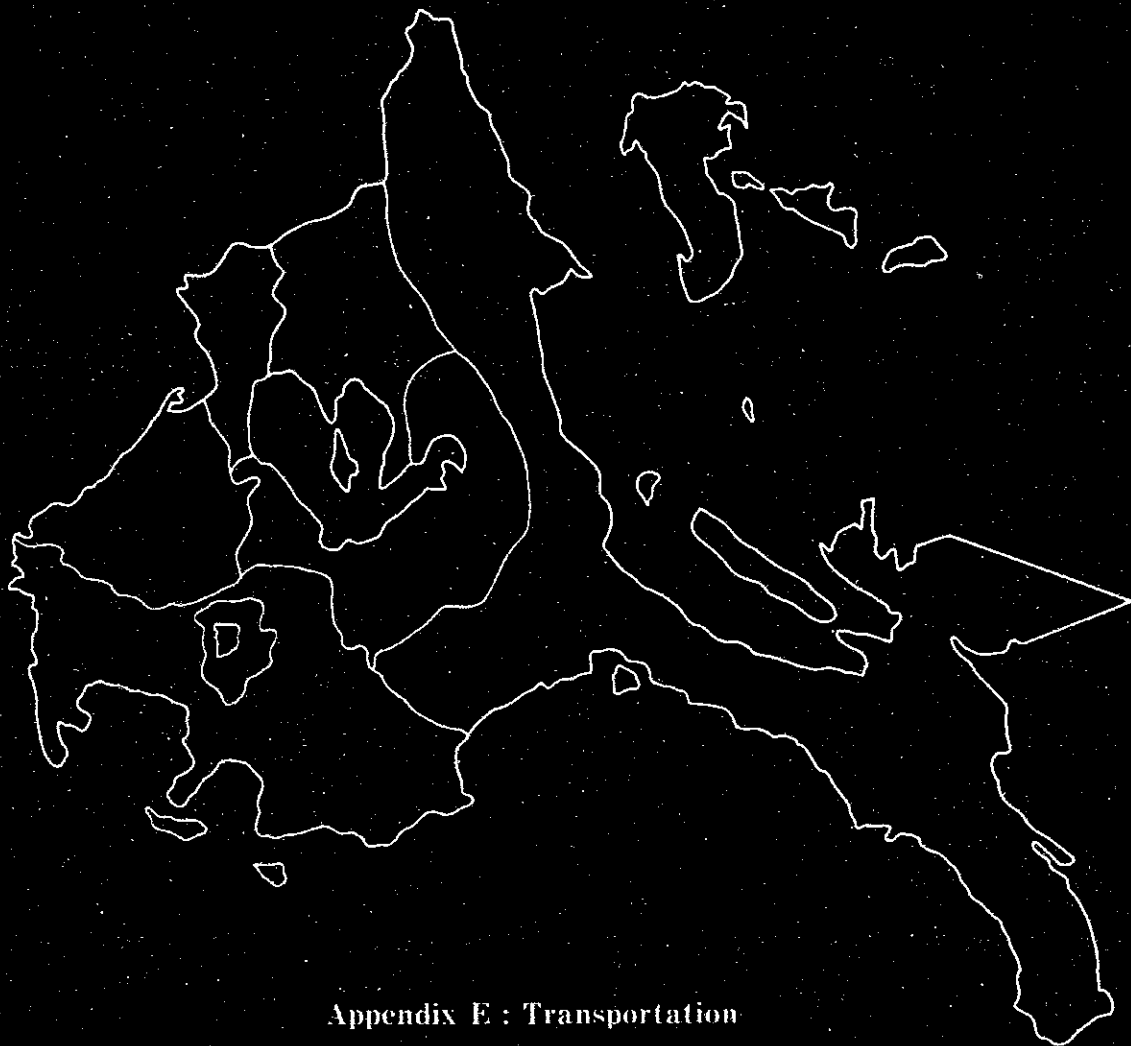


REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF TRADE AND INDUSTRY

THE MASTER PLAN STUDY
ON
THE PROJECT CALABARZON

FINAL REPORT



Appendix E : Transportation

October, 1991

JAPAN INTERNATIONAL COOPERATION AGENCY

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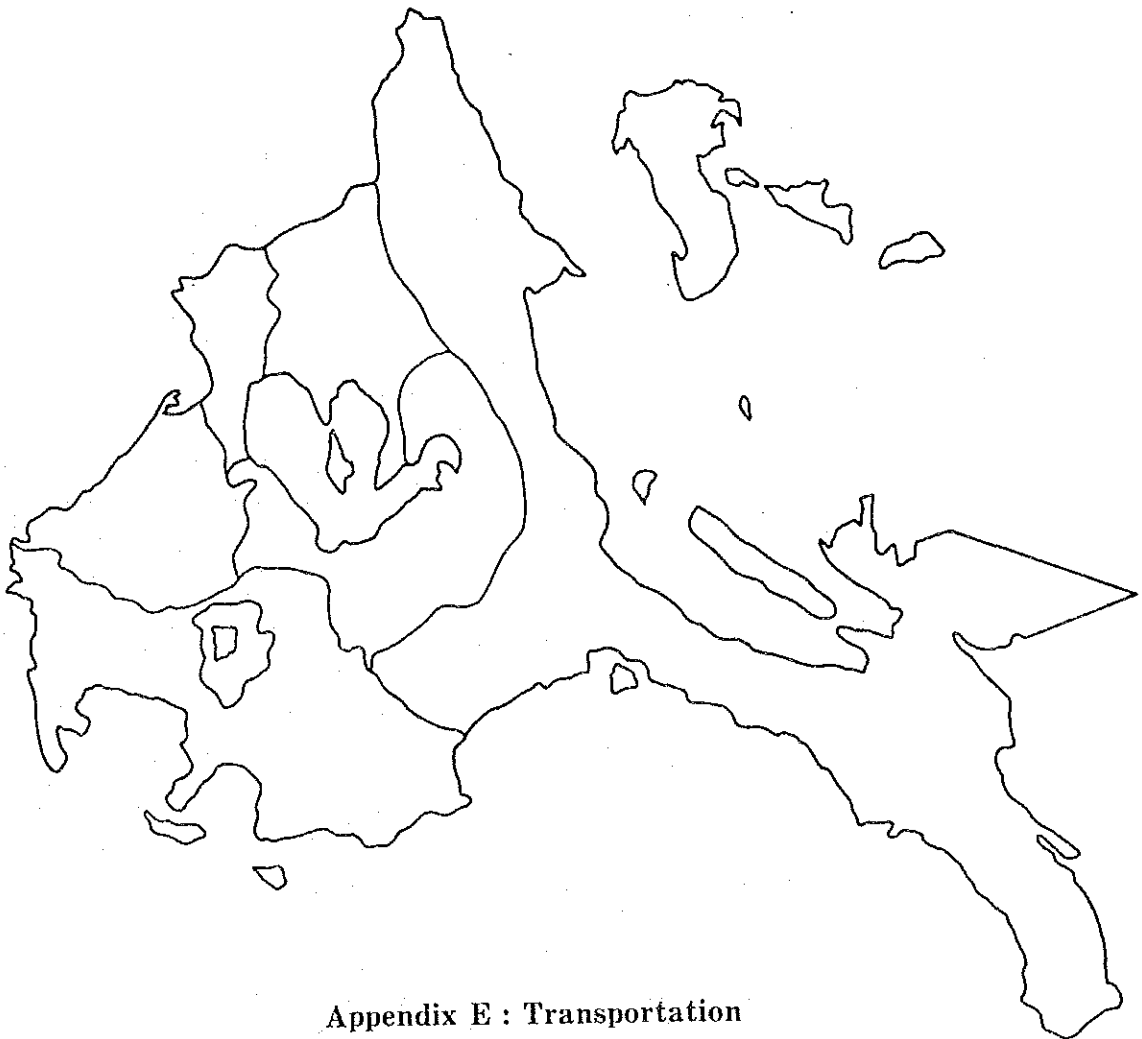
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JAPAN INTERNATIONAL COOPERATION AGENCY

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Appendix E: TRANSPORTATION

E.1 CALABARZON Transport Sector Profile

E.1.1 CALABARZON in the national transport system

The transportation system in the Philippines is composed of roads with a total length of 160,000 km, railways with 740 km, 396 ports (131 public and 265 private) and 203 airports/airstrips (83 national and 120 private). Roads and shipping are the major transportation modes. Roads share 65% and 90% of the total ton-km and passenger-km, respectively. Air and rail only share minimal percentages in passenger transport and hardly contribute to goods transport.

Inter-island traffic moves almost all by sea, while long-distance road freight traffic movements are only in Luzon. The main centers of production outside Luzon are located in the hinterland of a port and traffic normally drains to the nearest port of exit, minimizing high-cost road movement and maximizing sea movement. Thus, outside Luzon, population tend to be located in coastal areas with major concentrations in and around ports.

The regional transport policy of the Government has been devoted to the development of arterial roads to link major urban centers with each other and with their hinterlands. Efforts of improving Maharlika Highway (Philippine-Japan Friendship Highway), which forms the backbone of the country and links Luzon, Visayas and Mindanao via ferries and bridges, have been continuously undertaken. Expansion and improvement of feeder roads of Maharlika Highway are also underway.

CALABARZON, due to its locational advantages, is relatively well served by the national transport system. Major roads radiating from Metro Manila including the Maharlika Highway provide transport arteries in the Region. The main line railway (Main Line South of PNR) passes through the Region, an international airport (Ninoy Aquino International Airport) and an international port (Port of Manila) are accessible via these roads. The Region is further linked with a number of islands through a couple of regional ports (Batangas and Lucena).

E.1.2 CALABARZON transport network

(1) Overview

Roads in CALABARZON are mostly two-lane roads paved with concrete, asphalt and gravel, except the 45 km toll road (South Luzon Expressway) and some sections of national roads radiating from Metro Manila. The PNR Main Line South (double track up to Sucat only) runs from Manila through the Region via Calamba and San Pablo to Bicol, with a branch line to Carmona. There are only two ports of relative Significance in the Region: Batangas and Bauan. Accessibility to the international airport (Ninoy Aquino International Airport in Metro Manila) and port of Manila are assured. The overall CALABARZON's transport network is shown in Figure E.1.

(2) Arteries

The Region's transport network comprises strong arteries to/from Metro Manila and secondary links that connect some major urban activity centers with each other and with the arteries. At present, there are four major transport corridors in the region, namely:

- 1) Metro Manila - Calamba - San Pablo City - Lucena City; served by South Super Highway and national roads, PNR Main Line South, and Lucena port, forming part of the backbone of the country;
- 2) Metro Manila - Calamba - Lipa City - Batangas City - Calapan (Mindoro); served by South Super Highway and national road, Batangas and Bauan port, constituting an important artery for Region IV;
- 3) Metro Manila - Cavite City; served by national road, a vital link between Metro Manila and CALABARZON; and
- 4) Metro Manila - Antipolo; served by national road.

The main secondary links include the following:

Cavite City/Rosario - Tagaytay
Calamba - Sta. Cruz
Batangas City - Balayan - Nasugbu
Nasugbu - Tagaytay City - Sto. Tomas
Carmona - Trece Martires - Cavite City
Calamba - Sta. Cruz

Sta. Cruz - Famy - Real - Infanta
Marikina - San Mateo - Montalban
Cainta - Teresa - Tanay - Famy
Sta. Cruz - Lucban - Tayabas - Lucena City

(3) Existing problems

Basic transport system exists in the CALABARZON region except Quezon Province with relatively better standards than in other regions. The following characteristics and deficiencies are noted.

- There are mismatches in demand and supply in a number of locations of the transport system. Insufficient capacity and sub-standard structures of the roads exist in several heavy traffic sections, especially around those adjacent to Metro Manila boundary, while on the other hand, excess capacity and quality of the facilities are seen in other locations.
- The transport network is configurated with inclination to/from Metro Manila. An attempt of developing intra-CALABARZON transport network is not explicit. Hierarchical structure of the system is not clearly defined.
- Maintenance of the facilities is far from adequate in many areas.
- Intermodal coordination among roads, rail and ports in the Region, though insignificant, is not effectively practiced.

E.1.3 Transport organizations

(1) National agencies

A multitude of agencies are engaged directly or indirectly in the provision of transport services in the Philippines (Figure E.2). Main functions of each agency are summarized in Table E.1. They are categorized into those dealing with infrastructure construction and maintenance and others with policies governing transport operation.

The Department of Transportation and Communications (DOTC) is the primary government agency responsible mainly for planning and policy formulation related to road, rail, air and water transportation. DOTC started to implement its infrastructure projects in 1988. Agencies under DOTC are the Land Transportation Office (LTO) and the Land Transportation Franchising and Regulatory Board (LTFRB) for road transport, the

Philippine Ports Authority (PPA) and the Maritime Industry Authority (MARINA) for water transport, the Air Transportation Office (ATO) for air transport, and the Philippine National Railways (PNR) for rail transport. They carry out the planning, management and regulatory functions in respective areas.

The Department of Public Works and Highways (DPWH) is responsible for the planning, construction and maintenance of most kinds of infrastructure and practically all urban thoroughfares. DPWH is responsible for national and rural (barangay) roads, while provincial, city and municipal roads are under the Department of Local Government (DLG).

The National Economic and Development Authority (NEDA) is responsible for the formulation and development of plans, annual and medium-term public investment programs, programming of official development assistance (ODA), and monitoring of plan implementation. On the enforcement side, the Department of National Defense is responsible for enforcing traffic rules and regulations nationwide (i.e., through the Philippine Constabulary/Integrated National Police).

(2) Regional set-up

At a regional level, a regional coordinating body, usually composed of local government representatives and the private sector, addresses the transport and other needs of their particular area and coordinates their plans with the national agencies concerned.

E.1.4 Transport expenditures and financing

(1) National investment programs

The transport sector investment plan prepared by the Government in 1984 for the period 1985-1990 represented a considerable effort at reducing and/or delaying transport investments commensurate with the likely funding available under the then-prevailing economic situation in the Philippines. In October 1986, this investment program was adjusted for 1987-1992 (under the Medium-Term Public Investment Program or MTPIP) to represent a massive build-up to support economic recovery and agro-industrial development. The investment programs for 1985-1990 and 1987-1992 for the transport sector are compared for the transport sector based on the adjusted inflation assumptions for the latter and the recalculation of both programs in January 1987 prices.

Comparison of the Investment Programs for 1985-1990 and 1987-1992^{1/}

Subsector	Investment Program 1985 - 1990 (P M)	Investment Program 1987 - 1992 (P M)	Increase (%)
Roads	21,041	36,853	75
Ports	3,607	8,063	123
Railways	1,418	2,604	84
Airports	1,177	2,049	74
Urban	1,653	3,045	84
Total	28,896	52,614	82

^{1/} Figures have been adjusted to 1987 prices
Source: Philippine Development Report, 1988

(2) Government expenditures for transport

Of the total government infrastructure expenditures, 25% was for the transport sector in 1987. This percentage share decreased to 18% in the 1988 expenditures, and then increased to a high 30% share in 1989 and 1990. The distribution of infrastructure expenditures by transport sub-sector was as follows.

Government Infrastructure Development Program Expenditures for Transport Sector

Sub-sector	(Unit: million pesos)			
	1987	1988	1989	1990
Roads & Bridges	2,966	1,062	5,544	6,390
Ports	471	591	686	857
Railways	no data	39	319	347
Airports	1	76	313	221
Urban Transport	69	10	no data	0
Sub-total	3,507	1,778	6,862	7,815
Total Infra. Expense	13,855	10,007	23,152	26,401
% Share	25%	18%	30%	30%

Source: Philippine Development Report, 1988 and 1990

Actual operation and maintenance (O&M) expenditures recorded by the Department of Budget and Management for the period 1982-1986 and estimated for 1987 show relatively stagnant O&M expenditures up to 1985 followed by a substantial 53% increase in 1986. Government's O&M expenditures in the transport sector account for about 35% of total sector expenditures in 1986 and 1987 compared to about 28% in previous years.

Operation and Maintenance Expenditures for Transportation, 1982 to 1987

Subsector	(Unit: million pesos)					
	1982	1983	1984	1985	1986	1987
Roads	1,211	1,176	1,470	1,229	2,207	2,321
Ports	240	244	305	307	400	585
Aviation	71	79	90	77	105	151
Rail	145	129	169	165	188	n/a
Urban	n/a	147	223	422	463	n/a
Total	1,667	1,775	2,257	2,200	3,363	

Source: Department of Budget and Management, sector agencies

The relative emphasis given to road maintenance as opposed to construction has changed significantly over the years. In 1980-1981, about 67% of total expenditures was used for construction, with the remainder allocated between maintenance (25%) and administration (8%). By 1986, maintenance expenditures had increased to about 30% of total expenditures.

(3) Infrastructure expenditures for CALABARZON

For the CALABARZON region, the annual infrastructure expenditures incurred for 1982 to 1985 (averaged) and the expenditures programmed for 1986 to 1990 are shown in Table E.2. The expenditure level becomes significantly high when foreign assisted projects are undertaken as seen in Cavite and Batangas.

(4) Financing in transport sector

The infrastructure program of the Government for 1988 was financed through budgetary appropriations, domestic borrowings, corporate internal cash generation, equity contributions of the government to public corporations and foreign borrowings. Financing from foreign sources constituted about 31.5% of the disbursed amount while continuing annual appropriations and other local sources accounted for 68.5% of the total disbursed about (Table E.3).

Operations and maintenance activities for road, rail and port/shipping are financed mostly from their own internal revenues and from either direct or indirect government subsidies. Table E.4 gives the funding sources, expenditure and revenue items of agencies in each transport sub-sector.

E.2 Road Infrastructure

E.2.1 Existing road network

The road network in the CALABARZON region consists of about 11,600 km in 1989. The roads are classified into four groups: 2,120 km national, 2,200 km provincial, 1,010 km city/municipal, and 6,300 km barangay roads.

The national roads comprise in general the trunk system and access roads to national airport, seaports, etc. Provincial roads connect municipalities/cities with each other and with the trunk system, public wharfs and other terminals. Municipal/city roads are either roads or streets within the poblacion of a municipality/city or its sitios. Barangay roads are in essence farm-to-market roads.

National roads and barangay roads are constructed and maintained by DPWH, while the provincial government and the municipality/city are responsible for provincial roads and municipality/city roads, respectively.

Road length by class and administrative unit in the CALABARZON region is summarized in Table E.5. National roads in the Region are classified by surface type in Table E.6.

The national roads are mostly paved in Cavite, Laguna, Batangas and Rizal (85% of the total length in 1988) but in Quezon only 34% is paved. Barangay roads are hardly paved with only about 3% of the total length paved with concrete or asphalt in Regions IV and V. Situations are similar in the CALABARZON region.

The availability of roads in the CALABARZON region is summarized in Table E.8. The characteristics are as follows:

- Overall availability of roads in CALABARZON is considerably better, except in Quezon, than those of other regions, with the exception of NCR, not only in terms of road length but also in the percentage of paved roads and of fair-conditioned roads.
- Cavite has higher road density than other provinces in CALABARZON. Rizal and Laguna have relatively poor road density. Quezon by far has the lowest road density. Batangas has higher road density than these three provinces, but road conditions are relatively poor.

- Of the total road length, barangay roads share about 45% in Cavite and Laguna, while about 60% in Batangas, Rizal and Quezon.

E.2.2 Road conditions

South Luzon Expressway

The South Luzon Expressway from EDSA in Pasay City to Calamba, Laguna is a limited access motorway with median, two lanes in each direction and paved shoulders. The Expressway is a toll facility operated by the Philippine National Construction Corporation (PNCC), which is the franchise holder for operation and development of North and South Luzon Expressways.

The traffic on the first sections of the Expressway from Nichols to Sucat has reached about 50,000 annual average daily traffic (AADT); the traffic on each of the two adjoining two-lane service roads was about 20,000 AADT. The Expressway traffic between Alabang and Calamba is about 10,000 - 12,000 AADT.

PNCC prepared a development program which included the extension of the SLE to Sto. Tomas, Sto. Tomas to Batangas City and Calamba to Lucena City. The scheduled extension of the SLE to Sto. Tomas (8 km) is on-going. The feasibility study and detailed engineering design have been completed and the implementation is included in the Calamba - Calauag road rehabilitation project funded by OECF special rehabilitation loan.

Manila South Road

The Manila South Road (MSR) from Calamba in Laguna to Matnog in Sorsogon, together with the South Luzon Expressway, from Pasay City to Calamba, makes up the main trunk route serving Southern Luzon (part of the Maharlika Highway or Philippine-Japan Friendship Highway).

The old MSR from Las Pinas to Alabang is now an access link to the South Luzon Expressway. This section has a traffic volume of 12,000 AADT. A further improvement of this congested road by adding more lanes would have to be evaluated in the context of the Metro Manila outer ring road system (C5 and C6).

The section from Alabang to Calamba is a two-lane paved road in fair condition which now mainly serves as a local service road for the municipalities located along the route. The road is still congested with traffic volumes in the range of 8,000 - 10,000 AADT.

From Sto. Tomas to San Pablo bypass, the 6.7 meter wide concrete pavement has, in general, a good riding quality with some spot failures and sealed cracks. The traffic volume is about 4,400 AADT and the roadside development is light almost throughout the length. The section does not seem to be in need of a major increase in capacity for the immediate future.

The section from San Pablo to Lucena has a concrete pavement in fairly good condition up to Candelaria, with a few cracks and failures. Further on to Lucena, there are more cracks and failures; a short stretch at the railroad crossing before Candelaria is very poor.

The road further on from Lucena to Camarines Norte boundary has a 6.7 m wide concrete pavement which for most of the length is riddled with extensive cracks and serious pavement failures. The main cause of the extensive cracks and failures appears to be grossly inadequate subbase/base and drainage facilities. The road section also has an extremely poor horizontal alignment.

Batangas Road

The road from Sto. Tomas to Batangas City is a two-lane paved road in good condition. The road was recently rehabilitated with asphalt overlay and provided with bypasses of Sto. Tomas, Lipa City and San Jose. The section from Sto. Tomas to Lipa City has a traffic volume of 6,400 AADT, while the section from Lipa City to the outskirts of Batangas City has a traffic volume in the range of 3,000 to 3,500 AADT.

Manila East Road

The Manila East Road from Cainta in Rizal to Sta. Cruz in Laguna and further on to Calamba in Laguna was rehabilitated/reconstructed with several bypasses around towns in Rizal and Laguna in the early 1980's. The road is divided into two lanes throughout the stretch, with varied shoulders. The pavement condition is fair. Traffic volume varies from 5,000 to 8,000 AADT near Calamba.

Las Piñas - Tagaytay - Batangas Road

The road from Las Pinas to Tagaytay was rehabilitated/reconstructed with a bypass around Silang in the early 1980's. The road is very congested between Las Pinas and Dasmarinas with a daily traffic volume of some 12,000 AADT. The sections further on from Dasmarinas to Silang and from Silang to Tagaytay have traffic volumes of around 6,000 AADT. The road further on from Tagaytay to Batangas was reconstructed with

financial assistance from ADB to seven-meter asphalt carriageway with 2 x 2 meter shoulder in the early 1980's.

Famy - Infanta (Quezon) Roads

The present road to Infanta from Famy in Laguna is a four to seven meter wide gravel road which for most of the length is in a bad to very bad condition. There are two fords over narrow streams, three temporary bridges and two old steel bridges. The present traffic is 300 - 500 AADT.

Laguna - Quezon Road (Pagsanjan - Lucena)

The national road from Pagsanjan to Lucena is a two-lane road with an asphalt pavement. The pavement is fairly new and in good condition (overlay) from Pagsanjan and two-thirds of the way to Cavinti.

From Cavinti to Lucban, the pavement is in a bad state with large potholes and sections where the pavement has more or less disappeared. The traffic is about 800 AADT between Pagsanjan and Luisiana, and about 180 between Luisiana and Lucban.

The road sections from Lucban to Tayabas and further from Tayabas to Lucena is an old five to six-meter wide asphalt road which is heavily patched. The traffic is 480 and 3,000 AADT on the first and second sections, respectively.

Biñan - Carmona - Dasmariñas Road

This road from Biñan, bypassing Carmona to Trece Martirez and further on to Ternate and Puerto Azul was constructed with asphalt pavement in the early 1980's. The pavement is in good condition except for short sections with potholes and signs of pavement failure. The traffic level is about 3,000 to 5,000 AADT.

Other roads

The national and provincial roads in Laguna are mostly paved. The asphalt roads, however, are mostly in bad condition and need overlays or reconstruction.

The road from Bay to Calauan and further on to San Pablo has an old asphalted pavement which is heavily patched and has a rough, uneven surface. Only a few kilometers are concreted. The traffic is heavy in volume (4,000 - 5,000 AADT) but with few heavy trucks.

The San Pablo - Nagcarlan - Liliw road has recently been overlaid with DBST for about 18 km. The remaining asphalt is old, heavily patched and needs resurfacing. The road further on to Majayjay is narrow (4 to 5 meters) with poor asphalt pavement. The provincial road between Majayjay and Luisiana has been closed in the last two years due to a landslide.

Several of the minor roads in Cavite were improved in the 1980's. Cavite has a relatively good road network. The remaining problem is the work and heavily congested roads along the northern coast between Las Pinas and Rosario. This demand for further road capacity has to be considered in the context of the proposed extension of the Roxas boulevard (R-1) to Cavite and the proposed Metro Manila outer ring road system.

The national and provincial roads in Batangas are 55% paved with asphalt, and only 5% have concrete pavement. The asphalt pavements are generally old and in need of patching, sealing, and overlays. Tables E.8 through E.12 further show the availability of barangay and municipal roads by municipality for CALABARZON.

E.2.3 Road classification and standards

(1) Road classification

At present, roads are classified by administrative body, according to a series of Executive Orders, Republic Acts and/or Presidential Decrees. The most fundamental one was Republic Act No. 917 (the Philippine Highway Act) which classified roads as follows:

- National Primary and Secondary Roads
- "National Aid" Roads
- Provincial and City Roads
- Municipal Roads

This classification was more clearly defined by Executive Order No. 113, which provided necessary amendments. Today, DPWH classifies roads into the following:

- National Roads (possibly subclassified into national primary and national secondary)
- Provincial Roads
- City Roads
- Municipal Roads
- Barangay Roads

Road classification by DPWH is based mainly on the administrative responsibilities and jurisdiction of the agencies concerned in the funding, planning, construction/improvement and maintenance, rather than functions, of roads. National and provincial roads or provincial and barangay roads are often indistinguishable, because some provincial roads have comparable functions with national roads, while some function only as feeder roads which is the main function of barangay roads. Sometimes, classification of a road is changed at a provincial or a municipal boundary, for instance, from a provincial road to a barangay road.

For planning and developing an efficient road network, functional classification is essential. Functional classification groups roads according to importance and the character of services they are intended to provide. Individual road links of similar importance and quality of services are organized into systems so that a road network in accordance with the hierarchy of functions can be planned and formed. Thus they can be efficiently managed with consistent policies, design and operation.

A functional classification was made in two previous studies: Rural Roads Development Program II conducted under IBRD assistance in 1982 and Functional Road Classification Study undertaken with IBRD assistance in 1986. A summary of the studies' recommendations are presented in Table E.13. DPWH with technical assistance from ADB under the Roads and Road Transport Program Loan has initiated another road classification study.

(2) Engineering standards for roads

DPWH worked out the Highway Design Guideline in 1984 and issued the Barangay Road Design Criteria as Ministry Order No. 4 in 1987. The Department of Local Interior and Government (DILG) also published the Interim Design Guideline in 1981. The main provisions for engineering standards of these guidelines are summarized in Table E.14.

E.2.4 Road traffic characteristics

(1) Passenger traffic

The results of the JUMSUT II Study (JICA/DOTC 1984) give an indication of the person traffic demand level and distribution for CALABARZON, shown in Figure E.3. The characteristics are as follows:

- Metro Manila generates extremely large volume of traffic with high density. The 1984 data indicate an estimated traffic demand, in terms of motorized person trips, of 12.5 million a day. Metro Manila attracts 1.1 million trips to/from the areas outside Metro Manila.
- The immediate adjoining areas of Metro Manila in Bulacan, Rizal, Cavite, and Laguna provinces heavily interact with Metro Manila. Of the total traffic demand of Bulacan area (467,000 trips/day), 42% are to/from Metro Manila, while the same traffic accounts for 45% of the whole of Rizal Province's traffic (452,000 trips/day) and 32% of the total Cavite/Laguna area's traffic (882,000 trips/day).
- Cavite and Laguna have relatively high percentages of inter-regional traffic, 66% of the total traffic, while Rizal and Bulacan areas have approximately 55% and 45%, respectively.
- The above adjoining areas do not have any significant inter-provincial traffic movements between the other areas, with the exception of Metro Manila.

These person trip demands are largely met by public transportation. The modal shares of public transportation for major OD movements are 74% within Metro Manila, 80% for Metro Manila-Bulacan, 78% for Metro Manila-Laguna/Cavite, 91%, 86% and 87% respectively within Bulacan, Rizal and Laguna/Cavite.

Of the public transport traffic, almost all are of road transport. Rail meets the demand of several thousand passengers along the line.

(2) Freight traffic

Freight traffic movement in CALABARZON relies almost exclusively upon road transport, while all inter-island traffic movements are by sea. PNR's contribution, at present, is negligible. Metro Manila is the hub for most domestic movements, particularly road movements in Luzon. CALABARZON is not an exception. However, there is no up-to-date information on the movement of goods in the area. Limited surveys conducted in NTPP in the early 1980s (OD survey at Sto. Tomas) give an indication of commodity flow pattern in Southern Luzon as shown below.

Commodity Flow Pattern in South Luzon

Commodity	% of Trucks	
	From Manila	To Manila
Unprocessed Agricultural	10.5	33.9
Processed Agricultural	3.5	4.9
Soft Drink/Beer	4.2	2.3
Timber/Firewood	1.0	1.8
Mineral Oils	3.1	3.8
Construction Materials	6.8	2.2
Others	9.9	10.5
Empty	61.0	40.7
Total	100.0	100.0

Source: NTPP Part III, August 1982

Except for the heavy flow of unprocessed agricultural products to Manila, there is at the aggregate level little difference in the in-coming and out-going commodity flows. As with Northern/Central Luzon, there is an imbalance of traffic toward Manila. In general, this would be expected with low value, bulk commodities moving in one direction and higher value processed commodities moving in the opposite direction.

(3) Road vehicular traffic

The latest available information on present road traffic volumes for CALABARZON is in terms of Annual Average Daily Traffic (AADT). DPWH undertakes annual counts of very large number at fixed count stations. Three types of count stations are included in the program:

- Seasonal stations, where 24-hour counts are carried out for one week every month;
- Control stations, where 24-hour counts are carried out for one week, four times a year; and
- Coverage stations, where 12-hour counts are carried out for two days, twice a year.

There are only a few seasonal stations which provide information on seasonal fluctuations. The more numerous control stations provide data on hourly and daily traffic fluctuations. The traffic count results obtained at the coverage stations are expanded (with the use of factors calculated from the seasonal and control stations) to give estimates of AADT. The traffic count system, in general, covers only national roads.

Road traffic volume in CALABARZON is shown in Figure E.4. The general road traffic characteristics noted are as follows:

- There is a gradual increase in total traffic volume noted for road sections linking cities and municipalities.
- Roads near the periphery of Metro Manila, linking nearby cities/municipalities with the metropolis, register high vehicle counts per day.
- For the province of Batangas, roads linking Sto. Tomas, Tanauan, Lipa City, Batangas City and Bauan show heavy traffic volumes.
- For the province of Laguna, roads linking Biñan, Sta. Rosa, Cabuyao, Calamba and Los Banos show traffic volumes of more than 10,000 vehicles per day.
- For the province of Cavite, roads linking Zapote, Bacoor, Kawit, Noveleta, Cavite City and Imus show heavy traffic volumes.
- For the province of Rizal, roads linking Taytay, Angono and Binangonan are the only road sections with traffic volumes of more than 10,000 per day.

E.3 Road Transport

E.3.1 Public transport

(1) Structure of industry

Registered public utility buses (PUB), including tourist buses, increased only slightly from some 1,732 in 1981 for Region IV to 1,922 in 1989, with constant percentage share to total national registered public utility buses (Table E.15). Apart for NCR, the major areas for bus registration are North and Central Luzon and South Luzon.

There are some 1,500 provincial bus operators in the Philippines. These range in size from the very large operators such as Pantranco and BLTB, having over 350 units, to operators having only a single unit. Almost 75% of operators in the Philippines have 3 or fewer units whilst only 3% of operators field more than 20 units. All of the individual regions reflect the national pattern of single unit operators being the largest individual group. This is particularly significant in North and Central Luzon, where single unit operators share 53% and operators using fewer than 5 units share 92% of the total operators of the region. This apparent domination of the industry by small operators is also reflected in the distribution of operators by number of franchises held. A typical provincial bus operator serves only one franchised route with either a single unit or a very small fleet of units (Table E.16).

Over one-third of all units being operated belong to companies with over 50 units, although only just over 1% belong to companies with fleets of between 11 and 50 buses. Overall, the 107 companies with fleets larger than 10 units operate over 4,500 buses (or 57% of the national bus fleet). In contrast to this the 651 buses operated by single unit operators comprises only 8.3% of all buses in operation.

Accordingly, while numerically a small group, the large operators are in fact very important in the bus industry given the scale of their operations both in terms of number of units operated and the number of routes served.

Jeepneys and tricycles are probably playing much more important roles than buses in both urban and rural areas of CALBARZON. The number of jeepneys and tricycles/motorcycles in CALABARZON is 86,300 and 33,600 units, respectively, far exceeding that of buses. It is to be noted that these localized paratransit modes provide the Region with not only relatively high quality public transport services but also considerable amount of job opportunities.

Number of Motor Vehicles Registered by Type, CALABARZON in 1990

Province	Type of Motor Vehicle						Total
	Cars	Jeepneys	Trucks	Buses	Motorcycles/ Tricycles	Trailers	
Cavite	6,510	21,641	949	719	4,888	242	34,949
Laguna	7,952	29,565	3,485	1,249	9,754	539	52,544
Batangas	4,373	20,376	3,219	147	11,226	159	39,500
Rizal	4,962	8,874	629	41	4,108	127	18,741
Quezon	1,788	5,809	1,641	389	3,663	90	13,380
Total	25,585	86,265	9,923	2,545	33,639	1,157	159,114

(2) Regulatory framework

Regulations and franchising

The bus passenger industry is subject not only to safety regulations but also to a variety of economic regulations which cover matters such as entry to the industry, route of operation and fares. These regulations are enshrined in a variety of acts, decrees, executive orders and memoranda-circulars and are implemented through the Land Transport Franchising and Regulatory Board (LTFRB).

The main control method of the industry is through the franchise system whereby any operator wishing to run passenger bus services is required to obtain authorization from LTFRB in the form of a Certification of Public Convenience (CPC) or a Provincial Authority (PA) which are documentary proof of authority to operate a public service.

Franchises were initially issued by the now defunct Public service Commission. When the PSC was abolished in 1972, the BOT took over and performed this function until March 1985 when it was also abolished. Presently, the power to issue franchises is vested with LTFRB.

LTFRB processes both franchise applications and petitions. Franchise applications are requests for authority to operate a public transport service. This authority may be a CPC or a PA. Petitions are requests for the amendment of previously issued franchises or authorities. Petitions are further classified into those which necessitates a hearing and those which do not. Petitions relating to the following fall under the first classification:

- Increase of authorized units
- Amendment of Line
- Sale, assignment or transfer of franchise

- Extension of franchise authority

Petitions classified under the second category are those whose requested modifications can be verified from LTFRB records, i.e.

- Withdrawal of authorized unit(s)
- Substitution of unit(s)
- Change of engine
- Interchange of unit(s)
- Correction of errors in the franchise

Franchises are granted to citizens of the Philippines, or to corporations, partnership, associations or joint-stock companies constituted under Philippine law, provided that sixty per cent of the stock or paid-up capital of such business groups belong to Filipino citizens. The items which an applicant for a franchise must furnish LTFRB before any application can be considered include financial and corporate data, details of proposed services and details of garages. Once these requirements are met, the actual processing is carried out. The more significant stages include informing the public (particularly those who are already franchised on the route being applied for) about the application, the hearing and the final decision. Essentially, the approval or denial of an application hinges on whether the applicant can convince the hearing officer(s) that:

- he is financially capable of undertaking the proposed services; and
- his proposed public service will promote the public interest in a proper and suitable manner.

Providing proof of financial capability appears a demanding requirement, at least on paper. In practice, affidavits and bank statements to show ownership of the appropriate amount of assets can apparently be easily acquired.

In order to meet the second criterion the process starts with the solicitation of affidavits from leading local figures in commerce, industry and local government that the service is needed. If the route being applied for is new, the hearing body will normally accept these affidavits as sufficient evidence of public need. If, however, there are other operators already on the route being applied for, a hearing is set wherein these operators can oppose the applicant's applications, generally with argument based on route "saturation" and "ruinous" competition. To check actual situation, LTFRB staff are sometimes sent out to inspect conditions on the route.

After both sides have been heard, the hearing body hands down its decision. Being a quasi-judicial body, appeals against the decisions, orders and ruling of LTFRB can be only be made to a higher court.

Observations in various parts of the Philippines suggests that the effectiveness of this system varies between regions. Whilst most operators of large buses hold franchises many examples have been found of operators not adhering to the details of their CPC. Unauthorized withdrawal of units has been observed in many areas.

In the mini-bus sector of the industry in certain regions, operation without a franchise ("colorum" operation) appears widespread based on observations of buses operating as public utility buses but displaying license plates for a private vehicle. While it is understood that some of these vehicles may be operating under PA's, a high proportion of those observed are certainly colorum. The fact that such widespread and blatant violation of the franchising regulations is tolerated in certain areas clearly undermines the purpose of the regulatory system. In addition, it would suggest that the present system of control of entry to the industry does not provide sufficient flexibility to allow adequate response to changes in demand for transport.

Fares

LTFRB also sets the fares for all public utility passenger vehicles in the Philippines. Fare structures are based on a given minimum fare for a fixed distance and then a rate per kilometer beyond that.

These rates are set after discussions with operators and are supposed to ensure a 12% return on capital for bus operators. Different rates are set for the different regions to allow for variations in operating costs occasioned by regional variations in fuel costs and road conditions.

The present passenger fares start in Luzon at 30¢ per km for ordinary buses and jeepneys and rise according to the quality of service being offered to a top rate of 44.¢ per km for aircon buses. Many large bus operators adhere to the authorized fare structure though some cases of price cutting have been noted in different areas.

The authorized fare structure specifies the same fares for ordinary buses (including mini-buses) and for jeepneys. Given the wide differences in operating costs for these groups of vehicles and the differences in passenger comfort between them, this unitary fare rate does

not appear to be justifiable. Certainly jeepney and mini-bus operators throughout the Country does not regard it as logical, as fares for these two types of passenger transport are virtually never in line with the LTFRB rates. Jeepneys typically may charge 40-50% less than the authorized rate while minibuses' charges may be 25-30% below the official fare or more in some areas.

This reaction to the official fare rates is very much market-oriented. Where minibuses are competing with large buses over a given route, any attempt to charge the same fare by a minibus operator as on a large bus would almost certainly result in a loss of riders to the large bus given the additional comfort and more reliable schedules of big buses. The only way minibuses can compete for riders is to offer a lower rate to match the lower quality of service.

Similar considerations exist when jeepneys are running in competition with minibuses. In certain areas, a situation exists where big buses, minibuses and jeepneys are all operating over the same route (almost certainly with the jeepney being totally illegal in their operation). In these case, the travelling public is given a wide choice of fares and service quality with those who wish greater comfort, definite departure times but who are willing to pay a higher fare travelling on big buses whilst those whose main objective is to minimize the fare paid and/or to depart as quickly as possible and who are not concerned with comfort travelling by jeepney. Minibuses represent the middle section of this spectrum of service quality which from observations in the field is welcomed by the travelling public.

(3) Bus operation in Southern Luzon

The largest operator in Southern Luzon is Batangas, Laguna, Tayabas Bus Company (BLTB) who operate a fleet of around 370 buses on routes to Manila from many towns in the region. BLTB's operations are entirely concentrated in the Southern Luzon region although the company's recent acquisition of Pantranco North suggests a desire to expand into other areas of the country.

Saulog Transit with just over 200 units is the next largest operator. Most of Saulog routes link Manila with the towns of Cavite province although the company also operates about 20 units on routes to the north of Manila (mainly Olongapo). In this respect, Saulog is unique in Philippine bus companies as no other operator runs services to both north and south of the capital region.

There are a large number of medium sized operators in this region with between 40 and 100 units each. This is unusual compared to other parts of the Country as typically once one removes the two or three largest operators then most of the next category of operator tend to be in the 20-40 units ranges. However, in Southern Luzon, companies such as RJM Liner, Superlines, Laguna Transit, JAM Transit, and Kapalaran all operate on a variety of routes in competition with each other and with BLTB.

Among the main routes in the region are Manila-Batangas, Manila-Lucena, and Manila-Sta. Cruz. On each of these routes there are at least 2 or 3 of the above medium-sized companies competing with BLTB in addition to quite a number of smaller operators such as Biñan Express, Batangas Liner and Triffman Liner. On the Manila-Lucena routes, services are also provided by Philtranco and JB Express who pass by on their routes linking Manila and the Bicol region.

Traffic on these routes is fairly heavy with some operators quoting average load factors of 60-70% for routes, particularly those routes linking towns such as Biñan and Sta. Cruz with Manila. Many of the passengers on these routes are commuters travelling daily to Manila. Passenger flows through major centers are given in Table E.18.

This commuter traffic, while providing a considerable demand for passenger transport, creates some problems for bus operators as demand is sharply peaked at certain times of the day and is uni-directional at those times. Demand of the non-commuter routes is much more balanced.

The large number of operators on most routes means that competition is stiff. Many operators have complained of over-saturation on routes and the resulting effect on their profitability. While the competition may well have an effect on the returns of each company, it has also had the effect of improving the quality of service provided by many operators. The annual daily traffic/count for buses and minibuses for Southern Luzon Corridors are shown in Figure E.5.

In many cases, operators are upgrading their services by fielding air-conditioned buses in place of ordinary ones, particularly on the commuter-oriented routes, the small difference in fares between aircon and ordinary buses (P1.50 for Biñan-Manila) makes aircon travel attractive to many passengers.

Service schedules for most routes are frequent and departure times and service intervals adhered to as companies recognize the benefits to them in terms of attracting passenger if they behave thus.

For the Manila routes, fares charged are generally in line with the LTFRB authorized fares. There are, however, occasional fare wars, particularly on the Biñan - Manila routes. These "wars" are the result of aggressive competition among the medium-sized companies for passengers. The last major fare war late in 1983 caused heavy losses to many operators. The war only ended when BLTB exerted pressure on the main protagonists to return to the authorized fare by threatening to undercut them completely and rely on its strong financial background to ensure its survival at its competitors' expense.

On the non-Manila bound routes, a few services are provided by some of the medium and large companies, but mainly by a large number of relatively small operators of minibuses and large buses. In general these services do not run to fixed schedules but depart when acceptable passenger loads have been reached. Usually this is taken to be around 50% of the seating capacity of the bus.

For some local routes, operators have formed informal groups who share terminal facilities and coordinate competition of services. In these cases their main competition comes from colorum jeepneys which are reported to be very common in the area. For other routes small operators remain in competition with each other, and with the jeepneys. While most operators on local routes claim to be charging the authorized fares, they generally also report that profits are very low. A frequent reason cited for this, in addition to the competition from jeepneys, is the very bad condition of roads in the area which leads to high operating costs.

(4) Current issues

Todate, several deregulatory measures for both the public utility buses and the public utility jeepneys are under study by LTFRB. Two measures which would affect public transportation in CALABARZON and which are gaining grounds for implementation in the near future are as follows:

- 1) Bus Franchise Liberalization - entails the provision of increasing/decreasing and switching of units by provincial bus operators in their franchised routes.

- 2) Flexi-fare Scheme - entails the application of a flexible fare charging by the provincial jeepney operators according to the dictates of the demand characteristics of routes plied. This would be somewhat similar to the flexi-fare scheme which is already being practiced by the bus operators.

E.3.2 Truck industry

(1) Industry profile

In 1985, there were approximately 94,000 trucks registered in the Country. The number of trucks licensed for hire (TH) was about 10,000 or only 9% of the total, the remaining being private trucks. About one-third of the total fleet were registered in Metro Manila, the rest in Luzon, Visayas and Mindanao (Table E.19).

The licensed for-hire operators are mostly small in size. The average number of units per operator is 5.5. Of all the operators, 25% own only one unit, while 52% own 2 to 5 units. However 10% of the operators own almost half of the total fleet (Table E.20).

In addition to the licensed TH-operators, there are a large number of illegal ("colorum") for-hire operators. Some are full-time truckers, while others are only part-time operators with trucking as a complementary activity to their legal businesses. The roadside interview survey conducted in the Study indicates that:

- at least half of the commercial truck transport is carried out by illegal ("colorum") truckers and by other private trucks; and,
- at least half the number of trucks utilized by licensed truckers in commercial transport carries private license plates.

There are a number of trucking associations in Metro Manila and a few associations in other regions of the Country. Available information indicate that their power and activities have been very limited. These associations represent probably less than 20% of the licensed operators but a higher share of the licensed truck fleet. In 1984 a Confederation of Truckers Associations of the Philippines (CTAP) was established with nine member organizations. This CTAP is now pursuing some policy issues of vital importance to the industry's operating conditions, costs and future development.

The trucking rates are in principle regulated by LTO which prescribes a fixed rates per ton-km. The industry and the users are with a few exceptions, ignoring the LTO rate, the rates are decided by the market forces.

(2) Medium/long distance truck operation in Luzon

Medium and long distance (15 to 150 km, respectively) trucking in Luzon is dominated by transport between Metro Manila and each of the other regions. The outflow from NCR consists mainly of manufactured goods while the inflow includes agricultural, forestry, fishery and handicraft products. Most freight is carried by full truck loads in end to end hauls, only a minor part is carried as part loads or as smaller consignments in consolidated loads.

Larger manufacturing and distribution companies in Metro Manila are often using contract carriers to distribute their products to regional wholesalers or other sales outlets. Luzon is usually divided into a number of distribution routes, each route is awarded a contract carrier through bidding and/or negotiations. The trucker picks up the multi-consignment load at the manufacturer/distributors' warehouse and delivers the consignments in a multidrop run through the assigned route or area. The distribution area of a route varies, but is very often as large as a whole region. The trucker has no need of own terminal facilities for this type of service.

Other shippers in Metro Manila with smaller transport demand are using common carrier services if not their own vehicles. The common carriers have generally their own bodega or terminal in Metro Manila; some have also bodegas in the main centers of their distribution area. Larger consignments or groups of consignments are often picked up and delivered directly by the line haul truck. Small consignments are mostly delivered to the truckers' bodega but are usually delivered to the consignee's door in the multidrop runs. Carriers that maintain provincial bodegas are sometimes leaving small consignments there for pickup by the consignee. Very few common carriers maintain pickup and delivery services apart from the service carried out directly by the line haul truck. The provincial bodegas are also serving as consolidation centers for Manila-bound LTL-consignments.

Most of the common carriers were truckers catering for the LTL market. A few forwarders, however, were found who have no trucks of their own, thus long distance haul and distribution were subcontracted to provincial truckers or traders which were offering their backhaul capacity.

Each contract or common carrier is in general only serving one corridor or route. Each trucker is operating on his own; cooperation or coordination between several truckers is very rare. One example of cooperation is the vegetable terminal in Baguio which is run by BAVEDA, the Baguio Vegetable Drivers' Association.

The frequency of the common carrier service is decided by the transport demand; a truck is usually only dispatched when it is loaded to capacity. Trucks are dispatched daily on some routes, only once a month on others, the frequency varies with seasonal fluctuations in the transport demand. The peak season is October to December, the low season from January to March.

There are as far as known, no common carrier apart from expensive parcel services, that operators with fixed schedules and a guaranteed delivery time (for example, 24 hours). A forwarder/trucking subsidiary of an interisland shipping company tried however to introduce this service concept in 1982. The main features of that project may be summarized as follows:

- a) A "Terminal" in each of the cities of Manila, Legaspi, and Tuguegarao which basically consisted of a semi-trailer chassis with container;
- b) Pickup/delivery services in each of the cities which was operated with Ford Fieras or similar vehicles; and
- c) Daily shuttle service between Manila and the two other cities by a prime mover that delivered the trailer with incoming cargo and left immediately with the trailer containing the outgoing freight.

This setup facilitated a high quality service and high productivity for the expensive motive units. The project was however abandoned, probably due to the relative high freight rates charged and the downturn in economic activity.

Both contract and common carriers are emphasizing the importance of backloads in long distance trucking. Most claim that a high percentage of full backloads are essential to keep their business profitable at the present rate levels.

(3) General operating characteristics

Operation and marketing

Most trucking firms are small family-owned outfits where trucking is often only a part of the family business. Licensed truckers engaged in medium and long distance haulage appear to be mostly medium-sized firms where transport is the main or only activity. Each trucking firm is usually operated completely on their own; there are few examples of active cooperation in marketing and operations.

Marketing and job hunting are usually done on a personal level by the owner or his manager. Few truckers or forwarders are marketing their service through the press, the yellow pages of the telephone directory or similar media. Soliciting of backloads are often left to the drivers and independent agents. Contracts for haulage appear in general to be rather simple agreements on rates and provision of capacity.

Vehicles and loading

Medium and long distance haulage of general cargo is generally carried by 6-wheeler and 10-wheeler straight trucks. A 6-wheeler truck is loaded with up to 10-15 tons while 10-wheeler carry loads of 20 to 25 tons. The vehicles are thus most often heavily overloaded compared to the legal axle load and gross weight limits.

Tractor-semitrailers and truck-trailer combinations are rarely used except for carriage of specific bulk commodities like fuel and cement and in the haulage of beverages and logs. For hire truckers are almost exclusively using secondhand trucks from Japan. Trucks marketed by PTMP is considered far too expensive.

Productivity and efficiency

The productivity in medium/long distance haulage of general cargo appears to be fairly low with annual mileages in the range of 25 to 50 thousand km. A contract bulk carrier of petroleum products claims, in comparison, to achieve 120 to 160 thousand km per year. Some of the factors that contribute to the low productivity levels are:

- loss of time due to hunting and waiting for front and backloads; and
- loss of time due to queueing for loading and unloading (It is claimed that delivery of for example copra and tobacco leaves, at processing plants involves up to 3-4 days waiting outside the plant gates.)

The efficiency in using the vehicle load capacity is however, fairly high due to the massive overloading as indicated above. The rate of backloads in Luzon may be in the range of 20 to 50%, while backloads are rarely obtained on other islands.

Advance planning and scheduling of transport demand and services is little developed among users as well as operators. The low productivity levels indicate further that there is a significant over-capacity within the industry.

Technical and management skills

Drivers and managers have generally obtained their skills through job experience. While these skills may be noteworthy, the observed low levels of productivity and vehicle care and apparent high levels of break downs and accident suggest that there is ample room for improvements. There are, however, few opportunities for acquiring skills through formalized training apart from the in-house training activities of a large private truck fleet owners and bus companies.

Pricing and liabilities

Trucking is in general a very competitive business. The rates are based on cargo weight/volume and distance. Factors of importance for the rate level are the opportunity for backloads, whether the trip is a front or backhaul, and type of service included (e.g. end to end hand, multidrop distribution, etc.). The present rates for long distance transport in Luzon is mostly in the range of P0.60 to P1.10 per ton-km, or some 1/4 to 1/2 the present LTC rate. The rates in Mindanao and other islands are, with a range of P1.10 to P2.70 per ton-km, significantly higher and reflects different market and operating conditions.

The truckers are generally responsible for the freight in their custody up to its declared value. Few truckers take out insurance to cover their liability; they prefer to carry the risks on their own. Insurance is, however, claimed to be available at costs of 0.1 to 0.5% of the goods' declared value.

Financial condition

The medium and distance trucking appears in general to be a very competitive business with fairly modest, if any, profit margins. Capital is scarce and expensive (interest rates of 30% p.a. or more) so operators try very hard to minimize their capital investments and expenditure commitments. The use of relatively cheap second hand trucks from Japan fits well with this policy. Office, garage and terminal facilities are often of a rather rudimentary standard. Drivers and helpers are most often paid on a per trip basis or by percentage of

freight income rather than as regular employees with weekly or monthly salary. Maintenance and repair are most done in reaction to problems. Preventive maintenance appears less developed.

(4) Current issues

Government regulations

The trucking industry is in general opposed to any Government involvement and regulation of the industry. The newly established CTAP forwarded in October 1985 a position paper to the Ministry of Transport and Communications which argued for and recommended a complete deregulation of the industry. The main features of the position paper may be summarized as follows.

- a) Colorem operators are now (as claimed) outnumbering the franchised operators by 4 to 1. The trucking industry has lived with deregulation rates for two years without eliciting complaints from either the trucking operators or the transport users. This shows that deregulation is a viable condition for the industry.
- b) Colorem truckers operating with T-plated trucks have a significant advantage over franchised TH-operators in terms of lower annual fees and taxes. The TH-operators have to obtain an equal fee and tax basis to have a chance of survival in the intense competitive market.
- c) The position paper recommends on this basis that:
 - the franchise system should be completely dismantled; the registration of any truck should include the right to carry freight for hire; and
 - the adoption of a single annual registration fee rate. The rate may for example be set at the present level for TH-trucks and thus generate more income for the government.

The position paper claims that this total deregulation would mobilize presently "idle" capacity in private trucks, facilitate better marketing of presently "colorem" services, enhance competition, and lower rates - overall facilitate more efficient and cheaper trucking services. The paper refers to the American experience where complete deregulation is claimed to have strengthened the trucking industry and become a boon to the national economy.

Most truckers appear indifferent to the activities of the PTMP, claiming that their products are far too expensive to be viable as alternatives to the secondhand Japanese trucks.

Education and training

CTAP has expressed the industry's awareness of the need for education and training of drivers and managers. The Confederation points out, however, that few managers in the industry can afford to be away from the business more than a few days at a time. The training schemes should, therefore, be organized as correspondence courses with short workshop seminars as seen necessary.

Common user terminals and clearing houses

The truckers have generally a negative attitude towards the development of common user terminals. The truckers prefer to be in full control of their own facilities and operations and prefer not to be located next to their main competitors. They have voiced surprise over the Government's concern for the terminal question as they see several other and more pressing issues that are requiring government attention and investment. Examples given include road maintenance and development of the secondary road network. Although clearing houses are seen as possible way of improving coordination of transport demand and supply, very few think that truckers or any others would be able to operate them efficiently. The general view is again that the Government should leave trucking operations and facilities to be developed by the private sector.

Specific problems

The trucking industry is citing a number of specific problems that are affecting the efficiency and costs of their operators. The most important ones appear to be:

- the scarcity and high cost of spare parts
- the scarcity and high cost of capital
- harassment by police and other enforcement agencies
- difficulty in obtaining franchise
- condition of secondary road system
- the truck ban in Metro Manila
- pilferage
- overcapacity, competition, backloads

It is claimed that the costs of spare parts have skyrocketed in the last two years, and some parts are very difficult to obtain. It appears that licensed importers of spare parts are taking undue advantage of the restrictions on dollar allocations for imports.

The trucking industry has difficulty in raising capital to finance investments. It is claimed that truckers have to pay up to 40% interest p.a. for short term loans. It is also claimed that the Development Bank of the Philippines require real estate collateral for any loan.

Truckers usually have to pay a fee or "tong", to pass checkpoints set up by the police and LTC units. These "fees" add to the truckers' costs and have to be passed on to the users.

The procedures for obtaining TH-franchises are claimed to take a long time and require quite significant outlays of grease money. Some truckers claim that they operate illegally only because of bureaucratic inefficiency. Another problem is the difficulty of obtaining license that facilitates inter-island trucking.

One of the universal complaints is over the poor condition of the secondary road network which hampers operations and increases costs. The truck ban in Metro Manila affects not only operations in the metropolis but almost all long distance trucking in Luzon. It is claimed that the ban has severely reduced the productivity of the trucking fleet and increased the problem of pilferage and truck hijacking.

E.3.3 Road traffic management

Road traffic management at the provincial level is usually in the hands of the local governments (i.e., cities and municipalities). More specifically, it is the responsibility of the local enforcement groups with the support of civic organizations to manage traffic within densely populated areas where traffic is normally congested. The traffic branch of the Philippine Constabulary - Integrated National Police located in each city and municipality is the main traffic enforcement authority supplying traffic policemen for traffic *direction and enforcement*.

The Constabulary Highway Patrol Group's (CHPG) main functions are to promote traffic *safety through the enforcement of traffic and driver and vehicle safety and pollution regulations*, and to conduct operations against carnapping, hijacking and holdupping and assist in the prevention, investigation and repression of other crimes committed on *highways involving the use of motor vehicles*. Through Presidential LOI 43 the CHPG directs traffic on sensitive thoroughfares and stretches of the highways.

E.4 Railways, Air Transport and Shipping

E.4.1 Railways

(1) Railway network and facilities

The PNR network is divided into two operating systems (Figure E.6 and Table E.21):

- a) Main Line North: running from Tutuban Station (km 0) to San Fernando, La Union (km 266), with a branch line from Tarlac (km 119) to San Jose (km 174); and
- b) Main Line South: running from Tutuban (km 0) to Legaspi (km 478.5) with the following two major branch lines:
 - East Line: Sta. Mesa (km 6.5) to Guadalupe (km 13) (closed to operation since 1982), and
 - Carmona Line: San Pedro (km 6.5) to Carmona (km 40)

Commuter service is provided for the North and South Lines between San Fernando, Pampanga (km 61.6) in the north, Carmona (km 39.7) and College (km 66.5) in the south, and Guadalupe (km 13) in the east. however, the current operation is restricted to San Fernando, Pampanga and Carmona (Figure E.6 and Table E.22).

The PNR track structure has a railway gauge of 1,067 mm. The railway is constructed of 37 kg/m and 32 kg/m rail with 1,600 and 1,800 cross ties per km, respectively.

The Main Line South (MLS) track comprises 25 km of double track section with a track center distance of 4.0 m between Tutuban and Sucat and 454 km of single track section between Sucat and Legaspi. Sleepers are of Molave, Yakal, and Narig hardwood. The 60 m long 37 kg rail has elastic fastening, and others have rail dog spikes. Ballast material is of crushed stone with thickness of 200 mm below the sleeper and grain size of 50 mm in diameter for the section other than the turnout section.

The rehabilitation of the track structure for the Main Line South has been carried out for the section between Paco and Naga since 1977 under an ADB loan. However, no significant achievement was made. At present, an additional rehabilitation work is on-going under OECF to improve the facilities and operation.

The Main Line North (MLN) tracks are laid out over a very flat terrain. Its alignment is either straight or has a large radius of curvature. The MLN crosses several large rivers and channels.

A cable network of bare wire carrier is used for all telecommunications, HF radio system and VHF radio system. However, this system cannot be efficiently used, except for the HF and VHF radios. Only adjoining stations are connected to each other by blocking telephone.

A number of problems regarding the facilities of the PNR lines include the following:

- a) Weak track facilities such as alignment, missing and rotten sleepers, insufficient ballast volume, eroded embankment, damaged rail, etc.;
- b) Inefficient communication system due to improper induction of power transmission line, damaged open wire transmission line, lack of spare parts for the equipment, etc.;
- c) Obsolete signaling system due to old equipment and obsolete technology;
- d) Inadequate level crossing system; with no automatic warning system, ineffective traffic control at the crossing and unsmooth pavement at the crossings;
- e) Poor passenger facilities at and for access to the stations such as proper access roads, signboards, fences, waiting facilities, toilets, lighting, and public transport connection; and
- f) Squatters in and along the PNR right-of-way.

(2) Railway operation

The PNR in the CALABARZON region refers specifically to the following sections:

- Main Line South between San Pedro and Tagkawayan through Calamba, San Pablo: single track, operational,
- Branch Line from Tiaong to Tagkawayan: 181 km, single track, under rehabilitation,
- Branch Line from San Pedro to Carmona: 5.1 km, single track, operational, and

- Branch Line from Calamba to Batangas: 57 km, not operational, right-of-way retained.

The operational lines upto San Pablo serve a total of 12 sections in the Region: San Pedro, Carmona, Biñan, Sta. Rosa, Cabuyao, Mamatid, Calamba, Pansol, Masili, Los Baños, College and San Pablo.

Commuter services are available using Main Line South and Main Line North for seven routes which are classified into two:

- a) Routes having Manila (Tutuban) Station as its terminals, namely:

Manila - Carmona	:	40.3 km
Manila - Alabang	:	28.1 km
Manila - San Fernando,P	:	61.6 km
Manila - Meycauayan	:	15.0 km

- b) Routes running through North and South Line without passing Tutuban Station, namely:

Carmona - Caloocan	:	46.1 km
Alabang - Caloocan	:	28.1 km
Malolos - Alabang	:	65.2 km

Current service frequencies are low except for Manila - Carmona route. Particularly along Main Line North, service frequencies are negligible compared to buses/jepneys (Figure E.7).

Travel time fluctuates considerably and thus scheduled operation is not practiced. Cancellations or delays are not timely informed due to poor communication system. Average travel time between major destinations related to CALABARZON is as follows:

-	Manila	-	Carmona	:	80 minutes
-	Manila	-	College	:	120 minutes
-	Carmona	-	Caloocan	:	90 minutes

(3) Railway traffic

Long distance passenger traffic

The number of PNR passengers has declined since the peak periods of the early 1960's. Although the traffic volume increased between 1972 and 1974 due to the acquisition of new long distance railroads, the completion of the Maharlika Highway to the south in 1975 resulted in the drastic diversion of the rail passengers to buses (Table E.23).

The cumulative effect of years of neglect on the condition of PNR tracks has also played a part in recent years; the consequent reduction in train speeds has increased the advantage of bus transport while the number of derailments, on the Main Line South, in particular, has made passengers and even freight movement unreliable and deterred potential customers still further.

The decline in the number of passengers was largely offset by the mid 1980's due to an increase in average length of journey. The average trip length had sharply risen from 86 km in the 1960's to 194 km in 1985 and 292 km in 1990. The reasons for the rise in the average length of journey are:

- Short distance travellers diverted to bus service as a result of the gradual improvements of the standard of the highways to the north and to the south of Manila;
- Long distance travellers increased in accordance with economic growth and the rapid growth of Metro Manila; and
- Recent improvement of services along the Main Line South contributes to attracting long distance travellers.

Inter-provincial passenger traffic originating from CALABARZON using the PNR, therefore, is insignificant. The PNR services are relatively well used between Metro Manila and Quezon/Bicol regions as well as within the latter regions (Figure E.8).

Commuter traffic demand

At present, commuter services of PNR for CALABARZON are available between Metro Manila and Carmona, though the services existed up to College in Laguna in 1981. The traffic sharply decreased from the peak traffic of 8.2 million in 1977 to 5 million in 1980 then further to 1.2 million in 1988 (Table E.21). The decline is largely due to the deterioration of facilities and services rather than the competition with road public transport.

The recent efforts of PNR commuter service improvement contributes to the regain of passenger patronage considerably. It is reported that the current commuter traffic level is approximately 10,000 passengers on a weekday.

PNR survey results

Surveys on the PNR commuter and long distance services were undertaken in August 1990. The notable survey results are as follows.

1) Distribution of commuter - train passengers

Metro Manila being the focal point of activities has been strengthened. There are more passengers counted boarding than alighting north bound trips. This could be indicative of the volume of passengers heading for Metro Manila. Similarly, there are more passengers counted alighting than boarding south bound trips. This could only mean the passengers returning back from the metropolis.

2) Trip purpose of commuter - train passengers

The primary trip purposes of PNR passengers are "to home", "to work" and "private", accounting for 41%, 29% and 15%, respectively.

3) Origin/destination

From the origin and destination of PNR passengers for both commuter and long distance services, the following patterns are noted (Table E.24):

- a) Laguna posted the highest share (40%) of passengers originating from the area but mostly bound for Metro Manila.
- b) The next largest volume of passenger originates from Metro Manila but bound for Cavite and Laguna.
- c) A high share of PNR passenger from the Southern Tagalog areas or 35% have Metro Manila as their destination. This is followed by Laguna (22%), Camarines Sur (17%) and Cavite (16%).

Freight traffic

The tonnage carried by PNR had continuously deteriorated from 1.2 million tons in 1960-61 to 0.3 million in 1974-75, to 142,000 tons in 1980, to 54,000 tons in 1985, and to only 32,000 tons in 1990. Express traffic also had decreased from the peak of 102,100 tons in 1973/74 to only 16,800 in 1990. Since 1985, the ordinary traffic remained the traffic level of around 60,000 tons a year until it started to show a decline in 1988 (Table E.25).

Of the total tonnage, 24% generates from Tagkawayan, 23% from Manila, 16% from Hondagua and 11% from Ragay, while 50% are attracted to Manila, 15% to Lucena, 12% to Ligo and 10% to Naga. Manila accounts for 73% of the total generating and attracted tonnage of goods.

Composition of major commodities handled varies considerably by year. The following data for 1990 are only indicative.

Major Commodities Handled by Freight, 1990

Commodity	1990 Volume Handled (tons)	% to Total
1. Copra/Coconut	13,121	40.8
2. Other Mined Products	3,520	10.8
3. Firewood	3,154	9.8
4. Lumber & Plywood	2,970	9.2
5. Misc. Categories	2,146	6.7
6. Beer/Wine/Liquor/Softdrinks	2,016	6.3
7. Salt	1,196	3.7
8. Cement	1,015	3.2
9. Rice/Paddy/Husk	860	2.7
10. Sand/Gravel/Stones	759	2.4
Total	30,757	95.6

Source : PNR

(4) Rolling stock

Rolling stock owned by PNR is composed of diesel railcars (109 units), diesel locomotive (64 units), passenger cars (136 units) and freight cars (832 units) as of 1990. Availability of rolling stock is as follows: diesel cars (26%), diesel locomotives (25%), passenger cars (16%), and freight cars (41%). Some units are obsolete while others would prove uneconomical if repaired. However, no standard criterion exists as to whether such units should already be condemned. Setting up the guidelines on this matter would prove beneficial to the Government as this would:

- increase availability of spare parts; and
- increase space on sidings thereby minimizing long exposure of waiting cars to weather.

E.4.2 Air transport

(1) Institutional structure

The government agency overseeing the Philippine civil aviation sector is the Department of Transportation and Communications (DOTC). DOTC performs this function through various agencies, including the Civil Aeronautics Board (CAB) and the Air Transport Office (ATO). CAB formulates and reviews policies governing civil air transport and regulates the economic aspects of air transport within the country. ATO implements technical and operational rules and regulations, issues aircraft registration and air-worthiness certificates, and operates the domestic public airport network.

DOTC also coordinates with other government agencies on matters affecting aviation. These agencies include:

- the Department of Finance and its subordinate agencies such as the Bureau of Customs and the Bureau of Internal Revenue, regarding taxes and duties on aviation-related equipment and supplies;
- the Board of Energy regarding allocation, pricing, and other matters concerning aviation fuel and other petroleum-based products;
- the Central Bank of the Philippines regarding foreign exchange transactions for aviation-related items;
- the Department of National Defense and the Armed Forces, regarding complementation, security, and other matters of mutual interest; and
- the Philippine Aerospace Development Corporation (PADC), a government-owned corporation established to promote the development of the Philippine aerospace industry by engaging in aircraft assembly, maintenance, and air transport services.

The DOTC also interacts with the private sector, particularly on matters that will affect private or general aviation.

(2) Air transport system and traffic

National system

The present airports consist of 83 national airports, 120 private airports/landing strips, military airports and heliports. The national airports comprise five international airports (Manila, Cebu, Davao, Zamboanga and Laoag), trunkline airports, secondary airports and feeder airports (Figure 5.10). The international airports are used for the operation of aircraft engaged in international air commerce, trunkline airports serve the principal commercial centers of the Country, secondary airports serve towns and cities with less regular air traffic densities and feeder airports serve towns and rural communities with limited air traffic potential.

International air traffic is handled by the Ninoy Aquino International Airport (NAIA), formerly called Manila International Airport (MIA). It is located some 9 km south of the city center. Access from the North and South is through MIA road and Airport road, each with three lanes, both directions. Other routes that run through a maze of streets out by many crossings exist. However, it is very important to emphasize that traffic bound for the NAIA constitutes only a small part of the total traffic on these roads.

Access through south Superhighway opens only to aircraft maintenance areas, not to the airport.

Air traffic

There is no airport in the CALABARZON region and Manila (Ninoy Aquino International Airport or NAIA) is practically the only airport which provides air links between the Region and the rest of the Country as well as the world. Most of the major destinations in the Country are directly connected with NAIA and to some extent with Cebu and Davao, while the other regional centers are not linked each other directly.

NAIA is in the premier position in the air passenger movements, handling 4.4 million passengers in 1980. The second is Mactan in Cebu which handles less than a fourth of NAIA. NAIA is located within Metro Manila that provides easy access to/from the airport. Capacity of airside will not be reached in the near future, while, the terminal and curbside already show congestions during peak hours. Relatively large number of visitors and well wishers and inefficient traffic control often amplify the chaotic situation. Traffic conditions in Metro Manila roads are getting worse to make the access time long and unsure.

E.4.3 Ports and shipping

(1) Port system

The Philippine Ports Authority (PPA) has five Port District Offices (PDO) in the whole Country and there are 19 Port Management Offices (PMO) under the PDOs. There are 19 base ports, 57 sub-ports, some five hundred other public ports and some three hundred private ports under the supervision of the PMOs in the Philippines.

In Luzon Island, there are two PDOs, namely Manila and Luzon. In the CALABARZON region, there is a Port Management Office (PMO) Batangas under the PDO of Luzon. Besides, there are two PMOs, South Harbor and North Harbor under the control of PDO of Manila and a Field Office of Manila International Container Terminal (MICT).

According to the Annual Report 1988 published by PPA, the combined volume of trade reached 89.3 million metric tons in 1988 (Table 5.10). Domestic cargo comprised 57% of the aggregate, and foreign cargo, 43%. Containerized foreign and domestic cargo continued to rise to reach 13.94 million metric tons or 15.6% of total cargo and total containers handled reached 1.07 million TEUs. Of the annual cargo throughput, 47% were handled by the public ports and 53% by the private ports.

The passenger traffic recorded 23.34 million in 1988, an additional 5.37 million passengers over the previous year or an increase of 30% (Table 5.11).

The port system in Region IV is composed of 82 public ports and 46 private ports. Of all the public ports, 15 are classified as national and the rest as municipal ports. The port of Batangas is a base port, and there are 6 sub-ports and 26 private ports under the supervision of PMO Batangas.

Along the long coastline of Quezon, there are 27 existing ports. Under the sub-port of Siasin, there are one national port, and two private ports. More important ports and routes for regional shipping are ports of Hondagua (national), San Andres, Infanta-Polillo, Gumaca-Alabat, Atimonan-Alabat and Cotta (Lucena City).

(2) Ports in CALABARZON

Batangas port

The port of Batangas is located in Santa Clara, Batangas City in the northeast section of Batangas Bay in the southwestern part of Luzon island, approximately 100 km south of

Metro Manila. There exist four wharves owned by PPA. Piers I and II are used for accommodating Ro-Ro vessels and ferry boats plying between the Batangas port and the ports of Calapan, Puerto Galera and Abra de Ilog located in the northern periphery of Mindoro Island. At Pier III, it is currently difficult to maintain the required depth due to the siltation. This pier is mainly utilized for handling silica sand, gypsum and pyrite by barges. The marginal wharf connected with Pier II is utilized for accommodating large size vessels which carry broken bulk cargoes such as lumber, logs, and general cargoes. The eastern side of the marginal wharf provides a berthing place for small vessels like tug boats.

According to the Profile of Philippine Ports 1989, published by PPA, a total of 12.4 million metric tons of cargo are loaded and unloaded in 1988 at the ports controlled by PMO Batangas including private ports. Of these, a total of 703 thousand tons of cargo are handled at the Batangas base port.

Of the total domestic cargo, over 85% is handled by Ro-Ro service. The total number of passengers was 1,032,736 in 1988. Major cargoes handled at the Batangas port are rice, calamansi, copra, logs/lumber, minerals and other general cargoes coming in, and bottled cargoes, cement and other general cargoes going out. No foreign export cargo is recorded in recent years, while foreign import cargoes consist of fertilizer, sugar and other general cargoes.

Private ports

There are 13 private ports located along Batangas Bay. They handled 11 million metric tons or 88% of the total cargo of PMO Batangas in 1988, including the base port, other public and private ports. Characteristics of these ports are summarized in Table 5.12.

(3) Interisland shipping

Main passenger transport routes with more than 50,000 passenger per direction in 1986 are 17 to/from Cebu, 7 to/from Manila, 7 to/from Zamboanga and 17 to/from other areas. There are 3 main routes to/from Batangas: to/from Calapan with 316,000 passengers, Calapan with 207,000 passengers, and Puerto Galera with 57,000 passengers.

Main routes with more than 100,000 tons per direction in 1986 are concentrated in Manila and Cebu. Batangas also has 4 main routes: to/from Calapan with 98,000 tons, Calapan with 103,000 tons, Davao with 149,000 tons, and Cebu with 141,000 tons.

E.5 CALABARZON Transport Development Strategy

E.5.1 Government transport plans and policies

(1) Current transport policies

In pursuance of its decentralization policy to further improve project administration and accelerate project completion, the Government instituted several policy measures during the year 1988. These include the expansion of the limits of authority of the regional directors of DPWH on the approval of agency estimates and award of contracts; the development of certain functions of infrastructure agencies to the local government units (LGU's) to increase their participation in the implementation of local projects; the standardization of procedures of contract-related activities; the institutionalization of labor-based techniques in all productive sectors of the economy; and the intensification of the involvement of the NGO's in the planning and monitoring of projects.

To provide for the efficient and coordinated implementation of local projects and to avoid duplication and overlapping of functions, DPWH and DILG entered into a Memorandum of Agreement delineating the activities and responsibilities among DPWH, DILG and LGU's with respect to the planning, identification and implementation of local road projects funded from *National Assistance to Local Government Units (NALGU) fund*. This agreement is also a preliminary step toward improving the capability of LGU's in carrying out project-related activities.

The transportation sector continued to implement infrastructure projects formulated to support the development thrust of the Government. Transport projects implemented were, therefore, designed to help increase agricultural production, encourage small and medium industries, support land reform and increase rural incomes on a wide scale. Special attention was given to the completion of ongoing projects that are confirmed to be consistent with the development thrust in order to realize the benefit from their early operation, and to the maintenance of existing facilities in order to prolong their useful lives and reduce costs to users.

The year 1988 was the first year DOTC started implementing its infrastructure projects pursuant to Executive Order 125 A, as amended. Project implementation was therefore in its organizational stage. A system for project implementation was first set up during the year. Along this line, Department Order 88-323 as amended, was issued. This provided for the decentralization to the regional level of the pre-qualification, bidding and awarding of contracts up to an amount of 5 million pesos.

DOTC is in the process of instituting policy reforms as regards public transport services. An implementation program for a period of five years is being drawn up for a new regulatory framework for inter-urban public land transportation services marked by reduced government intervention both for route entry and fares. Other policy reforms and programs being implemented nationwide for road transport are as follows: liberalization in trucking operations in both economic entry and freight rate setting, liberalization in the importation of motor vehicles and spare parts at lower tariffs, ensuring the safety and road worthiness of motor vehicles through a nationwide construction and establishment of motor vehicle inspection station, strengthening traffic law enforcement measures to improve traffic circular flows in urban area, and identifying and implementing necessary actions addressing the hazard of air pollution from vehicle emission.

Through Memorandum Order No. 33, the President revoked the one-airline policy and DOTC started drawing up guidelines for the grant of operating rights to other domestic airlines. For the shipping industry, deregulation is targeted within the next five years.

(2) Existing programs

The infrastructure development program in the Region for 1988 involved major investments in the construction/rehabilitation of highways, ports, flood control, water supply and school buildings and the construction/rehabilitation of power and electrification projects. Total investments for public works and highways projects, including irrigation projects, reached 590.5 million pesos. Power and electrification projects amounted to 3,070 million pesos, the biggest share in the total infrastructure investment for 1988.

A list of road/bridge projects, both ongoing and committed, for the CALABARZON region is given in Table E.26 and shown by province in Figures E.9 to E.13. A detailed description of each project is presented in Annex.

The transportation sector aims to improve and expand access to or linkage between markets and producers especially in the countryside and provide increased capacity in urban areas. The following shall be addressed for the period covering 1989 to 1992 (Medium-Term Public Investment Program).

Roads and bridges

The improvement and rehabilitation of existing facilities is given emphasis rather than new construction, with increasing investments in the rural areas. Special requirements of the

Comprehensive Agrarian Reform Program, regional industrial centers and tourism shall also be addressed within the period.

Water transport

The projects to be implemented over the period are intended to improve the productivity of inter-island movement of goods, as well as to encourage the movement of private sector investments to other regions. The rehabilitation and improvement of the Manila North and South Harbors, the development of the Batangas Port and the procurement of modern cargo handling equipment shall be undertaken. The proposed conversion of Sangley Point into a commercial port needs a further study as well as continued initiative.

Air transport

Facilities of the Ninoy International Airport shall be improved to accommodate increased flight, passenger, and cargo traffic as well as to enhance safety.

(3) Anchor projects of CALABARZON

The anchor projects of CALABARZON originally proposed by the Government for the transportation sector are six for roads, two for rail and one for port. They are described below and illustrated in Figure E.14.

Roads

The anchor projects on roads aimed at creating a road network in the CALABARZON region to link Metro Manila to the Region's major towns and cities, export processing zones and industrial estates, low cost housing estates, and the international port.

1) Carmona-Ternate-Nasugbu Road (99 km); Cavite and Batangas

A feasibility study for this project was completed in 1988 and the detailed engineering in March 1990. The right-of-way acquisition is targeted to be finished by the first half of 1990 and construction was expected to begin in the first quarter of 1991 up to late 1992.

2) Gen. Trias-Rosario Road (21 km); Cavite

The feasibility study was completed in March 1989. The detailed engineering is still on-going. Construction/improvement activities are targeted for the first quarter of 1991.

3) Cavite Coastal Road (10.5 km); Cavite

The phase II feasibility study for this 4-lane highway is still on-going, under consideration for technical assistance from the Korean government. Detailed engineering is targeted to start by 1991 and is expected to last for 12 months. Implementation of the project is expected to commence by the fourth quarter of 1992 and is targeted for completion by 1994.

4) Calamba - Sto. Tomas Expressway Extension (8 km); Laguna and Batangas

The feasibility study has already been completed and the detailed engineering still on-going. Implementation of this project will be undertaken as part of the Calamba-Calauag Road Rehabilitation.

5) Sto. Tomas - Batangas Expressway Extension (45 km); Batangas

The feasibility study for this project was completed in 1985. Detailed engineering was targeted for completion in August 1990. Construction of Phase I (Sto. Tomas - Lipa City) of the project was expected to be during the first quarter of 1991, while Phase II (Lipa City - Batangas City) scheduled for 1992-93.

6) Marikina - Infanta Road (133 km); Rizal and Quezon

Phase I of this project is from Sumulong to Camp Capinpin and Phase II is from Camp Capinpin to Infanta.

Rail

1) Rehabilitation of PNR Main Line South

2) Rehabilitation of PNR South Commuter Line; Laguna

Feasibility on the revitalization of the PNR South Line was completed in 1987. Implementation has been scheduled under 3 phases starting 1989 till 1994.

3) Manila - Batangas PNR Line Extension; Batangas and Laguna

This project is in its pre-feasibility study stage. The conceptual planning and reconnaissance survey were completed in November 1989. A CIDA - assisted pre-

feasibility study conducted in 1987 concluded that expected freight traffic between Manila and Batangas City could not provide an economic ground for its reconstruction/improvement.

Port

- 1) Batangas Port Development (Phase I, II and III); Batangas

Detailed engineering for phase I was completed in 1990. Construction is scheduled to commence in 1992.

The profile of these projects are given in Annex.

E.5.2 CALABARZON transport strategy and measures

- (1) CALABARZON transport objectives

Transportation development in CALABARZON will have to satisfy two distinct but mutually inter-related objectives:

- 1) to contribute to the establishment of more efficient transportation system for the Greater Capital Region centering around Metro Manila, and
- 2) to support and promote the CALABARZON regional development.

For the attainment of the first objectives, the following will be particularly important:

- inter-linkages between the urban transport system of Metro Manila and the CALABARZON regional transport system especially with respect to roads/highways and the railway, and
- port development within CALABARZON to share responsibilities with the Manila ports with proper functional division.

In order to attain the second objective, transport projects should in general be designed to serve increasing agricultural production and marketing, encourage small and medium industries, support land reform and increase income levels. Indirect effects are as important as direct ones. In fact, the transportation sector in general is a significant contributor to the broad service sector in terms of value-added and employment. The service sector in turn claims the larger share, as the economy develops to reach the higher level.

(2) Strategy for transport development

At national level

The following will be the basic strategy for transport development at the national level, having relevance also for CALABARZON:

- 1) to strengthen the inter-modal coordination in transport planning for efficient allocation of development resources, and
- 2) to effect further decentralization in transport project planning, implementation and management and further privatization/liberalization of transport industry.

At regional level

- 3) To strengthen linkages between the urban transport system of Metro Manila and CALABARZON regional transport system to ensure the smooth interactions of the activities and information and to orderly guide the suburbanization of Metro Manila.
- 4) To structure regional arterial transport network with clear hierarchy for more effective integration of subregions of CALABARZON (Figure E.15).

At local level

- 5) To ensure adequate level of accessibility for all parts of CALABARZON to/from urban/rural centers.
- 6) To establish a transport facility development and maintenance system of tertiary/rural roads by utilizing self-help efforts which will be supported by the provision of basic facilities and equipment as well as proper training.

Intermodal coordination in CALABARZON

Roads will be the prime mode of transportation in CALABARZON. However, accessibilities to international airport and seaport will become more critical as urbanization makes progress, foreign investments are made and tourism development takes place etc. Expansion/relocation/new construction of international airport and seaport would, therefore, directly or indirectly affect the internal road network of CALABARZON. Rail

transport which runs parallel to Maharlika highway should play two key roles; to provide long distance goods and passenger transport along the route and to meet commuter travel demand to/from major urban centers such as Metro Manila and Lucena City. Strategies for strengthening of intermodal coordination for CALABARZON transport system are as follows:

- 7) To provide adequate links for international airport and seaport with internal road network to ensure smooth transport of export and import goods and international travellers.
- 8) To improve the existing railway as an economical mass-transport means in order to encourage further urbanization integrated with transportation. Access roads and transport facilities to the railway should be improved.

(3) Measures for road transport development

Road development of Metro Manila

As Metro Manila is the major external access node of CALABARZON, road conditions between Metro Manila and the Region are very critical (Figure E.16). Those roads which specifically link both areas are: R1 (Cavite Coastal Road), R3 (South Super Highway), R5A (Ortigas Ave.) and R6 (Marikina - Infanta Road). To improve the situation, the following measures should be simultaneously taken:

- 1) Widening of the above roads to increase capacities.
- 2) Constructing additional links, especially towards Cavite in between R1 and R3.
- 3) Extending R7 to provide alternative link to Metro Manila from Rizal.
- 4) Constructing C5/C6 to disperse the CALABARZON traffic before reaching EDSA which is already getting saturated.

Road development for priority areas

The roads which will encourage regional development should be given priority. They include the following.

- 1) Strengthening roads which will support industrial development in Laguna/Cavite areas. The size of the industrial development anticipated in

the areas will require additional arteries and better configured secondary road network with adequate standards.

- 2) Constructing tourism roads in Looc area where large tourism development potentials are identified.
- 3) Strengthening roads to encourage effective development in Tagaytay area.
- 4) Constructing road and road transport facilities for major urban centers including bypass, transport terminal, etc.

Low-cost rural roads

Adequate transport facilities should be provided to match varied needs of the areas with poor accessibilities. They include the following.

- 1) Footpath for school children using road shoulders.
- 2) Development of adequate transport facilities where roads with carriageways cannot be warranted due to insufficient traffic volume.
- 3) Provision of low cost road development measures to meet varied needs in rural areas where prevailing transport means are on foot, cart, bicycle, pedicab, animal-drawn vehicles, motorcycle, tricycles, etc. and often roads are used for non-transport purposes.

Institutional framework for roads development and maintenance

In order to maximize the effective utilization of limited resources for roads development and maintenance, the following areas should be further looked into.

- 1) Review and formulation of the functional classification of the existing roads and roads standards to match more adequately the local needs.
- 2) Review and update of planning and investment criteria for roads development and maintenance to avoid excessive or substandard investments.
- 3) Expansion of roads development and maintenance funds which could more directly be accessed by local governments through modification of current taxation system, creation of new taxes specifically for the use of roads development, promotion of private sector's participation, establishment of self-help methods, etc.

- 4) Strengthening of road maintenance system such that maintenance requirements are timely and adequately met.

Public transport system

Infrastructure development should be associated with proper management of road transport for passengers and goods movement. Financial assistance to operators is not warranted for fleet replacement considering the highly competitive nature and viability of the land transport industry. As recognized by DOTC, *certain regulatory reforms and institutional streamlining* are needed to limit government control of the industry. The areas to be looked into include the following.

- 1) Development of public transport terminals to encourage modal coordinations among buses, jeepneys, tricycles, pedicabs, etc.
- 2) Restructuring of public transport routes with particular regard to the provision of accessibility to the unprofitable areas in the Region through adequate Government subsidy or incentives.
- 3) Provision of segregated public transport facilities such as exclusive or segregated bus lanes, introduction of higher occupancy vehicles, etc., along the major corridors linking Metro Manila and CALABARZON (i.e., Cavite coastal road, SSH and Ortigas Ave./Shaw boulevard).

(4) Measures for rail transport development

Intensive urban development along the west coast of Laguna de Bay will further progress even with land use control. Present traffic conditions are already serious and will become worse in the future. Expansion of road capacities is limited and even if roads are widened, additional capacities would quickly be occupied by private vehicles. This situation is also anticipated along the coast of Cavite and the eastern corridor towards Rizal. Segregated public transport corridors should be provided for the smooth interchange of goods and passengers between Metro Manila and CALABARZON by utilizing the existing rail facilities to a maximum extent. Specific measure include the following.

- 1) Strengthening of PNR commuter services to relieve the anticipated increase in public transport demand along the southern urban corridors of Laguna; Urban development should also be integrated with PNR commuter improvement and expansion.

- 2) Extension of LRT; At a system cost of P 800 million per kilometer, extension of the LRT Line No. 1 to Cavite is not recommended. However, other mass transit options may be considered. For LRT Line No. 2 (Divisoria - Cubao Route), possible extension to Marikina is under consideration.

(5) Air transport improvement

Although the existing airport might be relocated in the long run due to the fact that further progress of urban development in the area will cause more serious environmental problem, the existing airport together with military base block the sound urban expansion towards the south. More importantly the land could be more effectively used for other purposes. The following improvements could be looked into with regard to CALABARZON development.

- 1) Improvement of existing international terminal facilities and management including curbside traffic management, luggage handling, congestions and comfort at departure and arrival areas, etc.
- 2) Improvement of domestic terminal building.
- 3) Provision of more direct access to the airports from the south of CALABARZON region.
- 4) Construction of grade-separated tollway to provide alternative link between EDSA and the airports.

Tables

Table E.1 Functions of Relevant Transport Agencies (1/2)

Organization	Agency	Functions
DOTC	LTO	<ol style="list-style-type: none"> 1) Inspects/registers motor vehicles 2) Administration tests, gives licenses and educates drivers and conductors 3) Enforces traffic rules and regulations.
	LTFRB	<ol style="list-style-type: none"> 1) Evaluates application for franchises. 2) Issues franchises to public transport operators/owners. 3) Monitors performances of these PU operators. 4) Establishes, prescribes and regulates routes, zones, and/or areas of operation for PU vehicle.
	ATO	<ol style="list-style-type: none"> 1) Develops policies, standards, programs, rules and regulations governing air space utilization, air traffic, and the maintenance/operation of aircraft and components and airports operation services. 2) Develops policies, standards and criteria for the design, construction and maintenance of airports, seaports and heliports.
	MMTC	Operates a public transport system in Metro Manila.
	PNR	Manages the operation of the railway network in Manila.
	LRTA	Manage the operation of the urban light rail system in Metro Manila. Also provides comprehensive policy guidance for the development, operation and promotion of an LRT system.
	MARINA	Provides for the effective supervision, regulations and rationalization management, ownership and operations of all water transport utilities and other maritime enterprises.
	PADC	Develops local capabilities in the maintenance, repair/overhaul, and modification of aerospace and associated flight and ground equipment and components thereof in order to provide technical services to government agencies owning aerospace equipment.
	PNL	Undertakes all manner of business activity for the establishment of a reliable shipping services.
	TTC	Upgrades the capability and potential of government personnel concerned with transportation through intensive and practical training in the fields of traffic engineering, planning and management.

Table E.1 Functions of Relevant Transport Agencies (2/2)

Organization	Agency	Functions
DOTC	PPA	<ol style="list-style-type: none"> 1) Supervises, controls, regulates, constructs, maintains, operates and provides such facilities or services as are necessary in the ports vested or belonging to the authority. 2) Prescribes rules and regulations, procedures, and guidelines governing the establishment, construction, maintenance and operations of all other ports, including private ports in the country.
	TRB	Encourage private investments in public infrastructure programs by way of expectation of reasonable returns through collection of tolls from these facilities.
NEDA		Key agency for carrying out intermodal coordination among ports, railways, airports, highways and rural roads in terms of allocating resources for already prepared projects in all sectors.
DPWH	BC	Provides policies and guidelines for the construction of all public infrastructures.
	BM	Provides policies and guidelines for the maintenance of all public infrastructures.
	BD	Provides guidelines for the design of all public infrastructures.
	PPDD	Responsible for formulating highway development plans.
	RO	Each regional office plans, regulates, implements and monitors the construction/improvement and maintenance of national infrastructures in their area of jurisdiction.
MMA	TOC	Coordinates and integrates efforts and activities relating to traffic management and control in Metro Manila.
DND	PC/INP	Enforces existing and prescribed traffic rules/regulations.
	CHPG	Promotes safety on the highways and major thoroughfares and conducts operations against crimes committed on highways/thoroughfares.
	PCG	Enforces laws, rules and regulations governing the territorial waters of the Philippines.
DILG		Responsible for construction/improvement and maintenance of infrastructures on the local government level (i.e., provincial, city and municipal roads).

Table E.2 Annual Infrastructure Program for CALABARZON (in Million Pesos)

Province		Ave. of	1986	1987	1988	1989	1990
		1982-1985					
1. Cavite	1) National Roads	5.3					
	- Foreign Assisted		6.6	19.2	5.0	24.2	142.0
	- Locally Funded		5.4	1.5	7.0	4.0	5.0
	2) Provincial Roads	2.0	-	5.4	-	5.1	-
	Road Total	7.3	12.0	26.1	12.0	33.3	147.0
	3) Portworks	1.3	-	0.3	1.0	-	0.7
	4) Flood control/Drainage	0.4	2.0	0.5	1.0	1.2	2.5
5) Shore Protection	0.6	-	0.2	0.2	0.5	0.5	
6) Mini Dams	-	-	-	-	-	0.2	
	Total	9.6	14.0	27.1	14.2	35.0	150.9
2. Laguna	1) National Roads	5.3					
	- Foreign Assisted		4.4	5.3	14.0	22.1	26.8
	- Locally Funded		3.4	7.0	10.5	9.5	11.0
	2) Provincial Roads	-	-	4.2	4.8	5.2	-
	Roads Total	5.3	7.8	16.5	29.3	36.8	37.8
	3) Portworks	-	0.2	0.4	1.0	-	-
	4) Flood control/Drainage	1.1	0.3	1.2	2.4	1.5	3.4
5) Shore Protection	-	-	-	-	0.5	-	
6) Mini Dams	-	-	-	-	-	-	
	Total	6.4	8.3	18.1	32.7	38.8	41.2
3. Batangas	1) National Roads	6.2					
	- Foreign Assisted		40.4	26.3	60.1	76.1	150.3
	- Locally Funded		0.9	6.2	10.7	5.0	14.6
	2) Provincial Roads	1.3	-	8.8	9.3	7.6	-
	Road Total	7.5	41.3	41.3	80.1	88.7	164.9
	3) Portworks	1.1	0.7	1.7	6.0	1.0	-
	4) Flood control/Drainage	1.0	0.6	1.0	2.6	2.2	1.6
5) Shore Protection	0.3	0.5	0.5	1.1	1.0	1.7	
6) Mini Dams	-	-	-	-	-	0.1	
	Total	9.9	43.1	44.5	89.8	92.9	168.3
4. Rizal	1) National Roads	7.2					
	- Foreign Assisted		-	23.0	0.7	1.6	12.5
	- Locally Funded		3.5	7.0	9.0	4.0	5.0
	2) Provincial Roads	-	-	2.8	3.2	3.6	-
	Road Total	7.2	3.5	32.8	12.9	9.2	17.5
	3) Portworks	0.4	0.3	0.6	2.0	0.3	2.0
	4) Flood control/Drainage	0.9	0.2	-	5.2	1.3	3.2
5) Shore Protection	-	-	-	-	-	-	
6) Mini Dams	-	-	-	-	-	-	
	Total	8.5	4.0	33.4	20.1	10.8	22.7
5. Quezon	1) National Roads	3.7					
	- Foreign Assisted	-	-	19.0	-	-	-
	- Locally Funded	-	1.5	17.2	11.5	4.0	20.0
	2) Provincial Roads	-	-	19.8	12.2	10.0	10.0
	Road Total	3.7	1.5	56.0	23.7	14.0	30.0
	3) Portworks	1.6	0.4	0.9	11.5	11.5	0.2
	4) Flood control/Drainage	3.3	0.1	0.5	1.6	2.4	1.4
5) Shore Protection	-	0.5	0.3	0.6	1.5	0.6	
6) Mini Dams	-	-	0.4	0.4	6.0	1.0	
	Total	8.6	2.5	58.1	37.8	35.4	33.2

Source: DPWH Region IV-A

**Table E.3 Government Infrastructure Development Program
Disbursement by Funding Source (1988: in million pesos)**

Sources	Actual Program	Amount Released	Disbursement	Growth Rate (1987-88)
Domestic Sources	11,665	8,329	6,856	-28.0
Budgetary				
Gen./Cont. Approp.	5,347	3,697	2,851	
Corporate Equity	1,013	1,013	955	
Others	479	149	145	
Corporate Earnings	4,827	3,471	2,904	
Corporate Borrowings	-	-	-	
Foreign Sources	8,228	4,237	3,152	-27.3
Total	19,894	12,556	10,007	-27.8

Source: Philippine Development Report, 1988

Table E.4 Transportation Operations and Maintenance Funding

Transport Agencies	Funding Source	Expenditure Item	Revenue Item
Road	Revenues Govt. Subsidy	Capital Outlay Personal Services Maintenance/ Operation	Registration Licensing Franchising Penalties Toll Operating Rev.
Rail/PNR	Govt. Subsidy Revenue	Personal Services Maintenance/ Operation	Railway Rev. Non-Rail Rev.
Port/Shipping	Revenue	Capital Outlay Personal Services Maintenance/ Operation	Registration Franchising Penalties Operating Rev.

Source: Department of Transportation and Communications

Table E.5 Roads in CALABARZON, 1989

Province	Area	Road by Administration (km)				Total
		National	Provincial	City/Mun.	Barangay	
Cavite	Cavite City	10	-	56	10	76
	Tagaytay city	40	-	24	68	132
	Trece Martires	47	-	13	74	135
	Districts	207	430	80	584	1,300
	Sub-total	304	430	173	736	1,643
Laguna	San Pablo city	39	-	80	82	121
	Districts	307	252	147	563	1,269
	Sub-total	346	252	227	645	1,390
Batangas	Batangas City	73	-	28	139	239
	Lipa City	34	-	16	161	211
	Districts	415	1,099	233	1,935	3,682
	Sub-total	522	1,099	277	2,235	4,132
Rizal	Districts	254	67	143	792	1,256
Quezon	Districts	692	355	273	1,869	3,189
	Total	2,118	2,203	1,093	6,277	11,610

Source: DPWH, Region IV

Table E.6 National Roads by Surface Type in CALABARZON, 1988

Province	Concrete		Asphalt		Gravel		Earth		Total	
	km	%	km	%	km	%	km	%	km	%
Cavite	54.9	18.1	235.1	77.3	13.9	4.6	-	-	303.9	100.0
Laguna	142.6	41.2	121.0	35.0	82.5	23.8	-	-	346.1	100.0
Batangas	52.5	10.0	384.5	73.7	74.7	14.3	10.2	2.0	521.9	100.0
Rizal	123.6	49.8	97.7	39.4	26.7	10.8	-	-	248.0	100.0
Quezon	197.7	28.6	39.8	5.8	414.6	59.9	40.0	5.8	692.1	100.0
Total	571.3	147.7	878.1	231.2	612.4	113.4	50.2	7.8	2,112.0	100.0

Source: DPWH Region IV

Table E.7 Inventory of Roads in CALABARZON, 1986

	Cavite	Laguna	Batangas	Rizal	Quezon	Total/ Ave.	NCR	Phil.
1) Road Length (km)								
- National	304	346	522	254	692	2,118	876	26,260
- Provincial	430	252	1,099	67	355	2,203	0	28,425
- City	80	80	44	0	17	221	1,274	3,987
- Municipal	93	147	233	143	256	872	554	12,826
- Barangay	736	645	2,235	792	1,869	6,277	238	90,214
Total	1,643	1,470	4,133	1,256	3,189	11,691	2,942	161,712
2) % of Paved Roads (PCC/AC)								
- National	93.5	77.0	82.0	85.1	38.9	68.5	98.4	45.1
- Provincial	32.0	57.4	44.1	34.4	8.4	35.3	0.0	11.1
- City	60.0	70.0	90.1	0.0	83.0	70.2	87.5	67.0
- Municipal	70.1	77.0	54.0	76.5	42.8	59.4	92.6	26.0
- Barangay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average	32.0	40.0	24.0	28.1	13.2	24.6	84.7	13.0
3) % of Fair Condition (km/sq.km)								
- National	62.0	67.0	57.1	73.0	53.0	59.9	79.6	52.0
- Provincial	37.5	54.0	40.1	30.3	26.6	38.3	0.0	28.5
- City	52.0	54.1	50.3	0.0	61.8	53.2	65.1	55.1
- Municipal	73.5	73.4	43.5	70.1	51.8	57.9	82.5	35.5
- Barangay	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Average	34.0	42.0	28.1	34.0	34.0	33.1	68.7	30.1
4) Road Density/Area (km/sq.km)								
- Total Roads	1.3	0.8	1.1	0.9	0.2	0.9	4.6	0.5
- Paved Roads (PCC/AC)	0.4	0.3	0.3	0.3	0.1	0.3	3.9	0.1
- Fair Condition Roads	0.4	0.3	0.3	0.3	0.1	0.3	3.2	0.1
5) Road Density/Arable Area (km/sq.km)								
- Total Roads	2.3	1.3	1.7	1.2	0.5	1.4	15.0	1.2
- Paved Roads	0.7	0.5	0.4	0.3	0.1	0.4	12.7	0.1
- Fair Condition Roads	0.8	0.6	0.5	0.4	0.2	0.5	10.3	0.3

Source: 1986 Infrastructure Atlas, DPWH

Table E.8 Road Availability in CALABARZON by Municipality
(Province of Cavite)

Municipality	Population	Land Area (sq.km)		Existing Bgy./Mn. Roads (km)	Road Density (km)		
		Total	Farm		Per Land Area	Per Farm Area	Per 1,000 Pop.
Cavite	97,529	11.8	0.3	65.7	5.6	234.6	0.67
Tagaytay City	20,761	74.0	27.5	72.9	1.0	2.7	3.51
Trece Martirez	10,569	39.1	15.5	86.7	2.2	5.6	8.20
Alfonso	26,771	64.6	40.8	59.6	0.9	1.5	2.20
Amadeo	19,300	47.9	21.0	65.8	1.4	3.1	3.41
Bacoor	125,181	25.0	16.4	16.9	0.7	1.0	0.13
Carmona	87,291	40.2	9.5	14.6	0.4	1.5	0.17
Damarinas	70,869	82.3	28.0	28.9	0.4	1.0	0.41
Gen. E. Aguinaldo	10,791	51.0	27.8	39.3	0.8	1.4	3.64
Gen. Trias	50,669	87.0	40.4	35.4	0.4	0.9	0.70
Inus	74,659	89.0	36.0	12.5	0.1	0.3	0.17
Indang	37,747	81.8	52.6	61.8	0.8	1.2	1.64
Kawit	49,246	13.4	7.8	11.5	0.9	1.5	0.23
Magallanes	11,080	78.6	25.4	49.2	0.6	1.9	4.44
Maragondon	22,802	139.8	31.1	64.2	0.5	2.0	2.80
Mendez-Muñiz	17,438	16.7	6.9	32.2	1.9	4.6	1.85
Naic	46,909	78.6	27.8	12.4	0.2	0.4	0.26
Novelata	17,751	5.6	2.3	12.7	2.3	5.6	0.72
Rosario	42,481	3.6	1.2	6.9	1.9	5.8	0.16
Silang	66,421	14.7	81.9	110.1	0.8	1.3	1.66
Tanra	55,057	72.4	26.6	16.9	0.2	0.6	0.30
Ternate	14,046	43.5	2.1	5.9	0.1	2.8	0.42
Gen. Alvarez							
Sub-total	975,378	1,287.6	528.9	882.1	0.7	1.7	0.90

Source: Department of Public Works and Highways, Region IV.

Table E.9 Road Availability in CALABARZON by Municipality
(Province of Laguna)

Municipality	Population	Land Area (sq.km)		Existing Bgy./Mn. Roads (km)	Road Density (km)		
		Total	Farm		Per Land Area	Per Farm Area	Per 1,000 Pop.
San Pablo City	150,118	214.0	93.9	161.9	0.8	1.7	1.08
Alaminos	23,685	54.7	28.1	21.7	0.4	0.8	0.92
Bay	27,511	46.9	23.9	12.5	0.3	0.5	0.45
Bitan	101,402	43.5	21.7	44.1	1.0	2.0	0.43
Cabuyao	57,265	84.6	24.8	8.3	0.1	0.3	0.14
Calamba	150,330	144.8	112.9	15.3	0.1	0.1	0.10
Calauan	28,116	66.4	32.6	18.9	0.3	0.6	0.67
Cavinti	14,905	70.4	49.5	42.3	0.6	0.9	2.84
Famy	6,103	19.4	14.7	21.1	1.1	1.4	3.45
Kalayaan	12,262	46.6	11.8	20.8	0.4	1.8	1.70
Liliw	19,441	39.1	19.8	29.1	0.7	1.5	1.00
Los Baños	59,804	56.5	8.8	17.8	0.3	2.0	0.30
Luisiana	13,516	63.8	35.1	52.1	0.8	1.5	3.85
Lumban	20,075	96.8	11.1	19.4	0.2	1.8	0.96
Mabiat	9,922	73.3	17.6	13.7	0.2	0.8	1.38
Magdalena	12,103	34.4	19.1	2.3	0.1	0.1	0.19
Majayjay	14,968	69.6	37.0	19.9	0.3	0.5	1.33
Nagcarlan	34,979	78.1	38.4	32.2	0.4	0.8	0.92
Pact	18,584	32.4	12.0	46.7	1.4	3.9	2.38
Pagsanjan	23,217	26.4	10.1	27.8	1.0	2.8	1.20
Pakil	10,068	13.0	13.0	21.3	1.6	1.6	2.12
Pangil	12,514	23.0	23.0	20.3	0.9	0.9	1.62
Pila	24,165	31.2	17.6	15.6	0.5	0.9	0.65
Rizal	7,543	27.9	9.6	8.3	0.3	0.9	1.10
San Pedro	106,904	22.6	3.1	14.2	0.6	4.5	0.13
Sta. Cruz	71,184	38.6	19.5	36.4	0.9	1.9	0.51
Sta. Maria	17,668	128.4	65.0	64.7	0.5	1.0	3.66
Sta. Rosa	77,542	39.1	27.2	17.4	0.4	0.6	0.22
Siniloan	20,512	41.1	26.6	36.2	0.9	1.4	1.76
Victoria	19,519	33.1	9.2	22.9	0.7	2.5	1.17
Sub-total	1,165,925	1,759.7	836.7	885.2	0.5	1.1	0.76

Source: Department of Public Works and Highways, Region IV.

Table E.10 Road Availability in CALABARZON by Municipality
(Province of Batangas)

Municipality	Population	Land Area (sq.km)		Existing Bgy./Mn. Roads (km)	Road Density (km)		
		Total	Farm		Per Land Area	Per Farm Area	Per 1,000 Pop.
Batangas City	168,891	283.0	91.3	160.3	0.6	1.8	0.95
Lipa City	142,016	209.4	130.2	177.0	0.8	1.4	1.25
Agoncillo	19,025	54.7	13.5	122.2	2.0	8.3	6.42
Alitagtag	17,364	23.4	6.6	52.1	2.2	7.9	3.00
Batayan	50,727	108.7	69.4	59.5	0.5	0.9	1.17
Balete	9,661	25.0	12.8	24.7	1.0	1.9	2.56
Bauan	50,878	66.6	19.6	50.5	0.8	2.6	0.99
Calaca	43,256	100.2	73.4	112.7	1.1	1.5	2.60
Calatagan	32,849	112.0	49.4	97.5	0.9	2.0	2.97
Cuenca	19,593	40.4	16.8	43.9	1.1	2.6	2.24
Ibaan	29,908	99.0	26.3	74.4	0.7	2.8	2.49
Laurel	21,820	68.1	48.9	144.1	2.1	2.9	6.60
Lemery	50,019	101.6	33.7	50.6	0.5	1.5	1.01
Lian	30,135	76.8	39.1	54.8	0.7	1.4	1.82
Lobo	27,777	192.7	88.0	51.9	0.3	0.6	1.87
Mabini	27,474	43.0	23.3	53.6	1.2	2.3	1.95
Malvar	21,257	36.4	17.9	38.5	1.1	2.1	1.81
Mataas na Kahoy	13,919	22.1	8.5	28.3	1.3	3.3	2.03
Nasugbu	70,526	263.0	76.2	121.4	0.5	1.6	1.72
Padre Garcia	22,570	93.7	24.5	46.4	0.5	1.9	2.05
Rosario	63,612	189.4	102.1	125.5	0.7	1.2	1.97
San Jose	32,699	49.5	24.7	65.5	1.3	2.6	2.00
San Juan	68,540	273.4	92.7	92.2	0.3	1.0	1.34
San Luis	20,091	39.2	12.1	81.4	2.1	6.7	4.05
San Nicolas	12,585	26.6	6.7	74.8	2.8	11.1	5.94
San Pascual	30,905	35.0	17.1	61.1	1.7	3.6	1.98
Sia. Teresita	12,474	12.5	6.7	21.3	1.7	3.2	1.71
Sto. Tomas	50,780	91.1	56.8	54.2	0.6	0.9	1.07
Taal	33,607	29.7	18.6	64.9	2.2	3.5	1.97
Talisay	22,883	28.2	21.7	43.2	1.5	2.0	1.89
Tanauan	83,520	107.2	64.1	89.3	0.8	1.4	1.07
Taysan	22,547	109.4	32.5	106.8	1.0	3.3	4.74
Tingloy	15,431	32.4	16.0	25.5	0.8	1.6	1.65
Tuy	29,318	122.4	60.3	53.4	0.4	0.9	1.82
Sub-total	1,368,657	3,165.8	1,401.6	2,523.5	0.8	1.8	1.84

Source: Department of Public Works and Highways, Region IV.

Table E.11 Road Availability in CALABARZON by Municipality
(Province of Rizal)

Municipality	Population	Land Area (sq.km)		Existing Bgy./Mn. Roads (km)	Road Density (km)		
		Total	Farm		Per Land Area	Per Farm Area	Per 1,000 Pop.
Angono	36,288	26.0	1.2	20.5	0.8	17.8	0.56
Angipolo	102,211	306.1	37.7	74.7	0.2	2.0	0.73
Baras	12,567	23.4	3.2	60.3	2.6	18.6	4.80
Binangonan	97,020	72.7	15.2	101.7	1.4	6.7	1.05
Cainta	91,940	10.2	4.7	35.6	3.5	7.6	0.39
Cardona	27,819	31.2	3.1	82.4	2.6	26.8	2.96
Jala-Jala	14,059	49.3	25.9	47.8	1.0	1.8	3.40
E. Rodriguez*		312.8	12.0	40.5	0.1	3.4	*
Morong	38,368	37.6	18.5	91.3	2.4	4.9	3.22
Pililia	27,781	74.0	48.6	113.7	1.5	2.3	4.09
San Mateo	63,932	64.9	16.8	51.8	0.8	3.1	0.81
Tanay	46,961	243.4	96.6	127.8	0.5	1.3	2.72
Taytay	89,109	38.8	4.0	54.2	1.4	13.6	0.61
Teresa	17,567	18.6	18.1	23.7	1.3	1.3	1.35
Sub-total	707,692*	1,309.0	305.7	926.0	0.7	3.0	1.31

Source: Department of Public Works and Highways, Region IV.

Table E.12 Road Availability in CALABARZON by Municipality
(Province of Quezon)

Municipality	Population	Land Area (sq.km)		Existing Bgy./Mn. Roads (km)	Road Density (km)		
		Total	Farm		Per Land Area	Per Farm Area	Per 1,000 Pop.
District I							
Burdeos	14,888	84.5		19.8	0.4		2.24
Gen. Nakar	12,127	1,343.3	49.0	51.8	0.0	1.2	4.95
Infanta	27,814	134.6	25.1	48.8	1.1	5.8	5.37
Jomalig	3,972	51.7	29.7	16.1	0.4	0.7	5.02
Lucban	25,826	69.3	63.4	132.5	2.5	2.7	6.54
Mauban	37,814	416.0	141.3	79.2	0.3	0.9	3.55
Pagbilao	31,681	171.0	75.3	93.5	0.9	2.1	5.06
Patnanungan	7,456	89.0	31.6	27.9	0.3	0.9	4.10
Pofillo	20,565	288.0	91.4	41.2	0.2	0.7	3.25
Real	14,463	563.8	27.8	25.8	0.1	2.4	4.75
Sampaloc	9,365	73.8	26.9	41.3	0.6	1.8	5.47
Tayabas	42,137	318.0	83.4	78.8	0.4	1.5	3.13
Panukulan	7,885	245.8	24.8	25.2	0.1	1.1	3.52
District II							
Candelaria	54,629	148.7	51.7	91.7	0.8	2.4	2.33
Dolores	15,352	53.0	29.8	45.6	1.1	2.0	4.00
San Antonio	17,701	54.0	16.3	68.2	1.4	2.4	4.49
Sariaya	74,148	245.3	109.4	116.0	0.6	1.5	2.23
Tiaong	48,606	57.7	36.5	78.4	2.0	3.2	2.42
Lucena City	107,880	69.5	70.1	125.5	0.9	0.9	0.60
District III							
Agdangan	7,389	34.8	27.7	28.4	0.9	1.2	4.90
Buenavista	16,246	129.0	98.9	24.6	0.2	0.3	2.20
Catanauan	42,121	178.5	159.9	87.0	0.6	0.7	2.84
Gen. Luna	16,526	137.7	75.4	19.5	0.2	0.4	2.23
Macaletan	17,167	94.0	65.5	32.1	0.4	0.6	2.65
Mulanay	31,701	313.0	150.4	73.0	0.3	0.8	3.90
Padre Burgos	14,078	69.0	37.9	45.3	1.1	2.0	5.50
Pitogo	15,825	90.4	48.9	14.4	0.4	0.8	2.66
San Andres	17,822	198.9	48.0	117.6	0.5	2.4	6.92
San Francisco	33,928	462.9	178.6	68.4	0.1	0.4	2.48
San Narciso	28,958	202.4	83.7	37.4	0.3	0.7	2.22
Unisan	18,230	91.7	73.4	51.7	0.8	1.1	4.55
District IV							
Alabat	11,385	91.5	34.5	30.5	0.4	1.2	3.90
Atimonan	39,824	166.8	144.6	44.8	0.5	0.5	2.22
Guinayangan	29,174	148.0	110.0	71.1	0.6	0.8	3.09
Gumaca	42,143	222.0	116.7	21.4	0.2	0.4	1.34
Lopez	58,402	395.0	197.9	35.5	0.2	0.4	1.23
Perez	7,551	58.6	32.2	12.4	0.5	0.9	4.30
Plaridel	6,386	16.0	14.8	6.5	0.8	0.9	2.21
Quezon	10,734	54.0	53.4	44.2	1.1	1.1	5.95
Tagakawayan	31,381	647.0	126.3	58.6	0.1	0.7	2.70
Calauag	57,907	404.0	226.8	116.6	0.4	0.7	2.83
Sub-total	1,129,187	8,682.2	3,089.0	2,248.3	0.4	1.0	2.77

Source: Department of Public Works and Highways, Region IV.

Table E.13 Functional Road Classification of Rural Roads Recommended in Previous Studies

IBRD Assisted Functional Road Classification Study (DPWH), 1986	IBRD Assisted Rural Roads Development Program II (DLG), 1982
(1) National Primary Road Connect primary centers	(a) Primary Road Major inter-provincial roads or major intra-provincial trunk roads linking one or more municipal towns to the Provincial Capital
(2) National Secondary Road Connect secondary centers to one another and to National Primary roads	
(3) National Tertiary Road Connect tertiary centers to one another to a National Primary or National Secondary road	
(4) Provincial Road Connect cities and municipalities not classified as primary/secondary/tertiary center to a national road.	
(5) Feeder Road Connect barangays, outside urban development areas of a city or municipality, to one another and roads not classified as national or provincial	(b) Secondary Road Roads (other than above) linking municipalities with each other or to the provincial capital or to the primary network
	(c) Tertiary Road Roads linking barangays to the municipal towns and to the primary or secondary network
	(d) Farm-to-market road Roads linking farm areas to their respective barangay centers or to the higher level network
	(e) Street Roads within built-up population centers with essentially urban rather than rural functions



<ul style="list-style-type: none"> • Primary Center (28) <ul style="list-style-type: none"> - either a national or regional capital - or base for a national base seaport - or base for an international airport - or having a rating of 9 or less • Secondary Center (58) <ul style="list-style-type: none"> either a provincial capital or base for a national sub-base port or having a rating of 10 to 13 inclusive • Tertiary Center (14) <ul style="list-style-type: none"> either a sub-provincial capital or having a rating of 14 to 16 	<table border="0"> <tr> <td>Rating</td> <td></td> </tr> <tr> <td>National/Regional Capital</td> <td>.....1</td> </tr> <tr> <td>Provincial Capital</td> <td>.....2</td> </tr> <tr> <td>If combined</td> <td>.....0</td> </tr> <tr> <td>Sub-provincial Capital</td> <td>.....3</td> </tr> <tr> <td>National Base Seaport</td> <td>.....1</td> </tr> <tr> <td>International Airport</td> <td>.....1</td> </tr> <tr> <td>National "Sub-base Seaport</td> <td>.....2</td> </tr> <tr> <td>National Trunkline Airport</td> <td>.....2</td> </tr> <tr> <td>National Seaport/Secondary Airport</td> <td>.....3</td> </tr> <tr> <td>Feeder Port</td> <td>.....4</td> </tr> <tr> <td>Population over 100,000</td> <td>.....1</td> </tr> <tr> <td>75,000 - 100,000</td> <td>.....2</td> </tr> <tr> <td>50,000 - 75,000</td> <td>.....3</td> </tr> <tr> <td>If None</td> <td>.....5</td> </tr> </table>	Rating		National/Regional Capital1	Provincial Capital2	If combined0	Sub-provincial Capital3	National Base Seaport1	International Airport1	National "Sub-base Seaport2	National Trunkline Airport2	National Seaport/Secondary Airport3	Feeder Port4	Population over 100,0001	75,000 - 100,0002	50,000 - 75,0003	If None5
Rating																															
National/Regional Capital1																														
Provincial Capital2																														
If combined0																														
Sub-provincial Capital3																														
National Base Seaport1																														
International Airport1																														
National "Sub-base Seaport2																														
National Trunkline Airport2																														
National Seaport/Secondary Airport3																														
Feeder Port4																														
Population over 100,0001																														
75,000 - 100,0002																														
50,000 - 75,0003																														
If None5																														

Source: Pilot Study for Rural Road Network Development Project, 1989 JICA

Table E.15 Registration Statistics for PUB

Year	Region IV	Philippine Total	Regional Share (%)
1981	1,732	11,665	14.8
1982	1,578	11,939	13.2
1983	1,409	11,962	11.8
1984	1,621	11,253	14.4
1985	1,688	11,641	14.5
1986	1,734	11,586	15.0
1987	1,637	11,278	14.5
1988	1,749	11,420	15.3
1989	1,922	13,077	14.7
1990	2,090	14,077	14.2

Source: DOTC

Table E.16 Distribution of Operators by Fleet Size

Item	N. & Ctrl Luzon (%)	Luzon (%)	Visayas (%)	Mindanao (%)	Philippines (%)
No. of Units Operating					
0	0.7	0.0	1.0	1.0	0.6
1	52.7	35.3	27.7	32.7	43.8
2	22.1	18.8	20.0	16.3	20.4
3	8.6	9.5	11.2	9.2	9.5
4	4.3	6.6	6.3	9.2	5.4
5	3.5	7.5	8.7	7.1	5.3
6	2.2	1.4	2.9	1.0	2.1
7	1.1	1.4	1.0	1.0	1.1
8	0.8	1.7	3.4	3.1	1.7
9	0.5	1.7	1.5	1.0	0.9
10	0.6	4.3	2.4	4.1	2.0
11 - 20	1.6	6.9	9.2	7.1	4.2
21 - 50	0.8	2.6	4.9	3.1	1.9
51 - over	0.6	2.0	0.0	4.1	1.1
No. of Franchises Held					
1	82.9	75.5	76.0	72.9	79.3
2	12.1	16.7	12.5	15.6	13.7
3	3.0	4.0	3.4	3.1	
4	0.6	0.9	1.4	2.1	0.8
5	0.4	0.0	1.9	1.0	0.5
6	0.4	0.6	2.4	1.0	0.7
7 - more	0.8	2.3	2.4	4.2	1.6
No. of Operators	837	346	206	98	1,487

Source: Department of Transportation and Communications

Table E.17 Distribution of Units in Operation by Size of Operator

No. of Units Out per Operator	% of All Units in Operation	No. of Units Out per Operator	% of All Units in Operation
0	8.3	8	2.5
1	7.7	9	1.6
2	5.4	10	3.8
3	4.1	11 - 20	12.0
4	5.0	21 - 50	11.2
5	2.3	51 and over	34.5
6	1.4		

Source: Department of Transportation and Communications

Table E.18 Passenger Flows through Major Centers

Location	Southern Luzon							
	South Bound				North Bound			
	Pax. In	Pax. Out	Pax. (Alighting)/ Boarding	Transit Pax.	Pax. In	Pax. Out	Pax. (Alighting)/ Boarding	Transit Pax.
M. Manila* 1/	0	48,935	48,935 (0)	0	41,599	0	(41,599)	0
Cavite	6,621	0	0 (6,621)	0	0	6,646	6,646 (0)	0
Biñan	10,092	0	0 (989)	0	0	9,024	9,024 (0)	0
Tagaytay	1,663	674	0 (674)	674	552	1,725	1,173 (0)	552
Nasugbu	674	0	0 (0)	0	0	552	552 (4,289)	0
Calamba	26,586	28,952	2,336 (3,869)	0	25,501	21,212	0 (0)	21,212
Lipa	14,971	11,102	0 (7,570)	26,586	7,391	12,678	5,287 (0)	7,391
Batangas	11,102	3,532	0 (3,532)	11,102	2,206	7,391	5,185 (0)	2,206
Lemery Sto. Tomas	3,532	0	0 (1,693)	3,532	0	2,206	2,206 (52)	0
San Pablo 1/	10,539	9,016	170 (5,369)	8,846	5,871	8,711	3,762 (385)	5,602
Lucena 1/	9,016	3,751	174 (7,415)	3,577	3,200	5,871	2,838 (0)	2,924
Sta. Cruz	7,415	0	0	0	0	7,104	7,104	0

Source: Road Transportation Industry Study, 1987, (NTPP)

1/* Includes passengers in Bicol corridor.

Table E.19 Truck Fleet, 1990

Area	for Hire Trucks		Other Trucks		Total	
	No.	(%)	No.	(%)	No.	(%)
North/Central Luzon	883	(13.6)	27,261	(21.9)	28,144	(21.5)
Metro Manila (NCR)	2,532	(38.8)	42,360	(34.1)	44,892	(34.3)
South Luzon	300	(4.6)	12,926	(10.4)	13,226	(10.1)
Visayas	1,268	(19.5)	23,079	(18.5)	24,347	(18.6)
Mindanao	1,532	(23.5)	18,832	(15.1)	20,364	(15.5)
Total	6,515	(100.0)	124,458	(100.0)	130,973	(100.0)

Source: MIS, DOTC

Table E.20 Ownership of the For-Hire (TH) Truck Fleet, 1984

Area		Fleet Size (No. of Units)							Total
		1	2 - 5	6 - 10	11 - 20	21 - 50	51 - 100	Over 100	
North/Central Luzon	No. of Owners	58	161	28	17	6	1	1	272
	No. of Units	58	524	206	243	187	63	101	1,382
NCR	No. of Owners	161	379	113	63	24	6	2	748
	No. of Units	161	1,260	936	927	744	452	409	4,889
Philippines	No. of Owners	428	902	229	117	48	14	4	1,741
	No. of Units	428	2,937	1,817	1,682	1,487	1,023	510	9,384

Source: NTPP (MIS, DOTC)

**Table E.21 PNR's Network Description
(As of August 1990)**

Routes	Tracks	km	Current Status
A. Main Line North			
1) Tutuban-Caloocan	double	6.1	in operation
2) Caloocan-Dagupan	single	189.3	in operation
3) Dagupan-San Fernando, L.U.	single	70.6	temporarily closed
4) Tarlac-San Jose	single	55.0	in operation
5) North Harbor (to Pier 2)	single	1.0	abandoned
Total	-	322.8	
B. Main Line South			
1) Tutuban-Cabin A (Tayuman Junction)	double	(1.5)	jointly operated with Manila Line North
2) Cabin A (Tayuman Junc.) - Sucat	double	23.7	in operation
3) Sucat-Camalig	single	435.3	in operation
4) Camalig-Legaspi	single	13.5	in operation
5) Sta. Mesa-Guadalupe	single	6.6	permanently closed
6) Calamba-Makiling	single	7.7	abandoned
7) Santibanez Line (Pandacan)	single	1.0	in operation
8) San Pedro, Laguna-Carmona	single	5.1	in operation
9) Food Terminal, Inc., Siding	single	1.5	temporarily closed
Total		494.4 <u>1/</u>	

Source: PNR

1/ This figure does not include the 1.5 km joint operation from Manila to Cabin A.

Table E.22 Route of Commuter Services

Line	Route	Length (km)	Ave. Daily Frequency (One-way)
North Line	Manila - Meycauayan	15.0	1
South Line	Manila - Carmona	40.3	3
	Manila - Alabang	28.1	6
	Manila - Calamba	56.2	1
	Espana - Alabang	31.9	2
North-South Line	Caloocan - Alabang	33.9	1
	Malolos - Alabang	65.2	1
	Meycauayan - Alabang	43.1	1
	Malolos - Alabang	62.0	1

Source: PNR "Temporary Schedule of Metro Manila Commuter Trains",
January 1991

Table E.23 PNR Passenger Traffic Volume

		Pear Yr (Past)	1980	1985	1986	1987	1988	1989	1990
1. Long Distance Services		(1963-64)							
	No. of Pass (000)	9,699	2,466	749	910	1,178	985	1,005	928
	Pass. kms (mill)	830	416	146	173	219	230	250	271
	Ave. Trip Length (km)	86	169	194	190	186	234	249	292
2. Commuter Service		(1977)							
	No. of Pass (000)	8,150	4,958	2,952	2,835	2,021	1,182	980	5,561
	Pass kms (mill)	11,166	4,299	1,296	1,341	613	277	17	70
	Ave. Trip Length (km)	1,370	867	439	473	303	234	17	13

Source: PNR

Table E.24 OD Matrix of PNR Passengers (South Line)

O	Metro Manila		Cavite		Laguna		Batangas		Rizal		Quezon		Albay		Camarines Sur		Sorsogon		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Metro Manila	0		150	10.8	167	12.0	2	0.1	0	0	4	0.3	61	4.4	138	9.9	1	0.1	523	37.5
Cavite	188	13.5	4	0.3	88	6.3	1	0.1	1	0.1	2	0.1	2	0.1	5	0.4	0		291	20.9
Laguna	303	21.7	71	5.1	62	4.4	0		0		0		25	1.8	97	7.0	2	0.1	560	40.0
Batangas	2	0.1	1	0.1	0		0		0		0		0		3	0.2	0		6	0.4
Rizal	0		1	0.1	0		0		0		0		0		3	0.2	0		4	0.3
Bulacan	0		0		0		0		0		0		3		5	0.4	0		8	0.6
Nueva Ecija	0		0		0		0		0		0		0		1	0.1	0		1	0.1
Camarines Sur	1	0.1	0		0		0		0		0		0		0		0		1	0.1
Total	494	35.4	227	16.3	317	22.7	3	0.2	1	0.1	6	0.4	91	6.5	252	18.2	3	0.2	1,394	100.0

Table E.25 Trends of PNR Freight Traffic

	Year									
	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
1. Ordinary Traffic	1,206	1,206	1,206	1,206	1,206	1,206	1,206	1,206	1,206	1,206
Tons 000	142	54	64	62	80	53	32			
Ton-km 000	36,668	12,728	14,587	16,157	15,089	13,063	7,075			
Ave. Haul km	161	236	228	261	265	246	221			
2. Express Traffic	1973-74	1973-74	1973-74	1973-74	1973-74	1973-74	1973-74	1973-74	1973-74	1973-74
Tons 000	102.1	24.8	19.4	21.5	27.7	23.3	21.5	16.8		
Ton-km 000	36.3	6.8	4.4	4.8	5.6	5.5	5.3	4.9		
Ave. Haul km	356	275	229	223	201	238	247	292		

Source: PNR

Table E.26 Projects in CALABARZON (1/2)

Area	Code	Project Name
Cavite	R201	Laguna-Canlubang-Tagaytay Road
	R202	Balibago-Tagaytay Road
	R203	Aguinaldo-Talaba Road Flyover
	R204	Novelcta-Sangley Point Access Road
	R205	Novelcta-CEPZ Diversion Road
	R206	Rosario-Gen. Trias-Imus Molino Expressway
Laguna	R301	Laguna Lake Shore Roads
	R302	Manila East Road (widening: Calamba to Famy)
	R303	Provincial Roads Improvement:
		a) Nagcarlan-Dayap Road
		b) Liliw-Novaliches Road
		c) Cavinti-Bukal Road
		d) Nagcarlan-Abo Road
	e) Punta-Bunggo Road	
	f) Alaminos-Lima Road	
Batangas	R401	Batangas Coastal Road
	R402	Batangas Inland Roads
	R403	Lian-Nasugbu Bridge
	R404	Taal Lake Circumferential Project
	R405	Package A:
		a) Mataas na Kahoy-Balete-Ambulong-Tanauan
		b) Sto. Nino-Tulos-Rosario-Palahanan 2nd San Juan Road
		c) Anilao-San Teodoro Road, Mabini
		d) San Jose-Bauan Road
	R406	Package B:
		a) San Jose-Ibaan Road
	b) Poblacion-Muzon Road	
	c) Taysan-Dagatan Road	
	d) Taal-San Luis Road	
R407	Package C:	
	a) Lucsuhin-Biga-Duhatan Road, Calatagan	
	b) Tuy-Lian Road	
	c) Nonong Casto Road, Lemery	
	d) Tapia Road, Tanauan	
	e) Artery Road-M. Pulo-Altura-Cale-Sala-Trapeche-Pob, Tanauan	
R408	Batangas 3rd District Road Improvements	
Rizal	R501	San Mateo Bridge Project
	R502	Laguna de Bay Viaduct Project
	R503	Talim Bridge Project
	R504	Widening of Ortigas Avenue
	R505	Construction of Shaw Blvd. Ext. to Taytay
	R506	Construction of Roads Bosoboso (Antipolo)-San Mateo Bridge to Batasan Complex
	R507	Construction of Manggahan-Longos Bridge
	R508	Construction of Fairview-Montalban Road
	R509	Opening of Mabagang Parang-Guipiing-Pilapila, Limbon-Limbon to Tapao Point
	R510	Antipolo-Angono-Daraongan Road
	R511	Macamot Binangonan to Bombongan Morong
	R512	Construction of Road leading to Bgy. Ticulio and Circumferential Road in Talim Island

Table E.26 Projects in CALABARZON (2/2)







Area	Code	Project Name
Quezon	R601	Quezon Canal
	R602	Circumferential Road (Lucena-Tayabas-Lucban-Sampaloc-Mauban-Mainit Loop Road)
	R603	Atimonan-Mauban-Real-Infanta Coastal Road Project
	R604	Calamba-Calaug Road (Rehabilitation Project)
	R605	Jct. Pitogo-Mulanay-San Narciso Road
	R606	Famy-Real-Infanta Road
	R607	Marikina-Infanta Road Project
	R608	Quirino Highway Road Project (Tabugon-Tagkawayan-Camarines Sur Boundary)
	R609	First Congressional District Road Package A: Concreting of National Roads (Lucban-Tayabas Rd, Lucban-Luisiana Rd., Lucban-Sampaloc Rd., Lucban-Majayjay Rd., Lucban-Tayabas-Lucban-Mauban Port Rd., Mauban-Mainit-Tayabas Rd., Pagbilao-Tayabas, Sampaloc-Lucban Port Rd., Lucban-Mauban Port Rd., Quezon Ave.)
	R610	First Congressional District Road Package B: Concreting/ Construction of Provincial Roads (Burdeos-Polillo Rd., Mauban-Tignoan, Tongohin Prov'l Rd., Ingas-Robin Rd., Mauban-Tignoan, Mauban-Atimonan, Mauban-Cavinti, Tignoan-Mauban, Kinaluman-Kisusuyo Rd., km. 14-Tipuan Rd., Cawayan-Waterfall Rd., Malapad-Pinamaytuan Rd, Lubayat-Sto. Buho Rd.)
	R611	First Congressional District Road Package: Concreting of Municipality Streets (Poblacion-Sabang Port Rd., Municipal St.)
	R612	First Congressional District Road Package D: Construction of Barangay Roads (Coastal B/R along Tourism Dist. (Boboin-Dinahican) Restoration of Infanta-Dinahican Rd., Restoration of Infanta-Real Boundary Rd., Poblacion-S. Tapul, S. Tapul-Poblacion, Poblacion-S. Sangil, S. Sangil-Poblacion, Poblacion-S. Gatmon-S. Gatmon-Poblacion, Main Luod-S. Sinintan, S. Sinintan-Main Luod)
	R613	Second Congressional District Road Package A: Concreting of National Roads (Dolores-Tiaong Rd., Dolores-San Pablo Rd., National Rd. in San Antonio, Tiaong-San Antonio, Paiisa-Cabay-de Rosario)
	R614	Second Congressional District Road Package B: Concreting of Poblacion Provincial Road
	R615	First Congressional District Road Package C: Construction of Barangay Roads (Dolores Municipal Road, San Antonio Municipal Road, Tiaong Municipal Road)
	R616	Third Congressional District Road Package A: Construction/ Concreting of Provincial Roads (Gen. Luna Prov'l Rd., Buenavista-Guinayangan, S. Francisco Div. Rd., Poblacion Prov'l Road, Poblacion-B. Silang Prov'l Road, B. Silang-Batabat No., Batabat Norte-Magallanes-Lopez, Macalelon Jct. Rd., Poctol Cros. Prov. Rd. S. Francisco Prov. Rd., Poblacion-Panaon-Socorro
	R617	Third Congressional District Road Package B: Construction/ Concreting of Barangay Roads (Pagsanjan B/R, Casay B/R, Don Juan Vercelos-Nasalaan, San Roque-San Pablo-Dongan Ilaya, Nieva-Recto Ilaya-Casay-Nasalaan)
	R618	Fourth Congressional District Road Package A: Construction/ Concreting of National roads (National Road, Guinayangan-Buenavista Road, Repair of National Road)
	R619	Fourth Congressional District Road Package B: Construction/ Concreting of Provincial Roads (Atimonan-Mauban Rd., Guinto Blvd. Provincial Road, Summit-Talaba Provincial Rd., Guinayangan-Sumulong Provincial Road, Gapas-Aloneros Provincial Road)
	R620	Fourth Congressional District Road Package C: Construction/ Concreting of Barangay Roads (Poblacion-Magibay Rd., San Isidro-Manato Sation (via Mangayao), Lopez Barangay Roads)

Figures

REPUBLIC OF THE PHILIPPINES
 THE MASTER PLAN STUDY OF
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Legend

Figure E.1

-  EXPRESSWAY
-  NATIONAL ROAD
-  PROVINCIAL ROAD
-  RAILROAD
-  AIRPORT
-  PORT

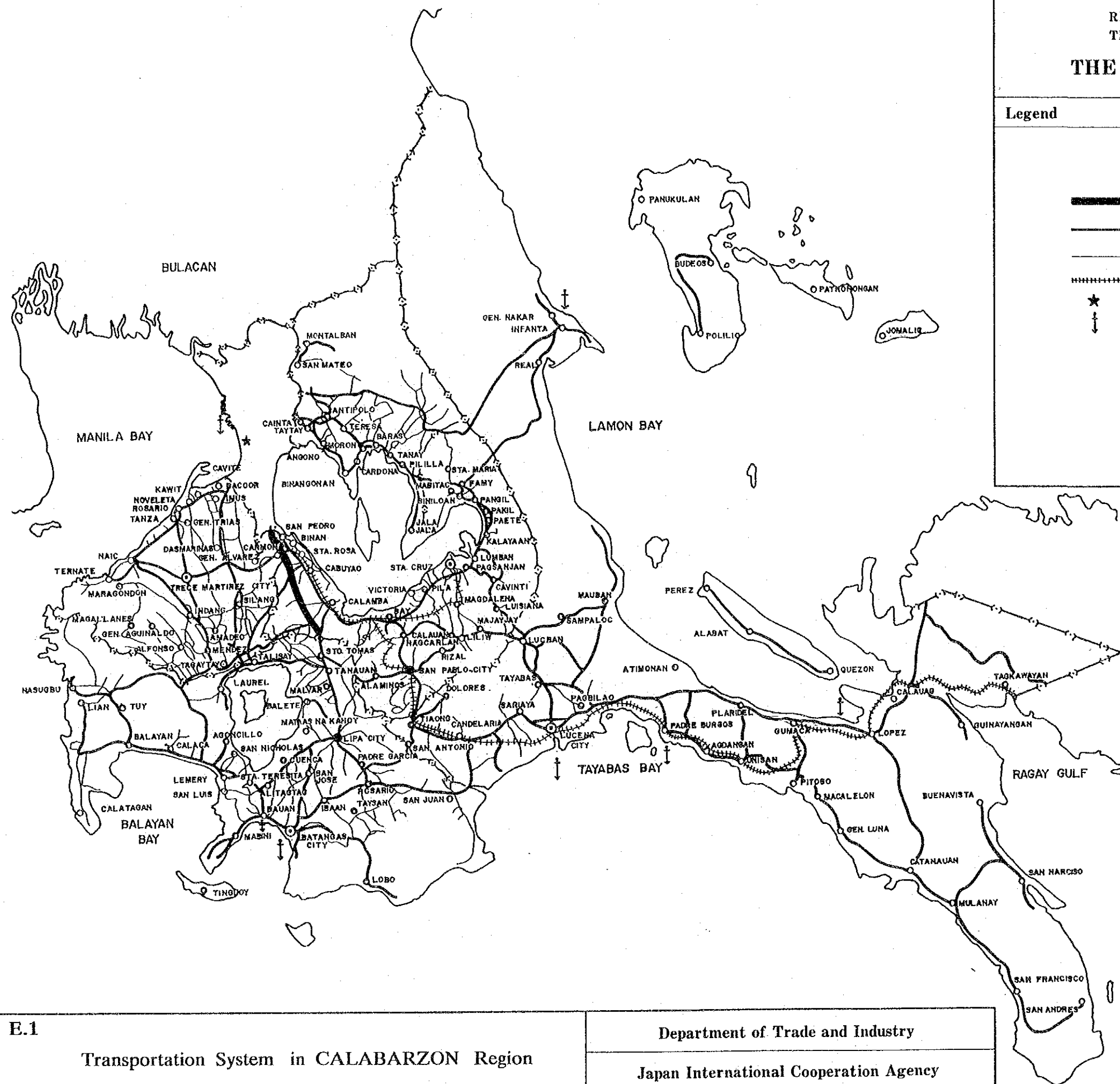
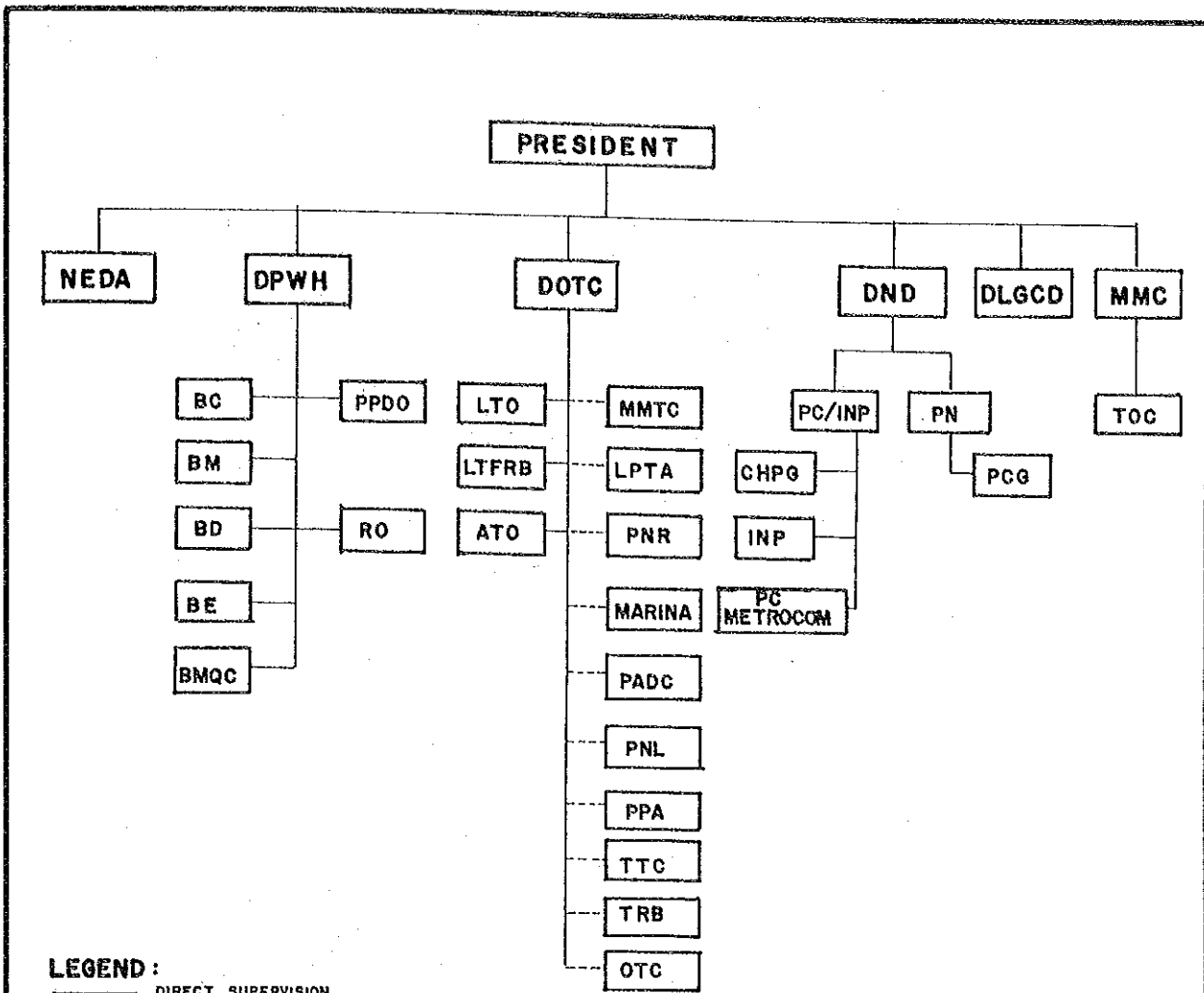


Figure E.1

Transportation System in CALABARZON Region

Department of Trade and Industry

Japan International Cooperation Agency



LEGEND:

———— DIRECT SUPERVISION

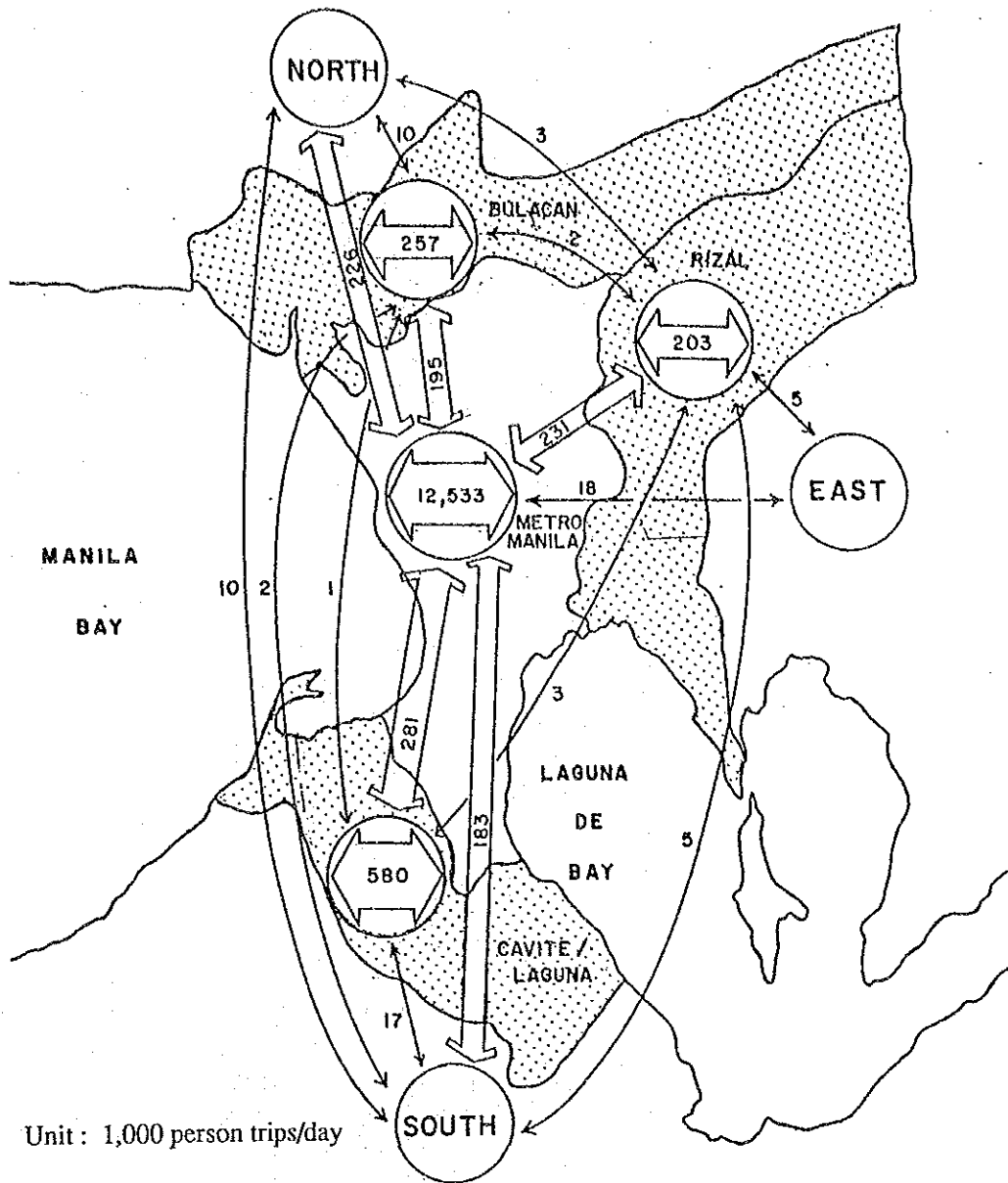
----- ATTACHED AGENCY (ADISORY RELATIONSHIP)

- | | |
|--|--|
| NEDA - NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY | OTC - OFFICE OF THE TRANSPORT COOPERATIVES |
| DPWH - DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS | DND - DEPARTMENT OF NATIONAL DEFENSE |
| BC - BUREAU OF CONSTRUCTION | PC/INP - PHILIPPINE CONSTABULARY/INTEGRATED NATIONAL POLICE |
| BM - BUREAU OF MAINTENANCE | CHPG - CONSTABULARY HIGHWAY PATROL GROUP |
| BD - BUREAU OF DESIGN | INP - INTEGRATED NATIONAL POLICE |
| BE - BUREAU OF EQUIPMENTS | PCMETROCOM - PC METROPOLITAN COMMAND |
| BMQC - BUREAU OF MATERIALS AND QUALITY CONTROL | PN - PHILIPPINE NAVY |
| PPDO - PLANNING AND PROJECT DEVELOPMENT OFFICE | PCG - PHILIPPINE COAST GUARD |
| RO - REGIONAL OFFICE | DLGCD - DEPARTMENT OF LOCAL GOVERNMENT & COMMUNITY DEVELOPMENT |
| DOTC - DEPARTMENT OF TRANSPORTATION AND COMMUNICATION | MNC - M.M. COMMISSION |
| LTO - LAND TRANSPORTATION OFFICE | TOC - TRAFFIC OPERATION CENTER |
| LTFRB - LAND TRANSPORTATION FRANCHISING AND REGULATORY BOARD | |
| ATO - AIR TRANSPORTATION OFFICE | |
| MNTC - M.M. TRANSIT CORPORATION | |
| LRTA - LIGHT RAIL TRANSIT AUTHORITY | |
| PNR - PHILIPPINE NATIONAL RAILWAYS | |
| MARINA - MARITIME INDUSTRY AUTHORITY | |
| PADC - PHILIPPINE AEROSPACE CORPORATION | |
| PNL - PHILIPPINE NATIONAL LINES | |
| PPA - PHILIPPINE PORT AUTHORITY | |
| TTC - TRANSPORT TRAINING CENTER | |
| TRB - TOLL REGULATORY BOARD | |

FIGURE E.2
National Transport Organization

LEGEND:

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JAPAN INTERNATIONAL COOPERATION AGENCY



Unit : 1,000 person trips/day

Source: JUMSUT II JICA/DOIC 1984

Definition of adjoining areas is as follows:
 Bulacan includes: municipalities of Obando, Bulacan, Marilao, Bocaue, Meycauayan and San Jose del Monte (1980 population; 392,000)
 Rizal includes: municipalities of Montalban, San Mateo, Antipolo, Cainta, Taytay, Morong and Binangonan (1980 population; 405,000)
 Cavite/Laguna includes: Cavite City and municipalities of Kawit, Noveleta, Rosario, Bacoor, Imus, Damarinas, San Pedro, Carmona, Biñan, Sta. Rosa and Cabuyao (1980 population; Laguna 269,000 and Cavite 441,000)

FIGURE B.3
Distribution of Person Trips (Motorized)
of Manila's Adjoining Area

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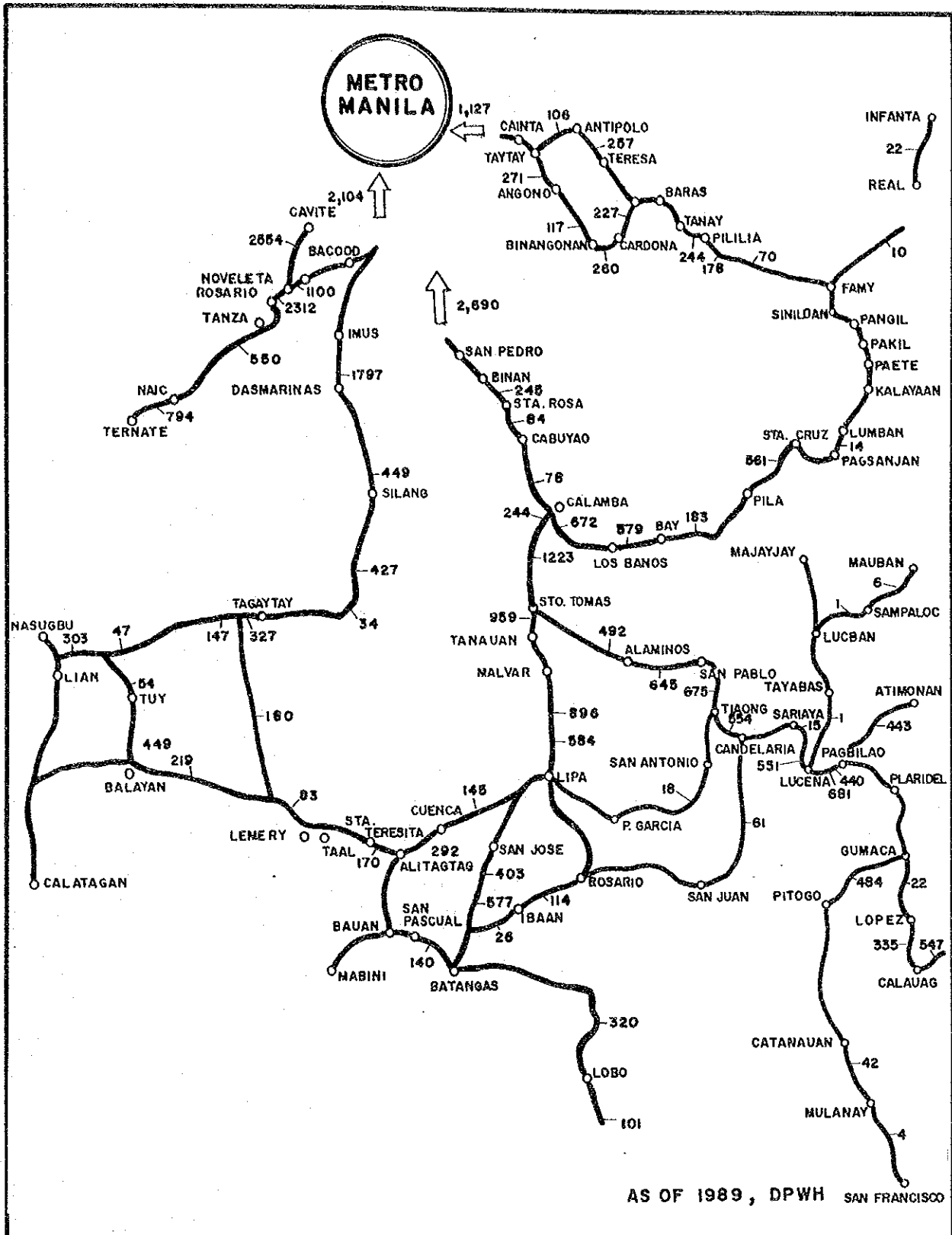


FIGURE E.5
Public Transport Traffic Volumes in
CALABARZON (Bus/Mini – bus,1989)

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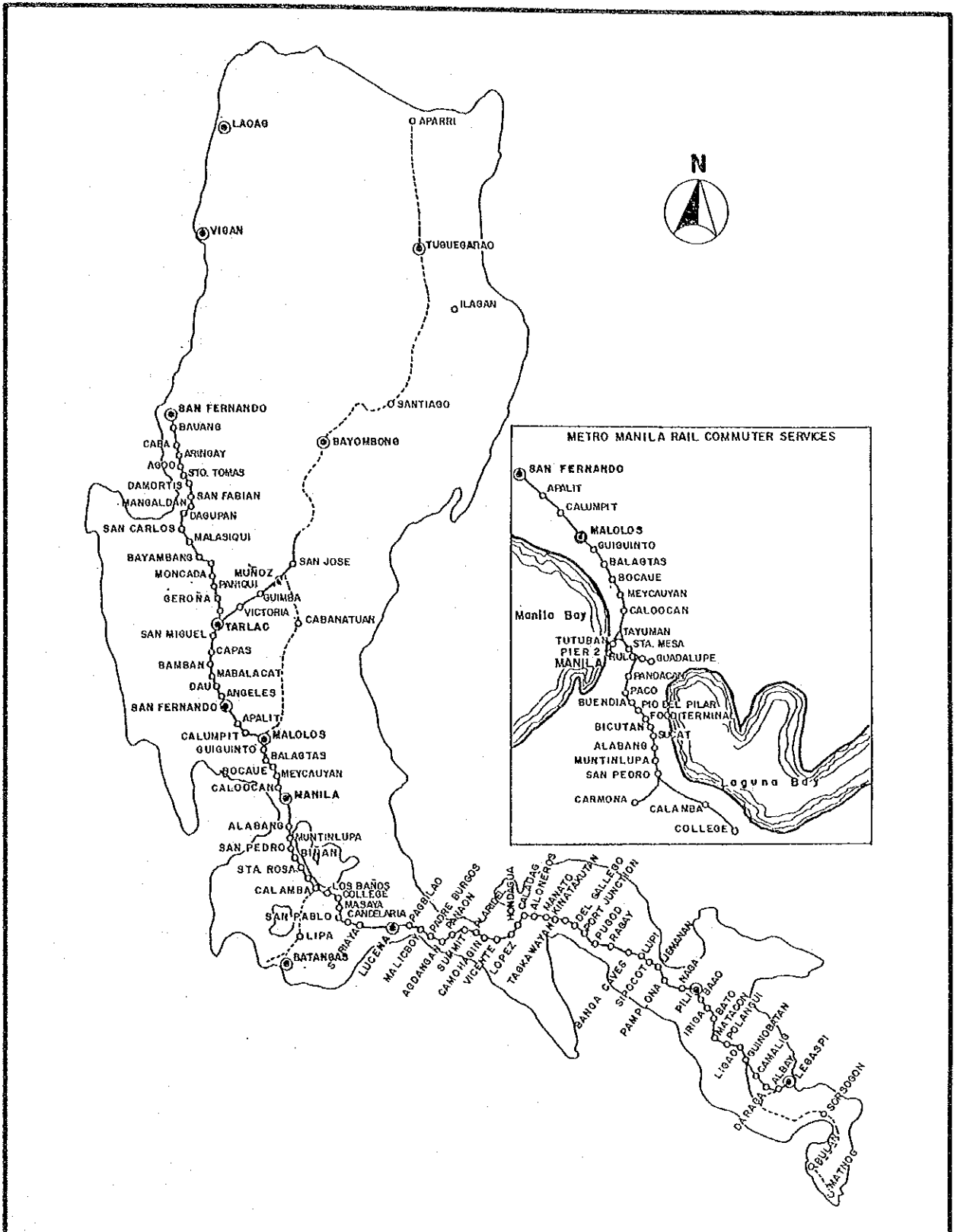


FIGURE E.6

PNR Network

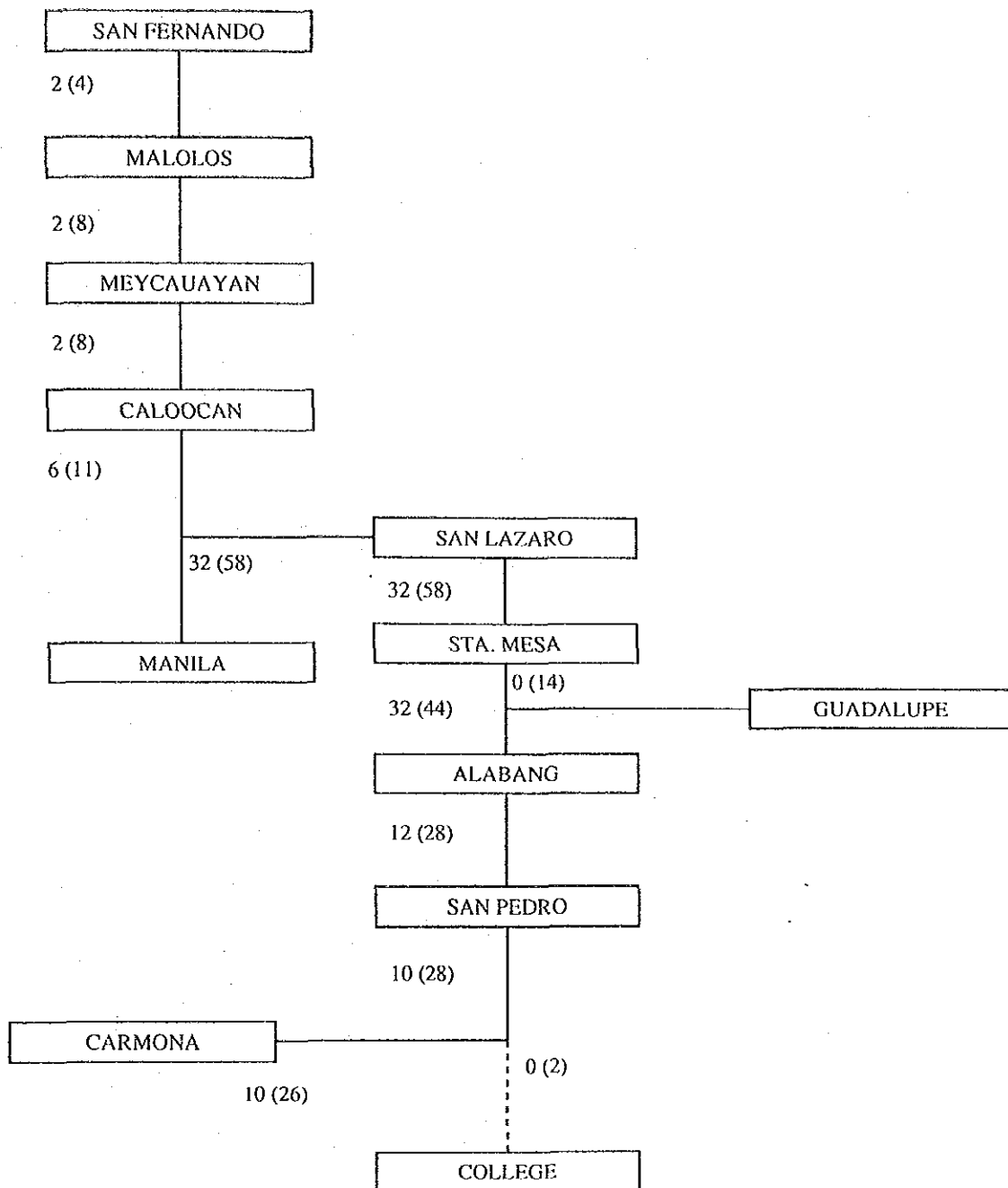
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LEGEND :

- LINES IN OPERATION
- - - - POSSIBLE NEW LINES



Source: PNR (as of Jan. 1991)

1/ Figures in Parentheses are the frequencies as of 1981 while those which are not are the frequencies as of 1991.

FIGURE E.7 Frequency of Metro Manila Commuter Train by Section (No. of Trains/Day; Two Way)

LEGEND :

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	M Manila					
M Manila	0.1	Laguna				
Laguna	0.4	0.1	Quezon			
Quezon	4.4	1.6	14.7	Camarines Sur		
Camarines Sur	27.7	4.4	8.8	22.2	Albay	
Albay	15.6	1.7	1.1	0.5	0	(%)

Source: Philippine National Railways

FIGURE E.8
Distribution of Inter – Provincial
Passenger Traffic on Main Line South

LEGEND :

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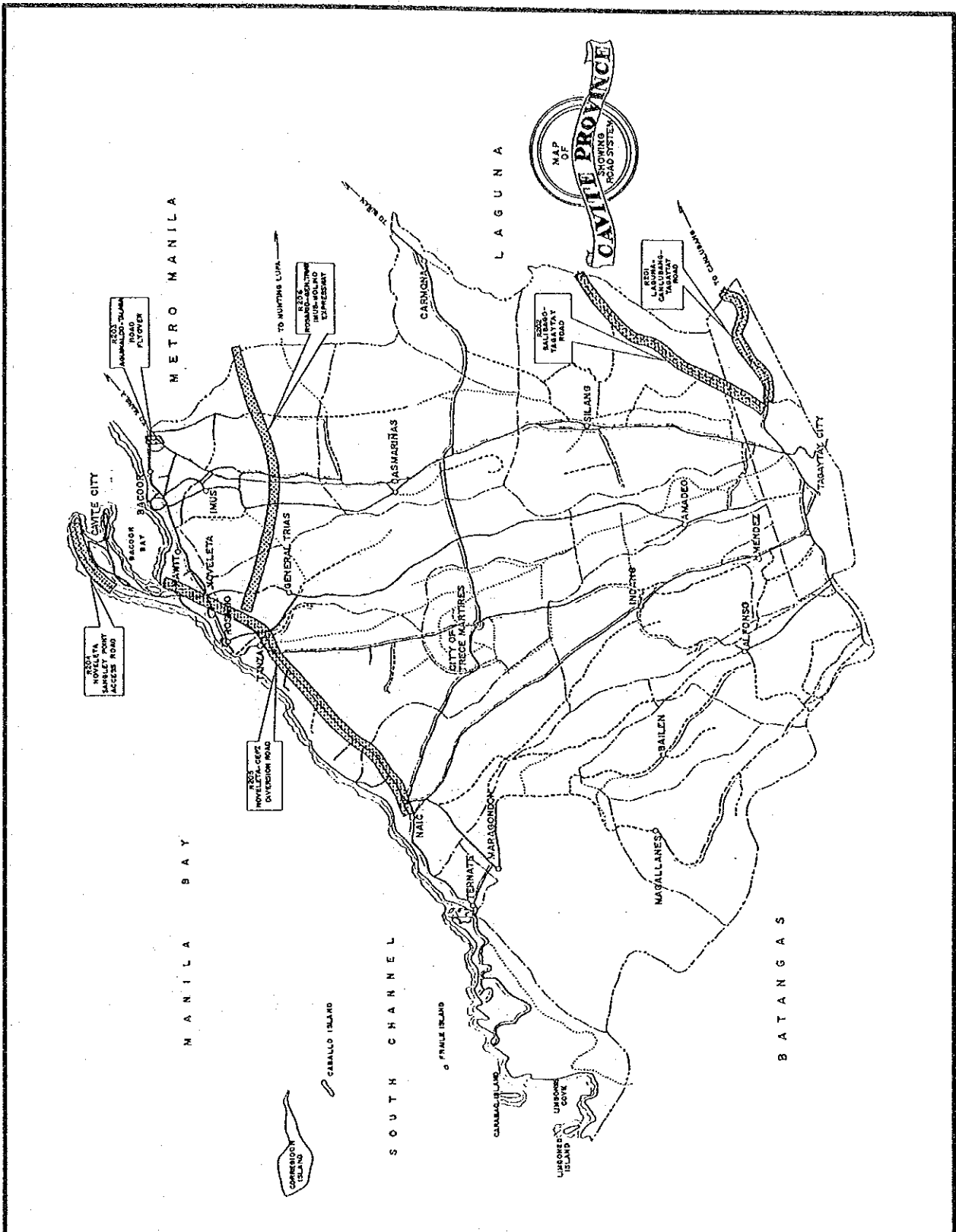


FIGURE E.9
Project Location Map (Cative)

REPUBLIC OF THE PHILIPPINES
 THE MASTER PLAN STUDY OF
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 JAPAN INTERNATIONAL COOPERATION AGENCY

- LEGEND :**
- FIRST CLASS CONCRETE ROAD
 - FIRST CLASS ASPHALT ROAD
 - FIRST CLASS MACADAM OR GRAVEL
 - SECOND CLASS ROAD
 - THIRD CLASS ROAD
 - PROPOSED ROADS
 - MUNICIPAL BOUNDARY
 - PROVINCIAL BOUNDARY
 - TOWN
 - CITY
 - CAPITAL

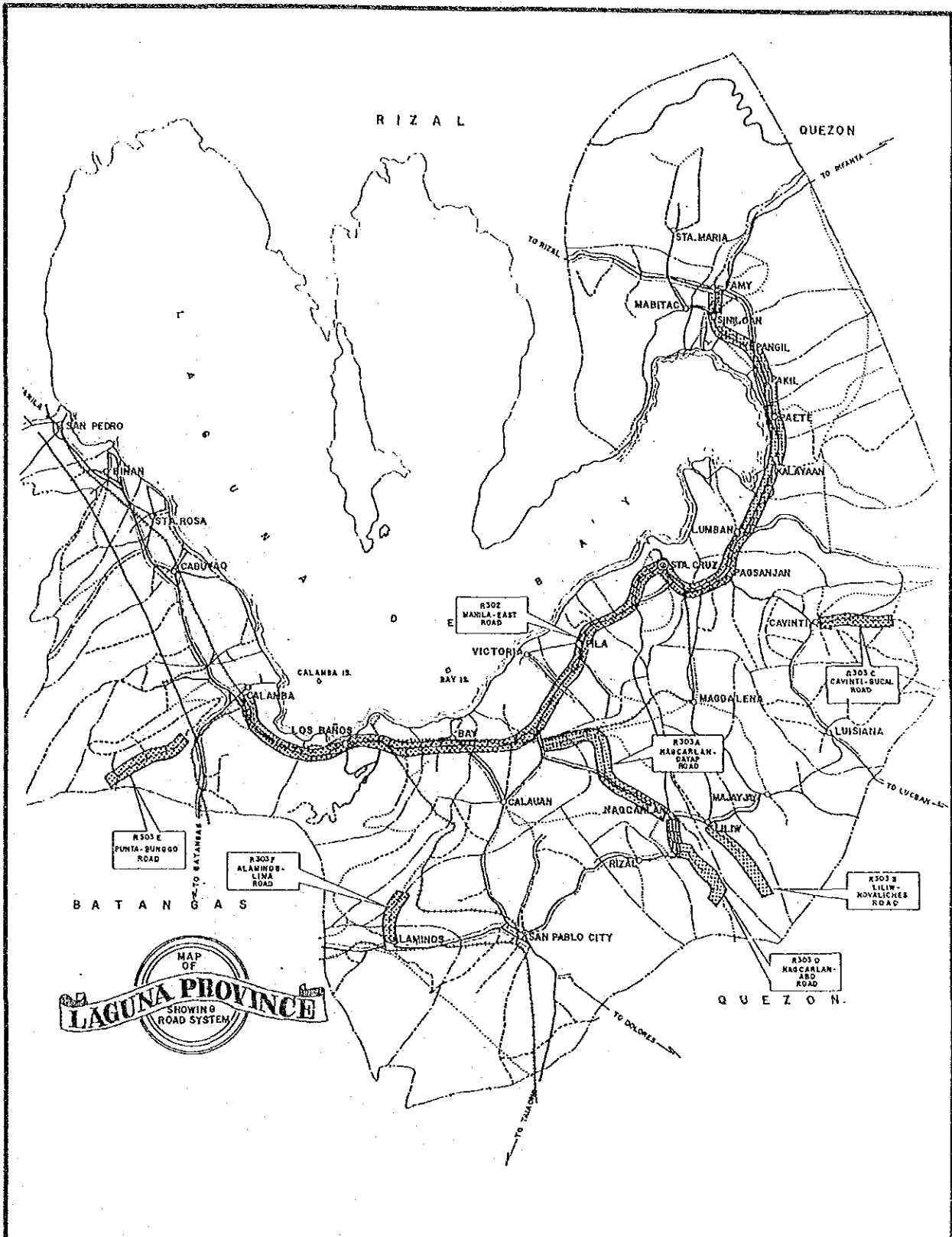


FIGURE E.10
Project Location Map (Laguna)

REPUBLIC OF THE PHILIPPINES
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 JAPAN INTERNATIONAL COOPERATION AGENCY

LEGEND :

- FIRST CLASS CONCRETE ROAD
- FIRST CLASS ASPHALT ROAD
- FIRST CLASS MACADAM ON GRAVEL
- SECOND CLASS ROAD
- THIRD CLASS ROAD
- PROPOSED ROADS
- MUNICIPAL BOUNDARY
- PROVINCIAL BOUNDARY
- TOWN
- CITY
- CAPITAL

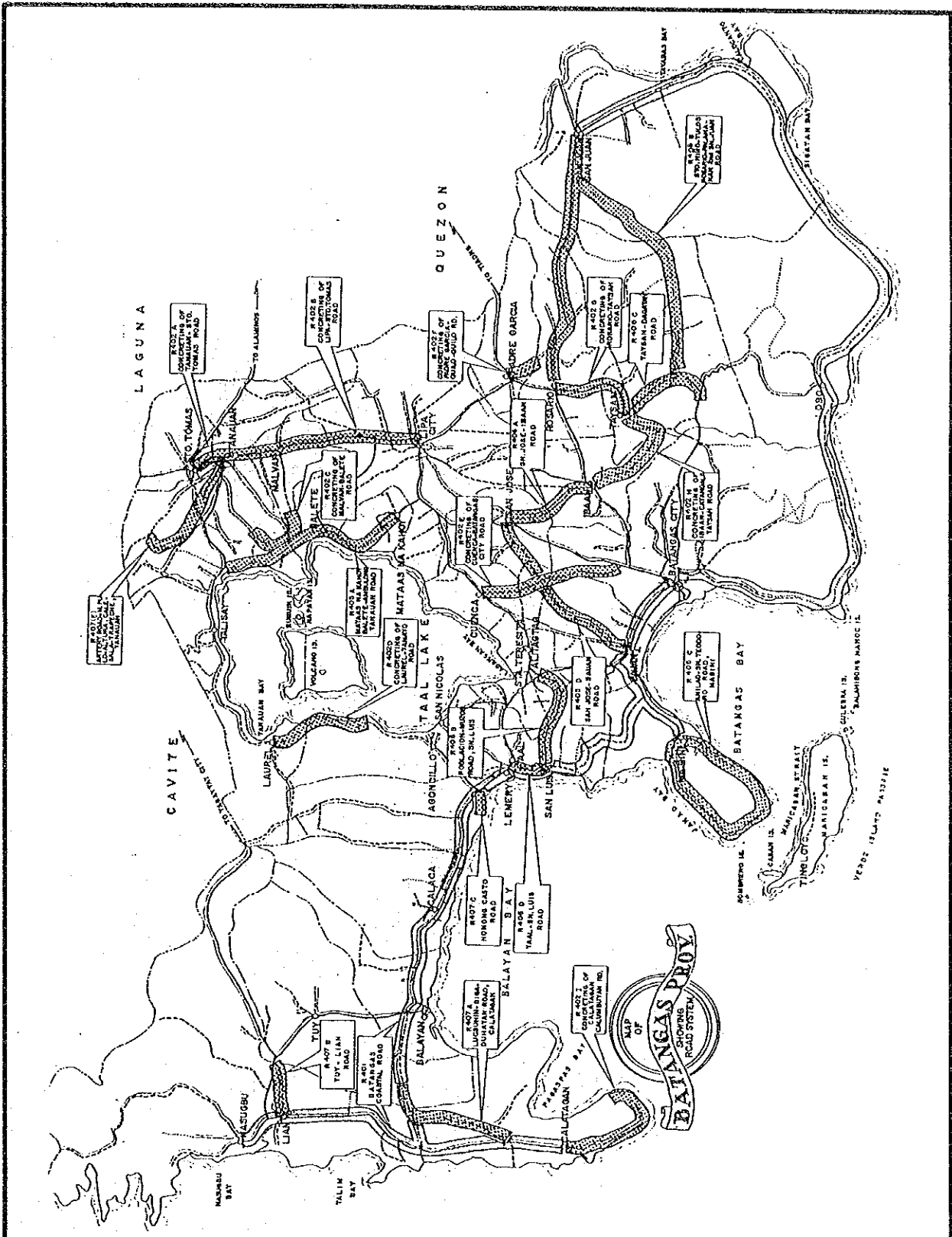


FIGURE E.11
Project Location Map (Batangas)

LEGEND :

- FIRST CLASS CONCRETE ROAD
- FIRST CLASS ASPHALT ROAD
- FIRST CLASS MACADAM OR GRAVEL
- SECOND CLASS ROAD
- THIRD CLASS ROAD
- PROPOSED ROADS
- MUNICIPAL BOUNDARY
- PROVINCIAL BOUNDARY
- TOWN
- CITY
- CAPITAL

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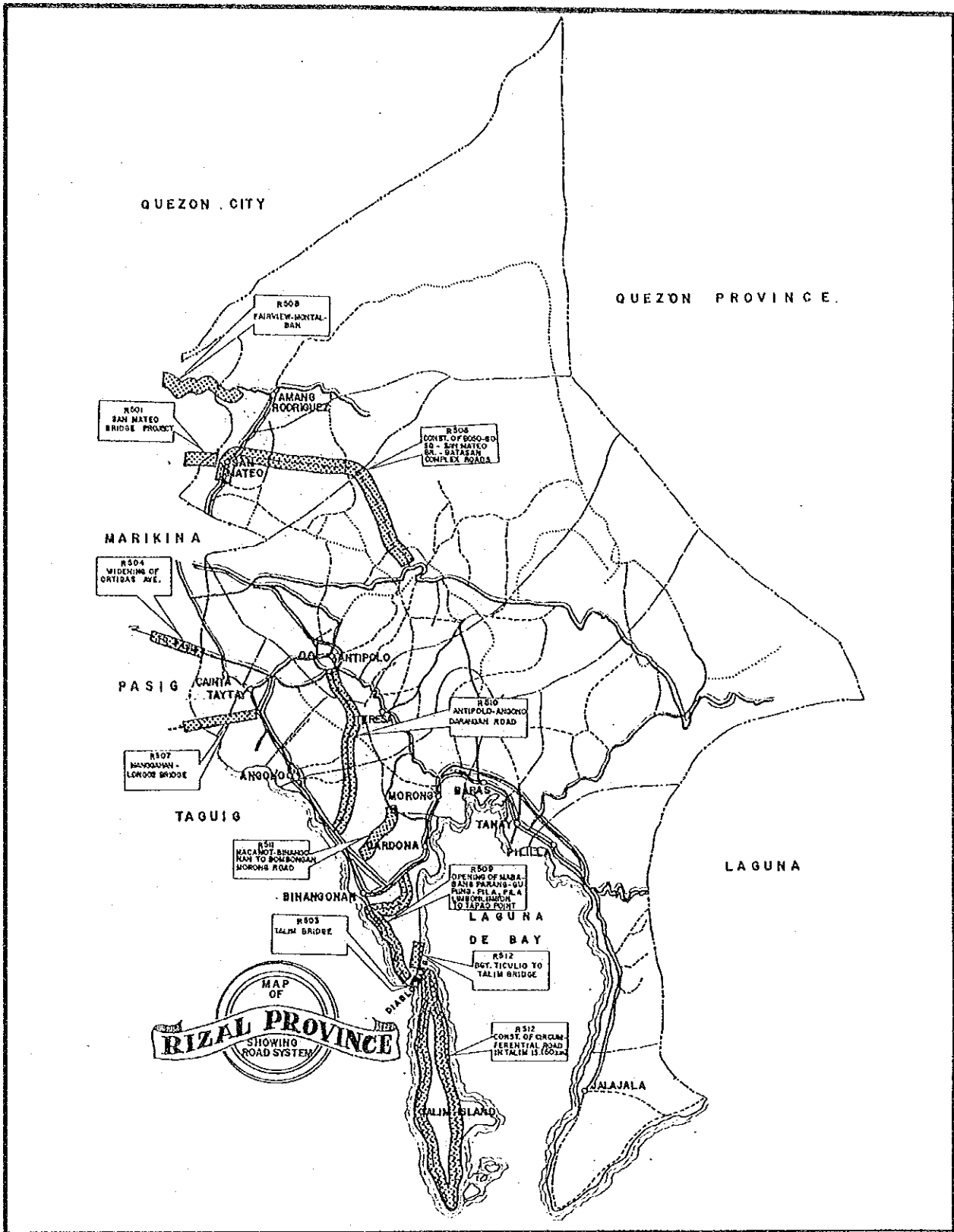


FIGURE E.12
Project Location Map (Rizal)

LEGEND :

- FIRST CLASS CONCRETE ROAD
- FIRST CLASS ASPHALT ROAD
- FIRST CLASS MACADAM OR GRAVEL
- SECOND CLASS ROAD
- THIRD CLASS ROAD
- PROPOSED ROADS
- MUNICIPAL BOUNDARY
- PROVINCIAL BOUNDARY
- TOWN
- CITY
- CAPITAL

REPUBLIC OF THE PHILIPPINES
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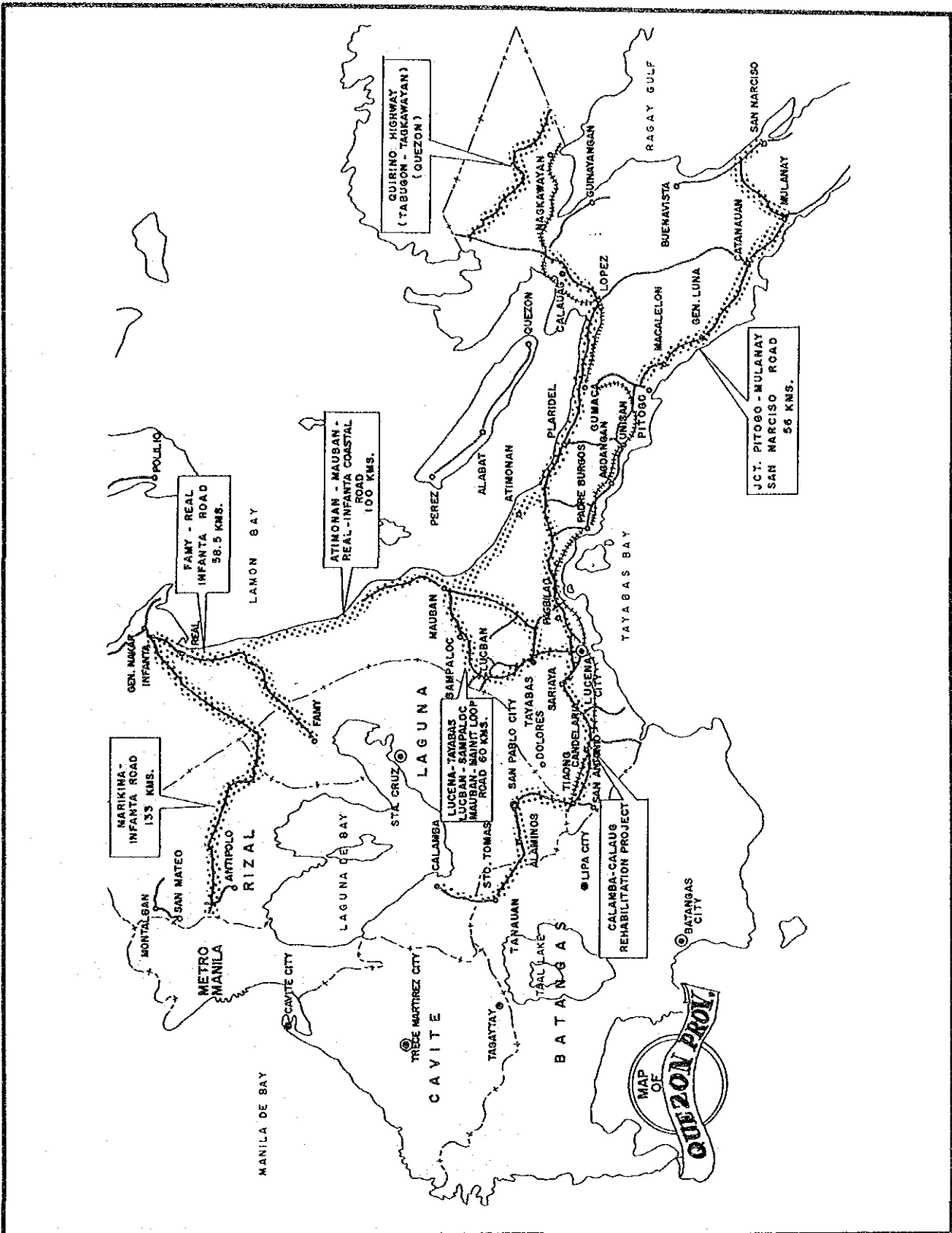


FIGURE E.13
Project Location Map (Quezon)

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 JAPAN INTERNATIONAL COOPERATION AGENCY

LEGEND :

- ROAD
- RAIL ROAD
- - - - PROVINCIAL BOUNDARY
- TOWN
- CITY
- ⊙ CAPITAL

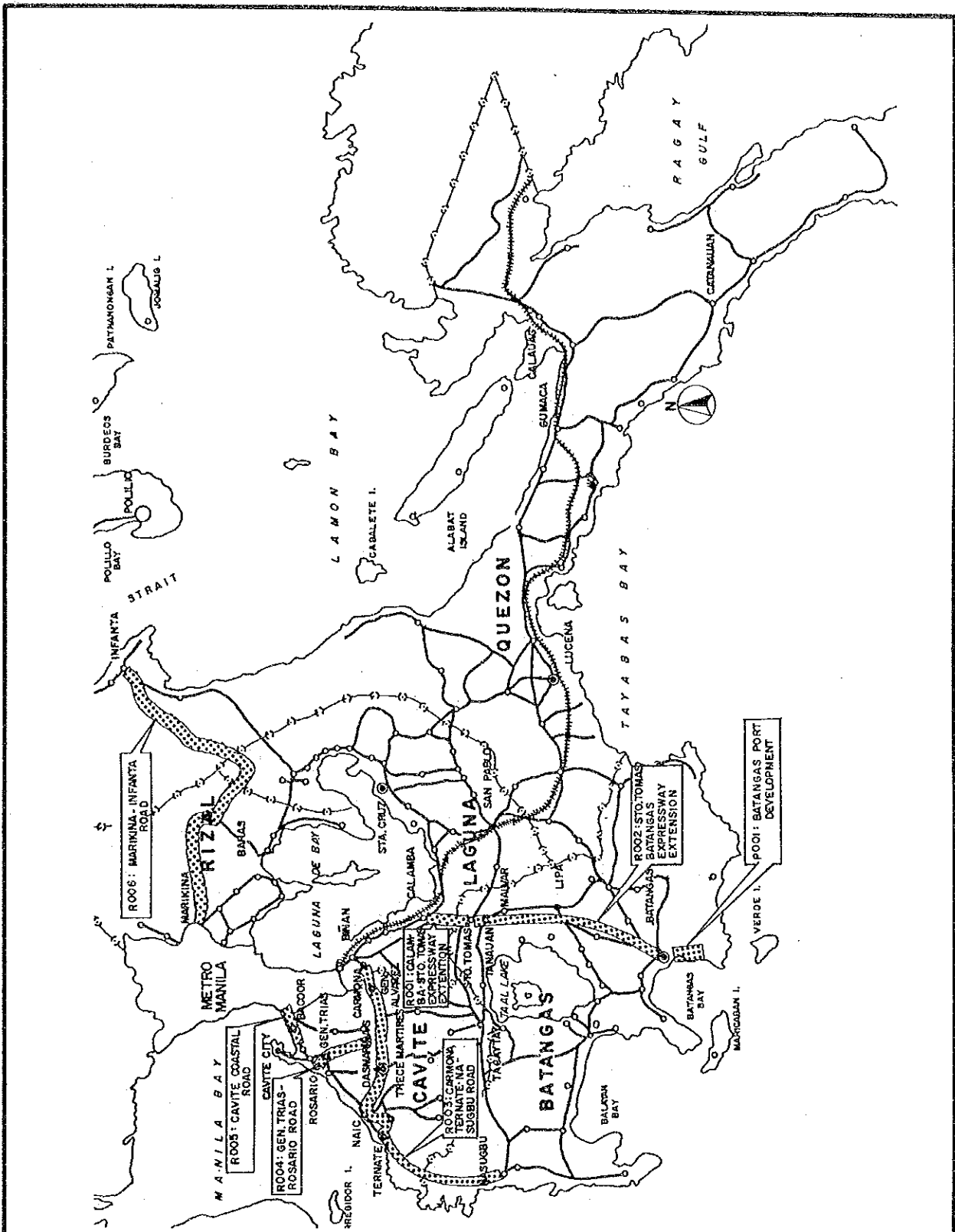


FIGURE E.14
CALABARZON Anchor Projects
Location Map

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
LEGEND :

- MUNICIPALITY
- ⊙ CAPITAL
- CITY
- ROAD
- ▬ RAILWAY
- ⌞—⌞ PROVINCIAL BOUNDARY

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Legend

Figure E.15

-  REGIONAL URBAN CENTER
-  MAJOR URBAN CENTER
-  SERVICE URBAN CENTER
-  PRIMARY TRANSPORT ARTERY
-  SECONDARY TRANSPORT ARTERY
-  ROADS
-  RAILWAY
-  PROVINCIAL BOUNDARY

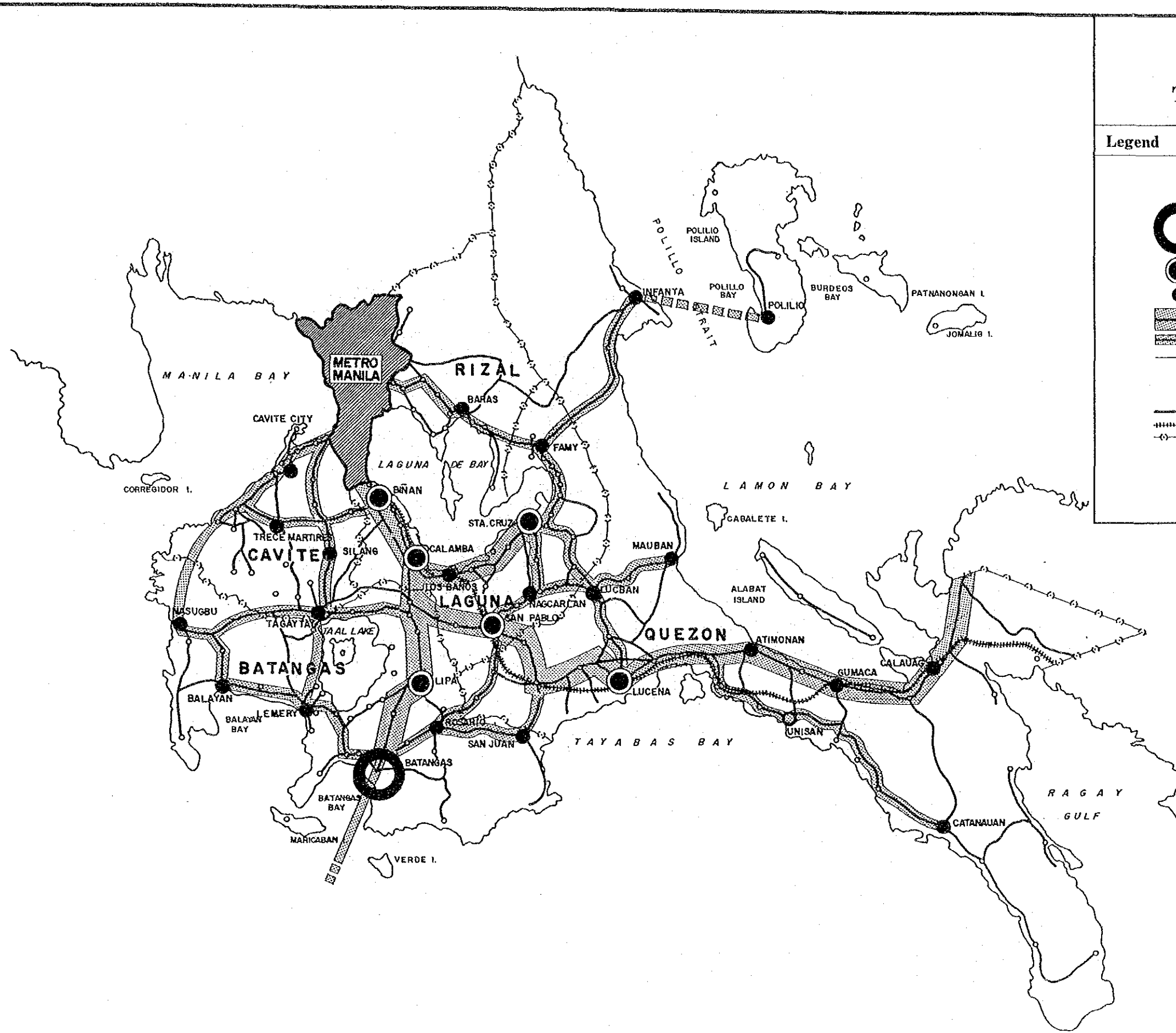


Figure E.15
 Transport Arterial Network for CALABARZON

Department of Trade and Industry

Japan International Cooperation Agency

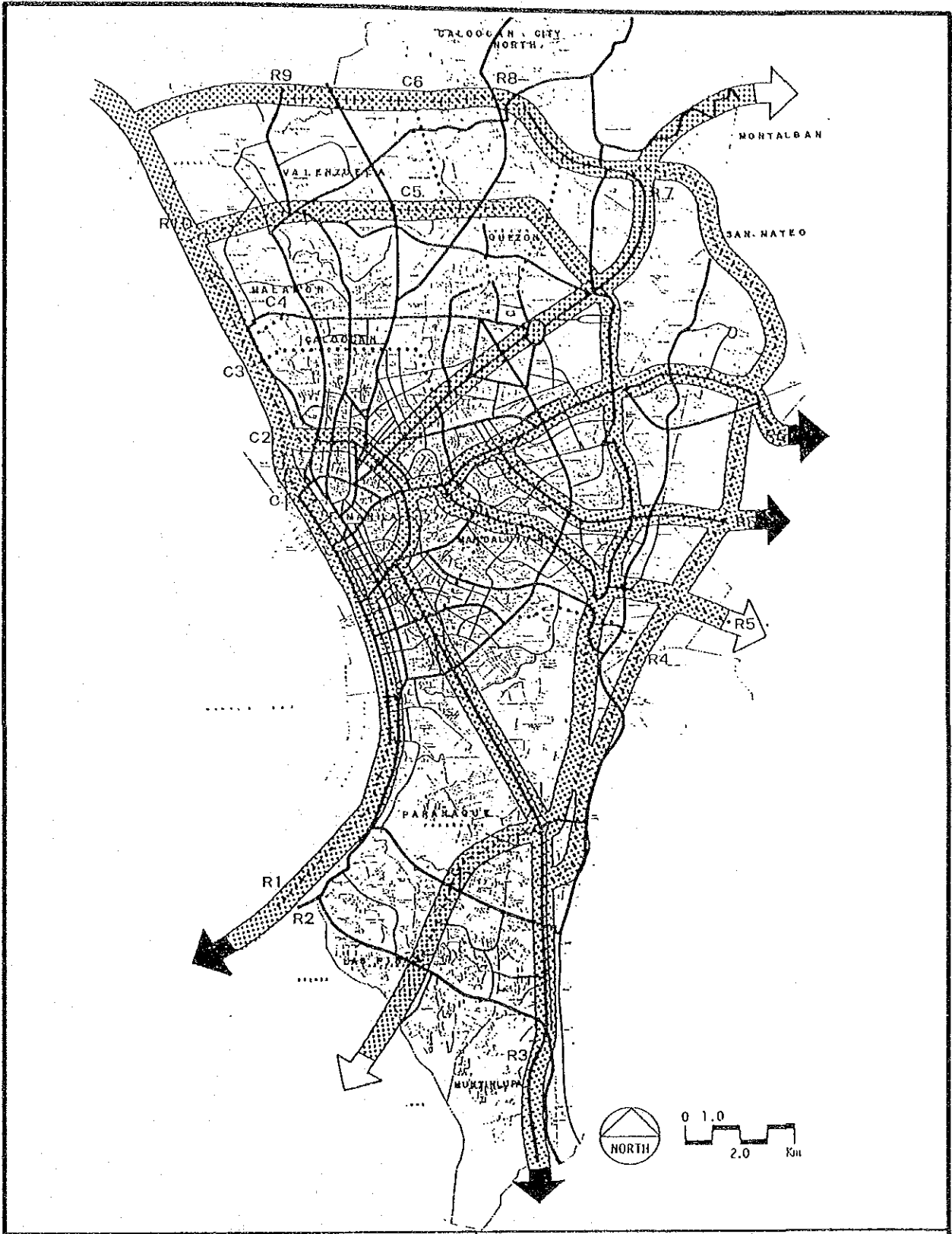




FIGURE E.16 Metro Manila's Road Network Development Opportunities for CALABARZON

LEGEND :

-  CALABARZON LINKS ' METRO MANILA (EXISTING)
-  (PROPOSED)

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Annex to Appendix E

