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# Paul Downtown People Mover

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A Report to the  
1979 Minnesota State Legislature

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March 1979

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300 Metro Square Building, 7th Street and Robert Street, Saint Paul, Minnesota 55101 Area 612, 291-6359

March 14, 1979

TO: Members of the Minnesota Legislature

Two years ago the Minnesota Legislature directed the Metropolitan Council to submit a report to the Legislature of its findings on the proposed St. Paul Downtown People Mover. The report that accompanies this letter is the Council's response to your directive.

The Council's findings relative to the DPM project, adopted March 8, 1979, are contained on pages 3 through 9 of the report.

The most significant finding (No. 7) places the Council in agreement with the conclusion of the consultant retained by the Council, Charles River Associates, Inc., Boston, Mass., that the project is "financially feasible" if certain additional commitments are secured. The additional commitments would require the escalation of DPM revenues at the same rate that operating costs increase, and the assumption by the federal Urban Mass Transportation Administration of extraordinary start-up costs of the system.

Transmittal of the report at this time is in compliance with a requirement that the Council present its findings on the DPM project within 30 days following its receipt of a preliminary engineering and feasibility study conducted for the project sponsors, the City of St. Paul and the Metropolitan Transit Commission.

I and members of the Council staff would welcome any opportunity to be of further assistance to the Legislature in its discussions regarding the project.

Sincerely,

Charles Weaver  
Chairman

CW/poc

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## INTRODUCTION

Minnesota Laws Chapter 454, Section 45, Subdivision 1 and 2, passed in 1977, require the following:

1. Authorizes the Metropolitan Transit Commission (MTC) to participate in a Preliminary Engineering (PE) Study for the proposed Downtown People Mover (DPM) under a joint powers agreement with the City of St. Paul.
2. Establishes the membership of a Steering Committee to direct the project.
3. Requires that the PE Study include a feasibility study.
4. Directs the Metropolitan Council to evaluate the PE Study upon its completion.

The feasibility study to be included in the PE Study was to consist of:

1. An analysis of the prudent and feasible alternatives to a fixed guideway transportation system that will achieve the development objectives and other goals of the people mover project.
2. A study of the potential people mover ridership.
3. A review of the economic development assumptions used in predicting the economic benefits from the project.
4. Formulation of a specific plan that establishes the sources and method of payment of operating deficits and capital cost overruns of the project.

The statute instructed the Metropolitan Council as follows:

"The Metropolitan Council shall independently evaluate the preliminary engineering study upon its completion. The Council shall submit a report of its findings to the Legislature and the Steering Committee created under the joint powers agreement no later than 30 days following the submission to the Council of the completed study. The report shall include the Council's findings with respect to the reasonableness, accuracy and reliability of the assumptions and conclusions of the study. The Council shall give particular attention to the matters required to be included in the feasibility study. The Council shall contract with an independent private consultant to carry out the duties imposed by this section".

In May 1978, the Council contracted with Charles River Associates Inc., Boston, Mass., to carry out the independent evaluation mandated by the Legislature.

## Organization of the Report

Findings made by the Metropolitan Council on the Preliminary Engineering Study are presented after the introductory section. An Executive Summary of the evaluation report prepared by Charles River Associates, (CRA) follows the Council findings. The report concludes with two appendixes: one, remarks on the evaluation report from the consultant group that prepared the PE Study (BRW/Kaiser Engineers); and two, closing remarks from CRA.

FINDINGS ON THE PRELIMINARY ENGINEERING REPORT:

Findings, based upon the CRA evaluation report, are presented below to determine the reasonableness, accuracy and reliability of the assumptions and conclusions of the PE Study. Major conclusions for each chapter of the PE Study are briefly summarized and are presented before each finding. Two chapters of the PE Study have been omitted from this analysis: the "Introduction" provides background information only and therefore does not require any evaluation; the "Generic Description of the DPM System" contains general information with respect to the characteristics of the system and does not lend itself to evaluation. The assumptions of the PE Study will be discussed only when serious disagreement relevant to the final outcome of the PE Study has arisen.

1. Policy Framework:

Conclusion of the PE Study:

The PE Study concludes, after reviewing the Metropolitan Council's policies for the Metropolitan Centers, that the St. Paul DPM would underscore the Metropolitan Area commitment to strengthen the two Metro Centers.

Council Finding:

The CRA evaluation report supports the above PE Study conclusion in its discussion on "Consistency of DPM Development Plan with Council's Forecasts and Policies" (See page 19 of this report). Therefore, the PE Study conclusion is considered reasonable, accurate and reliable.

2. Role of DPM as an Economic Development Tool:

Conclusion of the PE Study:

The PE Study forecasts the following aggregate development growth for downtown St. Paul by 1990:

Residential Units:	3,386
Office (in square feet):	2,450,000
Retail (in square feet):	1,030,000
Hotel (in new rooms):	1,200

Council Finding:

The CRA report considers the above residential and office development reasonable and the retail and hotel development somewhat overstated. The CRA Report predicts the following aggregate development growth by 1990:

Residential Units:	3,386
Office (in square feet):	2,450,000
Retail (in square feet):	944,000
Hotel (in new rooms):	900

Conclusion of the PE Study:

The PE Study attributes the following development growth to the DPM system:

Residential (in housing units):	2,350
Office (in square feet):	1,040,000
Retail (in square feet):	450,000
Hotel (in new rooms):	675

Council Finding:

In the opinion of CRA, as shown in their evaluation report, the following development would be attributable to the DPM:

Residential (in housing units):	950 -	1,450
Office (in square feet):	450,000 -	825,000
Retail (in square feet):	181,000 -	227,000
Hotel (in new rooms):		442

Therefore, the development attributable to the DPM is overstated.

3. Route and Station Locations:

Conclusion of the PE Study:

Based upon an alternative analysis, 2.6 miles of two-way guideway, with a total of 13 stations, was selected as the preferred route for the DPM system study (see Page 54, Figure 18 of PE Study). It is understood that each system supplier will submit, as part of his proposal, the final guideway alignment, technology, and specific station locations; these items will be evaluated along with other items in determining the best DPM system for St. Paul.

Council Finding:

It is CRA's opinion that the PE Study decision making process for evaluating and selecting route and station locations was carried out in a fair and open manner.

4. Relationship of DPM to Downtown Development Plan:

Conclusion of the PE Study:

The DPM would act as a "horizontal elevator" providing access between six major activities areas (Lowertown, 7th Place, Arts and Science Center, State Capitol, Civic Center and Cathedral Hill). The DPM would also provide access to and from fringe parking facilities and would complement the skyway system and sidewalk level pedestrian amenities. In summary, the DPM would strengthen the future development of downtown St. Paul.

Council Finding:

The positive influence of the DPM in downtown development is reasonable based upon the finding that a portion of the development in downtown St. Paul is considered attributable to the DPM.

5. DPM Ridership:

Conclusion of the PE Study:

Based upon the "market potential" forecast, the 1990 ridership for the DPM is expected to be 46,815. A worst case (low development and -15% riders) would generate 37,733 riders. A best case (high development and +15% riders) would generate 57,012 riders.

Council Finding:

There is a disagreement between the PE Study figures and CRA's figures. CRA's analysis of the DPM ridership results in best- and worst-case 1990 estimates of patronage equalling 42,411 and 27,151 riders, respectively, based upon the market potential forecast for development. No ridership figures were estimated by CRA for other development assumptions. The CRA low ridership estimates (which could be even lower) are based upon their finding that many of the patronage model assumptions are inaccurate and statistically unreliable. (The financial implications of the discrepancy between CRA's and the PE Study's figures will be discussed when analyzing the financial plan.)

6. Costs and Benefits:

Conclusion of the PE Study:

The estimated capital cost of the proposed DPM system is not greater than \$90 million.

Council Finding:

In CRA's opinion the capital cost estimate is as accurate as can be determined at this time, and therefore is reasonable.

Conclusion of the PE Study:

The estimated 1990 annual maintenance and operating cost is \$2,644,000 (1978 dollars).

Council Finding:

The estimate is found to be reasonable in the CRA Report. Three major problems, however, could be encountered:

1. Extraordinary operating costs associated with system startup.
2. Higher operating-cost inflation-rate than the assumed cost-of-living inflation-rate in the financial plan of the PE Study.



3. Higher labor costs than anticipated.

The first problem could be solved if UMTA agrees to pay for extraordinary operating costs during more than the first year of operation.

The second problem could be solved if all parties involved in the financing of the system (MTC, City of St. Paul and private sector) agree to escalate revenues and deficit funding level at the same rate as the operating costs.

The third problem remains as an uncertain element in calculating operating costs.

Conclusion of the PE Study:

The private sector will benefit from the St. Paul DPM through incremental lease revenue, incremental retail profits and parking savings. The cumulative private sector benefits over a 7 year and a 40 year period are \$14.4 million and \$140 million respectively.

Council Finding:

Private sector benefits to CBD businesses attributed to the DPM system between 1984 and 1990 on an annual basis are found reasonable in the CRA Report. On a cumulative basis, however, in CRA's opinion the private sector benefit should be expressed in terms of present worth (discounted to reflect its value today). Under such an assumption, the 40-year benefits of the DPM system are \$60.5 million. If no incremental development is attributed to the DPM after 1990, then the cumulative 40-year benefit would be reduced to \$33.9 million.

Conclusion of the PE Study:

The 40-year total of public sector benefits attributed to the DPM are \$155 million.

Council Finding:

In CRA's opinion, the public sector benefit in a 40-year period would range between \$15 million and \$21 million if discounted to reflect its value today and no incremental development is attributed to DPM after 1990.

Conclusion of the PE Study:

The following regional benefits are identified although not quantified:

- Help to support a strong Metro Center
- Result in better use of existing public facilities (transit, sewers, etc.)
- Encourage business expansion in the region
- Benefit people working and visiting downtown St. Paul

Council Finding:

Although in terms of development little or no additional regional business expansion might be expected from the DPM, it is reasonable to expect the other three regional benefits listed above.

Conclusion of the PE Study:

The State of Minnesota would benefit as a result of the construction of the DPM. Between \$8.1 million and \$9.7 million of additional tax revenue would be generated within the State of Minnesota.

Council Finding:

CRA estimates that the above additional state tax revenue is reasonable.

7. Financial Plan:

Conclusion of the PE Study:

The PE Study concludes that the proposed financial plan including contributions of the private sector, the City of St. Paul and the MTC to the operating deficit would adequately cover the worst case scenario (ridership from lowest development forecast, less 15%, and revenues from lowest development forecast). Therefore, the PE Study concludes that the project is financially feasible.

Council Finding:

Several issues discussed in previous sections of this report are raised in the evaluation of the financial plan by CRA. It is concluded that the DPM project is financially feasible, in spite of the differences between some of the estimates presented by the PE Study and the CRA Report, provided that:

- Revenues are escalated at the same rate of inflation as operating costs, and this is agreed upon by the three participants (private sector, St. Paul and MTC).
- Extraordinary operating costs that could result from system startup are paid for by UMTA and covered by warranties with the system suppliers. This would require a firm commitment from the federal government.

This finding is based solely on the contents of the Preliminary Engineering Report and the Report of CRA and it is not based on a more detailed analysis of specific revenue sources and arrangements than is contained in those reports.

8. Environmental Impacts:

The environmental impacts of the St. Paul DPM will be addressed when commenting on the draft EIS.

9. Implementation:

Conclusion of the PE Study:

The procurement process would be divided into two parts: the selection of a system supplier and the selection of architect/engineer consultant to carry out civil engineering activities. The procurement bid package would include a cost plus fixed fee or incentive fee with guaranteed maximum.

Council Finding:

In CRA's opinion, the aforementioned implementation approach is reasonable.

10. Non-Fixed Guideway Alternative (Supplement to the PE Study):

Conclusion of the PE Study:

The PE Study concludes that the DPM provides the best circulation system, serves the greatest number of people at a lower cost and has the greatest benefit to the downtown area.

Council Finding:

- In CRA's opinion alternatives should have been considered in combination rather than individually.
- Potential funds available for alternatives could be greater than the \$14.6 million cash contribution considered in the PE Study.
- The process used in evaluating alternatives could be improved by reducing overlap between evaluation criteria, adding costs as a separate criterion, and by broader representation in the review panel.

11. Other Issues: Parking and Technology:

Two major assumptions are implicit in the PE Study:

- An extensive fringe parking program (approximately 10,000 new parking spaces) would be fully implemented with federal assistance by 1990.
- The baseline system as defined in the PE Study is a proven technology.

Council Findings:

- Further and more-detailed planning and engineering must be carried out with respect to the fringe parking plan during Phase II of the DPM project. The financial ability of the City of St. Paul to support the resulting capital, operating and maintenance costs for fringe parking needs to be demonstrated.
- The technological feasibility of the DPM system with regard to winter operation must be carefully assessed during Phase II of the DPM project.



CRA #415

Executive Summary

EVALUATION OF THE PRELIMINARY ENGINEERING STUDY  
OF THE PROPOSED ST. PAUL DOWNTOWN PEOPLE MOVER

Prepared for  
Metropolitan Council of the Twin Cities  
St. Paul, Minnesota

Prepared by  
Charles River Associates Incorporated  
200 Clarendon Street  
Boston, Massachusetts 02116

March 6, 1979



## EXECUTIVE SUMMARY

### Introduction

This evaluation of the Preliminary Engineering (PE) study for the proposed St. Paul Downtown People Mover is organized into seven chapters. The earlier chapters generally evaluate projections of certain basic data and assumptions, such as development attributed to the DPM (Chapter 2), patronage forecasts (Chapter 4) and estimated capital and operating costs (Chapter 5). The benefits attributed to the DPM (Section 5.3) and the "bottom line" subsidy contributions to the DPM which depend on the earlier data and assumptions are then evaluated in a financial plan and cash flow analysis (Chapter 6) which brings together the results of the analyses in the earlier chapters.

Chapters 1, 3 and 7 of the report are exceptions to this "cumulative" analysis. They deal with specific aspects of the physical DPM plan: Chapter 1, Route Analysis, Chapter 3, Bus and Fringe Parking Plan and Chapter 7, Non-Fixed Guideway Alternatives to the Proposed DPM System.



This evaluation is based on data and understandings available to CRA as of March 1, 1979. PE study estimates and arrangements between the parties involved in such a complex situation as planning and financing a DPM will always be subject to change. The findings of this evaluation may indeed hasten change, particularly in the financial arrangements between the city of St. Paul, the MTC, the private sector and the federal government in attempting to minimize the risk to all parties from the possible higher-than-expected annual subsidy costs identified in this evaluation.

For example, based on CRA's analysis, annual DPM operating deficits may exceed the "maximum shared commitment" of \$1.7 million in 1978 dollars (or \$3,830,000 in 1990 dollars escalated at 7 percent per year), if: 1) labor costs are similar to existing automated (AGT) systems; 2) operating costs escalate more quickly (e.g., 10 percent versus 7 percent) than revenues from fares and subsidy arrangements agreed upon as of this date among the three local subsidizing parties; and 3) start-up problems are encountered with the system that raise operating costs longer than the first year of operation which UMTA has (apparently) agreed to cover. Under conditions 1 and 2, the city of St. Paul may find itself responsible for \$1,822,000 to \$1,956,000 in 1978 dollars (or \$4,104,000 to \$4,405,000 in 1990 dollars) in annual operating cost payments.

If, however, it is agreed that there will be no "maximum shared commitment," and that the three parties will escalate ("index") fares and their equally shared subsidy contribution at the rate of escalation of DPM operating costs, the contribution of the city of St. Paul will be correspondingly reduced.

All three local subsidizing parties can protect themselves from the third condition above (start-up problems lasting more than one year) by obtaining agreement from UMTA to finance



extraordinary operating costs associated with system start-up, and by negotiating a multiyear warranty with the chosen DPM supplier(s) to assume the additional costs of unexpected break-in problems. The issue of how many years UMTA and the system supplier(s) should be expected to assume extraordinary start-up costs can be made moot, at least in part, by careful definition of the specific cost items which are considered extraordinary. To the extent that the proposed DPM installation is not "R&D performed on the street," as Morgantown and AIRTRANS may be said to have been, UMTA and the system supplier(s) should be quite willing to pick up these start-up costs (without, in the case of the supplier(s), passing them through to the public in the initial bid price).

As PE study estimates and understandings between the parties change after March 1, 1979, parts of this report will correspondingly no longer be valid. However, to the extent that this evaluation has contributed to the financial protection of all parties and has informed decisionmakers on various aspects of the proposed DPM system, the report will have served its purpose.

#### Chapter 1: Route Analysis

Chapter 1 of this evaluation reviews and analyzes the process by which routes, station locations, and service configurations were generated, evaluated and selected in the PE study. The stated objectives of the DPM system are compared with the preferences revealed by the route selection process. Possible omitted considerations relating to route, system and technological alternatives are highlighted.

The proposed DPM alignment in the PE report resulted from a comprehensive public evaluation of 19 alternative alignments. In choosing an alignment composed of two shuttle routes with





three CBD fringe terminals (as opposed to alignments consisting of or terminating in one-way loops), preference has been revealed for a system which is simple to operate, and whose alignment can be easily extended or truncated. In choosing an alignment that also "frames" rather than penetrates the existing financial core already well served by the skyway system, it is implied that: 1) the DPM system should complement the skyway system rather than compete with it; and 2) proximity to newly developing or redeveloping areas is as desirable as proximity to existing development. The transfer at Seventh Place for trips between the Capitol and points west of Seventh Place is intended to encourage use of the Town Square retail district.

Potential problems with the chosen alignment are: 1) it directly penetrates the historic Rice Park district with possible adverse visual impact on the district; and 2) the forced transfer at Seventh Place, designed to promote retail activity at this location, degrades the level-of-service offered by the DPM and tends to reduce use of the system. Any necessary transfer could be greatly facilitated by reducing the walk distance between guideway platforms.

To accommodate faster, no-transfer line-haul service with short waits, as compared to the proposed fixed-schedule, fixed-stop shuttle system, further consideration can be given to the implementation of switching facilities between intersecting lines, and on-demand scheduling. In addition, single guideways accommodating two-directional traffic in an over-and-under configuration (e.g., Cabintaxi) offer potential benefits of lower guideway construction cost, greater coverage, and lower visual impact. The benefits of these and other alternatives are discussed in the report.

CRA believes the PE study decisionmaking process for evaluating and selecting routes and station locations has been carried out in a fair and open manner.



## Chapter 2: Evaluation of Development Assumptions

Chapter 2 evaluates the development assumptions made in the PE study. The evaluation focuses on: 1) the reasonableness of the aggregate 1990 market forecasts for residential, office, retail, and hotel development in downtown St. Paul; and 2) the extent to which such development can be attributed to the DPM system. Four different procedures are utilized in addressing these questions:

- Review of Relevant Experience in Other Cities;
- Analysis of Aggregate Forecasts for Downtown;
- Analyses of Site-Specific Developments; and
- Forecasts utilizing interviews with private developers.

The DPM-related Downtown Development Plan is also compared for consistency with the Metropolitan Council's policies for Metropolitan Centers.

The development forecasts are of substantial significance in evaluating the results of the PE study. The PE study itself notes that, "Belief that the DPM will be a catalyst for additional development within the private market is the underlying premise behind the demonstration project." The legislation mandating this review specifically requires "a review of the economic development assumptions used in predicting the economic benefits of the project." In addition, the development forecasts are an input into projections of DPM system ridership, thus affecting system benefits as well as system costs and revenues. Since large state and local public investments will be required for payment of the capital costs, and public and private sector monies will offset the operating deficit of the system, an evaluation of public and private sector benefits attributable to the DPM is of major interest. "DPM-induced" new development and increased productivity of existing development (for example, increased rentals or retail



sales per square foot) are key inputs into the calculation of benefits attributed to the DPM system.

Tables S-1 and S-2<sup>1</sup> summarize the evaluation of the PE study forecasts. Table S-1 compares the CRA and HSG/DPM Staff forecasts of 1990 aggregate new development in downtown St. Paul. As indicated in the table, the HSG/DPM Staff forecasts of aggregate residential and office development potential are supported by CRA's analysis procedures. However, CRA's analysis indicates that lower retail and hotel development forecasts are more in line with actual development potential. It should be noted that the DPM study aggregate forecasts represent gross new development or redevelopment, not net new development.

Table S-2 compares the CRA and HSG/DPM Staff forecasts of 1990 incremental development in downtown St. Paul attributable to the proposed DPM. The table shows that the proposed DPM system will enhance residential, office, retail and hotel development in the St. Paul CBD. The significance of this finding, despite the discrepancies between the CRA and DPM Staff estimates discussed below, should not be overlooked. Specific attribution of site-specific development to a transportation investment is quite unusual in the transportation literature. The compactness of the DPM system and the CBD area affected has allowed a highly unusual interviewing procedure to be systematically applied to evaluate the development impacts of this particular transportation investment. The two CRA estimates range from 40 percent to 80 percent of the estimates of development attributed to the DPM system contained in the PE study.

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<sup>1</sup>Tables S-1 and S-2 are duplicated from Tables 2-2 and 2-3 in the report.



Table S-1

COMPARISON OF 1990 AGGREGATE DOWNTOWN  
ST. PAUL DEVELOPMENT FORECASTS  
(With St. Paul DPM)

	<u>HSG/DPM Staff</u>	<u>CRA</u>
Residential (in housing units)	3,386	3,386
Office (in square feet)	2,450,000	2,450,000
Retail (in square feet)	1,030,000	944,000
Hotel (in new rooms)	1,200	900

- NOTES: 1. Represents gross additions to Downtown St. Paul Development between 1977 and 1990.
2. HSG/DPM Staff forecast is a modified "Market" forecast based on estimated "final development potentials" for 1977 to 1990.
3. The PE study contains two estimates of hotel development: 1200 rooms in the benefit calculations (based on including the rooms in the soon to be renovated St. Paul Hotel in the benefit calculations).

SOURCE: Charles River Associates and St. Paul DPM Draft Preliminary Engineering Study, p. 27.



Table S-2

COMPARISON OF 1977-1990 INCREMENTAL DEVELOPMENT  
ATTRIBUTED TO ST. PAUL DPM

	<u>CRA Probable Estimate<sup>1</sup></u>	<u>CRA Maximum Estimate<sup>1</sup></u>	<u>HSG/DPM Staff Estimate<sup>2</sup></u>
Residential (in housing units)	950	1,450	2,350
Office (in square feet)	475,000	825,000	1,040,000
Retail (in square feet)	181,000	227,000	450,000 <sup>3</sup>
Hotel (in new units)	442	442	675 <sup>4</sup>

<sup>1</sup>See text for definition of terms.

<sup>2</sup>These estimates are presented in the St. Paul DPM PE Study discussion of development potentials.

<sup>3</sup>The PE Study contains two estimates of incremental retail sales attributed to the DPM: \$45 million, which is the basis for the 450,000 square foot projection, and \$30 million, which is used in the benefit calculations.

<sup>4</sup>The PE Study similarly contains two estimates of hotel development attributed to the DPM: 675 rooms, as presented in the development forecasts, and 975, which is used in the benefit calculations. The latter number includes 300 rooms in the soon-to-be-renovated St. Paul Hotel.

SOURCE: Charles River Associates and St. Paul DPM Draft Preliminary Engineering Study, p. 27.



CRA utilized the interview process to prepare two estimates of incremental development attributed to the DPM system: 1) a "Maximum" estimate, in which entire projects were attributed to the DPM if the timing, scale or marketability of the development were in any way identified by the developers as being affected by the DPM; and 2) a "Probable" estimate, in which the effect of the DPM was estimated in the context of the numerous other factors affecting the development potential of particular sites and subareas.

The CRA estimates are also likely to be upper-limit estimates of development attributable to the DPM. The estimates use as their development "universe" the development site list furnished by the DPM Staff, which is the basis for the HSG/DPM aggregate forecasts shown in Table S-1. Since the development list represents development opportunities directly related to the DPM, the incremental development potentials associated with this sample should be biased in favor of the DPM. This implies that utilization of this list for identifying DPM-related incremental development should yield high-side estimates for evaluating the HSG/DPM Staff assessment of DPM-attributable development.

The Downtown Development Plan, prepared by the city of St. Paul to incorporate the DPM into downtown development and planning, is consistent with the Metropolitan Council's policies for Metropolitan Centers. The 1990 market development forecasts imply a minor redirection of regional population, employment, and retail sales growth into downtown St. Paul from St. Paul non-CBD and suburban locations.

### Chapter 3: Interface of DPM with Bus and Parking

Chapter 3 evaluates the bus and parking plans proposed as part of the PE study. Evaluation criteria include: 1) whether



transfers to the DPM system are facilitated from buses and autos; 2) whether vehicular traffic congestion may occur at the proposed fringe parking sites; and 3) whether the financial plan to construct and operate the fringe parking ramps is based on reasonable analyses and assumptions. In the PE report, almost half of daily DPM ridership is expected to come from transfers to the DPM by regional bus and auto travelers.

#### Interface of the DPM with the Regional Bus System

Few, if any, savings in bus operating costs may be identified as a result of the implementation of the DPM, since there are no bus turnbacks at DPM stations. There will still be transferring of regional bus riders to the DPM for the downtown circulation portion of the trip (i.e., when the DPM provides better service for travel to the downtown destination, even with the transfer). The important question is the extent to which the proposed 1983 and 1990 regional bus system has been configured to encourage transfers from major corridor bus routes to the DPM.

It was found that, even though most regional bus routes pass within one or two blocks of a fringe DPM stop in one or both directions, many buses do not stop directly at DPM stations in both directions (due, in part, to the one-way street pattern in the CBD). Some routes should be considered for rerouting through these stations, particularly if the detour involved is small (e.g., using self-policing contraflow bus lanes on certain one-way streets). This would maximize bus/DPM transfer opportunities and encourage a route layout amenable to future experimentation with bus turnbacks at fringe DPM stations.

The present DPM plan assumes no revenue from transfers to or from regional buses. Even though no revenue is obtained from transfer riders, DPM operating costs can rise



substantially if more vehicles must be added to accommodate bus transfers to DPM which grow at a greater rate than other travel markets. In such a case, the DPM financial plan would need to be amended. However, our evaluation of expected DPM patronage from bus transfers shows that this is not likely to happen.

#### Evaluation of the Fringe Parking Plan

The fringe parking plan should be prepared with greater care than is presently the case, since the capital and operating costs of the amount of fringe parking proposed will be substantial. The present PE study estimates for fringe parking of \$40 million capital cost, \$1,164,000 annual gross operating cost, and parking revenues slightly in excess of all annual costs were arrived at using gross per-space costs of \$3,500 to \$4,000 for construction, \$120 for annual operation and maintenance cost, and a simple 85 percent occupancy estimate. Evidence from other multistory parking facilities suggests that construction costs are more likely to be \$5,000 to \$6,000 per space (1976 dollars), and operating costs to be over \$200 per space (1978 dollars). In addition \$.25 of the \$.75 parking charge should be credited to the DPM, not to parking, reducing parking revenue by one-third. The result of these differences is to increase capital costs from \$40 million to \$66 million and change a breakeven operation to one which loses almost \$2 million per year. In view of these discrepancies and the large capital and operating costs involved, the simplistically derived revenues and costs need to be reviewed, utilizing a more detailed engineering build-up of costs, and better planning information on parking demand and revenue.

With regard to the latter, consideration should be given to the extent and location of present subsidized parking so that the fringe parking demand estimates can be adjusted if





necessary. Fringe parking estimates should explicitly account for complementary core parking restrictions and pricing policies to obtain a more accurate estimate of occupancy rates than simply the conventional 85 percent.

In addition to problems with the financial plan, the parking ramps appear to contain too few entry and exit points for their size. Also, with the exception of the I-94 garage, the other large facilities front on surface streets, with significant potential for traffic congestion to both through-traffic and traffic desiring an easy interchange with the DPM at these fringe parking sites. These issues also require greater attention in designing final fringe parking facility plans, and in estimating fringe parking demand.

#### Chapter 4: Analysis of Patronage Forecasts

The analysis and evaluation of the DPM patronage forecasts is carried out in four steps which we mention briefly here, and discuss in more detail below. First, the original patronage forecasting model developed in Los Angeles is reviewed for its adequacy and suitability for DPM planning. Second, modifications made to the Los Angeles model in transferring it for application in St. Paul are evaluated, and problems which lead to forecast error are identified. Third, a similar evaluation is made of procedures and assumptions used for DPM patronage forecasting which do not relate to the originally estimated and transferred L.A. demand model. Finally, the identified forecasting errors are quantified to the maximum extent possible, and are used to calculate revised patronage estimates.

Table S-3<sup>1</sup> summarizes the results of this analysis and evaluation. The "base" PE study daily forecast 1990 DPM

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<sup>1</sup>Table S-3 is duplicated from Table 4-5 in the report.



Table S-3

DERIVATION OF ALTERNATIVE RIDERSHIP ESTIMATES  
(Percent Share of DPM Patronage in Parentheses)

Forecast Year Forecast Case	1983			1990			Line
	Base <sup>1</sup>	Best <sup>2</sup>	Worst <sup>2</sup>	Base <sup>1</sup>	Best <sup>2</sup>	Worst <sup>2</sup>	
Regional Market							
Bus to DPM Transfers	10,280	10,280	5,275	12,285	12,285	6,323	(1)
Auto/DPM Transfers	4,940	4,940	2,328	6,625	6,625	4,857	(2)
Internal Market	13,380	13,380	12,602	16,230	16,230	16,061	(3)
+ Induced Trips	3,745	3,745	1,386	4,475	4,475	1,767	(4)
+ Special Events	1,800	1,800	1,800	1,800	1,800	1,800	(5)
Subtotal #1	34,145	34,145	23,391	41,415	41,415	30,808	(6)
- Adjusted Development Forecast	--	(920)	(630)	--	(1,114)	(829)	(7)
Subtotal #2	34,145	33,225	22,761	41,415	40,301	29,979	(8)
+ Induced Elderly Ridership	3,400	1,338	0	4,200	1,623	0	(9)
+ Induced Under 18 Ridership	1,000	401	0	1,240	487	0	(10)
- Internal Trip Generation Rates	--	--	(2,222)	--	--	(2,818)	(11)
Total Ridership	38,545	34,964	20,539	46,855	42,411	27,161	(12)
Percent Difference from Base	--	-9.2	-46.7	--	-9.5	-42.0	(13)

SOURCES:

<sup>1</sup>Base case (market) forecasts, 1983 and 1990, are from City of St. Paul Metropolitan Transit Commission, BRW/Kaiser Engineers, Draft Final Report: Preliminary Engineering and Related Studies for St. Paul Downtown People Mover (St. Paul, January 1979).

<sup>2</sup>Best and Worst case calculations, 1983 and 1990, were generated by Charles River Associates, based on assumptions in Table 4-6.



patronage for the market development (intermediate level) is 46,855 persons (38,545 in 1983). CRA's evaluation of errors, to the extent these can be quantified, results in "best" and "worst" case 1990 patronage estimates of 42,411 and 27,161 passengers, respectively, or 10 to 42 percent below the PE study estimate. Other significant errors which cannot be quantified would further reduce the best and worst case daily patronage estimates.

A review of the original Los Angeles forecasting model indicates that the model structure as developed in Los Angeles and applied in St. Paul is adequate and suitable for DPM patronage estimation. The model is capable in its structure of predicting the temporal and geographic distribution of ridership in various markets, changes in route alignments, level-of-service and fare changes so that patronage, farebox revenue, and capacity needs may be calculated. However, the data used to estimate the model did not take advantage of the capabilities of the model structure. For example, the same Los Angeles noon-hour travel data for (and thus travel behavior of) persons employed in the CBD were used to estimate DPM use for trips originating both inside and outside the CBD (i.e., "intrastudy area" trips, and "regional" trips). The same data were thus used to estimate DPM use for workers and visitors approaching the CBD in buses and cars as well as for persons not already in a vehicle but in a downtown office or other employment location, deciding to travel to other CBD locations.

The effect of this assumed similarity of behavior on travel estimates in St. Paul cannot be quantified without a validation of the model in St. Paul, i.e., a run of the forecasting model to replicate current CBD travel patterns. This was not done. In the absence of such a validation test, it is felt that the assumed "homogeneity" (similarity) of



behavior in the several travel markets leads to overestimates (unquantifiable at this time) of DPM patronage.

The second step in evaluating the patronage forecasts was to identify several problems in the modifications made to the original L.A. model when transferring it for application in St. Paul. These include:

1. Too low a value of time;
2. Disaggregation of total travel time into access and in-vehicle travel time components after model estimation;
3. A DPM constant which was chosen arbitrarily and which is felt to bias travel to the DPM;
4. Not adjusting travel costs from 1978 levels back to 1975 levels to account for year of model estimation;
5. Not accounting for different lunch hours in L.A. and St. Paul.

All of these problems tend to overestimate DPM usage. However, by far the most significant overestimate results from the choice of the DPM "constant." This may be explained as follows. Each estimated mode-use forecasting equation consists of variables which are quantified (such as total travel time and cost) for a given trip, and those which are not, and are thus omitted. Omitted variables normally include comfort, convenience and reliability, but in this instance access time separate from line-haul travel time was also omitted. The omitted variables are accounted for in each mode-share forecasting equation by a single number (the mode-specific constant) which determines the mode chosen by a traveler, if all the variables explicitly included in the estimated model are equal for all alternative modes. The larger (positive) this number is for a mode the more likely the mode is to be

chosen in this "logit" model. The only available evidence from a previous logit model, as well as reasonableness tests, suggests that in this model, the DPM constant should reflect DPM's similarity to a transit mode with a fixed route rather than to an ubiquitous private auto, particularly since access time is omitted as a separate variable. However, the DPM constant used in St. Paul reflects the reverse assumption (DPM is more like an ubiquitous private auto).

Another problem with the patronage model as transferred to St. Paul is the number of adjustments which were made to the model in the transfer, after model estimation, to fit the travel behavior contained in the L.A. data. The original L.A. model chose only two coefficients (the DPM constant and the cost coefficient) after model estimation in order to apply the model in L.A. For the St. Paul application, 18 additional coefficients were chosen or modified, for a total of 20 out of 26 possible coefficients being chosen. In view of the now somewhat distant relationship to the travel behavior data on which it was estimated, the DPM patronage forecasting model, as used in St. Paul, cannot be defended as providing reliable forecasts on statistical grounds. This makes the need for a model validation in St. Paul all the more important, as noted above.

The third step in evaluating the DPM patronage estimate was to identify any problems in forecasting that related to the site-specific assumptions used to convert the predicted market shares from the demand model to actual DPM patronage numbers. Identified problems of this type included:

1. Unstable internal (intra-CBD) trip-generation rates for private office workers between the two local St. Paul pedestrian surveys used as the basic data sources;
2. Induced patronage estimates based on Washington, D.C. Metro estimates;



3. Double counting regional ridership due to social fares;
4. Use of CBD aggregate development assumptions felt to be slightly high in the retail and hotel categories (from Chapter 2).

The fourth and final step in evaluating the DPM patronage estimates was to quantify, to the extent possible, the errors associated with each of the above identified problems. Table S-3 shows the results of the adjustments to DPM patronage as a result of this analysis. The effects of the adjustments in the third category of errors (the site-specific, non-model assumptions) are shown in lines (4) through (11) in the table for the "best" and "worst" cases. The quantified model-related errors are only used to reduce patronage in the "worst" case estimates, as can be seen from lines (1) through (3) in the table.

Several identified problems mentioned above could not be quantified which would reduce still further the "worst" case estimates. These include:

1. The disaggregation of total travel time into access and in-vehicle travel time components after model estimation. The lowered coefficient on in-vehicle travel time serves to favor vehicular modes (including the DPM) over walk modes;
2. Differences in length of lunch hour in L.A. and St. Paul. If St. Paul lunch hours are shorter than those in L.A., the tolerable total travel time during the period of estimated peak demand on the DPM will be shorter;
3. The assumptions on homogeneity of travel behavior between internal and regional travel markets arising from the use of internal L.A. data to estimate behavior in both markets (discussed in the first part of this chapter summary under model structure).



## Chapter 5: Economic Analysis of the DPM System

This chapter analyzes and evaluates the PE study capital and operating costs of the DPM system, as well as its estimated private and public sector benefits.

### Evaluation of Capital Cost Estimates

In this review of capital costs, the costs of deploying 10 existing AGT (Automated Ground Transport) technologies in St. Paul were estimated to the extent they could be quantified based on previous operating experience. The estimated capital costs ranged from \$71 million to \$106 million (in 1978 dollars), with the baseline deployment being the third most expensive system in the comparison. A more qualitative analysis was then carried out on each of the systems to adjust their costs based on needed modifications to handle the combination of harsh climate, heavy utilization, comfortable ride, high performance and sophisticated system control functions, unique or relatively unique to St. Paul. Finally, the sensitivity of the capital costs to unexpected delays in construction were evaluated.

Our conclusion is that the estimated DPM capital cost of \$90 million in 1978 dollars is reasonable and as accurate as can be determined at this time in this demonstration program. The possible cost increases due to delays in construction appear, however, to have been somewhat underestimated. To reduce the risk of such cost overruns, the PE staff proposes letting fixed price or "cost plus fixed fee with guaranteed maximum" contracts to the DPM suppliers. These would place the financial burden of unexpected delays and costs squarely in the hands of the supplier(s). This assumes the supplier(s) will underwrite this risk entirely, rather than include all or part of it in their initial bid estimate.



Evaluation of Operating and Maintenance (O&M) Costs

This section of the report analyzes and evaluates the PE study estimates of O&M costs. These are estimated in the PE report in 1990 to be \$2,644,000 in 1978 dollars. Since the system specifications allow for leeway in the system and in technical performance characteristics to accommodate the proposals of existing manufacturers, it is important to evaluate the uncertainty in O&M cost estimates introduced by the resulting variability in the systems as finally selected.

The sensitivity of the 1990 \$2,644,000 baseline operating cost estimate is evaluated, therefore, with respect to changes in the following factors:

1. Technological aspects such as vehicle electricity consumption, snow melting methods, propulsion methods and initial break-in periods;
2. Operational aspects such as labor force size and pay scales;
3. Performance characteristics such as acceleration, deceleration, maximum speed, and round-trip time constraints;
4. Variation in ridership loads to be carried; and
5. Variation in inflation rates.

The impact of the DPM implementation on fringe parking and regional bus system operating costs is also examined.

It can be concluded that three of the above factors have the potential to significantly affect operating costs. The first of these is variation in O&M cost inflation. The PE study assumed a 7 percent annual O&M cost escalation. While 7 percent is an appropriate escalation factor for general consumer prices, it is somewhat low for some of the items covered under O&M costs. A more appropriate inflation factor to use in this case may be 10%. In this regard, the DPM Staff, in estimating future operating costs for a bus alternative to the DPM, made the following statement in their





"Draft Final Report on Non-Fixed Guideway Alternatives to the St. Paul Downtown People Mover" (St. Paul, February 1979),  
Exhibit G:

"Analysis of historical data indicates that transit related costs have escalated at an inflation rate of 10 percent per year. However, to be consistent with the DPM analysis, a 7 percent inflation rate has been used."

Use of a 10 percent rather than a 7 percent inflation rate raises total 1990 O&M costs in 1990 current dollars to \$7,947,000-\$8,311,000, compared to the PE study estimate of \$5,938,000 with a 7 percent inflation rate. A difference in current dollar O&M costs of over \$2 million is therefore possible from the inflation rate assumption used.

The second factor which significantly affects O&M costs is (not unexpectedly) labor force size. There is an implicit assumption in the staffing plan for the baseline system that the proposed DPM in St. Paul will be substantially more reliable than systems installed in the early 1970s (e.g., AIRTRANS and Morgantown). This is in spite of the unique city center and cold climate conditions of the present application. The increased reliability assumption shows up in the PE study staffing rates for the maintenance staff (only). These assume fewer employees per vehicle-mile or per vehicle than in other AGT systems (e.g., AIRTRANS and Morgantown) in normal (e.g., current) operation. If the present staffing levels were to be raised to match these currently operating systems, PE study 1990 operating costs could rise by \$452,700 a year to \$3 million (in 1978 dollars).

Also, there appears to be an implicit assumption in the 1983 and 1990 PE study labor cost analysis that labor requirements (comprising over 56 percent of total operating



costs) would be invariant by technology or vehicle fleet size. This is presumed to be the primary advantage of full automation of system functions. However, the actual maintenance of vehicles, guideways, etc. is a manual function and may vary by fleet size and technology. For purposes (only) of illustrating the sensitivity of operating costs to an alternative assumption, namely, that number of maintenance personnel varies directly with increasing fleet size (regardless of vehicle size), a 62-small-vehicle system could incur costs up to \$914,000 a year in 1978 dollars for additional labor alone, relative to the baseline 19-large-vehicle system. Though this alternative assumption is unlikely, it does illustrate the uncertainty in the PE study O&M costs introduced by the otherwise highly laudable strategy of allowing leeway in the system technical and performance characteristics to accommodate the proposals of as many existing suppliers as possible.

The third factor which could significantly affect DPM O&M costs relates to operational problems associated with the break-in period of the DPM system. Previous AGT systems have experienced O&M costs whose first-year operating costs exceeded those of subsequent years by a factor of 2. The draft PE report does not acknowledge this possibility in the 1983 O&M cost estimates. These initial-year estimates are simply a lowered 1990 estimate, prorated on lower vehicle miles and patronage for that year. The three local parties participating in subsidizing the DPM operation can protect themselves from the almost inevitable break-in period problems by obtaining agreement from UMTA to finance extraordinary operating costs associated with system start-up, and negotiating a multiyear warranty with the chosen DPM supplier(s) to assume the additional costs of unexpected break-in problems. The issue of how many years UMTA and the system supplier(s) should be



expected to assume extraordinary start-up costs can be made moot, at least in part, by careful definition of the specific cost items which are considered extraordinary.

Yet, despite the dramatic potential for operating cost overruns due to assumptions regarding inflation, labor force size, and start-up costs, the present O&M cost estimates cannot be categorically rejected as being too low. Labor force planning for AGT installations is not a well-developed field, and future inflation rates are not known with certainty. Thus, this evaluation of O&M costs should be interpreted as flagging possible cost overruns, rather than identifying with some certainty that O&M costs have been underestimated in the PE report. These possible increases in O&M costs are important inputs to the financial analysis of the proposed DPM system in the next chapter.

#### Evaluation of Benefits Attributed to DPM

An evaluation of the benefits considered to result from the St. Paul DPM is significant for two reasons. First, as in any large-scale project, a key question to be addressed is whether anticipated benefits resulting from the DPM system exceed the costs of construction and continued operation of the project over a specified period of time. Second, specific to St. Paul is the fact that benefits accruing to both the private and public sectors will be used for partial payment of capital costs and to offset the annual operating deficit of the system. From this perspective, an examination of the anticipated benefit stream is of major interest since a rationale for private sector participation in the subsidy is based on perceived benefits.

The Preliminary Engineering study quantifies seven types of private and public sector benefits attributable to the St.



Paul DPM. Private sector benefits include: 1) incremental lease revenues to owners of downtown office space; 2) increased retail profits to downtown merchants; and 3) savings to employers from reduced parking cost subsidies. Public sector benefits include incremental revenues to the city of St. Paul derived from three types of taxes and fees on DPM-induced development: 1) the property tax; 2) the utility franchise fee; 3) and the hotel room tax. In addition, the "recycling" of \$72 million in federal funds (80 percent capital grant for the St. Paul DPM) within the state economy is considered to result in a "GNP multiplier effect," which generates tax revenue gains to the state of Minnesota.

In evaluating the benefits attributed to the DPM system in the PE study, attention was focused upon the assumptions made by the economic consultants and DPM Staff, as well as upon the methodology used in the calculation process. The major findings of our evaluation are summarized below. Findings related to private sector benefits are presented first, followed by findings related to public sector benefits.

#### Private Sector Benefits

Private sector benefits attributed to the DPM system in the CBD between 1984 and 1990 are reasonable on an annual basis. However, failure of the study to discount the 40-year future benefit stream to its present value dramatically overstates the benefits attributed to the DPM. Discounted conservatively at 6 percent, the present value of the 40-year stream of private benefits of the DPM system are \$60.5 million, in contrast to the \$140 million presented in the PE study. This includes the assumption in the PE study that private sector benefits in the 33 years beyond 1990 would increase approximately 3 percent each year compounded. However, this assumption is not supported by the transportation economic



impact literature which notes that the incremental impact of a transportation investment on development takes only a very few years to occur. Therefore, if no annual increment is assumed, and the benefits are discounted to their present value, the 40-year private sector benefits of the DPM system are \$33.9 million, or roughly 25 percent of the original \$140 million in benefits over 40 years attributed to the DPM in the PE study.

#### Public Sector Benefits

The public sector benefits attributed to the DPM and quantified in the PE study are incremental revenues to the city of St. Paul derived from city taxes and fees on residential, office, retail, and hotel development attracted to downtown between 1977 and 1990 by the DPM. The 40-year total of \$155 million in public sector benefits attributed to the DPM in the PE study is therefore directly proportional to the different levels of incremental development attributed to the DPM in the PE study as evaluated in Chapter 2 of this report. The PE study estimates also assume 2.5 percent additional development compounded each year attributable to the DPM for the 33-year period beyond 1990, without discounting to their present value.

In contrast, the present value of the 40-year stream of public sector benefits attributed to the DPM in this evaluation (Chapter 2) ranges from \$15.16 million to \$21.37 million for the "probable" and "maximum" levels of DPM-induced development, respectively. This estimate is discounted conservatively at 6 percent, with no incremental development attributed to the DPM after 1990. Also, from a regional perspective, the public sector benefits consist entirely of transfers of benefits from elsewhere in the region to downtown St. Paul. Evaluation of the worth of public sector benefits is therefore as much a matter of regional policy as of economics.

Finally, in the PE study, annual revenue in 1990 from the Utility Franchise Fee and the city of St. Paul Hotel Tax on DPM-induced development is projected to total \$400,000. The conclusion of the analysis in this chapter is that 1990 revenue from these sources will be approximately \$200,000. These revenue sources are identified in the PE study as potential sources for funding the city's \$400,000 (assumed) maximum share of DPM annual operating deficits.

#### Benefits to the State of Minnesota

In the PE study, tax revenues generated within the state of Minnesota as a result of construction of the DPM are projected to total between \$8.1 million and \$9.7 million. These revenues are derived from income, sales and other taxes on economic activity generated by the large federal capital expenditure in St. Paul. CRA believes this estimate of total state tax revenue is reasonable.

### Chapter 6: Analysis of DPM Financial Plan

This chapter analyzes and evaluates the financial plan and public subsidy ("bottom line") impact of previously identified errors and uncertainties in PE study estimates of urban development, DPM ridership, and operating and maintenance costs. Additional related issues considered include the sensitivity of system revenue to ridership, the likelihood of realizing forecasted value capture revenue, identification of problems associated with year-to-year cash flow under alternative scenarios, and methods of paying for unexpected operating deficits.

#### Financial Plan and Cash Flow Analysis

The PE study estimates 1990 annual farebox revenue to be \$1,358,000 in 1978 dollars for market development of the CBD.



This would cover approximately 50 percent of 1990 PE study estimated O&M costs of \$2,730,000. The CRA best and worst case patronage estimates in Chapter 4 result in 1990 estimated farebox revenues of \$1,195,000 and \$861,000, respectively, or between 43 percent and 32 percent of PE study estimated O&M costs. Thus, subsidy requirements from nonfarebox sources will be correspondingly increased. The important bottom line questions are: 1) how much that increase may be to each of the local parties (city of St. Paul, MTC, and the private sector) under different, equally probable scenarios; 2) whether the city of St. Paul is exposed to paying 100 percent of the subsidy cost above the maximum commitment of the three local parties of \$1.7 million (1978 dollars); and 3) how the upside subsidy payment risk of the local parties can be minimized.

The table on the next page shows the subsidy payments required in 1983 and 1990 by the three local subsidizing parties under various scenarios of ridership, labor costs and O&M cost inflation. The table assumes the same fare increase schedule as in the PE study and the same 7 percent escalation of the \$1.7 million maximum shared commitment as assumed in the PE report. The columns for each year in the table reflect the farebox revenue and operating cost impacts of the best and worst case patronage estimates from Chapter 4. The rows correspond to three O&M cost scenarios discussed in Chapter 5. The first row assumes a 7 percent annual O&M cost escalation as in the PE report. The second row assumes a 10 percent annual operating cost inflation rate, with farebox revenues and the maximum shared commitment rising at (only) 7 percent annually. The 10 percent operating cost inflation rate reflects recent experience in the escalation of transit operating costs as noted earlier under operating costs (Chapter 5). The third operating cost scenario also assumes a 10 percent O&M cost

SUBSIDY PAYMENTS REQUIRED IN 1983 & 1990 BY CITY OF ST. PAUL, MTC AND PRIVATE SECTOR  
UNDER VARIOUS SCENARIOS OF RIDERSHIP, LABOR COSTS AND COST INFLATION

			1983			1990	
			<u>PATRONAGE SCENARIO</u>				
Cost Scenario			Best Case 34,964 Riders	Worst Case 20,539 Riders	Best Case 42,411 Riders	Worst Case 27,161 Riders	
			<u>Table 6-3</u>	<u>Table 6-4</u>	<u>Table 6-3</u>	<u>Table 6-4</u>	
P.E. Study Labor & Operating Cost, Escalated @ 7% per year (equals P.E. Study Case)	St. Paul	\$ 78	\$ 324,000	\$ 400,000	\$ 317,000	\$ 400,000	
		\$ Current	454,000	561,000	715,000	900,000	
	MTC	\$ 78	324,000	474,000	317,000	436,000	
		\$ Current	454,000	665,000	715,000	981,000	
	Priv. Sector	\$ 78	624,000	774,000	618,000	736,000	
		\$ Current	875,000	1,086,000	1,391,000	1,657,000	
	Social Fare	\$ 78	180,000	87,000	189,000	99,000	
		\$ Current	252,000	122,000	425,000	224,000	
	<hr/>						
	P. E. Study Labor & Operating Cost Escalated @ 10% per year	St. Paul	\$ 78	<u>Table 6-5</u> 400,000	<u>Table 6-6</u> 742,000	<u>Table 6-5</u> 1,053,000	<u>Table 6-6</u> 1,325,000
			\$ Current	561,000	1,040,000	2,372,000	2,984,000
		MTC	\$ 78	491,000	500,000	500,000	500,000
\$ Current			688,000	701,000	1,126,000	1,126,000	
Priv. Sector		\$ 78	791,000	800,000	800,000	800,000	
		\$ Current	1,109,000	1,122,000	1,802,000	1,802,000	
Social Fare		\$ 78					
		\$ Current	(Same as above)				
<hr/>							
High Labor Cost Escalated @ 10% per year		St. Paul	\$ 78	<u>Table 6-7</u> 904,000	<u>Table 6-8</u> 1,261,000	<u>Table 6-7</u> 1,822,000	<u>Table 6-8</u> 1,956,000
			\$ Current	1,268,000	1,769,000	4,104,000	4,405,000
		MTC	\$ 78	500,000	500,000	500,000	500,000
	\$ Current		701,000	701,000	1,126,000	1,126,000	
	Priv. Sector	\$ 78	800,000	800,000	800,000	800,000	
		\$ Current	1,122,000	1,122,000	1,802,000	1,802,000	
	Social Fare	\$ 78					
		\$ Current	(Same as above)				

NOTE: The table assumes a 7% inflation of \$1.7 million "maximum commitment" above which St. Paul is responsible for 100% of deficit.





inflation rate, but on costs that include additional 1990 labor costs of \$452,000 (1978 dollars) to provide DPM staffing levels similar to existing AGT systems built in the early 1970s.

As can be seen from the table, the contributions of the MTC and the private sector never exceed \$500,000 and \$800,000, respectively, in 1978 dollars, since this is the limit of their maximum shared commitment. However, in three of the six cases in 1983, and four of the six cases in 1990, St. Paul's contribution exceeds its "assumed" maximum share of \$400,000 in 1978 dollars; in the 1990 worst case, by a factor of almost five. The fast growth in the St. Paul contribution is due, of course, to its assumption of 100 percent of all operating costs above the maximum shared commitment of \$1.7 million (1978 dollars), and the fact that this maximum shared commitment, along with fares, is assumed to rise at less than the rate of escalation of operating costs.

As stated in the introduction to this Executive Summary, the high risk of DPM O&M costs rising faster than the general rate of inflation, and the financial impact of this on the city of St. Paul portrayed in the table, should lead the parties (particularly St. Paul) to seek agreement, written into law, that there will be no "maximum shared commitment" and that the three parties agree to escalate (index) their equally shared contribution at the rate of escalation of DPM O&M costs. This would protect the city of St. Paul from the rapidly rising subsidy payments shown in the table. It should be noted that the private sector benefits from the DPM between 1984 and 1990, viewed as reasonable on an annual basis in Chapter 5, should be sufficient to cover the private sector subsidy contributions required under equal cost sharing for all scenarios shown in the table.



Finally, there is a need to protect all the local parties from the third major O&M cost problem not shown in the table, but highlighted in the summary of Chapter 5. This was the likelihood of extraordinary costs associated with the start-up of the proposed DPM system. As stated earlier, protection of the local parties may be achieved by holding UMTA to its promise of financing extraordinary start-up costs, and negotiating a multiyear warranty with the chosen DPM supplier(s) to assume the additional costs of unexpected break-in problems. The issue of how many years UMTA and the system supplier(s) should be expected to assume extraordinary start-up costs can be made moot, at least in part, by careful definition of the specific cost items which are considered extraordinary. Nonlocal responsibility would then be assigned for these costs. To the extent that the proposed DPM installation is not "R&D performed on the street," as Morgantown and AIRTRANS may be said to have been, UMTA and the system supplier(s) should be willing to pick up these start-up costs.

#### Value Capture Program

Under a value capture program, a financial mechanism is established whereby the public sector shares in the benefits received by the private sector as a result of a public improvement. This "recaptured value" is then used by the public sector to offset the cost of constructing and/or maintaining the improvement. The value capture approach recommended in the PE study and approved by the Financial Advisory Committee consists of a three-tiered special assessment district. The special assessment district approach is a well-tested form of value capture, with a long history of use. Typically, the approach is used in financing pedestrian



malls, street improvements, and sewers. Only recently has there been interest in using special assessment to finance transportation.

Since the downtown St. Paul financial community, through Operation '85, has already approved the special assessment program approach, as well as the preliminary delineation of the three benefit zones and recommended levels of assessment, the following questions were analyzed and evaluated:

1. Given the delineation of the benefit zones and levels of assessment, will the recommended program be able to generate up to the \$800,000 maximum subsidy level (1978 dollars) required from the private sector to offset the operating deficit of the St. Paul DPM? and
2. What legal actions are required to create the special assessment district program?

With regard to the first question, the analysis indicates that there will be sufficient capacity within the districts to generate up to the \$800,000 limit for private sector subsidy of the DPM operating deficit. The CRA data indicate a somewhat lower revenue-generating capacity than estimated in the PE study, however. The analysis also indicates that in order to meet the \$800,000 limit in 1983 with the assessment levels currently being considered, most of the new development projected to occur in the three zones in the 1978-1983 period would have to come on-line. Based on our review of proposed projects, all but two projects appear to be relatively firm. Even if these two do not come on-line, however, the \$800,000 limit would be met.

With regard to necessary legal actions, it appears, based on discussions between CRA and the City Attorney's Office, that specific authorization for the DPM special assessment district program will most likely be part of a legislative package presented to the state legislature to authorize the St. Paul



DPM. In view of the fact that the legislature must put final approval on the funding of capital costs, the method of funding for operating costs could be included in the same legislation. This would give new and specific legal authority for the assessment method and benefit formula imposed. Existing legal authority for special assessment is reviewed in the report. As the existing authority leaves open the albeit remote possibility of legal challenges, the obtaining of specific authorization would appear to be preferable.

#### Sources of Public Funds

Participation of federal, state, and city governments will be required in financing the capital and operating costs of the St. Paul DPM.

Federal participation in capital costs will consist of a \$72 million capital assistance grant from the Urban Mass Transportation Administration (UMTA). UMTA will also provide operating assistance for the DPM through Section 5 of the Surface Transportation Assistance Act of 1978. Approximately \$112,000 in annual federal operating subsidy will be provided (in 1978 dollars). UMTA participation in the extraordinary start-up costs of the DPM has yet to be formally worked out.

The state of Minnesota will provide approximately \$9 million (10 percent) of DPM capital costs, either through direct appropriation or MTC bonding. In the latter case, the capital cost subsidy will be paid only by citizens in the region. In addition, the state will assist in the operating costs of the DPM through: 1) reimbursement for social fares; and 2) MTC sharing in the DPM operating deficit. The amount of the social fare reimbursement is shown in the preceding summary table for this chapter. The maximum reimbursement would be \$189,000 (in 1978 dollars). The state payment to the MTC for sharing in the DPM operating deficit has yet to be worked out.



However, since the MTC is limited under the current arrangement to \$500,000 maximum annual subsidy, a maximum estimate of annual state operating subsidy is approximately \$700,000 (1978 dollars).

Approximately \$9 million (10 percent) of DPM capital costs are to be provided by the city of St. Paul. Of this total, \$5.48 million will be provided by city bonding and the remainder through noncash contributions. The annualized capital cost to St. Paul, assuming 20-year bonds at 6 percent, is approximately \$488,000 per year.

The city will also participate in the annual operating deficit of the system. A ceiling of \$400,000 has been specified, although the city must pay all operating deficits in excess of \$1.7 million. As previously discussed, this maximum shared commitment exposes the city to rapid increases in subsidy payments under the 10 percent operating cost escalation scenarios shown in the preceding summary table for this chapter. These rapid subsidy payment increases could be avoided by escalating (indexing) the subsidy payments of all parties at the escalation rate of operating costs.

#### Chapter 7: Non-Fixed Guideway Alternatives to the DPM

This chapter reviews the supplementary report on Non-Fixed Guideway Alternatives to the St. Paul Downtown People Mover, prepared by Hammer, Siler, George Associates and MTC and city of St. Paul staff, in compliance with the 1977 mandate of the Minnesota state legislature. The legislature requires that the MTC and city of St. Paul complete "an analysis of the prudent and feasible alternatives to a fixed guideway transportation system that will achieve the development and other goals of the people mover project."



The supplementary report describes seven strategies as alternatives to the DPM:

- Strategy 1 -- Shuttle Bus: This includes shuttle bus in traffic and shuttle bus in exclusive lanes, both with downtown bus transfer at the fringe.
- Strategy 2 -- Fare Zone: This includes dime and free fare zones.
- Strategy 3 -- Skyways: This includes skyway system extensions with and without moving sidewalks.
- Strategy 4 -- Paratransit: This includes the use of commuter vans, car pools and shared-ride taxis, each with associated preferential treatment.
- Strategy 5 -- Public Improvements: This includes policy statements on street improvements, parking, public transit and other public facilities.
- Strategy 6 -- Variable Work Hours: This includes staggered work hours, flex-time and a four-day work week.
- Strategy 7 -- Economic Development: This includes land assembly for private development, new development tax subsidies and low interest development loans.

The underlying assumption of the analysis is that \$14.6 million is the available funding level for alternative strategies. This amount represents the \$9 million (10 percent) MTC share of DPM capital costs, and the \$5.6 million portion of the city of St. Paul's share of DPM capital costs that would be derived from city bonds.

In reviewing the Non-Fixed Guideway Alternatives report, CRA focused on the three subject areas described briefly above: 1) alternative strategies considered; 2) level of available funding identified; and 3) evaluation criteria and process used. Conclusions in each area follow.

First, the seven strategies identified in the Non-Fixed Guideway Alternatives report are presented as alternatives to



the DPM. More accurately described, the strategies presented are partly alternatives, and partly ongoing programs that would support alternatives rather than be implemented in isolation. The strategies are also considered individually, rather than in combination. Although the report states that "a compilation of beneficial alternatives or parts thereof that represent an alternative way to revitalize the St. Paul Metro Center" will be identified, no such identification is made. In view of the single-purpose function of many of the strategies considered, only through combination with other strategies can multiple purposes be served.

Second, the level of funding identified for funding alternative strategies is based on a partial view of local and state shares of DPM capital costs. While the full \$9 million MTC share is considered, only the \$5.6 million "cash" share of the city of St. Paul is included. The implication is that the city's noncash contribution of \$3.4 million to the DPM is without value. Such is not the case. The city's noncash contribution to the DPM involves, in part, planned capital projects that would serve to support the DPM system. Presumably, then, if an alternative to the DPM were identified, planned capital projects supportive of the alternative could similarly be selected.

A related problem is that only state and local capital costs for the DPM are considered available for funding non-DPM alternatives. In reality, the state and local contribution to the DPM includes both capital and annual operating costs, and is thus greater than \$14.6 million. As shown in the summary table in Chapter 6, the 1990 annual state subsidy for the DPM could be as high as \$700,000 (in 1978 dollars) and as high as \$1,956,000 from the city of St. Paul (in 1978 dollars), depending on the patronage and operating cost scenarios.



In addition, no consideration is given to the potential for leveraging federal funds in the review of alternative strategies. As an example, the report implies that capital and operating costs of a downtown shuttle or circulation service would be fully borne by the city and state. At a minimum, federal capital assistance could be sought for shuttle vehicle acquisition. If creatively expanded, federal funds could be pursued for an auto-restricted zone (ARZ) demonstration in which the downtown shuttle could be effectively combined with the proposed seven-block Seventh Place Mall.

With regard to the third area of evaluation criteria and process, the 12 evaluation criteria used in the report contain a high degree of overlap between categories. The effect is to favor certain types of strategies over others. As most of the categories pertain to transportation interface and linkage, strategies such as DPM, Shuttle Bus, and Skyway are preferred. Also, the report omits from consideration any evaluation criteria pertaining to cost. The criteria should include measures related to capital cost and to operating cost, if not to cost-effectiveness of the alternatives. Clearly, the different strategies do not have the same cost. If the objective of the report is to compare the relative effectiveness of strategies (or combinations thereof) that are of equal cost, then this objective is not achieved. If the strategies are not of equal cost, then they should be ranked on the basis of capital and operating cost as well as other criteria.



APPENDIX A



March 7, 1979

MEMORANDUM

TO: Metropolitan Council  
DPM Steering Committee

FROM: DPM Staff *BRW*

SUBJECT: Comments on Charles River Associates' (CRA)  
Report on Evaluation of Preliminary Engineering  
Study of the Proposed Saint Paul DPM

OVERVIEW

CRA's draft final report on the "Evaluation of the Preliminary Engineering Study of the Proposed Saint Paul DPM" was released on February 26, 1979. Outlined below are comments organized into four areas:

- Areas of agreement between the CRA Report and the DPM Report.
- Areas of difference between the CRA Report and the DPM Report, for each area of difference an explanation of the reason for the difference is given.
- Areas requiring further study.
- Suggested changes to the draft DPM Final Report as a result of the CRA Report.

Review of the areas of agreement and difference, along with the further information presented indicate there are very few points of real difference.

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AREAS OF AGREEMENT BETWEEN THE CRA REPORT AND THE DPM REPORT

Route Analysis - The decision making process for evaluating and selecting route and station locations was "carried out in a fair and open manner" according to CRA.

1990 Aggregate Development Forecasts - Outlined below are the aggregate development forecasts for four land use categories as developed by the DPM economists and CRA:

Use Category	1977 Total	DPM Forecast 1977-1990	CRA Forecast 1977-1990	Difference
Residential Limits	2,300	3,386	3,386	0
Office Sq. Ft.	8,597,000	2,450,000	2,450,000	0
Retail Sq. Ft.	3,766,000	1,030,000	944,000	86,000
Hotel Rooms	1,394	1,200	900	300

Total agreement exists for both residential and office, a difference of less than 10% exists for retail, and hotel differs by 25%. These two independent forecasts are considered essentially equal by both CRA and DPM staff.

Consistency With Metropolitan Policies - The Downtown Development Plan which incorporates the DPM into downtown development is "consistent with the Metropolitan Council's policies for Metropolitan Centers" according to CRA.

Potential for Interface of DPM and Bus Routes - Pages 91 and 92 of DPM Profit Final Report discuss MTC policy on bus-turnbacks. The MTC plans to conduct a demonstration of the feasibility of bus turnbacks; if feasible, the MTC would anticipate turning back between 20-35% of the total bus routes. Thus, there is agreement that potential for bus turnbacks does exist and will be demonstrated.

Capital Costs - The capital cost estimate of \$90 million was found by CRA to be "as accurate as can be determined at this time".

Operating and Maintenance Costs - The operating cost estimate of \$2,644,000 (1978 dollars) is found by CRA "to be reasonable estimates". CRA also finds that the costs would be substantially higher if certain problems occur; these are discussed below.

Private Sector Benefits - CRA finds that "private sector benefits attributed to the DPM system between 1984 and 1990 are reasonable on an annual basis". Failure of the DPM economists to discount benefits is discussed below.

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State of Minnesota Benefits - The income to the State of Minnesota of between \$8.1 and \$9.7 million is found by CRA to be "reasonable".

Value Capture Approach - The benefit assessment district to provide the private sector maximum subsidy of \$800,000 (1978 dollars) is found by CRA to produce "sufficient revenue potential to generate the required maximum subsidy by 1983 at the proposed assessment levels".

Sources of Public Funds - Outlined below are the selected or optional sources of capital and operating costs for the DPM; options exist in 10% of the local share of capital costs and options exist for the source of MTC participation in the operating deficit.

- Federal Participation:
  - \$72 million capital assistance grant
  - operating assistance for the fixed-guideway system of \$112,000 (1978 dollars) annually
  - payment of operating costs for system start-up that are unusual
- City of St. Paul Participation:
  - \$5.6 million general obligation bonds and non-cash contributions of at least \$3.4 million to cover 10% of the local share of the capital costs
  - up to \$400,000 (1978 dollars) of the operating deficit on a shared basis
  - all operating deficits in excess of \$1.7 million (1978 dollars)
- State of Minnesota Participation:
  - possibly part or all of the local 10% (\$9 million) of the DPM capital costs
  - social fares
  - possibly part or all of the MTC share of operating deficit
- MTC Participation:
  - possibly part or all of the local 10% (\$9 million) of the DPM capital costs
  - possibly part or all of up to \$500,000 of the operating deficit

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AREAS OF DIFFERENCE BETWEEN CRA REPORT AND DPM REPORT

Amount of Development Attributable to the DPM - While very close agreement existed on the aggregate forecasts between 1977 and 1990, differences exist between CRA and the DPM economists on the amount of development attributed to the DPM.

Use Category	CRA Mid-Range Estimate	DPM Economist Estimate	% of CRA of DPM
Residential Units	1,200	2,350	51%
Office Sq. Ft.	638,000	1,040,000	61%
Retail Sq. Ft.	204,000	450,000	45%
Hotel Units	442	675	65%

Three comments are made about the differences:

- Given the difficulty of the economic forecasting task, the differences are not surprising; there is no DPM system in any downtown to use as a case example.
- Many downtown developers, who were "confidentially" interviewed by CRA, are in the process of arranging financing, securing equity investors, and negotiating with tenants. In this process it behooves them to maintain a confident attitude about the present marketability of the project. If they were to admit that it were dependent upon the not yet approved DPM, they would run the risk of having the negotiation delayed until the DPM implementation is determined.
- The difference has very little, if any, impact on the financial plan. Initially major emphasis was placed on the increment of development attributable to the DPM because the value capture techniques included options that depended upon significant revenue from the development increment. The selected value capture technique obtains revenue from all development on an equal basis; there is agreement on the aggregate forecasts. There is a difference in benefits; these are discussed below.

Ridership Forecasts - CRA states in the summary that their estimates are "10-42% below the PE study estimate". The following two comments are made:

- CRA includes no additional ridership for the free or reduced social fares for the elderly, under 18, or handicapped under their worst case.
- CRA uses different development assumptions; they use the slightly lower aggregate forecasts previously presented.

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The comparison includes:

	1990 DPM Forecasts W/O Social Fares	1990 CRA Forecasts Before Adjustments
Worst Case	33,383	30,808
Intermediate Case	41,415	--
Best Case	50,437	41,415

Thus, it would be said that CRA's worst case is only 7.7% lower than the DPM forecast. They reduce the 30,808 by 829 trips for lower aggregate forecasts, and further reduce the total by 2,818 to account for the possibility that 1972 trip generation rates may be more accurate than the 1977 rates.

The DPM patronage consultants have prepared a rebuttal to the CRA discussion of coefficients, value of time, constants, etc. Little value is seen in this discussion, and the DPM will use 27,161 riders as the basis of a "worst-case" financial plan for 1990.

Operating and Maintenance Costs - two major problems are identified by CRA that would impact the operating costs: start-up problems and inflation rate for operating costs. CRA makes two excellent points which were not discussed in the DPM Final Report. As a result of these points, two actions must be taken:

- agreement must be reached between the private sector, MTC, and City of St. Paul to escalate the commitments made to the operating deficit at an inflation rate indexed to the cost of operating the DPM system
- agreement must be reached that UMTA will participate in the unusual start-up operating costs for however long they last. If the selected system supplier is made contractually responsible for the operating and maintenance costs on a fixed-price basis for a period of 5 years, he becomes liable for the operating costs whatever they may be.

Discounting of Benefits - CRA is correct, the private sector benefits were not discounted to present value; if discounted, the value of the benefits (defined only as including increased lease revenues, increased retail sales, and cost savings to CBD employers who subsidize parking costs in fringe facilities) would be \$60.5 million. At the same time the following comments are made:

- The capital cost to compare to the benefits should be the present value of \$70 million not the inflated value of \$90 million.

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- A complete benefit-cost study was not conducted; other benefits to individuals would include transportation cost reductions for people that moved downtown because of the DPM, travel time savings, regional infrastructure cost, etc.

The DPM Final Report will be revised to reflect discounted benefits.

Benefits Beyond 1990 - There is no reason for the growth in private sector benefits to stop on December 31, 1990. The assumption made was that the growth experience from 1983-1990 would again be equalled in the next 33 years.

City of St. Paul Benefits - The benefits to the City of St. Paul are property tax revenue, utility franchise fees, and hotel room tax on the increment of development attributable to the DPM. Two major differences between CRA and the DPM economist are:

- CRA has development attributed to the DPM at rates between 45-65% of the DPM economist's forecast.
- CRA assumes no incremental development is attributed to the DPM after 1990.

The DPM Final Report will be changed to discount the benefits to the City of St. Paul, but will continue attributing growth to the DPM beyond 1990.

Regional Benefits - CRA states that "From a regional perspective, the public sector benefits consist entirely of transfer of benefits from elsewhere in the region to downtown St. Paul." The public sector benefits of encouraging growth in the Metro Centers are probably best documented in the policies of the Metropolitan Council.

City of St. Paul Revenue from DPM - The City of St. Paul will receive revenue from three sources because of the DPM:

- Utility franchise fees from the energy consumed by DPM; this totals approximately \$45,000 (1978 dollars).
- Revenue from the hotel room tax on the rooms induced by the DPM.
- Revenue from the utility franchise fees on the energy consumed by all development induced by the DPM.

It appears CRA forgot the fees from the energy consumed by DPM. The difference in hotel room tax and utility franchise fees relates to the differences in forecasts of DPM related development.

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Summary of Benefits - If the benefits are discounted as properly pointed out by CRA, the annual benefits still exceed the annualized capital and operational costs. The benefits in the DPM Final Report will be discounted.

Financial Plan - CRA points out that the City of St. Paul could be financially responsible for amounts between \$3,204,000 - \$3,505,000 (1990 dollars) if the following conditions occur:

- operating costs escalate at 10% per year versus the projected 7%
- fares and commitments to the operating deficits escalate at 7% per year
- the patronage in 1990 is 27,161
- labor costs exceed estimates

If the fares and commitments to the operating deficits are escalated at the same rate as the operating costs, the other conditions could occur and a viable financial plan exists as outlined on Table 1.

TABLE 1  
FINANCIAL PLAN USING CRA'S AGGREGATE DEVELOPMENT AND  
PATRONAGE FORECASTS

ITEM	1990 VALUE (CRA)	COMMENT
Regular Riders	20,838	DPM Forecast Is 29,130
Youth Riders	0	DPM Forecast Is 1,240
Elderly	0	DPM Forecast Is 4,200
Bus Transfers	<u>6,323</u>	DPM Forecast Is <u>12,285</u>
Total	27,161	46,815
Base Fare	35¢	Escalated at 7% per year
Operating Cost	\$5,703,000	Assumes the same level of service and cost for 27,000 riders as provided for 47,000 riders; escalated at 7% per year
Sinking Fund	<u>\$ 338,000</u>	
Total	\$6,041,000	
Revenue		
- Fares Regular Riders	\$2,188,000	DPM Forecast Is \$3,059,000
- Advertising	142,000	Agrees with DPM Forecast
- Federal Operating Assit.	174,000	Agrees with DPM Forecast
- Social Fare Revenue	<u>0</u>	DPM Forecast Is \$568,000
Total	\$2,504,000	DPM Forecast Is \$3,943,000
Deficit	\$3,537,000	DPM Forecast Is \$2,205,000
Private Sector Share	\$1,656,000	DPM Forecast Is \$1,185,000
City Share	\$ 900,000	DPM Forecast Is \$ 510,000
MTC Share	<u>\$ 981,000</u>	DPM Forecast Is <u>\$ 510,000</u>
Total	\$3,537,000	DPM Forecast Is \$2,205,000
Maximum Private Sector Comm.	\$1,801,000	\$800,000 Escalated at 7%/year
Maximum City Commitment	\$ 900,000	\$400,000 Escalated at 7%/year
Maximum MTC Commitment	<u>\$1,125,000</u>	<u>\$500,000</u> Escalated at 7%/year
Total	\$3,826,000	\$1,700,000 Escalated at 7%/year
Maximum Commitment Coverage	1.08	DPM Forecast Is 1.73



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#### AREAS REQUIRING FURTHER STUDY

Fringe Parking - it was not the purpose of the DPM Final Report to present details on engineering layouts, capital costs, operating costs, financial plan, etc. for the fringe parking facilities. This work will be completed in the application presently being prepared by the Minnesota Department of Transportation for Interstate funding for the parking facilities.

Comments on the operating costs of the parking facility are made as follows:

- the existing Civic Center Ramp has an operating cost of \$100 per space per year
- the large Health Science Parking Ramp at the University of Minnesota has an operating cost of \$60 per space per year
- the heated, ventilated, small First National Bank enclosed parking facility has an operating cost of \$237 per space per year
- a reasonable estimate of the operating cost for large fringe parking facilities that are not heated or ventilated is \$120 per space per year

Non-DPM Alternatives - additional work in combining the alternatives will be completed, as well as investigating levels of funding in excess of \$14.6 million.

#### SUGGESTED CHANGES TO THE DRAFT DPM FINAL REPORT

As a result of the CRA report the following changes will be made to DPM Final Report:

- all benefits, both public sector and private sector, will be discounted to present value
- the need to establish inflation rates for fares, operating costs, and commitments for funding operating deficits at equal rates will be identified
- the need for federal participation in unusual operating costs for the length of time that they are experienced, however long that may be, will be identified

## MEMORANDUM



To: Metropolitan Council  
DPM Steering Committee File: 415

From: Daniel Brand *Daniel Brand* Distribution:  
Charles River Associates

Date Created: March 8, 1979

Typed by: dmk ( 3/8/79 )

Subject: CRA Response to DPM Staff Memo: "Comments on Charles River Associates' (CRA) Report on Evaluation of Preliminary Engineering Study of the Proposed Saint Paul DPM" (March 7, 1979)

This memorandum responds to the DPM staff comments of March 7, 1979 on the CRA "Report on Evaluation of the PE Study for the Proposed St. Paul DPM." Our objective in this memo is to respond, as briefly as possible, to areas of difference between the CRA report and the DPM report which have been highlighted in the DPM staff memo. Conclusions on the consequences of these differences for DPM decision making are then presented.

1. Amount of Development Attributable to the DPM  
(Page 4, DPM Memo).

The DPM memo cites a "CRA Mid-Range" figure to represent CRA's estimates. In reality, CRA made two estimates, a Probable Estimate and a Maximum Estimate. Averaging the two CRA estimates as the PE staff has done, reduces the differences between the CRA and DPM estimates. In fact, CRA's "Mid-Range Estimate" is our Probable Estimate.

Regarding the lengthy confidential interviews of downtown developers, an overly "confident attitude about the present marketability of the(ir) project" cannot be said to have characterized many of the interviewees. We found the developers interviewed to be extremely candid and forthright regarding the many factors and uncertainties affecting their investment decisions.

2. Ridership Forecasts (Pages 4 and 5, DPM Memo).

In comparing DPM and CRA ridership forecasts, the DPM staff memo quotes a worst case CRA forecast which is actually a subtotal before the effects of all errors were subtracted. Thus, the 30,808 number in the PE memo should be 27,161. Our corresponding best case is 42,411 riders. This is the range of ridership which we were able to quantify as a result of identifying errors in the documented procedures used to derive the 46,815 DPM staff 1990 ridership estimate.



CRA Response to DPM Staff Memo

In response to the charge that CRA incorrectly includes no separate add on factor for additional ridership due to social fares in our worst case estimate, we accounted for social fares in three ways. First, the average fares used in the model run in 1990 already reflect in part the effect of the free or reduced social fares on ridership. Second, the DPM demand model estimated in Los Angeles accounts for part of the effect of social fares since it was estimated on data which included half fare for the elderly. Finally, CRA's relatively generous worst case estimate of additional induced travel due to the DPM over and above that which the behavioral demand model was intended to predict, included the remaining adjustment for social fares.

3. Benefits Beyond 1990 (Page 6, DPM Memo).

CRA maintains that seven years is an adequate time period for the private sector to make its development decisions in response to the single major transportation investment decision (the DPM). The extensive transportation economic impact literature does not support indefinitely compounding growth in development impacts of a one shot transportation investment. Our estimate of benefits beyond 1990 therefore assumes constant annual 1990 benefits.

4. City of St. Paul Revenue From DPM (Page 6, DPM Memo).

CRA did indeed overlook the fact that the City of St. Paul will receive revenue from utility franchise fees on the energy consumed by the DPM (about \$45,000 in 1978 dollars). This raises our estimate of revenue to the City of St. Paul from the DPM from approximately \$200,000 or 50 percent of the \$400,000 estimate in the PE Report, to \$245,000 or approximately 60 percent of the PE staff estimate.

Conclusions

The above comments notwithstanding, CRA still finds the proposed St. Paul Downtown People Mover to be financially feasible. The effect of our (average) 25 percent or more lower ridership estimate is to increase operating subsidy requirements from non-farebox sources by less than this percentage (i.e., if farebox revenue as estimated in the PE Study paid 50 percent of the operating costs, a 25 percent reduction in patronage



## CRA Response to DPM Staff Memo

and farebox revenue would result in an additional subsidy requirement from non-farebox revenue sources of 25% x 50%, or 12 1/2%). Thus, the discrepancy in patronage forecasts has a lesser effect on the "bottom line" subsidy requirement than the discrepancy in patronage would indicate.

Also, it should be noted that regardless of the lower CBD development attributable to the DPM by CRA, the aggregate 1990 CBD market forecasts are still viewed as reasonable. Therefore, there will be sufficient assessable property in the special assessment district to cover the private sector subsidy contribution to the DPM operating deficit in the amount presently estimated in the DPM report. Also, it should be noted that the private sector benefits to CBD businesses from the DPM between 1984 and 1990, viewed as reasonable by CRA on an annual basis, are greater than the private sector subsidy contribution required under equal cost sharing for all labor cost and inflation scenarios shown in our report. However, to cover these additional private sector subsidy contributions, the assessment rates in the special assessment district would either have to be increased slightly, or the boundaries of the district would have to be extended slightly in the event that assessed values did not increase in the special assessment district at the same rate as DPM operating cost inflation.