-route accessible services and the identification of all of the areas impacted by such phase-in activities.
  
- . Phase II - deals with the preparation of technical advice in the areas identified

above — general categories include needs assessment; operations; coordination; planning; marketing; and monitoring and evaluation.

- . Phase III - includes the preparation of a draft guidance manual consisting of the findings and technical advice prepared in the previous two phases.
- . Phase IV - includes the testing of the draft manual in two cities where accessible fixed-route buses are programmed and the subsequent revision of the manual contents based on this experience.

To guide the overall study effort, a Review Panel consisting of nine experts has been assembled. Each panel member will be requested to provide written comments on the task reports as well as the draft manual. The panel is also expected to participate in four workshop sessions scheduled at critical points during the conduct of this study.

\* \* \* \* \*

This is the first of two reports to be prepared under the Phase I effort previously described. The remainder of this report presents our findings of the existing planning practices and experience in phasing-in fixed-route accessible services.

The report is organized as follows:

- . Chapter 2 - Task 2 Data Collection Activities - describes the screening process utilized in the selection of six case study sites for

the detailed investigation and other efforts to get up-to-date information on the status of planning and operation of fixed-route accessible services.

- . Chapter 3 - Assessment of Current Activities - presents a summary of findings regarding current practices and identifies areas to be focused on in the subsequent tasks.
  
- . Appendices - include detailed profiles of each of the six case study systems and a bibliography.

CHAPTER 2  
TASK 2 - DATA COLLECTION ACTIVITIES

A review of the current status of planning practices related to the phase-in of fixed-route accessible transit service has been undertaken as the first step in this study. We have concentrated on those planning and operations activities in which the transit operator and MPO were involved during the pre-implementation stage and on the modifications resulting from their operating experience. This review spans the planning, operations, coordination, maintenance and marketing functions of the transit system. The documentation of these operating experiences will provide valuable lessons for those systems which have yet to implement accessible service. It will also be useful in providing a framework for the planning manual on the phase-in of accessible service, the final product of this study.

A total of 20 transit systems now operate fixed-route service with buses which can be utilized by individuals in wheelchairs. A number of other transit systems are nearing the implementation stage. The characteristics of the existing accessible systems vary greatly. Operating equipment ranges from two to 280 lift-equipped "new look" and advanced design buses made by six different vehicle manufacturers outfitted with five different types of lifts. Some routes are fully accessible, others only partially. Driver responsibilities range from giving only verbal instructions to personally wheeling the person onto the lift, if necessary. Service areas also vary in size, climate and topography.

As each system joins the ranks of accessible service providers, implementation is made easier for the remainder of the transit industry. Most of the information that these first operators obtained was through informal contact with one another. Some existing documentation can be found in either trade publications or reports related to an UMTA Service and Methods Demonstration but more extensive formal documentation of their activities has been rather limited. As such, it has been necessary to perform this task with a large amount of primary data collection. We have reviewed two different categories of transit systems, those that are currently operating fixed-route accessible service and those that have undertaken planning activities toward that end. This has been accomplished through three means:

- . Detailed investigation of six case study systems;
- . Telephone interviews with other accessible transit system operators; and
- . A review of the existing literature on the subject of accessible fixed-route transit.

## 2.1 Case Studies and Telephone Interviews

The selection of the case studies was made in consultation with the study's Review Panel. This section of the report discusses the selection process and presents a brief rationale for selecting these particular sites.

2.1.1 Selection of Case Studies - Several transit systems currently operating or planning to implement accessible service were contacted in July 1979. Guidance during this step was sought from the Transportation Systems Center

(TSC), in Cambridge, which has been monitoring the expansion of accessible transit service. Information was requested from TSC on the current accessible systems including the number of vehicles and routes operated, the length of time the service has been in operation, and the pre-implementation planning activities.

A profile of current accessible services was presented to the Review Panel at its August 1979 meeting. The nine-member panel, representing transit operators, MPOs and service users, reviewed the current services. Six systems were then selected for the detailed investigation. The selection reflects an effort to review systems with different types of vehicles, climate and size.

2.1.2 Case Study Sites - The six case study sites represent a diverse group of transit operators. Two of the six have not yet implemented service though they have completed extensive planning activities. Those that have been operating fixed-route accessible service have from six months to two years' experience. The selected case study sites are listed below:

- . Champaign-Urbana, Illinois — The Champaign-Urbana Mass Transit District will be operating a 40-bus, fully-accessible fleet consisting of retrofitted General Motors "new look" buses and new Grumman Flexible 870s, as part of an UMTA-sponsored demonstration program. The site is

a small urban area with a large university. The university's Rehabilitation-Education Center attracts a large number of handicapped individuals both as students and area residents. Accessible curbs and buildings are very common throughout the area.

- . Los Angeles, California - The Southern California Rapid Transit District has been involved in extensive planning for the phase-in of lift-equipped buses. The District started receiving the 200 AM General coaches in 1977 but has not yet been able to put them into service. The preparation for accessible service in Los Angeles has served as a model for several other systems.
- . Milwaukee, Wisconsin - Milwaukee County Transit System began operating its 100 lift-equipped buses on six fixed-routes in April 1979. The Flexible "new look" buses operate as "guaranteed" accessible service, that is, all base period service is scheduled with the lift buses. In the peak period these same buses are supplemented with accessible trippers. The County also sponsors a user-side subsidy program for the handicapped.
- . St. Louis, Missouri - Bi-State Development Agency received national recognition when it implemented the first major accessible fixed-route transit

service in September, 1977. Being the first transit system to implement extensive accessible service (San Diego began operating four lift-equipped buses six months before St. Louis), St. Louis experienced many problems associated with new technology and new service style. Information on their activities, including service adjustments made because of reliability problems, has been extensively documented in the literature.

- . Santa Clara County, California - Santa Clara County Transit District (SCCTD) designed a special route to serve likely generators for the handicapped. They also designed their own lift. A mini-bus, equipped with the specially designed lift, began operating on the route in 1976. In October, 1978, larger Gillig coaches were placed on this route. Service has since been expanded to several intersecting routes in the SCCTD system. The District credits much of its success to its advisory committee. The Committee, in addition to advising on service policies, participates in driver and user training sessions.
- . Washington, D.C. - The Washington Metropolitan Area Transit Authority (WMATA) operates lift-equipped Flexible "new look" buses which interface with its accessible rail system. Service has been implemented

gradually since April 1979. The first phase made service available to a small group of volunteer users. Handicapped individuals agreed to ride buses frequently and report back to WMATA on the problems they encountered. As such, the first routes were tailored to their trip needs. At the time of the case study, WMATA was operating 81 buses on 30 routes.

2.1.3 Conduct of the Case Studies - Each of the case study sites was visited during August, 1979. Interviews were held with general managers; directors of transportation, maintenance, marketing, planning and special services; and MPO transportation planners. Existing reports and records were collected. Subsequently, contact has been maintained with these systems to obtain the latest available information and to note any changes in their operation. The individual case studies are presented at the conclusion of this report as Appendices A through F.

2.1.4 Telephone Interview - The information obtained through the case studies was supplemented with telephone interviews with seven other major providers of accessible service. The purpose was to gather information on their planning activities; operating practices and problems; and driver training programs. The systems contacted by telephone are listed below:

- . Southeastern Michigan Transportation Authority (SEMTA) - Detroit, Michigan
- . H.N.S. Management Company - Hartford, Connecticut

- . Metropolitan Transit Authority (MTA) -  
Houston, Texas
- . Palm Beach County Transportation  
Authority - West Palm Beach, Florida
- . Rhode Island Public Transit Authority  
(RIPTA) - Providence, Rhode Island
- . Municipality of Metropolitan Seattle  
(Metro) - Seattle, Washington
- . Westchester County Department of Trans-  
portation - White Plains, New York

## 2.2 Literature Review

During the conduct of the case studies, reports were collected from the local agencies which documented their planning and implementation of fixed-route accessible service. These reports were supplemented with reviews of materials on hand in the consultants' own libraries, the U.S. Department of Transportation Library, UMTA's Office of Transportation Assistance, the Transportation Systems Center, and the libraries of the Transportation Research Board and American Public Transit Association.

Existing literature, in general, is rather limited in its ability to guide a local planner or transit operator in how to implement accessible service. However, the information can guide the planner through different steps of the service implementation process. For example, local planning reports can provide information on demand estimation and route selection. Demonstration evaluation plans provide detailed techniques for monitoring the service delivery. Published articles document operating experience.

The materials included in the literature review are listed in bibliographic format in Appendix G. A summary of these materials is presented below according to the categories of information:

- . Local Planning Studies - Most local planning studies were prepared before the Section 504 Regulation was finalized. They present a discussion of alternative approaches to serving the handicapped such as fixed-route, demand responsive, and userside subsidy, and present the advantages and disadvantages of each. The fixed-route analysis frequently touches on the perceived operating problems of driver assistance, standees, and bus stop access. Local planning reports also include estimates for the transportation handicapped population. In some instances, this is prepared for each service alternative. Latent demand is frequently estimated with gap analysis techniques relying on national incidence rates and census statistics.
- . Technology-Related Studies - Much information is available which describes new bus technology and accommodations for the handicapped. Early research reports describe various types of lifts and the changes that would be required of a transit system to make their fleet accessible. Another major information source is the numerous reports prepared as part of the TRANSBUS Program. The testing of these vehicles in four cities provided some operational experience from the standpoint of both the operator and the passenger. Related

studies have evaluated the use of lifts and ramps to determine the feasibility of including them in standard bus specifications. Bus manufacturers have prepared reports on their TRANSBUS prototypes and on adapting the current design buses to achieve accessibility. Manufacturers have prepared training and maintenance material for the buses and lifts. Transit systems have supplemented these with their own training materials and operating manuals. These system-specific materials provide instructions and guidance which are transferable to those systems which have yet to develop a driver and wheelchair-user training program. They describe the operation of the lift, kneeler and tie-down, and enumerate all of the steps in the boarding process, as well as recommended preventive maintenance practices.

- . Demonstration Program Materials - When lift-equipped buses were placed in service in San Diego and Atlanta, the operation was the subject of an evaluation by the Transportation Systems Center. These evaluation reports have been distributed widely to transit systems and MPOs. Service in St. Louis is also currently being evaluated by the Transportation Systems Center. To date, a task report on planning activities and a project evaluation report have been prepared in draft but their distribution has been limited. All of these reports document the steps leading to service implementation, operating results and subsequent

steps to deal with some of the problems. Other SMD projects -- Champaign-Urbana, Palm Beach County, and Washington, D.C. -- are just getting under way, so information on their planning and operation activities is not yet readily available. The draft evaluation plans for each of these projects provide an extensive description of expected monitoring and evaluation activities, ranging from maintenance records to passenger surveys.

- . Trade Publications - Transit industry periodicals often describe a transit system's introduction of accessible service. Trade publications occasionally print feature articles on accessible service. Specifically, these have dealt with planning in Los Angeles and operation in St. Louis. These publications are a primary means of communication between transit operators. Papers have also been presented, at conference, which discuss both the experience of a specific transit system and the overview of accessible service throughout the country.

CHAPTER 3  
ASSESSMENT OF  
CURRENT PLANNING ACTIVITIES

The information collected during the case studies, interviews and literature review has enabled a comparison among the many planning approaches currently used in phasing-in fixed-route accessible bus service. This chapter summarizes the activities of the planners and operators in the six case study sites, in the systems contacted by telephone, and in those described in the current literature. Activities in the following seven areas are described:

- . Needs Assessment and Route Selection
- . Operations
- . Labor Issues
- . Coordination
- . Maintenance
- . Marketing
- . Monitoring and Evaluation

For each of these areas, the range of actions is identified and assessed in light of operating experience. The intent is to contrast and interpret these activities for any apparent strengths and weaknesses. Detailed descriptions of the case study sites' planning activities are presented as Appendices to this report. It should be pointed out that this information reflects the status of the accessible bus operations during visits to the six case study sites in August, 1979, and telephone

contact with the other seven systems during July and October 1979. Progress subsequent to these dates has not been included in these status reports.

### 3.1 Needs Assessment and Route Selection

An initial step in preparing for fixed-route accessible service has been to estimate what the demand for the service will be, determine the service style that will best meet these needs, and create a priority list of routes for vehicle deployment. This section discusses the approaches taken by the six case study systems to address these tasks during the early planning stages preceding accessible service implementation.

3.1.1 Demand Estimation - Estimates of the number of transportation handicapped individuals have been prepared as part of a region's overall special efforts planning. The starting point for this in St. Louis, Los Angeles, and Champaign-Urbana was the national incidence rate which provided an aggregate estimate of the number of disabled individuals in the service area, specifically those in wheelchairs. In Champaign-Urbana, a university town where wheelchair users are more prevalent than the national average, this national rate was used as the low estimate. A high estimate was developed from an incidence rate which assumed that the ratio of student wheelchair users to all students was consistent throughout the community. A more elaborate demand estimation procedure was thought to be unnecessary since the entire bus fleet would be accessible. Estimates were made for only handicapped persons who use wheelchairs since standees would not be permitted to use the lift. In other accessible system sites, the following demand estimation

procedures were used:

- . Washington, D.C. - As the first phase in a study to evaluate service alternatives<sup>1</sup>, an extensive survey of the disabled community was developed to determine demographic and trip characteristics. The survey results were used to develop latent demand estimates of the target population.
  
- . Milwaukee - Latent demand estimates for accessible transit were performed as part of a regional plan to meet the needs of the transportation handicapped.<sup>2</sup> The technique utilized regional trip rates for handicapped groups which were developed as part of a long-range planning activity to inventory regional travel.

All other activities related to needs assessment have been intended to determine specific generators and routes where service should be provided. These will be discussed in the next section. Though aggregate estimates according to level of disability have been prepared, often as part of an overall

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<sup>1</sup> Mark Battle Associates, Inc., Transportation for the Elderly and Handicapped in the Washington Metropolitan Area, Washington, D.C., Metropolitan Washington Council of Governments, October 1978.

<sup>2</sup> Southeastern Wisconsin Regional Planning Commission, A Regional Transportation Plan for the Transportation Handicapped in Southeastern Wisconsin: 1978-1982, Waukesha, SEWRPC, April 1978

planning activity concerning elderly and handicapped needs, local planners in the six case study sites have not used these results for planning the phasing-in of accessible service. A major barrier to their use is that the data cannot be easily disaggregated to a route or a corridor level. The lack of a technique to provide detailed demand estimates will be discussed in subsequent tasks of this study.

3.1.2 Route Selection - In order to select which routes will be the first to be scheduled for accessible service, transit systems have used various approaches to identify preferred destinations.

- . Hartford, Santa Clara County, and Washington, D.C., with handicapped agency sponsorship, performed a survey of the handicapped community, requesting origin and destination information.
- . Washington distributed a mail-back questionnaire to local agencies and groups to obtain trip information for disabled individuals. Several groups reprinted the form in their own newsletters.
- . All six case study systems worked with a local advisory committee to identify generators that should be served with accessible buses.

In the case of Santa Clara County, input from the handicapped community resulted in a new cross-country route being developed and added to the transit system network. All other systems have selected existing

routes for accessible service. Common criteria in selecting routes have been:

- . Generators served by the route;
- . Ability to transfer between buses and other transportation modes; and
- . The level of service on the route, considering the number of accessible vehicles required.

Los Angeles concentrated on the generators, the first criterion and selected 23 initial routes which provide service to:

- . Colleges and universities;
- . Airport, bus and train terminals;
- . Regional shopping centers;
- . Business districts and concentrations of employment;
- . Major entertainment attractions;
- . Community-based demand-responsive systems; and
- . Hospitals and rehabilitation centers.<sup>3</sup>

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<sup>3</sup> Cannon, Dennis, "Operating Accessible Buses," Passenger Transport, May 27, 1977, pp. 8.

Four of the case study systems have attempted or have planned for 100 percent accessible service during the base period on the designated routes. These systems prefer to offer a high level of service on only a few routes rather than to provide a few accessible trips on more routes. Conversely, St. Louis chose to spread the service around to more routes but with fewer trips.

Once the 100 percent route accessibility decision has been made, the decision still remains as to which routes should be selected. Two systems, after considering assumed generators and transfer possibilities, have taken different approaches to vehicle assignments.

- . Santa Clara selected routes which required a small number of buses to achieve 100 percent base period accessibility. This option gave them the potential to offer a high level of service on several routes.
  
- . Milwaukee preferred to concentrate service on the major routes in the system -- major in terms of ridership volumes, service levels, and generators served. The high vehicle requirements of these routes meant that 100 percent base period accessibility would only be available on a few routes, but at a high frequency and long span of service.

Some systems have other level of service criteria. For example, Seattle is striving for a one-hour base period headway for accessible buses on all

routes. Washington's accessible routes feed the accessible rail system, making accessible service more widely available.

Routing decisions, in actuality, have been based on the actual supply of accessible vehicles rather than on the expected demand for accessible service. This supply number, in most situations, has predetermined how many routes can be made accessible. Service decisions have, therefore, become based on how many of these vehicles can be expected to be operable on regular scheduled routes. The system's service decisions for phasing-in the supply of buses has included:

- . Number of routes which can be served;
- . Number of trips on these routes which can be scheduled;
- . Headways possible with this schedule;  
and
- . Vehicle capacity for this route based on current ridership.

In the last factor, vehicle capacity, is related to systems with a mixed fleet. In some systems, the accessible buses have a lower seating capacity than the rest of the fleet. Designating a route with high ridership as an accessible one may result in new considerations for the dispatcher if the route has been served with larger vehicles.

An evaluation of service levels and route selection techniques will be discussed in subsequent tasks of this study.

3.1.3 Community Participation - A mechanism which provides for participation by members of the handicapped community has been found to be very worthwhile in all sites. All but St. Louis had or have committees and advisors who work directly with the transit system. Though often sponsored by the MPO, it has been found that the committees' effectiveness is enhanced when it can develop a strong working relationship with the transit system and when it includes members of the handicapped community. In each location, the community's assistance has provided a consumer's insight to numerous planning and operations activities, including:

- . Developing vehicle specifications;
- . Vehicle testing;
- . Bus stop access testing;
- . Route selection;
- . Driver training;
- . User training; and
- . Service users.

In Washington, D.C., six members of the handicapped community were enlisted in a special pre-service demonstration phase. The first routes serviced with accessible vehicles were oriented to their travel needs. Participants were asked to ride the routes often and maintain contact with the transit system (WMATA) and to report any operational problems and how they were alleviated or averted. Their participation in the two-month demonstration

enabled WMATA to identify potential problems and make changes in procedures before expanding the service to all other planned routes.

3.1.4 Relationship with Regional Planning Activities - The involvement of Metropolitan Planning Organizations (MPO) in the planning for accessible service has been limited to preparing and reviewing grant applications and documenting "special efforts". Service planning decisions regarding route selection, scheduling, and operating policies have been made by the transit system, independent of the regional planning process.

### 3.2 Operations

Another step in planning for accessible service has involved the transportation function of the transit system. Different departments have been called on to make changes in scheduling, dispatching and road supervision procedures and to determine the proper conditions for lift use.

3.2.1 Restrictions on Lift Use - As Exhibit 1 shows, there is no consistent policy on lift use. Systems with similar equipment, such as Milwaukee and Washington, D.C., have divergent policies. Systems which restrict lift use to wheelchair users have done so out of a perceived safety concern, as there is only a 56-inch clearance from the top of the raised lift to the bottom of the door frame on "new look" buses. This low clearance is evident at the midpoint of the lift platform. Washington has dealt with this constraint by advising standees, semi-ambulatory passengers or attendants of passengers in wheelchairs to stand towards the front of

**EXHIBIT 1**  
**SELECTED POLICIES ON LIFT USE**

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<u>Transit System</u>	<u>Lift Type</u>	<u>Eligible Lift Users</u>
Champaign-Urbana	EEC	Wheelchair Only
Milwaukee	Vapor	Wheelchair Only
Palm Beach County	TDT	Wheelchair and Semi-Ambulatory
St. Louis	TDT	Wheelchair Only
Santa Clara County	TDT	Wheelchair and Semi-Ambulatory
Washington, D.C.	Vapor	Wheelchair and Semi-Ambulatory
Westchester County	GM	All Passengers

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the lift, thus alleviating the low clearance problem. Lift use policies are one of the following:

- . Wheelchair passengers only;
- . Wheelchair passengers and attendants and semi-ambulatory passengers; or
- . All passengers.

Westchester County will soon make its lift available to any passenger during the base period. This is expected to assist passengers traveling with shopping carts or baby carriages. During peak periods, passenger loads are too high to allow room for the carts and carriages.

In those systems which permit standees, there have been no reported problems. Thus, there does not appear to be a necessity for the restrictions on standee use of the lift. Extra handrails in the stepwell area to aid boardings of ambulatory passengers, installed by several systems, provide a stationary grip for the standing lift user.

3.2.2 Scheduling - The question of extending running times to account for accessible service has been a major concern of current accessible transit providers. Only St. Louis has made deliberate extensions to layover and recovery times prior to service initiations. These extensions still remain in the schedules after two years of operation.

The other systems contacted have not made pre-service schedule changes, but rather have adopted a "wait and see" approach. This has proven to be

appropriate for their needs. In all but one case, ridership has been too infrequent or irregular to warrant any changes. Actual delays in Milwaukee, for example, are handled through radio contact with the dispatcher on a case-by-case basis.

One exception to this has been in Hartford. After several months of operation, daily passengers were recognized by drivers. The next round of schedule revisions added in a few extra minutes for each of the "known" work trips to provide extra time for boarding and alighting the lift users. Contrary to this, regular lift users in Washington have been able to diminish their total boarding time from approximately 3-4 minutes to approximately 90 seconds. This operating experience indicates that boarding and alighting times tend to improve as drivers and wheelchair passengers become more familiar with the lift and tie-down procedures.

Exhibit 2 summarizes the different approaches to changes in running times. Currently, operators believe these practices are working effectively in their own systems. The existing recovery and lay-over times on accessible routes vary according to other scheduling constraints. Any route with a tight schedule (less than three minutes layover time) has cause for schedule adherence problems for any number of reasons: accessible service may only contribute to this situation. However, current providers see it as only one additional factor in on-time performance adjustment procedures.

Other scheduling-related impacts in St. Louis included interlining practices and driver relief points.

**EXHIBIT 2**  
**SELECTED APPROACHES**  
**TO CHANGES IN RUNNING TIMES**

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<u>System</u>	<u>Approach</u>
Champaign-Urbana	No changes planned. <sup>(a)</sup>
Hartford	Additional time added for known daily trips by wheelchair users.
Los Angeles	No changes planned. <sup>(a)</sup>
Milwaukee	No time added; running time problems handled as they happen by the dispatcher.
Palm Beach County	No changes made.
St. Louis	Extra time added on all routes.
Santa Clara County	No changes made.
Washington, D.C.	No changes made.

<sup>(a)</sup> *Not in operation yet.*

- . Interlining (when one vehicle operates on more than one route) had constrained the ability to designate which routes and trips will be accessible. The earlier route selection process eliminated interlined routes from consideration for accessibility because of scheduling difficulties.
- . Drivers were previously replaced by a new driver and a new bus dispatched from the garage. To keep the accessible buses on the street, however, it became necessary to have drivers relieve each other on the street, resulting in an increase in driver hours.

3.2.3 Street Supervision - Prior to accessible service implementation, all systems had street supervision practices, including:

- . Starters at major boarding points;
- . Road supervisors circulating throughout the service area; and
- . Radio contact among drivers and supervisors.

The major expansion of these street supervision practices has been in the area of radio contact. In all case study sites, lift-equipped vehicles are also radio-equipped. Seattle, like many systems, is including radios as original equipment on all new buses. Radios are used to notify the dispatcher of in-service problems such as mechanical breakdowns or schedule delays.

The level of required radio reporting varies from system to system. So does the level of monitoring on lift use. Since the radios in many systems were already in place, it was felt that the drivers should be asked to report their ridership and delays. In actuality, radios are usually reserved for reporting when there is an in-service breakdown. Heavy communication's traffic is a major deterrent to routine reporting.

The practice of lift-related radio use reflects the system's general use of radio communication. Milwaukee is an exception among the four case study systems currently providing accessible service. Their drivers are required to report any in-service delay greater than five minutes to the dispatcher. This was easily expanded to include reports of wheelchair passenger ridership, with specific information on origin, destination and extra time required. The dispatcher then has the immediate capacity to deal with schedule problems by turning the bus back after the handicapped person alights, letting it run late, or dispatching another bus. The last measure is reserved for lengthy breakdowns where other passengers are on board.

Radio equipment has been used to keep road supervisors informed of any potential problems in the lift operation. Often, when minor problems occur, the supervisor has been in closer proximity to the bus than a mechanic. A Milwaukee supervisor's training in minor lift repairs and specially-issued tools enables him to make minor adjustments in the lift and keep it in service.

The tools are used primarily to manually operate the lift.

The level and type of street supervision will be evaluated in subsequent tasks of this study. Current levels are not specifically designed for monitoring lift use. The current ridership and in-service breakdown levels present a dichotomy of street supervision requirements. At the current time, it is not possible to determine the appropriate level.

3.2.4 Depot Dispatching - Among the four case study systems now providing accessible service, there is no standard procedure for dispatching lift-equipped buses to designated accessible runs. Since many systems dispatching vehicles on a "first-in/first-out" basis, it has been necessary to segregate the accessible buses from the rest of the fleet.

Other dispatching procedures were less affected by the change in vehicles. In Milwaukee, when buses are lined up at night, it is according to route assignment rather than by morning pull-out time. The hostler makes sure that all vehicles for each route are together in one track. Buses for accessible routes, then, are only placed in the tracks for those routes. Other dispatching precautions are:

- . Washington does not dispatch an accessible bus to a non-accessible route until all accessible runs have been met.

- . Milwaukee has prepared a second assignment sheet of all day runs and trippers which are to be dispatched with accessible buses if more than the scheduled number of accessible vehicles are available.

These procedures are working effectively from the transit systems' perspectives. The addition of accessible buses to the fleet has only necessitated another minor concern for the dispatcher when preparing vehicle assignments. Out of the dispatcher's control, but affecting a smooth morning dispatching period, is the driver's requirement, notably in Washington to cycle the lift through its operation before taking the bus on the street. The dispatcher has also had to keep additional accessible buses in an easily dispatched location in the garage in the event that the lift will malfunction during cycling and a replacement will be needed.

3.2.5 Insurance - Experience with insurance for accessible service has not identified major cost impacts. However, future experience may be different when more accessible services are implemented.

Smaller systems (those that are not self-insured), have not experienced any rate increases directly attributable to the accessible operation. Their underwriting companies will not make these changes, it is felt, until more operating experience exists which would warrant a change.

Claims related to lift operations have been minimal. In St. Louis, approximately \$17,000 in

claims have been paid since service was initiated two years ago. Claims have been paid to ambulatory passengers, as well as wheelchair-using passengers. Those lifts with a drifting problem resulted in a few cases of an ambulatory person tripping on the lengthened step-riser of the stowed lift. Other transit systems have no lift-related claims to date.

### 3.3 Labor Issues

The involvement of drivers and their union during the pre-implementation period has provided internal support for the service and alleviated the drivers' fears about the new equipment and responsibilities. The pre-implementation concerns of management over negative driver reaction has rarely occurred, even in systems where labor-management relationships are strained. Most opposition has been based on confusion over what the accessible service would actually involve in terms of time and responsibility.

This section discusses driver assistance, training programs, and reactions to accessible service.

3.3.1 Required Assistance - Transit systems do not require their drivers to provide very much assistance to the wheelchair passenger. Santa Clara County stresses that all lift users be "self-assisted" -- either able to board without assistance or bring along an assistant.

Exhibit 3 summarizes requirements for driver assistance in several systems. There is a wide variety in the actual requirements, ranging from the St. Louis policy of verbal instructions only to

**EXHIBIT 3**  
**SELECTED REQUIREMENTS**  
**FOR DRIVER ASSISTANCE**

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<u>System</u>	<u>Driver Assistance Provided</u>
Detroit (SEMTA)	Leave seat to operate rear door lift; verbal assistance.
Milwaukee	Verbal instructions on boarding; check and assist in tie-down procedure.
St. Louis	Verbal instructions only.
Seattle	Verbal instructions only.
Washington, D.C.	Level of assistance requested by passenger for lift and tie-down.

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the Washington policy which expects the driver to provide whatever assistance is needed. In other systems, with both front and rear door lifts, drivers provide verbal instructions for boarding. However, they are expected to check the passenger to see that the wheelchair is properly secured in the tie-down. While checking, they are expected to provide assistance in tying-down properly. At a minimum, drivers are told not to move the bus until the passenger is secured. This often amounts to a verbal confirmation from the passenger to the driver.

Tie-down assistance is predicated on safety concerns. Lift assistance policies, in many systems, have been predetermined by the lift controls. Some models require the driver to push buttons or toggle switches on or near the dashboard to deploy the lift. The control panel on the Washington buses was mounted so that the driver can reach it while standing on the lift. This enables the driver to be able to provide a higher level of assistance when it is needed.

This discussion has centered on required assistance. Actual operations have shown that drivers often provide more assistance than is required of them, particularly to the less-experienced passengers. The transit systems are generally pleased by this extra level of assistance. However, in Detroit, SEMTA has advised drivers not to deviate from the system policy since any injuries they might receive during the process from unrequired assistance will not be covered by workers compensation.

3.3.2 Driver Training - Training for the operation of lift-equipped buses has concentrated on two major components:

- . The mechanics of operating the lift; and
- . Sensitivity to the needs of handicapped passengers.

The training sessions have ranged from 30 minutes to eight hours and have usually consisted of several training packages. All current operators train the drivers in using the lift and operating the new vehicle. In Westchester County, this was provided by the manufacturer. Milwaukee and Westchester County drivers received practice sessions only in operating the lift. The absence of sensitivity training prior to accessible service implementation was due to funding constraints in Westchester County. For the past few years Milwaukee has included a sensitivity slide show<sup>4</sup> in its new driver training program which deals with passengers with ambulatory handicaps. This was felt to be sufficient for sensitivity training.

Existing sensitivity training programs have consisted of these elements:

- . Previously developed slide presentations on ambulatory handicapped people using buses;

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<sup>4</sup> The 20-minute slide and cassette presentation entitled, "Special People" was developed by Moss Rehabilitation Hospital and the Southeastern Pennsylvania Transportation Authority.

- . Classroom lectures;
- . Audio-visual materials, including special films and slide shows;
- . "Hands-on" practice with drivers using the lift while simulating handicaps; and
- . "One-on-one" practice sessions of a driver and a handicapped individual.

These training materials have been developed by individual transit systems, borrowed from another transit system, or purchased from another agency:

- . Los Angeles prepared its own film entitled, "The New Mobility" which is used for both driver and user training.
- . Champaign-Urbana prepared its own slide/tape presentation with technical assistance from the University of Illinois Rehabilitation-Education Center.
- . SEMTA in Detroit borrowed a film entitled, "Walk a While in My Shoes" from Toronto.
- . St. Louis relied on staff from local agencies to conduct their training, supplementing it with a slide presentation.
- . Moss Rehabilitation Hospital and the Southeastern Pennsylvania Transportation Authority developed a second slide/tape presentation for wide distribution on ambulatory handicaps entitled, "You Can Open the Door."

"Hands-on" experience has been used for pairs of drivers, small groups of drivers, or individual drivers and a handicapped individual. In this simulation, the driver must board the bus while in a wheelchair and use the tie-down mechanism. To simulate the difficulty of an ambulatory handicapped person, the driver must board the bus blindfolded and then with earmuffs as if he/she had a visual or hearing impairment. At a minimum, each driver has had five to ten minutes to practice. Transit operators which use a sensitivity training program feel that the experience greatly enhances the driver's level of understanding. An extensive training program in Washington, developed with UMTA demonstration funds, will evaluate the effectiveness of this type of training.

The amount of time spent for training has also varied greatly:

- . Washington conducted one 18-hour class for the program's trainers. They, in turn, conducted numerous three-hour training sessions for all of the drivers.
- . Detroit (SEMTA) provided training for all drivers during their swing time between shifts. A film, slide show of light operations, and a "one-on-one" practice session were included in the training package.
- . Seattle provided eight hours of sensitivity training for all drivers. Additionally, those that select accessible runs and those who work the extra board receive two more

hours of training, which includes the lift operation and role-playing activities.

- . Santa Clara County provided a two hour training session -- 45 minutes of classroom lecture and one hour and 45 minutes practicing with a mock-up of the lift and tie-down. Groups of five drivers go through each step of the procedure. Additionally, each driver spends at least 10 minutes with a handicapped individual ( a volunteer from the advisory committee) in a "one-on-one" training session.
- . Palm Beach County's four-part training package lasted for six hours. A two-hour awareness session was conducted by local agencies representing handicapped individuals. Another one and one-half hour session explained the lift operation. Following this was a one-half hour session with the lift mock-up. Finally, in a two-hour session, each driver had "hands-on" experience using the lift while in a wheelchair.

Several training packages include unique components. Champaign-Urbana will include a lecture to inform the drivers of different types of disabilities and the type of mobility impairments this produces. This will train the driver to know what level of assistance the different disabled passengers will require. They will also receive first aid instruction on dealing with special needs of handicapped passengers in case of an emergency.

In Seattle, drivers were instructed on locating the most accessible boarding stops. Seattle has painted a blue stop line at each stop along an accessible route to indicate where it is easiest for the wheelchair passenger to board.

At this time, it is not possible to say what the ideal level of training should be. Other evaluations of the effectiveness of the training programs are currently underway. Their findings will impact the input to the manual. For the present, though, each local system feels that its training program is adequate for orienting drivers to the new accessible service. The only deficiency cited was a need for later refresher training, particularly in lift operations. The limited amount of experience that the driver has in actually boarding and alighting a lift user, due to low levels of ridership, scattered ridership, and a small number of accessible routes, does not enable them to master their skills. Their unfamiliarity with the procedures has been cited as one reason for in-service delays. To deal with this, Los Angeles has proposed a short-multiple-choice quiz which will determine the driver's need for refresher training. Though no systems have a formal refresher training program, most do suggest that they will be needed in the future. In Milwaukee, drivers have requested that the supervisor spend a few minutes going over the steps in the lift operation, explaining the proper sequence to deploy the lift. Provisions for refresher training will be discussed in later tasks of this study.

3.3.3 Driver Reactions - In the systems that were contacted during this task, it has been observed that driver reaction to the operation of lift-equipped buses has been positive. Individual drivers presently have the option of driving accessible or inaccessible routes through the picks process. This option will exist until the entire system is accessible. Informal comments made by drivers about perceived additional responsibilities have not resulted in significant problems. Most comments have been made before the service is implemented when there is no operating experience and little understanding of what the service will entail.

Only in one instance has there been an extreme labor problem related to accessibility. The drivers' union for the City of Detroit Department of Transportation delayed the introduction of accessible vehicles until questions on responsibility could be answered and a wage premium was obtained for actual recorded use of the lift.

In Seattle, a working relationship was developed with drivers who choose to operate the first accessible routes. These drivers were invited to participate in a task force on accessible transit operations. Forty drivers responded to the invitation and have formed the nucleus of the task force. The task force provides a focal point for drivers' comments and provides an informal avenue for the drivers to recommend changes to the transit system management. The drivers have also been active in outreach training programs where potential users are given the opportunity to see a

demonstration of the lift and have an opportunity to practice using the lift and tie-down.

New developments in this area will be monitored and discussed in later tasks of the study.

### 3.4 Coordination

Each case study system evidenced some level of effort in coordinating accessible services with other transportation services and transportation-related agencies. This section discusses service coordination with bus routes, rail systems, and paratransit services, as well as institutional coordination with local governments.

3.4.1 Service Coordination - In partially accessible systems, the ability to easily transfer between the accessible routes has been a consideration in the route selection process.

- . For example, Seattle's initial bus routes were the most appropriate for selection, primarily because they cross trolley routes which will also be accessible.
- . Five of Milwaukee's six accessible routes are radial and meet in downtown Milwaukee. Some transfer activity has been assumed from drivers' ridership reports which indicate an alighting on one route at one downtown stop, which is promptly followed by a boarding on another route at the same stop or one nearby. In addition, multimodal accessible service coordination has been achieved.

In Washington, most of the 30 accessible routes feed the accessible Metrorail system. An existing

accessible rail system was a major reason behind the decision to purchase accessible buses. The lift-equipped bus service is a major means of access to the regional rail systems for handicapped persons and is intended to supplement the coverage of the rail network. In the San Francisco Bay area, accessible feeder service to the BART system, one of the nation's three accessible rail systems, is provided by one San Mateo County route. A soon to be implemented Santa Clara route will also open up for handicapped persons in the Bay Area (accessible feeder service to BART). Adjacent San Mateo and Santa Clara Counties, coincidentally, have accessible routes which meet at the county line. However, the existing schedules and questions of service reliability do not warrant advertising the services as coordinated.

Some of the current operators also provide paratransit service as a "special effort" to transport elderly and handicapped persons. A range of service is illustrated by Exhibit 4. These services have continued to operate at the same level provided prior to the implementation of accessible fixed-routes. In two systems, known transferring has occurred between a paratransit service and an accessible fixed-route.

- . Milwaukee's user-side subsidy program now places a ceiling on the monthly use. One frequent rider would conserve the monthly allocation by using a paratransit service for the trip from home to the bus stop. Using paratransit for the entire trip would have exhausted the subsidy amount before the end of the month.

**EXHIBIT 4**  
**RANGE OF PARATRANSIT SERVICE**  
**PROVIDED BY SELECTED SYSTEMS**

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<u>Transit System</u>	<u>Paratransit Service</u>
Champaign-Urbana	Half-fare cab program.
Detroit (SEMTA)	Door-to-door special transit service.
Los Angeles	Municipal paratransit service within service areas.
Milwaukee	User-side subsidy program.
Santa Clara County	Dial-a-Ride in rural portion of the county.

- . SEMTA's Essential Transportation Services (ETS) picks-up one regular user at his home to begin the daily trip to a sheltered workshop. The ETS minibus takes the passenger to an accessible route terminus where a transfer is made for the completion of the trip.

Additionally, SCRTD's planning section has considered interfaces with the many municipal para-transit services provided in Los Angeles County. No other known instances of service coordination exist among existing accessible services. This includes no known instances of coordination with transportation provided by social service agencies, though feeder service by the agencies is in the discussion stages in several areas. The extent that these other services will affect and will be affected by the provision of accessible fixed-route service will be given further discussion in later phases of this study.

3.4.2 Institutional Coordination - Each case study system has identified access to bus stops as a major deterrent to ridership on accessible routes. Only Santa Clara County has jurisdiction over the local roads and can thus alleviate these problems through internal programs. Other systems have submitted requests to state and local public works departments of desirable locations for curb cuts. They have met with varying degrees of success. In some locations, a priority has been established for installing curb cuts in the downtown area. Their installation has been programmed for the

next few years. Requests for curb cuts in outlying areas cannot be acted upon immediately. As such, the transit system's recommendations will not be scheduled for several years. The advisory committee in Los Angeles has been playing a major role in requesting the many governmental jurisdictions in the service area to expedite the installation of curb cuts along accessible bus routes. Their success has varied from town to town.

More success has been achieved in portions of the Washington metropolitan area and in Champaign-Urbana. One suburban Washington county will honor requests by individuals for curb cuts. Champaign-Urbana already has numerous curb cuts throughout the service area. The downtown areas and university campus are almost totally accessible. An existing program to install 25 additional curb cuts was available for the transit system's requests for improved access along bus routes.

In a related institutional coordination action, additional curb space at downtown bus stops has been requested in Champaign-Urbana. This pre-implementation request is intended to provide additional space for the driver to pull-in close to the curb to deploy the lift.

### 3.5 Maintenance

To prepare for the arrival of lift-equipped buses, all but one of the case study systems hired additional maintenance personnel. This section discusses the pre-implementation requirements for personnel and acceptance testing, as well as the daily operations issues of lift cycling, spares and reliability.

3.5.1 Additional Maintenance Personnel - Additional mechanics were hired to repair the lifts in all but one of the six case study systems. In each of the five, the mechanic was viewed as a "lift mechanic," not as an additional bus mechanic who would also do occasional lift maintenance. The sixth, Santa Clara County, trained a mechanic to specialize in lift repairs. Only one system contacted by telephone cited it did not hire lift mechanics -- Palm Beach County. This system, however, has an increased fleet as a result of its participation in the full accessibility demonstration and has expanded its maintenance staff. It is not possible to isolate lift maintenance from the overall expansion of the fleet and staff. Moreover, Palm Beach County has arranged to contract out some of the routine lift maintenance steps such as steam cleaning and fluid level checks.

The number of mechanics added varies from system to system. Champaign-Urbana, not yet operating, has budgeted one mechanic for 40 lifts. Washington, D.C. is at the other end of the spectrum with one mechanic for every nine lifts. Several others have an average of one mechanic to every 20-25 lifts. Exhibit 5 provides information on six systems.

In all cases, these mechanics are kept busy by lift work. Washington has increased its staff to 16 lift mechanics (from eight) this fiscal year as a result of their first year of experience. Milwaukee expects its five mechanics to be even busier in the winter months with additional cold weather-related problems. The arrival of 150 new buses in the Spring will be met by seven additional lift mechanics, following the current proportion of

EXHIBIT 5  
ADDITIONAL MECHANICS  
HIRED FOR LIFT MAINTENANCE

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<u>System</u>	<u>No. of Additional Mechanics</u>	<u>No. of Accessible Buses</u>
Champaign-Urbana	1	40
Milwaukee	5	100
Palm Beach	0 <sup>(a)</sup>	64
Santa Clara County	0 <sup>(b)</sup>	53
St. Louis	6 <sup>(c)</sup>	157
Washington, D.C.	16	151

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*(a) Recent system expansion included additional mechanics.*

*(b) An existing mechanic was specially trained.*

*(c) St. Louis now has four mechanics assigned to lift duty.*

mechanics to buses. These mechanics, like the others, will be located at both depots and the central maintenance facility.

The lift manufacturers have provided guidance materials for mechanic training. In most cases, they directly trained the mechanics, often on a mock-up of the lift available at the transit system. This training provision was included in the procurement specifications. Milwaukee states that its mechanics are "self-taught," relying on the manufacturer's manual. In all systems, there is some amount of on-the-job training in working with this new component. The necessary level of mechanic training is an important aspect of service implementation. These training needs will be treated in a later task of this study.

3.5.2 Vehicle Allocation - Vehicles are usually divided among the system's depots according to route and existing proportional allocation plans. However, two systems have taken opposite approaches to allocating accessible buses.

- . Los Angeles has chosen to concentrate the buses in four garages, necessitating some changes in some dispatching arrangements. This decision was based on the ability to reduce the number of extra mechanics and parts that the lifts and AM General buses will require.
  
- . Milwaukee preferred to distribute the buses fairly evenly among all garages. It was

expected that the new buses would have reliability problems. By spreading the buses out, no one depot would have an excessive number of inoperable buses and therefore could meet its scheduled service.

Each system feels that its system is appropriate to its needs. This too will be a subject for later discussion.

3.5.3 Facility Renovation - The addition of lifts to the buses has not required any modifications to the layout of maintenance facilities. Only St. Louis had to construct three work pits at their central maintenance facility. This was not determined until after the buses arrived. At that point, the system decided it did not want to use its existing hoists to perform lift maintenance.

3.5.4 Acceptance Testing - The acceptance testing process involves a thorough review of the vehicle including all of its new components by the transit system with the manufacturer's guidance. In frequent cases, the lifts have required retrofits. The amount of time required for retrofits can be longer than two years. Los Angeles started receiving their accessible buses over two years ago. Lift and other vehicle problems have still delayed service initiation. Santa Clara County, after two years, now has an "accumulator" designed by the lift manufacturer, to control the drifting problem, installed on all but two of their 52 accessible buses. The remaining two are still inoperable and will require a whole new lift assembly. Milwaukee took one year to have enough operable buses to

implement service. Other systems, such as Washington and Westchester County, began operating the service after a few months of testing in an effort to detect problems that would only surface in daily operation. These were designated as demonstration or "shake-down" periods. The service's availability was not advertised, so lift use was not anticipated. The major concern was to see how daily use of the bus would affect the reliability of the lift.

During the pre-implementation testing and retrofitting steps, the transit systems exercised the manufacturer's warranty provisions, so no major costs were incurred by the system.

3.5.5 Cycling Activities - All currently operating case study systems have a practice of cycling the lift as least once a day (Exhibit 6). Washington has expanded this to morning and evening cycling procedures.

- . Morning cycling assures that all vehicles have working lifts when they leave the garage. For vehicles stored outside, morning cycling will take on added importance during the winter months should the lift hydraulics freeze overnight.
- . Evening cycling eases the morning dispatching as it detects malfunctions before the vehicles are lined up for the morning. It also allows a list of lifts to be repaired to be ready for the garage supervisor before other morning work assignments are made.

**EXHIBIT 6**  
**LIFT CYCLING ACTIVITIES**

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<u>System</u>	<u>Frequency of Activity</u>
Detroit (SEMTA)	Once – in the evening.
Milwaukee	Once – in the evening.
Providence	Once – in the morning with mechanic present.
Santa Clara County	Suggested for every layover period.
Washington, D.C.	Twice – morning and evening.

There are advantages to each. Nonetheless, though a cycling procedure does detect some problems and it assures that all lifts are operable when they are dispatched, it is still no guarantee against in-service breakdowns. This is attributed to the sensitivity of the lift to dust, dirt and potholes. As a further precaution, Providence has a mechanic observe the morning cycling. In some cases, a minor repair can be made immediately and fewer buses are kept from morning runs.

Additionally, there is a practice of drivers cycling the lift during layover times. Santa Clara County states that the lifts work better if they are used more often and recommends that it be cycled at the end of every trip, when time permits. Conversely, Milwaukee has switched from a similar policy to one which prohibits any unnecessary lift use. This was prompted by several incidents where the lift malfunctioned during the layover, thereby hampering schedule adherence.

3.5.6 Reliability - Experience with the first accessible buses shows that systems are reluctant to schedule much more than half of the accessible fleet. They do not feel that they can guarantee that a higher number will be available on a recurring basis.

- . Milwaukee schedules 57 of 100 buses.
- . St. Louis now schedules 40 of 90 unbolted accessible buses.
- . Washington has just increased service to 81 of 151 buses.

These systems, as well as the other providers, are now very cautious when they schedule accessible buses. They want to be sure that they can provide reliable scheduled service.

The front door location of the lift is particularly vulnerable to any damage to the front of the bus. Conversely, systems operating buses with rear door lifts have experienced fewer maintenance problems. Systems which operate buses with rear door lifts include the following:

<u>System Location</u>	<u>Number of accessi- ble buses operated</u>
Detroit - SEMTA	14
Providence	14
Westchester County	15

It should be noted that the rear door lift has additional operational considerations such as requiring the driver to leave his/her seat to deploy the lift and maneuvering at the bus stop so as to bring the lift near the curb.

Since the accessible buses are the newest in the fleet, any available operable buses over the number required for the accessible runs are usually dispatched on other non-accessible runs. This common practice has a direct relationship on the availability of accessible buses in the spares pool. As in-service breakdowns are not uncommon, this means an accessible

bus would have to be replaced by a non-accessible bus. Exhibit 7 provides information on spares and peak-base ratios for St. Louis' 157 fleet.

Data on in-service breakdowns are not uniformly available. Of the four case study systems currently operating accessible service, the following data on in-service breakdowns can be reported:

- . Milwaukee experienced 40 problems out of a total of 167 boardings during the first 105 operating days in which the driver could not complete the lift cycle properly. Only seven of these required a mechanic's road call and taking the bus out of service. Other problems were handled by a road supervisor or through verbal instructions from the dispatcher. It is not known how many of these problems were mechanical and how many were related to improper use of the lift.
- . Santa Clara County estimates an average of four to five road calls per day, with 22 buses now in service. Approximately one vehicle is removed from service each day.

Washington does not yet have comprehensive data in this category. St. Louis has decreased its record-keeping with last year's cutback in service. Previously, data were collected on missed runs and trip denials, the latter based on drivers' reports.

Even for those systems which do maintain data on in-service breakdowns, it is not possible to determine what the specific reason for failure was. The major

EXHIBIT 7

BUS ASSIGNMENT DATA BY GARAGE

Garage	Non-Accessible Buses						Accessible Buses					
	Assigned Buses	A.M. Peak	Base	P.M. Peak	Peak-to-Base Ratio <sup>(a)</sup>	Spares Ratio <sup>(b)</sup>	Assigned Buses	A.M. Peak	Base	P.M. Peak	Peak-to-Base Ratio <sup>(a)</sup>	Spares Ratio <sup>(b)</sup>
Debalviere	243	206	79	209	2.64	16%	40	32	27	32	1.19	25%
N. Broadway	210	180	60	176	3.00	17%	51	41	32	41	1.28	24%
S. Broadway	197	164	49	163	3.35	20%	51	41	34	41	1.20	24%
E. St. Louis	72	60	24	60	2.50	20%	8	6	5	7	1.40	14%
Belleville	51	43	11	45	4.09	13%	7	5	4	5	1.25	40%

(a) Ratio of p.m. peak buses scheduled to base period buses scheduled.

(b) Spare vehicles as percent of p.m. peak requirements.

Source: Applied Resource Integration Limited, *Draft Interim Report – Evaluation of St. Louis Accessible Bus Service, 1978.*

reasons are assumed to be either a mechanical problem with the lift or the driver's possible confusion over this little-used procedure. Additional data collection by some transit systems will record this information. These results will be included in later reports from this study.

### 3.6 Marketing

The key function of the marketing activities has been to provide information on the availability of accessible bus service. This has been targeted to both potential lift users who are unfamiliar with the transit system and current riders who may notice a change in operations. The level of marketing activities that have been employed by the current accessible service providers corresponds proportionally to the system's overall marketing effort. As such, systems with large marketing programs have been more active in promoting the new service than the system which rarely advertises its other services. Key components in marketing accessible service have been brochures, media and demonstrations.

3.6.1 Brochures - Many of the current accessible service providers have created a user's guide to the service which includes information on:

- . How to obtain route and schedule information;
- . How to recognize the accessible bus;
- . Where to board;
- . How to board and tie-down the wheelchair;

- . What assistance to expect;
- . What fare to pay; and
- . How to alight.

Exhibit 8 shows the cover of the two-fold brochure created by Milwaukee. The entire inside section is a photographic illustration of the boarding, alighting and tie-down procedures. Neither the Milwaukee nor the Washington brochure include route-specific information as this was presumed to change frequently as more service was phased-in. A simple flyer was prepared which listed the routes and the generators they serve. A map of the routes is also included. For the Washington flyer, shown as Exhibit 9, the map is on the reverse side. This is available throughout the service area in any bus schedule rack.

Conversely, the St. Louis brochure listed the accessible routes. This is less desirable for cost reasons, since any changes in the accessible route structure would require changes in the brochure. The simple flyer is an easier procedure for a partially-accessible system. Los Angeles has solved this problem by listing route and schedule information on a replaceable insert to the brochure.

The brochures have been distributed in the same outlets as other service information -- schedule racks and through the mail. Additionally, the following distribution has occurred:

Brochures have been delivered in bulk by all systems to agencies and organizations

EXHIBIT 8

MILWAUKEE COUNTY BROCHURE FOR LIFT USERS

---

# how to ride the **WHEELCHAIR LIFT BUS**

A new way to  
help you get around



**EXHIBIT 8**  
**MILWAUKEE COUNTY BROCHURE FOR LIFT USERS**  
 (Continued)

**HOW TO GET ON A LIFT-EQUIPPED BUS**



1. When the bus arrives, remain at least five feet from the front door, allow other passengers to get on or off, and wait for the lift to be lowered.



2. The driver will tell you when the lift is ready for you to board. Please board the lift **BACKWARDS** and move as far back as possible.



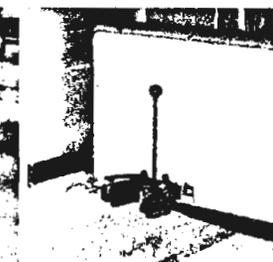
3. Lock your wheels. A safety barrier will be raised and the lift will be elevated to the level of the bus floor.



4. The driver will instruct you to enter the bus when the lift has stopped at the proper level. When you enter the bus deposit your fare, and tell the driver where you wish to get off.



5. Move backward toward the securement area as indicated by the driver.



6. Maneuver your wheelchair into the safety locking device which will firmly clamp to your right wheel.

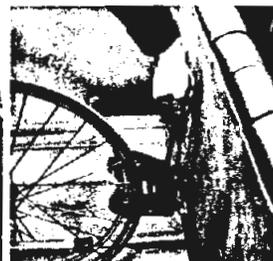
**HOW TO GET OFF THE LIFT BUS**



7. Lock your wheelchair brakes, and fasten the safety belt (the driver may assist you if necessary).



1. Adjacent to the securement area is a yellow signal strip. Push the strip to alert the driver that you wish to get off at the next bus stop.



2. When the bus comes to a complete stop, unfasten the safety belt, and unlock the securement device by pushing down on the knob near your right wheel. Unlock your wheels. Please wait for all other passengers to get on or off.



3. Move to the front of the bus. When the driver indicates that the lift is ready to board, move onto the lift facing out, and lock your wheels.



4. When the lift is at ground or curb level and the safety barrier is lowered, unlock your wheels and move completely off the lift.



**YOUR BUS TRIP  
 HAS BEEN  
 COMPLETED!**

**NEED MORE  
 INFORMATION?**

**CALL  
 344-6711**

## EXHIBIT 8

### MILWAUKEE COUNTY BROCHURE FOR LIFT USERS

#### WHO CAN USE THE LIFT?

Lifts on Milwaukee County Transit System buses are designed to safely accommodate wheelchairs *only*, therefore *only* a person in a wheelchair will be permitted to ride the lift.

#### WHAT IS THE FARE?

Half Fare Cash: 25¢ Tickets 10 for \$2.50

Full Fare Cash: 50¢ Tickets 10 for \$5.00

#### NOTE:

Reduced fares are in effect for wheelchair confined persons all hours except Monday through Friday between 6:00 a.m.-9:00 a.m. and 3:00 p.m.-6:00 p.m. when the regular fare must be paid. An attendant, assisting a person in a wheelchair may ride free anytime a reduced fare is in effect.

#### WHERE TO BOARD LIFT BUSES

As with all regular Milwaukee County Transit System bus service, board at any designated bus stop along routes assigned lift-equipped buses. Buses will *not* stop anywhere other than a designated bus stop.

#### THE SCHEDULES — WHEN THE LIFT BUSES WILL BE RUNNING

Call 344-6711. If you have not already done so, we suggest you request specially noted timetables and route maps for routes assigned lift-equipped buses. The symbol "H" indicates when and where all lift-equipped trips will be running. Trained information clerks are on duty 24 hours every day including holidays to answer any other question you may have about routes, schedules, fares, and how to use the lift.

#### PREPARING FOR YOUR TRIP

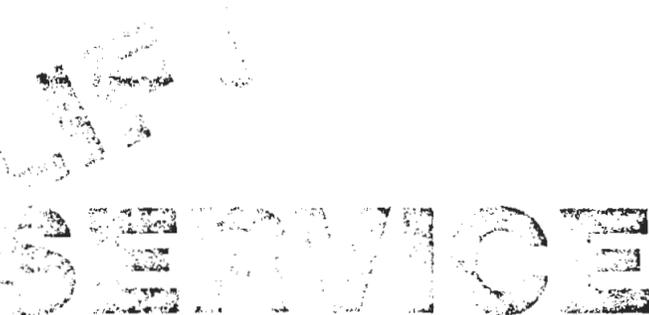
1. Plan your trip as far in advance as possible by calling for route maps and schedules.
2. Be at your bus stop several minutes before the bus is scheduled to arrive.
3. Fares are paid with exact change, a ticket, or weekly pass *only*. Drivers do not make change, sell tickets or passes.
4. Each bus has *one* securement area. Prior to boarding, the driver will advise you to wait for the next bus if that area is already occupied.
5. It is up to you to arrange for any help you will need getting to and from the bus stop or on and off the bus.
6. The driver must remain in his seat to operate the lift, but will give you verbal instructions and will assist you at the securement area.



Milwaukee County Transit System  
4212 West Highland Boulevard  
Milwaukee, Wisconsin 53208  
344-6711

EXHIBIT 9  
FLYER DESCRIBING THE INITIAL WASHINGTON SERVICE

# metrobus



Beginning July 1, 1979 new lift bus service will operate on twelve Metrobus routes serving employment centers, hospitals, shopping and recreation centers in the Washington metropolitan area. In September, service will be expanded to an additional twenty routes (see map on reverse side).

If you have difficulty climbing stairs, the lift bus kneels and makes climbing easier. If you're in a wheelchair, a platform lowers to the curb and lifts the wheelchair on the bus. Aboard the bus, the wheelchair locks into one of the two areas reserved for wheelchairs.

Traveling on Metrobus is now easier and more comfortable for the elderly and handicapped with Metro's new lift bus service.

## ROUTES & SERVICE

**ROUTE 10 -- ALEXANDRIA-ROSSLYN LINE**  
Serving Hunting Towers, Del Ray, Arlandria, Shirley Park, Shirlington, Westmont, Parkington, Virginia Square, Clarendon, Ft. Myer and Rosslyn Metro Station

**ROUTES 30, 32, 34, 38 -- PENNSYLVANIA AVENUE LINE**  
Serving Friendship Heights, Wisconsin Avenue, M Street, G.W. Hospital, Pennsylvania Avenue, 15th & Pa. S.E., Shipley Terrace, Naylor Gardens and Hillcrest

**ROUTE 40 -- MOUNT PLEASANT LINE**  
Serving Mount Pleasant, Union Station/Visitor Center, RFK Stadium, Stadium-Armory Metro Station, and Seat Pleasant

**ROUTES A2, A4, A6, A8 -- ANACOSTIA-CONGRESS HEIGHTS LINE**  
Serving Greater Southeast Community Hospital, D.C. Village, Bellevue, Fort Drum, Livingston, Wheeler Rd. & Varney St., Federal Center SW Metro Station and 10th & Pa.

**ROUTES D2, D4, D6 -- GLOVER PARK-TRINIDAD LINE**  
Serving Glover Park, Sibley Hospital, Trinidad, Ivy City, Rhode Island Ave. Metro Station and V.A. Hospital

**ROUTES F4, F6**  
Serving Silver Spring Metro Station, P.G. Plaza, East Pines, New Carrollton Metro Station, Maryland University, Beltway Plaza and Greenbelt

**ROUTE M6 -- M STREET-VISITOR CENTER LINE**  
Serving Rosslyn, Georgetown, Federal Triangle, Capitol Hill and Union Station/Visitor Center

**ROUTES S2, S4 -- 16TH STREET LINE**  
Serving Silver Spring Metro Station, 16th Street, Federal Triangle

**ROUTES T4, T6 -- BETHESDA-ROCKVILLE LINE**  
Serving Montgomery College, Rockville, Naval Medical, NIH, Bethesda, Friendship Heights and Dupont Circle

**ROUTE T17 -- JOHN HANSON HIGHWAY EXPRESS LINE**  
Serving Belair Center and New Carrollton Metro Station

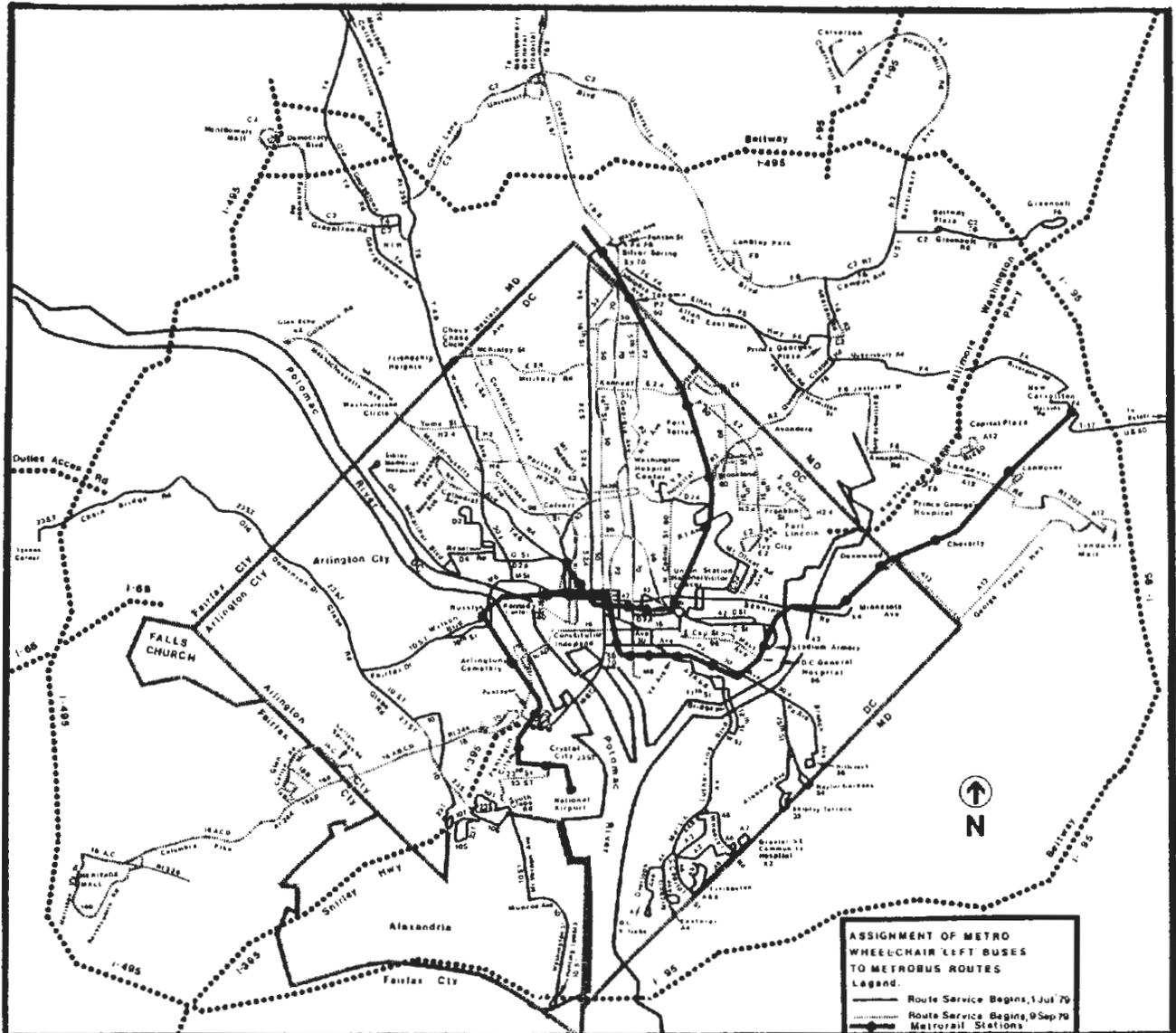
**ROUTES X4, X6 -- BENNING LINE**  
Serving Minnesota Avenue Metro Station, Mayfair Gardens, 34th & Benning, Union Station/Visitor Center and Lafayette Square

Not every bus operating on the lift service routes will be a lift bus. Individual timetables for each route are marked with a "w" to indicate exactly what bus trips operate with lift-equipped buses. To get the timetables you need, call our Timetables Office at 637-1261.

The elderly and handicapped ride Metrobus and Metrorail at reduced fare with proper identification. To find out how to obtain your identification card call: 637-1245 -- Handicapped Unit 637-1179 -- Senior Citizen Unit

Community based training on the lift bus equipment is available. Several areas throughout the metropolitan region have been selected for training sites. Wheelchair users and mobility impaired who would like to learn how to use the lift service before actually riding the bus can make arrangements for this special training by calling 637-1256.

**EXHIBIT 9**  
**FLYER DESCRIBING THE INITIAL WASHINGTON SERVICE**  
 (Continued)



which represent the disabled for further distribution to their clients and members.

- . St. Louis made a special effort to distribute the brochure to generators served by the initial accessible routes.
- . Milwaukee used its registrants for the user-side subsidy program as a target market for a mailing containing a letter from the program director, a brochure, and a map.
- . Seattle's marketing efforts have been assisted by a local organization of disabled persons. The group has prepared a map of downtown Seattle indicating existing curb cuts and bus stops where accessible routes pass.

A unique brochure has been prepared in Champaign-Urbana for distribution to current passengers. The brochures explain the new service, illustrates the new vehicle and its lift components, and describes expected impacts on the current operation, such as changes in travel time, use of the fold-up seats, and use of the rear door to exit when a passenger is using the front door lift. This will be handed out on board the bus by the drivers several weeks before accessible service is implemented. Seattle will distribute a "Rider Alert" flyer to all passengers on the first accessible route to inform them that the bus is lift-equipped and to advise them on how to obtain more specific information.

3.6.2 Public Timetables - Timetables for accessible routes have been modified to indicate which routes and trips are operated with lift-equipped buses.

The front of the timetable has been modified to include the international accessibility symbol. Exhibit 10 shows the front covers of accessible route timetables from St. Louis, Milwaukee and Washington. Placement of the symbol at the top of the cover has made the St. Louis and Washington timetables more distinguishable than the Milwaukee timetable when presented on a systemwide schedule rack.

The inside of the timetable provides the actual schedule for accessible trips. As Exhibit 11 shows, St. Louis indicated these trips with a star. Other systems have also used a "W" for wheelchair or an "H" for handicapped next to the designated trips.

Timetables have been distributed as part of the systemwide marketing program. In addition, as with the brochures, they have been made available to agencies and mailed out as a packet upon request by the information center.

3.6.3 Information Center - Seattle has provided training to information center operators regarding sensitivity to a disabled person's needs, explaining their potential lack of familiarity with transit service, and the operator's requirements to spend additional time to properly respond to the person's questions. In addition, operators have been given information on which bus stops are easiest to use. They are expected to provide boarding and alighting information along with route and schedule information to anyone who contacts the center for accessible service information.

EXHIBIT 10  
 SAMPLE PUBLIC TIMETABLES FOR ACCESSIBLE ROUTES

 W— DESIGNATED TRIPS OPERATED WITH WHEELCHAIR LIFT EQUIPPED BUSES

# ROUTE 10

ALEXANDRIA—ROSSLYN LINE  
 between  
 HUNTING TOWERS  
 DEL RAY  
 ARLANDRIA  
 SHIRLEY PARK  
 SHIRLINGTON  
 WESTMONT  
 PARKINGTON  
 VIRGINIA SQUARE  
 CLARENDON  
 FT. MYER  
 AND  
 ROSSLYN METRO STATION



# metrobus schedule

**M** WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY  
 600 5th Street, N.W.

EFFECTIVE DATE JULY 1, 1979  
 INFORMATION 637-2437

CONDENSED TIMETABLE  
**ROUTE 23**  
 EFFECTIVE: JUNE 17, 1979



**FOND DU LAC AVENUE**

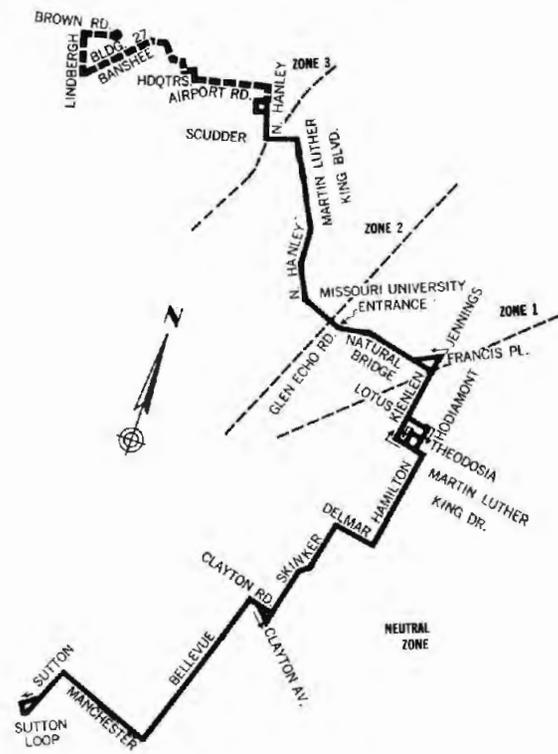


SUBJECT TO CHANGE WITHOUT NOTICE  
 Telephone Information 344-6711

 **CITY LIMITS — BERKELEY**  
**ROUTE NO. 16**

★ DESIGNATED TRIPS OPERATED WITH WHEEL CHAIR LIFT-EQUIPPED BUSES BEGINNING AUGUST 15, 1977

EFFECTIVE APRIL 18, 1977  
 (Subject to Emergency Changes)



For additional timetables or information call 773-1120  
**BI-STATE DEVELOPMENT AGENCY**



3869 PARK AVENUE ST. LOUIS, MO. 63110

EXHIBIT 11

ST. LOUIS PUBLIC TIMETABLE SHOWING DESIGNATED ACCESSIBLE TRIPS

Monday thru Friday						Monday thru Friday					Saturday					Saturday								
NORTHBOUND						SOUTHBOUND					NORTHBOUND					SOUTHBOUND								
Lv. Saffan Loop	Skinker & Lindell	Wellston Loop	Nor-mandy	King Dr. & No. Hanley	Arr. Airport & Midtownway	Lv. Airport & Midtownway	King Dr. & No. Hanley	Nor-mandy	Wellston Loop	Skinker & Lindell	Arr. Saffan Loop	Lv. Saffan Loop	Skinker & Lindell	Wellston Loop	Nor-mandy	King Dr. & No. Hanley	Arr. Airport & Midtownway	Lv. Airport & Midtownway	King Dr. & No. Hanley	Nor-mandy	Wellston Loop	Skinker & Lindell	Arr. Saffan Loop	
AM						AM						AM						AM						
	*5500	*510	*519	*528	*534				*520	*531	*545													
522	534	545	554	603	609	*538	*546	*555	*605	*618	*632													
539	551	602	613	622	628				625	638	652													
*552	*606	*619	*630	*639	*645	623	631	642	654	710	725													
616	630	643	654	704	710	639	647	658	710	728	743													
*629	*643	*656	*707	*717	*724	*653	*701	*712	*724	*742	*757													
*639	*653	*707	*718	*728	*735	704	712	724	736	754	809													
658	714	728	739	749	756	717	726	738	751	809	824													
728	744	758	809	819	826	*731	*740	*752	*805	*821	*838													
748	804	818				800	809	821	828	846	901													
*803	*818	*832	*843	*853	*900	*805	*814	*826	*839	*857	*912													
821	836	850				830	839	851	903	918	933													
838	853	907	918	928	935	*925	*933	*944	*955	*1010	*1025													
*855	*906	*924				955	1003	1014	1025	1040	1055													
913	928	942				*1048	*1056	*1107	*1118	*1132	*1146													
*938	*953	*1007	*1018	*1028	*1035	*1145	*1152	*1202	*1213	*1227	*1241													
*1010	*1025	*1039							*1050	*1105	*1120													
*1035	*1050	*1104	*1117	*1127	*1134				1143	1157	1211													
1105	1120	1134																						
*1130	*1145	*1159	*1212	*1222	*1229																			
*1156	*1211	*1225																						
PM						PM						PM						PM						
1221	1238	1250	103	113	120	*1237	*1244	*1254	*1230	*1252	*106													
*1251	*106	*120	*133	*143	*150				*105	*118	*133													
*116	*131	*145				124	131	141	152	206	220													
*143	*159	*213	*226	*238	*243	*210	*217	*232	*216	*230	*244													
206	222	236	249	258	306	*255	*302	*317	*328	*344	*400													
229	245	258				*315	322	337	348	404	420													
*300	*316	*333	*347	*357	*405				*400	*424	*440													
*320	*337	*355				*356	403	418	429	445	501													
334	351	409	424	434	443	*420	*427	*442	*453	*509	*525													
356	413	432	447	457	508	*454	501	516	527	542	558													
*414	*431	*450	*505	*515	*524	505	512	527	538	553	609													
434	451	510	525	535	544	515	522	536	547M															
*456	*513	*532	*547	*557	*604	*532	*539	*546	*602	*616	*632													
523	539	555	600	610	625	602	609	620	630	644	700													
*555	*810	*824	*837	*847	*854	*828	*835	*846	*856	*910	*924													
625	640	654	706	716	723	*706	*713	*724	*734	*747	*801													
*655	*710	*724	*738	*746	*753	*810	*817	*827	*837	*850	*902													
*727	*742	*755	*807	*817	*824	*908	*914	*924	*934	*947	*959													
*807	*821	*834	*846	*858	*903	*1000	*1014	*1024	*1034	*1047	*1059													
*907	*921	*934	*845	*855	*1002	*1100	*1114	*1124	*1134	*1147	*1159													
*1000	*1021	*1034	*1045	*1055	*1102																			
*1102	*1115	*1128	*1130	*1149	*1156																			
AM						AM						AM						AM						
*1202	*1215	*1228				*1200	*1206	*1216	*1226H	*1228H														
S--Lv. Skinker & Waterman						H--To Hamilton & Delmar only						S--Lv. Skinker & Waterman						W--Wheelchair Lift Equipped Buses						
*--Wheelchair Lift Equipped Buses						*--Wheelchair Lift Equipped Buses						*--Wheelchair Lift Equipped Buses												
	Airport & Midtownway	Bldg. 101	W. Midg. Bldg.	Gate 102	Bldg. 4	Bldg. 27																		
AM	*609	630										AM												
*628																								
*735			*738	*740	*743	*750																		

-67-

The information centers at all accessible transit systems mail out available information to anyone requesting it. Los Angeles will monitor these requests. Records of the requests have been developed, which list the person's name, address and the information received. This list is intended as both a monitoring tool and a mailing list for future information on service changes and expansions.

Several systems have installed teletypewriter (TTY) terminals to provide information to hearing impaired persons. These currently exist in Santa Clara and Washington. A few other systems have no near-term plans to install the equipment as they doubt it will receive much use. As an alternative, they have made service information available to social service agencies with TTY capabilities.

3.6.4 Media - Television and radio commercials have been used by most systems as a means to attract potential lift users and to explain the service to the general public. These spots have usually been public service announcements, so there has been no charge to the transit system for the air time. The only direct cost has been production.

Washington prepared two 10-second and one 30-second television spots which illustrated a person in a wheelchair boarding the bus, securing the wheelchair and then alighting. One of the 10-second spots just showed the kneeling feature. At the conclusion of each, the public information number was displayed. The transit system was given prime area time during the evening news for the spots. Their reaction is that that the visual demonstration

was very effective in introducing the concept of fixed-route accessible service to the handicapped community and the general public.

Radio public service announcements, usually 30 seconds in length, have also been utilized. Milwaukee developed two different spots which announced the implementation of lift-equipped buses on the first routes. Both were simple announcements which provided a telephone number for further information.

Newspapers have also provided coverage in three ways:

- . Using the transit system's press releases;
- . Preparing news reports on the service; and
- . Writing feature articles about particular users of the service.

For the first day of service, some systems have prearranged a "first user trip" with a volunteer from the advisory committee. This trip is held as a media event with local television, radio and newspaper reporters able to record the service initiation.

Some systems, such as Westchester County, have not provided any marketing of their accessible services. Westchester County's operating budget does not provide for transit marketing activities. At the same time, the system suspects that its low ridership is attributable in part to not getting the message out to potential users. The effectiveness of marketing programs in attracting wheelchair passengers

will be a topic for further discussion in the next phase of the study.

3.6.5 User Training - To encourage ridership by disabled individuals and to respond to their lack of experience in using transit, demonstrations and practice sessions have been scheduled by all of the case study systems. The purpose of this Outreach program is two-fold:

- . To build confidence in using transit; and
- . To develop speed and proficiency in using the lift and tie-down.

These practice sessions have shown that, as a person becomes more familiar with the lift and tie-down procedures, their speed in doing it increases. This has the added advantage of decreasing dwell time for the transit system. The rationale for the practice session is to have the person's first attempt be in a familiar, supportive surrounding, rather than at a bus stop.

Demonstrations have been held at a number of locations, including:

- . Rehabilitation centers;
- . Social service agencies;
- . Shopping centers;
- . The downtown area; and
- . Meetings of groups of disabled individuals.

The last location has been utilized in Los Angeles with the practice session serving as a special presentation at the meeting. Washington has co-sponsored many demonstrations with handicapped groups and has requested their assistance in publicizing the event.

If the purpose of the demonstration is to inform the general public of the service, rather than to enable potential users of the service a chance to practice, it may be more economical to use an audio-visual display (the operators' training materials have been used for this purpose) and a mock-up of the lift. The alternative requires keeping at least one bus and one driver at the demonstration site. Often, general population-oriented demonstrations have been set up for long hours at shopping centers or special events such as the County Fair. To require a bus and a driver for this period of time when the expected number of potential users is low may be a non-productive use of resources.

Unique characteristics of the user training program are as follows:

- . Seattle has relied on a task force of drivers to assist in the demonstration. The drivers were selected from a group of 40 who signed up to drive the first routes. The fact that these drivers are present at the demonstration has assisted some passengers when they see a familiar face on board the bus.

- . Santa Clara County trained one customer service representative in sign language. That person attends all demonstrations.
- . Washington's grant to develop training programs enabled the transit system to hire one person whose primary responsibility is to schedule user training programs.
- . Champaign-Urbana has expanded the list of potential demonstration sites to include any individual requests.

The program of user training has been active for several years. St. Louis, the first system to offer major accessible service, conducted 35 site demonstrations prior to service initiations. The widespread use of the technique by virtually all current providers of accessible service, is testimony to its value.

### 3.7 Monitoring and Evaluation

The extent of current data collection for accessible service has been related to the system's data collection requirements prior to the implementation of accessible service. In some systems, drivers complete a daily tally card which now includes lift use. Elsewhere, some system's buses are equipped with registering fareboxes and the driver can record handicapped ridership if the passenger pays a special fare. In these instances, the inclusion of data collection on lift use is not a major addition to the driver's data collection responsibilities.

3.7.1 Monitoring Activities - Most of the case study systems collect data on ridership, vehicle

dispatching, and in-service breakdowns. However, the reliability of this data varies from system to system.

Ridership data in most systems is expected to be turned in with the driver's tally card for each run. With the addition of registering fareboxes, systems can corroborate these daily records. However, these do not often include a special category for lift use, but rather for reduced-fare passengers.

During the evaluation of service in St. Louis, handicapped individuals prepared daily trip diaries. These trip records indicated that the drivers were only reporting about half of all lift use. Drivers in Washington do not always remember to fill out their trip cards to show wheelchair passengers. This illustrates the difficulty in obtaining accurate ridership records even though mechanisms are currently in place to collect the information.

Exhibit 12 presents some of the current techniques used to record ridership in the case study system. The one unique method, and believed to be one of the most accurate by the transit system, is Milwaukee's radio reporting procedure. As mentioned previously, the driver is required to notify the dispatcher whenever a wheelchair passenger boards or alights to forewarn him of a potential delay. A major reason why this radio technique works in Milwaukee, but would not be applicable in other systems, is the emphasis placed on schedule adherence and radio reporting. Drivers in Milwaukee are required to notify the dispatcher any time they are behind schedule by more than five minutes. As such, the

**EXHIBIT 12**  
**METHODS TO RECORD RIDERSHIP**  
**BY LIFT USERS**

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<u>System</u>	<u>Method</u>
Detroit (SEMTA)	Daily tally card, farebox reading.
Milwaukee	Radio message to dispatchers.
Palm Beach County	Trip card and farebox reading.
Providence	Special card and farebox reading.
Seattle	Farebox reading.
Washington, D.C.	Trip cards.
Westchester County	Special tally sheet.

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extension of the requirement to record wheelchair ridership was not difficult to accomplish.

Vehicle dispatching information is prepared by many systems with a checklist for each accessible bus. This information is then used as a check against scheduled accessible runs to see that accessible vehicles are being assigned properly. Other dispatching checklists include daily cycling reports. These indicate whether the vehicle was able to be dispatched or whether it was kept for maintenance.

In-service breakdown information is kept by the dispatcher. In systems where the accessible buses are equipped with radios, mechanical problems can be reported immediately. Of the six case study systems, only Santa Clara operates some of its buses without radios. More are currently being installed so that all accessible buses will soon be radio-equipped.

The dispatchers central location on a radio-equipped system enables a recording of in-service problems. Exhibit 13 illustrates a log maintained by the Milwaukee dispatcher on origins, destinations, boarding and alighting delays, and mechanical problems.

In an effort to provide internal monitoring of the accessible bus operations, one case study system, Santa Clara County, established a Passenger Lift Task Force. Membership consists of representatives of:

- . The advisory committee



- . The maintenance department
- . A road supervisor; and
- . A senior information services representative.

The task force discusses matters relating to the operation of the accessible service and reviews operating records.

3.7.2 Surveys - To date, major survey activity has only occurred in St. Louis in conjunction with UMTA Service and Methods Demonstration (SMD) evaluation. Other surveys are scheduled for the three additional SMD evaluations in Champaign-Urbana, Palm Beach County and Washington, D.C.

SMD-related surveys have been and will be conducted both on-board and in the homes of disabled individuals. Different on-board surveys have been prepared for handicapped and non-handicapped users. In total, four different target groups have been identified for evaluation surveys.

- . Transit users on-board surveys
  - lift users
  - non-lift users
- . Home interviews of handicapped
  - transit users
  - non-transit users

The surveys have included questions on origin and destination, attitudes toward accessibility, and the availability of public information regarding accessible bus service. Home interviewees have been asked about

their travel patterns and attitudes toward using accessible transit. They were also asked to complete a travel diary showing all trips, mode, trip purpose and travel time.

None of the six case study systems, other than St. Louis, have conducted surveys to date on their operation. Nor are these planned for the near future. A major reason for hesitating to conduct surveys is the low level of ridership by wheelchair users.

3.7.3 Evaluation Activities - Aside from the UMTA-sponsored evaluations, little assessment of accessible service has occurred on the local level. Several systems are waiting until more service is in place before devoting staff time to an evaluation.

The data collected for a transit system's monitoring activities has not been very extensive. Some local planners have stated that the data would be more useful if ridership were higher, and they would be able to use the data to adjust service to meet the high level of demand. Current low levels of ridership<sup>5</sup> have restricted the use of the collected monitoring information to serving as documentation of the system's efforts. The data are submitted to the

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<sup>5</sup> Some systems have been able to report these current ridership figures:

- . Detroit (SEMTA) - 2 trips per day
- . Milwaukee - average of 1.3 trips per day
- . Providence - 26 trips per month
- . St. Louis - 66 trips per month
- . Santa Clara - 8 trips per day

transit system Board of Directors and the system's funding agencies. However, it is not used for service planning activities. The type of monitoring and evaluation activities that can be accomplished will be discussed thoroughly in the next phase of this study.

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## **APPENDICES**

Appendix A: Case Study – Champaign-Urbana, Illinois

Appendix B: Case Study – Los Angeles, California

Appendix C: Case Study – Milwaukee, Wisconsin

Appendix D: Case Study – St. Louis, Missouri

Appendix E: Case Study – Santa Clara County, California

Appendix F: Case Study – Washington, D.C.

Appendix G: Bibliography



## APPENDIX A

### CASE STUDY - CHAMPAIGN-URBANA, ILLINOIS

#### 1.0 Case Study Summary

The Champaign-Urbana Mass Transit District (MTD) will be initiating fixed-route accessible service throughout its 10-route system. The initial implementation date was set for Fall 1979. Mechanical problems have postponed the service start until Spring 1980.

The accessible MTD fleet will consist of two types of buses; 25 new Grumman Flexible Corporation model 870 buses equipped with a hydraulic lift manufactured by Environmental Equipment Corporation (EEC); and 15 older General Motors coaches (1971 model year) which are being retrofitted with the EEC lift by a company in Schenectady, New York. The 15 older buses and five of the newer buses are 35 feet long. The 20 other new buses are 40 feet long. All are 96 inches wide.

The MTD is participating in an UMTA-sponsored Service and Methods Demonstration (SMD) which will test and evaluate the operation of a fully-accessible transit system in two small urban areas. The other system is in Palm Beach County, Florida. Though both are similar in size, major differences exist in climate and service area population. Champaign-Urbana has a young, university-oriented population and cold midwestern winters. Palm Beach County has a large elderly population, many of whom are attracted by the year-round warm climate. The SMD support will not only enable the MTD to retrofit

their vehicles and administer the service, but will provide extensive monitoring and evaluation of the service through the Transportation Systems Center in Cambridge, Massachusetts.

No changes are being made to routes or schedules prior to the initiation of service. Rather, the MTD has adopted a "wait and see" approach. One preliminary action, however, has been to request additional clearance at bus stops from the two municipal governments. This is to assure the driver's ability to pull into the curb to deploy the lift. In designing the service, the MTD assumed that the travel needs of the handicapped were the same as those of the general public. The first accessible route will link university housing, the university campus, and downtown Urbana.

#### 1.1 Unique Characteristics of this Case Study

The level of service evaluation which will occur in Champaign-Urbana as a result of the SMD project sets this case study apart from the others. More importantly, there are several basic characteristics about the Champaign-Urbana community that underlie its selection as a demonstration site.

- . Champaign-Urbana is the home of the University of Illinois and its well acclaimed Rehabilitation-Education Center. The existence of the Center and its disabled students has had a unique effect on the local community.
  
- The high population of disabled persons in the area has brought about an unusual level of acceptance and sensitivity to the needs of the disabled on the part of residents and students throughout Champaign-Urbana.

- The existence of the Center's program has created a virtually barrier-free environment. This high level of accessibility extends beyond the University's buildings and sidewalks to the entire twin cities area. New buildings routinely include provisions for the handicapped. Also, an unusually high number of curb cuts exists. Twenty-five curbs are converted each year by local streets departments in addition to the ramping of any new or damaged curbs.
  
- The Center has been operating lift-equipped buses for its students for the past 28 years, primarily to link University residents and classrooms. A platform-style lift has been developed for use in a fixed-route operation. Over the years, the lift has been modified to reflect both improved technology and knowledge gained from the operation of the service. This experience and technical knowledge provides a great asset to the MTD's upcoming demonstration through frequent consultations between the MTD and the Center.
  
- Disabled students at the University and other disabled residents living and working in the area provide a disproportionately high number of potential passengers. In addition to the number of users, the MTD's target market is unusual in that they are considered to be more independent and "mainstreamed" than the overall disabled community found in other cities. Their past

or present relationship with the University makes its Rehabilitation Center a focal point for disseminating information on the MTD service to the disabled community.

- . Support for transit service is also high in Champaign-Urbana. The passage of an eight-point property tax-related referendum in March 1977 enabled the MTD to expand service to outlying neighborhoods and provide limited service on evenings and Sundays. Included in the referendum was the feature of lifts on any future buses purchased for use in regularly scheduled service. The MTD is also viewed positively by the local press and the national transit industry as a progressive, consumer-oriented, well managed system.

## 2.0 Case Study Setting

Accessible transit service will be available throughout the MTD's service area. This section provides background information on the service setting.

### 2.1 Geographic and Demographic Characteristics

The twin cities of Champaign and Urbana are located in East Central Illinois. Chicago is 130 miles to the north, Indianapolis is 120 miles to the east, and St. Louis is 150 miles to the southwest. The area consists of 34 square miles of flat terrain subject to the winds, snow and ice of winter and the heat and tornado watches of the summer.

The central generator in Champaign-Urbana is the University of Illinois campus which occupies over 700 acres of land in the south central portion of the area. The campus is located in both cities, as its buildings span the dividing line between Champaign on the west and Urbana on the east.

Champaign-Urbana's population, according to the 1970 census, is approximately 90,000. Champaign is the larger of the two cities, with approximately 56,000 people; Urbana is comprised of 34,000 people. Students represent a transient population of approximately 33,000. The twin cities and the MTD service area are only a part of the Champaign-Urbana urbanized area. The entire Champaign-Urbana urbanized area has a population of approximately 163,000.

An estimated range of wheelchair-using residents was prepared for the demonstration evaluation plan.<sup>1</sup> The low range of the estimate was based on the recent national incidence rate of 0.275 percent of the total population being in wheelchairs. This was published in U.S. DOT's 1978 Summary Report of Data from National Survey of Transportation Handicapped People. Applying this to the Champaign County Regional Planning Commission's current population estimate for the twin cities (92,000) yielded an estimated 253 wheelchair individuals (92,000 x 0.275%). The high range assumed that the incidence of wheelchair users on campus was consistent throughout Champaign-Urbana. This estimate yielded 414 wheelchair users.<sup>2</sup>

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<sup>1</sup> Webb, Peter, Evaluation Plan Volume I, Fully Accessible Bus Fleet Demonstration Project, Champaign-Urbana, Illinois, prepared for the U.S. Department of Transportation, Transportation Systems Center, (Menlo Park, CA, Crain & Associates, August 1977).

<sup>2</sup> The number of wheelchair-using students (150) was divided by the student enrollment (33,000) to yield an incidence rate of .45 percent. This was applied to the area population of 92,000.

## 2.2 Institutional Setting

The MTD is accountable to its Board of Directors. Its service area is restricted to primarily the urbanized areas of Champaign and Urbana, though the U.S. Census Bureau's Standard Metropolitan Statistical Area (SMSA) and Champaign County are much larger areas.

The MPO for the twin cities is the Champaign County Regional Planning Commission (CCRPC), with offices in downtown Urbana. Both CCRPC and the MTD Board allow the MTD management to control the daily operation of the system with little interference. The Regional Planning Commission will be preparing a Transition Plan for the area. However, since a fully accessible fleet will be in operation before the plan is submitted, it is not being viewed as a major planning task. A local advisory committee will be reconvened for the transition planning process.

Informal guidance, particularly for the demonstration program, is provided by the University of Illinois Rehabilitation-Education Center, a pioneer in this field. The Center and its personnel are well-respected nationally and represent the views and needs of the local handicapped community, particularly the transient students. Also connected with the demonstration are UMTA's SMD office in Washington, the Transportation Systems Center in Cambridge, and an evaluation contractor. All will be involved in the service evaluation.

## 2.3 Transit System Characteristics

The passage of the March 1, 1977 MTD referendum provided an increase in the property tax levy specifically earmarked for transit service. This enabled the MTD to follow a proposed eight-point program of service expansion, including

extensions into outlying areas, evening and Sunday service, and additional routes on weekdays. A total of 10 routes now operate on Monday through Saturday. Most of the service begins at 6:00 a.m. and ends at 7:00 p.m., operating on an average headway of 30 minutes. Thirty-three of the MTD's 43 vehicles are needed for peak hour service.

The tax levy enables a skeletal system to operate on Monday to Friday evenings and on Sunday. A reduced system of four routes is in operation at these times. Service is also on a 30-minute headway ending before midnight on weeknights. Sunday service is available from 9:00 a.m. to 5:00 p.m.

All routes are centered around three focal points:

- . Downtown Champaign;
- . Downtown Urbana; and
- . The University of Illinois campus.

Nine of the ten routes serve the campus, eight serve downtown Champaign and six serve downtown Urbana. Average daily ridership has been increasing rapidly to 12,000 passengers. The MTD operates out of a relatively new garage and office facility in northeast Urbana. Like most buildings in the area, it is accessible to the handicapped.

MTD charges a 35-cent fare for their service. Exact fare is required after 7:00 p.m. Elderly and handicapped individuals with an MTD picture identification card can purchase 16 tokens for \$2, or can purchase an annual pass for \$25. The adult full fare for the annual pass is \$90. Students can buy 12 tokens for \$2. An all-day transfer is available on weekends.

The current MTD fleet consists of 43 "new look" buses and two 14-passenger vans. Many of the buses will be replaced by

the Grumman Flexible 870s on order. The vans are primarily used by the road supervisors. However, they can double as back-up vehicles when a bus falls behind schedule by ten minutes or more. If this occurs, the bus is turned back at the point in the route and schedule that it will be on time in the reverse direction. A van, usually on patrol in the service area, is dispatched to the turnback point. The supervisor then transports any passengers on the late bus to their destinations and picks up any passengers waiting for the late bus. This practice has virtually eliminated any missed runs and reduced the frequency of late runs.

As part of the referendum passage, MTD was able to initiate a half-fare cab subsidy program for the elderly and handicapped who are unable to use the bus. Most users of the service are elderly. One lift-equipped van is also available through one of Champaign-Urbana's cab companies. Average taxi fares are \$2.20; the cost to the MTD is \$1.10. Average fares for the van, however, are \$8.00; the MTD subsidy pays \$4.00. The fare is computed as \$5.00 to board and \$1.00 per mile. The total trip cost may be no more than \$8.00. The MTD will pay one-half of the total, up to a subsidy limit of \$75.00 per month per individual. Though the service is to continue, MTD management expects that the accessible buses, because of their 12½ cent fare, will attract many of the van users who are now paying an average of \$4.00 for a one-way trip. In the first part of 1979, van use has ranged from 72 to 116 trips per month. Monthly taxi trips for this same time period ranged from 5,108 to 5,838 trips per month.

Cunningham Township (Urbana) also supports a free cab program for Urbana senior citizens. The service is primarily for medical trips and requires a 24-hour advance reservation. A United Way-funded agency also provides transportation to the elderly and handicapped through a network of volunteers driving their own cars. Many of the local agencies also use

the Rehabilitation Center's buses for group social trips. However, the four buses are in fixed-route operation on the University of Illinois campus for 14 hours a day. Four fixed-routes are established each semester according to the needs of the students. Each vehicle makes two runs each hour. Peak load capacity of the service is 200 passengers per hour, though average ridership is 45-50 passengers per hour. The service, available to disabled students, faculty, and staff and their attending friends, has been providing access between University residence halls and classroom buildings since 1952.

### 3.0 Accessible Service Operation and Development

This section discusses the steps undertaken by the MTD in developing an accessible transit system. It includes the activities necessary to prepare for the first day of operation.

#### 3.1 Service Evolution and Description

Planning for accessible service began in 1975. A transit improvement program published in 1976 recommended that fixed-route accessible service be implemented rather than a parallel demand-responsive service. Following the recommendations of the study, the MTD applied for a demonstration grant to retrofit their entire fleet which then consisted of 25 vehicles. Grant approval was received in September 1977.

However, service expansion as a result of the March 1977 referendum necessitated fleet expansion in addition to the retrofits. The new vehicles, expected to be delivered in January 1980, were purchased with two capital grants totalling \$2,031,580. The bid announcement for the retrofitting was in April 1978. In January 1979, the contract was signed with the retrofitter, Ribley & Harppinger of Schenectady, New York. One week later, the first bus was sent for retrofitting. The purchase of the lifts, their installation, and the administration

of the demonstration program is included in an UMTA SMD grant of \$502,040. Each vehicle retrofit will cost \$23,000. The project was planned for two stages: eight months for planning and design, and 18 months for the operation of the vehicles.

Upon the delivery of the 25 Grumman Flxible 870s and the completion of the retrofiting of 15 buses from the existing fleet, MTD will initiate accessible fixed-route service. Two routes have been selected for the initial service. It was originally thought that enough retrofitted vehicles would be available by the Fall to initiate the service. This may not be possible. A delivery date for both the new and retrofitted vehicles is still uncertain. If the vehicles arrive during the winter, testing and local weather conditions will delay the service initiation until Spring 1980.<sup>3</sup>

Within a short time after the first two routes are implemented, all routes will be accessible. The schedule for phasing-in additional routes will be determined by the operational experience. The 100 percent accessible fleet will operate the same routes and schedules as the current service. Though the MTD is aware of the pre-implementation changes that other transit systems have made, particularly in the areas of routes and schedules, they have decided not to make these changes until the actual operation proves them necessary.

Each of the vehicles will be equipped with two wheelchair tie-downs and a kneeling feature. Both the new Grumman Flxible 870s and the retrofitted General Motors buses are 96 inches wide. Champaign County would not permit the MTD to operate the wider 102-inch model. The vehicles will also be equipped with Duncan registering fareboxes. The size and location of the farebox, complemented by the narrow aisle of the bus, may create a tight entrance for the wheelchair passenger.

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<sup>3</sup> When this Case Study was conducted, no vehicles were ready for service.

## 3.2 Service Implementation Activities

In anticipation of service implementation, the MTD has developed or is planning to develop several programs and practices. The following discussion treats the activities of demand estimation, operations, training, maintenance, marketing and coordination. The planned evaluation of the service, made possible by its being a demonstration project, will be discussed in a later section of this report.

3.2.1 Demand Estimation and Route Selection - In other accessible transit systems, level of demand is one of several criteria used in determining which routes will be scheduled with lift-equipped buses. In Champaign-Urbana, the need for demand estimation exercise was questioned since the entire fleet will be lift-equipped. With the advice of the Rehabilitation Center, the MTD assumed that the travel needs of the disabled were no different from those of the general population. Transit service should be provided to all travel generators in the community. If certain ones are not served, the disabled community, just like the "able-bodied" community, will let the operator know where the deficiencies are.

Initially, it was thought that two routes could be implemented in the Fall with the retrofitted vehicles, and the new buses would be placed into service in the Spring. To select which routes should be the first two, the MTD looked for known concentrations of wheelchair persons in the community. Concentrations are well known to the local staff because of a familiarity with the local housing complexes. The major concentrations were found on

campus, primarily in the more accessible dormitory complexes. As such, the first route selected for implementation passes this complex in Urbana and serves the campus, the married student housing complex, and downtown Urbana. The second route selected passes the accessible dormitory complex on the Champaign side of campus. The expansion of service to the other eight routes has not been scheduled. It will depend on the arrival of the new vehicles and the mechanical reliability of the entire fleet.

Some analysis has been made of the bus stops along the first accessible routes. MTD personnel and a volunteer in a wheelchair performed this analysis and rated stops as "usable," "good" or "needing improvement." Additional curb space has also been requested from the two cities to lengthen the bus stops. This will provide more clearance for the driver to pull-in closer to the curb and deploy the lift.

3.2.2 Operations - In the pre-implementation phase, the MTD will not be adjusting its routes or its schedules. Rather, they will make revisions after continued use of the lift results in delays and schedule adherence problems. The current amount of layover time which would be used to make up for the increased dwell times varies from route to route. As such, ridership on a route- and trip-specific basis will determine where additional running time is needed.

Currently, passengers are often required to stand during the peak period. The possibility of limiting standees to the area behind the wheelchair

station has been discussed. However, it may be operationally difficult to enforce since most standees usually situate themselves in front of the bus.

An operational change may be required for the MTD's turnaround procedure for buses running behind schedule. The supervisor's van that is dispatched to complete the late run will not be accessible. Provisions will have to be made for accommodating any wheelchair passengers who are either on the bus when it is turned back or who are waiting for the accessible bus that the van replaces. This may necessitate dispatching another bus rather than using the van.

Wheelchair passengers may have difficulty maneuvering on-board the 96-inch wide vehicle. The average wheelchair is 27 inches wide and may not be able to clear the bus aisle if passengers are seated on the first bench seats. Entrance into the vehicle may also be difficult because of the new, larger fareboxes. The MTD has been experimenting with a cardboard scale model of the Duncan registering farebox. They have found that the new farebox will not constitute a major obstacle, though some minor "remodeling" will be necessary on the older buses being retrofitted. This will involve modifying the shape and location of the forward handrail so that it will be out of the wheelchair's turning radius. On the new buses, the farebox location is expected to be dealt with during the manufacture of the bus.

The problem of inaccessible sidewalks and bus stops due to snow and ice is beyond the realm of the MTD. Its removal is not an MTD responsibility. Snow and ice are common to Champaign-Urbana. Rarely will activities be cancelled by the weather. As such, disabled students and area residents, as well as able-bodied students and residents, have developed the skills of winter mobility.

3.2.3 Driver Training - As a preliminary step, talks and presentations are planned with the union and the safety committee. There has been some question of increased operator responsibility. The informal response from management has been that operators receive an hourly wage regardless of the responsibilities they assume during that hour.

A formal training program is being prepared with technical assistance from the Rehabilitation Center. The four-hour program will include two hours of classroom training and one hour of "hands-on" operating practice with each vehicle model (the new buses and the retrofits). The classroom portion will include a slide/tape presentation. This medium was selected because of its adaptability to changes in service, equipment, and regulations. The operators will be trained in first aid and evacuation procedures as they relate to disabled passengers. For day-to-day operation, they will also be trained as to what type of assistance each kind of disabled passenger is likely to require. No specific policies for assistance have been adopted. Rather, the operator is expected to be sensitive to each passenger's needs.

The presence of the Rehabilitation Center in Champaign-Urbana will provide direct and indirect assistance to the training program. Directly, the Center is providing technical assistance in the preparation of the program. Indirectly, disabled people are a large and visible part of the community, and most residents have already received indirect sensitivity training through their daily contact with these individuals.

3.2.4 Maintenance - The project budget includes funding for one additional mechanic. This ratio of one lift mechanic for 40 buses is much lower than that used by other transit systems. Operating experience will determine if this level of additional maintenance is adequate to keep the lift equipment in proper working condition.

Detailed maintenance records will be kept in conjunction with the evaluation. This recordkeeping will be discussed in the later section on data collection.

3.2.5 Marketing - A brochure announcing the accessible service has been prepared for distribution to current riders. It will be distributed on-board MTD buses prior to accessible service implementation. It discusses the accessibility features on the vehicles and what changes in service the existing passengers can expect.

Another brochure will be developed for potential users to introduce and explain the service. It will be distributed primarily to local agencies and the Rehabilitation Center for further distribution to potential passengers.

Most of the advertising will start two to four weeks before service is introduced. The theme of "Bear with Us" will be used in explaining the service to current riders. The demonstration project budget includes \$10,000 for marketing. This will be supported by the MTD's ongoing marketing budget of \$50,000 per year. The MTD is fortunate in that the local press views the transit service favorably and is cooperative. Media expected to be used include radio spot commercials, public service announcements, newspaper advertisements, and transit ads.

In the Spring, practice sessions will be held for potential users. The MTD will provide a spare bus to any group or individual who requests a training session. Potential candidates for demonstrations include nursing homes, social service agencies, university residence halls, the Rehabilitation Center, and shopping centers.

3.2.6 Insurance - Insurance costs for the MTD increased by 50 percent in the last year. The MTD assumes this is inflation-related rather than tied to the implementation of accessible service. Nonetheless, the demonstration project budget included \$5,000 to \$10,000 for insurance costs. The MTD is not self-insured on liability. A study being conducted by the State of Illinois is currently exploring the feasibility of cooperative coverage for all the small transit systems in the state.

3.2.7 Coordination - An informal working relationship currently exists between the service providers in Champaign-Urbana - - the MTD, Rehabilitation-Education Center, social service agencies, and the local taxi companies. While there is widespread support for the demonstration, no changes in the other services are anticipated. Included in this list of services not expected to change is the MTD's own subsidized taxi program. Nor will transfers be scheduled between the MTD's fixed-route and those of the Rehabilitation Center, though the routes will intersect frequently and make this a possibility. The data collection for the demonstration will include information on the impact on these other services.

#### 4.0 Planned Data Collection and Evaluation

By virtue of its status as an UMTA demonstration project, MTD's initiation of fixed-route accessible service will be closely monitored. Existing recordkeeping activities will be supplemented with on-time street checks, lift usage records, and weather data. In addition, surveys of "able-bodied" transit riders, wheelchair-using transit riders, and wheelchair-using non-transit users will be conducted. Drivers, mechanics, and management personnel will be interviewed. The results of these evaluations will also be contrasted with those from the other fully-accessible small urban transit system demonstration in Palm Beach County, Florida.

Because of the extensive data collection and evaluation to be conducted in Champaign-Urbana, a separate section in this case study has been devoted to it. The following discussion will describe existing records, planned recordkeeping, and planned surveys.

#### 4.1 Existing Records

For the demonstration period, existing recordkeeping practices will be modified and expanded. This will provide data for both the analysis of the services' "success" and the comparison of success in Champaign-Urbana and Palm Beach County. Modifications will be made to the following data collection forms to include the lift-equipped buses:

- . Dispatch logs;
- . Drivers' waybills (includes passenger counts for each fare category);
- . Bus check-out sheets;
- . Maintenance reports;
- . Supervisory reports; and
- . Periodic Section 15 reports.

On-board survey results from 1976 and 1978 are also available for use as baseline data.

#### 4.2 Planned Recordkeeping

Special records have been identified to provide evaluation data. These records will be concentrated in five categories:

- . Lift usage;
- . Trips denied;
- . Missed or inaccessible runs;
- . Incremental cost records; and
- . Weather data.

Most of this information will be maintained in log or check sheet forms. These will be detailed in this section. The next section will discuss the surveys and interviews to be conducted.

The primary source for collecting ridership data will be the drivers. Their waybill will be expanded to include lift users. From driver counts and revenue data, it will be possible to tally the number of times the lift is used each day and the percentage of total passengers who use the lift. Ridership per vehicle hour and vehicle mile will also be calculated. The estimate of unduplicated users will be based on operator records and home interview results (discussed in the next section). Related data also to be monitored include registrations for identification cards which have been issued to wheelchair users and are required for riding at reduced fares, and the amount spent by the MTD on subsidized trips for the local cab company's lift-equipped van. The impact on social service agency programs will be examined to determine if fixed-route accessible transit service had any effect on participation rates.

The effect of lift usage on dwell times will be documented with on-street time checks at selected points in the MTD system. Checkers will note arrival and departure times at end points and at several stops with high boardings such as those in both downtowns and on campus. These data will be collected both before and after accessible service initiation to identify any changes that have occurred. The percentage of vehicle hours spent as dwell time will also be computed.

Equipment reliability is another important category for data collection. To determine the maintainability and reliability of both the new vehicles and the retrofits, records will be kept of:

- . Road calls;
- . Preventive maintenance schedules;
- . Numbers of vehicles out of service;
- . Extent of repairs and maintenance;

- . Time required for repairs; and
- . Number of runs missed.

Information on missed runs will be corroborated by dispatchers' records on in-service breakdowns and equipment shortages.

Financial records will be identified by various line items. Wherever possible, these costs will represent only the extra increment related to the addition of lift-equipped buses to the MTD system. The line items include:

- . Purchase and installation of the lift;
- . Maintenance of the lift;
- . Related operating cost increases possibly due to:
  - additional drivers wages, and
  - lower travel speeds and longer dwell times.
- . Training;
- . Insurance and claims;
- . Marketing; and
- . Planning and implementation.

On an annual basis, the costs will be calculated per lift rider, per total rider, and the marginal cost per additional rider. As with other performance statistics, these will be contrasted with the results in Palm Beach County.

Finally, weather data will be supplied to the MTD by the Illinois State Water Survey. When other data have been collected and trends in ridership and cost appear, the weather data will be used to determine if a correlation exists between Champaign-Urbana's weather and the operation of the MTD's lift-equipped buses and the weather and operation in Palm Beach County.

### 4.3 Planned Surveys

The records to be maintained will be supplemented by surveys of users and providers. An on-board survey will question "able-bodied" passengers on their reactions to the service. Persons who use wheelchairs, both users and non-users of the system, will be selected for home interviews. They will also be asked to complete a travel diary. Driver, mechanics, and MTD management personnel will be interviewed about the "success" of the operation. Each of these data collection tools is discussed in the subsections below.

4.3.1 On-Board Survey - Non-handicapped passengers will be asked about their perceptions of the benefits and delays resulting from the implementation of accessible service. The survey will be conducted several months into the operation to assure that passengers are well aware of the service and have viewed its operation. The survey will also ask non-lift users about available sources of information about the service to evaluate the effectiveness of various marketing programs.

The survey will not be distributed to all passengers; rather, selected runs will be used for this survey. Approximately 200-300 usable responses are desired.

4.3.2 Home Interviews and Diaries - Several months into the operation of the service, after the "newness" and novelty of the service have worn off and travel patterns begin to adjust, home interviews of individuals who use wheelchairs will be conducted. Users of the service will be identified by their registration for handicapped identifications cards.

Non-users will be identified by the Rehabilitation Center and the social service agencies. Approximately 300 individuals will be asked to participate in an interview and complete a travel diary. Hopefully, many of the interviewees will have been or continue to be participants in the MTD's user-side subsidy program and will be able to show a comparison of use for both types of service.

The survey will attempt to determine what percentage of the users are making trips to new locations or trips they had not made before. Their perceptions of increased independence will be rated, along with their attitudes towards the user-side subsidy program's van service. Users will be asked to rate their transit trips according to:

- . Ease of use;
- . Safety;
- . Reliability;
- . Convenience of farebox location and design;
- . Maneuverability inside the bus; and
- . Safety and ease of use of the tie-down.

Users will also be asked where they received service information and what influenced their decision to try the service.

Non-users will be asked to identify their reasons for not using the service. Aspects which discourage their use of transit may include the absence of curb cuts, fear of boarding and maneuvering on

the bus, fear of the reactions of others, or other barriers to their mobility. The responses from users and non-users will be contrasted for trip purpose, availability of other transportation, access to the bus stop, and demographics such as age, physical condition, and level of independence. Results will be contrasted with those from Palm Beach County. The effect of climate on travel patterns may become apparent in this analysis.

Users and non-users of the MTD accessible buses will be asked to complete a travel diary. For each trip made, they will be asked to record:

- . Trip purpose;
- . Origin and destination;
- . Distance travelled;
- . Mode used;
- . Weather;
- . Time of departure;
- . Availability of alternative modes;  
and
- . Service or vehicle failures.

This information will be requested for all trips made, regardless of mode. Thus, the appropriateness of the transit mode will be isolated. For transit trips, additional information will be requested:

- . The time the user sets out for the stop;
- . The distance to the stop;

- . The time the user arrives at the stop;
- . The time the vehicle arrives;
- . Any time required for transfers; and
- . The mode used from the stop to the final destination.

One major finding from the diaries will be a computation of average waiting time and the access distance a user is willing to travel.

4.3.3 MTD Interviews - Drivers and mechanics will be questioned on their attitudes towards the demonstration. Specifically, they will be asked about:

- . Perceptions of lift reliability;
- . Actual use of the lift; and
- . Reactions of lift users and non-lift users to the service.

The question of changes in work loads and its impact on contract negotiations may also be raised. For this purpose, union representatives and MTD management will be interviewed. They will be asked about any difficulties and how they were resolved.

## 5.0 Costs

Funding for accessible service is being provided by the UMTA Service and Methods Demonstration program and the MTD's allocation of federal capital funds. The breakdown of these costs is presented in this section.

## 5.1 Capital Costs

The purchase of the 25 new vehicles has been funded by two separate capital grants totalling \$2,031,580 and the required 20 percent local match.

Retrofitting costs are being funded out of the demonstration budget of \$502,040. The capital cost line item is for \$325,150. This is 100 percent federally funded. Each retrofit is expected to cost \$23,000, according to the latest estimates from the firm performing the work.

## 5.2 Operating Costs

The remainder of the demonstration budget (\$176,890) is for operating expenditures and contingencies. This will include installation and modification of the lifts, one extra mechanic to work on the lifts, a project director, extra marketing, and extra insurance premiums.

The cost of the data collection activities conducted by the evaluation contractor, funded through a separate grant, is estimated to be \$13,870. This includes the time checks, home interview surveys, on-board surveys, and travel diaries. The MTD's budget also includes a \$30,000 line item for data collection.



## APPENDIX B

### CASE STUDY - LOS ANGELES, CALIFORNIA

#### 1.0 Case Study Summary

The Southern California Rapid Transit District (SCRTD), operating primarily throughout Los Angeles County, has one of the largest service areas (2,280 square miles) and bus fleets (2,600 vehicles) of any transit system in the nation. It made an initial resolution to implement accessible bus service in 1974 and ordered its first lift-equipped buses in 1976. It has done extensive planning for its accessible services, with several unique aspects. However, due to continuing difficulties with acceptance of the 200 AM General lift-equipped buses, involving both the vehicle and lifts, no accessible service has yet begun. It is expected to begin on the first route in November 1979.<sup>1</sup>

Perhaps the most unique aspect of the SCRTD efforts is the high level of citizen involvement throughout the planning and preparation process. The Citizens Advisory Committee on Accessible Transportation (CACAT) was formed in 1975 and has been active in reviewing plans, formulating policies, and communicating both with the handicapped community and municipal agencies. The presence of this group, composed of disabled persons, has resulted in a high level of user awareness in the SCRTD accessible service plans. Similarly, a Paratransit

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<sup>1</sup> This case study was prepared prior to the initiation of accessible service in Los Angeles.

Advisory Committee developed a plan for coordination of special service transportation with the fixed-route service, to increase usage of both systems.

This coordination with other non-District services has been a goal of SCRTD throughout its planning. This involves determining how the fixed-route service can best be matched with services provided by local governments, private groups, and other municipal operators. The initial accessible route (Route 88) will be connected at both ends with paratransit services provided by other agencies.

The initial 200 vehicles will operate on 23 routes throughout the District. These are "new-look vehicles," and the lifts have been receiving extensive testing under an UMTA grant. Modification of both the vehicles and lifts has been ongoing for several months. Fifteen vehicles should be ready to begin revenue service by November 5, 1979. SCRTD has ordered 230 Grumman Flxible 870s with lifts, which are scheduled for delivery in early 1980. Extensive bus procurement plans call for purchase of some 920 new accessible buses in the next several years, so the movement towards a fully accessible system will be reasonably rapid.

The CACAT was active in determining the routes for initial accessible service. The basic plan is for service to be provided over the entire county and not restricted to specialized trip purposes or destinations. Routes were chosen to serve major work, shopping, travel, educational, and medical facilities to make as many kinds of trip destinations as possible available to handicapped persons. The routes will have all the base service provided with accessible vehicles.

The 23 initial routes will be operated from four of the 11 divisions to consolidate training and maintenance requirements. The 18 lines utilizing the 230 buses on order will be operated from four different divisions, again to consolidate resources, and to begin to build an experience base with lifts throughout the system. A 15 percent spares factor, somewhat higher than for normal service, is anticipated. No changes in bus schedules are currently planned.

SCRTD has made extensive efforts in training its operators, as well as potential users, in lift utilization. A special movie and corresponding booklet showing disabled persons in various activities, including lift use, are aimed at increasing sensitivity among drivers and others, as well as showing correct lift procedures. The film and booklets have been used with good success at a number of demonstration/training sessions with handicapped persons to overcome initial psychological resistance. The film will form the basis for TV spots concerning the service.

After selecting the initial routes, SCRTD tested each bus stop for lift usability and wheelchair accessibility. A list of stops where problems were found was forwarded to the city and municipalities within the district, along with a request that those locations be given priority for curb cuts and other improvements. The CACAT members again assisted with citizen involvement in this process. After discussions, the concept of bus stop access was incorporated into the curb cut plans. Similar coordination with the state has resulted in needed highway improvements along one route.

Detailed monitoring efforts have been planned, including evaluation of operations and maintenance activities, as well as ridership counts and surveys. Measuring the effectiveness of the marketing program will also be a major task. The

format of the written plan establishes responsibilities and schedules for each step. These detailed evaluation efforts are funded as an UMTA demonstration program.

In summary, SCRTD will be the largest bus system to initiate accessible service. Its extensive planning, testing, and other preparations, including major user involvement, hopefully will result in a successful beginning and expansion of service with minimal disruption of normal operations, and reliable, effective services offered to both handicapped and able-bodied riders.

## 2.0 Case Study Setting

The Southern California Rapid Transit District (SCRTD) has a service area of 2,280 square miles, covering primarily Los Angeles County, with a few commuter routes into Orange County, Riverside County, and San Bernardino County. The service area population is about seven million persons. The District has a total fleet of approximately 2,600 vehicles and provides service on 218 routes. There are 1,957 buses in service during the morning peak and 1,995 in the evening peak. SCRTD's 11 operating divisions are scattered throughout the service area.

SCRTD is a state entity and the legislation which created it specifies that it must provide regional transportation service. This is in part due to the fact that there are several municipal operators imbedded in the Transit District itself. These municipal operators provide service generally within the confines of their own city or community. SCRTD is charged with the task of providing district-wide transportation and interfacing with these municipal operators. A dial-a-ride service was initially considered as an accessible service provision

but was discarded as being financially and logistically impossible because of the geographic size and density of Los Angeles County.

A comprehensive five-year program for improvements to existing transportation services for elderly and handicapped persons in Los Angeles County was approved by the Los Angeles County Transportation Commission (LACTC) during 1978 with a large input from SCRTD and its citizens' committees. If fully implemented, the program will result in accessible fixed-route service on regional carrier bus lines, supplemented by partially accessible local fixed-route service and a variety of demand-responsive services. Coordination among transportation services and reduction of architectural barriers are also emphasized.

On October 22, 1974, the Board of Directors of the Southern California Rapid Transit District (SCRTD) adopted a policy that "specifications prepared for buses to be purchased in the future provide facilities to accommodate handicapped persons, including those confined to wheelchairs." On October 13, 1976, the Board awarded the contract for the first 200 wheelchair-accessible 40-foot transit coaches to begin the program for district-wide service to both the elderly and the handicapped.

These vehicles are part of a fleet modernization program. Currently, SCRTD has 230 Grumman Flexible 870s on order, and 940 additional buses are planned for a multi-year procurement beginning in 1980. The objective is to provide all base service with accessible vehicles by July 1982, the date specified in DOT's 504 Regulation.

Several other programs are designed to encourage maximum use of the accessible bus services. SCRTD will work with public agencies, interest groups, and paratransit groups to

construct pedestrian improvements at bus stops and to interface stops, routes, schedules, and dispatching. Various programs to instruct drivers, handicapped persons, and able-bodied passengers in the use of accessible buses will be developed.

### 3.0 Accessible Service Operation and Development

The following sections describe various activities which have taken place during the planning for accessible service. Specific areas of emphasis include demand estimation and route selection, operations, training, maintenance, marketing, coordination, citizen participation and evaluation.

#### 3.1 Service Evaluation and Description

The District has 200 AM General 40-foot buses equipped with a Transportation Design and Technology (TDT) lift in the front door and two tie-downs per vehicle. These vehicles were purchased during FY 1977 to begin operation of accessible fixed-route service. However, as of the end of October 1979, no accessible fixed-routes were operating due to mechanical difficulties with both the new vehicles and the lift themselves. It is expected that the first route should begin on November 5, 1979.

As a condition to approval of the accessible bus procurement by the Urban Mass Transportation Administration (UMTA), the manufacturer and the District were required to conduct a test and evaluation of a production lift-equipped bus to determine what, if anything, should be done to the lift to make it more reliable, easier to maintain, and safer. That test was to be conducted by an independent consulting firm. These tests were conducted with a lift-equipped bus on a test track in Ohio and then, when winter made that impossible, at a test

facility in Nevada. The procedure simulated the in-service operating environment of the SCRTD. From this testing process, nine changes were suggested relating to the hydraulic system, the drifting problem and passenger safety. According to the contract between AM General and SCRTD, AM General would make those modifications identified in the tests prior to receiving the final 20 percent payment on each bus delivered.

Unfortunately, there were many other areas in which the buses did not meet SCRTD specifications. These areas included wiring discrepancies, over-heating brakes, approach and departure angle variations, and other problems not related to the lift. These problems had to be corrected by the manufacturer before the buses could be accepted, and this delayed the beginning of the changes in the lift itself. Work to bring the lift up to specification was not actually begun until May of 1979. Before that time, approximately 80 of the buses had been accepted in all other areas except the lift, and had been placed in revenue service with the lifts disconnected pending completion of the retrofit program. While AM General originally promised that it could complete the lift retrofit program in 13 weeks on all 200 buses, it is now doubtful that this schedule can be achieved.

The first 15 buses are expected to be available in the first week of November 1979, at which time one route will be implemented for a 60-day evaluation period. The results of that evaluation should assist in determining whether additional changes are needed to the lift or operating procedures before the introduction of all 200 vehicles into service.

The selected trial route (Route 88) serves major shopping and employment areas in the San Fernando Valley, UCLA/Westwood, Los Angeles International Airport, and hospitals. It is connected at both ends with paratransit service provided

by other agencies. This route will be operated with the entire base fleet composed of accessible buses. The base service frequency will be operating continuously even during the peak period. Therefore, accessible service will be available on a predictable basis throughout the day.

Currently on order are 230 Advanced Design Buses manufactured by Grumman Flexible Corporation, which should arrive in early 1980. These buses will either be equipped with a lift designed by Environmental Equipment Corporation (EEC) or, as currently scheduled, with a ramp/winch device designed by SCRTD. Because of these purchases and the future procurement schedule, the District has every reason to believe that it will easily meet all the vehicle requirements of the DOT 504 Regulation.

### 3.2 Service Implementation Activities

It is important to note that, due to mechanical difficulties with both the buses and the lifts, the SCRTD is not yet operating any accessible service. However, this service has been envisioned for several years. Because of this long lead time, a great deal of planning has taken place. The following sections detail these activities.

The steps taken by SCRTD during pre-planning activities are summarized in Exhibit B-1. Each item is listed with the approximate starting and ending times relative to the implementation date. This format allows each department within the system to know their exact responsibilities, and for management to easily ascertain whether preparations are on schedule.

EXHIBIT B-1

SCHEDULING OF IMPLEMENTATION TASKS FOR ACCESSIBLE BUSES

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION						IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION						DEPARTMENT(S) RESPONSIBLE
	6	5	4	3	2	1		1	2	3	4	5	6	
<p><b>PUBLICITY AND COMMUNITY CONTACT TASKS</b></p> <p>Informing the public of the accessible system will be done through news releases, public service announcements, brochures, agency and community groups, and direct public contact. News releases will be prepared by the News Bureau. Television and radio public service announcements will be produced by the News Bureau, using audio and visual clips from the film. The News bureau will be responsible for development of press lists, calling press conferences, and contacting media representatives for distribution of public service announcements and news releases. Copies of all news releases are to be sent to the Planning Department's E&amp;H Projects Coordinator. The Planning Department's Consultant and the E&amp;H Projects Coordinator are to be available for interview on the accessible buses.</p> <p>Marketing will work with its communications arm to develop a standard-format announcement of the accessible buses that may be used directly by groups of handicapped and elderly persons in their publications.</p> <p>Marketing is responsible for development of a brochure to be used as a training tool for the operators and as a general-distribution item for the public. The draft of this brochure will be reviewed by Planning for consistency with the overall program. The final brochure will be distributed to agencies by Community Relations and to individuals and groups by Customer Relations.</p> <p>In addition to distributing the brochure, Community Relations will be responsible for training Speakers' Bureau representatives and sending them out to talk to agencies and</p>														

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Source: "Evaluation of 200 Accessible Buses' Program by Department," prepared by the Planning Department, Southern California Rapid Transit District, August 11, 1979.



EXHIBIT B-1

SCHEDULING OF IMPLEMENTATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION					IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION						DEPARTMENT(S) RESPONSIBLE	
	5	4	3	2	1		1	2	3	4	5	6		
<b>PUBLICITY AND COMMUNITY CONTACT TASKS (CONT.)</b>														
4. Call press conferences and contact media representatives														News Bureau
5. Participate in interviews on accessible system														News Bureau, Plan.
6. Follow-up news releases w/photos														News Bureau
7. Decide on brochure content														Mktg., Plan.
8. Prepare draft of brochure														Mktg.
9. Review draft of brochure														Planning
10. Prepare photos for brochure (w/film)														Mktg.
11. Prepare slide presentations for Community Relations, Planning														Mktg.
12. Prepare brochure prototype														Mktg.
13. Final review of prototype														Planning
14. Print brochure														Mktg.
15. Distribute brochure to Community Relations, Customer Relations, Planning														Mktg.
16. Prepare mailing list for press conference														Community Relations
17. Train speakers for Speakers' Bureau assignments														Com. Rel., Plan.
18. Schedule speaking assignments														Community Relations
19. Take accessible demonstration bus to groups to demonstrate use of bus														Com. Rel., Plan.
20. Presentations to groups, agencies on accessible buses														
21. Orient Customer Relations staff on accessible system														Cust. Rel., Plan.

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EXHIBIT B-1

SCHEDULING OF IMPLEMENTATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION						IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION						DEPARTMENT(S) RESPONSIBLE
	6	5	4	3	2	1		1	2	3	4	5	6	
<b>PUBLICITY AND COMMUNITY CONTACT TASKS (CONT.)</b>														
22. Distribute brochures, schedules on accessible system														Cust. Rel., Plan.
23. Answer inquiries on accessible system														Cust. Rel.
24. Handle complaints on accessible system														Cust. Rel.

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EXHIBIT B-1

SCHEDULING OF IMPLEMENTATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION						IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION						DEPARTMENT(S) RESPONSIBLE	
	6	5	4	3	2	1		1	2	3	4	5	6		
<p><u>MAINTENANCE TASKS</u></p> <p>The Maintenance Department is responsible for dealing with maintenance of the accessible buses. Working with the manufacturer, they will supervise training of mechanics and road service personnel in service of the lift and kneeling devices. They will prepare a system for tabulating wheelchair counter results and will procure additional parts and equipment for the accessible buses as necessary.</p> <p>Timing for completion of these tasks is as follows:</p> <ol style="list-style-type: none"> <li>Supervise training of mechanics and road service personnel</li> <li>Prepare system for tabulating wheelchair counter results</li> <li>Procure additional parts and equipment as necessary</li> </ol>															
															Maintenance
															Maintenance
															Maintenance

B-13

EXHIBIT B-1

SCHEDULING OF IMPLEMENTATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION						IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION						DEPARTMENT(S) RESPONSIBLE	
	6	5	4	3	2	1		1	2	3	4	5	6		
<p><b>SCHEDULING TASKS</b></p> <p>The Schedule Department is responsible for preparing schedules for routes equipped with accessible buses. Since basic schedules will not change, Schedules will only need to decide which runs are to be equipped with accessible buses, design a system for indicating an accessible bus run, forward timetable layout to the print shop, and distribute revised schedules.</p> <p>After implementation, Schedules will initiate riding and point checks and revise accessible bus schedules if necessary.</p> <p>Timing of these tasks is as follows:</p> <ol style="list-style-type: none"> <li>1. Decide runs to be equipped with accessible buses</li> <li>2. Decide on system for indicating accessible bus run</li> <li>3. Forward timetable layout to print shop</li> <li>4. Book material for distribution</li> <li>5. Present schedules to UTU</li> <li>6. Distribute schedules to Trans., Cust.Rel.</li> <li>7. Distribute schedules to public</li> <li>8. Initiate riding and point checks</li> <li>9. Revise accessible bus schedules, if necessary</li> </ol>															
															Schedules
															Schedules
															Schedules
															Schedules
															Schedules
															Schedules
															Customer Relations
															Schedules, Transp.
															Schedules

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**EXHIBIT B-1**

**SCHEDULING OF IMPLEMENTATION TASKS FOR ACCESSIBLE BUSES**

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION						IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION						DEPARTMENT(S) RESPONSIBLE
	6	5	4	3	2	1		1	2	3	4	5	6	
<p><u>OPERATOR ORIENTATION AND TRAINING</u></p> <p>The Transportation, Personnel and Safety Departments will have primary responsibility for operator orientation and training. The Planning Department will consult with these departments and review training programs for consistency with its plans and programs. Notices were sent to affected divisions and operators after the June shakeup. Personnel (Training) is responsible for developing a training program and schedule for affected operators in cooperation with Transportation and Safety. Marketing is to produce a film for use in training operators and the public in use of the accessible buses. Transportation (Instruction) will qualify instructors with the accessible bus training program and train operators in use of accessible buses. Training will be four hours long, with time equally divided between awareness and operating instruction.</p> <p>PAX and Customer Relations will be trained separately by their respective departments.</p> <p>Timing for completion of these tasks is as follows:</p> <ol style="list-style-type: none"> <li>1. Send notices to affected divisions and operators</li> <li>2. Design preliminary training program for drivers</li> <li>3. Review preliminary training program</li> <li>4. Design final training program</li> <li>5. Revise official passenger guidelines</li> </ol> <p>CONTINUED ON NEXT PAGE</p>														
														Transportation
														Pers., Trans., Safety
														Pers., Trans., Safety,
														Personnel
														Transportation

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EXHIBIT B-1

SCHEDULING OF IMPLEMENTATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION						IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION						DEPARTMENT(S) RESPONSIBLE	
	6	5	4	3	2	1		1	2	3	4	5	6		
<p><b>BUS STOPS AND SIGNS</b></p> <p>Operations is the lead department in the bus stop sign program. By the time the accessible buses are implemented, all bus stops along accessible routes will, as a minimum measure, have a decal with a wheelchair symbol and the statement "lift bus stops here."</p> <p>Stops and Zones is responsible for reviewing present stop locations for barriers and problem areas and preparing a list of curb cuts necessary. When redesigned bus signs for accessible stops are available, Stops and Zones will be responsible for their installation.</p> <p>The District has asked for and received a promise from the City of Los Angeles to give top priority to curb cuts along streets with accessible bus routes. In addition, all other cities along accessible routes have been asked to give priority to curb cuts along accessible routes.</p> <p>Timing for completion of these tasks is as follows:</p> <ol style="list-style-type: none"> <li>1. Review present stop locations for barriers</li> <li>2. Prepare list of curb cuts necessary</li> <li>3. Install decals on existing bus stop signs along accessible routes</li> <li>4. Send letter to cities about curb cuts along accessible routes</li> <li>5. Install redesigned signs along accessible routes</li> </ol>															
															Stops & Zones
															Stops & Zones
															Stops & Zones
															Plan., Com.Rel.
															Stops & Zones

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EXHIBIT B-1

SCHEDULING OF IMPLEMENTATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION						IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION						DEPARTMENT(S) RESPONSIBLE	
	6	5	4	3	2	1		1	2	3	4	5	6		
<u>OPERATOR ORIENTATION AND TRAINING (CONTINUED)</u>															
6. Write scripts for instructors															Pers., Trans.
7. Qualify operators															Transportation
8. Train operators															Transportation
9. Conduct additional training as needed															Transportation
10. Write RFP for film															Marketing, Pers.
11. Select consultant for film															Mktg., Pers., Plan.
12. Determine content of training films and develop script															Mktg., Pers., Plan.
13. Filming															Consultant
14. Print and distribute copies of film															Pers., Mktg.
15. Design training for PAX, Customer Relations															PAX, Cust. Rel., Pers.
16. Distribute schedules, other materials to PAX, Customer Relations															Schedules, Mktg.
17. Conduct PAX, Customer Relations training															PAX, Cust. Rel.

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### 3.2.1 Demand Estimation and Route Selection -

Initially, a dial-a-ride concept was proposed for accessible service and an attempt was made to outline a "target area" where a dial-a-ride pilot project could be initiated. Unfortunately, there was no demographic data available to indicate where such a pilot project might appropriately be implemented. The fact that there were apparently no concentrations of disabled individuals and, therefore, no viable way to choose a preliminary target area, as part of the reason why a dial-a-ride concept was discarded.

Even after the SCRTD's Board of Directors had decided on a fully accessible system, some attempts were made to assess demand and determine the size of the population to be served. The resulting report, "Transportationally Dysfunctional Handicapped Population in Los Angeles County," utilized data from national studies and projected them into Los Angeles County. In addition, contacts were made with organizations of disabled individuals and service agencies in the county to attempt to "weight" these data for Los Angeles County. Also, data from the earlier initiated reduced-fare-program were utilized in the same way.

Statistically, there are an estimated 350,000 transportationally disabled individuals in Los Angeles County. Results of surveys conducted with organizations of disabled people and municipal entities in the county further indicated that disabled individuals are virtually uniformly distributed through the county and their trip needs are not significantly different from the general population.

The conclusion, then, was that service for handicapped persons must be provided over the entire county and not be restricted to specialized trip purposes or destinations.

In a report entitled, "Design Criteria for Transportation for the Disabled," the concept of "equivalent facilitation" was delineated and the Test of Equivalence developed from it. Using this test as a basis for service, a cost/benefit analysis was performed. A fixed-route accessible service was determined to be the most cost-effective method for providing transportation to disabled individuals from the standpoint of providing equal regional transportation service. (It was also recognized, however, that accessible paratransit service was desirable as a supplement to the accessible fixed-route service. This generated the Paratransit Advisory Committee discussed later). Using the concept of serving regional transit generators and providing base service frequency on all lines selected, 23 initial routes were eventually chosen. These routes are shown in Exhibit B-2. The selection of these routes was done in close cooperation with the Citizens' Advisory Committee on Accessible Transportation (CACAT) in 1975. An additional 18 routes have been selected in the same manner to phase-in the 230 Grumman Flexible accessible buses.

Routes were chosen to provide service to the following major generators:

- . Colleges and universities;
- . Airport, bus and train terminals;



- . Regional shopping centers;
- . Business districts and concentrations of employment;
- . Major entertainment attractions;
- . Hospitals and rehabilitation centers; and
- . Transfers with community-based demand-responsive transportation systems.

Buses will be operated to provide base frequencies, where possible, throughout the day. A 15 percent accessible vehicle spare factor will be maintained to ensure proper schedule protection.

3.2.2 Operations - Since implementation has not actually begun, there is no information available on many operational considerations. However, in planning for the introduction of accessible service, several techniques were used to minimize operational problems. For example, the 23 lines selected for initial deployment were consolidated in four operating divisions. This required some reassignment of lines, but will result in savings from a training and maintenance standpoint. Stocking of parts and repair procedures should be minimized by this consolidation. Furthermore, the lines to be implemented with the next 230 accessible buses have been consolidated into four different operating divisions, again to minimize training and maintenance problems. These eight divisions will provide practical experience for further expansion of accessible vehicles. No special garaging techniques are anticipated, though there may be some variation in dispatching in order to ensure accessible buses on the correct lines. The planned deployment is based upon a 15

percent spare ratio and this is expected to be sufficient.

The operators will be instructed to cycle the lift in the morning before taking the bus out on the street. As yet, there is no information as to whether this is sufficient for lift operation. Once the implementation has begun, a detailed evaluation will be done on the lift and its operation to determine what needs to be corrected.

Recently, the Operations Department of SCRTD proposed an "accessibility package" that consists of a folding ramp with a winch in place of the usual lift. This device is scheduled to be ordered on the next 230 buses as part of an UMTA-sponsored test of the technology. The advantage of this new device is a greatly simplified mechanical system, as compared with the lifts. However, this ramp system requires approximately six minutes for loading or unloading and requires a great deal of participation by the driver. The union leadership has agreed that the drivers will perform this work. As yet, there is no indication what effect this longer loading time will have on schedules. If ridership is low, schedules may not be affected.

The District does not anticipate the modification of any service standards or schedules to accommodate accessible service. Layover and recovery time is considered adequate to accommodate delays during loading and unloading of disabled passengers along the route. While seating capacity may be affected somewhat, it is not anticipated that this will pose a significant problem. Currently, the

District operates a variety of buses of varying seating capacity, and the distribution of these vehicles throughout the system has not posed any significant problems. Furthermore, the accessible buses only have two seats fewer than a standard vehicle, and it is rarely the case that there are only two standees.

Dwell time is not expected to increase significantly enough to affect schedules, partly due to the anticipation that the ridership will be disbursed. This means that a large number of disabled persons are not expected to be riding a single line at any given time. Also, practice sessions conducted with the lifts have shown that ease of boarding and alighting depends greatly upon the amount of practice. Disabled persons board and alight significantly faster on the second and all subsequent trials as compared with the first time. This is part of the rationale behind the demonstration/training sessions conducted in SCRTD's marketing program.

So far, no problems have been identified relating to impact on union/management relations. The drivers have been informed throughout this planning process and their union leadership has been quite cooperative. There has been no apparent impact on labor negotiations as a result of planning for accessible service.

3.2.3 Operator Training - Each driver will be given four hours of specialized training. A film, "The New Mobility," was developed as part of the training program. The concept behind this film is that simply training the drivers in the proper operation of the

lift will not ensure a successful program. It is important, in the District's opinion, that the operators also develop the proper attitude and give up many of the myths and preconceptions that they may have. The film, then, specifically attempts to portray a wide range of wheelchair users, both in terms of disability, age and ethnic background. In addition to developing methods of boarding and using the bus, these disabled persons are portrayed in a variety of work, social and recreational activities.

After viewing the film, drivers operate the lift and, in turn, ride in a wheelchair, ride on the lift and use the tie-down. This provides an opportunity for the drivers to become sensitized to the needs of disabled persons. While drivers are not required to assist disabled people on or off the lift, or help in use of the tie-down, they are trained in the proper procedure if this becomes necessary. The most important consideration is passenger safety, and operators are shown the correct way to assist in case they should perceive an unsafe situation. This includes the proper way to assist a wheelchair user on or off a curb in case the bus cannot get close enough to the sidewalk. The driver is ultimately responsible for determining whether the chair is correctly clamped down, but is not necessarily required to perform the operation. Drivers also drive the bus around during the training period and operate the lifts under a variety of real-world situations. A short multiple-choice test has been prepared that will be administered to the drivers at periodic intervals. This will help determine the need for refresher training.

3.2.4 Maintenance - The TDT lifts have presented a number of maintenance problems, the most serious being the drifting of the lifts from the step configuration. This is one of the areas that should be corrected when the suggested changes, resulting from the tests, are initiated. Also, there has been considerable difficulty with the sensitive edge. This is especially critical since the sensitive edge must be triggered in order for the safety gate to lower. If the sensitive edge is not triggered, no one can get on or off of the platform. In some of the demonstrations, the operator has had to step out of the bus and squeeze the sensitive edge two or three times before it would function properly.

The vulnerability of the front door location has posed some problems in those buses which have been operating with the lifts disconnected. In several of those vehicles, it was discovered that the lift was jammed, apparently because of impact to the front bumper. The stepwell had to be slightly expanded before the lifts would operate. Checking this stepwell alignment has now been added to the routine maintenance inspection procedure. The maintenance program has been modified to include checks on the lift operation during all phases of maintenance. The automated maintenance schedules will permit a direct assessment of the lift, as distinguished from any other subsystems on the vehicle. Printouts will be generated separately on all lift problems as part of the extensive evaluation procedure. In addition, drivers will be required to report any malfunction of the lift during operation. The vehicles are radio-equipped so that such reports can be made on the road. A separate listing of lift-related road calls will also be made.

As each lift is modified, a detailed acceptance inspection and review takes place. All repairs are now done under warranty so it is not possible to determine whether parts' availability will be a problem in the future. AM General has established a maintenance facility in Riverside County to perform the retrofit and warranty work on the lifts, as well as the buses. This should ease some potential supply problems. Also, TDT is located in San Diego, which may mean that parts will be more available here than to other operators. The SCRTD does estimate that there will have to be additional maintenance personnel hired, at least initially, to keep enough buses on the street. This is especially true since there is a "learning curve" associated with the maintenance of any new equipment. SCRTD has authorized the hiring of 20 new mechanics to deal with all aspects of the new buses, not just the accessibility components.

One additional problem not directly related to the lifts is that the District has many buses that are very old. Maintenance on these vehicles is difficult and requires a great deal of time, leaving less time for work on the lifts. In determining how to allocate the new AM General buses, the age of the buses of each operating division was considered so that the oldest vehicles in the fleet would be replaced.

3.2.5 Marketing - The SCRTD has initiated several marketing efforts concerning the accessible service, including the use of contacts through the CACAT. These informational activities will be expanded as accessible service actually begins operating.

Aside from normal press releases, the District has produced a film, "The New Mobility," which actually serves three purposes. It is a training film for drivers, an informational film for disabled people, and an awareness tool to educate the general public. The major focus of the film is on dispelling myths about disabled individuals rather than solely explaining the operation of the lift. As such, it will be valuable in promoting public acceptance of accessible services. Several local television stations have already expressed an interest in airing the film prior to service implementation. In addition, excerpts from the film will be developed as public service announcements to be televised in the Los Angeles area.

In addition to the film, a booklet entitled, "The New Mobility," has been published as a companion piece to the film. It contains stills and dialogue from the film, as well as some specific "how to" instructions. The booklet contains information about services and requirements for boarding the lift such as proper height for foot rests and how to clamp the seat belt. The booklet also contains a map showing the initial 23 routes. This map is a separate drop-in sheet and can be replaced with a map showing the service expansions.

The booklet and the film have been used in a series of demonstration/training meetings held throughout the county. Organizations of disabled persons have been contacted to arrange these community meetings with wheelchair users. The meetings often are scheduled to coincide with a regular meeting of one or more organizations. Special meetings have also

been arranged during the day, in the evening, and on weekends. They have been held at colleges and universities, independent living centers, community centers, elementary schools and libraries.

The general format of these meetings consists of a presentation by a Community Relations Representative on some of the background, as well as some technical information about use of the buses. This is followed by a screening of "The New Mobility" film and then an actual practice session with a demonstration bus. All individuals are encouraged to use the lift and the tie-down. Many individuals have found that there is one particular method that works for them in boarding the bus and maneuvering inside. While some individuals do need assistance, a larger proportion than anticipated have been able to devise some method to get on and off of the lift by themselves. The most difficult aspect actually is unlatching the wheelchair clamp. In addition, the clamp has been found not to fit one of the most currently popular power wheelchairs. Some modifications have been suggested to the clamp and will be tested during the early implementation phase.

Experience thus far has shown a dramatic difference in both acceptance and use of the lift by disabled persons between those who have seen the film and those who have not. In some training sessions, technical difficulties have prevented the showing of "The New Mobility" film and, in every case, this has adversely affected the training experience. Because the film shows a wide range of disabled persons using the lift in a

variety of ways, this seems to promote the attitude of, "if they can do it, I can." These community meetings will be conducted on a regular basis prior to implementation and for some time after implementation. The goal is to reach as many potential riders as possible so that anticipated problems in loading and unloading can be avoided. Results of those demonstration programs already completed have shown not only an improved attitude towards lift usage but a dramatic decrease in loading and unloading time between the first and second trials by any individual. In most cases, the boarding and alighting time has been cut at least in half.

In addition to these community meetings with disabled persons, the film has been shown and will continue to be shown to other community groups of able-bodied persons. Demonstration buses will be exhibited at shopping centers and other locations around the county immediately prior to and during the first few weeks of implementation. This effort is important to inform system riders about accessible services and hopefully develop a positive attitude towards the service.

In 1976, SCRTD became one of the first transit districts in California to install a teletypewriter (TTY) system to provide route and schedule information to deaf passengers. The District is also experimenting with methods to provide more information to blind individuals, including the possibility of raised route designation numbers on bus stop poles. In addition, a new program to provide route and schedule information at the bus stops will include special symbols and information

for disabled persons. The position of such information, type size, etc., will be designed to meet requirements for disabled individuals.

### 3.2.6 Coordination and Citizen Participation -

There are over 800 separate providers of paratransit service in Los Angeles County. In recognizing the desirability of a supplemental service to augment the fixed-route accessible service, in March of 1977 SCRTD put together a 14-member Paratransit Advisory Committee. The Committee was given an eight to nine month charge to inventory available service and funding resources, analyze the need for additional supplemental service, and develop recommendations for coordination with the fixed-route service.

This report was completed and given to the Los Angeles County Transportation Commission (LACTC) for action. Many of the recommendations are found in the five-year "Los Angeles County Portion of the Regional Elderly and Handicapped Transportation Plan." The paratransit plan assumes a fully-accessible fixed-route transit network as a base for other special services.

In an effort to accomplish this needed coordination, SCRTD has initiated contacts with several paratransit operators to establish convenient transfer/interface plans, and even to pursue the possibility of joint dispatch. During the test on Route 88, the District will be working with a paratransit service provided by the Westside Community for Independent Living and will be testing the feasibility of paratransit/fixed-route interface.

In Los Angeles, citizen participation in transportation planning has received a great deal of interest. In contrast to the ad hoc advisory committee approach frequently taken by other transit systems, in April of 1975 SCRTD created the Citizens' Advisory Committee on Accessible Transportation (CACAT). Members for this Committee were recruited from the major activists' organizations of disabled persons in Los Angeles County. In addition, there was a representative from the California State Department of Rehabilitation, the Los Angeles Advisory Council on the Handicapped, and the Los Angeles County Commission on the Handicapped. This Committee has met periodically since that time on an as-needed basis. Generally, the group has been brought together at specific program benchmarks. For example, CACAT evaluated various stages of the reduced-fare program. They also were kept abreast of developments in the procurement of lift-equipped buses and helped evaluate the specifications. More recently, they participated in, and approved, the final selection of routes for deployment of the initial 200 buses and the coming 230 buses.

Several of the members of this committee are active on the local level, especially in regard to local paratransit services. These members have, in many cases, been the spearhead and the impetus behind efforts to coordinate paratransit and fixed-route services. In addition, Committee members have been active in persuading their local governments to eliminate external barriers and provide access to bus stops with curb cuts and passenger pads, in cooperation with SCRTD efforts.

Members of the Citizens' Advisory Committee (CACAT) have been directly involved in enlisting the aid of the California Department of Transportation (Caltrans) to improve a section of a state highway where one of the accessible routes will operate. Disabled community members were also involved in selecting convenient and accessible transfer points between fixed-route and paratransit services. The approach of accessible service has been to be the catalyst in many areas for the removal of external environmental barriers.

Members of the CACAT were selected in part due to their membership in more than one organization. This allowed a relatively small group of ten people to provide input from a large number of disabled advocacy organizations. There are also people on the Committee representing social service agencies but, in general, these are also disabled individuals. The Committee has been one of SCRTD's primary conduits for communication with the disabled community, both in terms of input from that community and in disseminating information to it. The Committee has been very effective, for example, in communicating information about the reduced-fare program and encouraging individuals to apply even though they may not be able to use the buses at this time. This has resulted in a relatively high number of cards issued and the resulting larger data base. This computerized data base has been valuable in supplementing often sketchy existing demographic data regarding the handicapped community.

In February 1975, the District hired a disabled person to assist in implementing the October 1974 resolution on full accessibility. SCRTD felt that there were advantages to this as a supplement to reliance on a volunteer advisory committee. They indicated that, from the standpoint of liaison with the disabled community, an on-board consultant could provide information both on a continuous basis and at a much quicker rate than a committee. The resulting cooperative venture eliminated many potential misunderstandings.

In a major coordination effort, shortly after SCRTD had selected the 23 original routes, contact was made with the Los Angeles City Department of Public Works. This department is in charge of the citywide program to construct curb cuts at old intersections. Initial contacts between SCRTD and the Board of Public Works indicated an interest in prioritizing curb cut selection according to the designated accessible routes. A formal request to this effect was then forwarded to the Board of Public Works and the Department of Engineering. The Board agreed that such a prioritization scheme was desirable. In fact, many of the same criteria used for the selection of routes had already been used to select appropriate curb cut sites. Shortly thereafter, a similar letter requesting coordination of efforts was forwarded to each of the municipal and county agencies having jurisdiction over curb cut programs within the SCRTD service area. The response was very favorable.

In early 1978, a bus with a functioning lift was taken to every bus stop on the initial 23 lines. Each bus stop was tested with the lift because there had been an earlier problem when a high-crowned road was coupled with a high curb. Under such circumstances, the lift-sensitive edge would make contact with the sidewalk before the lift platform was fully extended. This would shut off the lift and prevent it from being deployed. Of the 4,699 bus stops surveyed, the lift was found to be inoperable in 270. However, the majority of these inaccessible bus stops were a result of uneven or grass-overgrown parkways or the presence of such obstructions as magazine racks, benches, trash receptacles, or mail boxes. A smaller proportion were truly inaccessible, including nine freeway stops where access was possible only by a long flight of stairs.

The City of Los Angeles had previously begun planning for a program to upgrade bus stop passenger loading areas. This program would construct concrete pads in the parkways to improve conditions for all riders. A detailed list of the bus stop/lift evaluation was forwarded to the City Council with an additional request to prioritize their bus pad project to coordinate with accessible service. After some discussion, the concept won approval by the City Council. The city is proceeding with its passenger pad program prioritized, in part, along the accessible routes. The same bus stop inventory was forwarded to other agencies within the county and, again, reaction was generally positive. Any stops which ultimately will not be accessible for use by handicapped persons will not be

labeled with the International Symbol of Access. Because of the detailed on-the-ground evaluation and improvement program, there will be very few of these inaccessible stops.

3.2.7 Data Collection and Evaluation - A detailed evaluation of accessible service is scheduled to begin immediately upon implementation. This evaluation will include detailed monitoring of many aspects of maintenance and operations activities. The evaluation activities are shown in Exhibit B-3, with a timetable and responsibilities. This major evaluation effort is funded by an UMTA demonstration grant. A report on these evaluation efforts, both planning and implementation, will be issued at the end of the evaluation period.

As can be seen from this schedule, the marketing program will be evaluated to determine which informational techniques have been most effective. In part, this will be determined by a series of mailout and on-board questionnaires administered to both disabled and able-bodied passengers. In addition, there will be some special mailout questionnaires sent to disabled individuals through organizations in Los Angeles County. The SCRTD News Department will also catalogue all items relating to accessible service separately to determine the amount of press coverage.

Normal ridership checks will include a separate item for disabled passengers. Some special checks may also be initiated from time to time. Information booklets used by telephone information operators

EXHIBIT B-3

SCHEDULING OF EVALUATION TASKS FOR ACCESSIBLE BUSES

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION				IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION								DEPARTMENT(S) RESPONSIBLE	
	4	3	2	1		1	2	3	4	5	6	7	8		
<u>OPERATIONS AND SCHEDULES EVALUATION</u>															
1. Determine accessible lines to be sampled and checked															Operations, Plan.
2. Obtain most recent checks for lines sampled															Planning
3. Conduct riding, point checks															Transportation
4. Compare actual with projected delay															Sched., Plan.
5. Keep record of road calls on accessible buses															Operations
6. Record number of trips held in because no accessible bus available															Operations
7. Record schedule changes necessary and forward to Planning															Schedules

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Source: "Evaluation of 200 Accessible Buses' Program by Department," prepared by the Planning Department, Southern California Rapid Transit District, August 11, 1979.

EXHIBIT B-3

SCHEDULING OF EVALUATION TASKS FOR ACCESSIBLE BUSES

(Continued)

The evaluation of the District's first 200 Accessible Buses is under the general direction of the Planning Department. A comprehensive evaluation program (detailed in the attached Evaluation of 200 Accessible Buses: Program by Department) has been developed.

UMTA has shown a great deal of interest in evaluation of our program. A number of evaluation items will be funded by a Section 9 grant. These include: planning and consultant staff time for evaluation, schedule checking staff, operations staff for supervising collection of data on operations, a consultant to conduct the passenger and handi-capped person survey, production of a film for training and community information and production of public service announcements.

The scheduling of tasks is dependent upon implementation date. The following tasks are scheduled in relation to date of implementation.

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION				IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION								DEPARTMENT(S) RESPONSIBLE	
	4	3	2	1		1	2	3	4	5	6	7	8		
<b>DESIGN AND COMPLETION OF EVALUATION PROGRAM</b>															
1. Design first outline of evaluation				April 1977											Planning
2. Meet with department representatives on plan for evaluation				May 1977											Planning
3. Develop draft program for evaluation				June 1977											Planning
4. Circulate draft to departments, discuss				July 1977											Planning
5. Write final evaluation Program				August 1977											Planning
6. Develop inventory forms necessary															Plan., Depts.
7. Print forms, distribute															Depts.
8. Coordinate departmental data collection															Planning
9. Compile data collected															Planning
10. Analyze data observations															Planning
11. Write draft evaluation report															Planning
12. Circulate to departments															Planning
13. Write final evaluation report															Planning
14. Print and distribute final report															Planning

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EXHIBIT B-3

SCHEDULING OF EVALUATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION				IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION								DEPARTMENT(S) RESPONSIBLE	
	4	3	2	1		1	2	3	4	5	6	7	8		
<b>MAINTENANCE EVALUATION</b>															
1. Set up control account number(s) for bus maintenance problems			■												Maintenance
2. Develop maintenance inventory form			■												Maint., Plan.
3. Compile maintenance costs, types by bus numbers						■	■	■	■	■	■	■	■		Maintenance
4. Keep daily tab of number of accessible bus spares available at each division						■	■	■	■	■	■	■	■		Maintenance
5. Forward information to Planning													■		Maintenance
6. Compile and analyze information													■	■	Planning

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EXHIBIT B-3

SCHEDULING OF EVALUATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION				IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION								DEPARTMENT(S) RESPONSIBLE	
	4	3	2	1		1	2	3	4	5	6	7	8		
<b>MAINTENANCE EVALUATION</b>															
1. Set up control account number(s) for bus maintenance problems			■												Maintenance
2. Develop maintenance inventory form			■												Maint., Plan.
3. Compile maintenance costs, types by bus numbers						■	■	■	■	■	■	■	■		Maintenance
4. Keep daily tab of number of accessible bus spares available at each division						■	■	■	■	■	■	■	■		Maintenance
5. Forward information to Planning													■		Maintenance
6. Compile and analyze information													■		Planning

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EXHIBIT B-3

SCHEDULING OF EVALUATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION				IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION								DEPARTMENT(S) RESPONSIBLE	
	4	3	2	1		1	2	3	4	5	6	7	8		
<u>LEGAL AND INSURANCE EVALUATION</u>															
1. Record type and cost of accidental damage to lift mechanism--send to Insurance															Maintenance
2. Provide list of bus series numbers to G.A.B.															Insurance
3. G.A.B. flag claims arising out of lift mal-function, forward to insurance															Contractor
4. Analyze lift injury claims as they come in															Insurance
5. Compile dollar amount of claims															Insurance
6. Analyze number and cost of claims, compare percent increment on lift															Insurance, Plan.
7. Send analysis to Safety for input															Insurance, Plan.

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EXHIBIT B-3

SCHEDULING OF EVALUATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION:				IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION								DEPARTMENT(S) RESPONSIBLE	
	4	3	2	1		1	2	3	4	5	6	7	8		
<b>TRAINING EVALUATION</b>															
1. Develop reaction sheets for evaluation of training		■													Personnel, Transp.
2. Develop practice exercises for evaluation of training		■													Personnel, Transp.
3. Develop forms (check list) for evaluating driver performance with lift and handi-capped passengers		■													Personnel, Transp.
4. During riding, have special agents, instructors note effectiveness of training						■	■	■	■	■	■	■	■	■	Transportation
5. Review complaints compiled by Customer Relations at 6-month intervals for redesign of training													■		Personnel, Plan.
6. Review road call information at 6-month intervals for possible redesign of training													■		Personnel, Plan.
7. Review legal and insurance claims for opportunities for redesign of training													■		Personnel, Plan.

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EXHIBIT B-3

SCHEDULING OF EVALUATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION				IMPLEMENTATION DATE	MONTHS AFTER IMPLEMENTATION								DEPARTMENT(S) RESPONSIBLE
	4	3	2	1		1	2	3	4	5	6	7	8	
<u>EVALUATION OF HANDICAPPED AND ABLE-BODIED PASSENGER ATTITUDES</u>														
1. Decide objectives for survey	■													Planning, Mkt. Research
2. Write RFP		■												Mkt. Research
3. Select consultant			■											Planning, Mkt. Research
4. Design questionnaire			■	■										Planning, Mkt. Research
5. Draw sample			■	■										Consultant
6. Mail questionnaire										■				Consultant
7. On-board survey										■				Consultant
8. Tabulate results											■			Consultant
9. Analyze results												■		Mkt. Research

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EXHIBIT B-3

SCHEDULING OF EVALUATION TASKS FOR ACCESSIBLE BUSES

(Continued)

IMPLEMENTATION OF TASKS	MONTHS PRIOR TO IMPLEMENTATION				I M P L E M E N T A T I O N D A T E	MONTHS AFTER IMPLEMENTATION								DEPARTMENT(S) RESPONSIBLE
	4	3	2	1		1	2	3	4	5	6	7	8	
<b>EVALUATION OF COMMUNITY CONTACT</b>														
1. Determine questions to be included on passenger and handicapped person surveys to evaluate publicity and news release effectiveness														News Bureau, Plan., Mkt. Research
2. Keep record of news releases, public service announcements														News Bureau
3. Keep record of direct/indirect costs of publicity														News Bureau
4. Analyze cost effectiveness of publicity														News Bureau, Plan.
5. Design inventory forms to record complaints on accessible buses														Cust. Rel., Plan.
6. Maintain record of requests for information on accessible buses														Customer Relations
7. Maintain record of complaints on accessible buses, forward to appropriate department														Customer Relations
8. Analyze complaints														Cust. Rel., Plan.
9. Compile list of agencies and organizations sent notification of speaker availability														Community Relations
10. Keep record of number and location of speaking engagements														Com. Rel., Plan.
11. Prepare analysis of response														Com. Rel., Plan.
12. Develop record sheet for recording information on calls about accessible buses														PAX, Plan.
13. Train operators to record accessible bus call information														PAX
14. Record calls														PAX
15. Compile information														Planning

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have already been modified to designate accessible routes. Telephone operators will begin cataloging requests made regarding accessible service as soon as implementation begins.

#### 4.0 Costs

The accessibility features on the AM General buses, that is, lift, wide-door, fold-down seats and clamps, added approximately ten percent to the vehicle cost. True maintenance cost is difficult to predict and will depend upon the success of the changes identified during the testing period in minimizing such costs. Approximately \$70,000 per year has been added to operating costs to cover the extra mileage resulting from the shift of some of the lines from one division to another, but this cost is expected to be offset by savings from consolidating maintenance and training for the accessible buses.

## APPENDIX C

### CASE STUDY - MILWAUKEE, WISCONSIN

#### 1.0 Case Study Summary

Milwaukee Transport Services, Inc. (MTS), the operator of the Milwaukee County Transit System, began operating wheelchair-accessible buses on five of their routes on April 18, 1979. This required the use of 50 buses. A sixth route was added on May 28, 1979, bringing the daily requirement of lift-equipped vehicles to 57. Accessible service is available on ten percent of the MTS routes. The 57 buses are approximately ten percent of the total fleet. The remaining 43 accessible buses in the fleet are used as peak hour trippers or are assigned to three other routes when they are available. Service on the six routes is "guaranteed" accessible; that is, every bus operating on the route in the base period is accessible. With the addition of peak hour trippers, approximately every other bus in the peak period can be accessible.

Delivery of MTS's 100 Vapor lift-equipped Flexible "new-look" buses began in May 1978. However, mechanical problems with the lift and the other new components on the vehicles delayed the implementation of service for nearly one year. The 100 new Flexibles represent the first new vehicles purchased since 1967. In addition to the new lift equipment, the buses are also the first in the fleet to be air-conditioned and the first to be equipped with the new "121" anti-skid brakes. Like the lifts, these two components have required extensive maintenance time. Five additional mechanics were hired to work on the lifts and are assigned to each of the garages and the main shop.

The 100 vehicles operate out of all three MTS garages. This decision on vehicle allocation was based on expected reliability problems. It was felt that the vehicles would spend more time out of service than the existing fleet. By dividing the buses among the three garages, no one garage would be overburdened with maintenance and schedule reliability problems.

The drivers have been unable to complete the lift cycle in 40 out of 167 attempted boardings. However, in only seven instances was it necessary for a mechanic to make a road call or for the bus to be taken out of service. The other mechanical problems were handled by a road supervisor or by the dispatcher providing instructions over the radio system. The dispatcher also plays a major role in monitoring the delivery of service. The system's emphasis on on-time performance is supported by a requirement that drivers notify the dispatcher any time they are delayed by more than five minutes. Drivers are required to notify the dispatcher when a wheelchair passenger boards the bus, even if this does not cause a five-minute delay, to alert the dispatcher of possible delays in alighting. This immediate response capability prompted a decision not to adjust operating schedules. This reporting requirement also provides a secondary function of recording ridership, origins and destinations, and delay time as it occurs.

Ridership has averaged 1.3 one-way trips per day. Much of the trip-making is occurring on weekends. It is estimated that ten different individuals are using the service, but none of these individuals uses the bus for daily work trips. MTS also administers a user-side subsidy program which provides 150 daily trips to users of wheelchairs, walkers and crutches, and those who are legally blind. The registrants provided a target market for distributing information on the accessible routes. The director of special services sent a personal

letter, map and descriptive brochure to user-side subsidy program participants who are wheelchair users before service began and again when the sixth route was added. Registrants who use walkers and canes would not be able to use the lift, because of the MTS policy prohibiting standees on the lift.

## 2.0 Case Study Setting

This section describes the characteristics of the service setting. It includes geography and population, institutions and transit service.

### 2.1 Geographic and Demographic Characteristics

Milwaukee is located in southeast Wisconsin on the western banks of Lake Michigan. The largest city in Wisconsin, it is 90 miles north of Chicago. As in many other cities, handicapped and able-bodied residents must cope with cold, snow and wind during the winter months.

The Milwaukee urbanized area, in 1975, had an estimated population of 1,418,487. Milwaukee County accounted for 1,009,235 of this total. Within the county, an estimated 4.6 percent or 46,147, were transportation-handicapped. The Milwaukee County Transit service area population is estimated at 927,737 persons.

### 2.2 Institutional Setting

Milwaukee County acquired the assets of the area's major private transit provider in 1975. They now provide transit service through a public operating division, Milwaukee Transport Services, Inc. (MTS).

The MPO for this region is the Southeastern Wisconsin Regional Planning Commission (SEWRPC). Their area consists of seven counties and three urbanized areas (Milwaukee, Racine and Kenosha). SEWRPC has conducted studies of the needs of the transportation-handicapped and convened advisory committees on this matter for each of the three urbanized areas. SEWRPC is also responsible for the preparation of the TIP and the Transition Plan.

### 2.3 Transit System Characteristics

Milwaukee Transport Services, Inc. (MTS) operates a fleet of 578 buses on 62 routes throughout Milwaukee County. The newest in the fleet are 100 lift-equipped Flexible "new look" buses. Peak hour service on all 62 routes requires 510 buses. MTS's physical plant includes three garages throughout the service area and one central maintenance facility.

In addition to operating accessible fixed-route service, MTS administers a county-supported user-side subsidy program. Registered users arrange for their own transportation from five carriers under contract to the program. Together, the carriers have a fleet of over 200 taxis and 45 lift-equipped vans. The eligible user, one who requires a wheelchair, walker, crutches or long leg brace, or who is legally blind, is required to pay the first \$1.00 of the fare. When the program first started in June 1978, the county assumed all fares above \$1.00. Recent budgetary constraints have necessitated maximum subsidy levels for one-way trips of \$10.00 for wheelchair users and \$7.00 for non-wheelchair users. The program has a hardship classification for persons who make medical, employment, and education trips which exceed the maximum subsidy limits. A total of 3,000 people are registered for the program, though regular use is only recorded by about 300 users. On an average, 150 daily trips are made by these individuals.

### 3.0 Accessible Service Operation and Development

This section describes the activities in Milwaukee prior to the implementation of fixed-route accessible service and the current status of the operation.

#### 3.1 Service Evolution and Description

In 1975, Milwaukee County submitted a grant application to the Urban Mass Transportation Administration for capital assistance in acquiring the assets of the Milwaukee and Suburban Transport Corporation, a private operator serving the metropolitan Milwaukee area. During the public hearing prior to submitting the application, local handicapped individuals questioned the lack of any service which they could utilize. As a result of a civil suit by three handicapped individuals, the court enjoined the newly formed Milwaukee County Transit System from purchasing non-accessible buses unless a "comparable" service could be provided.

The Milwaukee County Transit Board, in August 1975, requested the Southeastern Wisconsin Regional Planning Commission to include in the annual work program a study of the best approach to meet the court order. SEWRPC prepared a study work plan which included assembling a data base, evaluating alternative service options, and developing a five-year regional plan for serving the transportation-handicapped. A consultant began this study in the latter part of 1976.

During the course of the study, however, it was necessary for the county to purchase 100 new vehicles to replace a portion of the fleet acquired from the private operator. As the court order required the provision of accessible mass transit services and MTS had not yet received the study recommendation of the preferred alternative to provide service to the handicapped, it was necessary for the county to include wheelchair accessibility components in their specifications.

Advisory committees were convened by SEWRPC for each of the three urbanized areas (Milwaukee, Kenosha and Racine) included in the study. The Milwaukee committee consisted of service providers, funding agencies, planning and implementing agencies, and potential users. In early 1978, they assisted MTS in selecting 11 initial routes to receive the accessible buses. Vehicles began arriving at MTS in May 1978, one month after the release of the final draft copy of the SEWRPC study.<sup>1</sup> Acceptance testing of the vehicles began in May 1978. However, these activities were hampered by a five-week strike by MTS employees beginning in the same month.

The SEWRPC study recommended a dual approach to serving the handicapped - - fixed-route accessibility complemented with a user-side subsidy program. One month later, June 1978, a state and county-sponsored user-side subsidy program began, funded with \$250,000 in block grant monies. (Initial funding for the program did not include any federal monies). Eligible users, upon registering with the MTS and receiving an identification card, could arrange for taxi or chair-car service for which they would only have to pay \$1.00. The block grant would cover all fares beyond this amount.

Concurrent implementation of fixed-route accessible service was delayed by problems with the new technology. MTS was the first transit system to order Vapor Corporation's lift. Acceptance testing of the lift indicated a need for extensive retrofitting of the components. Other implementation delays were caused by common "new vehicle" problems. The 100 vehicles

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<sup>1</sup> Southeastern Wisconsin Regional Planning Commission, Planning Report No. 31: A Regional Transportation Plan for the Handicapped in Southeastern Wisconsin, Waukesha, April 1978.

were outfitted with several components new to the MTS fleet such as air-conditioning and anti-skid brakes. Though these presented problems, they were not as severe as those posed by the lift.

Initially, it was thought that the vehicles would be ready for service in mid-January 1979. Drivers were trained and the service advertised. However, a new problem with the lift was discovered when the lifts were retested before service implementation. The starting date was postponed until April 18, 1979. Only 50 of the 100 buses were placed in service at this time. Rather than the 11-route network previously identified by the advisory committee, it was only possible to schedule the buses on five routes. As retrofits made vehicles available, it was possible to expand the service. A sixth route was added on May 28, 1979. The remainder of the accessible buses (43) are either reserved as spares, in need of repair on any number of components, being inspected as part of a preventive maintenance program, or are dispatched to other routes. The decision to regularly schedule only 57, though, is based on MTS's concern over providing reliable service. Though more than 57 buses may be operable on any given day, the reliability of the lifts is not predictable to schedule additional all-day runs. The initially planned 11-route network and service on other routes will not be in service until next spring when MTS takes delivery of 150 General Motors RTS II coaches.

The six accessible routes are major routes within the MTS system operating daily for more than 20 hours. Service is also available on Saturdays, Sundays, and holidays. The six routes are:

- . No. 10, Wells - Wisconsin;
- . No. 14, Holton - Mitchell;

- . No. 18, National;
- . No. 23, Fond du Lac Avenue;
- . No. 27, 27th Street; and
- . No. 71, State Street.

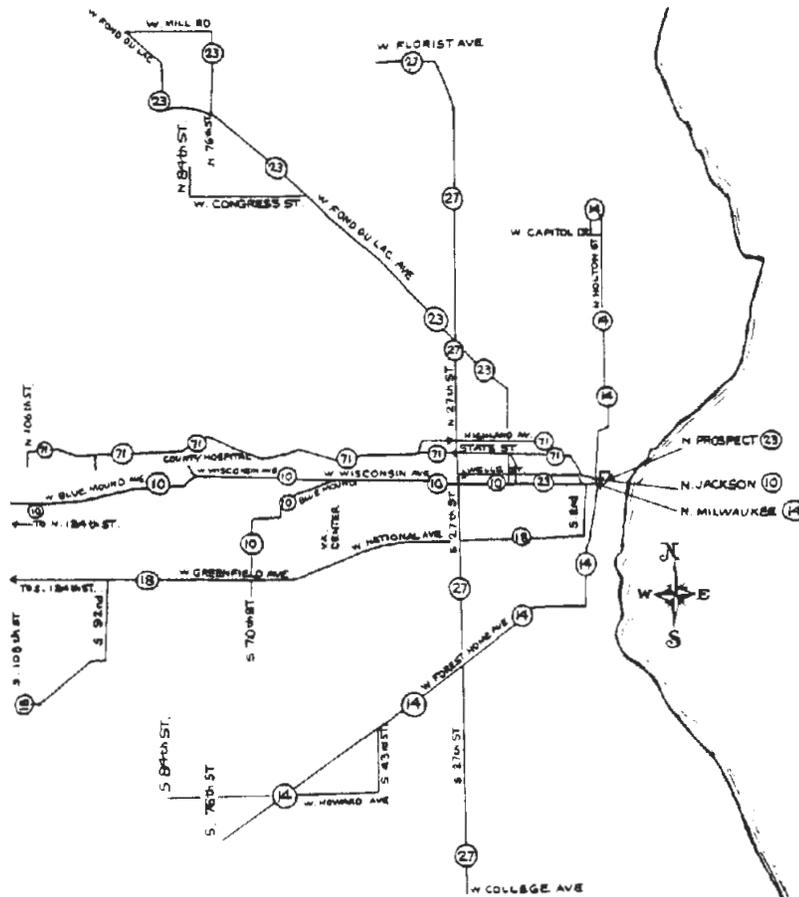
As shown on Exhibit C-1, these six routes are geographically distributed throughout the service area. Five of the routes are radial in nature and meet in downtown Milwaukee. The sixth route, No. 27, provides north-south crosstown service west of the downtown area.

The six routes are guaranteed 100 percent base period accessible; that is, any bus operating on the route during the base, evening, or weekend period, is guaranteed by the schedule and the vehicle dispatcher to be a lift-equipped bus. A policy decision was reached that this high level of service on a few routes was more desirable than assigning the buses to a few trips on all routes.

If more than 57 vehicles are available for service on any given day, three additional routes have been selected for accessible service. However, because of the uncertain availability of the vehicles, these are not advertised as "accessible." Some ridership by wheelchair users has been recorded on these routes. Users of these routes are aware of the service by seeing it on the street in operation.

Since fewer than 57 buses are required for weekend service on the six "guaranteed" accessible routes, MTS can usually provide additional accessible service on the three unadvertised routes, thereby increasing the area coverage. As a result, most ridership by wheelchair users on these three routes has been recorded on weekends.

**EXHIBIT C-1**  
**MILWAUKEE COUNTY TRANSIT SERVICE**  
**ACCESSIBLE ROUTES**



SIX ROUTES WITH LIFT BUSES SERVE THESE LOCATIONS  
 OF INTEREST TO THE HANDICAPPED:

- No. 10 (Wells-Wisconsin): Serving American Red Cross Headquarters, Milwaukee County General Hospital, Downtown Milwaukee, The County Zoo, Marquette University and the County Courthouse.
- No. 14 (Holton-Mitchell): Serving Curative Workshop-Southwest, Jewish Vocational Service, Mitchell Street Shopping District, and Downtown Milwaukee.
- No. 18 (National): Serving Woods Veterans Administration Center, State Fair, West Allis-Treasure Island and Downtown Milwaukee.
- No. 23 (Fond du Lac Avenue): Serving Goodwill Industries, Downtown Milwaukee, Capitol Court, and Marquette University.
- No. 27 (27th Street): Serving Sacred Heart Rehabilitation Hospital, American Red Cross Headquarters, Southgate and Point Loomis Shopping Centers.
- No. 71 (State Street): Serving Curative Workshop-Watertown Plank, Downtown Milwaukee, the County Courthouse and MATC-Downtown Campus.

### 3.2 Service Implementation Activities

To prepare for the operation of the lift-equipped buses, various MTS departments were involved in activities in these eight areas:

- . Demand Estimation and Route Selection;
- . Operations;
- . Driver Training;
- . Maintenance;
- . Marketing;
- . Insurance;
- . Coordination; and
- . Data Collection and Evaluation.

Each of these activities is described in a subsection below.

3.2.1 Demand Estimation and Route Selection - MTS was not directly involved in estimating demand for wheelchair accessible service. Rather, this was one aspect of the alternatives analysis performed by a consultant and SEWRPC.

In the consultant's estimate for accessible transit use, various trip rates were considered. The first was based on observed travel patterns by wheelchair users on the BART system. The second and third rates contrasted trip patterns by the more mobile transportation-handicapped, such as those who currently use the bus system, with those of just wheelchair users and with those of the entire transportation-handicapped population in the area. These trip rates were available in the existing regional travel network developed as part of SEWRPC's long-range transportation planning

process. The consultant's procedure estimated 60,955 annual latent demand trips by the noninstitutionalized handicapped for a fully accessible transit system in Milwaukee County.

SEWRPC staff prepared its own estimate. Their estimate of 62,615 annual trips corroborated the earlier consultant's prediction. This amounts to a latent demand estimate of 185 trips per day on a fully accessible transit system. As this estimate assumed that all users could reach the bus stop, actual ridership should be lower.

These estimates determined areawide demand and were not disaggregated to a route level. With limited demand data on trip origins for handicapped individuals, it was necessary to plan service according to destination. Members of the SEWRPC-sponsored advisory committee assisted MTS in identifying likely destinations to which the handicapped individuals they represented would desire access. MTS supplied information to the group on existing transit system characteristics. Priorities were established for the selection of the first accessible routes. These included:

- . Likely destinations for the handicapped;
- . Major routes in the transit system according to ridership levels; and
- . Geographic distribution of service throughout the county.

The intent was to provide a small network of service providing regional coverage, a high frequency of service, and a cross-section of destinations. The committee and MTS staff jointly identified 11 routes they hoped to be able to serve with the 100 buses. The six routes currently operated serve the following generators:

- . Downtown Milwaukee;
- . Milwaukee County Courthouse;
- . Marquette University;
- . Milwaukee Area Technical College;
- . Milwaukee County General Hospital;
- . Curative Workshop (two sites);
- . Goodwill Industries;
- . Veterans Administration Center; and
- . Southgate Shopping Center.

3.2.2 Operations - The advent of lift-equipped buses into the MTS operation brought few changes in operating procedures. As a low frequency of ridership by wheelchair users was anticipated, operating schedules were left untouched. A decision was reached that running times would be adjusted for daily users when trip patterns became known. Any other changes in schedules were thought to be presumptuous. Layover times on MTS routes are at least three minutes or seven percent of the round trip running time as per the union contract. Though it was feared that this might not be enough time for a wheelchair passenger to board and alight the bus, it did not seem appropriate to add extra time, and extra operating costs, when it was not known where and when the time would be required. Actual boarding and tie-down times have averaged

5.3 minutes; alighting times have averaged 3.8 minutes. However, with ridership of 1.3 one-way trips per day, it is still not appropriate to make changes in operating schedules. Drivers are instructed to take as much time as is necessary and leave the schedule adjustment problems to the dispatcher.

MTS policy and emphasis on on-time performance requires all drivers to notify the dispatcher of a delay greater than five minutes. As drivers were already accustomed to doing this, surveillance of possible delays due to lift use was easily implemented. The driver is required to call the dispatcher (all coaches are radio-equipped) to report lift use and expected delay time. When the call is made before reaching the alighting stop, the dispatcher will notify a road supervisor of the trip. If the supervisor is available and in the vicinity of the bus, he will meet the bus at the alighting stop. This is a precaution against lift mechanical problems which the supervisor but not the driver may be able to repair. The radio procedure also enables the dispatcher to record lift usage, the passenger's origin and destination, and whether or not a turn-back for schedule adherence or an extra bus because of a major mechanical problem will be needed to keep the route on schedule. The dispatcher prepares two data forms - - a log and an individual trip record. Copies of these forms follow as Exhibits C-2 and C-3.



**EXHIBIT C-3**  
**INDIVIDUAL TRIP RECORD**

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WHEELCHAIR PASSENGER DATA

DATE \_\_\_\_\_

OPERATOR \_\_\_\_\_ BADGE \_\_\_\_\_ ROUTE \_\_\_\_\_ RUN \_\_\_\_\_ BUS NO. \_\_\_\_\_ DIRECTION \_\_\_\_\_

BOARDING LOCATION \_\_\_\_\_

TIME REQUIRED; FROM: \_\_\_\_\_ A.M.—P.M. TO \_\_\_\_\_ A.M.—P.M. TOTAL \_\_\_\_\_ MINUTES

ALIGHTING LOCATION \_\_\_\_\_

TIME REQUIRED; FROM: \_\_\_\_\_ A.M.—P.M. TO \_\_\_\_\_ A.M.—P.M. TOTAL \_\_\_\_\_ MINUTES

TOTAL DELAY ENCOUNTERED \_\_\_\_\_ MINUTES

INSTRUCTIONS BY DISPATCHER OR SUPERVISOR TO RESTORE SCHEDULED SERVICE:

REMARKS:

C-15

The 100 buses were assigned to routes throughout the service area. As such, the buses were assigned to all three MTS garages. Each garage was given a priority list for assigning the vehicles. This is to assure that the buses are dispatched to the guaranteed routes first. In addition to providing efficient dispatching, the decision to assign the lift-equipped buses to all three garages was intended to minimize one garage having too many buses out of service at one time, as it was anticipated that the new vehicles would require more maintenance than the existing fleet.

In addition to the scheduled accessible runs, each garage has a list of secondary all-day or peak hour assignments for any additional vehicles in operable condition.

The introduction of accessible service did not require changes in vehicle storage. Vehicles were already being stored inside in tracks according to route rather than morning pull-out time. Thus, there was little difficulty in dispatching the accessible buses to the proper routes. The only storage constraint was due to the air-conditioning unit. In some cases, the garage door did not provide ample clearance for the air-conditioning condenser at the previously assigned track location.

Operating policies were also unchanged since a priority was assigned to transporting the 260,000 non-wheelchair users who ride MTS buses daily. For example, problems with crowding were not given special attention. However, the decision to "guarantee"

accessible base service was intended to minimize excess waiting time between accessible vehicles. A policy was established to limit use of the lift to wheelchair users. This was based on the doorway height and a belief that it would not provide adequate clearance for a standing person.

3.2.3 Driver Training - For the past few years, all new drivers have been shown a 20-minute slide and cassette presentation entitled, "Special People," developed by the Southeastern Pennsylvania Transportation Authority and the Moss Rehabilitation Hospital. A variety of ambulatory handicaps are discussed in the presentation. The intent is to heighten the driver's sensitivity to the particular handicap, describe how this affects using transit, and identify the steps a driver can take to make the person's trip easier and more comfortable.

Prior to the initiation of service with the new lift-equipped buses, each of the 970 drivers was given a 30-minute equipment familiarization session in which they practiced using the lift and kneeling feature. Due to the delay in service initiation, all drivers were trained twice - - prior to the planned January date for service and prior to the actual start of service in April.

A laminated instruction card explaining the steps in deploying the lift and kneeler was prepared. The card is attached to the control panel on all 100 buses. Exhibit C-4 shows both sides of the drivers' instruction card. These same step-by-step instructions appear in the recently developed

## EXHIBIT C-4

### ON-BOARD INSTRUCTION CARD

#### Operating Procedure Vapor Travelift System

##### IF DOOR DOES NOT CLOSE

1. Check air valve; if in "OFF" position, turn to "ON" position.
2. If air valve is in "ON" position and door does not close, press "SYSTEM ON" button.
3. Press and hold "STEPS FOLD" button.
4. If door still does not close, call dispatcher.

##### USING THE KNEELING FEATURE

1. Open door.
2. Press "KNEEL" button.
3. Close door -- bus will automatically return to proper height.
4. Brake interlock will release when bus has returned to proper height.

PLEASE REPORT ANY MALFUNCTION OF THE WHEELCHAIR LIFT  
TO DISPATCHER IMMEDIATELY AND REPORT ON YOUR DEFECT REPORT

(OVER)

##### BOARDING A WHEELCHAIR PASSENGER

1. Press "SYSTEM ON" button.
2. Press "RAISE LIFT" button.
3. Press and hold "PLATFORM UP" button.
4. Press and hold "LOWER LIFT" button until lift reaches ground or curb level. If downward movement does not stop at ground level, immediately release button.
5. After visually verifying that lift is at ground or curb level, momentarily press "END GATE DOWN" button.
6. Allow passenger to board lift. Wheelchair should be backed on.
7. Press "END GATE UP" button.
8. Momentarily press the "RESET / PROCEED" button.
9. Press and hold "RAISE LIFT" button.
10. Allow passenger to clear step area.
11. Press and hold "STEPS FOLD" button and at the same time, momentarily press "END GATE DOWN" button.
12. Press "OFF/STOP" button.

##### ALIGHTING WHEELCHAIR PASSENGER

- A. Press "SYSTEM ON" button.
- B. Press "RAISE LIFT" button.
- C. Press and hold "PLATFORM UP" button.
- D. Make sure end gate is in up position; if not, call dispatcher.
- E. Allow passenger to board lift.
- F. Press and hold "LOWER LIFT" button until lift reaches ground or curb level. If downward movement does not stop at ground level, immediately release button.
- G. After visually verifying that lift is at ground or curb level, momentarily press "END GATE DOWN" button.
- H. Allow passenger to clear lift.
- I. Press "END GATE UP" button.
- J. Press and hold "RAISE LIFT" button.
- K. Press and hold "STEPS FOLD" button and at the same time, momentarily press "END GATE DOWN" button.
- L. Press "OFF/STOP" button.

operators manual. The manual also includes steps on preparing the seating area, notifying the dispatcher, and sensitivity to handicapped passengers.

Road supervisors were also trained in the operation of the lift so that they can manually reset the lift and keep it in operation in the event of in-service breakdowns. Each is assigned a tool which, when inserted in the front of the bus, can manually raise or lower the lift. This is a two-person operation. The driver controls the lift from the inside and is able to watch the operation for the supervisor who is unable to observe the process from the front controls.

3.2.4 Maintenance - MTS hired five additional mechanics to work exclusively on the 100 lifts. One mechanic was assigned to each of the three garages; two were assigned to the main repair shop. Each is kept busy by lift repairs. Their work loads are expected to increase during the winter because of weather-related problems. Based on this experience, MTS has requested funding for seven additional lift mechanics for the 150 General Motors RTS II buses on order. Training for the mechanics was, for the most part, on-the-job. A repair manual was available from the manufacturer and with it, the mechanics taught themselves to repair the lifts. A monthly preventive maintenance program was also established following the manufacturer's guidelines. Each lift is inspected, cleaned and lubricated on a monthly basis.

No changes have been made in the spare ratio though recent systemwide ridership increases have prevented MTS from retiring the older coaches in the fleet. Though only 57 of the 100 accessible buses are scheduled for daily operation, others are often deployed to runs on other routes beyond the six "guaranteed" base period accessible routes or used as peak hour trippers on the six routes to provide a higher level of accessible peak hour service. As many as 80 accessible buses have been available. On this top performance day, 68 were assigned to all-day runs. The remainder were used as peak hour trippers. MTS records, however, do not indicate if the dispatched vehicles had operable lifts. Many may have been awaiting lift parts but were otherwise in good condition. As these are the newest buses in the fleet, it is likely that they will be dispatched first.

The maintenance department has had some problems in obtaining an ample parts inventory. When parts are available, the lift can be repaired the same day. If parts are unavailable, the bus is usually dispatched to a non-accessible route.

In 167 attempted boardings, during the first 105 days of operation, the driver has been unable to complete the lift operation 40 times. In most cases, this was a minor problem related to the sensitivity of the lift mechanisms and, to some extent, the driver's unfamiliarity with the procedure. Nonetheless, this resulted in a delay in the service. In seven of the 40 instances, the problem required a mechanic's road call and the bus being taken out of service. In all cases, the operator is expected to call the dispatcher and describe the problem. The

dispatcher can either give the operator verbal instructions to solve the problem or notify a nearby road supervisor who carries special tools and is trained to make minor adjustments to the lift and to manually raise and lower the lift. If a lengthy delay is anticipated, the dispatcher will send another bus (usually inaccessible) to transport the ambulatory passengers on-board.

Each lift is cycled once every night to assure that it is in proper working order. A list of malfunctions is provided daily to the garage foreman, maintenance supervisor, and equipment supervisor. Those buses in working order are placed in the track according to the morning route assignment.

New maintenance records have been developed including a checklist of the lift operation and a daily status report prepared for the Superintendent of Equipment on each night's lift cycling. The checklist follows as Exhibit C-5.

In related equipment issues, there have been several comments from ambulatory elderly passengers about the handrails and step height of the passive lift. The lift mechanism requires a clear stepwell area so that handrails which are installed on non-accessible buses are not appropriate. The handrail on the inside of the door is still there, as is a loop handrail on the left side of the lift. MTS mechanics installed an additional handrail above the stepwell parallel to the dashboard. This assists passengers in climbing the middle step, which has an 11 inch riser. MTS drivers have also discovered that the sun glare makes it difficult to

**EXHIBIT C-5  
MECHANIC'S CHECKLIST**

12-29-78

INITIAL LIFT INSPECTION CHECK OFF SHEET

Bus No. \_\_\_\_\_

Time \_\_\_\_\_

Garage \_\_\_\_\_

Date \_\_\_\_\_

Inspector \_\_\_\_\_

	OK	DEFECTIVE	NATURE OF FAILURE
1. Cycle lift			
2. Sensitive edges			
3. Leaks			
a. outward			
b. pan			
c. hydraulic box			
d. towers			
4. Wiring			
a. box			
b. towers			
c. pan			
d. other			
5. Clean lift, mineral spirits			
6. Lubricate lift, dry lube			
7. Inspect towers			
8. End gate pressure			
9. Clean pan assembly			
10. Pan length 9-3/8" $\pm$ 1/8"			
11. Rod adjustment			
12. Nuts and E-clips			
13. Control box lights			
a. step-out light			
b. others			
14. Platform leak test			

NOTE: Report all defects found or immediately repair lift.

**EXHIBIT C-5  
MECHANIC'S CHECKLIST  
(Continued)**

page -

12-29-70

**INITIAL LIFT INSPECTION CHECK OFF SHEET**

**WARNING: Be sure the electrical system is turned off before operating lift manually.**

	OK	DEFECTIVE	NATURE OF FAILURE
1. Pump operation			
2. Raise lift			
3. Raise end gate			
4. Lower end gate			
5. Return all selectors to neutral position			
6. Turn system on electrically			
7. Electrically fold lift			
8. Shut off system			
9. Other defects			

follow the light sequence on the lift control panel. The laminated instruction card serves as a make-shift sun visor for the controls.

3.2.5 Marketing - Registration for the user-side subsidy program provided MTS with names and addresses of wheelchair-using individuals who might be able to ride one of the accessible routes. A major marketing effort involved the coordinator of the program sending a letter to this target market explaining the new service. Attached to the letter was a brochure showing the lift operation, a map of the routes and a list of the major generators served by each. (This map was presented earlier as Exhibit C-1). The coordinator also met with groups interested in knowing more about the service. A second target group mailing took place when the sixth route was added.

A brochure describing the operation of the lift was prepared. In addition to being mailed out to user-side subsidy program registrants and on request to others by the information center, the brochure was delivered in bulk to several agencies who were asked to distribute the brochure to their clients.

Public timetables for the accessible routes were reprinted showing the international accessibility symbol on the front and an "H" next to all accessible trips. A person calling the information number provided in MTS advertisements would be able to request a map of the routes, a brochure describing the lift operation, and a set of timetables for the accessible routes.

Press releases and the route map were sent to the local media. Advertisements for the service appeared in the major daily papers and weekly community papers two and three days before service implementation, on the first day, and eight days later. Radio time was also utilized from three days before to 12 days after service implementation. Approximately 125 announcements were made of the availability of lift-equipped buses. Major TV stations and newspapers were contacted and provided coverage of the implementation of accessible service.

As a future marketing activity, the system guide will be revised to show which routes are accessible. The current guide, dated September 1978, includes a one paragraph description of the service. However, specific routes had not been selected, nor was the service initiation date finalized when this was printed.

3.2.6 Insurance - Insurance coverage is unchanged as MTS is self-insured. To date, MTS has received no claims for injuries relating to the lift operation.

3.2.7 Coordination - A county task force on coordination, of which MTS is a member, meets regularly to discuss coordination possibilities among county agencies. This committee is a continuation of the one established for the SEWRPC study. MTS's two services for the handicapped, the lift-equipped buses and the user-side subsidy program, exist independently of other services. Local agencies have been asked to distribute information on the services to their clients. The users of the two

MTS programs are, for the most part, not affiliated with the various social service agencies in Milwaukee. As such, the agencies provide little input to the MTS programs.

Members of the advisory committee and registrants of the user-side subsidy program are concerned that the county may curtail funding for the program now that lift-equipped buses are in operation. The future of the program rests with the county as the county Board must approve all funding appropriations. The first-year program required supplemental funding prior to the end of the fiscal year. This necessitated placing a limit to the county subsidy of \$10.00 for wheelchair users and \$7.00 for non-wheelchair users. The program currently has 3,000 registered users and is under pressure to expand the availability beyond wheelchair, walker and crutches users and the legally blind.

3.2.8 Data Collection and Evaluation - MTS developed several major recording forms to monitor the delivery of wheelchair-accessible service. Exhibit C-6 is a composite log which shows:

- . Ridership;
- . In-service breakdowns and solutions; and
- . Delays in boarding and alighting.

More specific information on these subjects is available through trip reports and dispatcher logs. The policy of drivers immediately reporting to the dispatcher all use of the lift is a major monitoring effort.



Maintenance monitoring forms were developed, as previously discussed. Records of vehicle dispatching were prepared to assure that the accessible buses were being assigned to the guaranteed routes. Also, the composite log, Exhibit C-6, provides valuable information to many departments within MTS.

Monthly progress reports summarizing ridership and mechanical problems are prepared for the Milwaukee County Transit System Board. The visibility of the service and interest in its operation are the major reasons for preparing the summary. If ridership levels would increase or major operational problems would arise, the data could be used to adjust service to more appropriate levels. A thorough evaluation of the service is not planned due to the absence of statistics preceding accessible service implementation. Monitoring of service delivery will be primarily a recording of ridership and service reliability.

#### 4.0 Ridership

MTS staff feel that the existence of the user-side subsidy program is a major reason why low ridership levels have occurred.

#### 4.1 Volumes

In the 105 days from April 18, 1979 to July 31, 1979, a total of 167 boardings have taken place on the accessible MTS routes. In some cases, a one-way trip involved a transfer between one of the six routes. This lowers the number to 132 one-way trips. An average of 1.3 trips per day are made, though on some days as many as five one-way trips have been recorded.

During the first week of service, a total of 16 one-way trips were made. In the second week, only five one-way trips were recorded. By comparison, the user-side subsidy program provides 150 daily trips. The program's 3,000 registrants include approximately 300 regular users.

Dispatchers logs listing origins and destinations for lift users indicate that about ten different individuals use the accessible bus service. Most use it on an occasional basis.

Each bus has only one wheelchair tie-down. In one instance, two wheelchair users wished to board the same vehicle. One of the users was able to shift from the wheelchair, after boarding the bus, to a regular seat. The driver then folded the wheelchair and placed it behind the seat, out of the way.

#### 4.2 Frequency and Trip Purpose

Due in part to the existence of the user-side subsidy program, the accessible routes have not attracted any passengers making daily trips to work, school, or workshops. A large amount of the trip-making is generated on weekends and appears to be for shopping, errands, or social-recreational purposes. This trend may be shifting to weekday trips. During the first two weeks, as much as 61 percent of the usage was recorded on weekends. A current tally shows 43 percent of the trips being made on weekends. The low levels of ridership make it difficult to draw any conclusions about the lift users.

#### 5.0 Costs

MTS has only isolated costs for accessible service in three areas - - capital purchases, additional personnel, and purchased advertising time and space. All other costs are

considered to be part of the regular operation and their lift-related portions have not been determined.

### 5.1 Capital Costs

The 100 Flxible "new look" buses were equipped with a Vapor Travelift. The cost associated with the addition of the lift is \$8,500 per bus.

MTS also has an order with General Motors for 150 lift-equipped RTS IIs. Since General Motors manufacturers both the vehicle and the lift, it is difficult to isolate the cost associated with just the lift. An estimate of \$10,000 has been made.

### 5.2 Additional Personnel

Five additional mechanics were hired to maintain the 100 lifts. Two remain at the main shop. The other three are divided among the three MTS garages. As they work exclusively on the lifts, their costs can be directly tied to the new service. The costs associated with their position, including fringe benefits, has been estimated to be \$120,000.

### 5.3 Marketing

Media announcements regarding the introduction of accessible service were purchased at a cost of \$6,600. This was allocated as follows:

- . \$4,000 for approximately 125 radio announcements from the period April 15 through 30;  
and
- . \$2,600 for newspaper advertisements, including:

- Four 3-column x 10-inch ads in the Milwaukee Journal on April 15 and 18, and in the Milwaukee Sentinel on April 16 and 19, and
- Twenty 3-column x 10-inch ads on April 26 in weekly newspapers covering Milwaukee County.

This does not include the cost of producing the instructional brochure or the mailings to target market uses. No assessment has been made of the effectiveness of these media in reaching potential lift users.



## APPENDIX D

### CASE STUDY - ST. LOUIS, MISSOURI

#### 1.0 Case Study Summary

Bi-State Development Agency was the first major U.S. transit operator to offer extensive regular fixed-route service to wheelchair passengers. The implementation of accessible service, which was divided into three phases, has undergone significant transformations. Phase I service was initiated on ten routes with 60 vehicles in August 1977. Average Phase I monthly ridership was estimated at 199 trips. Phase II, service expansion, offered accessible service on 22 routes, with 157 vehicles. Despite the service expansion, average monthly ridership dropped to 151 trips. Though severe winter weather conditions adversely impacted ridership, inability to meet peak and base vehicle requirements was the most serious detriment to maintaining riders. Phase III reflected the policy decision to curtail accessible service. In September 1978, accessible service was provided on 12 routes with 40 vehicles. As of May 1979, ridership is estimated at 66 trips per month.

Maintenance of the lift equipment has inhibited Bi-State's ability to provide reliable service. Lift equipment has undergone 14 retrofits, including remedies to prevent drifting of the ramp and actions to taper the sensitive edge. At any one time, Bi-State estimates that 40 percent to 50 percent of the accessible vehicles are inoperative.

Implementation of fixed-route accessible service was introduced incrementally as a result of delays encountered with the vehicle delivery schedule. The route plan chosen by Bi-State reflects the concept of best overall geographic coverage rather than concentrated coverage on a select few routes.

During the planning stages, any possible impingement on the bus operator's travel time was identified as a potential labor problem. Consequently, additional vehicle hours of service were built into the schedules to counterbalance anticipated increased running time which would result from wheelchair boardings and alightings. However, actual delay time caused by fixed-route accessible service was considerably less than the anticipated delay. Despite the actual delay experienced in Phases I and II, extra service hours were programmed into Phase III.

## 2.0 Case Study Setting

Bi-State operates transit service in Missouri and Illinois. St. Louis City is clearly the focal point of the operations.

### 2.1 Geographic and Demographic Characteristics

Bi-State Development Agency serves seven jurisdictions in both Missouri and Illinois. Over two million people within 4,501 square miles are located within the service district. Bi-State estimates that 7,400 wheelchair users live within the seven jurisdictions. In Missouri, the jurisdictions served are: St. Charles County, Jefferson County, St. Louis City and St. Louis County. Jurisdictions in Illinois are: Madison County, Monroe County and St. Clair County.

## 2.2 Institutional Background

The Bi-State Development Agency was created in 1949 pursuant to a compact between the States of Missouri and Illinois. The agency's primary responsibility is operating the region's public transit system, which it assumed in April of 1963. Though the agency has no taxing powers, it is authorized to issue revenue bonds, collect fees from the operation of its facilities and receive contributions from individuals, corporations and local and state governments.

Besides the bus system, Bi-State operates an airport in Illinois and the Gateway Arch transportation system. It also serves as regional coordinator for the Port of Metropolitan St. Louis.

Bi-State shares planning responsibilities with the East-West Gateway Coordinating Council, the area MPO. The Council is responsible for developing a balanced regional multi-modal transportation system. It is responsible for the Transportation Improvement Program, the Transportation Systems Management Element, and the Unified Work Program. Historically, the Council's input in planning for the transportation-handicapped has been of a policy nature. Though the Council maintains an Elderly and Handicapped Technical Advisory Committee, turnover has been high and attendance at the meetings has been erratic. The Committee has no affiliation with Bi-State.

## 2.3 Transit System Characteristics

Bi-State operates approximately 160 routes with 1,000 buses serving 65 million annual passengers. By far, most of the service and patronage is located within St. Louis City and County. Sixty-five percent of all bus trips originate in the City of St. Louis, while 21 percent originate in St.

Louis County and 14 percent in Illinois. Bi-State reports that the City of St. Louis is the destination of nearly 75 percent of all patrons. A profile of users indicates that most riders use the bus for the journey to work. The average user's bus ride is 30 minutes.

Bi-State routes are served from five garages. Major repair and maintenance work is carried out at a central facility in St. Louis. Services offered by Bi-State include local, express, neighborhood circulators and special services. The basic fare is 25¢, while zone and transfer fares are 10¢ each, and the express/park premium is 5¢. Elderly and handicapped patrons ride for 10¢ during the off-peak period. An identification card must be obtained to take advantage of the reduced rates.

### 3.0 Accessible Service Operation and Development

The evolution of lift-equipped bus service in St. Louis is divided into three phases (Exhibit D-1). The service cut-back from a Phase II high of 22 routes and 126 accessible buses to a Phase III low of 12 routes and 40 accessible buses was perhaps the single greatest policy decision made by Bi-State regarding accessible service. It was reflective of low patronage figures and reliability problems with the lift. Despite the anxiety experienced by the operating units in the pre-implementation stage, wheelchair service is now treated as a normal component of Bi-State service.

#### 3.1 Service Description and Evolution

The motivation for providing accessible services appears to have been driven by two forces:

- . Desire to obviate a potential lawsuit from handicapped user groups; and

EXHIBIT D-1

PHASE-IN OF ACCESSIBLE SERVICE

	<u>Date</u>	<u>Accessible Routes</u>	<u>Accessible Vehicles</u>	<u>Assigned Vehicles</u>	
				<u>Peak</u>	<u>Base</u>
Phase I	August 1977	10	60	51	48
Phase II	November 1977	22	157	102	126
Phase III	September 1978	12	157 <sup>(1)</sup>	40	40

(1) Though the total accessible fleet is 157, for practical purposes only 90 buses are typically available. The spare ratio is, therefore, approximately 125 percent.

- . Desire to comply with UMTA Special Efforts requirements.

The decision to implement fixed-route accessible service occurred after a series of public meetings held to discuss the grant application for the purchase of new buses. In August 1976, a public meeting was held and attended by 100 people. Of the 45 people who made oral presentations, 24 spoke in favor of total accessibility for Bi-State. The possibility of legal action was raised by the speakers, many of whom represented consumer groups. This meeting acted as a catalyst to purchase lift-equipped vehicles. At the time of the meeting, Bi-State had no plans for the phase-in of accessible service. On November 12, 1976, the Bi-State Board voted to implement accessible service.

Fixed-route accessible service in St. Louis followed a three-phase evolutionary process:

- . Phase I: Initial Service Introduction
- . Phase II: Service Expansion
- . Phase III: Service Cutback

The objective of the service was to provide wheelchair users with regularly scheduled service at regular intervals. Not all buses on the selected routes were accessible, thereby indicating Bi-State's preference for a comprehensive, rather than concentrated, service concept. Instead of scheduling all accessible vehicles on a few routes, Bi-State decided to offer geographically dispersed service at less frequent intervals.

The decision to introduce service incrementally (initial introduction and service expansion) was caused by delays encountered with the vehicle delivery schedule. (The first

vehicle delivery was expected in March, but did not arrive until late spring). Bi-State ordered 157 wheelchair lift-equipped Flxible "new look" coaches; the lifts were ordered from Transportation Design and Technology (TDT). Many of the TDT lifts were subsequently retrofitted by Flxible. Low ridership and mechanical difficulties with the lift contributed to the policy decision to enter into Phase III (service cutback).

Subsequent to the initiation of wheelchair lift service in August 1977, Bi-State received a grant from the U.S. DOT Transportation Systems Center to evaluate the first 12.5 months of service (Phase I and Phase II). Much of the information generated from this evaluation has facilitated the task of describing Bi-State's experience with implementing fixed-route accessible service.

### 3.2 Service Implementation Activities

Prior to the implementation of fixed-route accessible service, Bi-State performed a variety of activities to prepare itself for service initiation. The following sections describe the pre-implementation activities and the ensuing operations.

3.2.1 Demand Estimation and Route Selection - No primary surveys were conducted to estimate potential demand by wheelchair users. Instead, national prevalence rates were used to estimate the number of wheelchair users in the service area. Estimates were prepared for non-institutionalized and institutionalized wheelchair users. Estimates indicated that approximately 7,400 wheelchair users resided in the St. Louis area and that 2,600 lived within one-quarter mile of the proposed accessible service. In the absence of hard data, Bi-State used the number of elderly people living within one-eighth of a

mile from each route as a proxy for the number of wheelchair users.

Bi-State selected a plan which would deliver the best overall rather than concentrated coverage. Though the staff estimated the number of wheelchair users, this information was not used for route selection. First, the staff identified the system's most heavily traveled routes, as well as those routes which serve generators thought to be used by the handicapped. Next, all mixed local and express bus routes were identified and eliminated from consideration. All routes which had interlining needs were also excluded. Of the selected routes, none were scheduled to be 100 percent accessible. During Phase I, 60 percent of the scheduled trips were accessible, while during Phase II the comparable figure was 71 percent. In Phase III, a significant cutback in accessible service was made - - to 31 percent.

The route selection process was an in-house staff activity. Though Bi-State occasionally confers with the East-West Gateway Coordinating Council and its Elderly and Handicapped Technical Advisory Committee, the Council did not influence route selection. As the local operator, Bi-State felt it was the most qualified to select routes.

3.2.2 Operations - Accessible service was expected to adversely impact route travel time through increased dwell time caused by wheelchair boardings and alightings. Increased running time would jeopardize schedule adherence, as well as diminish layover time. Management perceived any impingement on layover

time as a potential labor problem that would have to be rectified in the pre-service stages. Consequently, an average of 12 minutes of layover time was ensured on each of the routes.

The Schedule Department estimated that the operation of fixed-route accessible service would provide a 2.7 percent increase in platform hours. During Phase I, a total of 245 hours of additional weekly vehicle hours of service were added to the schedule. During Phase II, 519 hours of weekly vehicle hours were added to the schedule. For Phase I and Phase II, the first 12.5 months of service, 24,435 extra hours of service were added. During Phase III, 340 hours of weekly vehicle hours were added to the schedule. For the ten-month period of September 1978 to June 1979, approximately 14,000 extra hours of service were added. Actual total delay time for Phases I and II was estimated to be 509 hours, considerably less than the extra 24,435 vehicle hours of service that was added to the schedule by Bi-State.

Staff report that a major trouble spot in assessing the need for extra hours was that there was insufficient wheelchair passenger activity to evaluate the service for scheduling ramifications. While no actual field data are available to verify individual boarding and alighting times, Bi-State had performed a special test to estimate total dwell time per trip. This test was used to confirm Bi-State's decision to add extra vehicle hours of service to counterbalance longer dwell times. It was not used as a planning tool to estimate the

need for extra service hours during the pre-implementation stages. The tests were held at Bi-State facilities by wheelchair persons on a bus which was not in service. Tests indicated that, for a person in a wheelchair without an attendant, total dwell time per trip was 225 seconds or 3.75 minutes (130 seconds for boarding and 95 seconds for alighting). For a person in a wheelchair with an attendant, total dwell time per trip is 630 seconds or 10.5 minutes (355 seconds for boarding and 630 seconds for alighting). Boarding and alighting time is high for a wheelchair attendant trip due to Bi-State's policy which prohibits non-wheelchair users from riding the lift. The attendant must therefore wait until the user has been raised to bus floor height and then board through the rear door. This requires the operator or another passenger to activate the door. The attendant then secures the user. Information from these tests confirmed the Schedule Department's conviction that the extra layover time was necessary to allay the concerns of schedulers and operators about on-time performance. It is not known whether these tests faithfully replicated field conditions.

Implementation of fixed-route accessible service necessitated other operational changes. On accessible runs, bus operator changeover occurred at the end of the route rather than at the garage. This policy change contributed to the addition of extra vehicle hours to the schedule. Besides the changeover at the end of the route and the layover time, another operating concern was that delays on routes with five-minute headways would cause overcrowding on the following vehicles.

A boarding policy procedure was also initiated as a result of accessible service. At first, it was established that wheelchair patrons would be the last to board the bus. This policy was later changed to allow priority loading for wheelchair passengers. This would enable the wheelchair patron to secure himself safely into position while the rest of the passengers were boarding. Only wheelchair patrons are allowed to use the lift, as there is insufficient clearance for standees at the outer end of the platform.

Another policy decision made during the pre-implementation phase was to have the bus operator radio the dispatcher when a wheelchair user was on-board. This policy was designed to serve as an accounting mechanism for keeping ridership records, as well as a mechanism for ensuring the safety of the handicapped user.

This procedure was not faithfully executed. Operators reported that the negotiation of safety measures while pulling out of bus stops left little time to radio that a wheelchair user was on-board. The Bi-State operations supervisor has suggested that a form be used to replace the radio procedure. The supervisor points out that the bus operator must be motivated to comply with the data requests, and suggests that the operator be paid a nominal fee for the submission, regardless if there were any riders. To date, bus operator reluctance to radio the presence of a wheelchair passenger has made it difficult for Bi-State to maintain accurate wheelchair ridership figures.

The number of partially- or wholly-missed runs was a major concern. According to reported information, on the average, approximately 16 percent of all scheduled accessible runs are missed. During Phase II, mechanics bolted ten vehicle lifts so as to ensure delivery of service to non-wheelchair patrons. In the beginning of service initiation, if a lift was inoperable, a road supervisor would be dispatched to determine if he could transport the wheelchair user in a Bi-State service vehicle. This procedure would work only if the user had a foldable chair. Users in electrically-powered chairs would have to wait until another accessible vehicle arrived. Average headways for accessible service ranged from 12-17 minutes during the peak on the heavily traveled lines, and over one hour during the base period.

The evaluation of the accessible service indicates that missed runs were greater than that which was reported by the operators. The number of buses actively available for runs was considerably less than the service reliability statistics estimate. Though the actual number of missed runs cannot be accurately verified from the bus operator reports for Phase I and Phase II, bus availability data at the garage indicate approximately 35 percent of the peak trips were missed, while 20 to 30 percent of the scheduled trips in the base were missed. Though service was cut back in Phase III, a consequence was that only five percent of all accessible runs were missed.

3.2.3 Driver Training - All bus operators were required to receive training in the operation of lift-equipped vehicles. This training was compensated at the regular rate rather than at the lower Bi-State training rate. Fifteen senior operators were given two days of intensive instruction by Bi-State staff concerning sensitivity and operation of the lift. In turn, these senior operators instructed Bi-State's drivers in proper execution of the lift equipment.

Bus operators were allowed to sign-up for instruction at their own convenience within a three-week period. An instructor and a wheelchair lift-equipped bus were assigned to each garage. At the larger garages, where turnout was expected to be high, two instructors were assigned.

The training session was designed to last one hour. A narrated slide show was developed by Bi-State's elderly and handicapped specialist. The 15-minute slide show was the basis of the sensitivity component of the training session. The slide show covered such topics as attitude, self-esteem, dignity, wheelchair use and lift procedures, and the kneeling feature. The 45-minute segment of the training dealt with all operational aspects of the lift, including evacuation procedures. Bus operators had on-board practice using the lift equipment. One driver would activate the lift, while the other rode the lift in the wheelchair. All operators were given a manual describing lift operation procedures.

As a result of management's decision to avoid potential labor problems, bus operators were instructed not to leave their seats while aiding wheelchair passengers. This decision was made to obviate the occurrence of any workmen's compensation claims. Generally, bus drivers were instructed to be cooperative and to view accessibility as any other service innovation. Once the operators were advised that they would not be liable for injuries or damages sustained during operation of the lift, labor opposition to the service dissipated. Though the union raised the issue of receiving additional compensation for operating wheelchair lift service, management decided that operators of accessible vehicles would not be compensated at a higher rate than regular route operators.

The new training program is no longer incorporated in the new bus operator training session, as it is not considered a priority.

3.2.4 Bus Operator Reaction - Driver reaction to the service has been positive. Operators who wish to avoid lift service can do so through the job-pick system. To date, Bi-State has not experienced any problems in fulfilling the accessible runs. A common problem, however, is that drivers do not have frequent experience operating the lift. In the event that a wheelchair patron wishes to board, it is probable that the driver's skills are rusty, thereby causing potential problems with lift execution.

3.2.5 Maintenance - Maintenance was heavily impacted by the implementation of accessible service. Due to the initiation of service, six mechanics were trained and assigned to a lift repair tour of duty on a full-time basis. Three new pits with side bays had to be constructed at Bi-State's central maintenance facility to enable repairs of the lift equipment. All major repair work on the lifts is scheduled at the central facility.

Flxible provided the Maintenance Department with the following six-step preventive maintenance program:<sup>1</sup>

<u>Preventive Maintenance Task</u>	<u>Recommended Interval</u>
1) Test Operation (Check for binding, physical damage, leaks and jerky operation - repair as necessary)	Daily
2) Check Reservoir Fluid Level (Check with ramp in stowed position, and lift system de-activated)	Daily (use only API service SE engine oil)
3) Clean and Lubricate Lift Track Assembly and Step Hinges and Lock Linkage	Weekly
4) Inspect for Damaged or Loose Wires, Tubing, or Connections, and Physical Damage	Weekly
5) Replace Hydraulic Filter Element	Every 6 months
6) Drain and Refill Hydraulic Fluid and Conduct Servicing and Operating Test	Every 6 months (Use SAE10W, API engine oil)

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<sup>1</sup> Applied Resource Integration Limited, Draft Interim Report - Evaluation of St. Louis Accessible Bus Service, 1978, p. 6-15 and 6-16.

Several maintenance tasks were subsequently modified by Flxible to reflect Bi-State's recent experience with the lift. For example, in Task 3, a heavier grease than the one originally recommended by Flxible is now used.

Several modifications were made to the lift by Flxible prior to service implementation. During the pre-testing phase, drifting of the ramp and step sections of the lift were noticed. Modifications to the lift include:

- . Installation of an electrical circuit time delay;
- . Installation of a higher pressure check valve;
- . Installation of a positive stow lock; and
- . Installation of an automatic recovery system.

Besides the drifting of the lift, another major problem was that the sensitive edge was too thick for certain wheelchairs to negotiate entry. The edge was tapered in a subsequent modification.

As a result of scheduling practices in which a large proportion of accessible buses are kept in service during the base period, accessible buses have a considerably lower peak-to-base ratio than non-accessible buses. Within the five garages, the peak-to-base ratio for accessible buses ranges from a low of 1.19 to a high of 1.40. The high

utilization of the accessible buses reflects that they are not readily available for maintenance work during the base period.

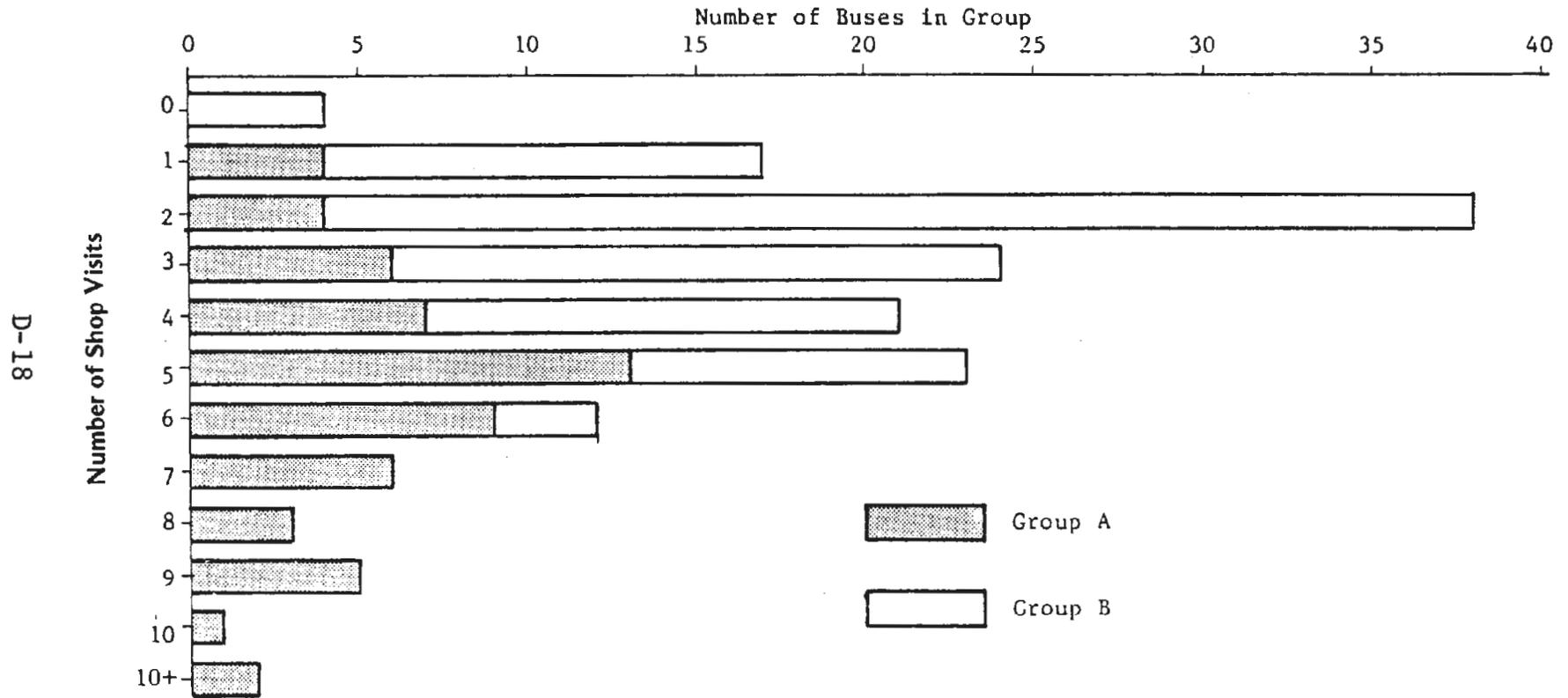
Exhibit D-2 illustrates the number of times that a vehicle was sent to the repair facility. Group A refers to the 57 vehicles which were put into service during Phase I, while Group B represents the 90 vehicles which were put into service during Phase II. By the end of September 1978, Group A vehicles had accumulated nearly 55,000 miles each, while Group B vehicles amassed 40,000 miles each. Phase I vehicles experienced considerably more repair work even when the additional mileage is considered. This reflects the design problems with the lift which were more pronounced in Phase I. The bolting of lifts in ten vehicles during Phase II contributes to the lower repair rate, as a vehicle could accumulate mileage even though the lift was inoperative. These vehicles could be placed in regular, non-accessible revenue service. Phase III information is not yet available.

Bi-State's preventive maintenance schedule calls for inspections on a 1,500, 9,000 and 27,000 mile basis so as to integrate lift repair work with other programs. Daily cycling of the lift, a component of the preventive maintenance program, was carried out during Phases I and II, but eliminated during Phase III.

Maintenance categorized lift failures as electrical, hydraulic or mechanical. Electrical failures concern the control box circuit board

EXHIBIT D-2

SUMMARY OF FLEET REPAIR FREQUENCY



Source: Applied Resource Integration, *Draft Interim Report – Evaluation of St. Louis Accessible Bus Service*, 1978, pp. 6-22.

assembly and the five micro-switches which control lift movement. Hydraulic failures deal with the ramp-extending cylinder and the hydraulic manifold, while the major mechanical problem was drifting. Other mechanical problems dealt with the replacement of the extending slides which support the outer platform and the skidpan.

The total number of lift repairs by month is shown in Exhibit D-3. In many cases, garages faced the decision of sending the vehicle to the central repair facility for an unknown period of time, or keeping the bus with the inoperable lift in service. Given the possibility of missing regularly scheduled service runs, the latter option was frequently selected.

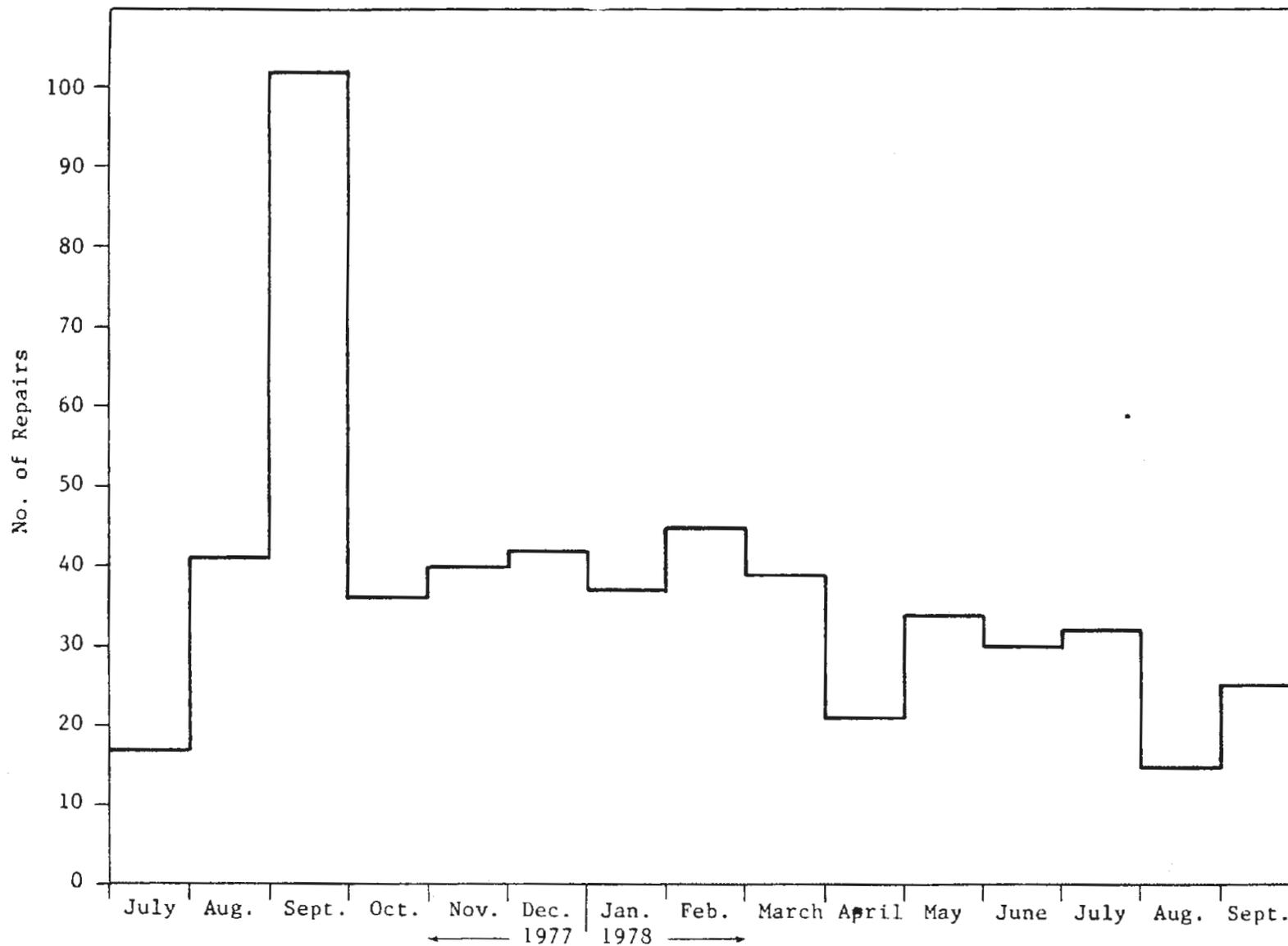
The maintenance of the lift-equipped vehicles has become less of a priority during Phase III. The number of mechanics has been reduced from six (Phase I and Phase II) to four (Phase III). Repairs for transmissions and air conditioning take precedence over lifts.

3.2.6 Marketing - Prior to the initiation of service, wheelchair lift buses were taken to 35 demonstration sites in an effort to familiarize potential patrons with the new service. Demonstrations were held at major activity centers, as well as at social service agency locations. Public turnout was reported to be heaviest at the social service agencies. Demonstrations were held on both weekdays and weekends.

EXHIBIT D-3

TOTAL NUMBER OF REPAIRS BY MONTH

D-20



Source: Applied Resource Integration, *Draft Interim Report – Evaluation of St. Louis Accessible Bus Service, 1978*, pp. 6-34.

Equipment reliability problems detracted from the success of the demonstrations. On one occasion, the lift started to stow (return to step position), while a wheelchair user was still on the lift. Staff members report that after this particular occurrence, no other potential patrons used the lift that day.

Besides the demonstration program, Bi-State used other techniques to publicize the service. Prior to Phase I, service timetables were distributed along the ten routes at generators, including neighborhood grocery stores. Bi-State ran radio commercials and conducted several speaking engagements at social service agencies. Modest television and newspaper advertisements were run. Pamphlets instructing potential patrons on how to use the system were distributed. Separate telephone lines were maintained in the Program Development Department to answer questions about the service.

Current marketing of fixed-route accessible service at Bi-State is limited. Departmental employees feel that, in good faith, they are unable to market an unreliable service. However, if questions about the service are received, they are promptly fulfilled. No media advertisement or pamphlet distribution activities are taking place, nor are they scheduled to resume.

3.2.7 Insurance - Bi-State is self-insured and, therefore, accessible service had no impact on insurance expenses. The agency reports that it has paid \$18,700 in damages to clients resulting from

51 separate wheelchair lift-related accidents. The claims are for personal injury and property damages.

3.2.8 Coordination - Coordination activities at Bi-State are limited. Bi-State does not coordinate operations with other social service agencies which have transportation services.

Bi-State and the East-West Gateway Coordinating Council have an independent working relationship. The Council and Bi-State do not confer on fixed-route accessibility issues, nor have the two agencies been able to establish a strong community participation program.

3.2.9 Data Collection - A series of forms and procedures were developed to document the delivery of fixed-route accessible service. For the most part, the forms were developed specifically for the evaluation plan which was sponsored by TSC. Bi-State had primary responsibility for collecting all evaluation data. Bi-State staff also critiqued the evaluation as it was being carried out. The data collection instruments were designed as part of the TSC evaluation project.

- . Daily Wheelchair Trip and Denial Records were maintained (Exhibit D-4). Bus operators were requested to radio every wheelchair trip; the dispatcher was to report time and location of boarding, alighting, and the user's Bi-State identification number. Reasons for denial of service were to be cited.



Wheelchair trips and denials were to be entered on the dispatcher log, which notes such occurrences as road calls, emergencies and delays.

- . A Trouble Log was designed to list any problems on the road which involved the lifts (Exhibit D-5).
  
- . User Surveys and Travel Diaries were maintained, but met with limited success. Few users were ever identified. Out of a total of 16 users who were surveyed, only nine had made any trips during the three-week period when the travel diaries were to be kept. Exhibit D-6 illustrates the Travel Diary form.
  
- . A Non-User Survey was administered to wheelchair persons who had not used Bi-State's services. Surveys were administered in a non-random fashion to hospitals and social service agencies. Over 60 completed returns from non-institutionalized users were returned, while over 200 responses from institutionalized users were submitted.
  
- . Two Able-Bodied Rider Surveys were conducted to ascertain attitudes on accessible service and whether or not any inconvenience had occurred as a result of fixed-route accessible service.

EXHIBIT D-5

# WEEKLY TROUBLE SUMMARY

WEEK OF \_\_\_\_\_

Scheduled Lift Runs	Missed Runs		Trouble Occurrence														Rectification Procedure						
			Code A		Code B		Code C		Code D		Code E		Code F		Totals		Code X		Code Y		Code Z		
	Full	Partial	no.	min.	no.	min.	no.	min.	no.	min.	no.	min.	no.	min.	no.	min.	no.	min.	no.	min.	no.	min.	
Monday																							
Tuesday																							
Wednesday																							
Thursday																							
Friday																							
Saturday																							
Sunday																							

**TROUBLE CODE**

- A Lift stuck in step position - won't deploy
- B Lift stuck in other position - won't stow
- C Lift stuck on curb
- D Steps slipping
- E Automatic barrier doesn't function properly
- F Accident involving person in wheelchair
- G Securement device

**RECTIFICATION CODE**

- X Bus replaced
- Y Emergency dispatcher sent
- Z Shop called

D-25

EXHIBIT D-6

BI-STATE LIFT BUS TRAVEL DIARY NAME \_\_\_\_\_

Trip No.	Date	Trip Origin		Access to Bus		Route No.	Transfer	2nd Route No.	Access to Destination		Trip Destination		Weather Code	Trip Purpose Code	Lift Bus Trouble Code	Alternate Mode Code	Comments
		Address	Time of Day Left	Mode Code	Distance (Miles)				Mode Code	Distance (Miles)	Address	Time of Day Arrived					
1.																	
2.																	
3.																	
4.																	
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	

MODE CODE

1. Walk/wheel unattended
2. Walk/wheel attended
3. Taxi
4. Auto passenger
5. Auto driver
6. Agency transportation

WEATHER CODE

1. Clear, warm
2. Clear, cold
3. Rain
4. Snow

TRIP PURPOSE CODE

1. Work
2. Sheltered occupation
3. Rehabilitation
4. School
5. Shopping
6. Personal business
7. Social/recreation
8. Home
9. Other

LIFT BUS TROUBLE CODE

1. Lift malfunction – denied entrance into vehicle
2. Lift malfunction – boarded vehicle with delay
3. Bus too crowded – denied entry
4. Both wc positions occupied – entry denied
5. Lift bus late – trip delayed
6. Other (describe in Comments)
7. Snow or other environment
8. Securement device
9. No trouble

ALTERNATE MODE CODE

1. Auto passenger
2. Auto driver
3. Walk/wheel unattended
4. Walk/wheel with assistance
5. Taxi
6. Social agency transportation
7. Other (describe in Comments)
8. Would not make trip

Source: Applied Resource Integration, *Draft Interim Report – Evaluation of St. Louis Accessible Bus Service*, 1978, Appendix B.

- . Driver and Supervisor Surveys were also conducted to ascertain attitudes about the service and whether it was being used with confidence.
- . Bus Maintenance Master Record and Status Master Record provide a complete history of lift-related repair work. This information was used to complete a picture of maintenance costs, breakdowns, availability and impacts relating to vehicle mileage. Exhibits D-7 and D-8 illustrate the Bus Status and Bus Maintenance Master Records.

As was the case with marketing, data collection activities have decreased. Bus operators do not regularly report wheelchair boardings and lift problems over the radio. Failure to report boardings is partially attributable to heavy radio traffic and continuing operator reluctance to follow the procedure. Maintenance data collection activities continue to be executed. Maintenance repairs for lifts are part of the regular recordkeeping efforts. The Program Evaluation Department transfers the information onto the specifically designed forms.

#### 4.0 Ridership

Ridership records are maintained on the basis of radio communication between the bus operator and the dispatcher. However, due to driver reluctance to follow the procedure and heavy radio traffic, accurate ridership statistics are





unavailable. For example, travel diaries kept by users over a three-week period documented that 44 trips were taken. However, the bus operator reports for the same period account for only 24 of these trips. Bi-State therefore estimated that the actual number of trips was approximately twice the number of reported trips. Bi-State follows a practice of doubling the reported ridership.

#### 4.1 Volumes

Since the program's inception in August 1977, until May 31, 1979, an estimated 2,580 one-way trips have been made by wheelchair persons, or approximately 126 trips per month (Exhibit D-9). Ridership was greatest in Phase I and lowest in Phase III. The reduction in Phase III service adversely impacted ridership.

Bi-State performed a special analysis to determine the number of individual users. Staff tried to assign 1,026 trips to specific users, based on repeat travel patterns for origin, destination, route traveled, and time of day. Bi-State identification numbers were also used to determine individual users. Since most operators failed to report the identification number, this procedure had limited value in estimating individual ridership. All wheelchair trips could not be assigned, as there were scattered origins and destinations which did not fit into any recognizable travel pattern. Bi-State was able to assign 92 percent of the 1,026 trips.

Bi-State estimates that only 60 different wheelchair patrons have used the fixed-route accessible service. This represents 0.54 percent of the estimated wheelchair population in the Bi-State service area. The staff estimates that 48 percent of all wheelchair trips were made by three individuals; the remaining trips were made by more infrequent users.

EXHIBIT D-9

WHEELCHAIR RIDERSHIP

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	<u>Total One- Way Trips</u>	<u>Monthly</u>
Phase I	538	199
Phase II	1,516	151
Phase III (a)	<u>526</u>	<u>66</u>
TOTAL	2,580	126 (b)

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(a) Phase III ridership is inclusive through May 1979

(b) Based on 20.5 months of service

According to a Bi-State survey, users indicated that denial of service (lift failure) and physical barriers (curb cuts) were the two most important reasons for not using the service. Non-users stated that they had other available means of transportation.

#### 4.2 Trip Denials

Bus operators were also required to report trip denials as well as trips served. Bi-State estimates, however, that reported denials were less than actual denials. The number of bus operator-reported denials for Phase I and Phase II averaged 9.3 denials per month. Reported denials ranged from a low of one in August 1977 to a high of 31 in April 1978. There were no reported denials in September 1977. Reported denials are for scheduled trips only.

#### 4.3 Frequency and Trip Purpose

User travel diaries, which were completed by nine of 16 respondents, indicate that work and sheltered occupation trips were the most common, followed by home and recreational trip purposes. The users also reported that they had access to alternate transportation modes, primarily as an auto passenger.

#### 5.0 Costs

Capital, start-up and additional marginal operating costs have been incurred in order to implement fixed-route accessible service. These costs are derived from the TSC evaluation.

#### 5.1 Capital Costs

Besides the purchase of the vehicles, Bi-State had to install three special pits at a cost of \$1,750 each or \$5,250.

Even though the pits can be used to service non-accessible vehicles, their cost is attributed to the phase-in of accessible vehicles. Total capital costs are:

. Accessible Equipment on Vehicles Cost	\$912,555
. Maintenance Facility Cost	<u>5,250</u>
TOTAL	\$917,805

### 5.2 Start-up Costs

These costs, which pertain to the following activities, were derived from Bi-State estimates and records.

. Marketing and Publicity Costs	\$ 35,174
. Maintenance Preparation Costs	31,010
. Driver Training Costs	16,322
. Administrative Costs	<u>14,040</u>
TOTAL	\$ 95,546

### 5.3 Marginal Operating Costs

Additional operating costs are as follows for Phases I, II and III. Phase III is inclusive through June 1979.

. Additional Service Hours Cost	\$349,766
. Lift Repair Costs	375,516
. Preventive Maintenance Costs	88,113
. Administrative & Support Staff Costs	167,070
. Accident Liability Costs	<u>18,700</u>
TOTAL	\$999,165



## APPENDIX E

### CASE STUDY - SANTA CLARA COUNTY, CALIFORNIA

#### 1.0 Case Study Summary

The Santa Clara County Transit District currently has 52 accessible vehicles, 13 of which are deployed on two fixed-routes. Only 13 out of the 52 buses are deployed since there have been mechanical problems which cause the lifts to drift. Accumulators have been installed in approximately 20 vehicles to remedy the drifting problem. All vehicles are scheduled to be retrofitted.

Santa Clara's two accessible routes operate from the same garage. The third accessible route will become operational in October 1979,<sup>1</sup> while a fourth route is scheduled to offer lift service by the end of the year. All routes are scheduled to be 100 percent accessible. The buses are manufactured by Gillig Corporation and have a Transportation Design and Technology (TDT) lift installed in the front door. There are three wheelchair tie-downs in each of four vehicles, while each of the remaining coaches have only one tie-down.

Planning of accessible service in Santa Clara was accompanied by a high degree of consumer participation. The Ad Hoc Committee on Transportation for the Handicapped assisted the District in the plotting of the first accessible route. Rather than make an existing route accessible, the District and the Committee decided to create a new route

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<sup>1</sup> This case study was prepared prior to the initiation of the third and fourth accessible routes in Santa Clara County.

which was specifically tailored to meet the travel needs of the transportation-handicapped. Subsequent routes which were made accessible were part of the existing transit system and connected with this route.

The Ad Hoc Committee and the District continue to exhibit a strong working relationship. The Committee is active in planning, training and marketing activities. In fact, disabled volunteers from the Ad Hoc Committee assist the District in the operation of the passenger familiarization program.

Santa Clara's route plan reflects the concept of concentrated rather than geographically dispersed coverage. Instead of spreading a limited number of vehicles over a large number of routes, the District decided to assign buses to only a few routes. Initially, service was introduced on one route. The District has not had to modify service standards as a result of the phase-in, and no additional layover time has been added to the schedule. To date, the principal maintenance problem is the tendency of the lifts to drift.

Santa Clara's experience with the phase-in of accessible service has yet to be evaluated. Origin and destination information has not been compiled. A full evaluation of ridership is anticipated to be conducted once the three lines are completely operational.

## 2.0 Case Study Setting

Santa Clara County Transit District operates service in 15 jurisdictions. The City of San Jose is the largest of the jurisdictions.

## 2.1 Geographic and Demographic Characteristics

As of the 1970 census, the Santa Clara service area population is 1.2 million. The District serves 70,000 revenue passengers a day. The flat fare is 25¢, while student fare is 10¢. During the peak hours, elderly and handicapped ride for 10¢, while during the base period they ride at no charge. The District does not have any zone fares.

## 2.2 Institutional Background

The Santa Clara County Transit District (SCCTD) is administered by the Santa Clara County Transportation Agency, an arm of the county government. The County Board of Supervisors is also the Board of Directors of the Transit District. The Transportation Agency is essentially the old Department of Roads and Highways of the county. The MPO for the area is the Metropolitan Transportation Commission (MTC), located in San Francisco.

## 2.3 Transit System Characteristics

The SCCTD total fleet size is 351 vehicles, of which 217 are used during the peak hour. The buses operate out of four divisions on 45 routes throughout the county.

Dial-a-ride service is provided to the general public in the South County sector with a three-wheelchair tie-down Gillig coach and three inaccessible Gillig coaches. The one accessible coach services all four zones. SCCTD plans to eventually have all dial-a-ride vehicles accessible.

### 3.0 Accessible Service Operation and Development

Fixed-route accessible service was implemented in 1976 with four FMC Handicoaches. SCCTD developed its own lifts for these vehicles - - TE-1 and TE-2 (Transit Elevators). These lifts were only produced in small numbers by the SCCTD staff. Service was significantly expanded in October 1978 when the Gillig buses were put into service. The following sections document the planning and implementation activities.

#### 3.1 Service Evolution and Description

On the average, 13 accessible Gillig buses are operated daily on two routes. This is in addition to the vehicle which operates in the demand-responsive mode in the South County. Average daily headway on Route 18 is 120 minutes, with no difference between peak and base. Route 64 has a 15-minute headway that changes to 30 minutes on evenings and weekends. Route 62 will become accessible in October 1979, with vehicles scheduled at 30-minute headways.

The decision to implement fixed-route accessible service can be traced to the District's demand-responsive service for the general public. The service, initiated in November 1974, was short-lived. This service was in effect until May of 1975 when a court decision in favor of a consortium of private taxi-cab operators forced the abandonment of this service. The Transit Agency is now legally permitted to provide dial-a-ride service only in rural South County. A general dial-a-ride service is still provided there. A lift-equipped Gillig bus is now used in this operation to provide service to the area's elderly and handicapped, as well as the able-bodied population.

In 1975, a study by Bechtel Corporation reported that a minimum of 100 buses would be required to provide adequate demand-responsive service to elderly and handicapped people in the service area. In late 1975, SCCTD performed a cost analysis of a totally accessible fleet for fixed-route service, and one with only 60 accessible vehicles operating in the demand-responsive mode. Based on their operating costs, the demand-responsive system would increase the operating budget by 55 percent with a minimal impact on serving the needs of the elderly and handicapped population. As a result of this analysis and recommendations from the Ad Hoc Committee on Transportation for the Handicapped, the Board of Directors, on April 12, 1976, adopted a resolution calling for total fixed-route accessibility. The county instituted a project to retrofit some of its older vehicles and to purchase new buses with a lift.

UMTA has already approved a grant to retrofit the 81 previously purchased non-accessible Gillig buses. In addition, there is an outstanding order for 50 rear-door lift General Motors RTS-IIIs; delivery is expected in December 1979. Besides the General Motors RTS-IIIs on order, the District has 66 General Motors RTS-IIIs, turned over by AC Transit, which may be retrofitted with a prototype front door lift now being developed by three companies. A grant application is being processed for 134 more accessible buses. This will account for virtually an entirely accessible fleet, well within the vehicle-related program accessibility requirements of the 504 Regulation.

### 3.2 Service Implementation Activities

Prior to the phase-in of fixed-route accessible service, SCCTD performed a variety of activities to prepare itself for service initiation and operation.

### 3.2.1 Demand Estimation and Route Selection -

Before the initiation of fixed-route service, there was essentially no transportation available to the general handicapped population. There was, however, a handful of specialized services available to some social service clients. These services, however, did not provide any usable ridership information, primarily due to their scattered nature and the specialized populations they were serving.

As mentioned in a previous section, in early 1974 the Transit District was planning to initiate a countywide dial-a-ride system for the general population, which also included some accessible vehicles for handicapped and elderly persons. For this service, four FMC Handicoaches were ordered. Dial-a-ride for the general public began in November 1974 and ended in May 1975 because of the aforementioned court decision. Service for handicapped persons had not, at that time, been initiated because the Handicoaches were late in arriving. At this time the Ad Hoc Committee on Transportation for the Handicapped had been created. In September of 1975, the Committee assisted the Transit District in soliciting information from elderly and handicapped persons for designing an appropriate fixed-route for the deployment of the four Handicoaches in fixed-route service. Questionnaires were placed in newspapers and delivered to social service agencies. The resulting information on desired destinations was used to plot Route 18, a special route designed to specifically serve elderly and handicapped persons. This was done instead of making an existing fixed-route accessible.

Route 18 went into service in December 1975, and the origin/destination information generated from this route helped establish future direction. Route 18 was specifically designed to serve generators of particular interest to the disabled community, but became a part of the overall SCCTD route network.

Both before Route 18 was initiated and during its operation, some attempts were made to estimate the demand for service. The principal data source was the 1970 census which indicated that somewhere between 1-2 percent of the population was physically disabled and that the transit-dependent population was between 3-4 percent. In 1975, the County Planning Department conducted a special "Census '75" which, for the first time, attempted to collect comprehensive demographic data in Santa Clara County. Information from these sources was sketchy at best and did not provide adequate demand estimations. The best sources of data in this case, in the opinion of the Planning Staff, were the ridership on Route 18 and input from the Ad Hoc Committee. The Planning Staff believes that this procedure, that is, working closely with the disabled community and initiating a phase-in operation, is a useful tool.

Once the decision had been made in April 1976 to purchase only accessible buses, the Planning Staff and the Ad Hoc Committee proceeded to design a formal plan and establish route priorities. Working closely with the Committee, the Planning Staff developed a set of three initial routes serving

a variety of generators and which connected with Route 18. For example, Route 18 serves Stanford University, DeAnza College, San Jose City College and San Jose State University. Route 64 connects with the only other college, University of California at Santa Clara, as well as a BART station. Another route, Route 62, was originally not scheduled for implementation in this first set. However, the AID Center, an independent living center, is a major generator for disabled individuals now located in Route 62's service area. The AID Center was originally located on Route 18 and, when it moved, the route serving it was given a high priority. Route 64 was implemented on February 14, 1979. Route 62 will go into service in October 1979.

Route 66 will be implemented when there are sufficient vehicles. After the first three routes have been initiated, an evaluation will be performed on their ridership and operation. This will be presented to the Planning Committee of the Transportation Commission, the Commission itself, and finally to the SCCTD Board of Directors.

In deciding priorities for new routes, not only are generators taken into account, but the number of buses required per route and the size of the buses. One of the initial requirements was to pick routes which required few buses, thus allowing the available coaches to be spread further. An early decision of the Planning Staff and the Ad Hoc Committee was that every coach on each chosen route would be accessible. Existing ridership on the routes was also considered. The

Gillig buses have only a 35-passenger seating capacity and several routes require larger vehicles.

3.2.2 Operations - To date, no service standards have been modified to accommodate accessible service. Generally, layover and recovery times are adequate to provide for the loading and unloading of disabled passengers. The only factor which may be affected is seating capacity since accessible buses have fewer seats. The only accessible buses currently in the SCCTD fleet are the smaller Gillig buses. These are only used on routes which do not have high standing loads. The Santa Clara County Transit District has a very low peak-to-base ratio and has not experienced any difficulty in providing a bus with fewer seats. In fact, its experience is the opposite of that predicted by others, as accessible buses actually provide more room for standees than a non-accessible bus. This is attributable to the interior design of the bus, which provides an adequate turning radius for the wheelchair user.

Accessible service will be expanded greatly with the arrival of new General Motors RTS-II buses. The Santa Clara County Transit District will soon begin retrofitting the 66 General Motors RTS-IIs originally intended for AC Transit. Since these have not been lift-equipped and users have indicated their preference for a front-door lift location, three lift manufacturers and retrofitters have been asked by SCCTD to develop a prototype front-door lift for the General Motors RTS-IIs. These are due later this year. The models

will be evaluated by SCCTD staff and the Ad Hoc Committee. When these buses are ready, routes which require larger capacity buses can be made accessible. The Transit District also has an order directly with General Motors for 50 rear-door lift-equipped RTS-II buses.

Dwell time has not been adversely affected by the implementation of accessible service. Currently, loading time varies within a wide range, depending upon passenger mobility. On the whole, the average dwell time does not seem to have changed. Precise figures will be available after the preliminary evaluation. This is scheduled to be done when the first three routes have been operational for awhile.

The major impact on operations is dispatching lift-equipped buses for the accessible routes. This has necessitated some procedural changes to assure the assignment of lift-equipped buses to the accessible routes. Under normal circumstances, buses go out randomly from the pool at the beginning of the day's run. Special care must now be taken to assure that accessible buses go out only on accessible routes. This presents a special problem for the spares pool. Since all the lifts have not been retrofitted with an accumulator to prevent drifting, the District experiences difficulty in assuring that accessible spares will be available when there is a breakdown. Usually, when a bus breaks down on any route served from that particular depot, a spare is drawn from the general spares pool. On occasion, this has meant

that an accessible bus was assigned to a non-accessible route. When an accessible bus breaks down, there is no choice but to replace it with an inaccessible bus, even though the route is supposed to have all accessible buses. The only other option is to not replace that vehicle until there is a spare accessible vehicle available. This would leave a hole in the service. The Transit District estimates that, unless it is possible to reserve a pool of accessible buses above and beyond the normal spares pool, this problem will not be solved until approximately 50 percent of the fleet is accessible. When this point is reached, then approximately 50 percent of the spares would be accessible buses and they believe the problem would disappear. SCCTD has made no garage or storage changes for these buses and has attempted to solve the problem only by varying the dispatch procedure. The District has had general maintenance problems, some not always related to the lifts, and therefore cannot afford to keep the accessible buses in a special spares pool.

To date, there has been no adverse effect on service due to accessibility. No changes in schedules have been made nor has there been any change in procurement schedules, except that buses have not arrived on a timely basis. These delays have caused some relatively minor changes in priorities and programming. The general reliability of equipment, not related to the lift, has caused some changes in operations and scheduling. Recent studies have shown, for example, that the growth

of the county necessitates more vehicles than were originally planned in the five-year plan. The gas shortage and ridership growth, especially for commuter service, has necessitated these revisions.

Revisions in the overall development of the system have affected accessibility in a variety of ways, rather than accessibility affecting the development of the system. For example, some accessible route priorities were based on the bus size; that is, the use of the smaller Gillig accessible buses, rather than the larger accessible buses to be delivered later. However, the increased ridership has often required the use of larger buses which meant that certain routes could not be implemented with accessible equipment as originally planned. This is especially true of Route 66 which feeds a BART station. Previously, it was a relatively low ridership route, consisting primarily of "excursion trips." The smaller Gillig buses were appropriate until Route 66 attracted more commuters. Providing accessible service on this route will either require that the headways be cut in half (requiring twice as many buses) or waiting until the General Motors RTS-IIIs have been retrofitted. Some members of the Planning Staff have suggested that decreasing the headway would be desirable in any event, and its interface with BART gives it a high priority for accessibility. Other plans include instituting special accessible express service to BART.

3.2.3 Training - The District has instituted an "Operator Familiarization" program. Each driver has two hours of special training, in addition to the standard operator training program. This includes both "hands on" use of the equipment and familiarization with the concept of "full accessibility" and "mainstreaming." During this training program, each driver spends a portion of the time using the lift in a wheelchair, on crutches, and blindfolded. This training program is conducted with a volunteer recruited from the Ad Hoc Committee who demonstrates the use of the lift and answers any questions that might arise regarding disabled individuals. The volunteer spends at least ten minutes with each driver. The Transit District believes that the direct participation of a disabled person is a necessary component to an effective training program.

The Transit District has recently identified the need for some refresher training, especially since several drivers were trained some time ago and the lifts were not able to be deployed because of the drifting problem. Even drivers who are now scheduled on accessible routes may need a refresher course since they may not serve many wheelchair users and thus do not have an opportunity to frequently deploy the lift.

The union at the Santa Clara County Transit District is politically active in the affairs of the Transit District and members of the union are often present at Board and other meetings. As a result, they have been informed of all the steps

in the implementation process, and members of the Ad Hoc Advisory Committee have made contacts at various times with union members.

Santa Clara County Transit District has experienced no labor problems as a result of the accessibility issue. The Transit District's policy is that the lift is available to all "self-assisted" mobility-impaired individuals. Drivers are not required to assist anyone on the lift. However, many do assist, partly due to their sensitivity training. But since they are not required to do so by management, there is apparently no friction in this area. There is, however, some concern that the RTS-IIs on order may create problems because of the rear-door lift location. (This group of RTS-IIs is separate from the 66 buses from AC Transit which will be retrofitted with a front-door lift).

In addition to training drivers, SCCTD has required that all road supervisors and operations management participate in a version of the operator familiarization training program. This training has been invaluable, in their opinion, in making the transition to accessible service easier.

3.2.4 Public Acceptance - The District reports no complaints from the general public regarding the lift service. Drivers are asked to report any on-board difficulties that may occur. Passengers are encouraged to file complaints with the Transit District if they experience difficulties. These passenger complaints come through the same department that is responsible for most of the planning activities, and the staff has been alerted to watch for such complaints.

3.2.5 Maintenance - The principal maintenance problem identified with the TDT lifts is that of "drifting." The lift has a tendency to shift below its stowed position during normal operation of the vehicle. To some extent, this problem is alleviated if the lift is used often enough. Those lifts which have the highest usage are generally the easiest to maintain. TDT is currently installing an "accumulator" to correct the drifting problem. As yet, there is insufficient operational experience to determine whether or not this really solves the problem. In general, the Fleet Manager stated that the lift is simpler to maintain than the air conditioning. However, there is insufficient experience to estimate the maintenance cost of the lift versus other subsystems.

Drivers are instructed to cycle the lift at the beginning and end of each run, and during the lay-over period. Santa Clara has discovered that the more use the lift gets, the less maintenance it requires and the more reliable it becomes. Ensuring that this procedure is followed has not been easy. However, several members of the Ad Hoc Committee have been making spot checks at the turnaround points of accessible routes to see if the drivers are, in fact, cycling the lifts.

Another problem that has been noticed is the vulnerability of the front-door location. On one particular day, three of the buses were inoperable because of the failure of the lift and six were down because of an accident. The accidents were not major but still resulted in

a slight deformation of the stepwell and consequent binding of the lift.

A separate report is being developed to track lift maintenance problems. When completed, this procedure will result in a daily "lift report" which will record any problems directly related to the lift. This will eventually be fed into a computer to generate graphs and other analysis devices. In general, the lifts are inspected every 1,000 miles for leaks. In addition, after 4,000 miles, the operation is checked. At 8,000 and 24,000 miles, a more thorough "overhaul" is performed. The buses average 150 miles per day.

No new equipment has been purchased to maintain the lifts and there have been no modifications to the garaging facilities. Nor is there a priority for maintaining the accessible buses other than to assure that there are enough available for the accessible runs.

To help identify problems, the driver is required to record any malfunctions and supply this information to the Maintenance Department. In addition, the driver is required to operate the lift at each end of the run and record any abnormal behavior.

Initially, TDT supplied a practice lift for the Maintenance Department, and classroom instruction was given on correct lubrication procedure, preventive maintenance and operation. This practice lift will be used to conduct future on-the-job training. TDT also demonstrated how to remove

a damaged lift and how to install a new one. In this regard, the District believes that the spare ratio is inadequate as there are only five or six extra buses which have been retrofitted with the accumulator. TDT also conducted an acceptance review of the lifts as they arrived, including inspection for leaks and operation. During this process, the drifting problem was identified. This problem worsened as the buses went into service. The District believes that it is too early to determine whether or not the training has been adequate, since the procedure has not "peaked" yet. However, the District believes that there is a need for more extensive training of mechanics and that an add-on training package needs to be developed as a refresher.

Much of the work currently being done, including the installation of the accumulator, is under provisions of the warranty. It is too early to tell whether there will be any problem with parts availability. So far, the Transit District has not needed to stock significant quantities of spare parts, since TDT has been supplying them.

Thus far, the major problem has been keeping the accessible buses on the street due to overall equipment problems with all the components. Problems with braking and overheating often require replacing an accessible bus with an inaccessible one, as there are insufficient lift-equipped spares which have been retrofitted with the accumulators.

3.2.6 Marketing - When SCCTD's own lift design was generally perfected, the Transit District commissioned the production of a film showing its use. This film was designed primarily as a marketing tool and was shown extensively at community meetings, schools and various transit meetings. This film, while still of value in many ways, is no longer being used because the technology has changed. It is doubtful that Santa Clara County Transit District will make another film showing the new TDT lift.

The primary marketing technique being used now is called "Passenger Familiarization." This is a program in which a community meeting is arranged and a demonstration bus and mock-ups of the lift and tie-down are demonstrated. The use of the mock-ups allows people in wheelchairs to familiarize themselves with the approach ramp, slope, aisle, seat and the maneuvering necessary to board the lift and to secure the tie-down. Since only one person at a time can board the bus, and the process may take some time if people are not familiar with it, the use of the mock-ups allows many more people to try the system in a shorter period of time. The usual process is for wheelchair users to practice on the mock-up until they have found the best way to board the lift and to secure themselves. Then, they actually board the bus. The use of the mock-ups also means that a demonstration can be conducted even if a bus is not available.

The Passenger Familiarization program makes extensive use of disabled volunteers recruited from the Ad Hoc Committee. Every session has at least one wheelchair user and semi-ambulatory person available to demonstrate the lift. This program is an outreach activity sponsored by the Transit District, and meetings are arranged at convenient locations, particularly on the advice of the Ad Hoc Committee. Groups and organizations do not request that the bus come out, but rather are informed of a schedule of such appearances. The Transit District has been running a newspaper ad announcing the time and location of these meetings under the slogan, "A Bus for Everyone." They have also created a new logo for the accessible bus program.

The Ad Hoc Committee has requested that the Transit District create a slide/sound show for use at other meetings where the bus or the mock-up are not appropriate. Also planned is a change in the time-guide (schedule) to indicate that the route is accessible. There is, incidently, no marking on the bus or indication in the body of the schedule itself of accessibility because all buses on the routes are accessible. Only the route destination will indicate accessibility.

The Transit District has also installed a teletypewriter system (TTY) for hearing impaired persons and has sent one of its employees to school to learn sign language. This person is part of the customer service team which goes out on bus demonstrations. They have also developed a training program for developmentally-disabled persons.

3.2.7 Insurance - To date, there have been no changes in insurance due to the accessible vehicles. The District is primarily self-insured. There have been no claims and no reports of accidents or problems due to the lifts.

3.2.8 Coordination - The City of San Jose currently provides some subsidies for the operation of paratransit service within the city. This service is under contract to the Yellow Cab Company which provides only sedans. The service is, therefore, not available to persons who use wheelchairs or other persons who cannot use a passenger car. As a result of public pressure, input from the Ad Hoc Transportation Committee and the installation of accessible fixed-route service, Yellow Cab has recently announced plans to purchase at least one lift-equipped van and will begin providing service to wheelchair users as well. Yellow Cab anticipates purchasing more as demand for its services warrants, and other cab companies in the area have intentions to follow suit.

A Paratransit Coordinating Council is required in each county by the Metropolitan Transportation Commission (the local MPO). Such a council must be functioning within a county in order for the MTC to approve grants for transportation services. The council reviews all grants for paratransit service within that county and is charged with the responsibility of coordinating these services. The Council within Santa Clara County has recently hired a full-time coordinator whose job is to investigate opportunities

for more effective coordination, pooling of resources, and joint procurement of maintenance and insurance, for example. SCCTD is a member of the Coordinating Council and its service provides the skeletal framework upon which the Council builds the paratransit service. The Council is also charged with eliminating duplication of services to conserve funding. So far, the Council has not addressed specific issues of joint dispatching so that paratransit providers can provide more effective feeder service to the fixed-route system. While the SCCTD operates both the regular fixed-route system and the dial-a-ride in South County, there is as yet no accessible fixed-route which connects the two.

Because Santa Clara County Transit is the only public operator of transit service in the county, it does not have to contend with differing eligibility requirements for reduced-fares. Since it operates a fixed-route accessible service, it has no eligibility requirements as a provision for that service; that is, any individual waiting at a bus stop will be picked-up. There is not yet sufficient fixed-route service or paratransit service to adequately test the interface. So far, problems with interfacing one system to another have not surfaced.

The implementation of Route 62 will provide direct access to the BART system, an accessible regional rail service. Implementation of accessible service on this heavily traveled route, however, awaits the delivery of the larger General Motors RTS-II buses.

3.2.9 Consumer Participation - The Director of Transit Operations gives much of the credit for the success of its service to the local disabled consumers and especially the Ad Hoc Transportation Committee. While the Committee has an official Ad Hoc status, it is likely to continue to function as a standing committee. The members of this Committee are selected by the Board of Supervisors, primarily from the people who had contacted them with concerns about transportation problems. Most of the members were previously active in the community and had addressed problems of transportation at public meetings and Board of Supervisors meetings.

The Director of Transit Operations contends that Santa Clara has one of, if not the highest, degrees of cooperation and credibility of disabled consumers of any transit district in the country. He attributes this to the active involvement of the Ad Hoc Committee members and the fact that they "do their homework." The Ad Hoc Committee members have taken it upon themselves to be informed not only about issues relating to disabled persons, but public transportation in general. They have not only actively participated in efforts to educate the community but in programs to educate the Transit District staff. The Committee constantly asks questions of the Transit District and seeks information on all aspects of the operation. At the request of the Committee, several "mini workshops" have been arranged on the subjects of financing, operations, technology and specifications.

The Committee invites members of the Transit District's Executive Committee and professional staff to give programs on these topics. To date, there has been a high degree of cooperation. The Director of Transit Operations believes that seeking the advice of the active disabled community is the best way to adequately meet the transit needs of that community. He believes that a transit district should take steps to find those individuals who are community advocates, even though some of their input may not always be comfortable to hear. What may begin as an uncomfortable relationship eventually flows into a creative, cooperative relationship that will ultimately smooth the transition to accessible services.

3.2.10 Data Collection and Evaluation - There is no origin/destination information available on the users of the system. Persons who have participated in the Passenger Familiarization training are asked to fill out forms indicating their travel needs, but no survey has been done of the actual riders. Occasionally, the driver is requested to count the number of lift users, both wheelchair and semi-ambulatory persons, but service has not been in effect long enough to generate usable figures.

Currently, the dispatcher's reports indicate only the deployment of accessible buses. More data will be available when a separate maintenance report on bus breakdowns is completed. Though it is possible to determine whether a lift-equipped bus is on the road with an operational lift, there is yet no real way to determine whether the lift is operating properly.

From the results of the Passenger Familiarization program, Santa Clara County Transit District has determined that people have very little trouble using the lift, but that the tie-down poses serious problems. The clamping device is difficult to release, except by a very agile individual. The Customer Service Section intends to continue with the Passenger Familiarization technique, as well as the sensitization training of its own personnel.

In an effort to deal with future problems, the Agency has created a Passenger Lift Task Force composed of a member of the Advisory Committee, one from the Maintenance Department, a road supervisor, and a senior information services representative. The senior information services representative chairs this committee. Its task is to review all complaints regarding the lift, the performance, and the maintenance records.

Besides the ridership and lift evaluations, the District plans to initiate a survey of all the system's bus stops to determine accessibility. The Agency itself has control over the bus stops, benches and passenger loading pads. It is responsible for maintaining them in good condition and has occasionally installed curb cuts where a passenger pad is isolated from pedestrian walkways. The Transit Agency has had continuous communication with local jurisdictions responsible for providing curb cuts and other facilities, including the local cities and the California Department of Transportation. Some of the roads in the service area are directly under the jurisdiction of the county government itself. If the bus stop is scheduled to be improved,

that improvement will be prioritized according to the accessible bus implementation schedule. If not, disabled persons will be advised not to use that particular stop.

#### 4.0 Ridership

Only preliminary ridership figures are available and a full evaluation will not be done until all three of the new routes (18, 62 and 64) are operational for awhile. There are, however, ridership estimates on Route 18. According to a 1976 preliminary count conducted on 11 separate dates over a one-year period, an average of 9.6 daily wheelchair patrons used the service. On one occasion, there were 21 riders. The District estimates that seven percent of all riders were in wheelchairs. In all cases, on the FMC buses, with SCCTD's own TE-1 and TE-2 lifts, and now the TDT lifts, semi-ambulatory persons are permitted to use the lift if they have difficulty climbing steps. (TE-1 and TE-2 were designed according to the District's specifications, but are no longer used, as no manufacturing company would bid on them). In the TE-1 and TE-2, a fold-down seat was available and on the TDT lifts, a moving handrail is provided.

In view of the ridership on Route 18, it is anticipated that the connection of this route with the other routes will stimulate high ridership. Route 18 has since been streamlined and is now experiencing increased ridership by all passengers. Route 64 began operations in February 1979, while Route 62 is anticipated to begin service in Autumn 1979. The fourth route, Route 66, was scheduled for Autumn 1979 implementation. However, recent ridership increases make the route infeasible for operation with the smaller Gillig buses.

## 5.0 Costs

The accessibility features on the District's buses have added approximately ten percent to their capital cost. The budgeting for the lifts is included in all of the transportation improvement programs and has been since 1976 when the Transit District began planning for accessible vehicles. In addition, there is a one-half percent sales tax countywide which helps support the Transit District.

There have been no changes in the operating budget. The cost of maintaining the lift has not yet been determined, nor has the cost per wheelchair ride. This, in part, may be due to the warranty provisions and the fact that much of the work has been done by TDT. The exact cost impact of maintenance and other operational considerations will be tracked by the new computerized maintenance evaluation procedure.

APPENDIX F  
CASE STUDY - WASHINGTON, D.C.

1.0 Case Study Summary

The Washington Metropolitan Area Transit Authority (WMATA), the transit operator for the Washington, D.C. region (which includes the Maryland and Northern Virginia suburbs) began accessible bus service on six routes in April 1979. WMATA had purchased 151 Flxible "new look" buses with Vapor Travelifts as part of the FY 1978 capital grant program: 131 standard 40-foot and 20 smaller 31-foot buses. The basic system concept is to provide initial service on a set of major lines that connect with rail stations and major generators to increase accessibility. The vehicles have been gradually phased into service so that currently accessible service is offered daily on 30 lines, using 81 vehicles, at about one-hour headways.<sup>1</sup> Ridership by handicapped persons has generally been low, with some 15-20 riders per week.

Efforts to identify special travel demands to help in structuring the accessible service were disappointing. Mailed-out forms and newspaper ads were aimed at getting handicapped persons to identify their origins and destinations. The response was quite low and inconclusive. The half-fare card registration system also did not identify many potential users. An Ad Hoc Advisory Committee of handicapped persons proved the best source of information and help in deciding on the basic plan. The routes were outlined by WMATA staff and refined based on local jurisdictions' comments.

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<sup>1</sup> More vehicles have been added since the preparation of this Case Study.

Six initial users agreed to use the system with some regularity. The accessible buses were then scheduled on six routes to serve these initial users. Valuable operating experience was gained over a three-month period. Changes to procedures and equipment were made before service was expanded to more routes, and line selection was refined.

The WMATA philosophy is very service-oriented. Operating practices include:

- . Allowing use of the lift by any handicapped person who cannot use stairs, whether or not he/she is in a wheelchair (head clearance has not been a problem with this policy so far);
- . Providing operator assistance to the handicapped person, if requested, throughout the boarding and alighting process, including helping on/off the lift, and operating fold-up seats and tie-downs; and
- . Allowing any passenger to use the lift on an accessible bus if it is operating on a designated accessible route. The operator must allow use of the lift even if that particular trip has not been identified for accessible service.

Experience has shown that normal lift boarding and alighting requires from two to three minutes. However, due to the infrequent and generally unpatterned usage, no schedule changes have been necessary.

User and operator training has received extensive attention from WMATA. A driver and user training program has been developed and implemented as part of an UMTA Service and Methods Demonstration (SMD) in cooperation with George Washington University. WMATA instructors and supervisory personnel were given 18 hours of sensitivity training. All WMATA drivers are scheduled to receive three hours of special training with emphasis on user sensitivity. As of October, about one-half the drivers had completed the program, including those scheduled to operate on accessible routes and all extra board operators. Also, there is an outreach program to train handicapped persons on lift utilization. Thirty site demonstrations have been conducted or are planned at public and private locations using an accessible bus and special outreach persons.

WMATA added eight new mechanics and a supervisor to maintain the lifts. Because of mechanical difficulties, there are plans to increase the number of mechanics to 16 in FY 1980. Problems have centered around the electrical control system, as well as damage to the bottom plate and alignment, frequently due to careless driving. Modifications have been made to the latch, control box, and sensitive edge to correct problems found earlier in the program. Efforts to inform the drivers about the lift damage from careless operation are also ongoing.

Experience thus far has shown the WMATA maintenance personnel that lift system preventive maintenance is important. A process of testing the lifts in the evening and morning has proven useful. However, other preventive maintenance checks and procedures are critical to continue lift operations. The spare parts inventory necessary to maintain the lift is also a considerable expense.

Monitoring of ridership is aided by an SMD evaluation effort which will include extensive counts, surveys, and interviews. Ridership data will be collected one week each month during the 18-month demonstration period.

## 2.0 Case Study Setting

Washington, D.C. offers an opportunity to view accessible bus service in an urban, multimodal setting.

### 2.1 Geographic and Demographic Characteristics

The Washington, D.C. region is composed of the District of Columbia and surrounding Northern Virginia and Maryland suburbs. As the nation's capital, employment is primarily white collar, with the Federal Government being by far the largest employer.

The population of the region (1974) was estimated at 3,061,000. A recent study by Mark Battle Associates, Inc. (MBA Report)<sup>2</sup> set the non-institutionalized transportation-handicapped population (both elderly and non-elderly) at 77,250 (2.5 percent). The total number of elderly persons in the region was 183,770. The District of Columbia had the highest percentage of elderly persons as a portion of the total population of any jurisdiction in the region. The overall percentage of elderly in the region, approximately six percent, is lower than the national average of 10.7 percent.

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<sup>2</sup> Mark Battle Associates, Inc., Transportation for Elderly and Handicapped Persons in the Washington Metropolitan Area, prepared for the Metropolitan Washington Council of Governments, Washington, D.C., 1978.

## 2.2 Institutional Background

Transit service in the region, both bus and rail, is provided by the Washington Metropolitan Area Transit Authority (WMATA), a semi-autonomous body created by the U.S. Congress and the legislatures of Virginia and Maryland in 1967. It is composed of eight jurisdictions: the City of Washington; Arlington and Fairfax Counties and the Cities of Alexandria, Falls Church and Fairfax in Virginia; and the Counties of Montgomery and Prince Georges in Maryland. It is governed by a six-member Board, composed of two members each from Washington, D.C.; Virginia; and Maryland. Because of the closeness of the federal offices and the unique governmental structure of the District of Columbia, there is also a great deal of direct and indirect involvement by federal officials in the planning, operation, and funding of the transit system.

The MPO for the region is the Metropolitan Washington Council of Governments (MWCOCG). It coordinates comprehensive as well as transportation planning for the area. MWCOCG has a much larger membership than WMATA, as several outlying suburban jurisdictions in both Virginia and Maryland participate in MWCOCG but not in the transit system. No transit services are provided to these (financially) non-participating areas.

The MBA Report referred to earlier was an UMTA-funded study, completed in 1978, of transportation for the elderly and handicapped persons in the Washington, D.C. area. One finding was that a large number of specialized transportation providers are active in the region. However, there are frequent restrictions on usage, differing costs, and almost no coordination between the available services. There is also very limited transportation available to handicapped persons to make work-related or other regular, non-medical trips.

### 2.3 Transit System Characteristics

WMATA operates both buses and a heavy rail rapid transit system. The two operations are closely integrated as buses interface with rail stations along many routes. In the suburbs, most routes terminate at rail stations rather than continuing into Washington.

Unlike the other heavy rail systems in the country (with the exception of BART in San Francisco and MARTA in Atlanta) the WMATA rail system was designed with access to the handicapped in mind. All rail stations have elevators. Trains and platforms are constructed so that a wheelchair can easily enter and exit the cars. Special fare entry and exit gates are also provided, with widths to accommodate wheelchairs or other mobility devices such as walkers.

The bus system has a total fleet size of 1,796 vehicles, some 1,600 of which are required in the peak periods. Route coverage is extensive in Washington and becomes less dense in the suburban areas. A small bus downtown circulation system, the Downtowner, is WMATA's only major circulation-distribution operation. The system is maintained out of eight garages with a major facility including extensive rebuild capacity on Bladensburg Road in Washington.

No specialized services are available from WMATA, although half-price fares for elderly and handicapped persons are available. WMATA issues registration cards to handicapped persons based on an application and doctor's certificate. Senior citizen cards are available through several other outlets and require only proof of age. Therefore, handicapped elderly are not usually identified as handicapped, and so no special data which could be useful for demand estimation were obtained from this group.

### 3.0 Accessible Service Operation and Development

The following sections will outline the developmental sequence for the accessible services and the current operating, training, maintenance, marketing and monitoring procedures.

#### 3.1 Project Description and Evolution

WMATA currently has 151, 1978 Flexible "new look" buses with lifts: 131 standard 40-foot, and 20 31-foot buses. The vehicles are equipped with a front-door Travelift manufactured by Vapor Corporation. All the lift-equipped buses have a kneeling feature and two wheelchair tie-down positions.

WMATA currently operates 81 accessible vehicles on 30 major lines throughout the region. The routes are both radial and cross-county or city, providing a network throughout the service area. More importantly, a majority of the accessible routes provide direct connection with the Metrorail system. The accessible buses are allocated for service to the individual jurisdictions on the same basis as the peak hour vehicles allocation. Within this allocation, the WMATA staff has had the lead role in service design throughout the planning process. They are also in charge of service operation and monitoring.

The accessible buses are scheduled on approximately one-hour headways in most of the region. In Northern Virginia, each branch (route) of the accessible lines has one-hour headways, resulting in more frequent service on the trunk portions. The basic system philosophy is to provide some accessibility on a limited number of major routes and then gradually expand the number of routes and lower headways as more accessible vehicles become available.

WMATA undertook an extensive program to upgrade its bus fleet since acquiring the assets of the four private bus companies in 1972. The FY 1978 capital program projected the purchase of some 260 new full-size coaches, as well as replacing the Downtowner "mini-buses." Several times during the discussions on the UMTA capital grant preparation, speakers noted the requirement for local areas to make substantial progress towards transportation accessibility. The rail system had good accessibility but no accessible public transportation was available to or from the stations. WMATA adopted a conservative approach to the initial purchase of lift-equipped buses using the FY 1978 capital program. They ordered about half the buses in the program with lifts and the other half prepared for the lifts but without them installed. In this way, if serious difficulties were encountered or lift technology improved, the system wouldn't have an unreasonable number of problem vehicles.

Using this approach, 131 of the 261 full-sized and all 20 smaller buses were advertised for bid with lifts. The Flxible Corporation, the low bidder, delivered the vehicles during 1978 and early 1979.

The bus procurement process was going on at the same time as the Mark Battle Associates study on available transportation for the elderly and handicapped. The MBA Report recommended that, as part of a program to increase transportation opportunities for the elderly and handicapped, some new accessible buses should be purchased to gain operating experience and data. To supplement these vehicles, the study also recommended that curb cuts and bus shelters should be available, internal and external driver announcements of stops should be made, and more stanchions and hand-grips in the vehicle should be provided. These recommendations further strengthened WMATA's

previously made commitment to fixed-route accessibility. In addition to purchasing accessible buses, WMATA is planning to incorporate many of these recommendations in the accessible project plans.

The WMATA staff outlined a series of potential routes for first implementation of lift service and presented these to the local jurisdictions for review. The routes were revised somewhat based on jurisdictional comments and discussions. The concept of using several major routes that provide access to Metrorail stations and major travel generators was used as a base for the planning. The access to Metrorail makes rail use available to the handicapped bus rider who is willing to transfer to the rail system. The accessibility and extensiveness of the rail system then greatly increases the number of destinations that are served by accessible transit.

Because of the lack of experience with accessible service both at WMATA and nationwide, it was decided to request UMTA grant assistance in structuring a training program. The grant would be used to inform both the drivers and potential users about the service. It would also assist in the monitoring of the results. WMATA obtained an UMTA Service and Methods Demonstration grant of \$240,000 with a parallel grant given to George Washington University to prepare the training and materials. The WMATA grant also funded a full-time program coordinator to assist in the planning, implementation, and monitoring of the accessible services.

The service was phased-in gradually using roughly the following schedule:

<u>Implementation Date</u>	<u>Number of Accessible Lines</u>	<u>Vehicles Required</u>
April 1, 1979	6	6
July 1, 1979	12	32
September 29, 1979	30	81

In this way, experience could be gained with lift operations using a controllable number of routes and vehicles.

An outgrowth of the Ad Hoc Advisory Committee was the identification of six handicapped persons who would be "initial users." These persons agreed to use the lifts with some regularity. The first six routes were established to serve them. Not all these routes are still included in the 30-route system, as two of the initial six persons did not use the service after a few trips, and the routes serving them were not retained based on other criteria.

The system of 30 lines is expected to remain about the same for at least a year. This level of service should provide a great deal of operating experience for WMATA and also meet the travel needs of some handicapped persons. Equally important is the maintenance experience which shows that currently only about 60 percent of the accessible vehicles can be scheduled to assure provision of a reliable lift operation on the routes indicated. As maintenance reliability improves, the number of scheduled accessible vehicles on the routes will be gradually increased.

The accessible bus fleet size, currently 151 vehicles, will probably not increase in the coming year (FY 1980). First, no new bus purchases are planned (any new buses ordered must, by DOT regulation, be accessible). Second, the WMATA staff feels that existing lifts available from any manufacturer are

in need of improvement before installation on the additional 150 buses would be desirable.

### 3.2 Service Implementation Activities

After the decision to purchase lift-equipped buses was made, a variety of planning and operational activities were necessary. These are outlined in the following sections.

3.2.1 Demand Estimation and Route Selection - Soon after the decision to purchase lift-equipped buses, WMATA formed an Ad Hoc Advisory Committee of handicapped individuals to assist with the planning process. Several routing concepts were discussed with them. The consensus was that designing special routes was not feasible nor desirable as travel patterns of the handicapped were frequently similar to those of the general population in terms of where they live, work, and shop. From this came the basic plan to choose several major routes that service major generators and rail stations as a base for expansion.

WMATA made an effort to estimate demand to determine which routes should have priority. They mailed out 2,300 forms to social service groups asking handicapped persons to make their origin, destination, and other travel needs known. Several groups reprinted the form in their newsletters to solicit the information from their membership. In total, only about 200 replies were returned. This was not sufficient for the WMATA staff to use as detailed input to route planning.

Another potential source of information on the handicapped was the identification cards issued for the special fare program. However, only a few of the cards had been issued to known wheelchair users. Since senior citizen I.D. cards are much easier to obtain than handicapped ones, elderly handicapped persons are not usually identified by handicap. Therefore, the useable information from this source was limited.

The initial 30 lines were identified after several discussions with local staffs. In addition to primarily choosing lines with better than average ridership, other factors included:

- . Locations to which wheelchair users expressed a desire for accessible service (initial users);
- . Provision of cross-county as well as radial service;
- . Service to major generators such as shopping malls and medical facilities; and
- . Availability of curb cuts and absence of obvious barriers to route access for potential handicapped riders.

A further route selection consideration was service to fringe parking lots. Fringe lots allow handicapped persons to use vans or other vehicles to make a convenient connection with the accessible buses. This eliminates waiting at stops for the bus.

The trips made by the initial user group provided a base of operating experience that was essential to help WMATA refine operating procedures and identify problems. It provided a manageable scale initial experience. This "initial user" concept required close personal contact between the transit system staff and the users. It was important to remind the individuals that they were helping, as they frequently encountered delays and frustration.

The accessible route system will be fine-tuned in the coming months. The WMATA staff plans to designate new accessible routes and delete less utilized ones as needs and demands develop. In practical terms, if transportation-handicapped persons make their travel needs known and indicate a desire to use the bus system, accessible service will probably be provided on a route near them.

The available accessible vehicles were assigned to each jurisdiction according to their percentage of peak hour regular buses. This constrained the headways provided. Northern Virginia used a limited number of routes (6) and scheduled lift buses on all base service. Other parts of the region have a larger geographic coverage and somewhat longer headways.

The 20 Downtowner buses operate on a loop throughout the center of the city, connecting major business, commercial and tourist areas. These buses are now lift-equipped. It was felt that although many handicapped persons may continue

to drive or use other established patterns to come into the city, accessible Downtowners would allow them to move about easily without their cars. Also, the small buses may be usable in other types of special service at a later time.

3.2.2 Operations - WMATA had the goal throughout their planning of providing a high quality service-oriented operation. The procedures developed by them are detailed in this section.

Boarding and Alighting Procedures - The driver's duties in lift usage reflect the basic service-oriented policy. Exhibit F-1 is a summary of the service guidelines initially used. Some of these will undoubtedly be changed as experience with lift usage is gained, but they are a good indication of the many issues that must be addressed when beginning accessible service.

One notable aspect of WMATA's operating policy is that non-wheelchair using handicapped persons may use the lift. Also, necessary attendants with handicapped persons can ride up on the lift. In both cases, the driver is expected to instruct the standee to move on the lift towards the bus as far as possible. This is because of the low head clearance on some parts of the lift when it is in the raised position.

The current policy is not to make route deviations to accommodate handicapped users. However, the bus operations personnel can relocate bus stops if the existing location is unmanageable

## EXHIBIT F-1

### WMATA INITIAL OPERATING POLICIES

Eligibility	Order of Use	Provision or Denial of Lift-Bus Service	Assistance by Operators
<ul style="list-style-type: none"><li>. All passengers with medically-indicated ambulation problems, who are unable to go up and down the boarding steps when the bus is in a kneeling mode, will be entitled to use the lift on lift-equipped buses.</li><li>. No attendants will be allowed on the lift with the wheelchair user or the semi-ambulatory passenger.</li></ul>	<ul style="list-style-type: none"><li>. At bus stops where two or more persons (including wheelchair or other lift users) are waiting to board a bus, the lift user will board first. When two or more persons (including at least one lift user) are preparing to alight at the same stop, the lift user will not be allowed off the bus until the other passengers have debarked.</li><li>. Note: A system of requesting able-bodied passengers to alight via the back door while the front door is in use for the exiting lift passengers will be tested. Overall delay at the bus stop would be reduced if this practice were adopted.</li></ul>	<ul style="list-style-type: none"><li>. Any time a lift user waiting at a bus stop asks the operator of a lift-equipped bus to take him aboard, the operator must comply, whether or not the bus is engaged in one of the lift-bus trips identified in the published timetables.</li><li>. In the event that the bus operator knows that the lift is inoperable, or if both wheelchair tie-down locations are already occupied by wheelchair users, the operator of a lift-equipped bus will stop to so advise and will inform the waiting lift passenger of the probable (schedule) time of arrival of the next lift-equipped bus.</li><li>. If a lift is inoperable on a scheduled lift-bus trip, the driver will cover (reverse) the lift-bus sign on the front of the vehicle.</li></ul>	<ul style="list-style-type: none"><li>. On request, the bus operator will help wheelchair passengers board the lifts.</li><li>. Operators will go out the back door to help the passenger board; he will not jump down to the lowered lift.</li><li>. Operator will provide instructions to wheelchair users and other passengers to enable wheelchairs to be boarded and loaded:<ul style="list-style-type: none"><li>- by directing the wheelchair user in the loading/unloading process;</li><li>- by requesting passengers seated on the fold-up benches at tie-down locations to give up their seats so that wheelchairs can be secured; and</li><li>- by folding up the convertible bench seats if the wheelchair passenger cannot and other riders do not help.</li></ul></li></ul>

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**EXHIBIT F-1**  
**WMATA INITIAL OPERATING POLICIES**  
**(Continued)**

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**Fare Collection**

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. A lift passenger may be accompanied by one attendant who pays half-fare, provided that the attendant has a Metro I-D card, which specifies that the half-fare privilege applies only when the attendant is with the disabled user.

. Note: Discussion of this point has considered the likelihood that two or more members of a household may alternate as attendants for a lift user. At present, each will need to obtain the special I-D to travel at half-fare.

Mention has been made that attendants have been allowed to ride free in some U.S. cities and the argument has been advanced that there are likely to be so few lift users on the system each day that the cost of free rides for persons traveling as attendants would be negligible, and that attendants could be expected to reduce delay in accommodating lift passengers by their assistance to the disabled passengers.

. The lift user is expected to deposit fares the same way everyone else does. However, if upper-body disabilities prevent this, the bus operator is authorized, as at present, to assist in making the fare payment.

**Emergencies**

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. *Operational:* In an emergency, the bus operator will be responsible for the physical transfer of wheelchair and non-wheelchair passengers or other lift users to another vehicle (replacement lift-bus or patrol vehicles) and for seeing that the disabled passenger is able to complete his/her trip.

. *Medical:* Existing procedures on medical emergencies apply to lift-bus service.

. *Non-Cooperation:* The bus operator will deal with uncooperative passengers (including the disabled, other passengers, and attendants of the disabled) in the manner normally prescribed.

**"Kneeling" Action**

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. The kneeling action of the new buses — identified by a light, in the front entrance corner, which has a picture of a person with a cane superimposed — is available by request to reduce the height of the first step when the bus cannot get to the curb.

**Procedures**

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. The wheelchair user may choose whether to use the lift platform in a forward- or backward-facing mode, whichever is most comfortable for the individual.

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or unsafe for a handicapped person. This can be caused, for example, by a lack of sidewalk or curb, or blocked access from parked cars. However, the disabled individual is expected to board or alight the bus along the normal route.

No schedule changes have been made although operating delays from the lifts was an initial concern. Experience now indicates that dwell time averages 2-3 minutes per boarding or alighting. One and one-half minutes is about the best time and results from an experienced driver and user. However, because of the relatively random pattern of lift usage, and the limited number of users, it has not been necessary to adjust any particular schedule.

Dispatching and Breakdown Procedures - No central records on dispatching of accessible trips are kept. Each garage is responsible for assuring that operable accessible vehicles are dispatched. In an attempt to detect any lift mechanical problems, a thorough check-in and check-out procedure is used. In the evening, when an accessible bus comes into the garage to be fueled and stored, the servicing personnel cycle the lift. If it is operational, the bus is put in the designated storage area for accessible buses. If a mechanical problem is found, it is noted and the vehicle is taken in for maintenance. In the morning, before a bus is dispatched on an accessible trip, the driver is required to cycle the lift again. This "double-check" has been useful in detecting problems but has not eliminated on-the-road failures of the lifts.

If the lift becomes inoperable while in service, the driver calls central control. All buses now have two-way radios, so this is always possible. One of three courses of action then occurs:

- 1) An accessible bus on a nearby route (that is, not in designated lift service), is switched with the inoperable lift vehicle; or
- 2) Another accessible bus is put in service from the depot to replace the inoperable one; or
- 3) The person is transported in a scout car by a street supervisor if no bus is available.

However, the run is continued without the lift operating until the changeover is made. As noted in the procedure, if a handicapped person needs to use the lift during this time, they would be informed of its inoperable condition and when the next accessible bus is scheduled.

3.2.3 Operator Training - One of the strongest parts of WMATA's accessible bus operation has been the driver training. The George Washington University Rehabilitation Research and Training Center (GWURTC) and WMATA have parallel grants to develop, implement and monitor a training program for operators and users. This includes literature and training materials. WMATA has a \$240,000 UMTA Service and Methods Demonstration

grant. GWURTC has a \$450,000 combination grant from UMTA and the U.S. Department of Health, Education and Welfare (now Health and Human Services). GWURTC's responsibilities include developing the training program and instructing the initial trainers, including both WMATA and social service personnel. WMATA is to implement the training and evaluate the effects on operators, riders, and the overall bus system. A training manual usable by other properties will also be available from the GWURTC-WMATA joint effort.

The driver training is a three-hour block of instruction: two and one-half hours on sensitivity to the handicapped, and one-half hour on the mechanical operation of the lift. The instruction was initially given during special sessions over a two-week period. Drivers were paid for their training time through the UMTA grant. The sensitivity training was given at the Bladensburg Road facility, while the mechanical training was provided at the individual garages. All 2,900 drivers were requested to attend and about one-half complied. All assigned accessible route operators and "extra board" operators were required to attend.

The training is still being given on a recurring basis as instructors are available. The percentage of operators with the training is gradually increasing. The training package has now been integrated into the six-week full-time new driver training course. As part of the training, each operator is given a technical manual dealing with operation of the lift. They also receive materials

on various types of handicaps, again oriented towards sensitivity. These same materials are given to street supervisors, division superintendents, and others who might be called upon in an emergency.

GWURTC gave "trainers" instruction to a core of WMATA personnel: 18 instructors, 2 supervisors, and 10 other management personnel. The course consisted of 18 hours of sensitivity training. It was felt that the instructors should have a broad knowledge about handicapped sensitivities, and the training included personal discussions with disabled individuals and practice using a wheelchair. This was so that the instructors could effectively convey this sensitivity to the drivers. The mechanical aspects were secondary for the drivers' training as these could be easily learned and shown on charts next to the lift control panel.

The major concern of the operators during training was the question of liability. The answer was that they had the same liability as with any other riders. If the operator is grossly negligent in his/her actions, he/she could be liable for injuries. Any problems during normal operations is a WMATA liability. However, this question was answered briefly and was not discussed at length.

3.2.4 Maintenance - Because maintenance is such a major factor in the accessible service program, it will be discussed in detail. The major topics of personnel and reliability are shown separately below.

Personnel - WMATA has hired eight additional mechanics and a supervisor to maintain the lift equipment. Since accessible buses are assigned to each of the eight garages to minimize deadhead time, one mechanic is located at each garage. These mechanics have a specific job classification of "lift mechanic" and get on-the-job training. The training is primarily conducted by the lift maintenance supervisor although WMATA has recently hired a maintenance training supervisor who will take over some of this responsibility. WMATA believes that the role of the lift maintenance supervisor is important to the maintenance function, as this person is responsible for training and major lift repairs.

The original mechanical training of the supervisor and two mechanics was done by the lift manufacturer. The WMATA staff recommends that other properties be sure that this initial training and maintenance assistance are included in the procurement contract for the vehicles and lifts.

According to FY 1980 plans, the eight lift mechanics will be increased to 16. This is an attempt to improve the availability of the lift-equipped vehicles for accessible service. The 16 mechanics will mean about one lift mechanic for every nine lift-equipped buses. The maintenance staff also includes a lift maintenance supervisor.

Preventive maintenance and minor lift maintenance work, such as hydraulic leaks and other items that can be readily repaired, are performed at the garages by the lift mechanics. All heavy

maintenance, including body, frame or major component repair, is done at the bus system's central shop facility on Bladensburg Road. This work is the responsibility of the lift maintenance supervisor, who uses the normal shop maintenance staff to assist him.

Reliability - Experience has shown that preventive maintenance is critical to lift reliability. The procedure of cycling the lift as vehicles check-in and check-out is useful to detect problems. Close checks on fluid and lubricant levels and other preventive procedures are also essential because of the sensitivity of the lift devices.

No new tools or other equipment have been needed to maintain the lifts. However, the spare parts budget has increased considerably due to the lifts. An estimate is that spare parts will average \$150,000 per year (for the current 151 buses). Ten spare lifts were purchased with the initial capital grant.

No data on breakdowns and failure rates are currently available, although WMATA is gathering this data and hopes to make it available soon. Preliminary analysis by WMATA indicates that often the inoperability of the lifts is caused by damage to the lower plate or alignment when a bus hits a pothole or when the front corner of the bus comes in contact with the pavement. This damage occurs both on the road and in the garage areas where buses driven carelessly can result in a lift breakdown. This potential for damage has been emphasized to the drivers to try to reduce the problem.

Initially, ten accessible buses were used for testing. They were not in lift service but were operated on regular routes. However, the lifts were tested by WMATA personnel frequently. They discovered three major problems:

- . The sensitive edge had insufficient coverage of the bottom plate;
- . The control box was hampered by dust; and
- . The latches operated improperly.

WMATA has taken actions to try to reduce these problems. One is the fabrication of covers for the lift control boxes. This reduces dust getting into the electrical connections and also helps prevent drivers accidentally pressing the buttons or "playing" with them during idle times. Another is the modification of the "sensitive edge" tube to give it a large area of coverage. This decreases the chances of damage from the lift not stopping when it strikes an object on the ground or curb.

These problems, as noted, were discovered during the early testing and the initial route usage. Adjustments could be made before service was expanded when the vehicles would be required for scheduled service. Therefore, an initial limited service period proved very valuable.

3.2.5 Marketing - The marketing program for accessible buses has two general purposes. These are:

- . Raise the general awareness of the riding public to the handicapped user; and
- . Get specific knowledge to, and attract, the handicapped persons in the community to the transit system.

The marketing program had two major aspects: media and site demonstration.

Media - The media efforts included:

- . Development of "how to use" and accessible route brochures;
- . Letters with brochures sent to advocacy groups for handicapped persons; and
- . Public service announcements on T.V. and radio.

The basic theme of the marketing effort was that the accessible service was available. A detailed explanation of the use of the equipment was limited to retain its impact.

A "How to Ride" brochure for accessible buses was written similar to the one for the general public, except that the additional lift usage information was included. It describes the entire riding

process beginning with getting information on the specific routes. In the materials describing the accessible routes, the stress is on which routes, where they go, and which destinations they serve. The brochures were initially distributed through mailings to advocacy groups that had contact with disabled persons. The mailings also included a letter indicating that the accessible service was operating and a phone number at WMATA to call for more brochures and information.

The media information effort also included public service announcements. A wheelchair-using person appeared in the initial 30-second T.V. spots. WMATA plans to follow-up the first spots with a "success story." They anticipate an "it helped me" theme. They have been able to get the spots used during prime T.V. and radio time. The media seems more receptive to this issue than most other transit-related ones and have been very helpful.

Site Demonstrations - As part of its grant, WMATA has funds for 30 special-group demonstrations. The basic purposes are the same as for the marketing program concerning public and user awareness. The demonstrations are held in such locations as shopping centers, hospitals, nutrition centers, and elderly housing sites. Basically, the site is chosen where a group of handicapped persons can see and try the bus and/or the general public can see it.

Based on their experience, the WMATA staff feels that there could be two separate approaches to the demonstration program:

- . Actual demonstrations could be made where handicapped persons can try out the lift and become aware of its use. However, these are expensive because they require the time of a bus and driver.
  
- . A tape/slide show or other audio-visual presentation about the accessible bus could be set-up in the shopping centers or other public locations. The show could be used to raise the general public's awareness without the necessity for a bus being present. This would be a much less expensive alternative that might be almost as effective in accomplishing its goal of public information.

WMATA does not have such an audio-visual show available now. They feel, therefore, that resources are frequently underutilized when taking the bus, driver and demonstrator to all sites.

Their experience also indicates that when setting up sites, it is necessary to well publicize the event. To announce the program, flyers were sent to 200 organizations in the Washington area who have an interest in the handicapped. Their interest in sponsoring or participating in the demonstration was solicited. A contact person for each specific site was required to help coordination and do some local publicity. Even with this, turnout at some locations has been small.

3.2.6 Insurance - WMATA, like most large transit systems, is self-insured. As such, the implementation of accessible service has had no impact on their insurance. To date, no claims have been filed for passenger personal injuries.

3.2.7 Monitoring and Evaluation - Because of the demonstration grant, there are two major aspects to the WMATA monitoring efforts. These two aspects, the WMATA procedures and Transportation Systems Center (TSC) plans, are discussed separately below.

WMATA Monitoring - When deciding how best to get counts and data on lift usage, WMATA originally considered two options. Because radios are available in all the buses, the first was to have the drivers notify central control each time the lift was used. This was determined to be impractical. The three radio channels are constantly used during peak periods, and additional messages would only worsen the situation. Also, the safety aspects of asking the driver to call-in while operating the bus was questioned.

The procedure chosen was to request the driver to fill-out a log showing lift usage. This allows detailed information such as dwell time and boarding and alighting locations to be recorded. The log is to be turned in at the end of the run whether there was any usage or not. However, compliance with this requirement has been poor, and the driver's log to record accessible trips has frequently not

been filled out. Usually, the drivers who did not fill it out say they did not have any usage to report. There is a perception by the WMATA management that the drivers' attitude is that the service will continue whether or not anyone rides. Thus, the drivers doubt the value of filling out the forms. The drivers' attitude concerning the forms is reflected in the count for August, when about six percent of bus trips were reported, with some 30 forms returned for 500 runs. Consequently, data on the use of the lifts are limited. This makes it difficult to make service changes that would reflect overall demand.

The WMATA management is trying to improve the driver log completion. They are only asking for logs one week each month, which is considered sufficient for sampling purposes. Also, any driver who fails to turn in their log for trips during that week is instructed to repeat the log completion for their accessible trips the following week.

TSC Plan - The Transportation Systems Center in Cambridge is conducting an evaluation of WMATA fixed-route accessible service. Key evaluation issues will relate to:<sup>4</sup>

- . Planning and Implementation Strategies
- . Equipment Characteristics

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<sup>4</sup> Evaluation Plan for the Washington, D.C. Accessible Bus Project, Cambridge, Massachusetts, Multisystems, Inc., April 1979.

- . Level of Service/Supply Characteristics and Effects on Handicapped and Non-Handicapped Ridership
- . Travel Behavior
- . Operator Productivity
- . External Impacts

WMATA will collect the data for TSC. Some pre-implementation data collection, in addition to normal WMATA efforts, was made to provide a basis for comparisons. WMATA will collect selected data throughout the grant period of 18 months. This will include surveys of both users and drivers, as well as counts and other tabulations. Because of this, there will probably be much more monitoring of ridership and evaluation of operations than would be done without the demonstration.

#### 4.0 Ridership

As part of the SMD evaluation, WMATA is planning to monitor lift usage carefully one week each month during the first 18 months. The first count on the 30-route system will not be made until late October, so no figures are currently available. However, with the 12-route system, ridership was generally low - - some 10-15 riders per week, or less than two per day. For example, during the ten-day period from July 11 through 20, there were 18 known boardings. This is estimated to be some five or six different users.

It is generally felt by the WMATA staff that the profile of the typical current lift users is that they are young, adventurous, and progressive about handicapped rights. Consequently, they are willing to work through the hardships

involved with initial use and emphasize the value of accessible buses.

## 5.0 Costs

WMATA's procurement of the Flxible "new look" buses included both accessible and non-accessible buses. The former were estimated to cost \$82,600 each; the latter were \$76,000. Thus, the cost of the Vapor lift and its installation was \$6,600 each. This relatively low difference in price can be attributed to the buses without lifts being delivered with the structural modifications already made so that a lift could be installed without major retrofit at a later date.

No information on operating costs attributable to the accessible buses was available at the time of the case study except for the \$150,000 estimated annual cost for spare parts.





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