

# SÃO PAULO SOUTH LINE SUBURBAN TRAIN PROJECT

(BR-0163)

## EXECUTIVE SUMMARY

**BORROWER:** Government of the State of São Paulo

**GUARANTOR:** Federative Republic of Brazil

**EXECUTING AGENCY:** Secretaria de Estado dos Transportes Metropolitanos de São Paulo [São Paulo State Department of Metropolitan Transportation] (STM) through the Companhia Paulista de Trens Metropolitanos [São Paulo Suburban Railway Company] (CPTM)

**AMOUNT AND SOURCE:** IDB: US\$420 million  
Local counterpart funding: US\$320 million  
Total: US\$740 million

**FINANCIAL TERMS AND CONDITIONS:** Amortization period: 25 years  
Disbursement period: 4 years  
Interest rate: variable  
Inspection and supervision: 1%  
Credit fee: 0.75%

**OBJECTIVES:** The primary objective of this project is to contribute to the integration of the different mass transit systems in the south and southwest sectors of the São Paulo metropolitan area and so to facilitate the daily commute of the middle- and low-income population, reduce travel times, and improve service quality, comfort, and safety.

**DESCRIPTION:** The project consists of three subprojects: (i) construction and operation of a first 9.3-kilometer section of METRÔ Line 5 between Capão Redondo and Largo Treze; (ii) upgrading of the CPTM South Line; and (iii) institutional strengthening.

**ENVIRONMENTAL CLASSIFICATION:** The Environment Committee, at its meeting on October 12, 1993, classified this project as a Category III operation and at its meeting on July 12, 1994, approved the respective environmental summary.

**BENEFITS:** The benefits are improved living conditions for the population in the outlying districts in south and southwestern metropolitan São Paulo, mostly low-income families, by reducing travel times and improving the quality, safety, and comfort of mass

transit. The direct beneficiaries of the improved system will be 720,000 commuters daily.

**RISKS:**

The CPTM is a recently established company, currently in consolidation, that has two metropolitan railway systems to administer. This situation may give rise to delays in project execution. However, this risk will be reduced by the technical and administrative consulting services to be provided during project execution.

**THE BANK'S  
COUNTRY AND  
SECTOR STRATEGY:**

The pipeline for 1994-1995 stresses projects in social sectors and other areas targeting low-income groups and improving socioeconomic conditions in regions with deficiencies requiring immediate attention.

The proposed project is consistent with that strategy since its purpose is to meet the needs and improve the quality of life of broad segments of the low-income population. The project includes a technological modernization plan to reduce air pollution, improve the use of available resources, and satisfy the demand for transportation.

**SPECIAL  
CONTRACTUAL  
CONDITIONS:**

Prior to signature of the loan contract: Evidence must be submitted to the Bank that the requisite environmental permits have been obtained for the civil works to be carried out under the project (paragraph 3.11).

Prior to the first disbursement: (a) A consulting firm must be hired to provide technical and administrative support for the project (paragraph 3.2); (b) a detailed final resettlement plan and specific environmental protection plans must be submitted to the Bank's satisfaction (paragraph 3.9); (c) evidence must be submitted that the project coordinating unit (PCU) has been established and is operational (paragraph 4.3); (d) an agreement between the borrower and the executing agency must be signed under which the former transfers to the latter the resources of the financing and the counterpart capital contribution (paragraph 4.4); (e) the internal auditing unit of the CPTM must have the structure, functions, and staffing necessary to fulfill its responsibilities, and the contracts for supporting services to carry out internal auditing must have entered into force (paragraph 4.7); (f) evidence must be submitted that the independent public accountants who will certify the financial statements of the project have been appointed (paragraph 4.8); and (g) evidence must be submitted that the agreement between the CPTM and

FEPASA, under which FEPASA grants the CPTM, for a period of not less than 30 years with no obligation to make payments, the rights necessary for the project to be properly executed, including the right to operate and make investments in the suburban train system of the São Paulo metropolitan area, with full autonomy, and the use of all the respective assets and human resources (paragraph 4.10).

Within six months after the effective date of the loan contract: (a) A report must be submitted to the Bank for comment, detailing the progress and recommendations of the studies commissioned under the IBRD-I program (paragraph 4.14); (b) an inventory and revaluation of the CPTM's assets must be initiated (paragraph 4.15); and (c) it must be demonstrated that the FEPASA-RMSP merger has been officially completed (paragraph 4.10).

Within 12 months after the effective date of the loan contract: The following technical-cooperation activities for institutional strengthening must be undertaken: (i) analysis of alternatives and definition of the business strategy for private-sector participation in the operation and provision of services; and (ii) feasibility studies on subsequent stages of the fifth METRÔ line (paragraph 4.15).

One year after the effective date of the loan contract and every year thereafter: (a) Progress reports must be submitted to the Bank for comment until all the studies commissioned under the IBRD-I program have been completed and the new systems have been implemented and are operational (paragraph 4.14); (b) evidence must be submitted that the borrower, through the executing agency, is applying a fare policy which, coordinated with those of other means of transportation, will generate sufficient operating income to cover all or most of the CPTM's operating costs before depreciation, taking into account the indicative operating ratios, operating indices, and compensation to cover the fares for passengers entitled to ride free of charge (paragraph 5.37).

Within 36 months after the effective date of the loan contract: It must be demonstrated that the measures and recommendations agreed upon, based on the technical-cooperation activities for the institutional strengthening of the CPTM, have been implemented (paragraph 4.16).

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During the life of the loan contract: The borrower must transfer to the CPTM the amounts necessary to compensate it for income foregone from fares for passengers entitled to ride free of charge and the additional amounts needed to cover operating costs (paragraph 5.39).

## I. FRAME OF REFERENCE

### A. São Paulo metropolitan area

#### 1. General background

- 1.1 The São Paulo metropolitan area (SPMA) has some 15 million inhabitants living in an area of 8,000 square kilometers, which makes it the largest population center in Brazil and the second-largest in the Hemisphere. It is also the country's leading center of economic activity, generating more than 20 percent of the national GDP, with 44,000 industrial establishments.
- 1.2 During the past decade the urban area has expanded rapidly into what had previously been considered outlying areas. At the same time, subcenters gradually merged in intermediate areas to close a ring around the core city of São Paulo. The development of commerce and production in all the metropolitan area municipalities has reduced the relative importance of the central area as the principal commuting destination.
- 1.3 Because of the rapid urban growth, the rising demand for basic services is joined by the need for an efficient transit system. In the 39 municipalities of the SPMA 30 million trips are generated every day, 39 percent of which are by mass transit, 34 percent on foot, and 27 percent by private vehicle.

#### 2. Metropolitan transit system

- 1.4 The SPMA has an intermunicipal mass transit network of high- and intermediate-capacity routes. The high-capacity routes are railways, both overground (suburban train and METRÔ lines) and underground (METRÔ lines). The intermediate-capacity lines are thoroughfares on which buses operate in separate lanes or general traffic lanes. These high- and intermediate-capacity routes are supplemented by feeder bus lines that serve local needs and connect to the intermunicipal lines.
- 1.5 The public sector participates in the provision of mass transit service through: (i) the overground suburban trains of the Companhia Paulista de Trens Metropolitanos [São Paulo Suburban Railway Company] (CPTM); (ii) the overground and underground trains of the Companhia do Metropolitano de São Paulo [São Paulo Rapid Transit Company] (METRÔ); and (iii) motor bus and trolleybus lines, which are administered at the state level by the Empresa Metropolitana de Transporte Urbano [Metropolitan Urban Transit Company] (EMTU), and at the municipal level by the municipal governments, under which they are privately operated to a considerable extent. In fact, the motor bus services are provided for the most part by the private sector under concessions and contracts awarded by the

public sector. Moreover, taxi services are provided by independent operators in the private sector.

- 1.6 The overground rail system consists of: (i) 65 kilometers of lines that originally belonged to Ferrovia Paulista S.A. [São Paulo Railway, Inc.] (FEPASA) and run through the SPMA to the south and west, and (ii) 190 kilometers of lines formerly run by the Companhia Brasileira de Trens Urbanos [Brazilian Commuter Railways] (CBTU), which cross the SPMA from east to west and from northwest to southeast. These rail systems have now both been placed under the administration of the State of São Paulo through the CPTM in an effort by the state government to reorganize urban transit into a single integrated system for the entire metropolitan area. The CPTM operates 291 cars and carries 1.2 million passengers a day.
- 1.7 The rapid transit system operated by METRÔ consists of three lines totaling 42 kilometers. These lines cross the center of the SPMA from north to south, from east to west, and from south to northwest. The system operates 98 cars and carries 2.3 million passengers a day.
- 1.8 The motor bus system comprises 1,407 lines, of which 300 are intermunicipal (EMTU) under the state government, and 1,107 are municipal. Of the 1,107 municipal lines, 650 belong to the São Paulo municipal government and 457 to the other 38 municipalities. These lines operate a fleet of some 12,000 motor buses and carry 8 million passengers a day.

### 3. Fare system

- 1.9 Mass transit fares in the SPMA are adjusted periodically according to inflation to maintain their real value. As of July 1, 1994, when the "real" went into circulation as legal tender in Brazil, the fare on the METRÔ system was raised to the equivalent of US\$0.60 per trip, on motor buses to US\$0.50, and on the suburban trains to US\$0.60 on the former FEPASA lines and US\$0.50 on former CBTU lines.
- 1.10 Even before July 1, 1994, the fare revenues of the METRÔ system covered about 70 percent of operating and maintenance costs, net of finance charges and depreciation. The fares of the motor bus system covered the cost of operating and maintaining the vehicles plus a reasonable return on invested capital not counting expenditures for the road infrastructure. As for the suburban overground rail system, in 1993 fare revenues covered about 89 percent of the operating costs, before depreciation, of the former FEPASA system, and 58 percent of those of the former CBTU system. These proportions will obviously be higher with the real increases in effect since July 1.
- 1.11 The Secretaria de Estado dos Transportes Metropolitanos [São Paulo State Department of Metropolitan Transportation] (STM), in charge

of the state public transit system, has established as the policy for the sector and for the proposed integrated system that the rail system fares must cover a greater and growing share of operating and maintenance costs, with due regard for the payment capacity of the users and the corresponding costs of the motor transportation system. The financial projections for the project assume increasing coverage of the operating and maintenance costs over time for the rail system. These targets presuppose improved efficiency of services to riders reflected in a steady reduction of operating costs and improved operating income (see chapter V for more details on expected operating income and the financial feasibility of the project).

- 1.12 The demand for public urban mass transit derives stems from, among other externalities, traffic congestion and environmental pollution. It is therefore logical to accept a reasonable difference between social and private cost. Elsewhere in the world only the commuter rail systems of Hong Kong and Singapore cover 100 percent of their operating and maintenance costs out of fare revenues. The São Paulo METRÔ system currently already covers a higher proportion of these costs than do most of the world's rapid transit systems.

#### 4. Deficiencies of SPMA intermunicipal transportation

- 1.13 Owing to the rapid pace of urbanization in the SPMA, where population density reaches 10,000 inhabitants/square kilometer in São Paulo municipality, the transportation system is heavily dependent on automotive transport. The rapid growth of urban areas has made this system inadequate to meet the demand for intermunicipal passenger transportation, and problems of congestion and air pollution have arisen, resulting in lengthy commuting times, loss of efficiency, and deterioration of the quality of life. In addition, because of the high population density, many commuters have to travel long distances.
- 1.14 In the SPMA 20 million vehicular trips are taken per day, of which 60 percent are by mass transit (motor buses, suburban trains, and METRÔ). Most of the mass transit passengers live in the outlying areas of the SPMA and work in the center of the city and the sub-centers, thus generating significant commuter traffic and making it increasingly difficult to get from one place to another at rush hour.
- 1.15 Though interurban travel is beset by delays in all four quadrants of the SPMA, studies have shown that the problems are greatest in the south, southwest, and east areas. Losses of time in these areas have been calculated at from 20 minutes to two hours due to the lack of transportation infrastructure, inefficient use of the existing infrastructure, and/or saturation of current capacity. Such losses have a negative impact on mass transit riders and the efficiency of activity in the metropolitan area in general. The south and west sectors of the SPMA contain 70 percent of the

*favelas* [shantytowns], whose residents, low-income families, are the principal riders of mass transit.

- 1.16 The characteristics of the rail transit system and its location in the metropolitan area make it the preferred option for organizing an efficient mass transit system. Its present deficiencies, however, prevent it from meeting the demand for services properly and effectively. The most important of these deficiencies are that: (i) the rail lines of the METRÔ and suburban train systems are not physically integrated; (ii) the existing passenger transfer facilities are inadequate, and demand goes unmet where there are no stations; and (iii) operational integration requires a restructuring of the system.
- 1.17 Pedestrian travel is not a reasonable alternative because of the long distances between places of work and residence. Lanes reserved for bus traffic are an essential part of the transportation solution and have been and continue to be implemented where physically practical and economically feasible, particularly in São Paulo municipality. However, there are several corridors where such lanes already exist and are saturated, or where they cannot be successfully implemented because demand is so heavy that the number of buses needed to meet it would inevitably degrade the quality of the service. These are the conditions that prevail particularly along the main routes in the project's area of influence: Avenida Marginal Pinheiros, the Santo Amaro-Nove de Julho bus corridor, and the avenues and routes to the west of the Pinheiros River, in addition to the bridges crossing the river and other access routes.
- 1.18 Meterings done at the 20 air quality evaluation stations of the Companhia de Tecnologia de Saneamento Ambiental [Environmental Sanitation Technology Company] (CETESB) have established that the SPMA has excessive levels of environmental pollution generated by emissions of carbon monoxide, ozone, and particulates. In recent years, public health warnings have been issued due to air pollution from carbon monoxide for 250 days a year, from ozone for 108 days, and from particulates for 54 days. About 80 percent of these different pollutants is generated by the five million vehicles registered in the SPMA.
- 1.19 While in recent years the São Paulo State authorities have made great efforts to improve public transportation in the SPMA by building the three METRÔ lines and improving routes reserved for bus traffic, there has been no coherent guideline or policy to coordinate the functions and responsibilities of the enterprises that provide those services. As a result, the transportation services are clustered in some geographic areas and do not operate as frequently as they are needed.
- 1.20 The above-described picture demonstrates the urgent need to improve traffic conditions and at the same time reduce the negative externalities associated with the current transit systems. The



best technically feasible alternatives are those that favor public mass transit, that is, trains and buses.

- 1.21 To support the reorganization of the metropolitan transportation system, assigning priority to measures in the areas with the greatest problems, in November 1991 the state government created the STM, to which it transferred administration of METRÔ, the EMTU, and later the CPTM. This institutional reorganization is all part of a reform that the respective authorities are implementing with a view to providing a coordinated, efficient transit system for riders. While the proposed operation was being prepared, the *Sistema Integrado Metropolitano* [integrated metropolitan transit system] (SIM) program was developed, and financial assistance requested from the World Bank, the IDB, and other possible cofinancing agencies to implement it.

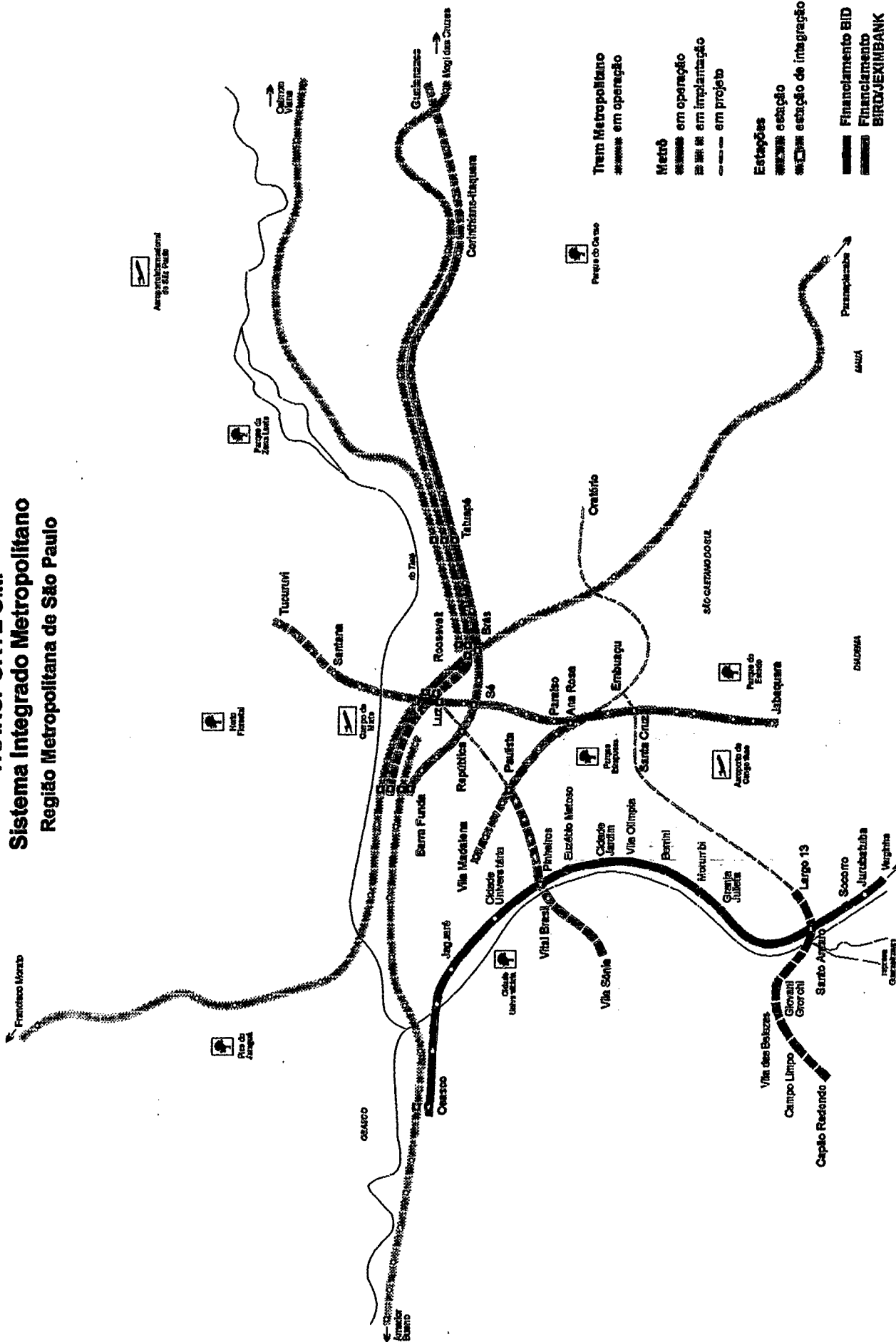
5. The integrated metropolitan transit program

- 1.22 The purpose of the integrated transit program is to meet the demand for and improve the efficiency of mass transit services in metropolitan São Paulo by integrating operation of the mass transit systems, through the execution of four specific investment projects and one management project. The measures envisaged would cost approximately US\$2,553,000,000 and are described below (see map on next page):
- a. Central integration project: For the physical and operational connection of the CPTM East Line and the other components of the suburban rail system, a 5.5-kilometer overground track will be built between the Roosevelt station on the East Trunk Line (formerly CBTU) and the Barra Funda intermodal station. The improvement also includes the installation of a single traffic control center for the East and Northwest/Southeast Lines. The cost of this project is about US\$85.8 million, and will be financed with the support of the IBRD.
  - b. East Line project: For integration and joint operation of the METRÔ and suburban train systems serving the eastern metropolitan area: (i) 30 trains will be procured and signaling improved at a total cost of US\$250 million, to be drawn on an approved IBRD loan to the Government of Brazil, execution of which will be completed at the end of 1994; (ii) a six-kilometer extension of the second (east-west) METRÔ Line from Itaquera to Guaianazes will be completed with the construction of three stations; and (iii) 30 new trains will be procured, to be financed with internal funds and suppliers' credits, at an estimated cost of US\$180 million.

# TRANSPORTE SIM

## Sistema Integrado Metropolitano

### Região Metropolitana de São Paulo



- c. South Line project: To meet the demand for transportation of the lowest-income groups the problems of access and loss of time owing to lack of proper mass transit infrastructure and services will be addressed. This subproject comprises:
  - (i) the construction of a 9.3-kilometer METRÔ track between Capão Redondo and Largo Treze, the first segment of Line 5; and
  - (ii) improvement of the suburban train South Line with the construction of seven stations along the Jarubatuba-Pinheiros connecting line, and the acquisition of transportation, maintenance, and signaling equipment. This is the subproject, the cost of which totals about US\$740 million, for which Bank financing is proposed.
- d. South Line interconnection project: To integrate the METRÔ system and the South Line of the suburban train system, a fourth METRÔ line will be built, nine kilometers long, with seven stations and a maintenance yard. The new line will connect the Pinheiros station of the South Line with the Paulista (Clínicas) station of the METRÔ system, and will run west to Vila Sônia. The cost of the project is US\$1,242 million, to be financed with the participation of the IBRD and EXIMBANK of Japan.
- e. Management project: To strengthen the management capability of the metropolitan mass transit system, advisory services will be provided for:
  - (i) coordination between the rapid transit companies, operators (public and private), and riders;
  - (ii) improvements in productivity, efficiency, performance, and management control; and
  - (iii) attention to environmental and institutional concerns. A laboratory will be set up to test the emissions of mass transit vehicles. The component also includes a study on other emission-control measures. The project will cost an estimated US\$35 million and will be financed with the participation of the IBRD and the Bank.

1.23 Although the four investment projects and the management project are all part of the integrated transit program, given the amount of resources required, they will be implemented with the support of different sources of financing. The central integration project, the East Line project and the South Line interconnection project will be supported by the IBRD, EXIMBANK of Japan, and suppliers, while the South Line project will have the proposed financial support of the Bank. The management project will enjoy the coordinated support of all the participating financial institutions.

1.24 The Bank would participate in the South Line project because the proposed works would directly benefit the poorest segments of the population. However, since all these projects are components of the integrated transit program, the necessary coordination has been established for their separate execution without prejudice to their interconnection.

6. Economic and social situation in the area of influence of the project

- 1.25 The area of influence of the project comprises some 96,000 hectares southwest of São Paulo municipality and contains the metropolitan area municipalities of Embú-Guaçu, Itapecerica da Serra, and Taboão da Serra. It has about 2.1 million inhabitants, or 13 percent of the total population of metropolitan São Paulo.
- 1.26 The Pinheiros River divides the municipality of São Paulo from north to south into two socioeconomically disparate parts in the direct area of influence of the project. Indices for mobility, income, and general quality of life in the part east of the river are higher than the mean for the area of influence as a whole. Though only a small fraction of the area of influence, its population density is high (18 percent of the population in the direct area of influence), and the higher socioeconomic status of its residents significantly raises the average general indicators in the area of influence. For example, the mean monthly per capita income of the population living east of the Pinheiros River is about US\$200, compared with about US\$70 west of it. The mean for the direct area of influence as a whole is less than US\$100 a month.
- 1.27 The direct area of influence is poorly endowed with urban infrastructure and services, the supply of which is below the average in the overall metropolitan area. An analysis of the current housing situation shows that southwest area contains more than half of all the *favelas* in São Paulo municipality. More than 20 percent of the inhabitants live in *favelas* and 62 percent of the project beneficiaries belong to low-income groups.

B. The Bank's country strategy and pipeline

- 1.28 The proposed project falls within the strategy agreed upon by the Bank and the Brazilian authorities for the period 1994-1995, which stresses projects in the social sectors and other areas of substantial benefit to low-income groups. In this connection, the proposed project is designed to meet the social needs of the low-income urban population living on the periphery of metropolitan São Paulo by improving the quality and extending the coverage of urban transportation services, whose deficiencies demand an immediate, comprehensive solution.
- 1.29 In addition, the proposed operation responds to the priorities established by the Bank for meeting the needs and improving the quality of life of broad segments of the population, especially the low-income strata. In this regard the transportation sector has a significant role to play in urban economic and social development by providing access to different districts and centers of activity to broad population segments, thereby creating more employment opportunities. The project will be governed by a scheme of

technological modernization designed to reduce air pollution, improve use of available resources, and meet demand for interurban transit more efficiently.

C. Experience of the Bank and other financing agencies

- 1.30 The proposed operation will be the first high-capacity urban transit project to be financed by the Bank and the first in Brazil. The Bank's operations in recent years have concentrated on the support of highway transportation programs in Brazilian states and in the country's federal road system, and have focused primarily on strengthening technical and administrative capacity and providing for proper operation and maintenance of the road infrastructure. Those programs have contributed satisfactorily to the mitigation of infrastructural deficiencies, encouraging the development of production, and facilitating the socioeconomic integration of the country's different regions.
- 1.31 As mentioned in paragraphs 1.21 and 1.22, the IBRD is also participating in the financing of the integrated transit program. As for the IDB, this would be its first experience in an operation involving the construction of a new commuter rail line. The Bank's project team coordinated measures and exchanged views on the preparation and execution of the integrated transit program as a whole. However, the analysis of the rate of return on the investments to be financed under the project has shown them to be economically feasible even without concurrent implementation of the components supported by other sources of financing.

## II. THE PROJECT

### A. Objectives

- 2.1 The primary objective of this project is to contribute to the integration of the different mass transit systems in the south and southwest sectors of the São Paulo metropolitan area to facilitate the commute of the middle- and low-income population, reduce travel times, and improve the quality, comfort, and safety of public transportation. In addition, the project will improve the flow of street traffic in this sector by reducing the number of motor buses, which will also help reduce the environmental pollution caused by vehicle emissions.
- 2.2 The project also calls for institutional strengthening measures to endow the STM and CPTM with modern management systems and procedures for efficient administration of the integrated metropolitan transit system.

### B. Targets

- 2.3 The South Line of the suburban rail system will become a structural axis of mass transit by increasing the number of passengers transported daily from 50,000 to 450,000.
- 2.4 The suburban train system will become accessible to the residents of the Campo Limpo and Capão Redondo districts of São Paulo municipality and the municipalities of Itapequerica da Serra, Embú, and Embú-Guaçú through construction and operation of a new METRÔ line to carry up to 320,000 passengers/day between Capão Redondo and Largo Treze.
- 2.5 An institutional framework will be set up for establishment of the most appropriate type of operation for the South Line and Capão Redondo-Largo Treze Line so as to provide a high level of service to riders with optimal profitability for the system.

### C. Description

- 2.6 The project consists of three subprojects, as follows:
1. Improvement of the South Line of the suburban train system
- 2.7 This subproject comprises: (a) improvement of the alignment and track along a 15-kilometer segment between Osasco and Jurubatuba so that it can carry more trains at higher speeds; (b) provision and installation of equipment to expand and improve the electric power supply systems for traction, signaling, and telecommunications in keeping with the envisaged higher frequency of trains; (c) construction of seven new stations along the section between Pinheiros

and Jurubatuba; (d) provision and installation of the electro-mechanical equipment needed for operation of the stations; and (e) procurement of 10 new four-car trains.

## 2. Construction of the Capão Redondo-Largo Treze Line

- 2.8 This subproject comprises: (a) construction of a 9.3-kilometer METRÔ line (7 kilometers of elevated track, 1.5 kilometers of surface track, and 800 meters of underground track) between Capão Redondo and Largo Treze, the first segment of Line 5 called for under expansion plans for the São Paulo METRÔ system; (b) provision and installation of electric power supply equipment for traction, signaling, and telecommunications on the new line; (c) construction of marshaling and parking yards and provision of shop equipment for repair of the rolling stock and systems; (d) construction of six stations and transfer terminals for interconnection with urban and interurban bus lines; and (e) procurement of rolling stock (eight 64-car trains) to ply on the Capão Redondo-Largo Treze section.

## 3. Institutional strengthening

- 2.9 This subproject comprises the financing of the following technical-cooperation activities: (a) a study to identify alternatives and define the business strategy for private-sector participation in the operation and provision of high-capacity mass transit service; (b) a study to take stock of and revalue the assets of CPTM in order to determine its financial condition; and (c) feasibility studies on the second stage of METRÔ Line 5, after completion of the Capão Redondo-Largo Treze segment. The terms of reference for these studies may be found in the technical files of the project.

## D. Cost of the project

- 2.10 The total cost of the project has been estimated at the equivalent of US\$740 million, broken down as follows: 1/

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1/ The costs breakdown for each subcategory is given in Annex II-1.

COST AND FINANCING OF THE PROJECT (US\$ thousands)				
CATEGORY	IDB LOAN	LOCAL CONTRIB.	TOTAL COST	%
Engineering and Administration	20,995	2,505	23,500	3.2
Technical studies	0	1,400	1,400	0.2
Admin. and support/PCU	6,745	355	7,100	1
Supervision of works and equipment	14,250	750	15,000	2
Direct Costs	339,082	175,038	514,120	69.5
Civil works (South Line)	63,755	3,355	67,110	9.1
Systems and equipment (South Line)	22,110	10,890	33,000	4.5
Rolling stock (South Line)	46,410	8,190	54,600	7.4
Civil works (Capão Redondo-Largo Treze)	136,770	7,200	143,970	19.5
Systems (Capão Redondo-Largo Treze)	66,297	32,653	98,950	13.4
Rolling stock (Capão Redondo-Largo Treze)	0	111,500	111,500	15.1
Access routes	3,750	1,250	5,000	0.7
Associated Costs	2,000	46,750	48,750	6.6
Expropriations and relocation	0	44,600	44,600	6.0
Special studies	2,000	2,150	4,150	0.6
Subtotal	362,087	223,293	585,380	79.1
Unallocated	53,713	26,807	80,520	10.9
Contingencies	27,535	8,928	36,463	4.9
Cost escalation	26,178	17,879	44,057	6.0
Total investment costs	415,800	251,100	666,900	90.1
Finance charges	4,200	68,900	73,100	9.8
Interest	0	61,746	61,746	8.3
Credit fee	0	7,154	7,154	1
Inspection and supervision	4,200	0	4,200	0.5
TOTAL	420,000	320,000	740,000	100
Fund/Project (percent)	56.8	43.2	100	



1. Engineering and administration (US\$23,500,000)

- 2.11 This category comprises the costs of the services of the consulting firms that will: (i) prepare the engineering designs necessary to bring the project to the execution level; (ii) support the executing agency in administration of the project; (iii) supervise the civil works and the manufacture, installation, and startup of the electromechanical and communications equipment and rolling stock; and (iv) advise the STM on transportation policy and other aspects of metropolitan transportation management.

2. Direct costs (US\$514,130,000)

a. Civil works (US\$216,080,000)

- 2.12 This category comprises the costs of:

- (i) earth-moving work for the construction and/or realignment of the track, tunnel excavation, and preparation of the land on which the marshalling yards, shops, and auxiliary structures will be located;
- (ii) erection of reinforced concrete and/or metal structures for the elevated track, tunnels, transfer terminals, and other auxiliary structures;
- (iii) procurement and installation of track materials;
- (iv) finishing, electric and sanitary installations, signaling and landscaping, and improvements in access routes to the stations and terminals; and
- (v) improvement of access routes to stations and transfer terminals along about 35 kilometers, including upgrading pavements, pedestrian walkways, elimination of critical points, and signaling.

b. Equipment and systems (US\$131,950,000)

- 2.13 This category includes construction of the infrastructure works, procurement of materials and equipment, and the assembly and installation of:

- (i) electric power supply systems, including the construction of primary, rectifying, and auxiliary substations, installation of transmission lines and distribution networks to supply power to the trains and to auxiliary services at stations;
- (ii) signaling and control systems for train operation, including a control center and all safety devices along tracks and in yards;

(iii) telecommunications systems, comprising equipment for data transmission, radio and telephone communications, public address systems at stations, closed-circuit television, and timekeeping;

(iv) fixed and mobile equipment and facilities for maintenance of the track, the rolling stock, and the operating and control systems; and

(v) electromechanical equipment that is part of the station furnishings, such as escalators, elevators, ticket-control machines, air conditioning, pumps, and fire fighting equipment.

c. Rolling stock (US\$166,100,000)

2.14 This category comprises the purchase of:

(i) 64 cars to make eight eight-car trains to run on the new METRÔ line between Capão Redondo and Largo Treze; and

(ii) 20 motor cars and 20 trailer cars to make ten four-car trains each in motor-trailer-trailer-motor series, for improved operation of the South Line.

3. Associated costs (US\$48,750,000)

2.15 This category represents 6.6 percent of the total cost, and comprises: (i) payments for expropriation of land and of dwellings and other structures affected by project execution; (ii) compensation for the inhabitants of the dwellings and businesses to be expropriated, and payment of their resettlement expenses; (iii) payment for technical assistance services for institutional strengthening of the STM/CPTM and analysis of alternatives and determination of a strategy for private-sector participation in the operation and provision of services under the CPTM; and (iv) expenses connected with environmental management under the project.

4. Unallocated (US\$80,520,000)

2.16 This item covers: (i) the equivalent of US\$36,463,000 for possible costs not foreseen in the project design and which may arise during project execution or construction of the works; and (ii) the price escalation that domestic and foreign inflation will generate between the date the baseline budgets were prepared and the dates of actual execution of the works and procurement of goods, in the amount of an estimated US\$44,057,000.

5. Finance charges (US\$73,100,000)

- 2.17 This category constitutes 9.8 percent of the total cost of the project and comprises the interest that will accrue during the execution period (US\$61,746,000), the credit fee (US\$7,154,000), and the charge for inspection and supervision of the project (US\$4,200,000).

E. Sources of funds

- 2.18 The total cost of the project (US\$740 million) will be financed as follows: (i) up to 57 percent of the total cost, the equivalent of US\$420 million, from the ordinary capital of the Bank, to be disbursed in foreign exchange; and (ii) contributions by the State of São Paulo equivalent to US\$320 million, from internal funds. The feasibility of these contributions is described in chapter V below.
- 2.19 The matrix applicable to the loan will be 57/43 in keeping with the rule that allows up to 10 percent in addition to the regular matrix (50/50) for projects in Group A countries when more than 50 percent of the benefits generated accrue to low-income groups.
- 2.20 The terms and conditions under which the loan will be granted are as follows:

Terms and conditions	OC foreign exchange
Amortization period	25 years
Grace period	4.5 years
Interest rate	variable
Credit fee	0.75 percent
IDB inspection and supervision	1.00 percent

- 2.21 The State of São Paulo is exploring the possibility of replacing part of the local counterpart resources with credits from suppliers and international banks. These resources would be used to finance the rolling stock, equipment, and systems in the amount of the equivalent of US\$175 million, which will not be financed using the proceeds of the proposed loan. The Bank has reviewed the specifications of the rolling stock, equipment, and systems to be procured, which were found to be of a standard type that can be

procured on a competitive basis from suppliers in the Bank's member countries. If cofinancing is arranged, it will be considered part of the local contribution, and the Bank and the State of São Paulo will agree on the appropriate adjustments to be made in the investment items of the cost and financing table, maintaining the Bank financing at the total of US\$420 million.

### III. EXECUTION OF THE PROJECT

#### A. Executing agency

- 3.1 The project will be executed by the STM through the CPTM. The loan and counterpart resources will be transferred to the executing agency by the State of São Paulo.
- 3.2 The STM and the CPTM will appoint the members of the project coordinating unit (PCU) as described in chapter IV. In addition to the support of the different offices of the STM and the CPTM, the PCU will also have the technical and administrative support of a consulting firm, which must be hired as a condition precedent to the first disbursement and whose services will be financed using the resources of the loan.

#### B. Status of project preparation

- 3.3 The CPTM and STM hired consulting firms to provide advisory services to prepare the loan request presented to the Bank, the economic and environmental studies, and the basic designs for all the project components.
- 3.4 The basic designs for the civil works have been reviewed by the Bank and are technically satisfactory and detailed enough to determine costs, and contain the information needed to issue invitations to bid according to Brazilian legislation and Bank procedures.
- 3.5 The technical alternatives for the equipment and systems studied by the CPTM/STM and the basic specifications proposed are justified and reasonable. The general characteristics, quantities, technological level, and cost ranges of the equipment, materials, and systems to be procured using the resources of the financing and counterpart funding have already been determined. The detailed specifications for these components are substantially complete and will be finished in good time before the scheduled bidding date.
- 3.6 The environmental report has been completed and accepted by the Bank. Its principal recommendations, summarized in paragraphs 3.33 to 3.36, have been incorporated into the basic designs and will be incorporated into project execution.
- 3.7 Before the works under the project can be executed, 538 properties (including commercial establishments) must be expropriated and about 555 families (2,680 persons) resettled; 50.9 percent of the families are homeowners, 31.1 percent are tenants, and 18.7 percent live in structures abandoned to them. Though only 14.2 percent of the families involved live in makeshift structures on illegally occupied land (*favelas*), most of the families are low-income and as

such will need technical assistance in finding new housing, in addition to the financial compensation associated with expropriation.

3.8 The preliminary resettlement plan presented with the environmental studies is appropriate. The executing agency does not consider relocation to mean just the compensation given for expropriation of the housing unit or the registration of low-income families in low-cost housing programs. All the families affected, regardless of their socioeconomic status, will have access to better housing. The PCU will therefore hire a person to be responsible for environmental issues, including finding new housing for the population concerned. The PCU will serve as a liaison with the institutions involved in the process, the Companhia de Habitação e Desenvolvimento Urbano [Urban Housing and Development Company] (CDHU), the Conselho Regional de Corretores de Imóveis [Regional Board of Real Estate Brokers] (CRECI), and private banks, and will be supported by the consulting services for project management. The project team has reviewed this arrangement and found it appropriate.

3.9 Prior to the first disbursement, the executing agency must submit the final resettlement plan and the specific environmental protection plans to the Bank's satisfaction. Before works can be initiated, any necessary relocations of affected persons must be completed.

C. Land and access routes

3.10 An inventory of the properties decreed to be of public interest and therefore to be expropriated has been drawn up, and the number of families that will have to be resettled to clear the areas for execution of the works and operation of the two lines has been determined. The resources to pay for the expropriations and resettlements are part of the cost of the project and will be provided by the borrower. Before authorizing the issuance of invitations to bid for any group of works, the borrower will have to submit evidence that it is in legal possession of the land on which the works are to be carried out and that the affected inhabitants have been duly compensated.

3.11 Prior to signature of the loan contract, the executing agency must submit evidence to the Bank that it has obtained the environmental licenses required for the civil works under the project.

3.12 To provide easy, safe, and efficient access routes for riders to the stations and transfer terminals, the project calls for specific improvements and measures along about 35 kilometers of track. These activities will provide bus users and drivers with safe, efficient access.

D. Execution procedures

1. Hiring of consulting services

- 3.13 Whether or not the consulting services are to be financed by the Bank, before issuing each call for bids, the borrower must submit to the Bank for clearance the terms of reference, baseline budget, and criteria for the evaluation and selection of consultants. In addition, consulting services financed entirely or in part with the resources of the loan must be hired according to Bank standards and procedures.
- 3.14 The services to advise and support the CPTM and the STM in their work, the construction supervision services, and the special studies included in the institutional strengthening component, depending on their particular features, may be commissioned from consulting firms or, with the Bank's prior authorization, from individual experts.
- 3.15 The preparation of the civil works projects, except those for the Santo Amaro bridge/station and the Largo Treze underground station, will be included in the contract for the firm that will support the CPTM and the STM in project management. Preparation of the final projects for the other two stations will be included among the responsibilities of the contracting firms to which the works are awarded. These firms will therefore have to demonstrate their capacity to do so and include in their proposals a letter of agreement with the consulting firm and the specialists who will be preparing the designs.
- 3.16 The designs of the systems, equipment, and rolling stock to be procured under the project will be prepared by the suppliers, in keeping with the characteristics and specifications adopted by the CPTM and approved by the Bank. These designs will be reviewed and their consistency with the specifications verified by the firms and experts in charge of supervising their installation and startup.
- 3.17 The supervision and technical monitoring of the civil works and the supply, installation, and startup of equipment, systems, and rolling stock will be entrusted under contracts to specialized consulting firms and, in cases where so required and subject to prior authorization by the Bank, to qualified experts. The supervisors must also review the execution of the designs when they are to be executed by construction firms hired or by suppliers of equipment and systems.

2. Bidding for construction contracts

- 3.18 All the civil works under the project will be executed by private contractors, for which purpose contracts will be awarded according to Bank standards and procedures. Since most of the civil works under the project are not complex and do not require a high degree

of specialization, prequalification of bidders will not be necessary and the two-envelope system may be used. There are special structures, however, namely the bridge/station across the Pinheiros River (Santo Amaro) and the underground station and tunnel at Largo Treze, which are unusual structures for the country and will entail the use of nonstandard equipment and procedures. For these two cases only the bidding procedures will include prequalification.

- 3.19 The civil works on the Capão Redondo-Largo Treze line will be divided into four groups for bidding purposes: (i) basic works for tracks, stations, and yards, to be divided into six geographic lots; (ii) construction of the track, which will comprise two contracts, one for supply of the rails and one for laying them, including all materials and fastening devices; (iii) finishing and signaling on the tracks and in stations and yards, divided into eight lots; and (iv) construction of transfer terminals and improvement of access routes, which will comprise four contracts.
- 3.20 The civil works to upgrade the South Line will be divided into two groups for bidding purposes: (i) basic works and finishing of the new stations and improvement of existing stations and yards, divided into six contracts; and (ii) improvement of the track, which will comprise two contracts, one for supply of the rails, and the other for laying them.

### 3. Procurement and assembly of equipment, systems, and rolling stock

- 3.21 All contracts for the procurement of goods and the installation and startup of equipment, systems, and rolling stock for which resources from the loan are used, must be awarded through international public bidding according to Bank procedures. A total of 11 contracts are to be awarded for the supply and assembly of equipment and systems, and two contracts for procurement of the rolling stock.
- 3.22 Before the Bank gives authorization for each of these calls for tenders to be issued, the borrower must submit the complete set of bidding documents, containing the basic designs, specifications of the goods to be purchased, instructions for bid preparation, and the bid evaluation system.

### 4. Bidding schedule

- 3.23 The table in Annex III-1 shows the tentative bidding schedule for the entire project and the estimated amounts of the contracts for both the South Line improvement and Capão Redondo-Largo Treze subprojects.
- 3.24 The borrower has published the general procurement notice (GPN) and begun the contractor prequalification process for the civil works on the Santo Amaro and Largo Treze stations.



E. Execution period and targets

- 3.25 A four-year period has been allowed for execution of the project, beginning on the date of approval of the loan contract, during which all the civil works and procurement and assembly of all the systems and equipment must be completed, as well as the testing and startup of the new Capão Redondo-Largo Treze Line and the upgraded South Line.
- 3.26 The improved South Line will become operational in the first half of 1998 and the Capão Redondo-Largo Treze Line will begin regular operation in the early months of 1999.

F. Investment timetable

- 3.27 The table in Annex III-2 presents the investment timetable for the project execution period and the schedule for disbursement of the loan and the counterpart contribution.

G. Contractor and supplier capacity

- 3.28 Except in a few cases, in the acquisition of goods, the awarding of construction contracts, and the selection of consultants to be financed with the resources of the loan, the system of international public bidding shall be followed to ensure the proper level of competence and capacity. Nevertheless, there are contractors and consultants on the local market with the technical and financial capacity to submit tenders of their own. Similarly, there are suppliers of locally produced goods and representatives of international producers in the country that can also provide a satisfactory level of competence.

H. Study to determine the strategy for private-sector participation

- 3.29 To conduct an analysis of alternative options and determine a corporate strategy for the CPTM/STM for private-sector participation in the operation, the provision of services and investment financing of the transit system, the São Paulo State authorities have requested that a technical-cooperation component be included in the proposed financing for the project. The terms of reference for a study on this matter can be found in the technical files of the project. This technical assistance will enable the STM to select the alternative found most appropriate to begin the concession and/or transfer of rapid transit system operation and related services.

I. Operation and maintenance

- 3.30 The borrower will agree to operate and maintain all systems, facilities, and equipment, in good condition, and to observe international safety rules and standards. Indicators of operating

efficiency of the services and systems to be periodically evaluated have been established and may be found in Annex III-3.

J. Ex post evaluation

- 3.31 In keeping with the current policy on ex post evaluation, the State of São Paulo (SSP) has been consulted regarding its desire to conduct such an evaluation of the project. The project team considers that an ex post evaluation of this operation should be conducted in order to determine the goals accomplished, verify the validity of the assumptions adopted, and document experience for future projects. The borrower has agreed to participate in this evaluation both by itself and with the STM, the CPTM, and METRÔ, and will therefore collect and process the relevant information during the execution period. Three years after the two lines have begun operation, the borrower will conduct the ex post evaluation in coordination with the Bank. The methodology will be the one used for the economic and financial evaluation of the project. The executing agency will also be responsible for running the four-stage urban transportation model and for supplying the other data requested.

K. Environmental concerns

- 3.32 At its meeting on October 12, 1993, the Environment Committee (CMA) classified the project as a Category III operation, and at its meeting on July 12, 1994, approved the environmental summary. The study on the environmental impact of the project, on which the environmental summary is based, took into account the CMA's recommendations and addresses all attendant environmental issues. The impact evaluation was conducted in relation to a future situation without the project and sought to determine the impact caused by the project, separating it from the intense urban changes under way in the region. The study considers, the following, among other factors: improved access from low-income neighborhoods, potential impact in areas of protected springs, reduction of air pollution, population transfers, and urban and social change.
- 3.33 The environmental impact assessment included the impact expected in each subarea and low-income neighborhood, allowing for the expected effect of measures to mitigate any adverse environmental impact and to protect the environment. The overall impact of the project will therefore be positive. Apart from its specific merits in terms of public transportation, the project is needed to organize the rapid process of urban transformation and improve the quality of life, chiefly in the southwest sector of the SPMA. Concrete environmental protection plans will mitigate any adverse impact well, and the final situation is expected to be better than the situation without the project.
- 3.34 The resettlement plan for families and economic activities is designed to offer alternative forms of fair compensation acceptable

to all the families to be relocated. This flexible system of fair compensation is based on:

- a. the adoption of market mechanisms for homeownership families with incomes above US\$450, including (i) expropriation in accordance with rules laid down in specific legislation, and (ii) a "letter of credit" for the value of the home, negotiable on the real estate market;
  - b. access for low-income families to the state government's housing programs under its housing policy, which is implemented by the CDHU and provides the following arrangements: (i) indemnification proportionate to the value of the housing unit, (ii) a CDHU letter of credit for the purchase of a home on the market, and (iii) a bank letter of credit to obtain financing;
  - c. a security bond equivalent to three months' rental for tenants and residents in homes abandoned to them;
  - d. indemnification at market value of the homes whose owners do not live in the area.
- 3.35 The proposed strategy relies on interaction between the community and the institutions involved in the project and establishes a monitoring and evaluation system which ensures that the process will be effective and socially equitable. The analysis of the principal environmental and social impact at each income level shows that in the low-income sector there will be 123 beneficiaries for each person adversely affected. It should be noted that the project will benefit all income levels, not just low-income groups, and that the adversely affected population will be duly compensated and will also enjoy the benefits of the project.
- 3.36 The environmental studies have been reviewed and accepted by the project team, and conclude that the project is environmentally feasible.

#### IV. INSTITUTIONAL AND FINANCIAL ANALYSIS

##### A. Institutional analysis

##### 1. Borrower and guarantor

- 4.1 The State of São Paulo (SSP) will be the borrower, and the Federative Republic of Brazil the guarantor.

##### 2. Executing agency

- 4.2 The executing agency of the project will be the SSP Department of Metropolitan Transportation (STM) through the São Paulo Suburban Railway Company (CPTM). The STM was created on July 16, 1991, and the CPTM on July 2, 1993, and assigned responsibility for operating the commuter trains of São Paulo formerly run by the CBTU and FEPASA.
- 4.3 The PCU will consist of a general coordinator appointed by the STM and a technical coordinator designated by the CPTM, who will be directly assisted by an administrative and financial specialist and an environmental specialist. In the performance of its duties, the PCU will be supported by the entire existing organization of both the STM and the CPTM, as well as by the services of a consulting firm hired with resources of the loan for administration of the project. The loan contract will include a provision that prior to the first disbursement, evidence must be submitted that the PCU has been constituted and that its officers have been appointed and begun work.
- 4.4 Under an agreement signed between the borrower, the STM and the CPTM, the SSP will transfer the respective resources of the financing and those of the local counterpart contribution to the CPTM as contributions to its capital. The STM and CPTM will execute the project in accordance with the terms of the loan contract between the SSP and the Bank. The transfer agreement must be submitted to the Bank and accepted by it as a condition precedent to the first disbursement.

##### a. Purpose and organization of the CPTM

- 4.5 The CPTM was established to improve public rail transit in the SPMA under the integrated rapid transit program, coordinate the different subsystems and means of transportation, and take measures and make investments to improve the services and physical infrastructure. This purpose entails a change in business strategy for both the marketing and delivery of those services. The idea is to meet the demand with both more and better services in a market that will offer riders a choice of means of transportation, and to increase income and reduce costs through higher productivity and

efficiency. Under this business approach, the proposed operation will support the identification of alternative courses involving greater participation by the private sector to improve system operation and related services, enhance efficiency, and reduce public spending.

- 4.6 As a stock company, the CPTM has four administrative organs: the stockholders' meeting, the administrative council; the fiscal council, and the board of directors. The latter body consists of a director-chairman and four directors. The director for engineering and works will be the technical coordinator of the project.
- 4.7 The CPTM is now consolidating its organization following the approval of its corporate charter, by-laws, basic organizational chart, and manual of organization, which are all considered appropriate. Its organizational structure includes an internal auditing unit under the director-chairman, consisting of a chief auditor and a permanent staff of five auditors. This unit will also use outside auditing services hired on contract. This organizational structure is considered appropriate. It is recommended that a clause be included in the contract requiring that, prior to the first disbursement of the loan, evidence be submitted that the internal auditing unit of the CPTM has the structure, functions, and staffing necessary to fulfill its responsibilities, and the contracts for supporting services to carry out internal auditing have entered into force.
- 4.8 External auditing of the CPTM is carried out by the Accounting Board of the SSP and by independent public accountants. It is recommended that a clause be included in the loan contract requiring that evidence be submitted, prior to the first disbursement, that the independent public accountants who will certify the financial statements of the project during its execution, with the financial statements of the CPTM, during the life of the loan have been appointed.

b. Merger and expansion plan

- 4.9 The CPTM began its operations with a small staff of 27 professionals with extensive experience in the transportation sector gained in previous employment in the METRÔ, CBTU, and FEPASA systems and the SSP Department of Transportation. Its first activities were the legal procedures for its merger with the CBTU and FEPASA. Completion of these mergers will increase the CPTM work force to 5,227 (3,700 from the CBTU and 1,500 from FEPASA).

(i) Merger with the CBTU and FEPASA

- 4.10 The merger with the CBTU was carried out in June 1994 following a series of legal transfer procedures set in motion between the SSP and the federal government under an August 1991 agreement. The merger with FEPASA is expected to be final by March 1995: the only

step remaining is enactment of a state law authorizing the separation of part of the net worth of FEPASA, the transfer of that part to the CPTM without the transfer of liabilities, and provision to FEPASA of the resources needed to pay off the liabilities not transferred. As a condition precedent to the first disbursement of the loan, the agreement signed between the CPTM and FEPASA, under which FEPASA grants the CPTM, for a period of not less than 30 years with no obligation to make payments, the rights necessary for the project to be properly executed, including the right to operate and make investments in the suburban train system of the São Paulo metropolitan area, with full autonomy, and use of all the respective assets and human resources. Within six months after signature of the loan contract, evidence must be submitted that the merger of FEPASA and the RMSP has been officially completed.

- 4.11 Under an agreement between the SSP and federal government, the latter agreed to meet the obligations arising out of loan contract 3457-BR with the World Bank (IBRD-I) for completion of the project for decentralization of the CBTU and its partial recovery. The federal government accepted to put up the local contribution of US\$125 million and to maintain its commitment to repay loan IBRD-I for US\$125 million. The CPTM became a party in the management of the contracts resulting from IBRD-I and the SSP assumed responsibility for the transfers required for operation of the CBTU services in the future and any additional investments needed for the recovery of those services.
- 4.12 At the same time, a protocol for the separation and transfer of part of the assets was signed by the CBTU, CPTM, and Rede Ferroviária, S.A. [Federal Railways, Inc.] (RFFSA), thereby transferring the assets of the CBTU, but not its liabilities, to the CPTM. However, the entire staff assigned to those services was transferred, together with all the liabilities arising out of their seniority up to the time of the transfer.

(ii) Other merger-related activities

- 4.13 In the short run, the CPTM will continue to use the existing operating, administrative, financial, and accounting systems acquired through its merger with the CBTU and FEPASA, and under an administration agreement has commissioned the FEPASA units to perform the functions not transferred. At the same time, execution has begun of part of the institutional strengthening component of the CBTU/IBRD-I program, which calls for consulting services in the areas of finance, human resources, data processing, materials administration, improving the company's public image, and corporate merger.
- 4.14 In the course of these joint operations with the CBTU and the World Bank, the CPTM found it necessary to adapt the original terms of reference to the new needs generated by its merger with the CBTU and with FEPASA. This strategy will take advantage of the existing

IBRD-I financing, and new systems suited to the current needs of the CPTM will be developed. In order to follow closely these activities, and to decide on the measures and the terms for their execution, the loan contract will include a clause stipulating that: (i) within the first six months after signature of the loan contract, a report must be submitted describing in detail the progress made in implementing the new systems recommended by the aforementioned consulting services and a timetable showing the tentative implementation dates; and (ii) one year after signature of the loan contract and at the end of each year thereafter until all the consulting services have been completed and the resulting measures implemented, similar reports must be submitted to the Bank for comment.

- 4.15 The institutional-strengthening components of the project are: (i) devising alternative arrangements for private-sector participation in the operation and financing of the services; (ii) revaluating the CPTM's assets in order to determine the real financial status of its net worth; and (iii) completing the feasibility studies on METRÔ Line 5, beginning with the Capão Redondo-Largo Treze section. The revaluation of the CPTM's assets must be initiated within six months after the effective date of the loan contract, according to terms of reference agreed upon with the Bank. The activities for the design of alternatives for private-sector participation and for the feasibility studies must be initiated within 12 months after the effective date of the loan contract, according to the terms of reference agreed upon with the Bank.
- 4.16 Within 36 months after signature of the loan contract the borrower must demonstrate to the Bank, through the CPTM, that the measures agreed upon, based on the recommendations of the consultants for each area of study to strengthen the CPTM, have been implemented, as described in paragraphs 4.13 to 4.15 above.

c. Conclusion

- 4.17 Both the STM and the CPTM have the institutional capacity to improve the productivity and efficiency of the urban train services for which they are responsible to expand the services, and to administer the project resources properly, with the support of consultants.

B. Financial analysis

1. State of São Paulo

- 4.18 The figures used in the analyses are expressed in terms of the equivalent of constant 1993 dollars of the United States of America.

a. Budget performance

4.19 The following table summarizes the budget performance of the SSP during the period 1988-1993:

(in equivalents of US\$-millions)

SSP Budget performance	1988	1989	1990	1991	1992	1993
Current income	13,871	17,333	17,159	14,892	13,574	12,513
Total expends.	16,918	20,426	22,418	18,834	19,834	23,021
-current	11,998	14,791	16,034	13,416	13,453	16,026
-capital	3,896	4,247	5,090	3,796	3,965	4,977
-debt service	1,024	1,388	1,294	1,622	2,416	2,018
Difference	(3,047)	(3,093)	(5,259)	(3,942)	(6,260)	(10,508)
Capital income	920	1,361	1,699	1,913	3,003	5,815
Budget deficit	(2,127)	(1,732)	(3,560)	(2,029)	(3,257)	(4,693)

- 4.20 Budget performance during the period 1988-1993 shows that current income rose 23.7 percent in the first three years, and declined 27.1 percent in the following three years as current receipts gradually fell from a peak of US\$17,159,000,000 in 1990 to a low of US\$12,513,000,000 in 1993.
- 4.21 The high incomes of 1988-1990 are the direct result of the 1988 constitutional reform, which broadened the tax base of the states. Much of the increase was generated by the value-added tax known as the ICMS, which was extended to additional items (fuels, lubricants, electric energy, minerals, transportation, and telecommunications), the tax revenues of which were previously only enjoyed by the federal government. The 1990 revenues were also boosted by the unfreezing of financial assets that had been frozen for payment of taxes under the Collor stabilization and structural adjustment plan.
- 4.22 The decline in current income from 1991 to 1993 was caused by the economic recession and mounting inflation, which affected both the SSP's internal resources and its receipts in transfers from the federal government.
- 4.23 Current expenditures are seen to have fared similarly, rising 33.6 percent in the period 1988-1990. Personnel costs increased chiefly due to the filling of vacancies and new hirings made in



education, health, sanitation, and security. Transfers to municipalities rose significantly once they began receiving a higher share of tax revenues pursuant to the 1988 constitutional reform.

- 4.24 In 1991 and 1992 there was a reduction of 16.1 percent in current expenditures, chiefly in those for personnel and transfers to municipalities. In 1993 they reverted to the level of 1990 owing especially to payments for expropriations in earlier years and expenditures for school rehabilitation.
- 4.25 Among capital expenditures, investments in physical works, facilities, and equipment, transfers of funds to state enterprises and to different state departments held at an average of US\$1,152,000,000 a year during the 1988-1993 period. Financial investments averaged US\$1,681,000,000 a year and included increases in the capital of state enterprises and loan transfers to them. Debt service rose appreciably in 1992 and 1993 as arrears were paid off, and at the end of 1993 the unpaid balances were renegotiated with the federal government, as discussed below.
- 4.26 The differences between current income and total current and capital expenditures were financed partially by capital income in domestic and foreign loans. In 1993, an extraordinary amount of US\$3,508,000,000 was received mainly as the proceeds of sales to the private sector of shares in the state electric power utility, Companhia Elétrica de São Paulo. The balance, after deduction of the capital income, is the budget deficit.
- 4.27 The cash deficits of 1988-1993 ranged between a low of US\$1,732,000,000 in 1989 and a high of US\$4,693,000,000 in 1993, and were covered primarily by carrying over accounts payable each year to the next year, and to a minimal extent by the use of available Treasury funds. The deficit increase in 1993 was caused chiefly by another reduction of tax revenues and higher expenditures in payments by court orders in previous years, school rehabilitation, and transfers to state enterprises. This situation should be reversed in 1994, as these factors are evolving toward disappearance of the cash deficit.

b. Status of the debt

- 4.28 The total indebtedness of the SSP as of March 30, 1994, amounted to the equivalent of US\$22,499,000,000, of which US\$16,646,000,000 was domestic debt and US\$5,853,000,000 foreign debt, as can be seen in the following table:

(in equivalent of US\$ millions)

OUTSTANDING BALANCES as of March 30, 1994	Current debt	Past due debt	Total debt
DOMESTIC DEBT	16,646	0	16,646
Contracts	5,269	0	5,269
Securities	6,739	0	6,739
Guarantees	4,638	0	4,638
FOREIGN DEBT	4,332	1,521	5,853
Contracts	551	305	856
Guarantees	3,781	1,216	4,997
TOTAL DOMESTIC AND FOREIGN DEBT	20,978	1,521	22,499

4.29 Of the foreign debt as of March 30, 1994, a total of US\$1,521,000,000 had not been paid (US\$305 million under contracts and US\$1,216,000,000 under guarantees). These past due amounts were renegotiated by the federal government on April 22, 1994 under an agreement reached with foreign creditors, and the situation was regularized when the federal government extended the benefits of the agreement to the SSP.

4.30 The domestic debt under contracts and guarantees was renegotiated with the federal government at the end of 1993, and an extension of the term to 20 years was granted. The debt in securities can be renewed annually on up to 90 percent of the annual maturities so long as no new paper is issued until the year 2000. Federal Senate Resolution 11 enacted provisions that govern the domestic and foreign credit operations of the states and prescribe annual ceilings on the contracting of new debt. As a result, the SSP has regularized its both domestic and foreign debt and has an indebtedness profile with maturities it is able to meet totaling US\$2,031,000,000 in 1994, US\$2,142,000,000 in 1995, US\$1,795,000,000 in 1996, and gradually decreasing amounts in the years thereafter. These maturities have been included in the SSP's financial projections for 1994-2003.

#### c. Conclusions

4.31 The analysis of the SSP's budget performance shows that after 1988 it enjoyed a greater potential for internal cash generation as a result of the constitutional reform. In the use of the funds generated by that reform, priority was given to increasing expenditures in the social sectors (education, health, sanitation, and safety), both for the improvement of physical infrastructure and to increase the staffing required to service those sectors. The

decline in current income starting in 1991 led to a contraction of expenditures, chiefly in payroll, through real wage reduction, and a proportional reduction of transfers to municipalities. The level of capital investments has held almost unchanged, and the service on the debt has been normalized.

- 4.32 The renegotiation of the SSP's debt regularized its financial situation and gave it an indebtedness profile with maturities that it is clearly able to meet. As a result, its indebtedness capacity has improved within the parameters established by the federal government for the states. At the same time, the SSP has a greater capacity to generate funds of its own, which will manifest itself when the country's economic growth resumes.

## 2. Companhia Paulista de Trens Metropolitanos (CPTM)

- 4.33 The financial analyses for the period 1989-1993 were carried out on the operations of the CBTU and FEPASA because the CPTM was only established in mid-1993 and is in the process of merging with the two companies. The profit-and-loss statements of the CBTU and FEPASA show that both required federal and state transfers to finance their operating costs before depreciation. This situation was primarily due to the low quality of the services, inadequate fares, number of passengers legally entitled to ride free of charge, a high percentage of fare-dodging riders, and deficiencies in equipment and installations owing to wear and saturation of their capacity.

### a. CBTU

- 4.34 Over the last five years the operations of the CBTU have reflected an operating and financial situation comparatively less efficient than that of FEPASA. Operating income rose from US\$19.5 million in 1989 to US\$58.3 million in 1993, mainly on the strength of a real fare increase of 299 percent, from an average fare of US\$0.07 per passenger in 1989 to US\$0.27 in 1993. Operating costs rose in smaller proportion than income, thereby improving the operating ratio (operating costs before depreciation over operating income), which ranged from 4.20 in 1989 to 1.23 in 1992 and 1.73 in 1993. The rise in 1993 resulted principally from a raise in salaries to offset the loss in their real value. Financial performance was negative, though decreasingly so during the period.
- 4.35 Despite this slight financial improvement, the operating coefficients show a decline in the period from 1989 to 1993. The number of passengers carried daily by the CBTU dropped 8.6 percent, from 890,000 in 1989 to 814,000 in 1993; the proportion of fare dodging passengers jumped from 11 percent to 29 percent; available rolling stock declined from 81 percent to 70 percent; and the average annual mileage of the rolling stock dropped 20.6 percent between the two equal years of 1989 and 1993 owing to breakdowns. The greatest decline in these indicators occurred in 1992 and 1993.

The economic recession, shortage of equipment and installations owing to deferred investments and maintenance, and the inflation of the period all greatly lowered the level of activity of the enterprise and worsened its financial situation.

- 4.36 The measures being taken in 1994, including the change in the management of the CBTU upon its merger with the CPTM, and the ~~investments in works and the improvements in operations~~, financial management, and control to be implemented under the IBRD project under way (IBRD-I) and those called for under the proposed IDB project will appreciably upgrade the operating and financial efficiency of the transportation services provided by the CBTU. These activities and investments and the expected results for the period 1994-2003 are described in detail in the financial projections of the CPTM.

b. FEPASA

- 4.37 Operating income rose from US\$9.4 million in 1989 to US\$35.8 million in 1993 owing chiefly to an average rise of 298 percent in fares, which increased from an average of US\$0.10 per rider in 1989 to US\$0.41 in 1993. The average fare is now US\$0.42 per rider in 1994. The operating ratio reflected an important improvement over the period in declining annually from a high of 2.72 in 1989 to a low of 1.13 in 1993. Net operating income was negative throughout the period, though it improved with the fare increase.
- 4.38 Despite this financial improvement, the operating indicators show a decline over the period. The number of daily riders carried by FEPASA increased 10.4 percent from 326,000 in 1989 to 360,000 in 1991. Ridership then fell 6.7 percent in the next two years to 336,000 riders/day in 1993, primarily owing to deficiencies in equipment and installations. In addition, fare-dodging grew worse, increasing from 16.1 percent in 1991 to 20.9 percent in 1992 and 16 percent in 1993; the available rolling stock shrank from 86.3 percent in 1991 to 75 percent in 1993; and average annual mileage declined 35 percent owing to equipment breakdowns.
- 4.39 As in the CBTU, the measures and investments to be carried out under the proposed IDB project and the IBRD-I project are expected to result in an appreciable improvement in the operating and financial efficiency of the metropolitan rapid transit services, which until a short time ago were being run by FEPASA. These improvements will also be discussed in the section on the financial projections of the CPTM.

## V. FEASIBILITY OF THE PROJECT

### A. Technical feasibility

- 5.1 The subprojects of the proposed project involve certain special features in the design and execution of works, particularly for implementation of the systems needed to improve the South Line and to operate the new Capão Redondo-Largo Treze line, and the construction of some unusual structures, such as the bridge/station on the Pinheiros River, which will be the first such station to be built in Brazil.
- 5.2 There are professionals on the local market with considerable experience in the construction and operation of the existing rapid transit system. Their experience made it possible for the project designs to be prepared, on the basis of which bidding will be held for the works, installations, and equipment. The Bank has reviewed the designs drawn up by the CPTM and STM consultants and made recommendations that have been incorporated into the plans and documents that will be used to hold competitions for the works, equipment, supplementary installations, and professional services.
- 5.3 The lists of quantities, specifications, and other technical documents on the basis of which bidding will be held for construction contracts and the procurement of equipment contain all the information needed to define the work to be done and the systems required, while at the same time leaving enough room for a wide range of competition and allow the bidders to offer cost-reducing alternatives that do not alter the project's fundamental design criteria.
- 5.4 The costs of the different components have been estimated at market prices and compared with quotations for similar works and installations both in the country and abroad. Owing to the instability of domestic prices, conservative factors have been used to offset the impact of price variations on the costs of the subprojects.

### B. Financial feasibility

#### 1. Financial projections for the State of São Paulo

- 5.5 In recent years, Brazil has experienced macroeconomic disequilibrium which led to an annual economic growth rate of 0.7 percent from 1988 to 1993. However, with the recent initiatives to open up the economy to the outside world, privatize public enterprises and transfer certain State-run activities to the private sector, and implement a new economic plan designed to bring public finances and inflation under control, economic growth can now be expected to resume in the coming years.

- 5.6 After a three-year recession, the real GDP of Brazil recovered with a growth rate of five percent in 1993, and is expected to grow not less than 3.7 percent in 1994. For purposes of the financial projection of the income and expenditures of the State of São Paulo, real GDP was assumed to grow an average of 2.7 percent a year from 1994 to 1997 (the average for the last 10 years), and four percent for the period from 1998 to 2003.
- 5.7 The basic projections of SSP income and expenditures are presented on the next page, and their salient features are discussed below.

a. Current income

- 5.8 Current income will be the equivalent of US\$15,324,000,000 in 1994, still 11.6 percent below the 1989 level (US\$17,333,000,000). Collections in the first half of 1994 confirm that the current income budgeted for the year will be achieved. By 1997 it will again reach that level (US\$17,089,000,000). In the following years, collections will rise five percent annually, to US\$22,900,000,000 in the year 2003. The projections to 1997 were calculated using the mean growth rate of current income over the past 10 years, which was 3.7 percent a year. From 1998 onward, current income was projected to grow five percent a year, in pace with the expected growth of GDP.

STATE OF SÃO PAULO  
PROJECTED INCOME AND EXPENDITURES  
BASIC PROJECTION  
(in equivalent of US\$ millions)

DESCRIPTION	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>CURRENT INCOME</b>	<b>15324</b>	<b>15891</b>	<b>16479</b>	<b>17089</b>	<b>17943</b>	<b>18640</b>	<b>19782</b>	<b>20772</b>	<b>21810</b>	<b>22800</b>
Tax revenues	12895	13372	13867	14380	15099	15854	16647	17479	18353	19271
Federal transfers	688	713	740	767	806	846	888	933	979	1027
Other current income	1741	1805	1872	1941	2039	2140	2248	2360	2478	2602
<b>TOTAL EXPENDITURES</b>	<b>12868</b>	<b>13204</b>	<b>13533</b>	<b>13873</b>	<b>14483</b>	<b>15122</b>	<b>15789</b>	<b>16488</b>	<b>17219</b>	<b>17982</b>
<b>CURRENT EXPENDITURES</b>	<b>12868</b>	<b>13204</b>	<b>13533</b>	<b>13873</b>	<b>14483</b>	<b>15122</b>	<b>15789</b>	<b>16488</b>	<b>17219</b>	<b>17982</b>
Personnel and social benefits	4293	4452	4617	4788	5027	5278	5542	5819	6110	6416
Operating expenditures	3027	3057	3088	3119	3244	3373	3508	3649	3795	3946
Intergov. transfers	2084	2084	2084	2084	2136	2190	2244	2300	2358	2417
METRÔ	75	69	64	58	48	57	57	59	60	60
CPTM	82	59	51	42	60	68	67	68	70	72
Others	1927	1956	1969	1984	2028	2065	2120	2173	2228	2285
Transfers to municipalities	3464	3611	3745	3883	4077	4281	4495	4719	4955	5203
<b>CAPITAL EXPENDITURES</b>	<b>2501</b>	<b>3201</b>	<b>3504</b>	<b>3400</b>	<b>3256</b>	<b>3383</b>	<b>3496</b>	<b>3568</b>	<b>3644</b>	<b>3726</b>
Investments	753	1046	1147	1090	1145	1202	1262	1325	1391	1461
CPTM-IDB South Rail Project	0	94	80	128	43	0	0	0	0	0
CPTM Roosevelt-B. Funda Connection	3	15	19	6	0	0	0	0	0	0
CPTM Other projects	25	19	116	63	0	0	0	0	0	0
METRÔ Paulista/Pinheiros	102	68	91	67	10	0	0	0	0	0
METRÔ L. Este Sta.	42	71	14	0	0	0	0	0	0	0
METRÔ Sumaré/Magdalena	36	79	32	0	0	0	0	0	0	0
METRÔ Other projects	117	123	243	445	330	216	140	0	0	0
Others	428	577	552	381	762	986	1122	1325	1391	1461
Financial investments	1188	1393	1595	1548	1429	1380	1412	1401	1390	1380
CPTM-IDB South Rail Project	0	66	166	160	28	0	0	0	0	0
CPTM Roosevelt-B. Funda Connection	0	15	21	7	0	0	0	0	0	0
IBRD/JEXIMBANK SIM Program	101	284	277	182	23	0	0	0	0	0
Others	1087	1028	1132	1199	1378	1380	1412	1401	1390	1380
Intragov. transfers	560	762	762	762	782	801	822	842	863	885

DEBT SERVICE	2087	2138	2156	2223	2258	2301	2352	2412	2474	2511
Domestic	1918	1982	2001	2063	2095	2135	2183	2238	2296	2330
Foreign	149	154	155	160	163	166	169	174	178	181
IDB South Rail Project	0	4	10	17	27	58	54	52	50	48
Others	149	150	145	143	136	108	115	122	128	133
TOTAL EXPENDITURES	17436	18541	19193	19496	20097	20806	21637	22468	23386	24219
CURRENT INCOME LESS TOTAL EXPENDITURES	-2112	-2650	-2714	-2408	-2154	-1966	-1855	-1696	-1526	-1319
FINANCED WITH CAPITAL INCOME	2112	2650	2714	2408	2154	1966	1855	1696	1526	1319
Credit operations	2112	2650	2714	2408	2154	1966	1855	1696	1526	1319
Domestic	1717	1784	1801	1856	1781	1815	1712	1560	1397	1196
Foreign	395	866	913	552	373	151	143	136	129	123
IDB South Rail Project	0	66	166	160	28	0	0	0	0	0
IBRD/JEXIMBANK SIM Program	101	284	277	182	23	0	0	0	0	0
Other projects	294	516	470	210	322	151	143	136	129	123

b. Current expenditures

5.9 The 1994 budget reflects a major contraction of current expenditures (US\$12,868,000,000), 19.7 percent less than the previous year (US\$16,026,000,000). Budget performance for the first half of 1994 shows that the reduction may be somewhat smaller, due to higher personnel costs and operating expenses arising from the institution of the *unidade real de valor* (URV) in March 1994. Personnel costs will increase in 1995 at the same annual rate as current income, by 3.7 percent until 1997 and five percent beginning in 1998, and operating expenses will remain almost constant from 1995 to 1997, before increasing by some four percent annually thereafter.

5.10 The category of intragovernmental transfers was also approved in 1994 at a level below that of the preceding year as a result of a decision to reduce current transfers to SSP-owned foundations and enterprises, which is indeed the case according to budget performance in the first six months of the year. They will then rise one percent a year until 1997 and four percent a year thereafter, pursuant to the policy that the SSP has started applying to its indirectly administered institutions. This expenditure item includes transfers to the CPTM and METRÔ. Over the 10-year period from 1994 to 2003, the SSP will transfer to the CPTM the equivalent of US\$521 million in compensation for riders entitled to ride free, and in the six-year period from 1994 to 1999 it will transfer US\$117 million to cover CPTM's operating deficits. Starting in the



year 2000 the CPTM will generate sufficient internal funds under the project to cover its operating expenses before depreciation.

- 5.11 The only component of current expenditures for which an increase (+20.9 percent) has been approved is transfers to municipalities, since according to the Constitution municipalities are entitled to a share of ICMS revenues. This has indeed been the case according to budget performance for the first six months of 1994. Later these transfers will grow in proportion with current income.

c. Capital expenditures

- 5.12 Capital expenditures include physical and financial investments and intragovernmental transfers. Performance in the first six months of the year confirms that the 1994 budget will be executed. In the period from 1995 to 1997, physical investments in works, installations, and equipment will grow to levels higher than budgeted for 1994, chiefly because of the counterpart allocations to supplement external financing for transportation, sanitation, education, water resources, gas distribution, and pollution control. An annual growth rate of five percent, similar to that of current income, can be reasonably assumed starting in 1998.

- 5.13 Physical investments includes the counterpart contributions for the CPTM and METRÔ for the IDB project and the IBRD project. Physical investments will average US\$1,182,000,000 a year over the 10-year period projected, similar to the US\$1,152,000,000 a year in real terms of 1988-1993.

- 5.14 The counterpart contribution for the proposed project, the largest amount of which - US\$122 million - is to be provided in 1997, represents 0.7 percent of current income and to 11.2 percent of the total investments of that year, and is therefore considered feasible. If cofinancing is arranged, the contribution required from the SSP will be smaller.

- 5.15 The financial investments include chiefly transfers to state enterprises of funds from external loans, including the resources of the loan. The financial investments will average US\$1,411,000,000 a year, less than the annual average of US\$1,681,000,000 in the years 1988-1993.

d. Debt service

- 5.16 Amortization and interest comprise the maturities under the renegotiated domestic and foreign debt and the estimated service on new loans being negotiated.

e. Capital income

- 5.17 New loan operations were estimated on the basis of the current parameters for government debt, especially those prescribed by

Federal Senate Resolution 11. In regard to the income from the domestic funded debt it was assumed that 90 percent of the maturities would be renewed each year. The disbursements to be received from the operations under way and those under negotiation, including the proposed project, were considered capital income from foreign sources.

- 5.18 Correlating capital income with debt service over the period from 1994 to 2003 yields a net external capital income of US\$2,914,000,000 and US\$2,339,000,000 in net repayments of domestic debt, for net increase in total indebtedness of US\$575 million, which will raise the balance to the equivalent of US\$23,074,000,000 at the end of 2003. It was concluded that total SSP indebtedness will remain at a level similar to that on March 30, 1994 over the 10-year period, with maturities that can be met. The loan would amount to 4.9 percent of total foreign debt at the close of 1998 (US\$8,541,000,000) and to 1.7 percent of all debt (US\$25,149,000,000), amounts that would not affect the SSP's borrowing capacity.
- 5.19 The projections do not include the possible capital income from sales of SSP assets because little is known about these operations, which will add to capital income during the period.

f. Conclusions

- 5.20 On the basis of the SSP's income and expenditures the borrower is in a position to provide the counterpart contribution to the project, supplement the CPTM's operating costs, and cover the service on the debt to the Bank. Obtaining bilateral or suppliers' credit in substitution of part of the counterpart will improve the financial situation.
- 5.21 Though the projection is realistic, a sensitivity analysis was conducted in which the annual growth rate of current income was reduced to 2.5 percent during the period 1995-2003 instead of 3.7 percent from 1995-1997 and five percent during 1998-2003. In addition, it was assumed that the resulting lower current income would affect only the level of current and capital expenditures, without changing the capital income or debt service of the baseline projection. The sensitivity analysis reduces current income by US\$15.1 billion during the period 1995-2003. About 85 percent of this income reduction is offset by a reduction of US\$9.5 billion in personnel expenditures and operating costs and US\$3.4 billion in transfers to municipalities. The remainder of US\$2.1 billion to be offset affects: (i) physical investments, which are reduced by US\$1.1 billion (10 percent a year below the baseline projection), without affecting the counterpart contribution to the project, and (ii) intragovernmental capital transfers, which are reduced by US\$391 million, financial investments by US\$377 million, and current intragovernmental transfers which decline by US\$236 million.

- 5.22 Even under the pessimistic assumptions of the sensitivity analysis, the SSP would have the capacity to provide the counterpart contribution to the project, supplement coverage of the CPTM's costs, and meet the service on the loan.

2. Financial projections for the subprojects and the CPTM

- 5.23 Separate projections were computed for the South Line improvement and Capão Redondo-Largo Treze line subprojects, in addition to the financial projections of the CPTM. The separate financial analysis was conducted solely to measure the particular contribution of each subproject to the general improvement of the CPTM's financial situation.

a. South Line improvement project projections

- 5.24 Execution of this subproject will satisfy an additional demand of 400,000 riders a day that will be added to the 50,000 riders carried daily at present. The financial projection considers only the incremental income and costs of the subproject and assumes that the works will have been completed and put into operation in 1999. In the first five years of subproject operation (1999-2003), income will cover practically all operating costs, including depreciation of the new investment, and that profits will start to be earned in 2004. No finance charges are assumed because the SSP will transfer the proceeds of the Bank financing and the counterpart contribution as capital contributions, as set forth in the loan contract.
- 5.25 Over the five-year period (1999-2003), the subproject will yield the equivalent of US\$30 million in internal cash generation, which financial self-sufficiency is also reflected in the subproject's operating ratio, which is less than unity in each projection year (paragraph 5.36).

b. Capão Redondo-Largo Treze Line subproject projections

- 5.26 This subproject is part of and supplements the South Line improvement subproject. Its financial projection takes into account the respective income and expenditures. The works, installations, and equipment are expected to be completed and will have begun operation in 1999 and will be financed with capital contributions from the SSP. The income statement shows negative figures for each year of the period 1999-2003 almost solely because of the impact of depreciation. The operating ratio is expected to decline (paragraph 5.36).
- 5.27 Internal cash generation will be slightly negative in the period 1999-2003, falling from US\$3 million in 1999 to US\$1 million in 2003 and becoming positive again in 2004 with the expected increase in numbers of riders carried. SSP transfers will only be needed

until the end of 2003, after which cash surpluses will be generated. The subproject will thus help improve the CPTM's general financial situation from the start.

c. CPTM financial projections

- 5.28 The financial projections for the CPTM over the period 1994-2003 cover the consolidated activities of the former CBTU and FEPASA, which merged with the CPTM in 1994, and the investments and activities under the project, one project under way and another under study with IBRD financing, and the purchase of 30 train sets. These investments will improve the operating capacity and efficiency of the CPTM.

(i) Income statement

- 5.29 The projected income statement indicates that the number of riders carried will grow from 1,150,000 riders/day in 1993 to 2,983,000 riders in 2003. The growth rate will be two percent a year until the year 2000 and 2.5 percent from 2001 onward, the average rate estimated for the population in the SPMA. The increases to be generated by the improvements referred to in the preceding paragraph were also included.
- 5.30 The investments made to control rider access to stations and increase surveillance will reduce the proportion of fare dodging from 29 percent of the riders carried in 1993 to four percent in 1997 for the former CBTU line, and from 16 percent in 1993 to two percent in 1999 for the former FEPASA line. The proportion of riders entitled to ride free will be held at the 1993 level of 18.2 percent, and the SSP will reimburse the CPTM for their fares as usual. This obligation on the part of the borrower will be stipulated in the loan contract.
- 5.31 The projections held constant, in real terms, the present mean fare of US\$0.42/rider. For the former CBTU line they assumed an average fare of US\$0.35 in 1994 and US\$0.42 starting in 1995, since it will take time to bring CBTU fares up to those of the former FEPASA line.

(ii) Operating income

- 5.32 Operating income will rise an average of 17.8 percent a year from 1993 to 1998, from US\$94 million in 1993 to US\$181 million in 1997. The principal sources of this improvement will be the works and activities under way with financing approved by the IBRD, which will help reduce the proportion of fare dodging and improve the operating and administrative capacity of the CPTM, and place greater emphasis on the maintenance of rolling stock. Operating income will increase with the entry into operation in 1998 and 1999 of the components to be financed by the new IBRD operation and under the proposed project in each of those years. During the six

years from 1998 to 2003, it will rise from the equivalent of US\$181 million to US\$337 million.

(iii) Operating costs

5.33 A 62.1-percent increase in operating costs, from US\$169 million in 1993 to US\$274 million in 1994, will result chiefly from an increase in expenditures for materials and contractual services to expedite the repair and maintenance of rolling stock that was out of service at the close of 1993. Expenditures will hold at this level in the following years, which will allow a gradual improvement in the indicators of the productivity and quality of the rolling stock and the proportion of it available for service. This proportion will rise from 70 percent in 1993 to 90 percent in 1998 for the former CBTU line and from 75 percent in 1993 to 90 percent in 1998 for the former FEPASA line. Similarly, annual mileage between breakdowns will rise for both lines by 1998.

5.34 The other component of operating costs that will increase is depreciation of fixed assets, which will quadruple from US\$22 million in 1993 to US\$92 million in 1994. The reason for this is that the initial fixed assets in 1994 include the revaluation of the assets of FEPASA, though CBTU assets are still maintained at past costs in local currency. The revaluation will be conducted under the proposed project.

5.35 Operating costs will rise again in 1998 by 24.7 percent and in 1999 by 28.1 percent when the components of the new project with the IBRD and of the proposed IDB project become operational. Of these costs, the amount for materials and contractual services for the maintenance of equipment and installations in operation will hold at an appropriate level. Depreciation of fixed assets will still account for a high proportion (29 percent) of total operating costs, though the revaluation of the CPTM's assets will remain to be factored in.

5.36 The operating ratio will improve over the projection period, dropping from 1.50 in 1993 to 1.01 in 1999, falling below unity starting in the year 2000. This ratio is projected as follows:

CPIM	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Operating ratio	1.50	1.43	1.16	1.10	1.03	1.04	1.01	0.99	0.97	0.94	0.92

5.37 The loan contract will require that the borrower, through the executing agency and in coordination with the other transit carriers, follow a fare policy that will generate sufficient operating income to cover all or most of the CPTM's operating costs

before depreciation of the revaluated fixed assets, in light of: (i) the indicative levels of the operating ratio in the preceding table; (ii) the operating indices mentioned in paragraph 3.30 and attached as Annex III-3; and (iii) the compensation for passengers entitled to ride free. The ratios may be periodically revised by mutual agreement between the Bank, the borrower, and the executing agency.

(iv) Net income

- 5.38 Net income will be negative in every year of the projection, but will gradually and fluctuatingly increase from an estimated loss of up to US\$146 million in 1994 to at least US\$98 million in 1998, for an average of US\$113 million, which corresponds approximately to the amount of the annual depreciation.

(v) Source and application of funds statement

- 5.39 Internal cash generation will decline gradually during the period 1994-1999 from minus US\$55 million in 1994 to minus US\$3 million in 1999. From 2000 onward it will amount to the equivalent of US\$57 million over four years (2000-2003). Internal cash generation includes as funds of the CPTM the compensation that the SSP must provide to cover the income not collected from riders entitled to free rides, which will add up to US\$521 million over the 10 years of the projection. The cash deficits remaining after such compensation during the period from 1994 to 1999 will require the provision by the SSP of US\$117 million in supplementary resources. The SSP will also have to finance all the works, estimated at US\$1,074,000,000 over the projection period. The resources applied to those works include the financing from the IDB and the IBRD and the respective counterpart contributions (cofinancing equivalent), channeled to the CPTM as capital contributions. The loan contract will stipulate that the borrower must provide the project funds (financing and counterpart contribution) and the amounts required to finance the aforementioned compensations as a contribution to the capital of the CPTM, during the life of the loan contract.

(vi) Balance sheets

- 5.40 The year-end 1993 net worth of the CPTM, the equivalent of US\$2,750,000,000, underestimated fixed assets, which had not yet been revalued. At the end of 2003, its net worth will have risen to US\$2,773,000,000 with US\$3,915,000,000 in capital contributions, and a cumulative reduction of US\$1,143,000,000, largely from depreciation of assets in service, inasmuch as the fares will only begin to cover part of depreciation in the year 2000.

(vii) Conclusions

- 5.41 The analysis conducted shows that the two physical investment subprojects will contribute to an improvement of the general

financial situation of the CPTM and that, together with the other investments and activities to be carried out during the project execution period, the CPTM will yield sufficient internal cash generation to finance its operating costs before depreciation, without requiring any fare subsidies, and will begin to cover part of depreciation starting in the year 2000.

C. Institutional feasibility

- 5.42 The borrower and executing agency are taking appropriate steps to attain the institutional targets for the restructuring, modernization, and improvement of the existing urban rail services under the integrated transit program. The CPTM, through the execution of its merger and expansion plans, has the institutional capacity to improve the productivity and efficiency of the services for which it is responsible and to expand them, and that it will administer the project resources properly.

D. Economic feasibility

- 5.43 The principal impact of the project quantified in monetary terms consists of a reduction in the net travel time of riders and a reduction in operating costs of the motor buses replaced by rail transit. Other monetarily quantifiable effects of less weight in the overall calculation are a reduction in public sector expenses for road administration and maintenance thanks to the withdrawal of those motor buses from circulation. There is also the private benefit of reduced costs of operating private vehicles resulting from the reduction in the number of buses on the thoroughfares directly affected by the project and a reduction in the costs generated by traffic accidents. The benefits of accident reduction are relatively minor because a relatively safe means of transportation - buses - is being replaced by another even safer one - trains.
- 5.44 Costs include capital expenditures (civil works, installations, and equipment) and all additional expenditures incurred for operation of the project trains. Also included are the costs of mitigating the adverse environmental impact of the project during its implementation.
- 5.45 The basic "without project" situation includes improvements at the planning or execution stage which will become operational before the completion of the project works (see paragraphs 1.22 and 1.23): (a) implementation (already begun) of a lane reserved for buses on the Itapecerica highway; (b) improvements on the tracks of the CPTM's East Line (the key stages are to be completed by the end of 1994) and completion (also by the end of 1994) of the six-kilometer extension of METRÔ Line 2 to Guaianazes; (c) a 3.5-kilometer extension of METRÔ Line 1 to Tucuruvi, to the north (also by the end of 1994); (d) construction of nine kilometers of METRÔ Line 4 from Vila Sônia to Paulista; (e) works to interconnect the rail systems

in the area of Luz Station to allow transfers between METRÔ and CPTM trains; and (f) completion of the remaining sections of METRÔ Line 3 to link the Vila Madalena and Oratório stations.

5.46 The analysis follows the sequence of the execution of works and alternative solutions. The first subproject considered is improvement of the South Line, for which there is no alternative but the *status quo*, which implies increasing deterioration of the conditions for bus and car traffic on Avenida Marginal do Pinheiros, which already has special bus lanes. The cost of this subproject is relatively low, since it consists of the construction of seven new stations, improvements in equipment and track, and the procurement of new trains. In addition, it has the shortest execution time, offers riders the widest choice of routes and connections, and carries the largest number of riders. This subproject component is considered as the first step in the series of improvements in the rail system.

5.47 The table of profitability indicators that follows shows the economic internal rate return for improving the South Line (21 percent) and the net present value discounted at 12 percent (US\$123 million), indicating that it is economically feasible. All the following alternatives therefore include the improvement of this line in the reference situation.

Profitability Indicators

Subproject or Alternative	EIRR (%)	NPV (US\$ millions)	Sensitivity: EIRR		
			+10% costs	-10% benefits	+10% C & -10% B
Improvement of South Line*	20.8	122.7	18.0	17.7	15.0
Bus lanes <sup>1</sup> (Av. C. Caldeira Filho)	14.5	15.6	11.9	11.7	9.1
Capão Redondo-Largo Treze* Line (first section, Line 5)	15.4	102.6	13.8	13.7	12.1
Largo Treze-Embuçu Line** (second section, Line 5)	15.3	263.8	13.9	13.5	12.2

- <sup>1</sup> Alternative to the first section of the new line from Capão Redondo to Embuçu.  
 \* Component of the project.  
 \*\* Future extension.

5.48 Assuming the inclusion of the South Line improvement subproject and the bus lanes being set up on Avenida Itapecerica da Serra, the following alternatives were considered: (1) implementation of bus lanes on Avenida Carlos Caldeira Filho; and (2) the METRÔ line from Capão Redondo to Largo Treze, the first section of METRÔ Line 5 (Avenida Caldeira Filho runs along the Capão Redondo-Largo Treze Line in the section west of the Pinheiros River).



5.49 The profitability indicator table also shows that the Capão Redondo-Largo Treze line has a higher EIRR than the bus lanes on Avenida Caldeira Filho (15.4 percent versus 14.5 percent), and its NPV discounted at 12 percent is six times higher (US\$103 million versus US\$16 million). The impact of the bus lanes on Avenida Caldeira Filho is lessened by the presence of other bus lanes on Avenida Itapecerica, which is nearby and is included in the baseline situation in all the simulations.

5.50 Starting METRÔ Line 5 at Capão Redondo is essential because no space is available for maintenance at the future Embuaçu station at the other end of the route. It was also verified whether a second section was also economically feasible. The profitability indicator table shows that it is, with an EIRR of 15 percent and a NPV of US\$264 million.

1. Sensitivity analysis

5.51 The profitability indicator table shows that the two project subprojects and the future extension of Line 5 from Largo Treze to Embuaçu remain feasible with a 10 percent increase of project costs or a 10 percent reduction of its benefits, and even when such an increase in costs is combined with that reduction in benefits.

2. Benefits not quantified in monetary terms

5.52 The project will have a number of positive effects that cannot be reliably estimated for use in EIRR and NPV calculations. These effects include a reduction in air and noise pollution and improved comfort, punctuality, and other project features. These factors are not included in the calculations on the economic feasibility of the project.

5.53 The environmental studies determined that the noise level would be reduced from 3 to 1 db(A) in certain corridors which will still be used by buses, but less heavily. However, the noise level is expected to rise from 1 to 2 db(A) around the new stations. The predominant effect is a reduction in magnitude and in the number of persons affected.

5.54 Pollution by nitric oxide, sulfur oxide, and particulates will be reduced by 25-35 percent thanks to the reduction in the number of buses in the João Dias-Estrada Itapecerica corridor and by five to 18 percent in other areas. This is a significant impact.

5.55 Though noise and pollution reduction give the project additional justification, no monetary value can be assigned to them, since there is no "market" for the reduction of these pollutants or noise levels that can be used to do so. There are a variety of techniques for estimating the willingness to pay for benefits when there are no markets, but in the circumstances of the project none of them are reliable enough to justify using them to assign

monetary values to the benefits. However, these benefits reinforce the demonstrated profitability based on the quantified benefits.

### 3. Distributional impact

#### a. Distributional impact coefficient

5.56 The estimated distributional impact coefficient of the project is 0.53, as shown in the table in paragraph 5.65 and following the criteria for computation established for the Seventh Replenishment. The project will therefore mostly benefit low-income groups. This coefficient applies to all the project benefits and investments.

5.57 The poverty line calculated by the Bank was a monthly income of US\$120.58 in 1993. Adjusted to the date of the survey conducted by METRÔ on urban income and travel in the area, the figure is US\$95.90 or US\$406.62 per family, the equivalent of 9.83 monthly minimum wages. Low-income groups account for 56.2 percent of trips on public transportation in the direct area of influence of the project.

5.58 The main benefits of the project accruing to the private sector are described below, with a breakdown of those accruing to low-income groups, the remainder being attributed to other social segments.

##### (i) Reduction in bus system operating costs

5.59 Except during exceptional periods, the costs of operating the bus system have been entirely covered by fares, and 56 percent of ridership is from low-income groups.

##### (ii) Reduction in private transportation operating costs

5.60 Low-income groups use 28.6 percent of private means of transportation, for the most part poorly maintained old vehicles used by street vendors, construction workers, and other self-employed individuals.

##### (iii) Time savings in public transportation

5.61 Public transportation riders, 56 percent of whom are from low-income groups, will benefit from savings in time.

##### (iv) Reduction in the cost of accidents

5.62 Forty-six percent of the benefits from a reduction in the cost of accidents will accrue to low-income groups.

5.63 Distributional impact was also calculated according to the criteria governing operations under the Eighth Replenishment. The main project beneficiaries are public transportation users in the direct

area of influence of the project, 62 percent of whom are from low-income groups. Under these criteria the project thus also qualifies as a poverty-related investment.

5.64 The direct area of influence of the project is the poorest geographical area of the Municipality of São Paulo. The area west of the Pinheiros River has the highest poverty in the metropolitan area, with some 800 *favelas* and their 420,000 residents. That is half the total number of *favelas* and 40 percent of their total number of residents in São Paulo Municipality.

5.65 The distributional impact calculations according to the Eighth Replenishment criteria can be found in the technical files of the project. Those governing this operation are summarized below.

Calculation of Distributional Impact of the Project (Capão Redondo-Largo Treze South Line)					
Category	Total	Private Sector			Public Sector
		Low-Income	Other	Subtotal	
Costs	885.58	209.56	166.57	376.13	509.45
Investment	509.45	0.00	0.00	0.00	509.45
Operation	376.13	209.56	166.57	376.13	0.00
Benefits	1,377.97	720.73	617.82	1,338.55	39.42
Cost reduction, bus operation	461.61	257.18	204.43	461.61	0.00
Cost reduction, individual vehicle operation	81.35	23.29	58.06	81.35	0.00
Time savings	764.41	425.88	338.53	764.41	0.00
Reduction, bus administration and road maintenance	39.42	0.00	0.00	0.00	39.42
Reduction, accidents	31.18	14.38	16.80	31.18	0.00
Benefit-cost	492.39	511.17	451.25	962.42	-470.03
Low-income benefits/total private benefits = 511.17/962.42 = 0.53					

Source: STM, "Avaliação do Impacto Distributivo", April 1994, page 19.

E. Risks

- 5.66 The CPTM is a recently established company which is now in consolidation and has two metropolitan rail systems to administer. This situation may give rise to delays in project execution, but such risks will be reduced by technical and administrative consulting services to be provided during project execution.
- 5.67 The region in which the investment subprojects under the project are located is not subject to unusual natural phenomena that could threaten the stability of the works. There is no history of earthquakes of destructive magnitude or of significant flooding, though electric storms and high winds do occur at certain times of the year. The designs and specifications of the energy transmission, signaling, and communication systems include the necessary devices to protect the important components properly against any discharges of atmospheric electricity. Similarly, the design of the structure for the bridge-station across the Pinheiros River will be submitted to dynamic and aerodynamic analysis to test its behavior under high-intensity winds prior to its approval.

PROGRAMA DE TRENES METROPOLITANOS DE SAO PAULO  
CRONOGRAMA DE LICITACIONES Y CONTRATACION

ANEXO III - 1

Código	CATEGORIAS Descripción	US\$/mil	1994				1995				1996				1997				1998			
			1er.	2da.	3er.	4ta.	1er.	2da.	3er.	4ta.	1er.	2da.	3er.	4ta.	1er.	2da.	3er.	4ta.	1er.	2da.	3er.	4ta.
<b>1.</b>	<b>INGENIERIA Y ADMINISTRACION</b>	<b>24,100</b>																				
1.1	Estudios Técnicos	1,400																				
1.2	Gereciamento y Apoyo a la U.F.	7,100																				
1.3	Supervisión de Obras y Equipos	15,000																				
1.4	Acessoramento para implantação del SIM	600																				
<b>2.</b>	<b>COSTOS DIRECTOS</b>	<b>514,130</b>																				
2.1	Dinamización de la Línea Sur	154,710																				
2.1.1	Obras Civiles	67,110																				
2.1.1.1	Adecuación del Patio Pdte. Altino	10,370																				
2.1.1.2	Estaciones E. Matoso y Cidade Jardim	9,760																				
2.1.1.3	Estaciones Berrini y Vila Olímpia	8,670																				
2.1.1.4	Estaciones Morumbi y Granja Julieta	8,150																				
2.1.1.5	Estación y Terminal Socorro	8,740																				
2.1.1.6	Cercado del Derecho de Vía	7,000																				
2.1.1.7	Vía permanente - suministro de rieles	1,760																				
2.1.1.8	Vía permanente - instal. y otros materiales	12,660																				
2.1.2	Sistemas	33,000																				
2.1.2.1	Alimentación Eléctrica - Subestaciones	9,780																				
2.1.2.2	Alimentación Eléctrica - Adecuación red aérea	2,360																				
2.1.2.3	Adecuación Señalización, Control y Telecom.	17,500																				
2.1.2.4	Escaleras mecánicas y Elevadores	3,360																				
2.1.3	Material Rodante	54,600																				
2.2	Linha Capao Redondo/Largo Treze	354,420																				
2.2.1	Obras Civiles	143,970																				
2.2.1.1	Tramo elevado I, estación y Patio C. Redondo	17,700																				
	a) Obras brutas	16,650																				
	b) Acabados arquitectónicos	1,050																				
2.2.1.2	Tramo elevado II y estación Campo Limpo	15,470																				
	a) Obras brutas	14,530																				
	b) Acabados arquitectónicos	940																				
2.2.1.3	Tramo elevado III y estación Vila das Belezas	17,480																				
	a) Obras brutas	16,460																				
	b) Acabados arquitectónicos	1,020																				
2.2.1.4	Tramo elev./nivel IV, Est. G.Gronchi y Patio G.Caloi	17,050																				
	a) Obras brutas	15,980																				
	b) Acabados arquitectónicos	1,070																				
2.2.1.5	Tramo elevado V y estación Santo Amaro	18,220																				
	a) Obras brutas	16,490																				
	b) Acabados arquitectónicos	1,730																				
2.2.1.6	Tramo subterráneo VI, Estac. y Termin. Lgo.Treze	33,970																				
	a) Obras brutas	31,840																				
	b) Acabados arquitectónicos	2,130																				
2.2.1.7	Comunicación visual en vías, patios y estaciones	250																				
2.2.1.8	Vía permanente - adquisición de rieles	1,600																				
2.2.1.9	Vía permanente - instal. y otros materiales	14,300																				
2.2.1.10	Terminal Capao Redondo	2,370																				
2.2.1.11	Terminal Campo Limpo	1,530																				
2.2.1.12	Terminal Giovanni Gronchi	930																				
2.2.1.13	Terminal Santo Amaro	3,100																				
2.2.2	Sistemas	98,950																				
2.2.2.1	Alimentación Eléctrica - Subestaciones	23,360																				
2.2.2.2	Alimentación Eléctrica - Línea de contacto	18,980																				
2.2.2.3	Sistemas de Señalización, Control y Telecom.	36,920																				
2.2.2.4	Patios - Equipos y Sistemas de Mantenimiento	7,800																				
2.2.2.5	Escaleras mecánicas y Elevadores	9,750																				
2.2.2.6	Equipos y sistemas de control de boletaje	1,660																				
2.2.2.7	Sistemas auxiliares - Bombas y Eq. de incendios	480																				
2.2.3	Material Rodante	111,500																				
2.3	Adecuación vías de acceso a estaciones y termin	5,000																				
<b>3.</b>	<b>COSTOS CONCURRENTES</b>	<b>48,750</b>																				
3.1	Expropiaciones y relocalización de población	44,600																				
3.2	Estudios especiales	4,150																				
3.2.1	Estrategias de privatización	350																				
3.2.2	Evaluación de activos	300																				
3.2.3	Estudios de factibilidad 2a. Etapa - Línea 5	1,800																				
3.2.4	Apoyo a la gestión ambiental	1,700																				

MA DE TRENES METROPOLITANOS DE SÃO PAULO  
RAMA DE DESEMBOLSOS

CATEGORIAS	TOTAL	1995			1996			1997			1998			TOTALES GENERALES		
Descripción	US\$/mil	BANCO	GESP	TOTAL	BANCO	GESP	TOTAL	BANCO	GESP	TOTAL	BANCO	GESP	TOTAL	BANCO	GESP	TOTAL
<b>INGENIERIA Y ADMINISTRACION</b>	<b>23,500</b>	<b>5,046</b>	<b>666</b>	<b>5,712</b>	<b>7,123</b>	<b>1,375</b>	<b>8,498</b>	<b>5,879</b>	<b>399</b>	<b>6,188</b>	<b>2,947</b>	<b>155</b>	<b>3,102</b>	<b>20,995</b>	<b>2,505</b>	<b>23,500</b>
Estudios Técnicos	1,400		400	400		1,000	1,000								1,400	1,400
Entrenamiento y Apoyo a la U.E.	7,100	1,484	78	1,562	2,563	135	2,698	1,889	99	1,988	809	43	852	6,745	355	7,100
Supervisión de Obras y Equipos	15,000	3,563	188	3,750	4,560	240	4,800	3,990	210	4,200	2,138	113	2,250	14,250	750	15,000
<b>COSTOS DIRECTOS</b>	<b>514,130</b>	<b>53,304</b>	<b>28,939</b>	<b>82,244</b>	<b>135,849</b>	<b>54,160</b>	<b>190,009</b>	<b>127,542</b>	<b>83,933</b>	<b>211,475</b>	<b>22,397</b>	<b>8,005</b>	<b>30,403</b>	<b>339,093</b>	<b>175,038</b>	<b>514,130</b>
Manutención de la Línea Sur	154,710	23,815	3,455	27,270	57,234	8,509	65,743	51,226	10,471	61,698				132,275	22,436	154,710
Obras Civiles	67,110	12,141	639	12,780	34,735	1,828	36,563	16,879	888	17,767				63,755	3,356	67,110
Adecuación del Patio Pdte. Altino	10,370	2,955	156	3,111	6,896	363	7,259							9,852	519	10,370
Subestaciones E. Matoso y Cidade Jardim	9,760	2,782	146	2,928	5,563	293	5,856	927	49	976				9,272	488	9,760
Subestaciones Berrini y Vilha Olímpia	8,670	2,471	130	2,601	4,942	260	5,202	824	43	867				8,237	434	8,670
Subestaciones Morumbi y Granja Julieta	8,150	3,097	163	3,260	3,097	163	3,260	1,549	82	1,630				7,743	408	8,150
Subestación y Terminal Socorro	8,740				4,982	262	5,244	3,321	175	3,496				8,303	437	8,740
Almacén del Derecho de Vía	7,000							6,650	350	7,000				6,650	350	7,000
Mano de obra permanente - suministro de rieles	1,760	836	44	880	836	44	880							1,672	88	1,760
Mano de obra permanente - instal. y otros materiales	12,660				8,419	443	8,862	3,608	190	3,798				12,027	633	12,660
Equipos	33,000	2,392	1,178	3,570	8,576	4,224	12,800	11,142	5,488	16,631				22,110	10,890	33,000
Alimentación Eléctrica - Subestaciones	9,780				2,293	1,130	3,423	4,259	2,098	6,357				6,553	3,227	9,780
Alimentación Eléctrica - Adecuación red aérea	2,360							1,581	779	2,360				1,581	779	2,360
Adecuación Señalización, Control y Telecom.	17,500	2,392	1,178	3,570	5,382	2,651	8,033	3,951	1,946	5,898				11,725	5,775	17,500
Escaleras mecánicas y Elevadores	3,360				900	444	1,344	1,351	665	2,016				2,251	1,109	3,360
Material Rodante	54,600	9,282	1,638	10,920	13,923	2,457	16,380	23,205	4,095	27,300				46,410	8,190	54,600

<b>Estación Campo Limpo/Santo Amaro</b>	<b>354,420</b>	<b>29,489</b>	<b>25,484</b>	<b>54,974</b>	<b>77,491</b>	<b>45,276</b>	<b>122,767</b>	<b>73,691</b>	<b>72,586</b>	<b>146,278</b>	<b>22,397</b>	<b>8,005</b>	<b>30,403</b>	<b>203,068</b>	<b>151,352</b>	<b>354,420</b>
Obras Civiles	143,970	25,779	1,357	27,136	59,879	3,132	63,031	44,235	2,328	46,564	6,878	362	7,241	136,772	7,199	143,970
Estación I, Estación y Patio C. Redondo (1.92 km)	17,700	4,745	250	4,995	10,139	534	10,673	1,931	102	2,033				16,815	885	17,700
Obras brutas	16,650	4,745	250	4,995	9,491	500	9,990	1,582	83	1,665				15,818	833	16,650
Acabados arquitectónicos	1,050				648	34	683	349	18	368				998	53	1,050
Estación II y Estación Campo Limpo (1.71 km)	15,470	4,141	218	4,359	10,198	537	10,735	357	19	376				14,697	774	15,470
Obras brutas	14,530	4,141	218	4,359	9,662	509	10,171							13,804	727	14,530
Acabados arquitectónicos	940				536	28	564	357	19	376				893	47	940
Estación III y Estación Vilha das Belezas (1.70 km)	17,480	4,691	247	4,938	9,964	524	10,488	1,951	103	2,054				16,606	874	17,480
Obras brutas	16,460	4,691	247	4,938	9,382	494	9,876	1,564	82	1,646				15,637	823	16,460
Acabados arquitectónicos	1,020				581	31	612	388	20	408				969	51	1,020
Estación IV y Estación G.Gronchi (2.09 km)	17,050	4,554	240	4,794	6,377	336	6,713	5,266	277	5,543				16,198	853	17,050
Obras brutas	15,980	4,554	240	4,794	6,072	320	6,392	4,554	240	4,794				15,181	799	15,980
Acabados arquitectónicos	1,070				305	16	321	712	37	749				1,017	54	1,070
Estación V y Estación Santo Amaro (1.16 km)	18,220	2,350	124	2,474	6,266	330	6,596	8,282	436	8,718	411	22	433	17,309	911	18,220
Obras brutas	16,490	2,350	124	2,474	6,266	330	6,596	7,049	371	7,421				15,666	825	16,490
Acabados arquitectónicos	1,730							1,233	65	1,298	411	22	433	1,644	87	1,730
Estación VI, Estac. y Termin. Lgo.Treze (0.84 km)	33,970	4,537	239	4,776	12,099	637	12,736	10,289	542	10,830	5,347	281	5,628	32,272	1,699	33,970
Obras brutas	31,840	4,537	239	4,776	12,099	637	12,736	9,074	478	9,552	4,537	239	4,776	30,248	1,592	31,840
Acabados arquitectónicos	2,130							1,214	64	1,278	809	43	852	2,024	107	2,130
Comunicación visual en vías, patios y estaciones	250										238	13	250	238	13	250
Vía permanente – adquisición de rieles	1,600	760	40	800	760	40	800							1,520	80	1,600
Vía permanente – instalac. y otros materiales	14,300				4,076	215	4,290	9,510	501	10,010				13,585	715	14,300
Terminal Capao Redondo	2,370							2,252	119	2,370				2,252	119	2,370
Terminal Campo Limpo	1,530							1,454	77	1,530				1,454	77	1,530
Terminal Giovanni Gronchi	930							884	47	930				884	47	930
Terminal Santo Amaro	3,100							2,062	109	2,170	884	47	930	2,945	155	3,100
<b>Equipos</b>	<b>98,950</b>	<b>3,710</b>	<b>1,828</b>	<b>5,538</b>	<b>17,612</b>	<b>8,674</b>	<b>26,286</b>	<b>29,456</b>	<b>14,508</b>	<b>43,964</b>	<b>15,519</b>	<b>7,643</b>	<b>23,162</b>	<b>66,297</b>	<b>32,654</b>	<b>98,950</b>
Instalación Eléctrica – Subestaciones	23,360				6,260	3,084	9,344	9,391	4,625	14,016				15,651	7,709	23,360
Instalación Eléctrica – Línea de contacto	18,980							8,266	4,071	12,337	4,451	2,192	6,643	12,717	6,263	18,980
Equipos de Señalización, Control y Telecom.	36,920	3,710	1,828	5,538	8,658	4,264	12,922	7,421	3,655	11,076	4,947	2,437	7,384	24,736	12,184	36,920
Equipos – Equipos y Sistemas de Mantenimiento	7,800							1,829	901	2,730	3,397	1,673	5,070	5,226	2,574	7,800
Escaleras mecánicas y Elevadores	9,750				2,613	1,287	3,900	1,960	965	2,925	1,960	965	2,925	6,533	3,218	9,750
Equipos y sistemas de control de boletaje	1,660							445	219	664	667	329	996	1,112	548	1,660
Equipos auxiliares – Bombas y Eq. de incendios	480				80	40	120	145	71	216	96	48	144	322	158	480
<b>Materiales Rodante</b>	<b>111,500</b>		<b>22,300</b>	<b>22,300</b>		<b>33,450</b>	<b>33,450</b>		<b>55,750</b>	<b>55,750</b>					<b>111,500</b>	<b>111,500</b>
<b>Construcción vías de acceso a estaciones y terminales</b>	<b>5,000</b>				<b>1,125</b>	<b>375</b>	<b>1,500</b>	<b>2,625</b>	<b>875</b>	<b>3,500</b>				<b>3,750</b>	<b>1,250</b>	<b>5,000</b>

<b>COSTOS CONCURRENTES</b>	<b>48,750</b>	<b>255</b>	<b>44,900</b>	<b>45,155</b>	<b>800</b>	<b>635</b>	<b>1,435</b>	<b>945</b>	<b>815</b>	<b>1,760</b>		<b>400</b>	<b>400</b>	<b>2,000</b>	<b>46,750</b>	<b>48,750</b>
expropiaciones y relocalización de población	44,600		44,600	44,600											44,600	44,600
estudios especiales	4,150	255	300	555	800	635	1,435	945	815	1,760		400	400	2,000	2,150	4,150
estrategías de privatización	350	105		105	245		245							350		350
evaluación de activos	300	150		150	150		150							300		300
estudios de factibilidad 2a. Etapa -- Línea 5	1,800				405	135	540	945	315	1,260				1,350	450	1,800
apoyo a la gestión ambiental	1,700		300	300		500	500		500	500		400	400		1,700	1,700
<b>UB--TOTAL</b>	<b>586,380</b>	<b>58,605</b>	<b>74,505</b>	<b>133,111</b>	<b>143,772</b>	<b>56,170</b>	<b>199,942</b>	<b>134,366</b>	<b>85,057</b>	<b>219,423</b>	<b>25,344</b>	<b>8,561</b>	<b>33,905</b>	<b>362,088</b>	<b>224,293</b>	<b>586,380</b>



Indicadores de Desempeño de CPTM que Serán Desarrollados Como Metas  
 Sur y Capão Redondo—Largo Treze

Indicador	Definición	1993
Disponibilidad de Trenes	(No. de trenes/No. de trenes disponibles para los servicios)	70%
MKBF	Km en promedio entre fallas del material rodante	841 km
Regularidad	Viajes programados/Viajes realizados	95%
Productividad/Empleado	Pasajeros km transportados/empleado por año	n.d.
Evasión de Ingresos	Porcentaje de pasajeros que ingresan fuera de los equipos de control	26%
Costo/Pasajero km	Costo de explotación antes de la depreciación/no. pasajeros km	n.d.
Coeficiente de Explotación	Gastos de explotación antes de depreciación dividido por ingresos de explotación incluyendo compensación por gratuidades legales	150%
Indice de Confort	Porcentaje de pasajeros en vehículos con más de 6.5 persons/m <sup>2</sup> para pasaj. en pie en horarios críticos	n.d.

Los indicadores son preliminares y se encuentran bajo examen con respecto a la factibilidad de medirlos y las suposiciones en que se basan. Las metas serán establecidas y revisadas periódicamente en común acuerdo entre el Banco y el Prestatario.

APENDICE

PROPOSED RESOLUTION

BRAZIL. LOAN /OC TO THE STATE OF SÃO PAULO  
Metropolitan Trains of São Paulo Project

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the State of São Paulo of Brazil, as Borrower, and the Federative Republic of Brazil, as Guarantor, for the purpose of granting the former a financing to cooperate in the execution of a Metropolitan Trains of São Paulo Project. Such financing will be in an amount of up to US\$420,000,000, or its equivalent in other currencies, except that of the Federative Republic of Brazil, which are part of the Ordinary Capital resources of the Bank, and it will be subject to the "Special Contractual Conditions" and the "Terms and Financial Conditions" of the Executive Summary of the Loan Proposal.