Skyways

The Twin Cities climate presents a hindrance to outside walking in the winter months, particularly in areas of high pedestrian traffic. Both Minneapolis and St. Paul now have substantial portions of their downtown blocks linked by second-level pedestrian bridges (11 blocks in Minneapolis and 10 in St. Paul). These fully enclosed, heated, and air conditioned bridges link major offices, department stores, financial institutions, models, and residences within the downtown areas. They provide extremely pleasant environments for walking, protecting pedestrians from conflicts with automobiles and from weather, and benefit business. The Minneapolis system in 1974 had average weekday crossings from a low of 77,600/day in July to 131,000/day in December. This is a diversion of 50 to 75 percent of trips from surface sidewalks.

Pooling

Many parties in this area have been interested in the potential for decreasing peak-hour congestion and reducing parking requirements by increasing vehicle occupancy during the work trip. This has resulted in a number of actions aimed at encouraging the use of car pools and van pools, and both the public and private sectors have been involved. The Minnesota Department of Transportation has offered address-matching services to interested employees and to the whole region. A campaign organized by the American Automobile Association resulted in 24,000 responses from 76 firms requesting matching of home and work locations. The Department of Transportation and the Governor's Office have sponsored an areawide address-matching program. Every household with phone service received a car-pool matching application form with its February 1974 phone bill. The form was also made available through post offices, chambers of commerce, and newspapers.

Several companies, with 3M Company pioneering, have been operating van pools for their employees. The 3M effort is a major one, now involving 92 vans and more than 1000 riders. Success has been such that the 3M Company is now planning a major new corporate research and office complex on the assumption that work trips to the complex will be made with an average vehicle occupancy of 2.0 and that parking needs and access road capacity can be reduced 25 percent or more. 3M calls its program Commute-a-Van. The company purchases the vans at a fleet rate of around $7000. A pool of riders is organized with one member designated coordinator, who serves as chief driver, issues monthly fare billings to riders, and sees to it that gasoline, oil, and routine maintenance are provided at a 3M garage. Each van must have at least eight passengers. Their fares, calculated on a basis of distance from work, amortize the van. The current average monthly fare in St. Paul is about $26. Any fares above the basic eight are kept by the coordinator, who is also entitled to use the van in leisure time, paying a rate of 5 cents/km (8 cents/mile). 3M estimated that the 1975 operations saved 12.9 million km (1.8 million miles) of vehicle travel and more than 511,000 L (135,000 gallons) of gasoline.

PORTLAND, OREGON

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The final federal regulations concerning the institution of a transportation systems management (TSM) element as part of the transportation improvement program (TIP) were not set forth until September 1975. However, the nature and purpose of many decisions, programs, and projects acted on in the city of Portland and in the Portland region before that date were consistent with the objectives and rationale of the TSM program. Because of this and because of the relatively high level of success on TSM efforts in Portland, the Portland experience provides a perspective on the early application of the TSM approach. More specifically, the TSM experience in Portland offers some useful commentary on the relation between broad policies and TSM strategies and projects, considerations that should be addressed in the implementation of individual TSM projects, and apparent problems that must be confronted if TSM is to play an effective role in a regional transportation planning and implementation process.

To provide understandable comments on these Portland TSM considerations, we must briefly review the rather dramatic changes that have taken place in transportation planning policy in the Portland area during the past half decade. In large part, the fundamental shifts in transportation planning policy have established the framework for TSM project and strategy development.

Fewer than 5 years ago, the Portland region was making decisions on both major and minor transportation capital and operational investments on the basis of a regional transportation plan called the Portland-Vancouver Metropolitan Transportation Study (PVMATS) (1). Though never formally adopted by many local jurisdictions in the region, including the city of Portland, this plan was the only regional plan of any sort available and, consequently, was acknowledged by many as the region's official transportation plan and used to guide transportation decisions. The PVMATS plan was narrow in conception and purpose, but quite broad in its implications. The plan was singularly oriented to future investments in roadways to serve automobile movement, making only passing mention of transit investments. Moreover, with respect to its highway orientation, the plan called for a massive investment in a regional system of freeways and expressways, which if built would have left few areas of the region untouched and surely would have been self-fulfilling in terms of the automobile-oriented transportation system that the plan forecast for the region. In addition, and perhaps more important, the plan's freeway system implied fiscal requirements for the state and region that were, in retrospect, so excessive as to be totally unrealistic.

Of course, concerns such as these have not necessarily altered the plans, planning processes, and capital investment programs of many regions. What were the factors that made the difference in Portland? There were several, and these factors not only resulted in a dramatic
change in the regional transportation plan but also formed the influencing considerations on subsequent projects and policies, including the logical progression to a TSM approach.

One important consideration had as its impetus the thinking of a new city of Portland administration. Political leadership in the city recognized that Portland was, and still is, in a rather unique situation among U.S. cities. Having seemingly lagged behind the strong shift to investment in urban freeways that characterized other cities, Portland found itself in a position to learn and profit by the experience of other cities. Two important lessons were learned: (a) For a central city, freeways are not necessarily the most beneficial and productive transportation investment that can be made; and (b) using transportation capital solely for the purpose of attempting to solve travel demands is not an effective way to deal with many urban problems, including transportation. These basic perceptions led, in turn, to more resultant policy directions, including

1. Protecting and preserving the city's neighborhoods by designing transportation projects and services that are aimed specifically at city needs;
2. Reinforcing the Portland downtown as the region's primary business and commercial center but recognizing that this cannot be accomplished by sustaining the automobile as the primary mode of transportation to the downtown;
3. Recognizing that regional transportation investments and regional transportation planning cannot be separated from the interests of the city; and
4. Recognizing that for a long time to come the predominant elements of the transportation system are already in place and that the real challenge is to more effectively use that existing resource rather than to rely on future investments, which require substantial fiscal commitments.

A second important consideration that influenced the change in the direction of transportation planning was the increased concern and action in environmental matters. Although part of the new city administration's concerns, these matters went beyond the scope of the city. In response to the directives of the U.S. Environmental Protection Agency, the state of Oregon established a statewide environmental organization—the Department of Environmental Quality (DEQ)—charged with responsibility for environmental protection. Findings on the quality of the Portland region's airshed led rapidly to several key regulatory decisions. Within the city of Portland, a downtown clean air plan was developed and adopted in response to DEQ requirements. Among other things, this plan called for the increased reliance on transit for trips to and from the downtown and noted that a similar shift was needed on a regional basis if the airshed was to be protected. In addition, the DEQ established an approval process that required all transportation projects, including all off-street parking lots beyond a certain size, to receive DEQ review and approval. The city responded by initiating studies that resulted in the adoption in the winter of 1975 of transportation policies for the Portland downtown. Among other things, the policies established a parking limit for the downtown beyond which no additional parking spaces could be allowed (2). This limit, 30,650 parking spaces (nearly equaling what existed in the downtown at the time of adoption), immediately weighed heavily in decisions on transportation projects, for this policy regulation implied that future additional trips to the downtown (such as those represented in the approximately 50 percent increase in downtown employment forecast for 1990) would have to find a means of movement other than the automobile. The increased concern over regional air quality also had a less dramatic but nonetheless important impact on many regional transportation actors, who began to realize the implications of the then-current freeway plan in terms of future environmental impact.

The third important consideration that helped to focus the decision-making process on a wide range of implications in the PVMATS plan was the local, regional, and state decisions on the withdrawal of the Mt. Hood Freeway, a major freeway segment of Interstate 80N. Through the process of debate and deliberation over the withdrawal of the freeway—which was to be located in the city's southeast side—the Portland City Council, the Multnomah County Commission, other regional and state officials, and the public were forced to directly confront many issues as they applied to a specific decision. Decision makers were forced to consider the questions of freeway impact on neighborhoods, of freeway impact on downtown development objectives, of consistency with environmental concerns, and of critical fiscal implications of the segment in question. At the same time, they were forced to examine possible alternatives to the freeway, including many less costly and less environmentally damaging investments, which nonetheless provided important transportation benefits. Decision makers began to realize that there were other ways to solve transportation problems that did not result in the problems of freeway construction.

From these and other considerations came a series of more specific decisions. The first such decision, which provided the framework for others to follow, was the adoption in June 1975 of a new regional transportation plan (3). This plan, called the Columbia Region Association of Governments Interim Transportation Plan, departed from the previous PVMATS plan in several critical ways.

1. The new plan called for a major commitment of future transportation capital resources on major transit project investments in the region, including a number of such investments on existing rights-of-way. This basic diversion from previous plans was the result of a greatly increased awareness on the part of regional decision makers about environmental, energy, social, and fiscal concerns and was reflective of the city's explicit policy positions on such matters.
2. The plan called for an almost total reliance on existing transportation corridors, or rights-of-way, as the location for new regional transit facilities. This was in marked contrast with the previous plan, which called for new corridors requiring great displacement and disruption as well as excessive costs. This change in direction reflected the increased awareness of the region to the many problems and costs associated with new corridor development. More important, it seemed to reflect a better understanding of the thinking of the city of Portland in its Mt. Hood decision: that existing resources of housing stock, commercial and industrial facilities, local streets and arterials, and other elements must be reinforced and served by transportation investments, not arbitrarily displaced or disrupted.
3. The new plan set forth potential transportation investments that reflected a more realistic assessment of future transportation resources. The earlier plan prescribed a transportation system that, according to travel forecasts, would solve future transportation movement demands at a cost that was clearly unrealistic in terms of available and forecast capital resources. Instead, the new plan set forth capital investment opportunities that reflected a careful assessment of future
funding levels and described clearly the nature of the problems that would exist even if those investments were made. This analysis led to a better understanding that operational changes in the transportation system would have to be relied on to ameliorate many of the current and forecast problems and that the region could not realistically rely on continued capital investments—for which funds are unavailable—to solve all of its transportation problems.

4. The plan explicitly called for a substantial effort to more effectively and efficiently use the existing transportation system. This objective was influenced by an awareness of the fiscal constraints that the region would face in the future in seeking investments in new rights-of-way. Concerns about energy consumption patterns and automobile impact on the environment lent support to modifications of the existing street system to induce greater transit ridership. In addition, studies were initiated with the purpose of detailing points of excess capacity in the street system and exploring ways through which this capacity could be better used.

The city of Portland played an important role in the development of the new perspective set forth in the interim transportation plan. The city’s deliberation over the Mt. Hood Freeway forced transportation planners and engineers and council members to examine alternatives to the freeway. The answer that emerged from several months of study was that there was no single answer, no single project alternative that comprehensively addressed the problems the freeway was supposed to address. It was found, however, that a broad range of specific minor projects, policies, programs, and operational modifications in the existing system could go far in meeting the travel demands that the freeway was supposed to serve and do so at greatly diminished capital, social, and environmental costs. This thinking was applied to other transportation problems within the city, and the logic of the approach was carried by the city to the regional forum.

Within the city, this approach of attempting to deal with transportation problems through an examination of minor capital investments and operational modifications has been carried somewhat further. A fairly lengthy study is attempting to clearly define the functional relation between the city’s street system and the remainder of the regional transportation system so that classification policies will be established for every street within the city. These policies, which have been developed on the basis of a careful examination of street characteristics, neighborhood needs and problems, existing and forecast land uses, and travel demand forecasts, are not a plan for the city street system, but rather functional policies that give direction to the use of streets and establish parameters defining future project and operational designs. Through this analysis, it became clear not only that future transportation movement would have to greatly increase its reliance on transit but also that improvements within the city could be accomplished through operational changes and relatively minor capital improvements that would better use the resources represented in the existing street system.

Consequently, the proposed city street classification policies indicate which streets should serve as automobile-carrying or automobile-oriented arterials and which should serve as transit-oriented arterials. Subsequent project and operation decisions will be guided by the policies. The policies will also provide the basis for city comments on the propriety of proposed projects elsewhere in the region in terms of the impact of those projects on the transportation system within the city.

TSM PROJECT REVIEW

The specific project decisions that were generated from the change in approach were quickly forthcoming and, in some cases, actually preceded adoption of the new regional transportation plan. A brief review of some of the projects and programs undertaken provides not only a survey of what has been accomplished in Portland but also an opportunity to judge the manner and level of success.

Efficient Use of Road Space

A number of projects have been completed that had the objective of more efficiently using existing road space.

Banfield High-Occupancy Vehicle Lane

Faced with a resurfacing requirement on the most congested radial freeway in the Portland area, the Oregon Highway Division proposed to expand the freeway surface within the existing right-of-way and add two additional lanes for high-occupancy vehicle use. This was accomplished by removing the shoulder for much of the distance, narrowing the lanes, and adding emergency parking bays (to replace the shoulder). Although the high-occupancy vehicle lanes, which are used only in the peak hours in the peak direction, are not continuous for the entire length of the freeway (because of right-of-way obstructions), their use by both express busses and car pools has resulted in measurable relief to the congestion, as reflected in improved automobile speeds during peak periods and some reduction of traffic on parallel arterials. The project was accomplished with a relatively small capital investment beyond that required by the resurfacing project.

Portland Mall

The Portland Mall is a $15 million UMTA-sponsored project, which is converting two parallel downtown Portland streets to bus-only routes. When completed by the spring of 1978, 11 blocks of Fifth and Sixth streets will be characterized by widened sidewalks, landscaping, bus shelters, and other amenities. The mall will serve as a linear transfer and distribution system for Tri-Met and, at the same time, will result in significant improvements in automobile circulation and movement on other downtown streets. The mall is an integral part of the downtown clean air plan, providing another incentive to use the transit system by improving the level and efficiency of operation within the downtown.

Downtown Parking Policies

Adopted by the City Council and based in part on the objectives of the downtown clean air plan, the parking policies not only establish a maximum parking space allocation for the downtown but also call for a deliberate transition from long-term parking to short-term parking and for improved transit service to accommodate significant increases in downtown trips, particularly work-related trips.

Transit Stations

As part of the improved Tri-Met service to the entire region, dozens of park-and-ride sites have been established during the past 2 years throughout the region at practically no cost to the transit agency. Using church lots, unused parts of shopping center lots, and other
locations, Tri-Met has offered free parking facilities in both suburban and city areas along transit routes. The public response to these lots has varied from location to location, but a number have been fully used since the date of their opening. In addition, work is under way on several major, permanent transit stations that not only will serve park-and-ride and kiss-and-ride trips but also will accomplish major transfer functions. Sited in suburban areas and on the fringe of the city of Portland, three such stations are in planning phases while one—the West Portland station—is nearing completion.

Bicycle Paths

Using funds made available from state gas tax resources, the city and the region have developed a comprehensive bicycle path program, which is being implemented on an annual basis. Already many improvements have been completed including a number of both grade-separated and on-street bicycle routes. In addition, the city has spent funds to ease physical access for bicycles on streets and bridges leading into the downtown to allow for increased bicycle commuting.

Other

A number of other TSM improvements have been completed or are in the planning process. Through the encouragement of several agencies and officials, a number of industries have shifted their working hours to diminish the peak-hour problem. In several instances, Tri-Met has directly assisted by implementing the Early Bird transit service, which provides express buses directly to industrial centers before the regular peak hours. On another project, work will begin next year on a contraflow bus lane on an arterial, in this case providing a partial connection between the downtown and the West Portland transit station. Finally, proposals are now being prepared by city staff for a wide range of projects, including peak-hour signal preemption for buses and curb extensions at bus stops (which allow the bus to remain in the moving lane of traffic at stops), for implementation during the next year on a number of arterials. These improvements are intended to increase the operating efficiency and competitiveness of the transit service and are being carried out as part of the city’s arterial street study and program.

Vehicle Reduction in Congested Areas

During the energy crisis of 1973-74, a major commitment to a regionwide car-pool program was established by the Oregon Department of Transportation. The program proved so successful during the energy crisis that it has been continued under the supervision of the transit agency. The program offers a centralized information center for prospective car poolers and maintains a file of organized car pools on an origin and destination basis. In addition, the program works closely with businesses and industries in organizing car-pool efforts within private firms. Approximately 4000 car pools are organized and operating throughout the program.

Actions to Improve Transit Service

The list of activities that have been undertaken to improve transit service in the Portland region is lengthy, but the important and productive changes are discussed below.

Flat Fare

In an effort to encourage transit ridership from an economic standpoint and to simplify the pricing system, Tri-Met adopted a flat fare for the entire three-county service area. This change from the previous zone fare system established a flat 35-cent fare, since changed to 40 cents, and provided for free transfer. An important objective in this decision was to increase the level of suburban area ridership, particularly during peak hours, in order to reduce the reliance on the automobile and thus diminish highway congestion. The change has resulted in significant increases in ridership from suburban areas and has worked in concert with the interim park-and-ride lots and the establishment of several express routes to the Portland downtown.

Monthly Pass

Also a part of the pricing changes, Tri-Met initiated monthly passes, which are sold throughout the service area, are transferrable, and represent a cash savings for the daily rider. The passes cost $14 and currently approximately 15 000 are sold monthly.

Free Fare Zone

Tri-Met also established a free fare zone in the Portland downtown. Accomplished primarily to simplify and diminish the cost of downtown distribution from line-haul routes, the free zone has also resulted in diminished use of the automobile for trips within the downtown.

Other

A great many other transit improvements have been realized within the past several years, including the placement of shelters throughout the service area (a vital improvement in light of Portland’s climate), a much improved marketing program to inform the public of service, and significant improvements to service through better headways and many new routings, including a number of crosstown routes and service to suburban shopping centers. These changes have resulted in ridership increases of approximately 60 percent during the last 3 years.

TSM PROBLEMS AND OPPORTUNITIES

These project descriptions generally represent past experience in TSM. As was noted earlier, the basic change in the policy direction of the region several years ago and the thinking and analyses of transportation problems concomitant with that change provided a basis for TSM projects, programs, and policies.

In this context, the Portland region’s reaction to the formal requirements calling for a TSM element in the annual transportation improvement plan earlier this year was straightforward and, predictably, was probably not too much different from the reactions and responses of many other regions throughout the country. The metropolitan planning organization simply compiled a list of TSM projects that had been completed or were currently programmed throughout the region and submitted the list as the TSM element. As for the second year’s TSM submission, the Portland region is currently following essentially the same procedure.

TSM IN THE REGIONAL PLAN

One initial conclusion, which in fact may be a problem
TSM as an Alternative

As noted, merely compiling a list of TSM projects is not necessarily meaningful if the projects are not consistent with broader objectives. On the other hand, compiling the other parts of the transportation improvement program without any consideration of the TSM element also represents an ineffective application of TSM.

Given the many reasons behind TSM, but particularly singling out the fiscal problems facing most transportation investment programs, it has become apparent to a number of Portland area planners and engineers that we have not yet applied the TSM approach as fully as possible. Although many projects are listed under TSM, a much larger list of conventional highway and transit projects make up the rest of the region's transportation improvement program. Most of these found their way onto the list through a conventional process—problem identification and design of an appropriate solution—and, consequently, are implemented as fairly conventional projects. In fact, and unfortunately, it is unusual for anything but a highway project to be considered for application to a problem defined as a highway problem; rarely is consideration given to solving the problem through a transit investment or some other broader programmatic approach.

This situation represents an attractive opportunity to more fully employ the TSM approach, and this opportunity is currently being explored in Portland. More specifically, what might be done is to impose a requirement that all projects submitted for inclusion in the transportation improvement program be reviewed on a project basis to ascertain whether any possible TSM project solution could accomplish the same objective. In short, the region could require that TSM alternatives be considered in all project activities and resultant project submissions.

In many cases such a review would not be rigorous, and in some cases (for example, rural projects) the review might be quite rudimentary. But, in numerous instances such a requirement might lead to helpful, cost-saving modifications to a project. If nothing else, such a requirement would maintain an awareness among those responsible for project development that there exist alternative, although perhaps unconventional, approaches to problem solving and project design.

TSM Success

One of the more interesting aspects of the TSM approach and generally of TSM projects—at least in the Portland area—is the basic sensibility and logic of TSM and its appeal to a diverse group of professionals. The reference here is specifically to many of the more innovative TSM projects, particularly those aimed at providing greater efficiencies for transit and car-pool operations. Indeed, in Portland, projects such as signal preemption for buses, contraflow bus lanes, high-occupancy vehicle lanes, and the like are found almost total appeal among transportation planners, transit operators, traffic engineers, and highway engineers. Many of the projects that have been completed in Portland were in fact developed and initiated by the Oregon Highway Division or the Office of the City Engineer rather than by the transit agency or planning offices. Although this might be surprising and perhaps unique to Portland, what has not been surprising or unique has been the public reaction to many of these kinds of projects. The public reaction has often been in sharp contrast to that of the professional staffs developing the projects. The experience in Portland perhaps can provide some useful commentary on developing
the acceptability of TSM projects. A good project example, for purposes of illustration, is the Banfield high-occupancy vehicle lane.

The first point with respect to public acceptance is the importance of proper and adequate marketing of the project. In the case of the Banfield project, a major marketing, or information, effort was undertaken well in advance of the actual construction. Although this was an Oregon Highway Division project, the marketing effort was under the direction of the transit agency, upon whom it was felt would fail the primary burden of demonstrating the project to be successful. In advance of construction, a complete marketing strategy was developed that included the following important elements.

1. Development and design of leaflets (flyers) to be handed out to motorists entering the freeway. Leaflets were designed for several stages in the project, including before the initiation of construction, at the initiation of construction, and at the opening of the completed facility. The literature attempted to describe not only the specifics of the project in terms of design and operation but also the benefits of the project to both users and nonusers and the rationale behind the project.

2. Explanation and solicitation of support for the project from policy level boards, including the Portland City Council and the Tri-Met Board of Directors. These presentations were further reinforced with press releases providing explanations of both the project and the (supportive) actions of the boards.

3. Ongoing series of press releases was developed jointly by Tri-Met and the Oregon Highway Division, coinciding with various stages in the project development and aimed at keeping the public fully informed on project progress.

4. Establishment of both technical and citizen advisory committees for the project, which met weekly before and during the project implementation. (These committees continue to meet monthly to monitor the progress on the project and consider modifications to its operation.) The citizen committee was composed of representatives from business and residential interests located along the project route as well as any other special interest groups who wished to be involved. The technical committee was composed of highway engineers, planners, traffic engineers, law enforcement officials, transit operators, and other technical persons as well as representatives from the citizen committee.

5. Public hearings were held in advance of the project for the purposes of both providing a project explanation and soliciting comments on the project.

The second important consideration in the public acceptance of TSM projects has to do with their flexibility after completion. In many cases, innovative projects such as the high-occupancy vehicle lane are somewhat unproven and there is limited confidence in the forecasts made regarding their use. The most apparent way to deal with this problem is to first test the project through temporary measures, which can be easily modified or removed if success is not forthcoming. However, in the case of a project such as the new high-occupancy vehicle lane, this was not possible, so instead as much flexibility was retained in the project as possible. Although TSM projects are intended to be modifications in the operation of the transportation system, they themselves can be modified. This was done in the case of the high-occupancy vehicle lane.

The project was designated as "experimental" in which operational changes would continually be considered. If necessary, the lane could be reverted to full automobile use. Although this has not been done, the continued monitoring of the project has resulted in a number of operational changes, which were decided on basically through the technical review process. These changes included altering the enforcement period of the lane from all day to only during peak hours in the peak direction and adjusting the level of transit service provided especially for the project—in response to the demand for such service. Other adjustments that have been considered, but not implemented, include a redefinition of a car pool from the current three persons to two persons and the allowance of special carriers, such as taxis, into the lane regardless of whether they meet the three-person occupancy requirement. It is clear that the changes that have been made, although technically justified, have also helped to respond to the many public criticisms of the project. A key to this process was the initial decision to open the project with what were viewed as relatively rigid, or maximum, operational characteristics—characteristics that could be altered without resulting in the complete termination of the project.

Another important consideration in the development of TSM projects is the opportunity for simultaneously developing several TSM projects. In many cases, TSM projects are mutually supportive, and considerable thought should be given to their simultaneous development and implementation. For example, park-and-ride lots are obviously consistent with, and supportive of, express transit routes. In the case of the high-occupancy vehicle lane, many such related projects were considered and several were implemented. Tri-Met quickly purchased 10 additional buses, which were used on the express routes. These express routes were reinforced by the expedient development of two park-and-ride lots at locations near the outer terminus of the lane. In addition, the region's car-pool program seized the opportunity offered by the project and developed an information program aimed specifically at users of the freeway segment. This program included leaflets that were distributed to motorists and, subsequently, road signs posted along the route describing the car-pool service and providing the telephone number to call for information and assistance. Other TSM project opportunities considered but not instituted included reduced transit fares for the express bus service and the initiation of reduced parking prices in the downtown for car-pool users. (The latter concept is currently being developed for implementation.)

It is clear from the high-occupancy vehicle lane experience, as well as other experience in Portland, that it is important not to disassociate the TSM projects from the rest of the transportation system, but instead to capitalize on the TSM projects by supporting them whenever possible with other TSM projects. The major transit station currently under construction in Portland will be linked to the downtown with a contraflow bus lane, and express service will be developed from the station to downtown. TSM successes and resultant public acceptance are highest where a comprehensive approach to TSM is accomplished and where all agencies involved in the management of the transportation system are integrally involved in the process.

POLICY CONTEXT

The most important and fundamental conclusion with regard to the TSM success in Portland concerns the necessity of having a strong transportation policy direction that is conducive to TSM projects and programs. Although problems and discord still exist in Portland, there is widespread agreement among professional staffs and nearly all policy level boards that the direction
of regional transportation planning and implementation must be that which is stipulated in the regional plan. There is a recognition that much better use must be made of the existing transportation system, that the existing transportation system must and can be operated more efficiently, and that much greater reliance on transit must be selected in future transportation capital and operational investments. The level of understanding of these conclusions varies throughout the region, but the variety of strong rationales that support such conclusions have already been shown to be effective.

From the city's standpoint, broader objectives pertaining to neighborhoods, the downtown, and economic development plans clearly point in the direction of TSM, and the focus brought on the basic nature of the transportation problem facing the city by the deliberation over a freeway withdrawal has done much to educate not only city staff and council members, but also staffs and policy boards throughout the region and the public. For others, such as regional organizations, the rationale for TSM is probably less refined, but specific policy concerns and objectives on problems such as air quality provide essentially the same direction. An important rationale that is instrumental in directing efforts to TSM is the fiscal situation, which has resulted in an acute awareness on the part of many that a new direction must be taken in the development of the transportation system and that an important element in that direction is TSM. Although some problems with TSM remain unresolved, or perhaps even unidentified, it is clear that in Portland the experience to date has been quite positive and that there is an awareness on the part of many that the city and the region as well are only beginning to understand the potential that exists.

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MADISON, WISCONSIN

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The city of Madison is located in Dane County, Wisconsin, in the south central part of the state. It is roughly midway between Lake Michigan and the Mississippi River, some 130 km (80 miles) west of Milwaukee and 240 km (150 miles) northwest of Chicago. The city is the state capital, county seat, and home of the University of Wisconsin. As such, its economy is service oriented although there is some industry. The central business district, the Capitol, and almost all of the downtown area are located on a narrow isthmus, approximately 1 km (0.6 mile) at its narrowest, between two lakes (Figure 1). The university campus is located approximately 2 km (1.2 miles) to the west of the Capitol and is connected to the CBD by State Street, an intensively used commercial thoroughfare.

The 1970 population of the Madison SMSA was just under 300,000, and about two-thirds of this population (205,000) is located within the Madison urbanized area. The Madison SMSA is coterminous with Dane County. The county, in addition to the city of Madison, contains four smaller cities: Sun Prairie, 1970 population of 9335; Middleton, 1970 population of 8286; Monona, 1970 population of 10,420; and Stoughton, 1970 population of 6096. Middleton and Monona are part of the Madison urbanized area. The county also contains 28 villages.

Madison's downtown has a residential area where students, young professional workers, and families with children live. In 1970 more than 55,000 people lived in the isthmus area, approximately 4.5 km (2.8 miles) east and west of the Capitol. This area also contains over 50% of the region's employment. Suburban shopping malls have attracted much recent retail activity, and the Capitol Square-State Street area, the former retail core, has experienced a decline. The city, however, has become involved in a number of projects including a new civic center on State Street and an extensive mall effort to reverse this trend.

In the past the Madison area has grown quite rapidly, but at present the rate of growth has slowed considerably. Transportation planning efforts have been and are being reviewed and revised, where necessary, to reflect this change.

COMMUNITY GOALS AND OBJECTIVES

Because of the existence of active comprehensive planning programs at both county and city levels, community goals are well articulated. In addition, the Madison Department of Transportation and the Dane County Regional Planning Commission have undertaken extensive public attitude surveys related to transportation objectives.

At a general level Dane County has an adopted land use plan, which sets out policy guidelines for future growth of the area (8). The policy of the Dane County Transportation Study is to plan and direct the extension and expansion of transportation services and facilities in a manner consistent with that plan. In particular the county land use plan designates urban service areas, that is, areas intended to receive the bulk of urban growth during the next 10 to 20 years; and it is desired to confine the extension of urban transportation services to these areas. The city of Madison itself has a developed set of transportation objectives and policies (9, 15), among which are the following: