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DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REPUBLIC OF THE PHILIPPINES

METRO MANILA URBAN EXPRESSWAY SYSTEM STUDY

FINAL REPORT

VOLUME II

MAIN TEXT (MASTER PLAN)

OCTOBER 1993

KATAHIRA & ENGINEERS INTERNATIONAL

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METRO MANILA URBAN EXPRESSWAY
SYSTEM STUDY

FINAL REPORT VOLUME II
MAIN TEXT (MASTER PLAN)

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国際協力事業団

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PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a master plan and feasibility study on Metro Manila Urban Expressway System and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a study team headed by Mr. Tsuneo Bekki, Katahira & Engineers International, three times between March 1992 and August 1993.

The team held discussions with the officials concerned of the Government of the Philippines, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between the two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the team.

October, 1993



Kensuke Yanagiya
President
Japan International Cooperation Agency

October 29, 1993

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency
Tokyo, Japan

Dear Mr. Yanagiya,

Letter of Transmittal

We are pleased to submit to you the Final Report of the Metro Manila Urban Expressway System Study. The report contains the advice and suggestions of the authorities concerned of the Government of Japan and your Agency as well as the formulation of the above mentioned project. Also included are comments made by the Department of Public Works and Highways of the Republic of the Philippines during technical discussions on the draft report which were held in Manila, Philippines.

This report presents a master plan for Metro Manila Urban Expressway System (MMUES) which comprises of about 150 kms. expressways to cope up with the rapidly increasing traffic demand as well as to support and guide sound urban development of Metro Manila. MMUES will be developed in three stages in a time span of 19 years. This report also presents a feasibility study of the first stage expressways (about 59 kms.) which will significantly improve overall transport efficiency of Metro Manila and derive high economic return.

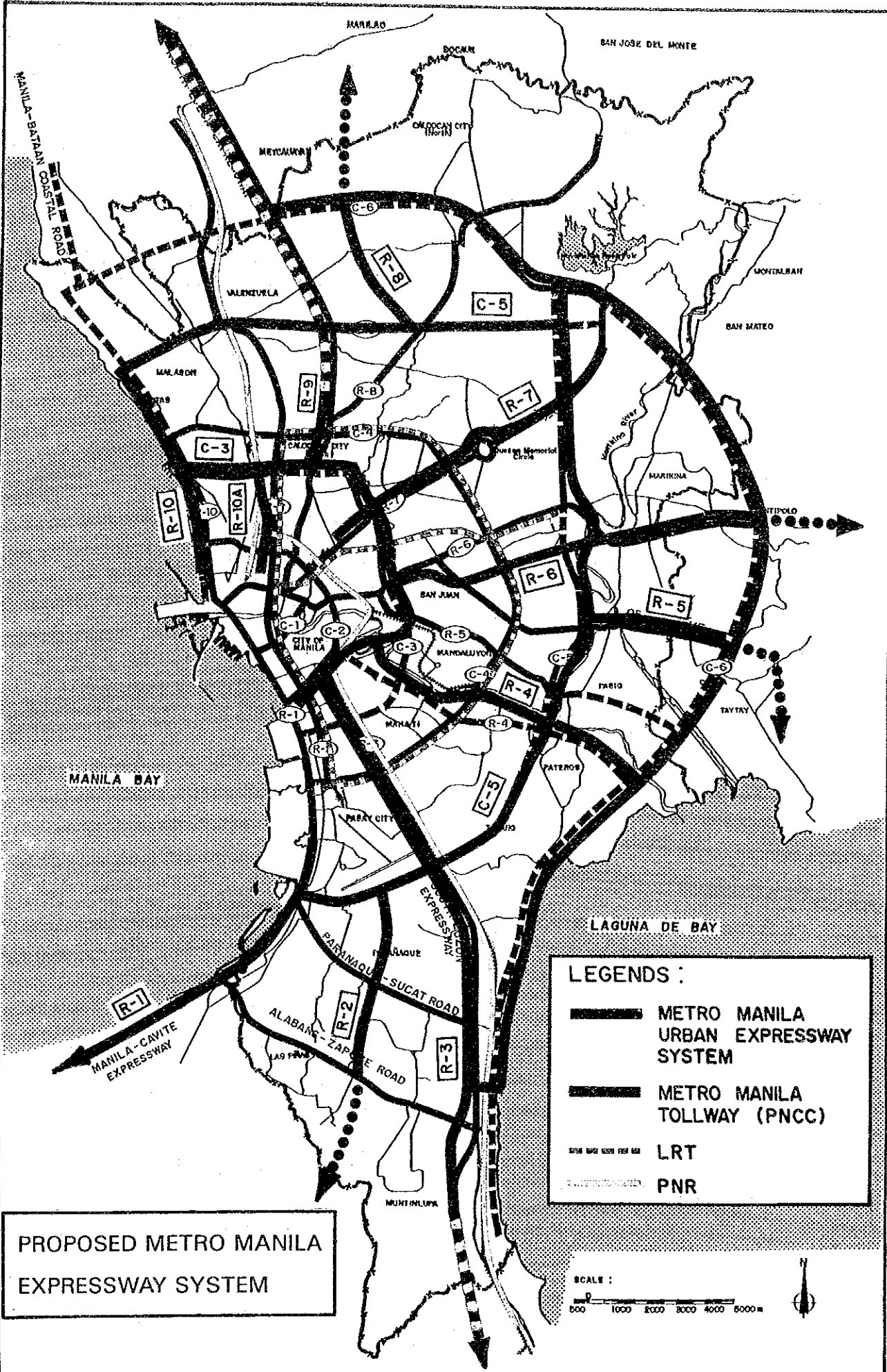
In view of the urgency of the urban expressway system in Metro Manila and of the need for socio-economic development of the Philippines as a whole, we recommend that the Government of the Philippines implements this project as a top priority.

We wish to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs and the Ministry of Construction. We also wish to express our deep gratitude to the Department of Public Works and Highways and other authorities concerned of the Government of the Philippines for the close cooperation and assistance extended to us during the course of the study.

Very truly yours,

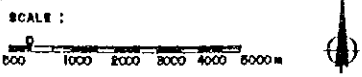


Tsuneo Bekki
Team Leader
Metro Manila Urban Expressway System Study



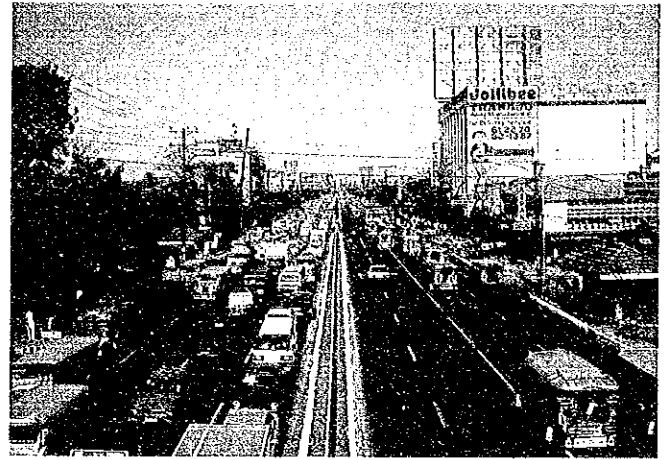
PROPOSED METRO MANILA EXPRESSWAY SYSTEM

- LEGENDS :**
- METRO MANILA URBAN EXPRESSWAY SYSTEM
 - METRO MANILA TOLLWAY (PNCC)
 - LRT
 - PNR

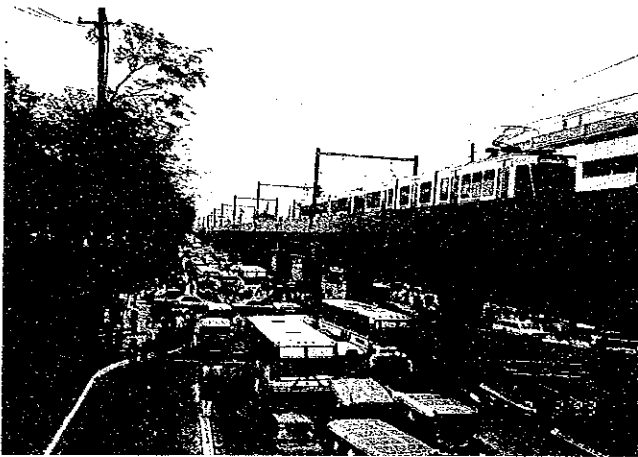




EDSA (C-4)



QUEZON AVENUE (R-7)



TAFT AVENUE (R-2)

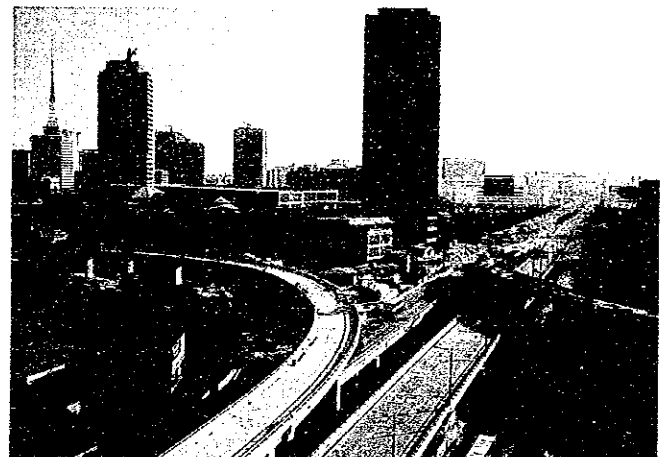


ROXAS BOULEVARD (R-1)

TRAFFIC CONDITION ON METRO MANILA ROADS

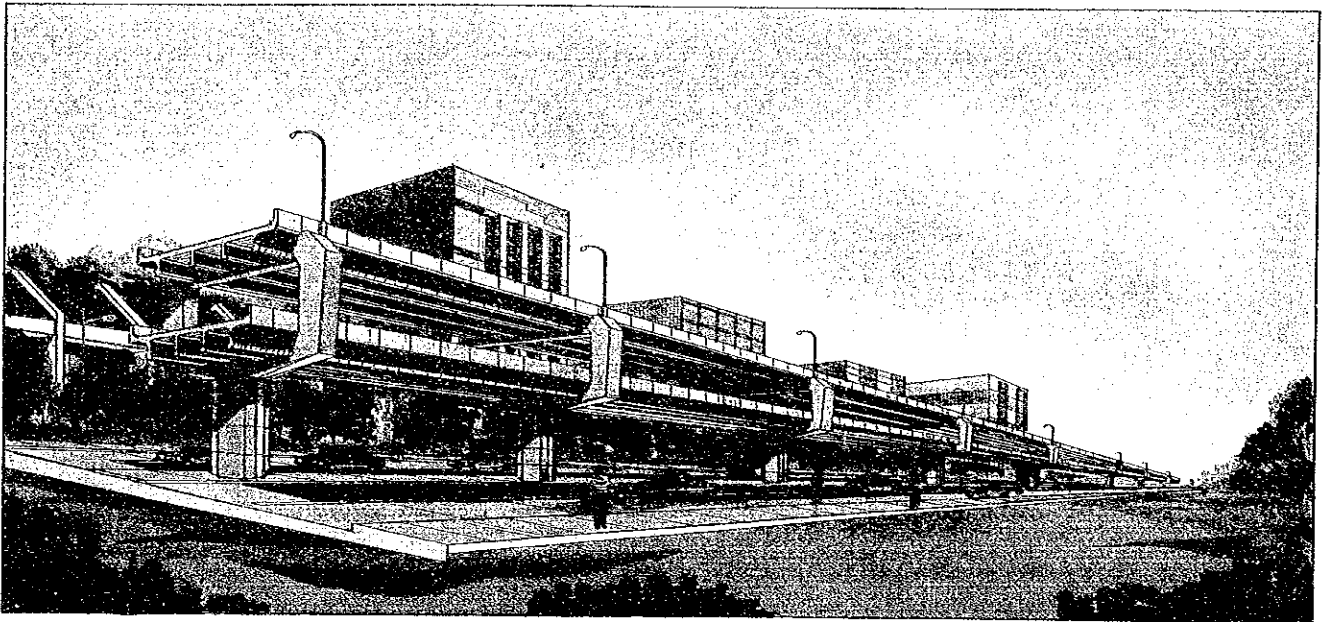


MAKATI CBD

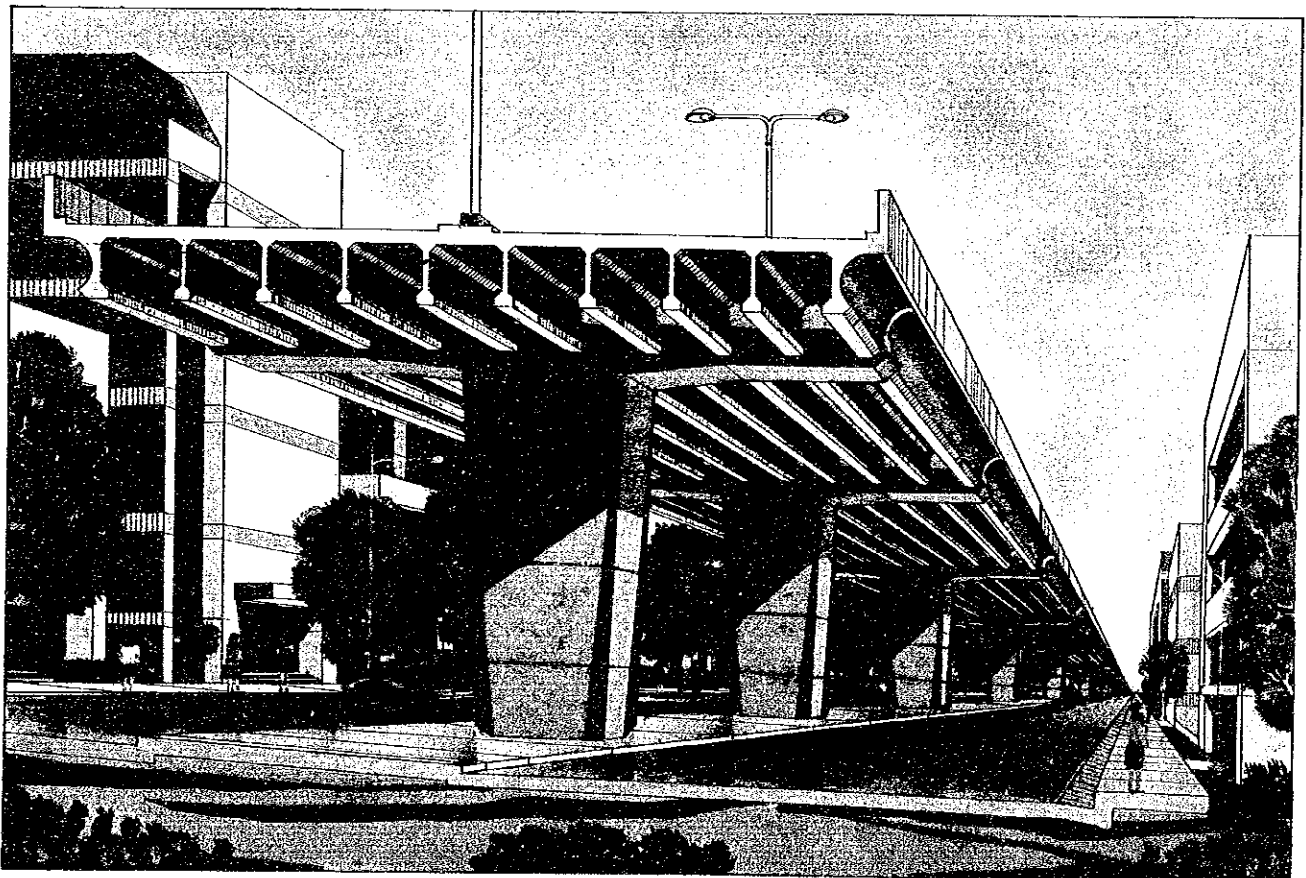


ORTIGAS CBD

GROWING CBDs



VIEW OF DOUBLE DECK TYPE EXPRESSWAY



TYPICAL VIEW OF ELEVATED EXPRESSWAY

**MASTER PLAN REPORT
FOR
METRO MANILA URBAN EXPRESSWAY SYSTEM**

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ABBREVIATIONS

AASHTO	:	American Association of State Highway and Transportation Officials
AC	:	Asphalt Concrete
ADB	:	Asian Development Bank
AFP	:	Armed Forces of the Philippines
BOT	:	Build-Operate-and-Transfer
BT	:	Build-and-Transfer
CBD	:	Central Business District
CDCP	:	Construction and Development Corporation of the Philippines
DECS	:	Department of Education, Culture and Sports
DOTC	:	Department of Transportation and Communications
DENR	:	Department of Environment and Natural Resources
DPWH	:	Department of Public Works and Highways
D-S Gap	:	Demand-Supply Gap
ECC	:	Environmental Compliance Certificate
EDSA	:	Epifanio delos Santos Avenue
EIA	:	Environmental Impact Assessment
EIRR	:	Economic Internal Rate of Return
EIS	:	Environmental Impact Statement
EMB	:	Environmental Management Bureau
FIRR	:	Financial Internal Rate of Return
GDP	:	Gross Domestic Product
HIS	:	Household Interview Survey
HLRB	:	Housing and Land Use Regulatory Board
IBRD	:	International Bank for Reconstruction and Development
I/C	:	Interchange
ICC	:	Investment Coordinating Committee
IEIS	:	Initial Environmental Impact Study
ILI	:	International Lending Institution
JICA	:	Japan International Cooperation Agency
JUMSUT	:	Metro Manila Transportation Planning Study
LRT	:	Light Rail Transit
MC	:	Motorcycle
MCCRRP	:	Manila-Cavite Coastal Road and Reclamation Project
MMA	:	Metro Manila Authority
MME	:	Metro Manila Expressway
MMEA	:	Metro Manila Expressway Authority
MMT	:	Metro Manila Tollway
MMUES	:	Metro Manila Urban Expressway System
MRT	:	Mass Rapid Transit
MSDR	:	Manila South Diversion Road
MST	:	Manila South Tollway
MV	:	Motor Vehicle
NAIA	:	Ninoy Aquino International Airport
NCR	:	National Capital Region
NEDA	:	National Economic Development Authority
NLE	:	North Luzon Expressway
NSO	:	National Statistics Office
NTPP	:	National Transportation Planning Project
OD	:	Origin Destination
OECS	:	Overseas Economic Cooperation Fund
PCC	:	Portland Cement Concrete
PC Girder	:	Prestressed Concrete Girder

PCU	:	Passenger Car Unit
PEA	:	Public Estates Authority
PM	:	Particulate Matter
PNCC	:	Philippine National Construction Corporation
PNR	:	Philippine National Railway
RA	:	Republic Act
ROW	:	Right-of-Way
SLE	:	South Luzon Expressway
SSH	:	South Super Highway
TC	:	Tricycle
TEC	:	Traffic Engineering Center
UP	:	University of the Philippines
UPTTC	:	University of the Philippines Transport Training Center
UTDP	:	Urban Transport Development Project
UTSMMA	:	Urban Transportation Study for Manila Metropolitan Area
V/C Ratio	:	Volume Capacity Ratio
VOC	:	Vehicle Operating Costs



CHAPTER 1
INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Metro Manila with its concentration of people and economic activities is growing rapidly. Similar with other metropolitan areas of the developing world, this expansion has continued to produce far reaching and complex problems, namely: unorderly development of urban areas, aggravation of urban environment and a progressively inefficient urban transportation system.

The present road network consisting of 3,091 km of public roads, of which about 907 km are classified as national roads, has become inadequate to meet the travel demands of the expanding metropolis. The network is characterized by partially developed primary road system, lack of well planned and developed secondary arterial and distributor roads, uncoordinated and inaccessible private roads and inadequate and often outdated pavement, drainage structures and road appurtenances.

The deterioration of the road condition and the public transport services have greatly inconvenienced the daily commuters and motorists, wasted valuable resources, compromised safety and environmental stability, and adversely affected economic activities.

In 1973, a JICA-assisted Urban Transportation Study for Metro Manila Areas (UTSMMA) prepared a master plan for Metro Manila transportation system involving development of an expressway system. The first expressway study in Metro Manila was undertaken in 1980 by the Construction and Development Corporation of the Philippines (CDCP) now known as the Philippine National Construction Corporation (PNCC). In 1985, the National Transportation Planning Project (NTPP) reviewed the proposed Metro Manila Expressway (MME) in comparison with the development of Circumferential Road 5 (C-5). Again, in 1989, PNCC commissioned the University of the Philippines Transport Training Center (UPTTC) to update the study as tollway, now known as the Metro Manila Tollway (MMT), in the light of the increasing traffic congestion in the area.

The heavy traffic congestion in the inner area of Metro Manila (inside C-4 or EDSA) needs strengthening of the road network to improve the situation. Important missing road links are under various stages or implementation. Due however, to the heavy roadside developments, widening of existing primary roads are expensive and difficult. The high rate of increase in the transport demand will saturate the road network in the very near future unless expansion of the road network is undertaken.

The establishment of an urban expressway system for Metro Manila and the conduct of a detailed feasibility study of identified priority section is urgently needed to cope up with transport problems. With this view, the Government of the Philippines (GOP) has decided to undertake "the Feasibility Study on Metro Manila Urban Expressway System (the Study)". GOP through Department of Public Works and Highways (DPWH) has sought a technical assistance from the Government of Japan (GOJ) for the Study in May 1990.

In response to the request of GOP, GOJ has decided to provide a technical assistance for the conduct of the Study and exchanged the Notes Verbals with GOP concerning the implementation of the Study. Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of technical cooperation programs of GOJ, has organized and dispatched a Study Team to the Philippines on March 25, 1992 in accordance with the Implementing Arrangement signed on October 31, 1991 between DPWH and JICA Preliminary Survey Mission.

1.2 OBJECTIVES OF THE STUDY

The objectives of the Study are as follows:

- Master plan study shall be conducted on the Intra-Urban Expressway Network System in Metro Manila to select high priority corridors in the system, taking into consideration transportation and infrastructure development plans in this region.
- Feasibility study shall be undertaken on the high priority corridors of the system taking into consideration the resource implication, both physical and financial.

1.3 STUDY AREA

The study area shall cover the whole of Metro Manila.

1.4 STUDY FRAMEWORK

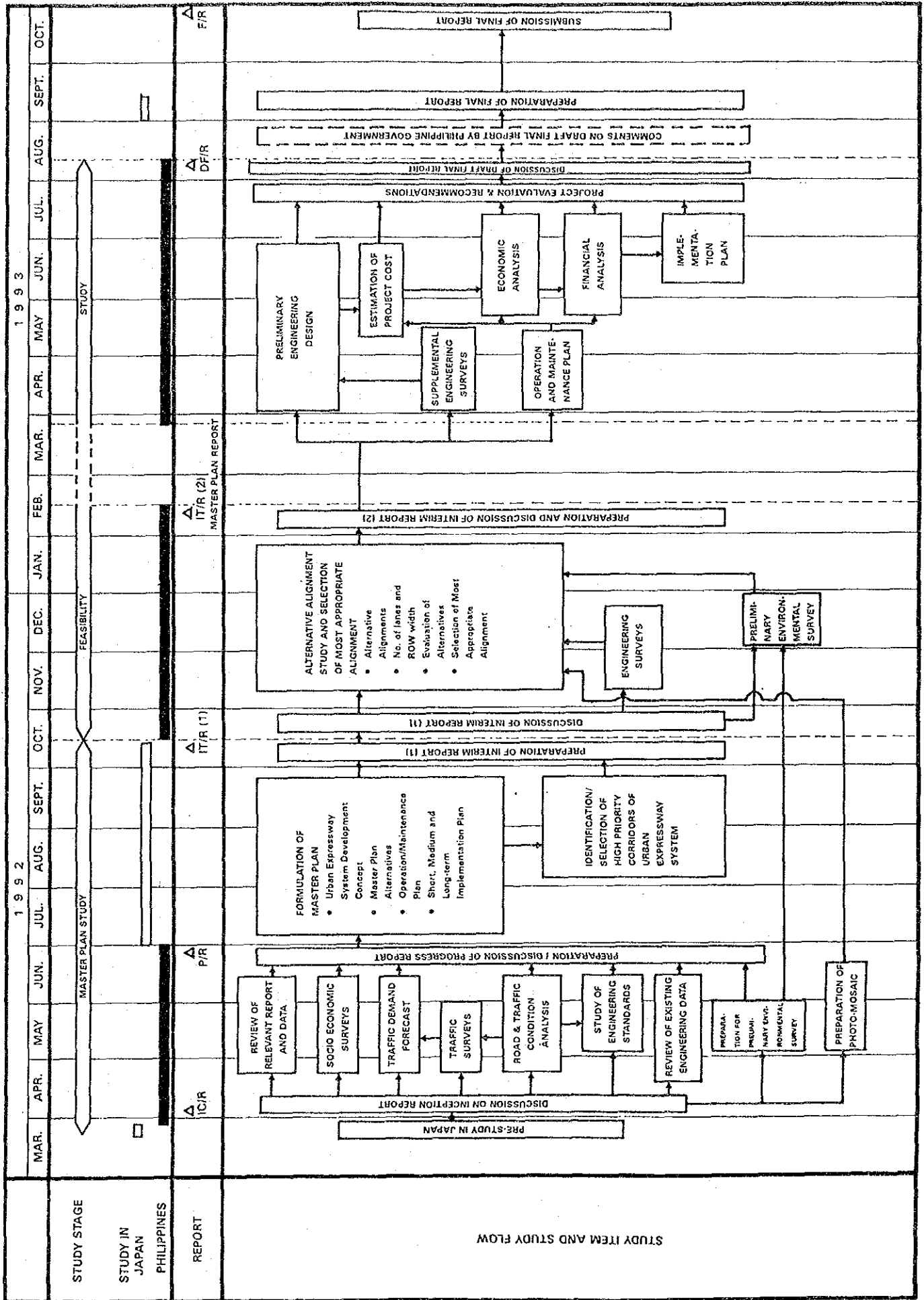
The study will be carried out in two stages, namely:

- Master Plan Study
- Feasibility Study on High Priority Corridors

The study flow diagram is presented in Figure 1.4.1. Major study items, major outputs and time frames are summarized as follows:

STUDY STAGE	STUDY IN	MAJOR STUDY ITEMS	MAJOR OUTPUTS	REPORTS	TIME FRAME
Pre-Study	Japan	<ul style="list-style-type: none"> • Review of Data • Establishment of Study Direction and Methodology 	<ul style="list-style-type: none"> • Basic Study Policy/Direction • Methodology 	• IC/R	March, 1992
Master Plan Study	Philippines	<ul style="list-style-type: none"> • Socio-economic survey • Road/Traffic Conditions Analysis • Traffic Demand Forecast • Study of Engineering Standards • Preparation of Photo-mosaic 	<ul style="list-style-type: none"> • Future Traffic • Existing Transport Problems • Needs of Urban Expressway • Conceptual Plan of Expressway System 	• P/R	April, 1992 to June 1992
	Japan	<ul style="list-style-type: none"> • Formulation of Master Plan • Selection of High Priority Corridors 	<ul style="list-style-type: none"> • Urban Expressway System Master Plan • Short, Medium Long-Term Implementation Plan • High Priority Corridors 	• IT/R (1)	July, 1992 to Oct. 1992
Feasibility Study on High Priority Corridors	Philippines	<ul style="list-style-type: none"> • Alternative Alignment Study • Engineering Surveys • Preliminary Environmental Survey 	<ul style="list-style-type: none"> • Most Appropriate Alignment for Each Corridor 	<ul style="list-style-type: none"> • IT/R (2) • Final Master Plan Report 	Oct. 1992 to Feb. 1993
	Philippines	<ul style="list-style-type: none"> • Preliminary Engineering Design • Economic/Financial Analysis • Project Evaluation • Implementation Plan 	<ul style="list-style-type: none"> • Plan and Profile • Project Cost • Feasibility of the Project • Conclusions • Recommendations • Implementation Plan 	• DF/R	Apr. 1993 to Aug. 1993
Preparation of Final Report	Japan	<ul style="list-style-type: none"> • Revision/Modification of Draft Final Report 	<ul style="list-style-type: none"> • Final Report 	• F/R	Sept. 1993 to Oct. 1993

FIGURE 1.4.1 STUDY FLOW DIAGRAM



1.5 ORGANIZATION FOR EXECUTING THE STUDY

The Study was undertaken jointly by the JICA Study Team and the DPWH Counterpart Team. The Study Team was guided by the Inter-agency Steering Committee and the JICA Advisory Committee. The organization chart is shown in Figure 1.5.1.

The members participated in the Study are listed below:

Inter-agency Steering Committee

Chairman	Teodoro T. Encarnacion	DPWH
Member	Manuel M. Bonoan	DPWH
Member	Jose C. Pendoza (Mar. '92-Mar. '93)	DPWH
Member	Jose F. Almada (Apr. '93-Sep. '93)	DPWH
Member	Bienvenido C. Leuterio	DPWH
Member	Manuel B. Mapa (Mar. '92-Apr. '93)	DPWH
Member	Clarita A. Bandonillo (May-Sep. '93)	DPWH
Member	Godofredo Z. Galano	DPWH
Member	George Esguerra	DOTC
Member	Robert C. Nacienceno	MMA
Member	Miguel L. Afionuevo (Mar.-Dec. '92)	PNR
Member	Antonio C. Garcia (Jan.-Sept. '93)	PNR
Member	Ryogi Hagiwara (Mar. '92-July '92)	DPWH
Member	Yukihiko Tsukada (July '92-Sep. '93)	DPWH

DPWH Counterpart Team

Team Leader	Elisa P. Josen
Highway Engineer	Eden G. Miro
Highway Engineer	Flordeliza S. Barcelona
Traffic/Transport Economist	Florencio Rey M. Alano
Researcher	Hermilayda M. Agor
Researcher	Jocelyn P. Sibayan
Researcher	Richard C. Santillan
Secretary	Isobelle V. Valmonte
Word Processor	Virgilio A. Venturanza, Jr.
Word Processor	Allan M. Laurio
Draftsman	Jessica R. Lozano
Draftsman	Wilfredo A. Buce
Draftsman	Isagani C. Rivera
Draftsman	Armando L. Ignacio
Draftsman	Alfredo R. Reyes
Draftsman	Aniceto C. Sta. Rita

JICA Study Team

Team Leader/Highway Planner	Tsuneo Bekki
Deputy Team Leader/Transport Planner	Shizuo Iwata
Deputy Team Leader/Highway Engineer	Mitsuo Hatakeyama
City/Regional Planner	Masato Koto
Environmental Specialist	Ramon P. Abracosa
Traffic Analyst	Takashi Okamura
Geodetic Engineer	Chifuyu Horiuchi
Structural Engineer	Takashi Okamura
Geo-technical Engineer	Ken Kusano
Cost Estimate/Construction Expert	Yasuaki Muramoto
Transport Economist	Takashi Shoyama

JICA Advisory Committee

Chairman Hideo Tsuji (March 1992 - May 1992)
Chairman Makoto Nakamura (June 1992 - Oct. 1993)
Member Yukihiro Tsukada (March 1992 - June 1992)
Member Hiroyoshi Miyauchi (March 1992 - Oct. 1993)

JICA Headquarters

JICA Project Officer Fumio Ishikawa (March 1992 - April 1993)
JICA Project Officer Toshihisa Hasegawa (May 1993 - Oct. 1993)

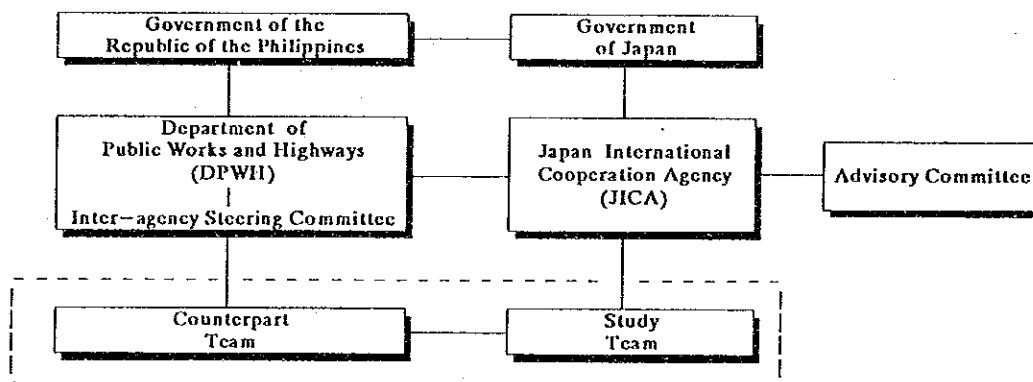


FIGURE 1.5.1 ORGANIZATION CHART

1.6 REPORTS

1.6.1 Reports Prepared

The following reports were prepared and submitted to DPWH during the course of the study:

- Inception Report April 1992
- Progress Report June 1992
- Interim Report (1) October 1992
- Master Plan Report February 1993
- Interim Report (2) February 1993
- Draft Final Report August 1993

1.6.2 Organization of the Final Report

The final report is organized as follows:

Volume I	:	EXECUTIVE SUMMARY
Volume II	:	MAIN TEXT (MASTER PLAN)
Volume III	:	MAIN TEXT (FEASIBILITY STUDY)
Volume IV	:	APPENDICES
Volume V	:	DRAWINGS

This report presents Volume II, MAIN TEXT of the Master Plan for Metro Manila Urban Expressway System and consists of nine (9) chapters which are outlined as follows:

- CHAPTER 2:** presents present status of Metro Manila, urbanization trend and urban development policy and framework,
- CHAPTER 3:** presents current urban transport demand, status of roads and road transportation and public transportation,
- CHAPTER 4:** presents transportation demand forecast for years 2000 and 2010,
- CHAPTER 5:** presents urban expressway planning opportunities and directions and provides necessary data and information for developing alternative expressway network and formulating master plan,
- CHAPTER 6:** presents alternative schemes for expressway network and selection of the most appropriate plan,
- CHAPTER 7:** presents detailed discussions on recommended expressway network system,
- CHAPTER 8:** presents evaluation of recommended expressway network system,
- CHAPTER 9:** presents recommendation on urban expressway implementation,



CHAPTER 2
URBAN DEVELOPMENT

CHAPTER 2

URBAN DEVELOPMENT

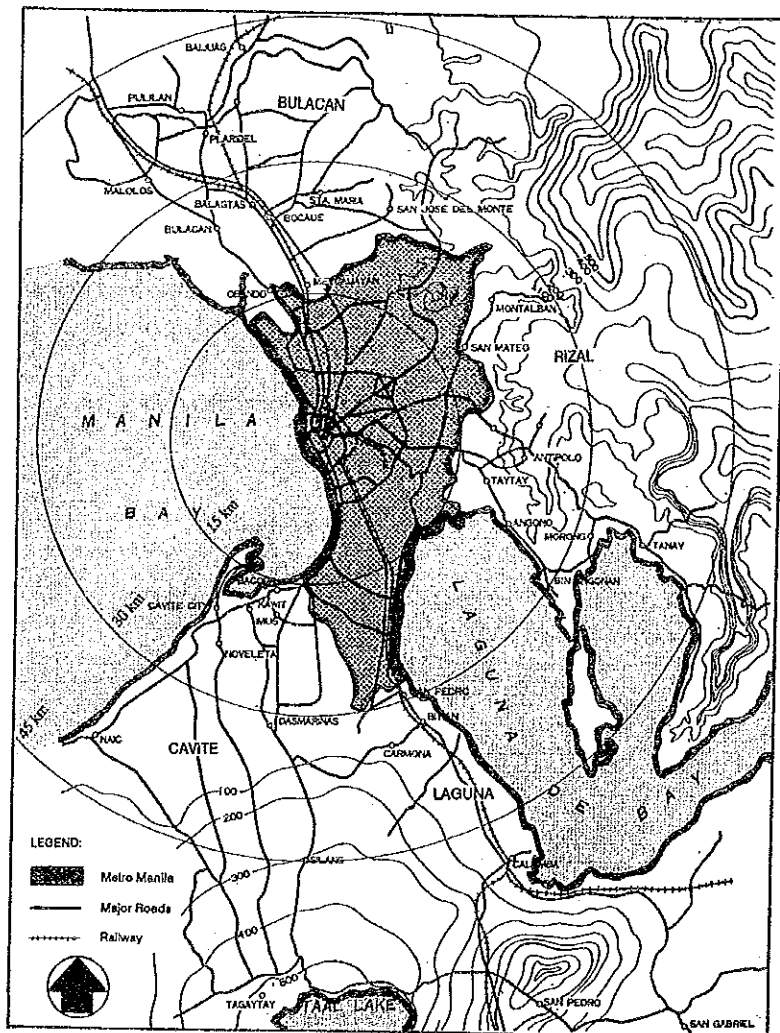
2.1 PROFILE OF METRO MANILA

1) Location

The Metropolitan Manila Area, called as the National Capital Region or Metro Manila, comprises four cities and thirteen municipalities, encompassing an area of 636 sq. km. Metro Manila is strategically located in the center of Luzon Island, linking the northern sector and the southern sector of Luzon Island. The growth of Metro Manila has spilled over to the adjoining provinces of Bulacan, Rizal, Laguna and Cavite, integrating significant portions as an actual part of the Metropolitan Manila Area. (Refer to Figure 2.1.1).

Geographically, Metro Manila is composed of flat lowlands along the coastal area, a valley in the eastern side, and relatively high grounds called Guadalupe Plateau in between flat low lands and the valley, extending from north to south.

FIGURE 2.1.1 LOCATION OF METRO MANILA



2) Urban Structure

The development of Metro Manila can be traced from the center of the City of Manila. As the years passed, Manila evolved into a major urban center. Other urban centers that have been developed through the years include Cubao, Makati and Ortigas.

Metro Manila's present population of 8 million has triggered the rapid growth of urbanization beyond EDSA. Areas such as Novaliches, Marikina, Pasig and Alabang are growing as major suburban centers. In the 1980s, the pressure of urbanization was outside Metro Manila, such that a strong link was established with the following areas: Meycauayan, Antipolo, Carmona and Cavite.

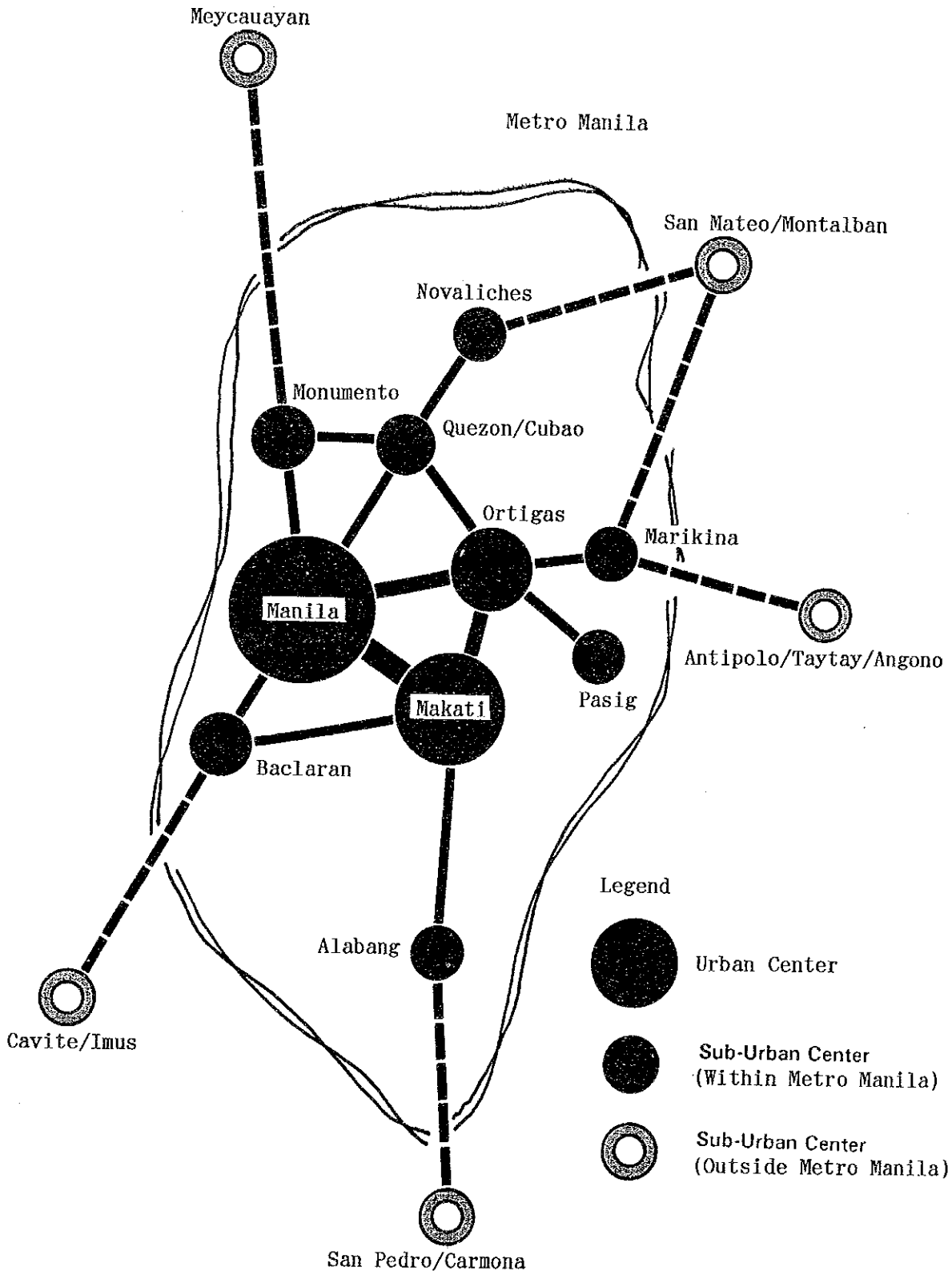
Therefore, the present urban structure of Metro Manila may be described as a radial-satellite pattern, with the City of Manila, Makati and Cubao/Ortigas in the center, as depicted in Figure 2.1.2 and outlined below:

As commonly observed in large urban areas which are only served by roads, the growth of a strong CBD is limited due to constrained accessibilities. In the case of Metro Manila, the traditional CBD in Manila seems to have reached more or less its saturation level around 1980, while other sub-urban centers have grown rapidly, especially along EDSA, which has large transport capacities. Especially, some urban centers developed at the strong initiative of the private sector such as Makati, Ortigas, Cubao, etc., contribute to the development of an adequate hierarchical urban system greatly.

Along with major transport corridors, suburban centers have further developed and linked with those in Metro Manila. As the actual urban areas of Metro Manila extend beyond its administrative boundary, the adjoining areas in Cavite, Laguna, Rizal, and Bulacan have been getting integrated with the metropolitan system.

It is anticipated that the growing unconventional CBDs, especially Makati and Ortigas would play more and more important role in the future to such an extent that they would affect the traffic distribution significantly. Limited accessibilities due to almost total reliance to road transport, other urban/suburban centers would also farther grow continuously.

FIGURE 2.1.2 PRESENT URBAN STRUCTURE OF METRO MANILA



3) Socio-Economic Characteristics

a) Overall Socio-Economic Profile

Despite the decentralization and regionalization thrusts of the government, Metro Manila still exerts a dominant influence on the rest of the country. It is the center of administration and socio-economic activities. (Refer to Table 2.1.1).

TABLE 2.1.1 METRO MANILA'S SOCIO-ECONOMIC INDICES

ITEM	YEAR	METRO MANILA	PHILIPPINES	% SHARE OF MM
1. Area: sq km	—	636	300,000	0.2
2. Population: 000 persons	1990	7,929	60,685	13.1
3. Population Density: /sq km	1990	12,467	202	—
4. Population Growth Rate: %/year	1980 – 1990	2.95	2.35	—
5. GDP: Billion Pesos	1989	310	937	32.0
6. GDP Growth Rate: %/year	1985 – 1989	5.7	4.5	—
7. Per Capita GDP: Pesos	1989	39,914	16,040	—
8. Employment: 000 persons (%)	1990	2,718	22,532	12.0
– Primary	1990	41 (1.5)	10,323 (45.8)	0.4
– Secondary	1990	759 (27.9)	3,253 (14.4)	23.0
– Tertiary	1990	1,918 (70.6)	8,956 (39.8)	21.0
9. Unemployment Rate: %	1990	14.1	8.1	—
10. Underemployment Rate: %	1990	13.1	22.1	—
11. Incidence of Poverty: %	1988	31.8	49.5	—
12. Monthly Family Income: Pesos	1988	6,610	3,367	—
13. Inflation Rate: %/year	1990	14.9	12.7	—
14. No. of Motor Vehicles (MVs) Registered	1990	685	1,620	42.0
15. Growth Rate of MVs Registered: %/year	1985 – 1990	8.1	7.7	—
16. No. of Cars Registered	1990	307	455	67.0
17. Growth Rate of Cars Registered: %/Year	1985 – 1990	6.7	5.5	—

Source: 1991 Philippine Statistical Yearbook

b) Population

It is estimated that the NCR currently has a population of 8.0 million. This excludes the transient workers and students temporarily residing in the city.

Based on the 1980 census, it is estimated that about 40 percent of the annual population increase in Metro Manila is attributed to migration. Population density is currently estimated at 125 persons per hectare.

c) Regional Economy

Metro Manila's economy slowly recovered from the slump experienced in 1984 to 1986 and posted a 6.1 percent average annual growth between 1986 to 1988. In absolute terms, the real regional output improved from P23.5 million in 1986 to P31.0 million in 1988 (1972 prices). (Refer to Figure 2.1.3).

The economy of the NCR is dominated by the tertiary sector and secondary sector. The former shares 63% of the gross regional domestic product while the latter, 37%. In addition to these formal sectors, it is to be noted that the shares of the various services of the informal sector are also significant, directly and indirectly affecting urban and transportation developments in Metro Manila.

FIGURE 2.1.3 GROWTH TRENDS OF NCR ECONOMY

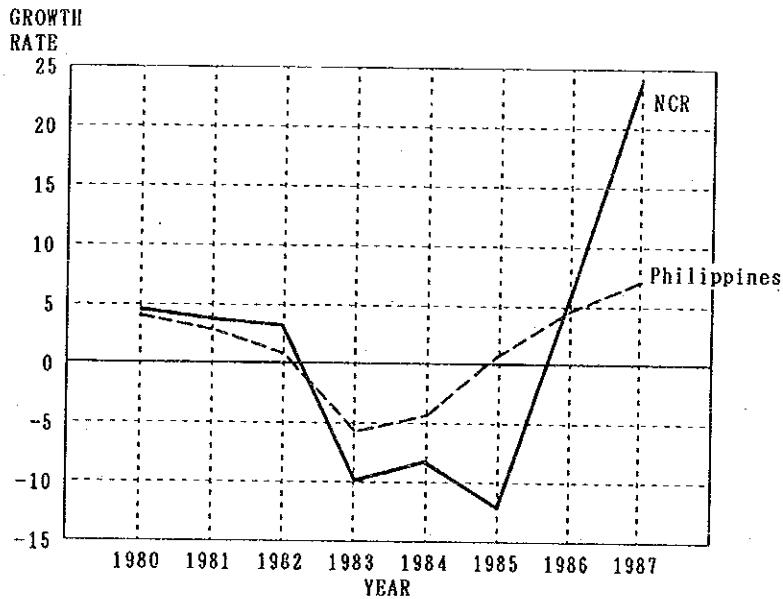
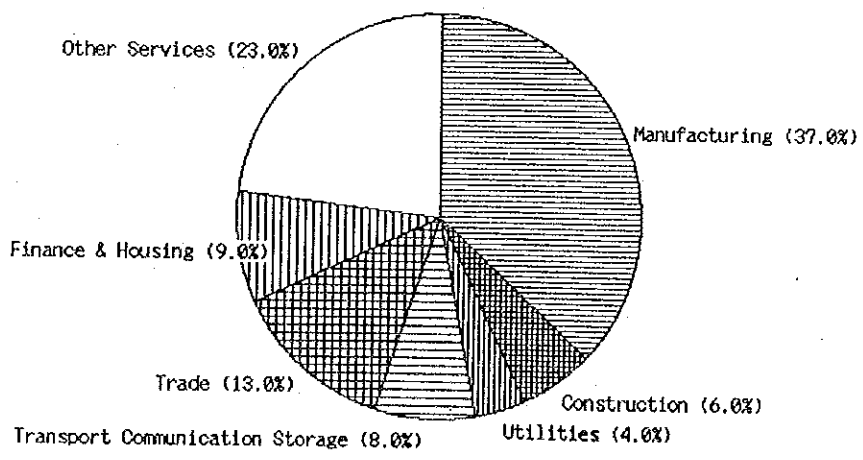


FIGURE 2.1.4 SECTORAL COMPOSITION OF NCR ECONOMY (1988)



d) Family Income

The average annual income of NCR families is P62,300 (in 1985 price), nearly double the national average or about 20% higher than that of other urban areas. The average income has grown only by about 9 percent in real terms between 1985 and 1988. (Refer to Table 2.1.2).

**TABLE 2.1.2 AVERAGE ANNUAL INCOME AND EXPENDITURES
PHILIPPINES AND NCR, 1985 AND 1988**

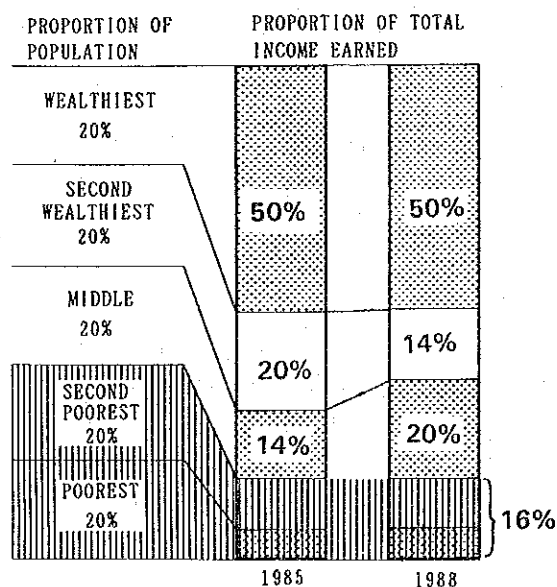
YEAR	ITEM	PHILIPPINES			NCR
		TOTAL	URBAN	RURAL	
1985	No. of Families ('000)	9,847	3,726	6,121	1,311
	Average Income (P)	31,052	46,127	21,875	57,193
	Average Expenditure (P)	26,865	39,134	19,397	48,453
1988	No. of Families ('000)	10,666	4,079	6,587	1,431
	Average Income (P) 1/	34,933	51,833	24,487	62,323
	Average Expenditure (P) 1/	28,326	41,100	20,416	48,537

Source: Medium-term National Capital Region Development Plan,
1990 - 1994 (Metro Manila Commission)

1/ In 1985 price

Results of the 1988 Family Income and Expenditure Survey shows that the income of the poorest 40 percent of households in Metro Manila has remained static at 16 percent of total income from 1985 to 1988 while the income of the middle 50th to 60th percentile groups has improved from 14 percent to 20 percent of total income during the same period. On the other hand, the income received by the 70th to the 80th percentile groups contracted from 20 to 14 percent of total income. The income earned by the wealthiest 20 percent of NCR households remained static at about 50 percent of the total income. (Refer to Figure 2.1.5)

FIGURE 2.1.5 TRENDS IN THE DISTRIBUTION OF FAMILY INCOMES, 1985 & 1988



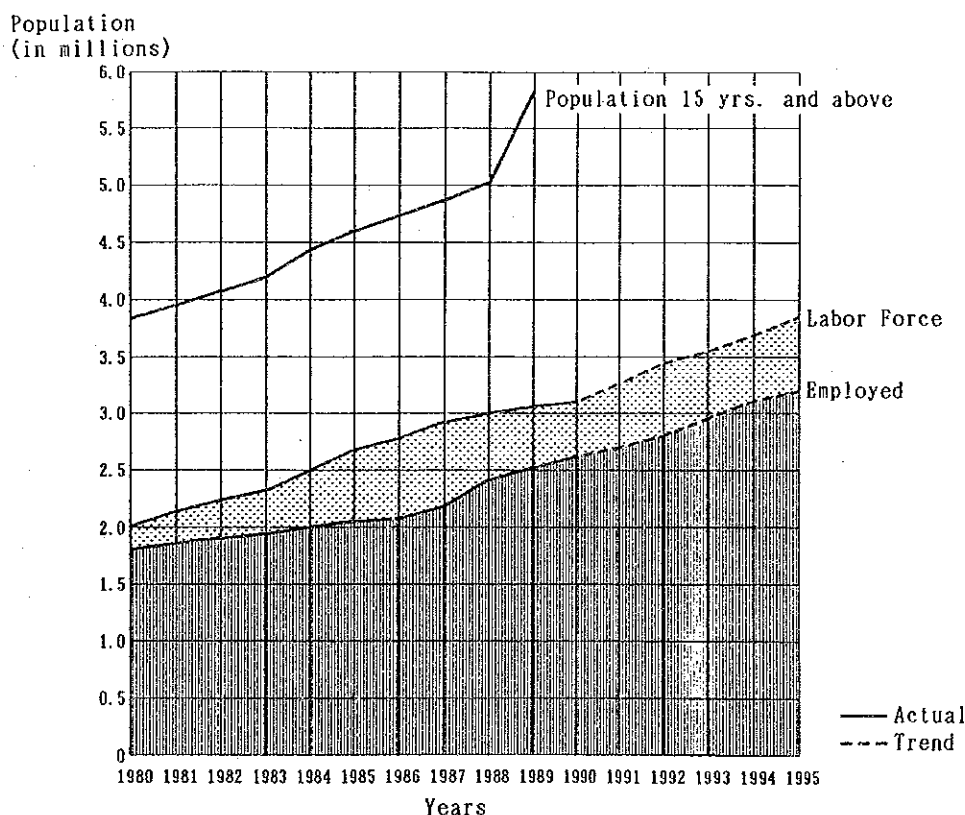
e) Labor Force, Employment, and the Informal Sector

The labor force of Metro Manila in 1989 is estimated at 3.1 million people, increasing at an annual average rate of about 3 percent in the last three years. This is about 60 percent of the working age population. In 1989, 82 percent of the labor force is employed, an improvement back to the 1982 levels of 82 percent. Employment rate was at its highest in 1980, reaching 87 percent. Unemployment levels ranged between 18 to 22 percent in the last three years. The highest was in 1986 at 26 percent. (Figure 2.1.6).

Between 1986 to 1988, 52 percent of workers were employed in the services sector, 47 were in the industry sector, and only 1 percent in the agricultural sector. The big shift in the employment generation from industry to services has been taking place.

The growth of the informal sector became prominent during the 1983-1986 period when unemployment rose due to closures and retrenchments of many manufacturing and other industrial firms. At this time, the informal sector provided an alternative means of livelihood for most of the laid-off workers in Metro Manila.

FIGURE 2.1.6 EMPLOYMENT SITUATION, 1980 - 1995



2.2 URBANIZATION TREND

1) Present Land Use

Existing landuse is conceptually understood as shown in Figure 2.2.1 and described briefly as follows:

a) Residential Use

Comparable to most dense and mature urban areas, the paramount use of land in the region is for residential purposes. Totalling 37%, these include the approximately 300 hectares occupied by slum and squatter communities. Over the years, residential areas developed as follows. The poorer, older, and higher density housing area are located closer to the old commercial districts. The new residential areas characterized the outskirts and suburbs, the outer rings of Metro Manila and infill sites in the urban core. This has created several distinct centers of activity.

b) Commercial Use

Land utilized for commercial uses encompass 5% of the metropolitan area. The old commercial districts of the City of Manila, chiefly concentrated in Ermita/Malate, Quiapo, Divisoria, Sta. Cruz, Binondo, and Tondo have lost their premiership. Their vitality is still strongly supported by the mass market, but because of age, the need to renew the area, now termed as the Central Business District, is vastly perceived to be implementable.

The huge population and the congested traffic conditions of Manila were factors which initiated the dispersal of commercial areas during the 1970's. New commercial activities developed outside the original city. These occurred in and around new regional nodes, first in Cubao and the Balintawak Area in Quezon City, at Makati and at Greenhills in San Juan. New fast-paced developments are seen at the intersections of North Avenue, Ortigas Avenue, and Shaw Boulevard with EDSA and the Ortigas Center in Pasig.

c) Industrial Use

Industrial landuse in Metropolitan Manila is characterized by strong concentrations in certain districts, mostly, along waterfront areas taking advantage of waterways as mode of transportation. A second concentration of industrial uses are located along major arteries -- MacArthur Highway, Quirino Highway, and Tandang Sora in the north and along Pasong Tamo and Manila South Expressway. Another discernible spread of industrial uses is the dispersion of small-scale industries throughout the urban fabric. This prominent feature has continued to sustain the economy of the region.

d) Institutional Use

Five percent of the total urban area is occupied by institutional facilities. Over the years educational institutions, health centers, cultural facilities and military institutions are dispersed throughout the Manila Metropolitan Area. The government's policy of decentralization and the lack of government-owned facilities in the area hastened this trend.

e) Open Space

Although existing landuse allocation studies list 35% of the metropolitan area as open space, these include vacant lands at the periphery which are essentially unserviced and undeveloped lands, cemeteries, and golf courses. Included within this category are pocket parks and major playgrounds of the region. One percent of the total land area of Metropolitan Manila is occupied by utility stations and facilities while a residue of 12% are still devoted to agriculture and food production.

Present development trends see the in-filling and intensification of landuses within the Metropolis. This is evidenced by the construction of high-density townhouses and condominiums within the mature sections of the urban core adjacent to major arterials. Development trends in the future will also see the renewal and redevelopment of large-scale mixed-used development in strategic locations of the metropolis, particularly in the old Central Business District, at the intersections of the main arterial roads with EDSA and at LRT stations.

With the pressure from the growing population that is expected to increase by about 25% within the next 20 years, urban sprawl will continue and subsequently spur the development of low-density subdivisions in the peripheral areas of the metropolis. The concomitant growth of economic and human activities will further trigger increased demand for space and consequent increase in the price of land. With this situation, there will be redevelopment of low-density landuses such as those happening in the Makati, San Juan and Mandaluyong areas.

The Metro Manila military camps located within the mature urban sections of the region are among the areas presently under-utilized. Located at strategic sections of the region, they offer fresh and varied opportunities for development.

FIGURE 2.2.1 CONCEPT OF EXISTING LANDUSE

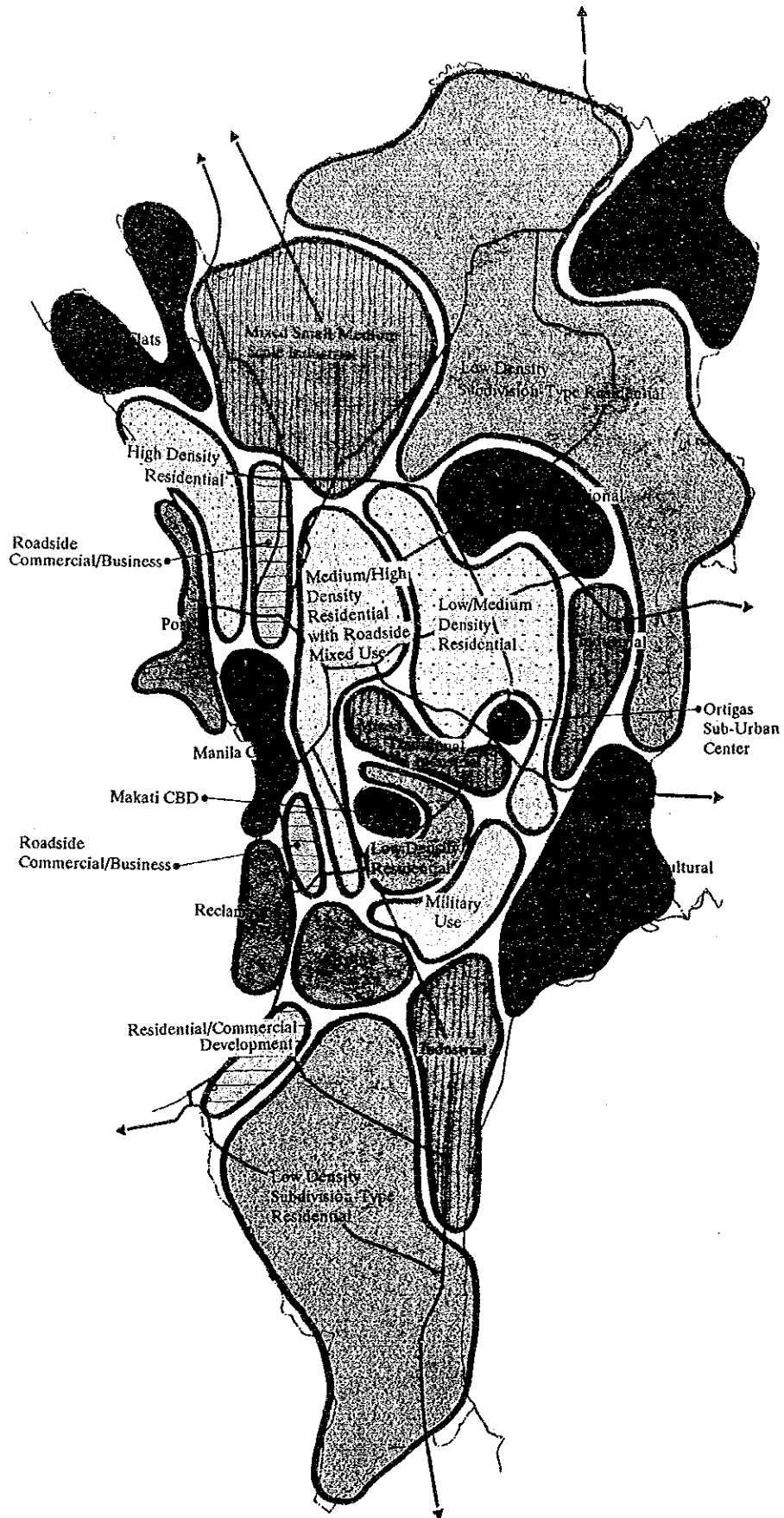
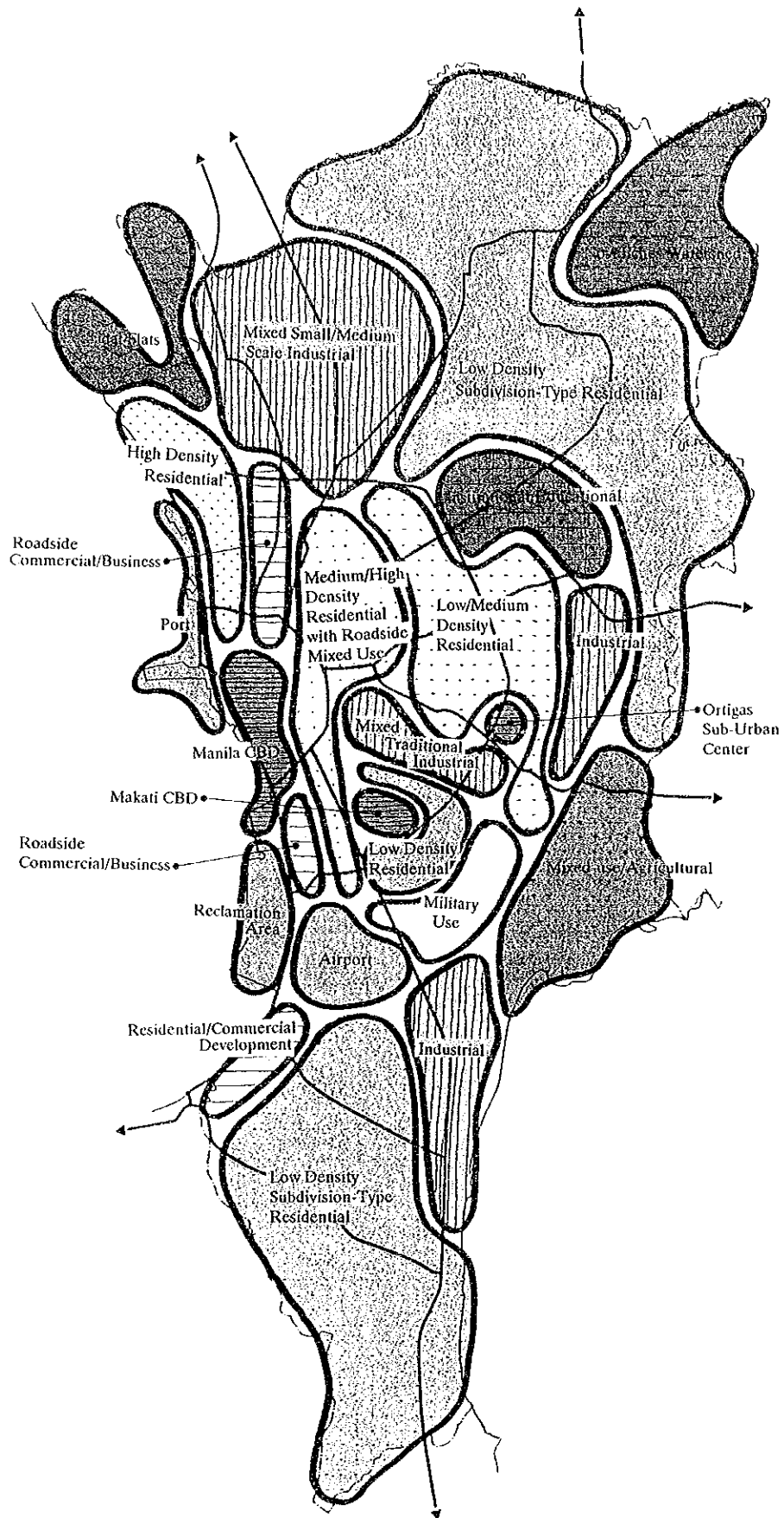


FIGURE 2.2.1 CONCEPT OF EXISTING LANDUSE



2) Urbanization Trend

Population and its distribution, among other things, determines the extent of urbanization, thus a close look into the trend of Metro Manila's population from 1960 to 1990 was undertaken based on NSO's data and graphically plotted as shown in Figure 2.2.2.

The share of Inside EDSA to the Metro Manila total decreased from 74% to 51% while that of Outside EDSA increased to almost thrice as much from 1960 to 1990. On the otherhand, a gradual increase in the share of EDSA Fringe was seen, from 16% to 22%. As regards density, Inside EDSA is the most densely inhabited area as it includes the City of Manila. The EDSA Fringe, with its well developed subdivisions comes second, followed by Outside EDSA. Annual growth rates are on a downward trend. Outside EDSA, which had a high of 9.10 went down to 6.54%.

Another factor to consider in urbanization is landuse. Based on the existing landuse and previous landuse studies, the past trend of urbanization (1975-1990) is described as follows:

- a) Urbanization extends not only to the entire Metro Manila area but outside Metro Manila as well, such as Meycauayan (north), Cainta (east), and San Pedro (south). (Refer to Figure 2.2.3).
- b) Population has been spreading towards the outer areas rapidly, while it has started to decrease in the inner areas. (Refer to Figure 2.2.4).
- c) Employment in many of the inner areas, except some major growth centers, has been declining together with population. Strong concentration is observed in areas along EDSA. (Refer to Figure 2.2.5).
- d) Commercial land use spread mostly to the north and south, proportionate with urbanization. Big commercial complexes were constructed, especially along EDSA, during the last 15 years. (Refer to Figure 2.2.6).
- e) Most of the industrial development occurred in the mid-1980s as a result of MMA's landuse policies and the rapid distribution of population, leaving no more room for further developments in the 1990s. (Refer to Figure 2.2.7).

The major areas where industrial facilities are concentrated include the following:

- Along MacArthur Highway
- Balintawak
- North Expressway/Bagbaguin Road
- Along Pasig River (from Manila Bay to EDSA)
- Along Marikina River (from Pasig River to Aurora Blvd.)
- EDSA/South Superhighway
- Along South Superhighway (from Sucat to Alabang)

FIGURE 2.2.2 POPULATION TREND (1960 - 1990)

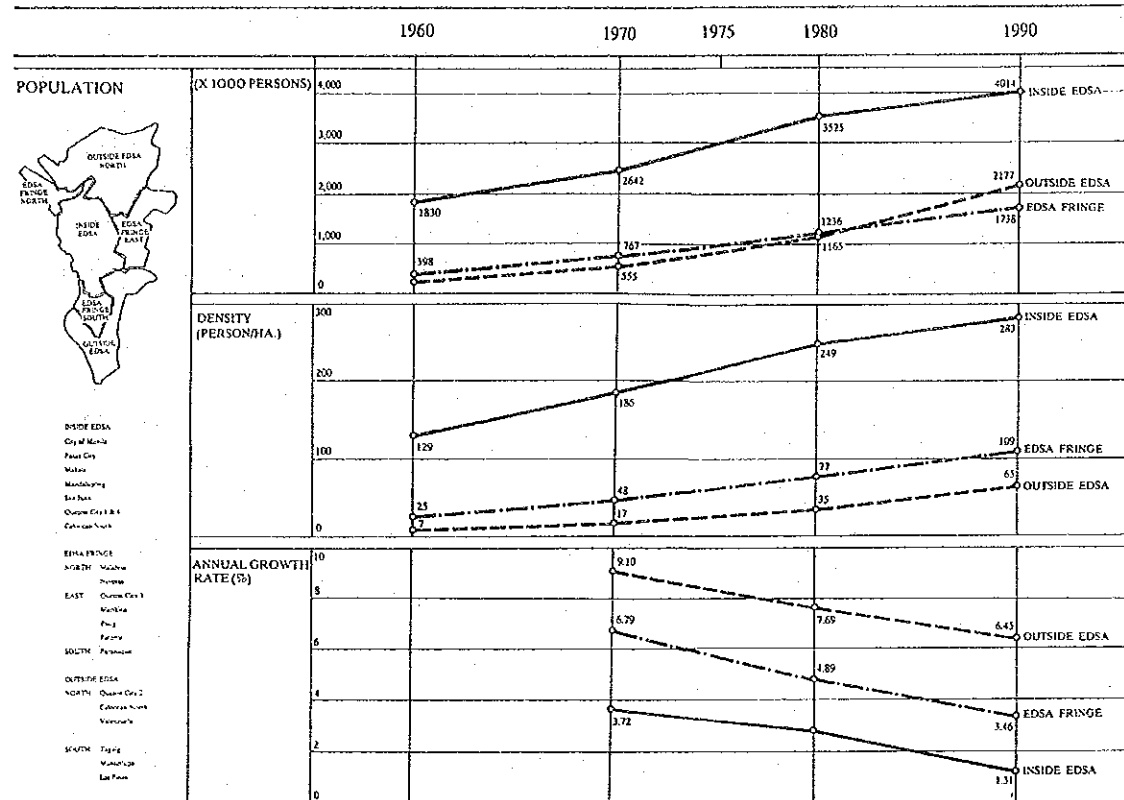


FIGURE 2.2.3 TREND OF URBANIZATION (1975 - 1990)

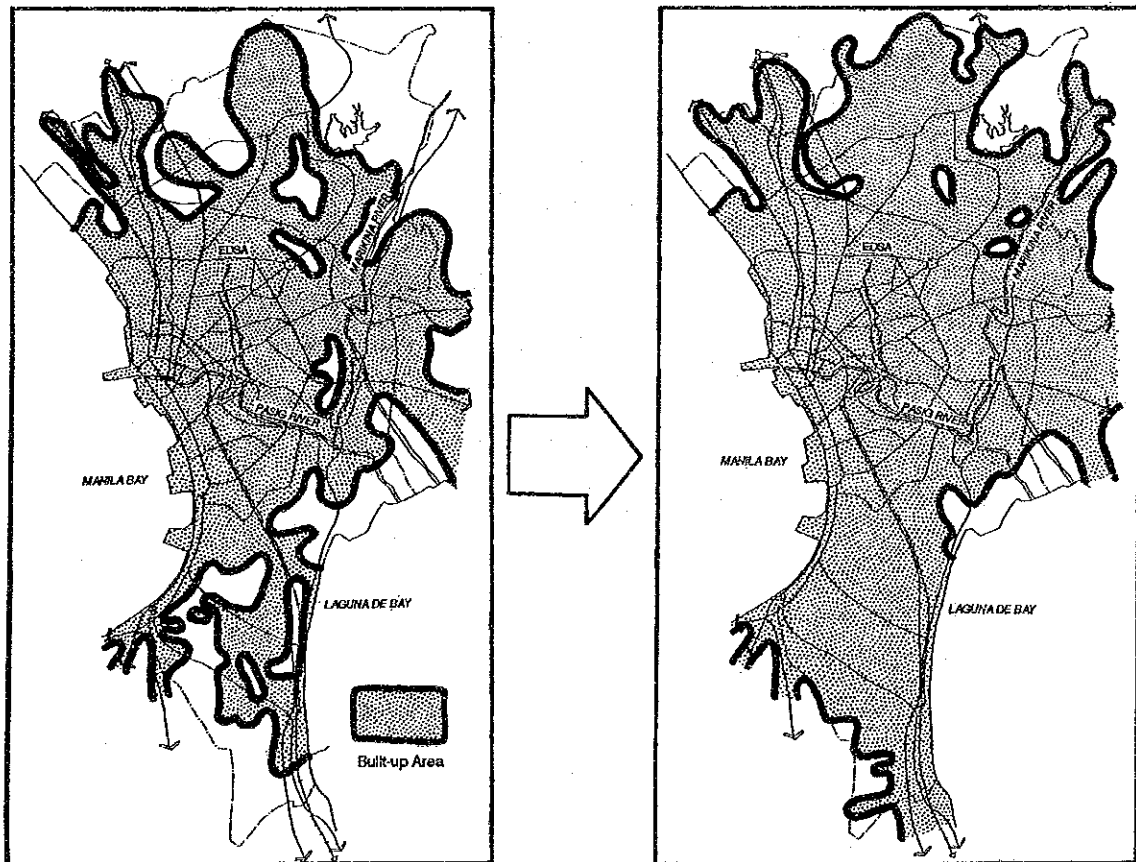


FIGURE 2.2.4 CHANGES IN POPULATION DISTRIBUTION BETWEEN 1980 AND 1990

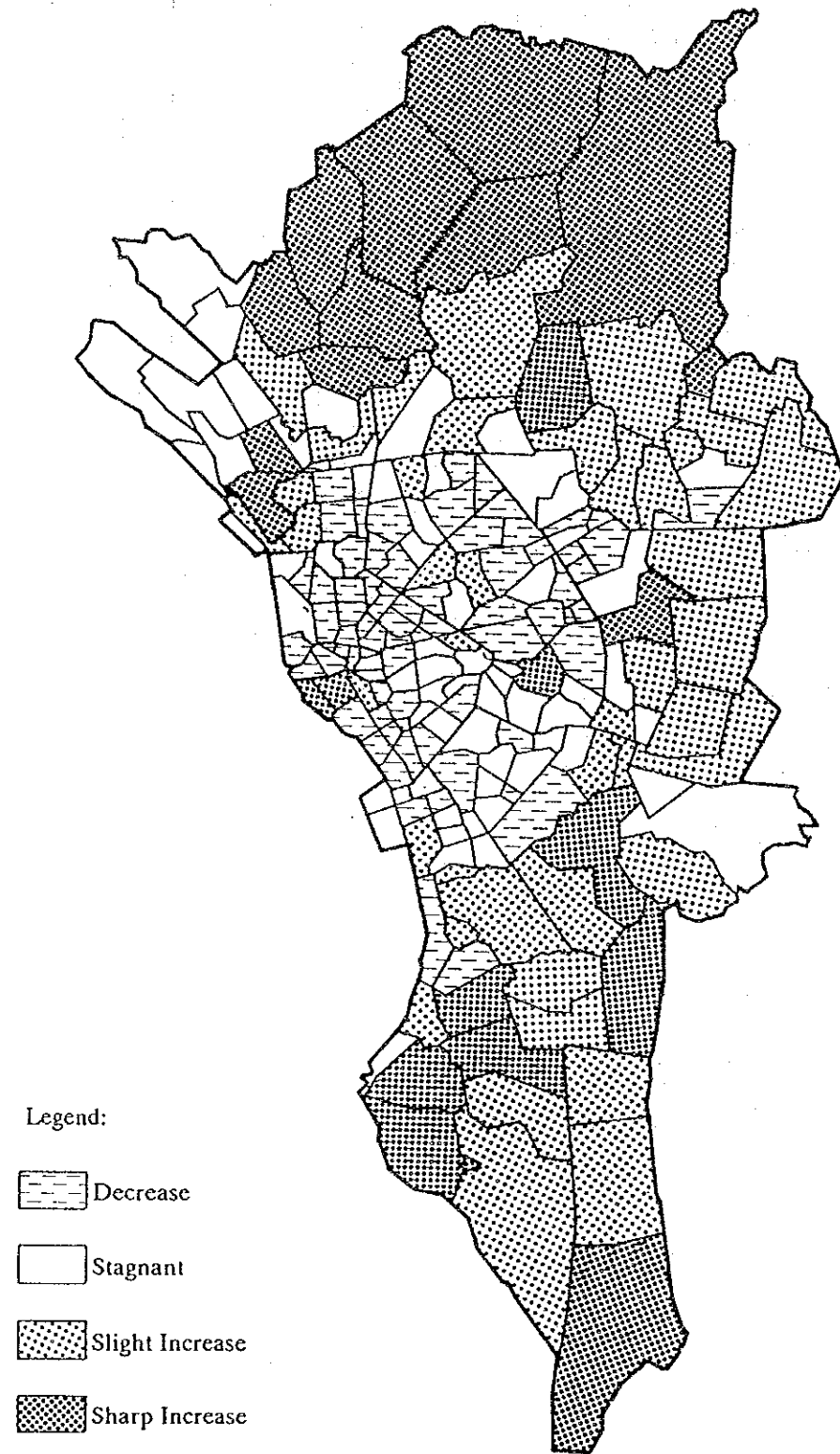


FIGURE 2.2.5 CHANGES IN EMPLOYMENT TREND BETWEEN 1980 AND 1990

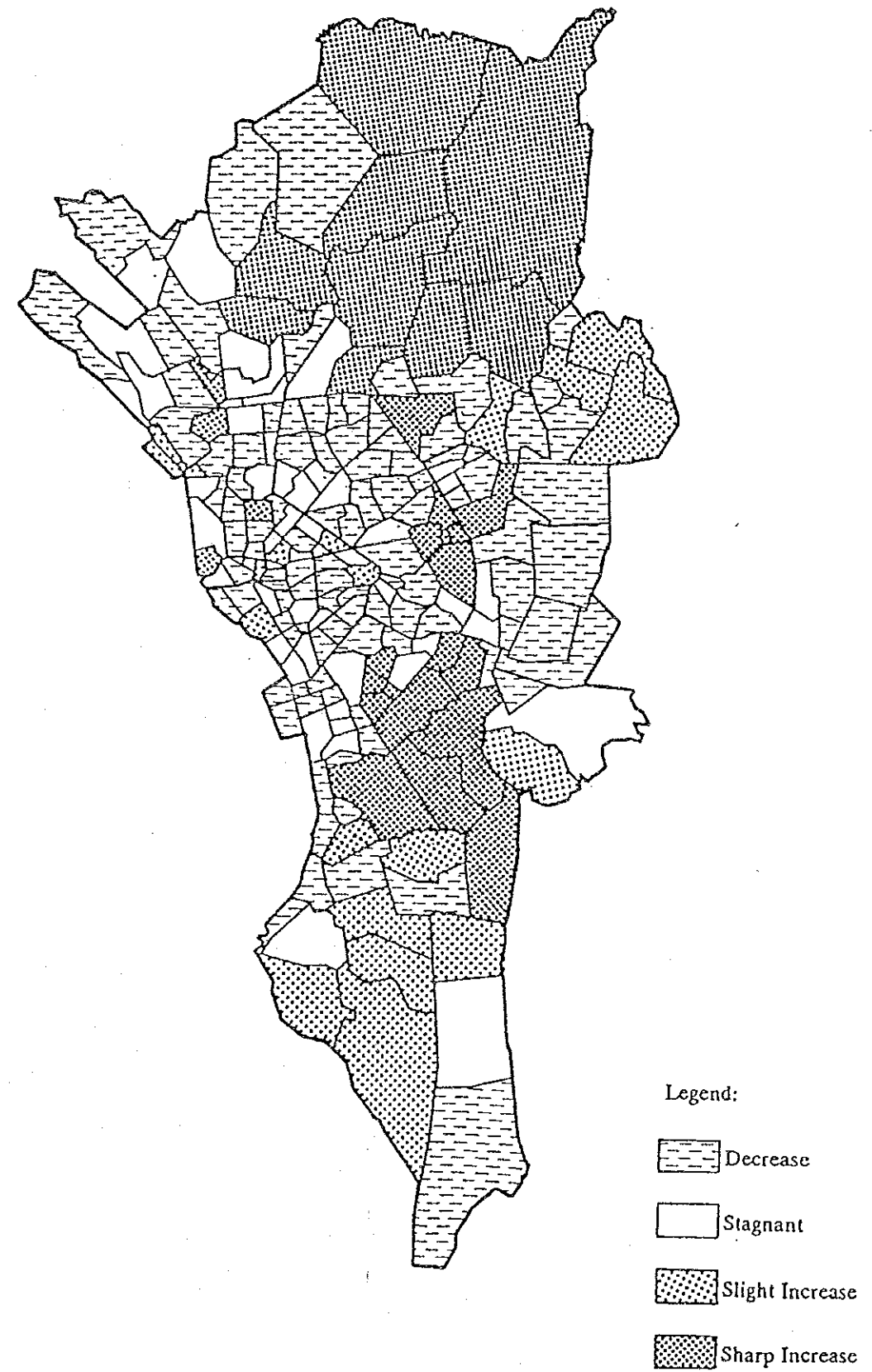


FIGURE 2.2.6 TREND OF COMMERCIAL USE (1975 AND 1990)

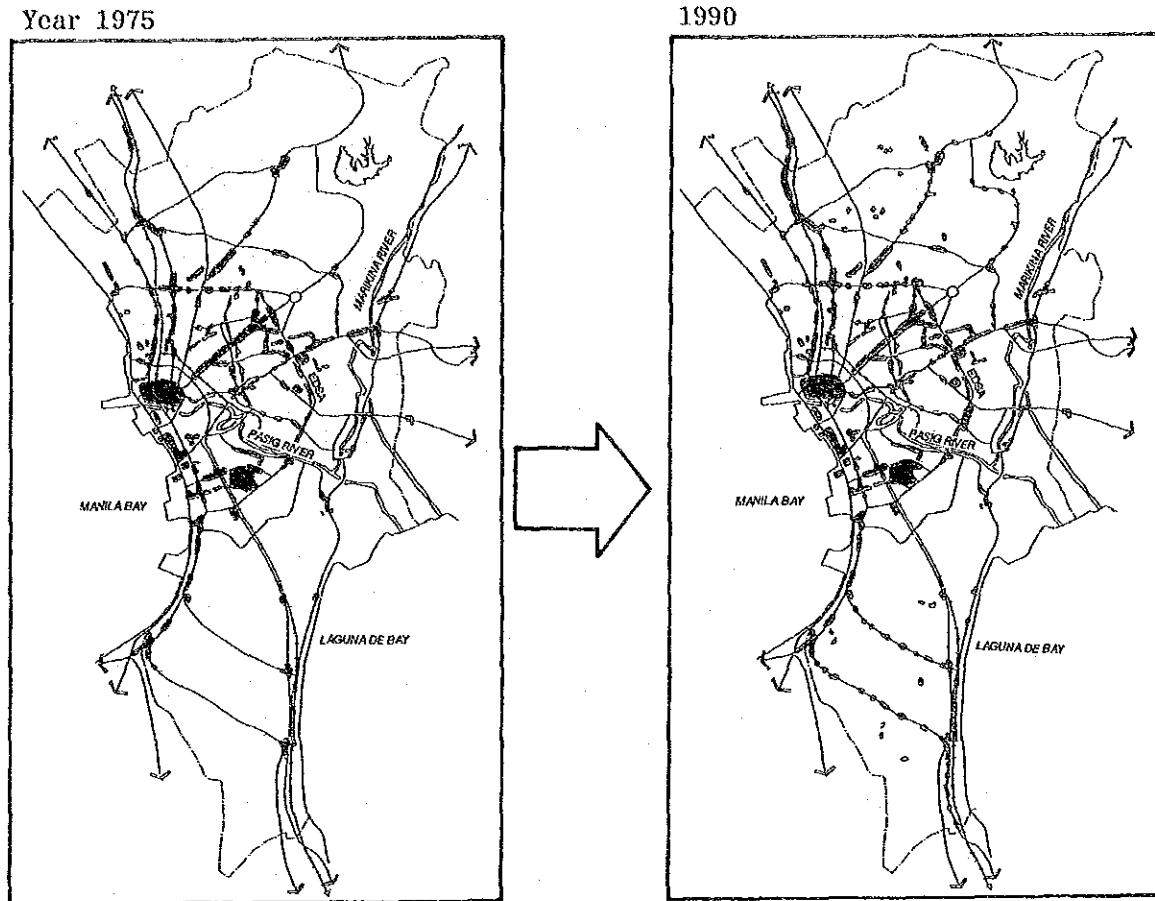
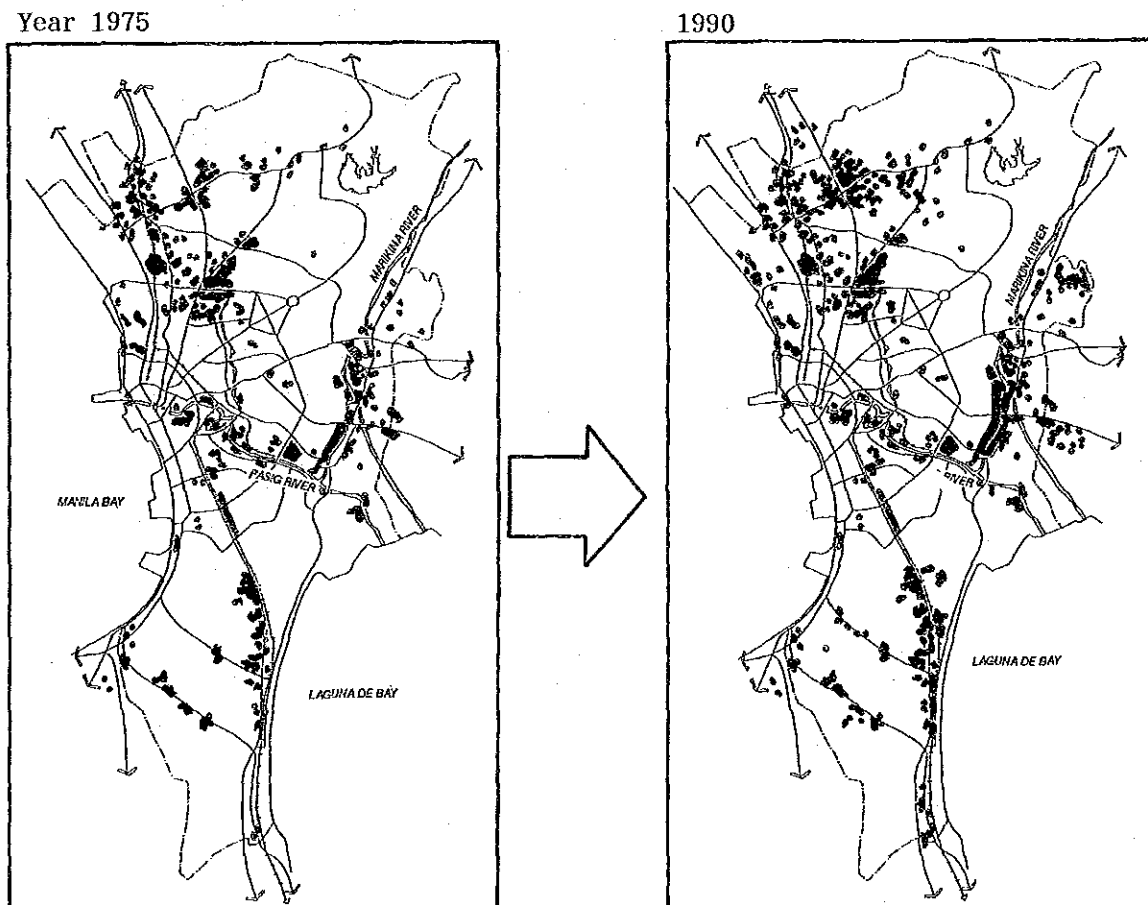


FIGURE 2.2.7 TREND OF INDUSTRIAL USE (1975 - 1990)



3) Major Traffic Generating Sources

Major traffic generating sources in Metro Manila are composed of existing developments and planned developments, which are briefly explained as follows:

- (a) **CBD:** In addition to the traditional Manila CBD, the Makati CBD, which has been growing rapidly and becoming the most important urban center of Metro Manila and the Ortigas sub-CBD provide wider urban function.
- (b) **Suburban Center:** As urbanization progresses, urban centers in suburban areas have started to grow including Novaliches, Alabang, Marikina, and Pasig.
- (c) **Commercial Complexes:** Urbanization also encourages the growth of traditional complexes and the development of various planned commercial complexes. They are Araneta Center, EDSA North, Monumento, Greenhills, ABC Guadalupe, Magallanes, Ayala-Alabang, Pamplona, Harrison Plaza, etc.
- (d) **Industrial Estate/Zone:** The major ones are those along MacArthur Highway, the Balintawak area, the areas along North Expressway/Bagbaguin Road, the areas along the Marikina River and Pasig River, the areas along South Superhighway, etc.
- (e) **Institutional Complex:** Diliman/Lawton area is a significant area where a large number of institutions are located.
- (f) **Transport Terminals/Distribution Center:** They include ports, airports, bus terminals, and goods distribution centers.

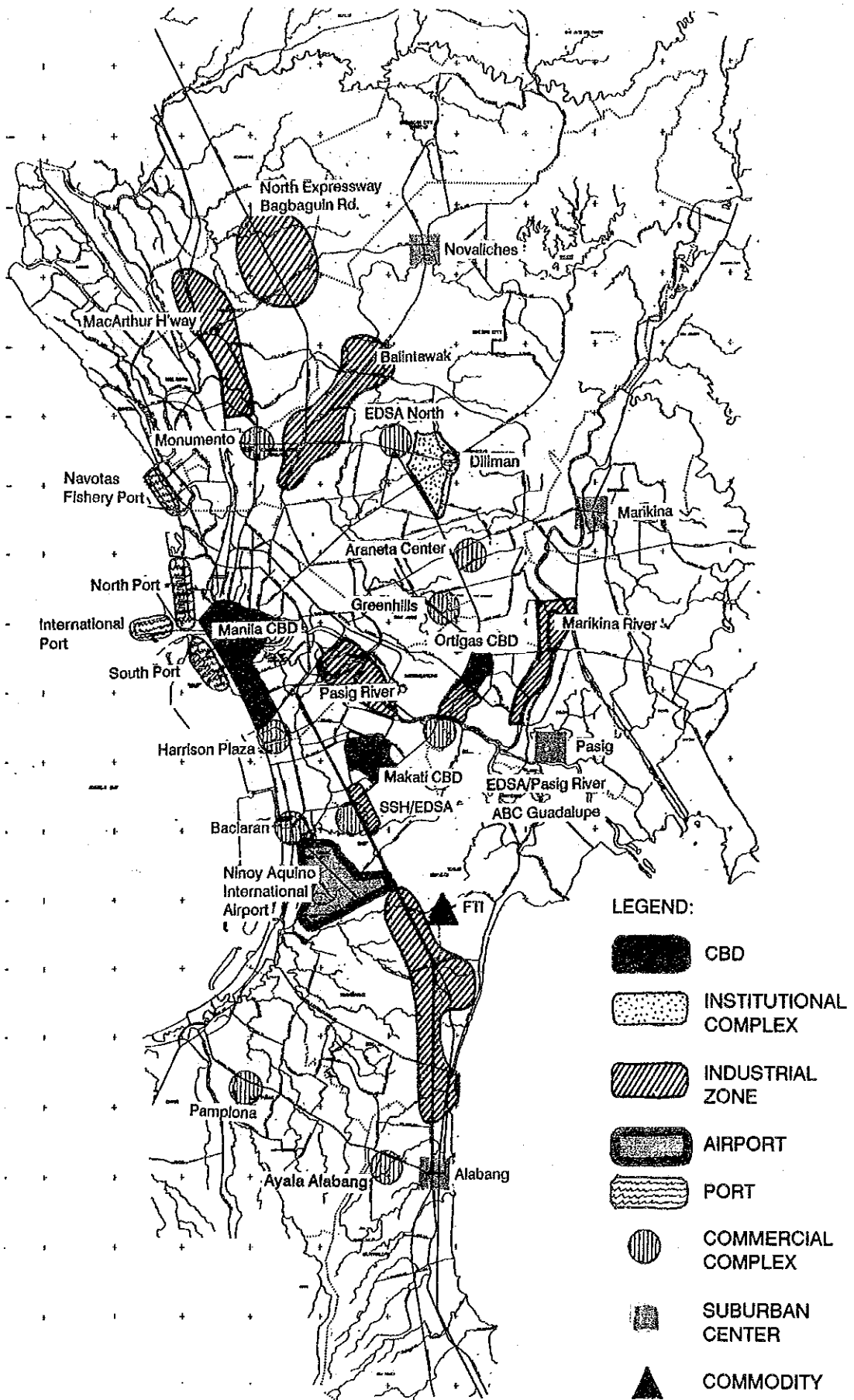
The existing major developments are summarized in Table 2.2.1 and their location are approximately shown in Figure 2.2.8.

The developments considered as major traffic generating sources distribute along the coast, north and south expressways, EDSA and Marikina River. While commercial complexes distribute along EDSA, industrial activities abound along the north/south expressways.

TABLE 2.2.1 EXISTING MAJOR DEVELOPMENT AS TRAFFIC GENERATION SOURCES

CATEGORY	DEVELOPMENT	DESCRIPTION
CBD	1) Manila CBD	Traditional major urban center
	2) Makati CBD	Modern urban center (approx. 600 ha.)
	3) Ortigas Sub-CBD	Modern urban center (approx. 200 ha.)
Suburban Center	1) Novaliches	Fast growing suburban commercial/business area
	2) Alabang	Fast growing suburban commercial/business area
	3) Marikina	Traditional suburban town center
	4) Pasig	Traditional suburban town center
Major Commercial Complex	1) Araneta	Major commercial/amusement center (35 ha. floor area)
	2) EDSA North	Lately developed new commercial center
	3) Monumento	Traditional commercial center
	4) Greenhills	Modern commercial complex
	5) ABC Guadalupe	Medium size commercial complex
	6) Magallanes	Medium size commercial complex
	7) Ayala Alabang	Medium commercial complex
	8) Pamplona	Medium size commercial complex
	9) Harrison Plaza	Modern commercial complex
Major Industrial Estate/Zone	1) MacArthur Highway	Large/medium industries such as paper and textile mills with mixed use
	2) Balintawak	Large/medium-scale industries such as machinery with mixed use (industrial/residential)
	3) North Expressway/ Bagbaguin Road	Large/medium-scale industries such as agro-industries with mixed use
	4) Marikina River	Well-planned, large-scale industrial estate
	5) Pasig River	Traditional industrial area within EDSA
	6) EDSA/Pasig River	Large-scale industrial complex mixed with business/commercial areas along EDSA
	7) SSH/EDSA	Medium-scale industries in the business/commercial area along major transport corridors
	8) SSH	Large-scale and hi-tech industries along the major transport corridor in southern Metro Manila
Institutional	1) Diliman/Lawton	Government offices and universities
Transport Terminals/ Distribution Centers	1) North Port	Domestic passenger and cargo port
	2) South Port	International passenger port
	3) Navotas Fish Port	Fish port
	4) International Container port	International cargo port
	5) FTI	Food commodities interchange point
	6) Ninoy Aquino International Airport	International airport
	7) Domestic Airport	Domestic airport
	8) Bus Terminals	Various provincial bus terminals

FIGURE 2.2.8 MAJOR TRAFFIC GENERATION AREAS/FACILITIES



4) Planned Developments

Among various planned developments, the major ones are:

- (a) Conversion Plan of Military Camps in Metro Manila
- (b) Laguna de Bay Reclamation Project; and
- (c) Manila-Cavite Coastal Road and Reclamation Project;

At present, these projects are yet on study stage and have no definite implementation plans, therefore, they are not reflected in the estimate of socio-economic parameters. However, as this Study should cover year 2010 for expressway system development, it is relevant to look into the outline of these projects.

(a) Conversion of Military Camps in Metro Manila

The objectives of the Comprehensive Conversion Program, guided by the principles embodied in the 1987 Constitution are as follows:

- a) To realize the best alternative social, economic, political, and security uses for the baselands;
- b) To maximize the development of the reverted baselands in 1979;
- c) To promote national security and achieve alternative used for some Metro Manila military camps and effect the transfer of elements of the Armed Forces to the Clark facilities and other locations; and,
- d) To reduce the dislocation following the U.S. withdrawal.

The Resolution identifies the disposition of Metro Manila camps as fund source. The camps can provide the funds for the modernization of the Armed Forces of the Philippines (AFP) and the provision of soft loans for AFP housing personnel. AFP units shall be relocated provided that adequate housing and other vital facilities are assured in the new sites.

Phase I : Conversion of the following, which cover a total of 657 hectares - Camps Claudio, Bago Bantay, AFP Medical Center, Villamor Air Base, and Fort Bonifacio.

Phase II : Conversion of the following, covering a total of 272 hectares: Camps Ver, Melchor, Atienza, Abad, parts of Villamor Air Base, and parts of Fort Bonifacio.

Figure 2.2.9 shows the location of the different military camps in Metro Manila.

At present, two project studies done by the Public Estates Authority are available:

- (a) Conceptual Framework for Heritage Memorial Park, September 1991
- (b) Villamor Planned Unit Development, December 1991

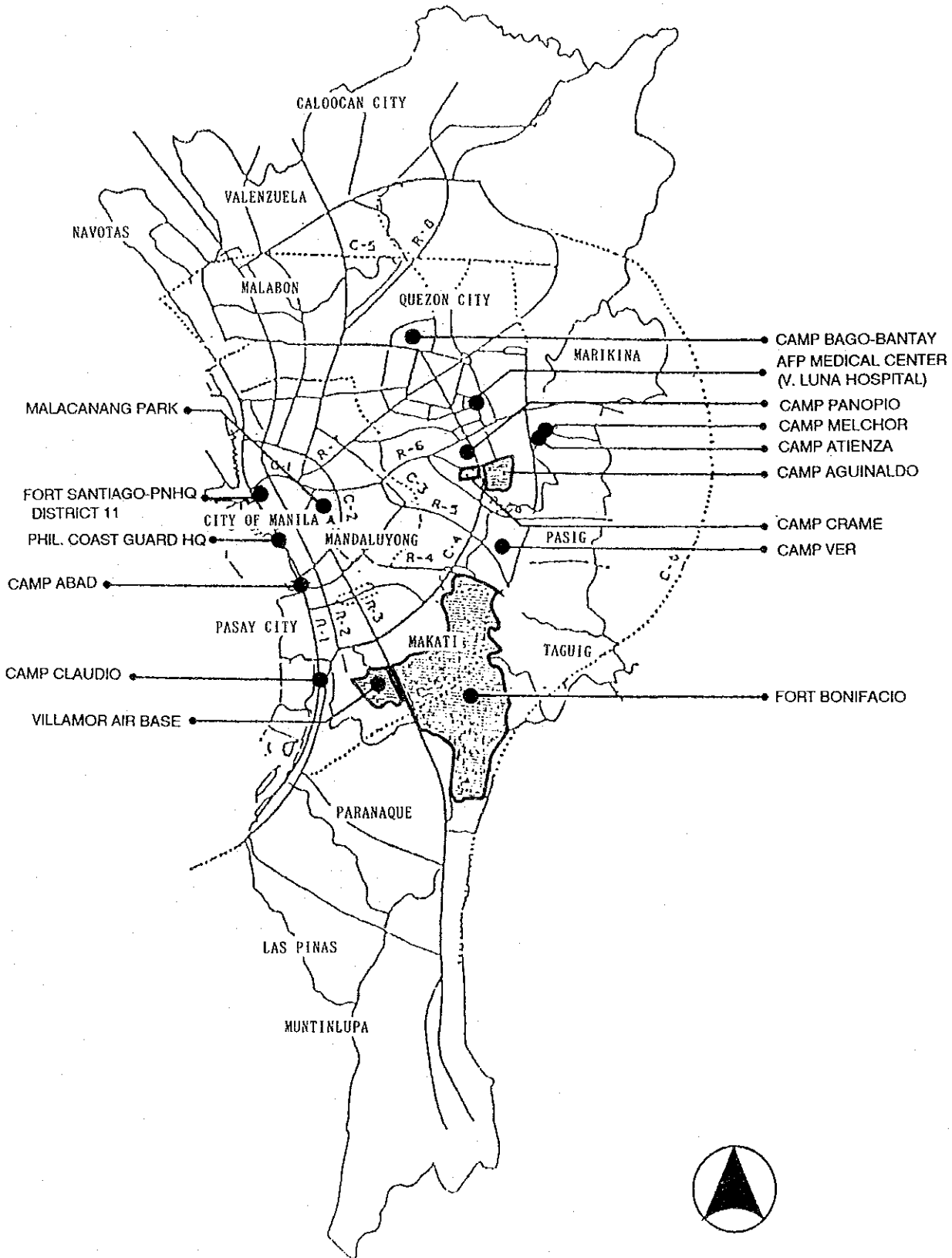
The redevelopment of Fort Bonifacio, which is located in a prime urban area, will have a significant impact on the urban system of Metro Manila when it is properly developed. According to the study on (a) above, the proposed developments, totalling 745 ha, include the following:

- (i) Retention of the existing 18-hole Fort Bonifacio Golf Course (45 ha.)
- (ii) High-value residential development including high-rise residential condominium (80 ha), medium-rise residential townhouse and condominiums (91 ha) and low-density residential subdivision (78 ha)
- (iii) Area reserved for low-income housing (45 ha)
- (iv) Commercial areas (39 ha)
- (v) Mixed industrial/residential areas (69 ha)
- (vi) AFP cantonment area (45 ha) and housing areas for the Philippine Army personnel (70 ha)
- (vii) Heritage Memorial Park (183 ha)

Villamor Air Base presently occupies a gross area of 264 ha, including 135 ha of Villamor Golf and Country Club. The initial phase of the Villamor Air Base Conversion Plan includes the following:

- (i) High-value residential development (43 ha)
- (ii) 27-hole golf course and clubhouse (74 ha)
- (iii) Community facilities (3 ha)
- (iv) Open spaces (16 ha)

FIGURE 2.2.9 LOCATION OF MILITARY CAMPS IN METRO MANILA



(b) Laguna de Bay Reclamation Project

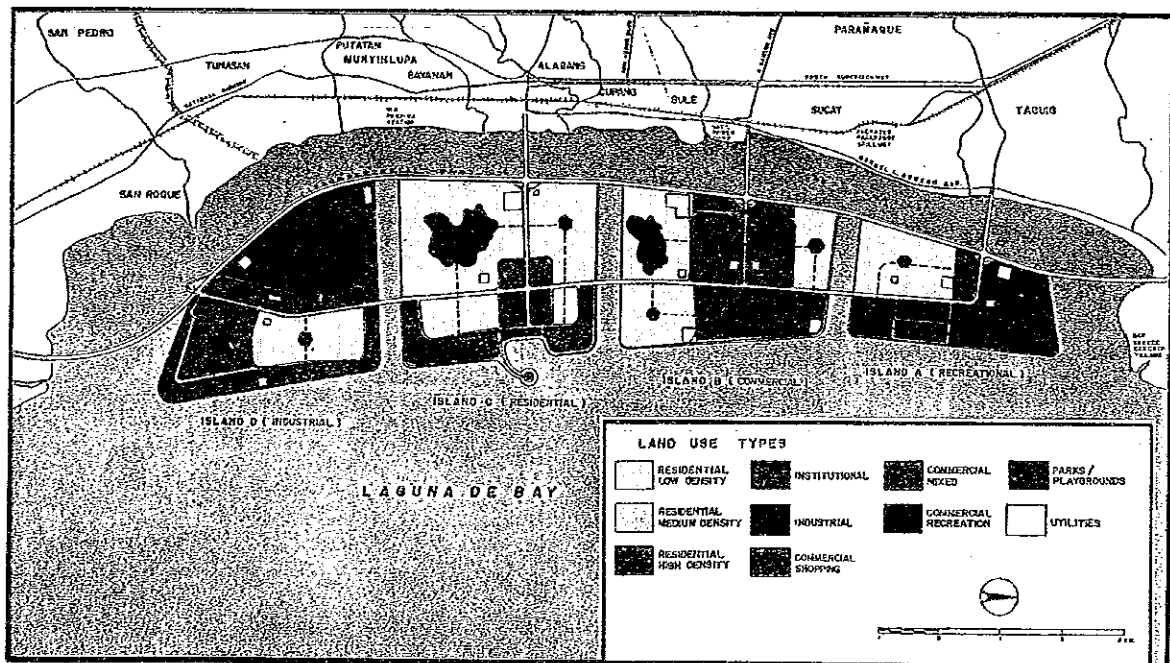
The project aims at developing 3,000 ha. of reclamation areas along the coast of Laguna de Bay, stretching from Taguig in the north to San Pedro in the south, in a comprehensive and integrated manner along a New Town Concept, offering a "countermagnet" or sub-regional center for the orderly expansion and spill over of the growth of Metro Manila. The entire project area is composed of four islands with landuse allocation shown in Table 2.2.2.

TABLE 2.2.2 LAND USE ALLOCATION

LAND USE	GROSS AREA (HA)	PERCENTAGE DISTRIBUTION
Residential, low density	733.0	24.4
Residential, medium density	341.5	11.4
Residential, high density	119.2	4.0
Institutional	76.0	2.5
Industrial	219.6	7.3
Commercial, shopping	112.0	3.7
Commercial, mixed	261.5	8.7
Commercial, recreation	433.8	14.5
Parks and playground	356.0	11.9
Roads (C-6 only)	248.7	8.3
	3,000.0	100.0

The project study (master development planning) was completed under the Public Estates Authority. At present, there is no concrete implementation commitment.

FIGURE 2.2.10 LAGUNA DE BAY PROJECT AREA

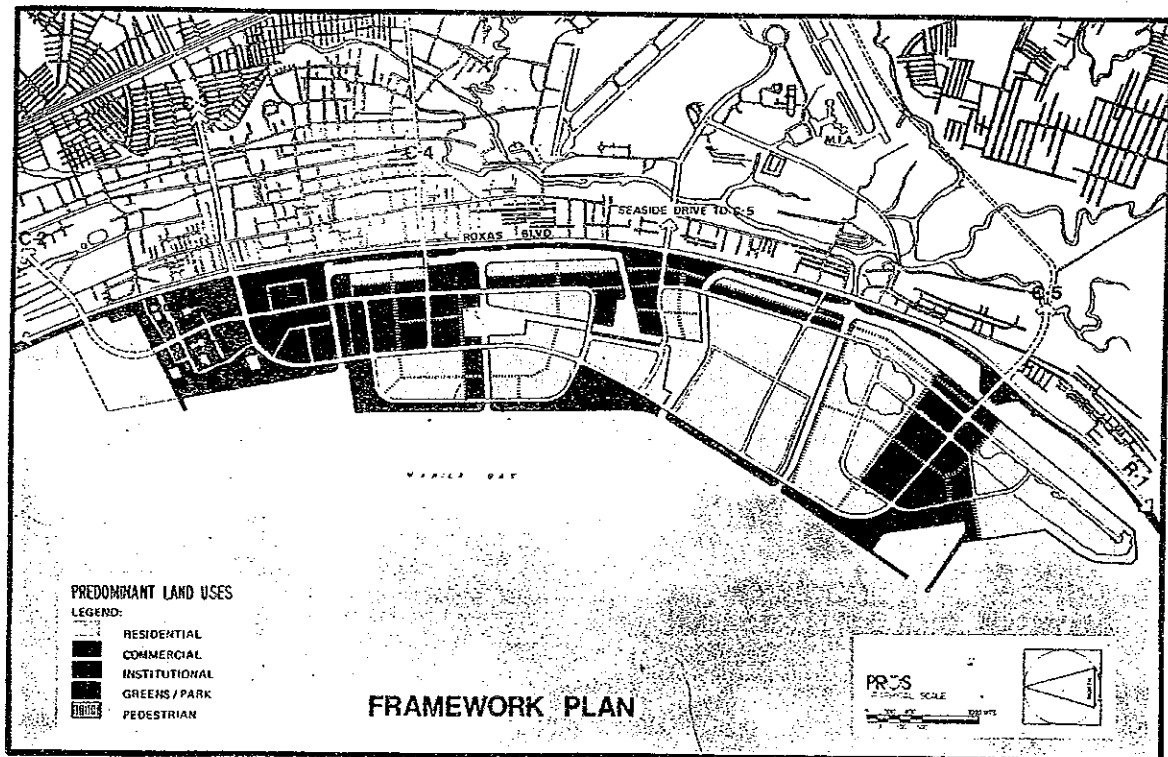


(c) Manila-Cavite Coastal Road and Reclamation Project (MCCRRP)

This project intends to develop a total of approximately 990 ha of reclaimed area, including 30 ha of CCP complex portion and some 400 ha of existing reclaimed areas, along the Manila-Cavite Coastal Road for self-sufficient urban sector or mini-metropolis. Proposed landuses would include economic activities, government services, educational opportunities, recreational facilities, and residential sites. The framework plan is shown in Figure 2.2.11.

The project study was made on May 1988 under the Public Estates Authority (PEA). At present, the reclamation project is integrated with the construction of the Manila-Cavite Coastal Road and being undertaken by PEA.

FIGURE 2.2.11 MCCRRP FRAMEWORK PLAN



2.3 URBAN DEVELOPMENT POLICY AND FRAMEWORK

1) Current Urban Development and Control System in Metro Manila

The abolition of the Metro Manila Commission in 1990 led to the creation of the Metropolitan Manila Authority. In the new set-up, the Metro Manila Mayors' Council was formed. The Council provides the mechanism for tackling urban management together with MMA proper.

One of the 17 Mayors serves as the Council Chairman. After being elected, the term extends for a period of six months, and/or another six months if reelected by majority of the Mayors.

Committees are formed within the Council. These include the Zoning Committee, Committee on Solid Waste Management, and the like. Each of the remaining 16 Mayors leads his particular committee. Problems and issues within the metropolis which are brought to the attention of the Authority are assigned and acted upon by the corresponding committee head and his members who are also Mayors themselves.

The revised Local Government Code is subject for implementation this year, 1992. In the absence of the Approved Implementing Guidelines, the status quo prevails. The new procedures involved are mainly on fiscal measures and the process involving the issuance of subdivision and condominium permits.

2) Zoning Administration

To promote the rational development and use of land, the Metro Manila Zoning Ordinance 81-01 took effect in 1981. While zoning is a regulatory function, it is vested in the Office of the Deputy General Manager for Planning, Metro Manila Authority.

The objective of the ordinance is to minimize development characterized by unfavorable mix of land uses. It is the policy of the Authority to confine certain types of activities within designated areas or zones.

In order to ensure effective implementation of the Ordinance, the Planning Office works in coordination with other MMA units, offices in the Local Government Units such as the Local Planning Offices, Local Building Officials, City/Municipal Treasurers and Business and Licensing Offices.

There is delineation in responsibility in the approval of applications for zoning clearance. The Local Government acts upon applications for residential, commercial, industrial, agricultural or any projects except subdivision or condominium projects, which are conforming to the approved municipal or city zoning plans. Thus, proposed commercial projects in commercial zones have to pass through the Local Planning Office alone.

Non-conforming projects, after being endorsed by the particular Local Planning Office, have to be evaluated in the Planning Office of the MMA. Afterwards, the Zoning Committee which is supervised by the Metro Manila Mayors Council decides on the applications. Once approved, the proponent may start the construction or the implementation of his operations. If denied, the proponent may apply for reconsideration with the MMA. If the decision is again, not favorable, the last recourse for appeal is the Housing and Land Use Regulatory Board (HLRB).

Until 1991, the HLRB was the sole agency in charge of processing applications for subdivision and condominium development permit and license to sell. With the revision of the Local Government Code, development permits have to pass through the Municipal or City Government Units initially. While the Code's implementing guidelines have to be formulated, the establishment of the new setup will take a few months late in 1992.

The existing zoning for Metro Manila is shown in Figure 2.3.1. The zoning classification specifies three types of residential areas by population density, three types of commercial areas by size of catchment area, two types of industrial areas, (light and medium), institutional, agricultural, agro-industrial areas, transport and utilities, parks and recreation, cultural areas, cemetery, BLISS areas (urban housing areas developed during the time of the Ministry of Human Settlements), military zone, fishpond, and so on. This zoning is currently being updated by municipal planning offices.

FIGURE 2.3.1 EXISTING ZONING

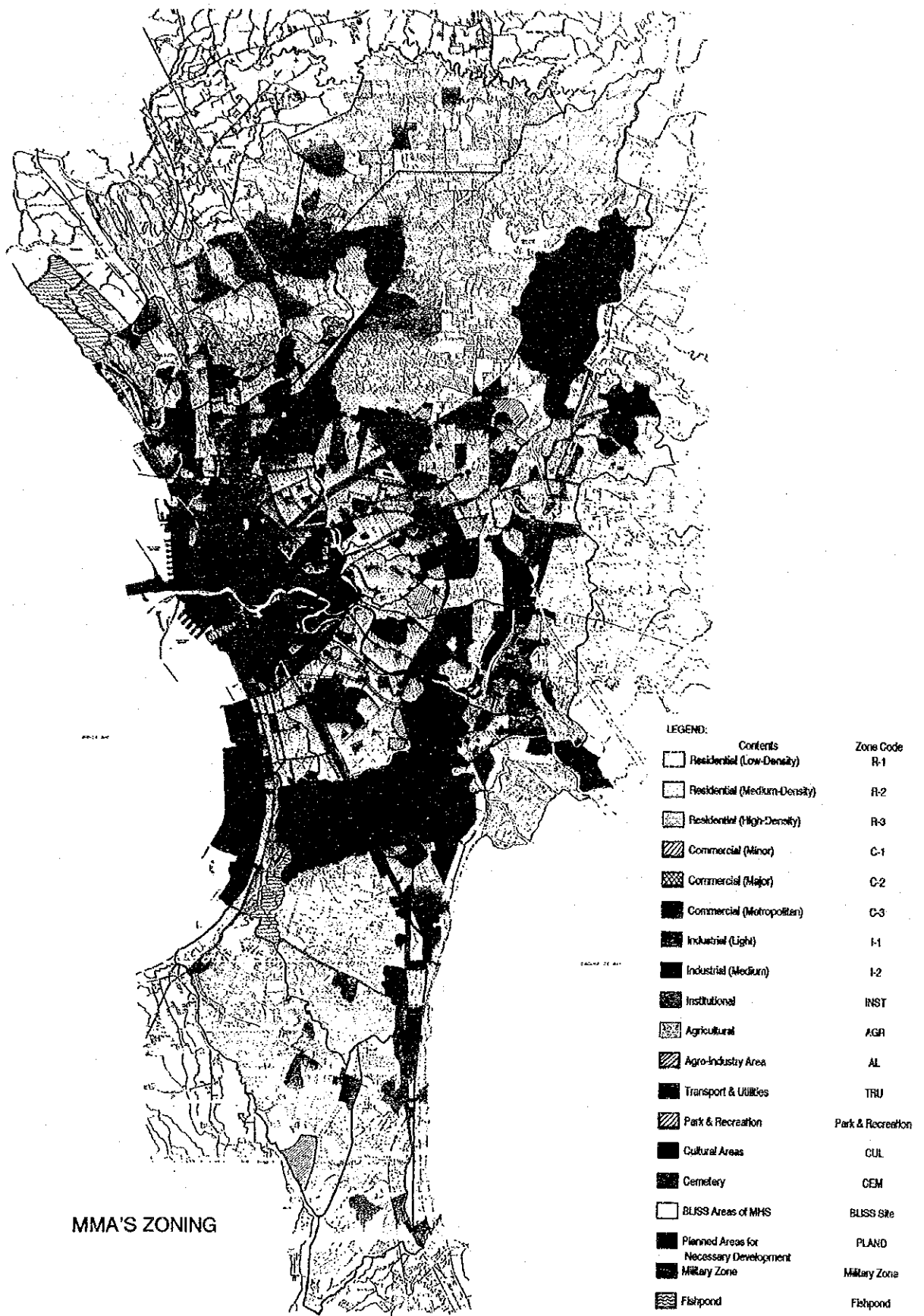
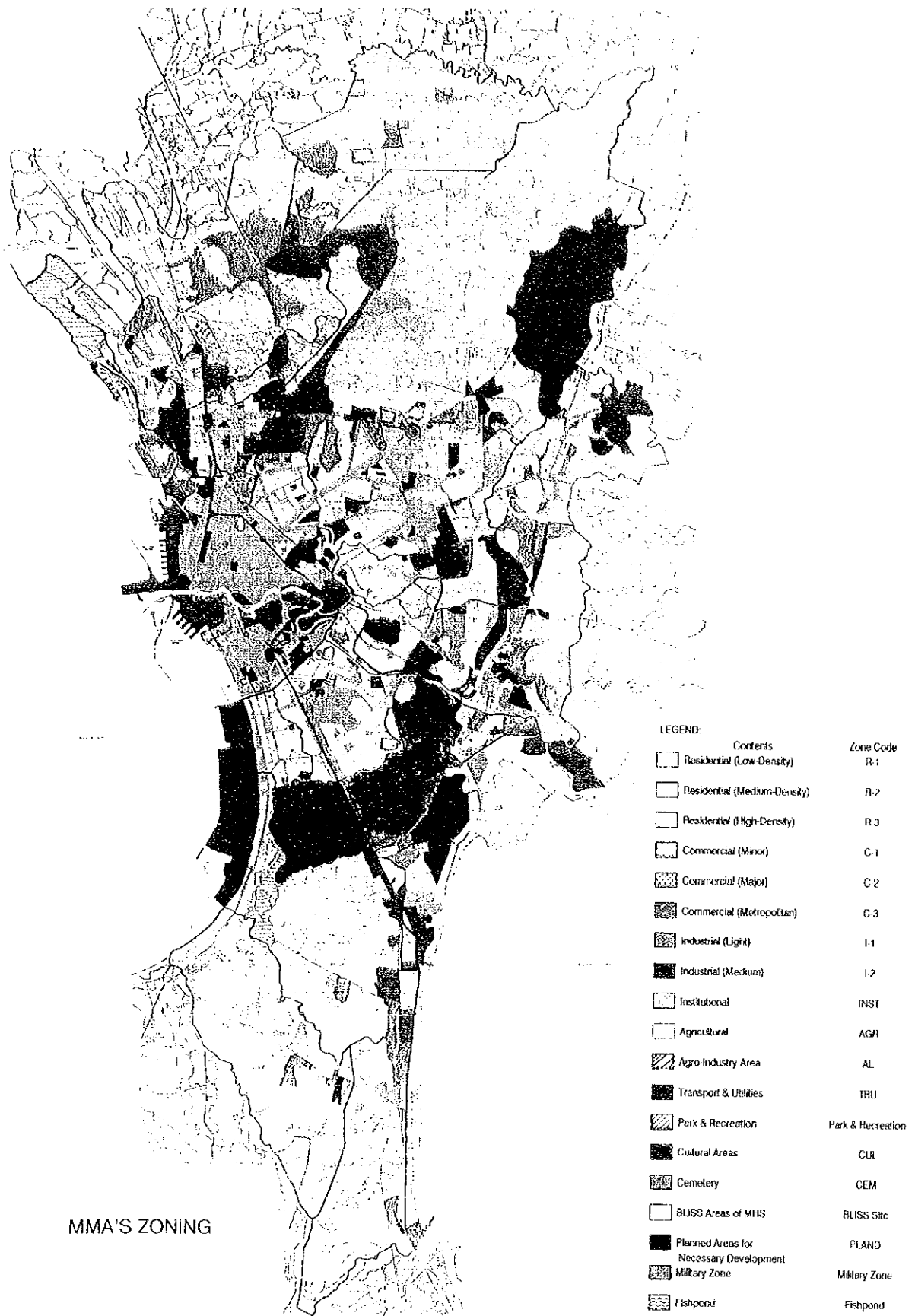


FIGURE 2.3.1 EXISTING ZONING



3) Regional Development Framework

The Philippine Development Plan provides for the overall direction of the country. The goals and policies embodied in the Plan contribute to the framework in which economic, social and infrastructure development would be directed.

It is in the context of the Philippine Development Plan that individual plans for the 13 regions in the country are based. The formulation of the regional plan for the National Capital Region is vested in the Metropolitan Manila Authority.

Recognized by major agencies, the Regional Development Plan for Metro Manila issues the relevant policies. Covering all the four cities and the 13 municipalities, programs and projects are identified to achieve the preset goals and objectives.

Specifically, medium-range plans which are for a period of five years, are formulated for the following:

- Economic sector - Plans are directed to the informal sector, industry, trade and commerce, tourism and employment.
- Social sector - Plans and programs are geared towards improvement in housing, livelihood, health, nutrition and family planning, social welfare, education, labor and manpower, environmental management and peace and order.
- Physical development - The programs are mainly infrastructure-related and cover transport, traffic engineering and management, water supply and sewerage, flood control and drainage, communications and energy.

Development strategies are geared towards providing the perspective for long-term planning. Efforts are directed to the following goals:

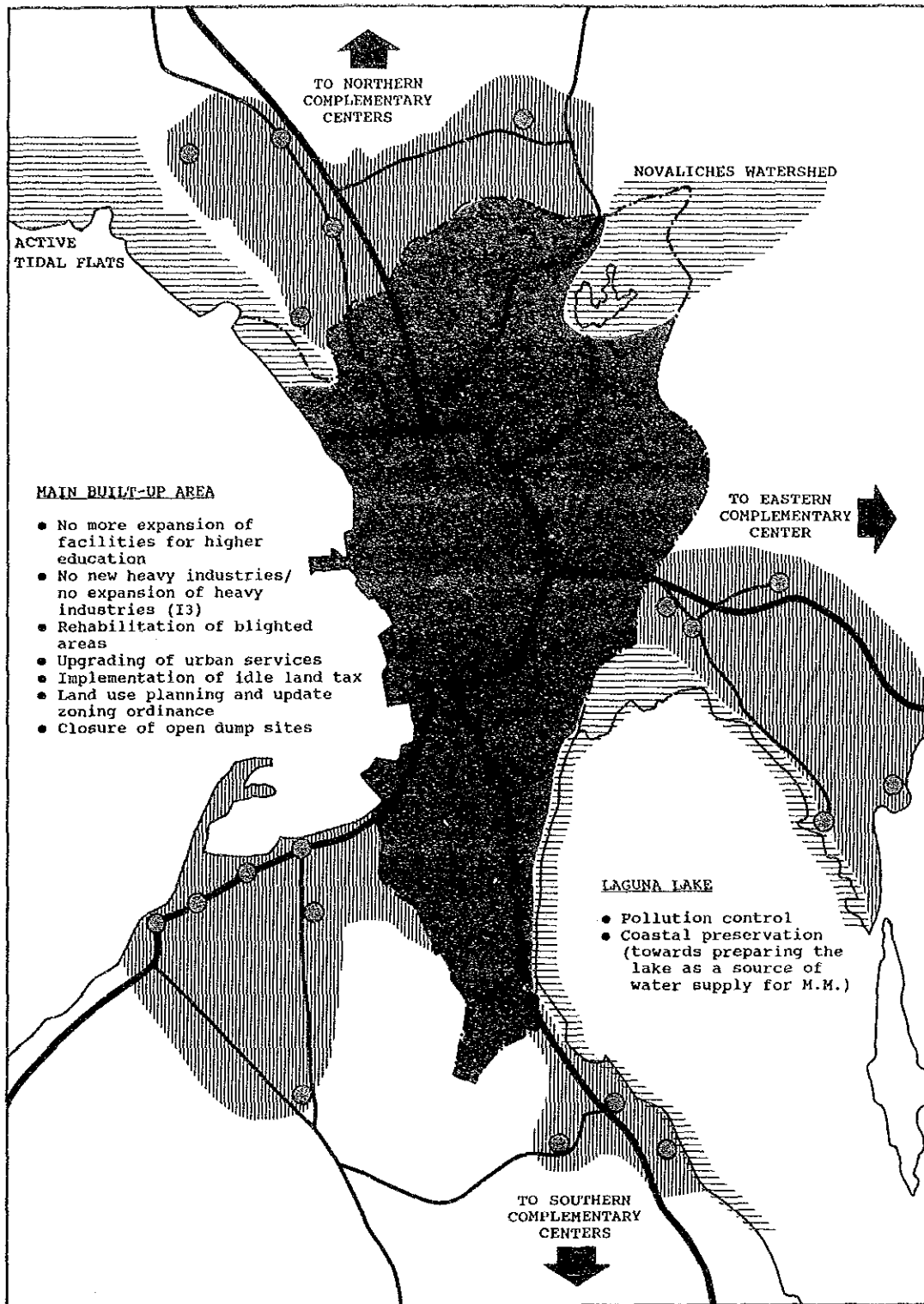
- Alleviation of poverty.
- Generation of productive employment.
- Creation of desirable environment.
- Enhancement in the delivery of urban services, and
- Strengthening the institutional capability.




Considering the physiographic characteristics of the capital and adjoining regions, as well as the urban form that has taken place, the physical growth strategy are as follows:

- a) Preservation areas, where urban development must not be allowed and mandated in the Novaliches watershed, Navotas, and in portions of municipalities along the Laguna Lake area.
- b) Urban consolidation zones, where planned development should be pursued, less pollutive industries may be allowed, and mandated outside the borders of Muntinlupa, Las Piñas, Pateros, Taguig, Kalookan (North) and Valenzuela.
- c) Main built-up areas, include portions of Manila, Pasay, Quezon City, Kalookan, San Juan, Mandaluyong and Makati, require the following:

- (a) Does not allow for the expansion of facilities for higher education,
 - (b) Bans both new and expansion of heavy industries,
 - (c) Encourages the rehabilitation of blighted areas, and the upgrade of urban services,
 - (d) Requires for the implementation of the idle land tax, land use planning and update of zoning ordinance and the closure of open dumpsites.
- d) In Laguna Lake areas, required are the regulation of pollution control and coastal preservation which is towards preparing the lake as source of water for Metro Manila.

FIGURE 2.3.2
REGIONAL DEVELOPMENT FRAMEWORK PLAN



-  **PRESERVATION AREA**
 - Urban development must not be allowed or must be contained.
-  **URBAN CONSOLIDATION ZONE**
 - Planned development should be pursued.
 - Special fiscal measures to promote consolidation of public facilities such as roads, sewerage, drainage.
 - I-1 & I-2 (industries - less pollutive) may be allowed in areas which permit additional industries to be located.
-  **COMPLEMENTARY CENTERS:**
 - Encourage location of facilities for tertiary education.
 - Provision of higher level of functions that agro-industrial development will require.

CHAPTER 3

URBAN TRANSPORTATION

CHAPTER 3

URBAN TRANSPORTATION

3.1 CURRENT URBAN TRANSPORT DEMAND

1) Overall Transport Demand

Urban transport demand of Metro Manila in terms of person trips as of 1990 is 13.6 million a day, reflecting a growth from the 10.6 million a day in 1980 or by 28% or an average growth rate of 2.5% a year during the decade. Characteristics of the current transport demand are briefly as follows:

- Due to the stagnant economic growth during the decade, transport demand has grown slower than population (2.9%/year).
- Road transport plays a dominant role sharing 97% of the total transport demand
- Although public transport still dominates urban transport demand, the share of private transport increased from 24% to 26%.
- Tricycle share has become significant which is probably due to the progress of suburbanization.
- LRT still shares minimal percentage in total demand, while PNR's role is almost negligible.

**TABLE 3.1.1 METRO MANILA TRAFFIC DEMAND
BY MODE**

	1980		1990	
	(000)	(%)	(000)	(%)
Private				
Car/Jeep	1,684	15.9	3,378	24.8
Truck/Others	861	8.1	163	1.2
Sub-Total	2,554	24.0	3,541	26.0
Public				
PNR	10	0.1	14	0.1
LRT	-	-	381	2.8
Bus	1,674	15.7	1,825	13.4
Jeepney	5,796	54.5	6,061	44.5
Tricycle	430	4.0	1,566	11.5
Taxi	168	1.6	232	1.7
Sub-Total	8,078	76.0	10,079	74.0
Total	10,633	100.0	13,620	100.0

Source: JUMSUT and 1990 HIS

The results of screenline and cordonline traffic surveys also indicate the following characteristics:

- The overall growth of screenline traffic in terms of person trips has grown by 31 percent between 1980 and 1990, while that in terms of vehicle trips only by 11 percent. This implies that average load factor of vehicles has significantly increased during the stagnant economic growth period through the 1980s. (Refer to Table 3.1.2 and Table 3.1.4).

TABLE 3.1.2 SCREENLINE TRAFFIC GROWTH

NO. OF VEHICLES	1990			(1990/1980)		
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL
EW--West Screen	106,080	192,491	298,571	0.84	1.12	1.00
EW--East Screen	49,501	169,443	218,944	1.14	1.29	1.25
NS--North Screen	118,377	231,478	349,855	1.05	1.27	1.19
NS--South Screen	81,710	211,369	298,079	0.96	1.12	1.07
Total	355,668	804,781	1,160,449	0.96	1.19	1.11
NO. OF PASSENGERS	1990			(1990/1980)		
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL
EW--West Screen	1,134,282 (1,312,876)	467,293	1,601,575 (1,780,169)	1.03 (1.20)	1.24	1.09 (1.21)
EW--East Screen	824,488	432,587	1,257,075	1.23	1.38	1.28
NS--North Screen	1,713,519	627,797	2,341,316	1.41	1.45	1.42
NS--South Screen	1,144,802	360,321	1,505,123	1.41	0.88	1.23
Total	3,672,289 (3,850,883)	1,527,677	5,199,966 (5,378,560)	1.23 (1.29)	1.36	1.27 (1.31)

- 1) Public: Bus, Jeepney, Tricycle and Taxi.
- 2) Private: Car/Jeep, Truck and Motorcycle.
- 3) Numbers inside parentheses includes LRT and PNR passengers.

TABLE 3.1.3 CORDONLINE TRAFFIC GROWTH

NO. OF VEHICLES	1990			(1990/1980)		
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL
North Cordon (West)	23,789	39,149	62,938	0.79	2.12	1.29
North Cordon (East)	3,428	3,151	6,579	4.65	1.97	2.81
East Cordon (North)	11,807	14,510	26,317	1.99	2.24	2.12
East Cordon (South)	11,866	23,623	35,489	0.92	3.83	1.87
South Cordon (East)	16,689	33,314	50,003	1.33	1.92	1.67
South Cordon (West)	23,675	37,391	61,066	1.83	3.04	2.42
Total	91,254	151,138	242,392	1.21	2.42	1.76
NO. OF PASSENGERS	1990			(1990/1980)		
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL
North Cordon (West)	468,357	182,911	651,268	1.48	1.79	1.56
North Cordon (East)	48,058	7,862	55,920	4.39	1.80	3.65
East Cordon (North)	175,328	51,364	226,692	2.81	2.91	2.83
East Cordon (East)	165,210	65,505	230,715	1.10	1.36	1.17
South Cordon (East)	276,486	100,784	377,270	1.56	1.85	1.63
South Cordon (West)	384,597	119,199	503,796	2.25	3.40	2.45
Total	1,518,036	527,625	2,045,661	1.71	2.01	1.78

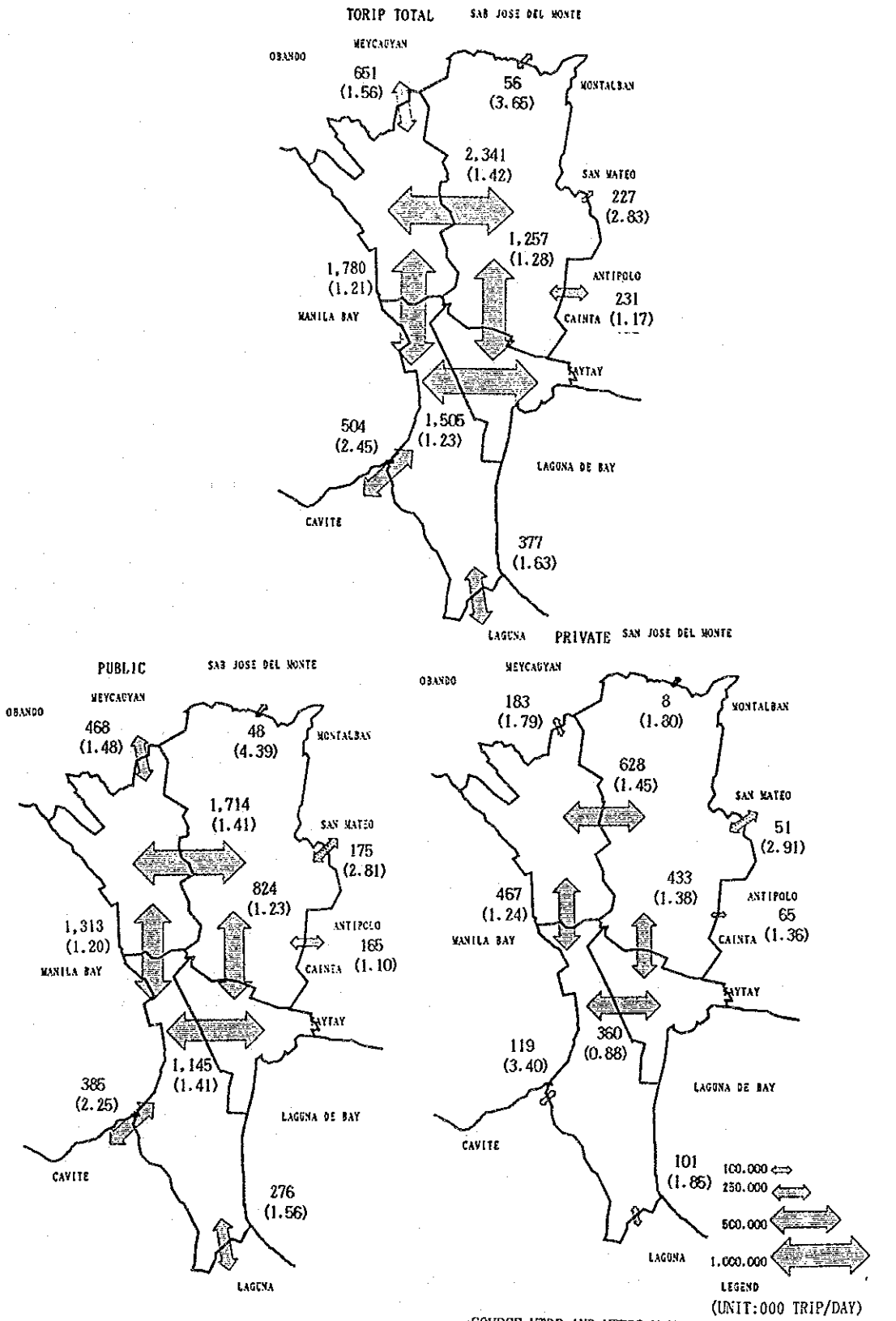
- 1) Public: Bus, Jeepney, Tricycle and Taxi.
- 2) Private: Car/Jeep, Truck and Motorcycle.
- 3) Numbers inside parentheses includes LRT and PNR passengers.

TABLE 3.1.4 COMPARISON OF VEHICLE AVERAGE OCCUPANCY AT CORDONLINE AND SCREENLINE STATIONS

SCREENLINE	1990			(1990/1980)		
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL
EW--West Screen	10.7	2.4	5.4	1.24	1.10	1.09
EW--East Screen	16.7	2.6	5.7	1.07	1.08	1.02
NS--North Screen	14.5	2.7	6.7	1.34	1.14	1.20
NS--South Screen	14.0	1.7	5.1	1.48	0.79	1.15
Total	16.6	1.9	4.5	1.27	1.14	1.14
CORDONLINE	1990			(1990/1980)		
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL
North Cordon (West)	19.7	4.7	10.3	1.88	0.85	1.20
North Cordon (East)	14.0	2.5	8.5	0.94	0.91	1.30
East Cordon (North)	14.8	3.5	8.6	1.41	1.30	1.33
East Cordon (East)	13.9	2.8	6.5	1.20	1.35	0.83
South Cordon (East)	16.6	3.0	7.5	1.18	0.96	0.97
South Cordon (West)	16.2	3.2	8.3	1.24	1.12	1.01
Total	16.6	3.5	8.4	1.41	0.83	1.01

- 1) Public: Bus, Jeepney, Tricycle and Taxi.
- 2) Private: Car/Jeep, Truck and Motorcycle.

FIGURE 3.1.1
PERSON TRIP FLOW



SOURCE:UTDP AND METRO MANILA EXPRESSWAY STUDY SURVEY

- The overall cordonline traffic has increased significantly by 78% from 1.15 million persons to 2.05 million persons a day between 1980 and 1990. The fast growth of cordonline traffic is largely attributed to the rapid suburbanization. (Refer to Table 3.1.3).
- The overall traffic flow between four subdivisions of Metro Manila is illustrated in Figure 3.1.1.

2) Transport Demand Distribution

Metro Manila's transport demand distribution is shown in Figure 3.1.2 which has been worked out based on the 1990 OD Tables (Formulation of 1990 OD Tables is explained in 4.3 of this report). Characteristics are as follows:

- The overall traffic demand is distributed over the entire Metro Manila and between adjoining provinces. This pattern is quite different from the one in 1980 when the traffic demand distributes more within Metro Manila with relatively heavy concentration in the city center and some growth centers such as Makati.
- The change in traffic distribution is particularly true for private transport demand. The largest traffic generating center seems to be Makati, followed by Manila and a number of growing centers in the north, south, and east.
- On the other hand, the public transport sector demand still concentrates in the Manila CBD. The major changes in tendency are the growing demand between the adjoining areas of Metro Manila, especially between Bulacan and Cavite, and the scattered demand to/from some suburban centers.
- As urbanization progresses, traffic demand increases and traffic distribution becomes more and more complex especially when accessibilities are constrained due to the lack of transport facilities. The availability of transport facilities has started to affect the traffic demand distribution significantly in Metro Manila.
- In summary, it seems that the public transport demand complies with the radial-circumferential roads pattern while that of private transport demand is more along the north-south directions.

3) Port and Airport Traffic

Port and airport traffic has been analyzed separately from the overall traffic demand taking into account that these traffic cannot always adequately be covered by Household Interview Survey and would be strongly related to expressways (Outline of these surveys is explained in 4.2).

- The total traffic generating from the airport is 37,500 a day of which private vehicles, excluding motorcycles, are 24,300 comprising 15,000 cars, 8,100 vans, and 1,200 trucks.
- Port generate almost 60,000 vehicular traffic a day, of which truck shares only 8,900, while car and van, 16,900 and 7,300, respectively.
- The airport and port traffic are distributed widely in Metro Manila, although there are significant movements between NAIA and Makati, and between the port and Manila area.

FIGURE 3.1.2
 TRANSPORT DEMAND DISTRIBUTION IN METRO MANILA

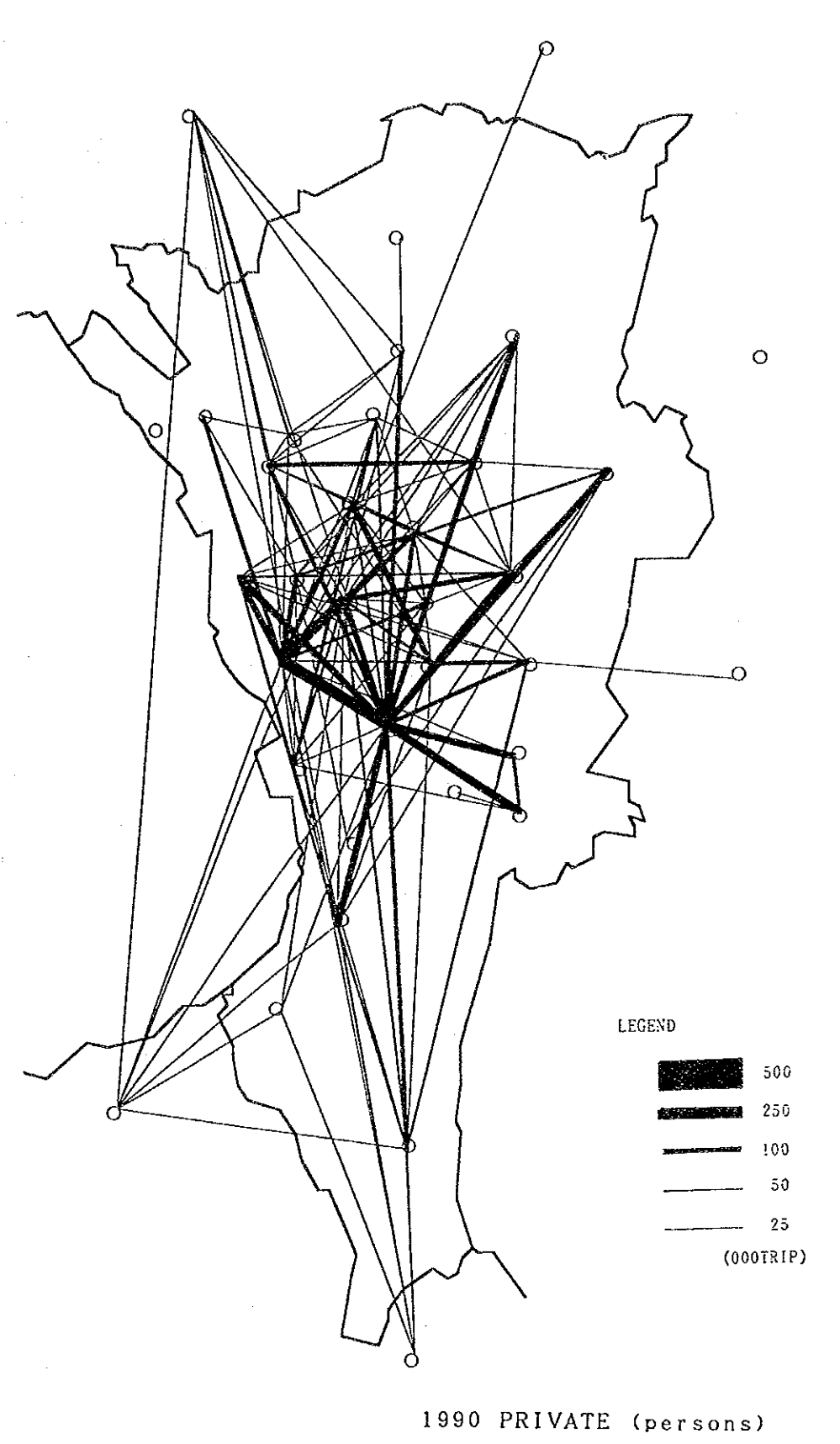
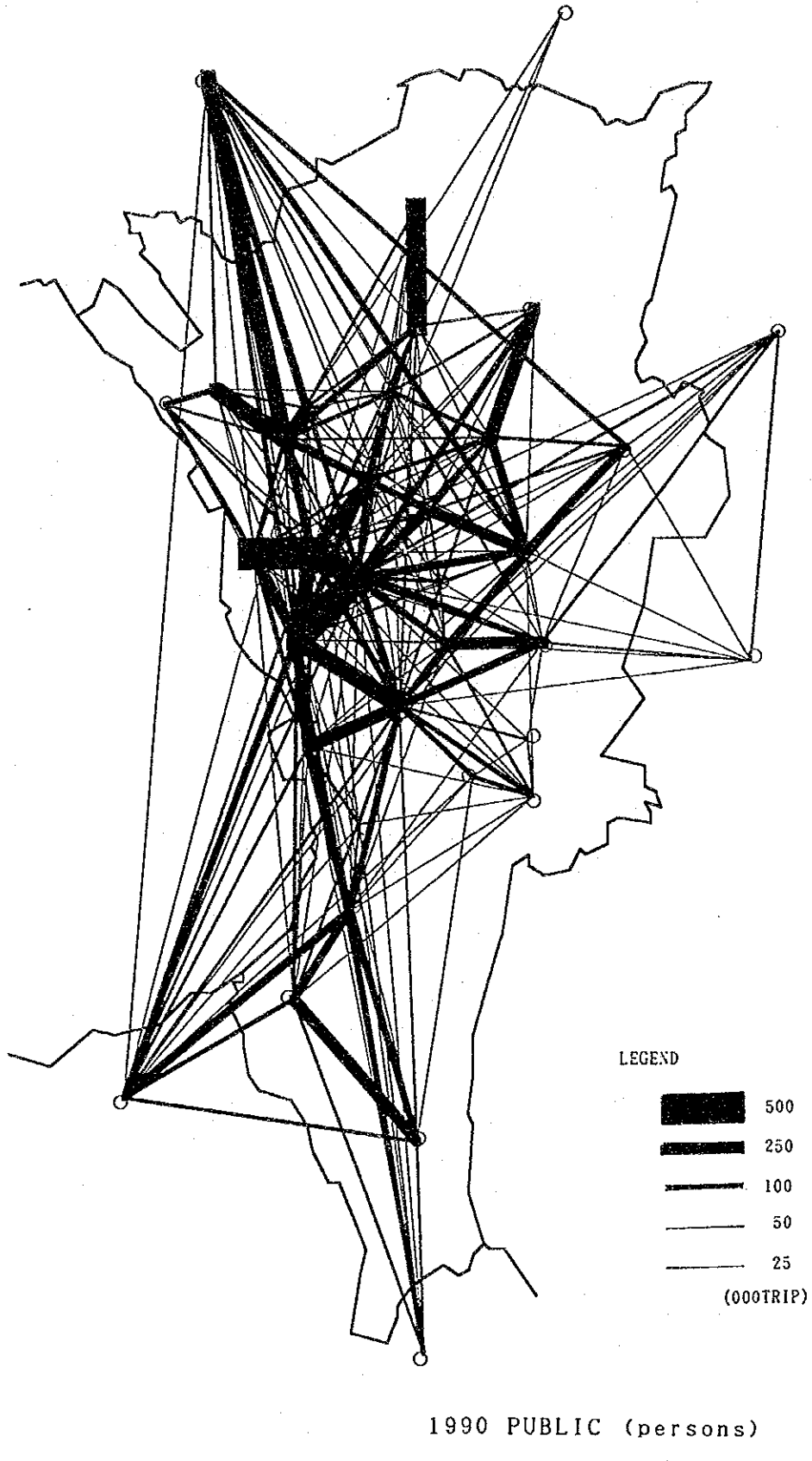
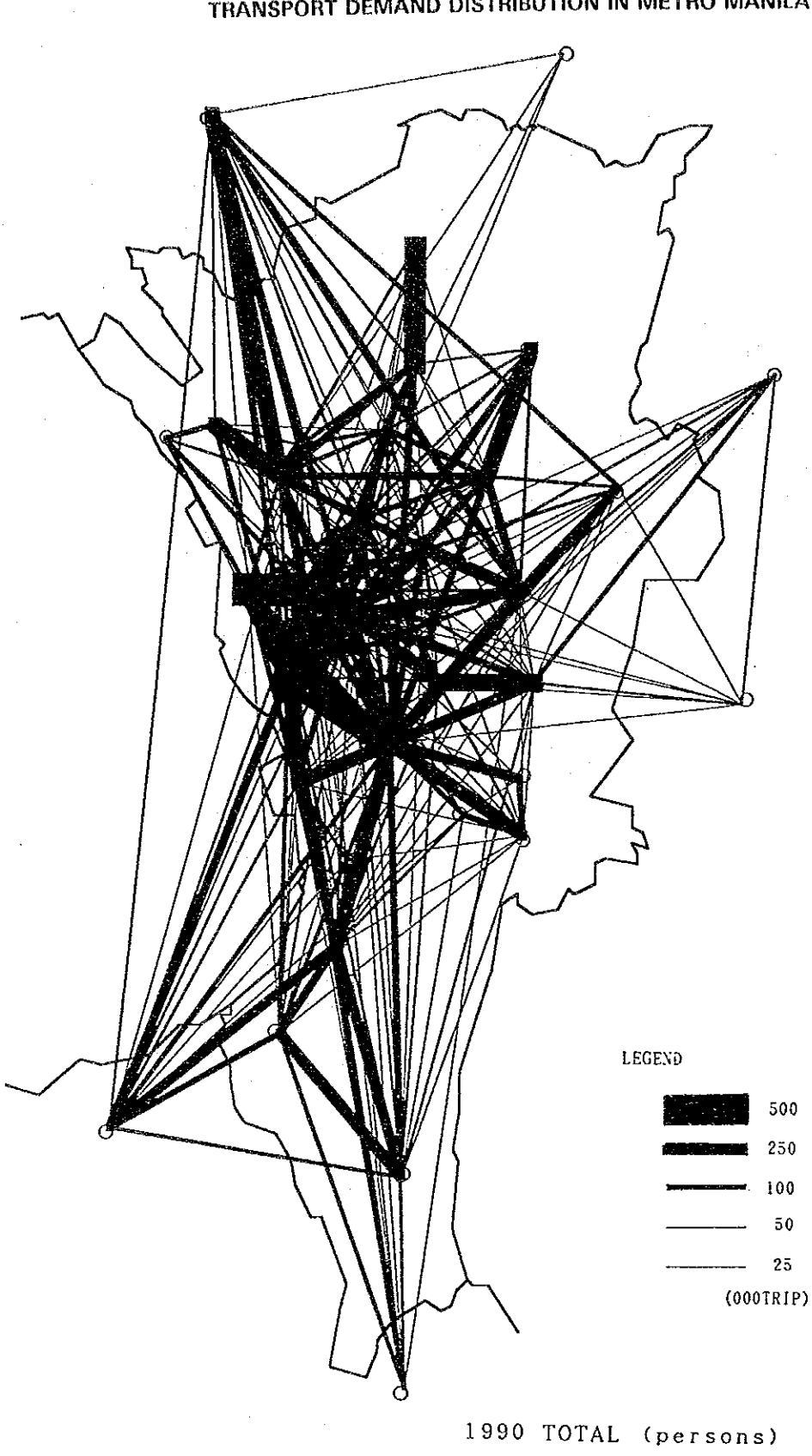


TABLE 3.1.5 AIRPORT AND PORT TRAFFIC

MODE	AIRPORT				PORT ¹⁾
	NAIA	DOMESTIC	CARGO	TOTAL	
Private	11970	9385	4569	25924	35720
Car/Jeep	7067	5781	2179	15027	16878
Van/Pickup	4004	2998	1132	8134	7306
Truck	78	3	1059	1140	8912
Motorcycle	104	11	114	229	1949
Others	717	592	85	1394	675
Public	4382	4497	2691	11570	24035
Jeepney	-	-	934	934	16478
Mini Bus	-	-	-	-	2
Big Bus	-	-	543	543	2
Taxi	4382	4497	1214	10093	5380
Tricycle	-	-	-	-	2173
Total	16325	13882	7260	37494	59755

1) North Port + South Port

FIGURE 3.1.3 DISTRIBUTION OF AIRPORT/PORT TRAFFIC

