STATUS REPORT: TRANSIT PROGRAM FOR THE TWIN CITIES AREA

Metropolitan Transit Commission

August, 1970

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Twin Cities Area Metropolitan Transit Commission
904 Capitol Square Building, St. Paul, Minnesota 55101

Summary

The Minnesota Legislature created the Twin Cities Area Metropolitan Transit Commission in 1967. The Commission was directed to develop a plan for a complete, integrated mass transit system for the metropolitan transit area.

In response, the Metropolitan Transit Commission developed a two-pronged approach including both short-term and long-term improvement programs. Planning for short-term transit system improvement is complete. The initial step in the long-range planning program has been finished and work is underway to give the 1971 Legislature on the trade-offs necessary between levels of investment and the several transit system options.

Initial implementation of the short-term plan, public acquisition of the bus systems, is underway. While ownership may transfer to the public, the Commission has arranged for new management by contracting with a private firm. Other improvements will be implemented following public ownership. These include: regular bus purchase program to reduce average age of the transit fleet from 14 years to less than six years, installation of 135 passenger waiting shelters, development of "park-and-ride" facilities, initiation of a public information program, changes in transit routes resulting in expansion of the network, and restructuring of fare zones. These and seven other recommended improvements are expected to result in a 9 percent increase in ridership.

Long-range planning accomplished to date is the beginning of a four-year transit planning effort. These early activities were based on an existing forecast system. Difficulties were experienced in drawing conclusions from this early, major step in developing a comprehensive transit plan. However, the results did produce these broad generalized conclusions; a system concept; the need for research, development, and demonstration programs; and the requirement for future interaction between transit development and other captital improvement programs to shape regional growth.

The system concept best suited to the area appears to be a "family of vehicles" rather than a single-vehicle system. It would consist of (1) rapid transit operating on its exclusive right-of-way as the backbone of the system to provide trunk service between selected major centers, (2) express buses operating in mixed traffic for trunkline service in less congested corridors, (3) local and feeder bus

service to provide direct service to the centers as well as to complement trunklines in low density areas, and (4) passenger distribution service within certain major centers. Planning will proceed on this basis.

An applied research program to inject new concepts into the transit development process appears essential. The 1968-69 studies made an inventory and assessment of nearly 100 new vehicle systems in different stages of research and development throughout the world. A number were found promising and possibly could have application in one element of the "family of vehicle" system: passenger distribution service within certain major centers.

The next step in the transit development program is anticipated to include plan refinement, impact analysis, and financial planning prior to the 1971 Legislative Session. Vehicle systems selection and designation of route and station locations can be accomplished in late 1971 and early 1972. While this time-table may appear slow, certain factors that became evidnet in early 1970 caused the work program to be broadened. The major concerns are:

1. The role of rapid transit is a relatively new and somewhat controversial subject in the Twin Cities. Its optimum role is far from identified, and its feasibility is not yet demonstrated.

2. The relationships between transit development, highway development and the patterns of future urban development are not clearly established.

3. The size and density of the Twin Cities region places it in a category where the precedents of other cities utilizing transit modes are not necessarily applicable, and thus, special studies are required to truly determine what various forms of transit can do for and to the region.

4. The need for greater emphasis on the planning of complementary and distribution sub-systems in order to assure an adequate level of service to the entire region, particularly the low density suburbs and the high-activity major centers.

The above factors have been reflected in the 1970-72 work program. The resultant comprehensive transit plan will mark the first clear determination of the desirable role of modern rapid transit for the Twin Cities Area. Until this is accomplished, the role of rapid transit in the area's balanced transportation development program will not be clearly delineated.

INTRODUCTION: WHY TRANSIT IS NEEDED

Interest in improving our area's public transportation system has snowballed in recent years as it has in every major urban area in the nation.

The reason for such interest is clear. Over the past 20 years, residents of the seven county metropolitan area have watched the steady deterioration of service by the area's major public transportation carriers, accompanied by a corresponding decrease in riders. Service has not followed growth into new areas of development. Some former riders have adapted themselves to the change by driving to work in the family car. Many have reluctantly come to live without good public transportation by purchasing a second car at some strain on the family budget. With declining service, jobs, housing, and a range of educational, recreational, cultural, and shopping opportunities have been increasingly restricted for those who must rely on public transportation.

Today, a total of 176,700 trips are made each day by public transit, many by people who have no alternative means of transportation. Also important is the fact that 17.5 percent of all trips to the downtown areas of Minneapolis and St. Paul are made on transit. Transit also accounts for 33 percent of the rush-hour trips into the city center.

Existing transit then given its minimal service, still plays a major role in all segments of the community for many kinds of trips. Today, more than 500 miles of bus routes serve over half of our municipalities in six of the seven counties.

More than 65 percent of the residents of the urbanized part of the metropolitan area today live within a five minute walk of a bus stop.

If the recommendations of this report are carried out, transit trips to the major centers of Minneapolis and St. Paul will grow by 140 percent from 1968 to 1985, while autos will show a moderate increase of 12 percent.

The increase in affluence we are experiencing has led many to believe that the percentage of people who do not own cars is decreasing and in time everyone will have a car. This is not true. Even though the percentage of households in the metropolitan area which own cars ranks high nationally, 17 percent of all households in the region did not have a car in 1960, the absolute number of such households will **increase** from 76,000 in 1960 to 94,000 by 1985.

Improved transit is also important, if not critical, to those who cannot afford to own or operate an automobile, and to many who cannot drive because they are too old, too young, or handicapped. By

1985, present trends indicate that over 800,000 people in the area will be in these categories. Transit is also crucial to second workers in a family that has only one car available.

But transportation for people who cannot drive or have no access to an automobile is only part of a good public transit system. The Twin Cities area is growing rapidly, both in population and in employment opportunities. Present trends indicate that the area will be home for 2.8 million persons by 1985. Exclusive reliance on the private automobile will not meet their travel demands. Many additional transit riders may result from the costs of commuting by automobile from the current estimate of 17¢ per mile to a figure in excess of 25¢ per mile in 1976. Traffic now flows relatively easily in the area's well-developed street and highway network, but in the future it will suffer the same congestion found in most other large metropolitan areas. Already Interstate 35-W carries a full capacity load during peak periods, and I-94, after only one year in operation, is already nearing capacity in some sections. Highway construction in some key areas is becoming more and more difficult and controversial as easily acquired right-of-way is used up. In many areas, particularly in and around the center cities, new highways will be almost impossible to build without taking more irreplaceable park land, dissecting neighborhoods, and compounding local tax problems.

What will happen by the year 2000 when our metropolitan area approaches 4 million population? How will people move? What will happen to our parks and open space? How will our lakes be kept pure and the air clean? What will happen to our development pattern if the current trends continue? Transit won't answer all the questions, but many answers will be unsatisfactory without transit.

People here are realizing that trying to solve transportation problems with highway construction **alone** is futile. The June 9, 1970 Minneapolis Star Metro Poll found that 71 percent of those surveyed feel there is a need for rapid transit in the Twin Cities.

To achieve mobility in the face of the area's future economic and demographic growth, full advantage must be taken of all modes of transportation — public and private — in a system that balances the advantages of each. Metropolitan transportation is not a question of **either** transit **or** highways. Each has an important function to perform. Private automobiles and trucks can provide service that is not tied to schedules or specific routes. But when travel is concentrated in time or in space, such as during peak periods between residential areas and high density employment centers, public transportation is needed.

The seven county area is developing an excellent street and highway system. Our need now is to continue this development, and to complement it with good public transit facilities. In recognition of this need, the State Legislature created the Twin Cities Area Metropolitan Transit Commission (MTC) in 1967. The Commission is charged with two specific responsibilities: to maintain and improve existing transit, and to develop a plan for a complete, integrated mass transit system.

To carry out this mandate the MTC engaged two consulting firms. Simpson & Curtin, a transportation engineering firm from Philadelphia, Pa., was assigned the task of developing a program for immediate improvement of the existing public transit system. Alan M. Voorhees and Associates, transportation planners from McLean, Va., began the task of developing a long-range transit development program. These two assignments, which have come to be known respectively as "Phase I" and "Phase II", have been completed,[1/] and together provide basic information for the long-term transit program.

Phase I produced a 13-point short-range transit improvement schedule with which the Commission concurred and is, in fact, already translating into reality. Phase II produced recommendations for a middle-and-long-range plan for feeder, distribution, collection, and express transit building on Phase I, using new technology, new operating concepts, and a modern rapid transit trunk line backbone.

A major step toward the successful implementation of these programs has been taken by the MTC in its decision to acquire Twin City Lines, Inc. This document contains a summary of the findings, conclusions, and recommendations of the Phase I and Phase II studies. The long-range segment is designed to evolve from the improved existing system; therefore, the long-term solution relies heavily upon implementation and success of the short-range segment of the total transit program.

1/See Bibliography, Page 27

PHASE I — AN IMMEDIATE RESPONSE

Who Uses Public Transportation?

The studies evaluating Twin Cities area mass transportation needs classified bus riders in two major categories: captive and choice. Captive riders are those who have no other means of transportation. This category includes young people, some poor, second workers in one-car families, handicapped, elderly, housewives, and visitors in the area.

Choice riders are those who have some private means of transportation, but choose to ride public transportation because they find it convenient.

Twin City Lines, Inc., which transports 95 percent of all bus users in the metropolitan area, has experienced a steady decline in ridership of from 200 million annually during World War II to 56 million in 1967.

The typical bus rider who boards one of the seven suburban bus company's vehicles comes from a higher income group and is more likely to be male, but the seven suburban bus companies collectively comprise only 5 percent of the area's total bus ridership.

The rider survey conducted in April 1968, discovered that two-thirds of the 78,128 passengers surveyed were using the bus to reach work. Other bus users included 18 percent for school trips, 7 percent for shopping, 6 percent for personal business, and 2 percent for social-recreational travel.

Is Public Transportation Adequate?

With the reduction in passenger volume, the level of service has also been reduced.

But while service is being cut back, the captive rider remains dependent on public transportation. Added to the need to provide adequate service for the captive rider is growing public interest in encouraging more transit ridership. Major business districts are already clogged with cars and are under pressure to provide more parking space. Today, in the central area of Minneapolis, 46 percent of the land is used for the circulation and parking of the automobile. As the area's population continues to grow, traffic problems can be expected to reach an unbearable level unless large numbers of people can be attracted to public transportation.

The Commission concluded that the generally accepted transit benefits cannot be expected to be offered to the public by the private company which is increasingly disinterested in transportation operations.

The company indicated it was unable to upgrade the bus company and provide the expanded service sought by the public and at the same time realize a fair return on the investment of its stockholders.

Concern over public transportation prompted the Minnesota Legislature to declare as a part of the legislation creating the Commission that "These systems are inadequate to meet the needs for public transit in the area."

Public Ownership — Private Management

Public ownership of Twin City Lines, Inc. will begin soon in a major way. The Metropolitan Transit Commission declared its intent to purchase Twin City Lines, Inc. in July 1969. Acquisition was determined to be essential to maintain and improve public transportation in the seven-county area since Twin City Lines, Inc. carries over 95 percent of the area's transit riders.

Most major cities have found it necessary to move to public ownership to guarantee adequate public transportation. Some cities acted in crisis, some in desperation. The Metropolitan Transit Commission based its decision to acquire the company on analysis, study and thorough consideration of the present condition of public transportation, means for improving it, and best means for assuring full realization of public interest in transit.

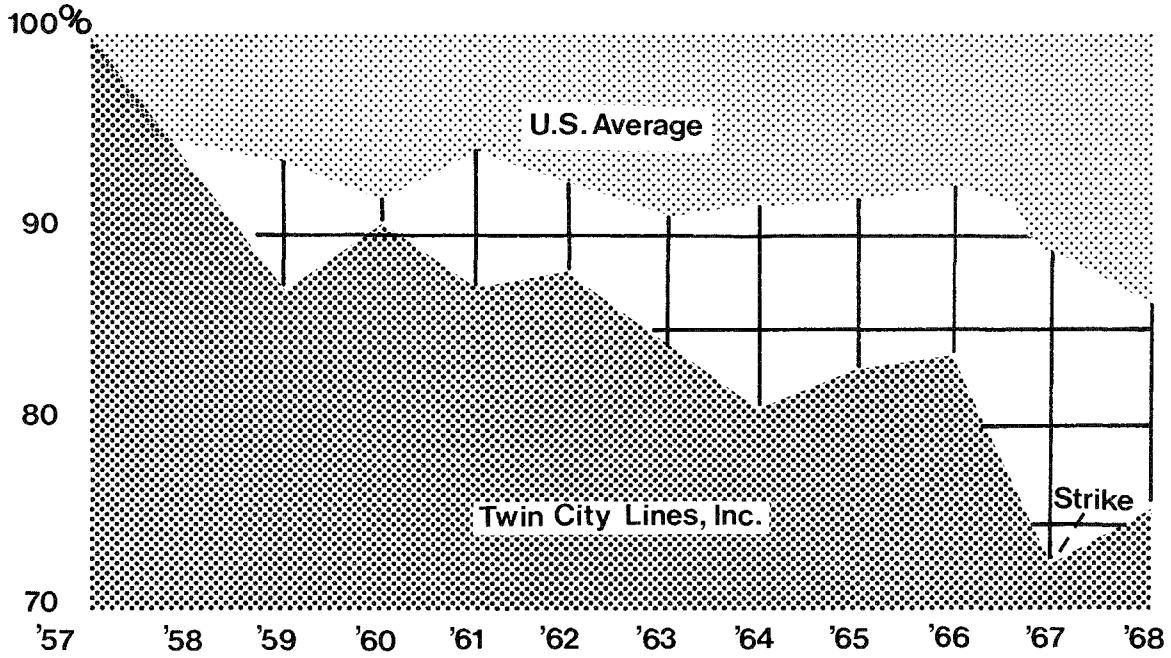
After investigation and debate, the MTC determined that it would be in the best interest of the public to make major improvements in present operating policies, service and equipment of Twin City Lines, Inc.

Investigation revealed that Twin City Lines, Inc. losses in ridership were continuing at a pace much greater than the sagging national average. The Commission determined that preserving the base of transit users and, in fact, building on that base is critical to the success of both short and long range transit objectives.

To accomplish reversal of the downward trend would require considerable improvement in the existing system followed by constant upgrading toward the day when a full transit network can be provided, the study revealed. After lengthy negotiation with Twin City Lines it became apparent that improvements necessary to upgrade the system and favorably influence ridership would not occur under the present private ownership.

The company indicated that its primary interest was to provide a just return on the dollar for its stockholders. In pursuing that objective promotion and improvement, costs were reduced drastically and service was cut back. The reductions were particularly painful for captive riders throughout the area who have no readily accessible alternative means of transportation and to suburban resi-

TREND OF REVENUE PASSENGERS



dents who saw developing areas denied service.

In December 1969 the Transit Commission moved to acquire the bus company by comdemnation after nearly one year of direct negotiations for purchase failed to bring about an agreement. During the first half of 1970 while the court took testimony and prepared to set the sale price, the Commission continued in its attempt to negotiate a settlement.

While preparations are underway to give the public direct control of public transportation, a private firm has been obtained to manage the bus operations.

American Transit Enterprises Management and Service Company, Inc. was hired by the MTC in June 1970 from a field of four competing private companies who were seeking to manage the Commission's bus operations. Bidding for the bus operations contract was advertised and open to all private operators who desired to operate the bus company and felt capable of doing so.

What Should Be Done?

Recommendations by Simpson & Curtin for the short-range bus improvement plans are included in a 13-point, five year program, which includes:

- A regular bus purchase program to reduce the average age of the transit fleet from 14 years to less than six years.
- A circulation system, using minibuses or other specialized vehicles, to serve the Nicollet Mall and adjacent areas of downtown Minneapolis.
- Consolidation of garage facilities, from three to two locations.
- Installation of passenger waiting shelters at 88 locations in the Twin Cities area.
- Development of "park-and-ride" facilities at 19 locations.
- Elimination of a substantial number of bus stops and installation of new, informative signs at the remaining 3,230 locations.
- Use of electronic computers for scheduling buses.
- Installation of two-way radios in the bus fleet.
- Establishment of reserved lanes for transit vehicles.
- Installation of equipment to permit remote actuation of selected traffic signals by bus drivers.
- Initiation of a public information program.
- Changes in transit routes, resulting in a net expansion of the network.
- Restructuring of the fare zones.

These improvements are expected to result in an increase in daily ridership of about 14,000 (9 percent).

The recommended improvements will benefit people who already use the bus and induce more people onto public transit daily.

A major factor is economics. Savings to the motorist are derived from reductions in those automobile operating costs which are associated with miles driven (fuel, oil, and maintenance). In addition, some of these former motorists will not need to own a car, or a second car, because of the availability of convenient transit. This results in a reduction for these motorists of the fixed expenses of secondary ownership, which include depreciation, insurance, and registration fees.

The most significant and readily-preceivable saving is in parking costs.

These combined savings to the diverted riders, minus the amount of their bus fares, will amount to an estimated $960,000 annually.

In addition to these direct benefits to the riders

of the transit system, there are a wide range of indirect benefits or collateral benefits which accrue to the community as a whole due to transit improvements.

The whole community benefits from the transit rider not using automobiles. Transit systems that reduce the number of auto trips, reduce highway construction needs and the accompanying loss of tax base, reduce traffic congestion, intrude less on natural resources and residential communities, and reduce levels of air pollution.

A second major area of community benefits stems from the increased mobility which the transit improvements provide. Direct beneficiaries of the increased mobility are the retailers and employers, because of improved service to their shops and places of business and the reduction in need for parking space. A more indirect benefit is the potential reduction in unemployment resultng from improved job access, and the resultant effect on welfare and crime costs.

Improving The System

A number of the Phase I improvements are contingent upon the Commission's purchase of Twin City Lines, Inc. However, a number of the recommendations have already been instituted or are being developed.

- In January, 1970, the MTC received a $185,183 federal grant to finance purchase of small buses for downtown Minneapolis. The new small bus operation will help move people throughout the central business district.
- An experimental "park-and-ride" program is underway through use of a portion of the parking area at Metropolitan Sports Center in Bloomington.
- A public information program was instituted in January with the hiring of a director of information. Working together with a private agency, the director of information is proceeding with programs to improve public awareness of transit opportunities.

A central transit information center where riders can easily receive route information will be instituted under the MTC public ownership plan. The present telephone information service is understaffed and unable to accommodate the level of calls placed to it daily.

- Upon purchase of the bus company the MTC plans to replace the aged vehicles in the bus fleet. During the first five years, 93 buses would be purchased each year until the entire fleet has been replaced and the average bus age reduced from 14 years to less than six years. Aside from greatly enhancing the public image of bus transportation, modernization of the bus fleet will substantially reduce maintenance costs.

Thereafter a continuing program of replacing one-twelfth of the entire fleet (62 buses) each year should be carried on.

• As an experiment, the first two groups of new buses may be air-conditioned to measure whether their greater attractiveness warrants the added cost (about 1.5 cents per mile for operation and maintenance).

• Another change suggested with public ownership is consolidation of garage operations into two facilities — the Nicollet Garage in Minneapolis and the Snelling Garage in St. Paul. Access to either city has been improved with the opening of Interstate 94 and thus it may be possible to consolidate activities presently conducted at the North Side Garage.

• Plans are already underway for the first of 135 passenger shelters proposed for 88 locations throughout the Twin Cities area. Shelter locations depend on the number of patrons boarding or transferring at a specific stop (only stops with 100 or more patrons were considered). Final locations will be determined in cooperation with local government officials and community groups.

Preliminary design calls for shelters constructed of metal and glass set on a concrete base. Schedule and route information, lighting and telephone services will be provided. Total cost of the shelter project is expected to be about $300,000 with a substantial portion of the cost to be financed through a federal grant.

• Location and identification of bus stops became part of our program because operating speed is an important element of good transit service. Attractiveness of the service depends to a great extent on the speed of the ride, and greater speed lowers operating costs. Spacing between stops is a major factor in determining operating speed.

Bus riders in the Twin Cities can now board at nearly any street intersection along a route. The space between stops averages slightly more than 500 feet.

The MTC plans to reduce the existing number of stops from 5,500 to 3,230 with an average spacing of 750 feet. Route information signs will be erected at major stops. The sign program is estimated to cost approximately $70,000 with local governments, the Minnesota Highway Department and the U.S. Department of Transportation sharing in the cost.

• Computer scheduling could be inaugurated to meet the constantly changing conditions and passenger's needs. A range of factors — varying from temporary street detours to increased service demand in newly developed areas — can substantially affect a transit system's operating schedule. Manual scheduling methods which are used throughout most of the transit industry today have failed to provide flexibility to meet changing service requiremens and optimum scheduling at minimum costs.

Electronic computer scheduling would provide fast, economical, and continual testing of alternate system schedules, prompt response to changing needs, and time and cost savings.

• Two-way radio operation, besides improving street operations and reducing supervisory costs, can also provide additional benefits. Among the advantages are greater flexibility and speed in solving service problems on the road, deterrent to vandalism, rowdyism, or holdups, close contact with police and fire departments for quick attention to emergencies, rapid notification of road and traffic conditions to allow schedule changes, public service information, and possible use of radio for check-in and check-out of drivers.

• Reserved lanes for transit vehicles are in use in a number of major U.S. cities — including Minneapolis, where buses enjoy use of the Nicollet Mall, a street that is closed to general traffic. Properly applied, the system does not benefit transit vehicles alone. Instead, by separating buses from other vehicles, it speeds movement of all traffic.

Simpson & Curtin designated five potential routes for reserved bus lanes. Three are in Minneapolis — Hennepin Avenue, Seventh Street, and Eighth Street. The other two are in St. Paul — Seventh Street and Eighth Street. The MTC plans to work with city officials on this program.

Buses operating in mixed traffic rather than the reserved transit lane concept is proposed for Interstate 35-W in Minneapolis and southern suburbs. There — with the help of a federal grant — the Commission, Metropolitan Council, and the Minnesota Highway Department, are about to initiate a demonstration program that will include special freeway-access facilities for transit vehicles whatever the condition. (Additional details — See Page 16.)

• A related research proposal is that of giving buses preferential treatment at some intersections by providing drivers with a means of activating traffic signals. The plan is designed to increase the speed of bus operations. This proposal, however, is not being proposed at this time until additional traffic studies can be made with the traffic engineering departments in Minneapolis and St. Paul.

CAPITOL IMPROVEMENT PROGRAM*

EXPENDITURES	FY 1970 Estimated	Proposed FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	Total
Mound Buses	96,631	.....	.....	.....	.....	.....	96,631
Dickenson Buses	15,700	.....	.....	.....	.....	.....	15,700
Small Buses	.....	277,775	.....	.....	.....	.....	277,775
Acquisition of TCL	.....	**	.....	.....	.....	.....	**
Bus Fleet Renewal Program	.....	3,836,800	3,594,000	3,701,000	3,812,000	3,926,000	18,869,800
Bus Shelter Program	.....	68,200	74,000	72,000	74,000	.....	288,200
Bus Stop Signs	.....	69,300	.....	.....	.....	.....	69,300
Public Information Program	.....	219,400	.....	.....	.....	.....	219,400
Two-way Radios	.....	.....	642,000	.....	.....	.....	642,000
Remote Signal Actuation	.....	.....	13,000	.....	.....	.....	13,000
Total	112,331	4,471,475**	4,323,000	3,773,000	3,886,000	3,926,000	20,491,806**

*Capital improvement program to be 2/3 funded by U.S. Department of Transportation.
**Purchase price of TCL to be determined (1970).

• The MTC will also closely examine the route structure itself to determine if the routes now operated are serving the public to the greatest advantage.

The MTC will evaluate routes on the basis of route location, speed of service, and service to expanding suburban areas and urban centers.

• The final element in the 13-point plan for improving bus service will be a restructuring of fares and transfers. The existing zone fare system used by Twin City Lines has many built-in inequities. For example, a rider can take a bus nearly six miles north or south of downtown Minneapolis for a basic fare. But westbound riders have to pay an additional zone charge after a ride of only three or four miles. Intercity riders have to pay a double fare as soon as they cross the Minneapolis-St. Paul city limits.

The MTC is looking at a fare plan that would be based on straight-line distances from the centers of the two major cities, without regard to municipal boundaries.

PHASE II — A CONTINUING PROGRAM

Background

Studies completed under Phase I and Phase II represent the latest major steps in a sequence of analyses leading to major improvement in public transportation in the Twin Cities area. In 1962, the Joint Program, an inter-agency task force, was created to coordinate efforts in transportation and land-use planning. The major policy statement of the Joint Program, the Metropolitan Development Guide, was made public in 1967. The Guide points to the need to integrate transportation systems with the homes, jobs, and other acivities they serve, and stresses the importance of a more balanced transportation system to avoid continued reliance on the private auto in the future.

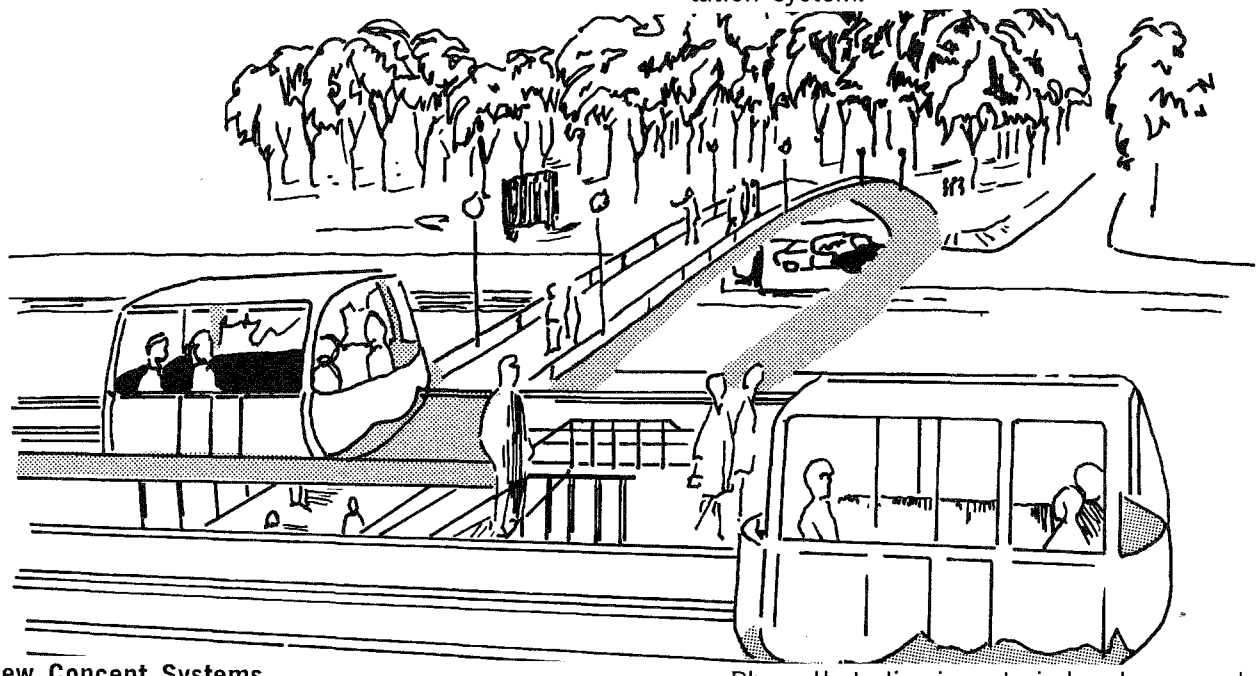
In 1967 the Joint Program participants were asked to consider four possible alternative patterns of regional development, the travel demand generated by each, and to determine the most adequate express transit system for each. This study, using the traditional cost versus revenue criteria for establishing "feasibility", concluded that the Twin Cities area could not support an extensive rail rapid transit system. The Joint Program consultant went on to recommend a system of buses which would operate partly on its own separate roadways.

Before accepting the recommendation of this brief and limited study, Joint Program participants decided that developments in transit technology should be researched to see if a better alternative would be available in the future. With a small vehicle, it was thought, a new unconventional form of transit system could perhaps be structured that would be better suited to urban growth characteristics and travel patterns in the Twin Cities area. This new concept could constitute the "missing link" between the conventional rapid transit systems and the private automobile. Because of the area's relatively low-density development and its orientation to the private automobile, it was sup-

posed that a system using smaller vehicles would be less costly to build per mile than large-vehicle, conventional rapid transit. This way, many more miles could be built for the same amount of money, servicing a much larger area. It would be fast enough to compete with the automobile so that more people would leave their cars at home.

It was argued that a system with smaller vehicles carrying fewer passengers would not be a disadvantage because travel in the area is not concentrated, but relatively dispersed. The Twin Cities just did not seem to need the large-capacity of a conventional rapid transit system.

This was the thinking that prevailed when the MTC was created in 1967. As a new Commission specifically charged with transit planning responsibilities, the MTC would conduct an inventory of all new-concept vehicle systems; it would select the most appropriate one and establish the location and length of its lines; and determine its costs and benefits. This became the original objective of the Phase II study. As it turned out, the study produced different results: guidelines and recommendations to illustrate a sequence of events to the community starting with bus system improvements that would eventually lead to a regional rapid mass transportation system.



New Concept Systems

Phase II studies inventoried and assessed nearly 100 new vehicle systems in different stages of research and development throughout the world. In one of the new concept systems analyzed by the MTC consultants, the area covered by the system would approximate that of the private automobile; that is, it would be almost as extensive as the street system. Service would be nearly "door-to-door" and vehicles would be small and electrically-powered. They would have a separate exclusive right-of-way or, more likely, they would be driven on the street system for part of the trip and then hooked into a special guideway with automatic control. This is called dual-mode operation.

If we do not know the probable net gains of waiting, we **do** have a good idea of the net losses involved. Travel demands will continue to increase with population growth. There will be either undue

congestion or mounting pressures for constructing more roads. Valuable park land will be lost and homes and businesses will be torn down. Urban development will continue to spread at low densities; travel times and distances will be longer, and concentration of development in major centers and the survival of the downtowns will be impaired. Low regional densities and ever increasing reliability on the private auto will make it much more difficult to build rapid transit successfully later.

These are not idle speculation. Twenty years ago, urban development and travel patterns in the Twin Cities area were more compatible with rapid transit than they are today. If rapid transit had been built then, we would have a more balanced transportation system today.

Thus, Phase II studies concluded that since major improvements in transit service are necessary and should begin right away, a totally new concept such as single vehicle systems cannot be properly and realistically considered as the basis for planning the area's transit system.

The best of today's transportation technology can then be the basis for the continued planning of mass transit. The concept will be a family of vehicles system consisting of (1) rapid transit operating on its exclusive right-of-way as the backbone of the system to provide trunk service between major centers for high volume travel corridors; (2) express buses operating in mixed traffic for trunkline service in the less congested corridors; (3) local and feeder bus service to complement the trunklines in low density areas; and (4) passenger distribution service within certain major centers. Planning will proceed on this basis.

The MTC will continue to monitor, research or demonstrate technological developments in order to apply them to the component parts of the transit system, when suitable and as they become available in the future. New technology could, for instance, provide transit service in specific parts of the metropolitan areas, such as dial-a-bus[1/] and automated small vehicle systems for certain areas.

Certain dual-mode systems would practically mean duplicating the highway system resulting in high system costs as well as extensive social and environmental costs; due in part to the large amounts of land required at interchange points, as well as in areas near the downtown, where the build-up of traffic volumes would be handled by many parallel guideways. Safe operation at high speeds would demand more reliable automatic control systems than now exist. Because it uses so much land for right-of-way, this system would have essentially the same negative impact on the urban environment as the automobile. It has been said, with some validity, that this concept would amount to little more than a "redesign of the automobile". The major difference would be the reduction of air pollution.

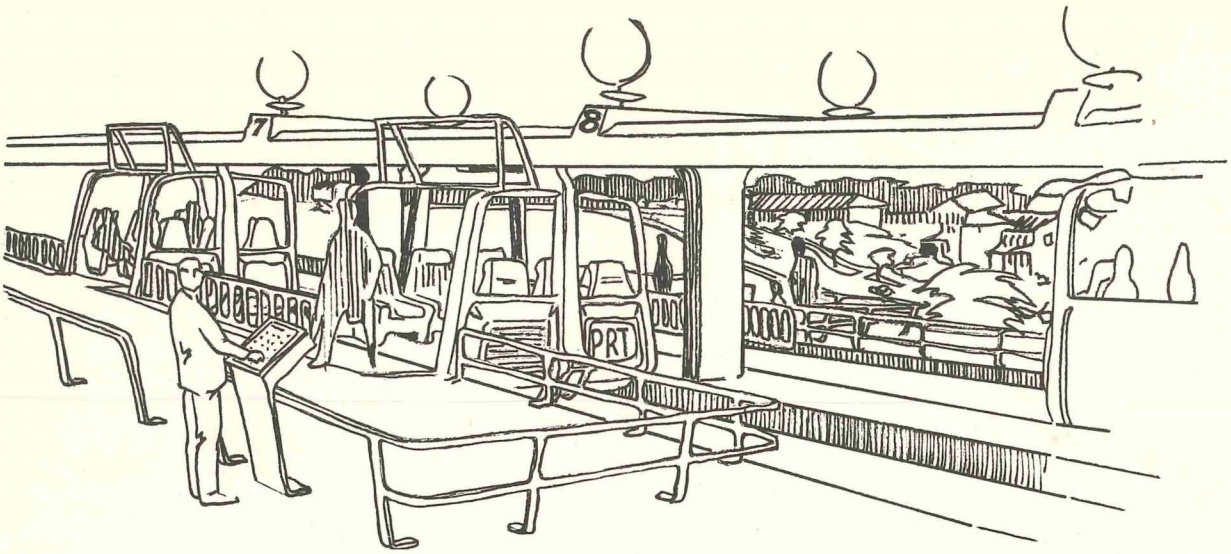
Also considered in Phase II was the concept called "origin-destination (O-D) transit modes". In this system small vehicles would run on a network of lines or guideways, reaching a wide enough area to be within walking distance of most people. All lines would be inter-connected so that trips could be made without transferring between any two stations in the metropolitan area. People arriving at a station would "call" a vehicle much like they would a standard elevator. Once in the vehicle, riders would select their desired destination station. The riding time would be considerably shorter than in conventional rapid transit systems because all intermediate stations would be skipped, permitting the vehicle to maintain a high speed.

Phase II consultants found that many of the problems of the dual-mode systems discussed previously would be common to this concept. An extensive network of elevated guideways would be objectionable to the community, but extremely costly if built underground.

No automated command and control systems have yet been developed that can control the operation of vehicles traveling close to one another at high speeds, and perform day in and day out under real-life, fail-safe conditions. Automated systems capable of controlling vehicles changing direction and switching from one line to another are even further in the future.

These technical problems must be resolved before these new concepts can be seriously considered for public transportation systems of any urban area. Most of these systems have yet to go from original conception to actual construction and operation. This long process includes engineering design, scale models, production and construction cost feasibility analysis, and, ultimately, construction and testing in realistic operating conditions.

All these uncertainties make it impossible to evaluate the benefits and costs of waiting for a suitable new concept. We simply do not know when this will take place, and, apart from the probable right-of-way costs involved, we do not really know how much we would actually have to pay to build and operate such a system.



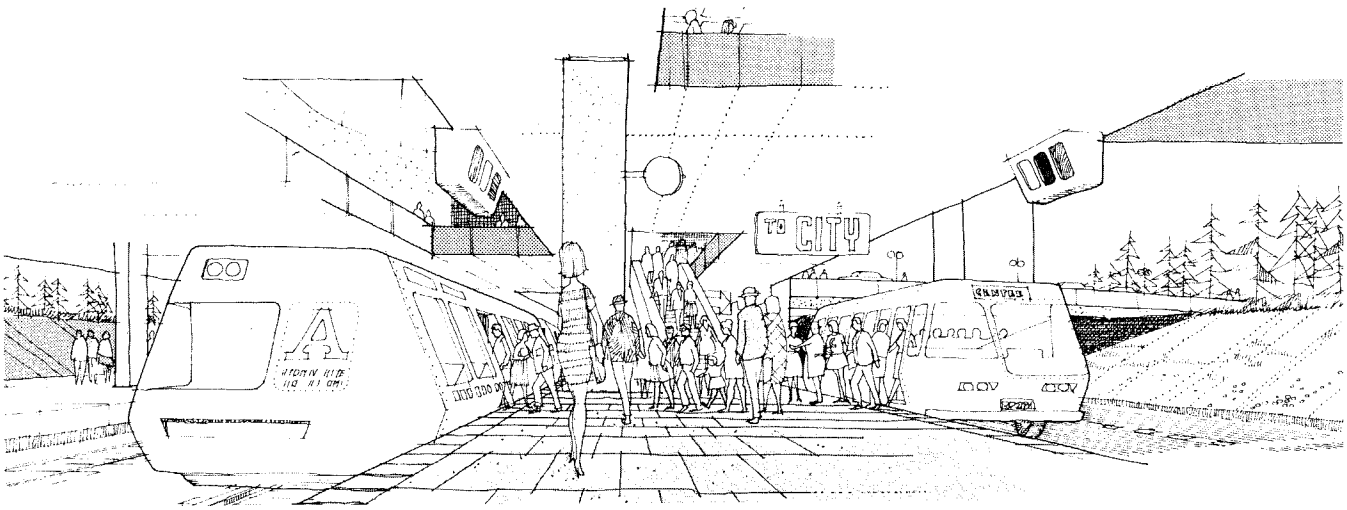
Future Transit System

The basis for the future mass transit system recommended for the Twin Cities area by the Commission's consultant, A. M. Voorhees & Associates, is illustrated on page 21. This recommended system is not a plan in the strict sense of the word. There is no official commitment to its construction. Therefore, it would be more appropriate to regard it as the concept of a plan and the features as illustrated are schematic only. In this sense, this recommended system would be more a "first approximation" in the process of developing and preparing an actual plan of exact routes and station locations:

Transit planning like all planning, is an open-ended, continuous process, which is never really complete due to the dynamic nature of the environment in which planning takes place: constantly changing transportation needs, technological innovations, population and urban development growth trends, fiscal policies and political atmosphere. A plan must be responsive to these changes and must, therefore, be modified correspondingly as often as necessary. Nevertheless, it is important that the ultimate result of the process, however tentative, be in view at all times. This is necessary to provide a basis for public discussion, to give direction to future planning efforts and to give dimension to anticipated financial requirements.

Using material developed from the consultant's report, the Metropolitan Transit Commission gave consideration to resources available in the area and formulated a basic concept for transit as an integral part of a transportation system for the area.

This basic concept calls for four distinct but fully integrated elements which together would provide a high level of transit service to the entire metropolitan area: rapid transit operating on its exclusive right-of-way; express buses; local and feeder buses; and passenger distribution systems.



Rail-Bus Transfer Terminal

Rapid Transit

Phase II studies compared vehicle systems by their ability to:

- Reduce air pollution, noise, and pedestrian conflicts.
- Reduce the requirements for additional freeways in existing urban development.
- Encourage a more structured regional development pattern.
- Provide for expanded mobility for non-car users.
- Improve peak hour mobility.
- Increase all weather transportation reliability and comfort.
- Improve the competitive posture of the Twin Cities area for economic expansion.
- Contribute toward a viable solution to the long-range transportation problem.
- Present an acceptable public image.
- Provide for reliable and safe public investment.
- Reduce transportation system costs

The above criteria are broader and provide a more proper evaluation framework than the traditional cost-benefit criteria. In the consultant's evaluation of seven alternative vehicle systems selected for detailed study, rail rapid ranked the highest.

The evaluation concluded that the system of buses operating on busways offered nearly as many advantages as rail transit. These two systems cost about the same to build and operate, assuming that both would offer an equal level of service to the downtown areas, which in either case would have to be in tunnels. Patronage for both systems would be nearly the same.

Unlike buses, rail rapid transit is reliable and safe under any weather conditions. This is particularly an important consideration in the Twin Cities area. Buses, even when running on separate roadways, could be seriously impaired by weather conditions. High volume bus operation in busways

under the downtown areas could present serious construction and operational difficulties such as greater width required at stations, extensive ventilation, and the need for accurate programming of buses.

In summary, it is the judgment of the consultant that rapid rail transit is to be preferred in this instance because of its higher capacity to handle long range traffic growth, its all weather reliability and safety, and its higher level of public acceptance.

The consultant's recommended eight major rapid transit corridors, comprising an ultimate network 71 miles long, to be built in stages. High speed, fully automated rail rapid transit was recommended for the first stages. The trains would be comfortable, modern, and electrically powered, thus precluding additional air pollution to the environment. Technological developments such as new propulsion systems now under research, and more advanced automatic fare collection and train control systems would be incorporated as well.

The rail rapid transit system described by the consultant would be underground in the downtown areas of Minneapolis and St. Paul, allowing for direct penetration and high accessibility to these areas, without interference or added congestion to the surface traffic and other activities. Elsewhere the rapid transit system would probably be mostly above ground to reduce construction costs, either in open cut or in esthetically-pleasing elevated structures.

Access to the system would be through attractive convenient stations which would provide direct connection to feeder bus service, pedestrian access to nearby points, and space for automobile parking.

Fares would be collected in the stations through use of automated equipment which would allow for varying fares depending on length of ride. The fare collection system would be capable of accommodating purchase of individual rides, use of prepaid multiple ride cards for regular commuters, and would allow a single fare for each trip even though the trip might involve use of both feeder bus and express transit.

Later stages of the network could take advantage of the latest developments in transit technology, such as station-to-station small vehicle systems, similar to those described earlier.

The Metropolitan Transit Commission, in reviewing the consultant's recommendation, expressed the desire to take maximum advantage of the latest developments in transit technology. Therefore the Commission modified the recommendation of rail rapid transit and substituted the term rapid transit on exclusive right-of-way in the family of vehicles system. This was done to permit further consideration of new concepts in rapid transit.

For the immediate future, rail rapid transit will be used as the "yardstick" system for cost estimating and for purposes of physical planning. This technique will not preclude choice of an alternative trunkline vehicle system.

Express Bus Network

Express bus service is an important component of the recommended regional transit system. Extensive use of express buses is proposed on existing and future freeways, expressways, and major arterial highways. Express buses could run on major streets in the outlying areas and then take freeways, stopping only at major destinations. Some express buses would be routed from communities on the fringe(s) of the metropolitan area to rapid transit stations.

Express bus lines would offer fast dependable service to outlying areas where exclusive right-of-way rapid transit is not proposed. They will also provide interim service in the travel corridors where

right-of-way rapid transit would later be built.

Under present conditions, express bus operations would be subject to the same congestion experienced by auto drivers on freeways in the vicinity of the downtown areas. To provide higher speeds and more reliability in the schedules of express bus routes, the recommended system could possibly incorporate an innovative concept: freeways would be "metered" to monitor traffic flow. Access of private automobiles and trucks to the freeway would be regulated to keep the volume of traffic from exceeding the capacity of the road under varying climatic and other operating conditions. Buses would be given preferential access to the freeway, through special ramps.

This concept offers a lot of promise, but has not been fully developed. The Metropolitan Council, the Metropolitan Transit Commission, and the Minnesota Highway Department will soon be testing the concept in an actual demonstration on Interstate 35-W between downtown Minneapolis and Burnsville. One of the main purposes of this project is to determine how the public reacts. People may not like to be denied access to a freeway, even if temporarily. If this concept works, it may be applied to other freeways where parallel arterial roads are adequate to carry the overflow traffic. This concept could possibly even eliminate the need for certain rapid transit lines with low patronage and high social, environmental and economic costs.

Feeder and Local Bus Network

The recommended transit system includes an extensive network of feeder bus lines to complement the rapid transit system. Buses would provide local service within and between communities in the metropolitan area and would also carry passengers to rapid transit stations.

Feeder and local bus lines can also take advantage of future innovations as they become available. One such innovation currently being researched is called Dial-A-Bus. Customers would telephone a central controller either from home or from a street station and indicate their starting time, origin and destination. The central controller would contact a bus with a compatible route and dispatch it to pick up the passenger. A signal on a special panel in the home would announce the approach of the Dial-A Bus. The service would be similar to that of a taxi — but cheaper, since several people share the vehicle. It would be more attractive than conventional buses since it offers door-to-door service. The federal government is researching this innovation and it may be ready for further demonstrations shortly.

Feeder service could also be improved using a small car or cart with electric motors, which would be available on a short-term, inexpensive rental basis at a transit station. This innovation, also being studied by the federal government, promises better access to the rapid transit system in low density areas, where good bus service is too expensive to provide.

Major Center Network

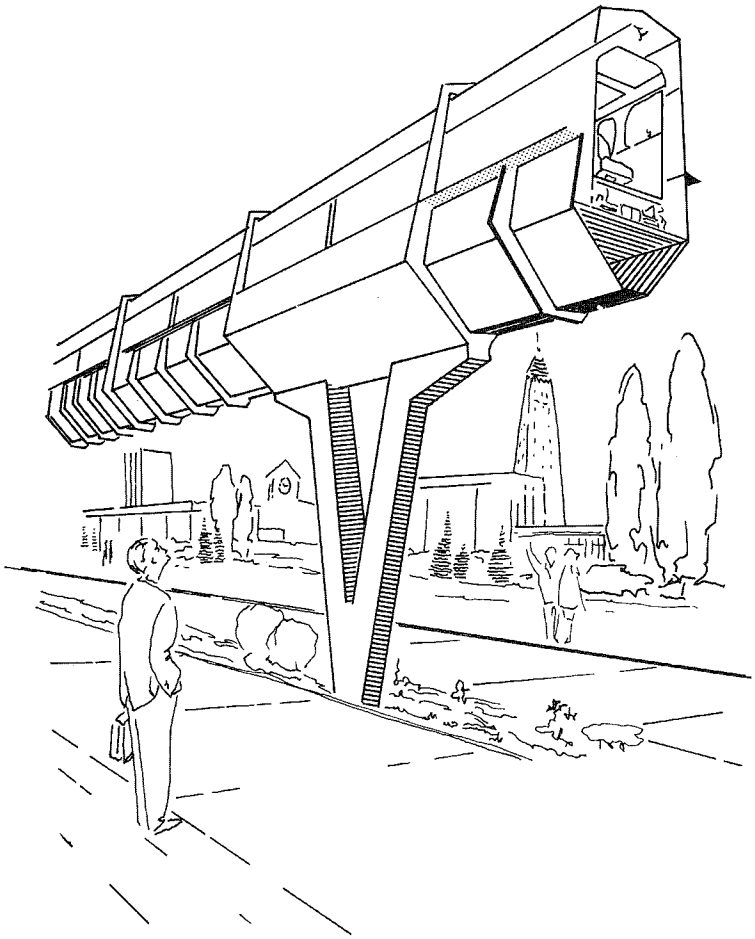
Special passenger distribution systems are rec-

Customers desiring Dial-a-Bus service could telephone the controller from home and indicate their desired starting time, origin and destination. A signal on the panel might announce the approach of the Dial-a-Bus.

ommended for specific transportation needs within areas of high activity such as the two downtown areas, the University of Minnesota campuses and the new suburban "major centers" contemplated in the Metropolitan Development Guide. The internal circulation needs of these areas and access to the rapid transit stations could be handled better with small vehicle distribution systems, such as a mini-bus fleet or an elevated guideway system. Several are currently being developed for airports across the nation.

Rapid Transit Routes

The rapid transit corridors shown schematically on page 19 were recommended on the basis of their estimated future patronage, the need for service to people with low incomes, forecasts of the future location of homes, jobs and other activities, and relief to existing highway congestion. In some travel corridors of the metropolitan area, travel demands are expected to grow considerably in the future, and at the same time highway construction will be particularly difficult, controversial, or costly. This factor has also been taken into consideration in the location of the recommended corridors.



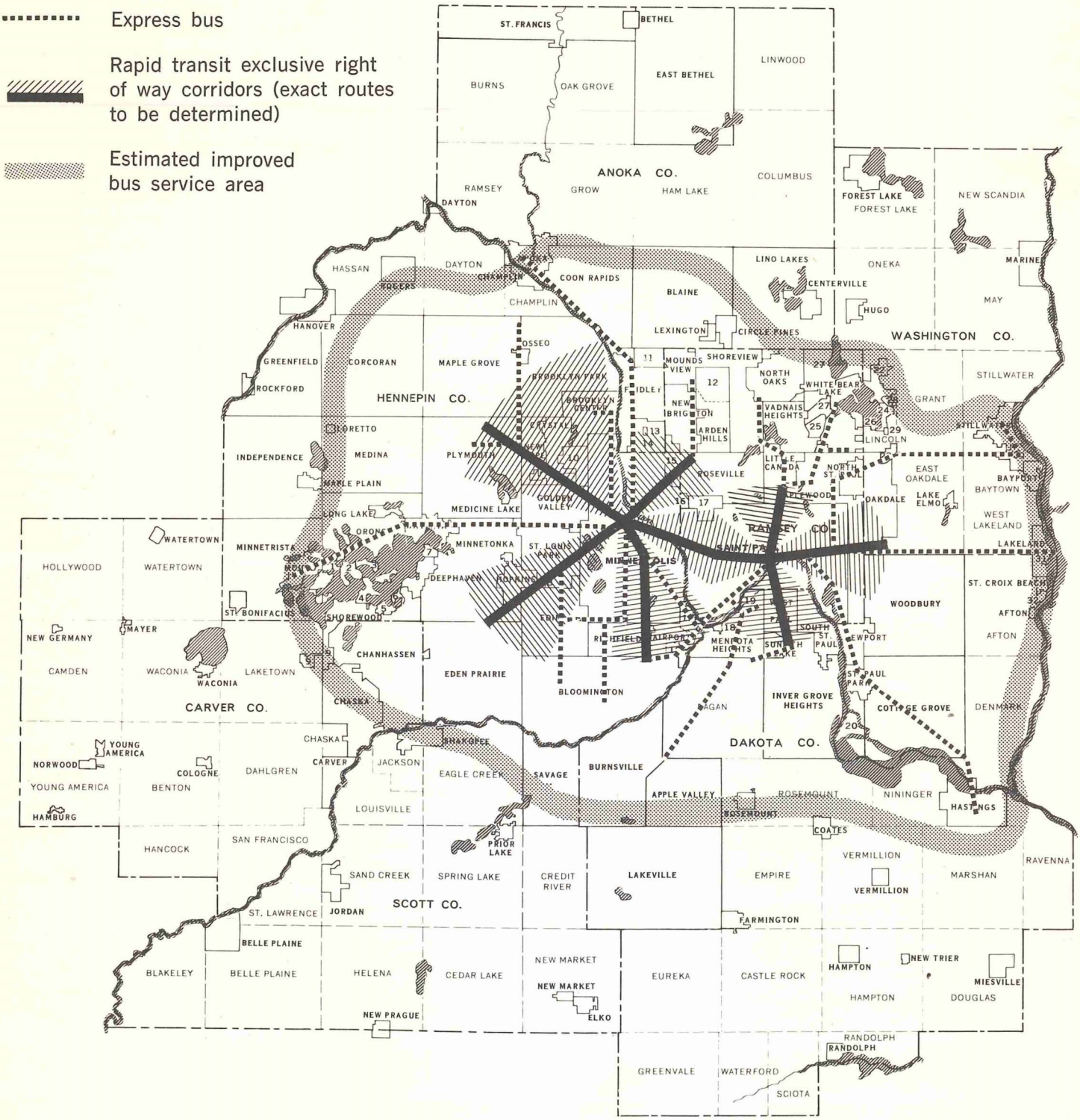
Nevertheless, the consideration given to these factors in Phase II studies has necessarily been limited. For this reason, the location of recommended corridors is only tentative. Detailed studies of the alternative alignments within these corridors giving full weight to the above considerations is and will be carried out before a more definite recommendation is made. More direct participation of public agencies other than the MTC is needed in future studies and the planning of these routes. Also, more active participation by the residents of the Twin Cities area is required. Future studies and the involvement of the community in all stages of the program may very well result in the modification of the recommended rapid transit corridors.

TRANSIT PLAN CONCEPT

Express bus

Rapid transit exclusive right of way corridors (exact routes to be determined)

Estimated improved bus service area



Staging

It is not necessary to build all the rapid transit lines included in the recommended system at the same time. These routes do not all have the same potential patronage, impact on urban development, nor relief to traffic congestion, nor do they provide increased mobility for people who depend on public transportation.

If all the rapid transit lines were built within a few years, say by 1980, the costs of the systems would no longer be proportional to the benefits derived by the community. Undoubtedly, these benefits would increase in the future, and eventually such a decision would begin to pay off. But in the meantime we would be getting less than we would be paying for, and perhaps could not even afford.

The rapid transit system should be built gradually. The consultants to the MTC, after reviewing the relative transportation problems in the different corridors, have suggested three stages: an initial line 19 miles long by 1980, 31 additional miles by 1990, and 21 more miles sometime later, to obtain an ultimate network 71 miles long.

However, work still remains to be done to determine the best staging sequence. This can only take place after there has been more direct participation and involvement in the transit planning process by other metropolitan agencies and municipalities, policy-makers, and the community at large.

The suggested staging should not be regarded as an inflexible construction program. Much more importantly, staging has been developed to show that a rail rapid transit system need not be unduly expensive if implemented gradually. For example, the recommended system, if staged as proposed by the consultant, would construct high use trunks early enough so their revenues can be applied to further construction at a cost saving of ⅓ the cost of the complete system built initially. The cost of 12¢ per passenger-mile[1/] compares favorably with those in other cities in the U.S. building or planning for rapid transit, and would actually be lower than the cost of commuter travel by automobile in the Twin Cities in 1968.

As is the case of highway construction, different schedules for building the rapid transit part of the

total transit system will have different implications on the patterns of urban growth and travel in the metropolitan area. But whatever order of priorities is ultimately agreed upon, it must reflect the relative needs and problems of the different parts of the area. Those sectors of the region that need transit more acutely and those that rapid transit is more suited to should have first priority. This does not mean that other areas will be ignored in the meantime. With the proposed initial program for express bus routes and complementary feeder and local service, all sectors of the metropolitan area would be served according to the nature and magnitude of their needs.

Financing

Public works of this type are usually evaluated on the 20-year costs of construction and operation. That part of the system as proposed for construction by 1990 would cost approximately $450 million based on 1968 prices. The ultimate system, with 71 miles of rapid transit would cost $862 million. These costs cover purchase of right-of-way, construction of station facilities, yards, shops and guideways; and all vehicles, including buses. Cost estimates are based on 1968 prices and must be adjusted to projected economic conditions for the estimated construction periods. These estimates need to be more precise before any commitment of funds to building the system is made, and will be refined with more detailed route location studies as proposed.

The system recommended by the consultant would carry approximately 100 million passengers per year by 1990, producing revenue in excess of $27 million based on current fares. On the same basis, operating costs would be four cents per ride over revenue. They are included here to give an idea of the magnitude of the proposed system.

If the system is built in the suggested stages, the annual net cost[1/] would total $23.3 million by 1980, increasing to $35.5 million by 1990. Most of these funds would come from federal grants which are available under the provisions of the Urban Mass Transportation Act of 1964, as amended. The Act provides for a two-thirds federal grant to be matched by a one-third local contribution. Congress is considering a bill which if passed, will expand the federal program, thus increasing the probability of obtaining these funds for the Twin Cities area.

The local share of the funds could be obtained in several ways. The Commission, in cooperation with the Metropolitan Council, will soon begin a study to determine which revenue sources would be adequate to evolve a transit development program from an express-bus network in the 1970's to a system containing exclusive right-of-way rapid transit in later years.

1/"Capital and operating cost less gross revenue. Capital costs amortized at 6% for 40 years for fixed facilities, for 20 years for rail cars, for 12 years for buses."

Urban Development Opportunities

The impact that rapid transit can have on urban development and the environment is enormous. This impact can be positive and when encouraged and properly guided, it is one of the major benefits derived from the development if a rapid transit system should take place together with establishing more positive controls over land development than are now in use. This is necessary in order to accomplish the goals for regional urban growth contained in the Metropolitan Development Guide which call for concentration of development in certain areas, as well as to assure the effective utilization of the transit system.

More orderly land development and exclusive right-of-way rapid transit go hand-in-hand. While this type of rapid transit requires some concentration of development to operate successfully, trunkline vehicles operating in mixed traffic do not. Thus, the basic objectives of the "major centers" policy and the proposed "family of vehicles" system coincide and are mutually reinforcing.

Nevertheless, the transit system cannot shape urban development by itself. Other tools are required, including zoning, open space, and sewer policies. The MTC consultants have suggested that still more land-use controls may be needed. This recommendation is consistent with the feelings of the Metropolitan Council in this regard, and will be coordinated with the Council's development programs in the years ahead.

Considerable study is necessary to determine the nature and feasibility of applying whatever new tools are required. Planning studies are programmed to deal with this analysis, and will be undertaken shortly.

Program For The Nineteen Seventies

Constructing a regional transit system is a major public works project which will require many years to complete. Time is required to carefully plan and program the development of the system in order to channel its impact in positive directions and insure the most benefits possible.

Considering the time required for more detailed planning, engineering design, right-of-way acquisition and construction, the earliest that any of the proposed routes could begin to operate would be about 1980.

In the meantime, only improving the existing bus system will provide better service to the people

who depend on public transportation. The initial improvements are described in the Phase I report.

However, it should be pointed out that these improvements cannot in the long run satisfy many of the goals for transit, set forth in the Metropolitan Development Guide. Even a highly improved bus system on a network of express bus-lines would have little impact on "shaping" regional growth, reducing the need for additional freeways, providing a real solution to transportation problems or providing adequate service for those without cars in the long run unless such a system has exclusive rights-of-way in the congested corridors. Thus, it appears important to establish an acceptable long-range transit program and, once established, the Commission should initiate an express bus network utilizing existing facilities and metered freeways during the 1970's.

The Tasks Ahead

The next step toward implementing a long-range transit development program is to refine the recommended family of vehicles to assure area-wide service. Extension of rapid transit to new major activity centers in outlying areas should receive special attention. Criteria for determining the level of service on trunk facilities needs to be established in sufficient depth to give adequate attention to the linking of outlying major centers.

Staging of all elements of the system should be re-examined and the system should evolve similar to the highway system; evaluating and applying the most advanced technology available at the point in time in which any increment is added. All staging should be accomplished after reassessment of passenger needs and development opportunities.

The initial sequence of activities will be to sketch out all elements to establish the workability of the system. Attention will then focus on those elements — trunklines and circulation systems — requiring separate right-of-way. The more flexible express bus lines, feeder and local systems will be integrated with the separate right-of-way systems as they are firmed up.

Broadly-based benefit/impact studies are considered an important part of transit determinations. Included are studies of environmental impact, social impact, and urban development impact as well as the more conventional cost/benefit determinations. Such studies in part reflect the growing recognition among the public as well as among professional transportation planners that conventional cost-benefit criteria are not sufficient alone as determinants for decision-making.

More refined cost estimates than were possible in Phase II for the proposed system are an essential component of further transit planning studies. These estimates will form the basis for detailed feasibility analysis of the system components, establish a more definite staging sequence, and determine funding requirements.

A financial resources study will be made to

establish the most adequate way to fund the system at the several stages of evolution. Analysis of various types of benefits as well as fiscal source availability will assist in developing recommendations on the relative use of these resources.

All of the above studies will be carried out jointly with the Metropolitan Council, Minnesota Highway Department, Minneapolis and St. Paul, and other municipalities and counties of the metropolitan area through the region's Transportation Planning Program.[1/] Close cooperation with the Metropolitan Council is especially needed to detail the plan as it affects the development of the "major centers".

The Commission will present a mass transportation concept plan and development program in a report to the 1971 Minnesota Legislature. Many of the above studies will be completed during 1970, and together with the Phase II results will make up this report. With approval by the 1971 Legislature, the MTC could continue the program to delineate actual routes, station sites, and other components of the system. The resultant comprehensive transit plan will mark the first clear determination of the capabilities of modern rapid transit for the Twin Cities area. Until this is accomplished, confusion will continue to exist particularly for those participating in public hearings for highway projects, as to the role of rapid transit in our balanced transportation development program.

Citizen Participation

Twin Citians will be invited to participate in the preparation of the transit plan. Citizen participation is needed at all stages of the program beginning with a critique of previous planning establishment of objectives, and extending through route selection and design. Lines of communication will be established and maintained which will not only seek the views of those affected by the program but demonstrate to them that their views receive full and sincere consideration in developing the transit plans. This is needed because, if the transit plan is not fully understood by the people who will be paying for its implementation, it will have little chance of being accepted.

The Transit Commission and its staff have initiated a community involvement program as part of the continuing transit planning process. This activity will be intensified in coming months as more detailed planning studies gather momentum.

1/The Transportation Planning Program is an inter-governmental metropolitan program having the general objective of bringing about a metropolitan transportation system adequate for future needs. The Program is built around three committees and a staff unit under the Metropolitan Council. The Management Committee consists of the chairman of the Metropolitan Council and the Commission; the Commissioner of Highways, and one municipal and one county representative selected by the Metropolitan Section of the League of Minnesota Municipalities and the Metropolitan Inter-County Council.

The Management Committee functions, not as a policy group on its own, because each member has the responsibility to represent the consensus of his own governing body, but rather as a management group to steer and expedite the planning process for a balanced transportation system in the Area.

The Management Committee is assisted by two advisory committees: a Policy Advisory Committee, made up of 15 elected officials, both county and municipal; and a Technical Advisory Committee, made up of 24 engineering and planning representatives of the cities, counties, and other agencies involved in transportation planning for the Area.

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