社会開発協力部報告書

No. 7

BARRANQUILLA

THE FEASIBILITY STUDY ON THE URBAN DEVELOPMENT OF THE CENTRAL DISTRICT OF BARRANQUILLA

THE REPUBLIC OF COLOMBIA

SUMMARY OF

FINAL REPORT

FEBRUARY 1988

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

It is with great pleasure that I present this Feasibility Study on the Urban Development of the Central District of Barranquilla to the Government of the Republic of Colombia.

This report embodies the result of a study which was carried out in Barranquilla from July 1986 to November 1987 by a Japanese study team commissioned by the Japan Internatinal Cooperation Agency following the request of the Government of the Republic of Colombia to the Government of Japan.

The study team, headed by Mr. Takeo Sato, and organized by Chodai Co., Ltd. and Yachiyo Engineering Co., Ltd. has a series of close discussions with the officials concerned of the Governmet of the Republic of Colombia, conducted a wide range of studies, and prepared the report.

I hope that this report will be useful as a basic reference for development of the region.

I wish to express my deep appreciation to the officials concerned of the Government of Colombia for their close cooperation extended to the study team.

February, 1988

Kensuke Yanagiya
President
Japan International Cooperation Agency

THE FEASIBILITY STUDY ON THE URBAN DEVELOPMENT OF THE CENTRAL DISTRICT OF BARRANQUILLA

SUMMARY EDITION

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1. INTRODUCTION

As a conclusion of the Masterplan Study (Comprehensive Urban Transport Study in Brrranquilla Metropolitan Region, JICA, 1985), the importance of the development of the central district has been identified and priority has been given to solve existing urban problems and to revitalize the district as a future region-wide activity center.

In this connection, the Government of Japan through JICA iniciated this study jointly with the Government of Colombia in August, 1986, taking into account the following six major projects as key factors for the development:

1) Construction of the bus terminal
   - Intermunicipal and urban bus terminal with urban bus rerouting
2) Reorganizaiton of the existing public market
3) Provision of urban park replacing Mercado Canal
4) Improvement of Calle 30
   - Widening between the intersections with Circunvalar and with Cra 46
5) Construction of Riverside Bypass
   - Section between the access road to Pumarejo bridge and Via 40
6) Arrangement of infrastructures

The objective of the Study is to investigate the feasibility of the development of the central district of Barranquilla, focusing on the high priority projects listed above. The planned orderly revitalization of the district is the target of this development.

The Main Study Area is the Barranquillita and Boliche area (ca. 150 HA), where a considerable extent of land is left underdeveloped in spite of its favorable location next to the existing activity center. The surrounding area is given consideration as a related Sub-study Area.

The Study was carried out by JICA in close coordination with the Government of Colombia through the Municipality of Barranquilla and with other agencies in Colombia.

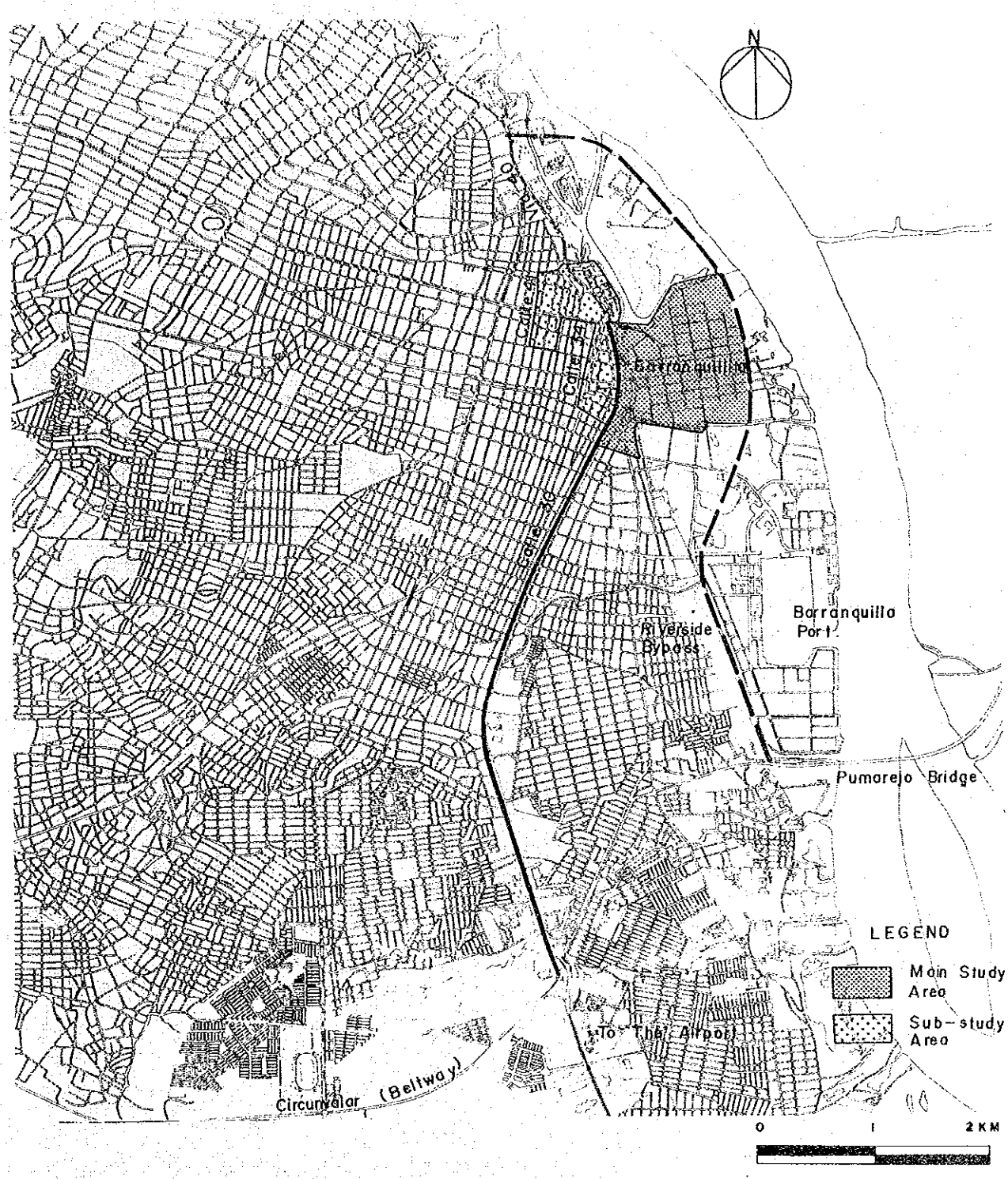

FIG. 1 STUDY AREA

2. DEVELOPMENT POLICY

Features of Development

The present situation of the central district requires the following planning premises :

1) Economic and industrial development of the city,
2) Upraising of the standard of living for social safety, and
3) Institutional arrangement for orderly planned development

The development should have dual aims : the solution of exising urban problems and the reinforcement of urbvan fuctions as a regional center. The selected Barranquillita and Boliche area is suitable for a project to intergrate these dual requirements for development. In this connection, however, some new development systems are to be introduced to supplement the defficiency of existing systems.

Development Target

The primary target of the development is to regenerate and create a region-wide major activity center with high amenities and envirionmental quality.

Overall Development Policy

To secure the conditions of the development, the following are the basic development policy :

1) Restructuring of the central district in terms of access to and from the Main Study Area
2) Infrastructure development in terms of land preparation and stormwater drainage

On these bases, the major development policy is stated as follows :

3) Reasonable mixed land use to reorganize and vitalize the area
4) Functional transport system to improve and support the access
5) Creasion of sound envirionment as an activity center

FIG. 2 PANORAMA OF PRESENT BARRANQUILLITA(1987)

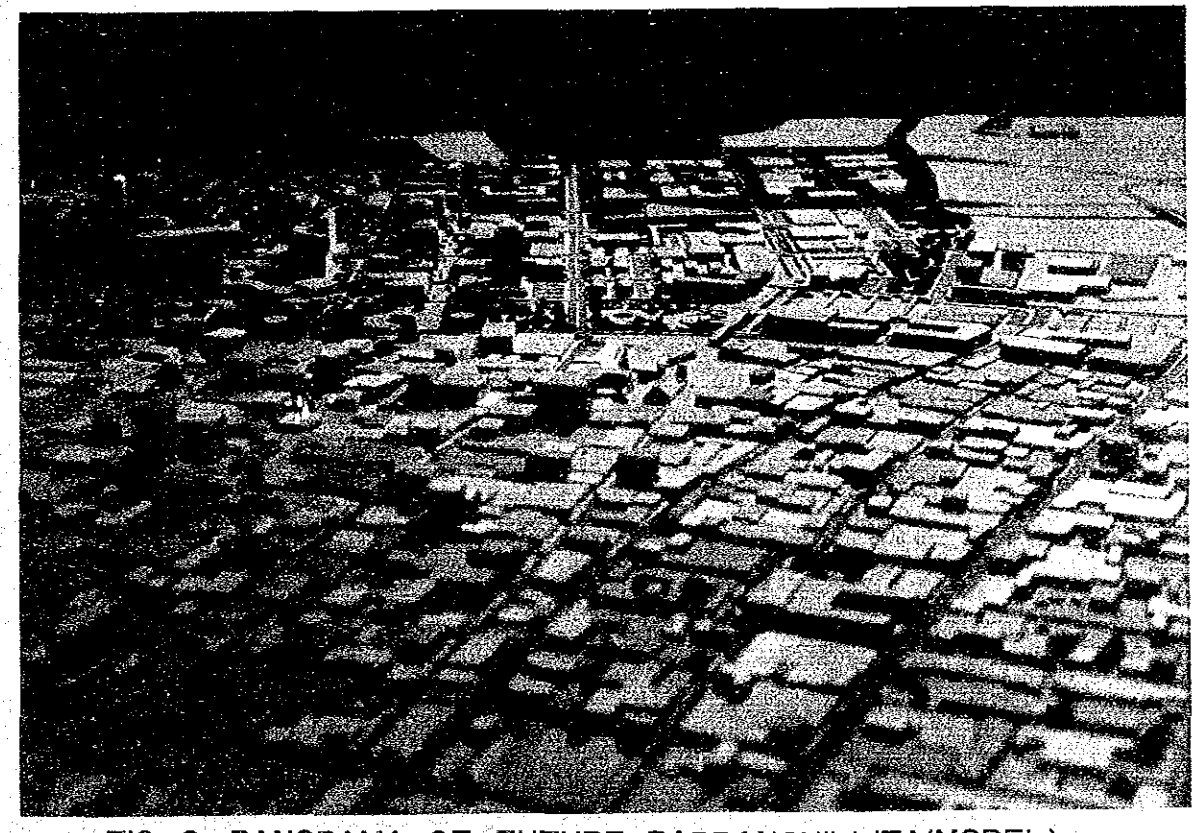

FIG. 3 PANORAMA OF FUTURE BARRANQUILLITA(MODEL)

3. LAND USE PLAN

Land use of the Main Study Area is mixed-use and composed of three types :

1) Existing location with improvement of use ; the block now Philips factory occupies is to be an industrial park.
2) Relocation and improvement of existing use ; the market and commercial facilities including reorganization of street vendors, and micro-industries in the area.
3) Introduction of new use ; business, commercial, residential, park and recreational uses and the bus terminal to vitalize the area.

The configuration of those uses is decided on the basis of the functional relation of each use and of the surrounding land use. As a result, the bus terminal is located at the center, the reorganization type land use in the south part and the new introduction type in the north part of the area.

The framework and the land use area of the development is as follows :

Residential	34.9 HA	20,000 inhabitants
Commercial & Business	28.0	23,600 employees
Bus Terminal	4.4	
Parks and Recreational	17.1	
Sewage Treatment Plant	3.5	
Industrial	27.7	1,800 employees
Road and Street	38.1	
Others	4.4	
TOTAL	158.0	

All of the six major projects in this Study are the key elements of the development and are integrated in this land use plan. The staging of land use realization is as follows : initiates from the reorganization type use in the south part utilizing vacant land, and installation of the bus terminal and the sewage treatment plant ; then, goes to west and north parts filling and changing Mercado Canal into parks and improving Calle 30 to introduce new functions ; finally, reaches the construction of riverside Bypass.

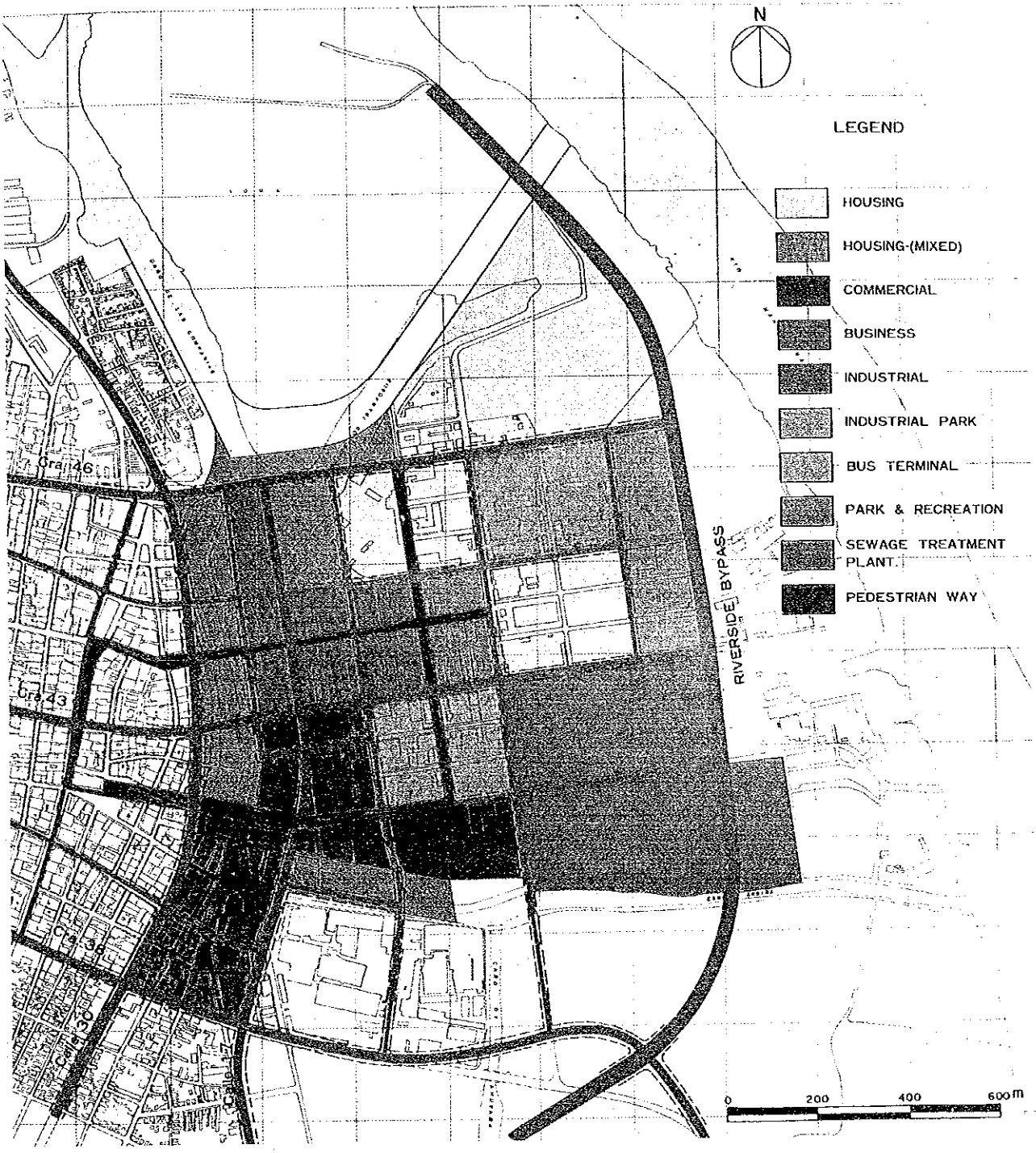

FIG. 4 LAND USE PLAN

4. TRANSPORT DEMAND PROJECTION

Traffic Flow in the Study Area

The estimation result of future traffic flow in and around the Study Area is shown in fig. 3.

The roads and streets where relatively large traffic volume is predicted are Calle 30, Riverside Bypass, Cra 38, Cra 46 and Calle 17. These are identified as a either arterial or semi-arterial in the Study. As for the other streets in Barranquillita, the traffic volume is mostly expected to be less than 10,000 pcu/day.

Traffic Volume on Calle 30 and Riverside Bypass

The traffic volume on Calle 30 varies from about 9,000 to 49,000 puc/day depending on the location. The traffic related to Barranquillita makes up about 10% of the total traffic on Calle 30 at maximu. This indicates that the area to be contributed by the improvement of Calle 30 would extend to the whole metropolitan region.

The traffic volume of Riverside Bypass ranges from 11,000 to 24,000 pcu/day. The traffic related to Barranquillita is counted as about 20% of the total traffic at the meximum section, which shows the importance of Riverside Bypass to the development of Barranquilla. In the case of Riverside Bypass, the left/right turn traffic is relatively small in the intermediate section, compared with those at the both ends.

Pedestrian Flows

A large number of pedestrians are expected on the following streets requiring adequate installation of pedestrian facilities :

1) Calle 28 (walk trips in commercial zones)
2) Cra 42 (walk along commercial zone and to and from the bus terminal)
3) Calle 7 (walk to and from the bus terminal)
4) Cra 44 (walk along commercial and business zones)
5) Cra 45 (walk to and from bus stops)

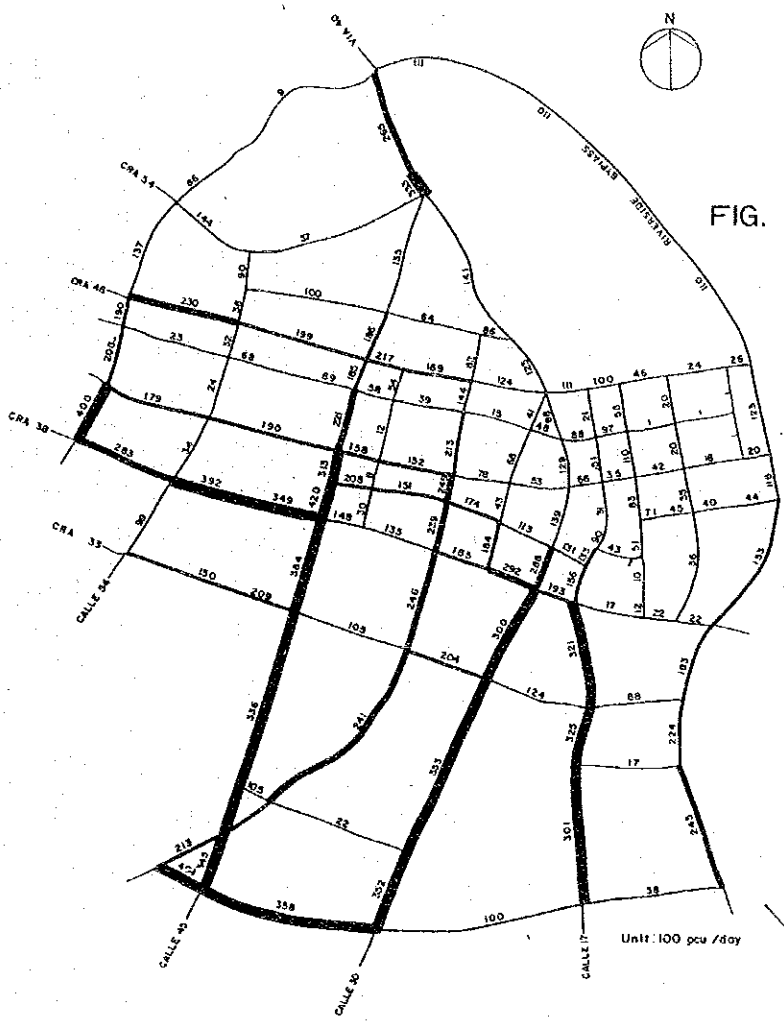

FIG. 5 TRAFFIC FLOW (2000)

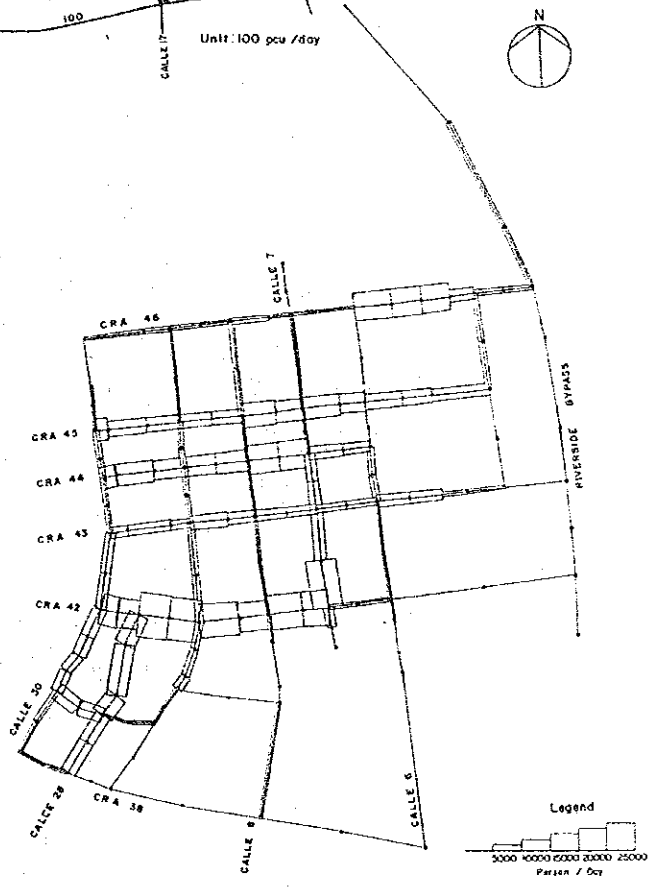

FIG. 6 PEDESTRIAN FLOW (2000)

5. CALLE 30 AND RIVERSIDE BYPASS

General

Calle 30 and Riverside Bypass are major projects of this Study in that they are not only the important access to the central district but the principal transport corridors connecting main traffic generation points in Barranquilla metropolitan area.
The calle 30 project is mainly for improvement of the existing route with some special attention to the part in the Study Area. On the other hand, Riverside Byupass is a new construction along the left bank of the Magdalena river to complete the Circunvalar as a beltway and to serve the Study Area as an arterial.

Calle 30 : Circunvalar - Cra 46 (5.82 km)

The typical cross section has six lanes for vehiclular traffic and the sidewalk width is 4.5 m in the central district and 3.0 m in other areas.

The Section I (between Circumvalar and Cra 21) is merely the improvement by widening within the existing right-of-way.

The Section II (between Cra 21 and Cra 38) is principally to widen the road on to the eastside keeping the westernmost edge of the sidewalk as it is. This measure is to avoid land and building acquision on both sides of the road. An exception is the arrangement at the Modern Football Stadium on the eastside. To maintain the function of the stadium the widening is on to the westside in this part.

The Section III (between Cra 38 and Cra 46) has a wider sidewalk of 4.5 m to correspond with a larger number of pedestrians in the central district. The alignment is altered to pass through existing buildings between Calle 30 and Calle 32. This arrangement is, for one thing, for the better alignment from the traffic engineering viewpoint, and for another, in the hope of acting as a preferable incentive to promote furhter urban renewal actions in the existing central district.

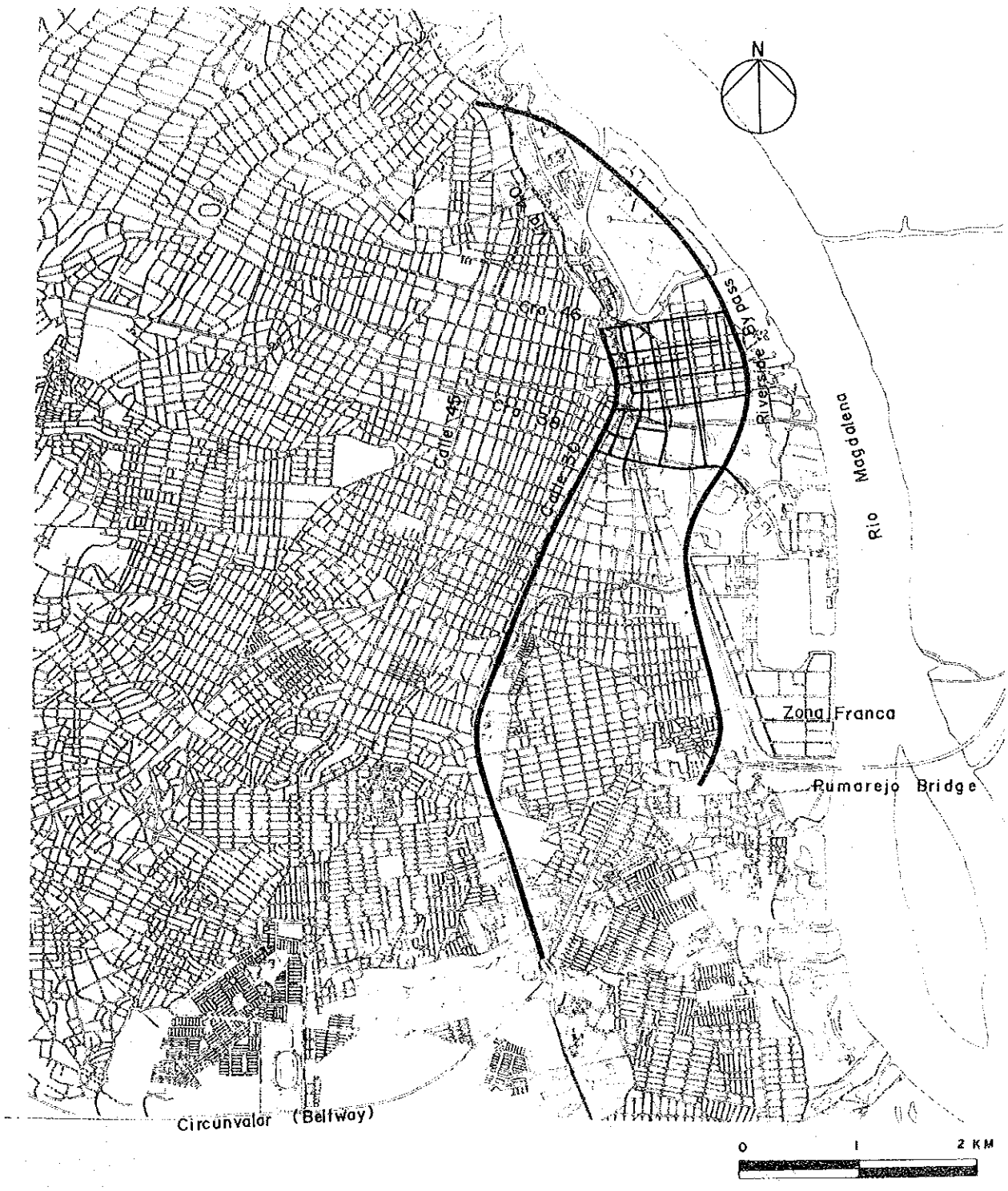

FIG. 7 LOCATION OF RIVERSIDE BYPASS & CALLE30

Riverside Bypass : Access to Pumarejo Bridge - Via 40 (Distance 7.31 km)

The typical cross section has four lanes for vehicular traffic with a 1.0 to 3.0 m wide medium, 1.5 m wide shoulders, and 3.0 m wide sidewalks.

The Section I (between access to Pumarejo Bridge and Cra 38) has an alighment running along the west bank of Ahuyama Canal and soft ground area between the lumberyard and Cra 38.

In this section the road can be a major access to and from the Free Zone (Zona Franca) and the Port which might be an important area for industrial development of Barranquilla.

There is another ideas for the road to pass through the Free Zone and the Port to secure a closer access, but on account of existing difficulties in technical and institutional aspects, the idea is left as a reference plan for the future.

The Section II (between Cra 38 and Cra 46) is an arterial access to and from the Barranquillita and Boliche area development and demarcates the eastern edge of the Main Study Area. The width of the medium is 3.0 m for easier left-turn of traffic at intersections.

The Section III (between Cra 46 and Via 40) is characterized by many canals and soft ground. Compañia Canal is supposed to be a waterway for river transport and the bridge of Riverside Bypass is required to have a clearance of 13.0 m between the high water level and the bottom of the bridge girder. This arrangement is one of the reasons of comparatively high construciton cost of the road in this section.

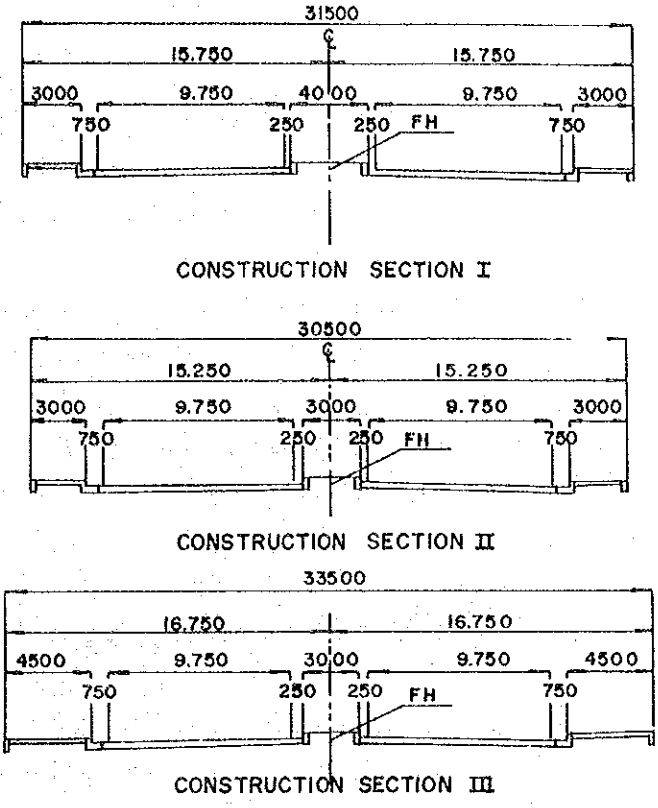

FIG. 8 CALLE 30 TYPICAL CROSS SECTION

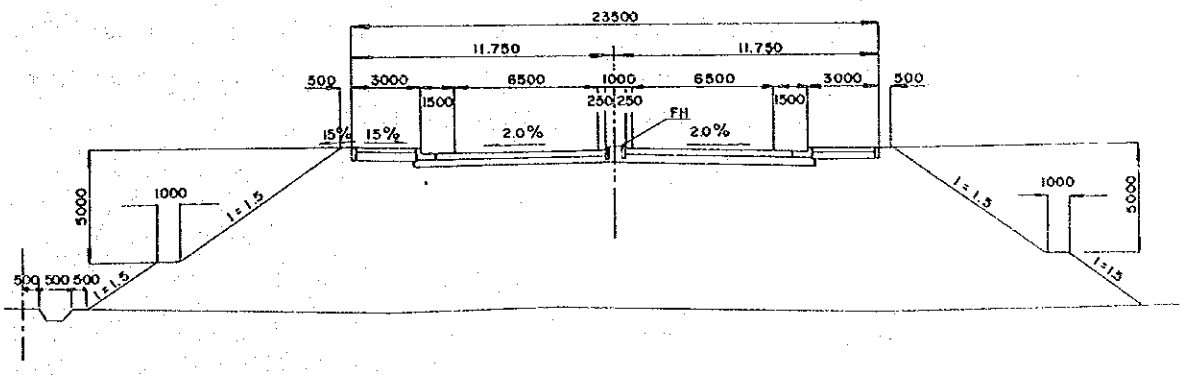

FIG. 9 RIVERSIDE BYPASS TYPICAL CROSS SECTION

6. STREET PLAN

The street network plan in this Study is formulated by modifying the plan proposed in the Masterplan Study so as to make it compatible with the revised land use plan and the placement of major urban facilities.

The streets are classified into arterial, semi-arterial, collector, and pedestrian street by considering their functions and characteristics.

The arterials are Calle 30, Riverside Bypass, Cra 38, and Cra 46. The semi-arterials are Calle 9 and Cra 43, and the pedestrian streets are Cra 42, Cra 44, Calle 7 and Calle 28.

Some characteristics of the street plan are summarized as follows:

1) The street network shows a grid pattern. This is to make the most of the existing street pattern, and for this purpose the alignment is readjusted for Cra 46 and Calle 17.
2) The arterials are the major access to and from the Main Study Area. Calle 30 and Riverside Bypass are for the north-south access, and Cra 38 and Cra 46 for the east-west approach.
3) As to Cra 46, Cra 45, Calle 8 and Calle 6, they are planned as a 4-lane street. This is because these streets constitute a circulation route of urban buses in Barranquillita where better traffic management is required.
4) The exclusive pedestrian streets are installed to facilitate easier flow of padestrians. Cra 42 is especially designed to connect the market area and the bus terminal with the existing cetnral district.

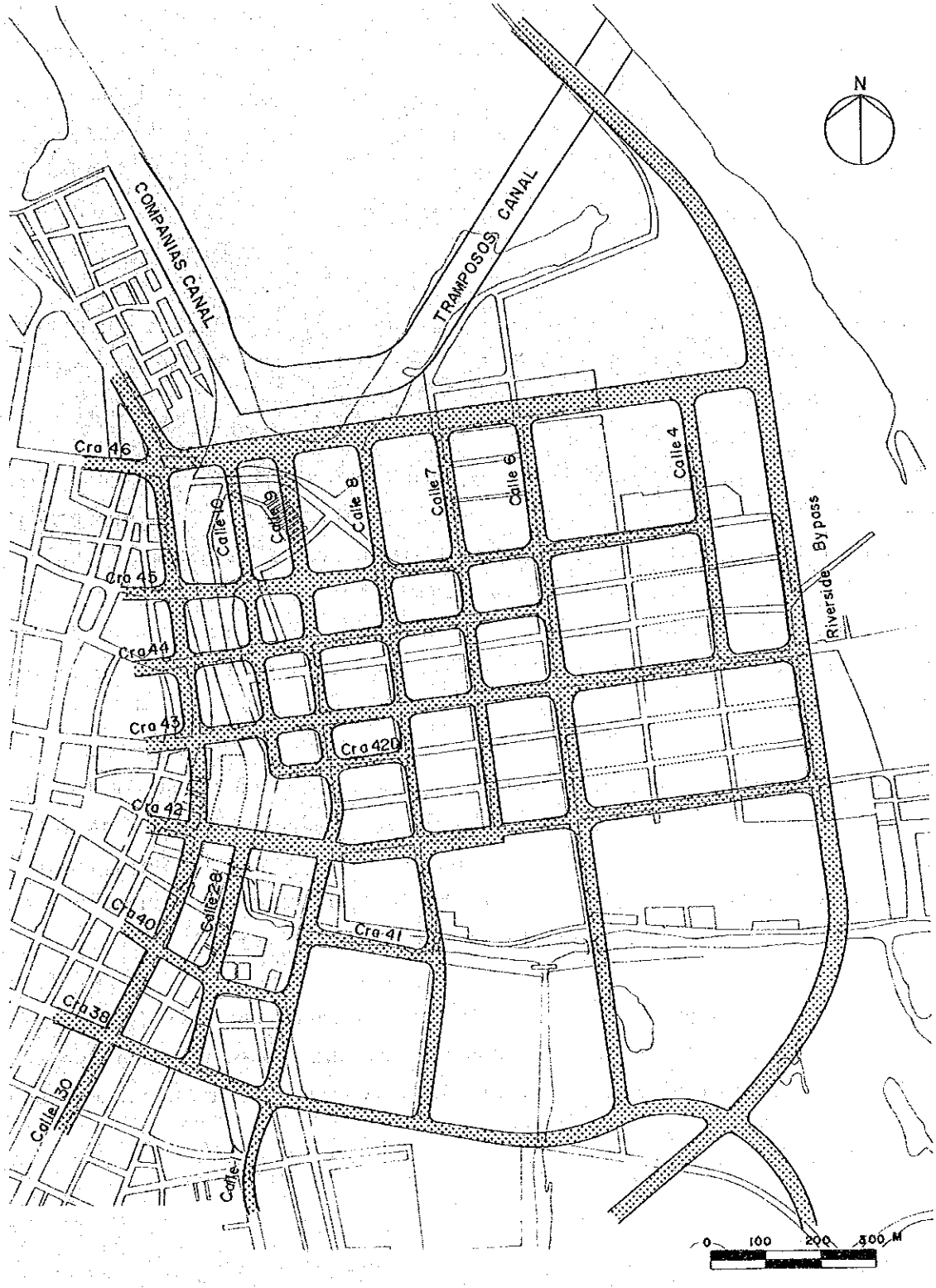

FIG. 10 STREET NETWORK PLAN

7. BUS TERMINAL

The bus terminal is the combination of intermunicipal and urban bus terminals. The intermunicipal bus terminal is to solve the existing traffic confusion caused by scattered dispatching points of intermunicipal buses in the central district, and the urban one is to serve the future residents, employees and vistors in the Main Study Area. The aim of this combination is to facilitate the transfer of bus passengers of both systems and to concentrate the movement of people.

Furthermore, the bus terminal is spatially connected with the reorganized market functions and is located almost at the center of the development area. Thus, it is a major factor to vitalize the development.

The estimated intermunicipal bus terminal users are some 23,400 persons/day and almost half of this figure is expected to transfer to and from the urban bus systems, while the number of the urban terminal users is estimated to be some 110,000 persons/day. In accordance with those figures, the required number of berths is estimated to be 15 for intermunicipal departure, 7 for intermunicipal arrival and 20 for urban operation. The required site area is approximately 4.4 ha.

The planning standard for the terminal facilities is studied through existing bus terminals in other cities in Colombia and special attention is paid to establish harmony with surrounding land use and streets and to intergration with the pedestrian network. To vitalize the bus terminal and to facilitate bus users a part of the site is used for commercial facilities.

The access to the intermunicipal bus terminal is supposed to be Calle 6 until the completion of Riverside Bypass, and that to the urban terminal to be Calle 8. For pedestrians Calle 7 and Cra 42 provides easier access to the terminal from the surrounding area.

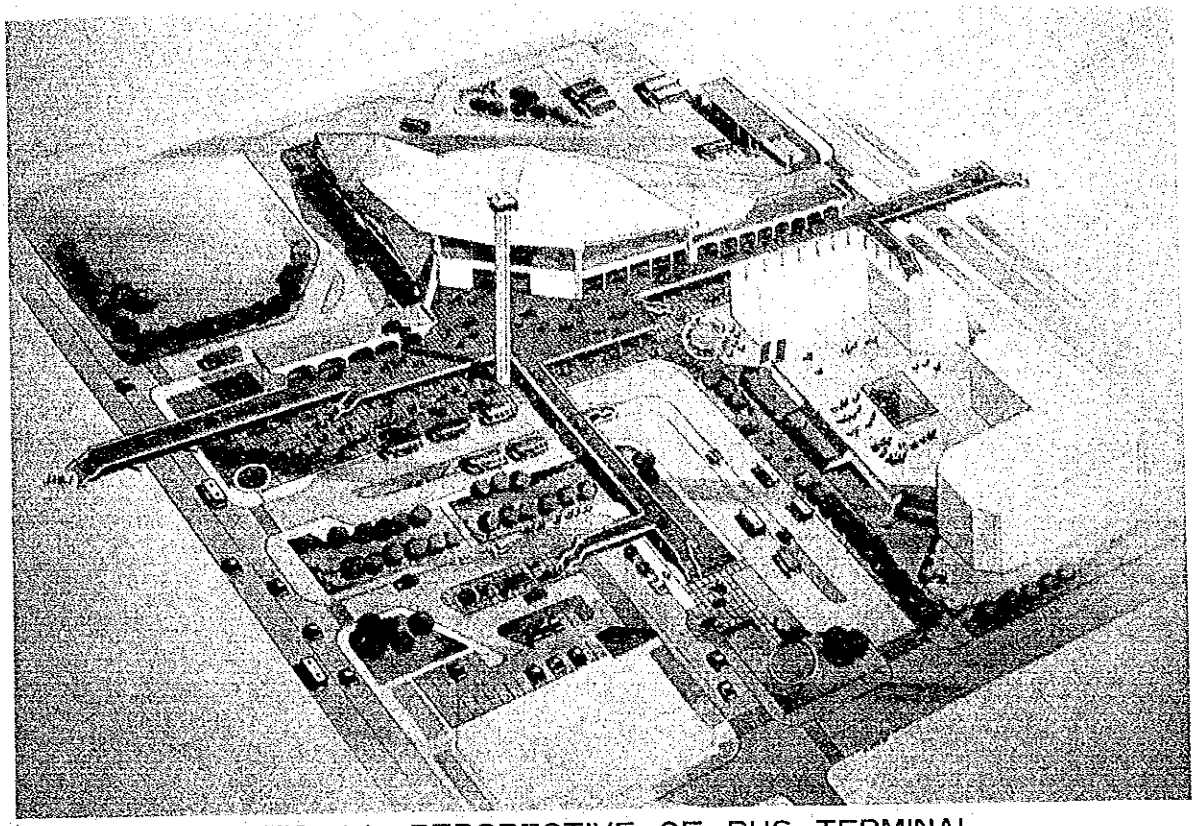

FIG. 11 PERSPECTIVE OF BUS TERMINAL

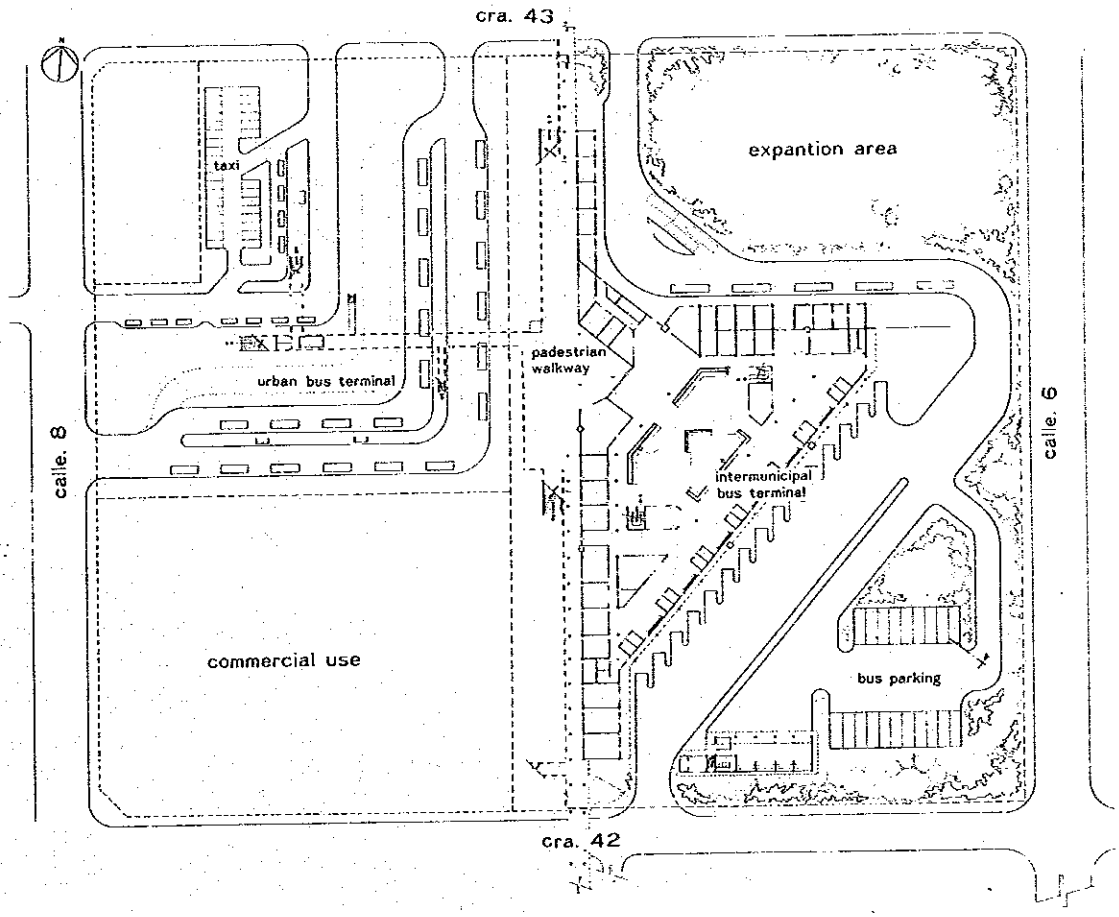

FIG. 12 PLAN OF BUS TERMINAL

8. MARKET FACILITIES

The existing public market located along the Mercado Canal faces serious environmental problems and the accessibility to the market is poor because of the contaminated canal. On the otherhand, street vendors' occupation of sidewalks and streets of the central district is another problem to be solved for the planned development of the Study Area.

Thus, the relocation of the public market and the rearrangement of street vendors are the major incentives to the market facilities project. The basic idea of the project is to ensure easier accessibility and to integrate market activities in the central district.

The public market is relocated to the area from Calle 6 to Calle 8 and in between the proposed bus terminal and the wharf. The site area is about 34,900 m^2 and the market is comprised of eight buildings:

1) An administration building
2) Five vendor market buildings
3) Two warehouse/distribution center buildings

The market accommodates 1,600 vendors and the total floor area is about 21,000 m^2.

The street venndors are housed in the open market which extends on the west of the public market. There are three distinct types of selling areas:

1) An open plaza providing flexible organization of stalls and carts
2) Roofed extensions of the pedestrian network which will form corridors to the vendor stalls arranged around them
3) Rooted structures with flexible stall distribution inside

The site area of the open market is about 59,500 m^2 and the number of vendors to be accommodated is about 7,600.

The rearrangement of the market facilities is closely related with the pedestrian network and the location of the bus terminal to vitalize the development of the Study Area.

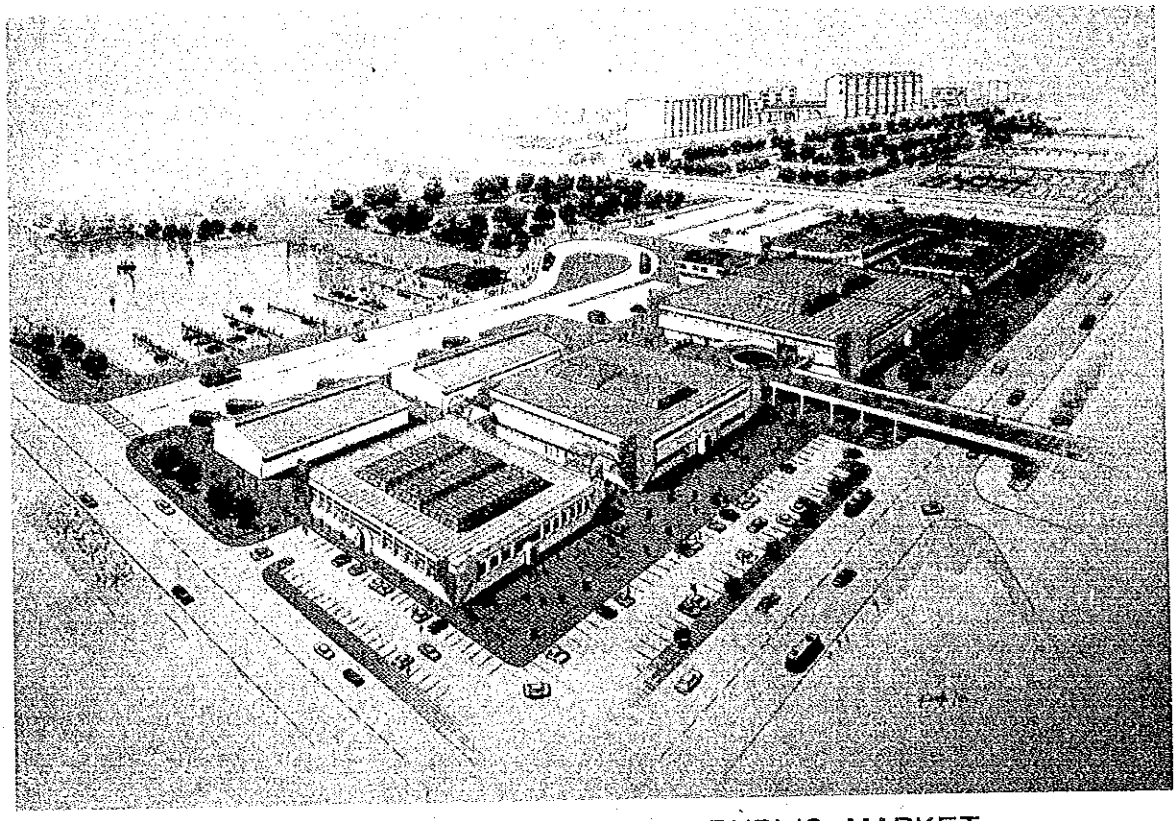

FIG. 13 PERSPECTIVE OF PUBLIC MARKET

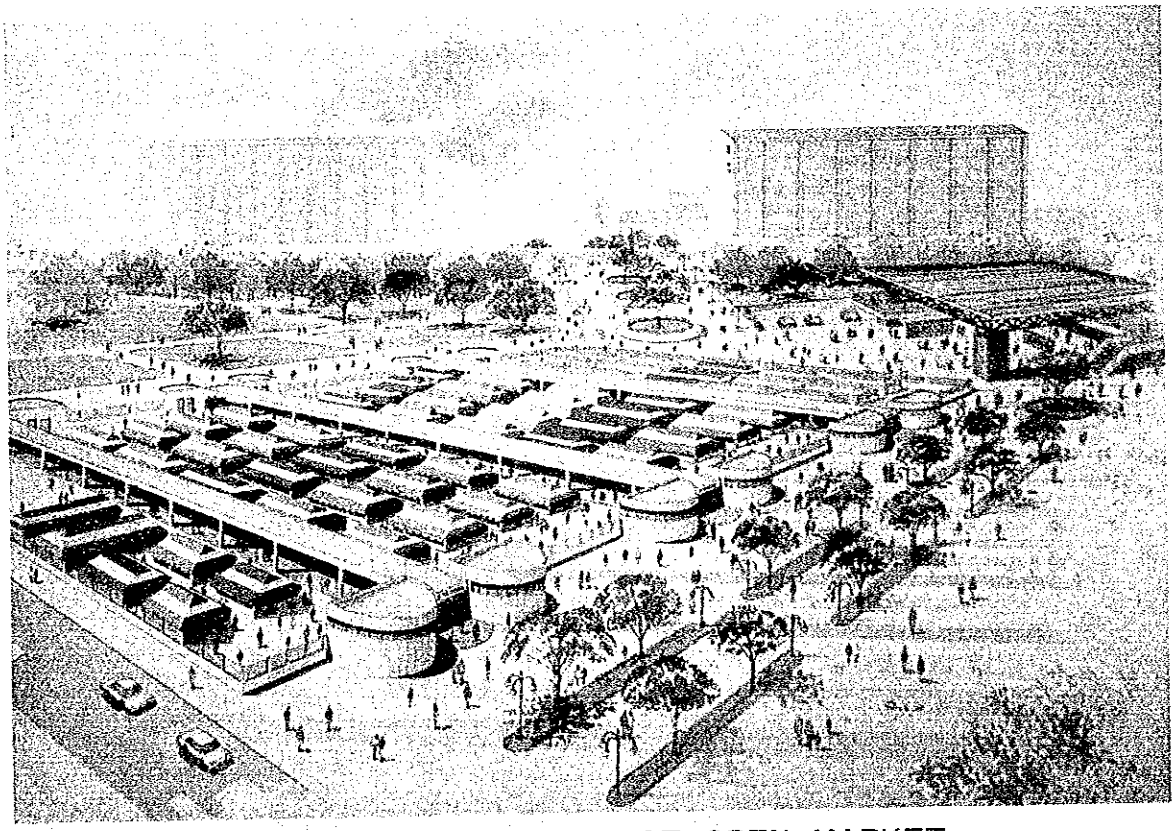

FIG. 14 PERSPECTIVE OF OPEN MARKET

9. PARKS AND RECREATIONAL FACILITIES

The idea of new installation of parks is based on the fact of the environmental contamination of the Mercado Canal and of the scarcity of open space in the existing central district. The canal is planned to be filled and converted into parks, which provide easier access to the Study Area and pleasant environment to be enjoyed by the people related to the central district activities. The recreational facilities are basically to serve the people in the other parts of the city as well as the residents in the central district.

The urban parks related to the rearrangement of canals are as follows:

1) Tramposos Canal Park (19,600m^2): This is located along Cra 46 and Tramposos Canal, and is a link between north-east residential area and the multipurpose parks on the Mercado Canal. The park design is a promenade type and people walk by the canal, continue by a shady tree planted area, circle around the proposed church and end up on the pier of the future fishing club.
2) Mercado Canal Parks (66,900m^2): Four distinct parks are located on landfill where the Mercado Canal currently runs. These parks are bordered by Calle 30 and Calle 10 between Cra 42 and Cra 46. Each park has its own feature, and as a system of parks, it is a combination of recreational, artistic, cultural and social activities in the central district.
3) Arriba Canal Park (25,500m^2): The park is located on landfill where the Arriba Canal currently runs. It borders the market area and provides shoppers and trade people with a relaxing environment.

The recreational facility in this project is a multiport park (54,900m^2) with fields for the most popular sports and indoor sports. The location is along the Riverside Bypass, and this facilitates the access of the general public to use this park.

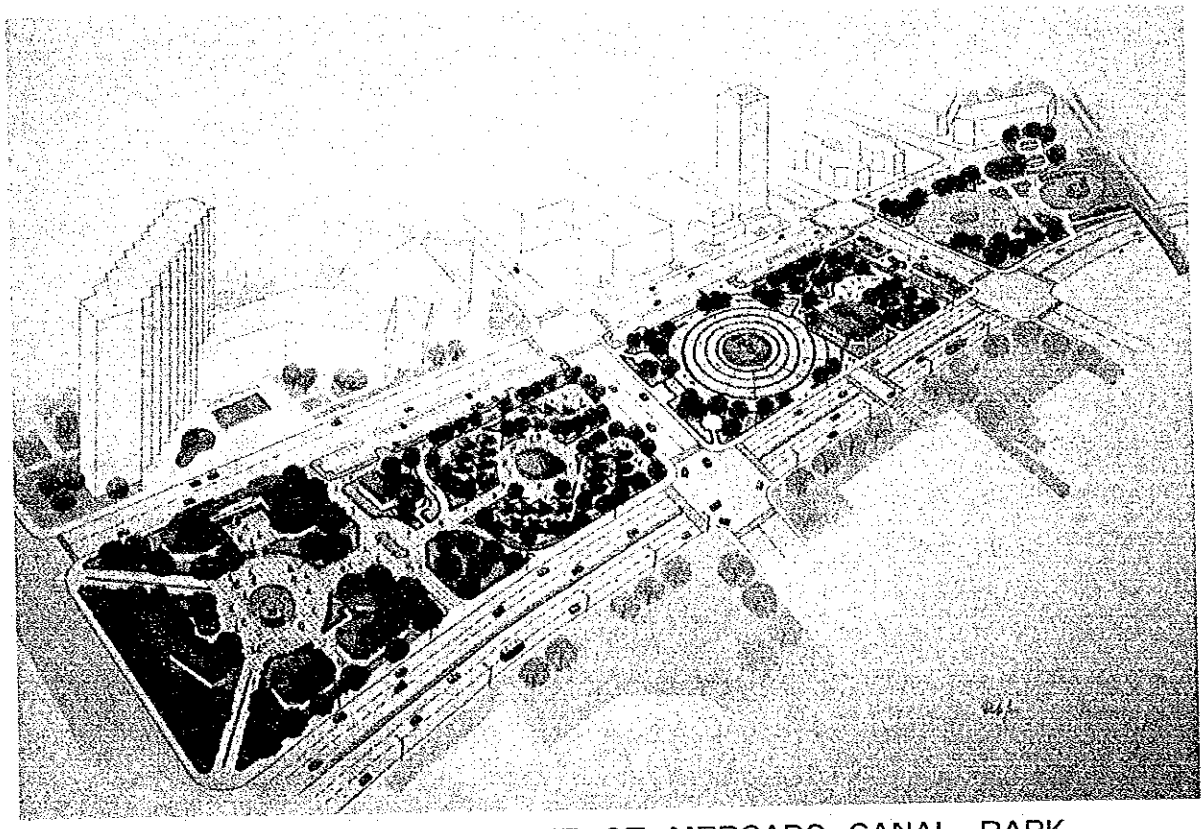

FIG. 15 PERSPECTIVE OF MERCADO CANAL PARK

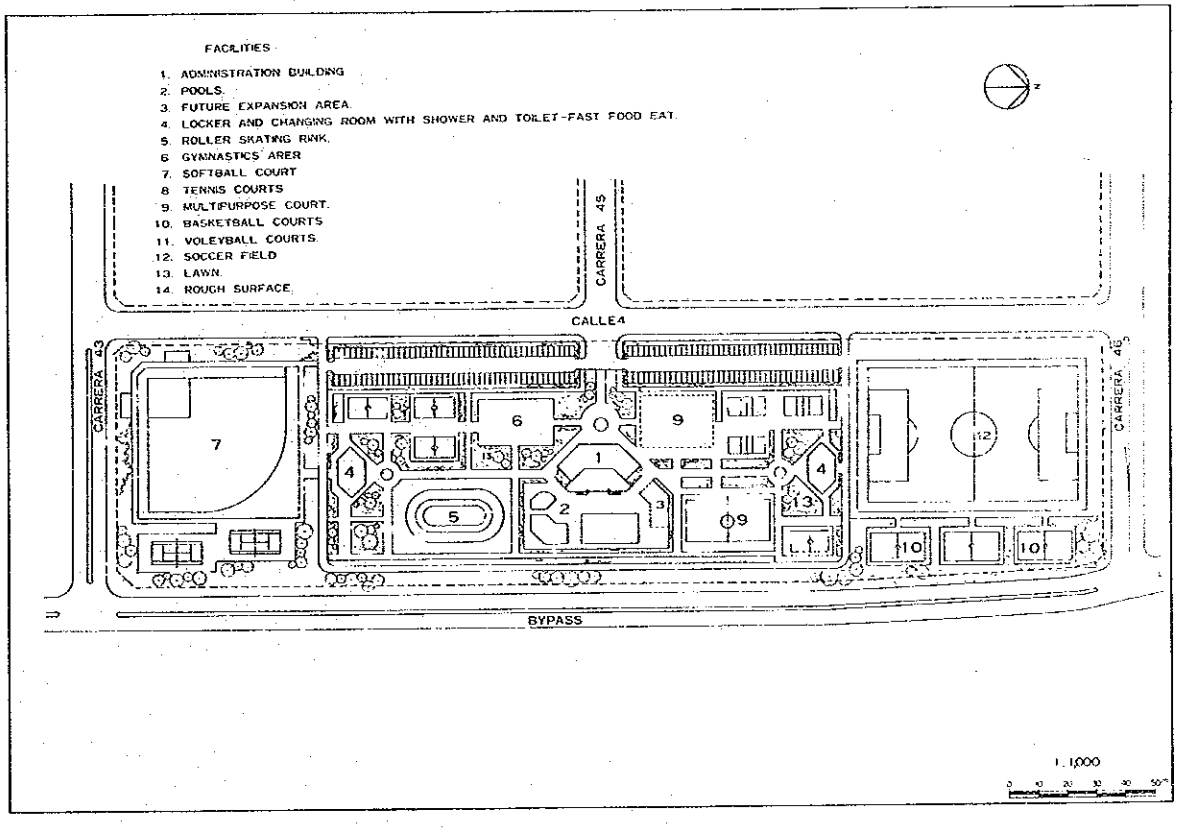

FIG. 16 PLAN OF RECREATIONAL PARK

10. PLAN FOR OTHER ZONES

Residential Zone

Some 20,000 people are housed to vitalize the area with resident population. The existing central district does not enjoy a favorable conditions for housing, but settled community in the central district is essential and is possible with the creation of appropriate environment.

The north part of the area is dedicated for this purpose with variety of houses, and the intended social stratum of residents is middle and high. The people may enjoy the closeness between work-place and residence, community facilities as well as all the functions in the area.

The northernmost sector near Loma I is low or middle-rise with special care to landscaping and environmental amenities. Other sectors are high-rise with enjoyable view of the Magdalena river and others. Pedestrian ways are provided to connect the zone to other land uses in the area and to the existing central district.

Business Zone

The provision of the business zone comes from the idea of the future region-wide activity center. The growth of economic and industrial activities inevitably leads to the enhancement of business activities.

The zone is located to the north-west part of the area to secure spatial continuity with the existing business activities on Paseo Bolivar and in the civic center area. The installation of the pedestrian way of Cra 44 is the major factor to provide the zone with this continuity and the sense of human amenities.

The zone enjoys rather quiet environment with high-rise office buildings. Two of those business blocks are intended for mixed use with residential use.

The access to business zone by cars is mainly through Cras 43, 45 and 46.

Industrial Zone

The industrial zone is composed of three sectors:

a. Industrial park: the existing factory of Phillips and the block next to it are to be converted in the long run into an industrial park with much environmental consideration and higher activity such as research institutes.
b. Reorganization sector: the sector along Arriba canal is used for reorganization and relocation of existing industrial facilities and warehouses.
c. New industrial sector: the sector for new industrial activities related to port functions or up-graded industrial function with little trouble with residential sectors.

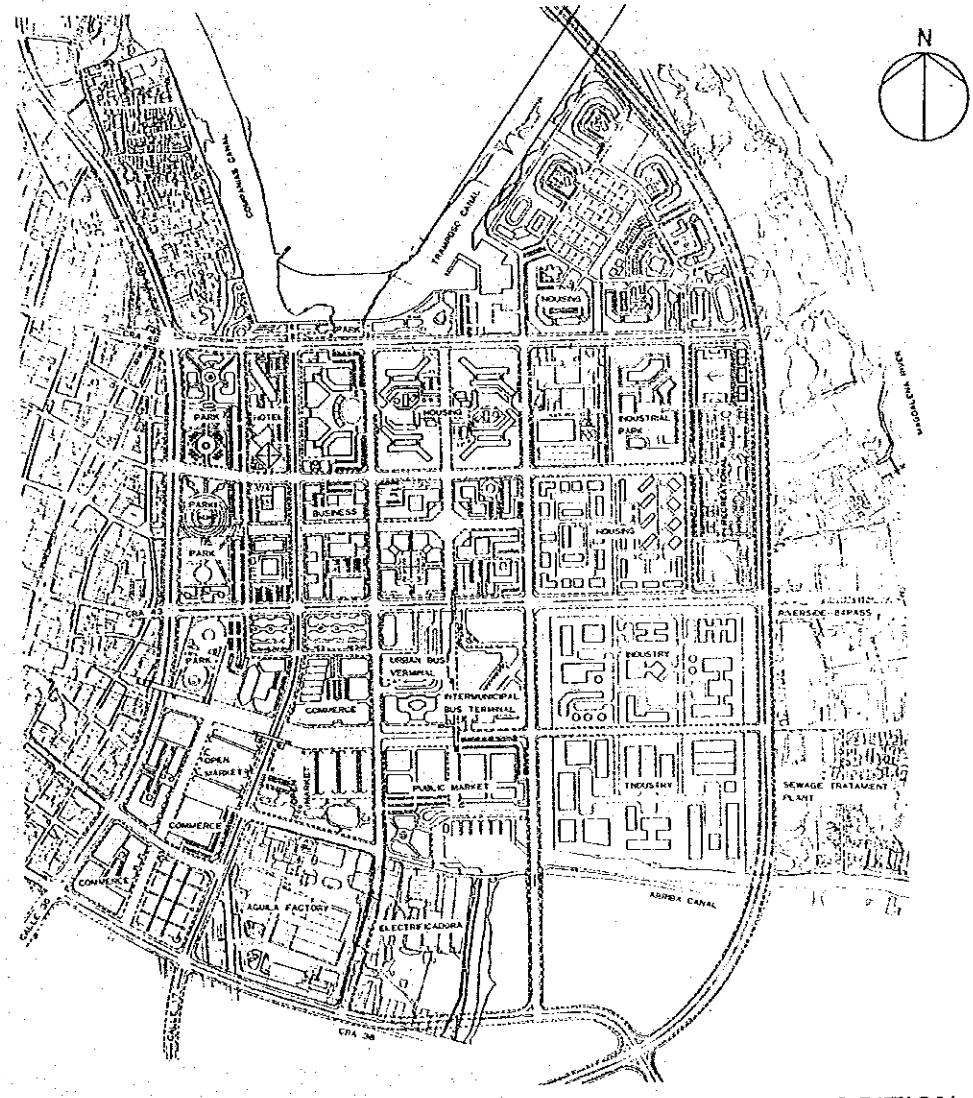

FIG. 17 TOTAL PLAN OF INSTITUTIONAL DISPOSITION

11. INFRASTRUCTURE

The following are required for the development of the Study Area:

a) Land preparation and drainage system: The preparation of the land, the filling of canals, and the creation of a drainage system within the Study Area for Arroyo flood control and an improved environment.

b) Urban utilities: The urban utilities such as water supply, sanitary sewers, electricity, telephone and gas supply to provide energy and services to the consumers who will reside in the Study Area. A sewage treatment plant to preserve the natural environment and to protect human health.

The urban utilities have different planning considerations from land preparation and the drainage system. The city of Barranquilla is provided with water, electricity, telephone, and gas systems by the authorized entities; the responsible agencies have their own development plans, included in which are the urban utilities of the Study Area. Therefore, utility services, except for a sewage treatment system, are supplied to the Study Area through existing authorities.

However, land preparation and the drainage system are currently planned and developed independently by an individual development body in Barranquilla.

A sewage treatment plant is established in Barranquillita. The national Law for environmental health obligates every public and private entity to treat waste water prior to dumping. However, the city of Barranquilla, as yet, does not have the Master Plan for its own public sewage treatment system. The sewage treament plant in Barranquillita is planned in acordance with the guidelines set by National Law. The plant in Baranquillita will serve as an independent system exclusively for the sewage of the Study Area. Therefore, the plant will serve as a model for the future city wide system.

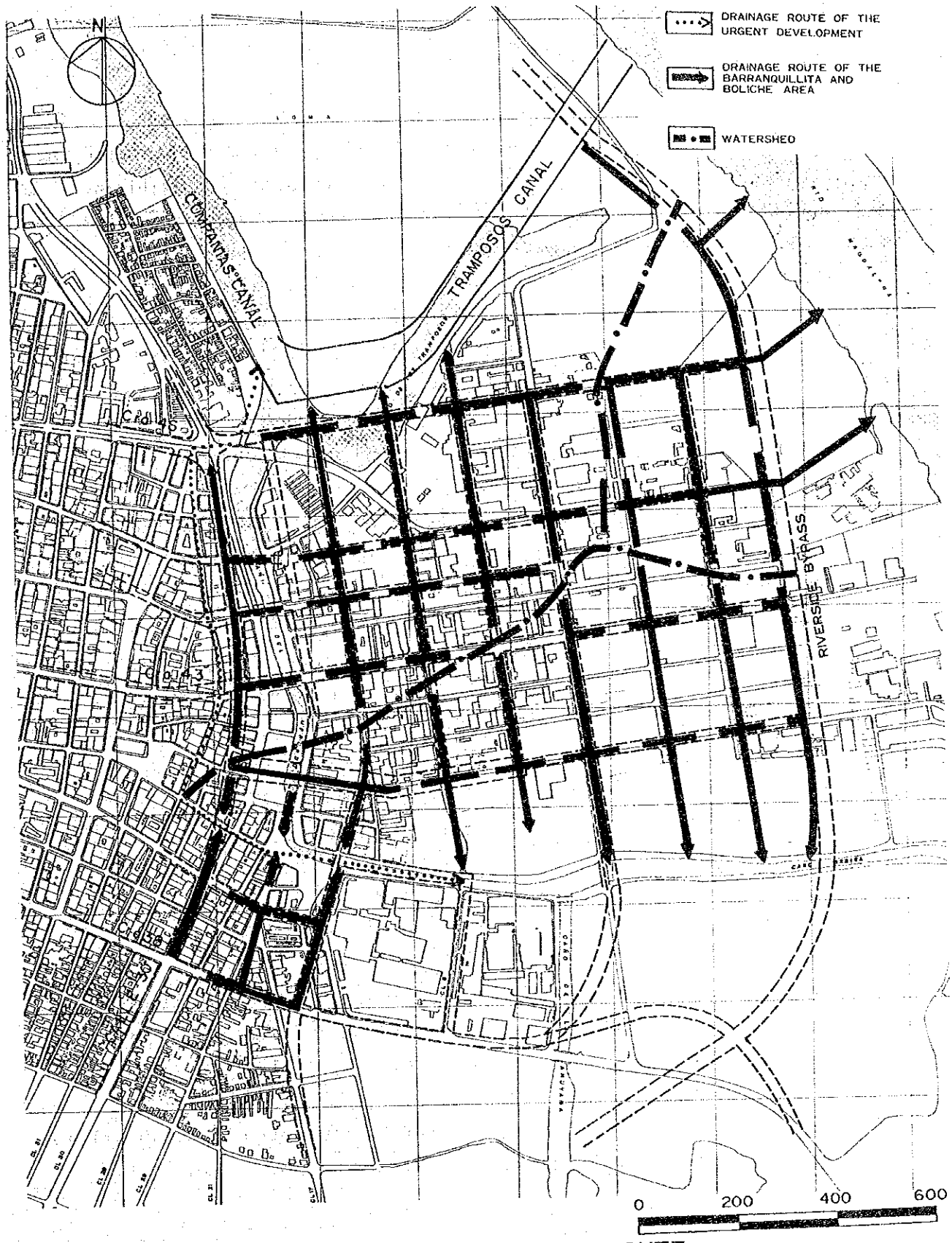

FIG. 18 DRAINAGE FLOW ROUTE

12. ESTIMATION OF PROJECT COST

Basic Method of Cost Estimation

At first the direct construction costs of each project of this Study are estimated, and the total construction costs are estimated by multiplying them by a coefficient (1.608). Then, the land and building costs are added to obtain the total project cost.

A direct construction cost is estimated by multiplying unit costs of work item by work quantity. A unit cost of work item is obtained by combining material costs, equipment costs and labor costs of each sub-work item.

For economic evaluation of projects, accounting prices of construction costs are necessary. For convenience of this conversion, taxes included in material and equipment costs and labor cost of unskilled laborer are estimated separately. Foreign and local portions of the costs are also separated as a basic information for studying of foreign loan.

Main sources of information for obtaining unit costs of construction works are the July, 1987 issue of the magazine CAMACOL and the "Rental Tariffs for Construction Machines" (1987 edition, ACIC).

Land and building acquisition costs are estimated as market prices by applying a revision factor (1.66) to prices valuated by IGAC.

Results of Estimation

The total project cost of this Study is estimated at 19,500 million pesos at 1987 prices, of which construction costs amount to 15,090 million pesos and land and building acquisition costs amount to 4,410 million pesos.

The construction cost of urban development is estimated at 9,330 million pesos, of which the cost of electricity is remarkably expensive.

The costs of building construction projects amount to 2,080 million pesos. Roughly speaking, each building project shares one-third of the total cost.

The road projects require 3,670 million pesos, of which 3,040 pesos is for construction of the Riverside Bypass.

In addition to the project cost of this Study, about 50,500 million pesos are necessary for completion of Barranquillita development. Therefore, the total cost of Barranquillita development amounts to about 70,000 million pesos.

TABLE 1 PROJECT COST OF THIS STUDY

Project	Amount (million pesos)
Urban Development	
Land Preparation	1,187.8
Drainage	1,015.8
Water Supply	130.6
Sewers	353.3
Sewage Treatment Plant	1,041.7
Electricity	2,307.9
Telephone	1,183.4
Street Pavement	781.2
Terminal Plaza	75.5
Pedestrian Streets	261.7
Pedestrian Bridge	174.4
Urban Park	556.1
Recreation Park	264.4
Subtotal	9,333.8
Building Construction	
Intermunicipal Bus Terminal	614.0
Public Market	797.6
Open Market	673.7
Subtotal	2,085.3
Road Construction	
Calle 30	626.5
Riverside Bypass	3,040.7
Subtotal	3,667.2
Total	15,086.3
Land and Building Acquisition	
Urban Development	
Land	2,025.6
Building	1,825.9
Road Construction	
Land	279.5
Building	279.3
Total	4,410.3
Grand Total	19,496.6

13. STUDY OF PROJECT IMPLEMENTATION

Investment Schedule

In this investment schedule it is intended that land and building acquisition starts in the second half of 1988, as soon as the executive body establishes the basic policy of development. Constructin work is scheduled to begin in 1990; therefore, engineers must be contracted to develop the detailed study and design no later than the end of 1989. The development of urban infrastructures of Barranquillita is scheduled to be completed in 1998, and it is expected that as many buildings as possible will be constructed up to the year 2000.

Project Formation

The projects of this Study are made concrete as described below.

Project	Outline of Project	Executive Body	Development System	Source of Revenue
Urban Development	. Land Preparation . Drainage . Urban Utilities . Streets and . Pedestrian Facilities . Parks . Project Area: 159 ha . Construction Period: 1988-1998	. Newly Established Urban Development Company (NUDC)	. Combination of Total Purchase, Valorizacion, Land Readjustment, and Land-trust System	. Sales of Prepared Lots
Bus Terminal Construction	. Construction of Terminal Building and Repair Shop . Site: 2700m² . Total Floor Area: 12,300m² . Construction Period: 1990 - 1992	. Newly Established Intermunicipal Bus Terminal Company	. Site: Purchase from NUDC at Preferential Price . Finance: 70%FFDU, 30% Own Capital	. Bus Charge . Rentals of Spaces . Sales of Spaces . Baggage Fees . Advertisemnt Charge
Market Reorganization	. Construction of Public Markets . Market B1.5, Admin. B1.1 Depot 2 . Total Floor Area: 20,900m² . Site : 34900m² . Construction of Open Markets Type A1, Type B2, Type C2 . Total Floor Area: 50,000m², . Site: 59500m² . Construction Period: 1990-1994	. Newly Established Market Operating Company	. Site: Purchase from NUDC at Preferential Price . Finance: 70% FFDU, 30% Own Capital	. Rentals of Stalls . Rentals of Storage Facilities . Premium
Calle 30 Improvement	. From Cra. 1F to Cra 6: 5,800m . Construction Period: 1996-1999	. Municipal Valorizacion	. Valorizacion System	. Valorizacion Contribution
Riverside Bypass Construction	. From Access Road to Pumarejo Bridge to Via 40: 7,300 m . Construction Period: 1996-1999	. Nation	. Valorizacion System	. Valorizacion Contribution (Transfer of Right of Collection to Municipality)

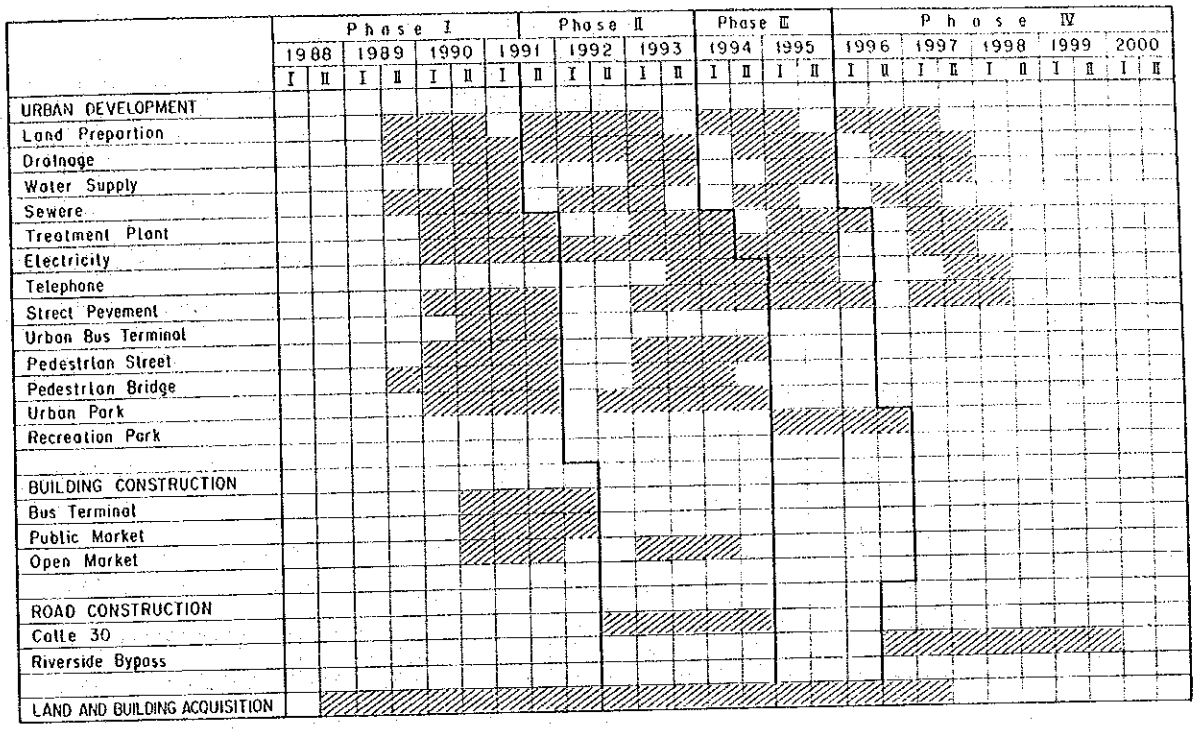

FIG. 19 INVESTMENT SCHEDULE

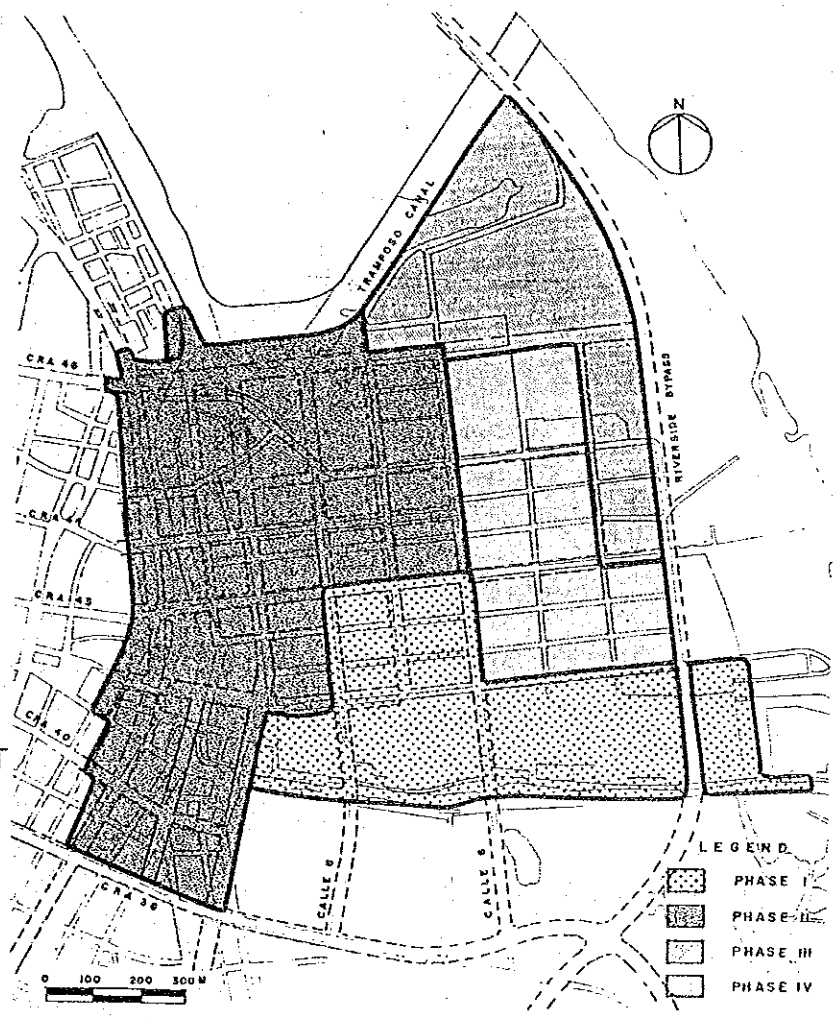

FIG. 20
DEVELOPMENT
PHASING

14-1. EVALUATION OF URBAN DEVELOPMENT PROJECT

Fundamental Profitability

The FIRR of this project is 14.5%, which is much lower than the average interest rate of 29.5% per annum of the project funds. As the real interest rate is estimated to be around 29.5%, it is difficult for the executive body to undertake this project under existing conditions.

Some Measures to be Taken

The following measures should be studied and taken in combination with each other for realization of the project.

a. Lowering the interest rate of FFDU down to about 25%
b. Extension of the limit of FFDU to cover land and building acquisition costs
c. Raise of the ratio of own capital to 20% - 25% of the project cost
d. Sharing of costs of urban utilities about half and half between the executive body and the responsible authorities

Proposal of New Development System

After a comparative study is conducted among four development systems, total purchase system, valorizacion system, land readjustment system and land trust system, a new combined system of them is proposed. The characteristics of the system are as follows:

a. Free submission of public land (before: lot, after: public land)
b. Application of land trust system (before: lot, after: lot)
c. Keeping of reserved land for executive body (before: public land, after: lot)
d. Establisment of maintenance body
e. Valorazacion for public land

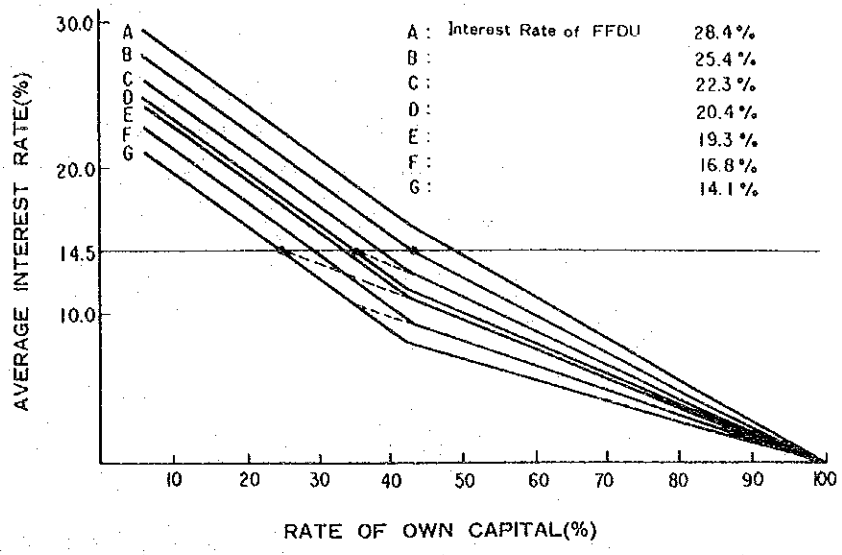

FIG. 21 AVERAGE INTEREST RATE AND RATE OF OWN CAPITAL BY INTEREST RATE OF FFDU

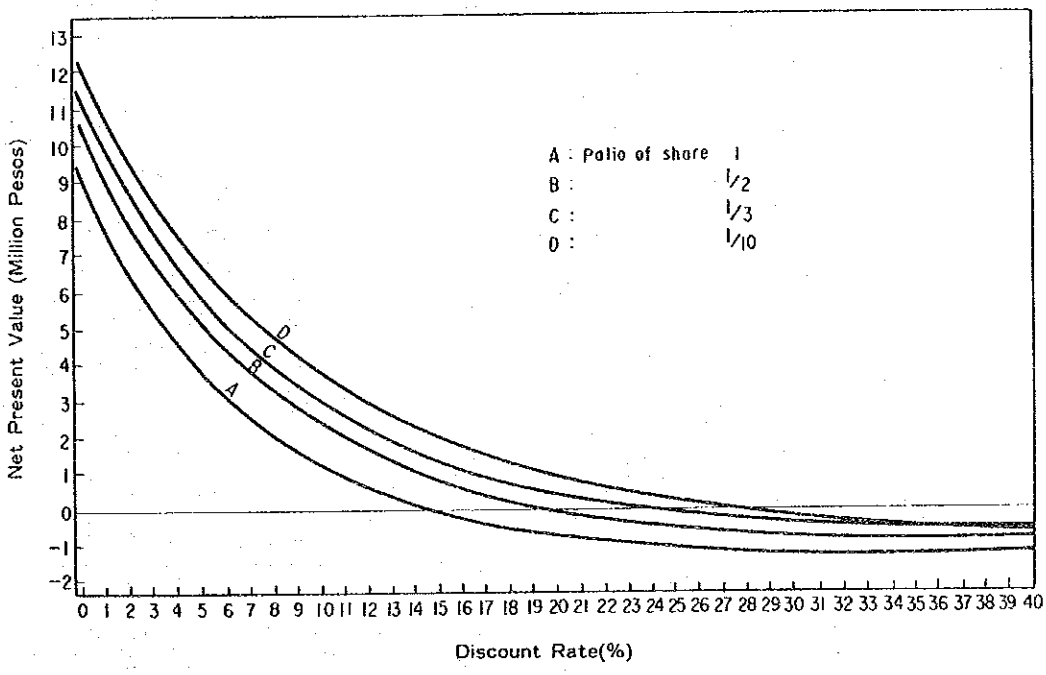

FIG. 22 NET PRESENT VALUE AND DISCOUNT RATE BY RATIO OF SHARE

Financial Situation of Executive Body and Land Owners in New System Case

Each side of the executive body and land owners maintains fainancial solvency. In this case, the short-term loans are not necessary except during the initial stage when the executive body does not have its revenues.
The reduction of revenue from land sales affects the financial situation a little. If the sites of the bus terminal and markets are lent free of charge, the situation is financially tight from 1990 to 1991, but from 1992 on it improves.

Economic Effect of Urban Development

Including the road projects, that is, the improvement of Calle 30 and the construction of Riverside Bypass, an economic analysis is tried for reference. NPV is 1,656 million pesos and B/C is 1.21 at a discount rate of 12% and EIRR is 17.2%.
The figure is not very high, but in this some benefits generated along the Calle 30 and Riverside Bypass are excluded. If these benefits are included, the indices can be raised to a higher level. Thus, it could be concluded that the total urban development package project is economically feasible.

TABLE 2 SUMMARY OF FINANCIAL STATEMENTS BY PROPOSED SYSTEM

(in millon pesos)

Case		Accumulated Net Income	Income Tax Paid	Accumulated Surplus	Short-term Loan Ammount	Short-term Loan Year	Additional Capital Ammount	Additional Capital Year
Base Case	E.B.	72183.1	30972.0	64325.5	-	-	23.2	1991 I 1992 II
	L.O.	61587.0	26838.8	56850.3	-	-	637.5	1995 I
Land Sales 10% down	E.B.	65012.7	27907.5	57155.1	-	-	43.0	1991 II 1992 II
	L.O.	40142.5	17873.1	35405.8	8.8	1990 II	1413.9	1995 I,II
Cost 10% up	E.B.	66701.0	28634.6	59107.1	-	-	43.5	1991 II 1992 II
	L.O.	54169.8	23783.1	49987.5	0.8	1990 II	894.2	1995 I
Terminal, Market 3000 pesos/m² (land)	E.B.	71465.3	30666.5	63635.7	-	-	28.0	1991 II 1992 II
	L.O.	58296.0	25458.8	53559.4	76.4	1990 II	731.0	1995 I
Terminal, Market 0 pesos/m² (land)	E.B.	70364.0	30197.7	62506.4	64.9	1990 II 1991 II	-	-
	L.O.	53276.5	23354.1	48539.8	406.6	1990 II 1991 I	874.0	1992 II 1995 I

Note : "Additional Capital" means that they compensate the deficit by a part of their accumulated surplus

14-2. EVALUATION OF BUILDING CONSTRUCTION AND ROAD PROJECTS

Evaluation Method

A financial analysis is made for building construction projects and an economic analysis for road projects.

Evaluation of Building Construction Projects

a. Bus Terminal Construction Project

As long as the bus charge system based on 40% of the bus tariff is adoptd, the evaluation indicators show a very low level (FIRR: 9.2%, B/C: 0.800) in spite of land acquisition at a preferential price of 3,000 pesos/m^2. In order to raise the fundamental profitability; 1) Raise of bus charge, 2) Establishment of passenger charege, 3) Gratuitous rental of site, and 4) Other measures are necessary to be taken for lightening the burden of the terminal company.

b. Market Reorganizations Project

When land acquisition cost is 3,000 pesos/m^2, the FIRR and B/C ratio of the public market project are 12.2% and 1.01, and those of the open market project are 18.0% and 1.50, respectively. Judging from these figures, the open market is rather profitable, while the public market has some problems. As it is difficult to find new sources of revenues in the case of market project, measures to reduce expenditures such as gratuitous rental of site and reduction of construction cost are to be taken.

TABLE 3 EVALUATION INDICATORS OF BUILDING CONSTRUCTION PROJECTS

Projects	IRR (%)	B/C	NPV (million pesos)
Bus Terminal			
Existing System	9.2	0.80	-
Proposed System	15.4	1.06	51.1
Public Market	12.2	1.01	12.3
Open Market	18.0	1.50	444.2

Note: It is assumed that the land acquisition cost is 3,000 pesos/m^2.

Evaluatin of Road Projects

a. Calle 30 Improvement Project

If only the Calle 30 improvement project is implemented, NPV is 1,009 million pesos and B/C ratio is 3.24 on condition that the discount rate is 12%, the IRR is also at a high level of 25.9%. These figures indicate that this project is economically feasible.

b. Riverside Bypass Construction Project

If only the Riverside Bypass project is undertaken, NPV is 365 million pesos and B/C ratio is 1.42, respectively. This is also economically feasible. Riverside Bypass will generate a smaller benefit than Calle 30 until the year 2002, but from 2003 onwards it will bring about a larger benefit than Calle 30.

This fact shows that it is efficient to improve Calle 30 at first, and then to construct Riverside Bypass, corresponding to the development process of the city.

c. Project Package of Calle 30 and Riverside Bypass

When both of the two roads are constructed according to the proposed schedule, NPV is 905 million pesos, B/C ratio is 1.68 and IRR is 19.7%. it can be concluded that this project is economically feasible.

In addition, if the schedule of construction of Riverside Bypass is advanced, benefit until 1999 increases a little but an advanced cost increases more because of small discount rate. As a result, the evaluation indices will be lowered. Some development effects, however, could be gained. For example, the following facts could be pointed out.

a. Promotion of location demand into the industrial zone in Baranquillita
b. Earlier improvement of accessibility to the Bus Terminal
c. Contribution to improvement of the industrial zone along Via 40, Barranquilla Port and Free Zones.
d. Earlier creation of job opportunity by construction work
e. Economic effects on related construction industries

TABLE 4 DISCOUNTED CASH FLOW OF CALLE 30/RIVERSIDE BYPASS

(in million pesos)

Year	Discounted Cost	Discounted Benefit	B-C
1988	0.0	0.0	0.0
1989	52.5	0.0	-52.5
1990	46.8	0.0	-46.8
1991	41.9	0.0	-41.9
1992	48.5	0.0	-48.5
1993	161.2	0.0	-161.2
1994	143.8	0.0	-143.8
1995	25.2	51.2	26.0
1996	56.5	63.4	6.9
1997	225.2	72.3	-152.9
1998	325.8	78.6	-247.2
1999	204.6	82.7	-121.9
2000	0.0	101.1	101.1
2001	0.0	132.2	132.2
2002	0.0	155.5	155.5
2003	0.0	172.2	172.2
2004	0.0	183.6	183.6
2005	0.0	190.6	190.6
2006	0.0	194.0	194.0
2007	0.0	194.4	194.4
2008	0.0	192.6	192.6
2009	0.0	188.9	188.9
2010	0.0	183.8	183.8
Total	1,332.0	2,237.1	905.1

TABLE 5 SENSITIVITY ANALYSIS OF ROAD PROJECTS

Projects		IRR (%)	B/C	NPV (million pesos)
Calle 30	Base Case	25.9	3.24	1,008.8
	Cost: 10% up	24.6	2.94	963.8
	Demand: 10% down	24.4	2.91	862.9
Riverside Bypass	Base Case	17.0	1.42	365.8
	Cost: 10% up	15.6	1.29	277.6
	Demand: 10% down	15.4	1.27	241.0
Both Calle 30 and Riverside Bypass	Base Case	19.4	1.68	905.1
	Cost: 10% up	17.9	1.53	771.8
	Demand: 10% down	17.8	1.51	681.2

15. PROJECT IMPLEMENTATION PROGRAM

Necessary Measures to be Taken

For implementing the program, the following measues should be taken.

a. Establishment of general and specified rules of share of urban development cost among related organizaions
b. Clarifying of authorized power of the New Urban Development Company in the fields of planning, project execution, financing and surplus appropriation
c. Earlier foundation of the New Urban Development Company, based on the above mentioned authorization
d. Formation of land trust association, based on the result of the study
f. Decision of compensation system and its amount
g. Clarification of public role of Bus Terminal and Markets and taking reasonable measure for financial assistance for them
h. Study of institutional and social possibility for extending the influence zone of valorizacion to the Metropolitan Area
i. Negotiation with Nation to construct Riverside Bypass by national fund

Overall Investment Program

From 1988 up to 1999 about 19500 million pesos at 1987 price are scheduled to be invested. The peak of annual investment is in 1990. When the investment amount reaches 2,930 milllion pesos. The New Urban Development company will invest about 11,160 million pesos up to 1998. The peak of annual investment is in 1990, when the investment amount reaches 1990 million pesos including building acquisition cost.

The land trust association will contract with the New Urban Development Company to sell its land, the value of which is about 2,000 million pesos, according to the development schedule.

TABLE 6 OVERALL INVESTMENT PROGRAM

(in million pesos, at 1987 price)

	Investment Body	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
Urban Development	NUDC 1)													
Construction			31.3	1585.9	1144.7	1377.9	1602.6	1405.0	1031.6	336.3	311.7	506.8		9333.8
Building Acquisition		229.5	459.1	403.1	347.1	204.0	61.0	53.4	45.8	22.9				1825.9
Land Submission	(LO) 2)	264.0	528.1	425.4	322.7	206.5	90.2	81.0	71.8	35.9				2025.6
Bus Terminal Const.	BUST 3)			153.5	307.0	153.5								614.0
Market Reorganization	MART 4)			296.7	544.8	199.4	301.3	129.1						1471.3
Calle 30 Improvement	MVO 5)													
Construction						19.5	303.5	303.5						626.5
Land & Building Acq.			65.8	65.8	65.9	65.9								263.4
Riverside Bypass Const.	MOPT 6)													
Construction										94.5	715.3	1309.6	921.3	3040.7
Land & Building Acq.							45.1	45.1	62.4	62.3	80.5			295.4
Total		493.5	1084.3	2930.4	2732.2	2226.7	2403.7	2017.1	1211.6	551.9	1107.5	1816.4	921.3	19496.6

1) New urban Development Company
2) Land Owner
3) Bus Terminal Company
4) Market Company
5) Municipal Valorizacion Office
6) Ministry of Public Works

TABLE 7 SHORT-TERM INVESTMENT PROGRAM (URBAN DEVELOPMENT)

(in million pesos at current price)

	1988		1989		1990		1991		1992		1993		1994	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Land Preparation				14.5	328.8	134.1		41.4	292.5	740.0	379.9			
Drainage				13.5	172.5	154.8	127.1	48.5	426.2	516.4	548.4	199.4		
Utilities				10.6	13.5	153.7	254.5		8.7	170.0	122.7	350.9		
Street Pavement					16.9	105.6	230.5	252.1			59.2	61.39	670.2	735.0
Pedestrian Street					3.3	20.6	44.9	49.1			25.4	263.7	287.9	315.7
Pedestrian Bridge				5.2	64.6	70.5	38.5				10.3	214.0	117.2	
Urban Park					4.0	41.9	45.7	50.2		53.7	418.3	456.7	499.3	546.7
Building Acquisition		312.7	334.1	357.3	381.9	310.0	331.4	354.2	378.7					
Total		312.7	334.1	401.1	985.5	991.2	1072.6	795.5	1106.1	1480.1	1564.2	2098.6	1574.6	1597.4

Note : Some part of construction work of Phase III is executed in 1994 and building acquisition for Phase III starts in 1992. These investments are not included.

TABLE 8 LOAN SCHEDULE

(in million pesos at current price)

	1988		1989		1990		1991		1992		1993		1994	
Own Capital	62.6	66.8	73.0	96.3	84.1	90.0	84.0	93.8	32.1	33.1	42.6	31.6	31.4	
Loan FFDU			36.5	504.2	570.8	622.9	375.8	637.3	1319.5	1398.7	1885.5	1416.5	1440.6	
Loan Com. Bank	250.1	267.4	291.7	385.2	336.4	359.8	335.7	375.1	128.6	132.4	170.5	126.5	125.5	

Short-Term Investment Program (Urban Development)

The period from 1988 to 1994 is selecteed as the short-term implementation period (Phase I and Phase II). During this period, an estimation of investment by the executive body is shown on the condition that they pay only one tenth of the cost of urban utilities for avoiding financial tightness under the existing FFDU system. The New Urban Development Company will invest about 14,300 million pesos at current price during this period.

In 1988, building acquisition is started. During the second half of 1989, the survey and design works will be contracted. The construction works will be started in the first half of 1990. The semiannual investment amounts at current prices are around 1,000 million pesos during the period from the first half of 1990 to the first half of 1992 and about 1,500 million pesos during the period from the second half of 1992 to the second half of 1994 except the second half of 1993 when the total amount reaches about 2,000 million pesos.

The funds for this investment are FFDU, loans from commercial banks and own capital. According to the FFDU rule, about 70% of the project cost (including interest during the construction period) is financed by FFDU. Of the rest (a part of construction cost and the total of building acquisition cost), 80% is financed by commercial banks and 20% is own capital.

16. CONCLUSION AND RECOMMENDATIONS

1. Outline of the Project

This Feasibility Study has an objective to install the fundamental facilities and utilities for the total development of the Study Area. The magnitude of the development including all the buildings in the area might be described as 70,000 million pesos (1987 price) in terms of the total investment.

Of this amount, the total cost of this Study is summerized as follows:

Urban Development	9,300 million pesos
Bus Terminal	600 million pesos
Markets	1,500 million pesos
Calle 30	600 million pesos
Riverside Bypass	3,000 million pesos
Land Acquisition	2,300 million pesos
Building Acquisition	2,100 million pesos
Total	19,400 million pesos

2. Result of Evaluation

The urban development project seems to be economically feasible, but there are many difficulties to overcome for implementing it financially.

The bus terminal and market projects also face some difficulties in financial feasibility. The road projects are feasible economically but it fears that the valorization contributions will reach a big amount.

Thus, itis important to find financial measures to implement these projects altogether.

It is considered that the period from 1989 to 1995 is a leading development phase for the suceeding development. It is necessary to make

efforts to hold out against the financial difficulties until1996, when the fruits of development start to be born.

The total investment schedule assumed before evaluation is not to be changed, but some considerations about the share of investment cost should be taken into account.

3. Recommendations

The Study depends on various kinds of premises in its planning, design and evaluation phases. It means that the recommendations are to show the way to clear those premises.

1) Consensus Formation for Urban Development Policy

The fundamental target of the development of the study area is to create a new region-wide activity center solving the existing urban problems in the Central District.

However, for the overall urban development of the city there might be so many tasks to be fulfilled in the future: for examples, the formation of stable foundation of industrial development (industrial infrastructures) and socio-economic and physical solutions for the poverty problems in the city.

Thus, what is required urgently is the future urban development policy with the consensus of all the sectors concerned, and the outcomes of this Study has to be duely placed and integrated in that policy.

2) Establishment of Firm Coordination among Administrative and Executive Bodies.

On account of the scale of the Study a number of existing and/or newly established entities will be involved in the implementation to support and facilitate it. Thus, the coordination among those will be a vital

factor for fruitful implementation of the Study.

The field of coordination may range wide and it will be indispensable to establish a solid rule to conduct coordination works.

3) Early Establishment of New Urban Development Company

The New Urban Development Company is the leading body of Barranquillita development. This entity is semi-public, but is aimed to get profits from the projects they conducts and to promote the urban development in Barranquilla. The establishment of the body should be proposed as early as possible.
As is planned, this executive body should be functional to organize a task force for developing Barranquillita.

4) Formation of Land Trust Association

The land owners in Barranquillita are recommended to form a land trust association. Thisassociation will contract with the New Urban Development Company to sell land at a higher price after development.

There are about 30 large land owners including Nation, Department, Municipality and EPM. These large owners could be leaders to form the association.

5) Necessary Measures for the Bus Terminal and Market Company

Although the bus terminal and market companies are difficult in financial condition, it is clear that the existence of bus terminal and markets is an important factor to develop Barranquillita.

In order to avoid the financial crisis, following measures are proposed.

a. Participation of New Urban Development Company
b. Utilization of properties belonging to existing relating organization
c. Free share of Land Acquisition

6) Compensation Measure to Existing Operating Establishment

The development of Barranquillita is aimed at the total change of the existing physical conditions, so it is necessary to move existing operating establishments. Although their land is kept in hand, they are obliged to stop the business for a considerable period.

Therefore, the compensention measure is the most important act prior to start the development.

7) Construction of Riverside Bypass by Nation

The Riverside Bypass will not only play an important role in economic development of Barranquilla and urban development of Barranguillita, but also improve the accessibility from the industrial zone, Barranquilla Port and Free Zone to the Departamentos in the Atlantic Region. But, the project cost including financial cost will amount to an enormous figure. It will be a heavy burden for Barranquilla to pay this cost.

Considering the characteristics of the Riverside Bypass and its economic feasibility, it is recommended that MOPT will conduct the direct construction of this road.

The collection of valorizacion contribution is to be ceded to the Municipal Valorizacion Office, in the condition that some percentage would be returned to the nation.

8) Total Distribution of Valorizacion Contribution

It is recommended that the projects executed by the valorizacion system should be packaged. That is, Calle 30, Riverside Bypass, streets and pedestrian facilities and Parks planned in Barranquillita are packaged to one network project. The total contribution amount is distributed to all the land owners in the metropolitan area and collected by the Municipal Valorizacion Office.

The MVO transfers the collected contribution corresponding to the Barranquillita projects to the New Urban Development Company.

9) Utilization of Foreign Loan

Under the actual economic situation, Colombia peso is projected to devaluate at about 30% per annum. If a development entity gets foreign loan directly, the real interest rate would be very high. On the other hand, the interest rate of FFDU is a little too high for the urban development. And it is severe for a developer that FFDU does not finance land and building acquisition costs. Considering the above mentioned facts, it is recommended that BCH establish a special urban development fund in which the interest rate is lowered about 3 percent point from FFDU and land and building acquisition costs are included in the project cost which is the object of loan.

10) Importance of Maintenance

The maintenance of public facilities like street and parks is very important. A responsible body for maintenance should be established. This body might be the New Urban Development Company or its subsidiary.

4. Remarks

1) The problems relating to project evaluation and execution are different to each other. To execute the development, it is important to establish an acceptable rule of cost sharing among Nation, Department, Municipality, the executive body, other administrative bodies, land owners and builders of various facilities after development.

2) Applying a new development system, it is necessary to study institutional and social validity in this country. Proposed system is no more than an example for calculation of distribution of development profit. What is important is to establish a new development system which is accepted broadly in society.

THE FEASIBILITY STUDY ON THE URBAN DEVELOPMENT
OF THE CENTRAL DISTRICT OF BARRANQUILLA

FINAL REPORT

CONTENTS

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