2.2 Socio-economy and Finance

2.2.1 Present population

The Study Area consists of following administrative units as shown in *Fig.* 2.1.

a. 11 units of Kecamatan
b. 142 units of Kelurahan
c. 788 units of RW and 4,228 units of RT

The population of the city was 944,372 persons in 1990, and 1,019,948 in 1993. Recently, since 1980, the population has increased rapidly and especially from 1985 to 1990 annual growth rate of 4.65% has been reported. The average population density of the whole Study Area at present is 58 persons/ha, and its delineation between the 7 central Kecamatans and 4 suburban Kecamatans are 225 persons/ha and 36 persons/ha, respectively.

There is a tendency of population decrease in the central parts, while the population in the suburbs has been increasing very rapidly. It is noted that recent increase of the population is caused by both factors of natural increase and social increase.

2.2.2 Existing land use

With the rapid increase of the population, the urban area has considerably expanded to 7,130 ha, which is 41% of the total area, with an annual average increase ratio of nearly 10 % since 1979. Non-urban area has decreased to 10,450 ha, which is 59 % of the total area, at present as shown below.

Year	1979 *a)	1989 *a)	1994 *b)
urban area	2,142 ha(12%)	6,824 ha(39%)	7,128 ha(41%)
non-urban area	15,435 ha(88%)	10,753 ha(61%)	10,449 ha(59%)

Source : *a) Buku Repelita KMUP 1989/90-1993/94
*b) estimated by the JICA Study Team

Note : Urban area means built-up areas involving residential, commercial, industrial, institutional, urban open space and road. Non Urban area means non built-up areas involving vacant land, dry field, paddy field, fish pond and river.

Existing land use of the whole Study Area is shown in *Fig.* 2.2.

2.2.3 On-going plans/programs and projects

(1) Housing and settlement development

The extension programs of the Antang and Tamalanrea PERUMNAS housing areas are progressing as follows.

a. Antang PERUMNAS

Around 4,500 units of housing for low and middle income group within 100 ha to the east of the existing Antang PERUMNAS area.

b. Tamalanrea PERUMNAS

Around 6,000 units of housing, especially for middle income group, within 200 ha to the east and south of the existing Tamalanrea PERUMNAS area.

The *Fig.* 2.3 shows the location of new housing areas. The situation of new housing areas which includes already developed/settled, under construction and planned areas are as follows.

a. Total new housing area : 1,500 ha at the end of 1994
b. Existing PERUMNAS area : 400 ha
c. Existing private housing area : 350 ha
d. Extension plan area of PERUMNAS : 300 ha
e. Areas under construction and proposed by private developers : 450 ha

(2) Slum areas

The slum areas can be found in the fringe of the central parts. The total area of the slum is more than 800 ha and number of household is 19,000 and population is 114,000 persons. This is about 11 % of the total population of the city. The population density of the slum area is quite high and living condition is very bad. Considerable efforts on improvement of the slum areas have been made since 1984 by KIP program in Urban III and V. Such improvement programs are still progressing under IUIDP and other programs.

(3) Highway network development

The first priority of the implementation of the highway road construction was determined by the local government of Tk. I and II as follows.

1) The inner ring road between Jbt. Toll Tallo and Jln. Sumiharjo scheduled to open by August 1995

2) The middle ring road between Jln. Perintis Kemerdekaan and the central radial road, to open until 1997

3) The inner road between Jbt. Toll Tallo and the Makassar harbour, to open until 1998

4) The central radial road between Jln. Veteran and Jln. Lingkar Tengah, to open until 1999

The long-term highway development of the inner, middle and outer ring roads, and central radial road are scheduled to be implemented as follows.

1) Inner ring road during REPELITA VI-VII, up to 2004

2) Middle ring road during PELITA VI-VII, up to 2002

3) Outer ring road during REPELITA VII-VIII, up to 2007
First segment between Jln. Urip Sumiharjo and the cross point to the middle ring road at Antang, from 1999 to 2004

4) Central radial road during REPELITA VI-VII, up to 2001

5) The artery road between Jbt. S. Jeneberang and Palanga and Inside of Barombong during REPELITA VII-VIII, up to 2009
First segment between Jbt. S. Jeneberang and Palanga, from 2004 to 2007

(4) GMTDC project

The Gowa Makassar Tourism Development Corporation (GMTDC) was established with the participation of the Governor of the South Sulawesi, the Mayor of Ujung Pandang, the Bupati of Gowa Regency and several private enterprises in 1991 for creating a tourism area at Tanjung Bunga.

The development concept of the area has been altered from its original tourism-oriented image to urban-oriented one to provide large-scale housing estates with business, commercial, cultural and recreational facilities.

The key issue on the GMTDC project concerning the JICA Study is wastewater management of the GMTDC area. This would require further co-ordination in later stage once the GMTDC scheme became concrete.

(5) Other infrastructure development programs

1) IUIDP

IUIDP, that has started in 1992/93, is one of the key program for development of integrated urban infrastructure involving urban road, drainage, solid waste, sanitation and KIP. The Batch II of the program is now in the appraisal stage and the major development projects in the Batch I of the program are mentioned below.

a. Urban road

This scheme consists of construction of new roads such as Inner and Middle Ring roads and rehabilitation/maintenance of the existing roads and provision of equipment such as road rollers and asphalt sprayers.

b. Drainage

This scheme consists of improvement/rehabilitation of the existing drainage covering 1,500 ha in the old urban area and development of drainage covering 4,700 ha in new areas to expand the service areas up to around 6,200 ha in total. The primary channels of Panampu, Jongaya and Sinrijala have already been constructed in 1992 and construction of Pampang River channel, as well as development of secondary/tertiary channels, is now on-going.

c. Solid waste

The existing TPA is located in Tamangapa with an area of 5 ha. It is planned to provide appropriate equipment and to expand the area to cope with the increasing demand of solid waste disposal and at the same time the municipality is looking for new potential TPA sites for long-term requirement of solid waste management.

d. Sanitation

Program of installation of MCK and other sanitary facilities are under progress and concurrently the introduction of off-site system and other alternative systems for wastewater management are under consideration.

e. KIP

21 locations of the existing slum areas, covering a total area of around 700 ha, are planned for improvement of their living conditions by development of access roads, drainage, MCK, TPS, etc.

2) Water supply (PDAM)

PDAM is planned to increase the capacity through construction of the Bili-Bili dam in the upstream of Jeneberang River in Gowa and installation of Somba Opu water treatment plant that is under construction. The first stage project will be completed by 1999. After completion of the whole project, 80% of the total city area could be served by PDAM.

3) Flood control

The Jeneberang and Tallo rivers are the main sources for flooding of the city. The management of flood control of the Jeneberang river is carried out by dredging, building the Bili-Bili dam, river bank protection and development of drainage. The Bili-Bili dam is planned not only for flood control, but also for hydroelectricity, irrigation and waters supply as a multipurpose dam.

2.2.4 Urban development in the surrounding area (MINASAMAUPA Concept)

The integrated approach to develop the urban area covering Ujung Pandang, Maros and Gowa as a metropolitan area, called MINASAMAUPA Concept, has been formulated and initiated by Cipta Karya in an attempt to involve all related sectors and all levels of government relating to the development of the area. The study was concluded in the form of "Review of MINASAMAUPA Metropolitan General Plan" in 1992.

2.2.5 Economy

(1) Macrocconomy

1) Aggregate supply

The year 1994 proved to be another year of steady progress for Indonesia. On the macroeconomic front, the country kept in shape with an estimated annual real growth rate of GDP standing at about 7 per cent rising from 6.5 per cent growth during 1993. The gross domestic product (GDP) at current price amounted up to $144.6 billion at the end of 1993/94, and the gross national product (GNP) per capita increased to $720 with the total population of 192.7 million. This growth in aggregate supply was largely due to an accelerated effort in the substantial structural reforms aiming at building strong foundations for the Indonesian economy.

The Key Economic Indicators (1)

Population (1994, estimate)	192.7 million
GDP (1993, current price)	$ 144.6 billion
GNP (1993, current price))	$ 136.4 billion
GNP per capita (1993, current price))	$ 720.0
Annual Real Growth Rate of GDP (1993)	6.5 %

Source: Indonesian Central Bureau of Statistics

2) Price, external sector, distribution

On the other side, the Indonesian economy also had to bear full blunt of adverse effects of the recent higher growth vis-à-vis persistence of price pressure, deterioration in the balance of payments, increased fiscal deficits, rising domestic and external borrowings, and exchange rate volatility against the yen. Rapid expansion of demand (largely attributable to the growth of domestic consumption at 18 percent followed by fixed capital formation at 15.3 percent and exports at 14.8 percent) together with supply constraints particularly low rice production resulted in the higher inflation rate standing at 10.2 percent in 1993. Severe shortages of cement and paper which have taken place since late last year also contributed to the hike in consumer price index[1].

Largely due to a bulk of goods and services import associated with a growing export, the external sector performance as borne out by current account has been deteriorated with a projected deficit of $3.6 billion in 1994. Non-oil exports, which now account for 70 percent of total exports, grew 15.6 percent in 1993 to a little less than $27.2 billion while its growth was merely 6.7 per cent first six months of the year. External debt outstanding reached $86 billion in 1994, of which 28 percent emanates from the private sector commercial banks[2].

The real effective exchange rate (REER), an estimated macroeconomic indicator of international competitiveness of the currency[3], continued the gradual depreciating trend since 1986 with the index of about 30 percent in 1994 as per 1985 level, or about 12.6 percent of depreciation in average per annum. This implies that the nominal rupiah depreciation of 4 percent in 1994 against the dollar was to some extent lower given the economic fundamentals of Indonesia and other major trade counterpart countries.

Meanwhile, there has been an improvement to a certain extent on the welfare front of the economy since 1993. In the wake of past effort, the national incidence of poverty declined to about 14 percent of the total population downsizing from 60 percent in 1970. In absolute term, the number of the poor in the country stands at 27 million with 18 million rural poor outnumbering 9 million urban poor.[4] By ministerial decree, minimum wage was increased in 1995 to Rp.4,600 per day in Jakarta and West Java, followed by other provinces all over Indonesia with regional adjustments ranging from 19 to 45 percent[5].

Little progress has been made to create new productive job opportunities in the society since 1990, where the 2.5 million new entrants set foot in labor markets each year. The unemployment rate has shifted from 2.5 percent in 1990 to 2.82 percent in 1993 whereas the under-employment rate slightly decreased from 39.1 percent to 37.9 percent during the same period.

3) Public finance

Largely due to the fairly realistic and conservative fiscal stance which the government adopted as part of a stabilization program, the approved 1994/95 state budget income and expenditure (APBN) was

Rp.69.7 trillion increased only by 2.5 percent in real terms from the previous year. Of this, oil and gas revenue accounted for 18.4 percent while the tax revenue reached 57.5 percent with Income tax, Value-added Tax and Land and property tax combining to a total of 84 percent of tax revenue as a whole.

In addition to the ever declining crude oil price, the combination of stagnant oil production and the rising domestic consumption curbed proceeds from domestic petroleum product sales to the state, thereby worsening the fiscal and the current account positions in 1993. The deficits in central government operations and current account were Rp.1.3 trillion and $2.9 billion, or 0.4 percent and 2.0 percent of GDP, respectively.

The Key Economic Indicators (2)

State Budget (1994)	Rp.69,749 billion
Central Gov Fiscal Deficit as per GDP (1993)	0.4 %
Current Account Balance as per GDP (1993)	-2.0 %
Annual Rate of Inflation (1993)	10.2%
External Debt Outstanding (1993)	$ 83.3 billion
Debt Service Ratio (1993)	31.6 %
Minimum Wage Rate in Ujung Pandang (1995)	Rp.3,100/day
Minimum Wage Rate, Jakarta (1995)	Rp.4,600/day

Sources: Asian Development Bank *Asian Development Outlook 1994, Cipta Karya,* 1995

(2) Regional economy

1) South Sulawesi province

The nominal Gross Regional Product (GRP) of South Sulawesi province in 1992/93 was Rp.6,071 billion in 1992. Of this aggregate supply, the large part emanates from the agricultural sector with 43.5 percent followed by other major sectors, vis-à-vis, the commercial (trade), restaurant and hotel sector, the manufacturing sector, the public service and defense sector, the transport and communication sector, the mining sector and the construction sector in that order accounting for 18.4 percent, 8.8 percent, 8.4 percent, 7.3 percent, 4.2

percent, and 3.4 percent, respectively. With the total population of a little more than 7.2 million, the nominal Gross Regional Product (GRP) per capita of South Sulawesi Province was about Rp. 840 thousand (equivalent to $391 as per 1992 foreign exchange quotation) which stands at 51 percent of the GNP per capita. Viewed in this light, productivity of human resources, as borne out by the GRP per capita, in South Sulawesi was placed well below the national average with the twenty-first place out of the total twenty seven provinces in Indonesia[6].

The Key Economic Indicators of South Sulawesi

Population (1993)	7.2 million
GRP (1992, current price, Rp. 2150/$)	$ 2,823.8 million
GRP per capita (1992, current price))	$ 390.7
Regional Income per capita (1992, current price)	$ 357.3
Annual Real Growth Rate of GDP (1992)	7.5 %
Annual Rate of Inflation (Ujung Pandang, 1993)	5.9 %

Source: South Sulawesi Statistical Office *Sulawesi Selatan Dalam Angka*, 1993

2) Ujung Pandang

The city of Ujung Pandang, the gateway to eastern Indonesia and the capital of South Sulawesi Province, is 175.8 square kilometers with the population of slightly above one million (1,019,948) in 1993[7]. About 40 percent of the city is urbanized with the remaining 60 percent essentially the rural area comprising fish ponds, swamps, tree plantation, gardens and rice fields. Administratively, Ujung Pandang has full city status (*kotamadya*) with the mayor reporting directly to the governor.

On the macroeconomic front, Ujung Pandang has made a steady and substantial progress during the period 1988/89 - 93/94 as borne out by several economic indicators. The nominal Gross Regional Product (GRP) in 1993 was Rp. 1,338.9 billion (about $622.7 million) rising from Rp. 683.02 billion in 1988 with the average annual growth rate of 14.3 percent. In real term, the aggregate supply of the region was Rp. 1,044.6 billion ($485.9 million) in 1993 as per 1988 price

increased by 9.0 percent annually in average since 1990. The GRP per capita and the regional income per capita in 1993 were Rp. 1.31 million ($610.5) and Rp. 1.122 million ($521.9) which outnumber those of South Sulawesi by 56.1 percent and 45.8 percent, respectively.

The Key Economic Indicators of Ujung Pandang (1)

Population (1993)	1.02 million
GRP (1993*, current price, Rp. 2,150/$)	$ 622.7 million
GRP per capita (1993, current price))	$ 610.5
Regional Income per capita (1992, current price)	$ 521.9
Annual Real Growth Rate of GRP (1993)	91.%
Annual Rate of Inflation (1993)	5.9%

Key Economic Indicators of Ujung Pandang (2), current prices

	1989	1990	1991	1992	1993
GRP (Rp. Billion)	794.2	921.3	1,029.1	1,171.1	1,338.9
Depreciation	104.8	119.7	139.0	157.6	178.5
Net Indirect Tax	34.4	36.8	46.3	54.5	59.9
Regional Income (Rp. Bill)	654.9	764.7	843.7	958.9	1,100.3
Regional Income pc (Rp.'000)	720.6	817.6	886.7	997.7	1,122.9

Source: BAPPEDA II *Produk Domestik Regional Bruto Per Kecamatan KMUP*, 1993

In respect of the industrial structure, the tertial (service) sector accounts for about 80% of the aggregate supply of the Region. A large part of GRP emanates from the commercial (trade) hotel and restaurant sector with 41.2 percent of share in 1993 followed by the transport and communication sector (19.3%), manufacturing (15.07%), construction (4.9%), public administration/defense (4.5%), finance (3.8%), agriculture (3.6%) and others. Of these, the manufacturing sector made a remarkable growth of 19.3% in real term since the previous year in 1992. In the subsequent year, the construction and the energy (electricity, gas and water) sectors marked above 12 percent real growth while other sectors merely posted the modest annual growth of around 5 to 7 percent. The expansion of the construction and the

energy sectors also can be seen from the increasing contribution of investments in Ujung Pandang that reached 13.0 percent in 1993[8].

2.2.6 Public finance

Generally, the financial position of local government is weak on account of volatile tax base in the region and the central government regulations which constrain self-efforts to raise funds through financial markets. While South Sulawesi and Ujung Pandang governments well manage the economy to date, the current financial position confined government activities to a limited extent. Government interventions in market economy, as measured by the share of public consumption out of aggregate demand, remain very low with 2.3 percent and 4.5 percent for South Sulawesi and Ujung Pandang, respectively.

(1) South Sulawesi Government

While weakening financial base of provincial governments and subsequent imbalanced regional growth become a growing concern for the government, macroeconomic management of the South Sulawesi provincial government has been rather sound with its balance budget policy in view. The provincial budget (*APBD* I) was Rp.149.0 billion in 1993 rising from Rp. 51.6 billion in 1987. Own revenue (PAD) in 1993 was Rp.31.8 billion which grew by 10.1 percent per annum over the period of 1989 through 1993. The indirect borrowings from foreign sources are negligible so far and are said to be amortized by the central government. [9] The budget balance at the end of each fiscal year (*UKP*) has been carried forward as an opening balance for the following year.[10] In 1993, UKP was Rp.8.6 billion accounting for 5.7 percent of the total provincial budget.

Financial Position of South Sulawesi Province, 1989/90 - 1993/94

(Rp. billion)

	1989	1990	1991	1992	1993
Total Provincial Budget	75.3	103.3	130.1	137.6	149.0
Routine Budget/	37.8	45.6	53.0	61.5	69.6
Development Budget	37.5	57.7	77.1	76.1	79.4
of which Own Revenue	21.6	31.1	40.3	34.4	31.7

Source: BAPPEDA Tk. I

(2) KMUP

The local government financial system is on a cash accounting basis which records income and costs only when cash is received and dispensed from the city safe. There is a macroeconomic equilibrium policy for the city budget to redress balance between revenue and expenditure. No forecast on annual surplus or deficit is made at the outset of the fiscal year. The budget balances at the end of fiscal year are carried forward as opening balances of the following year.

The Ujung Pandang city budget (APBD II) inclusive of all the sources of internal and external funds grew by 15.9 percent per annum rising from Rp.36.6 billion in 1990 to Rp.66.0 billion in 1994[11]. Besides the development of regional economy, the potential of Ujung Pandang could be demonstrated in the growth of PAD (own revenue). The 1994 RIAP (Revenue Improvement Action Plan) Study Report under the Integrated Urban Infrastructure Development Program (IUIDP) under the finance of the World Bank[12] shows that out of the nine major cities in the Sulawesi island, Ujung Pandang had the largest PAD amounting to Rp.15.9 billion in 1993, followed by Manado (Rp.7.7 billion), Palopo, Bone, Kendari, Golontalo, Bitung and Pare-Pare, in this order. During 1989 through 1994, PAD grew by 16.4% per annum for Ujung Pandang. At the completion of REPELITA V, the realization of PAD was high above the targeted amount of Rp.12.5 billion. Furthermore, the RIAP study projects that during REPELITA VI (1994-98) the revenue attributable to the city's higher income generating capacity would increase from Rp.12.5 billion in 1994 to around Rp. 23.5 billion.

Notwithstanding, the City has been heavily dependent on external funds in the forms of central/provincial grants and loan for the bulk of its revenue. In 1990, subsidy to autonomous *regions (Subsidi Daerah Otonomi, SDO)*, development grants (Presidential Instruction (*INPRES*) or *Instruksi Presiden*, and sectoral development expenditures (DIP) or *Dafter Isian Proyek*), and loan covered almost three quarters (72.5 %) of the local budget, with SDO, INPRES (general, II), APBD I and loans accounting for 41.5 percent, 18.8 percent, 2.1 percent and 8.6 percent, respectively. Disaggregating the FY1993 annual budget of Dinas Kebersihan, a large chunk of 60 percent of the budget emanated from external fund sources inclusive of APBN, INPRES II and World Bank loan.[13]

Further concern over the city's sound financial management would be the City's financial obligation to cover the debt services which amounted to Rp. 3,422.1 million, or one-third of PAD and about 5% of the 1994 local budget[14]. Volatility in sector growth would depend on this factor outside the control of the city government and would place greater pressure on its financial maneuverability in the years to come.

Financial Position of the City Government (1), 1990/91-95/96

(Rp. million)

	1991	1992	1993	1994	1995
Revenue	38,362	46,707	60,439	66,044	80,890
Expenditure	38,265	46,622	60,370	65,419	80,265
Debt Service	3,494	3,963	3,640	2,424	4,812

Source: BAPPEDA Tk. II, Hasanuddin University, 1995

2.2.7 Sector policy and investment

(1) Sector policy

With due recognition of the government strategy in the past which emphasized physical infrastructure targets and not policy and institutional frameworks with which the overall policy objective of sustainable urban/rural environment management be achieved, the government issued in 1987 a National Policy Statement for Urban Development representing a consolidated view of development in the sector.[15] While the principal objectives being incorporated in REPELITA V (1989/90-93/94), the Statement outlines the sector policy as follows:

i) Strengthening local governments to assume the lead role in developing, operating and maintaining local services on a sustainable basis over the long term.

ii) Improving the planning and programming of urban infrastructure investments.

iii) Mobilizing local revenues and optimizing their use.

iv) Implementing a coordinated financing system for the development and administration of local services.

v) Strengthening the consultative process at the different levels of government with emphasis on local participation.

The Integrated Urban Infrastructure Development Program (IUIDP) was the tool for the government to set these policy objectives into operation. The problems and issues left unsolved during the past REPELITAs are detailed in the Supporting Report.

(2) Sector investment

The government investments in urban infrastructure have not been adequately met with the needs. By the end of REPELITA V, less than 5 per cent of urban residents are served by operating sewer systems which are confined to Jakarta, Bandung, Semarang, Medan, Cirebon, Tangerang and Yogyakarta. There are on-site systems in 337 cities where around 35-40 percent of urban residents use septic tanks, drainage fields and leaching pits. In Jakarta, only one percent of about 200,000 cubic meter of daily septage discharge was treated by the City system, and the rest was discharged directly into canals and rivers. Similarly, some form of garbage collection have been provided to about 40 percent of urban residents. Facilities had been introduced or improved in 292 urban areas and about 55 percent of total solid waste was handled through some kind of formal system. Nonetheless, access of solid waste collection and disposal is very much unevenly distributed in the area. In some well-managed cities in Java, such as Semarang, up to 80 per cent of the households have municipal waste collection whereas around 20 per cent of the households being served in Kalimantan[16]. What's worse, only 19 percent of the urban poor largely living in congested Jakarta kampung communities are provided with garbage collection service.

1) The sewerage and solid waste subsectors

As noted above, the solid waste and sewerage subsectors have been particularly under-funded to meet urgent needs of urban and rural residents, particularly those in densely populated areas, for the minimum level of community services. While public health and human settlement-related sectors[17] were given priority with expenditures amounted to Rp. 9.3 trillion (equivalent to $ 4.4 billion), representing about 10 percent of the total outlay under REPELITA IV, the solid waste, sanitation, and sewerage/drainage subsectors together with received a marginal 3 percent share of the total outlays with only $ 3.96 million (0.42%), $ 15.77 million (1.68%), and as low as "negligible" (0%), respectively. The subsectors concerned were again

the smallest recipients under REPELITA V, with even a smaller chunk of 2.35 percent of the total, with only $ 3.98 million (0.33%), $ 29.69 million (2.0%), and $ 0.322 million (0.02%), for the solid waste, sanitation and sewerage subsectors, respectively.

In the meantime, aside from the public sector investment, much of the expenditures on sanitation in all over Indonesia were met by individual families. By the World Bank estimate, the total investment made by households so far in Jakarta amounts to Rp.360 billion (some US 180 million) with 900,000 on-site human waste facilities and per installation cost of Rp.400,000 (indicative cost of a twin-pit latrine) as given.[18]

2) Revised REPELITA VI investment plan (SARLITA)

In June 1995, Cipta Karya submitted the revised Memorandum Program REPELITA VI, Sektor Perumahan dan Permukiman, or SARLITA (a Yearly Development Budget) to BAPPENAS. The overall budget for the environmental sanitation (PLP) which pertains to the sewerage, the solid waste and the drainage subsectors during REPELITA VI stands at Rp.1,295.7 billion, assuming about 22.6 percent of the total budget allocation to Cipta Karya (Rp.5,740.6 billion), and a marginal share of 0.7 percent of the total development outlays which was initially set at Rp.175,967.7 billion (around US$ 83.8 billion).[19] This figure further declines to Rp.881.8 billion, or 0.5 percent, provided that the allocation confines to sewerage and solid waste subsectors with 0.29 percent and 0.21 percent, respectively. From the view point of national economy, the subject subsectors together account for 0.06 percent of GDP (Rp.310,890 billion) as per 1994 price given that the subject subsectoral expenditures be spread evenly over the five-year period. With a view to facilitating the perusal of the subsections above, the size of investment outlays to the sewerage and solid waste subsectors during REPELITA VI will be briefly illustrated as follows.

In the meantime, of the total PLP allocation, Rp.41,925 million, or 3.2 percent, goes to South Sulawesi province.

Revised Budget Allocation for Sewerage and Solid Waste Subsectors during REPELITA VI (Rp. Billion)

	Sewerage	Solid Waste	Drainage	Total
Indonesia	512.8	369.1	413.8	1,295.7
South Sulawesi	14.3	12.4	13.6	40.3
Ujung Pandang	0	8.9	11.3	20.2

Source: Cipta Karya Ibid., 1995

Revised Budget Allocation for Sewerage and Solid Waste Subsectors, 1994-1998 (Rp.Billion)

	1994	1995	1996	1997	1998	Total
Sewerage	77.3	104.4	107.3	110.3	113.5	512.8
Solid Waste	59.8	67.1	73.8	80.8	87.6	369.1
Drainage	62.7	71.3	81.6	92.1	106.1	413.8
Total	199.8	242.8	262.7	283.2	307.2	1,295.7

Source: Cipta Karya Ibid., 1995

Reference

[1]In early 1995, the price of long fiber pulp rose to US$935 per ton from $450 in early 1994 while that of short fiber pulp increased by 107 percent arising from $400 to $885 over the same period. As well, the prices of old-newspaper (ONP) and computer print-out (CPO) jumped from $110 to $250 and from $270 to $550 per tons, respectively. (Source: *Indonesia Business Weekly*, Vol.III, No. 23, 22 May 1995, p.5)
[2]By estimate of the World Bank, external debt was $90 billion at the end of the fiscal year 1993.
[3]Real Effective Exchange Rate index translates nominal exchange rate changes against a trade weighted basket of currencies of major trade partners adjusted by relative inflation differentials. (Ref: WB *Operational Manual Statement* No.1.11 Annex A2, 1988
[4]The official poverty line is still austere such that the numbers of the overall, urban and rural poor alter by another set of poverty lines. See World Bank *Poverty in Indonesia: Official Poverty Estimates and Poverty Measurement Issues*, 1993
[5]Sources: Asian Development Bank and *Cipta Karya*, June 1995.
[6]Source: Ministry of Home Affairs *Kota Keuangan 1992/93*
[7]Source: Kantor Statistik KMUP *KMUP Dalam Angka 1993*, May 1994
[8]Source: Kantor Statistik Sulawesi Selatan *Dalam Angka 1993*, May 1994 , p.319
[9]Source: BAPPEDA I, Provincial government
[10]UKP is incorporated into routine budget of the following year.
[11]Penetapan Sisa Perhitungan Anggaran Pendaoatan Dan Belanja Daera KMUP
[12]In tandem with the implementation of the Local Institutional Development Action Plan (LIDAP) study, RIAP was originally included in the Physical Urban (Development Plan (PJM) to supplement a physical plan therein.
[13]Regarding the financing mechanism, refer to 2.2.6 in this chapter.
[14]*Pendapatan Asli Daera, Public Saving dan Angsur an Piniaman/Hutang dan Bunga, 1989-94*
[15]By the mid-1980s the experiences of the government and donor-assisted projects led to a shifts in approaches to the urban sector.
[16]Ref: UNDP-WB *Water Supply and Sanitation Sector Review, Strategy, and Action Plan Preparation* (draft), Oct 94, p.55
[17]Specifically, Public Health/Social Welfare, Housing and Human settlements, and Natural Resources/Human Environment sectors are included.
[18]WB, *op. cit.*, 1993, pp. 70-72
[19]*OECF Research Quarterly*, No. 80, 1994, *JICA Expert Report on Solid Waste Management in Indonesia* (Japanese, 1994) cites the figure as 1.6%.

2.3 Sanitation and Environment

2.3.1 Sanitation facilities

In Study Area many households have their own on-site facilities like septic tanks and leaching pits to treat blackwater. Based on the result of field survey, almost all individual on-site systems, so-called septic tanks, function as leaching pit and in consequence cause serious groundwater contamination, especially in highly urbanized area. Hotels, department stores, institutional buildings and factories have their own treatment facilities though they do not have any graywater treatment facilities except for KIMA industrial estate which has own wastewater treatment plant.

Low income people still can not afford to construct their own toilet facilities. To provide basic sanitation service for them many types of public toilet have been constructed, but their capacity is still not enough. As a result there are not so few low income people without any toilet facilities, especially in slum areas. Based on the result of field survey the popultation who lack any toilet facilities reaches more than 60% in slum areas and 2% in the remaining area.

Dinas Kebersihan has five (5) vacuum trucks for septage collection service and collected septage is transported to Antang septage treatment plant.

Presently there are about 400 TPS in the Study Area for solid waste collection, and Dinas Kebersihan have 105 collection vehicles including 19 armrolls and collected solid waste is disposed of at Tamangapa final disposal site.

2.3.2 Water environment

The water environment of the Study Area covers all three major elements of surface water, groundwater and sea water. The major surface waters are Tallo River and Jeneberang River. The other surface waters are the internal drainage canals that essentially carry the urban surface run-off from the Study Area.

Sea coast of Makassar Strait forms the western boundary of the Study Area. In fact Ujung Pandang is the largest port city of Sulawesi Island.

The groundwater table level in the Study Area is essentially shallow, especially along the coastal area, that gradually becoming deeper toward the inland areas in the eastern direction.

(1) Surface water

The largest surface water body in the urban area of Ujung Pandang is Panampu-Jongaya canal, the major drainage canal. In addition, there are many small drains that crisscross the city center, some discharging directly to sea and others to Panampu-Jongaya canal.

Most of these canals in the city center are visibly polluted. This is confirmed by the water quality survey conducted by the Study Team, during the dry season in August 1994. The BOD level in most of these canals were measured to be in the range of 120~180 mg/ℓ. Moreover bacterial pollution, measured as total coliform (TC), exceeded 10^3 No./100 mℓ, with a maximum of about 10^6 No./100 mℓ.

The water quality standards of DKI Jakarta (Governor's Decree No. 1608, 1988) categorizes the potential use of a river into four (4) classes based on its quality, including that of BOD.

This classification with respect to BOD is as follows:

Class	Intended Use	BOD
A	Drinking water source	≤5~10 mg/ℓ
B	Fishery	≤20 mg/ℓ
C	Agriculture	≤20 mg/ℓ
D	Aquatic Biota	≤30 mg/ℓ

The measured BOD level of 120~180 mg/ℓ in canals is well above the least permissible standard limitation of 30 mg/ℓ as BOD, for Class-D use (conservation of aquatic biota), as per the above standards.

The dry season water quality of canals and rivers, as BOD, in the Study Area is classified as shown in *Fig.* 2.4. This classification is made based on sampling results and available water quality data as well as field observation conducted by the study team.

Based on the above, it is evident that most canals and drains crisscrossing the city center of Ujung Pandang are highly polluted, both organically (BOD) and bacteriologically (TC). They have no beneficial use other than as open sewers.

The principal cause of this water quality deterioration is attributed to the discharge of untreated graywaters that arise from the miscellaneous human activities of washing, bathing and cooking. The discharge of human waste (blackwater) due to population with inadequate and no on-site sanitation facilities like septic tanks and leaching pits may also be a significant contributory factor.

(2) Groundwater

Groundwater quality with respect to bacterial pollution is the most important aspect in assessing a groundwater. In this regard, groundwater quality deterioration in the entire Study Area, including the rural areas beyond the city center, is rather widespread.

This observation is both based on sampling conducted by the Study Team, and the available data. The bacterial pollution level measured as TC in all the ten wells sampled by the study team during the dry season of August 1994 was in the order of 10^2 to 10^3 No./100 mℓ, with no nil (0) count.

Moreover, the data on bacterial pollution level as measured on a random basis by Dinas Kesehatan, during the year of 1992~1993, covering the entire Study Area, indicated significant and widespread groundwater pollution.

Of the 221 wells sampled by the Dinas Kesehatan, 142 wells, representing 58%, recorded TC levels exceeding 10^3 No./100 mℓ. Only a few wells recorded nil (0) TC count.

Accordingly, groundwaters in the Study Area, in an overall sense, are not suited for direct potable use with no treatment, since they do not meet the required bacteriological quality for such direct potable use as per Classification-A of the usage based national water quality standards of the Ministry of Environment (Decree-02/MENKLH/1/1988).

This national standards of Classification-A stipulates a nil (0) bacterial count, with respect to both TC (total coliform) and FC (fecal coliform), for direct potable use.

However, the Classification-B as per the above national standards is for a potable source with treatment. The bacterial quality limitation for Classification-B with respect to TC is 10^4 No./100 mℓ .

Since none of the available bacterial quality data indicated a TC level exceeding 10^4 No./mℓ, the bacterial groundwater quality in the Study Area conforms to that of Classification-B, if not Classification-A.

The widespread bacterial pollution of groundwaters in the Study Area is attributed to improper as well as malfunctioning on-site human waste disposal facilities of septic tanks and leaching pits. Improper siting of a well and septic tank/leaching pit, close to each other, may also be a significant factor for groundwater pollution.

(3) Sea water

The coast line along the city center, the Lossari and Mariso bay areas are somewhat polluted visibly. Pollution due to floating solid wastes was also noted in these coastal sea waters.

Bacterial pollution of coastal waters was found to be significant both based on the sampling results of the study team and available data. In fact the TC levels varied widely from nil (0) to more than 10^5 No./100 mℓ.

High TC levels exceeding 10^3 No./100 mℓ were noted in the river mouth areas and the near coastal sea waters, while nil (0) counts were mostly noted at sea locations away from near coast. This demonstrates the effect of pollution load run-off from the land to coastal sea waters of Ujung Pandang.

The organic pollution level of coastal waters as BOD was measured to be in the range of about 1~6 mg/ℓ. The average BOD level of near coastal waters was about 4 mg/ℓ.

The national coastal water quality standards of the Ministry of Environment (Decree-02/MENKLH/1/1988) stipulates following water quality requirement for most beneficial uses of coastal waters:

TC ≤ 10^3 No./100 mℓ
BOD ≤ 20 mg/ℓ

Accordingly, the near coastal waters and the river mouth areas of Ujung Pandang do not meet the bacteriological quality as stipulated by the above standards.

The observed near coastal water BOD level of 4 mg/ℓ, though well within the quality limitation of 20 mg/ℓ as per the above national standards, represents significant organic pollution for a coastal water.

2.3.3 Living environment

The city of Ujung Pandang has become one of beautiful cities in Indonesia through strenuous efforts to clean the city for a couple of years, and was awarded ADIPURA Certificate in 1994 and ADIPURA Trophy in 1995 respectively. As a matter of fact, solid waste in urbanized area is well collected except for the pockets of slum area. New development areas are also fairly served. However, there are not few living environmental problems to be improved.

The result of field survey shows that still 43% of the generated solid waste is not collected by Dinas Kebersihan and is estimated to be disposed of by means of resident's self-treatment, land reclamation using solid waste and illegal dumping. The most common method of self-treatment is burning the waste, especially in the dry season. Illegal dumping is observed in open spaces, in ditches and in coastal waters. This is one of the most important problem for the deterioration of living environment, in addition to the direct discharge of graywater into ditches, canals and coastal waters.

In the Study Area many citizens discharge their solid waste at permanent bins in front of their houses or at TPS in unpacked form at any time. The combination of unpacked waste and irregular collection service frequency due to the insufficient equipment leads to such places becoming sources of insects and rodents.

2.3.4 Public hygiene

The documented cases of water-borne and water related diseases, as recorded in the Public Health Centers of KMUP (PUSKESMAS) include diarrhea, typhoid, varicella (chicken pox), dysentery, cholera and skin disease. Of these diseases, the number of cases suffered from diarrhea were consistent in the range of about 40,000 to 50,000 during the last five (5) years.

2.4 Institutions and Regulations

2.4.1 Institutions

Elucidation shall be made here on the main institutions deeply related to this Study, though there are so many at levels from the Central government to voluntary groups.

(1) Central government

The following two ministries are most deeply related with the Study at top government level.

1) The Ministry of Home Affairs

All 27 provinces (Tingkat I) are under the jurisdiction of this Ministry and exercise jurisdiction over local governments (Tingkat II) in their administrative territories respectively.

Local governments control Kecamatan (districts) in their respective areas. Kelurahan (sub-districts) are under the control of Kecamatan. The governmental structure is given in *Fig.* 2.5.

2) The Ministry of Public Works (Departmen Pekerjaan Umum; PU)

PU was formed in the Development Cabinet based on Kepres (Presidential Decree) No.183/1968, then became one of 18 ministries in compliance with Kepress No.64/1971.

PU, as a major implementation organization, consists of three Directorates General;

- Directorate General of Water Resources Development (Pengairan)
- Directorate General of Highways (Bina Marga)
- Directorate General of Human Settlement (Cipta Karya)

a. Cipta Karya

Cipta Karya is one of the three Directorates General in PU and the responsible Central Government Authority concerning this Study for KMUP.

Cipta Karya is composed of the Secretariat for the Director General and 6 Directorate departments. The Study mainly concerns the Technical Directorate (particularly the sub-directorate of environmental sanitation), the Directorate of Urban and Rural Development and the Directorate of Eastern Regional Development (specially the sub-directorate of eastern region II which is responsible for South and South-east Sulawesi).

Attention shall be paid to the Water Supply and Environmental Sanitation training Center, Bekasi, West Java. It functions under the control of Cipta Karya to provide chiefly governmental officials with environmental sanitation training courses including those on wastewater and solid waste.

b. KANWIL (Regional office) of PU

KANWIL of PU are located in 7 provinces and are very important for PU under the Minister, 3 in Java, 3 in Sumatra and 1 in Sulawesi. In 20 provinces, there are no KANWIL but simply Dinas PU having 3 sub-Dinas (sub-agency/board) corresponding to the three Directorates General such as Dinas PU Cipta Karya at the respective provincial levels (Tingkat I).

Dinas PU Cipta Karya of South Sulawesi is placed under KANWIL of PU in the administrative structure and also falls under the Governor in the command line. This is because its routine budget is supplied by the provincial government while the major part of its development budget comes from the Central government (the Ministry of Finance) after being allocated by BAPPENAS (National Development Planning Board).

(2) Provincial and local governments

1) Provincial government of South Sulawesi (Tingkat I)

The government as an autonomies unit based on the Law 5/1974 exercises jurisdiction over 25 local governments (Tingkat II); 2 municipalities (Kota Madya) and 23 regencies (Kabupaten) in the province.

a. BAPPEDA (Regional Development Planning Board) Tingkat I, South Sulawesi

BAPPEDA Tingkat I makes its own plans, follows national plans and supports local governments (Tingkat II) for their development plans not only from the physical side but also in their financial aspects. The section for special arrangements and land in the Physical Infrastructure division is in charge of land expropriation. BAPPEDA Tingkat I has the MINASAMAUPA plan covering KMUP, Kabapaten Gowa and Maros.

b. Bandes (Rural Community Development Board) Tingkat I

Bandes carries out the implementation of rural development projects according to the plans for rural communities.

2) KMUP (Tingkat II)

KMUP is the capital city of South Sulawesi province and one of 25 local governments with areas of clear and responsible autonomy; 2 cities and 23 Kabupaten in the province. It covers the jurisdiction of 11 Kecamatan (districts) in which 142 Keluraha (sub-districts) exist.

The organizational structure of KMUP is shown in *Fig.* 2.6.

a. BAPPEDA Tingkat II, KMUP

The role of BAPPEDA II, KMUP is to assist the Mayor by formulating policies related to city development planning and the evaluation of implementation. It also carries out supervising and contracting roles.

b. Bandes, Tingkat II

This authority works for rural community development at the level of Tingkat II in KMUP under the Mayor through the Vice Mayor.

c. Dinas Kebersihan (Cleansing department/board/agency)

Dinas Kebersihan was established in November 1987 based on the Perda (Peraturan Daerah, local government regulation) No.11/1987 as one of Dinas in a professional/functional group

apart from the ordinary administrative structure under the secretary of the Mayor in the command structure.

The organizational structure is shown in *Fig.* 2.7.

The role of Dinas Kebersihan is Solid Waste Management in KMUP such as collection, haulage, disposal of waste including street sweeping, ditch cleaning and night soil collection. Its staff numbered 836 persons as of May 2, 1994.

d. PDAM (Perusahan Dearah Air Minum, Water supply public enterprise)

PDAM, KMUP was established in July 1975 based on the Perda No.6/1974 promulgated by the Decree No.253/VI/1975 of South Sulawesi Governor on July 13, 1975 and started its operation in 1983 with about 400 personnel.

The organization has been changed twice to date as necessary in compliance with the relevant Perda, laws and regulations, sometime retroactively to the PANCACILA (Five Principles of Indonesian people) and the Constitution of 1945. The number of personnel was 417 persons as of 1994.

The present organization is shown in *Fig.* 2.8.

e. Administrative community in DATI (Daerah Tingket) II

Reference is made to *Table* 2.1 which shows levels of the formal organizations such as Kecamatan, Kelurahan and non-formal organizations such as RW (neighborhood citizens association) and RT (lowest neighborhood unit).

The governmental organisation chart focused on the Ministry of Home Affairs concerned is referred to in *Fig.* 2.9.

2.4.2 Regulations

Legislation was issued, promulgated and entered into force for the undermentioned subjects respectively and are related to this Study, but not limited to it.

(1) Nation and people
   a. Constitution 1945
   b. GBHN (guidelines of State Policy that included the Decree of People's Consultative Assembly No.II/MPR/1993), particularly regarding the improvement of manpower quality.

(2) Central government
   a. Presidential decrees No.64/1971 and No.183/1968 concerning the establishment of the ministries including PU
   b. Minister of Home Affairs regulation No.5/1975 on the procedures of general control on the execution of the regional/local government and that of the duties of the Ministry of Home Affairs
   c. Government regulation No.14/1987 on delegation of part of governmental authority for public works to the regions (Attendum to State Gazette No.25/1987)
   d. Minister of Home Affairs decision No.6/1988 on the procedures for Decisions on Legal Products within the environment of the Ministry of Home Affairs
   e. Minister of Home Affairs decision No.92/1992 on the organizational structure and working procedures of the Ministry of Home Affairs

(3) Provincial/local governments (Tingkat I and II)
   a. Government law No.5/1962 concerning regional/local autonomy
   b. Government law No.5/1974 concerning the performance of local government principles (Attention is paid to Article 59) in connection with Perda, PD, etc. The law of Ministry of Home Affairs stipulates provisions of local governments at levels toward Kecamatan, Kelurahan, etc.
   c. Presidential decree No.185/1980 concerning organizations and management of local governments
   d. Government regulation No.6/1988 concerning regional/local autonomy
   e. Government regulation No.45/1992 concerning regional/local autonomy

(4) Kecamatan, Kelurahan, RW, RT and LKMD
   a. Laws Nos.5 and 56/1979 concerning organizations and management of Kecamatan, Kelurahan, etc.
   b. Minister of Home Affairs regulations No.44/1980, No.7/1983 and No.82/1984 concerning Kecamatan and Kelurahan

c. Minister of Home Affairs regulation No.7/1983 concerning the establishment of RW and RT
d. Presidential Decree No.28/1980 concerning the establishment of LKMD
e. Minister of Home Affairs regulation No.4/1981 concerning LKMD particularly the main three tasks
f. Minister of Home Affairs regulation No.115/1992 concerning Kelurahan and Desa

(5) Non-governmental organization
a. Minister of Home Affairs instruction No.8/1980 concerning the Development of NGOs
b. Minister of Home Affairs instruction No.8/1990 concerning the development of NGOs

(6) Dinas
a. Law No.5/1979 concerning Dinas
b. Minister of Home Affairs decree No.80/1994 concerning the guideline for Dinas organization and administration of local public-work domain

(7) Badan Pengelolaan Air Minum: BPAM (Water supply management body)

The joint decree of the Minister of Home Affairs No.3/1984 and the Minister of Public Works No.26/KPTS/1984 concerning the procedures for establishing BPAM commencing with a water supply unit. The decree clarifies the relation between the central government and provincial/local governments.

(8) Regional/local public enterprises

In addition to the above-mentioned legislation concerning regional/local autonomy, the following are related to the subject.
a. Minister of Home Affairs regulation No.1/1984 on procedures for the guidance and control of regional/local public enterprises
b. Compilation of laws for regional/local government enterprises, Directorate general of general affairs and regional/local autonomy, Ministry of Home Affairs, 1990

(9) Regional development plan
a. Presidential decree No.27/1980
b. Law No.16/1992 regarding Housing

(11) KMUP

1) BAPPEDA TK II

Perda No.10/1983 concerning the organizations and management of Bappeda TK II

2) PDAM, KMUP

a. Mayor Perda No.6/1974 concerning the establishment of PDAM in KMUP, based on Laws Nos.29/1959, 5/1984, 28/KPTS/1984, Minister of Home Affairs regulations Nos.8/1983 and 1/1984
b. Governor decree No.253/VI/1975 concerning the establishment of PDAM in KMUP
c. Minister of Home Affairs decision No.16/1995 on the guidance of the accounting system of PDAM
d. Minister of Home Affairs decision No.690.900-327/1994 on the evaluation, guidance, and financial performance monitoring of PDAM

3) Dinas Kebersihan, KMUP

a. Mayor Perda No.6/1974 concerning the execution of cleaning services in KMUP
b. Mayor Perda No.11/1987 concerning the establishment of Dinas Kebersihan in KMUP, formation of organizational structure and working regulations
c. Mayor Perda No.3/1990 concerning the cleansing performance including retribution, tariff, payment, community participation, campaign on sanitation etc.
d. Mayor Perda No.2/1991 concerning penalty/punishment as revision of No.3/1990

(12) PD in other cities

1) PD PAL JAYA (Jakarta)

a. Governor Perda No.10/1991 with the approval of the Minister of Home Affairs No.668.311.1-1165 concerning the establishment of PD PAL JAYA
b. Governor approval No.240/1992 concerning the organization

2) PDAM (Bandung)

a. Mayor Perda No. /1974 concerning the establishment of PDAM

b. Mayor Perda No.21/PD/1981 concerning the merging of sewerage organization into PDAM

3) PD Kebersihan (Bandung)

Mayor Perda No.2/1985 concerning the establishment of PD Kebersihan in the scheme of the Bandung Urban Development Project (BUDP)

(13) Land

a. Agrarian basic law No.5/1960 concerning registration of land such as land registration of the nation, supreme power of land, rights of particular groups etc.

b. Government regulation No.10/1961 regarding land registration

c. Law No.20/1961: Revocation of land authority right and objects available on the land

d. Presidential instruction No.9/1973: Implementation of revocation of land authority right and objects available on the land

e. Government regulation No.39/1973: Procedure for determination of indemnity by the High Court in connection with revocation of land authority right and the right to objects available on the land

f. Regulation of the Minister of Home Affairs No.1/1975: Guidelines for determination of deposit money, annual fee and administration fee relating to giving right for authorization on state land

g. Regulation of the Minister of Home Affairs No.15/1975: Stipulations on the procedure of land acquisition, including the standard for estimation of land compensation

h. Regulation of the Minister of Home Affairs No.1/1987: Social facilities given by developers to local government(s)

i. Regulation of the Minister of Home Affairs No.3/1987: In this regulation the most important point is the provisions on delegation of power to a governor and a mayor/a bupati about land acquisition, reading as follows.

- 0-15 ha : to be dealt with by the mayor or bupati as far as a site is located in his jurisdiction
- 0-15 ha : to be left to the discretion of the governor in case a site is located at

intermunicipalities and/or interkebupaten in his jurisdiction

- More than 15 to 200 ha : to be decided by the governor as far as the site is located in his jurisdiction
- More than 200 ha : to be left to the discretion of the Minister of Home Affairs

j. Law No.24/1992 and the Minister of Home Affairs No.84/1992 regarding city planning

k. Presidential Decree No.55/1993 concerning Land Provision for Development Implementation for Public Purposes. This concerns the arrangement on Samata disposal site between KMUP and Kabupaten Gowa

l. Bupati of Gowa instruction (June 23, 1995) to Mr. Lurah, Kelurahan Samata, concerning Samata site

(14) Environment

a. Law No.4/1982 concerning the basic provisions on the management of living environment, particularly Articles 8 and 9, including public awareness, etc.

b. Government regulation No.29/1986 and its implementation Standard No.51/1993 concerning the process of AMDAL

c. Ministry of Environment decree No.02/MENKLH/1/1988 concerning water quality standards for portable, swimming pool water, etc.

d. Government regulation No.20/1990 regarding the control of water pollution, especially Article 27(1) for domestic wastewater in relation with Perda

e. Regulation No.15/1990 concerning ADIPURA

f. Minister of Public Works regulation No.46/PRT/1990 regarding Technical Guidelines on AMDAL for Public Works Project

g. Regulation of the Minister of Public Works No.779/KPTS/1990 regarding Technical Instruction on AMDAL for Solid Waste System Project

h. Decree of the Minister of Environment No: KEP-3/MENKLH/II/1991 concerning Standard Quality of Water

i. Law No.24/1992 concerning new environment, spatial planning, etc.

j. Government Regulation No.51/1993 concerning the Analysis of Impact upon the Environment

k. Decree of the Minister of Environment No.Kep.11/MENLH/3/1994 concerning the Venture or Activities which have to be addressed in the Environmental Impact Analysis
l. Decree of the Minister of Environment No.Kep 14/MENLH/3/1994 concerning General Guidelines for Formulating the AMDAL
m. Decree of the Head of BAPPEDAL No.KEP-056/1994 regarding the Guidelines for Important Impact Criteria
n. Perda No.4/1985 of South Sulawesi Province concerning Living Environmental Conservation and Management
o. Circular Letter of the Governor of South Sulawesi No.660.1/4574/BKLH/1989 regarding AMDAL study to the Development Project Activity which has a Potential Impact

2.4.3 Role of community

(1) Community organizations

1) RW (community unit) and RT (neighborhood unit)

As a non-formal organization, there are RW under Kelurahan and RT under RW respectively. One Kelurahan with at least 5,000 inhabitants shall form RW and RT. One RW consists of 8 - 10 RT while one RT is composed of 150 - 250 people (30 - 50 households).

2) LKMD (community-resident institution)

LKMD or Village Resilience Institution is one of the semi-governmental organizations at the level of Kelurahan, since its formation is sponsored/initiated by the government. This LKMD is formed based on Presidential Decree No.28 of 1980 and implemented in each village and Kelurahan in Indonesia.

According to regulation No.4 of 1981, the LKMD has three main tasks in providing services to both rural and urban villages:

a. To ensure development plans based on the principles of consensus (musyawarah);
b. To mobilize community participation for implementing integrated development, both in government or community development activities;

c. To create dynamic community conditions for maintaining the stability of Desa and Kelurahan security (Yayasan Kesejahteraan Veteran RI 1991: 380; Jahya Hanafi 1995).

3) PKK (Family Welfare Education)

PKK is an organization that is also formed by the initiative / sponsorship of the government based on the Instruction of Minister of Home Affairs Number 10 of 1980. The PKK are formed at central government level as well as at Kelurahan/village level. They are intended to improve the momentum of development, especially activities for the attainment of a prosperous family through the PKK organization.

4) Educational institutions (Universities)

An institute in Indonesia is an educational institution that carries out the task of "The Three Duties of Institute", namely:

a. To perform education for advancing science,
b. To make investigations for science improvement and
c. To apply the above to provide community service

The science partnership of institutes is related to wastewater and solid waste management in KMUP through their educational courses and programs.

5) Non Governmental Organization (NGO)

The term Non-Governmental Organization is recognized in the Law No.4 of 1984 on the Principal Stipulations of Living Environmental Management, and it is performing some activities related to the living environmental management.

In Ujung Pandang, there are 115 mass organizations registered in the Municipal Office of Ujung Pandang; and 17 NGO's organizations that have informed their existence in conformity to the Instruction of the Minister of Home Affairs No.8 of 1990 (Source: Social and Political Affair Office of KMUP). Another source is from Information and Communication Forum (FIK) of NGO of South Sulawesi. The FIK coordinates 33 NGOs and all of them are located in Ujung Pandang.

6) Other organizations

a. Karang Taruna (neighborhood youth organization)
b. Pramuka (boy scout)
c. Youth organizations such as Antipala (established in 1982)
d. Religious organizations such as Mosque teenagers

(2) Community participation

1) RW and RT

Efforts for community participation are spearheaded by administrative leaders (Lurah, RW/RT chiefs), environmental conservation groups as Antipala, and youth organizations.

The community is active in street sweeping generally in Kelurahan. Ditch cleansing activity appears to be unbalanced. Some citizens are actively cleaning ditches but others are not.

Individually, the form of participation is by cleaning the drain or sweeping the house yard, which is commonly done by most household members, both those who live in urban areas, and those who live in slum areas, the percentage for each are 82% and 76% respectively.

Moreover, the role of RW and RT will become larger in the future in the framework of public education (non formal education) and the encouragement of a spirit of mutual cooperation.

2) LKMD

The LKMD activity in TAS site is by giving aid to provide some tools for cleansing, such as spade, sweeper, and other tools. In spite of this, LKMD support is still limited. However, if it is well managed as an organization that is sponsored by government, it will be very helpful in cleansing management in Kelurahan by providing sufficient funds and tools for environmental sanitation.

Up to 1994 LKMD was active in operation of hand cart (gerobak) for collection of waste. In return LKMD used to receive 40% of retribution fees collected from the Kelurahan residents. Under the new system of retribution collection using PLN offices, Dinas Kebersihan

does not give LKMD 40% anymore. Consequently in most Kelurahan, hand cart service operated by LKMD has ceased.

3) PKK

Activity of PKK in TAS site is still limited. It is organising voluntary work together with community members for environmental sanitation every Sunday or another determined day. Another activity of the PKK women is reciting Koranic verses and regular social gatherings where members contribute to and take turns at winning aggregate sums of money ("arisan").

4) Educational institution (universities)

The local government can make use of the Urban Management Study Program, one of the Post Graduate Study Programs (PPS) of UNHAS (Hasanuddin University). This Urban Management Study Program, besides performing a regular "Master Course" for the Local Government's apparatus, also performs a "Training Course" for the Local Government apparatus, private, and Non-Government Organization (NGO's) in the field of city management.

In research aspects, universities can provide appropriate alternatives for solid waste management, or solve the problem of environmental sanitation in the city of Ujung Pandang.

For wastewater and solid waste management, the Obligatory (Rural) Social Action Internship (KKN) program is prepared for advanced university students or students who have almost finished their studies, except for 8 (eight) credit semester units.

The programs specially related to this Study are (a) Health and environmental sanitation, (b) Guidance on environment, health/sanitation and law, etc.

The KKN program is carried out for two months in the site (rural village), and it is carried out regularly every year. In Hasanuddin University it is conducted twice a year (April-May and August-September). For each phase, the number of students who take the KKN are about 1,300-1,400 persons.

5) NGOs

Five (5) out of 33 NGOs in KMUP are active in promoting a cooperation that supports environmental management, particularly the effort of city cleaning.

6) Other organizations

Although all the other organizations are not always active, they are supplying communities with voluntary work at levels and in respective fields for environmental sanitation of the communities.

(3) Participation in TEDUH BERSINAR (slogan of Dinas Kebersihan for the cleansing movement), KMUP in 1994 until May 1995.

"Teduh" means fresh and "Bersinar" is composed of the abbreviations of the following words:

BER	:	"Bersih" (means clean)
S	:	"Sehat" (health)
IN	:	"Indah" (beautiful)
A	:	Aman" (Safe)
R	:	"Rapi" (Tidy)

The following are the institutions and organizations including community units participating in TEDUH BERSINAR.

1) Community Agency, namely from Dinas PU of South Sulawesi province, Cleaning Board of KMUP, National Housing enterprise, KIP-IUIDP project, Living Environmental Sanitation Project of South Sulawesi province, Indonesia Armed Forces, District Government and Lurah of all parts of KMUP, as well as University and the Performed Body of Environmental Management Biro of South Sulawesi.

2) Private sector, GAPENSI (National Businessmen Association of Indonesia), N.V Haji Kalla, Insurance Board of Indonesia, PT (Persero) Jiwasraya Insurance, PKK of KMUP, IDI (Indonesian Physician Association, PT. Bank Utama, PT. Cocacola Pan Jaya, PT. Melati Tunggal Inti Raya, FKPPI (Communication Forum of the Retired Armed Service Officer's Sons and Daughters), PT Sampurna, PT. Amal Group, PT. Bosowa, PT Bank Pembangunan Daerah

(Local Development Bank) of South Sulawesi, Correspondent, and University Student.

3) Non Governmental/Self-Reliant Organization

PKK-KMUP, LKMD, RW and RT, as well as community members, Environmental Partnership Institution, Information Center for Environmental Resources of Sulawesi (PIPAS)

(4) Role of community

In short, the role of the community is to realize and maintain a healthy-living environment for the community. Realization of such an environment start with the community, extends to Kelurahan or Desa, Kecamatan, Kota Madya or Kabupaten, Province and culminates at the nation-wide level.

Based on the observation results of the Study, these constraints took place because of following reasons.

a. lack of information for the community

b. discontinued/not well programmed campaign

c. lack of supervision

d. weakness/inconsistency in law enforcement

e. insufficient use of community leaders or youth (mosque teenagers and other Youth Organizations) in its approach to the community to convey information.

The community self-help (voluntary work) is mostly influenced by the leadership of Lurah or local community leaders. The community leaders must be able to motivate and encourage awareness in order that the community may be willing to participate in environmental sanitation.

2.5 Wastewater Management

2.5.1 National strategy

In June 1995, Cipta Karya drafted the subject paper which is set against the current background of technical deficiencies and investment backlogs in the subsector concerned. The overall policy objective is to supply sufficient sanitation facilities in urban and rural areas thereby improving community health and also promoting an increased effort for environment conservation. The Paper is currently under circulation in Cipta Karya and other line agencies involved in sanitation and environment protection programs. With comments from these agencies, the draft is expected to be finalized by the end of the fiscal year 1995.

Meanwhile, it is noteworthy that Ujung Pandang has designated as one of the 9 metropolitan/large cities where off-site sanitation systems will be encouraged to be installed upon the clearance of the following conditions:

a. population density of more than 300 persons per hectare
b. service area of more than 200 hectare
c. water consumption of 150 litter per consumer per day
d. operation and maintenance costs be fully covered

The technical specification of the off-site sewerage system proposed in the Paper is as follows:

a. network/channel drainage and interceptor
b. house connection units
c. piping network with pumping station units, housing facilities, manholes and ventilation, and waste water treatment (IPAL).

2.5.2 Water consumption

In the Study Area it is very common to use well water beside piped water for domestic use. The result of field survey shows that the per capita water consumption of the residents who are served with house connection is much larger than those without house connection. Therefore the different per capita water consumption is applied to estimate the domestic water consumption.

At present PDAM has four (4) water treatment plants, namely Somba Opu, Panaikang, Ratulangi and Antang. Total quantity of PDAM water supply is about

34,000 m^3/d in 1992. The present house connestion ratio is about 20%. The location of water treatment plant and existing water supply service area is shown in *Fig.* 2.10.

The present domestic water consumption is estimated ot be about 69,500 m^3/d.

The present commercial and institutional water consumption are estimated to be about 3,800 m^3/d and 3,900 m^3/d respectively based on the existing data of PDAM because the portion of well water consumption seems to be negligible.

The present industrial water consumption is estimated to be 457 m^3/d also based on the existing PDAM data. The industrial wastewater generated inside KIMA would be better excluded from this Study because KIMA has its own wastewater treatment plant and this plant will treat all the industrial wastewater generated inside KIMA.

2.5.3 Wastewater generation

Wastewater generation is generally some portion of water consumption and this ratio is usually from 80 to 100%, depending on local condition. This study adopts 100% considering that water lost due to sprinkling seems to be negligible according to the observation of the Study Team. Therefore the present total wastewater generation of the Study Area is estimated to be about 77,700 m^3/d.

2.5.4 Pollution load generation

The present unit pollution load of toilet wastewater in terms of BOD is estimated to be 10.5g/d based on previous studies in Indonesia. The present unit pollution load of graywater is estimated to be 25.7g/d as BOD based on the result of field survey.

Based on the result of field survey, present quality of commercial and institutional wastewater in terms of BOD is estimated to be 266 mg/ℓ and 142 mg/ℓ respectively

Water quality of industrial wastewater can vary depending on the industrial activities. The present water quality of industrial wastewater is assumed to be same as that in Jakarta. The present pollution load is obtained by multiplying the average water quality, based on the existing data of sales amount of the respective classifications, with the amount of industrial wastewater generation. The average water quality is estimated to be 1,152 mg BOD/ℓ.

Consequently the present total pollution load generation is estimated to be about 23,800 kg/d in terms of BOD.

2.5.5 Existing wastewater management in KMUP

At present the role of public sector in wastewater management, similar to other cities in Indonesia, is very limited in KMUP. Except for septage collection service and treatment by Dinas Kebersihan and occasional provision of toilet facilities including MCK for low income people without any toilet implemented by many schemes, wastewater management is left to owner of facility without any instruction or guidance from civil authorities.

(1) Toilet facilities for low income people

Toilet facilities for low income people have been constructed by many schemes like BANDES program, IUIDP, and volunteer of Army, etc. Based on the result of field survey there are about a total of 200 public toilets, most being located in slum areas. About 30% of these toilets are malfunctioned or abandoned due to lack of responsible organization, lack of water supply or accessibility of users. Moreover, 36 public toilets do not have any organization for users.

(2) Septage collection service

At present Dinas Kebersihan provides the septage collection service based on the request from residents, therefore residents would use the facilities until septage be accumulated to the level where the toilet can not be used any more. For this service Dinas Kebersihan has five (5) vacuum trucks, but considering the number of on-site facilities in KMUP, which is estimated to be about 20,000, this indicates that the service level is far from satisfactory.

(3) Antang septage treatment plant

There is a septage treatment plant located at Kelurahan Antang, south-east of the City. The treatment facilities consist of imhoff tank, sludge drying bed, anaerobic pond, facultative pond and maturation pond as well as office and laboratorium. However the treatment is not satisfactory because of insufficient operation and maintenance and needs improvement. Moreover, the access road to the treatment plant needs improvement. The location of Antang septage treatment plant is shown in *Fig.* 2.10.

(4) KIMA industrial estate

KIMA industrial estate is located in the North-East of the City and run by a government owned company. The total area at present is 230 ha which is planned to be extended up to 730 ha. About 50% of the existing area is in operation mainly with agro industries.

A wastewater treatment plant with a design capacity of 3,000 m^3/d is in operation. The present inflow of wastewater is about 600 m^3/d. The treatment method is oxidation ditch for wastewater and drying bed for sludge. However, the operation and maintenance of the treatment plant needs much improvement. The location of KIMA is shown in *Fig.* 2.10.

Industries located outside KIMA are supposed to treat their wastewater within their own premise, but there is no control or monitoring of the treatment. It is likely that many industries discharge their wastewater without proper treatment.

2.5.6 Present problems and issues

(1) It is very necessary to eliminate the population with no access to any toilet facilities from the view point of Basic Human Needs.

(2) Discharge of untreated graywater into ditches and drains, especially in the highly urbanized area, has become the major cause for the deterioration of living environment as well as surface water quality deterioration.

(3) The existing on-site leaching systems being used for blackwater treatment are suspected to be the major cause of groundwater quality deterioration.

(4) At present there is no responsible organization for comprehensive wastewater management, and the main part of wastewater management is left to the owners without any instruction or guidance from civil authorities.

(5) Existing septage collection service and treatment is quite insufficient and needs improvement.

2.6 Solid Waste Management

2.6.1 National strategy

According to the targets set in Replita VI (1994 to 1998), metropolitan cities are responsible to provide solid waste collection service covering around 80% of the population. The plan also states that open dumping is prohibited in large cities in consideration of the protecting of living environment.

2.6.2 Outline of Solid Waste Management in Ujung Pandang

Dinas Kebersihan (DK) is responsible for solid waste management (SWM) in Ujung Pandang, with the exception of industrial waste. DK is also in charge of street sweeping, drain cleansing and desludging. Surveys show that 72% of the total population received solid waste collection service. The waste is collected and transported to the final disposal site located south-east of the city, at Tamangapa and amounts to 270 ton/day on average (225 ton in September and 330 ton in February). As the solid waste generated is estimated at about 471 ton/d, excluding industrial waste, the disposed amount in September is only 57% of the total bearing in mind that KMUP officially operates only one (1) disposal site.

The following indicators can be used to compare with other cities.

a. Collection amount per person

At present (Sept. 1994)	270 t/d / 380 persons	=	0.70 t/d/person
Required	420 t/d / 390 persons	=	1.07 t/d/person
	(armroll vehicles drivers increased by 10)		

b. Collection amount per collection vehicle

At present (Sept. 1994)	270 t/d / 95 vehicles	=	2.8 t/veh/day
Required	420 t/d / 105 vehicles	=	4.0 t/veh/day
	(armroll vehicles increased by 10 in 1995)		

c. Operation and maintenance cost per ton (excluding depreciation)

At present	Rp. 1.8 billion / (270 t/d x 365 day)	=	Rp. 18,300/ton

Concerning satisfaction with the municipal cleansing services, the residents interview survey implemented under this study shows that 17% were "quite satisfied" and 35% "satisfied".

2.6.3 Generation sources of solid waste

(1) Domestic waste

Domestic waste discharged from households constitutes the majority of solid waste generated in the city. In 1993 there were 162,000 households with an average of 6.3 persons/household. Around 40% of the population are living in the old city which consists of 6 Kecamatan on 7.6% of the total city land area. The population density there is 291 persons/ha. Population density in the remaining 5 Kecamatan is relatively low at 39 persons/ha. Average population density is 58 persons/ha. GRDP of KMUP is estimated at Rp. 1,171 billion and Rp. 997,000/capita. The old city's share of GRDP is 60%. Kecamatan Ujung Pandang has the highest income of Rp. 4,377,000/capita, while the lowest is in Kecamatan Tamalate at Rp. 455,000/capita.

(2) Commercial waste

There are 20 public markets in KMUP distributed in 11 Kecamatan. It is reported that KMUP has 7,528 shops, 826 restaurants, 78 hotels and 2,025 offices. The old city accounts for 62% of the total shops and 81% of the hotels. Kecamatan Wajo alone has 28% of all the shops and 41% of all hotels are in Kecamatan Ujung Pandang. Distribution data on restaurants and offices is not available but it appears to be similar to the distribution of shops.

(3) Industry

Ujung Pandang has 2,491 factories in total, of which 247 are medium scale and 2,244 are small scale. The average number of workers per factory is 14.5, with 67 workers in medium scale industries and 9 laborers in small scale industries.

(4) Others

The total road length of KMUP is 335 kilometers, with 138 km in the old city. KMUP has 4 general hospitals, 16 maternity hospitals, 72 clinics and 67 public health centers.

2.6.4 Solid waste amount and composition

(1) Solid waste amount

Surveys for the unit generation rate by waste types were carried out in the dry and wet seasons respectively. Based on the results of these surveys and observation of the waste amounts entering Tamangapa disposal site by type, the waste amount is estimated to be 471 ton/day, excluding industrial waste. A breakdown of the waste by type is as follows;

Waste Type	Weight		Density	Volume	
a. Domestic	367 t/d	78%	0.23 t/m^3	1,596 m^3/d	78%
b .Market	30 t/d	6%	0.30 t/m^3	100 m^3/d	5%
c. Commercial	36 t/d	8%	0.13 t/m^3	277 m^3/d	13%
d. Institution	15 t/d	3%	0.70 t/m^3	21 m^3/d	1%
e. Street	13 t/d	3%	0.23 t/m^3	57 m^3/d	3%
f. Ditch	10 t/d	2%	0.50 t/m^3	5 m^3/d	0%
Sub-Total	471 t/d	100%	0.23 t/m^3	2,056 m^3/d	100%
g. Industry	58 t/d	-	-	-	-
Grand Total	529 t/d	-	-	-	-

(2) Solid waste composition

Characteristics of solid waste composition in Ujung Pandang are summarized as follows;

a. High content of putrescible matter (67% by wet base)
b. Low non-combustible content such as metal and glass (5%)
c. High moisture content (58% in dry season, 68% in wet season)
d. Low calorific value specially (920 Kcal/kg in dry season, 590 Kcal/kg in wet season)

2.6.5 Service level

(1) Service ratio

Results of the questionnaire survey to each Kelurahan revealed that 70% of total RW and 72% of the total population receive collection service (refer to *Fig.* 2.11). On the other hand, waste amount entering the disposal site is estimated to be about 57% of total generated waste (shown by service area in *Fig.* 2.12). Therefore several Kelurahan practice self-disposal of solid waste, specially in slum areas and suburbs, by means of reclamation,

burning or dumping into the sea. DK should make more effort to expand its service, particularly to slum areas and new residential areas in the suburbs.

(2) Frequency of solid waste collection

According to DK's explanation, the old city area and its surroundings are served daily, and suburban areas twice or three times a week, as shown in *Fig.* 2.13. Where door-to-door service is provided, residents can enjoy a daily collection service. Primary collection service by hand cart provided by LKMD in some Kelurahan, has sharply decreased after the fall of 1994 upon suspending the system of paying 40% of collected retribution fees to the LKMD. This service used to be provided every 2-3 days/week. All TPS and most of the armroll containers are emptied daily. Most residents in the old city receive a reasonable service level, however residents of other areas seem to receive relatively poor service in terms of service ratio and collection frequency.

(3) Disposal

As mentioned above, solid waste disposed of at Tamangapa disposal site is only 57% of the estimated waste amount in average. The remainder is supposedly self-disposed through reclamation and burning. One reason for the increase in solid waste amount disposed of at Tamangapa in the wet season is that burning of waste is difficult in that season.

2.6.6 Collection and transportation

(1) Collection systems used in KMUP

Collection systems in KMUP consist of;

a. Door-to-door collection to a central area using dump trucks
b. Hand cart to hauled armroll container
c. Hand cart to TPS

Armroll hauled container system has been recently introduced and notably expanded during the study period. DK reported 443 TPS in 1994 consisting mainly of communal concrete bins and open space. However this number is decreasing as TPS are being replaced by armroll containers. Several types of collection vehicles are used in KMUP consisting of Kijang (pick-up truck, $3m^3$), dump truck ($10m^3$ and $6m^3$), ordinary truck without tipping

device ($6m^3$), multi-loader ($4m^3$) and armroll truck. Of the total fleet of 95 vehicles in 1994, there were 37 Kijang vehicles and 11 covered dump trucks (low operational efficiency) which decrease the overall efficiency.

(2) Efficiency of collection work

The average amount of solid waste transported to the disposal site was 1,090 m3/day (330 t/d) in February 1994 and 676 m^3/day (224 t/d) in September of the same year. The average waste amount was 270 t/d during this period. Efficiency of collection work in 1994 is estimated as follows;

Operation Indices	Feb. '94	Sept. '94	Average
a. Waste collected per staff (380 staff)	0.87 ton	0.59 ton	0.71 ton
b. Waste collected per vehicle (95 vehicles)	3.50 ton	2.40 ton	2.80 ton
c. Average trips/day	2.9 trips	2.4 trips	2.8 trips
d. Operation & maintenance cost per ton			Rp. 18,300/ton

2.6.7 Solid waste disposal

At presents KMUP has only one final disposal site for municipal waste at Tamangapa. This site is located east of the city, 14 kilometers from the city center. In 1994 the site area was 5 ha. This site is operating since 1993 as controlled landfill. Facilities of the site are shown in *Fig.* 2.14.

In the same site, a workshop for collection vehicles has been constructed by IUIDP financing and started operation at the end of 1994.

Based on the figures for disposal of waste amount (section 2.6.2), the amount disposed of at Tamangapa is estimated to be 150,000 ton in total (210,000m3 in in-site volume). The remaining capacity of Tamagapa is estimated to be 240,000m3 in 1994 with inclusion of the extension plan of 2.5 ha for that year.

During the last ten years DK has used the following three disposal sites. Each site was used for only three years for open dumping.

Panampu	1984 - 1987	Open dumping
Kantisange	1987 - 1990	Open dumping
Tanjung Bunga	1990 - 1993	Open dumping

2.6.8 Recycling

Recycling activity is mainly carried out by scavengers. There are 31 scavengers at the disposal site and they are registered with DK to enter the site. Scavengers are also active in the city at TPS and open stations. The recycled amount is estimated at 15 t/d, consisting mainly of glass and cans by weight. Due to the informal nature of this activity, the total number of scavengers in KMUP is unknown. Other recycling activity is conducted by pig farms, where farmers collect organic waste from restaurants, hotels and food industries for use on the farm.

2.6.9 Street sweeping

DK is implementing street sweeping on main roads using 19 supervisors and 171 sweepers. Over 94% of the street sweepers are assigned to the city's six (6) older Kecamatan.

Sweeping work is completely manual and is conducted in two shifts, the first from 5:00 AM to 8:30 AM, and the second from 1:00 PM to 4:00 PM. Each sweeper is assigned roughly 500 meters of road length to sweep per shift. Therefore the attainable road sweeping length will be around 145 km assuming daily sweeping (once a day).

2.6.10 Ditch cleansing

DK is responsible for cleaning of the larger ditches in KMUP. Smaller ditches in residential areas are cleaned by the citizens themselves under "Kerja Bakti", community participation activity.

Equipment used for the ditch cleansing by DK includes;

a. Shovel loader 1 unit
b. Dump truck ($6m^3$) 2 units

Ditches are classified into major ditches to be maintained regularly and others to be cleaned occasionally. The major ditches are as follows;

Major Ditch	Length (Km)	DK Cleaning Staff
a. Kali Makassar	2.75	3
b. Haji Bau and Mongonsidi	1.50	2
c. Kali Mawas	2.40	3
d. Sungai Pareman, Poso, Kelara	1.20	1
e. Muhammadiah and Salemo	1.25	2
f. Tarakan	1.45	1
g. Yosudaro, Sibula	1.75	2
h. Hati Murni	3.25	3
I. Cinderwasih	1.75	2
j. Gaddong	1.25	2
k. Kakatua	1.00	1
TOTAL	19.55	22

Occasional clean up of ditches is carried out based on area inspection and request of residents. This includes small ditches and also ditches in slum areas, although the latter are not well constructed and maintenance work is difficult. In the dry season DK cleans the sludge from the ditches as well as illegally disposed waste while in the wet season floating waste is removed.

2.6.11 Maintenance and workshop

Prior to the opening of the new workshop at Tamangapa, all maintenance of collection vehicles was conducted at Dinas PU workshop, located adjacent to the Governor's office. Upon the opening of the new workshop, maintenance work was shifted there and became the sole responsibility of DK. However the new workshop is lacking in equipment and the electric power supply is not reliable. DK employs many old collection vehicles, however the operation rate of vehicles in 1994 at 84%, (on average 80 units operated daily out of a total of 95 units) is not bad.

2.6.12 Retribution (fee collection) system

(1) New retribution collection system

In November 1994 KMUP introduced a new system for retribution collection under which retribution fees are collected directly with electric power consumption fees at the PLN offices. Under the old system where LKMD in each Kelurhan collected the retribution fees, the total collected in October 1994 was Rp. 15.1 million. In November the new system collected Rp. 69.4 million, and during the four months of December '94 to March '95

the average was Rp. 120 million. The superiority of the new system, where 86% of the potential amount is collected is obvious.

At present PLN has 142,325 customers, and if retribution fees are collected from all these customers, DK has calculated the total amount collected in one month to be Rp. 141.2 million. At RP. 1,694.7 million annually, this sum would cover 67% of the 1994/95 routine budget, and retribution amount collected would be more than 4 times that of the previous year.

(2) Retribution share of SWM expenses

The budget of DK is Rp. 5.0 billion in 1994/95. This includes the budget for desludging and ditch cleansing activity. DK budget in the last four years is as follows;

	1991/92	1992/93	1993/94	1994/95
1. EXPENDITURE (Rp. million)				
Routine	1,113.6	1,196.8	2,822.7	2,518.1
Development	835.9	1,947.2	1,735.2	2,453.9
Total	1,949.5	3,144.0	4,557.9	4,972.0
2. INCOME				
Retribution (Rp. million)	304.1	377.8	396.7	675.5
- % of total income	16%	12%	9%	NA
KMUP Budget (Rp. million)	438.7	905.1	1,227.9	NA
- % of total income	23%	29%	27%	NA
Other Sources (Rp. million)	1,206.7	1,861.1	2,933.3	NA
- % of total income	62%	59%	64%	NA

Although the retribution amount collected has increased gradually, the share of that amount in the expenditure continued to decrease, reaching 9% in 1993/94 budget. DK estimates that the actual retribution amount collected for that year is only 30% of the potential amount that could have been collected. That was the main reason for introducing the new retribution collection system.

2.6.13 Financial position

(1) Share of DK budget

In 1994/95 DK share of the total KMUP budget was 6.2%. This changes year by year and the highest in the last 4 years was 10.2% in 1992/93. Figures for the last four years are as follows;

	1991/92	1992/93	1993/94	1994/95
1) KMUP Total (Rp. million)	38,788	30,811	56,724	80,691
Routine	25,513	19,538	39,875	47,973
Development	13,275	11,273	16,849	32,718
2) DK Total (Rp. million)	1,949	3,144	4,558	4,972
Routine	1,113	1,197	2,823	2,518
Development	836	1,947	1,735	2,454
3) DK share of total (%)	5.0%	10.2%	8.0%	6.2%
Routine	4.4%	6.1%	7.1%	5.2%
Development	6.3%	17.3%	10.3%	7.5%

Concerning the routine budget, DK's share was 7.1% in 1993/94 but declined to 5.2% in 1994/95.

(2) Cost of solid waste management

Based on the breakdown of the routine budget of DK, the routine budget by activity in 1994/95 is estimated as follows;

Activity	Amount (Rp. million)	Share (%)
1. Solid waste collection and disposal	1,553	62%
2. Street sweeping and grass cutting	344	14%
3. Ditch cleansing	293	12%
4. Desludging	125	5%
5. Others (office maintenance, etc.)	203	8%
TOTAL	2,518	100%

As solid waste amount transported to the disposal site was 270 t/d on average during Feb. 1994 to Sept. 1994, the unit cost of solid waste collection and disposal is roughly estimated at Rp. 15,800/ton (excluding street sweeping, ditch cleansing, etc.).

(3) Regional product and cost of solid waste management

The gross regional domestic product (GRDP) is reported to be Rp. 959 billion in KMUP and Rp. 998,000/capita. Budget for DK (routine and development budget) shares 0.48% of GRDP. As the unit generation rate of solid waste is 0.34 kg/cap/d for middle and low income groups, solid waste collection and disposal cost (excluding development budget) will be Rp. 2,000 per capita, the same as 0.2% of GRDP/capita.

2.6.14 Studies and projects concerning this study

Several studies and projects are under way or completed to improve SWM in KMUP. Some of these may be briefly summarized as follows.

(1) IUIDP

IUIDP provided funds for the construction of the new workshop at Tamangapa and purchase of hauled containers in 1994.

(2) Increasing hauled container system equipment

In line with the IUIDP project, KMUP has taken the necessary steps to increase the armroll vehicles by 10 units and containers by 100 units.

(3) Expansion of night shift collection

DK started night collection in June 1994 at Kecamatan Wajo and in August of the same year expanded that system to all Kecamatan of the old city. Under this system residents are requested to discharge their solid waste in the evening before 8:00 PM for collection at night. Shops in the central area dispose of their solid waste using plastic bags.

(4) Introduction of intermediate facilities

During the period of this study the following SWM facilities were introduced as pilot projects.

a. Incineration plant of capacity 250 kg/hr, constructed at Hasanuddin University (operation pending connection to electric power supply)

b. Small scale compost plant constructed at Hasanuddin University and presently operating

c. Transfer depot from hand carts to transport vehicles constructed at Kecamatan Biringkanaya with a capacity of 12m^3 daily. Operation has not yet started because the nearby housing development to be served is still under construction.

The first two facilities have been financed by Cipta Karya, however the financing does not cover electric power supply and KMUP is now preparing

the necessary source. The third facility was constructed using funds allocated in DK's development budget (reportedly Rp. 38 million).

2.6.15 Problems and issues on solid waste management

(1) Present problems and issues

a. Efficiency of personnel shall be improved providing adequate equipment

b. It is noted that 30% of the available vehicle fleet is the Kijang type that can transport only 0.7 to 0.9 ton/trip and mainly consists of old vehicles. Estimation of total fleet capacity is slightly less than that required to achieve the target. Therefore efficient use of collection vehicles is very important.

c. Unit cost of solid waste collection and disposal excluding depreciation, and considering only routine budget inclusive of street sweeping, ditch cleansing and desludging in KMUP is estimated to be Rp. 25,400/ton of collected solid waste in 1994. In order to serve 80% of the generated waste in KMUP in 1995, the routine budget must be increased to Rp. 3.9 billion or cost efficiency should be improved.

d. As the existing Tamangapa disposal site has a small capacity, expansion of the present disposal site or land acquisition for new disposal sites is necessary within a few years.

(2) Urgently required actions

DK of KMUP is exerting efforts to clean up the city within strong limitations in equipment and budget, but it may be impossible to achieve the target set in Replita VI if improvement in efficiency is not achieved. To improve efficiency and city cleanliness, the importance of the following steps is stressed;

a. DK shall formulate a clear program in the short, middle and long terms, based on collection and analysis of reliable data.

b. Application of a priority system is the only way possible to efficiently utilize the existing resources of limited equipment, manpower and

budget. Priorities can be set based on area conditions and residents requirements.

c. There are many small disposal sites in the city because of irregular or lack of transportation service by DK, specially in slum and rural areas. It is impossible to eliminate all these small dumping sites if collection service is not regularly provided, even through open dumping is prohibited in Indonesia.

d. A final disposal site is indispensable for solid waste management, therefore a landfill site should be secured based on a long term plan. Sufficient disposal site capacity is a precondition for proper planning of solid waste collection, introduction of intermediate treatment facilities and a disposal system.

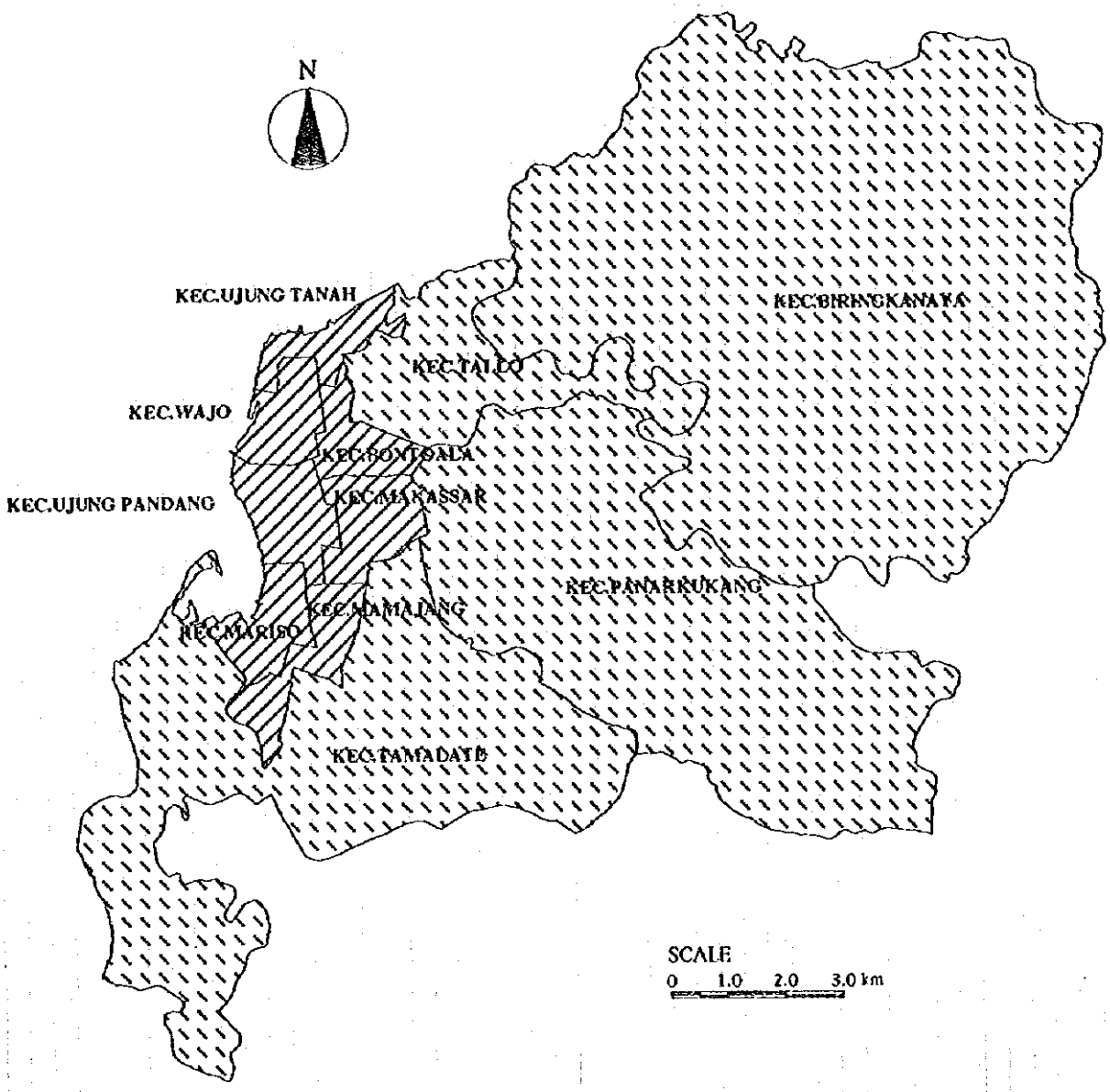
(3) Problems to be faced in the future

Changes in socioeconomic activities including increase in population, expansion of urban areas, and increase of economic activity will result in increase of solid waste amount and service demand together with change of solid waste composition. Land acquisition for disposal sites will become more difficult making disposal sites available only at distant locations. Also demand for environmental protection and cleanliness will increase. Labor cost will increase rapidly compared to other costs. These factors will bring about a rapid increase in the cost of solid waste management. These problems are faced by all large cities in the world and may be overcome through early implementation of necessary measures.

Table 2.1 Administrative Community in DATI II

Classification	Level		Forum
Governmental Administration (formal Organisation)	Municipality (TK. II) (Mayor)	Regency (TK. II) (Bupati)	Rakorbang Tk. II
	Kecamatan/District (Camat/Head of District)	Kecamatan/District) (Camat/Head of District)	Muker
	Kelurahan/Sub-District (Lurah/Head of Sub-District)	Desa/Village (Head of Village)	Musbang
	LKMD /as functional group Community-Resident Institution (Chief)	LKMD /as functional group Community-Resident Institution (Chief)	
	Lingkungan/Area (Head)	Dusun (Head)	
	Rukun Kampung/Village Neighborhood Unit (Head)		
Community (Non formal organization)	RW/Neighborhood Citizens Association (Chief)	RW/Neighborhood Citizens Association (Chief)	
	RT/Lowest Neighborhood Association (Chief)	RT/Lowest Neighborhood Association (Chief)	

Source : JICA Study Team



LEGEND

The Central Part of KMUP

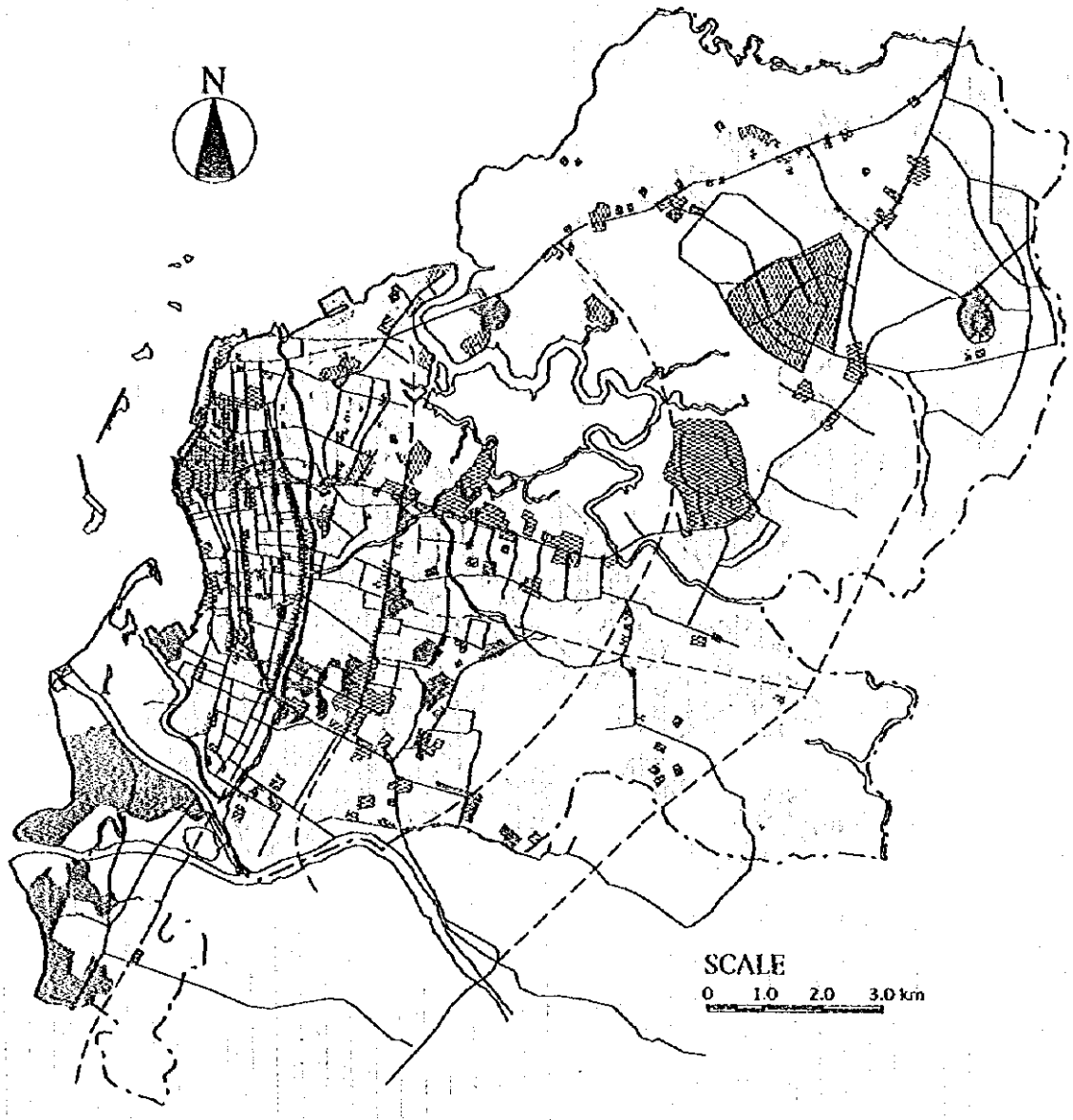
The Suburban Area

Kecamatan Boundary

FIG. 2.1 Administrative Boundary of KMUP

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995



LEGEND

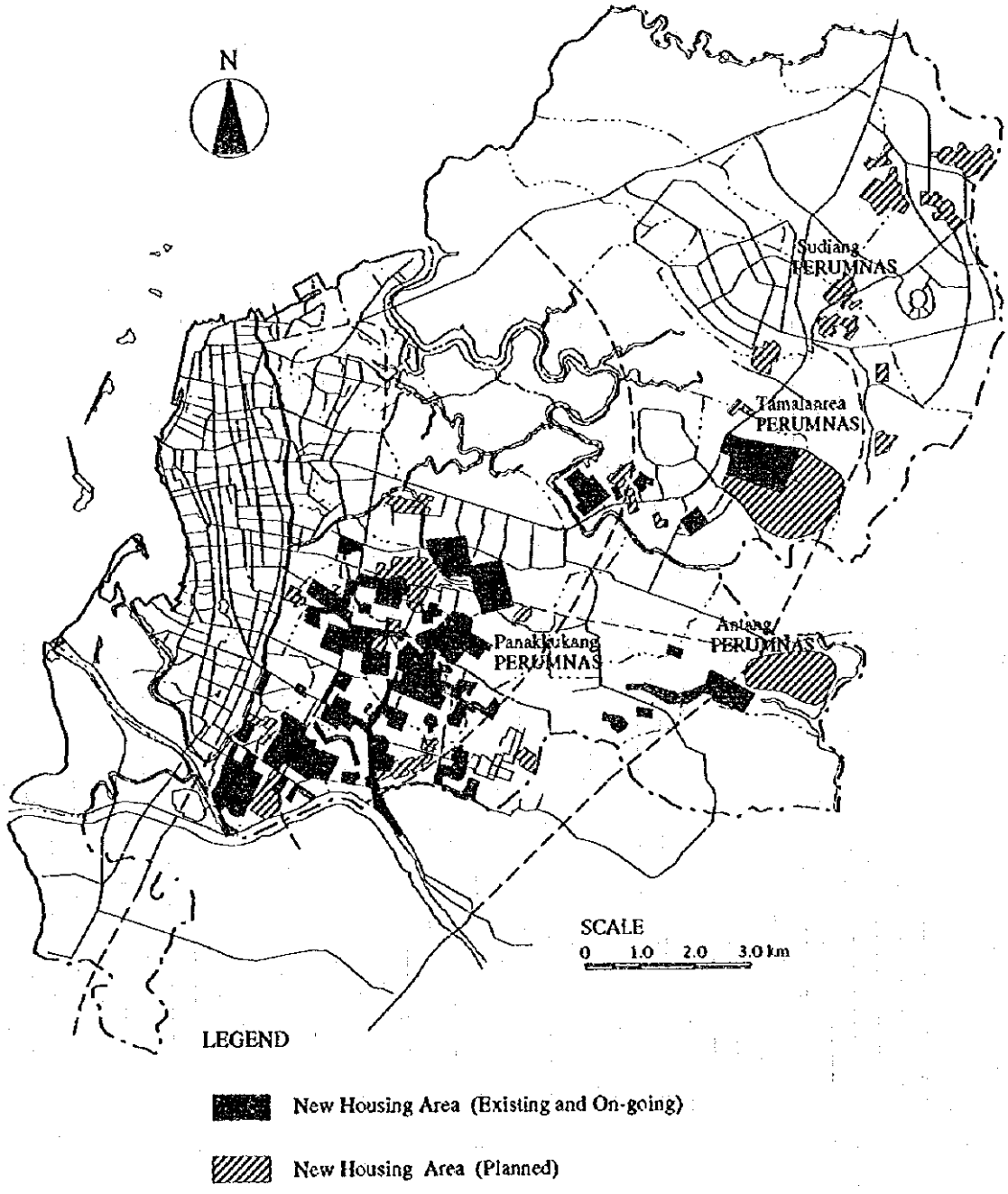
- Residential Area
- Commercial Area
- Institutional / Service Area
- Industrial Area
- Transportation Area
- Vacant Area
- Non Urban Area

(Source : JICA Study 1994)

FIG. 2.2 Existing Land Use of KMUP

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995

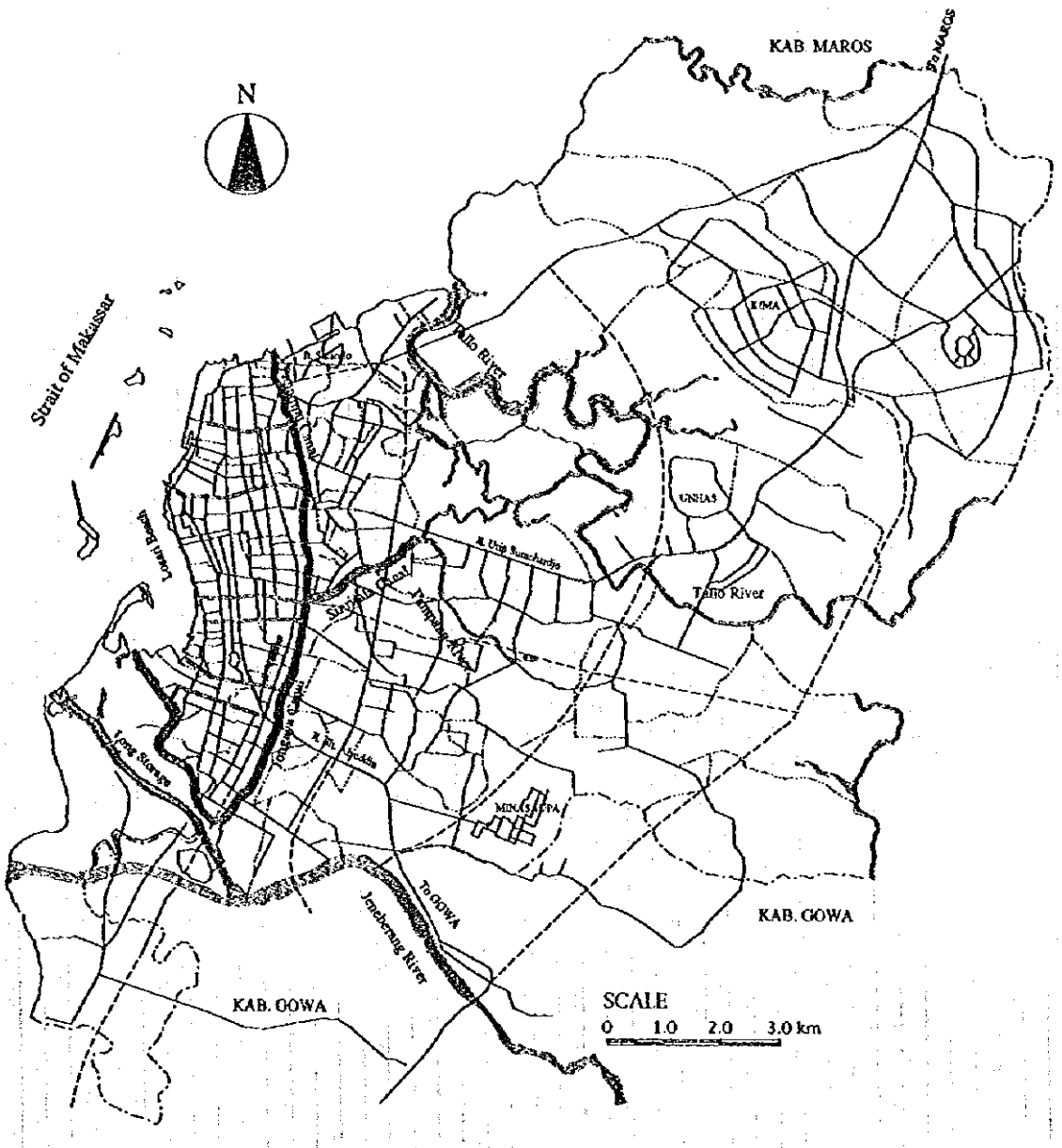


Source : JICA Study Team

FIG. 2.3 New Housing Areas

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995



LEGEND

- BOD < 30 mg/l
- BOD < 100 mg/l
- BOD > 100 mg/l

Source : JICA Study Team

FIG. 2.4 Dry Season Water Quality of Canals and Rivers

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995

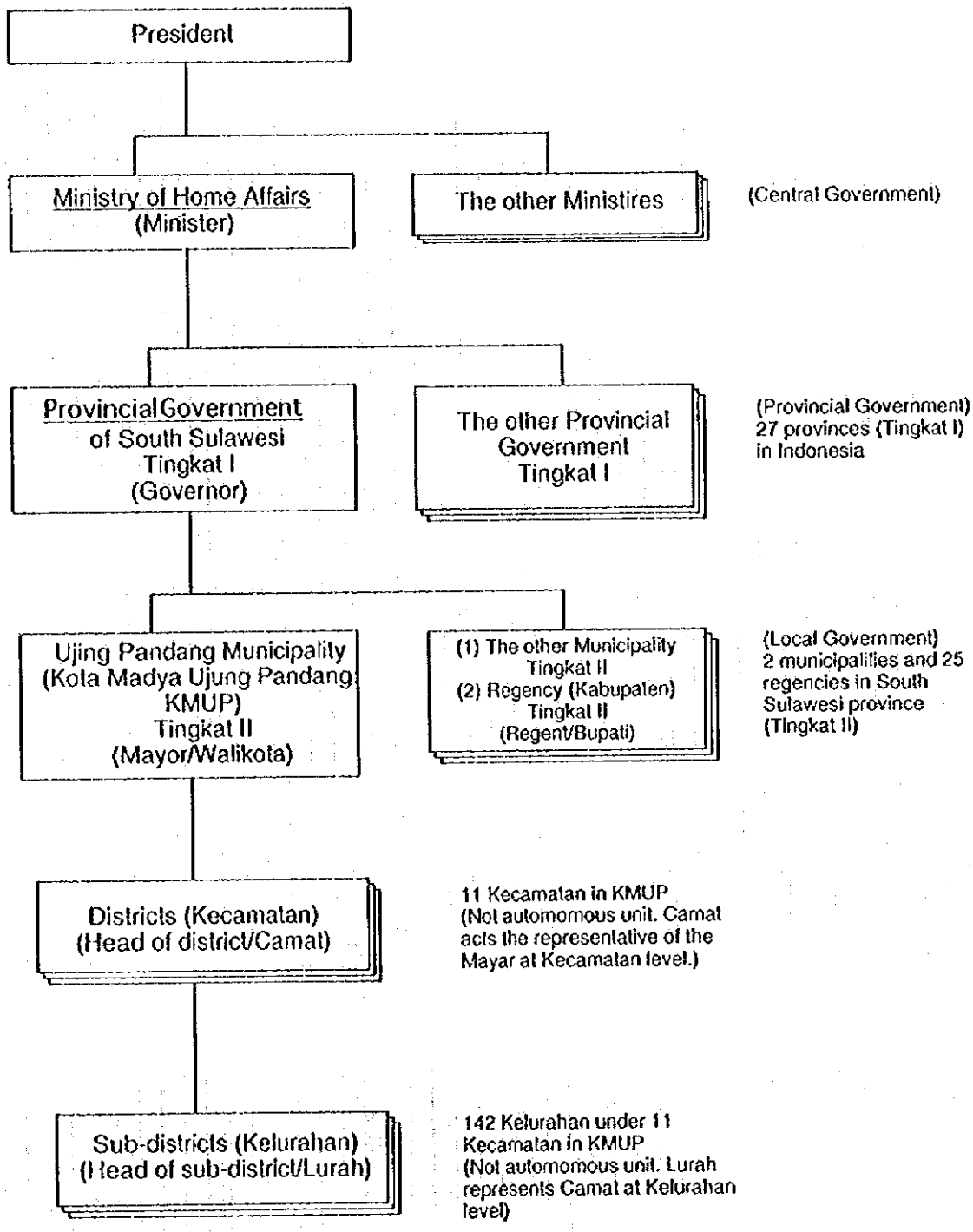


FIG. 2.5 Governmental Structure

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995

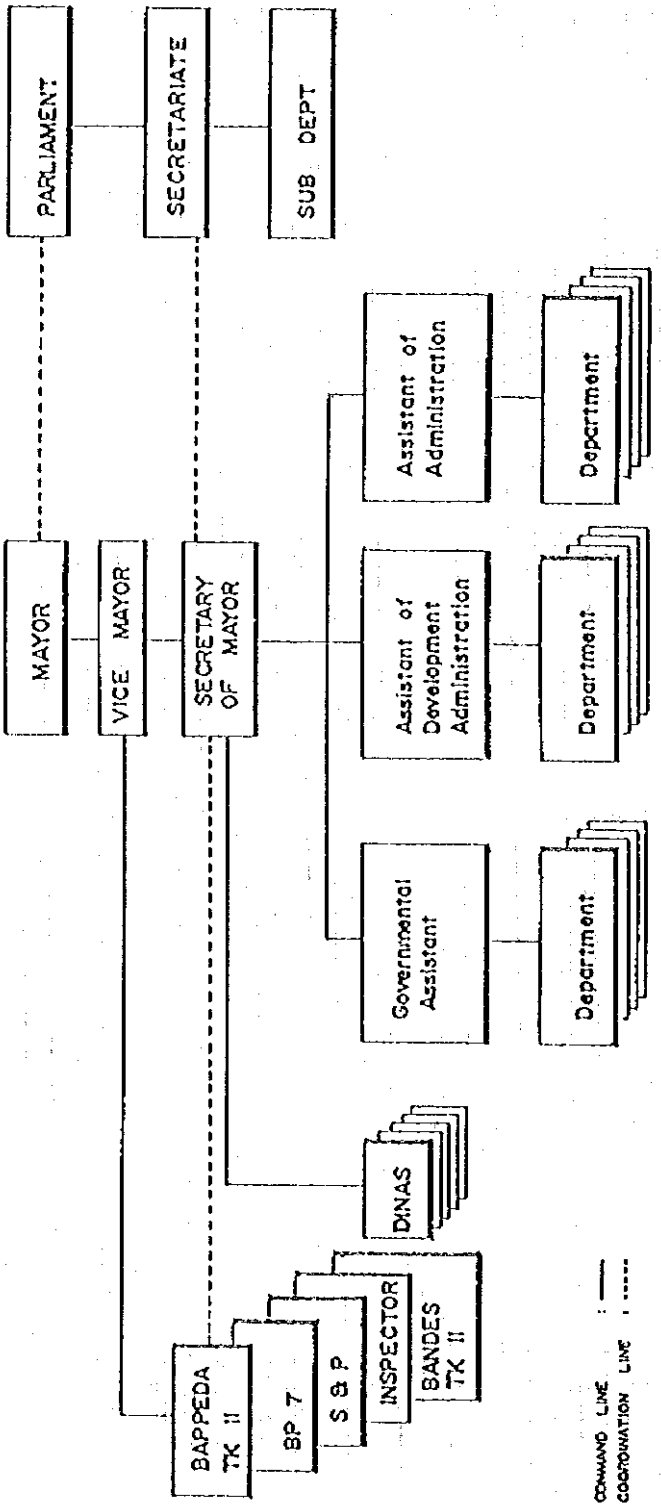


FIG.2.6 Organization Chart of KMUP

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995

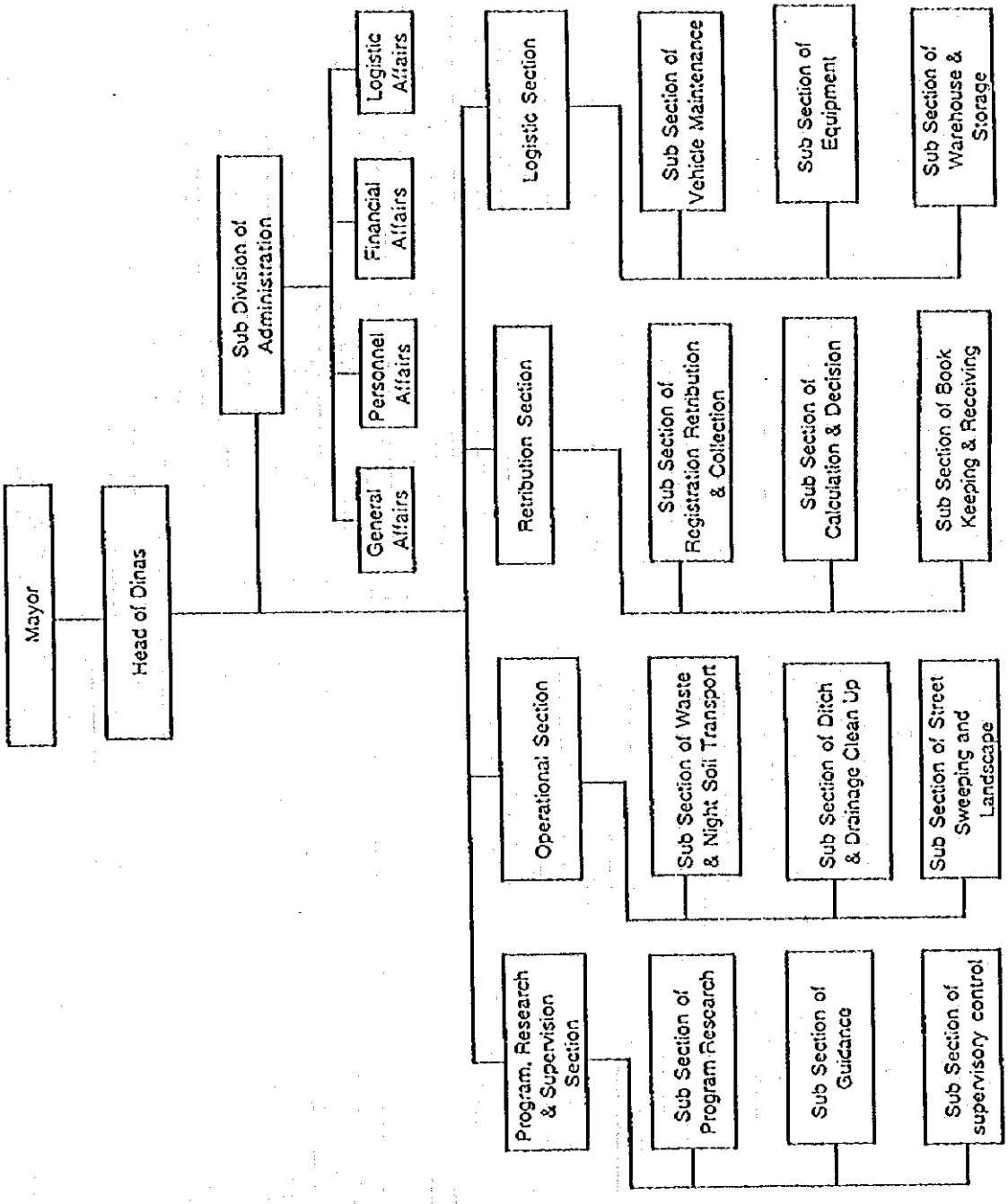


FIG. 2.7 Organization Chart of Dinas Kebersihan

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995

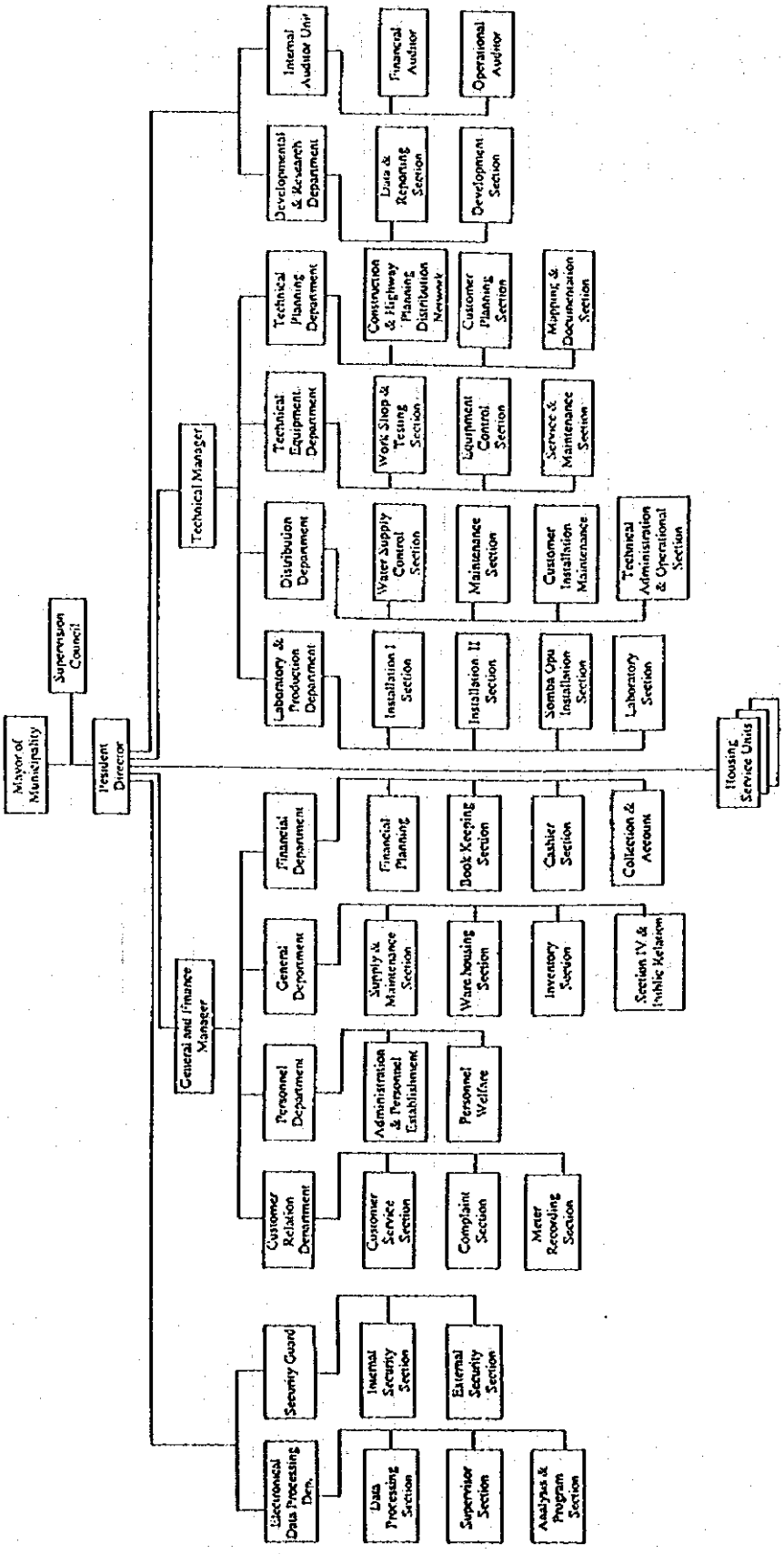
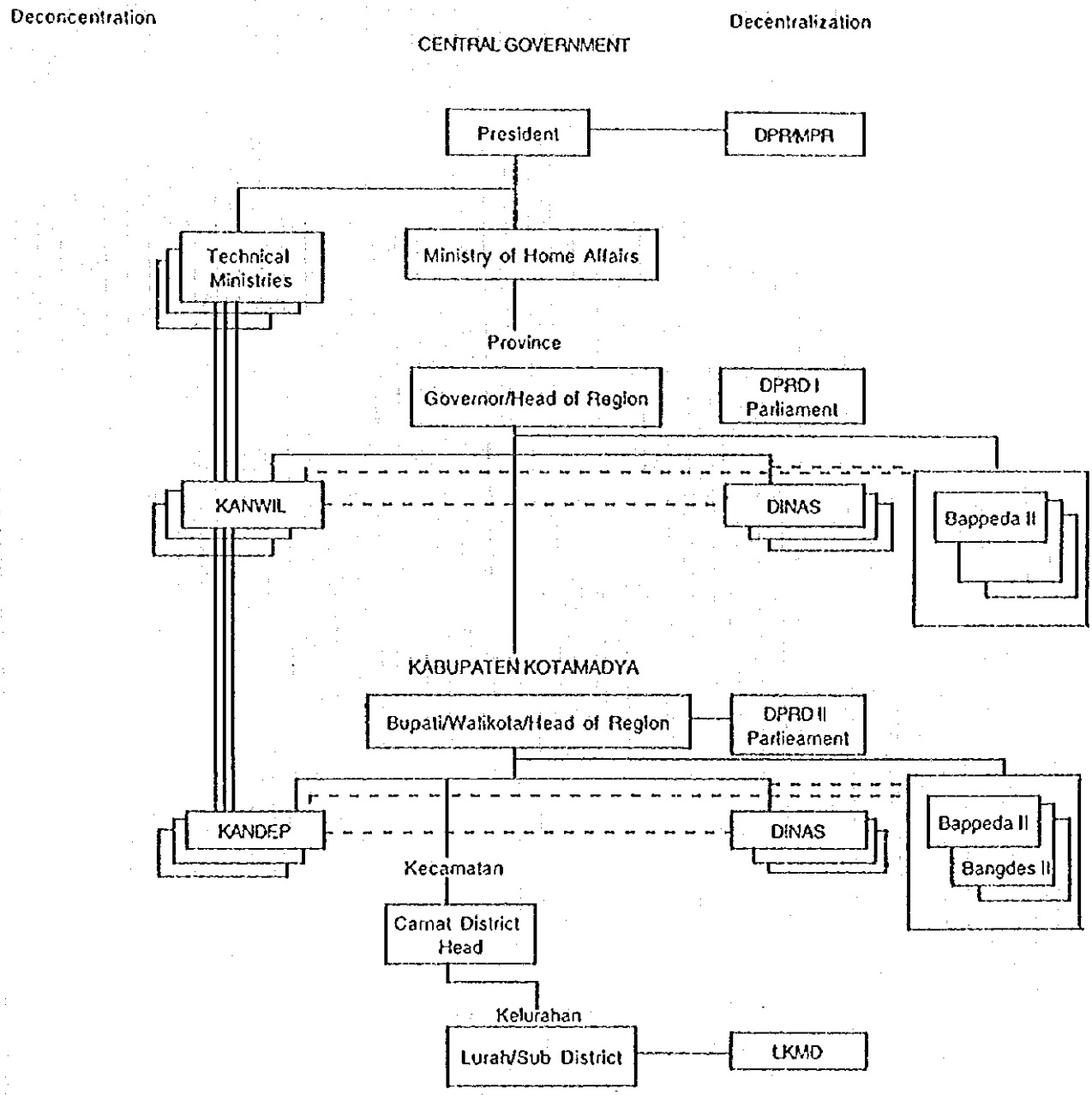


FIG. 2.8 Organization Chart of PDAM in 1992

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995



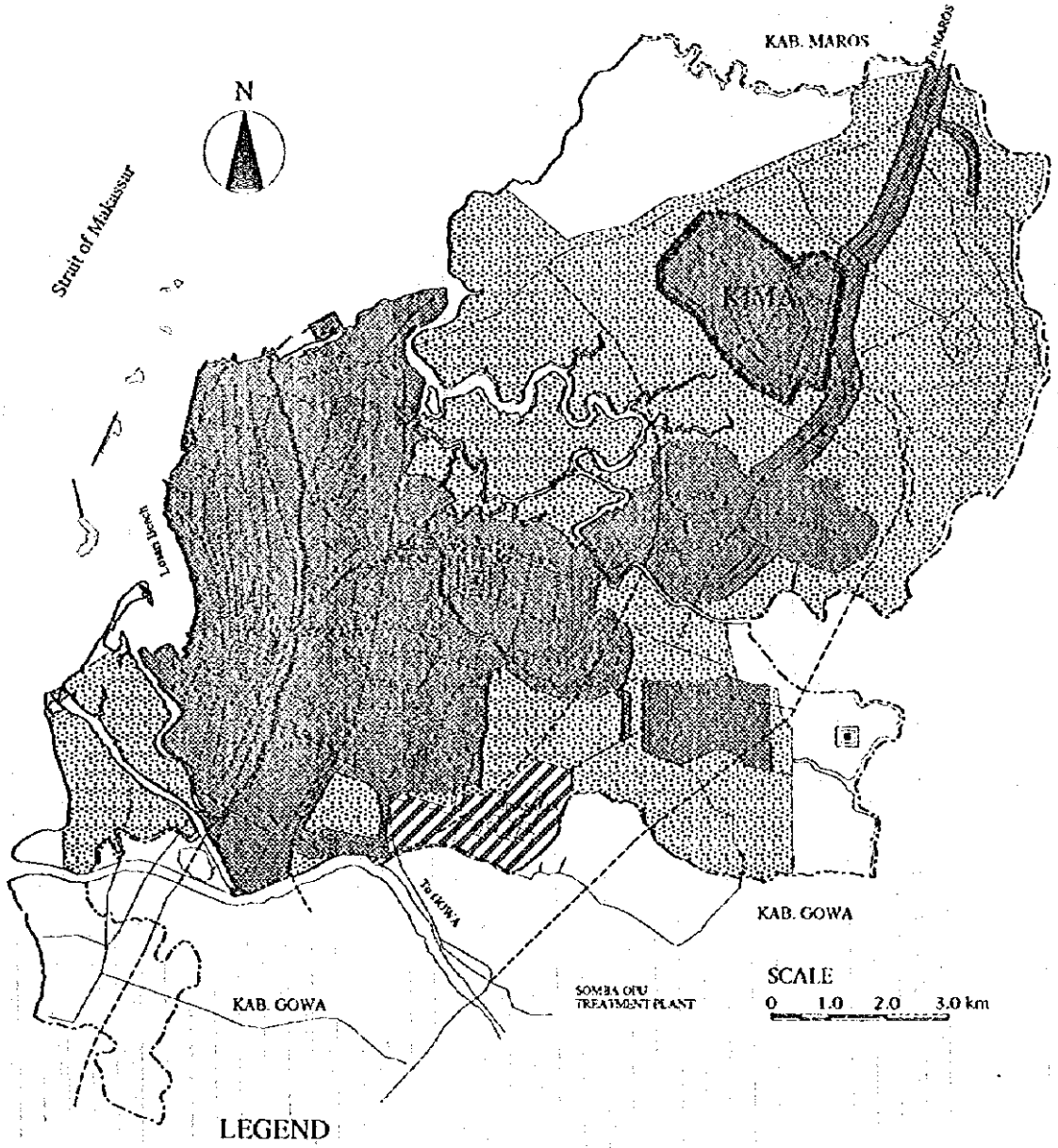
SOURCE : Nick Devas, ed., Financing Local Government in Indonesia, p.5
and Modification by JICA Study Team

Remarks :
(1) Kandep (Kantor Department/Ministerial office) are only four (4) such as for Education, Religion, Commerce and Information
(2) Lines ——Order/Command
.... Coordination

FIG.2.9 Structure of Deconcentration and Decentralization in Development among the Governmets

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995



LEGEND

- Water Supply Service Area by PDAM Ujung Pandang
- Water Supply Service Area by PDAM Gowa
- Planned Service Area to be completed until 2015 by PDAM Ujung Pandang
- KIMA Industrial Estate
- Antang Septage Treatment Plant
- Water Treatment Plant

Source : PDAM Ujung Pandang

FIG. 2.10 Water Supply Area and Main Facilities related WWM

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995

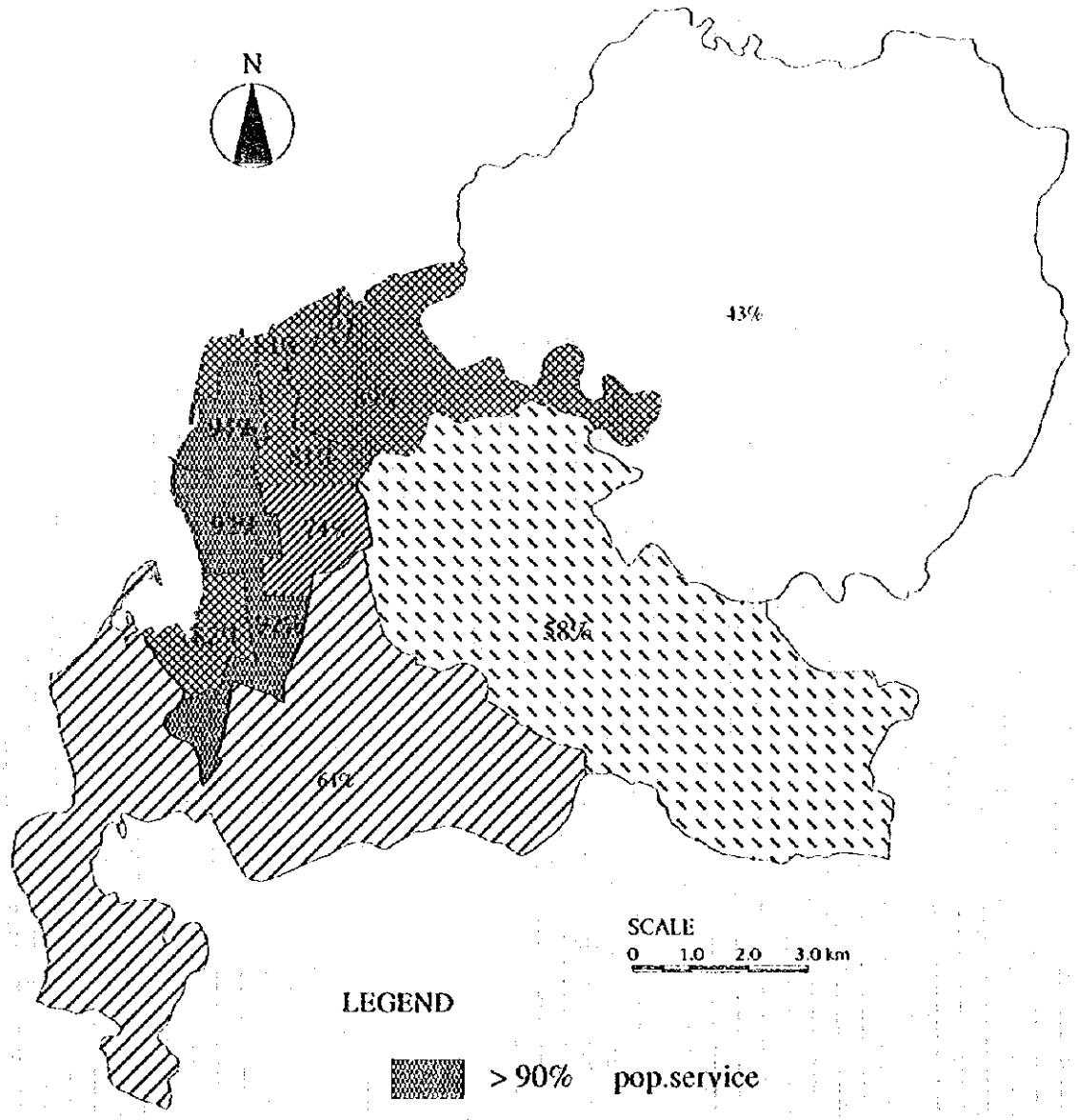
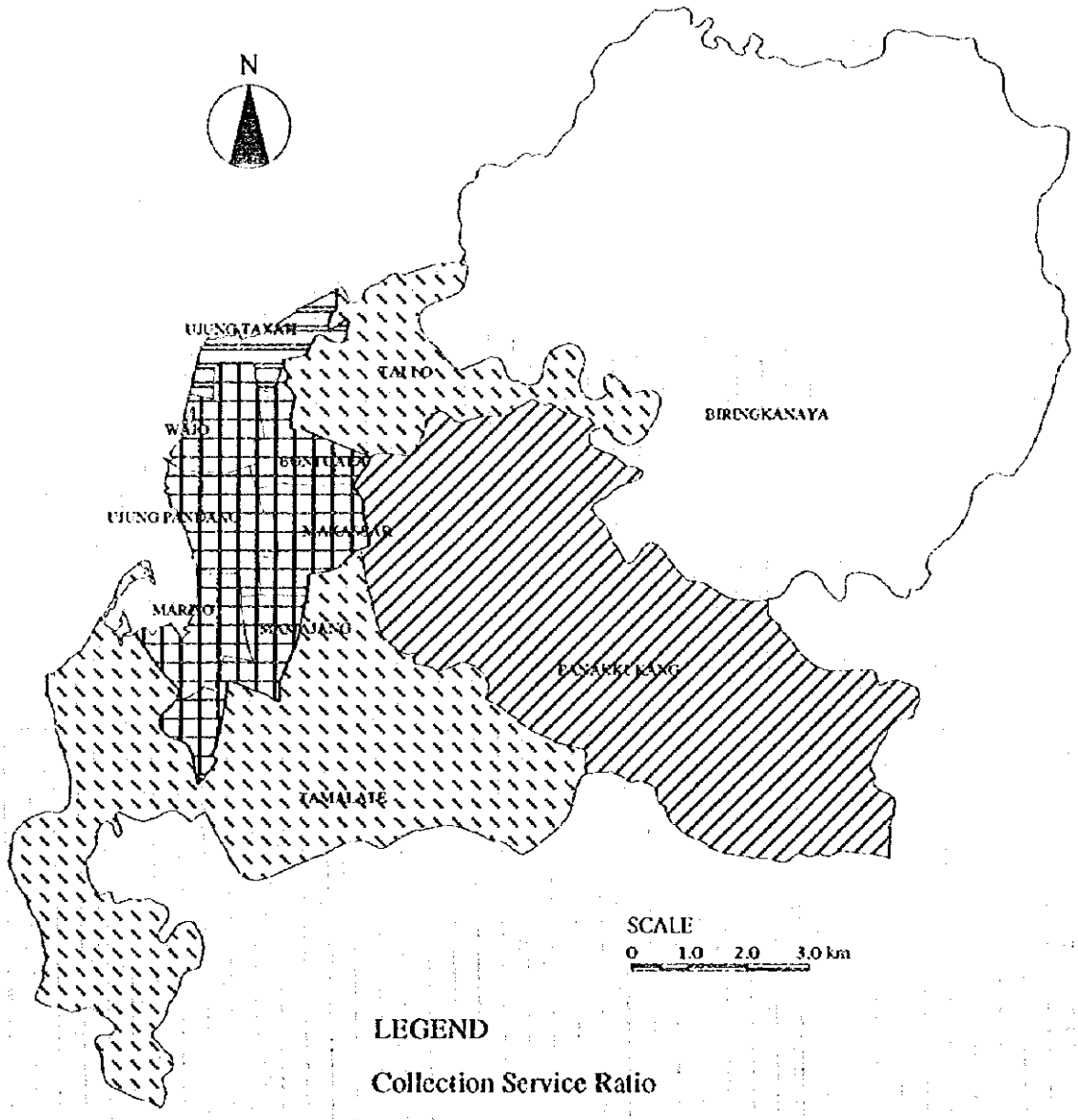


FIG. 2.11 EXTENT OF DINAS KEBERSIHAN WASTE COLLECTION SERVICE

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1994



LEGEND

Collection Service Ratio

- > 75%
- 51%
- 35%
- 20~25%
- 13%

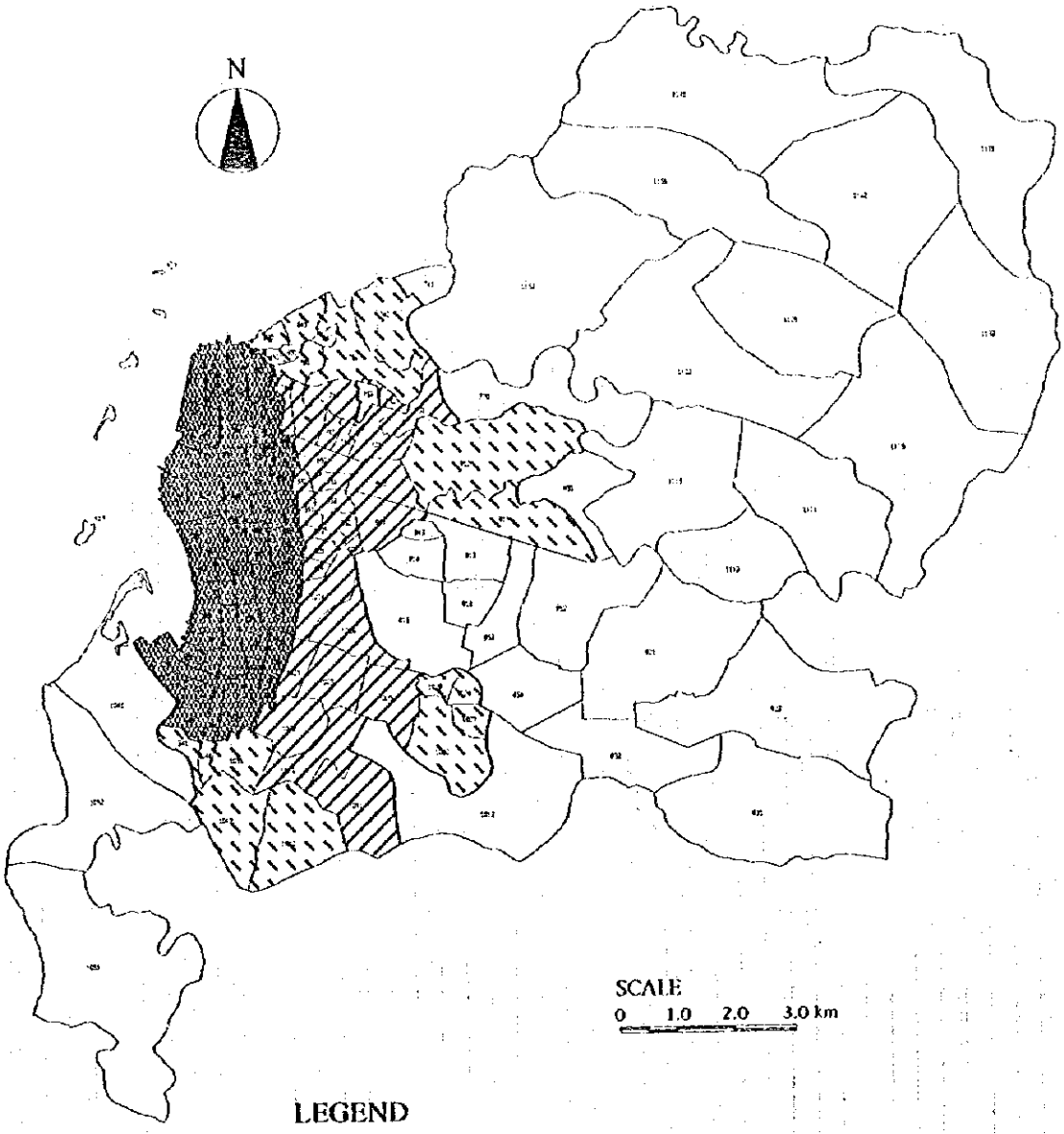
Average Service Ratio = 50%

(Source : TPA Survey 94/9/14~20)

FIG. 2.12 WASTE COLLECTION SERVICE RATIO (Volume)

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1991



(Source : Counterpart Team)

FIG. 2.13 DINAS KEBERSIHAN SOLID WASTE COLLECTION AND TRANSPORT OPERATION SYSTEM

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1991

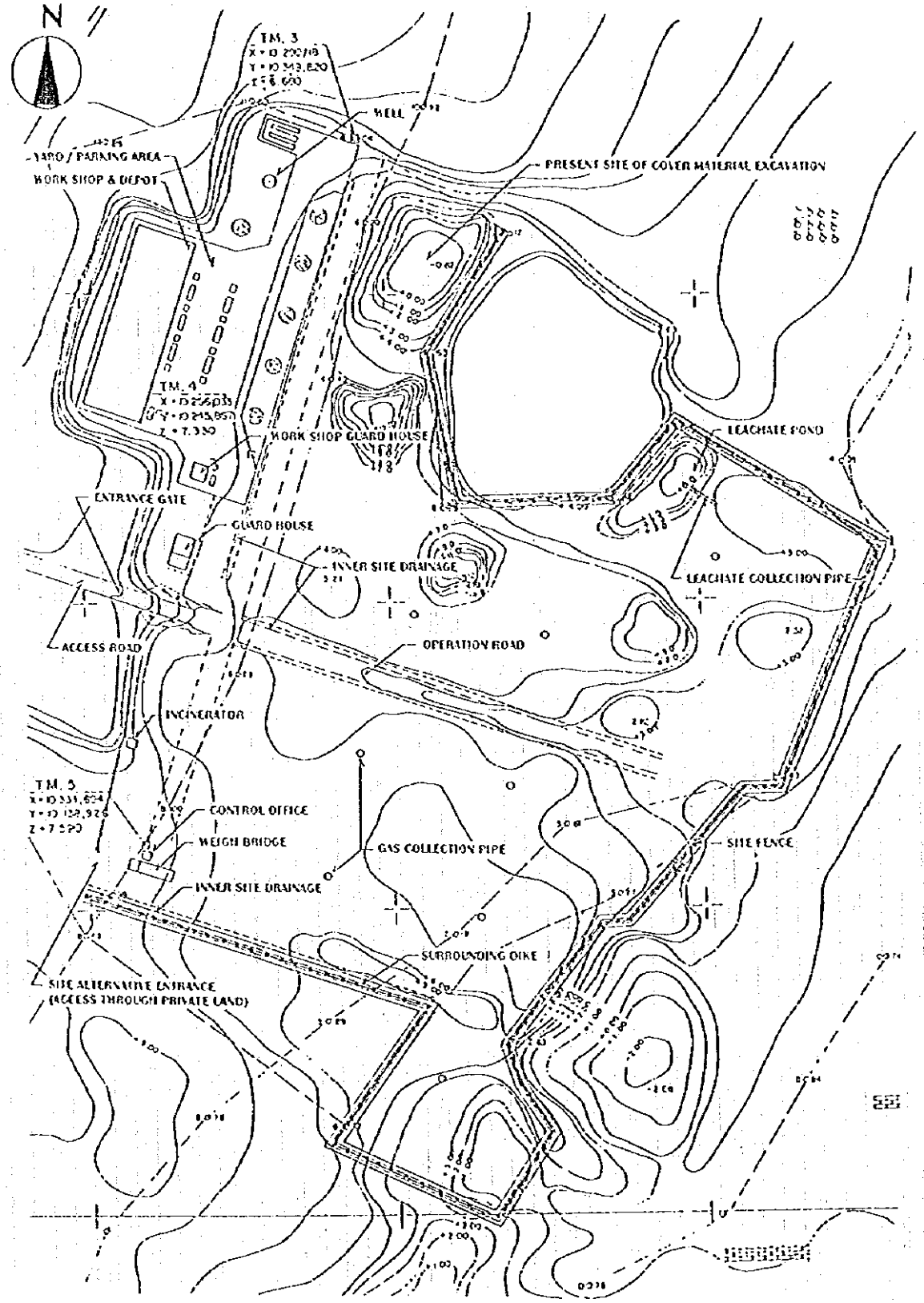


FIG. 2.14	Tamangapa Final Disposal Site

MASTER PLAN AND FEASIBILITY STUDY ON WASTEWATER AND SOLID WASTE MANAGEMENT FOR THE CITY OF UJUNG PANDANG IN THE REPUBLIC OF INDONESIA

JICA A.D.1995

CHAPTER 3

PLANNING FRAMES

CHAPTER 3 PLANNING FRAMES

3.1 Population Projection

3.1.1 Rapid growth of urban population

The increase of the total population in the South Sulawesi is 1.4% that is below the national average of 1.8% between 1980 to 1990. However the increase of the urban population in the South Sulawesi is 5.4% that is above the national average of 4.5% in the same period. The urbanization is obviously in progress in the national wide and the share of the urban population in the total population has increased to around 29% in Indonesia.

The total population in the KMUP has increased more rapidly at an annual average ratio of 2.9%, and 4.7% especially between 1985 to 1990 and the almost all the population is estimated as urban population in the statistic data.

The movement of population migration has become intensive at the national level and also in KMUP. The number of the out-migrants in the central parts was 1,600 persons and in-migrants in the suburbs was 5,000 persons between 1985 to 1990.

3.1.2 Population projection by the JICA Study Team

The Study Team made the population projection using the Age Cohort Component Method with the assumptions of fertility and mortality factors for the natural increase and assumption of migration factor for the social increase.

Natural increase was estimated based on the assumptions of TFR (Total Fertility Rate) for fertility level and Life Expectancy for mortality level as shown below.

a. TFR (Total Fertility Rate) was assumed around 3.1 in the year 2005 and 2.8 in the year 2015 while the existing TFR is 3.4 in 1990.

b. Life Expectancy (average for males and females) was assumed around 67.6 in the year 2005 and 73.8 in the year 2015 while the existing life expectancy is 59.2 in 1990.

As a result, natural increase of the Study Area is estimated at 1,363,000 until 2005 and 1,613,000 until 2015, respectively.

The social increase which is caused by in- and out-migration of the population was assumed based on the past trend with the alternatives as follows.

a. High migration pattern that was made based on that the high migration pattern during the previous years will be continued in the future, at least up to the year 2005 and the trend will be moderated afterwards. The characteristic of the assumption is "high increase of out-migration in the central parts and high increase of in-migration in the suburbs".

b. Low migration pattern that was made based on that the past trend of migration pattern was the special cases and it seems too high for a base for assumption, so that the trend will be moderated soon and declined to the future. The characteristic of the assumption is "low increase of in and out-migration in the suburbs and even in the central parts".

Number of total migrants estimated with the above conditions are as follows.

	up to 2005	up to 2015
High migration	+ 250,000	+ 802,000
Low migration	+ 69,000	+ 378,000

Based on the above assumptions, the total population of the city of Ujung Pandang is estimated as follows.

	2005	2015
High migration	1,614,000	2,415,000
Low migration	1,433,000	1,990,000
Medium(JICA projection)	1,520,000	2,200,000

The alternatives of population projection is shown in *Fig.* 3.1.

The population projection of the Study is the medium projection that is an average figure between the projections with high migration and low migration. This projection seems to be reasonable comparing with several population projections in the related plans and studies such as RUTRK (KMUP), MINASAMAUPA, BAPPENAS, PDAM, etc.

3.2 Future Land Use

3.2.1 Basis for forecasting future land use

Basis for establishment of future land use frame are as follows.

a. Compatible with the City Master Plan 2004 (RIK/RUTRK and RDTK), MINASAMAUPA Concept and the other related plans and programs.

b. Most of the present on-going plans and projects will be implemented and completed by the year of 2015.

c. Number of the future population up to the year of 2015 is based on the JICA projection mentioned above and the future population distribution is based on the study result of the land availability and population absorption.

d. Development trends of the past will continue up to the year of 2005 and alter its vector preferable way such as preferable population density, higher standard of infrastructure and public services, balanced land use composition, etc. in the long term.

3.2.2 Physical development plan of the related plans and programs

The orientations of the physical development of the city which is stated in the City Master Plan, MINASAMAUPA Concept and others are summarized as follows.

- Expanding the urban area up to around 80% of the total area of the city.
- Promoting the development towards the east area.
- Developing along two major axes, that is to say, Industrial/Economic Axis along Jln. Prof. Sutami artery road and Settlement/Social Service Axis along Jln. Urip Samoharjo artery road and Jln. A. Petterani.
- Developing the major road network, consist of three ring roads and three radial roads which has been proposed in the JICA Highway Study.

The concept of spatial development plan of KMUP is shown in *Fig.* 3.2.

The implementation schedule of the projects in the planning stage is assumed to be completed by the year 2015. The locations of the major on-going plans and projects are shown in *Fig.* 3.3.

3.2.3 Land availability and population absorption

As the geographic conditions of the city is relatively plain, the most of the land of the city can be potentially utilized as an urban area except for flood area, wet area and special areas such as military area.

The available land can be found in the following areas.

- Residential areas with low population density and having rooms to be more higher density
- Commercial and institutional areas where more intensive use of the space will be possible by mixed and effective use with residential in the central parts
- Agricultural areas with lower productivity compared with neighboring Kabupaten
- Fish pond and swamp areas

Population absorption of the Study Area is estimated as follows based on the assumed land availability.

a. 621,000 persons in the central parts (143 % of existing population)
b. 1,879,000 persons in the suburbs (332 %)
c. 2,500,000 persons in the whole city (250 %)

The result of population distribution by Kecamatan is shown in *Fig.* 3.4. Present and future distribution of population density by Kelurahan are shown in *Fig.* 3.5 through *Fig.* 3.7.

3.2.4 Distribution of new housing estates

Housing estates that will be developed by PERUMNAS and private developers are estimated based on the past achievement of housing development as follows.

	PERUMNAS	Private	Total
Present	400 ha	350 ha	750 ha
Future			
On-going(1995-2000)	300 ha	450 ha	750 ha
2001-2005	340 ha	240 ha	580 ha
2006-2010	360 ha	400 ha	760 ha
2011-2015	400 ha	460 ha	860 ha
Sub-Total (1995-2015)	1,400 ha	1,550 ha	2,200 ha
Total (Up to 2015)	1,800 ha	1,900 ha	3,700 ha

The number of the housing units and inhabitants in the above housing estates is estimated as follows.

	Housing units	Inhabitants
Existing	28,000 units	170,000
Future		
1) 1995-2005	57,500 units	303,000
2) 2006-2015	76,500 units	362,000
Total	162,000 units	835,000

3.2.5 Future land use plan

As a conclusion, the future land use of the Study Area in 2015 is projected as shown in *Fig.* 3.8.

3.2.6 Urban development in the surrounding areas

According to the MINASAMAUPA Concept mentioned in section 2.2, the future population of the Maros and Gowa are projected as follows.

(1) Total population

	1990	1995	2000	2005	2010	2015*a)
Maros	209,886	238,978	272,099	309,813	352,753	401,600
Gowa	202,121	230,136	262,032	298,351	339,702	386,800

Source: Review of MINASAMAUPA Metropolitan General Plan (Final Report)

*a) estimated by JICA with same increase ratio of projection(2.63 % annual) 1995~2010

(2) Urban population

	1990	1995	2000	2005	2010	2015*b)
Maros*c)	46,240	52,649	59,946	68,255	92,715	126,000
Sungguminasa	53,820	61,280	69,773	79,444	90,455	122,900

Source: Review of MINASAMAUPA Metropolitan General Plan(Final Report)

*b) estimated by JICA with same increase ratio of projection (6.32% annual) 2005~2010

*c) includes Maros and Banta Ase areas