

**TRANSIT COOPERATIVE RESEARCH PROGRAM**

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**TCRP Synthesis 14**

**Innovative Suburb-to-Suburb  
Transit Practices**

A Synthesis of Transit Practice

**Transportation Research Board  
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# **Synthesis of Transit Practice 14**

## **Innovative Suburb-to-Suburb Transit Practices**

**KATHERINE S. HOOPER**  
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## TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213--Research for Public Transit. New Directions*, published in 1987 and based on a study sponsored by the Federal Transit Administration (FTA). A report by the American Public Transit Association (APTA), *Transportation 2000*, also recognized the need for local, problem-solving research. TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of vice configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992. Proposed by the U.S. Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA, the National Academy of Sciences, acting through the Transportation Research Board (TRB), and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA. TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee.

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at anytime. It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel, appointed by the Transportation Research Board. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

Because research cannot have the desired impact if products fail to reach the intended audience, special emphasis is placed on disseminating TCRP results to the intended end-users of the research: transit agencies, service providers, and suppliers. TRB provides a series of research reports, syntheses of transit practice, and other supporting material developed by TCRP research. APTA will arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by urban and rural transit industry practitioners.

The TCRP provides a forum where transit agencies can cooperatively address common operational problems. TCRP results support and complement other ongoing transit research and training programs.

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The members of the technical advisory panel selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and while they have been accepted as appropriate by the technical panel, they are not necessarily those of the Transportation Research Board, the Transit Development Corporation, the National Research Council, or the Federal Transit Administration of the U.S. Department of Transportation.

Each report is reviewed and accepted for publication by the technical panel according to procedures established and monitored by the Transportation Research Board Executive Committee and the Governing Board of the National Research Council.

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## **PREFACE**

A vast storehouse of information exists on many subjects of concern to the transit industry. This information has resulted from research and from the successful application of solutions to problems by individuals or organizations. There is a continuing need to provide a systematic means for compiling this information and making it available to the entire transit community in a usable format. The Transit Cooperative Research Program includes a synthesis series designed to search for and synthesize useful knowledge from all available sources and to prepare documented reports on current practices in subject areas of concern to the transit industry.

This synthesis series reports on various practices, making specific recommendations where appropriate but without the detailed directions usually found in handbooks or design manuals. Nonetheless, these documents can serve similar purposes, for each is a compendium of the best knowledge available on those measures found to be successful in resolving specific problems. The extent to which these reports are useful will be tempered by the user's knowledge and experience in the particular problem area.

## **FOREWORD**

*By Staff  
Transportation  
Research Board*

This synthesis will be of interest to transit agency general managers and their marketing and planning staffs. It will also be of interest to state departments of transportation, metropolitan planning organizations, and other professionals in the private sector concerned with the provision of suburban transportation services. This synthesis provides information about the suburban shift from the more traditional central business district-oriented service patterns of selected transit agencies. Transit agencies with limited marketing successes in this area are being challenged to address these non-traditional markets anew.

Administrators, practitioners, and researchers are continually faced with issues or problems on which there is much information, either in the form of reports or in terms of undocumented experience and practice. Unfortunately, this information often is scattered or not readily available in the literature, and, as a consequence, in seeking solutions, full information on what has been learned about an issue or problem is not assembled. Costly research findings may go unused, valuable experience may be overlooked, and full consideration may not be given to the available methods of solving or alleviating the issue or problem. In an effort to correct this situation, the Transit Cooperative Research Program (TCRP) Synthesis Project, carried out by the Transportation Research Board as the research agency, has the objective of reporting on common transit issues and problems and synthesizing available information. The synthesis reports from this endeavor constitute a TCRP publication series in which various forms of relevant information are assembled into single, concise documents pertaining to a specific or closely related issue or problem.

This report of the Transportation Research Board describes some common elements of success among transit agencies with services that have suburban origins and destinations and that serve largely suburban travel needs. This synthesis documents current transit agency practice regarding targeted marketing, partnerships with the private

sector, site design and land use issues, and transit's role both as "mobility manager" and in taking corrective actions to attain national air quality standards. Selected case study examples representing the wide diversity of suburb-to-suburb transit services being offered in the United States and Canada describe in more detail where innovative approaches are being used to meet increased travel demands.

To develop this synthesis in a comprehensive manner and to ensure inclusion of significant knowledge, available information was assembled from numerous sources, including a number of public transportation agencies. A topic panel of experts in the subject area was established to guide the researchers in organizing and evaluating the collected data, and to review the final synthesis report.

This synthesis is an immediately useful document that records practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As the processes of advancement continue, new knowledge can be expected to be added to that now at hand.

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The Principal Investigators responsible for the conduct of the synthesis were Sally D. Liff, Manager, Synthesis Studies, and Donna L. Vlasak, Senior Program Officer. This synthesis was edited by Linda S. Mason, assisted by Rebecca B. Heaton.

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## INNOVATIVE SUBURB-TO-SUBURB TRANSIT PRACTICES

### SUMMARY

Suburb-to-suburb commuting has dominated work trip growth over the past two decades, constituting approximately one-third of all metropolitan commuting in the United States today. Central business districts (CBDs), in many cases, are no longer the principal place to do business in metropolitan areas. Employment growth has moved away from the central city in response to land availability, highway access, proximity to housing, and social and economic factors. Population and housing shifts to the suburbs have occurred during the same time period in response to many of the same factors.

Transit agencies that have traditionally served the suburb-to-downtown market now find it necessary to provide service to more diverse markets. Traditional radial route patterns of metropolitan transit systems are changing. New transit route patterns are more complex, resembling a giant web or a grid system in some instances. Two new principal transit commute markets have emerged as a result of these population, housing, and workplace changes: reverse commutes, where inner-city residents travel to suburban jobs, and suburb-to-suburb commutes.

Transit's role in reverse commuting has been extensively documented, such as in a 1994 report by the American Public Transit Association (APTA), *Access to Opportunity Linking Inner City Workers to Suburban Jobs*. Transit's involvement in suburb-to-suburb commuting is the subject of this synthesis.

This synthesis provides a look at the state of the practice by examining survey results of 23 transit agencies that provide some form of suburb-to-suburb service. The types of transit agencies responding ranged from those with just a few transit routes with suburban origins and destinations to entire systems that are largely suburban in nature. Initially, there was some confusion among several agencies as to what constitutes a suburb, and because there is no exact definition of "suburb," agencies surveyed were required to make their own determination. For the purposes of this synthesis, most services with suburban origins and destinations, and serving largely suburban travel needs, were considered to be suburb-to-suburb services. These services may also be characterized as serving low density areas, and being non-radial and non-center city oriented.

This synthesis takes an in-depth look at four case studies where exemplary practices and innovative approaches are being used to meet the increased travel demands of suburb-to-suburb commuting. The case study agencies include:

- PACE, Suburban Bus Division of the Regional Transportation Authority (RTA), with headquarters in Arlington Heights, Illinois, a Chicago suburb;
- New Jersey Transit (NJ Transit), a statewide transit agency, with headquarters in Newark, New Jersey;
- Grand Rapids Area Transit Authority (GRATA) in Grand Rapids, Michigan; and
- Ottawa-Carleton Regional Transit Commission (OC Transpo) in Ottawa-Carleton, Ontario.

The case studies represent a wide diversity of suburb-to-suburb services in both the United States and Canada. PACE was selected, in part, because 48 percent of its trips are suburb-to-suburb in nature and the system was specifically designated to address suburban travel needs in the Chicago region. The NJ Transit case study focuses on a collection of new services known as WHEELS, which are designed to serve suburban employment sites. GRATA recently undertook a major strategic planning process to meet the future mobility needs of its commuters and, for the first time, has initiated new routes in the suburbs. OC Transpo, unlike most U.S. transit agencies, considers suburb-to-suburb trips to be an integral part of its regional transit service. Also, unlike U.S. transit agencies, OC Transpo has a regional planning policy in place to direct development to areas that are well served by transit.

This synthesis describes some common elements of success among all the transit agencies surveyed. Success was defined by the agencies and is therefore a subjective judgment. Several elements considered by transit agencies that are planning to meet suburban travel needs through the introduction of new suburb-to-suburb transit services include targeted marketing to the business community, partnerships with the private sector, involvement in site design/land use issues, transit's role as a manager of mobility, and the requirement to implement actions to bring air quality up to standard.

Primary conclusions of this synthesis include a need for more specific ridership and financial information about suburban services. Also, there is a need for more information on what constitutes a state-of-the art marketing plan for transit agencies and how plans can be used to enhance suburb-to-suburb services; a need to examine how advanced public transit systems (APTS) and various traffic operations techniques, such as signal preemption can be used to enhance suburban transit operations, and how technology can help transit be more responsive to commuter needs; and a need to examine the long-term financial support for the operation of newer suburban services, especially when federal or state funds are used to support start-up and short-term operations, and to determine how these services will be continued in the future and who will pay for them.

## CHAPTER ONE

## INTRODUCTION

## PURPOSE AND CONTENTS

This synthesis provides an overview of suburban transit services and programs, and identifies and documents approaches that transit agencies are taking to meet suburb-to-suburb travel needs. For the purposes of this synthesis, transit routes, paratransit services, vanpools, and carpools with suburban origins and destinations, serving largely suburban travel needs, were considered to be suburb-to-suburb services. These services could also be characterized as serving low density areas, and being non-radial and non-center city oriented.

This chapter provides background on the challenges presented to transit agencies by changing demographics, land uses, and increased auto dependency in attempting to serve the suburb-to-suburb travel market. Chapter 2 discusses the results of a survey of 23 transit agencies that provide suburb-to-suburb services, followed by Chapter 3, which presents selected case studies of four suburban transit agencies. Common elements of success among the case study examples and the other survey respondents are identified in Chapter 4. Finally, conclusions are presented in Chapter 5.

## BACKGROUND

From a high of 26 billion passengers in 1946, U.S. transit patronage fell steadily for 30 years, declining to 8.8 billion in 1980 (1). There were temporary upsurges only during the years of tight gasoline supplies in the 1970s. Through the 1980s, the total number of transit riders remained the same, but those numbers represented a smaller and smaller share of total commute trips from 6.4 percent in 1980 to 5.3 percent in 1990 (1). Many factors have converged to affect transit's mode share over the past three decades.

A 1987 report by Pisarski, *Commuting in America*, outlined three major themes affecting commuting patterns in the United States: the worker boom, the private vehicle boom, and the suburban commuting boom (2). All of these trends have had detrimental impacts on traditional fixed route public transit. The latter two trends are briefly discussed later. A 1992 report by Pisarski, *New Perspectives in Commuting*, is based on early data from the 1990 Decennial Census and the 1990 Nationwide Personal Transportation Study (3), and provides a look at what has happened between 1980 and 1990. Some of the figures cited below have been updated based on this more recent data.

## The Auto Commuting Boom

Between 1960 and 1990, vehicle availability increased from an average of 1.03 vehicles per household to 1.66 (2,3). A majority of U.S. households now have two or more vehicles. The share of households without vehicles dropped from 22

percent in 1960 to about 11.5 percent of all households in 1990 (2,3). The most significant trend regarding vehicle availability during this period was in vehicles available per worker; this number rose from 0.85 per worker in 1960 to 1.32 in 1990 (2,3).

The dramatic changes in workers' access to private vehicles has coincided with equally dramatic increases in the use of private vehicles for work commuting, which almost doubled from 43 million users in 1960 to 83 million in 1980 (2). Only about one-half of the growth of private vehicle commuting can be attributed to the growth in the number of commuters; the remaining half was the product of shifts from other modes of travel, including public transit (2). By 1990, workers commuting in private vehicles accounted for 87 percent of all work trips (3).

## The Suburban Commuting Boom

Since 1950, 86 percent of the nation's population growth has moved to the suburbs (2). As a result, suburbs, with only 23 percent of the total population in 1950, nearly doubled their share of the population to 44 percent by 1984, while central city shares of U.S. population remained relatively constant. The suburbanization of jobs followed the suburbanization of population. Two-thirds of all metropolitan job growth between 1960 and 1980 occurred in the suburbs. In 1960, American suburbs contained about 14 million jobs, representing close to 35 percent of all metropolitan jobs. By 1980, the number of jobs in the suburbs had more than doubled to about 33 million, or 47 percent of all metropolitan jobs. The predominant commuter flow pattern is now the suburb-to-suburb trip with approximately 25 million commuter trips per day, which represents about one-third of all metropolitan commuting. The traditional commute between suburb and center city, although still growing, is no longer the dominant pattern, falling to third place behind central city-to-central city trips (2).

Travel to work between metropolitan and non-metropolitan areas is also growing. Approximately 2 million commuters enter metropolitan areas each day from non-metropolitan areas, while close to 1 million leave metropolitan areas for work in non-metropolitan areas (2). All of these trips traverse the suburbs, thus adding to suburban traffic congestion.

## Other Factors

In a paper by Cervero, "Surviving in the Suburbs: Transit's Untapped Frontier," the author notes that transit's "falling fortunes" are an outcome of many factors:

Traditional fixed route services radially linked to central business districts (CBD) are ill-suited for lateral, suburb-to-suburb journeys, the most rapidly growing travel market.

Also, most built environments in the suburbs are not conducive to transit riding. Low employment densities and the prevalence of abundant, free parking at most suburban workplaces induce many to solo-commute. Demographics and institutions also work against transit in suburbia. Suburban residents and workers tend to be more affluent and own more cars than their central city counterparts (1).

A 1992 report by the University of Tennessee's Transportation Center, *Suburban Mobility: A Challenge for Public Transportation*, notes that:

Suburban areas have grown with reliance on the personal automobile; in fact, development patterns have demanded dependence on the private automobile. In addition, campuslike suburban activity center (SAC) developments have provided large separations between individual buildings, requiring long walks between buildings as well as from the street to building entrances, located behind extensive parking lots (4)

## THE FUTURE

Cervero noted that despite these deterrents, several trends could work in transit's favor over time. Suburban centers are evolving into relatively dense, mixed-use concentrations, which could become the building blocks for integrated regional transit networks. Suburbs are also becoming home to increased numbers of senior citizens, ethnic minorities, and new immigrants to the United States--groups that have traditionally been transit dependent. High-priced, tight housing markets have also created a demand for condominiums and apartments, such as near rail stations and in some suburban areas. Lastly, some metropolitan areas are actively promoting more dense, transit-oriented development to meet the requirements of the Clean Air Act Amendments (CAAA) of 1990. Pisarski noted that, "As the suburban market becomes more dense, opportunities may increase for innovative transit services to meet specialized needs" (2).

Clearly, demographic and land use changes and increased private vehicle use represent challenges to public transit providers. For example, it is not easy from a political standpoint and with limited resources to initiate new services to the

suburbs potentially at the expense of central city residents who have had service for many years. In his paper "Safeguarding Suburban Mobility," Cervero wrote:

For transit to realistically compete in sprawling suburban environs, major service reforms are called for. In light of the trend towards cross-haul commuting, radial downtown-oriented routes should, where possible, be converted into grid networks that use office parks, shopping malls, and other activity nodes as timed-transfer points. Perhaps even more important, flexible forms of mass transportation need to be fully exploited.. (5)

Transit agencies throughout North America are responding to these challenges, and many are aggressively pursuing the suburban market. This synthesis illustrates successful and innovative approaches being used in suburban environments including

- The use of smaller vehicles,
- Demand-responsive services,
- Flexible routing,
- Targeted marketing approaches to the business community,
- Partnerships with the private sector,
- Involvement in land use and planning issues, and
- Other programs and techniques designed to increase transit's market share in the suburbs.

Despite fiscal and political constraints, many transit managers are attempting to meet the challenges of the future by creatively designing services that cater to the needs of the suburban market.

## LITERATURE REVIEW

The information sources for this synthesis included a review of the literature on suburban transit service and suburb-to-suburb commuting based on a Transportation Research Board (TRB) Transportation Research Information Service (TRIS) literature search, the author's own subject files, and a survey of transit agencies (discussed in Chapter 2) that provide suburb-to-suburb service. A bibliography is included following the references at the end of this report.

## CHAPTER TWO

### SURVEY FINDINGS

#### METHODOLOGY

A survey of transit agencies was conducted to gather information on the nature of transit services and programs being provided to accommodate increasing suburb-to-suburb travel. The survey (see Appendix A) was intended to elicit basic operating information from agencies on the type of transit service being provided including such aspects as mode, number of vehicles, fare structure, ridership, and hours of operation. The survey also included qualitative questions regarding why the service was developed, performance criteria used for evaluation purposes, agency involvement in site design and land use issues, marketing techniques, and transportation management association/transportation management organization (TMA/TMO) interaction.

#### RESPONSES

The survey was mailed to 37 transit agencies across the United States and Canada, some of which had responded to an earlier 1993 reverse commute survey by the American Public Transit Association (APTA). The APTA survey asked agencies to indicate whether they also operated suburb-to-suburb services.

Twenty-eight agencies (76 percent) responded to the survey for this synthesis; substantial telephone follow-up was required to obtain this level of response. Of these 28 agencies, 23 provide some form of suburb-to-suburb transit. Four of these agencies were selected for case studies. A complete list of the 23 agencies that provide suburb-to-suburb services is included in Appendix B.

#### SURVEY FINDINGS AND ANALYSIS

Key survey findings of the 23 agencies with some form of suburb-to-suburb service are analyzed and discussed next. Detailed responses to each of the survey questions may be found in Appendix C; in many cases, the total number of responses does not equal the total number of respondents since most questions had the possibility of multiple answers (i.e., "check all that apply").

##### Service Implementation

The majority of respondents (87 percent) indicated that their services were implemented due to increases in suburban travel. About 33 percent of the respondents indicated that they had implemented services due to clean air compliance or trip reduction mandates. Three respondents indicated that suburb-to-suburb services are not new and have been an integral part of their agencies' services for some time.

##### Mode of Service

As expected, buses operating on fixed routes were the most commonly used mode for providing suburb-to-suburb transit service with 20 out of 23 agencies using them. Shuttle services from rail ranked second at 39 percent. Many agencies use both 12.2-m (40-ft) and smaller buses to provide suburb-to-suburb service.

For agencies using fixed route buses, system size varied from 4 buses at Clark County Public Transportation Benefit Area Authority (C-TRAN) in Vancouver, Washington to 330 buses at MTA Long Island Bus (LI Bus) in New York; this range is indicative of the variation in size of agencies responding and the fact that there is not a "typical" operator of suburb-to-suburb service. The range of demand-response vehicles (buses and vans) providing suburb-to-suburb service ranged from 14 at Space Coast Area Transit in Cocoa, Florida to 316 at PACE in Arlington Heights, Illinois. Appendix D reports the number of vehicles used by responding agencies in both fixed route and demand-responsive suburb-to-suburb services.

The majority of agencies reported that their services were initiated in the late 1980s or early 1990s. This coincides with the suburban development boom of the 1980s and the fact that most services were initiated in response to increased suburban travel needs.

##### Target Ridership

Eighty-seven percent of respondents indicated that commuters were their target riders. All other categories ranked a close second with several responses each for shoppers, students, senior citizens, and transportation disadvantaged. "Other" responses included rail and multi-modal commuters and employees of businesses served, both of which could be grouped in the commuter category above. Thus, for 22 out of 23 agencies, commuters are the target market for ridership.

##### Number of Riders and Ridership Trends

Ridership varied greatly due to the variation in size of agencies responding. For example, C-TRAN (with 4 vehicles) reported that 600 passengers were carried on an average weekday. MTA LI Bus reported that its fixed route service (with 300 vehicles) carried approximately 82,000 passengers on an average weekday. Seventy-four percent of respondents indicated that ridership on suburb-to-suburb services was "up"; the category "steady" ranked next. Only two agencies reported that their ridership was on a downward trend. Average weekday ridership, as reported by each transit agency, is found in Appendix D.

## Service Evaluation Criteria

Fifty-seven percent of the agencies surveyed use the same criteria to evaluate their routes. One of the agencies that use separate criteria to evaluate suburb-to-suburb services is BC Transit in Surrey, British Columbia where lower levels of performance for suburban services are acceptable. BC Transit considers suburb-to-suburb services to reinforce regional policy. Metropolitan Council Transit Operations (Metropolitan Council) in St. Paul, Minnesota provides a \$4.00 maximum subsidy per passenger for suburb-to-suburb service, versus a subsidy of \$3.25-\$3.85 for local radial, all-day express, and peak express services, when suburban services do not meet such performance criteria as passengers per trip and passengers per platform hour. When the maximum subsidy is reached, the agency evaluates services for redesign or termination. Seattle Metro uses passengers per trip and passengers per platform hour to evaluate suburb-to-suburb services, which are placed in a separate class from other services as well. Individual routes are compared to others within the suburb-to-suburb class and the bottom 10 percent are evaluated annually for possible termination.

## Destinations Served

The most common destinations for suburb-to-suburb services were shopping centers/malls and office parks as types of developments proliferate in the suburbs. Other destinations that were closely ranked included industrial parks, schools/training centers, residential developments, and medical facilities. Suburban mixed-use developments being served by transit may account for the close rankings of the four distinct types of development. Recreational centers/parks were ranked last, probably because suburban parks are generally auto-oriented, and public green space is a rare commodity in many U.S. suburbs.

## Fares

Flat fares used by 43 percent of the responding agencies were the most common type of fare structure for suburb-to-suburb services. Distance-based or zone fares ranked second. "Other" responses included new service promotional fares, a paratransit zone fare, and a free fare for shuttle service to rail stations.

Respondents were asked to provide fare ranges by mode and to note whether ranges differed by mode. The fares ranged from free to a high of \$3.00 per trip; the average was \$1.25. Higher fares tended to be for more customized, demand-responsive, and express services. A complete listing of fares by transit agency is provided in Appendix D.

## Incentives Provided

Most agencies provided some incentives to encourage riders to use their service. Eighty-three percent of agencies surveyed use transit pass programs. Nearly 66 percent conduct outreach to the business community and nearly 33 percent

provide guaranteed ride home programs. The Suburban Mobility Authority for Regional Transportation (SMART) in Detroit has a "get a job/get a ride" program, which provides one month of free bus service for new employees and an unconditional moneyback guarantee on all services.

## Involvement in Site Design and Land Use

More than one-half of the agencies surveyed (14 out of 23) indicated that they are involved in site design and land use issues on a routine basis. Several agencies, including the Mass Transit Administration (MTA) of Maryland in Baltimore; CTRAN in Vancouver, Washington; PACE in Arlington Heights, Illinois; Metropolitan Council in St. Paul, Minnesota; and New Jersey Transit (NJ Transit), in Newark, have produced guidelines for site design/access criteria, which are distributed to the development community. NJ Transit's guidelines contain a transit friendly checklist, which is included in Appendix E.

## Use of Technologies

Respondents were asked to indicate whether they used any specific technologies such as timed transfers, priority treatments, advanced public transit systems (APTS), or route deviation to provide or enhance service delivery. Seventy-four percent of the respondents used timed transfers. Priority treatments were used by only 26 percent of the respondents, but ranked second in terms of technologies used. NJ Transit noted its flex routes, preferential access to rail stations, and new services, including fixed route, route deviation, and demand-responsive services. OC Transpo cited its ability to determine the time of the next bus via an automated telephone system, schedule display monitors at major stations, printed timetables at many bus stops, marketing targeted specifically at employers in these areas, and seamless integration of services with the rest of the regular route network.

## Marketing Techniques

Two-thirds of the respondents reported using different marketing techniques for suburb-to-suburb services from those used to promote regular fixed route services. GRATA reported using many of the same marketing techniques for its suburb-to-suburb and fixed route services, but also indicated the necessity to target marketing efforts to the business community for new suburban circulator routes. NJ Transit reported several marketing techniques, including working through seven TMAs in the state as well as sending direct mail to employers and employees to inform them of suburb-to-suburb services. San Mateo County Transit District (SamTrans) in San Carlos, California reported that marketing plans are submitted by employers with various marketing techniques for its regional rail shuttle bus program. Westchester County Department of Transportation (WCDOT) in White Plains, New York reported greater employer-based efforts and campaigns to highlight its "family of services" concept.

## **Relationship with Transportation Management Associations**

More than one-half of the agencies surveyed have TMAs/TMOs in their suburban service areas. Transit agencies had mixed responses regarding whether the TMAs/TMOs were important to the success of the agency's suburban service. The MTA Long Island Rail Road (LIRR) provides technical assistance to the TMAs on Long Island. MTA LIRR staff serve as members on several TMA boards. The seven TMAs on Long Island help promote MTA LIRR services. The Montgomery County Division of Transit Services in Maryland operates a transportation management district (TMD), which actively markets and promotes service in its business district. WCDOT reported that "The TMO is a very important element in terms of marketing and service development. There is a formal relationship between the county and the TMO." Seattle Metro reported that the "TMA is helpful in service issues Two TMAs are proactive in promoting and advertising transit service to employees. Metro has had successful cooperation in financing and production of marketing information."

On the negative side, one transit agency responded, "We have mixed results with TMAs. They are not an important element in marketing and have not generated any significant ridership for us. We do maintain formal membership with them. We have concerns over TMA marketing practices and have not encouraged them to market our services." Another agency responded, "TMAs are new to the local scene where our services have been around for a long time. Due to fiscal constraints, we are not able to respond to most service requests."

## **Additional Information Requested**

At the end of the survey, additional information that could not be readily obtained through the survey questions was requested, including the following: details on materials that directly relate to suburb-to-suburb services such as marketing materials, service descriptions, newspaper articles, photographs, and customer-oriented information; and information on innovative practices. Many agencies provided additional

information, which was then used to help select the case studies described in Chapter 3 and to discuss elements of success in Chapter 4.

## **Analysis**

The surveys and discussion held with transit providers focused on the changes made to meet suburban service needs, such as the development of marketing strategies, special advertising, access to employers, and special fares and services. It was found that many of these new services were lacking a common system for describing and understanding suburban consumer behavior, and there appears to be no uniform performance monitoring methodology among the transit agencies surveyed for detailing travel activity and transit service response with regard to funding implications.

There is lack of a reporting process for the service changes made to record the specifics of the physical changes made, such as changes in service frequency, fares, area coverage, schedule adherence, vehicle configuration, and service quality.

There is also lack of a more rigorous process for measuring the actual travel activity and its financial consequences. Many agencies reported a sense of success in that they discerned greater popularity of their service(s), i.e., greater use of the system. However, detailed ridership and financial statistics were not often available. A set of criteria for success, goals and objectives, in both ridership and financial terms, needs to be established. The criteria might include experiment start and end data, appropriate quarterly (monthly) ridership statistics, project initiation costs, and financial statistics before and after.

An experiment might have an appropriate time at which to draw conclusions, i.e., 1 year or more, although the undertaking might not in fact end. Ridership statistics for different services could vary substantially from passenger boardings to passenger miles to passengers per vehicle hour. Similarly, financial statistics could take different forms. But the formats selected as a metric for success could be explained and justified for use in future suburban transit provisions.

## CHAPTER THREE

**CASE STUDIES OF SELECTED APPROACHES TO SERVING  
SUBURB-TO-SUBURB TRAVEL**

The survey responses discussed in Chapter 2 provided the basis for selecting the four case studies outlined in this chapter. The selected agencies represent the wide diversity of suburb-to-suburb transit services being provided in both the United States and Canada. The agencies and their services differ in nature, focus, and size, and are not meant to be compared with one another. Rather, the case studies represent various ways transit agencies are meeting the suburb-to-suburb travel needs of the communities that they serve.

The four case studies are

- PACE, the suburban bus division of the Regional Transportation Authority (RTA) in Chicago, a suburban agency in which 48 percent of all trips are suburb-to-suburb;
- New Jersey Transit (NJ Transit), a statewide transit agency with a new suburban employment initiative;
- Grand Rapids Area Transit Authority (GRATE), a midsize transit agency in Michigan, which is reinventing itself to meet future mobility needs including those of suburb-to-suburb commuters; and
- Ottawa-Carleton Regional Transit Commission (CO Transit) in Ottawa, Ontario, which considers suburb-to-suburb trips to be an integral part of its regional transit service and which has a regional policy in place to focus development in areas well served by transit.

**PACE, ARLINGTON HEIGHTS, ILLINOIS**

PACE was created in 1984 following a reorganization of the RTA into three service boards: the Chicago Transit Authority (CTA); Metra, the commuter rail division; and PACE, the suburban bus division. PACE is charged with administering and providing all non-rail mass transit service in suburban Cook, Dupage, Kane, Lake, McHenry, and Will counties in Illinois (with the exception of the CTA's suburban bus services in Cook County).

The PACE service area measures 8,925 km<sup>2</sup> (3,446 mi<sup>2</sup>) (nearly the size of the State of Connecticut), and includes six counties, which incorporate 264 municipalities. Transportation needs within this broad area are as unique as the individual communities that comprise it. The suburb-to-suburb commute trip has now become the dominant travel market in the region and is primarily served by the automobile.

**Services Provided**

The following types of services are provided by PACE.

*Fixed Route*

PACE operates fixed route service over 140 regular routes, 79 feeder routes, 9 subscription routes, and 2 seasonal routes.

These routes serve 200 communities and carry nearly 3.0 million riders per month using 558 vehicles during peak periods. Approximately 48 percent of PACE's customers on the fixed route service are making suburb-to-suburb trips.

*Dial-a-Ride/Paratransit*

Dial-a-ride service is available throughout the six-county PACE service area. PACE uses 192 lift-equipped vehicles to provide door-to-door service to approximately 102,800 riders each month, the majority of whom are elderly and/or have disabilities. PACE also uses 124 lift-equipped vehicles to provide door-to-door paratransit service to approximately 21,250 riders each month who are unable to use PACE's regular fixed route service. Together, these paratransit services carry an average daily ridership of 5,867 individuals. All trips made on these paratransit services are suburb-to-suburb trips.

*Vanpool Incentive Program*

PACE established a vanpool incentive program (VIP) to serve the commuting needs of small groups of individuals in a changing market. The VIP service provides passenger vans to small groups (5 to 15 people), allowing them to commute to and from work together. The program continues to be well received, with 172 vans currently in use (90 percent of which serve suburb-to-suburb trips). PACE plans to increase this number to 215 by the end of 1995.

The vanpool program has been recently expanded to include the ADvAntage element, which provides an alternative service for those unable to use the regular paratransit service or to those living outside the 1.21-km (0.75-mi) service area. ADvAntage is intended to provide a transit alternative to individuals with disabilities who commute on a regular basis to work sites or rehabilitative workshops. About 20 ADvAntage vans are currently in use.

Fares for the vanpool services are based on round trip mileage and the number of passengers in each van. The vanpool services recover more than 100 percent of their operating costs.

*Subscription Service*

The nine subscription bus routes operated for Sears employees by private contractors are adding nearly 200,000 annual riders to PACE. Fares are set to equal 60 percent of the cost of service. A minimum of 30 passengers is required for each bus, and the service is open to the general public.

**Operating Environment**

The following information describes the unique operating environment in which PACE operates.



### Population and Employment

The suburban area has a 1990 population of 4,454,317 and employment of 2,163,600. The suburban area exceeds the City of Chicago in terms of absolute population and employment, and continues to grow while population and employment in Chicago have been declining since 1970, as shown in Figure 1.

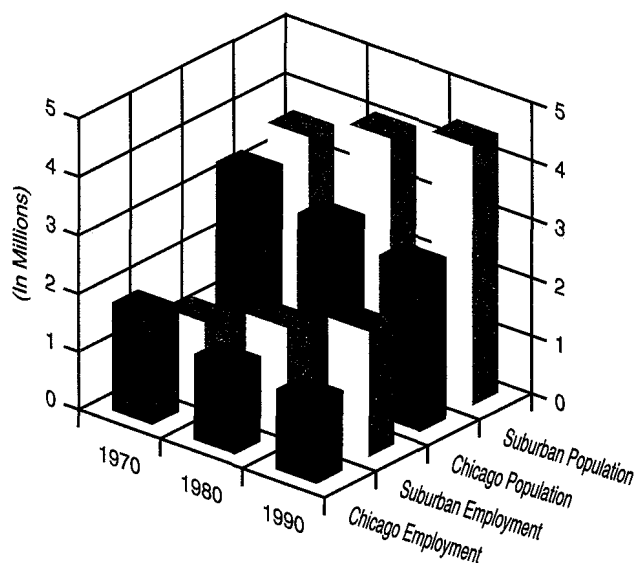


FIGURE 1 PACE service area population and employment.

Between 1980 and 1990, Chicago's population and employment base declined by 7.3 percent and 6.2 percent, respectively. Growth in suburban population at 9.3 percent and employment at 24.7 percent offset losses in the city's population and employment for net region-wide population, and employment gains of 2.2 percent and 10.6 percent, respectively.

### Suburban Office Space

Forty percent of the Chicago region's office space is outside the city limits. Since 1975, more than 55 million ft<sup>2</sup> of office space has been built in the suburbs, the majority of which is poorly accessible to transit patrons. Large building set-backs and a lack of sidewalks and pedestrian crossings are typical of the suburban environment. To ensure that future development is transit accessible, PACE is working closely with interested municipalities and developers to provide assistance in incorporating transit planning into their projects. By becoming part of the plan review process, transit amenities can be incorporated into development plans at the outset.

In 1993, PACE provided technical advice on 26 proposed development plans and 28 Illinois Department of Transportation (IDOT) roadway improvement projects. By cooperatively working with IDOT, PACE has been able to incorporate transit needs such as bus turnouts, shelters, turn lanes, and signal modifications into road improvements to provide faster,

more effective service. Reviews are advisory and are done at no cost to the submitter. PACE has published *PACE Development Guidelines* to assist developers in evaluating their projects.

### Highway Traffic Congestion

The substantial growth in suburban population, employment, households, and office space has increased traffic congestion on the Chicago region's highways. Between 1980 and 1990, traffic volumes increased 33 percent, while highway miles increased by only 5 percent. The situation is likely to worsen considerably by the year 2010 unless new funding is provided for both highway and transit improvements.

### Journey to Work Market

Nearly 80 percent of PACE passengers use the service to get to work. The total of one-way work trips in the region reached 3.3 million in 1990, up more than 9 percent from 1980. At the same time, total ridership for the region's mass transit providers fell by 16.7 percent, a loss of more than 137 million annual trips. The region's work commute market can be divided into four major segments (Figure 2), which illustrate the effect that population and employment shifts have on travel and transit demand.

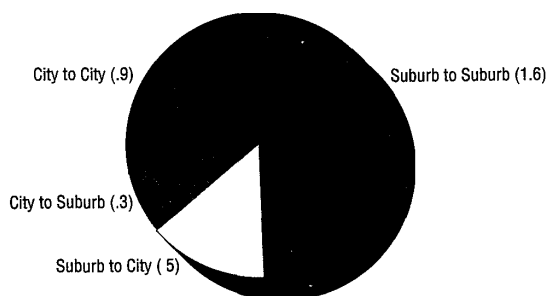


FIGURE 2 PACE journey to work travel market segments, in millions (based on 1990 Census Transportation Planning Package data).

Of these major market segments, the suburb-to-suburb commute market is by far the largest and is approximately equal to the other three markets combined. Also, between 1980 and 1990, this market segment grew by more than 300,000 a.m. trips, making it the fastest growing of the major commute markets. As represented in Figure 3, city-related travel markets (both city-to-city and suburb-to-city) experienced minor declines and could best be described as stable, while the suburb-to-suburb trip market grew by 22 percent and the much smaller city-to-suburb market grew by nearly 33 percent. The primary factors underlying the changes in travel market volumes have been the shifts in regional population and employment, both of which were discussed earlier.

The Chicago region's strongest transit markets have traditionally been the city-to-city and suburb-to-city commute

markets, and, as shown in Figure 3, they have either declined or remained constant from 1980 to 1990. In contrast, the suburb-to-suburb and city-to-suburb (reverse commute) markets have grown dramatically from 1980 to 1990.

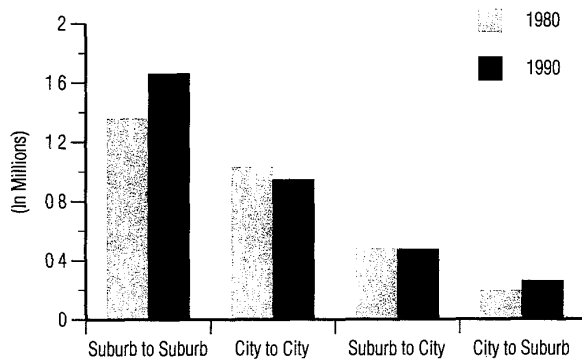


FIGURE 3 PACE journey to work trip volume by major market, 1980 vs. 1990.

PACE routes that primarily serve suburb-to-city trips experienced a decline in ridership of 6.6 percent over the 5-year period between 1989 and 1993. During that same period, routes serving suburb-to-suburb trips increased by 1.3 percent and city-to-suburb trips increased by 7.3 percent. The relatively constant performance in the suburb-to-suburb market, where most of the regional travel growth has taken place, is of concern to PACE.

#### *Clean Air Act Amendments/Employee Commute Options Act*

Significant legislation at both the federal and state level has been passed to prevent the further deterioration of air quality and to bring air quality up to standard in regions where it currently does not meet minimum standards established in the Clean Air Act Amendments (CAAA) of 1990. The northeast portion of Illinois is considered a severe nonattainment area for national air quality standards. Given this status, Illinois is required to take corrective actions within a specific time frame to attain national air quality standards under the CAAA of 1990.

As part of this effort, the Illinois Legislature enacted the Employee Commute Options (ECO) Act, which, in part, requires suburban employers with more than 100 employees to increase the average passenger occupancy (APO) of autos arriving at the employment site (during peak periods) to 1.36 by July 1998. To achieve this, employees will need to work flexible schedules, carpool, or more importantly for PACE, form vanpools and use PACE fixed route services. Under the Act, employers will be required to survey employees to determine current APO and to develop a compliance plan that demonstrates an APO of 1.36 will be achieved.

PACE anticipated that compliance efforts would create significant demand for services. To assist employers, PACE recently implemented its ECO-System survey support effort. PACE can now offer employers a fast and efficient survey

mechanism for a nominal fee. The data collected by the survey allow employers to determine their APO by site and provide PACE with valuable trip information for service planning.

In March 1995, the Governor of Illinois suspended the compliance requirement of the ECO Act for budgetary purposes. As a result, suburban employer interest in pursuing the survey has waned. However, PACE still finds a great deal of interest by suburban employers in dealing with transportation issues that impact them directly, such as access to labor markets, congestion, and relocation-related employment issues.

### **Operating Strategy**

The operations of PACE are guided by a strategic plan, which stems from a general strategy of simultaneously increasing ridership and the farebox recovery ratio. PACE has taken numerous actions to fulfill this objective including establishing consistent criteria to determine when service should be expanded or reduced, implementing cost containment programs such as self-insurance, decentralized purchasing, dial-a-ride cost ceilings, and competitive bidding for privately operated services; and implementing new services such as the PACE VIP, which has a high recovery rate (more than 100 percent) and provides effective service in low density markets.

PACE has established minimum performance standards for all of its services (see Table 1). For the fixed route services, evaluation criteria are geographically based. It is significant to note that all suburban services are permitted to operate at one-half of the recovery rate of 35 percent required by the RTA of PACE for other services.

### **The Future**

In 1992, PACE developed a long-range comprehensive operating plan (COP), which established a vision for the suburban transit agency to the year 2010. The COP provides a direct link between the region's 2010 transportation system development plan and PACE's 5-year capital plan and annual operating and capital budget elements. Specific efforts to be pursued in the development of a comprehensive suburban public transportation plan include the following:

- Doubling the level of fixed route services offered by the year 2010. Over a dozen corridors were identified to provide high-speed linkages to major suburban employment centers.
- Expanding dial-a-ride services throughout the service area to provide vital transportation service to low density areas not efficiently served by fixed routes.
- Expanding the VIP and subscription bus program to meet the 2010 goal of 500 vans. These services have high recovery rates (100 percent vanpool, 60 percent subscription bus) and are consistent with PACE's general strategy.
- Expanding the total vehicle fleet from approximately 1,000 now to 3,200 by 2010. Additional vehicles will be required for vanpools, express bus routes, fixed routes, paratransit, and dial-a-ride expansion. PACE will also experiment with other vehicle designs to meet market conditions such as more comfortable seating configurations for long distance express bus routes.

TABLE 1  
PACE SERVICE CRITERIA

Fixed Routes (Minimum Performance Standards)					
	Inner Suburban	Satellite City	Outer Suburban	Rush Hour Only	Subscrip. Bus
Performance (Pass. per revenue hour)	18.7	14.6	10.2	11.3	N/A
Finance (Recovery Ratio)	17%	17%	17%	17%	60%
Riders (Minimum)				40 per day*	30 per trip

\* Rail feeders

Note: The 17 percent recovery rate represents one-half of the recovery rate (35 percent) required by RTA of Pace.

Note: The passenger performance criteria represents one-half of the average performance for the route classification.

Paratransit: PACE requires local governments and other organizations to subsidize the service. PACE limits its financial contribution to \$2.50 per trip or 75 percent of the deficit whichever is less.

Vanpool: The program is structured to achieve a minimum 80 percent recovery ratio but has typically achieved over 100 percent recovery rate.

- Expanding present garage facilities as necessary to accommodate growing service levels. PACE is currently in the final stage of construction to renovate and replace the eight garages it operates. The need for three additional garages has been identified.

- Constructing 96 park-and-ride facilities by 2010 to maximize access to limited access highways and reduce bus circulation through residential communities. A large percentage of park-and-rides are planned near expressways and tollways. These facilities will improve auto-bus connections for customers who prefer or need to drive to get to a transit facility.

- Implementing eight additional transportation centers and 74 new transfer facilities by 2010. Transit centers will be implemented in major development areas to facilitate the interchange of express and local routes. Smaller transfer facilities will be integrated into small developments such as shopping centers. Both facilities may be constructed in conjunction with park-and-ride lots.

- Implementing 158 restricted use facilities along the major highways in the region. A restricted use facility would allow buses and other high-occupancy vehicles (HOVs) to bypass high congestion areas such as interchanges. Also, exclusive toll bypass lanes and bus only exit/entrance ramps are proposed at several locations.

- Identifying 75 corridors that would benefit from signal preemption for transit vehicles. The PACE 1995 capital program contains funds for the first phase of this agency's development. The on-time performance and operating speed of PACE vehicles can be significantly enhanced through the use

of signal preemption systems, which can determine whether or not a bus is on schedule and adjust oncoming traffic signals to speed its movement through an area.

- Conducting an effective employer outreach program and offering multiple service options; in Pace's experience, these are the most critical elements in the marketing of suburb-to-suburb services. PACE's field representatives make direct contact with suburban employers and are able to determine what, if any, transportation related issues the employer has. Based on this input, the representative can then offer appropriate solutions. Typical employer interests have included conducting awareness events to inform their employees of available transit connections; surveying employees to determine trip origins and interests in transit services (fixed route, vanpool, subscription bus, rail-feeder connections); and becoming an on-site sales agent for PACE's monthly pass and/or participating in the regional Transit Check program.

PACE has found that working with employers relocating from the city to the suburbs, or from an inner suburb to a further outlying suburban area, has yielded the most significant level of employer interest and success.

PACE's most noteworthy accomplishment in this area has been with the Sears relocation from Sears Tower in downtown Chicago to suburban Hoffman Estates (approximately 56.4 km (35 mi) northwest of Chicago's central business district (CBD)). Through extensive pre-relocation planning and interaction with employees via group meetings and surveys, PACE was able to capture approximately 25 percent of the 5,000-

member work force on transit. The employees using PACE are split approximately among vanpools (45), subscription routes (9), and fixed routes (2), each carrying about 800 riders per day. Roughly one-third of the employees reverse commute from the city, while the remainder make a suburb-to-suburb commute. Interestingly, a majority of the subscription bus riders drive their autos to the route origin point and pay an \$88/month subscription bus fare for the commute trip, which averages about 75.7 km (47 mi) one way.

From the Sears experience and by working with other suburban employers, PACE has identified the following factors that are important to the success of suburb-to-suburb transit services:

- Direct marketing via representative personal contact with employers is essential.
- Working with relocating employers prior to relocation to ensure service is in place on the first day of the relocation is critical.
- Having more than one service option to offer to meet as many trip needs as possible will maximize transit share.
- Guaranteed ride home programs are important to employees at locations that are not well served during off-peak periods, especially for vanpool and subscription bus patrons.
- Providing opportunities for park-and-rides for long express commute trips is important.
- Providing as many sheltered bus stops as possible is important. In suburban Chicago, unsheltered and "pedestrian hostile" waiting conditions are common and believed to be a major deterrent to system use.
- Creating opportunities for off-street transfer activities to take place is important. PACE has a significant level of transfer activity taking place at suburban shopping centers where allowed.
- Distributing widely route and schedule information to counter (though not fully make up for) the poor visibility of service in low-density markets served with low-frequency service (half-hour to one-hour headways).
- Measuring implemented services, which primarily benefit a single employer, against specific service criteria that objectively determine their status in the future absence of employer subsidies, because employers are usually reluctant to subsidize service for more than a buffer period (of 3 months to 1 year) after relocations.

## **NEW JERSEY TRANSIT (NJ TRANSIT), NEWARK, NEW JERSEY**

NJ Transit, a public corporation, is the nation's third largest provider of bus, rail, and light rail transit, covering 13,791.8 km<sup>2</sup> (5,325 mi<sup>2</sup>) and linking major points in New Jersey, New York, and Philadelphia. Operating 1,856 buses on 170 routes and 582 trains on 12 rail lines statewide, NJ Transit serves more than 290,700 customers daily. The agency's fleet provides 166 million passenger trips each year, and travels more than 1 billion miles annually.

NJ Transit's services include urban, suburban, intra-state, inter-state, and shuttle routes, many of which provide some suburb-to-suburb travel options, and are continually being evaluated and modified to match changing market demands. However, it is impossible in most cases to separate the suburb-to-suburb features of any particular route from the overall

context of the route. This case study focuses on NJ Transit's new suburb-to-suburb services, which were the result of the agency's suburban transit initiatives program.

## **Suburban Transit Initiatives Program**

There is a great need for improved public transit in New Jersey. A 1993 Rutgers University study reported that between 1982 and 1990, 80 percent of the new jobs created in New Jersey were in the suburbs. In August 1992, NJ Transit began to study how it could expand its reach into suburban areas by identifying new suburban travel markets and developing innovative transit services to best meet the needs of suburban travelers. To accomplish this, the agency and its consultants worked with seven TMAs, as well as local Chambers of Commerce and county officials across the state, to help identify new suburban travel markets. The program, initially known as the suburban transit initiatives program, identified three ways in which NJ Transit could market services to suburban residents: modifications to the fixed route concept, new employment-based transportation services, and new community-based transportation services.

As a result of this study, a list of 90 suburban service proposals was developed. The study also stimulated the idea for the WHEELS services, which are discussed next.

NJ Transit has implemented a \$7.0 million project supported by federal-aid highway program funds to improve transit access to employment sites. The project, WHEELS, has three components: fixed route bus, rail, and suburban employment. The WHEELS services are marketed as a "whole new generation of commuting."

The suburban employment component is a new mode for NJ Transit, and the new suburban routes are different for several reasons. First, they were designed solely for the suburban employment market. Second, they were designed in conjunction with major employers and TMAs. Third, they are operated with minibuses (see Figure 4). Fourth, they are marketed differently. And lastly, they use a different or nontraditional method of operation, such as flex routes, a new concept pioneered by NJ Transit that combines features of fixed, demand-responsive, and route deviation operating methods. Nontraditional options such as flex routes allow customers to reserve a ride in advance; circulator routes provide greater access to downtown retail areas; and additional park-and-ride and train station shuttle services further improve the convenience of public transit.

The suburban employment services are classified into four distinct categories: transit connection, park-and-ride, flex routes, and circulator services. By early 1993, NJ Transit had plans for 15 separate services. The first service was initiated in November 1993, while the majority were initiated during the summer of 1994. NJ Transit has contracts with private operators for the operation of all WHEELS routes. Examples of each service type are provided in Tables 2, 3, and 4.

## **Ridership**

Monthly ridership on the WHEELS services has steadily increased from 258 passengers, with just one route operating



FIGURE 4 NJ Transit WHEELS minibus. (Courtesy of NJ Transit)

TABLE 2

**SERVICE TYPE: TRANSIT CONNECTION**

Service:	Convent Station Employer Shuttle (966)
Description:	A shuttle operation between the Convent Station rail station on the Morris & Essex rail line and area businesses. Two separate routes operate to allow frequent and convenient service to and from employment sites.
Reservations:	No
Ridership during April 1995:	61.7 passenger trips/day
Fares:	\$.50 per trip
Frequency:	5 trips a.m. and 5 trips p.m. on each route
Implementation:	Began operation December 13, 1993; operated by Town & Country.

(November 1993), to 14,843 passengers, with 19 routes operating (April 1995). Table 5 illustrates monthly ridership by route from November 1993 to April 1995.

The WHEELS program is coordinated by the Service Development and Bus and Rail Service Planning Divisions of NJ Transit. Currently, 18 out of 21 counties in New Jersey are classified as severe nonattainment areas for ozone. The WHEELS

TABLE 3

**SERVICE TYPE: PARK-AND-RIDE**

Service:	Sparta I-80 Diamond Express (967) and Hackettstown I-80 Diamond Express (968)
Description:	Service to two office parks in eastern Morris County from park-and-ride lots in Sussex and western Morris counties. Uses the State's new HOV (high-occupancy vehicle) "diamond lanes" on I-80.
Reservations:	No
Ridership during April 1995:	23.9 passenger trips/day
Fares:	From Sparta: \$2.55 one way; \$23.00 ten trip; \$76 monthly pass From Hackettstown: \$2.90 one way; \$26.00 ten trips; \$86 monthly pass
Frequency:	One trip each morning and each evening to Morris Corporate Center from each origination point; two trips each morning and each evening to Prudential Business Campus from each origination point.
Implementation:	Began operation June 20, 1994; operated by Town & Country.

TABLE 4

**SERVICE TYPES: FLEX ROUTE AND CIRCULATOR**

Service:	(flex Marlton/Mt.Laurel--East Gate route) Express (992) Mt. Holly/ Mt. Laurel--East Gate Express (993)
Description:	Two reservation services providing commuter hour trips to the East Gate office/industrial park in Burlington County.
Reservations:	Yes; call Lion Tours at: (609) 267-3156
Ridership during	37 passenger trips/day April 1995:
Fares:	From Marlton and Ramblewood in Mt. Laurel: \$1.00 one way; \$37.00 monthly pass From Mt. Holly: \$1.70 one way; \$15.00 ten trip; \$57.00 monthly pass
Frequency:	4 "peak" hour trips each morning and evening; times to be based on demand
Service:	Circulator--portion of above route
Description:	A lunchtime circulator complements the "peak hour" service, giving East Gate employees transportation to the Moorestown Mall for lunch and errands.
Reservations:	No
Fares:	\$.50 per trip
Frequency:	Every 20 minutes during lunch hours
Implementation:	Began operation July 18, 1994; operated by Lion Corporation

services will assist employers to meet the requirements of the CAAA of 1990 and the state's own employer trip reduction (ETR) legislation (Traffic Congestion and Air Pollution Control Act). Under this legislation, employers with more than 100 employees must achieve an average passenger occupancy rate of not less than 25 percent above the average vehicle occupancy rate set for all such trips in the region by November 15, 1996. NJ Transit will work with employers to plan similar services in the future.

### Marketing Strategies and TMA Involvement

To market the suburban employment services, NJ Transit developed a brochure specifically tailored for each service. These attractive user-friendly brochures provide a description of the WHEELS program, tell customers how to use the

service, and contain schedule, map, and fare information; the brochures also include information on the NJ Transit Business Pass and the TransitChek programs.

The Business Pass Program allows companies to sell monthly bus and rail passes to their employees directly at their work site. Businesses can use payroll deductions or direct payment by employees to cover the cost. The TransitChek program is an easy way to provide a fringe benefit to workers. Employers purchase TransitCheks (good for up to \$60 toward the cost of a monthly pass), and provide them to workers as an incentive to commute regularly by public transit. TransitCheks are a tax-deductible expense for employers and cannot be counted as taxable income for employees.

The WHEELS brochures also provide telephone numbers for service providers (private contractors) and TMAs in the area. If the TMA has a guaranteed ride home (GRH) program, this information is also included. The seven New Jersey TMAs actively market transit services within their jurisdictions under contract to NJ Transit; a NJ Transit representative sits on the Board of Directors of all of the TMAs.

To encourage ridership on the new services, all routes had a free fare period ranging from 1 to 3 months. Free ride passes (Figure 5) were distributed at employment sites and were good for unlimited rides for a specified period of time.



This pass is valid for unlimited rides on the following WHEELS service:  
**#962 West Essex Shuttle**  
for the period ending September 30, 1994

This pass is valid for use only on the above WHEELS service, and only for the period indicated.  
This pass has no cash value and may not be refunded or sold

**For more information about WHEELS,  
please call Red & Tan Tours at:  
1 (201) 420-9292**

This WHEELS service is brought to you by NJ TRANSIT and Transit Plus,  
the Transportation Management Association of Essex and Union Counties



FIGURE 5 WHEELS free ride pass, NJ Transit.

### Service Evaluation

WHEELS services are required to meet a 15 percent recovery ratio goal by the end of the first year of operation. Throughout its system, NJ Transit operates with a 55 percent farebox recovery ratio. Of the 19 WHEELS services, four routes were meeting the 15 percent recovery ratio goal by

TABLE 5

NJ TRANSIT. WHEELS MONTHLY PASSENGER TRIPS, NOVEMBER 1993 TO APRIL 1995 (BY ROUTE NUMBER)

Month	981	966	967	968	973	978	979	980	987	988	984	992	993	975	976	977	990	960	962	Monthly Ridership
Nov 93	258																			258
Dec	469	198																		667
Jan 94	728	1,153																		1,881
Feb	610	1,459																		2,069
Mar	737	1,569																		2,306
Apr	425	916																		1,341
May	480	771																		1,251
Jun	524	1,045	68	89	861	59	24	62												2,732
Jul	456	1,011	183	271	3,546	709	422	425	259	125	255	13	40							7,715
Aug	537	1,190	246	435	2,306	842	633	676	408	204	623	114	96	205	471	394	256	7	243	9,886
Sep	426	1,084	388	650	1,759	731	593	636	399	156	652	204	151	143	838	375	566	38	1,121	10,910
Oct	445	953	357	381	1,922	824	701	706	421	236	613	187	240	189	1,237	475	517	35	1,075	11,514
Nov	506	1,124	286	334	2,019	880	733	825	345	194	613	229	213	206	1,493	558	536	46	1,327	12,467
Dec	519	1,155	248	261	2,276	783	710	812	168	224	510	281	256	176	1,732	596	647	32	1,139	12,525
Jan 95	542	1,295	255	321	2,001	1,200	827	922	273	326	644	337	292	228	1,862	760	736	33	1,289	14,143
Feb	549	1,272	211	292	1,966	1,200	750	988	333	308	606	289	285	223	1,954	786	914	19	1,286	14,231
Mar	645	1,578	225	275	2,471	1,571	1,184	1,202	449	390	774	461	477	269	2,435	904	959	26	1,703	17,998
Apr	591	1,233	239	237	2,056	1,251	923	1,156	429	289	582	372	366	209	1,968	706	835	13	1,388	14,843
Totals	9,447	19,006	2,706	3,546	23,183	10,050	7,500	8,410	3,484	2,452	5,872	2,487	2,416	1,848	13,990	5,554	5,966	249	10,571	138,737

Note: By route start date.

Table prepared by Office of Performance Standards.

April 1995. NJ Transit has divided the services into three categories: services that are doing well, those in which service or schedule modifications need to be made, and those that are likely not to succeed. The agency has already begun making modifications to several of the services. Each service will be monitored for a 1-year period and then evaluated to determine continuation. TMAs also provide assistance in monitoring and evaluating services operating in their jurisdictions and provide a direct link with employers. NJ Transit provides ridership reports to the TMAs on a weekly basis.

### **GRAND RAPIDS AREA TRANSIT AUTHORITY (GRATA), GRAND RAPIDS, MICHIGAN**

Grand Rapids, Michigan is the state's second largest city, with a 1993 population of close to 980,000 that is rapidly growing. The Grand Rapids Area Transit Authority (GRATA) is currently expanding and improving its services to meet the needs of this high growth area. Maintaining a fleet of 82 buses, GRATA operates 58 fixed route buses over a 388.5-km<sup>2</sup> (150-mi<sup>2</sup>) service area during peak times. GRATA's annual ridership including paratransit services totals 3.5 million rides per year.

#### **Mobile Metro 2020**

To serve the area's growing needs, GRATA is in the process of "reinventing" itself through its long-term planning process, Mobile Metro 2020. Highway traffic congestion, the growth of businesses and employment opportunities away from the downtown area, and increased air pollution as more motorists travel farther to get to work are among the problems that face the metropolitan area. GRATA believes that improved mass transit in Grand Rapids is key to solving these problems. GRATA conducted a 4-month study of transportation needs in the region to address these problems head on. The product of the study is a transportation plan, which will carry Grand Rapids into the first quarter of the next century.

In April 1994, GRATA held five public meetings in the Grand Rapids area to share initial findings on Phase I of the transit development study and to obtain feedback from the community. Phase I outlined a system with consistent bus headways of at least 15 or 30 min, suburban circulators in areas previously unserved, longer hours of service on Saturdays, and revised schedules that are easier for riders to understand (see Appendix F).

Phase I was intended to lay a foundation for future expansion of the system. The Phase I improvements, exclusive of the circulator services, required no fare increases or additional funding, although some minor service adjustments had to be made. Route segments proposed for elimination had low ridership at about 0.6 riders per mile, while the average ridership on all GRATA routes was 1.8 riders per mile. GRATA plans to increase the system-wide average to 2.2 riders per mile.

#### **Suburban Circulator Service**

In March 1995, GRATA's two new suburban circulators began operating in the communities of Kentwood, Grandville,

and Wyoming using 14-passenger minibuses, one of which is shown in Figure 6. These routes provide shoppers, workers, and area residents with convenient, comfortable transportation along West Michigan's busiest roads. These routes also connect to each other through other routes in the GRATA system, providing linkages to other parts of the region (see Figure 7). Both circulator routes have two shuttles, one moving clockwise and one moving counter clockwise. It takes approximately 1 hour for a bus to complete each loop.



**FIGURE 6 GRATA minibuss. (Courtesy of GRATA)**

Route 15 provides service to Kentwood located southeast of the Grand Rapids. The Kentwood circulator provides service to the fastest growing suburban employment center in the area. The Kentwood area includes an airport, hundreds of employers, a major department store, two shopping malls, Kentwood City Hall, and several office parks.

Route 11 serves the suburban communities of Grandville and Wyoming located southwest of Grand Rapids. The Grandville/Wyoming circulator provides service to four major shopping areas, the Wyoming Community Education Building, and the Wyoming Public Library. This route serves a mix of residential and commercial locations including small manufacturers, service businesses, and residential areas.

The new circulator routes are supported in part by federalaid highway program funds, which are available for a 2-year period. By the end of the 2-year program, GRATA will have worked with both local governments to assess the use of the service and determine a plan for continuation. The routes are projected to carry 12 passengers per hour. GRATA's other fixed routes are evaluated based on the number of passengers per mile.

Since the initiation of service on March 6 through early May 1995, these two routes carried nearly 15,000 one-way trips. Route 11 has been doing quite well, but ridership on Route 15 is building at a quicker pace (see Figure 8). For the first 10 weeks of service, the average number of passengers per week on Routes 11 and 15 was 894 and 582, respectively. Ridership on Route 15 has nearly doubled since initiation of service, with an average weekly increase of 8.75 percent.

#### **Additional Service Improvements**

As part of the transit development plan, GRATA also improved frequencies on five routes to provide consistent 30-min headways (replacing the previous 43- to 70-min frequencies)



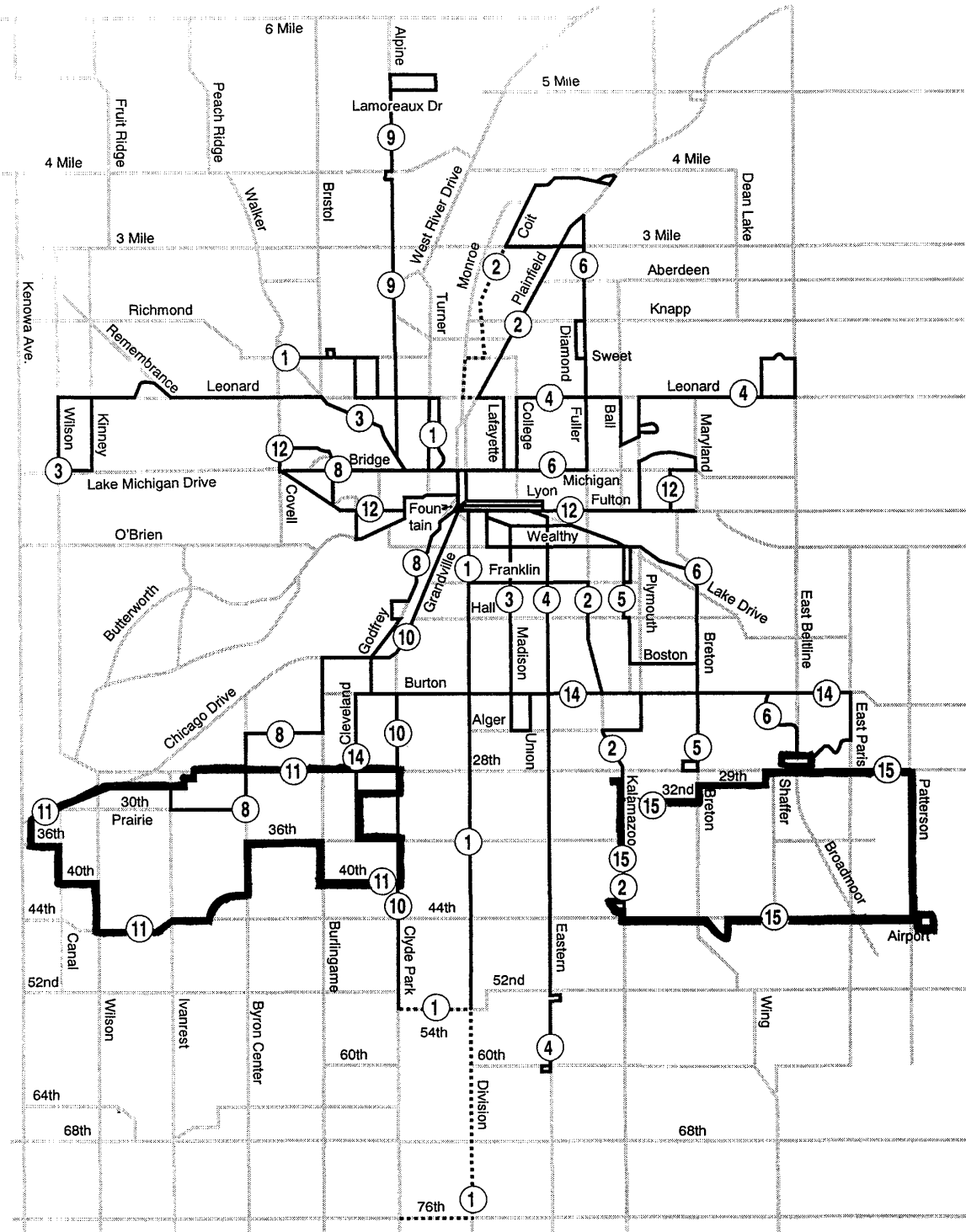


FIGURE 7 GRATA system map illustrating suburban circulators and linkage routes.

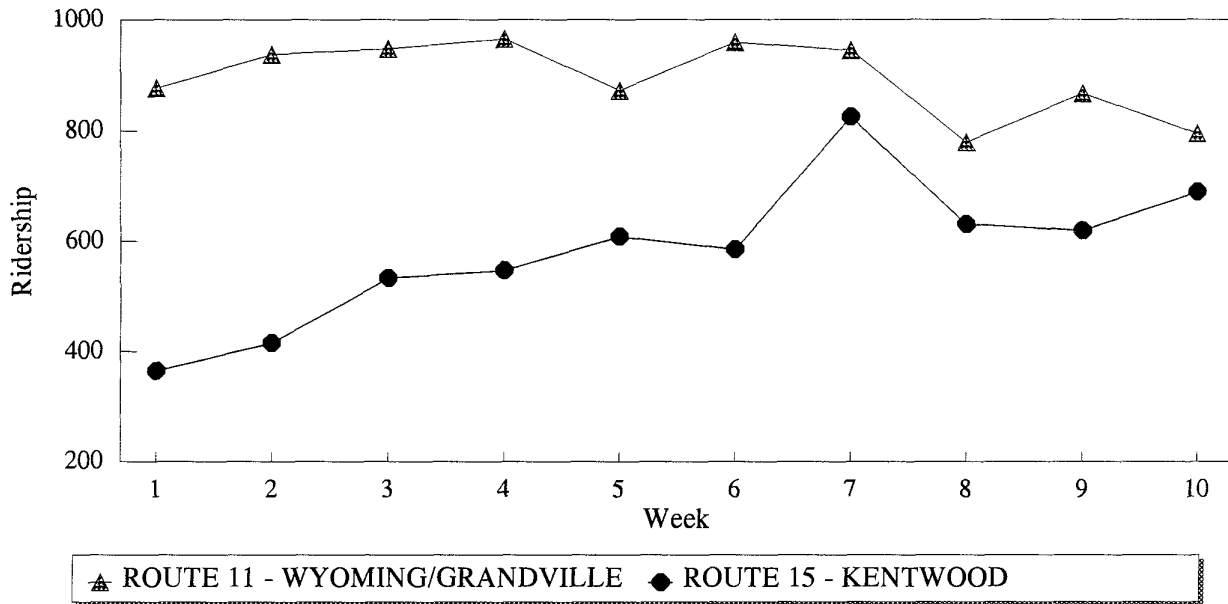


FIGURE 8 GRATA circulator routes weekly ridership (March 6–May 12, 1995).

One of these routes, Route 14, provides crosstown suburb-to-suburb service and serves as the connector route between the two suburban circulators. GRATA also implemented an improved transfer policy to allow passengers to use a transfer on any route or multiple routes within 1 hour after de-boarding a bus. Lastly, GRATA extended Saturday service hours on all routes. Previously, GRATA had very limited Saturday service on four routes from 6:00 to 11:00 a.m. and stopped service entirely at 6:00 p.m. on Saturdays. Suburban service now operates until 9:30 p.m.

Regular cash fares on all GRATA services are \$1.25. Substantial discounts (up to 52 percent) are available with GRATA's Super Saver program when a 10-ticket book is purchased for \$7.00. GRATA's \$27.00 monthly pass provides unlimited trips during a calendar month.

The next phase of the planning process, which has recently begun, is a study of access and travel needs in the immediate downtown area. Although GRATA's route service is currently centered on Grand Rapids' CBD, significant transportation needs remain within the city's core. In the future, GRATA will continue to analyze weekend, evening, and suburb-to-suburb travel patterns to determine if new circulator routes and hours can be added to meet community needs.

### RIDEFINDER Program

Because GRATA views itself as a mobility and transit provider, its services go well beyond traditional bus transportation. Since 1990, GRATA has been involved in promoting and facilitating ridesharing through its RIDEFINDER program. The program provides free assistance to individuals and employers interested in developing shared ride arrangements. A marketing brochure is used to explain the benefits of

ridesharing and to provide information on GRATA's bus services and convenient park-and-ride lot locations (see Appendix F). The brochure contains a mail back ridesharing application so that individuals may receive a free matchlist of persons who live and work near them. After receiving potential matches from GRATA, it is up to the persons to contact one another to form a carpool.

Periodic surveys of all individuals in the RIDEFINDER database allow GRATA to stay in touch with carpools to provide additional service and to gather participation data. About 20 percent of the surveys are returned and are used by GRATA to update and purge the database as required. A sample survey is provided as Figure 9.

Thirty-six percent of all persons who receive a matchlist actually become involved in carpooling. About 400 new carpools begin carpooling each year. GRATA's typical carpool has an average vehicle occupancy of three persons, travels 93.4 km (58 mi) per day (round trip), and operates 4 days per week. RIDEFINDER works closely with employers to develop and implement ridesharing programs. The employer-oriented programs include distribution of marketing materials, and provision of an information booth and on-site computer ride matching services. When bus service is available to a work site, ongoing distribution of bus schedules and sale of tickets and passes is offered. Metropolitan Hospital, Steelcase, Inc., and several temporary employment agencies are among those that promote GRATA services through RIDEFINDER.

The RIDEFINDER program also provides assistance in vanpool formation. Vanpool efforts are coordinated with the State of Michigan's MichiVan program. MichiVan is a statewide service provided by VPSI, Inc., and sponsored by the Michigan Department of Transportation. MichiVan provides groups of 5 to 15 people with a luxury passenger van, insurance, maintenance, and support services. One member of the



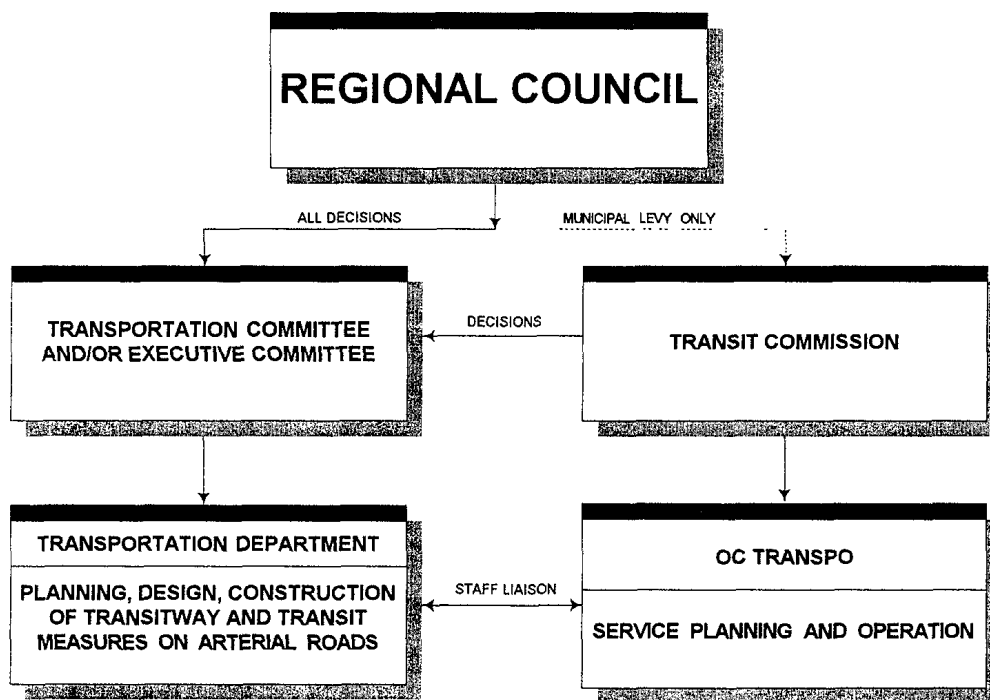


FIGURE 10 Local government organization for public transit. (Source: OC Transpo "Strategic Plan for the 1990s," March 1991)

patrons, particularly in the off-peak direction. This makes it difficult to attract riders in many suburban locations, particularly those who have ample free parking. However, the region has a planning structure in place that focuses development on areas well served by transit. This case study focuses more on how transit planning is done at OC Transpo rather than on particular aspects of the suburb-to-suburb transit service provided. Suburb-to-suburb services at OC Transpo are considered to be an integral part of the region-wide transit service and are not treated differently from any other types of transit service.

To understand the way in which transit planning is carried out and how it influences land-use and development, it is important to understand the political organization structure in Ottawa-Carleton. The region is a two-tier system in which the RMOC (upper tier) is responsible for certain region-wide functions while the lower tier, or area municipalities, perform other functions relating to local concerns.

The formation of the Ottawa-Carleton regional government in 1969 was a direct response to the rapid suburbanization occurring immediately outside the boundaries of the City of Ottawa. During the 1950s and 1960s, significant urban development had begun in the rural townships surrounding Ottawa. The traditional annexation approach failed to control this trend because the flexibility offered by the automobile meant that regulation of new development in one municipality simply shifted the development across the nearest municipal boundary. A comprehensive planning approach for an area large enough to encompass the total commuter area appeared to be the correct solution. Thus, a lower-tier government--the RMOC, with specific jurisdiction in the provision of major services and overall planning--was formed by the Ontario Government.

The RMOC's responsibilities regarding urban transportation include developing and implementing a regional transportation plan covering the arterial road system and, through OC

Transpo, the public transit service. The Regional Council also has some approval powers in the areas of municipal zoning, subdivision plans, and traffic by-laws. Other responsibilities include water and sewer. The relationship between the RMOC and OC Transpo is illustrated in Figure 10.

OC Transpo has sole authority to operate public transit services within the urban transit area. With a fleet of more than 830 buses, OC Transpo carries more than 76 million passengers annually, providing about 50 million km (31 million mi) of service. Transit operations and capital expenditures are subsidized at rates of approximately 17.5 percent and 25 percent, respectively, through a transit levy on local taxpayers. The levy is collected through an equalized assessment of homes within the urban area.

The Province of Ontario also exerts considerable influence over the provision of transit in the region through subsidy payments towards operating and capital costs. For operating costs, the province sets a target revenue to cost ratio based on transit property size and pays one-half of the difference between the revenues and costs. For OC Transpo, the target is 65 percent and the operating subsidy from the province is 17.5 percent. Capital expenditures for buses, garages, and construction costs are subsidized at a rate of 75 percent by the province.

On a macroscopic level, the RMOC has included a number of policies favoring transit in its official plan, such as

- The proportion of all jobs located at Transitway stations will be increased, including the central area. Except for Vanier, all primary employment centers, employing at least 5,000 persons, will be located at existing or future Transitway stations. Smaller secondary employment centers are allowed off the Transitway, but must have access to frequent and efficient all-day transit service. It is intended that 40 percent of all jobs in the region will be located at Transitway stations including downtown. The current figure is about 32 percent.

- Large regional shopping centers with more than 375,000 ft<sup>2</sup> of gross leasable space must be on the Transitway or future extensions thereof, except for Carlingwood, which is exempt for historic and geographic reasons.
- New developments are to be contiguous with existing areas, avoiding pockets of isolated development that are inefficient to serve.
- New developments are to be designed to be transit friendly (see Appendix G, Subdivision Transit Guidelines).
- Policy guideline modal splits (PGMS) have been established for fourteen major screenlines ranging from 20 to 45 percent, with one central area screenline set at 70 percent. The Regional Council must consider the PGMS in setting priorities among road and transit projects in each corridor. Subdivision design, Transitway extensions, and preferential treatment for transit on regional roads are all methods to help achieve the PGMS.

Additional items examined as part of the design of new subdivisions include

- Transportation in general, and transit specifically, is viewed as an essential service along with such things as water, sewer, and other utilities. Issues such as capacity and staging must be addressed for all services.
- Collector roads are designed first to meet transit requirements. Any additional requirements for auto access to a community are added later. Bus-only links may be required in some areas.
- Collector roads must have adequate geometrics (e.g., width, curves) and construction standards (e.g., pavement depth) to accommodate buses. A sidewalk on at least one side of each collector must be designated for transit use.
- Low-density residential subdivisions are typically served by transit on their internal collector roads rather than from the adjacent arterial roads. This is because it can be very difficult for pedestrians to cross busy arterials without the aid of traffic signals, which in turn increases walking distances unless signals are very closely spaced.

- Land use within communities is arranged so that the highest density uses (e.g., senior citizens' residences) are placed closest to transit lines and major roads while the lowest densities (e.g., single family residential, parks) are the farthest.
- Building orientation is important, especially for commercial buildings. Ideally, major buildings (also other structures such as townhouse complexes) should be close to the street with a major entrance close to the bus stop, and with parking at the rear. The RMO is encouraging mixed-use development at secondary employment centers so that office workers do not have to leave the site to go to places such as banks and restaurants.
- Proper staging of new developments is very important. New developments should be contiguous with existing development and should be staged in ways that efficient and effective transit service can be provided at all times. Temporary bus turnarounds or temporary roads for bus use may be required.
- Bus shelters and pads (paved waiting areas at stops) may be required from the developer.
- Based on this strategic direction of the Regional Council, a two-phase approach to meeting future transit needs has been adopted. First, every effort has been made to maximize the efficiency and use of the existing bus-based transit system. Second, an appropriate rapid transit strategy for Ottawa-Carleton's Transitway has been investigated and adopted.

### The Transitway

The Transitway is the region's largest ever transportation project. The Transitway's dedicated system of bus-only roadways provides an exclusive rapid transit link for more than 200,000 passengers daily across much of the region's urban area, and particularly the downtown business and retail core. Operated by OC Transpo, 25 km (15.5 mi) and 18 stations currently provide rapid transit service throughout the region's urban area (see Figure 11).

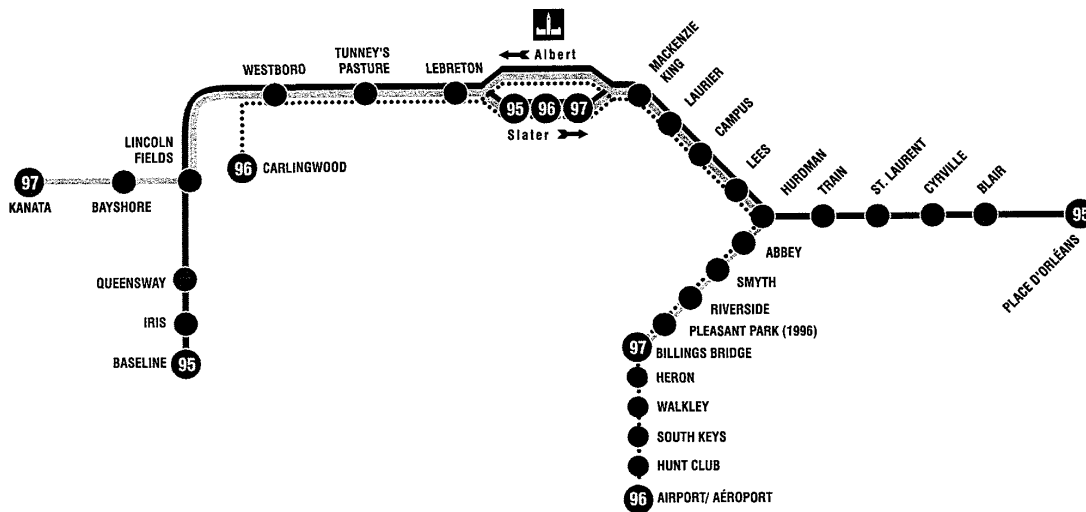


FIGURE 11 OC Transpo Transitway system map.

Weekday passenger volume on the Transitway is about 200,000. Approximately 190 buses operate in the peak hour in each direction. Transitway route 95 stops at all stations in the southwest and east corridors, while routes 96 and 97 serve the west and southeast corridors. Route 95 operates every 3 min during peak hours, every 5 min during the day, and every 10 to 15 min in the evenings. Fifty express routes provide peak period service, to and from the suburbs and downtown, via the Transitway. Forty local routes provide timed transfers at Transitway stations, and 6 other trunk routes also use various parts of the Transitway. Without the Transitway, 145 more buses would be required in OC Transpo's fleet to carry the same number of passengers at a capital cost of \$45 million (CAN), and annual operating costs of \$25 million (CAN). The initial 31 km (19.3 mi) of Transitway approved in 1978 will be completed by the end of 1996 at an estimated cost of \$450 million (CAN).

An examination of available land in the proximity of Transitway stations has shown that by the turn of the century, 40 percent of the region's employment could be within walking distance of the Transitway. For example, a Transitway station serves Tunney's Pasture, a major federal government office complex that houses 9,500 employees (Figure 12). The majority of users walk to the station; however, bus service to and from the station is provided throughout the complex, particularly for staff in buildings that are located farther away.



FIGURE 12 Tunney's Pasture Transitway station with the Tunney's Pasture office complex in the background. (Courtesy of OC Transpo)

Currently, about 34 percent of the region's employment is within walking distance of the Transitway. Approximately 82,300 jobs are located in the CBD of Ottawa amounting to about 21 percent of total regional employment. Another 4 percent, or about 13,600, of the region's jobs are located along the Transitway. The remaining jobs are located in other urban areas (62 percent) or in rural areas of the region (4 percent). It is estimated that close to \$1 billion (CAN) of investment in new development has occurred or is committed close to the Transitway.

A key component of the Regional Council's strategy to promote transit usage is to develop a rapid transit system in the Transitway. In the region's recently updated official plan, conceptual links to three suburban centers--Kanata Town Centre in the west, Orleans in the east, and Barrhaven in the south--have been identified. The clear delineation of the Transitway in the official plan for the next 20 to 30 years enables municipalities to plan to take advantage of it.

A good example of this is Orleans, a community of about 80,000, which straddles two area municipalities in the eastern portion of the region. The Transitway is unlikely to reach Orleans until the end of the century, but development in the community's center has already begun in anticipation of the Transitway. The Regional Council hired a consultant to work with a committee consisting of its own staff, OC Transpo, two municipalities, two major developers, electrical utility companies, and the Ontario freeway and transit agencies to determine the best location for a Transitway station. The process was difficult, because so many interests were represented. The Transitway station in Orleans opened in 1994, well ahead of the extension of the Transitway, ensuring a high profile for transit as the community develops. This process is now being repeated in Kanata Town Centre and Barrhaven.

### Bus Service Description

OC Transpo operates two different types of route networks. Regular, all-day service operates on a feeder-line-haul system similar to the airlines. Local feeder routes serve individual communities, and terminate at major stations where transfers can be made to other feeder routes, mainline routes along higher density major arterials, and Transitway routes that provide frequent cross-regional rapid transit service. Most major stations are Transitway stations. A timed transfer system is operated at several stations. Many regular routes also intersect other regular routes at street corners that are not stations.

In peak periods, a radial system of express routes is superimposed on the all-day network. The express routes pick up within individual communities and operate via the Transitway to downtown in the morning, and then return in the afternoon. Suburb-to-suburb commutes are considered to be an integral component of the entire route network.

### Suburban Employment Centers

Some major suburban employment centers, including Orleans, Kanata, and Barrhaven, are located on or near Transitway stations, where frequent cross-regional rapid transit service is always available. These centers have a high level of accessibility from most parts of the region due to the fast and frequent service provided along the Transitway. For example, the Place d'Orleans Transitway station (see Figure 13) is physically separate from the rest of the Transitway, but enjoys a rapid transit frequency and speed of service due to a shoulder bus lane on the freeway. An overhead walkway connects the Place d'Orleans station with the Place d'Orleans, a major regional suburban shopping center. The walkway also extends across the highway to a park-and-ride lot. Bus service to Orleans is provided as frequently as every 6 min during the peak hour.



FIGURE 13 The Place d'Orleans Transitway station with the Place d'Orleans, a major regional suburban shopping center, in the background. (Courtesy of OC Transpo)

For employment centers located away from the Transitway, it becomes increasingly difficult to achieve the critical mass of riders required to operate a high frequency of service from multiple corridors, and travel time quickly becomes uncompetitive with the private automobile. The availability of extensive free parking at many of these sites, combined with the various income tax regulations on employer-subsidized parking versus employer-subsidized transit passes, means that there is little incentive to use transit.

Suburban employment centers located away from the Transitway are generally served by one or both of the following types of service: all-day service on a regular route (either mainline or local feeder route), or peak-period only on counterpeak direction routes that travel from Transitway stations to the employment center in the morning, and are reversed at night. Some of these routes travel only to the nearest major station while others travel along the Transitway to the edge of downtown Ottawa.

For suburban employment centers, all routes (both regular and counterpeak) serve a dual function of accommodating both reverse and suburb-to-suburb commuters. Any combination of different route types may be used to make a trip depending on the individual origin and destination pairs. Some typical suburb-to-suburb commute trips include using a combination of local feeder routes and/or mainline arterial routes and/or Transitway routes, as required, entirely on the regular (all-day) route network: on the counterpeak routes, using a local or mainline route to a nearby Transitway station, then transferring to the counterpeak route; or using a Transitway route (perhaps after transferring from another local or mainline route) or an express route to a more distant station, where a transfer can be made to a counterpeak route. Some passengers are fortunate enough to have direct service from home to destination without transferring, using any of the different route types. All transfers between routes are free.

The routes serving outlying employment centers form part of the regular route network and serve many other functions as well. Therefore, it is difficult to determine the number of buses or riders using these services specifically for suburb-to-suburb trips. Modal splits for non-CBD employment centers range from up to 40 percent at Transitway stations to between 5 and

10 percent for some outlying areas. A 1986 OC Transpo survey determined mode splits for several locations (Table 6). As shown in the table, the Confederation Heights station had significantly lower modal splits than did Tunney's Pasture station. Confederation Heights is located somewhat farther from downtown than Tunney's Pasture, and road access to Tunney's Pasture is more restricted relative to transit. The fact that Confederation Heights is not served directly by a Transitway station plays a role in the lower modal split due to the extra inconvenience associated with travel to this station. Algonquin College station, located in the west end beside Baseline Station, had higher modal splits than Carleton University, which is more centrally located but is farther from the Transitway. The University of Ottawa modal splits are similar to other downtown locations.

TABLE 6  
OC TRANSPO: TRANSIT MODAL SPLITS FOR SELECTED LOCATIONS

	Destination		Origin	
	<u>6:00 to 9:00</u>		<u>5:00 to 8:00</u>	
	All	UTA	All	UTA
Tunney's Pasture	41	47	43	49
Confederation Heights	25	29	27	31
University of Ottawa	53	68	45	50
Carleton University	31	38	35	40
Algonquin (Woodroffe)	45	51	35	44

Modal split = transit users/car + transit users.

All trips = all trips within the survey area (urban and rural parts of the RMOC in Ontario and the Communauté Régionale de l'Outaouais in Quebec)

UTA trips = trips with the urban transit area (UTA) of RMOC and the central part of Hull, where a trip by OC Transpo is a reasonable alternative

Despite the region's best efforts, the number of jobs located at outlying locations is continuing to increase. The nature of the interline scheduling used on the express bus network makes it relatively inexpensive to implement new counterpeak routes from Transitway stations to outlying employment centers. Much of the revenue time for the counterpeak routes

would have been deadhead (non-revenue) time between express trips, so the marginal cost to implement new counterpeak routes is often much lower than for other types of routes. Generally, OC Transpo tends to use average seated loads during the peak hour rather than marginal costs to conduct route evaluations.



## CHAPTER FOUR

### ELEMENTS OF SUCCESS

An examination of the survey responses in Chapter 2 and a more in-depth look at the case studies in Chapter 3 indicate that transit agencies providing suburb-to-suburb services have some common elements that work to make their suburb-to-suburb transit more successful. These elements include the following: targeted marketing to the business community, partnerships with the private sector, involvement in site design/land use issues, and transit's role in mobility management.

The elements of success are briefly outlined next and specific examples from individual transit agencies are provided. Success was defined by the agencies involved in suburb-to-suburb transit. Agencies selected were enthusiastic about their approaches to meeting suburb-to-suburb travel.

Perhaps the overriding key to success among all transit agencies was a willingness to aggressively pursue this new and expanding market and to try new and different methods of marketing services to employers and employees.

#### TARGETED MARKETING TO THE BUSINESS COMMUNITY

Two-thirds of survey respondents indicated that they conduct specific outreach to the business community, such as sending direct mail to employers and employees. In addition, PACE and Seattle Metro have designated staff to market transit services in specific geographic areas. On an annual basis, PACE deals with approximately 2,200 employers. PACE's marketing development staff acts as a sales force with employers and municipalities because they feel that direct marketing through personal contact with employers is essential to the success of suburb-to-suburb services.

Seattle Metro provides schedule and route information targeted to specific employment sites such as the Bus to Boeing service. The agency's route and schedule brochure includes information targeted directly to Boeing employees, including information on Boeing's \$15/month transportation subsidy for employees. Seattle Metro also provides limited overtime service for Boeing employees who are required to work late.

#### PARTNERSHIPS WITH THE PRIVATE SECTOR

More than one-half of the agencies surveyed have transportation management associations/transportation management organizations (TMAs/TMOs) in their suburban service areas; comments regarding the usefulness of these agencies in regards to promotion of transit service were mixed. However, a large number of comments were positive and where the relationships between an agency and TMA/TMO were strong, for example in Seattle and New Jersey, these partnerships were deemed to be quite beneficial.

Seattle Metro has had particular success in financing and producing marketing information. The Overlake TMA produces a guide in cooperation with Seattle Metro to riding the bus for commuters in Redmond, Washington, a suburb of Seattle. This guide (see Appendix F) provides information on 18 transit routes that serve Overlake area commuters as well as information on how to purchase transit passes; the guide also lists phone numbers of all transit operators in the area including Seattle Metro, Community Transit, and Pierce Transit.

Seattle Metro also provides a service for employers known as Riderlink, which is accessible through employee transportation coordinators and at touch-screen kiosks at selected employer sites. Riderlink provides ridesharing and transit information that includes how to form a carpool or vanpool; road condition updates; and bus and ferry schedules, routes, and fares.

At NJ Transit, a staff member sits on the Board of Directors of the state's seven TMAs. NJ Transit staff regularly communicate with all of the TMAs that assist in marketing NJ Transit routes in their respective service areas. NJ Transit sends weekly ridership reports on the services operating in the TMA regions to inform the TMAs of how the routes are doing.

#### INVOLVEMENT IN SITE DESIGN AND LAND USE ISSUES

Fourteen out of 23 agencies responded that they are routinely involved in site design and land use issues. As illustrated by the case study in Chapter 3, OC Transpo is clearly the most involved of the survey respondents due to the regional policies in place that treat transit on an equal basis with all other utilities prior to subdivision approval. Another Canadian agency, BC Transit in Vancouver, British Columbia, has a regional growth management strategy in place designed to develop six regional town centers with sufficient mass to support high-quality transit services. Similar to OC Transpo, BC Transit is pursuing a rapid bus strategy to shape future urban development by replicating the attributes of rapid rail transit using low cost, successful bus technology.

In addition, many agencies, including OC Transpo, PACE, NJ Transit, Mass Transit Administration of Maryland (MTA) in Baltimore, and Clark County Public Transportation Benefit Area Authority (C-TRAN) in Vancouver, Washington, have developed guidelines for transit friendly development, which are shared with the development community and local officials. MTA initiated its Access by Design program in 1988 to explain the significant benefits of transit accessibility to the development community and to provide operational and design standards for specific transit facilities. The *Access by Design* report presents threshold criteria for new services, vehicle specifications, operational standards, passenger amenities, and geometric design standards. Included is a "transit

accessibility checklist" to help developers determine whether projects meet transit accessibility standards.

In December 1989, PACE published a manual, *PACE Development Guidelines*, to encourage development designs that incorporate public transportation considerations and the use of demand management techniques for controlling traffic congestion, improving job accessibility, and conserving public and private resources. PACE offers complimentary in-house development plan reviews through its market development program. The agency's staff work to identify ways in which transportation considerations can be incorporated into individual development plans and suggest design options to make those developments more transit serviceable. In addition to distributing more than 2,000 copies of its development guidelines, PACE has held workshops for developers, engineers, and community planners.

In June 1994, NJ Transit published *Planning for Transit Friendly Land Use--A Handbook for New Jersey Communities*. This handbook was prepared as a guide to New Jersey communities that wish to consider the implementation of transit friendly land use plans around their transit stations, along their major transit corridors, and for proposed new areas of development.

The NJ Transit handbook also contains a transit friendly checklist (Appendix E) to assist municipal representatives in deciding how transit friendly their current land use ordinances and master plans are. The document also provides model zoning, site plan, and redevelopment zoning ordinance language.

## TRANSIT'S ROLE IN MOBILITY MANAGEMENT

In follow-up conversations, a number of survey respondents indicated an interest in operating multiple services to provide customers with a variety of mobility options including vanpooling, carpooling, demand response, flexible routes, and other nontraditional services. One factor of success noted in the PACE case study (Chapter 3) was "having more than one service option to offer to meet as many trip needs as possible in order to maximize transit share."

In its Transit 2000 effort, the American Public Transit Association (APTA) noted that "The direct operation of public transportation services represents only one response to providing greater mobility and pursuing broader community and national goals." APTA encouraged the transit industry to take on a broadened role in the overall "management of mobility" (6). Many of the transit agencies surveyed have done just that.

For example, the Corridor Transportation Corporation (CTC) in Laurel, Maryland (between Baltimore and Washington, D.C.) incorporates the following language in its corporate mission: "to create programs which will help mitigate vehicle trips, facilitate traffic circulation, reduce parking requirements, improve environmental conditions, and lower the cost of transportation services to the public in the mid Corridor." This mission goes far beyond just the operation of traditional fixed route transit service. Ridership on the CTC has increased an

average of 20 percent each year since the service was initiated in 1990.

The Westchester County Department of Transportation (WCDOT) noted its ongoing marketing campaign to highlight its family of services concept. The agency actively promotes carpooling in the county in cooperation with Metropool, Inc. It also provides a guaranteed ride home service and is currently developing a preferential parking program for carpoolers and vanpoolers.

Similar to many other U.S. transit agencies, Seattle Metro has fully embraced carpooling and vanpooling as integral to operation of the transit system. In Seattle, commuters need only call Seattle Metro's free regional ridematch system to be put in touch with other commuters who want to share a ride. Commuters receive a list of names and phone numbers of possible car and vanpool partners, plus tips on how to start a successful ridesharing arrangement. The agency provides its own vans for vanpoolers and markets its service as "Go First Class."

## PROGRAMS DEVELOPED TO MEET THE CLEAN AIR ACT AMENDMENTS OF 1990

The case studies for NJ Transit and GRATA (Chapter 3) are examples of how agencies used federal transportation funds (for highways and transit) to assist in the start-up of new suburb-to-suburb services for the purpose of meeting Clean Air Act requirements. Federal and state funds are available to agencies to support the development, implementation, and operation of public transit projects and transportation management activities, such as employer-based trip reduction programs, ridesharing activities, and other demand management actions.

In the counties of San Mateo and Santa Clara, California, employers can receive public subsidies of up to 75 percent of the estimated annual operating costs for shuttle services from San Francisco-Bay Area Rapid Transit District (BART) and CALTRAIN rail stations. The program is limited to work trips from regional rail facilities to places of employment, and no fares will be collected on the shuttles as employer subsidies of 25 percent will replace the fares. Employers are encouraged to work together to develop routing proposals that serve multiple employers. This program, which is being offered to assist employers in meeting their trip reduction requirements under the 1990 CAAA, is funded by the Air District through the Peninsula Corridor Joint Powers Board (JPB). The JPB is a joint power agency that operates CALTRAIN services and is composed of San Mateo County Transit District, and the counties of San Francisco and Santa Clara. The JPB initiated rail shuttle services in 1989 and currently operates 27 shuttle buses to and from office and industrial parks.

Although clean air requirements are currently being challenged at both the state and federal levels, it is clear that in the United States, these requirements have served as the impetus for many new transit services. Should these requirements be overturned, the willingness of the private sector to help fund operation of these services may be diminished.

## CHAPTER FIVE

## CONCLUSIONS

Suburb-to-suburb travel is becoming the dominant commuting pattern today because of shifts in regional population and employment. This commuting pattern change from traditional transit. CBD-focused travel, continues to challenge transit agencies as they strive to creatively design services for the new suburban markets.

Despite innovative service provisions, there appears to be relatively constant performance in this market area where regional population growth is indicated. As reported from survey results, there also appears to be a knowledge gap here. It follows that sufficient performance monitoring data about suburban consumer behavior might help transit agencies to better respond to commuters' needs and to improve the present state of the practice.

The expanding suburb-to-suburb travel market offers transit agencies a unique opportunity to tailor their services to meet the needs of the market. The majority of survey respondents (87 percent) indicated that their suburb-to-suburb services were implemented due to increases in suburban travel. PACE in suburban Chicago, an agency specifically designated to serve the suburbs and suburb-to-suburb travel, currently has only a 2 percent market share. Clearly, considerable opportunities still exist for transit in this area. The majority of agencies responding (74 percent), however, reported that suburb-to-suburb ridership trends are "up" and only two agencies (9 percent) reported ridership on suburb-to-suburb services to be "down."

Suburban transit services need to be much more highly tailored to the customer than regular fixed route services. Transit agencies must be innovative to capture a significant share of this market, which is largely more affluent and less transit dependent than customers of more traditional transit services. The use of smaller vehicles, demand-response type service, flexible routing, and special promotions with the business community are just some of the ways transit is beginning to capture this emerging market.

If suburb-to-suburb service is to grow, transit agencies need to provide more incentives to customers--the automobile is strong competition in the suburbs. Simply putting service out on the street is not enough. Incentives such as guaranteed ride home programs, transit pass programs, merchandise discounts, and special outreach to the business community are important elements that should not be overlooked when marketing transit service in suburban areas. Currently, the majority of agencies responding (83 percent) use transit pass programs and nearly two-thirds conduct special outreach to the business community. Many transit agencies are finding that the use of multiple incentives supplemented by marketing on a route, corridor, and employer-by-employer basis are crucial to the success of these services.

Since suburban transit is at a competitive disadvantage with the automobile, transit agencies need to be viewed as players and partners in land use decisions. The abundance of free parking, sprawling office parks, poor building siting, and single-use development are just some of the factors that make serving the suburbs difficult. Many transit agencies have developed transit friendly guides for developers and community planners. Early involvement by transit agencies in local land use issues and the development process is necessary to assure that transit is able to serve new suburban developments

Transit agency staff, board members, and local transit decision makers need to be aware of the different marketing and cost requirements of suburb-to-suburb transit services. Fiftyseven percent (57%) of the agencies surveyed did not use different criteria to evaluate suburb-to-suburb services. Because marketing techniques are often different for these types of trips and because the costs of operating these services can be significantly higher than those of more traditional transit services, transit agencies need to be aware of the different requirements Direct marketing to employers, as done by PACE and Seattle Metro, is costly but critical to the success of these services Also, transit operating costs are often higher due to lower densities and longer trip lengths. If transit board members and decision makers are made aware of these requirements, they can encourage the use of different evaluation criteria for these services.

As transit agencies are being challenged to address nontraditional markets, it is useful to evaluate the status of transit agency market planning efforts. Traditional transit marketing plans consist largely of communications and promotional plans with little attention focused on the market segmentation, targeting, and positioning of the value offered to the customer. The private sector has long abandoned the concept of "one size fits all," and has strived to market unique products and services to increasingly well-defined market niches. Transit has had limited success in this area and perhaps could benefit from the application of private sector marketing practices.

There is a need to examine how advanced public transit systems (APTS) and various traffic operations techniques, such as signal preemption, can be used to enhance suburban transit operations. Only one out of 23 survey respondents indicated the use of APTS technology. OC Transpo (Toronto, Canada) noted its ability to determine the time of the next bus via an automated telephone system, and schedule display monitors located at major Transitway stations.

Many newer suburban services funded with federal or state start-up funding may only be available for a limited period of time. Will these services be continued in the future and who will pay for their operation? The success of these services may hinge on transit's ability to obtain funding from the private sector and/or local communities for their continued operation.

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**LIST OF ACRONYMS**

ADA	Americans With Disabilities Act	Metropolitan Council	Metropolitan Council Transit Operations
APO	Average Passenger Occupancy	MTA LI BUS	Metropolitan Transit Authority Long Island Bus
APTA	American Public Transit Association		
APTS	Advanced Public Transit Systems		
AVO	Average Vehicle Occupancy		
		OC Transpo	Ottawa-Carleton Regional Transit Commission
CAAA	Clean Air Act Amendments of 1990		
CBD	Central Business District		
COP	Comprehensive Operating Plan	PGMS	Policy Guideline Modal Splits
CTA	Chicago Transit Authority		
CTC	Corridor Transportation Corporation	RMOC	Regional Municipality of Ottawa-Carleton
C-TRAN	Clark County Public Transportation Benefit Area Authority	RTA	Regional Transportation Authority
ECO	Employee Commute Options	SAC	Suburban Activity Center
ETR	Employer Trip Reduction	SMART	Suburban Mobility Authority for Regional Transportation
GRATA	Grand Rapids Area Transit Authority		
GRH	Guaranteed Ride Home	TMA	Transportation Management Association
		TMD	Transportation Management District
HOV	High-Occupancy Vehicle	TMO	Transportation Management Organization
IDOT	Illinois Department of Transportation	TRB	Transportation Research Board
JPB	Joint Powers Board	TRIS	Transportation Research Information System
LIRR	Long Island Railroad		
		VIP	Vanpool Incentive Program

# APPENDIX A

## Questionnaire

QUESTIONNAIRE  TRANSIT COOPERATIVE RESEARCH PROGRAM SYNTHESIS TOPIC SB-02
--

**TRANSIT INVOLVEMENT IN SUBURB-TO-SUBURB COMMUTING**  
 This survey is being undertaken as part of a Transit Cooperative Research Program (TCRP) Synthesis on Transit Involvement in Suburb-to-Suburb Commuting. The purpose of the survey is to gather information on the nature of transit services and programs being provided to accommodate increasing suburb-to-suburb travel demand. Services from center city to suburb reverse commute services are not included in this study.

If your agency does not directly provide suburb-to-suburb service, please do not fill out the questionnaire. If your agency provides suburb-to-suburb service using more than one mode of transportation, please answer the questions below as they relate to the specific modes.

Your responses are essential to the success of this report.

Name \_\_\_\_\_

Title \_\_\_\_\_

Organization \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Telephone \_\_\_\_\_

Fax \_\_\_\_\_

1. **WAS YOUR SUBURB-TO-SUBURB TRANSPORTATION SERVICE/PROGRAM DESIGNED**  
 (check all that apply)
- in response to increased suburban travel needs
  - in response to employer/business/Chamber of Commerce requests
  - in response to clean air compliance/trip reduction mandates or to local trip reduction ordinance
  - other (please indicate)
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

2. **TARGET RIDERSHIP:**  
 (check all that apply)
- commuters
  - shoppers
  - students
  - senior citizens
  - transportation disadvantaged
  - other (please indicate)
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

3. **MODE USED TO PROVIDE SUBURB-TO-SUBURB SERVICE:**  
 (check all that apply)
- fixed route bus (please indicate size of vehicle used) 40 ft. coach \_\_\_\_\_ smaller buses \_\_\_\_\_
  - demand response bus/van (circle vehicle used)
  - rail
  - shuttle from rail (bus/van)
  - vanpools\*
  - carpools\*
  - other (please specify)

\*Note: in order to check carpools and vanpools they must either be operated or financed directly by your agency

4. **NUMBER OF VEHICLES USED IN SUBURB-TO-SUBURB SERVICE:**

	Number of Vehicles	Year initiated services
fixed route buses	_____	_____
demand response buses/vans	_____	_____
rail cars	_____	_____
shuttle from rail	_____	_____
vans	_____	_____
cars	_____	_____
other (specify)	_____	_____

\_\_\_\_\_

\_\_\_\_\_

5. **NUMBER OF RIDERS SERVED**  
 Note: please provide ridership data by mode, if available.
- Average Weekday
- fixed route bus (please indicate size of vehicle used) 40 ft. coach \_\_\_\_\_ smaller buses \_\_\_\_\_
  - demand response bus/van (circle vehicle used) \_\_\_ / \_\_\_\_\_
  - rail \_\_\_\_\_
  - shuttle from rail (bus/van) \_\_\_\_\_ / \_\_\_\_\_
  - vanpools \_\_\_\_\_

**APPENDIX A (Continued)**

- carpools \_\_\_\_\_
- other (please specify) \_\_\_\_\_

(We recognize that most agencies do not track the number of carpool or vanpool participants and that the "average weekday" number of riders served may not reflect the total number of persons ridesharing. You may attach more detailed information regarding carpool or vanpool ridership information if available.

**6. RIDERSHIP TRENDS**

Note: please provide by mode, if available.

- up \_\_\_\_\_
- down \_\_\_\_\_
- steady \_\_\_\_\_

**7. DOES YOUR AGENCY KEEP SEPARATE COST DATA ON SUBURB-TO-SUBURB SERVICES?**

- yes
- no

If yes, please provide a copy of the data with this survey.

**8. ARE THE CRITERIA USED TO EVALUATE YOUR AGENCY'S SUBURB-TO-SUBURB SERVICES DIFFERENT FROM THOSE USED TO EVALUATE REGULAR SERVICES?**

- yes
- no

If yes, what criteria are used? And how are they used? please explain:

Performance \_\_\_\_\_  
 Financial \_\_\_\_\_  
 Ridership \_\_\_\_\_  
 Other \_\_\_\_\_

**9. HOURS OF OPERATION**

(check all that apply)

Note: please provide by mode if hours differ by mode.

- same as other service \_\_\_\_\_
  - peak hours only \_\_\_\_\_
  - weekday service only \_\_\_\_\_
  - daily service \_\_\_\_\_
  - set by program participants \_\_\_\_\_
  - other (please specify) \_\_\_\_\_
- \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**10. DESTINATIONS SERVED**

(check principal destinations only and indicate by mode)

- shopping centers/malls \_\_\_\_\_
  - schools/training centers \_\_\_\_\_
  - office parks \_\_\_\_\_
  - industrial parks \_\_\_\_\_
  - medical facilities \_\_\_\_\_
  - recreation centers/parks \_\_\_\_\_
  - residential developments \_\_\_\_\_
  - other (specify) \_\_\_\_\_
- \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**11. FARE STRUCTURE**

Note: please provide by mode if fare structures differ by mode.

- distance-based \_\_\_\_\_
  - flat fare \_\_\_\_\_
  - coordinated/integrated fares with other services \_\_\_\_\_
  - other (specify) \_\_\_\_\_
- \_\_\_\_\_  
 \_\_\_\_\_

**12. FARE RANGE (\$ \_\_\_\_\_ to \$ \_\_\_\_\_)**

Note: please provide by mode if ranges differ by mode.

- fixed route bus (please indicate size of vehicle used) 40 ft. coach \_\_\_\_\_ smaller buses \_\_\_\_\_
- demand response bus/van (circle vehicle used) \_\_\_ / \_\_\_\_\_
- rail \_\_\_\_\_
- shuttle from rail (bus/van) \_\_\_\_\_ / \_\_\_\_\_
- vanpools \_\_\_\_\_
- carpools \_\_\_\_\_
- other (please specify) \_\_\_\_\_

**13. INCENTIVES PROVIDED**

- transit pass program
  - outreach to business community
  - guaranteed ride home
  - preferential parking
  - commuter club membership
  - other (specify) \_\_\_\_\_
- \_\_\_\_\_  
 \_\_\_\_\_



**APPENDIX A (Continued)**

14. DOES YOUR AGENCY BECOME INVOLVED IN SITE DESIGN/LAND USE ISSUES ON A ROUTINE BASIS?

- yes
- no

If yes, does your agency have formal review authority of developer plans? Does your agency have standard site design/access criteria which it distributes to the development community? Please elaborate:

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15. DOES YOUR AGENCY USE ANY OF THE FOLLOWING TECHNIQUES TO PROVIDE OR ENHANCE THE PROVISION OF SUBURB-TO-SUBURB SERVICE? (check all that apply)

- timed transfers
- priority treatments
- Advanced Public Transportation Services (APTS)
- route deviation
- other (please specify)

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16a. Are different marketing techniques used from those of your regular service? Yes \_\_\_\_ No \_\_\_\_

16b. If yes, what are they and how are they different? How is your suburb-to-suburb service promoted/marketed?

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17a. Is there a transportation management association/organization (TMA/TMO) in your suburban service area?

yes \_\_\_\_ no \_\_\_\_

17b. If yes, is the TMA/TMO an important element in the success of your agency's suburban service? Does your agency have a formal relationship with the TMA/TMO? Does the TMA/TMO actively market and promote your suburb-to-suburb services? Please elaborate:

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**ADDITIONAL INFORMATION**

In order to select case studies for the TCRP Synthesis report, additional information is needed which cannot be readily obtained through a mail-back survey. Please attach the following types of information which directly relate to the provision of suburb-to-suburb service: marketing materials, service description, newspaper articles, photographs, customer-oriented information and any other information which you think would enhance the synthesis.

Also, if your agency is involved in other programs which help meet suburb-to-suburb commute needs, please attach relevant information. Examples of such programs could include: bicycle/pedestrian programs, alternative work hour programs, the establishment of telecommuting centers, employer transportation planning services, etc.

We are particularly interested in innovative or nontraditional practices which make your suburb-to-suburb service a success and which could be replicated by other transit agencies.

PLEASE RETURN THE COMPLETED QUESTIONNAIRE BY SEPTEMBER 26, 1994 TO:

Katherine S. Hooper & Associates  
One Hunter's Way  
Falmouth, Maine 04105.

THANK YOU VERY MUCH FOR YOUR PARTICIPATION.

## APPENDIX B

### SURVEY RESPONDENTS THAT PROVIDE SUBURB-TO-SUBURB SERVICES

**San Francisco-Bay Area Rapid Transit District (BART)**  
800 Madison Street  
P.O. Box 12688  
Oakland, California 94607

**San Mateo County Transit District (SamTrans) Peninsula Corridor Joint Powers Board**  
1250 San Carlos Avenue 2nd floor  
P.O. Box 3006  
San Carlos, California 94070

**Space Coast Area Transit**  
401 South Varr Avenue  
Cocoa, Florida 32922

**Cobb Community Transit**  
10 East Park Square  
Marietta, Georgia 30090-9612

**PACE Suburban Bus Division of the RTA\***  
550 West Alogonquin Road  
Arlington Heights, Illinois 60005

**Mass Transit Administration of Maryland (MTA)**  
300 West Lexington Street  
Baltimore, Maryland 21201

**Montgomery County Transit Services**  
110 North Washington Street  
Rockville, Maryland 20855

**Prince George's County Department of Public Works and Transportation**  
9400 Peppercorn Place Suite 320  
Landover, Maryland 20785

**Corridor Transportation Corporation (CTC)**  
7901 Sandy Spring Road Suite 501  
Laurel, Maryland 20707

**Suburban Mobility Authority for Regional Transportation (SMART)**  
660 Woodward Avenue, Suite 950  
Detroit, Michigan 48226

**Grand Rapids Area Transit Authority (GRATA)\***  
333 Wealthy Street S.W.  
Grand Rapids, Michigan 49503

**Metropolitan Council Transit Operations (Metropolitan Council)**  
560 6th Avenue North  
Minneapolis, Minnesota 55411

**New Jersey Transit Corporation (NJ Transit)\***  
4th Floor  
One Penn Plaza East  
Newark, New Jersey 07105

**MTA Long Island Bus (LI Bus)**  
700 Commercial Avenue  
Garden City, New York 11530

**MTA Long Island Rail Road (LIRR) Company**  
Jamaica Station  
Mail Code 0535  
Jamaica, New York 11435

**Westchester County Department of Transportation (WCDOT)**  
121 East Post Road  
White Plains, New York 10601

**Southeastern Pennsylvania Transportation Authority (SEPTA)**  
841 Chestnut Street, 11th Floor  
Philadelphia, Pennsylvania 19107

**Dallas Area Rapid Transit (DART)**  
1401 Pacific Avenue  
P.O. Box 660163  
Dallas, Texas 75266

**University of Tennessee Transportation Center**  
348 South Stadium Hall  
Knoxville, Tennessee 37996

**King County Department of Metropolitan Services (Seattle Metro)**  
821 Second Avenue, Mail Stop 64  
Seattle, Washington 98104

**Clark County Public Transportation Benefit Area Authority (C-TRAN)**  
P.O. Box 2529  
Vancouver, Washington 98668

**BC Transit**  
13401-108 Ave.  
Surrey, British Columbia  
Canada V3T 5T4

**Ottawa-Carleton Regional Transit Commission (OC Transpo)\***  
1500 St. Laurent Boulevard  
Ottawa, Ontario  
Canada K1G 0Z8

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\*Selected for more in-depth case study (four agencies).

## APPENDIX C

### SURVEY RESPONSES

The number of responses does, in many cases, not equal the total number of respondents because most questions had the possibility of multiple answers (i.e., "check all that apply"). The number of responses to each question is listed first, followed by the percentage of total responses (example: 20 responses/(80 percent of total responses)).

#### Question 1. Was Your Suburb-to-Suburb Service/Program Designed:

*In response to increased suburban travel needs: 20/(87%)*

*In response to employer/business requests/Chamber requests: 13/(6%)*

*In response to clean air compliance/trip reduction mandates or local trip reduction ordinance: 7/(3%)*

*Other responses:*

- "It (suburb-to-suburb service) is an incidental by-product of offering regular peak commute services from the suburbs to the city. In the process, we do make possible some suburb-to-suburb trips as well." (BART, Oakland, CA)
- "Improve mobility of transportation disadvantaged." (SPACE Coast Area Transit, Cocoa, FL)
- "Initiated at the same time transit service started in the County--part of overall transit program." (Cobb County Transit, GA)
- "We have three bus routes that are suburb-to-suburb. Only one was specifically designed as a suburban commuter express service. The other two routes are local cross-town services." (MTA, Baltimore, MD)
- "Customer/residents' requests." (Metropolitan Council Transit Operations, Minneapolis, MN)
- "Increase ridership in this market segment." (MTA Long Island Rail Road, NY)
- "Coordination with railroad service development." (Westchester County DOT, NY)
- "Political equity." (King County Department of Metropolitan Services, Seattle, WA)
- "Regional growth management strategy designed to develop regional town centers with sufficient mass to support high quality transit services." (BC Transit, Surrey, BC)
- "To test innovative methods of service delivery." (New Jersey Transit, Newark, NJ)
- "Integral component of the route network." (OC Transpo, Ottawa, Ontario)

Note: Three of the "other" responses indicate that suburb-to-suburb services are not new and have been an integral part of the agencies' services for some time.

#### Question 2. Target Ridership:

Commuters:	20/(87%)
Shoppers:	14/(61%)
Students:	13/(57%)
Senior Citizens:	14/(61%)
Transportation Disadvantaged:	13/(57%)
Other:	2/(9%)

#### Question 3. Mode Used to Provide Suburb-to-Suburb Service:

Fixed route bus:	20/(87%)
40-ft coach:	15/(65%)
Smaller buses:	13/(57%)
Demand response:	6/(26%)
Buses:	4/(17%)
Vans:	3/(13%)
Rail:	5/(22%)
Shuttle from rail:	9/(39%)
Vanpools:	7/(30%)
Carpools:	5/(22%)
Other:	3/(13%)

#### Question 4. Number and Age of Vehicles Used in Suburb-to-Suburb Service

The total number of vehicles and the age of the vehicles used in suburb-to-suburb service is provided in Appendix D. For systems using fixed route buses, system size varied from 4 buses at C-TRAN in Vancouver, Washington to 330 buses at MTA Long Island Bus in New York. The range of demand-response vehicles (buses and vans) providing suburb-to-suburb service ranged from 14 at Space Coast Area Transit in Cocoa, Florida to 316 at PACE in Arlington Heights, Illinois.

#### Question 5. Number of Riders Served

The number of riders served by suburb-to-suburb services is reported in Appendix D. Ridership varied greatly due to the variation in size of systems responding. For example, the service with 4 vehicles (C-TRAN) reported that 600 passengers were carried on an average weekday. MTA Long Island Bus reported that its fixed route service with 300 vehicles carried approximately 82,000 passengers on an average weekday.

#### Question 6. Ridership Trends:

Up: 17/(74%)  
Down: 2/(9%)  
Steady: 7/(30%)

#### Question 7. Does Your Agency Keep Separate Cost Data on Suburb-to-Suburb Services?

Yes: 3/(13%)  
No: 19/(83%)

#### Question 8.a. Are the Criteria Used to Evaluate Your Agency's Suburb-to-Suburb Services Different from Those Used to Evaluate Regular Services?

Yes: 9/(39%)  
No: 13/(57%)

#### Question 8.b. All agencies responding "yes" were asked to explain which criteria were used. The following responses were received:

- The Grand Rapids Area Transit Authority (GRATA) in Michigan uses 12 passengers/hour as its criterion for its suburban circulator versus passengers/mile criterion for its regular fixed routes.
- New Jersey Transit expects 15 percent farebox recovery at the end of the first year. Other criteria used by New Jersey Transit includes whether the service is assisting employers in meeting their CAAA obligation.
- At BC Transit in Surrey, British Columbia, services are considered to reinforce regional policy therefore lower levels of performance are acceptable.
- Metropolitan Council in Minneapolis, Minnesota uses a \$4.00 subsidy/passenger as its criterion for suburb-to-suburb service. For local radial, all day express and peak express services, a range of \$3.25-\$3.85 is considered acceptable.
- Seattle Metro uses riders/trip, and riders/platform hour to evaluate suburb-to-suburb services. The service is placed in a separate class from other services. Individual routes are compared to others within the suburb-to-suburb class. The bottom 10 percent are evaluated for possible termination annually.
- DART (Dallas Area Rapid Transit) in Texas uses the same criteria for all types of service, however the various types are compared among similar route types.
- PACE, the suburban bus operator for the Regional Transportation Authority in Chicago, has geographically based service evaluation criteria. These are discussed more fully in the Chapter 3 Case Studies.
- The MTA Long Island Rail Road (LIRR) responded "no" to this question. However, MTA LIRR is currently developing a rail/bus service policy which will set the guidelines for evaluating the three demonstration rail shuttles currently operating.

#### Question 9. Hours of Service

Same as other service: 16/(70%)  
Peak hours only: 11/(49%)

Weekday service only:	10/(43%)
Daily service:	9/(39%)
Set by program participants:	2/(9%)
Other:	5/(22%)

There are many more responses to this question than survey respondents because agencies either operate more than one type of service or because hours of service vary even among the same service type. It should be noted that the response "set by program participants" refers to carpools and vanpools. Respondents who checked "other" had the following responses:

- Weekday and Saturday service
- Fixed-route service varies--generally six days per week
- Two shuttle services provide mid-day service for lunch, banking and shopping
- Service hours are tailored to particular sites if appropriate, especially at colleges and universities. Most peak services operate during normal commuter peak hours.

### Question 10. Destinations Served

Shopping centers/malls:	20/(87%)
Schools/training centers:	16/(70%)
Office parks:	20/(87%)
Industrial parks:	17/(74%)
Medical facilities:	15/(65%)
Recreational centers/parks:	11/(48%)
Residential developments:	16/(70%)
Other:	6/(26%)

### Question 11. Fare Structure

Distance based:	10/(44%)
Flat fare:	13/(57%)
Coordinated/integrated fares:	6/(26%)
Other:	6/(26%)

"Other" responses included the following:

- MTA Long Island Bus and MTA Long Island Rail Road have special Uniticket promotional fares for their new circulator services which reduces the shuttle cost from \$1.50 to \$.75 per trip.
- At PACE, subscription fares are tied to the cost of service to generate a 60 percent recovery ratio.
- The Suburban Mobility Authority for Regional Transportation (SMART) in Detroit, MI has a paratransit zone base of approximately 6 miles with a fare is \$2.00 (\$1 for seniors and disabled persons). SMART's regular fixed-route fare is \$1.50.
- San Mateo County Transit District/ Peninsula Corridor Joint Powers Board provides free shuttles to and from CALTRAIN rail stations. Employer subsidies of at least 25 percent replace fares for these services. The remaining costs are funded through the regional Air District (air quality compliance).

Note: A complete listing of fares by transit agency and mode is provided in Appendix D.

### Question 12. Fare Range

Note: A complete listing of fares by transit agency and mode is provided in Appendix D.

### Question 13. Incentives Provided

Transit pass program:	19/(83%)
Outreach to business community:	15/(65%)
Guaranteed ride home:	8/(35%)
Preferential parking:	2/(9%)
Commuter club membership:	6/(26%)
Other:	3/(13%)

"Other" responses included the following:

- PACE uses the RTA (Chicago) transit check program and direct passenger billing for vans and subscription buses.
- MTA Long Island Rail Road uses TransitChek, a program to encourage the use of public transit where companies are given a tax break by purchasing (up to 60 a month) in transit checks for employees to use.
- Metropolitan Council in Minneapolis provides carpool fuel in one corridor, Precision Tune discounts, and sponsors commuter fairs where free pens and information are distributed.
- SMART's "get a job/get a ride" program provides 1st month free bus service for new employees and an unconditional money back guarantee on all services.
- BART noted its cheaper fare of \$.80 for shorter suburb-to-suburb trips.

**Question 14.a. Does Your Agency Become Involved In Site Design/Land Use Issues on a Routine Basis?**

Yes: 14/(61%)  
No: 9/(39%)

**Question 14.b. If yes, does your agency have formal review authority of developer plans? Does your agency have standard site design/access criteria which it distributes to the development community? Please elaborate:**

- BART works with developers and communities on joint development.
- The MTA in Baltimore has its "Access by Design" Program.
- C-TRAN in Vancouver, WA produced a development handbook for transit friendly design.
- PACE has widely distributed criteria document and reviews over 100 improvement plans each year.
- Metropolitan Council in Minneapolis has design guidelines for bus operations, facility design and bus stop locations. This information is shared with public and private developers upon request.
- New Jersey Transit recently produced a handbook to promote transit-friendly development, however NJT does not routinely become involved in site design and land use issues.

**Question 15. Does Your Agency Utilize Any of the Following Technologies to Provide or Enhance the Provision of Suburb-to-Suburb Service?**

Timed transfers:	17/(74%)
Priority treatment:	6/(26%)
APTS:	1/(4%)
Route deviation:	4/(17%)
Other:	6/(26%)

"Other" responses included the following:

- GRATA in Grand Rapids cited its free transfers and/smaller more comfortable buses.
- At MTA Long Island Bus system a new transit hub/center was constructed. At MTA Long Island Railroad the buses wait for the train.
- New Jersey Transit cited its "flex" routes, preferential access to rail stations, and new services including fixed route, route deviation and demand-responsive services.
- Westchester County DOT cited its guaranteed ride home and interstate fare structures.
- OC Transpo in Canada cited its ability to determine the time of the next bus via automated telephone system, schedule display monitors at major stations, printed timetables at many bus stops, marketing targeted specifically at employers in these areas, and seamless integration of services with the rest of the regular route network.

**Question 16.a. Are Different Marketing Techniques Used From Those of Your Regular Service?**

Yes: 16/(70%)  
No: 8/(35%)

Note: SMART in Detroit reported that it uses different techniques to promote its paratransit service but not its fixed-route service.

**Question 16.b. If Yes, What Are They and How Are They Different? How is Your Suburb-to-Suburb Service Promoted/Marketed?**

- GRATA reported that many marketing techniques are the same, however there is much more marketing to businesses for the circulator routes.

- New Jersey Transit reported working through TMAs and also the use of direct mail to employers/employees.
- The San Mateo County Transit District reported that marketing plans are submitted by employers with various marketing techniques for its regional rail shuttle bus program.
- Westchester County DOT reported greater employer-based efforts and campaigns to highlight its "family of services" concept.
- PACE reported that its ads are geared toward suburban commuting and that it has an outreach program for employers.
- MTA Long Island Rail Road reported the receipt of federal grants to promote several of the services. Promotion has included: print media, posters, flyers, and private sector outreach. Marketing for shuttle services has been done by corridor, route and business.
- OC Transpo in Canada reported promotional material specifically oriented to a particular employer or employment center as well as site visits and open houses.

**Question 17.a. Is There a Transportation Management Association/Organization (TMA/TMO) in Your Suburban Service Area?**

Yes: 12/(52%)  
No: 8/(35%)

**Question 17.b. If Yes, is the TMA/TMO an Important Element in the Success of Your Agency's Suburban Service? Does Your Agency Have a Formal Relationship With the TMA? Does the TMA/TMO Actively Market and Promote Your Suburb-to-Suburb Services? Please Elaborate:**

Positive comments:

- "Yes, yes, yes." (New Jersey Transit)
- "The LIRR provides technical assistance to the TMAs on Long Island. On several, we serve as Board Members. The TMAs have promoted the services. There are a total of 7 TMAs on Long Island." (MTA Long Island Rail Road)
- "The Joint Powers Organization is a new organization, Once fully operational the answer to all above questions should be yes." (Metropolitan Council Transit Operations, Minneapolis)
- "TMA input is taken into consideration." (San Mateo County Transit District)
- "This agency operates a Transportation Management District in one business district. The TMD actively markets and promotes service to the area." (Montgomery County Division of Transit Services, Maryland)
- "TMA is helpful in service issues. Two TMAs are proactive in promoting and advertising transit service to employees. Metro has had successful cooperation in financing and production of marketing information." (Seattle Metro)
- "The TMO is a very important element in terms of marketing and service development. There is a formal relationship between the County and the TMO." (Westchester County DOT)
- "The TMA works to promote vanpool service. Fleet management is performed by our agency." (University of Tennessee Transportation Center)

Negative comments (not attributed):

- "We have had mixed results with TMAs. They are not an important element in marketing and have not generated any significant ridership for us. We do maintain formal membership with them. We have concerns over TMA marketing practices and have not encouraged them to market our services."
- "No." (2 agencies)
- "No, Yes, No." (relates to the three questions in 17.b.)
- "TMAs are new to the local scene where our services have been around for a long time. Due to fiscal constraints, we are not able to respond to most service requests."

**Additional Information**

At the end of the survey, additional information was requested that could not be readily obtained through the survey. The following types of material that directly relate to suburb-to-suburb services were requested: marketing materials, service descriptions, newspaper articles, photographs, customer-oriented information, etc. Information on innovative practices was also requested.

Many systems responded to the request for additional information. This information was used to help select the case studies described in Chapter 3 and to discuss elements of success in Chapter 4.

## APPENDIX D

### STATISTICAL INFORMATION OF SURVEYED AGENCIES

#### U.S. TRANSIT AGENCIES

##### Bay Area Rapid Transit District (BART) Oakland, California

Vehicles: not provided  
 Service Initiated: not provided  
 Avg. Wkdy. Riders: not provided  
 Fares: \$.80 to \$3.00; cheaper fares (\$.80) for short suburb-to-suburb trips

##### San Mateo County Transit District (SamTrans) Peninsula Corridor Joint Powers Board San Carlos, California

Vehicles: 27 buses  
 Service Initiated: 1989  
 Avg. Wkdy. Riders: 800  
 Fares: employer subsidies replace fares

##### Space Coast Area Transit Cocoa, Florida

Vehicles: 28 fixed route buses: 14 demand response buses/vans; 87 vans used for vanpooling  
 Service Initiated: not provided  
 Avg. Wkdy. Riders: 485 f-r; 1315 d-r; 1150 vanpool  
 Fares: \$.50 (e&d) to \$1.00 (reg) on f-r; \$1.00 (e&d & youth)/\$2.00 (adults) on d-r

##### Cobb Community Transit Marietta, Georgia

Vehicles: 10 fixed route buses; paratransit-not Provided  
 Service Initiated: 1989  
 Avg. Wkdy. Riders: 4,300  
 Fares: \$1.00 adult; \$.50 e&d; \$.65 youth  
 ADA paratransit adult fare \$2.00

##### PACE Suburban Bus Division of RTA\* Arlington Heights, Illinois

Vehicles: 558 fixed route buses (48% of ridership on f-r is suburb to-suburb; 316 demand response buses and vans; 5 shuttles from rail; 143 vans (90% suburb-to-suburb); 127 contractor-owned vehicles used for f-r service

Service Initiated: not provided  
 Avg. Wkdy. Riders: 127,248 f-r; 5,867 d-r; 1,906 vanpool  
 Fares: \$1.00 to \$1.60 without transfers; \$1.00 local; \$1.15 inner suburban; \$1.35/1.60 express; \$88.00/month subscription bus; \$1.30 dial-a-ride; Passes \$78.00 adult, \$35.00 (e&d)

##### Mass Transit Administration of Maryland (MTA) Baltimore, Maryland

Vehicles: 7 fixed route buses on 3 routes; 5 d-r vans; 1 rail car  
 Service Initiated: rail-1987, other not provided  
 Avg. Wkdy. Riders: 3,708 f-r  
 Fares: \$1.25-\$2.15

##### Montgomery County Transit Services Rockville, Maryland

Vehicles: 208 f-r buses  
 Service Initiated: not provided  
 Avg. Wkdy. Riders: 61,000-system ridership (about 2/3 is suburb-to-suburb)  
 Fares: \$1.00

##### Prince George's County Department of Public Works and Transportation Landover, Maryland

Vehicles: 22 f-r buses; 9 d-r buses  
 Service Initiated: 1987 f-r; 1991 d-r  
 Avg. Wkdy. Riders: 2,144 f-r; 69 d-r  
 Fares: \$.75 f-r; \$.50 d-r

##### Corridor Transportation Corporation (CTC) Laurel, Maryland

Vehicles: 10 f-r buses  
 Service Initiated: 1989  
 Avg. Wkdy. Riders: 1,100  
 Fares: \$.90 reg; \$.45 e&d; \$1.25 express

##### Suburban Mobility Authority for Regional Transportation (SMART) Detroit, Michigan

Vehicles: f-r not available; 100 d-r buses  
 Service Initiated: f-r and d-r 1970s  
 Avg. Wkdy. Riders: 5,234 f-r buses; 2,000 d-r  
 Fares: f-r \$1.50; d-r \$2.00 (reg)/\$1.00 (e&d)



**Grand Rapids Area Transit Authority (GRATA)\*  
Grand Rapids, Michigan**

Vehicles: total fleet: 82 buses; 4 suburban circulator minibuses; 60 vans for vanpools  
Service Initiated: 4 minibuses suburban circulator (2 routes) 1995; vanpool 1990;  
Avg. Wkdy. Riders: suburban circulator; vanpools 60  
Fares: \$1.25 f-r or 10 tickets for \$7.00, \$2.50 d-r; \$59/month for vanpools

**Metropolitan Council Transit Operations (Metropolitan Council) Minneapolis, Minnesota**

Vehicles: 15 f-r buses; smaller buses used in f-r are subcontracted--number not provided  
Service Initiated: 1979 through 1993  
Avg. Wkday. Riders: 1,800 f-r; 50 subcontracted service; 170 vanpools; 2,600 carpools  
Fares: \$.25 to \$1.25

**New Jersey Transit Corporation (NJ Transit)\*  
Newark, New Jersey**

Vehicles: varies--many of NJ Transit's services offer suburb-to-suburb travel options; WHEELS services are subcontracted--no. of vehicles not available  
Service Initiated: 1993-1994 (WHEELS)  
Avg. Wkdy. Riders: 742.2 (WHEELS)  
Fares: range: \$.50 to \$2.90 (WHEELS)

**MTA Long Island Bus (LI Bus)  
Garden City, New York**

Vehicles: 330 f-r buses (5 are small buses)  
Service Initiated: 1973  
Avg. Wkdy. Riders: 82,225  
Fares: range \$1.50-\$2.00; \$1.50 for suburb-to-suburb trips; special promotional fares for new circulator services

**MTA Long Island Rail Road (LIRR) Company  
Jamaica, New York**

Vehicles: 1,134 rail cars; 6 buses used as rail shuttles; rail shuttles provide suburb-to-suburb service  
Service Initiated: 1834 rail; 1991-1994 rail shuttle (LIRR provides 3 demonstration shuttle services)  
Avg. Wkdy. Riders: 6,000 rail; 200 rail shuttle  
Fares: rail \$46.00 to \$161.00 for monthly ticket; rail shuttle \$.25 to \$1.50; 2 of the 3 shuttle services have promotional fares. Uniticket bus/rail fares reduces shuttle cost from \$1.50 to \$.75/trip.

**Westchester County Department of Transportation (WCDOT)  
White Plains, New York**

Vehicles: 13 f-r buses; 8 vans as shuttle from rail; vans for vanpools-number varies  
Service Initiated: f-r early 1980s; rail shuttle 1983  
Avg. Wkdy. Riders: 1,200 f-r; 300 rail; 400 rail shuttle; 1,540 vanpools; 19,368 carpools—numbers are calculated by Metropool, Inc. reflects only number of matches made not actual amount of carpooling which is taking place.  
Fares: range: \$1.00-\$1.50; f-r \$1.15; rail is zone based structure; rail shuttle \$1.15

**Southeastern Pennsylvania Transportation Authority (SEPTA)  
Philadelphia, Pennsylvania**

Vehicles: 54 f-r buses  
Service Initiated: all prior to 1983  
Avg. Wkdy. Riders: 13,625  
Fares: range: \$1.50-\$2.70 cash; \$1.05-\$2.25 discounted tokens and cash; \$69.00 monthly suburban transit pass (\$1.73 cost per trip)

**Dallas Area Rapid Transit (DART)  
Dallas, Texas**

Vehicles: 34 f-r buses  
Service Initiated: 1986  
Avg. Wkdy. Riders: 10,100  
Fares: not provided

**University of Tennessee Transportation Center  
Knoxville, Tennessee**

Vehicles: 10 vans-vanpools; carpools  
Service Initiated: 1992  
Ridership: 70 vanpools; carpools unknown  
Fares: \$50-\$75 per month/per rider (distance based) vanpools

**King County Department of Metropolitan Services  
(Seattle Metro) Seattle, Washington**

Vehicles: 46 f-r buses; 17 vans-vanpools  
Service Initiated: 1979-current  
Avg. Wkdy. Riders: 7,100 f-r; vanpool not provided  
Fares: range \$1.10-\$1.60

**Clark County Public Transportation Benefit Area  
Authority (C-TRAN)  
Vancouver, Washington**

Vehicles: 4 f-r 30 ft. buses  
Service Initiated: 1989 Ridership: 600  
Fares: \$.60-\$1.10 (distance-based zone system)

**CANADIAN TRANSIT AGENCIES:****BC Transit  
Surrey, British Columbia**

Vehicles: 75 f-r buses; rail (service connects three suburban town centres with downtown. Many customers use rail for suburb-to-suburb service. Also operates urban ferry service.

Service Initiated: 1975

Ridership: 35,000 f-r buses; 30,000 rail

Fares: range: \$1.50-\$3.00 (three zones; all fares integrated regardless of mode

Service Initiated: 1983

Avg. Wkdy. Riders: Suburb-to-suburb ridership is not broken out because these trips are considered to be an integral part of the regional Transitway system. System-wide ridership on the Transitway is: 200,000

Fares: \$1.60 off peak, \$2.10 peak; Ticket equivalent fare \$1.30/\$1.95; monthly passes \$54.00 adult, \$44.50 student

**Ottawa-Carleton Regional Transit Commission  
(OC Transpo)\* Ottawa-Carleton, Ontario**

Vehicles: 190 f-r buses (40 and 60 ft.) operating on Transitway and shuttle buses from Transitway

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Note: This information was provided by the survey respondents. Except for the case study systems (noted by \*), followup was not done to ensure the accuracy of the data reported.

f-r = fixed-route  
d-r = demand response  
e&d = elderly and disabled

## APPENDIX E

### Transit Friendly Checklist, NJ Transit

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#### "Transit Friendly" Checklist

The following checklist is provided to assist municipal representatives in deciding how transit-friendly their current Zoning Ordinance, Site Plan Ordinance, Redevelopment Ordinance, and Master Plan are. The completed checklist can be used as a guide when a community is undertaking revisions to these ordinances, or is reviewing a major new development project.

The checklist can help to determine if these implementation mechanisms encourage physical conditions that are compatible with transit use. The checklist is not intended to be scientific, but rather aims to provide a sense of a community's commitment to transit. Rather than offering a passing or failing grade, the checklist helps to identify community elements in need of attention if a community wishes to become more transit-friendly.

Questions answered with a "no" indicate that the documents being reviewed may be deficient in these specific areas, and thought should be given to incorporating a coordinated system of "transit-friendly" regulations. Questions answered with a "yes" indicate

that your community has begun to incorporate "transit-friendly" considerations in planning for the municipality.

Questions answered with a "partly" response indicate areas in your current regulations that may be in need of further attention and improvement. For an example of a transit-friendly Zoning Ordinance, see Appendix "A".

#### Existing Institutional Mechanisms

1. Are goals and policy statements that encourage transit use or transit-compatible development incorporated in your community's Master Plan or Zoning Ordinance?  
 YES    PARTLY    NO
2. Are incentive mechanisms (i.e. bonuses, parking reduction, etc.) offered to encourage transit-compatible development?  
 YES    PARTLY    NO
3. Are any of the following mechanisms that might encourage transit-compatible development or redevelopment included in your municipal land use or zoning ordinance?
  - Special Districts
  - Overlay Zones
  - Planned Unit Developments YES    PARTLY    NO

#### Land Use

4. Are active pedestrian generating land uses encouraged to concentrate in activity centers or within walking distance of transit facilities?  
 YES    PARTLY    NO
5. Are a mix of land uses, especially residential, commercial, and retail, encouraged within walking distance of activity centers or transit facilities?  
 YES    PARTLY    NO
6. Are large areas of single use zones discouraged?  
 YES    PARTLY    NO
7. Are multiple compatible land uses permitted within buildings near transit operations?  
 YES    PARTLY    NO
8. Are convenience retail and service uses encouraged on the lower levels of buildings in activity centers or adjacent to transit facilities?  
 YES    PARTLY    NO

#### Density

9. Are relatively higher densities encouraged in activity centers or near transit facilities, with a gradual decrease in density away from these centers?  
 YES    PARTLY    NO

**APPENDIX E (Continued)**

**Integration of Land Use and Transportation**

Residential Use	Commercial Use	Transportation	Compatibility
15 to 24+ Units/Acre	150+ Employees/Acre	Supports rail or capacity service.	other high
7+ Units/Acre	40+ Employees/Acre	Supports local bus	service.
1-6 Units/Acre	2+ Employees/Acre	Supports cars, car	pools and vanpools.

10. Do the densities mandated near transit facilities, by the various municipal ordinances, support transit use? (use the above chart as a guide)  
 YES  PARTLY  NO

**Site Planning/Design**

11. Are continuous sidewalks that radiate from your community's center to outlying districts encouraged?  
 YES  PARTLY  NO
12. Are site designs that encourage buildings to cluster near transit facilities encouraged?  
 YES  PARTLY  NO
13. In non-centers, are site designs that encourage buildings to cluster in centralized groupings encouraged?  
 YES  PARTLY  NO

14. In centers, are buildings encouraged to locate at the street line, thus defining and enclosing the primary pedestrian paths?  
 YES  PARTLY  NO

15. Are larger developments or redevelopments encouraged to conform to existing block patterns and provide multiple access points for pedestrians?  
 YES  PARTLY  NO

16. Are subdivisions encouraged to conform to grid or modified grid patterns without cul-de-sacs or dead ends?  
 YES  PARTLY  NO

**Parking**

17. Are parking requirements reduced or shared parking provided for uses in close proximity to transit?  
 YES  PARTLY  NO

18. Is structured parking encouraged over surface lots in higher  
 YES  PARTLY  NO

19. Are surface parking lots encouraged to be located off of main streets and away from front lot lines?  
 YES  PARTLY  NO

20. If high capacity transit systems exist, are large commercial uses encouraged to provide shuttle service when located beyond walking distance from the facility?  
 YES  PARTLY  NO

**Joint Development**

21. Are key development sites adjacent to a planned or existing transit facility designated for transit compatible uses, densities and designs?  
 YES  PARTLY  NO

APPENDIX F

Sample Transit System Brochures and Schedules



**Scheduled Service**

Buses operate 6am-6pm Monday-Friday 9:30am-9:30pm Saturdays. Buses do not run on Sundays or the following holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas. If these holidays fall on a Sunday, no service will be operated on the following Monday. Times shown are scheduled but may vary due to traffic conditions, weather, or unforeseen events.



**GRATA Safety Guidelines**

- ▷ No smoking, eating, drinking, using audio devices without earphones, or other disruptive behavior is allowed on GRATA buses.
- ▷ No animals (except seeing eye dogs and registered service animals) are allowed on GRATA buses.
- ▷ Speak to the driver only if you have a question about GRATA or its services.
- ▷ Do not change seats while the bus is moving.
- ▷ Please remain seated until the bus comes to a complete stop.
- ▷ Several seats in the front of the bus are marked as priority for Senior Citizens and persons with disabilities.
- ▷ No shirt, no shoes, no service on all GRATA buses.
- ▷ Please do not litter on the bus.
- ▷ Please use rear door when deboarding.
- ▷ One child free if height of child is under 42" and accompanied by a paying adult.



**Comments and Suggestions**

We invite inquiries for schedules and information, as well as suggestions, complaints, and commendations.

**Please write:**

Operations Manager  
**GRATA**  
 333 Wealthy SW  
 Grand Rapids, MI 49503



**Bus Information**

Call GRATA's Information Center:  
**776-1100 TDD 774-1186**

Monday-Friday 8:00am-5:00pm

**Lost & Found 456-7514**

Monday-Friday 8:00am-4:30pm

**Cash Fare \$1.25**

**Seniors & Handicappers 60¢**  
 (Between 9am-3pm Mon.-Fri. and all day Sat.)

**Please Have Exact Fare**

Drivers do not have change

**New Transfer Policy**

- Transfers are free; passenger should request a transfer upon boarding
- Transfers are valid for up to one hour
- Transfers are good on any route
- Transfers can not be issued to someone already using a transfer

**Tickets sold in strips of 10**

Only 60¢ or 70¢ per trip  
 \$7/strip Adults  
 \$6/strip Students (K-12), Senior Citizens & Handicappers

**GRATA Ticket Outlets**

- Participating Sy's Food Markets
- Fulton Heights Foods
- All D & W Food Centers
- GRATA Bus Drivers
- GRATA Office, Located at 333 Wealthy SW
- Grand Rapids City Hall (Cashier's Office)

**Passes**

\$27/month -  
 Unlimited trips during calendar month

**GRATA Monthly Pass Outlets**

- Participating Sy's Food Markets
- Fulton Heights Foods
- All D & W Food Centers
- GRATA Office, Located at 333 Wealthy SW
- Grand Rapids City Hall (cashier's office)
- Steketee's - Downtown (customer service)
- Grand Rapids Community College (student activity center)
- Davenport College (bookstore)
- St. Mary's Hospital



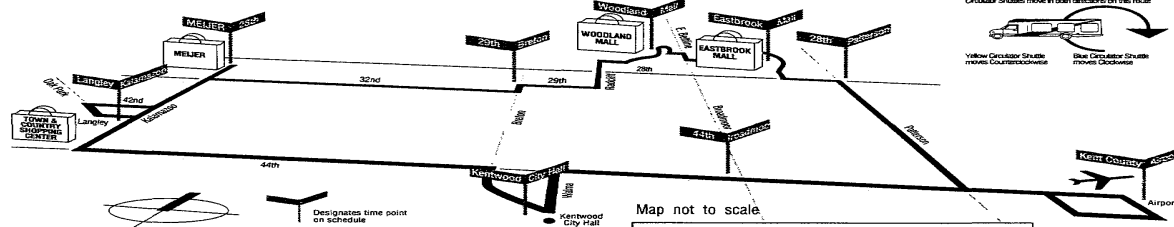
**15 Yellow Circulator Counter Clockwise Direction**

**Weekdays 5 am to 7 pm**

Langley / Kalamazoo	5:50	6:50	7:50	8:50	9:55	10:50	11:50	12:50	1:50	2:50	3:50	4:50	5:50	6:46
Kentwood City Hall	5:56	6:56	7:56	8:56	10:00	10:56	11:56	12:56	1:56	2:56	3:56	4:56	5:56	
44th / Breton	6:01	7:01	8:01	9:01	10:04	11:01	12:01	1:01	2:01	3:01	4:01	5:01	6:01	
Kent County Airport	6:07	7:07	8:07	9:07	10:09	11:07	12:07	1:07	2:07	3:07	4:07	5:07	6:07	
28th / Patterson	6:13	7:13	8:13	9:13	10:14	11:13	12:13	1:13	2:13	3:13	4:13	5:13	6:13	
Eastbrook Mall	6:20	7:20	8:20	9:20	10:20	11:20	12:20	1:20	2:20	3:20	4:20	5:20	6:20	
Woodland Mall	6:25	7:25	8:25	9:25	10:25	11:25	12:25	1:25	2:25	3:25	4:25	5:25	6:25	
Breton / 29th	6:32	7:32	8:32	9:32	10:32	11:32	12:32	1:32	2:32	3:32	4:32	5:32	6:32	
Meijer / 28th	5:44	6:39	7:39	8:39	9:39	10:39	11:39	12:39	1:39	2:39	3:39	4:39	5:39	6:39
Langley / Kalamazoo	5:49	6:45	7:45	8:45	9:45	10:45	11:45	12:45	1:45	2:45	3:45	4:45	5:45	6:45

**Saturday 9 am to 10 pm**

Langley / Kalamazoo	9:10	10:10	11:10	12:15	1:10	2:10	3:10	4:10	5:10	6:10	7:10	8:10	9:10	10:06
Kentwood City Hall	9:16	10:16	11:16	12:20	1:16	2:16	3:16	4:16	5:16	6:16	7:16	8:16	9:16	
44th / Breton	9:21	10:21	11:21	12:24	1:21	2:21	3:21	4:21	5:21	6:21	7:21	8:21	9:21	
Kent County Airport	9:27	10:27	11:27	12:29	1:27	2:27	3:27	4:27	5:27	6:27	7:27	8:27	9:27	
28th / Patterson	9:33	10:33	11:33	12:34	1:33	2:33	3:33	4:33	5:33	6:33	7:33	8:33	9:33	
Eastbrook Mall	9:40	10:40	11:40	12:40	1:40	2:40	3:40	4:40	5:40	6:40	7:40	8:40	9:40	
Woodland Mall	9:45	10:45	11:45	12:45	1:45	2:45	3:45	4:45	5:45	6:45	7:45	8:45	9:45	
Breton / 29th	9:52	10:52	11:52	12:52	1:52	2:52	3:52	4:52	5:52	6:52	7:52	8:52	9:52	
Meijer / 28th	9:04	9:59	10:59	11:59	12:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59
Langley / Kalamazoo	9:09	10:05	11:05	12:05	1:05	2:05	3:05	4:05	5:05	6:05	7:05	8:05	9:05	10:05



Crossbar Shuttles move in both directions on the route.  
 Yellow Circulator Shuttle moves Counterclockwise.  
 Blue Circulator Shuttle moves Clockwise.

**All buses are wheelchair accessible**

**Weekdays 5 am to 7 pm**

Langley / Kalamazoo	6:03	7:03	8:03	9:03	10:03	11:03	12:03	1:03	2:03	3:03	4:03	5:03	6:03	6:59
Meijer / 28th	6:09	7:09	8:09	9:09	10:09	11:09	12:09	1:09	2:09	3:09	4:09	5:09	6:09	7:04
Breton / 29th	6:16	7:16	8:16	9:16	10:16	11:16	12:16	1:16	2:16	3:16	4:16	5:16	6:16	
Woodland Mall	6:23	7:23	8:23	9:23	10:23	11:23	12:23	1:23	2:23	3:23	4:23	5:23	6:23	
Eastbrook Mall	6:28	7:28	8:28	9:28	10:28	11:28	12:28	1:28	2:28	3:28	4:28	5:28	6:28	
28th / Patterson	6:35	7:35	8:35	9:34	10:35	11:35	12:35	1:35	2:35	3:35	4:35	5:35	6:35	
Kent County Airport	6:41	7:41	8:41	9:39	10:41	11:41	12:41	1:41	2:41	3:41	4:41	5:41	6:41	
44th / Breton	6:47	7:47	8:47	9:44	10:47	11:47	12:47	1:47	2:47	3:47	4:47	5:47	6:47	
Kentwood City Hall	6:52	7:52	8:52	9:48	10:52	11:52	12:52	1:52	2:52	3:52	4:52	5:52	6:52	
Langley / Kalamazoo	6:02	6:58	7:58	8:58	9:53	10:58	11:58	12:58	1:58	2:58	3:58	4:58	5:58	6:58

**Saturday 9 am to 10 pm**

Langley / Kalamazoo	8:58	9:58	10:58	11:58	12:58	1:58	2:58	3:58	4:58	5:58	6:58	7:58	8:58	9:54
Meijer / 28th	9:04	10:04	11:04	12:04	1:04	2:04	3:04	4:04	5:04	6:04	7:04	8:04	9:04	9:59
Breton / 29th	9:11	10:11	11:11	12:11	1:11	2:11	3:11	4:11	5:11	6:11	7:11	8:11	9:11	
Woodland Mall	9:18	10:18	11:18	12:18	1:18	2:18	3:18	4:18	5:18	6:18	7:18	8:18	9:18	
Eastbrook Mall	9:23	10:23	11:23	12:23	1:23	2:23	3:23	4:23	5:23	6:23	7:23	8:23	9:23	
28th / Patterson	9:30	10:30	11:30	12:29	1:30	2:30	3:30	4:30	5:30	6:30	7:30	8:30	9:30	
Kent County Airport	9:36	10:36	11:36	12:34	1:36	2:36	3:36	4:36	5:36	6:36	7:36	8:36	9:36	
44th / Breton	9:42	10:42	11:42	12:39	1:42	2:42	3:42	4:42	5:42	6:42	7:42	8:42	9:42	
Kentwood City Hall	9:47	10:47	11:47	12:43	1:47	2:47	3:47	4:47	5:47	6:47	7:47	8:47	9:47	
Langley / Kalamazoo	8:57	9:53	10:53	11:53	12:48	1:53	2:53	3:53	4:53	5:53	6:53	7:53	8:53	9:53

**15 Blue Circulator Clockwise Direction**

APPENDIX F (Continued)

APPENDIX F (Continued)



*RIDEFINDER offers free assistance to persons and organizations in developing community ride share arrangements.*

**Ride Matching**

**Carpool-** *RIDEFINDER* will provide you with a free match list of people who live and work near you, and have similar work hours. You simply contact these people and form a carpool.

**Vanpool-** *RIDEFINDER* can assist you in forming your own vanpool or find an existing vanpool for you to join.

**Vanpool Service**

*RIDEFINDER* coordinates its vanpooling efforts with the State of Michigan's MichiVan program. MichiVan provides groups of 7-15 people with a luxury passenger van, insurance, maintenance and support services. One member of the vanpool volunteers to drive, and receives a free ride. Passengers pay low monthly fares to cover the cost of the vanpool.

**Public Transit**

GRATA'S bus routes offer reliable, convenient and low cost transportation in and around the Grand Rapids area. *RIDEFINDER* provides free information on bus routes and schedules which may best serve your needs.

**Park and Ride Lots**

Park and Ride lots are located conveniently for you to park your car and share a ride into work. Information which shows lots near your home can be provided to you on request.

**Employer Assistance**

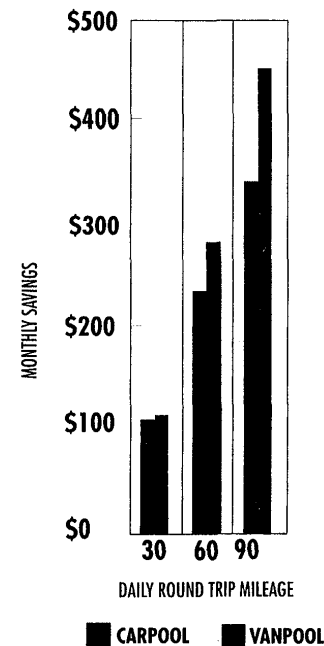
*RIDEFINDER* develops and implements ridesharing programs for employers. Rideshare programs consist of distribution of professional marketing materials supplied by *RIDEFINDER*, an on-site information booth, and computer ride matching services

**General Information**

To take advantage of *RIDEFINDER*'s free ride matching service, simply fill out and mail the attached Ride Sharing Application today. On the application you may indicate your interest in receiving information on other *RIDEFINDER* services, or, call *RIDEFINDER* at 458-7283. The *RIDEFINDER* office is open Monday through Friday, between 8:00a.m. and 4:30p.m..

**Monthly Savings**

*As rideshare participants, commuters can save hundreds of dollars every month. Below is a chart that illustrates monthly savings when carpooling and vanpooling. You can save between \$100 and \$450 per month depending on the distance you travel*



**APPENDIX F (Continued)**

<b>METRO Transit Route</b>	<b>Service From</b>
242	Northgate Transit Center Greenlake P&R <i>NEW ROUTE STARTS FEBRUARY 1994</i>
221	Redmond; Overlake; Bellevue Community College; Eastgate; Factoria.
231,232, 233	(Includes partial service on Route 253) Kingsgate P&R, Kirkland; Bellevue; Cross roads; Overlake; Evergreen Highlands, Redmond; English Hills.
251,254	Woodinville; Avondale Road, Redmond; Redmond P&R; Bear Creek P&R; Rose Hill Houghton P&R; Kirkland; Montlake Station; Downtown Seattle.
253,266	Bear Creek P&R, Redmond; Overlake; Crossroads; Bellevue Transit Center; Montlake; Downtown Seattle.
263	Microsoft Place; Overlake P&R; Montlake Station; Lk. Wash. Tech. College; Downtown Seattle.
267,268	Education Hill; Bear Creek P&R, Redmond; Sammamish Viewpoint; Overlake; Overlake P&R; Montlake Station; Downtown Seattle.
269	Issaquah; Pine Lake; Sahalee. Provides service to Bear Creek & Redmond for transfer to Overlake Routes
276	Bear Creek P&R, Redmond; Houghton P&R; Montlake; University District.
927	Dial-A-Ride Service.
922,929	North Bend; Snoqualmie; Fall City Carnation; Redmond; Stillwater; Duvall.
<b>COMMUNITY TRANSIT</b>	
441	Edmonds; Lynnwood; Overlake (SAFECO, & Nintendo).
442	Mill Creek; SilverLake; Overlake (SAFECO, & Nintendo).

*Time Schedules are available through Metro, Community Transit, the Overlake TMA 556-2416 and your ETC. For more information on trip planning call Metro's 24 Hour Rider Information Center at 553-3000, Community Transit at 1-800-562-1375. For information on routes for that serve south King and Pierce County call Pierce Transit at 1(800) 562-8109*



**A Guide to  
Riding The Bus for  
the Overlake Commuter**

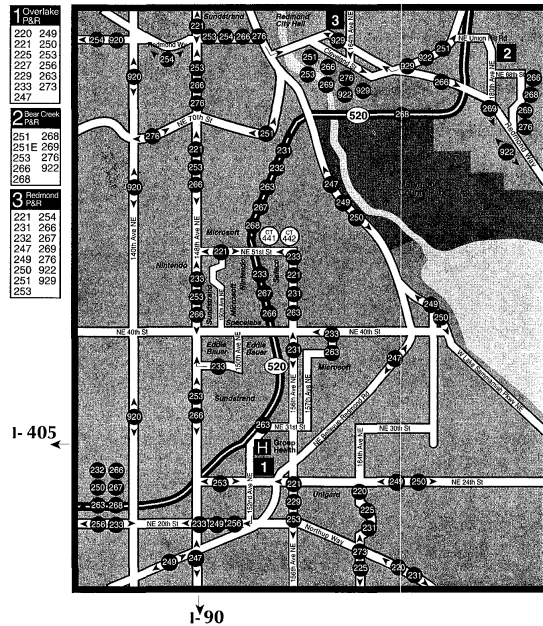
The Overlake  

**TRANSPORTATION  
MANAGEMENT  
ASSOCIATION**



## APPENDIX F (Continued)

There are over 18 Transit Routes that serve **Overlake area** commuters. This is a low-cost, flexible and convenient option that may work for you.



- Estimate based on mid sized car commuting 21 days per month. Mileage calculated at \$0.39 per mile for a 25 mile roundtrip commute. This includes depreciation, gas, maintenance and insurance costs. (Source AAA)

THANK YOU to Metro for printing this brochure

### Riding the bus is economical.

- A Metro monthly one-zone peak bus pass is **\$39.50**.
- A Metro monthly two-zone peak pass is **\$57.50**
- Monthly Community Transit passes are **\$56.50**.

Compared with a monthly cost of \$205 for an average 25 mile roundtrip drive alone commute to Overlake, *savings are obvious*.

*Metro and CT Passes can be purchased by phone, mail or in person.*

For information on how to obtain a transit pass, contact your **ETC** or the Overlake **TMA at 556-2416**. You can also contact the transit agencies directly.

- **Metro: 624-PASS**
- **Community Transit: 778-2185**
- **Pierce Transit: 593-4520**
- **For automated schedule information at Metro call: BUS -TIME**

**APPENDIX G****SUBDIVISION TRANSIT GUIDELINES IN THE REGIONAL MUNICIPALITY OF OTTAWA-CARLETON****Principles**

- a) Minimize overall walking distances by:
  - 1) appropriate location of the collector roadway system to be used by transit;
  - 2) provision of paved walkways;
  - 3) placing all medium density developments on streets carrying transit, or in closer proximity to such streets than low-density development, and
  - 4) placing all medium-density developments on streets carrying transit, or in closer proximity to such streets than low-density development
- b) Minimize the number of streets in which transit service is provided.
- c) Concentrate as many transit routes on the same street, to provide the highest possible level of service in terms of headway to all users.
- d) Minimize transit route lengths through the development by providing a collector road system that permits as direct as possible routing in the orientation of heaviest demands.
- e) Link sufficient neighborhoods by one service to ensure that attractive headways can be efficiently provided during both the peak and off-peak periods.
- f) Develop a transit route structure that lends itself to the minimum number of routing changes through the development stages.

**Conditions**

- a) The requirement for adequate construction depth, roadway geometrics, paved passenger standing areas and a minimum of a sidewalk on at least one side of the street on all streets carrying transit.
- b) Orientation of buildings and private accesses adjacent to the stops.
- c) The provision of paved all-season walkways through open areas and between streets to minimize walking distances.
- d) The provision of transit-only roadways, temporary or permanent, including temporary turnarounds during construction staging.
- e) The distribution of land uses.
- f) The developer must enter into an agreement with the municipality regarding the staging of development. These agreements, which also take into account automobile needs, may include a required sequence of construction, temporary roadways for transit access and the completion of essential roadway links prior to habitation of particular phases, plus any other measures that may be appropriate.

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*\*Source: Regional Municipality of Ottawa Carleton, Transit Servicing of New Areas-Guidelines for Development (Ottawa: RMOC-Transportation Planning Division, December 1981).*

**THE TRANSPORTATION RESEARCH BOARD** is a unit of the National Research Council, which serves the National Academy of Sciences and the National Academy of Engineering. It evolved in 1974 from the Highway Research Board, which was established in 1920. The TRB incorporates all former HRB activities and also performs additional functions under a broader scope involving all modes of transportation and the interactions of transportation with society. The Board's purpose is to stimulate research concerning the nature and performance of transportation systems, to disseminate information that the research produces, and to encourage the application of appropriate research findings. The Board's program is carried out by more than 270 committees, task forces, and panels composed of more than 3,300 administrators, engineers, social scientists, attorneys, educators, and others concerned with transportation; they serve without compensation. The program is supported by state transportation and highway departments, the modal administrations of the U.S. Department of Transportation, the Association of American Railroads, the National Highway Traffic Safety Administration, and other organizations and individuals interested in the development of transportation.

The National Academy of Sciences is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Bruce Alberts is president of the National Academy of Sciences.

The National Academy of Engineering was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Robert M. White is president of the National Academy of Engineering.

The Institute of Medicine was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Kenneth I. Shine is president of the Institute of Medicine.

The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Bruce Alberts and Dr. Robert M. White are chairman and vice chairman, respectively, of the National Research Council.