109040

REPORT BY THE

Comptroller General

OF THE UNITED STATES

9739

Issues Being Faced By The Washington Metropolitan Area Transit Authority

The cost estimate for constructing the national capital area's rapid-rail transit system--Metro--has increased from $2.5 billion in 1969 to $6.8 billion as of December 1978. Metro attributes almost one-half of the increased cost to schedule delays and cost escalation.

Neither of these figures include about $3 billion of estimated financing costs associated with the revenue bonds sold to help finance construction and some other adjustments. The Federal Government's share of both construction and these other costs is projected at $7.4 billion and the State/local share at $2.7 billion.

This report discusses the following issues facing Metro and the national capital area governments

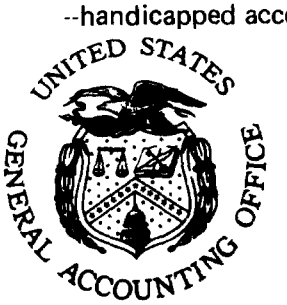
--whether costs should be paid through rider fares or area taxes,

--the effect of Federal funding being less than Metro says it needs,

--the need for a revenue source dedicated to pay the costs of mass transportation,

--the issues surrounding parking at rail stations and subsidized employee parking, and

--handicapped accessibility.



CED-79-52
APRIL 10, 1979

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

CNG-00204

B-141529

The Honorable Robert B. Duncan
Chairman, Subcommittee on Transportation
Committee on Appropriations
House of Representatives

HSE 00312

Dear Mr. Duncan:

This report analyzes the Washington Metropolitan Area Transit Authority's capital cost estimates and proposed funding sources as requested by your office. It also discusses our recent reports on the Authority's operations and financing, and the major issues facing the Authority and the local jurisdictions.

As arranged with your office, we are sending copies of this report to the Chairman, Board of Directors and the General Manager of the Authority; the Secretary, Department of Transportation; the Director, Office of Management and Budget; and other congressional committees. Copies will also be available to other interested parties who request them.

Sincerely yours,

Comptroller General
of the United States

COMPTROLLER GENERAL'S REPORT TO THE CHAIRMAN SUBCOMMITTEE ON TRANSPORTATION COMMITTEE ON APPROPRIATIONS HOUSE OF REPRESENTATIVES

ISSUES BEING FACED BY THE WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

D I G E S T

The Washington Metropolitan Area Transit Authority is constructing and operating the planned 101-mile national capital area's rapid-rail transit system--Metro--and has operated the region's regular route bus service since 1973.

GAO reviewed the Authority's policies and procedures for providing these services. ~~During the review GAO (1)~~ reported on several aspects of the Authority's operations and financing and ~~(2)~~ did some analysis for the Subcommittee on Transportation, House Appropriations Committee.

WHY COSTS HAVE INCREASED

The Subcommittee on Transportation, House Appropriations Committee wanted to know why the costs and cost estimates for Metro have greatly increased. In 1969 the estimated cost to construct Metro was $2.5 billion, not including financing costs. The Authority's latest estimate in December 1978 was $6.8 billion. According to the Authority, almost one-half of the $4.3 billion increase is due to cost escalation and unexpected delays. (See p. 16.) The Authority has not identified what portion of the increase is due only to inflation.

TOTAL COSTS OF METRO

The subcommittee also wanted to know what Metro will cost the Federal and State/local governments. Not included in the Authority's $6.8 billion estimate are the estimated $3 billion of financing costs associated with the $1 billion in revenue bonds sold during 1972 to 1975 to help finance rail construction and some other

Federal financing available for construction

The Authority and local jurisdictions have endorsed a construction schedule and financial plan that would make the total rail system operational in 1987 at an estimated cost of $6.8 billion. Initial funding will come from funds transferred from interstate highway projects. The Department of Transportation, however, has told the Authority it can only provide $275 million annually of the $400 million annually the Authority projects it will need to meet its construction schedule. As a result, the Authority says construction will be delayed by over 2 years and costs will increase by $310 million. Jurisdiction officials say they intend to ask the Congress for the funding needed to meet the construction schedule.

The Department of Transportation has also told the jurisdictions that after funding from interstate highway transfers runs out, the remaining Federal funding to complete construction, about $1.1 billion, may not be available unless the jurisdictions develop a revenue source dedicated to pay the costs of mass transportation. (See p. 45.)

Revenue source dedicated for mass transportation is needed

The three jurisdictions recognize the need for a dedicated revenue source, but there are different views on what form it should take. The Secretary of Transportation has stated that a Federal commitment for funding the full 101-mile Metro rail system depends on the jursidictions solving the continuing financial crisis by earmarking and guaranteeing tax revenue for the system. Many big-city transit systems in the Nation have such guarantees.

The Authority studied several alternative revenue sources and concluded that only four appeared to meet its criteria. These are a possible

--1-percent payroll tax,

items of smaller amounts. The Federal Government's share of both construction and these other costs is projected at $7.4 billion and the State/local share at $2.7 billion. (See p. 26.)

Accounting principles followed by the Authority do not require it to include financing costs as part of project costs but provide that it can. Federal agencies must include financing costs paid during construction, and private enterprises may also soon be required to include them. GAO recommends that the Authority consider this preferred reporting method and add to its construction estimate about $445 million of interest to be paid on the Authority's bonds until the Metro segments built with the bond proceeds become operational. Future interest costs would be considered as part of operating expenses rather than as project costs. (See p. 26.)

ISSUES BEING FACED

Now that there is agreement on the goal of building the full 101-mile rail system, there are generally five main issues facing the Authority and the local jurisdictions.

Fare policy and fare escalation

General disagreement exists among the local jurisdictions (the District of Columbia, Maryland, and Virginia) on how much of the system's operating costs the rider should pay through fares and how much local residents should pay through taxes. There is also some disagreement on whether or not fares should be increased to keep pace with inflation. Generally, the District of Columbia wants lower fares, Virginia wants higher fares, and Maryland is in between, although leaning towards Virginia's views. (See p. 33.)

still developing its regulations to implement section 504 of the Rehabilitation Act of 1973 which would require full accessibility in transit systems receiving Federal funding.

The Authority estimates that it will cost over $71 million for capital improvements to make the rail system accessible, the cost being primarily for elevators. Also, buses equipped with wheelchair lifts cost an additional $10,000 and will add millions to the Authority's cost as it acquires them to replace buses being retired. Both estimates exclude operating costs.

The Authority does not routinely compile data on the use of its bus and rail service by the handicapped; however, it plans to implement a research program to measure costs, operating problems, usage, and perceived effectiveness of each of its handicapped services. During 1978 the Authority conducted two 1-day surveys that showed 126 handicapped persons using the rail station elevators in April, when 23.3 rail miles were operating, and 65 persons using the elevators in November, when 30.8 rail miles were operating. On these 2 days, 42 and 10 persons, respectively, were in wheelchairs. Another potential measure of usage is the number of identification cards issued whereby handicapped individuals can travel at reduced fares. As of December 1978, there were 7,425 cards issued, of which 134 were for persons in wheelchairs. (See p. 63.)

AGENCY COMMENTS

Oral comments were obtained from Authority and Urban Mass Transportation Administration officials and have been incorporated into this report. Concerning GAO's recommendation to include some financing costs in Metro's construction cost estimate, the Authority agreed to include these and some other costs, increasing its December 1978 estimate from $6.8 billion to $7.4 billion. (See p. 74.)

--1-percent sales tax,

--10-percent income tax surcharge, and

--1-cent-per-gallon tax or 1-percent sales tax on motor fuel. (See p. 47.)

Parking issues--spaces versus anticipated demand and subsidized employee parking

It is generally recognized that to attract suburban ridership to a rail system there must be adequate space for automobile parking. Parking demand is estimated at 103,000 spaces unconstrained; however, due to lack of space, congestion, and in consideration of social problems the Authority is planning to build only 52,000 automobile parking spaces. About 22,000 of the planned spaces were recently added to the planned system at an estimated cost of $108 million. The Authority estimates it would lose 38,000 potential riders daily by not meeting the parking demand. (See p. 55.)

Another parking issue is subsidized employee parking. In commenting on the national capital area's proposed clean air standards, the Authority pointed out that subsidized parking, especially for Federal Government employees, adds to pollution problems because there are more automobiles on the road. Further, the Authority says the subsidy practice competes with mass transportation.

As a way of recognizing what the Authority believes is its unique relationship to the Federal Government, the Authority recommends that the Federal Government charge employees commercial parking rates and give the income to the Authority as an additional operating subsidy. However, the Office of Management and Budget says that even if it decides to charge employees to park, it will not give the revenue to the Authority. (See p. 60.)

Costs of handicapped facilities and their use

An issue facing all the Nation's transportation systems is the cost-effectiveness of providing full accessibility for the handicapped. The Department of Transportation is

contents

CHAPTER 1

INTRODUCTION

The Washington Metropolitan Area Transit Authority manages mass transportation in the national capital region. The Authority is constructing and operating the planned 101-mile national capital area's rapid-rail transit system, commonly called Metro, and has operated the region's regular route bus service (Metrobus) since 1973.

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

The Authority is a public agency established in 1967 through a congressionally approved interstate compact (Public Law 89-774) among the District of Columbia and the States of Maryland and Virginia. The Authority's primary function is to plan, develop, finance, and provide for the operation of a rapid-rail and bus-transit system for the Washington Metropolitan Area Transit Zone. The zone includes the District of Columbia; the cities of Fairfax, Falls Church, and Alexandria, and the counties of Arlington and Fairfax in Virginia; and the counties of Montgomery and Prince George's in Maryland.

The Authority is governed by a board of directors consisting of two directors and two alternates from each of the three jurisdictions--Maryland, Virginia, and the District of Columbia. The Maryland members are appointed by the Washington Suburban Transit Commission; the Virginia members are appointed by the Northern Virginia Transportation Commission; and the District members are appointed by the District of Columbia's City Council. Most of the board members are elected officials from the jurisdictions, although a few are appointees of elected officials.

The Authority's chief administrative officer, the General Manager, is responsible for all activities subject to policy direction and delegations from the board. Other Authority officers are the Assistant General Managers for finance, construction, transit services, and general administration; the Secretary-Treasurer; and the General Counsel. Appendix I is an organization chart of the Authority.

DESCRIPTION OF TRANSIT SYSTEM

Metro ground-breaking took place on December 9, 1969, and in early 1973 the Authority acquired the region's private bus companies (authorized by Public Law 92-517).

ABBREVIATIONS

CPI	consumer price index
GAO	General Accounting Office
GSA	General Services Administration
Metro	National capital area's rapid-rail transit system
UMTA	Urban Mass Transportation Administration

METRO SYSTEM SCHEDULE AS OF JANUARY 1979

Phase	Route	Stations	Forecast operating date (note a)	Revenue miles	Number of stations	Number of cars per segment
I thru III	A	Dupont Circle to Metro Center	Now in operation	2.3	3	-
	B	Metro Center to Silver Spring	Now in operation	9.1	8	-
	C	McPherson Square to National Airport	Now in operation	7.6	9	-
	D	McPherson Square to New Carrollton	Now in operation	11.8	14	-
		Subtotal		30.8	34	280
IV	K	Rosslyn to Ballston	Dec. 79 - Jan. 80	2.9	4	16
IVA	G	Stadium-Armory to Addison Road	Mid - Late 80	3.5	3	14
V	A	Dupont Circle to Van Ness	Early 81	2.1	3	14
	C	National Airport to Huntington	Early 82	5.4	4	14
VI	A	Van Ness to Grosvenor	Early 83	6.8	5	70
VIA	A	Grosvenor to Shady Grove	Early 85	7.0	4	24
	F/L	Gallery Place thru L'Enfant Plaza to Pentagon (Shuttle)	Late 81	2.9	3	10
		(Full service)	Early 84	-	-	20
	L	Gallery Place to Columbia Heights	Mid 85	3.1	4	16
	J	King Street to Van Dorn	Early 84	2.4	1	24
	H	Van Dorn to Franconia-Springfield	Late 84	3.5	1	10
	K	Ballston to Vienna	Mid 83	9.1	4	80
VII	B	Silver Spring to Glenmont	Early 86	4.6	3	18
VIII	F	Gallery Place to Anacostia	Early 84	2.0	3	30
	F	Anacostia to Rosecroft	Mid 87	4.6	4	30
	E	Columbia Heights to Greenbelt	Early 87	10.3	6	66
		Total		b/ 101.0	c/ 86	d/ 736

a/ Schedule is based on the Authority's projections of $400 million annual Federal funding through 1984.

b/ 48.6 miles underground.

c/ 50 stations underground.

d/ 220 passengers per car.

Rail operations began on March 27, 1976--a 4.6-mile segment with 5 stations between Farragut North and Rhode Island Avenue.

As of March 1979 there were 30.8 miles operating. As shown on the following chart the total rail system as planned will include

--101 miles of revenue operations, 48.6 miles underground;

--86 stations, including 50 underground;

--736 air-conditioned cars, each capable of carrying 220 passengers; and

--operations phased in through mid-1987.

Since the opening of the "Orange Line" during November 1978, Metro ridership has averaged about 220,000 passengers daily during the week and 62,000 passengers on Saturdays. The Authority is considering expanding operations to Sunday either during 1979 or 1980.

The Authority operates about 1,800 buses which carry about 450,000 passengers daily during the week, 125,000 on Saturdays, and 65,000 on Sundays. The fleet includes standard 47 passenger intracity buses, minibuses, and suburban-type buses for express and charter service. Also, the Authority has ordered larger capacity articulated buses (70 passenger buses which bend in the middle permitting turns on city streets in spite of their considerable length). As each phase of the rail system is opened, bus service is rerouted to bring passengers to the rail stations instead of continuing downtown.

ALTERNATIVES ANALYSIS AND FINANCIAL PLAN TO COMPLETE CONSTRUCTION AND OPERATE THE TRANSIT SYSTEM

In September 1976 the Federal Urban Mass Transportation Administration (UMTA) requested that the Washington Metropolitan Area analyze transit alternatives to certain unbuilt Metrorail system segments. The Alternatives Analysis, as it is commonly called, was a prudent device for evaluating the need for and the return on a sizeable Federal investment.

The Alternatives Analysis was completed in May 1978 and recommended that the full rail system be built substantially the same as the system previously adopted by the area jurisdictions. The Joint Policy Steering Committee on Alternatives Analysis then responded to UMTA's mandate for a financial plan that recognized the amount of available Federal and local funds and asked the Authority to prepare the plan by August 1978.

Financial plan

In August 1978 the Authority proposed its financial plan for "completion and operation of the public transportation system for the national capital area." The plan had three fundamental elements (1) a recommended approach (referred to as plan 1) and a fall-back alternative (plan II) for funding construction of all remaining rail system segments, (2) a method of providing Federal and State/local cooperative funds to pay both principal and interest on Metro revenue bonds, and (3) an outline of actions needed to permit more reasonable management of rail and bus operating subsidies and more equitable and politically acceptable sources for subsidy payments.

After receiving Federal and State/local comments on its proposed financial plan, the Authority proposed a modified plan II in December 1978. At a December 1978 conference of Federal and State/local officials, the modified plan was endorsed and subsequently approved by the Authority's board of directors.

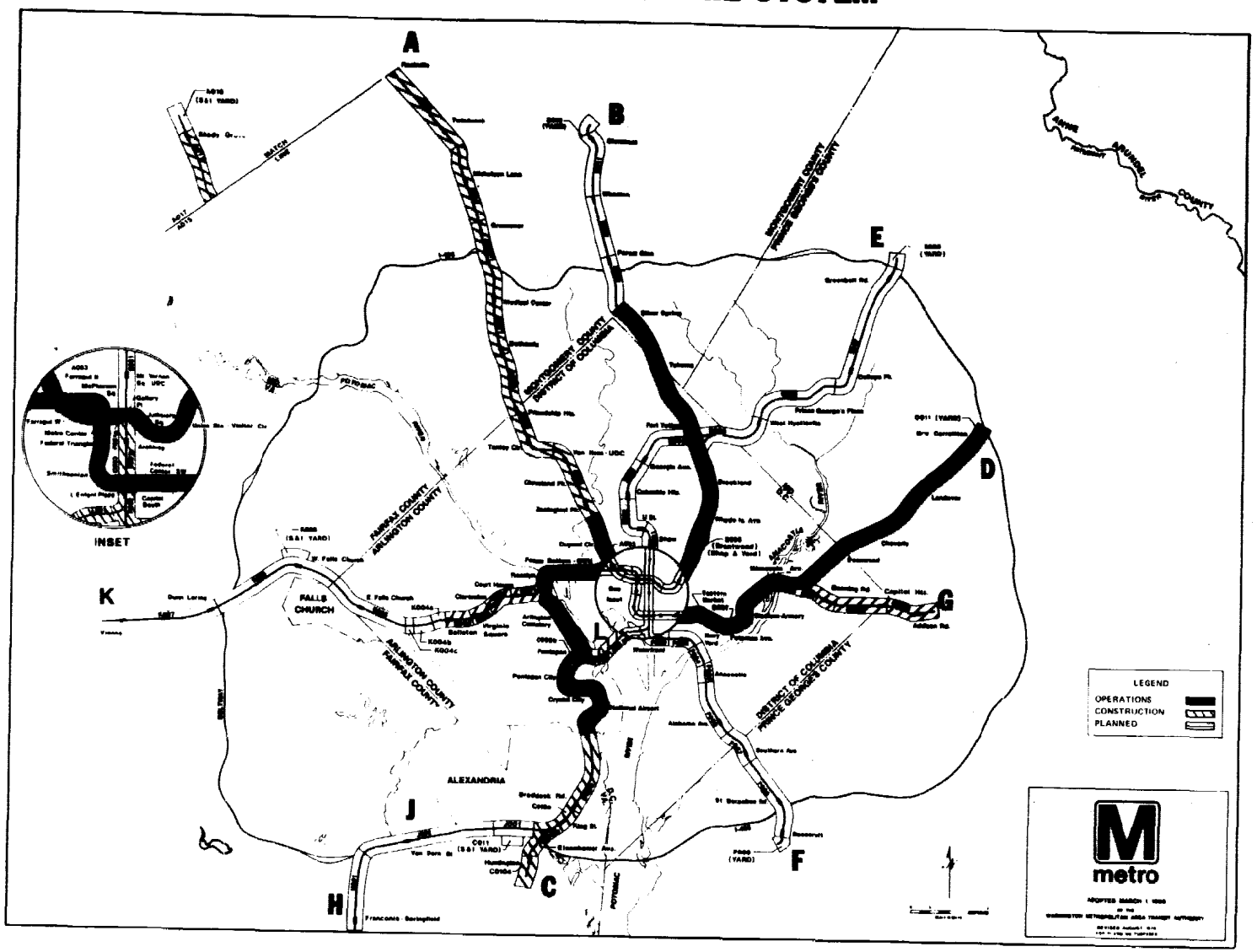
SCOPE OF REVIEW

We reviewed the Authority's policies and procedures for administering its activities. This included (1) gathering general working information on major aspects of the Authority, (2) examining legislation affecting the Authority, and (3) selectively testing management controls. We reviewed pertinent reports, correspondence, and records; and obtained the views of the Authority and Department of Transportation officials.

During our review we identified several areas where improvements were possible and we issued reports to the Authority and the Department of Transportation on these areas.

At the Subcommittee on Transportation, House Appropriations Committee's request, we also examined the Authority's costs and cost estimates, and the financing sources proposed to complete and operate the national capital area's mass transportation system.

101-MILE METRO RAIL SYSTEM



million of guaranteed revenue bonds and until the proceeds were needed, invested them and earned income on the unspent proceeds.

According to generally accepted accounting principles, net interest is determined by subtracting any income earned on the bond proceeds from interest costs. This is consistent with the statutory language "net interest cost." The Authority, however, did not subtract the income earned, but rather considered all the income to be its own. Therefore, the Federal Government's share of bond interest cost was too large since it was being determined on the basis of "total" rather than net interest costs. Potentially, the Federal Government may have paid $114 million more than it was legally authorized to pay.

We agree with the accounting principle the Authority's certified public accountants used; in certifying the Authority's financial statements they subtracted the amount of income earned on the bond proceeds from the bond interest costs. The National Committee on Governmental Accounting's guidance 1/ for State and local governmental accounting also supports this concept of net interest.

Federal Government paying most of the Authority's bond interest

In addition to paying 25 percent of the interest costs, as required by Public Law 92-349, the Federal Government has been paying most of the remaining interest costs. A tentative agreement between the Authority and the executive branch, if congressionally approved, will provide for all future interest and principal payments to be on a two-thirds Federal, one-third State/local split.

From the original bond proceeds, the Authority set aside enough funds to pay 4 years of its share of interest--the 75 percent remaining after the Federal 25-percent subsidy. Beginning in fiscal year 1977, however, these set-aside funds were insufficient to pay the interest costs. The Authority proposed and the Federal Government agreed to pay 80 percent of the interest balance for fiscal years 1977-79.

For future payments, under a tentative agreement reached in December 1978, the Federal Government will pay the principal and interest on two-thirds of the bonds.

1/"Governmental Accounting, Auditing and Financial Reporting;" National Committee on Governmental Accounting, 1968.

CHAPTER 2

OUR EVALUATIONS OF THE AUTHORITY

Since 1972, we have evaluated numerous aspects of the Authority's operations and financing estimates. Before 1978 we issued 13 reports on such things as the Authority's reporting system for its rapid-rail cost and construction status, evaluation of the capital cost estimate, suggested reporting formats, and operational and construction safety measures. We testified before the Congress on some of these reports and related matters.

Within the last year we reported on the Federal Government's share of the Authority's bond interest costs; the Authority's revenue collection process, its entitlement to use Federal procurement services, its cost estimating process; and the need for the Authority to strenghten its internal auditing and better manage rail equipment warranties.

Appendix II is a complete listing of our evaluations of the Authority.

FEDERAL SHARE OF THE AUTHORITY'S INTEREST COST IS TOO LARGE

In September 1978, we reported to the Secretary of Transportation that the Federal Government may have paid $114 million more of the Authority's bond interest cost than it was legally authorized to pay. We recommended that the Secretary take action on the funds in question. The Secretary's statutory 1/ response to our report was due November 1, 1978, but on December 11, 1978, the Secretary sent an interim response saying that the Department of Transportaton needed to research the matter further and would respond by February 15, 1979. As of March 14, 1979, the Department had not responded.

Concept of net interest

We reported that the Authority's handling of bond interest income was not in compliance with our legal analysis of the intent of Public Law 92-349, wherein the Secretary of Transportation is authorized to pay 25 percent of the Authority's "net interest" cost on federally guaranteed Authority obligations. Between 1972 and 1975 the Authority sold $997

1/Section 236 of Legislative Reorganization Act of 1970 requires a response in 60 days.

To test the refund procedure, we took one of the canceled cards from a vending machine trade-in bin and had a staff member attempt to use it. The card was rejected by the fare gate but the station attendant sent the card to the revenue office for a refund. The refund was made in the form of a new farecard which we subsequently returned to the revenue office.

We recommended that the Authority act to remedy the potential revenue loss from misuse of canceled farecards; it has acted on our recommendations. The automatic fare collection equipment is expected to be modified by March 1979 to eliminate the problem. In the meantime, the Authority issued operating procedures making it a violation for anyone other than the revenue collection teams to remove farecards from the machine. We believe the Authority's action will rectify the problem.

AUTHORITY ENTITLED TO USE FEDERAL PROCUREMENT SERVICES

Although the Authority is not a Federal agency, it is entitled to use Federal procurement services. Although it had not been using the services, we believed it should because any savings it realizes will be shared by the Federal Government through reduced subsidy or capital payments, either directly or via the District of Columbia government. The other national capital area governments would also save.

Update of Authority's eligibility to use Federal procurement services

Although in 1970 the General Services Administration (GSA) ruled that the Authority was eligible to use its services, the Authority was not using them because it had experienced problems in working through the District of Columbia government. During our review we raised the issue with GSA and received their updated legal opinion that the Authority was eligible for some direct Federal procurement services. On August 15, 1978, we sent the Authority's General Manager a letter notifying him of GSA's opinion. On September 20, 1978, the Authority responded that it would use Federal services whenever feasible.

GSA reconfirmed its earlier opinion that the Authority could purchase supplies directly from GSA. For procuring services, such as equipment repair and printing, GSA still said that requests would have to come through the District government. However, GSA felt it would be a simple matter for the District government to internally delegate authority to the Authority so they could also procure services directly.

This principal amount is $665 million and the interest due is $1.9 billion.

REVENUE COLLECTION PROCESS

In August 1978 we reported to the Authority on our observations of its revenue collection process for bus and rail. We concluded that, overall, the process was efficient and security was adequate. We also observed how the rail automatic fare collection equipment was serviced and recommended an improvement in the Authority's security over canceled farecards.

While observing a revenue team servicing the automatic fare collection equipment, we noted a problem with the way canceled farecards were handled which may have been causing a loss of revenue to the Authority. Each farecard vending machine has an open bin where the canceled farecards are deposited. Canceled cards are either vending machine misprints or customer trade-ins. These bins are not secure and farecards can be removed by anyone having access to the machine--Authority revenue attendants or mechanics, some subcontractors, and station attendants. Supposedly, the canceled farecards are valueless, but we found otherwise.

After examining and testing some canceled farecards to see if they were really valueless, we found several farecards that were still good. Such "testing" was made easy by inserting the card into the trade-in slot of the farecard vending machine to see if it would accept it. Apparently some station attendants were doing this. One of our staff members experienced a malfunction of a vending machine and lost $1.05. The station attendant, after failing to locate the lost $1 bill, gave our staff member two farecards valued at $1.25. Our staff member observed that the attendant had several more farecards. We had one of the farecards "read" by the revenue office equipment and found that it was an apparent misprint that had not been erased by the vending machine. We referred our staff member's experience to the Authority's Office of Security.

Many of the canceled farecards we examined looked usable but had no value when tested. In these cases the magnetic value had been appropriately erased but a printed value remained. These cards will be rejected by the system but a refund can be obtained because the revenue office cannot distinguish between a farecard erased by a vending machine and one erased by coming in contact with a magnetized object, such as a credit card. Therefore, it is possible for personnel having access to the vending machine to take the cards and give them to friends to submit for refunds.

As of January 1979 the Authority's purchasing office told us they were still exploring the potential benefits of using Federal procurement services and would be modifying their procurement system to use the Federal system. Also, it still had to draft the agreement with the District government.

NEED FOR INDEPENDENT REVIEW OF THE AUTHORITY'S COST ESTIMATE

In December 1978 we reported to the Authority on the process it used to estimate the cost of Metro at December 31, 1977.

We found that although the Authority had improved its estimating capability over the years, it misclassified and excluded costs from the estimate; inadequately recognized program changes; insufficiently used and analyzed available data in developing the estimate; and lacked an independent review which could help assure the estimate's completeness, consistency, and reliability.

Most of the problems, we believed, stemmed from the absence of written direction and guidance, both general and specific, which would insure a common understanding of the criteria and responsibilities for developing, documenting, and updating the estimates throughout the Authority.

We recommended that the Authority develop and implement consistent and effective cost estimating procedures and guidelines and that special provisions be made for

--defining contingencies properly and analyzing uncertainties in the Metro system rather than relying on UMTA requirements;

--including all costs associated with equipment design, construction, and acquisition regardless of the funding source;

--estimating the total impact of program changes through program completion; and

--providing an effective independent review of the estimate.

Although Authority officials generally agreed with our findings, they felt that the independent review function was adequately performed by the extensive management and jurisdictional reviews before the cost estimate was released to the public. Although this top management review is necessary,

GSA wrote to the District government and explained this to them.

During a meeting between Authority, GSA, and District government officials it was decided that the Authority and the District government would draft an agreement outlining each parties' rights and obligations.

Federal services available

In October and November 1978 Authority personnel met with GSA customer representatives and were briefed on the Federal services available. Authority personnel said they were interested in all services available and would modify their present supply and procurement systems to use GSA. In January 1979 GSA consumer representatives conducted two 1-day training sessions at the Authority on how to use Federal procurement services. Some services the Authority's purchasing office plans to explore are

--using GSA's schedule of Federal procurement contractors,

--obtaining surplus equipment, and

--using GSA service contracts.

Also, it plans to switch to standard Federal specifications to make procurement easier.

Observations

The possible savings from the Authority's use of Federal procurement services cannot be determined until it has explored all available options and experiences working with GSA. The Authority's purchasing office told us that besides any actual cost savings, the Authority may also benefit by (1) having a guaranteed supplier and (2) reducing the lead time for some items it now procures commercially.

The Authority has to determine how much of what it procures is unique to its operations and how much is "general" and, therefore, likely to be available through GSA. Such things as office supplies and general machine and automotive parts are common to other operations. In addition, the purchasing office said there may be component items used in bus and rail operations that are not necessarily unique to transit systems, for example, electronic circuit boards.

no internal auditing was budgeted for 18 months, through June 1980.

Authority studying need to strengthen internal audit

We discussed our concerns over the de-emphasis of internal auditing with the Authority's Comptroller and were informed that beginning in January 1979 the Authority planned to analyze its audit function in terms of making the internal audit activities equal to external audits of contractors, and either allocate additional resources or reallocate existing resources to internal auditing.

In a letter report to the Authority's General Manager on January 16, 1979, we endorsed the proposed analysis and urged that it be given a high priority. We also suggested that, in addition to internal financial and control audits, the Authority consider having the internal audit office evaluate the economy and efficiency of operations and whether anticipated program results are being achieved. Some evaluations are already being done by the Authority's Office of Budget and Management Analysis or by outside consultants. While such evaluations are acceptable, the audit office should be required to periodically evaluate the work of this office and the outside consultants.

NEED TO BETTER MANAGE WARRANTIES ON RAIL EQUIPMENT

In February 1979 we reported to the Authority that it had not effectively administered its warranty and reliability provisions. This was primarily because:

--Contract provisions may be difficult to enforce in an operational environment which requires quick repair to keep a sufficient number of trains running.

--A clear and consistent interpretation of contract provisions was needed.

--Lines of authority and responsibility for enforcing the provisions were unclear.

Warranty and reliability provisions must suit the equipment and the conditions under which they will be administered. Before contracts are signed, warranty language should be reviewed by all parties to insure a consistent understanding

in our opinion an independent review by someone who is not affiliated with the estimating office, who can cross division boundaries, and who can obtain high-level solutions to differences would have corrected and brought to management's attention many of the errors and shortcomings in the estimate. Authority officials later told us that the Authority has agreed to consider establishing an independent review within its staff structure.

INTERNAL AUDIT NEEDS TO BE STRENGTHENED

In January 1979 we reported to the Authority on the need for it to strengthen its internal audit activities. We found that before 1978 the Authority's Office of Audits had done some internal financial and control audits, but beginning in 1978 such internal auditing had been greatly de-emphasized. Instead, almost all audit resources were devoted to financial audits of Authority contractors. Such audits, commonly referred to as external audits, are also a vital part of a comprehensive audit effort, but should not be done at the expense of internal auditing.

During 1978, 74 of 79 audits completed were of contractors. For fiscal years 1979 and 1980, the budgeted percentages of audit resources for contract audits were about 91 and 99 percent, respectively.

In preparing its fiscal year 1979 budget request, the audit office proposed that 55 percent of its resources be devoted to contract audits and 45 percent to internal audits. The proposal also showed that its top 6 priority areas, of 14 identified, were for internal auditing. Although the audit office was subsequently allocated more than the minimum resources it said it needed, most of the funds were allocated for contract audits. Of the audit office's top six priorities, the Authority only allocated resources to two of them, about 5 percent each to priorities three and four (rail and bus operations). The other priorities which were not allocated resources were:

--Priority number 1: computer auditing.

--Priority number 2: insurance auditing.

--Priority number 5: internal financial auditing.

--Priority number 6: operational asset auditing.

Because of audit resources allocated to contract audits, the audit office director said that starting in January 1979

and rail services. According to some Authority officials, however, this has not always occurred.

The Authority's Office of Equipment Design is responsible for administering equipment warranties. However, the office, which is primarily concerned with procurement, must administer the railcar and automatic train control warranties with the assistance of the Office of Rail Services, which is primarily concerned with keeping the required number of cars ready for service.

Authority comments and our evaluation

The Authority acknowledged the existence of management weaknesses in its enforcement of warranties. It believed the need for continued rail operations required immediate maintenance instead of sending components to the manufacturer because of the uncertainty and time-consuming repair turnaround. It stated that as operating experience was gained, warranty management had improved.

We made several recommendations to the Authority on how to better manage warranties on rail equipment. As a result the Authority said it was taking specific actions to strengthen warranty administration.

In our view, the actions being taken by the Authority should improve their warranty enforcement efforts, thereby reducing its operating expenses, assuring its entitlements are received, and protecting the significant Federal and local investments.

of what the contract requires. To effectively enforce the provisions, the roles and relationships of those involved in warranty administration must be clearly defined and consistent with good management practices.

Contract provisions difficult to enforce

Contract provisions pertaining to the correction of deficiencies used in three of the five equipment contracts we reviewed were taken from the Defense Acquisition Regulation, apparently without considering their workability in an operational environment. The Authority had to make railcar warranty repairs itself, because the repair turnaround time was too uncertain to assure that a sufficient number of railcars would be available for revenue service. Also, the railcar contract did not define what constituted "prompt" repairs, nor did it provide for the Authority to recover costs of making repairs itself unless the contractor had been properly notified and refused to correct the deficiency.

In the automatic train control contract, the correction of deficiencies clause is rarely enforced because, according to officials, the paperwork required to invoke the clause is too time-consuming, and correction can be agreed upon informally. Likewise, Authority officials informally obtained equipment modifications to the railcars, because it took too long to accumulate the contract-required data.

Differing interpretations of provisions

Authority officials have interpreted the correction of deficiencies clauses differently. The Authority's General Counsel indicated that the clause in the railcar contract covers random failures due to inferior material and workmanship. The official enforcing the contract believes that such failures are covered, but only because a specific warranty period is identified in the contract's technical specifications. Officials administering the automatic train control and communications warranty provisions insist that the correction of deficiencies clause does not provide contractor remedy for random failures due to poor material and/or workmanship. The contractors, however, are occasionally making such repairs without billing the Authority.

Unclear lines of authority and responsibility

Effective warranty management depends on close coordination and cooperation between the offices of equipment design

As shown above, the capital cost estimate has grown from $2.5 billion to $6.8 billion, an increase of $4.3 billion, since February 1969. The following schedule itemizes the total accumulated increase by category.

Description	Amount	Percentage of total increase
	(millions)	
Original cost estimate	$2,494.6	
Increases:		
Route alignments	210.4	4.8
System additions	652.0	15.0
Estimating	647.2	14.9
Escalation	976.2	22.5
Schedule delays (escalated costs)	1,054,0	24.3
Design & engineering	10.0	0.2
Contingency	85.5	2.0
Other	870.0	20.1
System reductions	(167.4)	(3.8)
Total increases	$4,337.9	100.0
December 1978 capital cost estimate	$6,832.5	

The Authority has not identified what portion of the $4.3 billion increase is due only to inflation.

Problems of estimating costs

Problems exist in estimating the cost of any project of Metro's magnitude and complexity. In the early stages of such a project much of the detailed information needed to develop accurate estimates is unavailable. For example, the exact route alignments, station locations, number and degree of delays, and inflation rate are not known.

Public hearings, studies, reviews, and approvals must be completed before a contract can be awarded to design a route section. Further, information, such as current material and labor prices, is often not available until shortly before the construction contract is awarded. The closer a section design is to being finalized, the fewer uncertainties remain, and the more accurate the estimate. Unfortunately, the Authority did not have this type of information in making its original 1969 estimate. Even today many route sections have not been designed and there are possible funding delays that could further increase the estimated cost.

CHAPTER 3

TOTAL COSTS AND WHY COSTS HAVE INCREASED

The Subcommittee on Transportation, House Appropriations Committee requested that we analyze the Authority's costs, cost estimates, and financing sources proposed to complete and operate the mass transportation system for the national capital area. For use during its fiscal year 1980 appropriation hearings, we provided the subcommittee information on (1) the reasons why the estimated construction costs have greatly increased since the original estimate and (2) what the estimated total costs will be to the Federal and State/local governments.

REASONS FOR INCREASED COSTS

The Authority says that unexpected delays and cost escalations have accounted for a large part of the cost increase over the original estimate. A summary of the Authority's reasons for the increases, and the amounts, are discussed below.

Revised cost estimates

The Authority's board of directors approved Metro's first $2,494.6 million capital cost estimate on February 7, 1969. The estimate has increased steadily to the $6,832.5 million present estimate. Similarly, the completion date for the system has steadily slipped. In February 1969 it was projected that the system would be completed by December 1979; in 1974 completion was scheduled for 1981; in July 1976 completion was projected for 1983; and now completion is estimated for 1985-87. Shown below are the revision dates and the Authority's cost estimates at that time.

Revision date		Cost estimate
		(millions)
Feb.	1969	$ 2,494.6
Dec.	1970	2,980.2
Nov.	1974	4,453.7
Dec.	1975	4,676.6
July	1976	5,024.8
Dec.	1976	5,104.0
July	1977	5,146.0
Dec.	1977	5,319.2
Aug.	1978	a/ 6,722.4/6,933.1
Dec.	1978	6,832.5

a/These two amounts correspond to the recommended plan I and fallback plan II, respectively. (See p. 2.)

Description	Amount (millions)
Rail revenue collection vehicles	2.6
Additional fare collection equipment	3.2
Temporary maintenance facility for New Carrollton Station	1.2
Other	178.8
Total system additions	$652.0

Deducting system additions and route alignments from the total $4.3 billion increase still leaves a $3.5 billion increase. This amount is attributed to estimating variances, errors in forecasting escalation, scheduling delays, and the cost of carrying construction overhead for a longer period than anticipated.

Estimating

The Authority attributes 14.9 percent, or $647.2 million, of the cost estimate increase to estimating variances as shown below.

Description	Amount (millions)
Updated design estimates	$171.5
Construction modifications	309.0
Updated utility agreements	84.7
Other	82.0
Total estimating increase	$647.2

As previously stated, the closer a section design is to being finalized, the more accurate the estimate. The $171.5 million represents the increase attributable to section designers' updated cost estimates, based on more definitive plans and drawings.

Construction modifications cover changed conditions and additional construction tasks which occur after a contract is awarded. The $309.0 million for construction modifications covers the cost of past, in-process, and an estimate of future modifications to complete the system. Updated utility agreements cover relocating utilities which conflict with Metro construction.

Another factor contributing to the cost estimating problem is that a somewhat different system is being built than was originally planned. Route alignments and the number of stations have changed and facilities and equipment have been added.

Revised route alignments

The Authority attributes 4.8 percent, or $210.4 million, of the total accumulated increase to revised route alignments. The major revisions included in this increase are

--extending the system to Shady Grove, with an additional station on the "A" route;

--extending the "JH" route south of Franconia Road;

--adding a deep Fort Totten station and revising an alignment in the vicinity of Prince George's Plaza on the "E" route; and

--modifiying the "F" route alignment with a revised terminal location at Rosecroft instead of Branch Avenue.

Some revisions are only proposed and until financing is finalized are subject to change, with corresponding changes in the system's cost estimate.

System additions

The Authority attributes $652.0 million, or 15.0 percent, of the cost estimate increase to additional requirements. The major items included in this increase are shown below.

Description	Amount (millions)
254 additional railcars	$250.5
Enhanced parking facilities	108.2
Additional spare parts	39.5
Capitalization of start-up costs	31.3
Railroad safety improvements	12.6
Emergency storage and turnback track at Federal City College Station	10.7
Advance land acquisition for Tysons Corner and Auth Road future routes	11.0
Handrails for aerial structures	2.4

The following graph shows the escalation rates experienced to date, in terms of actual and average rates and trend, compared to the Authority's forecasted rates from 1979 to estimated completion.

As can be seen from the graph, the Authority's projected annual percentage increase drops off to 6 percent in 1983 and thereafter. Although using a 6-percent constant escalation rate for out-years is a common forecasting practice, the actual escalation rate the Authority experienced in the previous 9 years does not support this optimistically low escalation level.

As the graph shows, the actual price escalation experienced in the previous 9 years has never gone below 6.6 percent annually. The average escalation rate for the period is 8.4 percent, which would mean an additional $201.2 million to the Authority's latest $6.8 billion construction cost estimate.

Further, as can be seen from the graph, although trend analysis shows a decreasing escalation rate over the construction period, it never reaches the Authority's 6-percent goal. Instead, between 1979 and the rail system's completion the trend analysis shows that escalation will range between 0.5 and 1.0 percent higher than the Authority's projection. This difference would mean an additional $83.3 million to the Authority's latest $6.8 billion construction cost estimate.

Scheduling delays

The Authority attributes $1,054 million, or 24.3 percent, of the total accumulated increase in the latest cost estimate to scheduling delays already evident. This includes the estimated costs of experienced and anticipated delays.

The following summarizes by phase the various constrction delays experienced.

Phase I

Phase I, which included 4.6 miles and six stations on the Red Line from Rhode Island Avenue Station to Farragut North, was originally scheduled to open December 1972 but was delayed to March 1976, a 40-month delay. Several factors caused the delay. Funds were not approved for the District of Columbia's Metro construction in fiscal years 1969, 1971, and 1972. Indecision and changes in the National Visitors Center's design delayed the Union Station contract completion, which was critical to phase I and all the following

Price escalation forecast

The Authority attributes 22.5 percent, or $976.2 million, of the cost estimate increase to past and forecasted escalation. For example, worker's compensation insurance, social security taxes, construction labor, and materials have all increased greatly since the construction program began. The Authority's reports show the following increases for these items:

Description	Percentage increase since 1969
Worker's compensation insurance	484
Social security taxes	186
Weighted construction craft wages	145
Weighted direct construction materials	121

In a previous review of the Authority's November 1974 capital cost estimate, we concluded that the Authority used reasonable procedures, data, and judgment in developing its estimates. 1/ However, by using equally valid Government and industry estimates at the time, we estimated the Authority's $4.5 billion estimate could have been understated by $0.5 billion. We concluded in that report that the November 1974 estimate was highly optimistic.

This optimism is still present in the current financial plan. Based on the construction program's 9-year history, the annual escalation rate projected by the Authority for the period 1979-86 may be too low. These rates are as follows:

Year	Annual percentage price increase over previous year
1979	6.92
1980	6.69
1981	6.46
1982	6.23
1983	6.00
1984	6.00
1985	6.00
1986	6.00
1987	6.00

1/"Evaluation of the Capital Cost Estimate for the Metro Rapid Rail Transit System," PSAD-75-95, May 8, 1975.

stage contracts for phase I operations. Further, additional public hearings and environmental impact study requirements added more time to the schedule. Public hearings are now required before and after an environmental impact study which preceeds the final design. Labor strikes, Hurricane Agnes in 1972, and slippage in railcar deliveries also delayed the opening of this phase. The opening of the Gallery Place Station was delayed more than the other stations because it was not accessible to the handicapped.

Phase IA

This phase included 1.07 miles and one station, Dupont Circle, on the Red Line. This station's original opening was to coincide with phase I opening in December 1972, but was delayed until January 1977, a 49-month delay. The funding delay and the same delays caused by the revised public hearing requirements as experienced in phase I also affected this phase. Similarily, labor strikes and severe storms (Hurricane Agnes in 1972 and Eloise in 1975) delayed this phase. In addition, the National Park Service did not give the Authority right-of-entry until the vent shafts at Farragut Square were redesigned to be moved into the streets.

Phase II

Phase II was originally scheduled to open in December 1973, but was delayed to July 1977. Phase II included 11.94 miles and 18 stations on the Blue Line from the Stadium-Armory to National Airport. This phase experienced the same delays--funding, public hearings, labor strikes, and severe storms--as the previous phase, plus slow tunneling progress and additional time required for system testing.

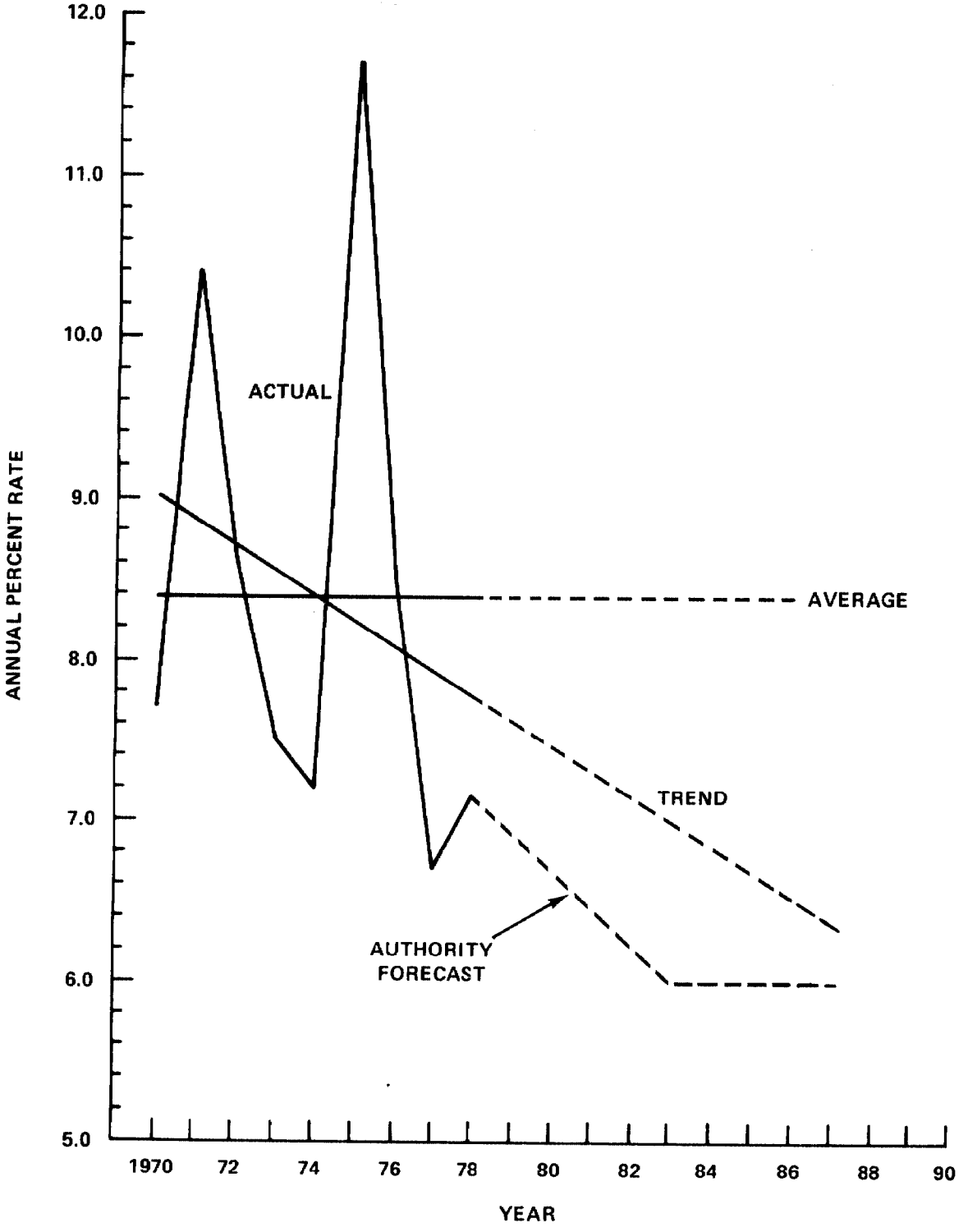
Phase IIA

This phase, which included 5.66 miles and four stations on the Red Line from Brookland to Silver Spring, was originally scheduled to open in July 1974, but was delayed to February 1978. The major causes of delay were the negotiations and coordination required with the C&O/B&O Railroads.

Phase III

Phase III was originally scheduled to open in December 1974, but was delayed about 4 years and opened in November 1978. This phase included 7.49 miles and five stations on the Orange Line from the Stadium-Armory to New Carrollton. Like the preceeding phase, this phase was also delayed by

THE AUTHORITY'S ACTUAL AND FORECASTED PRICE ESCALATION RATES FOR METRO RAIL CONSTRUCTION COMPARED TO THE TREND AND AVERAGE



NOTE: TREND FOUND BY USING LEAST SQUARES METHOD.

of the total increase to refinements in the cost estimate which appeared in the November 1974 estimate or earlier. This was a one-time adjustment and was not broken down by category, but was attributed to increases due to

--actual construction experience,

--more definitive plans and drawings,

--updated pricing information,

--environmental refinements, and

--revised rock tunnel design.

As noted on page 20, we evaluated the November 1974 estimate and found it reasonable, although optimistic.

System reductions

The accumulated cost increase has been reduced by 3.8 percent, or $167.4 million, to recognize the following.

Description	Amount of reduction (millions)
Metro work done by the Virginia Department of Highways and Transportation along the Vienna Route	$ 43.7
Location change of Anacostia Station	15.0
Reduced size of escalator machine rooms	1.0
Substituted stairs for escalators	0.1
Revised train control to eliminate need for special equipment at temporary terminals	1.2
Repackaged procurement contracts	20.0
Composite rail	1.8
Real estate recoupments	24.4

railroad coordination. Condemnation proceedings for the Penn Central Railroad properties and railroad construction on the New Carrollton route further delayed this phase's completion.

Phase IV through VI

These phases, which include several routes, 47.8 operating miles and 34 stations, have suffered delays similar to the previous phases. An environmental lawsuit has further delayed the Red Line to Rockville.

Phase VII and VIII

The remaining phases VII and VIII, which will complete the 101-mile system, have been delayed due to the Alternatives Analysis study required by UMTA and additional funding problems. The system, which was originally to be completed by December 1979, is now scheduled for completion by mid-1987. As previously mentioned, the cost of delays for these phases are included in the latest estimate.

Design and engineering costs

The Authority attributes $10 million, or 0.2 percent, of the cost estimate increase to design and engineering. This essentially represents an increase in design fees based on a higher dollar value of estimated construction at July 1978.

Contingency funds

A $85.5 million, or 2 percent, contingency for uncertainties is included in the December 1978 cost estimate. This recognizes that the estimate may increase due to other unknown factors. Authority officials stated that the contingency equals 5 percent of the cost of structural, finish, and stage work beyond the 60 miles covered by the Interim Capital Contributions Agreement. Structural and finish contracts pertain to constructing the basic structure, be it a rail line or a station, and stage contracts pertain to work that is common to the entire system, such as trackwork, electrification, train control, and communications.

Besides this $85.5 million unassigned contingency, Authority officials stated that another 5 percent is built into the construction cost of each route to cover contract modifications and claims.

Other causes for increasing costs

The Authority attributes 20.1 percent, or $870 million,

	Amount (millions)
Authority's December 1978 estimate	$6,832.5
Bond proceeds used to pay Authority's first 4 years of interest	227.4
Additional interest paid until rail segments built with bond proceeds are operational	217.3
Cost of handicapped facilities	71.2
Cost of system add-ons	20.3
Total	$7,368.7

According to the guidelines governing the Authority's accounting procedures, the Authority's accounting for bond interest costs separate from construction costs is permissible.1/ The guidelines, however, offer an alternative that we believe is preferable. Interest costs of a project, such as Metro, can be "capitalized" and added to construction costs to show the total project costs.

If the Authority was a Federal agency, capitalization of interest costs would be required.2/ Further, if the Authority was a commercial organization, a recently proposed standard by the Financial Accounting Standards Board, an independent organization which prescribes accounting standards for private enterprise, would also make capitalization of interest cost a requirement.3/ According to the board, its proposed statement

> "* * * establishes standards of financial accounting and reporting for capitalizing interest cost as a part of the historical

---

1/"Governmental Accounting, Auditing and Financial Reporting;" National Committee on Governmental Accounting, 1968.

2/Comptroller General of the United States' principles and standards for Federal agency accounting.

3/Financial Accounting Standards Board's exposure draft of a proposed statement of financial accounting standards on "Capitalization of Interest Cost." File Reference 1017-017. December 15, 1978

Description	Amount of reduction (millions)
Substituted concrete for granite parapets at street entrance escalators	0.3
Substituted mercury vapor lights for incandescent lights at surface stations	0.1
Revised earth tunnel construction method	9.8
Eliminated Springfield Station	13.5
Underground station design revised from vaulted arches to less expensive design	36.5
Total reduction	$167.4

COSTS OF COMPLETING AND FINANCING METRO

The Authority's financial plan projects separate costs for completing construction of Metro and retiring the Authority's revenue bonds. Combined, these costs total about $10.1 billion. Appendix III shows the projected funding sources. The Federal Government has contributed $2.4 billion and the Authority estimates it would have to contribute another $5.0 billion. State and local governments have spent $0.9 billion and will have to contribute another $1.8 billion.

Authority's construction cost estimate excludes certain costs

The Authority's December 1978 $6.8 billion construction cost estimate does not include any of the financing costs to construct Metro. Generally accepted accounting principles provide that the costs of financing paid during construction--$445 million of interest to be paid on the Authority's bonds until the Metro segments built with the bond proceeds become operational--could be considered as part of the total project costs.

The Authority's estimate also did not include some other costs, because funding comes from a different source. Adding these costs and the financing costs during construction to the Authority's estimate brings the total costs of Metro to about $7.4 billion as shown below:

and a second entrance at the Smithsonian Station. The remaining $12.9 million of add-ons had been requested by, and paid for by, local areas.

Authority officials said that although the December 1978 estimate did not include these costs, they have been added to the Authority's official cost estimate. They said that the December 1978 estimate was only intended for discussing future funding needed for construction and, since the funding for handicapped facilities and system add-ons was not an issue, the costs did not have to be included.

Not included in the Authority's estimate, but discussed on page 21, is another $83 million that could also be added to the Authority's cost estimate based on a comparison of the escalation rates it has actually experienced with the rates it used in projecting future costs. Authority officials told us that its technique of computing escalation is appropriate and within the Administration's guidelines on inflation control. The Authority's contingency of $85.5 million (discussed on p. 24), however, may be available if escalation is higher than projected.

Also, as discussed later on page 46, a possible construction delay, because Federal funding may be less than the Authority says it needs to meet its construction schedule, could add another $310 million to the Authority's cost estimate.

CONCLUSION

Although excluding the Authority's bond interest costs as part of total project costs is permissible, we believe the guidance provided to Federal agencies and being considered for private enterprise--capitalizing interest costs as part of project costs--is preferable. Capitalizing the bond interest costs until the rail segments built with the bond proceeds become operational would add about $445 million to the Authority's latest construction cost estimate of $6.8 billion. Future interest costs would be considered part of operating expenses rather than as project costs. This is only an accounting procedure to disclose total costs; the Authority is making provisions for paying the interest costs. (See p. 82.)

RECOMMENDATION

We recommend that the Authority's General Manager modify the Authority's cost estimate to include the capitalization of the estimated $445 million in interest costs to be paid during Metro construction.

(29) + digest

> cost of acquiring an asset that requires a significant period of time to bring it to the condition and location necessary for its intended use. Examples of the kinds of assets that qualify for interest capitalization are assets under construction for an enterprise's own use (such as facilities), * * *"

In deciding not to include financing costs as part of the Authority's estimate, Authority officials pointed out that it could be argued that other, less readily identified interest costs should also be considered as part of total costs. For example, the jurisdictions often raise money for their contributions by selling their own bonds, and the Federal Government also sells bonds and other securities to obtain funds for its various programs.

In addition to the guidance and proposed standard on capitalizing interest costs, we believe there is further rationale for including the Authority's bond interest cost as part of total project costs. These interest costs are additional to the other interest costs identified by the Authority, which would be similar for any Federal program where local funding is involved, and the Congress must approve and appropriate the Federal share in addition to any other funds for the Authority.

The Financial Accounting Standards Board's proposed standard also addresses the additional interest cost identified by the Authority as "imputed interest." The Board's proposal says that these interest costs should not be capitalized.

> "The Statement provides that the interest cost eligible for capitalization shall be the interest cost presently recognized on borrowings and other obligations; it does not provide for imputing interest cost to equity funds."

According to the Authority, the costs of handicapped facilities and system add-ons were not included in its December 1978 estimate of total costs because such funding comes from a different source than the other construction costs. The costs of the handicapped facilities, also on an 80-percent Federal, 20-percent State/local sharing basis, have been appropriated separately. System add-ons are paid by the requestor and, therefore, the Authority does not include them in total costs. For example, the Federal Government paid $7.4 million to add the Arlington Cemetary Station

Items	Fiscal years 1979-90 Federal	State/local	Total
	--------(millions)--------		
Rail equipment; i.e., information, bicycle racks, police cars, communication, rail maintenance equipment and operations equipment	9.8	2.5	12.3
Total	$375.3	$93.8	$469.1

Operating subsidies

Federal grant assistance, which is based on population and density, not costs, is estimated to pay $397 million of operating costs. The remaining $1.55 billion needed will be paid by the State/local governments. The Authority's operating subsidy projections for each fiscal year are as follows:

Year	Subsidy by mode (note a) Bus	Rail	Total	Paid by Federal (note b)	State/local
	----------(millions)----------				
1979	$ 73.9	$ 25.2	$ 99.1	$ 23.7	$ 75.4
1980	82.1	33.0	115.1	24.9	90.2
1981	81.0	39.6	120.6	26.4	94.2
1982	85.1	52.6	137.7	28.0	109.7
1983	89.1	62.9	152.0	29.7	122.3
1984	87.3	61.0	148.3	31.5	116.8
1985	93.5	63.6	157.1	33.4	123.7
1986	102.0	72.4	174.4	35.4	139.0
1987	107.5	80.0	187.5	37.5	150.0
1988	114.4	89.4	203.8	39.8	164.0
1989	119.7	94.5	214.2	42.2	172.0
1990	134.7	100.2	234.9	44.7	190.2
Total	$1,170.3	$774.4	$1,944.7	$397.2	$1,547.5

a/Based on the Authority's financial plan assumptions that fares will increase at a rate equal to the full increase in the consumer price index for rail, and at one-half the index increase for bus.

b/The Authority's projected Federal grants based on authorization through fiscal year 1982 at current percentage sharing and with an annual 6-percent increase thereafter.

AUTHORITY COMMENTS AND OUR EVALUATION

The Authority agreed to include in its Metro cost estimate the interest costs to be capitalized during construction as well as the costs of the handicapped facilities and system add-ons. To keep the estimate consistent with the presentation of prior estimates that did not include these costs, however, the Authority proposes to add a footnote to the cost estimate which itemizes these costs and shows the revised total.

We believe this in an appropriate way of showing these costs.

EQUIPMENT COSTS AND OPERATING SUBSIDIES FOR FISCAL YEARS 1979-90

Equipment costs are shared primarily 80-percent Federal and 20-percent State/local, except some costs are paid entirely by State/local. Operating deficits--the excess of costs over revenues--are subsidized by the State/local governments with some grant assistance from the Federal Government.

Equipment costs

For fiscal year 1979 the budget for bus equipment and rail replacement equipment is $35 million. For fiscal years 1980-90, the projected $434 million in equipment costs is mostly for replacement buses at 150 per year.

Items	Fiscal years 1979-90 Federal	State/local	Total
	---------(millions)-------		
Fiscal year 1979 budget	$ 27.9	$ 7.0	$ 34.9
Fiscal years 1980-90:			
Replace buses	256.2	64.0	320.2
Service vehicles, autos and trucks, for bus program	4.0	1.0	5.0
Bus garage construction; 4 during 1981 and 1982	27.2	6.8	34.0
Other bus equipment-- signs and shelters, information program, passenger protection, and revenue equipment	50.2	12.5	62.7

CHAPTER 4

MAIN ISSUES FACING THE AUTHORITY AND THE LOCAL JURISDICTIONS

The Alternatives Analysis process resulted in an agreement on the goal of building the full 101-mile rapid-rail system. With this issue solved, there are still five main issues facing the Authority and the local jurisdictions:

--The share of costs paid by the system user through fares versus the share paid by area residents through taxes, and whether fares should increase proportionately with inflation.

--The potential increase in costs and delay in operations due to Federal funding being less than the Authority's projected annual needs.

--The need for a local dedicated revenue source to pay expected increasing annual costs, primarily the operating deficit.

--The projected demand for automobile parking at rail stations being greater than the number of spaces to be built and the question of subsidized employee parking, primarily the Federal Government's.

--Accessibility for the handicapped, as required by section 504 of the Rehabilitation Act of 1973.

While the issues concerning the separate jurisidictions or even specific locations within the jurisdictions may vary, Authority officials agreed that the "main issues" are those above.

FARE POLICY AND DEFICIT ALLOCATION

An issue facing the Authority is the percent of costs the system user should pay through fares compared to the amount area residents should pay through taxes. Projections through 1990 show that it is unlikely that fares will ever cover operating costs, therefore, the national capital area jurisdictions, through taxes or some other revenue source, will continue to pay a large share of the operating deficit. The jurisdictions' views differ, however, on what the percentage split should be between the rider and the general public.

ADDITIONAL FINANCING NEEDED BETWEEN 1979-90

The previous discussions and tables include some costs already paid, financing already obligated, and projected costs to the year 2015. The immediate concern is how much money is needed to complete construction and pay other costs to 1990.

The following table summarizes the additional funding to be paid to the Authority between 1979-90. This does not necessarily correspond to the jurisdictions' taxpayer burden for the same period because in many cases the jurisdictions have sold long term bonds whose proceeds are applied to many purposes.

	Additional funding needed to 1990		
	Federal	State/local	Total
	----------(millions)----------		
Complete rail construction	$2,475.4	$ 541.9	$3,017.3
Interest on bonds (note a)	621.8	307.0	928.8
Equipment costs other than construction	375.3	93.8	469.1
Operating subsidies	397.2	1,547.5	1,944.7
Total	$3,869.7	$2,490.2	$6,359.9

a/The Authority has proposed that the Federal Government make larger payments until construction is completed, to be made up later by the Authority. If the Government agrees, its payments to 1990 would be increased and the Authority's reduced.

a jurisdiction. The major drawback to a zone-fare system is that it establishes arbitrary zone boundaries which unfairly penalize certain groups of passengers. For example, consider a peak-period trip between just north of Silver Spring and Walter Reed Hospital under the present Metrobus zone-fare system. The fare for this trip, a distance of only several blocks, is $.80 while a trip from Southeast Washington to Walter Reed, a distance of approximately 10 miles is only $.50. Similar inequities exist throughout the present zone-fare system.

Mileage-based system

Mileage-based fares come closest to charging passengers in direct proportion to the service received. The Authority feels this is the most equitable fare system.

The major disadvantages to a mileage system (and to a large extent the zone-fare system) are patron confusion and the expense and complexity involved in collecting fares.

The Authority uses a zone-fare system for Metrobus and a mileage-based system for Metrorail.

Fare equity between bus and rail

The present trend in the Authority's fare structure has rail fares increasing at a more rapid rate than bus fares. The Authority believes there is some justification to this because rail is faster, more comfortable, and in most cases offers more frequent service than bus.

The Authority believes, however, that if the fare disparity between rail and bus continues, it may be faced with a strong political push for parallel bus service, especially if rail fares become significantly higher than the corresponding bus fares. The Authority's staff supports a somewhat higher fare for rail trips vis-a-vis bus, but they point out that the fare discrepancy should not be allowed to attain such a magnitude that the parallel service problem becomes a reality.

Revenues do not cover operating costs

A major problem confronting the Authority is how to cope with increasing operating costs. Operating costs are increasing faster than revenue and, as a result, its subsidy requirement is growing. In fiscal year 1974, 76 percent of the Authority's operating costs were recovered through revenues. In fiscal year 1978, only 49 percent were so recovered.

In addition, a complex, often frustrating problem is how to allocate the operating deficit to each jurisdiction. For bus operations, the difference between a jurisdiction's revenues and costs determine that jurisdiction's share of the deficit. For rail operations, deficits are allocated on the basis of each jurisdiction's number of stations in operation, number of passengers, and population density.

A problem for the transit rider is the Authority's complex fare structure. The Authority believes, however, that its fare structure, although complex, is equitable. Fares are based primarily on miles traveled. The pros and cons of the Authority's fare structure and alternatives are discussed below.

Alternative fare structures

Flat-fare system

A flat-fare system would charge the same fare regardless of distance traveled. According to the Authority, this presents many inequities. A low flat fare, for example, would greatly subsidize long trips from the suburbs. A flat fare that would be equitable to the middle distance traveler would provide a fare subsidy to the rider making longer trips and would overcharge the rider making shorter trips. A very high flat fare would not subsidize long trips, but would overcharge the average distance rider and possibly would price the short trip rider off the system.

The chief advantages of a flat-fare system are that it is easily understood by the general public and that the fare collection equipment is less expensive.

The Authority decided not to adopt a flat fare because it would be necessary to charge an extremely high fare to collect the revenue necessary to meet its financial requirements. This would be inequitable to the short distance traveler. The Authority, however, believes a relatively low flat fare would be possible with a revenue source dedicated for mass transportation (see p. 47) but believes that equity and political considerations will continue to preclude serious steps toward a flat-fare system.

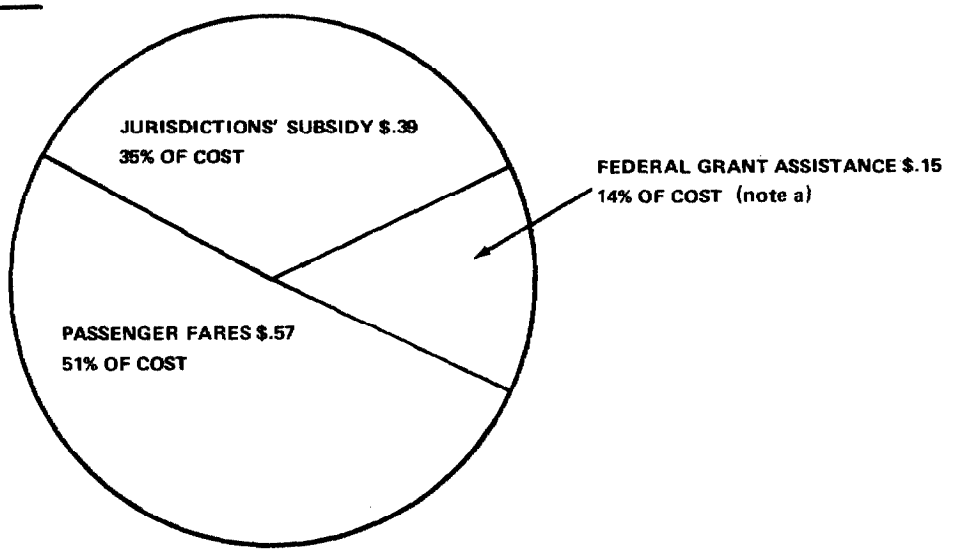
Zone-fare system

A zone-fare system, which charges a fare based on the number of zone boundaries crossed, is recognized to be a more equitable pricing concept than a flat-fare system because there is a relationship between fares and distance traveled. A zone-fare system also allows fare controls within

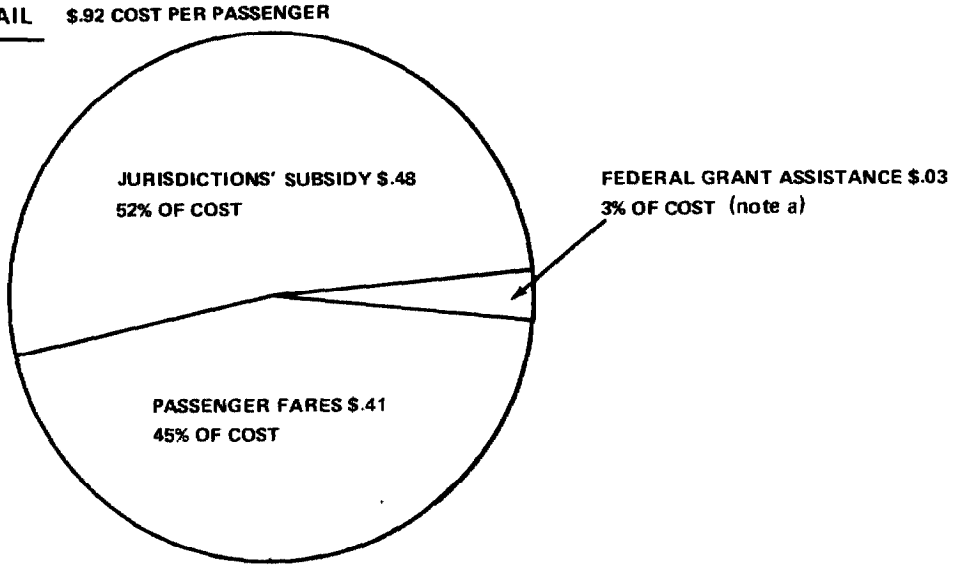
SOURCES OF REVENUE

FISCAL YEAR 1978

BUS $1.11 COST PER PASSENGER



RAIL $.92 COST PER PASSENGER



a) Federal funds are distributed directly to the three jurisdictions and not to the Authority. The jurisdictions decide how to allocate the Federal funds between bus and rail operations. For fiscal year 1978, the District of Columbia and Maryland allocated all Federal funds to bus while Virginia allocated part of its funds to rail. The amount allocated between bus and rail, however, does not affect a jurisdiction's total subsidy requirement.

For fiscal years 1979 and 1980 the Authority estimates that about 45 percent of costs will be recovered through fares. However, recovery is projected to increase by 1985 if fares are increased.

Viewed from a different perspective, per passenger bus costs for fiscal year 1978 were $1.11 of which $.54 was subsidized. Rail costs were $.92 per passenger of which $.51 was subsidized. The following graph shows the share of costs covered by fares, jurisdictions' subsidies, and Federal grant assistance for a rail and bus passenger in fiscal year 1978.

New fare policy proposed

Fares cover less than 50 percent of the Authority's operating costs and are not projected to cover more than 68 percent of costs through 1990. Because local jurisdictions must pay most of the deficit, primarily through property taxes, the jurisdictions are taking steps to have the passengers pay a constant percentage of costs. In its financial plan, the Authority proposed a new fare policy as the first step in stabilizing the increasing difference between revenues and costs.

Until fiscal year 1979, the Authority had no definitive policy on fare increases. The Authority has discussed the approach of linking fare increases to the consumer price index (CPI). Although the proposed fiscal year 1979 fare adjustments were not tied to CPI, the Authority may link fiscal year 1980 bus fare increases to CPI increases. Bus fares would increase at one-half CPI's rate of increase. Rail fares would increase at about the same rate as rail operating costs. The Authority recognizes that higher fares result in some ridership losses. However, the jurisdictions hope that this fare policy, having the user pay a greater percentage of the costs, will lessen the deficit and, therefore, their subsidy requirement. Until the jurisdictions agree to a new fare policy, however, the fiscal year 1980 budgeted subsidy has not been reduced to recognize possible revenue increases.

The table on page 38 shows a history of the Authority's increasing operating costs as more of the system becomes operational and the projected percentage of costs recovered from revenues. According to the Authority, the projected increase in the recovery rates for 1985 and 1990 reflects (1) the cumulative effect of the Authority's proposed new fare policy as discussed above and (2) greater bus and rail operating efficiency.

The history of the fare structure and fare increases in the national capital area has been governed by the differing fiscal philosophies of the area's jurisdictions. Virginia has had a long-time goal of recovering about two-thirds of operating costs from the rider. Although this goal is presently not being realized for Virginia, it has led to its strong support for at least annual fare increases at a full CPI level. The District of Columbia has supported a stabilized fare position (low and infrequent fare increases) because it views transit as a social and economic benefit to be paid for in great part by the national capital area residents. The position of Maryland has traditonally been somewhat in the middle. Since the cost recovery factor has dipped to about 50 percent, Maryland is now supporting full CPI fare increases in order to keep the current level.

To a great degree the above positions reflect both the fiscal policy of the jurisdictions as well as their source of transit operating subsidy funds. Virginia must rely almost exclusively on the local property tax; Maryland receives a significant amount of State aid as well as funds from local income taxes and transit taxes; the District of Columbia has the entire range of State-like taxes (property, income, sales, etc.) available to support its social welfare approach to transit. The District also receives more Federal aid for mass transit than Virginia or Maryland.

Report by the Washington Center for Metropolitan Studies

A July 1978 study by the Washington Center for Metropolitan Studies entitled "Paying the Operating Costs of Metro" recommended that "the basic regional transit system should be designed by WMATA to come as close as possible to 100 percent recovery of operating costs from rider fares." To accomplish this, the study recommends that local jurisdictions individually subsidize local, neighborhood bus service and programs for riders who they feel should be provided with discount fares (low income, school students, etc.). The Authority, however, states that implicit in this recommendation is that it should raise fares to a level high enough to cover 100 percent of the operating costs and increase fares annually as costs increase.

The Authority further states that most arguments in favor of not charging fares to equal 100 percent of costs are based on the fact that the entire community benefits from the use of transit (mobility, air quality, lower highway costs, etc.). The Washington Center report's primary

Fiscal year	Operating costs	Operating revenues	Percent of costs recovered through revenues
	(millions)		
1974	$ 77.0	$ 58.8	76.4
1975	106.0	63.0	59.4
1976	120.0	64.5	53.7
1977	125.5	65.9	52.6
1978	159.0	78.5	49.4
	----------(Projected)----------		
1979	189.2	90.0	47.6
1980	217.2	96.9	44.6
1985	428.8	276.8	64.5
1990	714.2	479.3	67.1

In addition to the local jurisdictions, the Federal Government assists in funding the Authority's operations. In fiscal year 1978 the Federal Government paid $17.8 million--22 percent of the operating deficit and 11 percent of operating costs. State and local jurisdictions paid $62.7 million--78 percent of the deficit and 39 percent of operating costs. Passenger fares covered the remaining 50 percent of operating costs.

The Authority estimates that the Federal Government's share of the operating deficit will remain about the same. The Federal Government's subsidy would, therefore, increase from $17.8 million in fiscal year 1978 to $46.9 million in 1990. The jurisdictions' subsidy requirement is much greater. From 1978 through 1990, the local jurisdictions' share of the subsidy will increase from $62.7 million to $190.2 million. The burden of subsidizing the Authority's increasing deficit, therefore, falls primarily on the local jurisdictions.

Jurisdictions have different views on fare policy

The percent of costs to be recovered through fares varies among the three jurisdictions. Each jurisdiction must decide how much they can afford to subsidize riders by balancing the Authority's subsidy requirement with other public service needs, such as police and fire protection and education. To achieve this balance, each jurisdiction's revenue needs and, therefore, fare level are different. For example, the District of Columbia has chosen to charge low fares and pay higher subsidies than the other two jurisdictions.

accounted for 39.81 percent of the population density component, 78.06 percent of the station component, and 34.15 percent of the passengers' residence component. Therefore, the District of Columbia's share of the rail deficit would be $9.53 million computed as follows.

Component	Percent	Component's share of deficit	District of Columbia's subsidy requirement
		(millions)	
Population density	39.81	$ 6.27	$2.50
Stations in operation	78.06	6.27	4.89
Passengers' residence	34.15	6.27	2.14
Total		$18.81	$9.53

Similarly, for fiscal year 1978, Maryland's share of the rail deficit was projected to be $4.00 million and Virginia's share $5.28 million. (Virginia, however, has chosen to use $1.1 million of its Federal aid to finance its rail deficit. Therefore, only $4.18 million will be financed by local funding sources.)

Both actual and estimated data are used in the rail subsidy formula. Revenue is actual revenue received through the fare collection system. The population density figures, which will remain constant through 1980, are based on 1976 population estimates. The number of stations in operation is determined by pro rating the period of time each station is operating during the fiscal year. Ridership by jurisdiction is determined by periodic surveys conducted by a private consulting firm.

Bus subsidy

A jurisdiction's share of the bus operating deficit is based on the amount of bus service provided to that jurisdiction and the revenue derived from that service. The bus subsidy allocation formula requires that revenues and costs be allocated separately among the jurisdictions. The more bus service provided to a jurisdiction, the higher its share of the subsidy.

response to these arguments is that residents' tax receipts are already being used to fund the long term capital cost of constructing the system and that they should not bear any significant operating cost burden.

The Authority stated that, at present, revenues cover about 50 percent of cost. A full CPI fare increase over the next few years will only increase this factor slightly. In a given year it would take a massive fare increase to measurably increase the percentage of costs recovered through revenues.

Subsidy allocation process

The process for distributing the subsidy by jurisdiction is complex and frustrating for the Authority. Subsidies are determined on the basis of formulas which consider the number of stations, ridership, and population density for rail and a pro rata share of costs and revenues for bus. The Authority's General Manager brought the cost distribution problem into focus in a November 1978 newspaper article. The General Manager was quoted as saying the thing he

> "* * * likes least about dealing with Metro on a day-to-day basis is the continual harangue over divying up the operating costs [subsidy]. One week one jurisdiction will come in with a new formula, perfectly fair, that just happens to result in the cheapest bill for that jurisdiction.
>
> "Then the next week another jurisdiction will come in with another formula, perfectly fair, that will do the same thing for it.
>
> "I'm just tired of that."

Metrorail subsidy

A jurisdiction's share of the Metrorail deficit is based on three components--population density, stations in operation, and the number of passengers from each jurisdiction. Each component is assigned one-third of the total rail deficit. By comparing a jurisidiction's share of a component to the the component's total, the Authority computes that jurisdiction's share of the deficit.

For fiscal year 1978, each component was assigned $6.27 million, one-third of the deficit. The District of Columbia

As was discussed earlier, a jurisdiction's share of the bus subsidy is based on the amount of service in that jurisdiction. Costs, therefore, are allocated on the same basis.

The Authority distributes costs among three categories--fixed costs, hourly variable costs, and mileage variable costs. Fixed costs are distributed to the jurisdictions on the basis of the number of buses required to provide peak period (rush hour) revenue service to each jurisdiction. Mileage variable costs are distributed on the basis of platform miles 1/ operated in each jurisdiction. Hourly variable costs are distributed on the basis of platform hours operated in each jurisdiction.

The bus allocation formula provides that fixed costs be allocated on the basis of the number of buses required to provide peak period weekday scheduled service in each jurisdiction. The Authority's schedule branch, using schedules and headway sheets (bus operator's log), computes the number of buses needed to meet peak period demand by jurisdiction. By comparing a jurisdiction's demand to total demand, the Authority computes a jurisdiction's share of fixed costs. The following table shows the number of buses required to meet peak period demand, the percentage of fixed costs allocated each jurisdiction, and the amount of fixed costs for fiscal year 1977.

	Number of buses	Percent of fixed costs allocated	Costs
			(millions)
District of Columbia	905	52.0	$11.6
Maryland	328	18.8	4.2
Virginia	508	29.2	6.5
Total	1,741	100.0	$22.3

1/The total miles a bus travels. This includes the miles the bus is in revenue service plus the miles traveled before and after a bus completes its run. Before fiscal year 1979, revenue miles and hours were used instead of platform miles and hours. Revenue miles and hours are the miles and hours a bus can pick up and discharge passengers.

The subsidy requirements for fiscal year 1977, and Federal aid received, are shown below.

	Costs	Revenue	Operating deficit	Less: Federal aid	Operating deficit funded by jurisdiction (note a)
			(millions)		
District of Columbia	$ 64.6	$35.9	$28.7	$ 8.1	$20.6
Maryland	22.0	8.7	13.3	5.7	7.6
Virginia	30.2	16.3	13.9	4.0	9.9
Total	$116.8	$60.9	$55.9	$17.8	$38.1

a/Federal funds are distributed directly to the local jurisdictions; therefore, the deficit the jurisdictions must fund through other revenue sources is reduced by the Federal funds.

Bus revenues are allocated to the jurisdictions on the basis of a passenger survey, because actual daily fare box revenues could not be allocated for every day in the year. For fiscal year 1978, the survey was conducted by a private consulting firm, using the Authority and jurisdictional staff, at a cost of $225,000.

The following chart shows the fiscal year 1977 allocation of bus revenues by jurisdiction.

Jurisdiction	Percent of revenue allocated	Amount
		(millions)
District of Columbia	58.9	a/ $35.9
Maryland	14.3	b/ 8.7
Virginia	26.8	16.3
Total	100.0	$60.9

a/Includes $1.2 million of school revenue and $3.8 million of school subsidy in addition to regular passenger revenues.

b/Includes $5,036 of school revenue and $15,108 of school subsidy in addition to regular passenger revenues.

late to make fare or service level changes. The jurisdictions are now informed promptly of changes in subsidy requirements and can act to hold subsidies within their budgeted levels.

FEDERAL FINANCING AVAILABLE FOR CONSTRUCTION

An issue to be resolved by the Congress and the Authority is the availability of Federal funds for completing the 101-mile rail system. The Secretary of Transportation has told the Authority that the Federal Government will not be able to provide the annual funding projected by the Authority to make the total rail system operational by 1987. The national capital area jurisdictions have responded that they will ask the Congress for these funds.

August 1978 proposals

The Authority's August 1978 proposed financial plan included two options. Plan I, the Authority's then recommended approach, continued construction according to the Authority's approved construction schedule. The total system would be operational during 1985 and would cost $6.7 billion. The plan, however, would have required 2 years where funding needs would be very high--$900 million in fiscal year 1980 and $1.2 billion in fiscal year 1981.

The Authority's fall-back plan, plan II, placed a ceiling of approximately $500 million ($400 million Federal, $100 million State/local) on construction activity during any 1 year. The plan would reduce high yearly outlays by delaying construction. The total system would be operational by 1987, but because of the delay, it would cost $200 million more--$6.9 billion instead of $6.7 billion.

December 1978 plan

After receiving and evaluating comments on its August 1978 proposed plan, the Authority proposed a revised plan II which included several modifications to the proposed rail system as suggested by the jurisdictions and approved by the Authority's board of directors. The revised plan kept the scheduled operation date of 1987 and the annual funding ceiling of approximately $500 million; however, the system modifications reduced total costs from $6.9 billion to $6.8 billion.

Variable costs are also distributed to the jurisdictions on the basis of usage. The Authority's first step in distributing variable costs is to determine which costs vary with time and which costs vary with mileage. A bus operator's salary, for example, would vary with the hours worked. The amount of fuels, lubricants, and tires used are mileage variable costs.

After hourly and mileage sensitive costs are determined, the Authority's schedule branch computes hours and revenue miles operated in each jurisdiction by using time data from the operator's headway sheets and mileage data from the mileage record. By comparing each jurisdiction to the total, the Autority computes a jurisdiction's share of the variable costs. The following table shows miles, hours, and amount of variable costs for fiscal year 1977.

	Mile variable costs		Hour variable costs		Total variable costs
	miles	costs	hours	costs	
District of Columbia	25,727,253	$16,162,797	2,333,864	$36,811,503	$52,974,300
Maryland	11,244,295	7,064,221	678,935	10,708,533	17,772,754
Virginia	15,333,343	9,632,879	889,088	14,023,254	23,656,133
Total	52,304,891	$32,859,897	3,901,887	$61,543,290	$94,403,187

Early warning system

The Authority developed an early warning system to inform the board of directors and the jurisdictions of changes in actual versus budgeted subsidy requirements. Based on the data provided by this system, a jurisidiction can change service or fare levels to bring costs and/or revenues within budgeted amounts.

At the end of each quarter, each jurisdiction is provided with a comparison, by rail and bus, of the approved budget subsidy level and the current best estimate of what its final subsidy level will be. Before the early warning system, the jurisdictions were not informed of subsidy changes until the fourth quarter of the fiscal year, too

Authority estimates of funding needs to complete the 101-mile rail system

Fiscal year	Federal share (80 percent) 8/78 plan I	Federal share (80 percent) 8/78 plan II	Federal share (80 percent) 12/78 plan II	State/local share (20 percent) 8/78 plan I	State/local share (20 percent) 8/78 plan II	State/local share (20 percent) 12/78 plan II
	(millions)					
1979	$275.0	$275.0	$297.0	$ 68.8	$ 68.8	$ 71.3
1980	734.7	382.2	425.3	183.7	95.5	75.0
1981	959.3	427.1	444.8	239.8	106.8	a/78.3
1982	232.5	400.8	339.9	58.1	100.2	a/82.2
1983	29.4	399.8	327.6	7.3	100.0	80.2
1984	9.2	399.7	425.2	2.3	99.9	101.7
1985	6.0	130.0	127.7	1.5	32.5	28.0
1986	1.6	1.6	1.6	0.4	0.4	0.4

a/Net of $24.7 million that the Authority believes will be available each year from prior contributions.

- - - -

Until the Congress decides on the amount of the annual Federal appropriation to the Authority, the total costs and the scheduled completion date cannot be finalized. Another potential problem is the Department of Transportation's position that the availability of Federal capital grants will be dependent on the Authority's obtaining a dedicated revenue source for mass transportation.

REVENUE SOURCE DEDICATED FOR MASS TRANSPORTATION NEEDED

According to the Authority, the probable solution to increasing operating deficits and availability of funding to complete construction is a revenue source dedicated to mass transportation. The Secretary of Transportation told the jurisdictions that a Federal commitment for funding the full 101-mile system depends on the jurisdictions solving the continuing financial crisis by earmarking and guaranteeing tax revenue for the system. Many big-city transit systems in the Nation have such guarantees but UMTA points out three major ones that do not--Washington, D.C., Philadelphia, and Detroit.

Federal position on Authority's proposed plan

In December 1978 the Secretary of Transportation told the Authority that the Federal Government is committed to the goal of completing the rail system. However, the Secretary said the Department could budget only $275 million annually of interstate highway transfer funds instead of the $400 million anticipated in the Authority's revised financial plan.

The Secretary referred to inflation as the number one domestic problem and said the President is "committed to a nationwide, industry-wide, economy-wide attack on inflation, and the Federal Government must set the example." Noting that a $275 million annual Federal participation is lower than the Authority's expectation, the Secretary pointed out that it is more than any other city is receiving in capital funds.

The $275 million comes from a total of about $1 billion in the interstate highway program plus local matching funds that have been earmarked for Metro construction. After the interstate highway funds are exhausted, the remaining Federal financing needed for Metro construction, about $1.1 billion, will come under UMTA's capital grant program (49 U.S.C. 1602). The Secretary of Transportation told the Authority that with a qualified local financing plan Metro would receive priority consideration for UMTA capital funds when interstate highway funds run out.

Significance of Federal position to the Authority

The Authority estimates that the proposed Federal ceiling of $275 million annually would delay completion of the full system to 1990 and add $310 million to the estimated $6.8 billion cost. Also, the Authority says operating costs would increase during the delay.

At a December 1978 conference, the jurisdictions unanimously supported the Authority's revised plan II calling for approximately $400 million annually of Federal funds. The jurisdictions' officials said they intend to ask the Congress for the funding needed to meet the Authority's proposed plan.

The following schedule shows the estimated annual funding needs under the Authority's August 1978 plans I and II, and its December 1978 revised plan II.

"Although as a matter of timing it was necessary to use the alternatives analysis procedures to develop the initial financing plan WMATA submitted in August, we have not assumed that the results would be the final basis for a Metro financing plan."

The Department further noted that the national capital region has requested the Department to fund an updated "Net Income Analysis." In reviewing this request and the proposed scope of the analysis, the Department said it was prepared to support the effort and would work closely with the Authority on all efforts leading to the adoption of the final Metro financing plan.

The Authority does not yet have ridership and operating cost forecasts acceptable to the Department of Transportation; therefore, the concerns expressed on the Alternatives Analysis' forecasts may still be valid.

The Authority says that a dedicated revenue source is needed

The Authority studied the problem of escalating costs and subsidies and concluded, in September 1977, that

"* * * with the growing recognition that public transportation is an essential public service and that fare policies must reflect social as well as economic attitudes, public tax support is necessary for public transportation."

The Authority believes that public transportation benefits everyone--it is a transportation alternative to the auto user; it provides basic transportation to citizens that have no alternatives; it reduces congestion and air pollution; and conserves energy. Therefore, the Authority believes that the system rider should only pay part of costs since the general public also benefits.

Criteria that a dedicated revenue source must meet

In determining what kind of taxes would meet the transit system's needs and objectives, the Authority evaluated proposed taxes in terms of the following criteria:

--Revenue potential. The extent to which the tax received would be sufficient to cover the jurisdictions' requirements, and the relationship of the tax to the current tax burden on the taxpayer.

It was originally anticipated that operating revenues would cover costs and also pay off the principal and interest on the $1 billion of revenue bonds sold to help finance the system; no need would exist for State/local contributions. However, the Authority has found that revenues do not cover costs.

Maryland, Virginia, and the District of Columbia have relied on a combination of Federal and State aid and local taxes, primarily real property taxes, to finance mass transportation needs. Inflationary impacts, other regional needs, and the current national concern over property taxes, compounded by the projected increasing annual funding needs, have made a new revenue source for transit almost mandatory.

Jurisdictions' payments to the Authority between 1979 and 1990 are projected at $2.5 billion--$542 million to complete rail construction, $94 million to purchase bus and rail replacement equipment, $307 million to pay the Authority's bond interest costs, and $1,548 million to pay operating subsidies.

The jurisdictions' operating subsidy between 1979 and 1990 will average $127 million annually, compared to $46 million annually, for fiscal years 1975-78. The projected interest costs between 1979 and 1990 will be $307 million compared to $15.4 million paid through December 1978.

Further, there is some question on whether the operating subsidies may be even greater than the Authority projected and used in its financial plan. The projected subsidy figures are based on projected ridership (and therefore revenue) estimates developed for the Alternatives Analysis which have been questioned by Department of Transportation and local officials. They believe the ridership projections are overstated and, therefore, costs and the resulting operating subsidy payments are understated. On December 21, 1978, the Authority requested the Secretary of Transportation to tell it whether the Department of Transportation accepts the ridership forecasts being used by the Authority.

On February 2, 1979, the Department of Transportation responded stating that the methodologies for ridership and operating cost forecasting were valid for the Alternatives Analysis' purposes--to assist in making relative comparisons among alternatives. However, the Department noted that:

The significant aspects of each tax are summarized below.

Payroll tax

A 1-percent payroll tax offers the greatest potential of all the proposed taxes and would be sufficient to cover all transit costs. Because of its relationship to personal income it would track inflation very well, especially the major component of transit costs--labor. By exempting a portion of wages and salaries, for example the first $3,000 to $5,000, the tax can be made more progressive.

To a large extent the tax burden would fall on those who benefit most from public transportation--those people who work in the downtown employment areas. The Authority felt it would also be appropriate for employers, including the Federal Government, who also benefit to share in the tax. The potential proceeds from each of the three jurisdictions generally parallel their total subsidy and debt costs.

According to the Authority, there are two major disadvantages to a payroll tax. Visitors and tourists do not pay any part of the operating deficit and the rate of tax on personal income levels is already high in the District and Maryland jurisdictions compared to the national average.

Sales tax

An additional 1-percent sales tax could provide substantial revenue. The income by jurisdiction, however, does not match well against their proportionate share of costs. A sales tax generally tracks inflation, and data indicates that compared to the national average the area jurisdictions have unused revenue potential.

Sales taxes, however, are regressive. The burden on the taxpayer while increasing in actual amounts decreases as a percentage of income as income rises. For example, the tax burden on a family of four in the Baltimore/Washington area would be 1.45 percent of income at the $6,500 income level but only .84 percent at the $27,500 level. This regression could be offset somewhat by exempting necessities such as food, shelter, clothing, and medical supplies.

There is little relationship between the people who pay a sales tax and those who benefit most from transit. It could, however, place some of the burden on visitors and tourists.

--Inflationary characteristics. The ability of the tax base to increase correspondingly with inflationary increases.

--Timeliness and reliability. The need for the estimates of potential revenue to be reliable and resources to be available on a timely basis.

--Progressiveness. Public acceptance of a dedicated revenue source in lieu of the property tax may be affected by how progressive the source is perceived to be.

--Political acceptability. Recognition that the jurisdictions' concerns differ considerably and that any tax has to be acceptable.

--Costs and complexities of administration and collection. Compares where the mechanism for collection is already in-process to proposed collection mechanisms which would require additional costs.

--Relationship to transit benefits. The extent to which the tax burden falls on those benefiting from transit services. For example, this would be the system rider or the auto user who benefits from reduced traffic congestion.

Taxes evaluated

The Authority evaluated several different kinds of taxes that could be imposed. After evaluating the taxes against the above criteria, the Authority concluded that only the first four "appeared to do the job."

--Payroll tax.

--Sales tax.

--Motor fuel tax.

--State income tax surcharge.

--Value-added property tax.

--Motor vehicle registration fee.

--Fuel economy tax.

--Tax on additional automobiles.

A registration fee does not track inflation and could be adversely affected if inflation and energy conservation measures discourage automobile sales. The fee would have the same inverse relationship to transit benefits as described for a motor fuel tax.

Fuel economy or additional automobile tax

Either a tax on automobiles over 3,500 pounds or on additional automobiles per household would provide low revenues. Revenues would probably diminish in future years if inflation and energy problems continue resulting in automobile manufacturers continuing the trend towards smaller, lighter cars and households averaging a fewer number of automobiles.

Fuel economy taxes would be regressive for certain groups; for example, those with low incomes usually purchase older cars which tend to be oversized and inefficient. A tax on additional automobiles, however, would be progressive. Either tax would have the same inverse relationship to transit benefits as any vehicle-related tax.

Projected regional revenue

The Authority's projected revenue, by jurisdiction, for selected years under each of the primary four possible revenue sources is shown in the table on page 54. As can be seen, the Authority projects that any of the first three tax options would provide sufficient additional revenue to more than meet the jurisdictions' subsidy payments.

Jurisdictions agree on need but views on revenue source differ

During November 1977 the Authority's board of directors passed a resolution approving the development of alternative funding sources for public transportation for the national capital region. The jurisdictions, however, have differing views on how the revenue should be derived.

District of Columbia

The District strongly supports the concept of a "uniform regional funding source." Although several options are available, the District supports a payroll tax dedicated to mass transportation. The District's main point is that any tax must be regional in nature--something that Maryland and Virginia say has little chance.

Motor fuel tax

The merit of this tax is its inverse relationship to those people who benefit from mass transit. A motor fuel tax is levied on the automobile, a competing transportation mode and according to the Authority would help attain two of mass transits' goals; (1) it enables mass transit to compete more effectively with the automobile and (2) it reduces gasoline consumption thereby improving air quality and energy conservation.

The revenue from a motor fuel tax, however, is insufficient by itself to meet transit needs.

State income tax surcharge

The yield from a State income tax surcharge would be substantial. However, the current State tax burdens are already substantial. In 1974 the District tax exceeded the national average by 23 percent and Maryland's exceeded the average by 40 percent. Virginia's tax was 16 percent under the national average.

A tax on income is generally regarded as the most progressive--those with higher incomes pay more. There is little relationship, however, between an income tax and those people benefiting most from mass transit.

Value-added property tax

This tax would be imposed on real property around rail stations that is expected to benefit from the transit facilities. The tax would be levied on the "added value" that the property receives because of its proximity to transit.

The Authority believes that the revenue would be substantial although it had no estimates. The tax would probably track inflation and, although it would not completely diminish the burden on the real property tax, it would shift it to specific areas benefiting from transit facilities.

Motor vehicle registration fee

Although an additional registration fee would provide several millions of dollars, the registration fees in the national capital area are already substantially greater than the national average. In 1978 the District of Columbia, responding to citizens' reactions to registration rates, lowered them by $15 to $20.

Virginia

Virginia said it would again try to get the Virginia General Assembly to raise the sales tax in Northern Virginia by 1 percent and dedicate it to transportation projects. At the same time there would be a penny-for-penny decrease in property taxes in Northern Virginia. The same proposal passed the Virginia Senate last year but failed by one vote in the Virginia House.

Even if the State legislature approved the proposal, however, it could face a veto by the Governor. The major issues being raised by opponents of the proposed legislation are: (1) that other areas in Virginia should receive similar taxing authority as Northern Virginia and (2) that approving local use of an additional 1-percent sales tax may result in subsequent difficulties in raising the sales tax for Statewide purposes.

Maryland

Maryland said that the State would not approve a new tax but it would try to get 1 percent of Maryland's 5-percent general sales tax earmarked for the State's transportation trust fund.

Once in the fund the money could be spent for transit projects, such as Metro or Baltimore's subway system, or for highways, railroads, or other projects throughout the State. This approach would have the advantage of appearing to be something for everybody without actually involving an increase in the tax rate consumers pay.

- - - -

As can be seen from the above discussion, establishing a dedicated revenue source is an issue that will not be easily resolved. Yet, it appears to be the cornerstone for successfully completing and operating a regional transportation system for the national capital area.

AUTOMOBILE PARKING ISSUES

Providing adequate automobile parking at rail stations to meet demand and the affect of subsidized employee parking on mass transportation and the area's air quality are the two parking issues affecting the national capital area's transit system.

Funds Generated From Possible Additional Revenue Sources

	Fiscal year 1978				Fiscal year 1984				Fiscal year 1990			
	District of Columbia	Maryland	Virginia	Total	District of Columbia	Maryland	Virginia	Total	District of Columbia	Maryland	Virginia	Total
	(millions)											
10% income tax surcharge	$ 17.4	$ 45.0	$17.6	$ 80.0	$ 26.0	$ 74.8	$ 30.5	$ 131.3	$ 39.5	$ 125.2	$ 46.9	$211.6
1% sales tax	26.4	33.5	33.8	93.7	38.0	53.0	52.5	143.5	55.8	79.1	77.5	212.4
1% payroll tax	100.2	59.0	47.3	206.5	152.9	99.5	76.5	328.9	225.4	168.4	110.8	504.6
1% sales tax on motor fuel	1.2	3.7	2.7	7.6	1.9	5.6	4.2	11.7	2.3	6.8	5.0	14.1
1 cent tax per gallon on motor fuel	2.3	6.7	4.9	13.9	2.0	5.8	4.3	12.1	1.6	4.7	3.5	9.8
Totals compared to projected jurisdictions' subsidy of				$ 63.3				$115.4				$190.2

on this estimate, the Authority could lose an estimated 38,400 potential transit riders daily because of the parking shortage. The following table compares, by rail route, the planned supply of all-day spaces before and after the reevaluation, with the projected demand in 1990.

Route A	Number of all-day parking spaces planned: Prefinancial plan Jan. 1977	Number of all-day parking spaces planned: Planned to date	Projected demand for parking in 1990
Shady Grove	3,000	3,000	(a)
Rockville	500	900	2,966
Twinbrook	1,000	1,000	772
Nicholson Lane	1,500	1,500	1,817
Grosvernor	500	1,200	2,147
Bethesda	-	500	(a)
Total	6,500	8,100	7,702
Route B			
Glenmont	1,800	1,800	3,166
Wheaton	250	1,050	3,692
Forest Glen	500	500	4,207
Silver Spring	-	1,000	(a)
Takoma	-	-	3,860
Fort Totten	300	300	6,616
Rhode Island Avenue	299	299	600
Total	3,149	4,949	22,141
Route C			
Huntington	2,500	3,150	1,848
Route D			
New Carrollton	b/1,900	1,900	1,667
Landover	1,000	1,922	3,947
Cheverly	500	500	34
Deanwood	220	220	257
Minnesota Avenue	327	529	2,657
Total	3,947	5,071	8,562

Providing adequate parking at rail stations

It is generally agreed that adequate station parking is required to entice the maximum number of suburban riders to a commuter rail system. Parking, however, must be balanced with other considerations, such as community opposition, the lack of available space, and adequate accessibility.

The Authority's latest plan is to provide a total of 52,043 all-day station parking spaces, which is only one-half of the estimated 103,207 space total demand projected for 1990. This total demand was determined in 1974 and 1975 on the basis of the theoretical assumption that unlimited parking could be supplied. The Authority used the difference between the total demand and the planned parking supply to determine the number of feeder buses and short term parking spaces needed.

Originally, about 30,000 all-day parking spaces were planned for the system; however, the total has fluctuated throughout the years as follows:

	Year	Number of spaces
Adopted regional system	1968	30,100
Net income analysis (note a)	1969	29,900
May 1971 board resolution	1971	29,900
Net income analysis (note a)	1971	28,950
Net income analysis (note a)	1974	26,247
Prefinancial plan	1977	29,849
Financial plan	1978	52,043

a/These studies are performed periodically to develop information for recalculating each jurisdiction's share of the system's net project cost as required by the Authority's Interim Capital Contributions Agreement.

The last 22,000 increase in total spaces between 1977 and 1978 was the result of an Alternatives Analysis' recommendation for enhanced parking and the Authority's reevaluation of its planned parking facilities during the development of its financial plan to complete construction and operate the rail and bus systems. The additional 22,000 spaces will cost about $108 million.

As previously indicated, even with the planned increase in parking, the total number of spaces is still about 51,000 short of the total parking demand for 1990. The Authority estimates that for every 100 spaces it is short of the total demand, it will lose about 75 riders daily. Based

	Number of all-day parking spaces planned		Projected demand for parking in 1990
	Prefinancial plan Jan. 1977	Planned to date	
Route K			
Vienna	2,000	3,300	2,329
Dunn Loring	1,000	1,000	4,285
W. Falls Church	1,000	2,900	3,277
E. Falls Church	300	1,200	5,296
Total	4,300	8,400	15,187
System Total	29,849	52,043	103,207

a/There are no demand figures because in 1974-75 when total demand was estimated it was allocated only to stations for which all-day parking was planned. Subsequently, all-day parking was added to six stations, but total demand was not reestimated or reallocated.

b/400 spaces provided by county included.

As shown in the above table, the extent of station parking shortages varies from route to route and station to station. One of the most critical parking shortages in the system is on the "B" route where the projected demand is over 22,000 spaces and the planned supply is 4,950 spaces, about 78 percent below the demand.

The Authority never planned to build enough station parking to meet the total projected demand due to various constraints, such as community opposition and the lack of available space and adequate accessibility at certain stations. Generally, no one wants a large parking lot in their neighborhood with the accompanying increase in traffic, congestion, safety problems, and pollution. Further, some stations are located where large parking facilities are not feasible due to the lack of available space or adequate street access.

To partially offset the lack of parking space at the stations, the Authority plans to provide

--"kiss-and-ride" short term parking facilities for depositing and picking-up passengers,

--feeder bus service from the surrounding communities, and

	Number of all-day parking spaces planned		Projected demand for parking in 1990
	Prefinancial plan Jan. 1977	Planed to date	
Route E			
Greenbelt	1,000	2,900	3,797
College Park	500	1,500	4,737
Prince George's Plaza	-	1,000	(a)
Chillum/W. Hyattsville	500	1,500	8,986
Total	2,000	6,900	17,520
Route F			
Branch Avenue/Rosecroft	1,000	3,000	3,418
Suitland/St.Barnabas	1,000	2,000	4,198
Southern Avenue	-	2,000	(a)
Naylor	500	-	2,901
Alabama Avenue	500	500	4,716
Anacostia	-	2,000	(a)
Total	3,000	9,500	15,233
Route G			
Addison Road	482	1,102	3,109
Capital Heights	321	1,221	3,303
Total	803	2,323	6,412
Route JH			
Franconia	1,500	1,500	3,212
Springfield	1,650	1,650	2,872
Van Dorn	500	500	2,518
Total	3,650	3,650	8,602

The Authority's financial plan proposes that the Federal Government stop the subsidy by charging employees commercial rates. The Authority also believes the Federal Government should recognize "its unique relationship to the Authority and the National Capital Area" and give the Authority an additional operating subsidy equal to the parking revenue it receives.

The Authority's rationale for ending subsidized parking

The Authority's proposal, which was previously recommended by the Joint Policy Steering Committee on Metrorail Alternatives Analysis, is based on the following premises:

--Continued subsidization will not decrease automobile use and thus is contrary to Federal air pollution reduction efforts.

--The Authority's belief that a unique relationship exists between itself, the national capital area, and the Federal Government.

The Authority maintains that the Federal Government recognized the unique relationship between them when it created the National Capital Transportation Agency in 1960 to develop a regional rapid transit system.1/ The Authority also believes that the Federal Government, as the major employer, most extensive landowner, and the most important operating entity in the capital region, benefits from a public transportation system. The Authority maintains, however, these benefits will never be realized as long as the Federal Government continues to provide subsidized parking for its employees.

Although the Authority's financial plan's parking proposal relates only to the Federal Government, it has also pointed out that local government and private employer subsidy practices are also an issue. Data is not available for private employers, but the following table shows the parking policies of the jursdictions that comprise the Washington Metropolitan Area Transit Zone:

1/Public Law 86-669, July 14, 1960.

--shuttle bus service between satellite fringe parking lots and rail stations.

Some jurisdictions have also taken steps to alleviate the parking shortage. For example, the State of Maryland is considering adding 2,000 spaces at the Greenbelt station and Montgomery County is temporarily providing 1,100 to 1,500 spaces near the Silver Spring Station while the remainder of the Glenmont route is under construction.

Another problem which is becoming troublesome is commuter parking on streets near Metro stations. Montgomery, Prince George's, and Arlington Counties, the District of Columbia, and the City of Alexandria have all initiated all-day parking restrictions for nonresidents around Metro stations.

As previously mentioned, community oppostion to large parking lots and problems related to space availability and accessibility of such lots may impede the Authority from obtaining maximum ridership. The degree to which these factors adversely affect Metro depends on how well the Authority and the jurisdictions are able to develop parking alternatives such as those mentioned above.

Authority does not have updated information on parking demand

The Authority's estimate for parking demand was determined in 1974-75 and has not been updated. As shown in the preceding table, total demand was only allocated to stations with planned all-day parking at that time. Since then all-day parking was added to six stations, but demand was not reestimated or reallocated.

Authority officials told us that they have not reestimated demand because the 1974-75 estimate was part of the Net Income Analysis which has not been updated. The Authority's fiscal year 1979 budget, however, provides that the analysis will be updated and Authority officials said parking would be one factor included in the update.

Subsidized employee parking

The Authority believes another parking issue is subsidized employee parking by Federal and local governments and private companies. The Authority maintains that subsidized parking not only has an adverse effect on mass transit ridership but also is inconsistent with Federal air quality and energy conservation objectives.

The Authority estimates that commercial parking fees for Federal parking spaces would generate approximately $20 million during fiscal year 1979, and with the rates increasing with the CPI, the revenue would increase to $38 million in fiscal year 1990.

Federal position on Authority's proposal

In February 1979 the Office of Management and Budget informed the Authority that

> "* * * while this Office still has the matter of whether to establish fees for Federal employee parking facilities under active review, we have rejected the suggestion that the revenues from such fees, if instituted, should be used for transit subsidies in this metropolitan area. Such an action would constitute, in effect, a tax on a narrow segment of the population."

ACCESSIBILITY FOR THE HANDICAPPED

The Authority and all the Nation's transportation systems are faced with the costs versus benefits of making transit systems totally accessible to the handicapped. The Department of Transportation is proposing to implement section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) dealing with nondiscrimination against the handicapped by requiring full accessibility for the handicapped in transit systems receiving financial assistance from the Department of Transportation.

Information on the Authority's facilities for the handicapped, costs, indications of usage, and pertinent issues are presented below.

Authority facilities for the handicapped

Because it has the newest rail system in the Nation, the Authority was able to design facilities for the handicapped into construction. Therefore, the Authority believes its rail system is in essential compliance with the proposed section 504 regulations.

Metro has elevators in all rail stations to meet the needs of wheelchair users and other persons unable to use the stairs or escalators. Other Metro features include warning bells and textured pavement surfaces to guide blind travelers and flashing lights signaling a train's approach for the deaf.

Jurisdiction	Parking policy
District of Columbia	Provides some free space; commercial rates are charged for spaces under the Department of General Services' control; provides priority spaces for carpools.
Arlington County	Presently provides free parking with a small number of spaces reserved for carpools, but considering charging commercial rates.
Fairfax City	Provides free space.
Alexandria	Provides free parking in leased spaces until lease expires.
Falls Church	Provides free space.
Fairfax County	Provides free parking with a small number of spaces reserved for carpools.
Prince George's County	Provides free parking with a small number of spaces reserved for carpools.
Montgomery County	Provides free space.

The Authority says it is difficult for it to attract the commuter to mass transit when subsidized parking provides a double benefit to the commuter. Not only does a commuter receive a parking space, but he is not required by Federal or State tax laws to pay tax on this hidden income while the transit rider must pay Federal and State tax on the money he uses to pay his transit fare.

Not only does subsidized parking (Government or private) adversely affect transit ridership but, in the Authority's view, it is inconsistent with the Federal Government's air quality and petroleum conservation objectives because it condones automobile use. The Authority points out that eliminating parking subsidies is a key feature of the current Washington Metropolitan Area Air Quality Plan being developed in response to the Clean Air Act Amendments of 1977.

Reason for elevator use	Number of persons interviewed	All users	Percent
Faster or more convenient	628	1,815	78.10
Obviously handicapped (note a)	65	b/65	2.80
Other physical problems	34	98	4.22
Fear escalators	41	118	5.07
Encumbered (baggage or children)	62	179	7.70
Miscellaneous	17	49	2.11
All users	847	2,324	100.00

a/Blind, use crutches or walker, in wheelchair.

b/A complete count was made of all obviously handicapped.

The Authority found that most elevator passengers (78 percent) said that they used the elevator because it was faster or more convenient than available alternatives. Heaviest use occurred at times when riders discharged from a train were congesting station escalators and platforms and the elevator was perceived to be an equal or better choice.

About 22 percent of the elevator users gave other reasons for not riding escalators or climbing stairs. These motives ranged from the frivolous (playing in the elevator) to the essential (wheelchair occupants). A number of persons with not-so-obvious physical problems (sprains, bad legs, heart conditions, etc.) were also identified. Fear of escalators accounted for over 5 percent of the elevator use. A substantial number of riders (nearly 8 percent) were burdened with luggage, using baby carriages and strollers, or had small children in tow.

The Authority's survey concluded that:

> "With the exception of the wheelchair users, few of the elevator passengers could not have used readily available alternatives; even persons who are afraid of escalators or are nauseated by the motion, can use stairways or a stopped escalator. Blind persons can usually use an escalator, unless accompanied by a guide dog."

As new buses are ordered, the Authority is gradually converting its bus fleet to better serve the handicapped. In 1978, the Authority received the first shipment of 280 new buses, representing 15 percent of its active fleet, equipped with "kneeling" devices which enable the bus operator, on demand, to lower the front end of the bus, making entry and exit easier. More than one-half of these new buses will be equipped with wheelchair lifts and the others can be fitted with lifts and will be as they are needed. These buses will each be able to accommodate two persons in wheelchairs, securely tied down near the front of the bus.

Costs of handicapped facilities

The Authority's August and December 1978 financial plans' estimate for rail facilities for the handicapped was $71.2 million to be funded on an 80-percent Federal, 20-percent State/local match. However, in September 1978 the Authority's General Manager testified at a Department of Transportation regional public hearing on section 504 regulations that

> "The capital investment for handicapped facilities in Metro stations for a completed 100-mile system is conservatively estimated at over $100 million, with elevators alone accounting for nearly three-fourths that amount." (underscore added).

Buses equipped with wheelchair lifts cost about $10,000 additional per bus. Potentially this could add millions of dollars to the Authority's capital costs. Such capital costs are also financed 80 percent by the Federal Government and 20 percent by State/local governments.

In addition to acquisition costs for handicapped facilities, operation and maintenance costs may also be large. The Authority projects that for fiscal year 1980 eight additional mechanics will be needed just for servicing bus wheelchair lifts.

Use of handicapped facilities

The Authority does not compile information on the handicapped's use of its transit system, but during 1978 it did conduct two 1-day surveys to determine who was using the rail station elevators and why. The last survey in December 1978, when 30.8 rail miles were operating, showed the following:

Cerebrovascular impairments	94
Respiratory impairments	107
Cardiac	325
Sight disabilities	486
Hearing disabilities	1,570
Dialysis	39
Incoordination	362
Development disabilities:	
Mental retardation	2,250
Cerebral palsy	188
Epilepsy	126
Autism	5
Neuro	419
Emotionally disturbed	206
Accompanied by attendants	191
Temporarily handicapped	151
Total	7,425

The Authority's offices of handicapped assistance and marketing told us that, although they are aware of some problems encountered by handicapped persons using the rail system, they have not analyzed the problems. By examining the station configurations, however, it is apparent that the elevator locations at some stations could be very inconvenient for persons in wheelchairs.

Following are the configurations of two stations where the elevator locations could be a problem. At the L'Enfant Plaza Station the railcars let off passengers approximately at the center of the station's "X" configuration; yet, the elevator to the street is a block away. Further, a person in a wheelchair wanting to go to either of the two major Federal departments located at the station would not only have to travel the block to the elevator to get to the street, but then would have to return the same block, going slightly uphill.

At the Pentagon Station the configuration appears to show that the elevator is near the station center; however, there are actually two elevators. One elevator goes from the railcar level to the mezzanine level and the other goes from the mezzanine to the street. It is possible for a person in a wheelchair to get off a railcar at one end of the station platform and have to go to the opposite end of the station to take the elevator to the mezzanine level. The person would still have to come more than half way back again to get the elevator to the street.

Although not mentioned as part of the survey, the Authority's rail revenue collection teams use the elevators and without them would have a more troublesome, time-consuming collection process.

Comparing the December survey results to the earlier survey done in April 1978, when 23.3 rail miles were operating, shows that the number of handicapped persons using the elevators decreased significantly, from 126 to 65, even though more of the rail system was operational.

Comparison of Handicapped Persons
on Metro Station Elevators
April and December 1978

Handicap category	Elevator users	
	Apr. 1978	Dec. 1978 (note a)
Blind	36	5
Semi-ambulatory	48	50
Nonambulatory	42	10
Not handicapped	1,762	2,259
All elevator users	1,888	2,324

a/Includes stations on the Blue Line extension (Stadium-Armory to New Carrollton) which opened in November 1978.

The Authority believes the decrease may have been due to the winter weather and snowy, slushy pavements which may have discouraged travel by blind and nonambulatory persons. The Authority plans another survey in the spring of 1979 to see if there are seasonal variances in ridership by the handicapped.

The Authority offers substantial fare discounts for the handicapped and issues them identification cards. Data from the cards issued offers another indication of handicapped usage. However, the data may be misleading because some handicapped persons may not apply for reduced fares while others who have received identification cards may not be using the transit system. As of December 1978, the Authority had issued 7,425 handicapped identification cards. These cards were issued for the following handicaps

Nonambulatory (wheelchair)	136
Semi-ambulatory:	
Leg, walker, crutches	134
Arthritis	321
Amputation, spinal, bone injuries	315

Authority officials told us that the placement of elevators in these stations resulted from the Federal direction to provide elevators, which was made after design and construction was under way.

Pertinent issues

The Authority recognizes the issues and problems associated with handicapped accessibility and is implementing a research program to

> "* * * measure the costs and operating problems associated with each of the special handicapped services and record the amount of use and perceived effectiveness of each program."

Having a rail system already designed to assist the handicapped interfaced with new buses similarily equipped provides the Authority a good basis for study.

Cost effectiveness

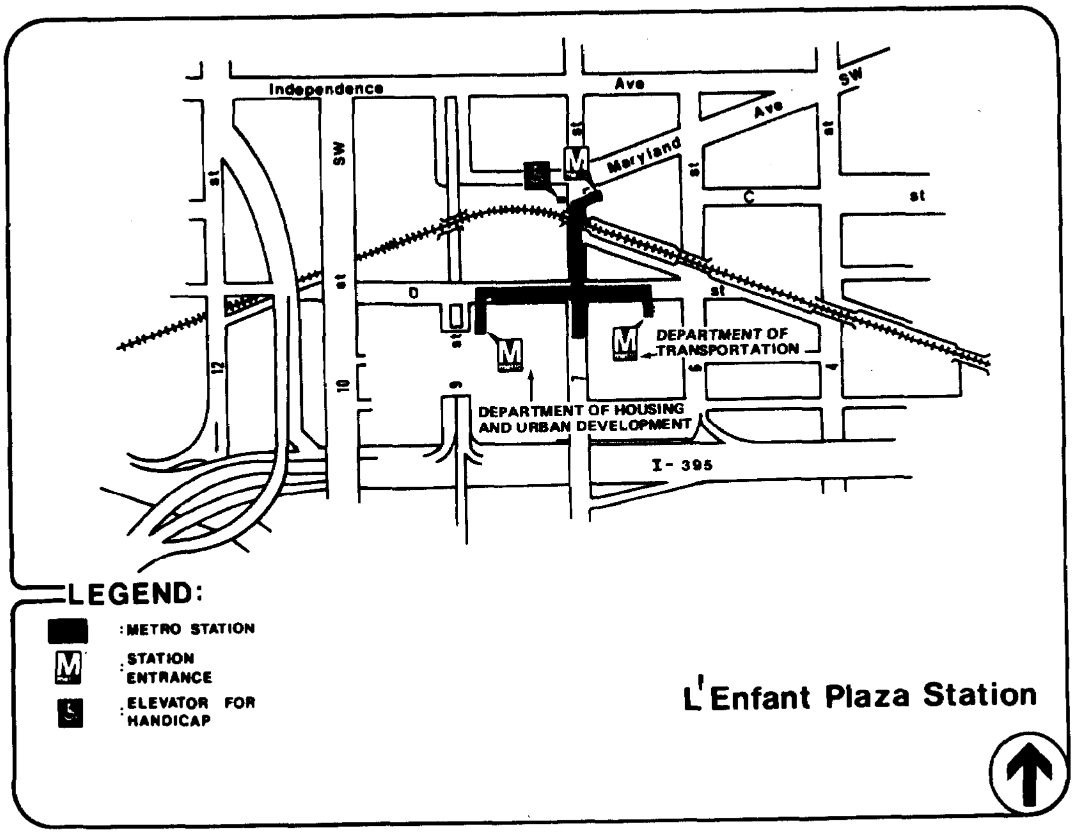
The main question being raised by the Nation's transit systems is the cost effectiveness of building, or retrofitting, transit systems to provide total accessibility for the handicapped. On the rail side, the Authority is better off than most systems because it was able to design handicapped facilities into the system. Retrofitting older rail systems to comply with section 504 requirements, however, is "an almost insurmountable financial obstacle" according to the Authority's General Manager.

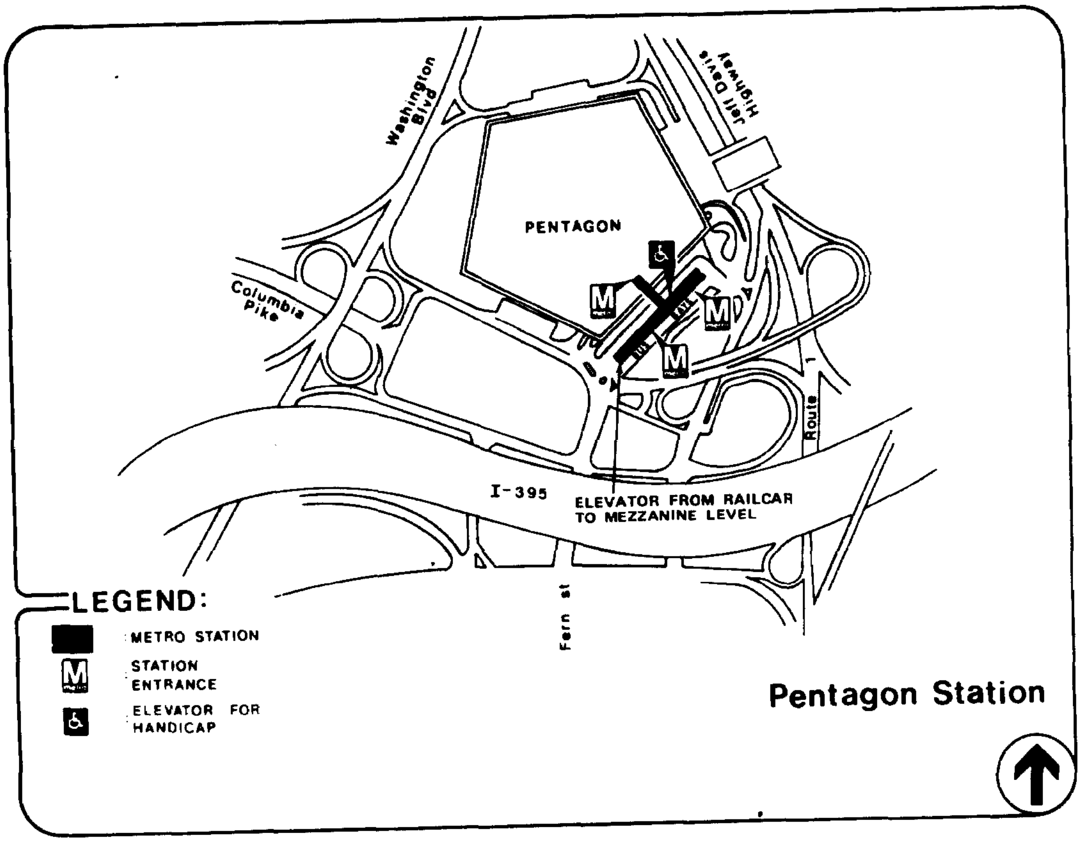
The Authority's data shows that most costs are associated with making the system accessible for the person in a wheelchair. Yet, as of December 1978, only 136 wheelchair users had applied to the Authority for reduced fare identification cards.

Equipment reliability and use

The Authority is concerned about the reliability of the lift-equipped buses and potential operational problems. For example, the General Manager testified that:

> "It is with some trepidation that WMATA prepares to initiate lift-bus service for wheelchair occupants. The experience that has been reported on services provided by a similar complement of lift-equipped buses in St. Louis (157 buses averaging fewer than six wheelchair boardings daily) is far from


Independence
Ave
SW
Maryland
Ave
st
C
st
SW
st
st
D
st
st
12
10
9
7
6
4
DEPARTMENT OF TRANSPORTATION
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
I- 395
LEGEND:
: METRO STATION
: STATION ENTRANCE
: ELEVATOR FOR HANDICAP
L'Enfant Plaza Station


Washington Blvd
Jeff Davis Highway
PENTAGON
Columbia Pike
Route 1
I-395
ELEVATOR FROM RAILCAR TO MEZZANINE LEVEL
Fern st
LEGEND:
METRO STATION
STATION ENTRANCE
ELEVATOR FOR HANDICAP
Pentagon Station

--Of the 7.4 million transportation-handicapped persons nationwide, less than 3 percent, or 201,200 individuals, use wheelchairs all or most of the time. Another 208,000 individuals use wheelchairs occasionally.

--Even if changes are made to buses, removing all vehicle barriers, other barriers (i.e., difficulty getting to the bus stop and waiting for the bus) would continue to prevent about 93 percent of all transportation-handicapped persons from using the bus as much as they would like. Similar improvements in rail would still result in about two-thirds of transportation-handicapped people in areas served by rapid rail facing barriers in the rail system.

Overall, the report found that the principal beneficiaries of a full accessibility mandate are those transportation-handicapped persons who already can use public transit. The proposed section 504 changes will make transit use for them easier, although most will still be unable to use transit as often as they like.

The Authority's concerns

The Authority's General Manager expressed the Authority's concerns about the accessibility provisions of the section 504 proposed regulations as follows:

--Will a totally accessible system effectively provide service for those citizens who may not be able to get to the bus stop or are unable to use the service for some other reason? Will a regulation requiring total accessibility provide real mobility for the majority of handicapped citizens or rather a somewhat empty symbolic victory?

--In an era of increasing limitations on tax resources, could not the sizeable sums of taxpayer funds required to make a system totally accessible be more effectively used to provide a higher degree of public transit service for both handicapped and nonhandicapped citizens? Should not cost-benefit considerations be given some weight in this regulatory decision?

--Can the accessibility equipment on buses be made to work effectively and safely? Can it be operated in such a fashion without significantly inconveniencing other public transit users?

reassuring, especially in light of an alarming rate of equipment failure and down-time.

"Although the lift-equipped buses purchased by WMATA are of a different design from those used in St. Louis, and are built to specifications which meet UMTA's design requirements, operator training sessions which have been conducted preliminary to initiation of revenue service, have identified definite problems of traffic flow within the bus and driver/passenger relationships which cause us to question the practicability of this approach to the accommodation of wheelchairs and their occupants on the regularly scheduled bus fleet. Besides the problems associated with the operation of the lift itself, the bus operator will have the difficult task of inducing full-fare bus riders to move from their seats so that a wheelchair can maneuver in the aisle. Furthermore, those passengers who happen to occupy the banks of three seats on either side of the center aisle which need to be folded against the wall to provide safe anchorage for the wheelchairs will have to give up those seats and find others, or stand. Even if local ordinances are adopted to require passengers to yield to wheelchair occupants, cooperation is likely to be lacking at times and enforcement difficult."

National survey of transportation-handicapped people

A study conducted for UMTA concluded in June 1978 that full transportation accessibility for the handicapped will benefit only a small number of those people who are presently unable to use public transit. This is because other barriers to transit use will still exist. Some of the study conclusions were:

--There are 7.4 million handicapped people nationwide classified as transportation handicapped. About 4.9 million transportation-handicapped persons live in areas served by transit, 689,000 of whom reside in areas served by rapid rail.

--Only 19 percent of all transportation-handicapped individuals are presently unable to use public transportation.

CHAPTER 5

CONCLUSIONS

Until the Alternatives Analysis was completed and it concluded that a full 101-mile rapid-rail system should be built, the major issue facing the Authority and the national capital area jurisdictions was how much of the rail system was to be built and where. Now the major concern is where to get the funds to finish constructing the rail system and to operate the region's combined bus/rail transit system.

Primarily because of cost escalation and unexpected delays, construction costs have increased greatly since the original estimate. The current estimate of $6.8 billion, however, is understated primarily because some of the interest costs of financing construction have not been included. Also, the Authority's projected costs may be low because its escalation rate appears optimistic. The estimate may further increase, and operations will be delayed, unless the Federal Government provides the annual funding levels the Authority says it needs to maintain its construction schedule.

Before the Federal Government will even consider the funding levels the Authority says it needs, it wants the Authority to solve its continuing financing problems by having the area jurisdictions dedicate local revenue sources to mass transportation, something many of the Nation's big-city transit systems have already done. The Authority and the jurisdictions recognize the importance of a dedicated revenue source, but there are jurisdictional differences on fare rates and what kind of a dedicated revenue source should be used.

Other issues facing the Authority include the question of whether total parking demand should be satisfied or whether feeder buses should accommodate part of the demand. Also, the Authority feels that subsidized employee parking (government and private) not only competes with the transit system, but also contributes to the region's air pollution. To rectify this, the Authority recommends that the Federal Government recognize its postion as the area's main employer and principal landowner, and charge its employees commercial parking rates and give the income, or an equal amount, to the Authority. However, the Office of Management and Budget says that even if it decides to charge Federal employees to park, it will not give the revenue to the Authority.

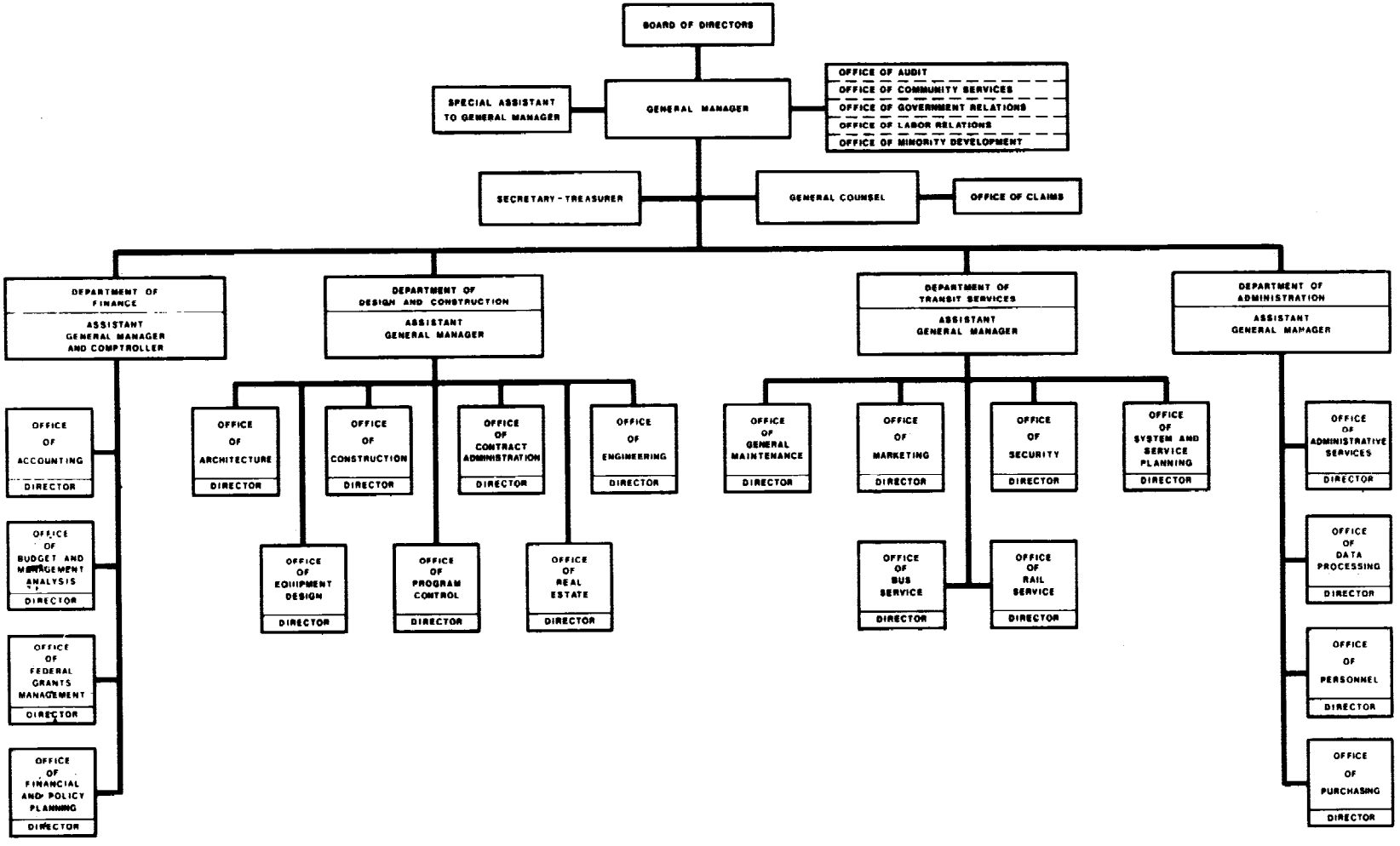
--In view of the significant financial impacts of a totally accessible standard on transportation operating entities, should not the Federal Government provide extra capital and operating assistance to avoid an adverse effect on service for the nonhandicapped transit user?

- - - -

The Department of Transportation has completed its public hearings to obtain views on its proposed section 504 regulations. As of March 1979, the Department was still developing its final regulations.

ORGANIZATIONAL CHART

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY



APPENDIX I

The Authority and all the Nation's transportation systems are also faced with the issue of the costs versus the benefits of making transit systems totally accessible to the handicapped, as is being proposed by the Federal Government. Since the Authority, unlike the Nation's other rail systems, was able to design some facilities for the handicapped into rail construction, the information it has on handicapped usage provides some insight into this issue. The Authority is also planning a research program to better examine the costs, usage, and perceived effectiveness of its handicapped facilities.

AGENCY COMMENTS

Oral comments were obtained from Authority and UMTA officials and have been incorporated into this report. Concerning our recommendation to include some of Metro's financing costs as part of the project costs, the Authority agreed to include these and some other costs. This increases the December 1978 Metro construction cost estimate from $6.8 billion to $7.4 billion.

Date	Title
November 18, 1975	Testimony by Mr. R. W. Gutman, Director, Procurement and Systems Acquisitions Division, on prior GAO reports and current work at the Authority
May 28, 1976	Letter report to Congressman Thomas M. Rees on Metro's operational safety and matters related to strikes (PSAD-76-143)
June 25, 1976	Letter report to Congressman Thomas M. Rees on Metro's construction safety program (PSAD-76-147)
August 27, 1976	Letter report to Congressman Thomas M. Rees on cost, funding, schedule, and performance of Metro as of December 31, 1975 (PSAD-76-165)
December 2, 1976	Letter report to the Chairmen, Subcommittee on Commerce, Housing, and Transportation, and Subcommittee on Fiscal Affairs, House of Representatives, on reporting formats for bus and rail operations and position of various funds administered by the Authority (PSAD-77-16)
June 29, 1977	"Need to Resolve Metro Funding" (PSAD-77-123)
August 15, 1978	Letter to the Authority's General Manager on the Authority's entitlement to use Federal procurement services
August 21, 1978	Letter report to the Authority's Secretary-Treasurer on needed security improvements over canceled farecards
September 1, 1978	Letter report to the Secretary of Transportation on the Federal share of the Authority's interest cost being too large (CED-78-161)

GAO EVALUATIONS OF THE AUTHORITY

Date	Title
June 16, 1972	Letter report to Congressman Earle Cabell on railcar bids from Rohr Industries (B-141529)
July 25, 1973	Letter report to Congressman Joel T. Broyhill on specific bus routes in response to certain complaints (B-141529)
March 4, 1974	Letter report to Congressman Stewart McKinney providing certain contract information on the Authority and the San Francisco and Atlanta rapid-rail systems (B-139617)
March 13, 1974	"Transit Authority's System of Reporting on the Status of Metro's Costs and Construction Progress Needs to be Improved" (B-141529)
April 2, 1974	Testimony by Mr. Henry Eschwege, Director, Resources and Economic Development Division, on the Authority's construction and cost reporting system
September 5, 1974	Letter report to Congressman Joel T. Broyhill on possible misuse of Federal funds by the Northern Virginia Transportation Commission (RED-75-269)
May 8, 1975	"Evaluation of the Capital Cost Estimate for the Metro Rapid Rail Transit System" (PSAD-75-85)
June 27, 1975	Letter report to Congressman Romano L. Mazzoli on selected aspects of Metro's cost and financing (PSAD-75-107)
November 4, 1975	Letter report to Congressman Thomas M. Rees on the Authority's estimating procedures and a GAO devised format to improve and simplify the Authority's external reporting system (PSAD-76-38)

PROJECTED FUNDING SOURCES TO COMPLETE AND FINANCE METRO

	Federal	State/ Local	Total
Spent or obligated as of Dec. 31, 1978	----------(millions)----------		
Applied to construction:			
Direct Federal appropriation with a local match on 2/3 Federal, 1/3 local basis	$1,147.0		
Interstate highway trust fund transfers--80-percent Federal, 20-percent local match	1,026.6	$657.4	$2,831.0
Funds to construct handicapped facilities--80-percent Federal, 20-percent local match	52.1	10.6	62.7
System add-ons paid by requestor	7.4	5.4	12.8
Authority internally generated funds used as State/local match to Federal contributions (note a)	-	236.8	236.8
Subtotal for construction	$2,233.1	$910.2	$3,143.3
Applied to debt servicing:			
Federal 25-percent interest subsidy (note b)	$ 101.5	-	$ 101.5
Sharing of remainder of interest deficit--80-percent Federal, 20-percent local	61.7	$15.4	77.1
Subtotal for debt servicing	$ 163.2	$15.4	$178.6
Total spent or obligated as of Dec. 31, 1978	$2,396.3	$925.6	$3,321.9

APPENDIX II

Date	Title
December 8, 1978	Letter report to the Authority's General Manager on review of cost estimating process (PSAD-78-141)
January 16, 1979	Letter report to the Authority's General Manager on suggestions for improving the Authority's internal audit activities.
February 27, 1979	"Better Management of Metro Subway Equipment Warranties Needed" (PSAD-79-141)

APPENDIX III

Additional funding needed	Federal	local	Total
		(millions)	
For debt servicing (note f):			
Federal share --100 percent of principal and interest on 2/3 of bonds--$ 665 million. State/local share is 100 percent of 1/3--$332 million.			
Interest	$1,831.8	$ 915.9	$2,747.7
Principal	665.0	332.0	997.0
Subtotal for debt service	$2,496.8	$1,247.9	$3,744.7
Total additional funding needed as of Dec. 1978	$4,972.2	$1,789.8	$6,762.0
Summary of funding sources to construct and finance Metro	$7,368.5	$2,715.4	$10,083.9

NOTES:

a/This is income earned on funds invested by the Authority until expanded. On page 6 we discuss our report to the Secretary of Transportation on part of these funds--the income earned on federally guaranteed bond proceeds.

b/This subsidy, pursuant to Public Law 92-349, recognized that, because interest on the Authority's bonds paid to the bond holders would be taxable, the Federal Government would pay part of the interest costs. Theoretically, the Government would get the money back through taxes paid by the bond holders.

c/Calculated on the basis of the Authority's assumption that sharing ratios will change to 85-percent Federal, 15-percent State/local in fiscal year 1980 based on recent legislation.

d/The State/local share of 10 percent is already included in other State/local amounts shown and could not be readily separated.

	Federal	State/ local	Total
	(millions)		
Additional funding needed			
For construction:			
Interstate transfer funds potentially available — 85-percent Federal, 15-percent local match (note c)	$1,244.8	$ 488.9	$2,851.4
Direct Federal appropriation—80-percent Federal, 20-percent local match	1,117.7		
Funds from Federal Highway Administration —90-percent Federal, 10-percent local match	108.0	(d)	108.0
Funds to construct handicapped facilities —80-percent Federal, 20-percent local match	4.9	3.6	8.5
System add-ons paid by requestor	-	7.5	7.5
Internally generated funds potentially available	-	41.9	41.9
Subtotal for construction (note e)	$2,475.4	$ 541.9	$3,017.3

e/The Authority lists the following as possible cost reductions that may be realized

- — contingencies, $85.5 million;
- — real estate recoupments, $15.1 million; and
- — betterments paid entirely by jurisdictions, $14.3 million (although this would result in increases to the jurisdiction making the payments).

f/In December 1978 the Authority, the Department of Transportation, and the Office of Management and Budget agreed that the Authority would pay 100 percent of interest and principal on $332 million of bonds and the Federal Government would pay 100 percent on $665 million. There would no longer be a separate 25-percent Federal subsidy, as discussed in note b. The interest expense shown assumes the principal will not be repaid until due, beginning in the year 2012. Earlier principal payments would reduce total interest costs.

The $997 million of bond proceeds were originally applied as $763.4 million to construction and $233.6 million to pay the first 4 years of State/local bond interest costs (because of the actual timing of the bond sales, however, only $227.4 million of the $233.6 million for interest costs was needed).

(34601)

*U.S. GOVERNMENT PRINTING OFFICE : 1979 O - 620-167/118

AN EQUAL OPPORTUNITY EMPLOYER

UNITED STATES
GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE,$300

POSTAGE AND FEES PAID
U. S. GENERAL ACCOUNTING OFFICE

THIRD CLASS