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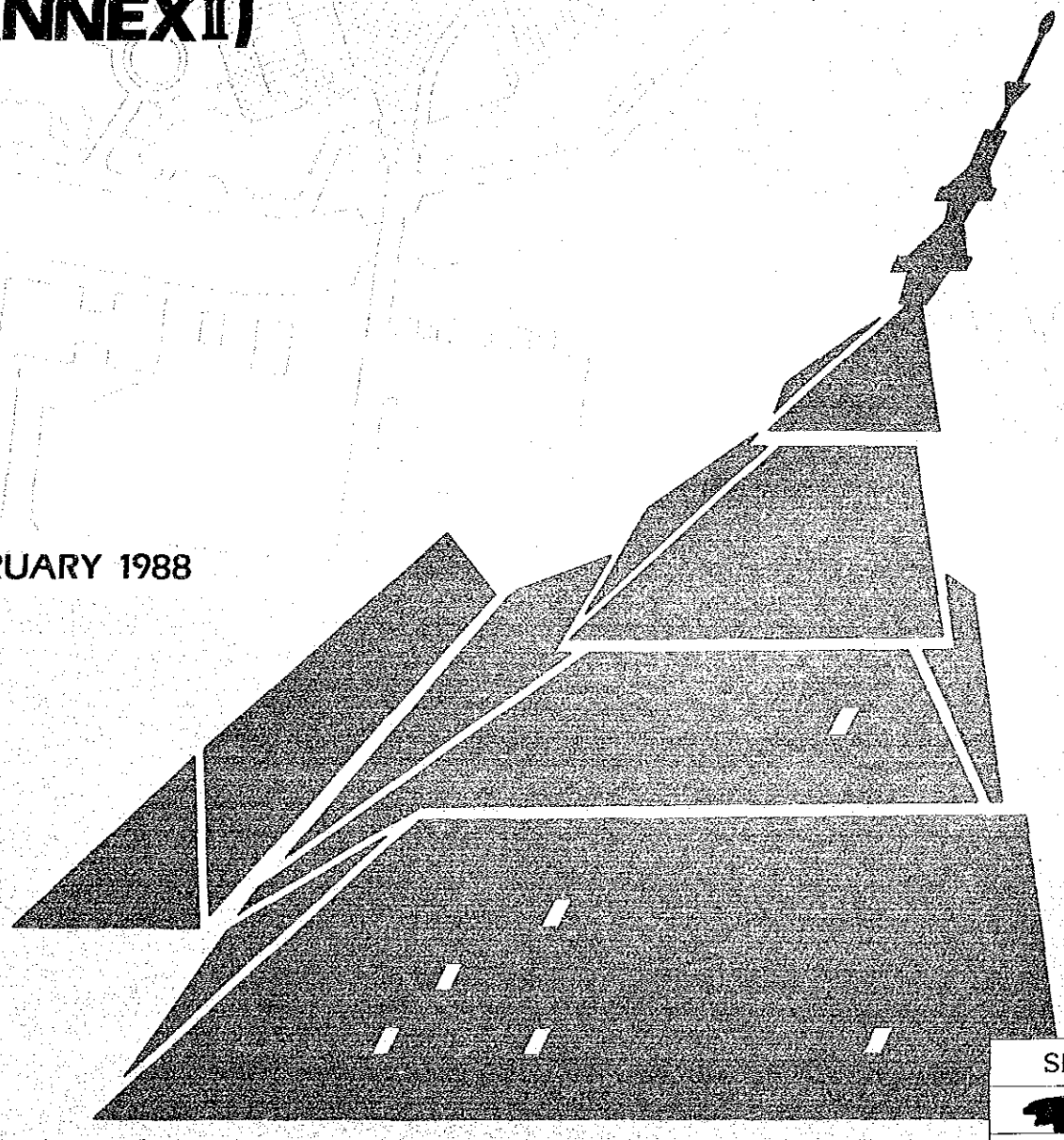
REPUBLIC OF INDONESIA DEPARTMENT OF TOURISM, POST AND TELECOMMUNICATION DIRECTORATE GENERAL OF TOURISM

No.

THE STUDY ON THE REGIONAL DEVELOPMENT PROJECT IN THE WESTERN PART OF JAVA

VOLUME 5

IMPLEMENTATION PROGRAMME (ANNEX II)



FEBRUARY 1988

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JAPAN INTERNATIONAL COOPERATION AGENCY

REPUBLIC OF INDONESIA DEPARTMENT OF TOURISM, POST AND TELECOMMUNICATION DIRECTORATE GENERAL OF TOURISM

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ON

THE REGIONAL DEVELOPMENT PROJECT

IN

THE WESTERN PART OF JAVA

(ANNEX)

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ABBREVIATIONS

National and International Organizations

ADB	: Asian Development Bank
APBD	: Anggaran Pendapatan & Belanja Daerah (Provincial & Regency Budget)
APBN	: Anggaran Pendapatan & Belanja Negara (National Budget)
ASEAN	: Association of South-East Asian Nations
ASEANTA	: ASEAN Travel Agencies Association
ASITA (APPI)	: Association of the Indonesian Tour and Travel Agencies (Asosiasi Perusahaan Perjalanan Indonesia)
BAPARDA	: Badan Pengembangan Pariwisata Daerah (Provincial Tourism Development Board)
BAPPARNAS	: Badan Pengembangan Pariwisata Nasional (National Tourism Development Board)
BAPPEDA	: Badan Perencanaan Pembangunan Daerah (Regional Development Planning Agency)
BAPPENAS	: Badan Perencanaan Pembangunan Nasional (National Development Planning Agency)
BPAM	: Badan Pengelola Air Minum (Water Supply Authority)
BPS	: Biro Pusat Statistik (Central Bureau of Statistics Office)
BTDC	: Bali Tourism Development Corporation
BUMN	: Badan Usaha Milik Negara (State Owned Enterprises)
DANA INPRES	: Special Budget
DEPARNAS	: Dewan Kepariwisataan Nasional (National Tourism Council)
DEPDAGRI	: Departemen Dalam Negeri (Department of Home Affairs)
DEPDIKBUD (DEC)	: Departemen Pendidikan dan Kebudayaan (Department of Education and Culture)

DEPERIN	: Departemen Perindustrian (Department of Industry)
DEPHUB	: Departemen Perhubungan (Department of Communications)
DEPPARPOSTEL	: Departemen Pariwisata, Pos dan Telekomunikasi (Department of Tourism, Post and Telecommunication)
DEP.P.U.	: Departemen Pekerjaan Umum (Department of Public Works)
DEPTAN	: Departemen Pertanian (Department of Agriculture)
DIPARDA Tk. I	: Dinas Pariwisata Daerah Tingkat I (Provincial Tourist Service)
DIPARDA Tk. II	: Dinas Pariwisata Daerah Tingkat II (Kabupaten Tourist Service)
DIT. BINA MARGA	: Directorate General of Road Construction
DIT. CIPTA KARYA	: Directorate General of Human Settlement
DITJEN. HUB. DAR.	: Direktorat Jenderal Perhubungan Darat (Directorate General of Land Transport and Inland Waterways)
DITJEN. HUB. DARA.	: Direktorat Jenderal Perhubungan Udara (Directorate General of Air Transport)
DITJEN. HUB. LA.	: Direktorat Jenderal Perhubungan Laut (Directorate General of Sea Transport)
DITJEN. PAR. (DGT)	: Direktorat Jenderal Pariwisata (Directorate General of Tourism)
DIT. PHPA. (DGF)	: Direktorat Jendral Perlindungan Hutan dan Pelestarian Alarm (Directorate General of Forest Protection and Nature Conservation)
DPU (P or K)	: Dinas Pekerjaan Umum (Propinsi-Kabupaten/ Kotamadya) (Provincial or Local Public Works Services)
IBRD	: International Bank for Reconstruction and Development
IDA	: International Development Association

IHRA (PHRI)	: Indonesian Hotel and Restaurant Association (Perhimpunan Hotel dan Restoran Indonesia)
INPRES	: Instruksi Presiden (Presidential Decree)
ITB	: Institut Teknologi Bandung (Bandung Institute of Technology)
JICA	: Japan International Cooperation Agency
JNTO	: Japan National Tourist Organization
KANDEP	: Kantor Departemen (District Office of the Department)
KANWIL	: Kantor Wilayah (Regional Office)
KLH	: Kependudukan dan Lingkungan Hidup (Population and Environment)
MOT	: Ministry of Transport (Japan)
NATOUR	: National and Tourism Corporation
PATA	: Pacific Asia Travel Association
PDAM	: Perusahaan Daerah Air Minum (Local Water Supply Company)
PERUMTEL	: Perusahaan Umum Telekomunikasi (Public Company of Telecommunication)
PHPA	: Perlindungan Hutan dan Pelestarian Alarm (Forest Protection and Nature Conservation Office)
PJKA	: Perusahaan Jawatan Kreta Api (National Railway Company)
PLN	: Perusahaan Listrik Negara (Public Corporation of Electricity)
PT. HII	: Hotel Indonesia International (International Hotel Corporation)
PT. JASA MARGA	: Indonesian Highway Corporation

Local Terms

Bukit	: Hill
Bupati	: Head of Kabupaten (Regency)
Danau	: Lake
Desa/Kampung	: Village
DKI Jakarta	: Daerah Khusus Ibukota Jakarta Raya (Special District Capital Greater Jakarta)
Gunung (G.)	: Mountain
IKK	: Ibu Kota Kecamatan (Sub-District Town)
Kabupaten (Kab.)	: Regency
Kecamatan (Kec.)	: Sub-District
Kelurahan	: Village
Kotamadya (Kodya)	: Municipality
KUD	: Koperasi Unit Desa (Village Unit Cooperative)
Lama	: Old
Palawija	: Upland crops
Pantai	: Beach
PELITA	: Pembangunan Lima Tahun (Five Year Development)
PT	: Perusahaan Terbatas (Private Limited Company)
Pulau (P.)	: Island
REPELITA	: Rencana Pembangunan Lima Tahun (Five Year Development Plan)
Sungai	: River
Tanjung (Tg.)	: Cape
Wilayah	: Region

UNITS OF MEASUREMENT

Length

mm	=	millimeter
cm	=	centimeter
m	=	meter
km	=	kilometer

Area

cm^2	=	square centimeter
m^2	=	square meter (or sq.m)
ha	=	hectare
km^2	=	square kilometer

Volume

cm^3	=	cubic centimeter
lit	=	litre
m^3	=	cubic meter

Weight

mg	=	milligram
g	=	gram
kg	=	kilogram
ton	=	metric ton

Electrical Measures

V	=	Volt
kV	=	Kilovolt
A	=	Ampere
kW	=	Kilowatt
MW	=	Megawatt

Other Measures

%	=	percent
PS	=	horsepower
°	=	degree
'	=	minute
"	=	second
°C	=	degree centigrade
10^3	=	thousand
10^6 (mil.)	=	million
10^9	=	billion (milliard)
ppm	=	parts per million
pH	=	scale for acidity

Derived Measures

m^3/s	=	cubic meter per second
kWh	=	kilowatt hour
MWh	=	Megawatt hour
kWh/y	=	kilowatt hour per year
kVA	=	kilovolt ampere

Time			Money		
sec(s)	=	second	Rp.	=	Rupiah
min	=	minute	US$	=	US dollar
h	=	hour	¥	=	Japanese Yen
d	=	day			
y	=	year			

ANNEX II.A

INFRASTRUCTURE

Annex II.A.1 PRELIMINARY DESIGN OF RESTORATION OF OLD MOAT

1) Flow volume of Old Moat

- Old moat in Old Banten will be restored as shown in Fig. A-1-1.

- Water depth of the moat must be more than 1.0 m to allow navigation of ferry boats to Pulau Dua.

The sectional area of the moat is calculated as follows:

$$(13.5 \text{ m} + 16.5 \text{ m})/2 \times 1.0 \text{ m} = 15 \text{ m}^2$$

- The velocity of the water flow is calculated based on the assumption that water will flow through the moat within one day to keep the water clean.

The velocity of water flow:

1,600 m/254 hours/3,600 seconds = 1.85 cm/sec.

Flow volume needed =

$15 \text{ m}^2 \times 0.0185 \times 2$ (moats) $= 0.56 \text{ m}^3/\text{sec}$.

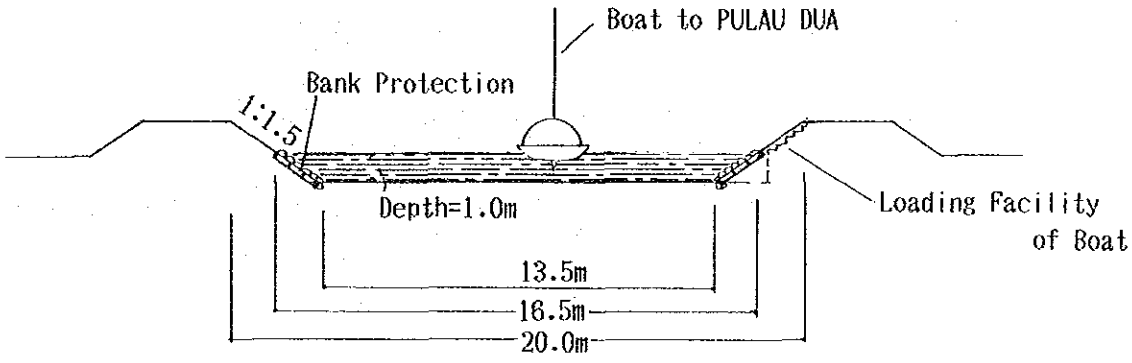


Fig. A-1-1 TYPICAL SECTION OF THE MOAT (after restoration)

2) Water source for Old Moat

Three alternatives of water source are proposed as shown in Table A-1-1.

Table A-1-1 ALTERNATIVE WATER SOURCES FOR OLD MOAT

	Water source	Advantage	Disadvantage
1)	Cibanten River	. Enough water volume . Short access from Old Moat	. Intake facility is needed. (Comparatively comprehensive)
2)	Irrigation canal adjacent to Old Banten Site	. Simple intake facility	. Constant water intake through year is impossible due to the first usage for irrigation. . Long-conveyance canal (more than 3 km).
3)	Wells	. Flexibility for the location	. More than 100 wells are needed for enough water supply to Old Moat. . Negative impact on the existing wells in Old Banten Area.

Alternative 1) of Cibanten river is recommended considering its advantage and disadvantage.

3) Design of water supply system for Old Moat

The water conveyance facility is needed for the supply of water to the moat.

- Source of water supply

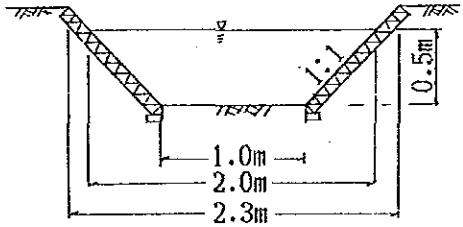
Cibanten River with a catchment area of 1983 km^2, which discharges the probable low water of 0.9 m^3/1/sec. in a 10 year return period, is recommended as the source of the water supply for the moat.

Note: /1 The probable low water of Cibanten River was estimated according to the data in the Master Plan Study on North Banten Water Resources Development (Appendix P.E.-63, JICA).

- Design of the conveyance channel

Open channel is proposed as the water conveyance channel from the Cibanten River. Manning's formula is applied for the design of the channel as shown below:

Fig.A-1-2 PROPOSED SECTION OF CONVEYANCE CHANNEL



$Q = A \cdot V$

$V = 1/n \cdot R^{2/3} \cdot I^{1/2}$

Q : Water volume (m^3/sec)

V : Velocity (m/sec)

n : Roughness Coefficient (= 0.025)

R : Hydraulic radius (m)

I : Gradint (= 0.0016)

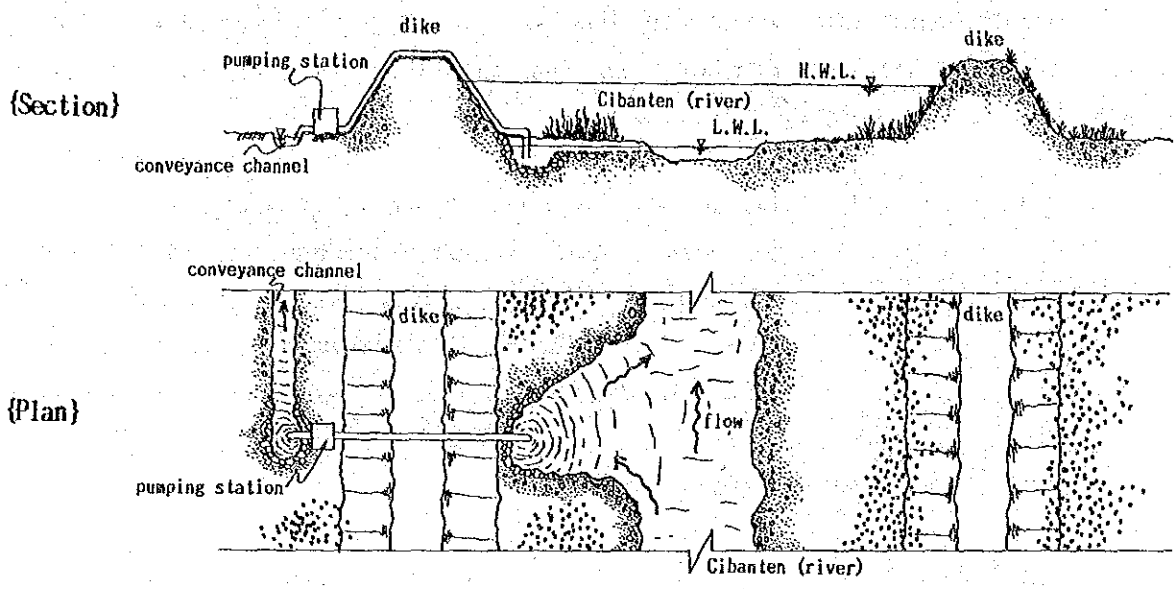
A : Sectional Area (m^2, (1 + 2)/2 x 0.5 = 0.75)

$$V = \frac{1}{0.025} \times \left[\frac{(1+2)/2 \times 0.5}{1+2 \times 0.7}\right]^{2/3} \times (0.0016)^{1/2}$$

$= 0.74$ m/sec

$Q = 0.75 \times 0.74 = 0.56$ m^3/sec

Fig. A-1-2 DESIGN OF WATER INTAKE IN CIBANTEN RIVER



ANNEX II.A.2 IMPACTS OF TOURISM DEVELOPMENT ON ROAD TRANSPORTATION

1) Summary of study

A study was conducted in order to assess the impact of tourism development in terms of increase in traffic volume upon the road transport.

As the first step, data currently available to this study were sorted looking into local population and production; road network; vehicle registration; and traffic volume.

Based on these as well as other related existing studies, future projection of traffic volume was obtained and compared briefly with the traffic capacity of each section of roads. All through this study, the traffic capacity as of 1980, determined by the Bina Marga, was adopted which does not reflect road betterment program presently under planning as a safety factor. The highway construction project between Tangerang and Merak was not taken into account since the implementation program was not fully determined by the time that this study was conducted.

At the final stage of this study, traffic volume generated by each of separate tourism development plan was determined then added on to the projected future traffic volume previously mentioned.

The conclusion through this study pointed out that there would be no serious impact on road transport by tourism development as far as current trend of regional development in general continues.

2) General situation in the study area

Comprehensive data on general situation as well as a part of future projection were compiled in the Progress Report. In this section, some of those are taken up again in order to sort out the basis of this study.

a. Basic statistics

(a) Population

Table II-A-2-1 shows the present and projected future populations and their annual growth rates of the Study area as well as of whole Indonesia analyzed by the Study team. According to this table, the population of the study area, which is the sum of Serang and Pandeglang, increases from 1,803,900 in 1980 to 3,123,700 in 2010 (approx. 1.73-fold).

(b) GDP/GRDP

Table II-A-2-2 shows the current and projected per capita GDP/GRDP in Indonesia. Future projection was analyzed by the Study team. According to this table, GDP/GDRP per capita in the study area is expected to increase from Rp.300,953 in 1984 to Rp.525,905 in 1995.

b. Road conditions

Fig. A-2-1 illustrates the road network in Serang and Pandeglang Kabupatens. In the Study area, a national road connects Jakarta and Merak in northern Serang, and currently a toll road is under detailed design stage for near future construction. Major cities are connected by provincial roads. Access by ship and ferry is available to Sumatra from the Merak Port.

Table A-2-1 POPULATION PROJECTION

(Unit: 100)

		1980	1985	1990	1995	2000	2010
Indonesia	A	1,480,402	1,651,536	1,834,571	2,027,470	2,227,536	2,624,412
	B	-	2.21	2.12	2.02	1.90	1.65
West Java	A	275,556	309,731	342,880	376,575	409,468	471,066
	B	-	2.56	2.05	1.89	1.69	1.41
DKI Jakarta	A	65,280	78,904	93,812	110,169	127,954	166,510
	B	-	3.86	3.52	3.27	3.04	2.67
Serang	A	11,092	12,629	14,087	15,583	17,053	19,829
	B	-	2.63	2.21	2.04	1.82	1.52
SPandeglang	A	6,948	7,761	8,518	9,294	10,036	11,408
	B	-	2.24	1.88	1.76	1.55	1.29

A: Population - Actual (1985-85), Projection (1990-2010)
B: Annual Growth Rate (%)

Remark: Prepared by the Study team

Table A-2-2 GDP/GRDP PER CAPITA PROJECTIONS

	Average Annual Growth Rate (%)	Assumed Average Annual Growth Rate (%)		GDP/GRDP Per Capita at Constant 1984 Prices (Rp.)		
	1978 - 84	1985 - 90	1990 - 95	1984	1990	1995
(1) Indonesia /a	6.1 /b	3.9	3.3	531,756 /b	589,148	627,056
Non-Oil/LNG GDP		4.0	4.4			
(2) West Java	8.5 /b	5.4	4.6	380,238 /b	463,531	528,474
Non-Oil/LNG GRDP		5.9	6.5			
(3) DKI Jakarta	10.8 /b	7.1	7.8	1,190,565 /b	1,454,805	1,803,424
(4) Banten Region	10.0 /b	6.5	7.2	289,245 /b	367,118	468,746
(5) Study Region	10.8 /c	7.0	7.8	300,953 /c	397,564	525,905
Serang	-	-	-	313,827 /c	411,425	541,442
Pandeglang	-	-	-	280,087 /c	374,640	499,853

Remarks: /a World Bank projections; Indonesia: Policies for Growth and Employment, April 1985
/b Actual.
/c JICA Study Team estimate based on the figures in 1978-82 (see Table 6-21).

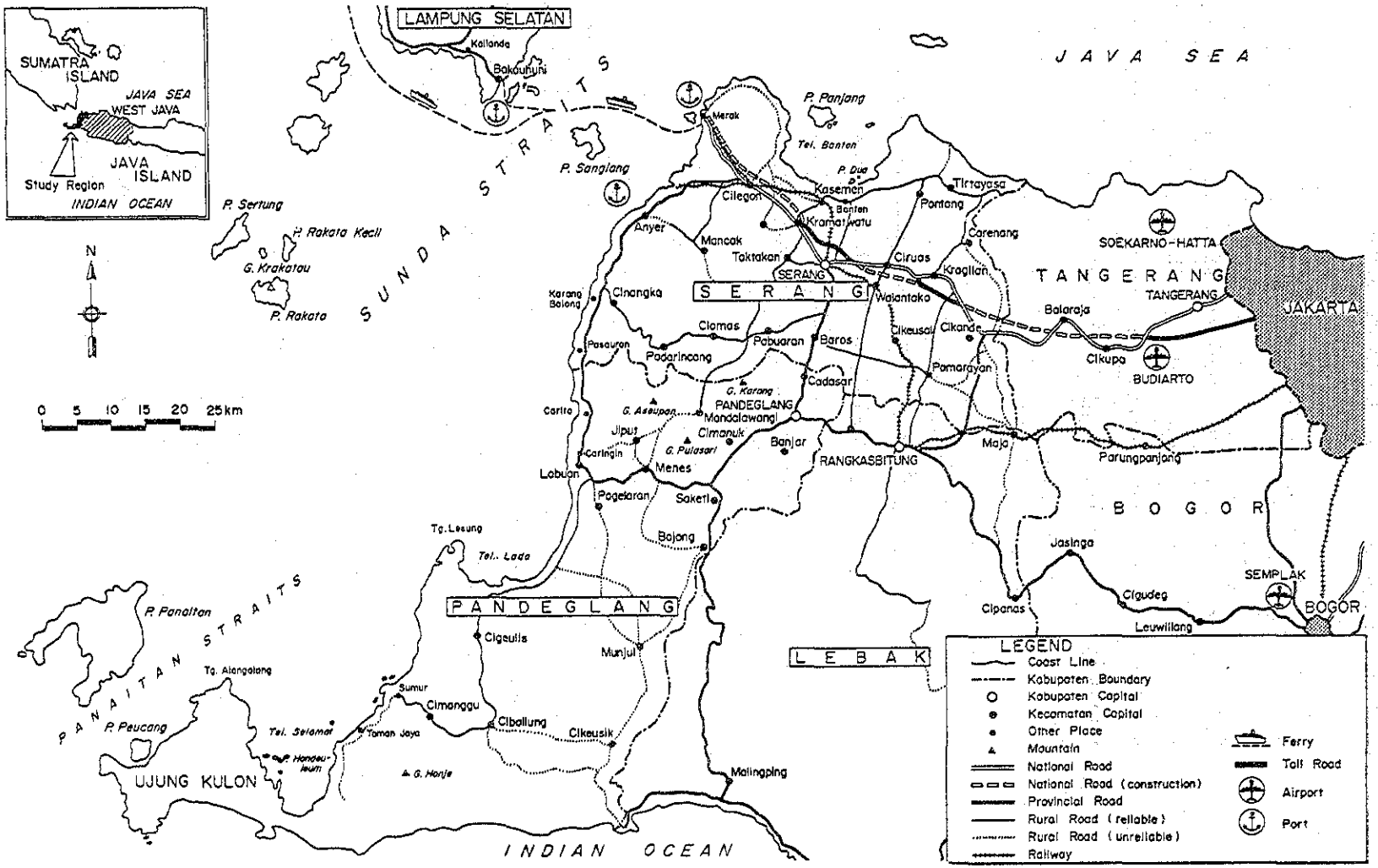


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Fig. A-2-1

ROAD NETWORK IN STUDY AREA

c. Traffic conditions

(a) Number of motor vehicles registered

Table A-2-3 shows the number of registered motor vehicles from 1980 to 1984 in West Java. According to this table, the number of registered vehicles was 304,050 in 1984 and its annual growth rate was 1.05.

(b) Traffic volume

Fig. A-2-2 shows the traffic volume of every five years in the study area from 1974 to 1984.

3) Future traffic volume without tourism development

a. Projection method

Fig. A-2-3 illustrates the concept of projection method for future traffic volume. There has been a reliable report of transportation study and by following this the future traffic volume was calculated by multiplying the 1984 traffic volume by the growth rate of generated/attracted traffic in the study area. Here, the year 2010 is set as a target year for the projection.

The generated/attracted traffic in future in West Java and Sumatra by zone was estimated according to the population growth in Table A-2-4 and the growth of economic indications. Volume of passenger-car traffic and bus traffic were obtained from the population growth, and truck-traffic volume was obtained from the growth rate of Gross Regional Domestic Product (GRDP).

Table A-2-3 NUMBER OF MOTOR VEHICLES REGISTERED IN WEST JAVA

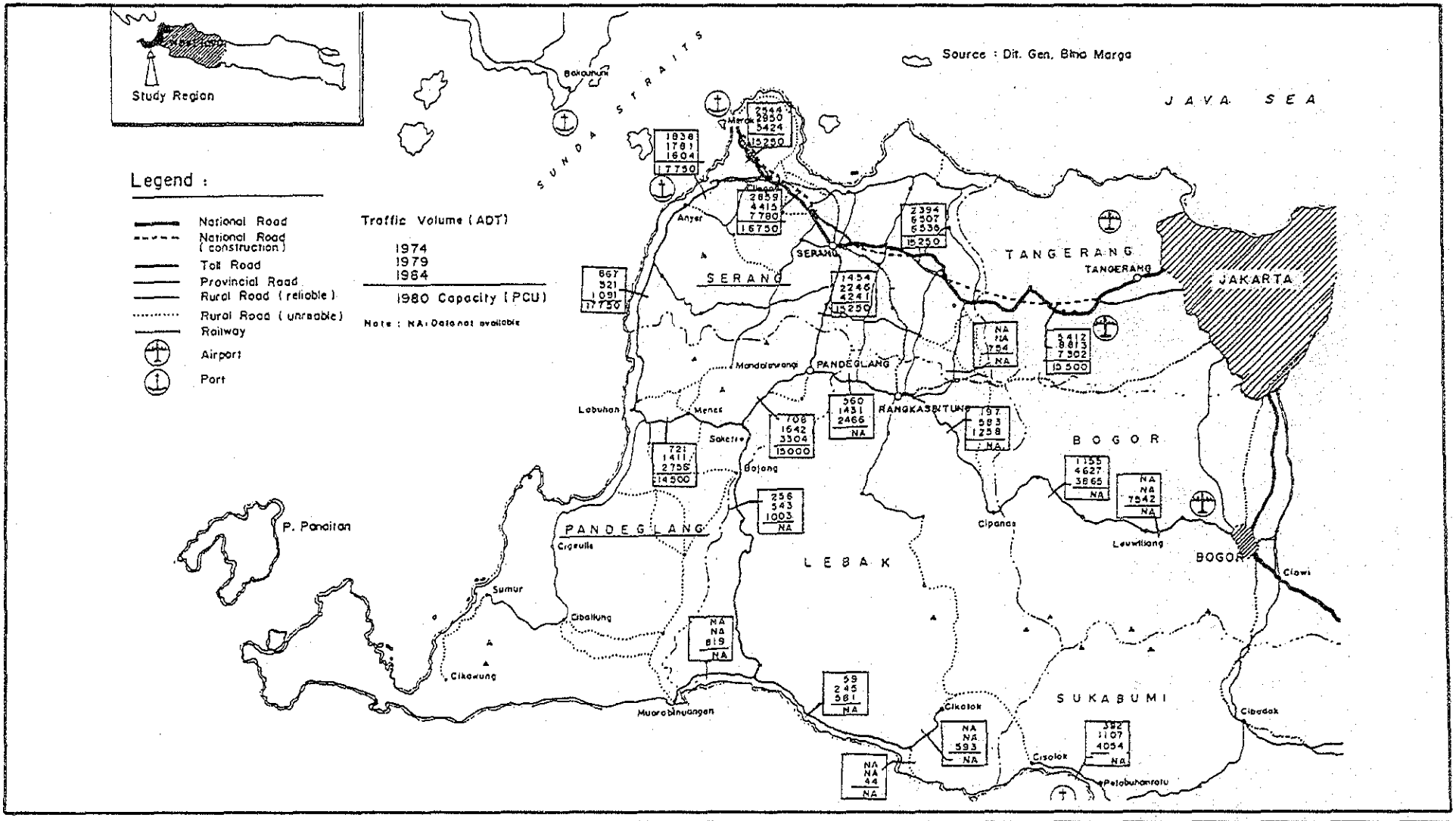
		1980	1981	1982	1983	1984
Passenger Car	A	122,910	133,408	142,497	152,496	152,443
	B		10,498	9,089	9,999	-53
	C	1.00	1.09	1.07	1.07	1.00
Buses	A	10,997	15,339	16,983	19,775	22,904
	B		4,342	1,644	2,792	3,129
	C	1.00	1.39	1.11	1.16	1.16
Truck	A	91,864	110,426	116,113	117,087	128,703
	B		18,562	5,687	974	11,616
	C	1.00	1.20	1.05	1.01	1.10
Total	A	225,771	259,173	275,593	289,358	304,050
	B		33,402	16,420	13,765	14,692
	C	1.00	1.15	1.06	1.05	1.05

A: Number of Motor Vehicles Registered

B: the difference

C: Annual Increase Rate

Source: Study team



Source: Prepared by the Study Team

Non-scale

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Fig. A-2-2

TRAFFIC VOLUME

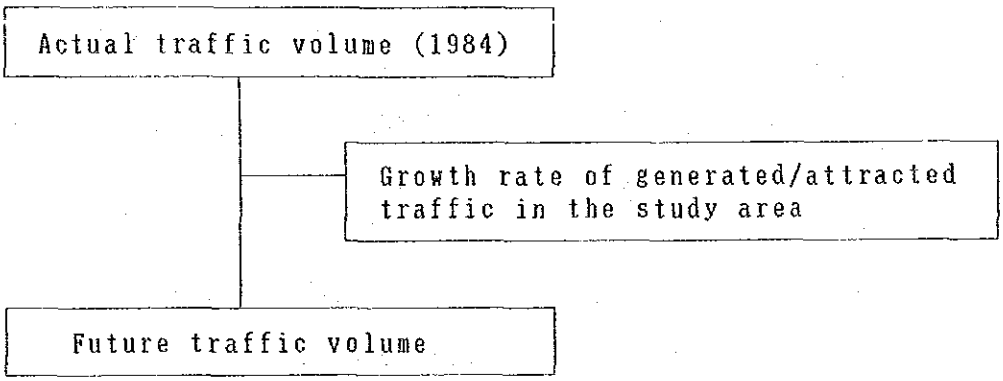

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Fig. A-2-3

PROJECTION METHOD FOR FUTURE TRAFFIC

Table A-2-4 PROJECTION OF POPULATION AND ECONOMIC GROWTH BY ZONE

Zone Name	Average Annual Growth Rate of Population (%)		Average Annual Growth Rate of GRDP (%)	
	1985 - 1995	1995 - 2005	1985 - 1995	1995 - 2005
1. Jakarta	2.99	2.10	5.5	5.5
2. Tangerang	4.10	4.10	5.2	5.2
3. Balaraja	3.35	3.35	5.2	5.2
4. Serang	2.20	2.20	5.0	5.0
5. Cilegon	2.90	2.90	8.3	8.3
6. Pandeglang	2.11	2.11	5.0	5.0
7. Other West Java	2.22	2.22	4.6	4.6
8. Sumatra	3.15	3.15	5.0	5.0

Sources:
1) Population census in 1971 and 1980
2) DKI Jakarta Masterplan, 2005
3) Proyeksi Penduduk Wilayah Penbangunan, 1980 - 1990, BAPPEDA Java Barat
4) Statistical Yearbook of Indonesia, 1983
5) Produk Domestik Regional Bruts menurut Wilayah Penbangunan Propinsi DT.I.Java Barat, 1979 - 1982
6) Rencana Penbangunan Lima Tahun Keempat 1984/85 - 1988/89

Table A-2-5 shows the trend of generated/attracted traffic volume by zone in West Java and Sumatra. However, the figures are available only up to the year 2005 by the pre-mentioned report. Thus, the traffic volume in 2010 is calculated using the same growth rate for the period from 1995 to 2005. Fig. A-2-4 represents the results of such analyses. From Fig. A-2-4, the generated/attracted traffic volume in 2010 is 19,333 trips/day and the growth rate to 1985 is 3.256.

b. Projection results

The projection result of future traffic in the study area is summarized in Fig. A-2-5. It shows that traffic is the heaviest along the national road connecting Jakarta and Merak with an estimated volume at 25,000 car/day. No road is expected to have traffic exceeding its capacity. A note should be taken, however, that is this estimation, it is assumed that the two lanes of the toll road which is now under detailed design stage is available by the year 2010 and therefore the capacity of the national road connecting Jakarta and Merak is twice the today's value.

4) Future traffic volume with tourism development and its impact

a. Tourism development plan

Table A-2-6 and Fig. A-2-6 show the tourism development plants in the Study area. In Kabupaten Serang, there are three planned projects, i.e., Tropical Marine Park, Kur Park and Old Banten. In Kabupaten Pandeglang, three projects, i.e., beach resort, Krakatau/Ujung Kulon and Country Park are

Table A-2-5 TRAFFIC GENERATION BY ZONE

(Unit = Vehicle Trips/Day)

Zone \ Year	1985	1995	2005
Jakarta	66,194	96,822	142,158
Serang	615	924	1,407
Cilegon	3,179	5,826	10,333
Pandeglang	2,144	3.241	4,479
Sub Total	**5,938**	**9,991**	**16,219**
Other West Java	33,373	46,359	64,697
Sumatra	747	1,162	1,816
Total	**106,252**	**154,334**	**224,890**

Remark: Prepared by the Study Team

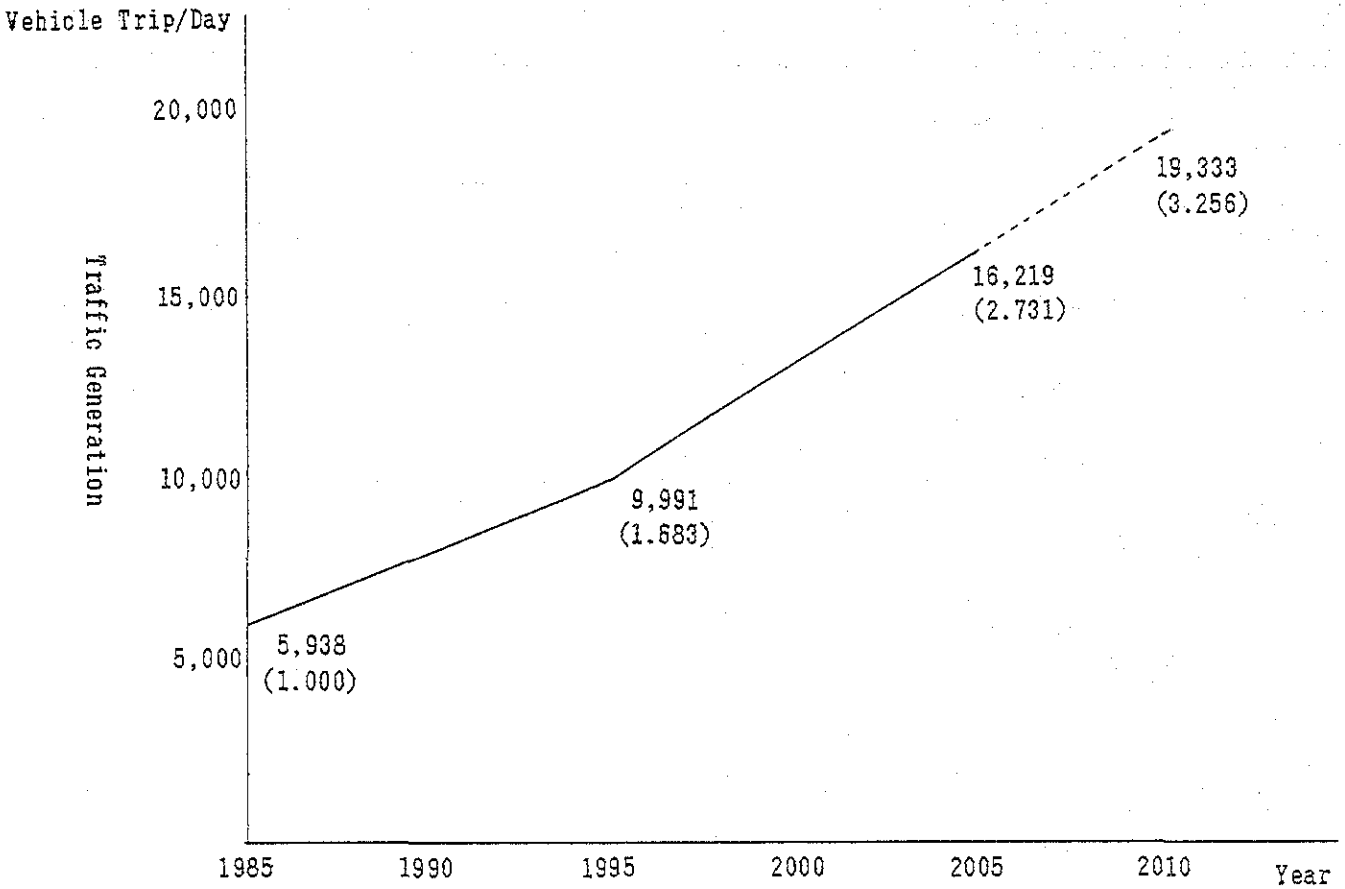

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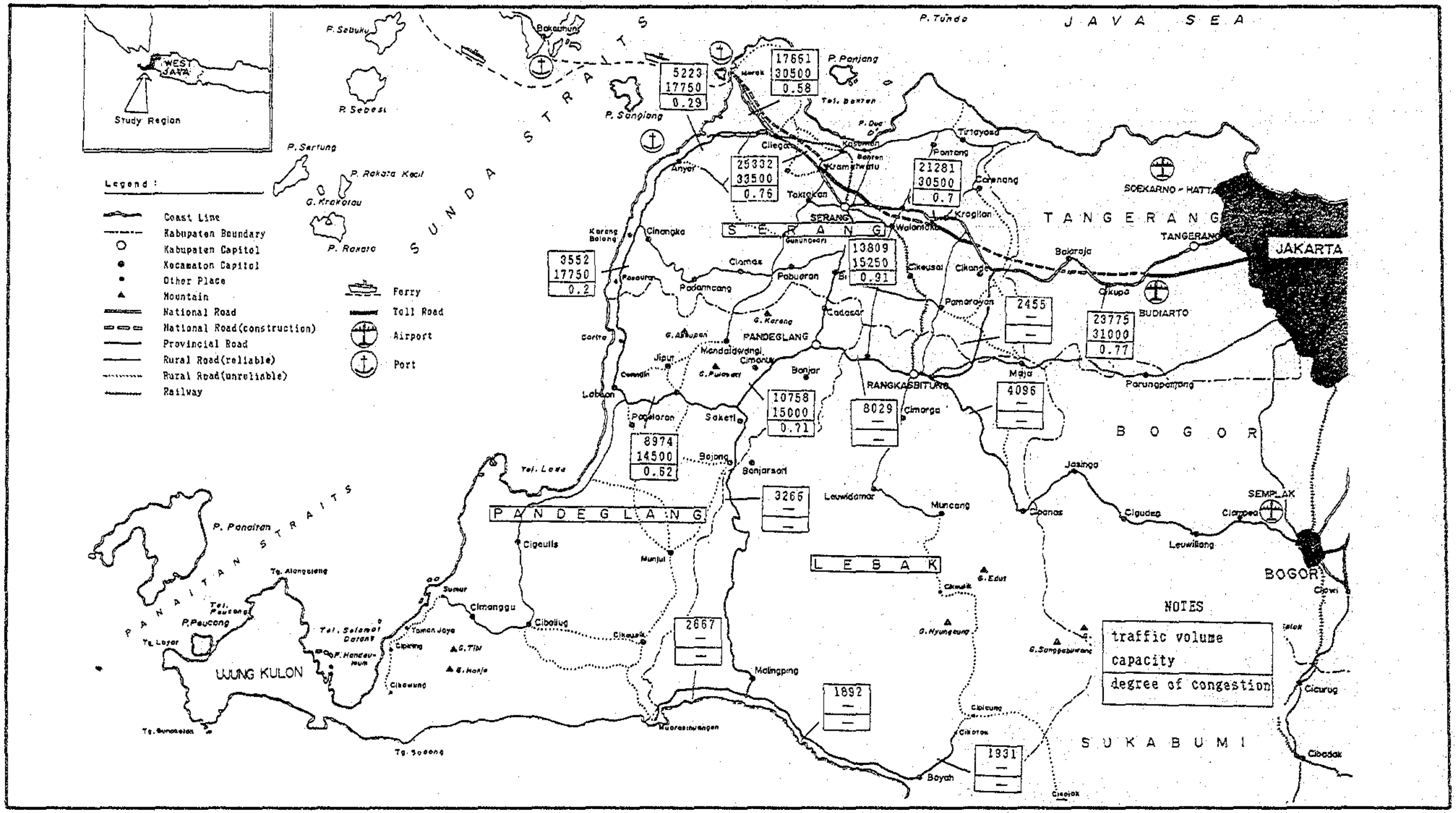
Fig. A-2-4
TRANSPORTATION OF TRAFFIC GENERATION/ATTRACTION



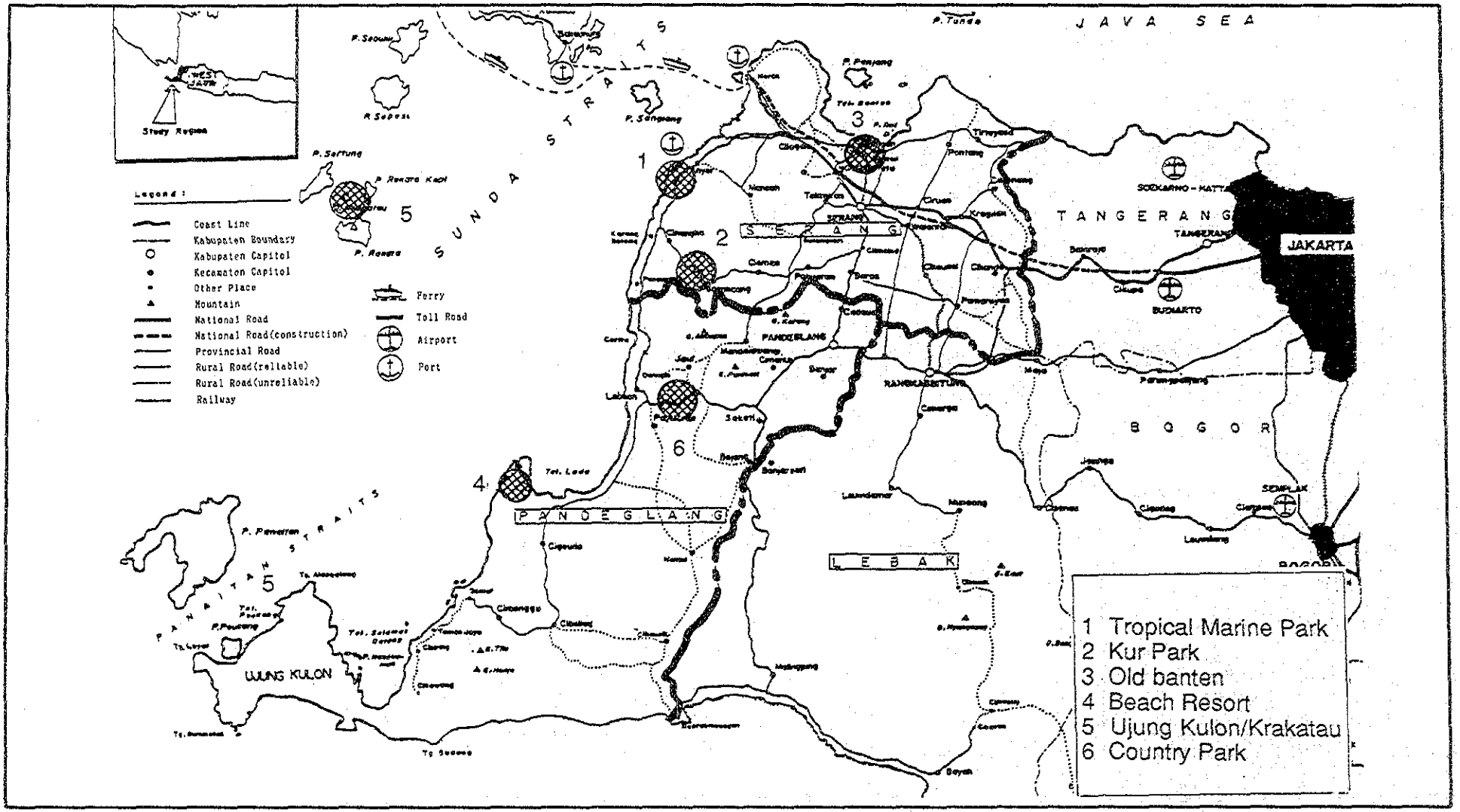
Source: Prepared by the Study Team Non-scale	DEPARTMENT OF TOURISM, POST AND TELECOMMUNICATION DIRECTORATE GENERAL OF TOURISM JAPAN INTERNATIONAL COOPERATION AGENCY THE STUDY ON THE REGIONAL DEVELOPMENT PROJECT IN THE WESTERN PART OF JAVA	Fig. A-2-5 TRAFFIC VOLUME IN 2010

Table A-2-6 TROURISM DEVELOPMENT PLAN

		Tourism (1,000 Person-Visits)		Instantaneous Capacity (Person-Visits)
		1984	2010	
Tropical Marine Park	A	0	0	9,000
	B	0	672	
	C	0	72	
Kur Park	A	-	66	2,000
	B	-	67	
	C	-	133	
Old Banten	A	1,195	2,000	13,000
	B	0	590	
	C	1,195	2,590	
Beach Resort	A	0	0	10,100
	B	0	507	
	C	0	507	
Ujung Kulon/ Krakatau	A	4	8	500
	B	0	17	
	C	4	25	
Country Park (Internatioal Recreation Park)	A	0	0	2,600
	B	0	137	
	C	0	137	

A: Demand without project
B: Demand induced by the newly developed project
C: A + B

Remark: Prepared by the Study Team



Source: Prepared by the Study Team

Non-scale

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Fig. A-2-6

TOURISM DEVELOPMENT PLAN

considered. From the estimated number of tourists, Tropical Marine Park is expected to be the biggest in scale and the Ujung Kulon/ Krakatau is the smallest.

b. Projection method

Fig. A-2-7 illustrates the process of projecting future traffic volume with the effect of tourism development plan taken into consideration. The traffic generation/attraction by type of vehicle created by tourism development is estimated from number of tourists per day and the average number of passengers per vehicle by type of vehicle. Then, the distributed traffic is calculated from the traffic generation/attraction obtained and the future generated/attracted traffic ratios by zone in the future. At the same time, a road network model is formulated and the routes by zone are set. Finally, by allotting the distributed traffic obtained to the road network, future traffic volume is projected.

(a) Estimated number of tourists in future

The number of tourists per day is estimated by multiplying the figures in Table A-2-6 by the day-trip concentration ratio of 0.02, as well as adopting estimated cycle of visitors at each location.

(b) Average number of passengers by type of vehicle

Table A-2-7 shows the average number of passengers by type of vehicle, estimated by the Study team. In Japan, the average numbers of passengers per vehicle of the traffic created by tourists are 3.1 for a passenger car and 38.0 for a bus in Fukushima Pref. in 1986.

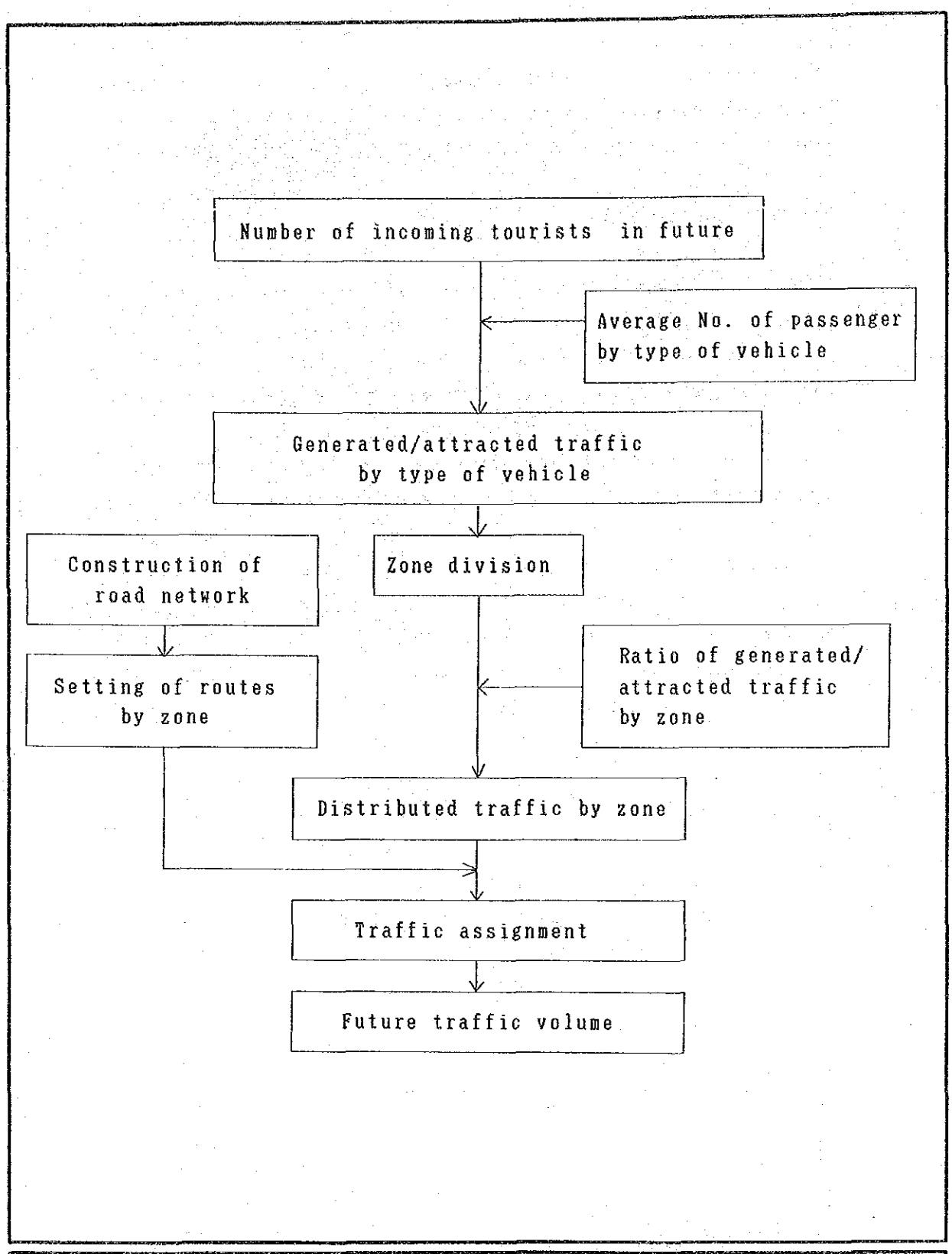

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Fig. A-2-7

PROJECTION METHOD OF FUTURE TRAFFIC WITH EFFECT OF TOURISM DEVELOPMENT

Table A-2-7 NUMBER OF PASSENGER FOR EACH TYPE OF VEHICLE

	Number of Passenger for each Type of Vehicle
Passenger Car	3.5
Light Bus	30.0
Heavy Bus	50.0

Table A-2-8 TRAFFIC GENERATION AND ATTRACTED TRAFFIC

	Car	Bus (Light)	Bus (Heavy)	Total
Topical Marine Park	1,280	150	90	1,520
Kur Park	230	30	20	280
Old Banten	520	60	40	620
Beach Resort	1,090	130	80	1,300
Ujung Kulon/Krakatau	30	10	10	50
Country Park	280	30	20	330

Remark: Prepared by the Study Team

(c) Generated/attracted traffic by type of vehicle

The generated/attracted traffic volume is calculated using the number of incoming tourists per day and average number of passengers for each type of vehicle. It is assumed in this calculation that visitors equally use each type of vehicles (passenger cars, microbuses and buses). Consequently, each type of vehicle is assumed to account for one third of the total traffic generated by tourism. Table A-2-8 shows the generated/attracted traffic in each tourist zone.

(d) Zone division

Fig. A-2-8 illustrates the zone divisions used for the assignment of traffic.

(e) Generated/attracted traffic by zone

Table A-2-9 shows the generated/attracted traffic by zone in the year 2010. For other West Java areas, traffic is distributed according to the traffic volume ratio (7302:1258 = 0.853;0.147) of routes connecting the study areas and Jakarta/Bogor.

(f) Distributed traffic by zone

Distributed traffic by zone is calculated by dividing the generated/attracted traffic of each tourist resort by the ratio of generated/attracted traffic by zone.

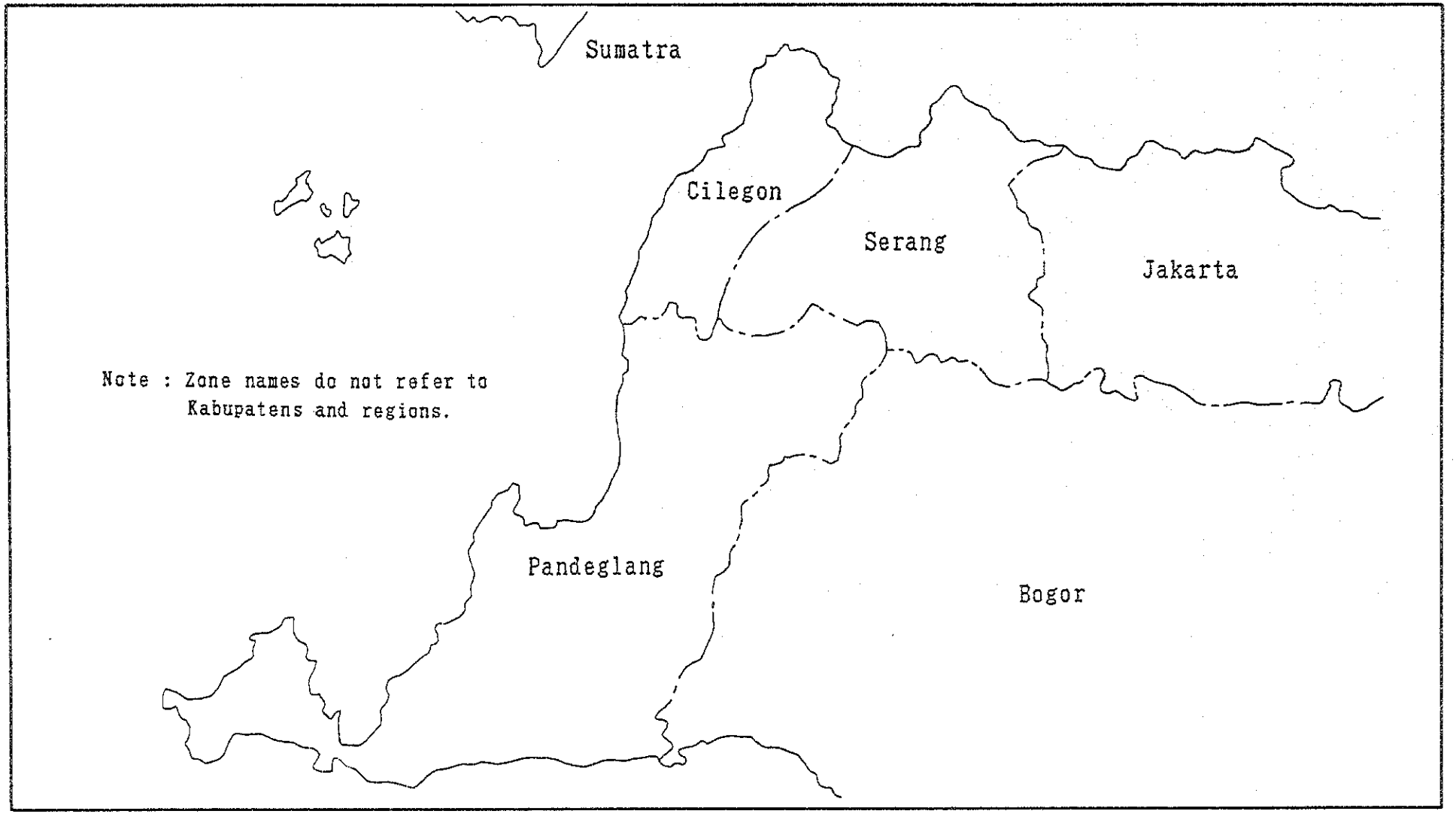

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Fig. A-2-8

ZONE DEVELOPMENT

Table A-2-9 TRAFFIC GENERATION AND ATTRACTED TRAFFIC

Zone	Traffic Generation and Attracted Traffic	Concentration Rate (%)
Jakarta	197,345	87.8
Serang	1,407	0.6
Cilegon	10,333	4.6
Pandeglang	4,479	2.0
Bogor	9,510	4.2
Sumatra	1,816	0.8

Remark: Prepared by the Study Team

(g) Construction of road network model

Fig. A-2-9 illustrates the model road network in the study area. The model road network represents national roads, a part of provincial roads and rural roads.

(h) Setting of routes by zone

The routes used in assigning distributed traffic by zone to the road network was set as shown in Fig. A-2-10 ~ 12.

c. Projection results

Fig. A-2-13 ~ 18 illustrate the results of traffic distribution to the model road network. The routes between a tourist resort and a set zone is predetermined, then the tourism generated/attracted traffic by zone is assigned to the model road network.

d. Effect of traffic created by tourism

Fig. A-2-19 ~ 24 show the sum of future traffic volume estimated in Section 3, and the traffic volume generated/created by tourism development at each tourist resort. In every case, the estimated traffic volume is within the corresponding road capacity. Therefore, it is concluded that the effect of tourism on the future traffic volume is negligible and quite unaffected by deviation of forecast due to little influence of tourist traffic.

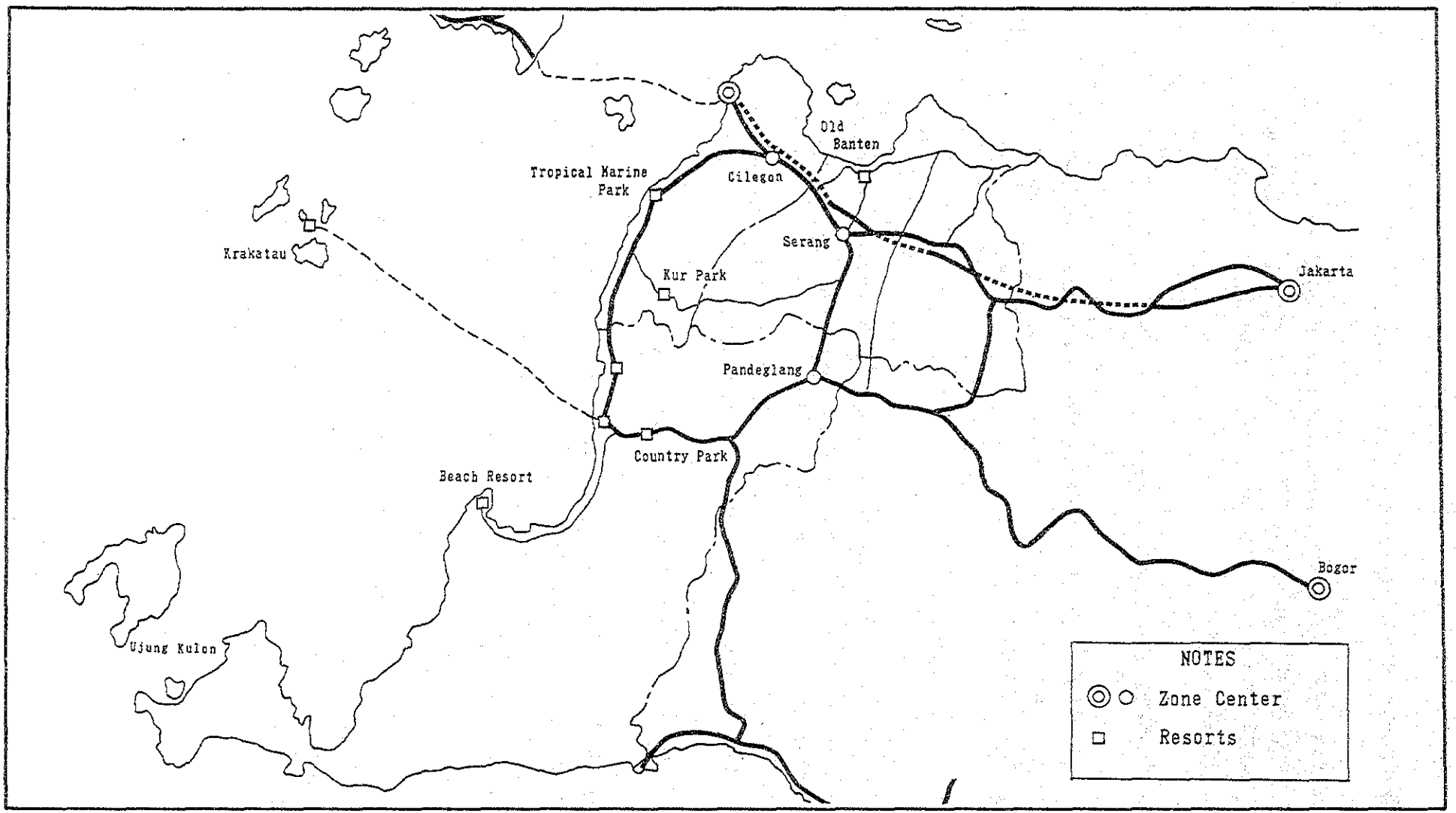

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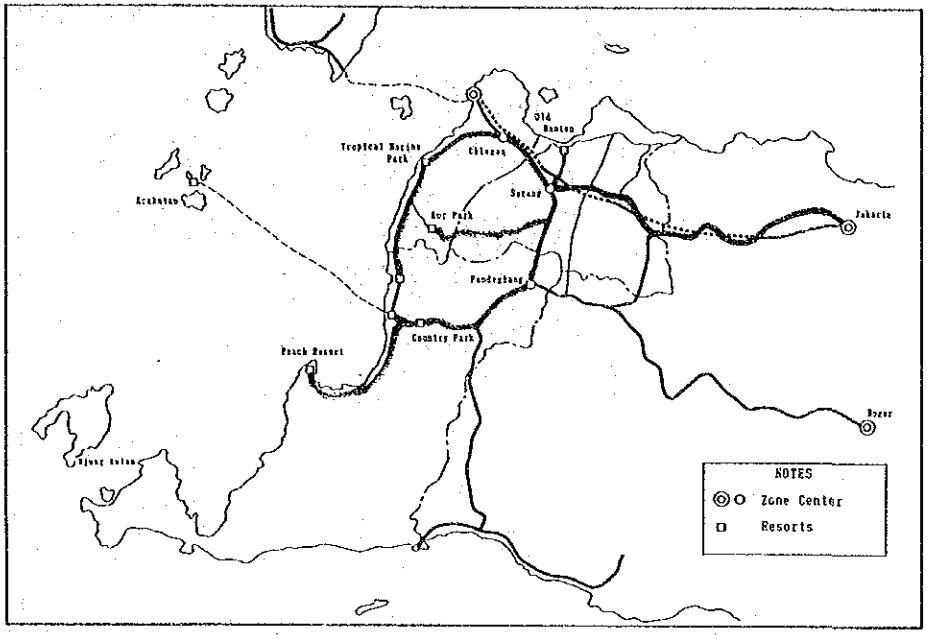
Fig. A-2-9

ROAD NETWORK IN STUDY AREA

(JAKARTA)



(SERANG)

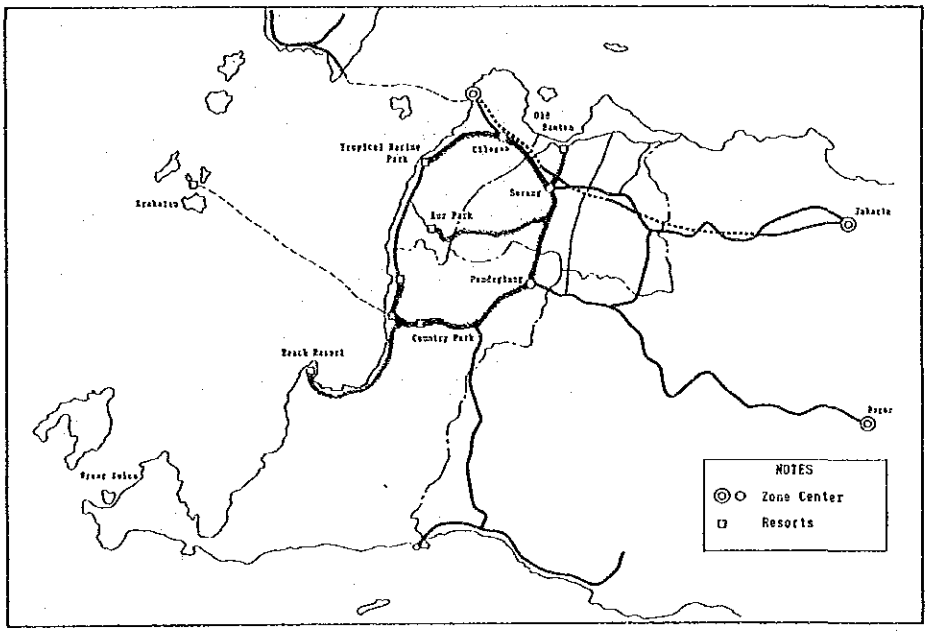


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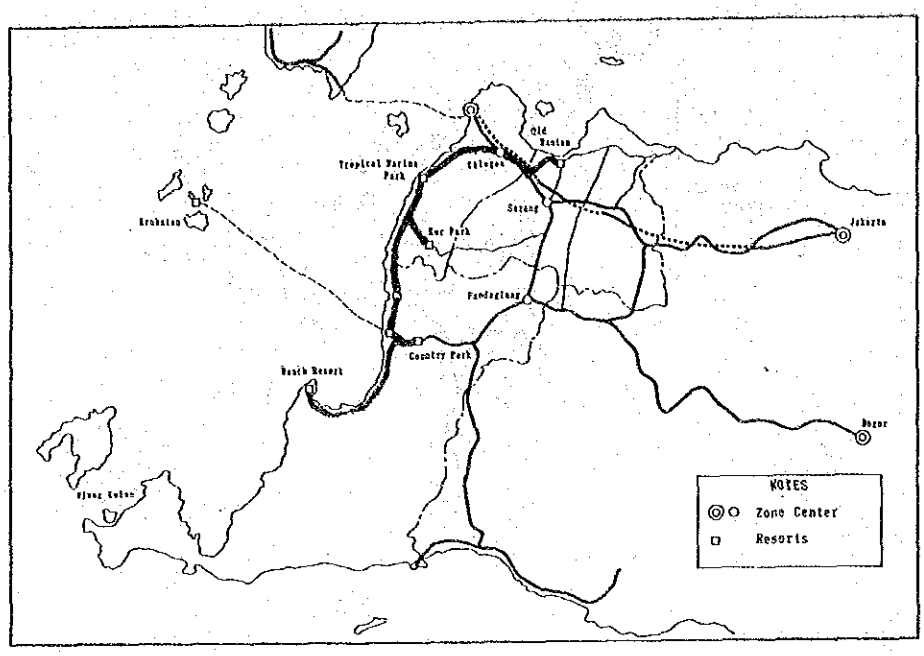
Fig. A-2-10
ROUTE BY ZONE
(JAKARTA) & (SERANG)

Non-scale

(CILEGON)



(PANDEGLANG)

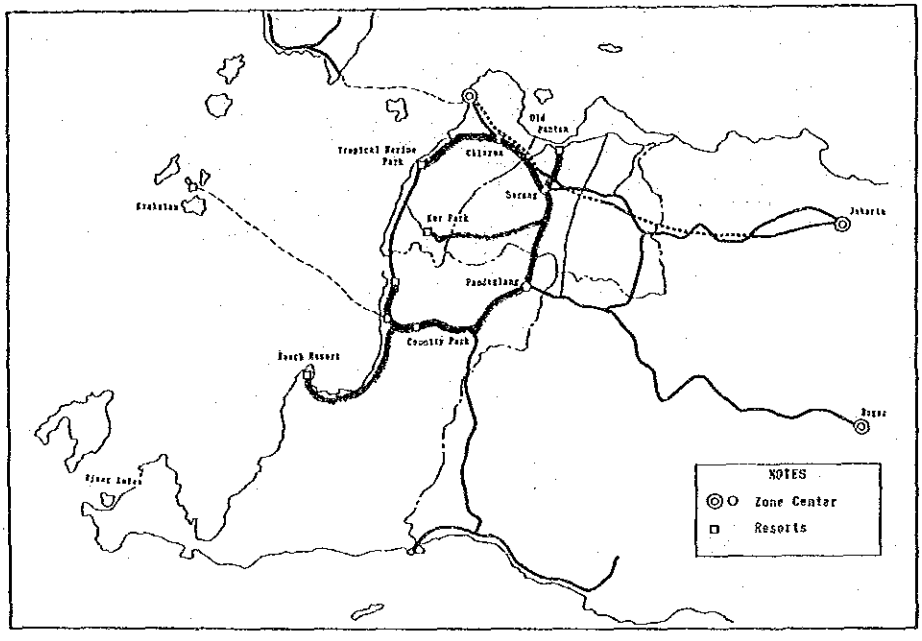


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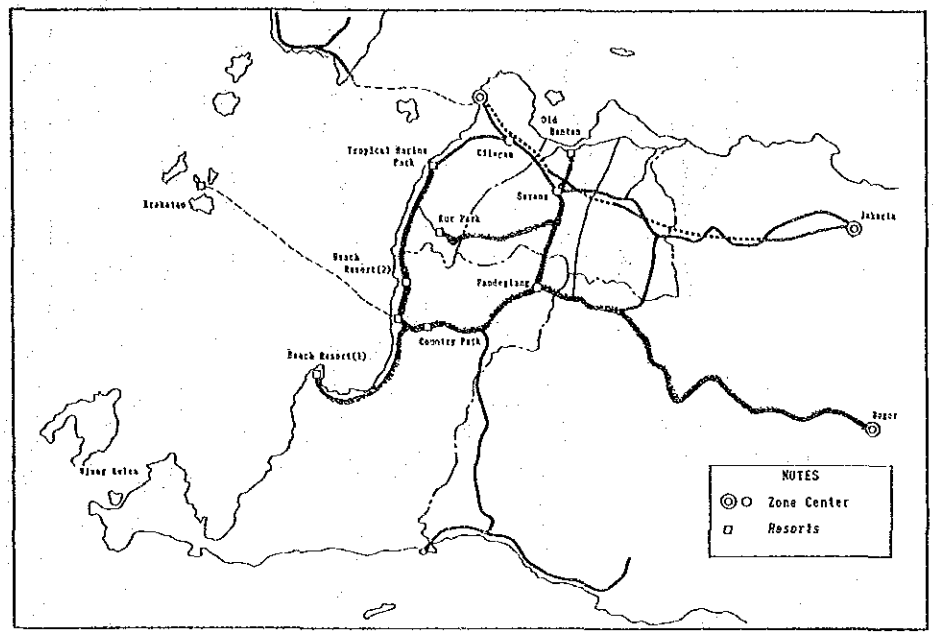
Fig. A-2-11

ROUTE BY ZONE

(CILEGON) & (PANDEGLANG)

Non-scale

(BOGOR)



(SUMATRA)

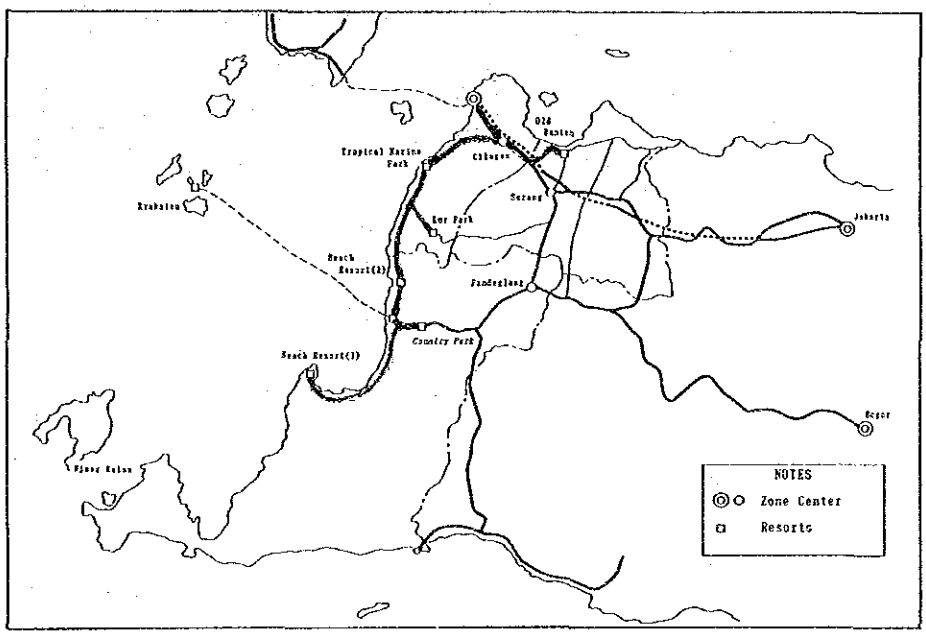


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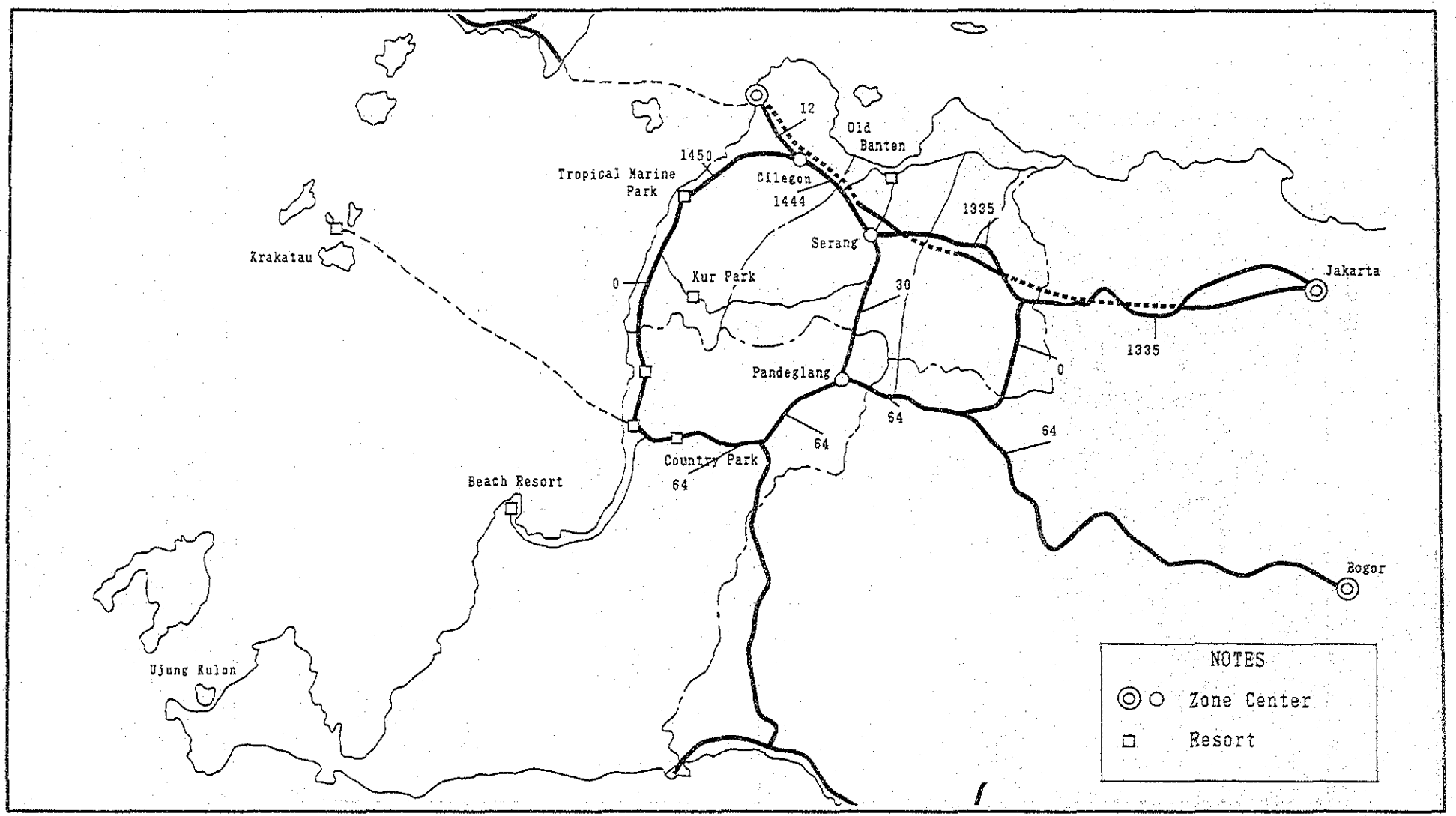
Fig. A-2-12

ROUTE BY ZONE
(BOGOR) & (SUMATRA)

Non-scale



Source: Prepared by the Study Team

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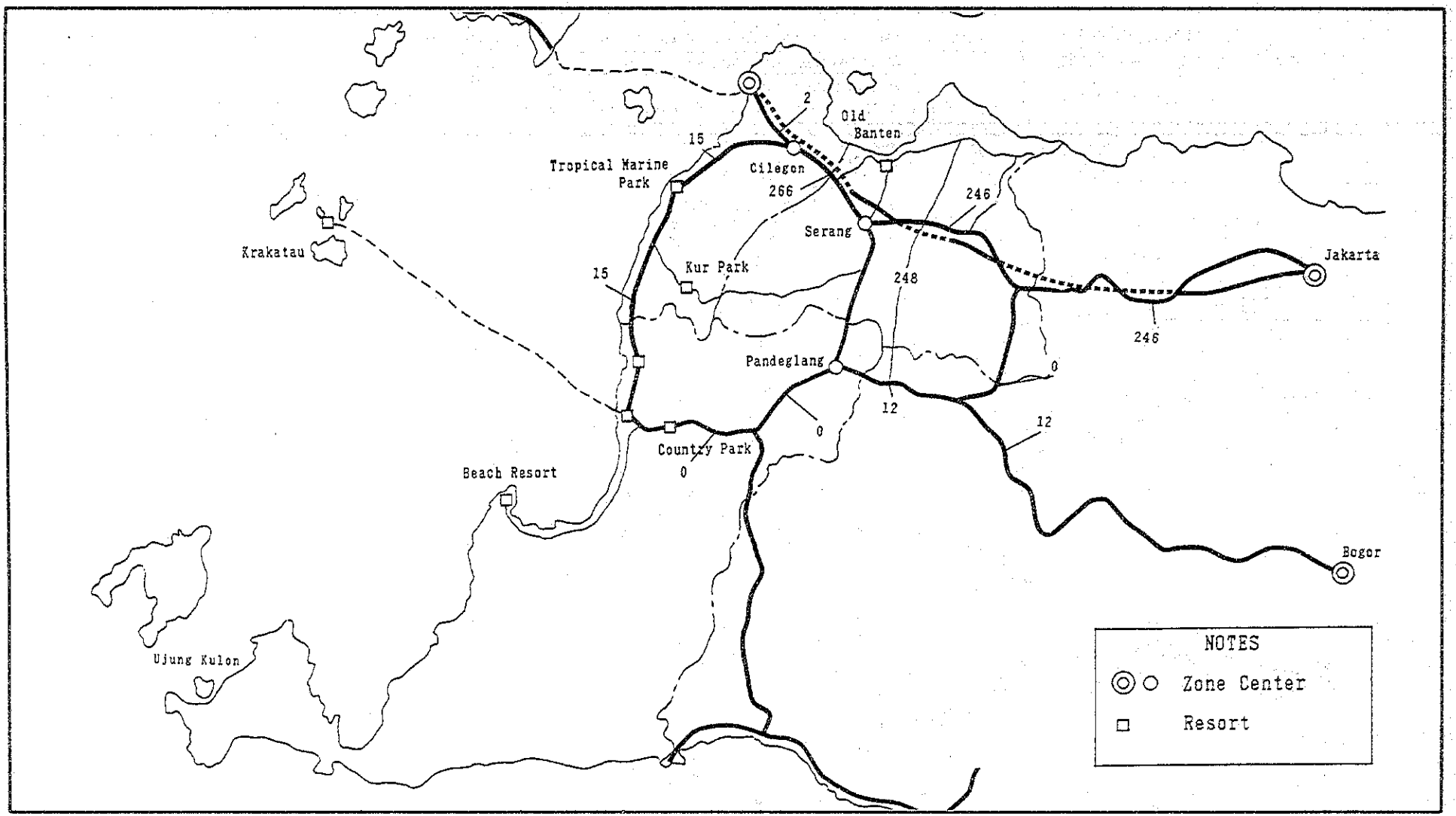
Fig. A-2-13
TOURISM TRAFFIC VOLUME
(TROPICAL MARINE PARK)



Source: Prepared by the Study Team

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Fig. A-2-14

TOURISM TRAFFIC VOLUME (KUR PARK)

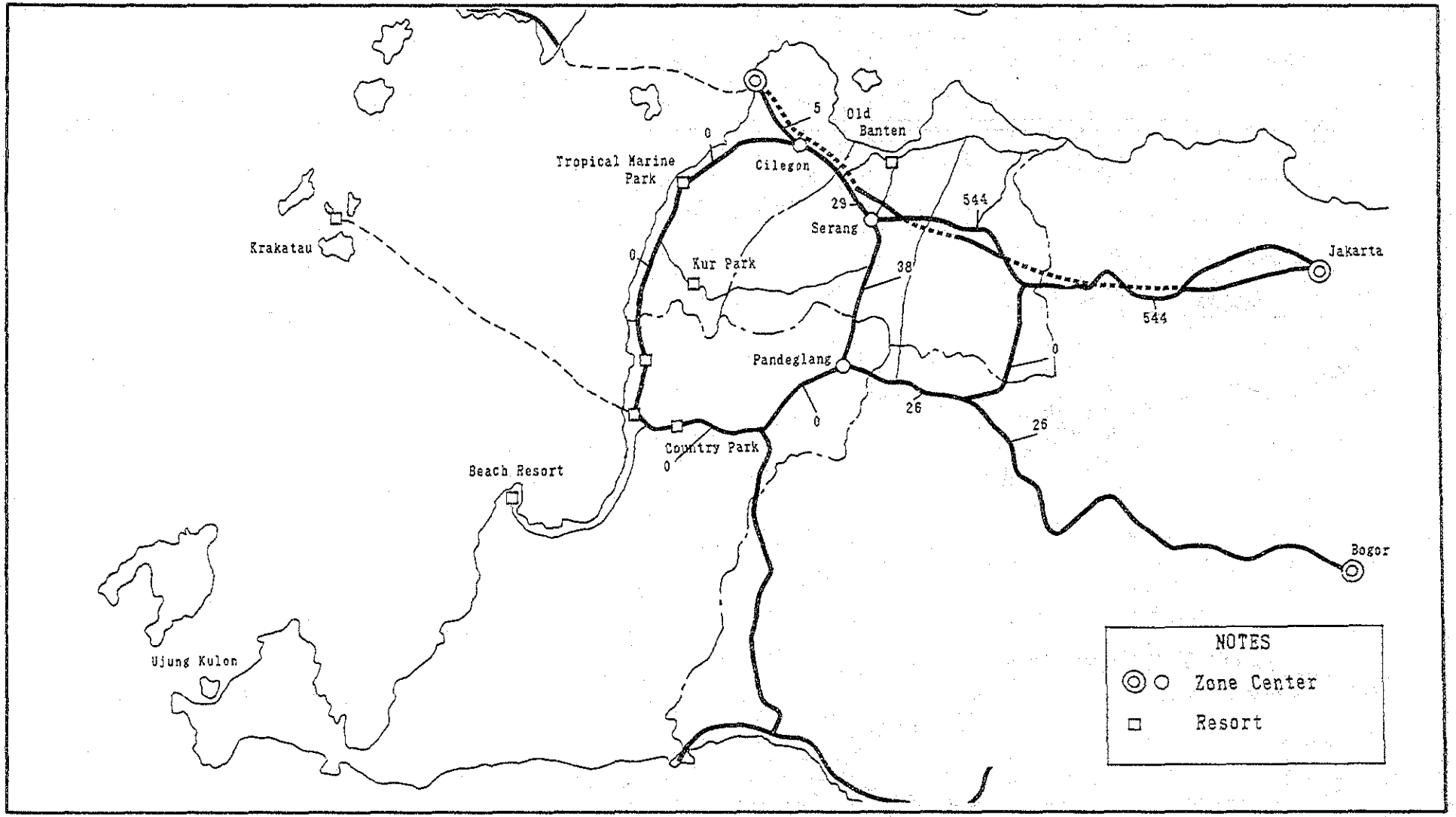

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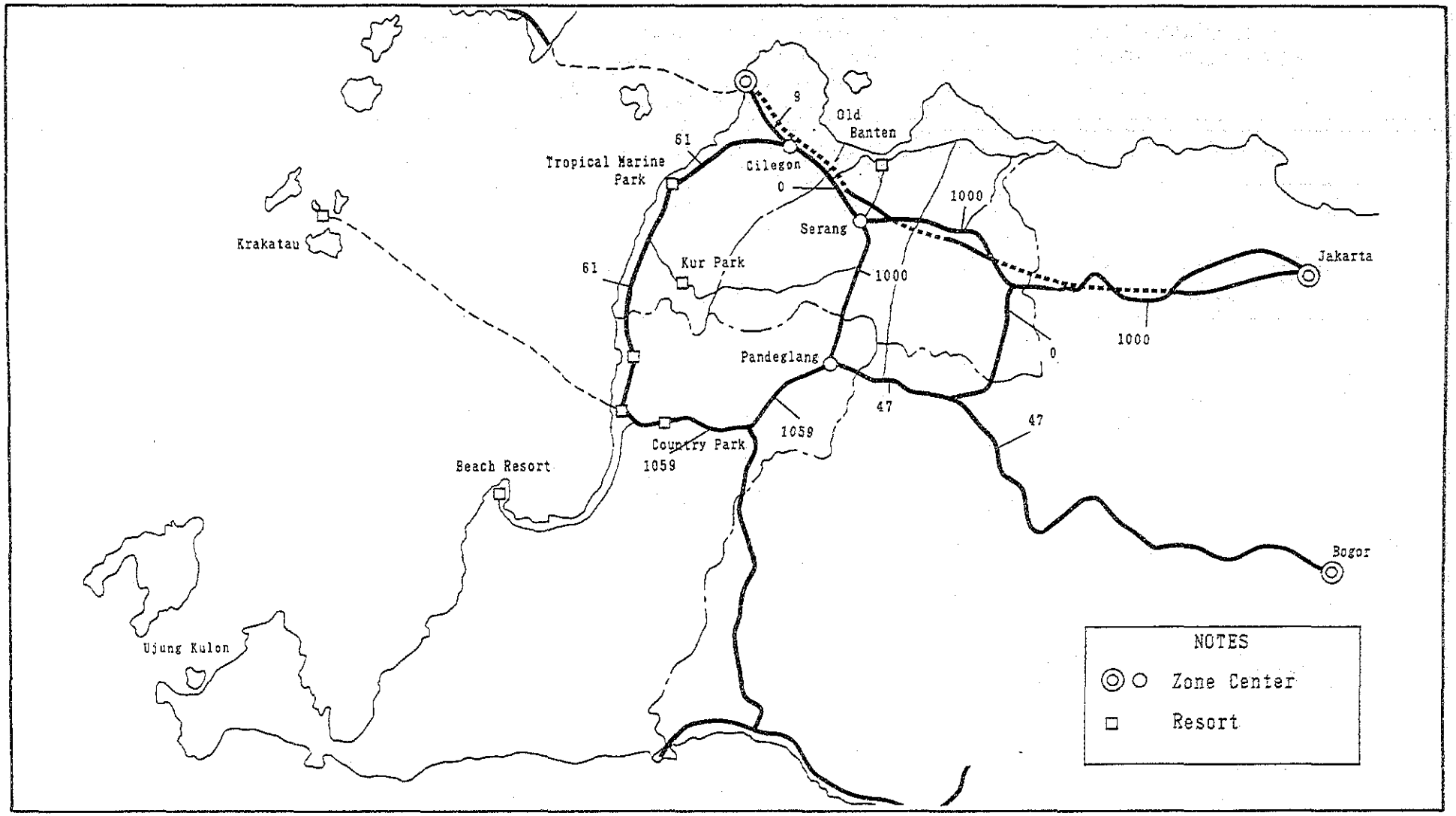
Fig. A-2-15

TOURISM TRAFFIC VOLUME (OLD BANTEN)



Source: Prepared by the Study Team

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Fig. A-2-16
TOURISM TRAFFIC VOLUME
(BEACH RESORT)

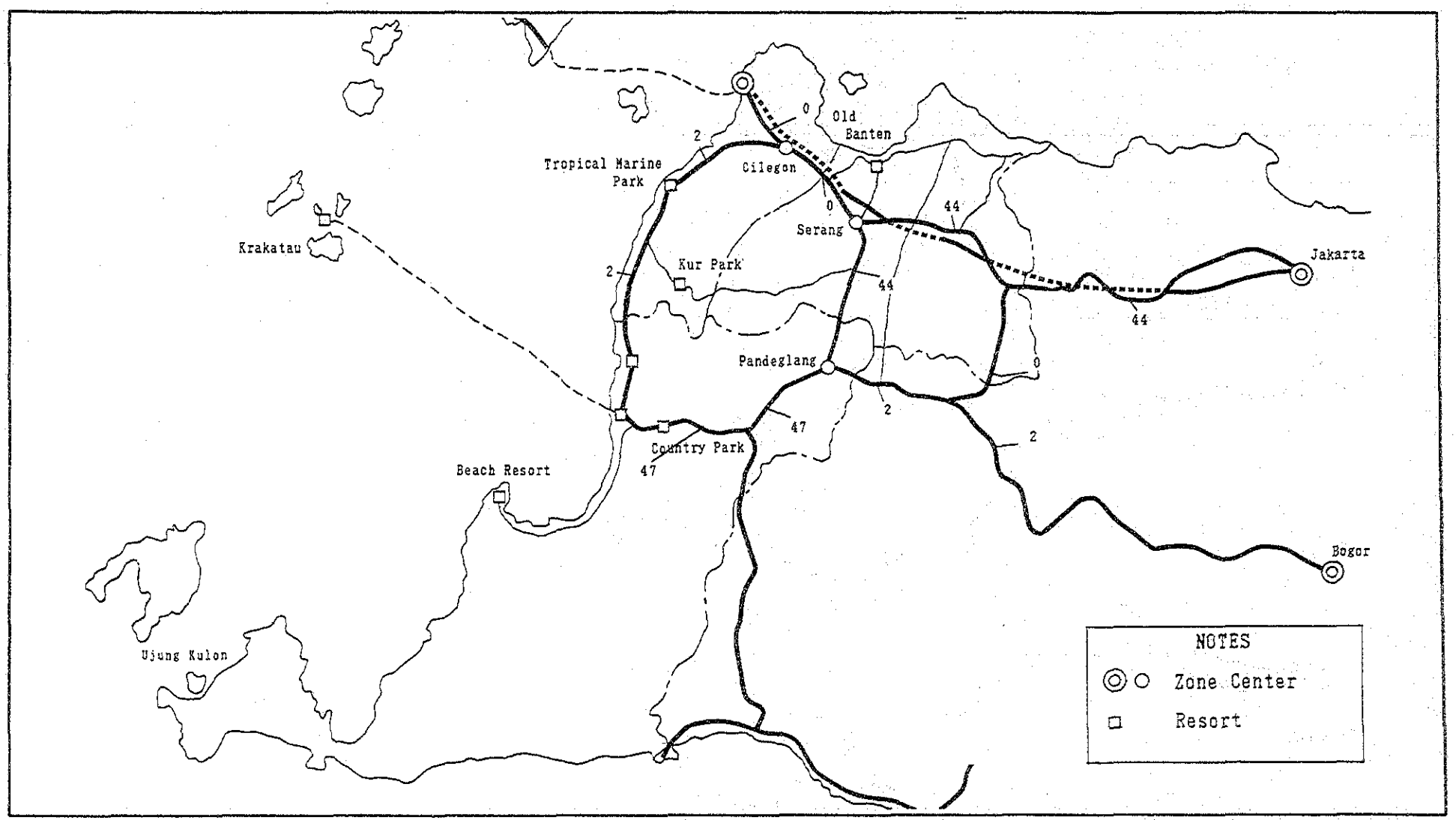

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Fig. A-2-17
TOURISM TRAFFIC VOLUME
(UJUNG KULON/KRAKATAU)

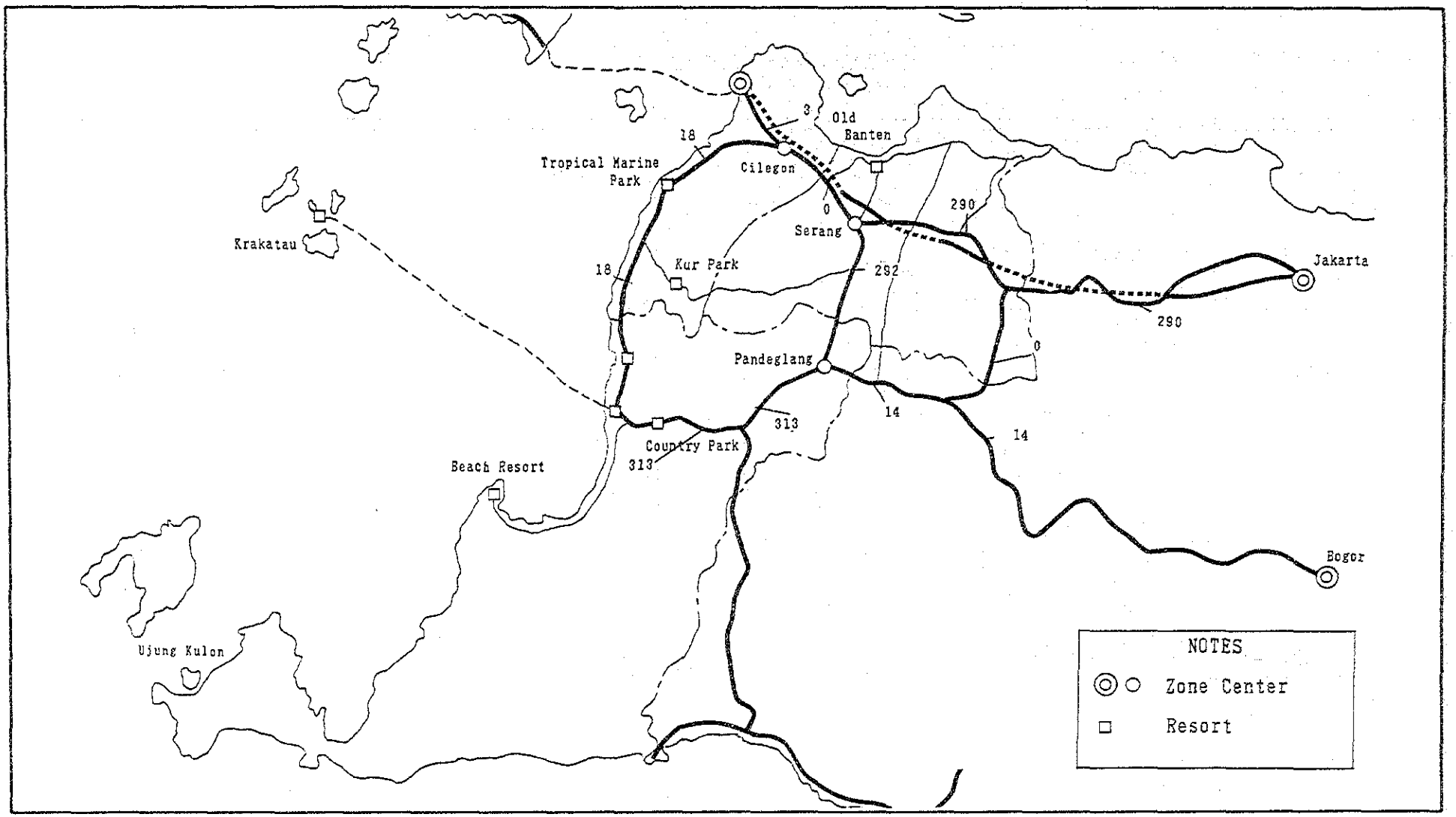

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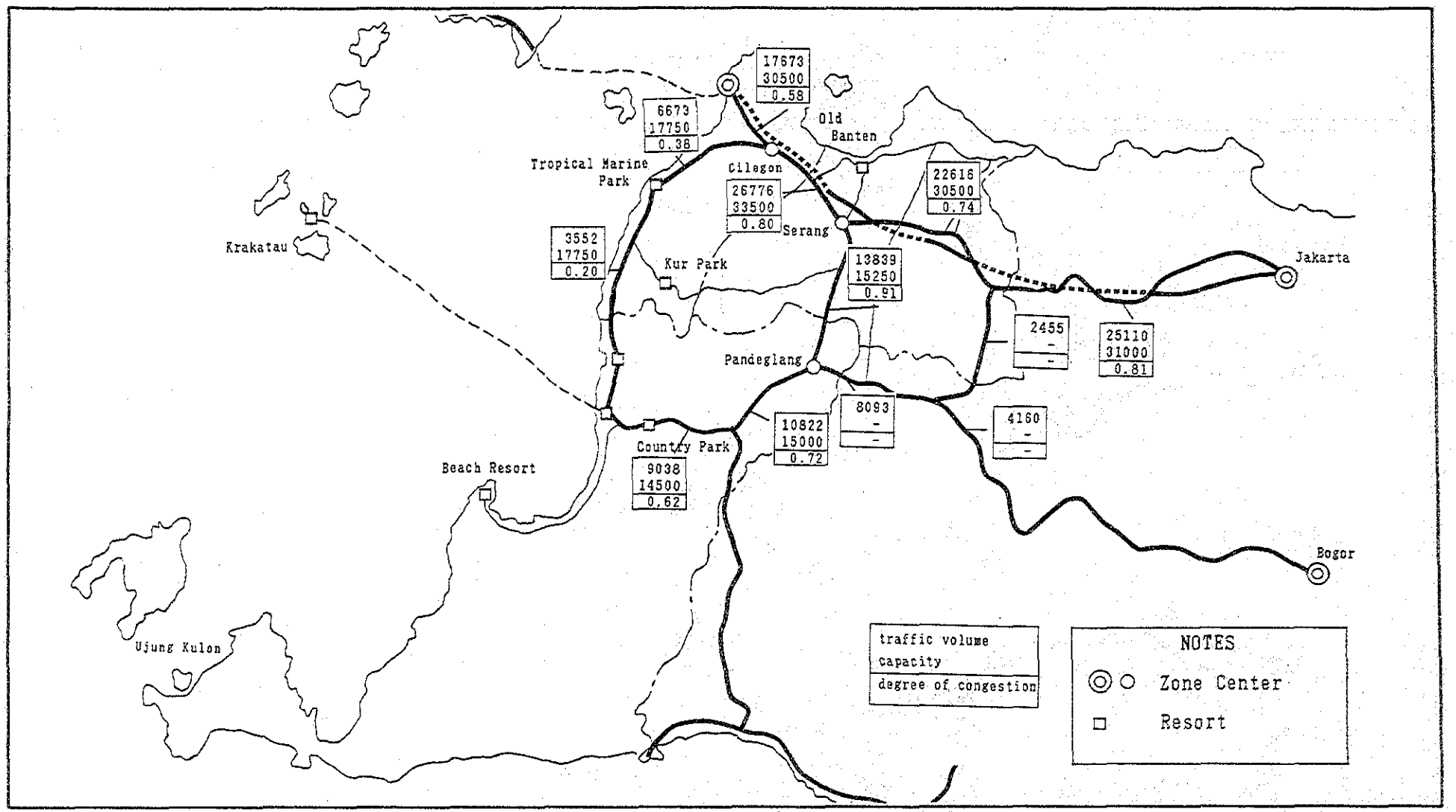
Fig. A-2-18
TOURISM TRAFFIC VOLUME
(COUNTRY PARK)



Source: Prepared by the Study Team

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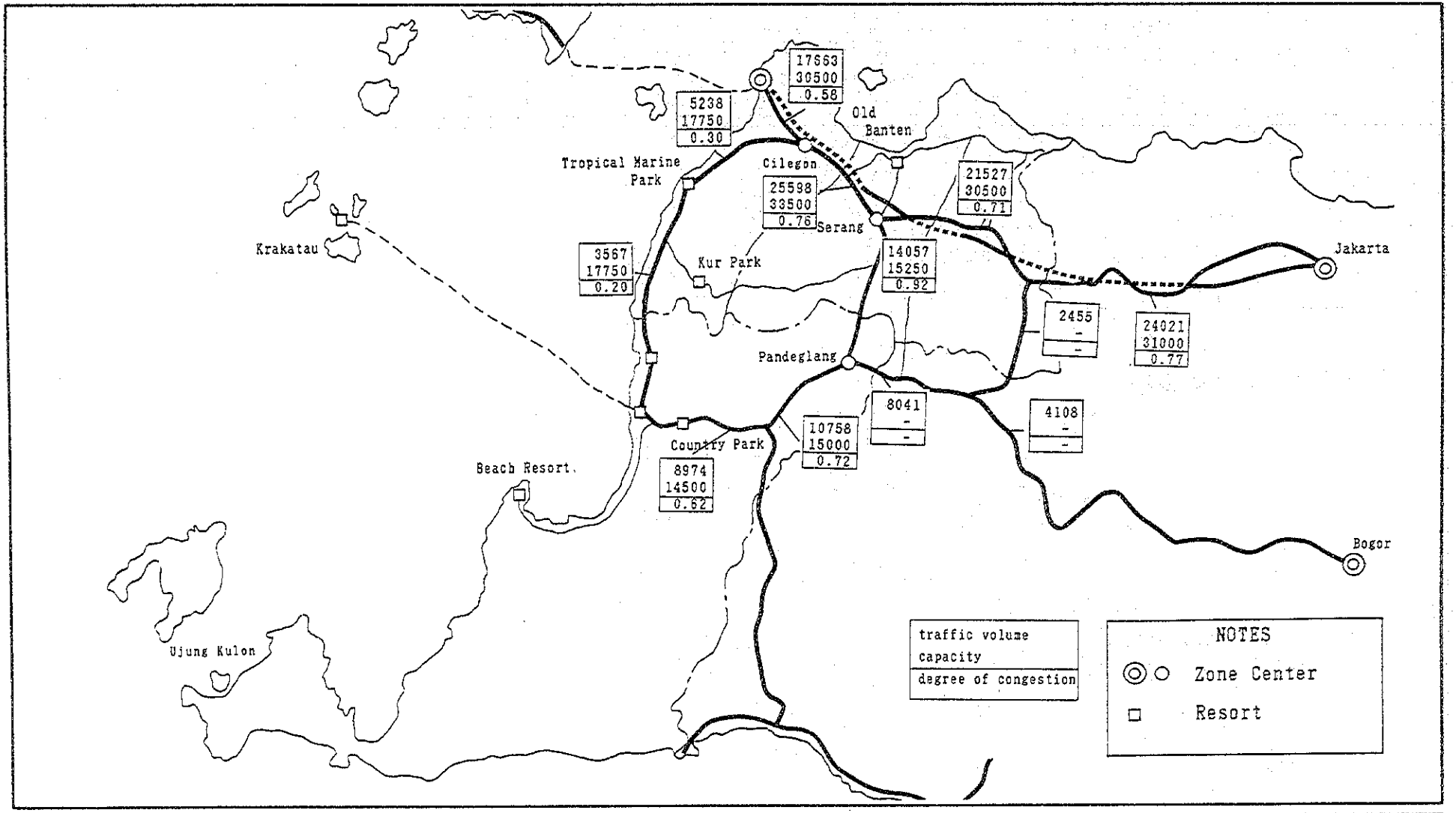
Fig. A-2-19
TOURISM TRAFFIC VOLUME IN 2010
(TROPICAL MARINE PARK)



Source: Prepared by the Study Team

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Fig. A-2-20
TOURISM TRAFFIC VOLUME IN 2010
(KUR PARK)

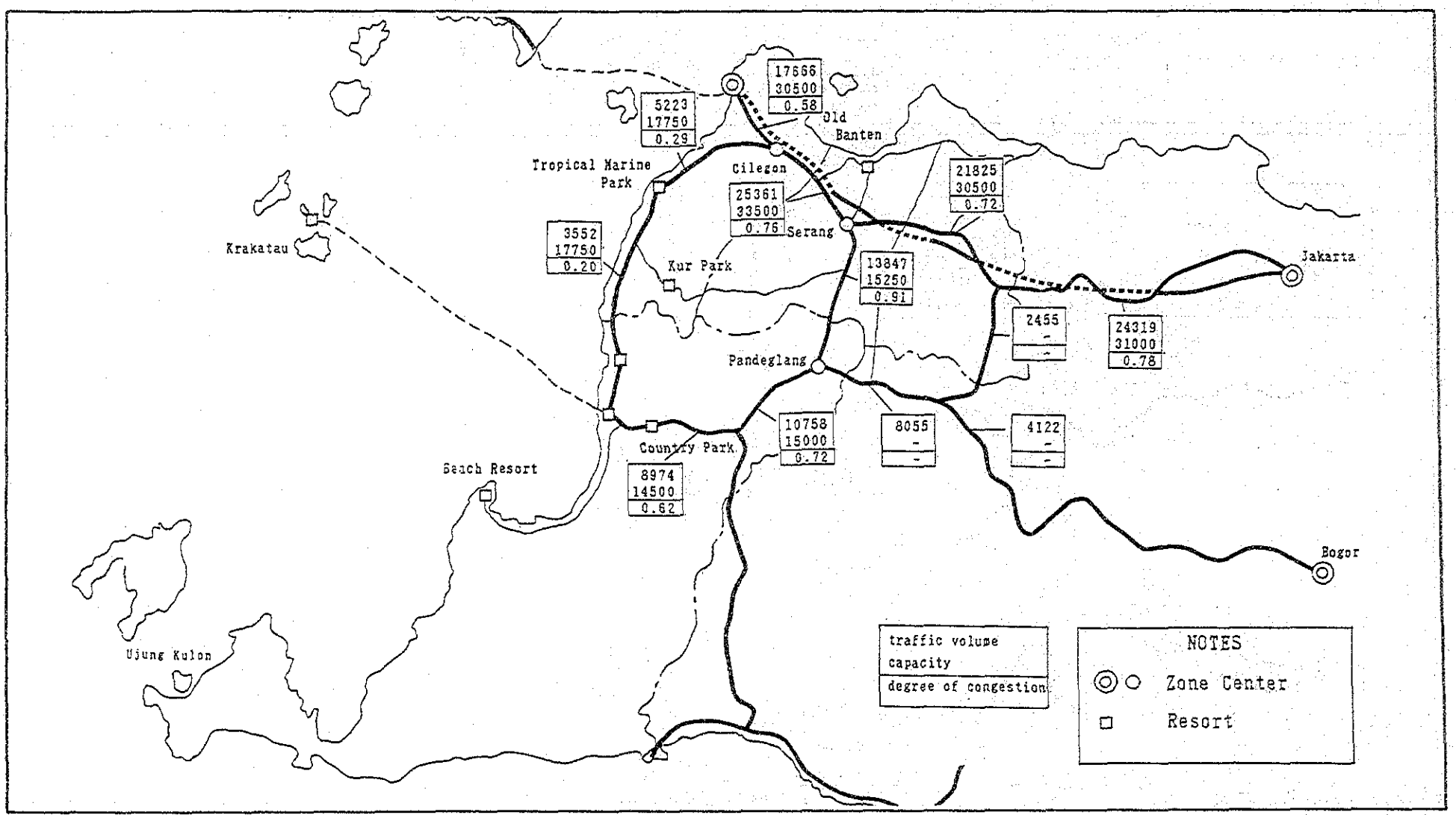

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Fig. A-2-21

TOURISM TRAFFIC VOLUME IN 2010
(OLD BANTEN)

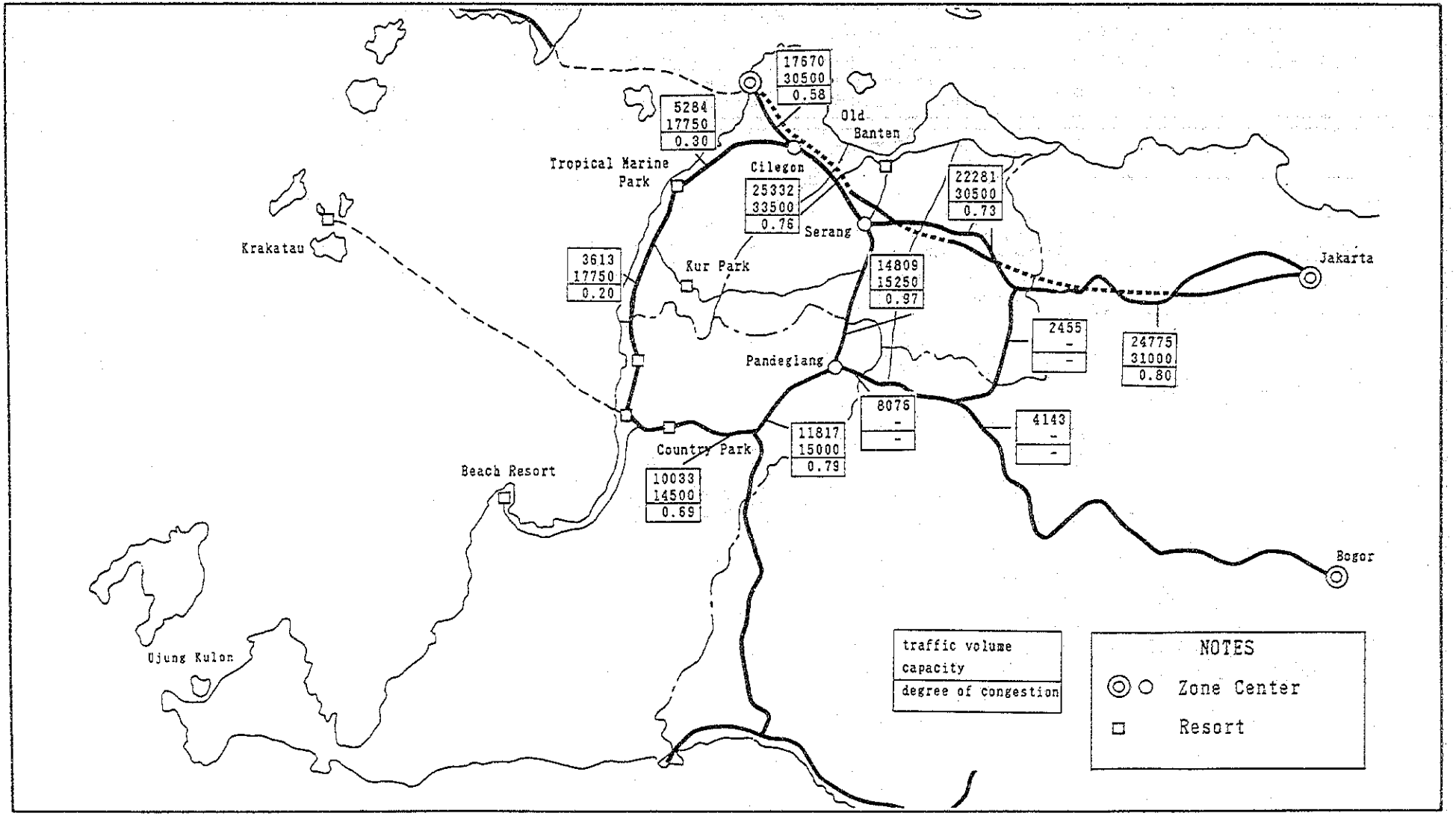

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Fig. A-2-22

TOURISM TRAFFIC VOLUME IN 2010
(BEACH RESORT)

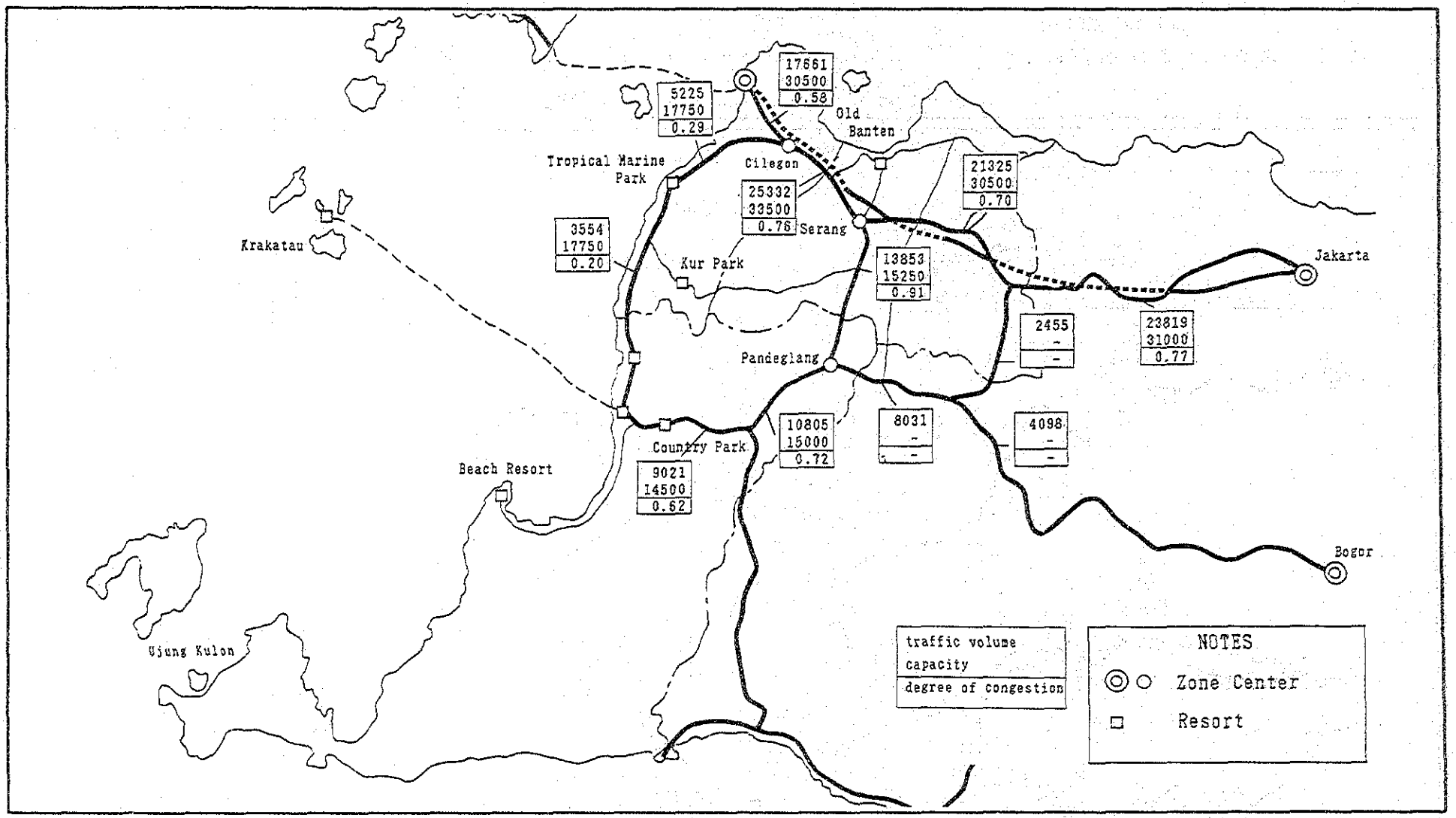

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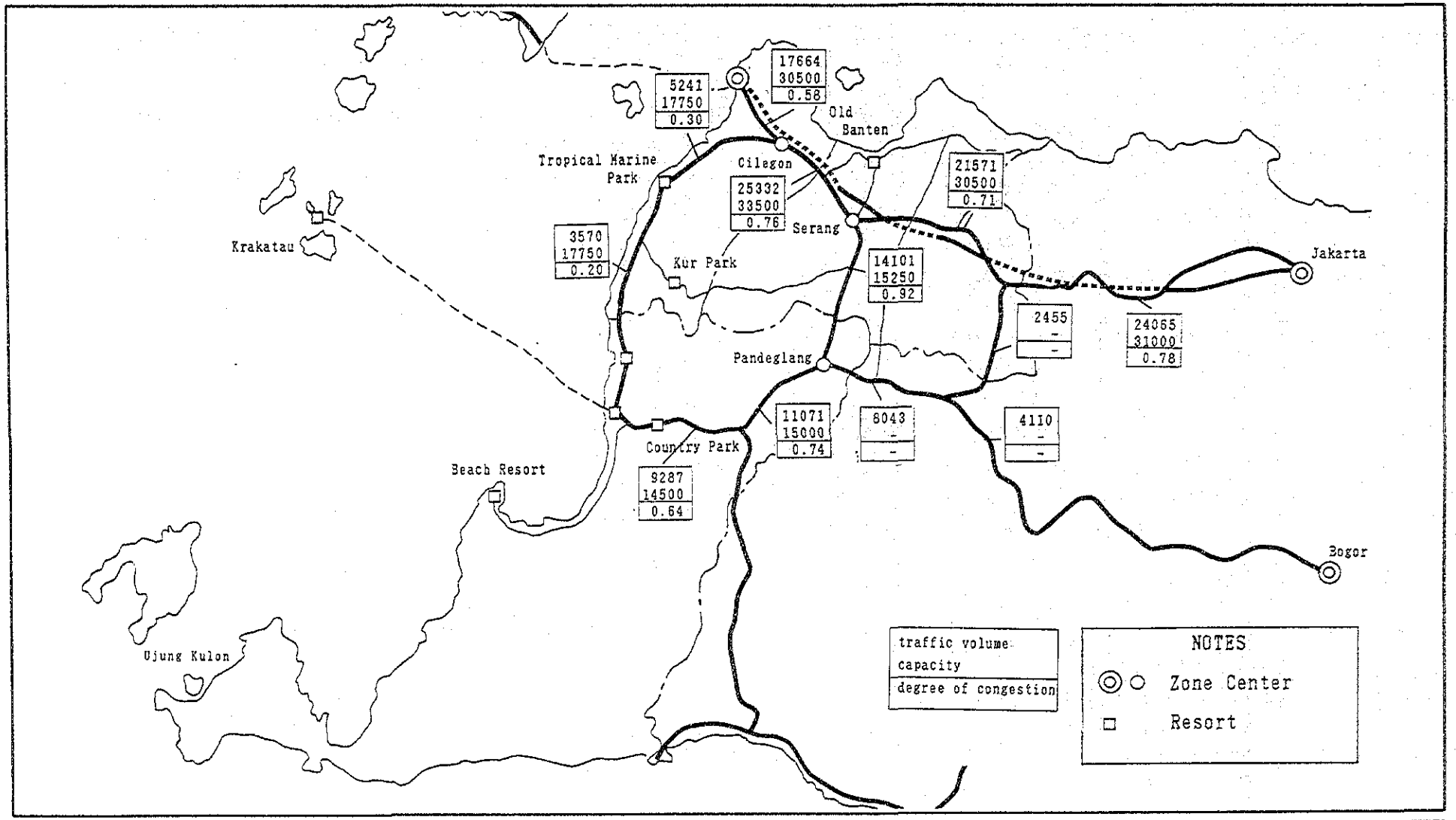
Fig. A-2-23
TOURISM TRAFFIC VOLUME IN 2010
(UJUNG KULON/KRAKATAU)



Source: Prepared by the Study Team

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Fig. A-2-24

TOURISM TRAFFIC VOLUME IN 2010
(COUNTRY PARK)

Annex II.A.3 METHOD FOR STUDY ON CAPACITY OF 2-LANE ROAD

For analysis of traffic capacity on road, the following manual is the most comprehensive and popular and thus in use world wide:

"Highway Capacity Manual, 1985"
(Special Report 209, Transportation Research Board)

This most authorized manual is adopted for this Study on West Java on an understanding that the result and its importance should be verified world wide.

There are, in the Study area, some terrain conditions which would be described as more than level. However, most of attraction sites are found to be at and around coast lines and are situated on quite a level terrain.

In the following pages compiled are extracts from the Highway Capacity Manual 1985, emphasizing on level terrain and heavy vehicles and recreational vehicles influence. Throughout this Study, the analysis on road traffic capacity should be referred to this Annex.

A. *General relationship*—The general relationship describing traffic operations on general terrain segments is as follows:

Equation 8-1 takes an ideal capacity of 2,800 pcph, and adjusts it to reflect a v/c ratio appropriate for the desired level of service, directional distributions other than 50/50, lane width restrictions and narrow shoulders, and heavy vehicles in the traffic stream.

$$SF_i = 2{,}800 \times (v/c)_i \times f_d \times f_w \times f_{HV} \qquad (8\text{-}1)$$

where:

SF_i = total service flow rate in both directions for prevailing roadway and traffic conditions, for level of service i, in vph;
$(v/c)_i$ = ratio of flow rate to ideal capacity for level of service i, obtained from Table 8-1;
f_d = adjustment factor for directional distribution of traffic, obtained from Table 8-4;
f_w = adjustment factor for narrow lanes and restricted shoulder width, obtained from Table 8-5;
f_{HV} = adjustment factor for the presence of heavy vehicles in the traffic stream, computed as:

$$f_{HV} = 1/[1 + P_T(E_T - 1) + P_R(E_R - 1) + P_B(E_B - 1)] \qquad (8\text{-}2)$$

where:

P_T = proportion of trucks in the traffic stream, expressed as a decimal;
P_R = proportion of RV's in the traffic stream, expressed as a decimal;
P_B = proportion of buses in the traffic stream, expressed as a decimal;
E_T = passenger-car equivalent for trucks, obtained from Table 8-6;
E_R = passenger-car equivalent for RV's, obtained from Table 8-6; and
E_B = passenger-car equivalent for buses, obtained from Table 8-6.

IDEAL CONDITIONS

Ideal conditions for two-lane highways are defined as no restrictive geometric, traffic, or environmental conditions. Specifically, they include:

1. Design speed greater than or equal to 60 mph.
2. Lane widths greater than or equal to 12 ft.
3. Clear shoulders wider than or equal to 6 ft.
4. No "no passing zones" on the highway.
5. All passenger cars in the traffic stream.
6. A 50/50 directional split of traffic.
7. No impediments to through traffic due to traffic control or turning vehicles.
8. Level terrain.

The capacity of two-lane rural highways under these ideal conditions is 2,800 pcph, total, in both directions.

Table A-3-1 LEVEL-OF-SERVICE CRITERIA FOR GENERAL TWO-LANE HIGHWAY SEGMENTS

LOS	PERCENT TIME DELAY	v/c RATIO[a]																			
		LEVEL TERRAIN							ROLLING TERRAIN							MOUNTAINOUS TERRAIN						
		AVG[b] SPEED	PERCENT NO PASSING ZONES						AVG[b] SPEED	PERCENT NO PASSING ZONES						AVG[b] SPEED	PERCENT NO PASSING ZONES					
			0	20	40	60	80	100		0	20	40	60	80	100		0	20	40	60	80	100
A	≤ 30	≥ 58	0.15	0.12	0.09	0.07	0.05	0.04	≥ 57	0.15	0.10	0.07	0.05	0.04	0.03	≥ 56	0.14	0.09	0.07	0.04	0.02	0.01
B	≤ 45	≥ 55	0.27	0.24	0.21	0.19	0.17	0.16	≥ 54	0.26	0.23	0.19	0.17	0.15	0.13	≥ 54	0.25	0.20	0.16	0.13	0.12	0.10
C	≤ 60	≥ 52	0.43	0.39	0.36	0.34	0.33	0.32	≥ 51	0.42	0.39	0.35	0.32	0.30	0.28	≥ 49	0.39	0.33	0.28	0.23	0.20	0.16
D	≤ 75	≥ 50	0.64	0.62	0.60	0.59	0.58	0.57	≥ 49	0.62	0.57	0.52	0.48	0.46	0.43	≥ 45	0.58	0.50	0.45	0.40	0.37	0.33
E	> 75	≥ 45	1.00	1.00	1.00	1.00	1.00	1.00	≥ 40	0.97	0.94	0.92	0.91	0.90	0.90	≥ 35	0.91	0.87	0.84	0.82	0.80	0.78
F	100	< 45	—	—	—	—	—	—	< 40	—	—	—	—	—	—	< 35	—	—	—	—	—	—

[a] Ratio of flow rate to an ideal capacity of 2,800 pcph in both directions.
[b] Average travel speed of all vehicles (in mph) for highways with design speed ≥ 60 mph; for highways with lower design speeds, reduce speed by 4 mph for each 10-mph reduction in design speed below 60 mph; assumes that speed is not restricted to lower values by regulation.

Table A-3-2 LEVEL-OF-SERVICE CRITERIA FOR SPECIFIC GRADES

LEVEL OF SERVICE	AVERAGE UPGRADE SPEED (MPH)
A	≥ 55
B	≥ 50
C	≥ 45
D	≥ 40
E	≥ 25–40[a]
F	< 25–40[a]

[a] The exact speed at which capacity occurs varies with the percentage and length of grade, traffic compositions, and volume; computational procedures are provided to find this value.

Directional Split	*Total Capacity (pcph)*	*Ratio of Capacity to Ideal Capacity*
50/50	2,800	1.00
60/40	2,650	0.94
70/30	2,500	0.89
80/20	2,300	0.83
90/10	2,100	0.75
100/0	2,000	0.71

Table A-3-3 PEAK HOUR FACTORS FOR TWO-LANE HIGHWAYS BASED ON RANDOM FLOW

a. LEVEL-OF-SERVICE DETERMINATIONS

TOTAL 2-WAY HOURLY VOLUME (VPH)	PEAK HOUR FACTOR (PHF)	TOTAL 2-WAY HOURLY VOLUME (VPH)	PEAK HOUR FACTOR (PHF)
100	0.83	1,000	0.93
200	0.87	1,100	0.94
300	0.90	1,200	0.94
400	0.91	1,300	0.94
500	0.91	1,400	0.94
600	0.92	1,500	0.95
700	0.92	1,600	0.95
800	0.93	1,700	0.95
900	0.93	1,800	0.95
		≥ 1,900	0.96

b. SERVICE FLOW-RATE DETERMINATIONS

Level of Service	A	B	C	D	E
Peak Hour Factor	0.91	0.92	0.94	0.95	1.00

Table A-3-4 ADJUSTMENT FACTORS FOR DIRECTIONAL DISTRIBUTION ON GENERAL TERRAIN SEGMENTS

Directional Distribution	100/0	90/10	80/20	70/30	60/40	50/50
Adjustment Factor, f_d	0.71	0.75	0.83	0.89	0.94	1.00

Table A-3-5 ADJUSTMENT FACTORS FOR THE COMBINED EFFECT OF NARROW LANES AND RESTRICTED SHOULDER WIDTH, f_w

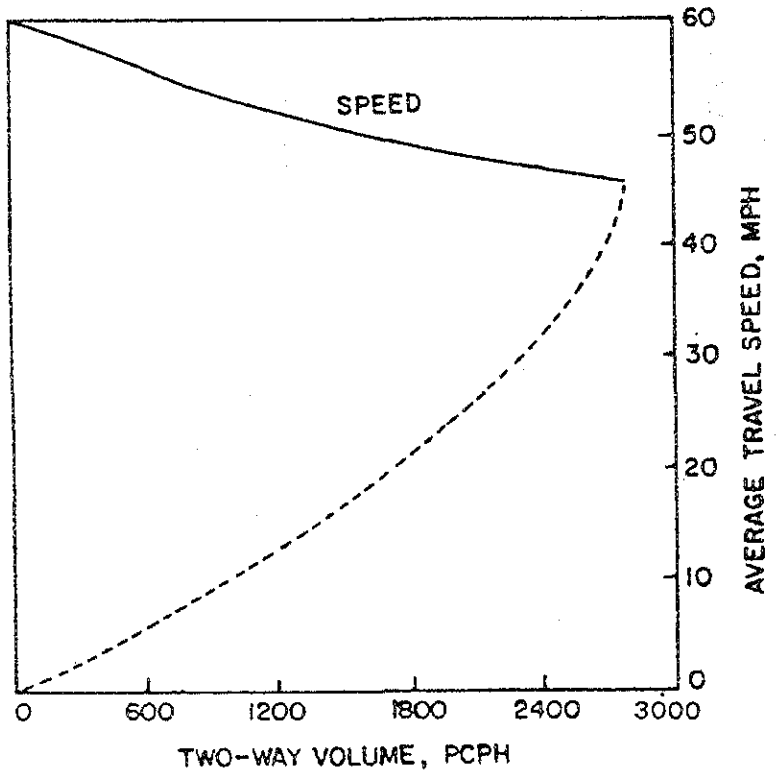
USABLE[a] SHOULDER WIDTH (FT)	12-FT LANES		11-FT LANES		10-FT LANES		9-FT LANES	
	LOS A–D	LOS[b] E	LOS A–D	LOS[b] E	LOS A–D	LOS[b] E	LOS A–D	LOS[b] E
≥ 6	1.00	1.00	0.93	0.94	0.84	0.87	0.70	0.76
4	0.92	0.97	0.85	0.92	0.77	0.85	0.65	0.74
2	0.81	0.93	0.75	0.88	0.68	0.81	0.57	0.70
0	0.70	0.88	0.65	0.82	0.58	0.75	0.49	0.66

[a] Where shoulder width is different on each side of the roadway, use the average shoulder width.
[b] Factor applies for all speeds less than 45 mph.

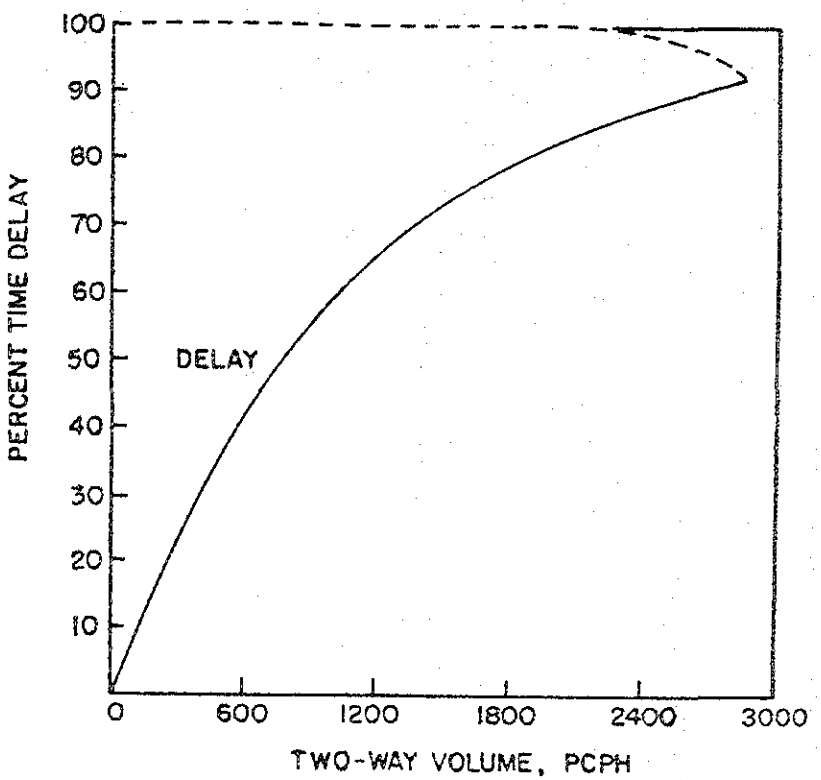
Table A-3-6 AVERAGE PASSENGER-CAR EQUIVALENTS FOR TRUCKS, RV'S, AND BUSES ON TWO-LANE HIGHWAYS OVER GENERAL TERRAIN SEGMENTS

VEHICLE TYPE	LEVEL OF SERVICE	TYPE OF TERRAIN		
		LEVEL	ROLLING	MOUNTAINOUS
Trucks, E_T	A	2.0	4.0	7.0
	B and C	2.2	5.0	10.0
	D and E	2.0	5.0	12.0
RV's E_R	A	2.2	3.2	5.0
	B and C	2.5	3.9	5.2
	D and E	1.6	3.3	5.2
Buses, E_B	A	1.8	3.0	5.7
	B and C	2.0	3.4	6.0
	D and E	1.6	2.9	6.5

SOURCE: Ref. 6



a. Relationship between average speed and flow on two-lane highways.



b. Relationship between percent time delay and flow on two-lane highways.

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Fig. A-3-1
SPEED-FLOW AND PERCENT TIME DELAY-FLOW RELATIONSHIPS FOR TWO-LANE RURAL HIGHWAY (IDEAL CONDITIONS)

ANNEX II.A.4 WATER DEMAND PROJECTION

1) Water demand in Old Banten Site

Table A-4-1 WATER DEMAND IN OLD BANTEN SITE

	No. of Tourists		Unit Water Use Per Capita (lit/person, day)	Demand of Water	
	(Per year)	(Per day) /1		(m^3/day)	(lit./sec)
Master Plan	2,600,000	62,000	10	600	7

Remark: /1 Peak factor 2%, turnover rate 1.2

2) Water demand in Beach Resort

(1) Water demand in Beach Resort (First Stage)

Table A-4-2 WATER DEMAND IN BEACH RESORT (FIRST STAGE)

Item	Number of Tourists (per day)	Unit Water Use per Capita (lit/person, day)	Water Demand (m^3/day)
1. Hotel	1,360	900	1,220
2. Condominium	200	900	200
3. Villa	-	-	-
4. Day Tripper	4,800 /1	50	240
5. Marina	2,900 /2	50	150
6. Employees' family	1,800	200	360
7. Others (plants, driver's quarter, etc.)	-	-	-
8. Total	-		2,170 (25 lit/sec)

Remarks: /1 4,000 (number of tourists per day) x 1.2 (Turnover) = 4,800 persons

/2 4,800 x 0.6 (service ratio) = 2,900

(2) Water demand in Beach Resort (Final Stage)

Table A-4-3 WATER DEMAND IN BEACH RESORT (FINAL STAGE)

Item	Number of Tourists (per day)	Unit Water Use per Capita (lit/person, day)	Water Demand (m^3/day)
1. Hotel	2,200	900	2,200
2. Condominium	300	900	300
3. Villa	100	500	50
4. Day Tripper	9,000 /1	50	450
5. Marina	5,400 /2	50	300
6. Employees & families	2,500	200	500
7. Others . Golf course . Plants . Drivers' quarters, etc.	-	-	100
8. Total	-	-	3,700 (43 lit/sec)

Remarks: /1 7,500 (Number of tourists per day) x 1.2 (Turnoer) = 9,000 persons

/2 9,000 x 0.6 (service ratio) = 5,400

ANNEX II.A.5 COST COMPARISON OF WATER SUPPLY SYSTEM IN OLD BANTEN

Two alternatives are proposed as the source of water supply for Old Banten.

Alternative 1 ... The irrigation canal adjacent to the Old Banten site would be utilized as the source of water supply.

The irrigation canal that runs close to the Tasikardi Lake is a candidate for the water source. The distance from the irrigation canal to Heritage Garden is approximately 3.0 km.

Alternative 2 ... Potable water could be conveyed from the existing water service in the city of Serang. The length of the conveyance pipe is 8.0 km from the center of Serang.

The construction costs of alternatives are estimated to be Rp. 296 million and Rp. 250 million respectively as shown in Table A-5-1.

In addition to the higher construction cost, alternative 1 has the following disadvantage:

1) The water of irrigation canal is sometimes exhausted in the paddy transplanting season.

2) The land acquisition of the treatment plant is needed. Ground water is not suitable for the potable water because of its salty quality.

In this study, alternative 2 is recommended.

Table A-5-1 CONSTRUCTION COST OF WATER SUPPLY SYSTEM IN OLD BANTEN

Alternative 1

(Million Rp.)

	F/C	L/C	Total	Remarks
1. Treatment Plant	180	-	180	Including weir
2. Distribution Basin (240 m^3)	4	36	40	
3. Pipes (ø100 PVC, 4,400 x 15 TRP/m)	7	59	66	
4. Others (Pumps, Hydrant, etc.)	5	5	10	
Total	196	100	296	

Remark: Engineering service and land acquisition cost are not included.

Alternative 2

(Million Rp.)

	F/C	L/C	Total	Remarks
1. Conveyance pipe ø100 steel pipe 8,000 m x 22 TRP/m	18	158	176	
2. Distribution Basin (240 m^3)	4	36	40	
3. Pipes (ø100 PVC, 900 m x 15 TRP/m)	1	13	14	
4. Others (Pumps, Hydrant, etc.)	15	5	20	Booster pump (3 units)
Total	38	212	250	

Remark: Engineering service and land acquisition cost are not included.

ANNEX.II.A.6 PRINCIPAL DESIGN CRITERIA FOR WATER SUPPLY SYSTEM

1) Water volume for design

The daily amount of water consumption varies with various factors such as season and concentration of usage.

Daily mean, daily maximum and maximum hourly rate of water volume are defined as follows:

Daily mean (m^3/day)	Daily average volume through a year (obtained by dividing total annual volume by number of days in a year).
Daily maximum (m^3/day)	Daily volume in a day with maximum volume through a year.
Maximum hourly (m^3/hour) ..	Maximum hourly volume through a year

These kinds of volume in each tourism project are shown in Table A-6-1 ~ A-6-3.

The volume of daily maximum is applied for the design of the filtration plant and the distribution basin. The capacity of distribution basis is calculated based on the volume of eight hours of daily maximum amount plus consumption for fire fighting (one hour volume of daily maximum).

The volume of maximum hourly is applied for the design of the distribution pipe.

Table A-6-1 WATER VOLUME FOR DESIGN IN OLD BANTEN

Daily mean	600 m^3/day	
Daily maximum	720 m^3/day	Daily mean x 1.2 /1 (Peak day rate)
Maximum hourly	110 m^3/day	Daily maximum x 1.2 /1 (Peak hour rate) ÷ 8 hours

Remark: /1 Peak day rate and peak hour rate is assumed based on the experience of the recreational area in Japan.

Table A-6-2 WATER VOLUME FOR DESIGN IN BEACH RESORT (FIRST STAGE)

Design water volume in Beach Resort (First Stage)		
Daily mean	2,200 m^3/day	
Daily maximum	3,100 m^3/day	Daily mean x 1.4
Maximum hourly	1900 m^3/day	Daily maximum x 1.5/24 hours

Table A-6-3 WATER VOLUME FOR DESIGN IN BEACH RESORT (FINAL STAGE)

Design water volume in Beach Resort D (Final Stage)		
Daily mean	3,700 m^3/day	
Daily maximum	5,200 m^3/day	Daily mean x 1.4
Maximum hourly	330 m^3/hour	Daily maximum x 1.5/24 hours

2) Distribution pipe

Polyvinyl chloride pipe for the range between 100 mm and 150 mm in diameter and ductile pipe for more than 200 mm in diameter may be adopted for the distribution pipe.

Hazen & Williams formula is applied for the design of the scale of pipes.

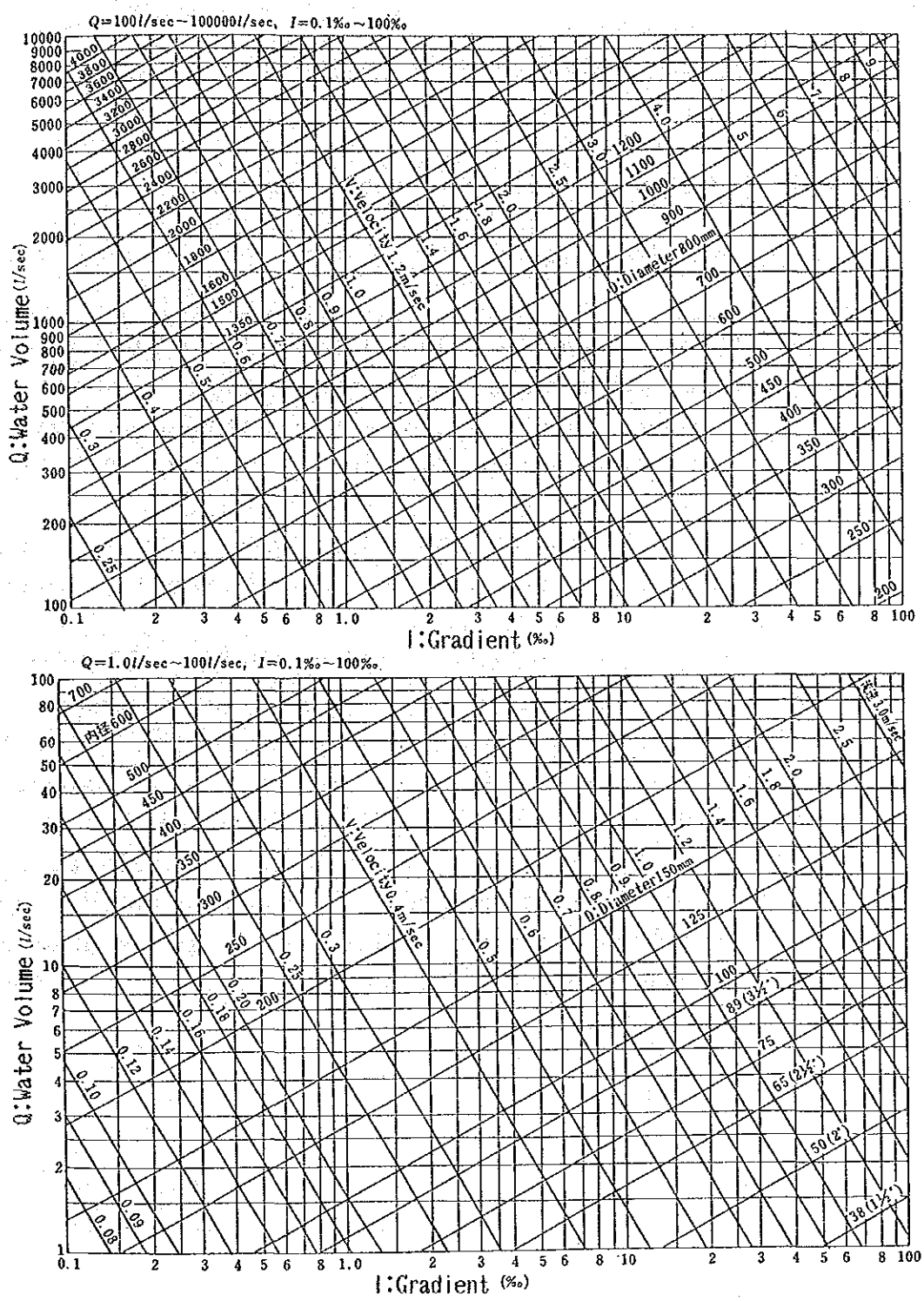
(Hazen & Williams formula)

$$V = 0.84935\ C R^{0.63}\ i^{0.54}$$

$$i = h/\ \ = 10.666 \cdot C^{-1.85}\ D^{-4.87}\ Q^{1.85}$$

v: Average velocity (m/sec)
C: Coefficient (= 100 $m^{0.37}$ $sec^{-1.00}$)
R: Hydraulic radius (m)
i: Gradient
h: Loss of head (m)
: Length of pipe (m)
D: Diameter of pipe (m)
Q: Water volume (m^3/sec)

Fig. A-6-1 can be utilized for the convenient design.



Remark: C=100

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Fig. A-6-1

HAGEN & WILLIAMS FORMULA' I-Q FIGURE

ANNEX II.A.7 SEWAGE TREATMENT

1) Principal design criteria for sewage treatment

(1) Sewage quantity for the design

Quality of sewage was assumed to be 90% of the amount of water supplied to consumers. Infiltration of ground water into the sewer was assumed at 10% of daily maximum of sewage as shown in Table A-7-1.

Design of treatment plant has been made with the maximum daily rate to treat sewage steadily rather than the rate of daily mean.

In the case that the treatment plant is designed with the rate of daily mean, the detention period will become short and steady treatment cannot be expected for the sewage amounting to daily maximum. It is better to apply daily maximum rate to minimize the contamination of effluent. In the present study, therefore, the rate of maximum daily is adopted as design sewage volume which is assumed to be 1.4 times of daily mean.

(2) Sewer

The maximum hourly sewage plus ground water was considered as the quantity for the design of sewer.

The velocity for sewage flow must be in the range of 0.6 m/sec and 4 m/sec and 1.0 ~ 1.8 m/sec for the optimum.

Table A-7-1 SEWAGE QUANTITY AT BEACH RESORT

First stage	Daily mean	2,000 m^3/day	
	Daily maximum	2,800 m^3/day	Daily mean x 1.4
	Maximum hourly	175 m^3/hour	Daily maximum x 1.5 ÷ 24 hours
	Ground water	280 m^3/day (10 m^3/hour)	Daily maximum x 10%
Final stage	Daily mean	3,300 m^3/day	
	Daily maximum	4,600 m^3/day	
	Maximum hourly	290 m^3/hour	OP., cit
	Ground water	460 m^3/day (20 m^3/hour)	

2) Comparative evaluation of sewage treatment plant

(1) Treatment standard

According to "Second Bandung Urban Development Project, Final Report, Vol. 3", the BOD quality of the sewage is calculated at as much as 300 ~ 360 mg/lit. and effluent standard after treatment is proposed as follows.

BOD5	20 ~ 25 mg/lit
COD	30 ~ 40 mg/lit
Faecal Coliforms	5,000 cells/100 ml in 80% of samples
pH	6.5 ~8.5

The average rate of BOD removal is thus 92%, so a high level treatment is planned to be introduced.

$$\frac{(300 - 25)}{300} \times 100 = 92\%$$

Same standard must be proposed for the Beach Resort Development in consideration of the high quality of

sea water in the Sunda Straits which is the receiving point of the effluent from the sewage treatment plant.

Fig. A-7-1 shows the impact on water quality by three types of treatment method, i.e., (1) no treatment, (2) preliminary treatment and (3) high quality treatment. Sea water quality standard with 12 ppm of COD and 1,000 MPN/100 ml of fecal coliform can be observed only in the case of high quality treatment.

(2) Evaluation of sewage treatment plant

Table A-7-2 shows the alternative method of sewage treatment for the high level treatment. According to the comparison of the cost, the site area, and other items, the oxidation ditch is recommended as the treatment plant for the Beach Resort.

(Advantage of the oxidation ditch)

- The construction cost is medium,
- The operation cost is medium,
- Required land area is the least,
- Maintenance is easier,
- Stability of treatment, and
- Removal of Nitrogen (TN) and Phosphorus (TP)

(3) Design of Oxidation Ditch

Fig. A-7-2 shows the flow sheet for the oxidation ditch process and Fig. A-7-3 shows the plan of the treatment plant of the oxidation ditch.

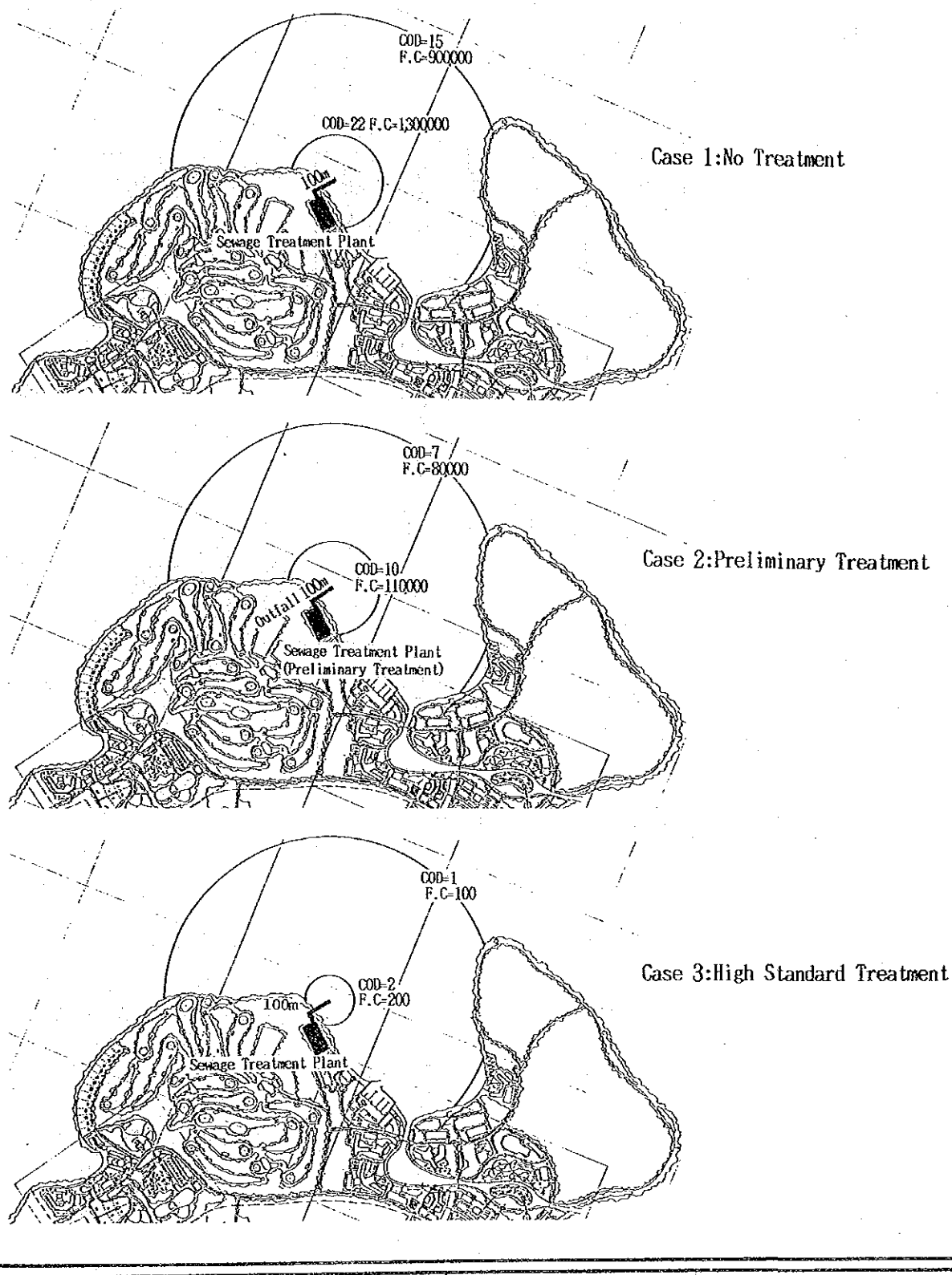

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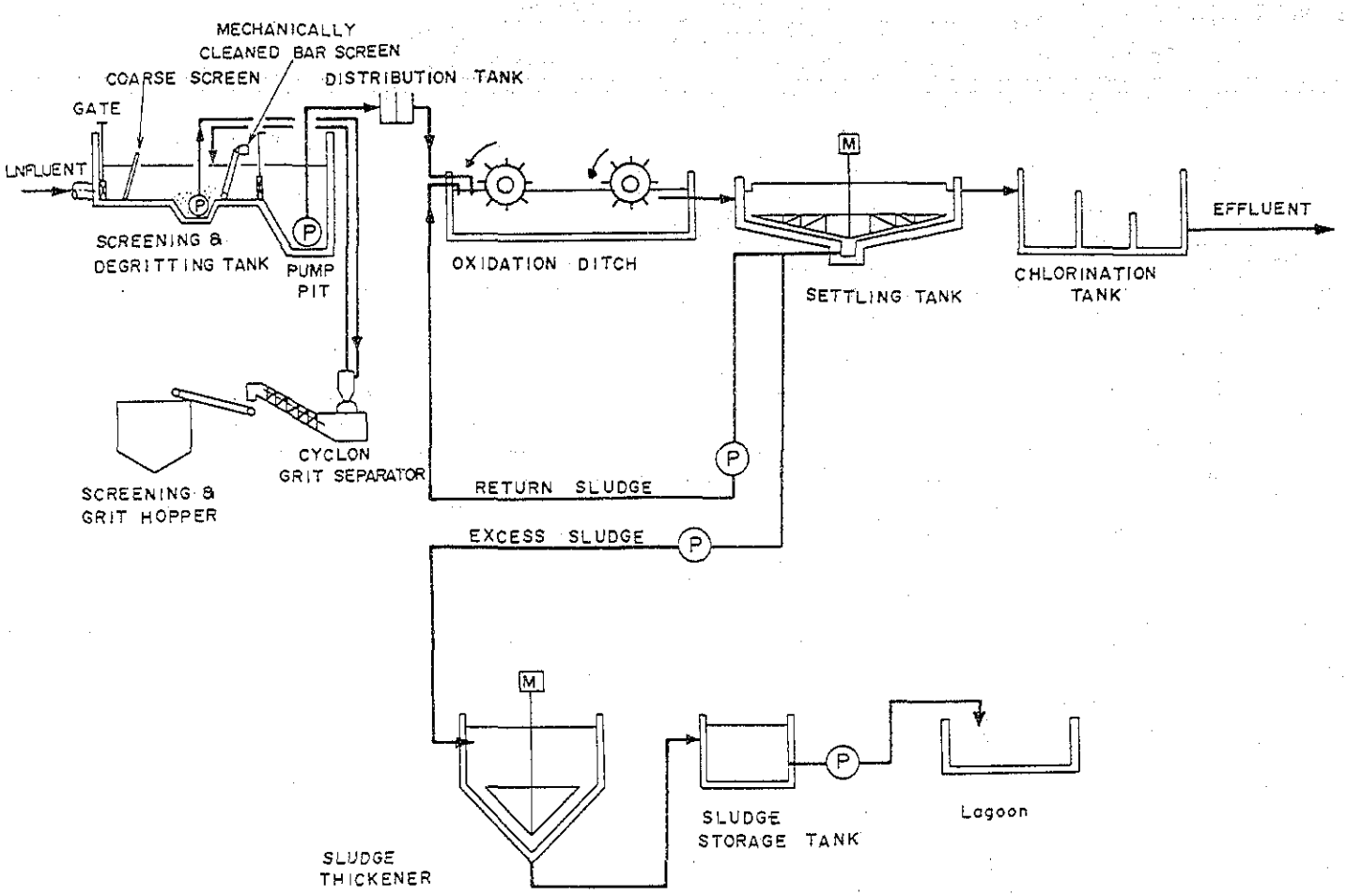
Fig. A-7-1

SEA WATER CONTAMINATION CAUSED BY SEWAGE EFFLUENT - COMPARISON OF TREATMENT LEVEL -

Table A-7-2 COMPARISON OF TREATMENT PROCESS

	Construction Cost except land purchase (Rp. thousand/m^3)	Required Land Area (at full development) (ha)	Operation Cost	Maintenance	Stabilization of Treatment	TN, TP Removal
1. Stabilization Ponds	180	25.0	low	easy	unstable	---
2. Aerated Lagoons	290	12.5	low	easy	unstable	---
3. Standard Activated Sludge	780	2.5	high	need expert control	stable	---
4. Oxidation Ditch	500	2.5	middle	easy	stable	possible



	DEPARTMENT OF TOURISM, POST AND TELECOMMUNICATION DIRECTORATE GENERAL OF TOURISM Japan International Cooperation Agency THE STUDY ON THE REGIONAL DEVELOPMENT PROJECT IN THE WESTERN PART OF JAVA	Fig. A-7-2 FLOW SHEET OF OXIDATION DITCH PROCESS

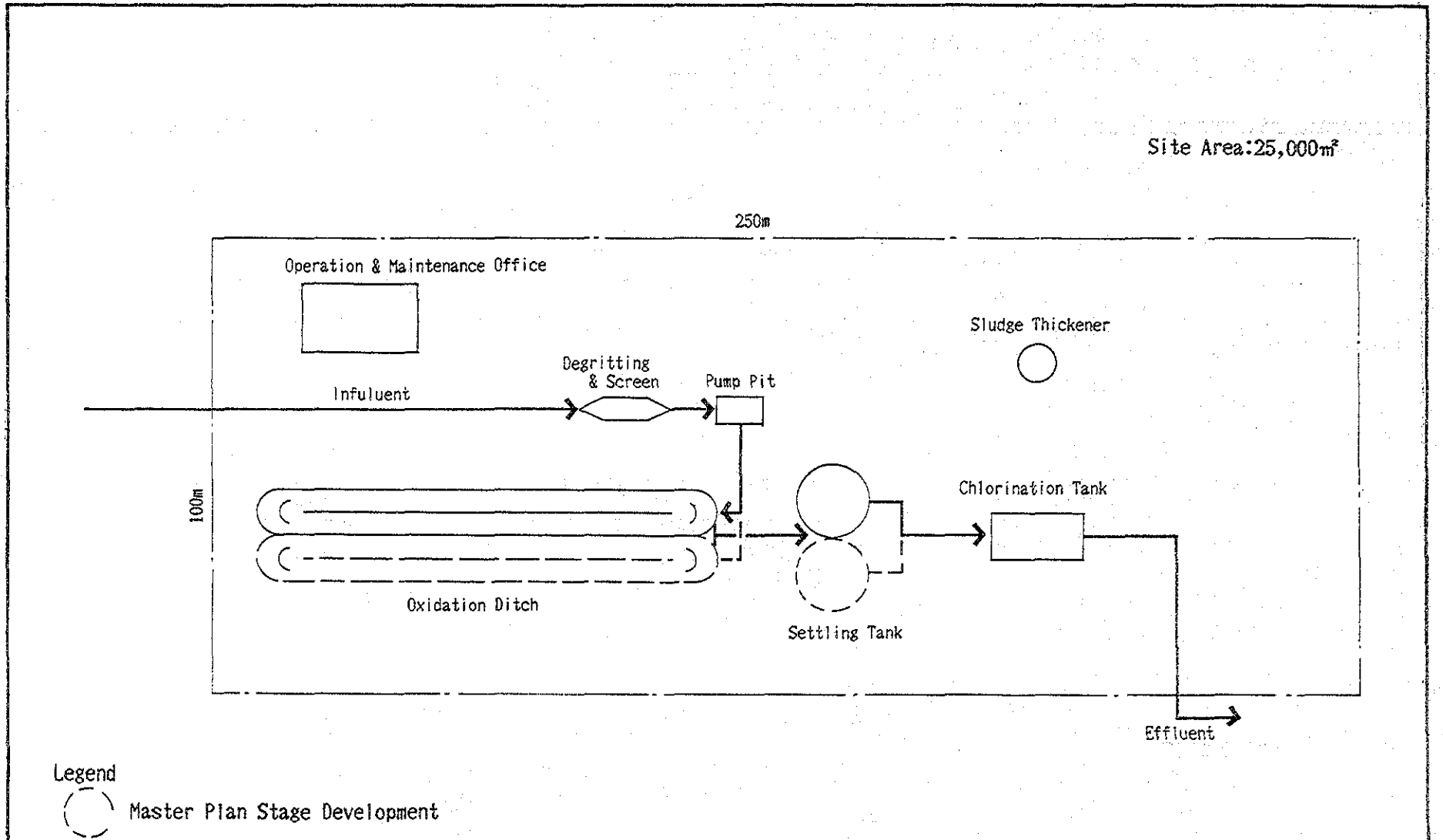


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Fig. A-7-3
PLAN OF SEWAGE TREATMENT PLANT
(OXIDATION DITCH)

Table A-7-3 PRINCIPAL FEATURES OF SEWAGE TREATMENT PLANT FACILITIES

Planning Quantity		Short Term	Master Plan
	Max Daily	2,700 m^3/day	5,000 m^3
	Max Hourly	160 m^3/hour	300 m^3
1. Degritting Tank	2.0 m (W) x 3.0 m (L) x 0.5 m (H) x 1 Basin		
2. Pump Pit	4 m (W) x 9 m (L) x 2 m (H) x 1 Basin		
3. Oxidation Tank	12 m (W) x 100m (L) x 2 m (H) x 1 Basin ..... Short-term Dev.		
	12 m (W) x 100 m (L) x 2 m (H) x 1 Basin ..... Master Plan Stage		
4. Settling Tank	ø16 m x 2 m (H) x 2 Basin (1 Basin is for Master plan stage.)		
5. Chlorination Tank	5 m (W) x 5 m (L) x 2 (H) x 1 Basin		
6. Sludge Thickener	ø5 m x 2.0 m(H) x 1 Basin		

Note: /1 Detention time of oxidation ditch is 24 hours.
/2 Detention time of chlorination tank is 15 minutes.

ANNEX II.A.8 DEMAND OF OTHER INFRASTRUCTURES

1) Power Supply

Table A-8-1 DEMAND OF POWER IN BEACH RESORT C & D

		Number of Unit (units)	Unit Power Use (kVA/unit)	Power Demand (kVA)
Short-term	Hotel	640 (340) rooms	2.5	1,600 (850)
	Condominium	75 (80) rooms	2.5	190 (200)
	Villa	- (90) units	3.0	- (250)
	Others	-	-	1,000 (1,000)
	Employee's Village	800 units	0.45	360
	Total			3,150 (2,300)
Master Plan	Hotel	1,040 (640) rooms	2.5	2,600 (1,600)
	Condominium	75 (150) rooms	2.5	190 (400)
	Villa	25 (145) units	3.0	80 (400)
	Others	-	-	500 (2,200)
	Employees' Village	1,100 units	0.45	500 (2,200)
	Total			5,370 (4,600)

2) Telephone

Table A-8-2 DEMAND OF TELEPHONE IN OLD BANTEN

	Number of Line
. Socio-Culture Center	1
. Pepper Trade Museum	1
. Site Museum (existing)	1
. Great Mosque (existing)	1
. Chinese Temple (existing)	1
. Market Place	5
. Restaurants & Shops	15
. Others	5
Total	30

Table A-8-3 TELEPHONE DEMAND IN BEACH RESORT

		No. of Units	No. of Tel.	Line Demand
Final	Hotel	410 rooms	410	18
	Condominium	75 units	75	5
	Villa	25 units	25	2
	Others (Administration facility, Amazing facility, Plants, Restaurants, Shops, Local Community, etc.)		25	25
	Total			50

3) Solid Waste

Table A-8-4 SOLID WASTE QUANTITY IN OLD BANTEN

	No. of Tourist (person/day)	Unit Quantity of Solid Waste (g/person,day)	Quantity of Solid Waste	
			(ton/day)	(m^3/day)
Day Tripper	1,800	200	0.36	0.6

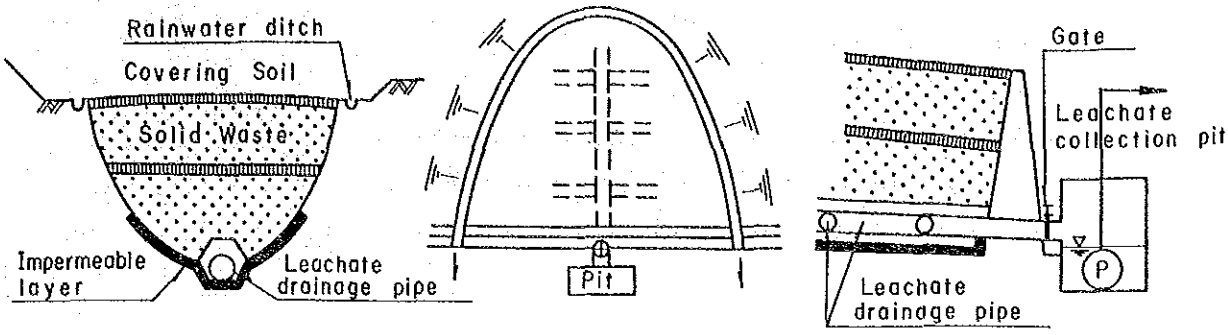
Table A-8-5 SOLID WASTE QUANTITY AT BEACH RESORT

		No. of Tourists (person/day)	Unit Quantity of Solid Waste (g/person,day)	Quantity of Solid Waste		
				(ton/day)	(m3/day)	(m3/year)
Short Term Dev.	Overnight Guest	1,850	1,000	1.9	3.2	-
	Day Tripper	5,600	200	1.1	1.8	-
	Employee	2,100	600	1.3	2.2	-
	Total	-	-	4.3	7.2	360*
Master Plan	Overnight Guest	2,600	1,000	2.6	4.3	-
	Day Tripper	7,500	200	1.5	2.5	-
	Employee	3,000	600	1.8	3.0	-
	Total	-	-	5.9	9.8	500

Remark: * Quantity per year can be calculated using year peak ratio as 0.02.

$7.2\ m^3/day \div 0.02 = 360\ m^3/year$

Fig. A-8-1 DESIGN CONCEPT OF TIP FOR SOLID WASTE DISPOSAL



Annex II.A.9 EVALUATION OF BOAT TRANSPORT OPERATION FOR UJUNG KULON AND KRAKATAU ISLANDS

1) Demand

Based on the data in the related sections of this report, demand projections for the tourism to Ujung Kulon and Krakatau islands were summarized as shown in the following Table.

Demand Pattern

(Persons)

	1984 Annual	2010 (Overnight stay)		
		Annual	Unit/day	Unit/day
Ujung Kulon & Krakatau Is.	4,000 ( )	14,000 (7,000)	200 (75)	300 (100)

Notes: - Average length of stay (in parentheses) is assumed to be 1.75 days.
- Concentration of tourists in one day is assumed to be 2% of the annual total.

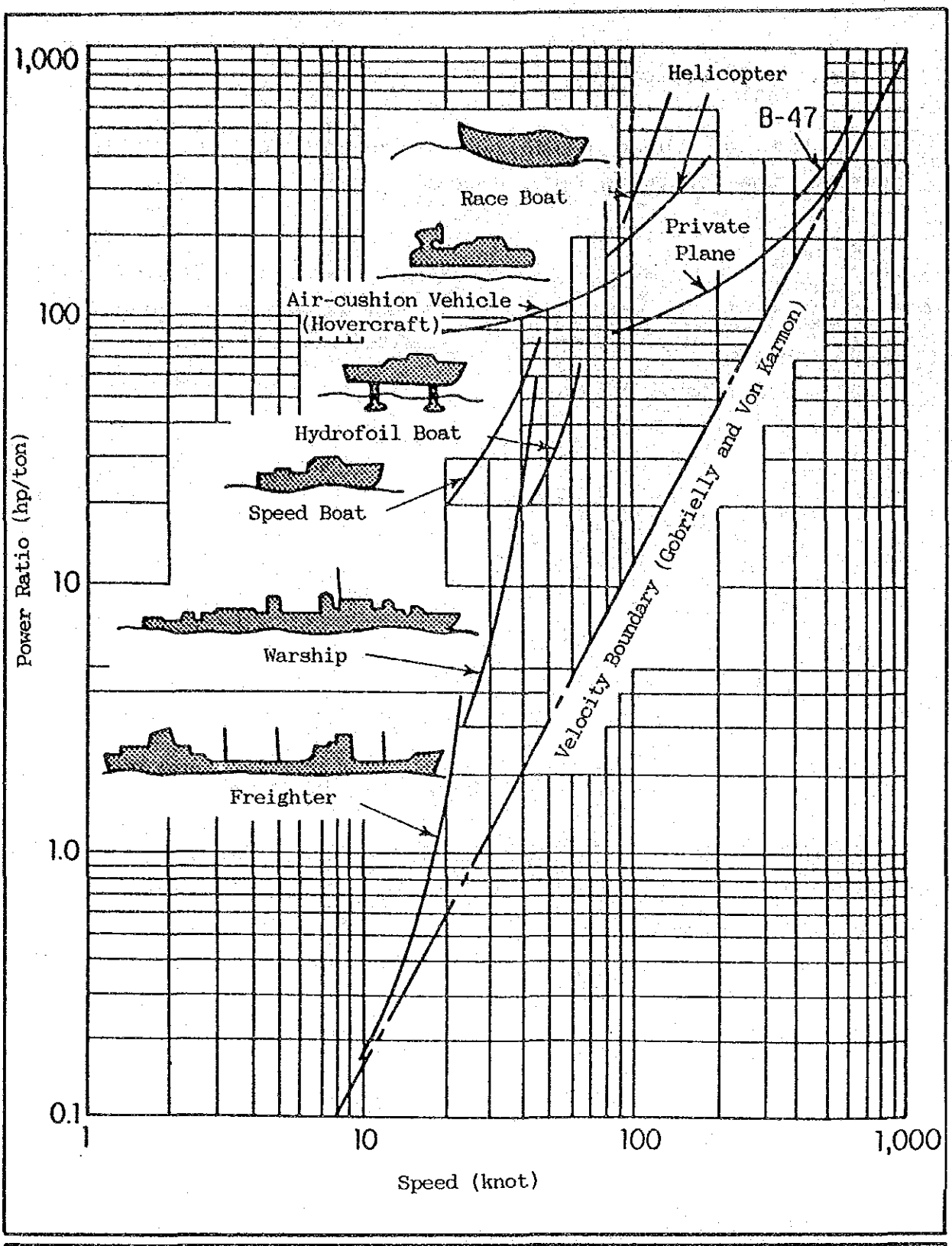
There is another demand in terms of making journeys to those attraction places in a short time. In order to evaluate this side of view, th distance between tourist sites are determined roughly as follows:

Labuan	- Krakatau	----------	55 km
Labuan	- Ujung Kulon	----------	75 km
Krakatau	- Ujung Kulon	----------	75 km

2) Selection of vehicle type

Vehicles for those places are expected to satisfy in general the following requirements:

- Economy
- Comfort
- Speed
- Reliability
- Serviceability
- Maintainability



SOURCE : MARINE ENGINEERING HANDBOOK

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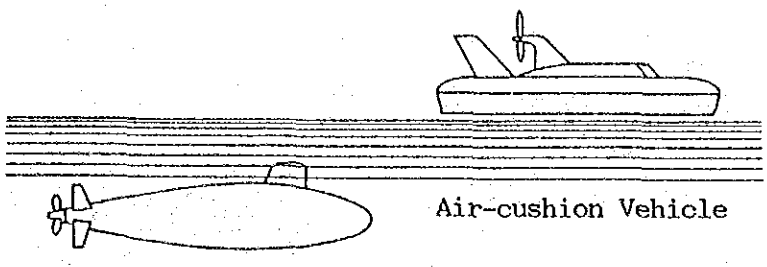
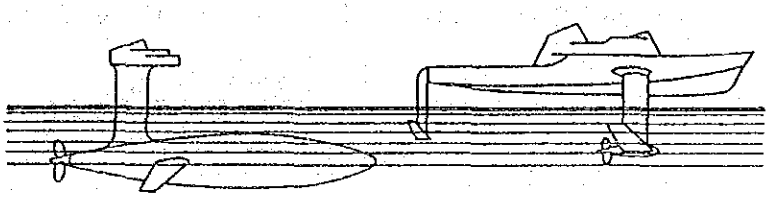
Fig. A-9-1

VEHICLE TYPE AND POWER RATIO



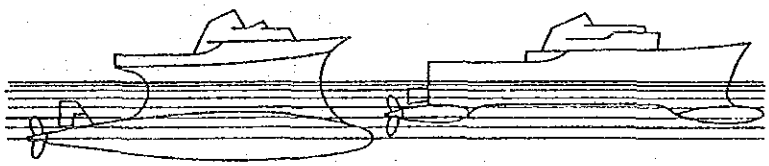
Air-cushion Vehicle

Submarine



Near-surface Submarine

Hydrofoil Boat



Shark Type Experiment

Bubble Nose Experiment

SOURCE : MARINE ENGINEERING HANDBOOK

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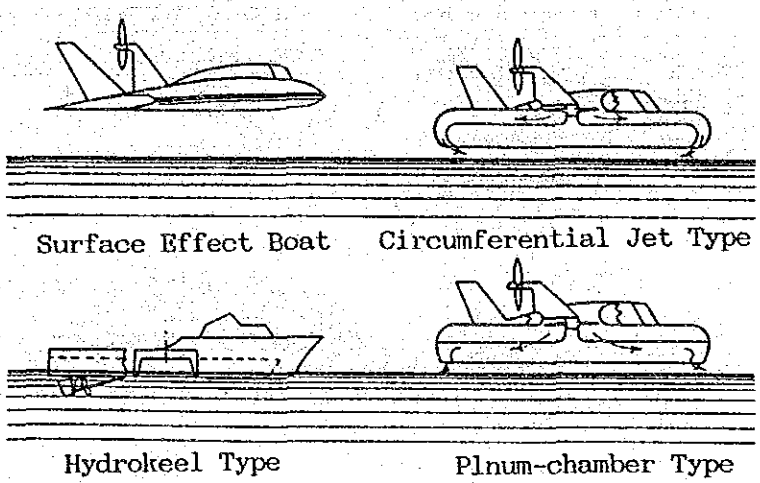
Fig. A-9-2

HIGH SPEED VESSELS



SOURCE : MARINE ENGINEERING HANDBOOK

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Fig. A-9-3

AIR-CUSHION VEHICLES

3) Capacity of speed boat

In order to determine the size of speed boat, four alternatives are conceived, which are:

Alternative	Passenger Capacity	Cruising Speed
1	20	20
2	35	25
3	50	30
4	100	30

(1) Alternative-1

By assuming the speed of boat (20 knot), the travel time between tourist sites is:

Labuan-(90 min)-Krakatau-(120 min)-Ujung Kulon-(120 min)-Labuan

Adding 60 minutes each at Krakatau and Ujung Kulon, one round trip takes 450 minutes (7.5 hours). This means that it is really impossible to make two round trips in a day otherwise tourists do not mind sightseeing in the dark. But, it is not recommended to cruise in the dark, because it would be highly dangerous to do so with almost non-existing navigation aid in the area.

Though a study on time schedule of boat operation and in order to provide passages of excursion nature to 200 tourists toward Krakatau and another 280 toward Ujung Kulon, 20 boats including some reserves for waiting are required for one hourly interval operation.

Other particulars are assumed as follows (for 20 boats):

- Capital investment (OMV) (Rp.160 mil./Boat)	Rp.3,200,000,000
- Annual maintenance	180,000,000
- Navigating and managing personnel (6p x Rp.3.0 mil./y)	360,000,000
- Tax and other social returns	25% of sales
- Inflation	12%/annual

It is fairly difficult to determine a fare of boat transportation, since it is affected by many aspects. For this instance, the following fare structure may be used by considering the return fare applied to the journey between Jakarta and Palau Seribu (approx. 45 km) being about Rp.74,000, and also the remoteness of this resort by applying approximately 60% reduction.

			Oneway Fare
- Labuan	- Krakatau	(55 km)	Rp. 30,000
- Labuan	- Ujung Kulon	(75 km)	Rp. 35,000
- Krakatau	- Ujung Kulon	(75 km)	Rp. 35,000
- Round Trip			Rp.100,000
- Return Trip to Krakatau			Rp. 60,000
- Return Trip to Ujung Kulon			Rp. 70,000

Annual turnover shall be assumed as follows:

- Annual number of tourist to Krakatau and Ujung Kulon

Visit	14,000
Stay (Ujung Kulon)	7,000
Total	21,000

- Each of the third shall be assigned as

Round trip	7,000 x Rp.100,000 =	Rp.700,000,000
Return trip to Krakatau	7,000 x Rp. 60,000 =	Rp.420,000,000
Return trip to Ujung Kulon	7,000 x Rp. 70,000 =	Rp.490,000,000
Total turnover		Rp.1,610,000,000

(2) Other alternatives

In conformity with the assumption in Alternative-1, the following particulars are conceived in order to assess and compare features of each of other alternatives:

Alternative-2

Travel Time: Labuan-Krakatau-Ujung Kulon-Labuan
70 min 100 min 100 min

One excursion: 6.5 hours (incl.60 min stops at each destination)
Capable of two excursions a day.

Required No. of boat: Total fleet of 10

Cost: Boat Rp.2,400,000,000
Maintenance Rp. 360,000,000 (First year value)
Operation Rp. 360,000,000 (First year value)

Alternative-3

Travel Time: Labuan-Krakatau-Ujung Kulon-Labuan
60 min 80 min 80 min

One excursion: 6.0 hours (incl.60 min stops at each destination)
Capable of two excursions a day.

Required No. of boat: Total fleet of 7

Cost: Boat Rp.2,100,000,000
Maintenance Rp. 315,000,000 (First year value)
Operation Rp. 315,000,000 (First year value)

Alternative-4

Travel Time: Same as Alternative-3

One excursion: Same as Alternative-3

Required No. of boat: Total fleet of 5

Cost: Boat Rp.2,000,000,000

Maintenance Rp. 300,000,000 (First year value)

Operation Rp. 375,000,000 (First year value)

(3) Evaluation

Financial analysis for a lifetime of 20 years is conducted and the results are shown in Tables A to D .

The following table represents summary of analyses:

	Alternative-1	Alternative-2	Alternative-3	Alternative-4
Net present value	Rp.1.4 bil.	Rp.4.1 bil.	Rp.4.7 bil.	Rp.4.3 bil.
B/C Ratio	1.08	1.29	1.35	1.31
FIRR	21.3%	22.5%	22.7%	22.6%

Assessing the values in the above Table, Alternative-3 is superior to all the others. However, the speed of boat, enabling two excursions a day, plays a vital role in financial assessment. Therefore, Alternatives of 2 to 4 have almost the same outcome. This evaluation result suggests further investigation into finding best combination of size of boats in excursion fleet.

Table A ALTERNATIVE-1

Financial Analysis for Speed Boat Operation

Year	Cost					Benefit		B/C Ratio
	Vessel (& Mainte.)	Operation Management	Tax & Others	Total Cost	N.P.V D/R=20%	Annual Turnover	N.P.V D/R=20%	For N.P.V D/R=20%
1991	3,200	360	403	3,963	3,963	1,610	1,610	0.41
1992	538	403	451	1,392	1,160	1,803	1,503	1.30
1993	602	452	505	1,559	1,082	2,020	1,402	1.30
1994	674	506	565	1,745	1,010	2,262	1,309	1.30
1995	755	566	633	1,954	943	2,533	1,222	1.30
1996	846	634	709	2,189	880	2,837	1,140	1.30
1997	947	711	794	2,452	821	3,178	1,064	1.30
1998	1,061	796	890	2,747	767	3,559	993	1.30
1999	1,188	891	997	3,076	715	3,986	927	1.30
2000	1,331	998	1,116	3,445	668	4,465	865	1.30
2001	1,491	1,118	1,250	3,859	623	5,000	808	1.30
2002	1,670	1,252	1,400	4,322	582	5,600	754	1.30
2003	1,870	1,403	1,568	4,841	543	6,273	704	1.30
2004	2,094	1,571	1,756	5,421	507	7,025	657	1.30
2005	2,346	1,759	1,967	6,072	473	7,868	613	1.30
2006	2,627	1,970	2,203	6,800	441	8,812	572	1.30
2007	2,943	2,207	2,467	7,617	412	9,870	534	1.30
2008	3,296	2,472	2,764	8,532	385	11,054	498	1.30
2009	3,691	2,768	3,095	9,554	359	12,381	465	1.30
2010	4,134	3,101	3,467	10,702	335	13,867	434	1.30
Total	37,304	25,938	29,000	92,242	16,669	116,003	18,074	1.08

(Inf.=12%) (Inf.=12%) (Bnft*25%) B/C=1.08 FIRR=21.26%

Note: N.P.V. --- net present value
D/R --- discount rate
B/C --- benefit/cost
FIRR --- fiancial internal rate of return
Inf. --- inflation ratio
Bnft. --- benefit

ANNEX II.B

COST ESTIMATE

Annex II.B.1 DETAILS OF CONSTRUCTION COST (OLD BANTEN SITE)

1) Heritage Garden

Area	Heritage Garden	38,900 m^2
	Public space	5,600 m^2
	Parking	37,900 m^2
	Total	82,400 m^2

(Rp.million)

- Preparatory works
  8.3 ha x 0.4 x 3 th. Rp./m^2 = 99.6 — 100

- Earthwork
  8.3 ha x 0.4 x 0.2 m^3/m^2 x 2 = 13.3
  8.3 ha x 0.4 x 2/m^2 = 64.4 (drain)
  79.7 — 80

- Performance Art Theater
  1,000 m^2 x 400 = 400 — 400

- Exhibition hall, Musholla, Restaurant, Shop
  500 m^2 x 300 = 150 — 150

- Adm., Heritage memorial hall, Information
  700 m^2 x 300 = 210 — 210

- Pepper Trade Museum
  500 m^2 x 300 = 150 — 150

- Plaza
  4,800 m^2 x 50 = 240 — 240

- Model Farm
  5,600 m^2 x 20 = 112 — 112

- Fountain, Pond
  700 m^2 x 40 = 28
  fountain 30
  58 — 58

- Small Shops
  8 m^2 x 50 shops x 100 = 40 — 40

- Open Air Theater
  900 m^2 x 50 = 45
  equipment 30
  75 — 75

- Landscaping, Planting 26,000 m^2 x 20 = 520	520
- Moatside promenade, Pedestrian way 5 m x 450 m x 8 = 18 4 m x 500 m x 3 = 6 24	24
- Bridge (Pedestrian) 2 x 4 m x 10 m x 1,000 = 80	80
- Landing facility (floating jetty) 4 m x 10 m x 700 = 28	28
- Parking, paved: 22,000 m^2 x 15 = 330 Parking, grass: 15,000 m^2 x 8 = 120 450	450
- Water supply (refer to B-2-3)	250
- Septic tank 100 m^3 x 300 = 30	30
- Electricity 10 KVA x 120 Rp./VA = 1.2 (connection charge)	2
- Miscellaneous	150
Sub-Total	3,149
- Engineering & Administration	472
- Physical Contingency	362
- Total	3,983
- Land Acquisition 82,400 m^2 x 11 = 906	906
Grand Total	4,889

2)	Chinese Temple, Speelwijk Fortress (6,000 m^2)	
	- Preparatory Works	6
	- Parking 5,000 m^2 x 15 = 75	75
	- Shops 120 m^2 x 100 = 12	12
	- Landscaping 1,000 m^2 x 20 = 20	20
	- Miscellaneous	2
	Sub-Total	115
	- Engineering & Administration	17
	- Physical Contingency	13
	Total	145
	- Land Acquisition (Department of Education and Culture)	-
	Grand Total	145
3)	Kaibon Palace (3,500 m^2)	
	- Preparatory Works	3
	- Parking 3,000 m^2 x 15 = 45	45
	- Shops 50 m^2 x 100 = 5	5
	- Landscaping 500 m^2 x 20 = 10	10
	- Miscellaneous	1
	Sub-Total	64
	- Engineering & Administration	10
	- Physical Contingency	7
	Total	81
	- Land Acquisition	-
	Grand Total	81

4) Tasikardi (2,000 m^2)	
- Preparatory Works	2
- Parking 1,000 m^2 x 15 = 15	15
- Shops 50 m^2 x 100 = 5	5
- Landscaping 1,000 m^2 x 20 = 20	20
- Miscellaneous	1
Sub-Total	43
- Engineering & Administration	6
- Physical Contingency	5
Total	54
- Land Acquisition	-
Grand Total	54
5) Karanghantu Harbor	
- Preparatory Works	8
- Earthwork 6,200 m^2 x 0.1 m^3/m^2 x 2 = 1.2	1
- Beautification of Harbor Area (pavement 6 m x 1,000 m, planting) 6,000 m^2 x 25 = 150	150
- Plaza 200 m^2 x 50 = 10	10
- Miscellaneous	2
Sub-Total	171
- Engineering & Administration	26
- Physical Contingency	20
Total	217
- Land Acquisition	-
Grand Total	217

6) Road (By pass)	
- Construction Cost	424
- Engineering & Administration	64
- Physical Contingency	49
Total	537
7) Restoration of Old Moat	
- Preparatory Works	80
- Excavation & Dredging 20 m x 4,500 m x 1 m x 6/m^3 = 540	540
- Bank Protection 3,000 m^2 x 2 x 150 = 900	900
- Landing Facility 400 m^2 x 700 = 28	28
- Landscaping 2,000 m^2 x 2 m x 30 = 120	120
- Water Intake & Conveyance Channel (refer to B-2-5)	57
- Miscellaneous	25
Sub-Total	1,750
- Engineering & Administration	262
- Physical Contingency	201
Total	2,213
- Land Acquisition	-
Grand Total	2,213

Annex II.B.2 LOCAL AND FOREIGN CURRENCY PORTION

B-2-1 LOCAL AND FOREIGN CURRENCY PORTION OF DESTRUCTION COST (OLD BANTEN SITE)

(Rp. 10^6, Current price as of 1986)

	Items	Portion (%)		Construction Cost		
		F/C	L/C	F/C	L/C	Total
A.	Heritage Garden					
1	Preparation Work	10	90	10	90	100
2	Earth Work	20	80	16	64	80
3	Art theater	30	70	120	280	400
4	Exhibition	30	70	45	105	150
5	Administration	30	70	63	147	210
6	Pepper Trade Museum	30	70	45	105	150
7	Plaza	20	80	48	192	240
8	Model Fare	-	100	-	112	112
9	Fountain	-	100	-	58	58
10	Seal Shops	10	90	4	36	40
11	Open Air Theater	20	80	15	60	75
12	Picnic Garden	-	100	-	520	520
13	Pedestrian	-	100	-	80	80
14	Promenade	-	100	-	24	24
15	Floating jetty	10	90	3	25	28
16	Parking	10	90	45	405	450
17	Water Supply	15	85	38	212	250
18	Septic Tank	10	90	3	27	30
19	Electricity	50	50	1	1	2
20	Miscellaneous			24	126	150
	Sub-Total			480	2,669	3,149
	E & A			72	400	472
	Physical Contingency			55	307	362
	Total			607	3,376	3,983
	Land Acquisition			-	906	906
	Total	12	88	607	4,282	4,889
B.	Chinese Temple, Speelwijk Fortress					
1	Preparation Work	10	90	1	5	6
2	Parking	10	90	8	67	75
3	Shops	10	90	1	11	12
4	Gardening	-	100	-	20	20
5	Miscellaneous			-	2	2
	Sub-Total			10	105	115
	E & A			2	15	17
	Physical Contingency			1	12	13
	Total	9	91	13	132	145
C.	Kaibon Palace					
1	Preparation Work	10	90	-	3	3
2	Parking	10	90	5	40	45
3	Shops	10	90	-	5	5
4	Gardening	-	100	-	10	10
5	Miscellaneous			-	1	1
	Sub-Total			5	59	64
	E & A			1	9	10
	Physical Contingency			1	7	8
	Total	9	91	7	75	82

(to be continued)

Items	Portion (%)		Construction Cost		
	F/C	L/C	F/C	L/C	Total
D. Tasikardi					
1 Preparation Work	10	90	-	2	2
2 Parking	10	90	2	13	15
3 Shops	10	90	-	5	5
4 Gardening	-	100	-	20	20
5 Miscellaneous			-	1	1
Sub-Total			2	41	43
E & A			-	6	6
Physical Contingency			1	5	6
Total	5	95	3	52	55
E. Karanghantu Harbor					
1 Preparation Work	10	90	1	7	8
2 Earth Work	20	80	-	1	1
3 Beautification of Harbor Area	10	90	15	135	150
4 Plaza	20	80	2	8	10
5 Miscellaneous			-	2	2
Sub-Total			18	153	171
E & A			3	23	26
Physical Contingency			2	18	20
Total			23	194	217
F. Road (By Pass)					
1 Construction Cost	20	80	85	339	424
Sub-Total	20	80	85	339	424
E & A			13	51	64
Physical Contingency			10	40	50
Total			108	430	538
G. Restoration of Old Moat					
1 Preparation Work	10	90	8	72	80
2 Excavation & Dredging	20	80	108	432	540
3 Bank Protection	20	80	180	720	900
4 Landing Facility	-	100	-	28	28
5 Gardening	-	100	-	120	120
6 Water Intake & Conveyance Channel	10	90	6	51	57
7 Miscellaneous			4	21	25
Sub-Total			306	1,444	1,750
E & A			46	216	262
Physical Contingency			35	166	201
Total	17	93	387	1,826	2,213
Total	12	88	1,147	6,989	8,136
Price Contingency			280	3,084	3,364
Grand Total	12	88	1,427	10,073	11,500

B-2-2 LOCAL AND FOREIGN CURRENCY PORTION OF CONSTRUCTION COST (BEACH RESORT)

Items	Portion (%)		Construction Cost (Rp. 10^6, current prices as of 1986)								
			Stage 1			Stage 2			Total		
	FC	LC	FC	LC	Total	FC	LC	Total	FC	LC	Total
1. Preparatory Work	10	90	281	2,527	2,808	281	2,527	2,808	562	5,054	5,616
2. Earth Work	20	80	31	122	153	57	227	284	88	349	437
3. Lagoon, Beach	20	80	910	3,640	4,550	-	-	-	910	3,640	4,550
4. Hotel	40	60	11,281	16,921	28,202	9,277	13,915	23,192	20,558	30,836	51,394
5. Condominium	30	70	1,443	3,366	4,809	739	1,724	2,463	2,182	5,090	7,272
6. Private Villa, G.H.	20	80	-	-	-	803	3,210	4,013	803	3,210	4,013
7. Marina	10	90	271	2,435	2,706	48	430	478	319	2,865	3,184
8. Central Plaza (Center)	30	70	1,240	2,893	4,133	531	1,240	1,771	1,771	4,133	5,904
9. Sports Facility	20	80	500	2,000	2,500	125	499	624	625	2,499	3,124
10. Picnic Area	0	100	-	1,122	1,122	-	604	604	-	1,726	1,726
11. Orchid Garden	10	90	-	-	-	110	980	1,090	110	980	1,090
12. Miniature Golf	10	90	-	-	-	43	387	430	43	387	430
13. Seminar House	30	70	-	-	-	270	630	900	270	630	900
14. Diving School	30	70	174	406	580	-	-	-	174	406	580
15. Open Air Theater	20	80	55	219	274	-	-	-	55	219	274
16. Golf Course	10	90	-	-	-	560	5,040	5,600	560	5,040	5,600
17. Playground	10	90	26	229	255	-	-	-	26	229	255
18. Giant Maze	10	90	74	665	739	-	-	-	74	665	739
19. Athletics field	10	90	20	179	199	-	-	-	20	179	199
20. Horseback Riding	10	90	29	259	288	-	-	-	29	259	288

(to be continued)

Items	Portion (%)		Construction Cost (Rp. 10^6, current prices as of 1986)								
			Stage 1			Stage 2			Total		
	FC	LC	FC	LC	Total	FC	LC	Total	FC	LC	Total
21 Theme Park	40	60	-	-	-	492	738	1,230	492	738	1,230
22. Camping Area	0	100	-	397	397	-	-	-	-	397	397
23. Economical Lodges	10	90	22	195	217	9	84	93	31	279	310
24. Employee's Village	10	90	97	876	973	39	343	382	136	1,219	1,355
25. Road	30	70	317	740	1,057	140	325	465	457	1,065	1,522
26. Storm Drainage	10	90	6	54	60	-	-	-	6	54	60
27. Sewage Treatment	50	50	1,021	966	1,987	653	502	1,155	1,674	1,468	3,142
28. Solid Waste Disposal	30	70	5	13	18	5	13	18	10	26	36
29. Electricity	50	50	278	277	555	182	183	365	460	460	920
30. Water Supply	35	65	568	1,622	2,190	212	17	339	780	1,749	2,529
31. Telephone	80	20	-	-	-	-	-	-	-	-	-
32. Access Road	30	70	270	630	900	-	-	-	270	630	900
33. Miscellaneous	30	70	368	860	1,228	290	676	966	658	1,536	2,194
34. Sub Total	31	69	19,261	43,380	62,641	14,866	34,404	49,270	34,127	77,784	111,911
35. Engineering & Administration	-	-	2,889	6,507	9,396	2,230	5,160	7,390	5,119	11,667	16,786
36. Physical Contingency	-	-	2,215	4,989	7,204	1,710	3,956	5,666	3,925	8,945	12,870
37. Total	31	69	24,365	54,876	79,241	18,806	43,520	62,326	43,171	98,396	14,567
38. Land Acquisition	-	100	-	516	516	-	-	-	-	516	516
39. Vessel	100	-	700	-	700	700	-	700	1,400	-	1,400
40. Grand Total	31	69	31,996	82,989	114,985	28,756	75,213	103,969	60,752	158,202	218,954

B-2-3 WATER SUPPLY FACILITY (OLD BANTEN)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Water Conveyance Pipe	ø100 steel pipe	m	2,200	19,800	22,000	8,000	18	158	176	
2. Distribution Basin	240 m^3	unit	-	-	-	1	4	36	40	
3. Distribution Pipe	ø100 PVC	m	1,500	13,500	15,000	900	1	13	14	
4. Booster Pump		unit	-	-	-	1	15	-	15	
5. Others		unit	-	-	-	1	-	5	5	Hydrants, etc.
Total							38	212	250	

B-2-4 TELEPHONE (OLD BANTEN)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Exchange	PABX	line	1,570,000	270,000	1,840,000	30	47	8	55	
2. Transmission Cable		unit	.75	.25	1	1	13	4	17	
3. Distribution cable		unit	980,000	220,000	1,200,000	30	29	7	36	
Total							89	19	108	

B-2-5 WATER CONVEYANCE CHANNEL TO OLD MOAT (OLD BANTEN)

	Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
				F/C	L/C	Total		F/C	L/C	Total	
1.	Excavation		m^3	600	5,400	65,000	1,000	-	6	6	
2.	Bank Protection	RC	m^2	15,000	135,000	150,000	20	-	3	3	
3.	Pump Station		unit	22,000,000	-	22,000,000	1	22	-	22	
4.	Intake pipe	ø400	m	10,000	90,000	100,000	25	-	2.5	2.5	
5.	Convayance channel	w = 2.0 m d = 0.5 m	m m	67,000	83,000	150,000	150	10	12.5	22.5	
6.	Miscelaneous		unit	-	-	-	-	-	1	1	
	Total							32	25	57	

B-2-6 WATER SUPPLY (BEACH RESORT OF STAGE 1 DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Treatment Plant		unit	-	-	-	1	380	-	380	
2. Intake water		unit	-	-	-	1	7	63	70	
3. Distribution Basin		unit	-	-	-	2	10	90	100	
4. Water Conveyance Pipe	ø250 PVC	m	4,700	43,300	47,000	2,000	9	85	94	
	ø250 steel pipe	m	7,000	63,000	70,000	19,000	133	1,197	1,330	Ciseukeut River-Tanjung Jaya
5. Distribution Pipe	ø200 PVC	m	4,000	36,000	40,000	1,850	7	67	74	
	ø150 PVC	m	2,700	24,300	27,000	2,200	6	53	59	
	ø100 PVC	m	1,500	13,500	15,000	3,700	6	50	56	
6. Booster Pump		unit	10	-	10	1	10	-	10	
7. Others	Hydrant	unit	-	17	17	1	-	17	17	
Total							568	1,622	2,190	

B-2-7 SEWAGE TREATMENT (BEACH RESORT OF STAGE 1 DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Treatment Plan		m^3	300,000	200,000	500,000	3,100	930	620	1,550	
2. Sewer	ø300 PVC	m	5,300	47,700	53,000	1,000	5	48	53	
	ø200 PVC	m	4,000	36,000	40,000	1,300	5	47	52	
	ø150 PVC	m	2,700	24,300	27,000	6,100	16	149	165	
3. Out Fall Pipe	ø250 PVC	m	4,700	42,300	-	1,000	1	9	10	
4. Others	Booster Pump Manhole	unit	-	-	-	1	64	93	157	
Total							1,021	966	1,987	

B-2-8 POWER SUPPLY (BEACH RESORT OF STAGE 1 DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. TL Line	70 KV	m	55,000	55,000	110,000	100,000	5,500	5,500	11,000	
2. Sub Station		unit	-	-	-	1	540	60	600	
3. Distribution Line	6 KV	m	10,000	10,000	20,000	8,000	80	80	160	
4. Street Lighting		unit	-	500,000	500,000	330	-	165	165	1 unit/50 m x 16,600 m = 330 units
Total							6,120	5,805	11,925	

Note: This is the construction cost of total electricity supply facility that can be constructed by PLN.

B-2-9 TELEPHONE (BEACH RESORT OF STAGE 1 DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Exchange	Terminal	unit	-	-	-	1	120	20	140	Radio concentrator system
2. Distribution Cable		line	980,000	220,000	1,200,000	30	30	10	40	
Total							150	30	180	

Note: This is the construction cost of total telephone facility that can be constructed by PERUMTEL.

B-2-10 SOLID WASTE DISPOSAL (BEACH RESORT OF STAGE 1 DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Landfiling Tip		m^3	1,500	3,500	5,000	3,600	5	13	18	-Impermeable layer -Leachate treatment facility -Civil work

B-2-11 DRAINAGE (BEACH RESORT OF STAGE 1 DEVELOPMENT AND TOTAL DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Drainage Ditch		m	10,000	980,000	100,000	600	6	54	60	Open conduit width = 1.0 m depth = 0.5 m

Note: Road Site gutter's cost is included in the cost of roads

B-2-12 WATER SUPPLY (BEACH RESORT OF TOTAL DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Treatment Plant		unit	-	-	-	1	570	-	570	
2. Intake Weir		unit	-	-	-	1	7	63	70	
3. Distribution Basin & Pump		unit	-	-	-	3	15	135	150	
4. Water Conveyance Pipe	ø250 PVC	m	4,700	42,300	47,000	2,000	9	85	94	
	ø200 PVC	m	4,000	36,000	40,000	1,000	4	36	40	
	ø250 steel pipe	m	7,000	63,000	70,000	19,000	133	1,197	1,330	Ciseukeut River-Tanjung Jaya
5. Distribution Pipe	ø200 PVC	m	4,000	36,000	40,000	1,850	7	67	74	
	ø150 PVC	m	2,700	24,300	27,000	2,700	7	66	73	
	ø100 PVC	m	1,500	13,500	15,000	5,200	8	70	78	
6. Booster Pump		unit	10	-	10	2	20	0	20	
7. Others	Hydrant,etc.	unit	-	30	30	1	-	30	30	
Total							780	1,749	2,529	

B-2-13 SEWAGE TREATMENT (BEACH RESORT OF TOTAL DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Treatment Plant		m^3	300,000	200,000	500,000	5,200	1,560	1,040	2,600	
2. Sewer	ø300 PVC	m	5,300	47,700	53,000	1,000	5	48	53	
	ø200 PVC	m	4,000	36,000	40,000	1,300	5	47	52	
	ø150 PVC	m	2,700	24,300	27,000	8,900	24	216	240	
3. Out Fall Pipe	ø250 PVC	m	4,700	42,300	47,000	200	1	9	10	
4. Others	Booster Pump, Manhole	unit	-	-	-	1	79	108	187	
Total							1,674	1,468	3,142	

B-2-14 POWER SUPPLY (BEACH RESORT OF TOTAL DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Transmission Line	70 KV	m	55,000	55,000	110,000	100,000	5,500	5,500	11,000	
2. Sub Station		unit	-	-	-	1	540	60	600	
3. Distribution Line	6 KV	m	10,000	10,000	20,000	11,000	110	110	220	
4. Street Lighting		unit	-	500,000	500,000	500	-	250	250	1 unit/50 m x 24,500 = 500 units
Total							6,150	5,920	12,070	

Note: This is the construction cost of total electricity supply facility that can be constructed by PNL.

B-2-15 TELEPHONE (BEACH RESORT OF TOTAL DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Exchange	Terminal	unit	-	-	-	1	161	29	190	Radio Concentrator System
2. Distribution Cable		line	980,000	220,000	1,200,000	50	49	11	60	
Total							210	40	250	

Note: This is the construction cost of total telephone facility that can be constructed by PERUMTEL.

B-2-16 SOLID WASTE DISPOSAL (BEACH RESORT OF TOTAL DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Landfiling Tip		m^3	1,500	3,500	5,000	7,200	11	25	36	-Impermeable layer -Leachate Treatment -Civil Work

B-2-17 CONNECTION CHARGE OF ELECTRICITY (BEACH REPORT OF STAGE 1 DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Connection Charge		KVA	-	125	125	3,150	-	390	390	
2. Street Lighting		unit	-	500,000	500,000	330	-	165	165	1 unit/50 m x 16.6 km = 330 units
Total							-	555	555	

B-2-18 CONNECTION CHARGE OF ELECTRICITY (BEACH RESORT OF TOTAL DEVELOPMENT)

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Connection Charge		KVA	-	125	125	5,370	-	670	670	
2. Street Lighting		unit	-	500,000	500,000	500	-	250	250	1 unit/50 m x 24.5 km = 500 units
Total							-	920	920	

Annex II.B.3 AREA AND SIZE OF FACILITIES (BEACH RESORT)

1) Frame of Capacity

(1) Number of yearly visitors (final stage)

- Day-use 338,000 persons
- Overnight 169,000 persons

(2) Number of daily visitors

- Day-use 338,000 x 0.025/1,125 = 7,500 persons
- Overnight-use

Hotel: 169,000 x 2.5/365 x 0.5 = 2,200 beds

Second house: 169,000 x 0.05/(30 x 3) x 4 = 400 beds

(Private Villa, Guest House 100 beds 25 houses
Condominium 300 beds 75 units)

2) Instantaneous Capacity

		Stage 1	Stage 2
Day-use		4,000 persons	7,500 persons
Overnight-use			
Hotel		1,360 beds	2,200 beds
Private Villa, Guest House	(18.7)	0	25 houses
Condominium	(56.2)	50 units	75 units
Sub Total		1,560 (beds)	2,600 (beds)
Total		5,560 persons	10,100 persons

3) Number of Visitors by Facility (Visitor Distribution)

	Stage 1	Stage 2
Total	5,560	10,100
Marina	300	500
Hotel, Private Villa, Condominium	350	600 pool
Tennis	350	600
Golf	-	100
Picnic, Beach	2,860	5,000
Sports	450	800
Amusement	450	800
Center, Open Air Theater	550	1,000
Camp	-	200
Others	250	500

4) Construction Stage of Hotel

Accommodation: 2,200 beds

			Stage 1	Stage 2
High Class		420 bds/hotel	-	2
Twin	190 rms	380 bds		
Suite	10 rms	40 bds		
Upper Middle Class (L)		520 bds/hotel	1	
Twin	220 rms	440 bds		
Suite	20 rms	80 bds		
Upper Middle Class (S)		420 bds/hotel	2	
Twin	190 rms	380 bds		
Suite	10 rms	40 bds		
Total			3 (1,360 bds)	2 (840 bds)

5) Size of Facilities

(1) Lagoon, beach

- Lagoon	80,000 m^2 x 2m	
- Lagoon (beach)	15,000 m^2	
sand volume	20,000 m^3	
Lagoon Area		8.0 Ha
Beach Area		1.5 Ha
Sub total		9.5 Ha
- Artificial Beach	500 m x 20 m (10 m)	0.5 Ha
Total		10.0 Ha

(2) Hotels

High Class Hotel (420 beds)

- Twin: 190 x 40 m^2/rm/0.55 = 13,818 (13,820)
- 3 stories: 13,820/3 = 4,607 (1F 5,420) (2, 3F 4,200)
- Suite: 10 rms x 100 m^2/rm = 1,000 m^2 (detached)

Total Floor Area 14,820 m^2

Building Coverage Area 6,420 m^2

Site Area 6,420/0.2 ~ 0.15 = 32,100 ~ 42,800

Upper Middle Class Hotel (L: 520 bds)

- Twin: 220 rms x 35 m^2/rm/0.55 = 14,000 m^2
- 3 stories: 14,000/3 = 4,667 (1F 5,400) (2, 3F 4,300)
- Suite: 20 rms x 90 m^2/rm = 1,800 m^2

Total Floor Area 15,800 m^2

Building Coverage Area 7,200 m^2

Site Area 7,200/0.2 ~ 0.15 = 36,000 ~ 48,000

Upper Middle Class Hotel (S: 420 bds)

- Twin: 190 rms x 35 m^2/rm/0.55 = 12,091 (12,100)

- 3 stories: 12,100/3 = 4,033 (1F 4,700 m^2)
(2, 3F 3,700 m^2)

- Suite: 10 rms x 90 m^2/rm = 900 m^2

Total Floor Area 13,000 m^2

Building Coverage Area 5,600 m^2

Site Area 5,600/0.2 ~ 0.15 = 28,000 ~ 37,300

Total Area: 3.7 x 2 + 4.2 + 3.3 x 2 = 18.2 18.2 Ha

(3) Condominium

75 units x 4 bds = 300 bds

75 x 100 m^2/0.8 = 9,375 m^2 (room + corridor)

3 stories: 9,375/3 = 3,125 (1 - 3F 3,125 m^2)

Public Space: 7,500 x 0.2 = 1,500 m^2

Total Floor Area 10,875 m^2

Building Coverage Area 4,625 m^2

Site Area 4,625/0.2 ~ 0.15 = 23,125 ~ 30,830

≈ 3.0 Ha

(4) Private Villa, Guest House

Building Area: 25 houses x 150 m^2/house = 3,750 m^2

Site Area: 25 houses x 2,500 m^2/0.7 = 89,286 m^2

9.0 Ha

(5) Marina

300 boats/yatchs will be accommodated

(Floating custody : 150
Inland custody : 150)

- Water Basin

	Visitors	Daily concentration	Hourly concentration	Space per boat	
Sailing Space:	150 x (1+0.05)	x 0.3	x 0.4	x 200 m^2	= 4,000

Mooring space: 150 x 100 m^2 = 15,000 m^2

Total: 19,000 m^2 (2.0 Ha)

- Inland Area:

Boat yard 60 x 25 m^2 = 1,500 m^2

	Double (2 storied) custody		Ratio of building	
Boat house	90 / 2	x	30 m^2 / 0.6	= 2,300 m^2

Lubrication, 300 x 0.05 x 40 m^2/0.6 = 1,300

Warehouse (Engine) 200 x 2 m^2/piece/2 double

	Ratio of users	Hourly concentration		
Clubhouse	500 x 0.6	x 0.4	x 6 m^2/person	= 720 m^2

720/2/0.6 = 600

Parking 300 boats x 0.3 x 1.5 car/boat x Ratio of visitors
25 m^2/car + 300 x 0.05 x 0.3 x 1.5 x 25 = 3,600

Utility space lift, slope 1,200 m^2

Others (45% of inland area) garden, road 9,500 m^2

Total 18,500 m^2 ≈ 2.0 Ha

(6) Central Plaza (Center)

- Building (Shops, Restaurants, Hall, Mosques, Administration, Small shops, ...)		
Total Floor Area (Building coverage 5,000 m^2)	6,000 m^2	
- Plaza (including small shop area)	15,000 m^2	
- Garden	3,000 m^2	
- Parking (800 cars)	24,000 m^2	
Total area	47,000 m^2	4.7 Ha

(7) Sports Facilities

- Gymnasium	2,000 m^2	
- Clubhouses: Total	1,000 m^2	
- Warehouse, horse: Total	800 m^2	
Sub total	3,800/0.6 = 6,350 m^2	
- Tennis courts: 20 courts x 800 m^2 = 16,000 m^2		
- Volley ball courts - Basket courts	10,000 m^2	
- Badminton courts		
- Ground (Soccer, others)	24,000 m^2	
- Grass field, picnic area	28,000 m^2	
- Parking: 1,200 cars	36,000 m^2	
Total	120,350 m^2	12.0 Ha

(8) Picnic Field

5,000 persons x 20 m^2/person	=	100,000 m^2	
Bath houses, shelters: Total		2,000 m^2	
Toilet: 12 toilets: Total		600 m^2	
Parking			
c. 5,000 x 0.7/3 x 30	=	35,000	
d. 5,000 x 0.3/50 x 100	=	3,000	
Sub-total		38,000 m^2	
Total 140,600/0.35	=	401,714 m^2	40.0 Ha

(9) Orchid Garden 6.0 Ha

(10) Miniature Golf 18 holes 4.0 Ha

(11) Seminar House 2,000 m^2 1.2 Ha

(12) Diving School

Building	500 m^2	
Diving pool	5 m x 100 m^2	
	1.5 m x 300 m^2	
	900/0.2 = 4,500 m^2	0.5 Ha

(13) Open Air Theater

- Theater	1,200 m^2	
- Garden	1,500 m^2	
- Grass Field	8,000 m^2	
- Parking (200 cars)	6,000 m^2	
Total	16,700 m^2	1.7 Ha

(14) Golf Course (18 holes)

- Champion course 120.0 Ha

(15) Play Ground 2.0 Ha

(16) Giant Maze 4.0 Ha

(17) Athletics Field 1.5 Ha

(18) Horse Back Riding

- Field		10,000 m^2	
- Course	2 m x 5 km =	10,000 m^2	(outside)
- Parking, Buffer		20,000 m^2	
Total		30,000 m^2	3.0 Ha

(19) Theme Park 6.5 Ha

(20) Camping Area 7.0 Ha

(21) Economical Lodge

service level

(2,200 + 400)/9 x 0.5 = 145 (150 bds)

150 x 10 m^2/p = 1,500 m^2
1,500/0.4 = 3,750 m^2 0.4 Ha

(22) Employee's Village

3,000 p. ─┬─ 1,500 p. (single) ── 1,000 commuter
└─ 1,500 p. (family) ── 500 dormitory

1,500/2.5 emp/fam = 600 households

Existing New (from existing)
600 - 150 = 450 + 50 = 500 h.h. (Flat)

Dorm. 500 p. x 12.5 m^2/(2 p. x 0.7) = 4,500 m^2
Flat 500 h.h. x 30 m^2/0.85 = 17,500 m^2

Dorm. Flat
Area 100 x 120 m + 150 x 300 m = 57,000 m^2

5.7 Ha

Annex II.B.4 DETAILS OF DEVELOPMENT COST (BEACH RESORT)

1) Preparatory works — Rp.million

312 Ha x 0.6 x 3th Rp./m^2 = 5,616 — 5,616

(1) Earthwork

312 ha x 0.7 x 0.1 m^3/m^2 x 2th/m^3 = 436.8 — 437

(2) Lagoon, Beach

Dredging	81,000 m^2 x 2 m x 10	=	1,620	
Reclaiming (sand)	13,000 m^2 x 2 m x 20	=	520	
Reclaiming (natural beach)	500 m x 40 m x 2 m x 20	=	800	
Bank protection	500 m x 1,000	=	500	
Bank protection	1,700 m x 500	=	850	
Landscaping	13,000 m^2 x 20	=	260	
			4,550	4,550

(3) Hotels

- High Class (420 bds)

Building	14,820 x 700	=	10,374
Swimming pool	1 x 130,000	=	130
Tennis courts	2 x 10,000	=	20
Landscaping A	32,000 m^2 x 0.3 x 50	=	480
Landscaping B	32,000 m^2 x 0.3 x 35	=	336
Landscaping C	32,000 m^2 x 0.4 x 20	=	256
			11,596
	11,596 x 2	=	23,192

Rp.million

- Upper Middle Class (L/520 bds)

Building	14,000 x 600th.Rp.	=	8,400	
Swimming pool	1 x 120,000	=	120	
Tennis courts	3 x 9,000	=	270	
Landscaping A	44,000 m^2 x 0.3 x 50	=	660	
Landscaping B	44,000 m^2 x 0.3 x 35	=	462	
Landscaping C	44,000 m^2 x 0.4 x 20	=	352	
			10,264	
	10,264 x 1	=	10,264	

- Upper Middle Class (S/420 bds)

Building	13,000 x 600	=	7,800	
Swimming pool	1 x 130,000	=	130	
Landscaping A	31,000 m^2 x 0.3 x 45	=	465	
Landscaping B	31,000 m^2 x 0.3 x 35	=	326	
Landscaping C	31,000 m^2 x 0.4 x 20	=	248	
			8,969	
	8,969 x 2	=	17,938	
Total	23,192 + 10,264 + 17,938	=		51,394

(4) Condominium

Building	10,875 m^2 x 550	=	5,981	
Swimming pool	1 x 100,000	=	100	
Tennis court	2 x 9,000	=	18	
Landscaping A	35,000 m^2 x 0.3 x 50	=	525	
Landscaping B	35,000 m^2 x 0.3 x 35	=	368	
Landscaping C	35,000 m^2 x 0.4 x 20	=	280	
			7,272	
	1st + 2nd 4,809 2,463			7,272

Rp.million

(5) Private villa, guest house

Building (total)	3,750 m^2 x 600	=	2,250	
Landscaping	2,350 m^2 x 25 x 30	=	1,763	
			4,013	4,013

(6) Marina

Break water (total)	180 m x 3,000	=	540	
Jetty	2 m x 25 m x 5 jetties x 700	=	175	
Dredging	10,000 m^2 x 3 m x 10	=	300	
Dredging	100 m x 500 m x 15	=	750	
Bank protection	200 m x 700	=	140	
Boat yard	1,500 m^2 x 15	=	23	
Boat house	2,300 x 150	=	345	
Lub, WH	1,300 x 150	=	195	
Club house	600 x 500	=	300	
Crane	1 x 60,000	=	60	
Lighting	1 set x 10,000	=	10	
Parking	3,600 m^2 x 15	=	54	
Utility	1,200 x 20	=	24	
Landscaping	5,500 x 35	=	193	
Road, others	4,000 x 15	=	60	
Rental yacht	30 x 500	=	15	
			3,184	3,184

(7) Central plaza (Center)

Building	6,000 m^2 x 400	=	2,400	
Plaza	15,000 x 100	=	1,500	
Landscaping	18,000 x 40	=	720	
Parking, Terminal	20,000 x 15	=	300	
Others (sign.lights)	(4,920) x 0.2	=	984	
			5,904	5,904

Rp.million

(8) Sports facilities

Gymnasium	2,000 m^2 x 500	=	1,000	
Club houses (total)	1,000 x 400	=	400	
Warehouses	800 x 250	=	200	
Tennis courts	20 courts x 9,000	=	180	
Volley, Basket courts	10,000 x 10	=	100	
Ground	24,000 x 20	=	480	
Grass field	28,000 x 8	=	224	
Parking (total)	36,000 x 15	=	540	
			3,124	3,124

(9) Picnic area (net area only)

Lawn field	60,000 x 0.8 x 15	=	720	
Grass field	40,000 x 0.8 x 8	=	256	
Bath house	2,000 x 150	=	300	
Toilet	600 x 300	=	180	
Board walk	3 m x 1,500 m x 60	=	270	
			1,726	1,726

(10) Orchid Garden

Rest house	200 m^2 x 350	=	70	
Glass house	500 m^2 x 200	=	100	
Garden	40,000 m^2 x 20	=	800	
Exhibition hall	200 m^2 x 200	=	40	
Pedestrian way	2 m x 2,500 m x 10	=	50	
Warehouse	300 m^2 x 100	=	30	
			1,090	1,090

Rp.million

(11) Miniature golf

Course	18 holes x 25 m^2 x 40	=	18	
Landscaping	24,000 x 15	=	360	
Others (light, booth)	1 x 50	=	50	
			428	430

(12) Seminar house

Building	2,000 m^2 x 300	=	600	
Landscaping	10,000 m^2 x 30	=	300	
			900	900

(13) Diving school

Building	500 m^2 x 300	=	150	
Pools	1 m^2 x 400	=	400	
Garden, parking	2,000 m^2 x 15	=	30	
			580	580

(14) Open air theater

Theater	1,200 m^2 x 50	=	60	
Garden	1,500 m^2 x 20	=	30	
Grass field	8,000 m^2 x 8	=	64	
Equipments	1 m^2 x 30	=	30	
Parking	6,000 m^2 x 15	=	90	
			274	274

(15) Golf course

Course	6,500 m x 40 m x 20	=	5,200	
Club house		=	400	
			5,600	5,600

Rp.million

(16) Play ground

Ground	10,000 m^2 x 15	=	150	
Nursery house	200 m^2 x 300	=	60	
Garden, parking	3,000 m^2 x 15	=	45	
			255	255

(17) Giant maze

Giant maze	6,000 m^2 x 60	=	360	
Garden, parking	8,000 m^2 x 15	=	120	
			480	480

(18) Athletics field

Pedestrian way (soil)	2 m x 3,000 m x 3	=	18	
Athletic tools	30 x 200	=	6	
Garden	5,000 m^2 x 15	=	75	
Rest house	400 x 250	=	100	
			199	199

(19) Horse back riding

Field	6,000 m x 10	=	60	
Course	2 m x 5,000 m x 8	=	80	
Parking	1,500 m^2 x 15	=	23	
Fence, others	1 x 10	=	10	
Horse	30 x 500	=	15	
Club house	200 m^2 x 300	=	60	
Warehouse, horse hatch	400 x 100	=	40	
			288	288

Rp.million

(20) Theme park

Pavement	20,000 m^2 x 15	=	300	
Pavilion	15 x 100 m^2 x 300	=	450	
Garden	20,000 m^2 x 20	=	400	
Others			50	
Parking	2,000 m^2 x 15	=	30	
			1,230	1,230

(21) Camping area

Grass filed	20,000 m^2 x 8	=	160	
Shelters, toilets	1,500 x 150	=	225	
Walk way	2 m x 2,000 m x 3	=	12	
			397	397

(22) Economical lodge

Losmen	1,500 m^2 x 200	=	300	
Garden	1,000 x 10	=	10	
			310	310

(23) Employee's village

Houses	22,000 m^2 x 5	=	1,100	
Roads, etc. (Improvement of laborers quarters)	(57,000 - 22,000) x 5	=	175	
Training school	400 m^2 x 200	=	80	
			1,355	1,355

Rp.million

(24) Road

Paved road	6 m x 9,800 m x 10	=	588
Pedestrian walk	3 x 10,500 x 3	=	91
Bicycle, jogging	3 x 4,200 x 4	=	51
Bridge (main road)	3 x 6 m x 30 m x 1,000	=	540
Bridge (pedestrian)	4 x 3 m x 30 m x 700	=	252
			1,522

1,522

	Stage 1		Stage 2	
P.R.	7,000 m	420	2,800 m	168
Ped.	8,200 m	71	2,300 m	20
B.J	1,400 m	17	2,800 m	34
Bridge (m.r.)		360		180
Bridge (ped.)		189		63
		1,057		465

(25) Storm drainage (Refer to Table B-4-1) 60

(26) Sewage treatment (Refer to Table B-4-2) 3,142

(27) Solid waste disposal (Refer to Table B-4-3) 36

(28) Electricity 920

(Connection Charge: Refer to Table B-4-4,
Construction: PLN's work)

(29) Water supply (Refer to Table B-4-5) 2,529

(30) Telephone (PERUMTEL's work) 0

(31) Access road 900

(32) Miscellaneous 2,194

Gate, fence, bus stop shelters, lights, signs,
rental goods, playing tools, etc.
(Above all) x 2-3%

			Rp.million
(33)	Land acquisition		
	312 ha x 0.3 x Rp.500/m^2	=	468 million
	80 household x 500,000/h.h	=	40
	Administration fee		8
	Total		---
			516 516

Table B-4-1 STORM DRAINAGE

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Drainage Ditch		m	10,000	90,000	100,000	600	6	54	60	Open conduit width = 1.0 m depth = 0.5 m

Note: Road Site gutter's cost is included in the cost of roads

Table B-4-2 SEWAGE TREATMENT

<1st Stage>

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Treatment Plant		m^3	300,000	200,000	500,000	3,100	930	620	1,550	
2. Sewer	ø300 PVC	m	5,300	47,700	53,000	1,000	5	48	53	
	ø200 PVC	m	4,000	36,000	40,000	1,300	5	47	52	
	ø150 PVC	m	2,700	24,300	27,000	6,100	16	149	165	
3. Out Fall Pipe	ø250 PVC	m	4,700	42,300	-	1,000	1	9	10	
4. Others	Booster Pump Manhole	unit	-	-	-	1	64	93	157	
Total							1,021	966	1,987	

<Total>

Items	Description	Unit	Unit Cost (Rp.)			Quantity	Total Cost (Rp. 10^6)			Remarks
			F/C	L/C	Total		F/C	L/C	Total	
1. Treatment Plant		m^3	300,000	200,000	500,000	5,200	1,560	1,040	2,600	
2. Sewer	ø300 PVC	m	5,300	47,700	53,000	1,000	5	48	53	
	ø200 PVC	m	4,000	36,000	40,000	1,300	5	47	52	
	ø150 PVC	m	2,700	24,300	27,000	8,900	24	216	240	
3. Out Fall Pipe	ø250 PVC	m	4,700	42,300	47,000	200	1	9	10	
4. Others	Booster Pump, Manhole	unit	-	-	-	1	79	108	187	
Total							1,674	1,468	3,142	