5.2 Important Future Trend in Jabotabek

5.2 Important Future Trend in Jabotabek

The Jabotabek region is and will be the national focus for economic activities such as trade and commerce, with a significant manufacturing and investment base, where a large and rich agricultural hinterland is also rapidly being urbanized. Jakarta is the dominant partner in Jabotabek, but data on economic and demographic levels show that Botabek is rapidly absorbing much of the region's growth, including growth at the West Java provincial level. In the West Java Provincial Structure Plan, the function of cities in Botabek is to support the development of Jakarta metropolitan city. Therefore, Bogor, Tangerang and Bekasi are expected to function as supporting cities in the future. The following sections present some socio-economic factors to indicate the future development trend of Jabotabek.

(1) Forecast of Population Growth

There exist various forecasts on the future population in the Jabotabek area, as summarized in **Table 1**. Each forecast method uses a different prediction model with both pros and cons. But, all the forecasts are based on the latest National Population Census data in 1990.

The Jabotabek region had a population of some 17 million in 1990 (about 9.5% of the national population), and it is forecasted to increase to around 30 million by the year 2010. Jakarta had a population of around 8.21 million in 1990 and would reach 11.2 ~ 11.5 million by 2010, during which time Botabek's population level is forecasted to increase from more or less 8.8 million to 18.5 ~ 18.7 million. The regional population growth is averaging about 2.9 % p.a. over the period.

This is a result of the truly impressive level of growth from 1978's population in the same region (10.5 million) and exceeds the earlier forecast in the 1980 JMDP report (23.6 million by 2000).

Jakarta's figure for the year 2010 quite likely marks a threshold beyond which population may be expected to grow only very slowly, or even possibly decline. There are factors directing residential patterns, as opposed to employment and development in Jakarta, which place limits to how far the population can be expected to grow. In the future, total population in Jakarta is expected to be directed into the proposed development areas in Jakarta, with emphasis being laid on growth in the east-west direction.

In all of these population forecasts, urban and rural population allocations were estimated with following assumptions :

1) Although population growth is derived from the net increase of urban and rural population, the revised population increment of the respective Botabek components was assumed to only bring about increase in the urban population. In short, a pull-back of the initially estimated increase in Bogor's population was considered to happen to the urban population, and the pull-back volume was supplemented by the increase in Tangerang and Bekasi urban population.

2) Distribution of the additional increase between Tangerang and Bekasi was assessed by the proportion of initially estimated urban growth potentials of the respective regions.

Table 1 Prediction of Future Population and Annual Growth Rate in Jabotabek

(Unit : 1,000)

Area	1990	1995	2000	2005	2010
DKI Jakarta	1) 8,210 3) 8,254 5) 8,260	1) 8,964 5) 9,161	1) 9,730 4) 10,000 5) 10,055	1) 10,487 2) 11,988	1) 11,178 4) 11,500
Growth Rate	1) 1.77 %(90-95)	1) 1.65 %(95-00)	1) 1.51 %(00-05)		1) 1.28 %(05-10)
Bekasi	1) 2,073 3) 2,104 5) 2,125	1) 2,697 5) 2,780	1) 3,348 5) 3,589	1) 4,066	1) 4,802
Growth Rate	1) 5.40 %(90-95)	1) 4.42 %(95-00)	1) 3.96 %(00-05)		1) 3.38 %(05-10)
Tangerang	1) 2,724 3) 2,765 5) 2,791	1) 3,570 5) 3,620	1) 4,506 5) 4,631	1) 5,504	1) 6,523
Growth Rate	1) 5.56 %(90-95)	1) 4.77 %(95-00)	1) 4.08 %(00-05)		1) 3.46 %(05-10)
Bogor	1) 3,949 3) 4,008 5) 4,032	1) 4,805 5) 4,724	1) 5,674 5) 5,469	1) 6,533	1) 7,407
Growth Rate	1) 4.00 %(90-95)	1) 3.38 %(95-00)	1) 2.86 %(00-05)		1) 2.54 %(05-10)
Total	1) 16,956 3) 17,132 5) 17,208	1) 20,036 5) 20,285	1) 23,258 4) 23,600 5) 23,700	1) 26,590	1) 29,910 4) 30,000
Growth Rate	1) 2.88 % on average (1990 - 2010)				

Sources : 1) Feasibility Study on Urban Arterial Road System Development Project in Jakarta Metropolitan Area (Ref. 173)

2) DKI Jakarta Structure Plan 2005 (Ref. 158)

3) Population Census

4) Jabotabek Metropolitan Development Plan Review (Ref. 134)

5) Proyeks Penduduk Indonesia per Kabupaten/Kotamadya 1990 - 2000 (Ref. 209)

(2) Expected growth in employment level

The three main factors in forecasting employment in Jabotabek are :

1) The on-going labor force growth at regional population level continues to increase, and including some further potential for a higher labor force participation rate ;

2) The on-going sectoral growth that is evident in manufacturing and other basic activities including finance and banking, external trade, central government and other traded services ; and

3) The on-going employment growth associated with the local services, needs of which arise from population growth, such as health and education, wholesaling and retailing, local transport, local service industries, and so on.

The region's labor force is also expanding at an increasing rate. The labor force is forecasted to grow at an average of about 3.9% p.a. The 1990's labor force in Jabotabek, including the people at work, unemployed and seeking work was around 6.7 million in total (3.1 million residents in Jakarta, and 3.6 million residents in Botabek). These figures indicate that employment (the employed labor force) can be expected to grow considerably faster than the total population over the 20-year period, at an average annual growth rate of 3.9 %/year for the whole Jabotabek area. There are two major reasons for such a rapid growth of workforce/employment:

- changes in age structure resulting from the effects of continued fertility decline which means an increasing share of total population in the working ages (10 year old and over), and

- increasing participation of working age females in economic activities

The working proportion of the regional population is and will be as follows :

aged 10 and over : 77 % in 1990 to 84 % in 2010

female participation to female population aged 10 and over :

30 % in 1990 to 41 % in 2010

male participation : constant at 68 %

Unemployment is taken into account by the expectation that in a labor surplus economy where there is a well defined informal sector, those in need of work will

generally be able to find something to do, even if at a very low level of productivity. Indeed, it is the informal sector - across most job categories - which enables job seekers to find employment even when jobs do not exist in the formal sector due to a labor over-supply.

The JMDPR analyzed, for estimating future employment levels, such factors as age structure, labor force participation ratios distinctive between male and female, and unemployment ratio. The employed population of the respective Botabek components was estimated according to the following procedures :

- A target compound employment ratio in 2010 was assumed to be the same (42.94 % vs. total population) in the respective Botabek components.

- The ratio in the intermediate year 2000 was estimated by interpolating between the 1990 and 2010 ratios.

- Based on the derived ratios, employed levels of the respective Botabek components were estimated.

The JMDPR forecast the growth in employment by industrial sector for DKI Jakarta and Botabek, 1990 - 2010. However, the employment numbers in Botabek are different from the 1990 census. Therefore, only the employment growth was adopted from the JMDPR and future employment was estimated. The sectoral employment of the respective Botabek components were based on the distribution characteristics derived from the 1990 census result, growth factors of total employment in the respective Botabek components and those of sectoral employment in Botabek totals. As a result, the future employment by industrial sector has been estimated for the Botabek components as shown in **Table 2.**

Table 2 Future Employment Level by Sector in Jabotabek

(Unit : 1,000 persons)

Area	Agriculture	Manufacture	Other Industries 1)	Trade	Other Services 2)	Total (% to Population)
1990 Actual Level (based on the 1990 Census Data)						
DKI Jakarta	31	599	224	778	1,294	2,926 (36) * 2,932
Botabek	460	667	235	596	823	2,780 (32) * 3,097
Jabotabek	490	1,266	459	1,374	2,117	5,706 * 6029
2000 Forecast Level						
DKI Jakarta	9	868	301	1,055	1,685	3,917 (40)
Botabek	365	1,551	426	1,143	1,576	5,061 (37) * 5,343
Jabotabek	375	2,419	727	2,197	3,261	8,978 * 9,260
2010 Forecast Level						
DKI Jakarta	2	1,063	387	1,305	2,094	4,851 (43)
Botabek	223	2,870	587	1,972	2,393	8,044 (43) * 8,047
Jabotabek	224	3,933	974	3,277	4,487	12,895 * 12,898

Sources : Feasibility Study on Urban Arterial Road System Development Project in Jakarta Metropolitan Area (Ref. 173) and National Population Census

Notes : * from Jabotabek Metropolitan Development Plan Review (Ref. 134)

1) including mining, electricity, gas, water and construction

2) including public/private services, transport and financial sector

(3) Trends in Jabotabek economy and future gross regional domestic product (GRDP)

The agricultural sector is now less important in Jabotabek's economy (0.9 % of Jakarta's GRDP and 12 % of Botabek's in 1992), and this is in part due to the rapid urbanization of remaining parts of Jakarta's fringe with development encroachment well into the adjoining fringe areas of Tangerang, Bekasi, and Bogor. However, manufacturing is now very important (26 % of Jakarta's GRDP and 30 % of

Botabek's in 1992) and is continuing to expand as a prime share of economic activity. It is particularly so in the Bekasi-Jakarta-Tangerang east/west corridor, which has access and other locational advantages for industry. The service sector continues to provide many jobs, especially as part of Jakarta's role as national capital and as a result of the region's focus on national and foreign investment. Domestic product ratio of Jabotabek to national GDP was about 15 % in 1992.

While GDP growth goals of future Indonesia has been set out in its 25-year development plans (PJP) or 5-year development plans (Replita) as shown in **Table 3**, a future GRDP has been projected in the DKI Jakarta Structure Plan 2005 as shown in **Table 4**. The GRDP growth in DKI Jakarta has been achieved at 9.5 % p.a. between 1980 and 1990, which was a little higher rate than that projected. Since the population growth was slower than that projected, the per capita GRDP could attain a higher rate of growth of 6.9 % p.a. over the period of 1980 - 1990, which was about 1.5 % higher than the projected value. Based on this comparative analysis, and the related planning studies such as JMDPR, the future GRDP in DKI Jakarta was re-forecasted by the JICA Feasibility Study Team on Urban Arterial Road System Development Project in Jakarta Metropolitan Area, as shown in **Table 4**.

In 1990, just 26 % of the people at work in Jakarta were considered to be part of the informal sector (self-employed, self-employed with assistant, family worker, etc.). Jobs have been "formalizing" as new investments in manufacturing and commerce move in. Over the decade, these jobs were formalizing at a growth rate of 60 %. Although Jabotabek is formalizing in economic activities at an unprecedented rate, there is still a requirement to ensure that small-scale informal sector activities in manufacturing, trade and other services, are allowed to continue their role of providing employment and incomes for those who otherwise cannot find employment in the formal sector. Even over the 20-year forecast period, some 20 % of all Jabotabek employment is likely to be found in the informal sector.

Table 3 Planned Goals of Average GDP Growth for Indonesia

(Unit : %/year)

Items/Years	1989 ~ 1993	1994 ~ 1998	1999 ~ 2003	2004 ~2008	2009 ~ 2013
GDP Growth	6.6	6.2	6.6	7.1	7.8
Agriculture	2.4	3.4	3.5	3.5	3.5
Manufacture	10.0	9.4	9.4	9.4	9.1
(non-oil/gas)	11.0	10.3	10.2	10.0	9.5
Other	7.2	6.0	6.3	6.8	8.0
Per Capita	Rp.1,188,000	Rp.1,487,000	Rp.1,908,000	Rp.5,525,000	Rp.3,483,000

Sources : PJP II (1994 ~ 2018) and Repelita V ~ IX (1989 ~ 2013, Ref.184)

Table 4 Projected Average GRDP in DKI Jakarta

Items/Years 1)	1985 ~ 1995	1995 ~ 2005
GRDP Growth (%/year)	8.0	7.0
Per Capita GRDP (%/year)	5.2	5.0
Items/Years 2)	1990 ~ 2000	2000 ~ 2010
GRDP Growth (%/year)	8.5	7.5
Per Capita GRDP (%/year)	6.7	6.0
GRDP (billion Rp./year) *	30,933	63,753
Per Capita GRDP (Rp./year)	3,177,000	5,703,000

Sources : 1) DKI Jakarta Structure Plan 2005, and Statistical Yearbooks of Indonesia (Ref. 61)

2) Feasibility Study on Urban Arterial Road System Development Project in Jakarta Metropolitan Area (Ref. 173), and Jabotabek Metropolitan Development Plan Review (Ref. 134)

Note : * at 1983 constant price

(4) Journey forecast of work commuters

Metropolitan fringe development patterns have reinforced the trend of commuting, with many of the middle and upper income households now living in the new residential fringe developments and traveling into Jakarta each day to work. As centers and employment nodes develop in Botabek and more residents commute from these new residential areas to the employment nodes, it is also likely that there will be growth in internal commuting within Botabek. Forecasts of the JMDPR study suggest

that there could be at least some 500,000 commuters traveling to Jakarta to work in 2010, in addition to the internal commuting within Botabek. This could be a conservative figure. It may result in larger commuter flows within Botabek as residents travel from the outlying parts of the region, into the larger and expanding urban centers such as Bogor, Tangerang, and Bekasi, and the newer expanding centers like Cibinong, Citeureup, Serpong, Depok, and so on. However, the JMTSS report's estimates are much lower than the JMDPR forecast as shown below :

Botabek to Jakarta :	300,000 people in 1990
	600,000 people in 2015
Jakarta to Botabek :	100,000 people in 1990
	200,000 people in 2015 (a net inflow of 400,000)

The net in-commuter population in 1993 was estimated by the JICA Study Team on Jakarta's road system to be 187,500 persons, so that those in 2000 were interpolated between 1993 and 2010 to be 280,800 persons. Directional in-commuter volumes, that is those from Bogor, Tangerang or Bekasi were only predictable from the 1993 traffic survey analysis. Based on the 1993 estimates of the directional volumes, they were assumed to grow proportionally to the respective population growth, and eventually to be adjusted to the Botabek totals as summarized in **Table 5**. Sectoral engagement of the net in-commuter population in 2010 was also analyzed by the JMDPR, so that the intermediate figures in 2000 were interpolated between those in 1993 and 2010. Future net in-commuter population by sector was in consequence estimated using the 1993 distribution pattern relating to both regions and sectors, and growth factors of the respective sectors and regions in Botabek.

Table 5 Forecast of Net In-Commuter Population from Botabek to Jakarta by Sector

Region	Agriculture	Manufact.	Other Ind.	Trade	Other Servi	Total
1993 Estimate						
Bogor	(Detailed data are not available.)					70,400
Tangerang						44,900
Bekasi						72,200
Botabek	0	7,900	2,000	104,300	73,300	187,500
2000 Forecast						
Bogor	0	9,700	2,800	44,400	43,000	99,900
Tangerang	0	5,300	1,300	32,700	30,900	70,200
Bekasi	0	11,100	3,200	49,000	47,400	110,700
Botabek	0	26,100	7,300	126,100	121,300	280,800
2010 Forecast						
Bogor	0	40,900	14,400	43,900	67,700	166,900 (117,180)
Tangerang	0	27,400	8,200	37,900	56,500	130,000 (91,326)
Bekasi	0	49,700	18,400	54,200	80,800	203,100 (142,618)
Botabek	0	118,000	41,000	136,000	205,000	500,000

Source : Feasibility Study on Urban Arterial Road System Development Project in Jakarta Metropolitan Area (Ref. 173)

Note : ( ) adopted from Jabotabek Metropolitan Development Plan Review (Ref. 134)

(5) Future fuel consumption

The consumption of energy is projected to grow to meet the requirements of the expanding economy in the Jabotabek region. Demand for petroleum products will grow, mainly driven by the growth in transportation, for which alternative fuels are too expensive. The demand for electricity is expected to increase as a result of the growing share of electrification in manufacturing, increasing shift into higher technological and value-added products, and the rising standard of living of the population with attendant demand for additional lighting, electrical appliances and the comforts of air conditioning.

As shown in **Table 6**, based on an "Unchanged Practices Scenario", tentative estimates done by the World Bank indicate that, over the period between 1990 and 2018, while the population of Jakarta DKI is projected to increase, and consequently the energy use will also increase.

Table 6 Projected Fuel Consumption in Jakarta DKI

Fuel	Unit	1990	1998	2008	2018	Growth Rates (%) 1990~98	1998~08	2008~18
Industry								
ADO+IDO+FO	mil. kl	0.5	1.1	3.0	5.5	11.1	10.5	6.3
Coal	mil. t	0.3	0.6	1.4	2.4	10.6	8.8	5.1
Natural Gas	BCF	14.7	33.9	61.3	96.2	11.0	6.1	4.6
Road Transport								
Gasoline	mil. kl	1.1	2.0	3.7	6.3	7.8	6.4	5.4
ADO	mil. kl	0.3	0.6	1.1	1.9	7.7	6.4	5.4
Power								
PLN ADO+IDO+FO	mil. kl	0.3	0.1	0.2	0.4	- 17.7	12.1	5.3
PLN Natural Gas	BCF	0.7	24.8	37.2	62.1	57.0	4.1	5.2
Captive IDO+ADO	mil. kl	0.2	0.4	0.8	1.7	8.0	7.3	8.7
Captive Natural Gas	BCF	0.3	0.6	1.3	3.0	10.0	8.2	8.7
Households								
Kerosene+LPG	mil. kl	0.8	1.0	1.5	2.2	4.0	4.0	4.0
Total								
Gasoline	mil. kl	1.1	2.0	3.7	6.3	7.8	6.4	5.4
ADO+IDO+FO	mil. kl	1.3	2.2	5.1	9.5	6.1	9.0	6.5
Kerosene+LPG	mil. kl	0.8	1.0	1.5	2.2	4.0	4.0	4.0
Natural Gas	BCF	15.7	59.3	99.8	161.3	18.1	5.3	4.9
Coal	mil. t	0.3	0.6	1.4	2.4	10.6	8.8	5.1

Source : Energy and the Environment : A Plan of Action for Pollution Control (WB,1994)

Notes : ADO = automotive diesel oil, IDO = industrial diesel oil, FO = fuel oilPLN = Perum Listrik Negara (State Power Corporation), LPG = liquefied petroleum gas, and BCF = billion cubic feet

(6) Key development tendency

Much of the private sector development which is on-going or "in the pipeline" will set the pattern for development in Jabotabek for this decade and into the next one. This is especially relevant in residential, urban, industrial and transportation development.

1) Residential Development

Residential developments are tending to "open up" new areas of the region, especially on the metropolitan fringe, and this pattern is leading to some possibility that "new towns" or "satellite cities" may emerge as a distinct urban form in Jabotabek. Bumi Serpong Damai (Tangerang) is the best current example, soon to be followed by Lippo City (Bekasi), and possibly other developments of a smaller scale according to present plans (e.g. Kapuk, to Jakarta's north west). This pattern of development raises issues of access, infrastructure provision, and housing markets, as well as supports the concept of public-private partnership in urban development. New Towns or satellites need to provide employment opportunities.

In addition, they are increasingly represented by modern sector real estate developments, specially on the Jakarta/Botabek fringe where land can be aggregated and easily developed, with reasonable road access back into Jakarta (including toll road access).

2) Urban Development

As a long-term planning horizon, the JMDPR reserves further extension of the initial east-west axis towards the Jabotabek boundary. The initial east-west axis development is assumed to be some 10 km in width. However, this urban extension is considered possible only if a heavy rail commuter system, supplemented by a feeder system, is developed to bring passengers within a tolerable commuting time. A light rail system cannot effectively serve for such long distance commuting with frequent stops.

Subsequent to the basic development strategy, which could accommodate 80 % to 90 % of total capacity required for 2010, the JMDPR compared alternative strategic growth models for the long-term perspective. It was intended through this comparative analysis to justify the basic development strategy, and eventually recommended the "East-West linear city" concept. Other alternative models compared were "Self-sustaining new towns" and "Self-sustaining fringer city".

Tendency and constraints of urbanization in the future could be summarized by area especially in association with transportation system as below :

DKI Jakarta

Generally speaking, further urbanization is not possible in DKI Jakarta, except for the reclamation or reconstruction of the built-up area to cope with population increase. Urban expansion should be focused towards Bekasi, Tangerang and Bogor.

Bogor

The proposed construction of an outer ring road, highways and railways will connect this Kabupaten with DKI Jakarta. The construction of these proposed transportation routes is estimated to accelerate urbanization in the area

Tangerang

The proposed construction of highways and railways in the western part will connect Tangerang with DKI Jakarta and Bekasi. Cisoka, Tigaraksa, and other areas will also be covered in the urbanization process.

Bekasi

With the proposed construction of highways and railways in the eastern part, Bekasi will be connected with DKI Jakarta. Urbanization will also be extended to areas along the proposed transport routes. This will connect Bekasi, Cikarang, and other areas to DKI Jakarta.

3) Industrial Development

There appears to be an existing over-supply of industrial land, including industrial estates. While much land in the region is designated for industry, many industrialists seem to prefer development "on their own land" and this reflects property interests and land speculation as much as (or more than) any rational preference for well-located industrial premises.

4) Transportation Development

Apart from an overall strategy, five area strategies have been developed in the JMDPR study that address the specific needs of locations. On the other hand, in the DKI Jakarta Structure Plan 2005 (revised in 1990), in parallel with the general

objectives and targets of transportation development in Jakarta, the promotion of public mass transportation is especially emphasized as follows :

- limitation of motorized private trips in the central area ;

- development of bus transportation networks as the main public transportation mode and provision of transfer facility with railway, bus terminal, exclusive bus lane, etc. ; and

- provision of accessibility to both East and West Primary Centers by public mass transportation system.

For the physical distribution the provision of truck terminals is planned near Cengkareng Airport, Tanjung Priok Harbour, Industrial Estate in Pulo Gadung, warehouses in Pluit and East and West primary centers. Besides, as for the future characteristics of the region's transportation, the long distance transportation system development strategy is represented by a simple urban expansion pattern structured with parallel east-west and north-south highways. Further light and heavy railways will be introduced in the east-west highway system to link a chain of urban sub-centers.

(7) Required land for industry and urbanization

Official figures from the relevant planning bodies in DKI Jakarta and the Kabupaten/Kotamadya indicate that there is presently some 15,200 ha of land for industry in the Jabotabek region. It is very likely that these figures include industrial estates and un-served industry land. Another data source indicates that Botabek accounts for 6,500 ha, with the balance of 11,500 ha in other parts of the West Java province. Besides, one recent report prepared for the Direktorat Pembinaan Pemgangunan Perkotaan (1991/2) indicates that, of the total amount of industrial estates in West Java, only 1,045 ha has been developed, and most of this (815 ha or 78 %) is in Botabek. Another figure often quoted is that Jabotabek and the surrounding kabupaten in West Java have a total of some 40,000 ha of industrial land, including industrial complexes and general land zoned for industry. However, this figure has yet to be verified. In the West Java Provincial Plan, industrial strategic areas in Botabek are located in Bogor (500 ha), Tangerang (3,500 ha) and Bekasi (3,000 ha), including potentiality of plantation (large estates), mining and quarrying as well as industry (large and medium scale manufacturing).

Based on job creation forecasts and typical levels of floorspace and land area

provisions, projections have been made of the land area required to accommodate those key activities using industrial land, over which the regional strategic plan should have some degree of influence in terms of location and extent of development. Significantly, these uses represent some 56 % of all employment and economic activity in the region over the forecast period. Beyond the year 2000, forecasts show continuing levels of land required in these key sectors, although the rate of increase shows a decline in Jakarta but an increase in Botabek, reflecting population growth trends in these parts of the region.

Table 7 shows the estimates of industrial land required in Jabotabek over the forecast period. Taking the projections for formal sector industrial land, it can be noted that approximately 75 % of all "industrial" land would be occupied by manufacturing, with the balance of the land used by building contractors, transport depots, public utility depots and so on. Thus, the amount of formal sector industrial land used for manufacturing in Jakarta over the period would be in the order of 2,900 ha, and in Botabek the figure would be about 7,200 ha. Thus, in total Jabotabek would require approximately 10,100 ha of land for manufacturing use over the 20-year period, or about 500 ha per annum.

The urban areas shown in the existing maps are measured to estimate the scale of urbanization in 2010. The urban agglomeration areas estimated for 1990 and 2010 based on the JMDPR are also measured. Population growth is generally considered to be proportional to the ratio of areas for urbanization. The calculation of the areas for urbanization is shown in **Table 8**. The calculation is carried out by proportional allotment based on population growth.

These are broad estimates of land required, and need to be reviewed regularly as more data become available and as new trends emerge in the property development sector in terms of development types and locational preferences.

Table 7 Industrial Land Requirements in Jabotabek

(Unit : ha)

Area/Years	1990 (1)	1990 ~ 2000 (2)	2001 ~ 2010 (3)	1990 ~ 2010 (2 + 3)	2010 (1+ 2 + 3)
Jakarta	4,519	2,340	2,240	4,580	9,099
Botabek	10,662	5,480	6,700	12,180	22,842
Total (Jabotabek)	15,181	7,820	8,850	16,670	31,851

Source : Jabotabek Metropolitan Development Plan Review (Ref. 134)

Table 8 Urbanization Land Requirements in Jabotabek

(Unit : ha)

Area/Year	1990	1995	2000	2005	2010
DKI Jakarta	1) 62,200	2) 43,800	1) 62,200	2) 53,600	1) 68,900 2) 68,900
Bekasi	1) 21,000	2) 2,800	1) 50,700	2) 41,300	1) 65,000 2) 48,800
Tangerang	1) 28,300	2) 15,800	1) 52,300	2) 39,600	1) 69,500 2) 46,900
Bogor	1) 53,000	2) 8,500	1) 64,000	2) 54,300	1) 86,200 2) 61,800

Sources : 1) Jabotabek Metropolitan Development Plan Review (MOPW, 1993)

2) The Study on Comprehensive River Water Management Plan in Jabotabek : Interim Report (Ref. 175)

Appendix 6

SOURCE CONTROL STARTEGY

6.1 Factories and Establishments

6.1 Factories and Establishments

6.1.1 Calculation of Air Pollutant Emission Reduction from Stationary Sources

The amount of emission reduction by the emission regulation was calculated by the procedure as shown in **Figure 1.**

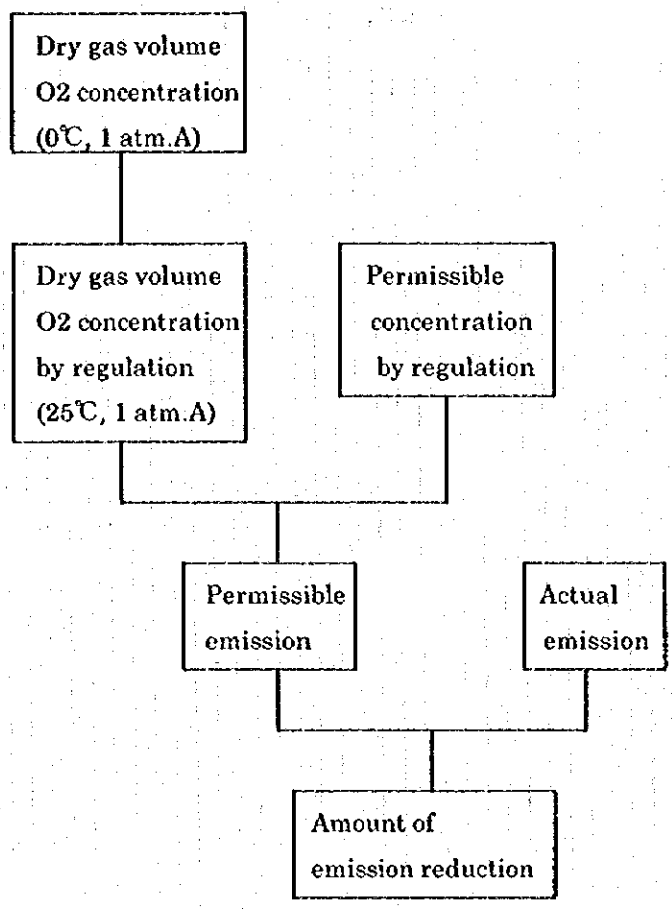


Figure 1 Procedure for Calculating Amount of Emission Reduction by Emission Regulation

Permissible emission (Ep) by the regulation is calculated by the following equation.

$$(Ep) = 298 / 273 \times (21 - O_2a) / (21 - O_2r) \times Ga \times Cp$$

where O_2r : O_2 concentration (%) by regulation

O_2a : Actual O_2 concentration (%)

Ga : Actual dry gas volume at 0℃, 1 atm.A

Cp : Permissible pollutant concentration

Therefore, amount of emission reduction (Er) = Ep - Ea

where Ea : Actual pollutant emission

Only if Er is positive value, pollutant emission can be reduced by the regulation.

6.1.2 Setting of Future Stationary Point Sources for Air Dispersion Simulation

Stationary point sources of factories in 2000 and 2010 were set as follows.

Numbers of facilities and stacks are the same in 2000 and triple in 2010 compared to those in 1995. However, pollutant emissions and wet gas volumes were assumed to change (**Table 1**).

Table 1 Stationary Point Sources in 2000 and 2010

Year	Number	Facility		Stack	
		Pollutant emission	Wet gas volume	Number	Location
1995	1	1.00	1.00	1	Same
2000	1	1.60	1.60	1	
2010	1	1.60	1.60	1	
	1	1.36	1.36	1	
	1	1.36	1.36	1	

6.2 Latest Automobile Emission Standards in Japan

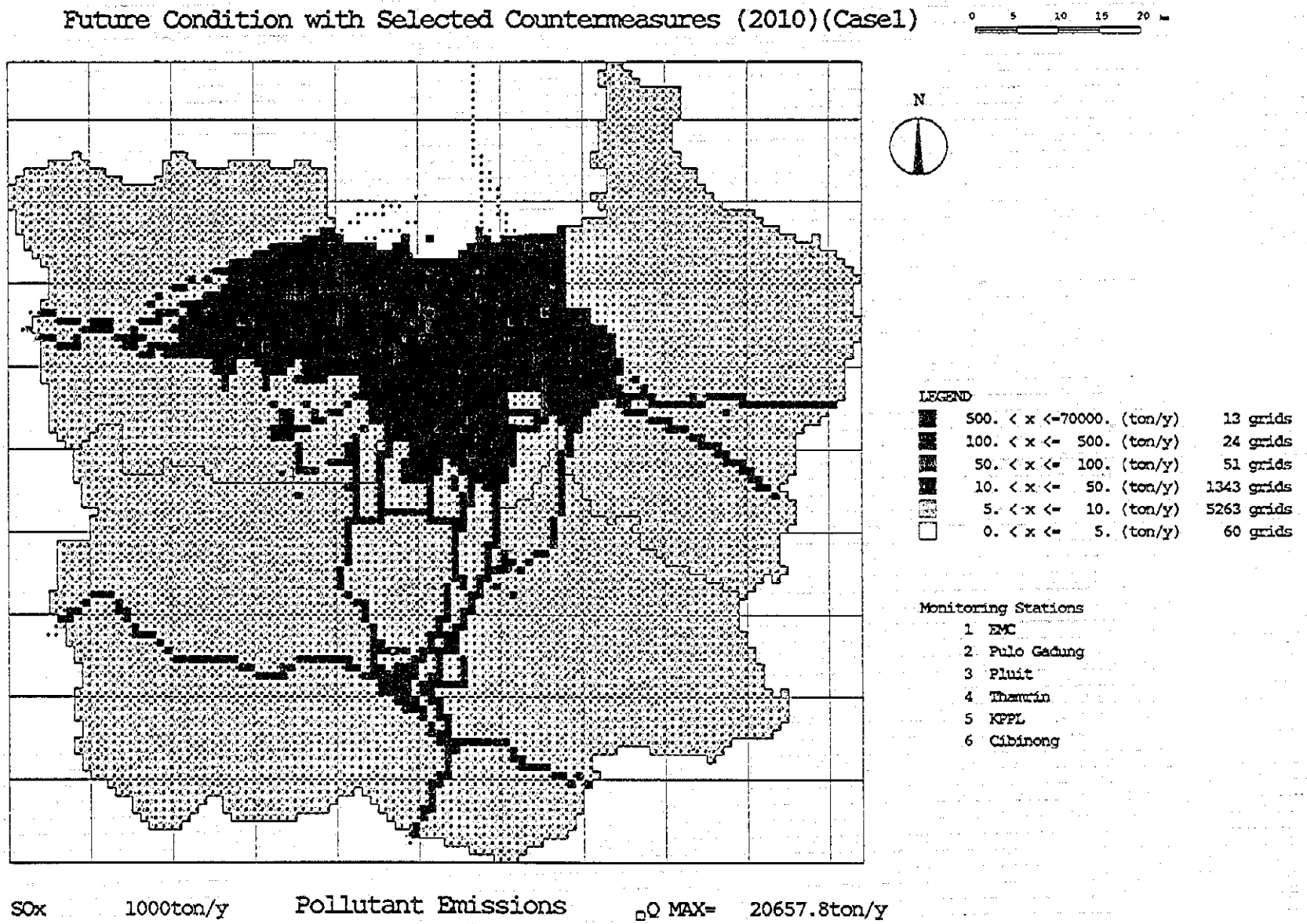
6.2 Latest Automobile Emission Standards in Japan

Fuel	Car Type	Unit	CO	HC	NOx	PM
Gasoline	Passenger Car Light-duty Bus/Truck	g/km	2.70 (2.10)	0.39 (0.25)	0.48 (0.25)	- -
	Medium-duty Bus/Truck	g/km	2.70 (2.10)	0.39 (0.25)	0.63 (0.40)	- -
	Heavy-duty Bus/Truck	g/kwh	136 (102)	7.90 (6.20)	5.9 (4.5)	- -
Diesel	Passenger Car Light-duty Bus/Truck	g/km	2.70 (2.10)	0.62 (0.40)	0.55 (0.40)	0.14 (0.08)
	Medium-duty Bus/Truck	g/km	2.70 (2.10)	0.62 (0.40)	0.97 (0.70)	0.18 (0.09)
	Heavy-duty Bus/Truck	g/kwh	9.20 (7.80)	3.80 (2.90)	5.8 (4.5)	0.49 (0.25)

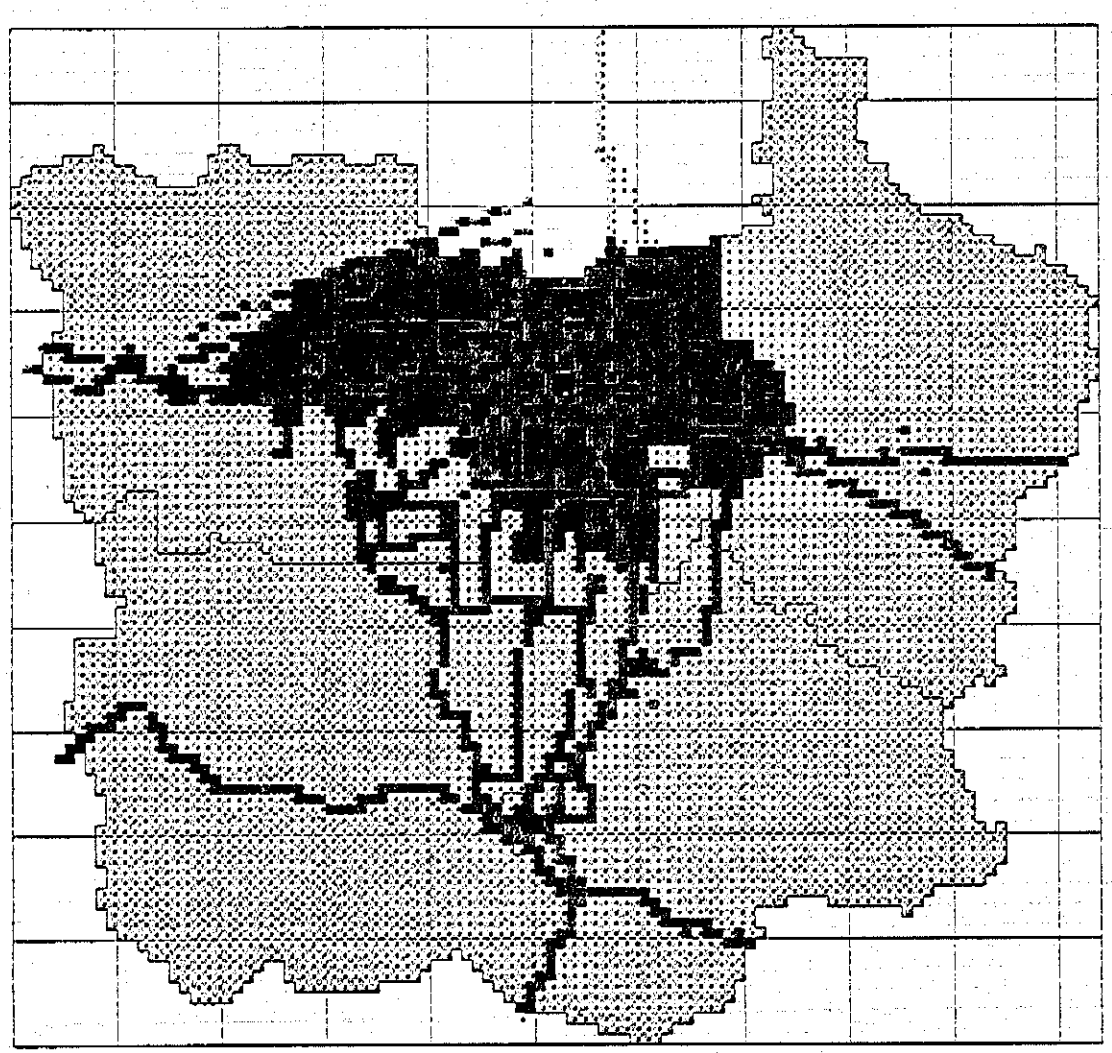
Notes : 1) Values are maximum permissible limits with average value in ( ).
2) Measurement methods : 10.15 mode for Passenger Car, Light-duty and Medium-duty Bus/Truck; 13 mode for Heavy-duty Bus/Truck

6.3 Pollutant Emission Maps of SO_x and NO_x with Control

6.3 Pollutant Emission Maps of SO_x and NO_x with Control

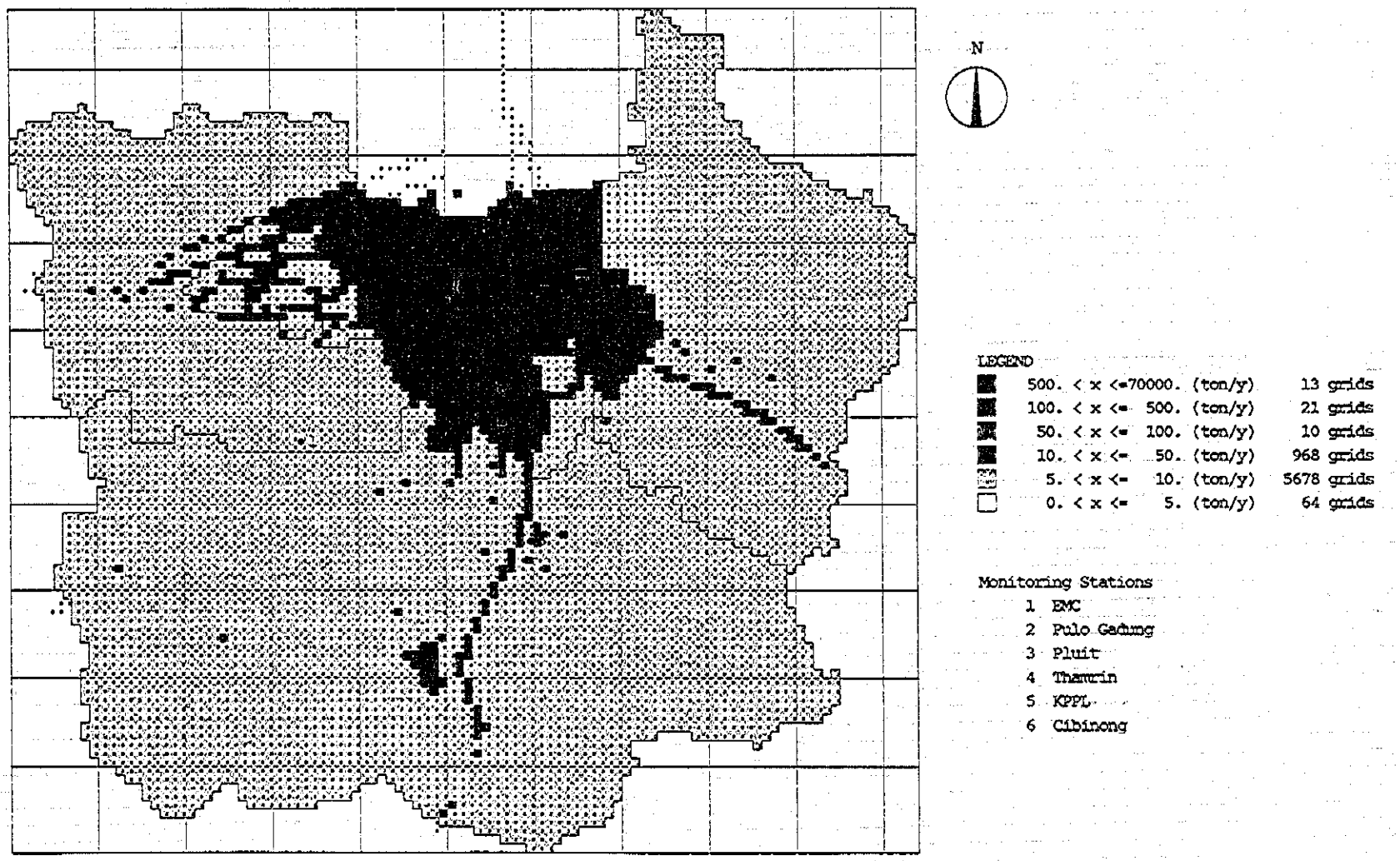


Future Condition with Selected Countermeasures (2010)(Case1)



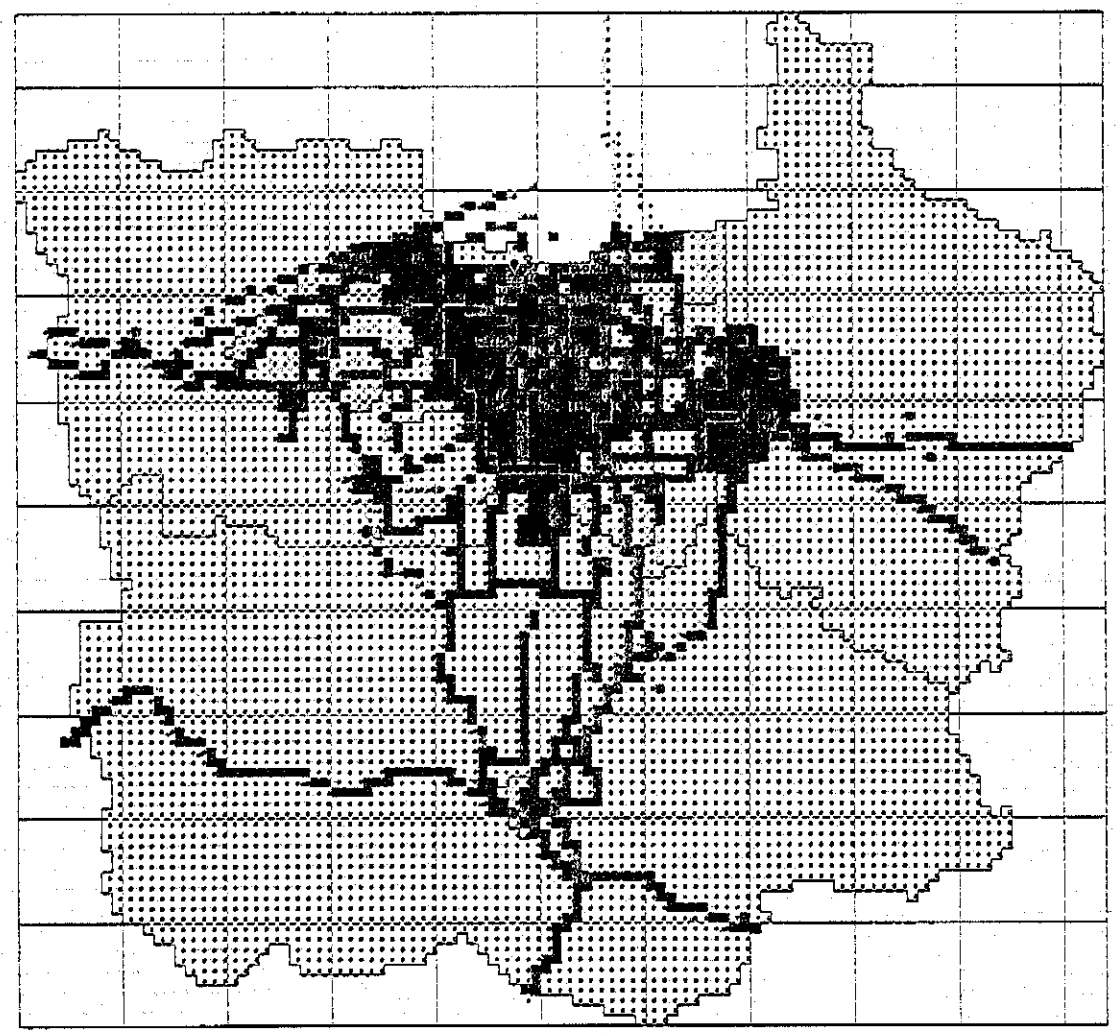
NOx 1000ton/y Pollutant Emissions □Q MAX= 29814.4ton/y

Future Condition with Full Countermeasures (2010)(Case2)



SOx 1000ton/y Pollutant Emissions □Q MAX= 20657.8ton/y

Future Condition with Full Countermeasures (2010)(Case2)



0 5 10 15 20 km

N

LEGEND

1000. < x <=30000. (ton/y)	9	grids
200. < x <= 1000. (ton/y)	122	grids
100. < x <= 200. (ton/y)	250	grids
20. < x <= 100. (ton/y)	894	grids
10. < x <= 20. (ton/y)	348	grids
0. < x <= 10. (ton/y)	5131	grids

Monitoring Stations

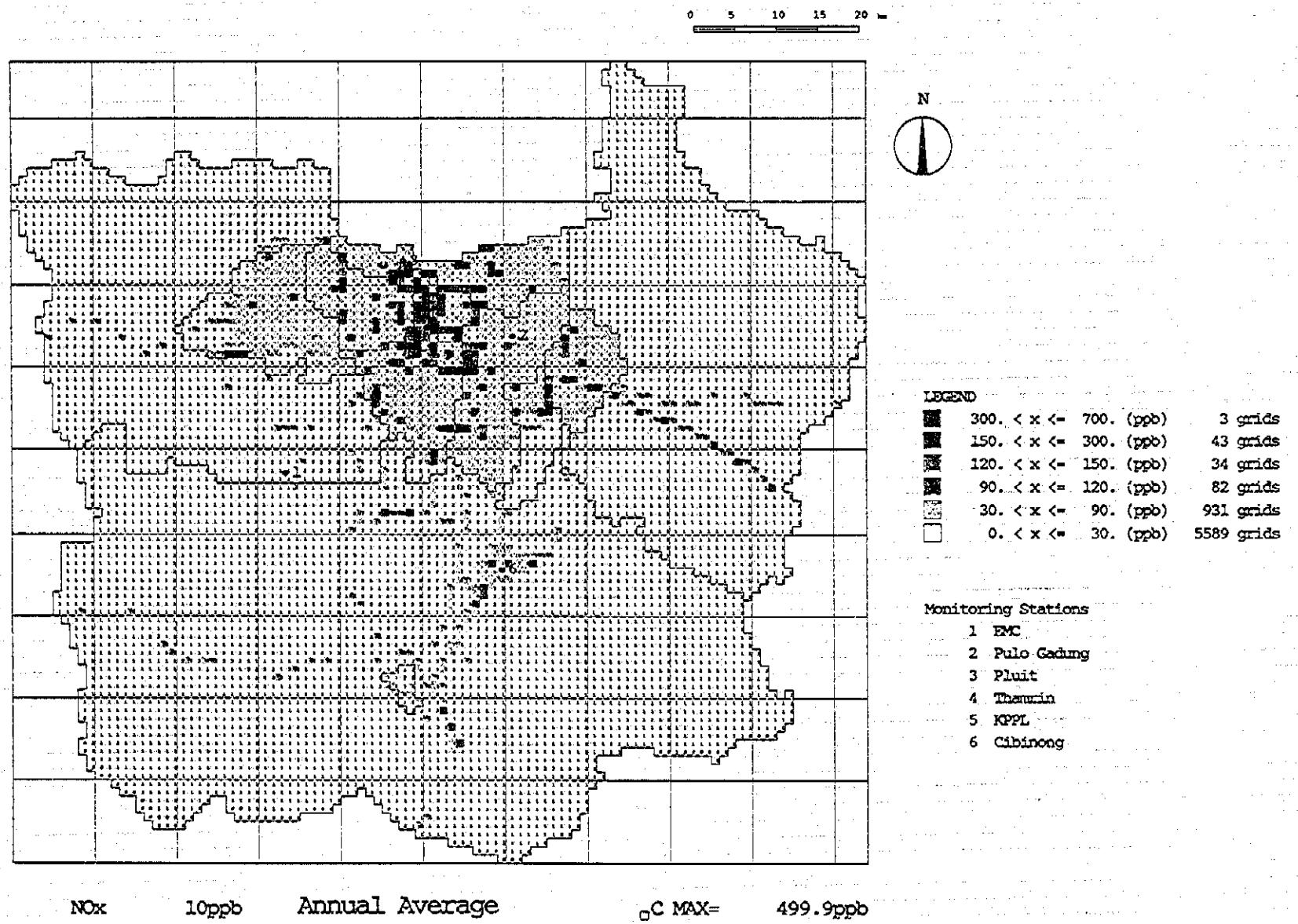
1 EMC
2 Pulo Gadung
3 Pluit
4 Thamrin
5 KPPL
6 Cibinong

NOx 1000ton/y Pollutant Emissions □Q MAX= 29814.4ton/y

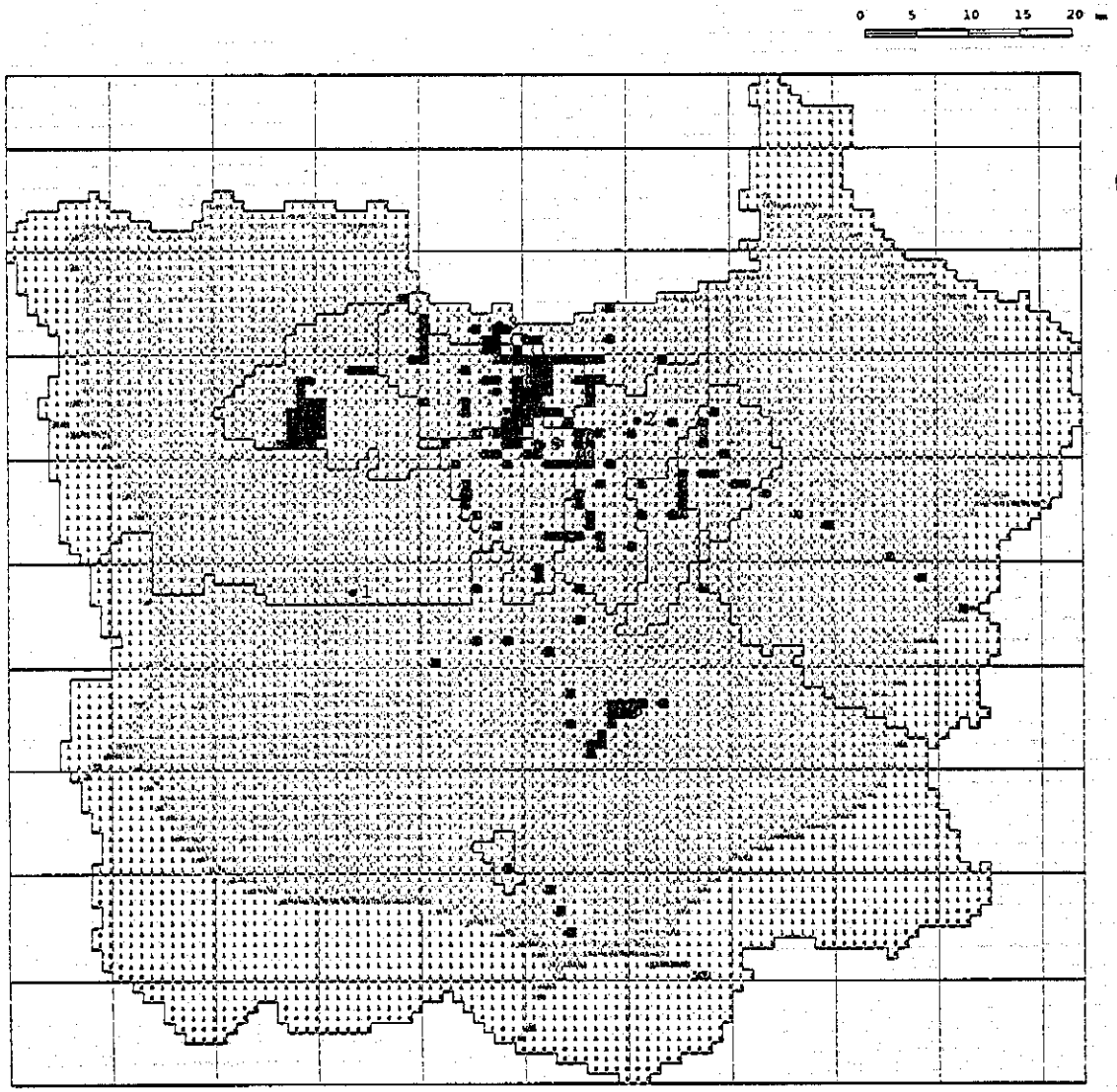
6.4 Concentration Maps of NO_x, SPM, and CO with Control

6.4 Concentration Maps of SO_x, NO_x, and CO with Control

Future Condition with Selected Countermeasures (2010) (Case 1)



Future Condition with Selected Countermeasures (2010) (Case 1)



Note: Approximate Estimate Only

Partial Contribution from Automobiles, Factories and Households

Underestimation

LEGEND

120. < x <=	240. (ug/m3)	0 grids
60. < x <=	120. (ug/m3)	9 grids
50. < x <=	60. (ug/m3)	18 grids
30. < x <=	50. (ug/m3)	164 grids
10. < x <=	30. (ug/m3)	4785 grids
0. < x <=	10. (ug/m3)	1706 grids

Monitoring Stations

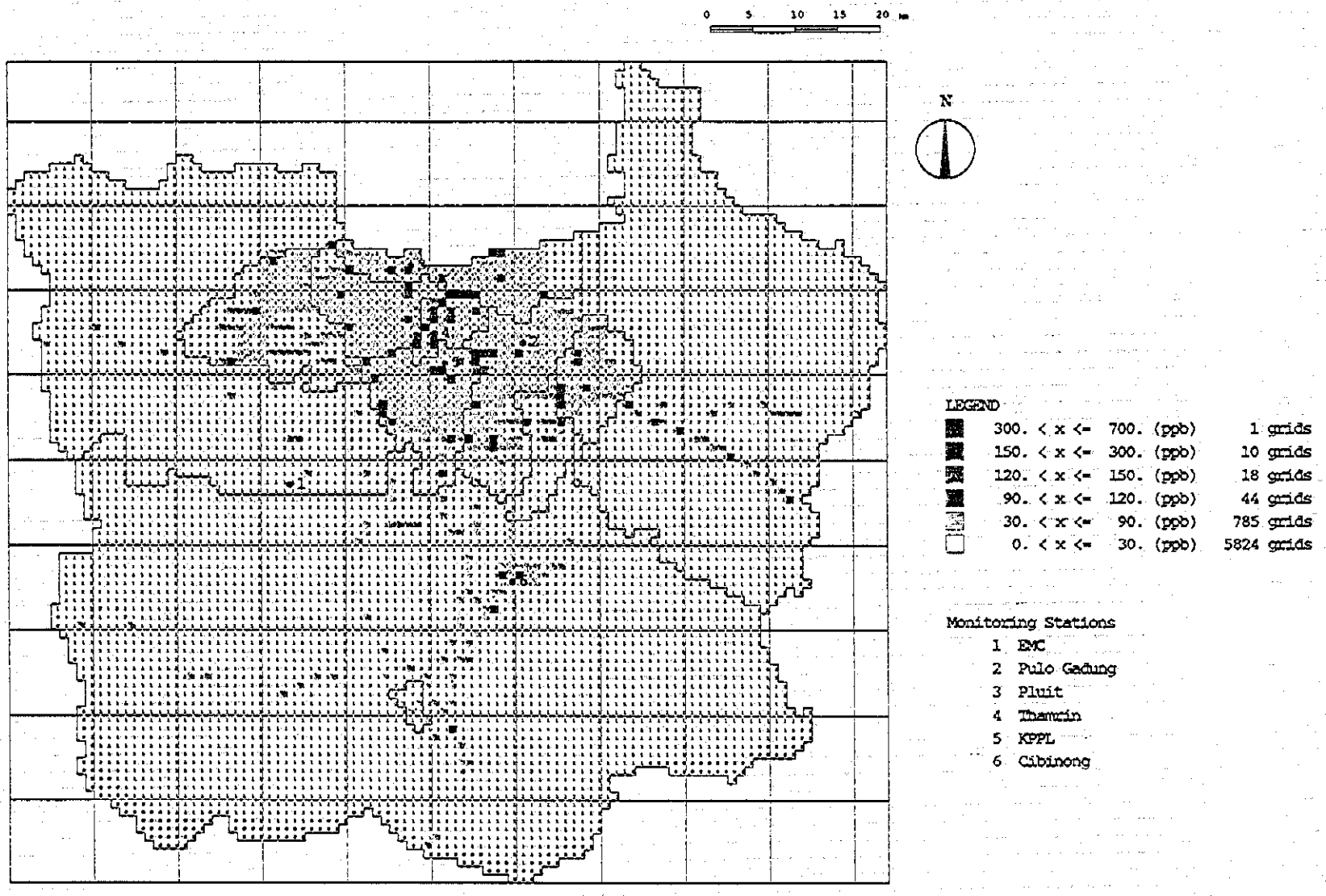
1 EMC
2 Pulo Gadung
3 Pluit
4 Thamrin
5 KPPL
6 Cibinong

SPM 10ug/m3 Annual Average

□C MAX= 108.7ug/m3

Background Concentration: 0.ug/m3

Future Condition with Full Countermeasures (2010) (Case 2)

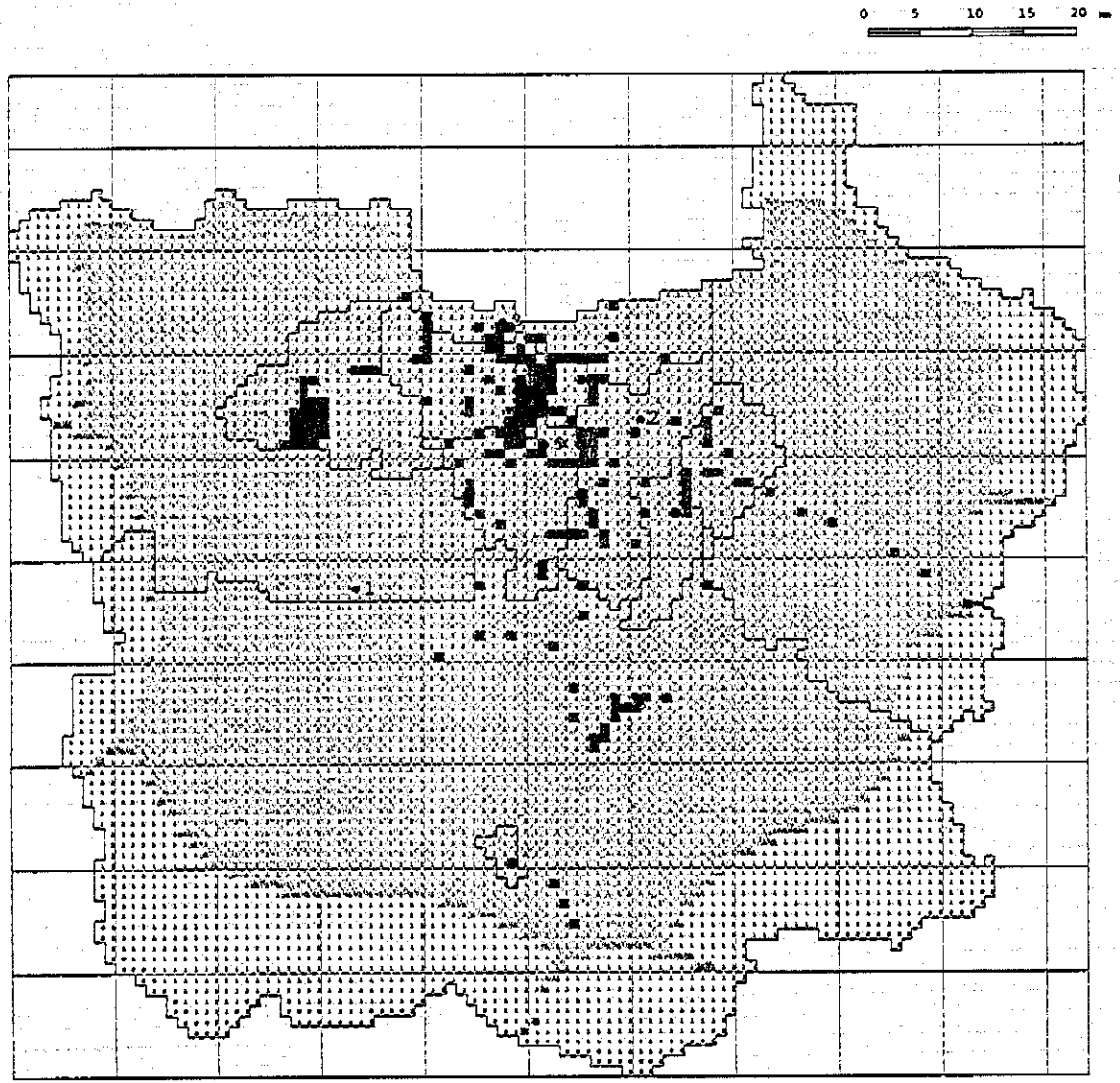


NOx 10ppb Annual Average

□C MAX= 313.1ppb

Background Concentration: 0.ppb

Future Condition with Full Countermeasures (2010) (Case 2)



Note: Approximate Estimate Only

Partial Contribution from Automobiles, Factories and Households

Underestimation

LEGEND

120. < x <=	240. (ug/m3)	0 grids
60. < x <=	120. (ug/m3)	8 grids
50. < x <=	60. (ug/m3)	19 grids
30. < x <=	50. (ug/m3)	161 grids
10. < x <=	30. (ug/m3)	4785 grids
0. < x <=	10. (ug/m3)	1709 grids

Monitoring Stations

1 EMC
2 Pulo Gadung
3 Pluit
4 Thamrin
5 KPPL
6 Cibinong

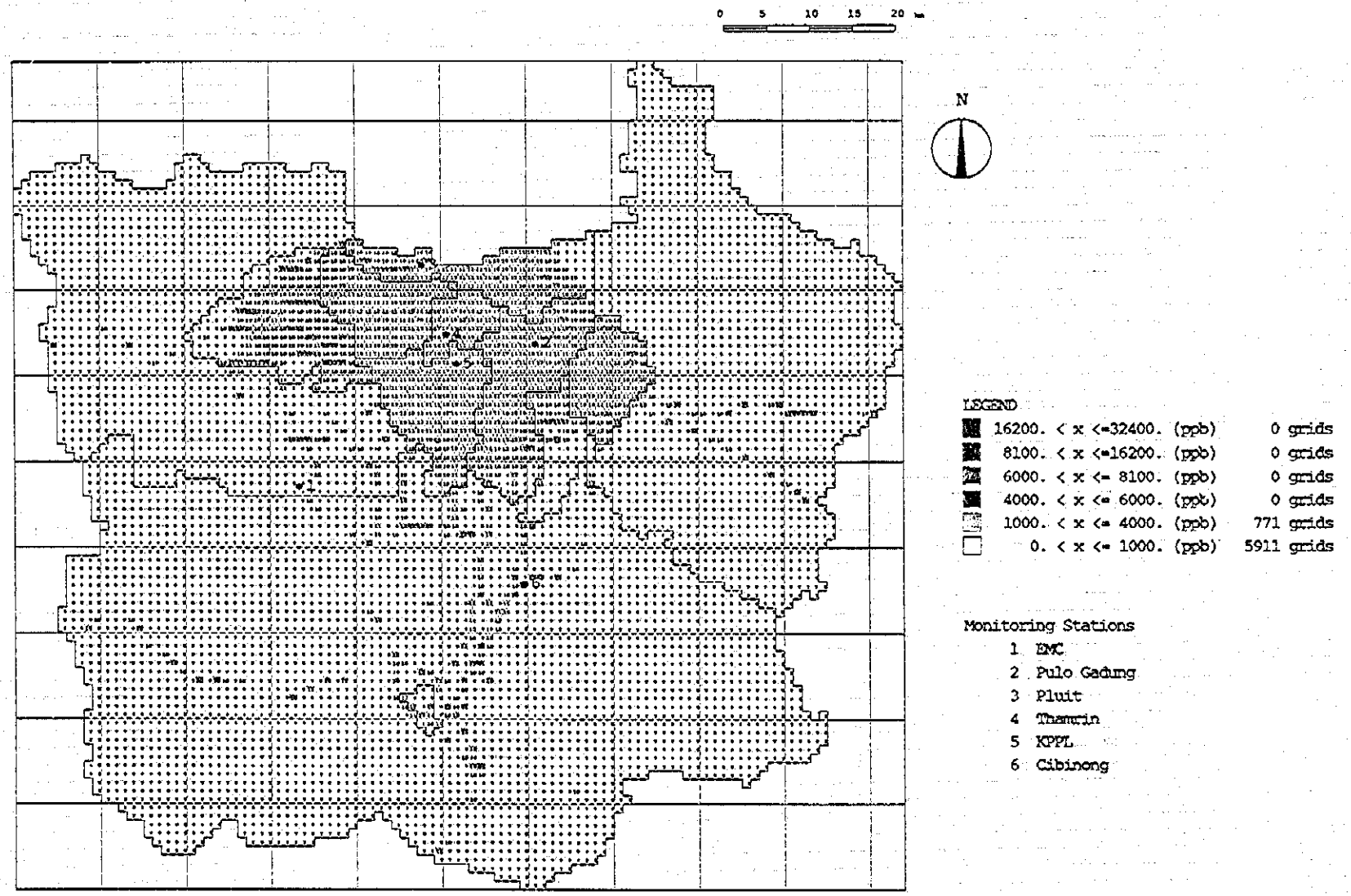
SPM 10ug/m3 Annual Average

C MAX= 108.7ug/m3

Background Concentration: 0.ug/m3

Future Condition with Full Countermeasures (2010)

(Case 2)



∞ 100ppb Annual Average □C MAX= 2904.6ppb

6.5 Traffic Flow Control and Traffic Volume Control

6.5 Traffic Flow Control and Traffic Volume Control

COUNTERMEASURES	ACTIONS
(1) Traffic Flow Control	
a) Strengthening traffic signal control	1) Introducing systematic traffic signal control, and regional control system in inner ring road
b) Reforming congestion areas	1) Conversion of rotary into cross section 2) Conversion of ground cross section into overpass 3) Widening road and establishing right- and U-turn lane 4) Building two-level crossing between road and railway
c) Improving road network	1) Early implementation of planned ring road 2) Executing proposed highway network plan
(2) Traffic Volume Control	
a) Control of vehicle number	1) Re-establishing taxation system such as car registration tax, possession tax and gasoline tax 2) Requirement of certificate of parking for registration of car (Tokyo Method) 3) Restriction of use of car in business and commercial area 4) Permission by lottery system for purchasing car (Singapore Method)
b) Control of traffic flow into central area	1) Strengthening regulation on number of passengers based on time and area 2) Charging entrance fee to urban areas 3) Day restriction by number plates 4) Strengthening prohibition of illegal parking on road shoulder in restricted area 5) Building public parking space for easing parking problem on road shoulder and congestion around exit of small parking place
c) Improving bus transportation service	1) Government support for introducing air conditioned bus and bus fare 2) Tax deduction for provision of commuting allowance 3) Building new bus priority route (road) and establishing loop bus route 4) Setting up reasonable transfer fee among different bus companies
d) Improving railway transportation service	1) Establishing bus terminal near railway station and improving bus network 2) Increasing number of operating trains 3) Promoting introduction of new traffic system such as subway and monorail 4) Upgrading urban railway service such as frequency of operation, connecting different routes and improving operation system
e) Improving function of urban area	1) Discentralization and dispersion of functions of urban area 2) Promoting high-rise building to reduce distance between place of work and of living places

(1) Traffic Flow Control

a) Strengthening traffic control system

285 places are equipped with traffic signals in DKI Jakarta at present. Of those, the Area Traffic Control System (ATCS) has been installed in 116 places in the center of DKI Jakarta in 1994. At present the ATCS system is located along Jakarta/Pusat (80 places) and Jakarta Selatan.

Expansion of the ATCS installation into the whole area of DKI Jakarta is being planned, especially in the eastern and southern parts of DKI Jakarta where is not covered by any system. On the other hand, another system is being considered instead of the ATCS in the western part of DKI Jakarta. There are some points to be solved for the integration of the two systems and for the modification of the system in the center of DKI Jakarta.

Table 6.5.1 Number of Traffic Signals in DKI Jakarta

Year	Computer Controlled Signal	Non Computer Controlled Signal	Total
1985	63	126	189
1990	94	145	239
1996	116	169	285

Source : Dinas Lalu Lintas Jalan Raya DKI Jakarta

b) Reforming congestion area

Multi-level crossings by overpasses are promoted and constructed presently in some intersections of the prime highways in DKI Jakarta to mitigate traffic congestion. The form of intersections is determined by traffic volume in both main and connected roads. With the increase of the traffic volume, it is considered to change intersections with the round-about with signal system, and then with the overpass system.

c) Improving road network

Compared to the road network in the south-north direction in DKI Jakarta, that in east-west direction is shorter since DKI Jakarta has developed along the rivers and canals

flowing from south to north. Motorways had been constructed at the sea-front area as a part of the inner-ring road, and opened in June 1996. Completion of the construction of the motorway between Grogol and Pluit has connected the Soekarno-Hatta international airport to the central area of DKI Jakarta so that mitigation of heavy congestion is expected along the area which would smooth traffic flow in the south-north direction.

The radial roads of the Jakarta-Cikampek road towards the eastern direction, the Jagorawi road towards the southern direction, and the Jakarta-Merak road towards the western direction, have been connected by the inner-ring road.

The outer-ring road is under construction and will be completed in 2000-2005. Further, according to UARSDP, it is planned to complete the construction of the Jakarta-Serpong, North-South Axis Tollway, and East-West Axis Road after 2005.

(2) Traffic Volume Control

a) Number of vehicles

The number of vehicles in DKI Jakarta increases with the GDP increase as shown in **Table 6.5.2.** There were 1.48 million vehicles, 1.54 million motorcycles and 3.02 vehicles in total in 1995. Average rate of annual increase from 1990 to 1995 were about 12% for motor vehicles and 13% for total.

Table 6.5.2 Number of Motor Vehicles in DKI Jakarta

Year	Passenger Cars	Buses	Trucks	Sub-Total (Growth Ratio)	Motor-cycles	Total (Growth Ratio)
1990	485,844	169,027	189,980	844,851	804,186	1,649,037
1991	534,210	191,973	208,851	935,034 (10.7%)	860,056	1,795,090 (8.9%)
1992	572,149	206,459	216,662	995,270 (6.4%)	916,889	1,912,159 (6.5%)
1993	617,565	226,320	228,569	1,072,454 (7.8%)	991,036	2,063,490 (7.9%)
1994	753,723	293,101	293,152	1,339,976 (24.9%)	1,344,774	2,684,750 (30.1%)
1995	849,939	320,246	310,128	1,480,313 (10.5%)	1,540,825	3,021,138 (12.5%)

Source : Vehicles and Length of Road Statistics 1995 (Ref. 200)

b) Control of traffic flow into central area

Since business function is concentrated along the Jalan Thamrin in the central DKI Jakarta, heavy traffic congestion is caused by commuters in the morning and evening. In order to solve the problem, cars with less than three passengers have been prohibited to enter the central area of the city from 6 : 30 to 10 : 00 am along Sudirman, Thamrin, Medan Merdeka Barat as well as Gatot Subroto (called "Three in One") since April 1992. However, the effect of the program is doubted because of illegal counter-actions. Therefore, introduction of congestion tax for the traffic flow into the central DKI Jakarta is under consideration in the city congress, instead of the Three-in-One program. And the tax income is planned to be used as capital for construction of subway.

c) Bus transportation system

The bus transportation system in DKI Jakarta is operated by the public corporation (PPD) and private companies. There are 386 bus routes. The number of buses operating in 1992 was 2,624, and the average number of passengers is 1.85 million per day. Bus service in the city is shown in **Table 6.5.3**, in which buses are categorized in three types: large, medium, and small bus.

Table 6.5.3 Existing City Bus Services

Bus Service Name	Vehicle	Capacity	Bus Route	Bus Stop	Number of Bus Routes	Bus Fare (Rp.)
1) Bis Kota	Articulated	100	Fixed	Fixed	3	300
	Double Decker	85	Fixed	Fixed	6	300
	Large Bus	50	Fixed	Fixed	71	300
2) PATAS	Large Bus	50	Fixed	Fixed	68	750
3) PATAS AC	Large Bus	50	Fixed	Fixed	10	1800
4) Bis Micro	Medium Bus	25-30	Fixed	Not Fixed	106	700
5) Angkutan Kota	Small Bus	9-12	Fixed	Not Fixed	122	500

Source : DLLAJR, Peta Trayek Angkutan Umum di DKI Jakarta (Ref. 91)

Note : Bus Fare revised in Aug. 1996

d) Imprpoving railway transportation system

There are seven routes whose total length is 160 km and fifty-five stations operated by PERUMKA in Jabotabek as shown in **Table 6.5.4**. According to the PMS III study, the number of passengers is 426,000 per day, about 88% of whom are commuters. The numbers of commuters in each route are shown in **Table 6.5.5**.

A MRT (mass rapid transit) as private sector project is under planning at present, which will commence construction between Blok M and Kota (14.5 km, 15 stations) aiming at operation from 2001. The proposed MRT project plans to provide 15 trains in peak hours, and expects 400,000 to 500,000 passengers per day at the starting years, while 30 trains and 739,000 passengsers are expected in 2010.

Table 6.5.4 Existing Railway Network

Line	Section	Distance (km)	Single or Double Track	Electrified (Yes/No)
Eastern Line	JKT Kota-Jatinegara	11.8	Double	Yes
	JKT Kota-Tg. Prok	8.1	Double	Yes
	Tg. Priok-Kemayoran	4.2	Double	Yes
Central Line	JKT Kota-Manggarai	9.7	Double	Yes
Western Line	JKT Kota-Kp.Bandan	2.7	Double	Yes
	Kp. Bandan-Duri-Tanah	14.3	Double	No
	Abang-Manggarai-Jatinegara	2.9	Double	Yes
Tangerang Line	Duri-Tangerang	19.3	Single	No
Merak Line	Tanah Abang-Serpong	23.3	Single	No
	Parung Panjang-Rangkasbitung	49.5	Single	No
Bogor Line	Manggarai-Depok	22.2	Double	Yes
	Depok-Bogor	22.7	Single	Yes
Bekasi Line	Jatinegara-Bekasi	14.8		
	Kerawang-Cikampek-Purwakarta	76.2	Double	No

Sources : ARSDS Supporting Report No.3 ; and Jakarta Mass Transit System Study

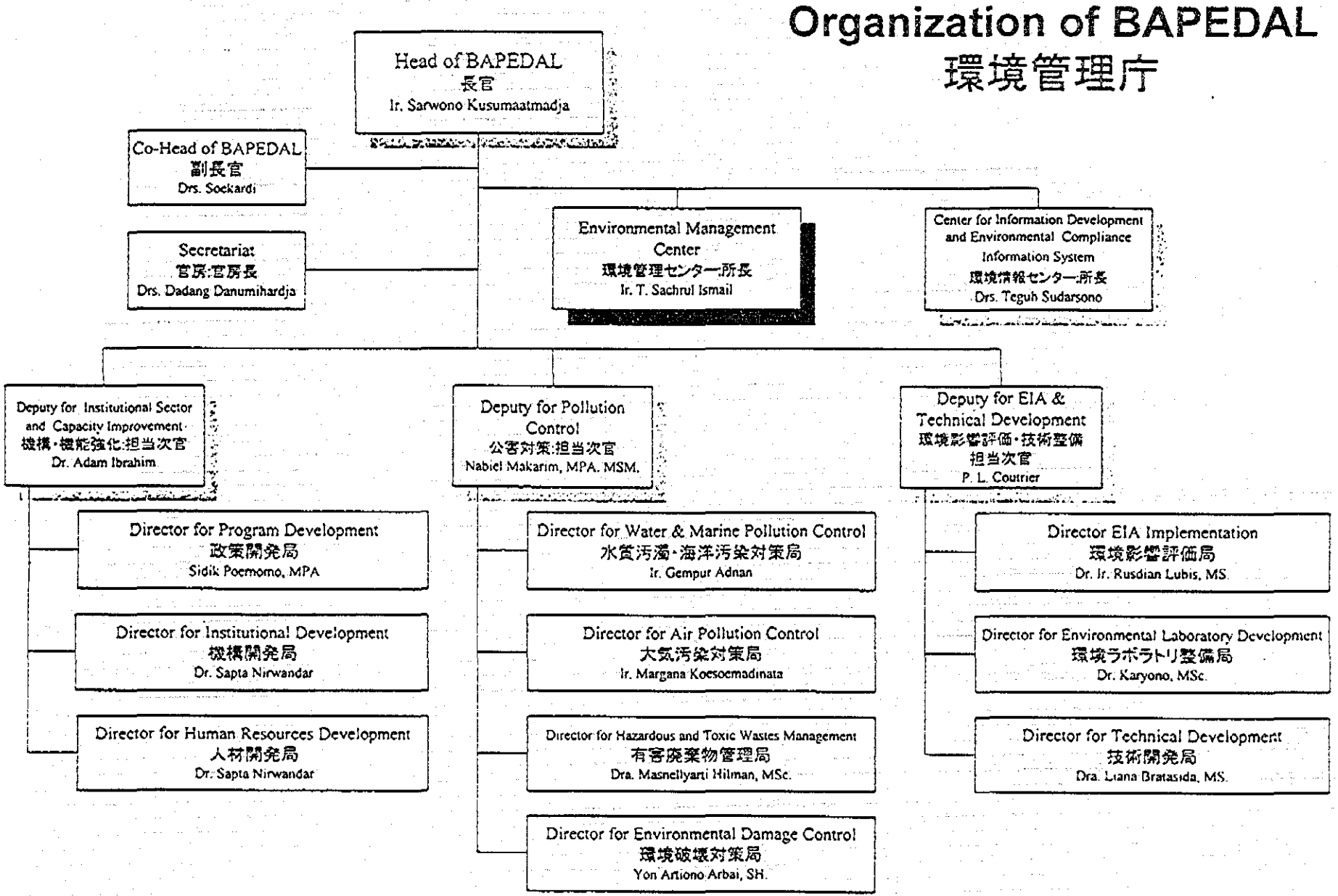
Appendix 7

ORGANIZATION CHARTS

FOR NATIONAL GOVERNMENT AGENSIES

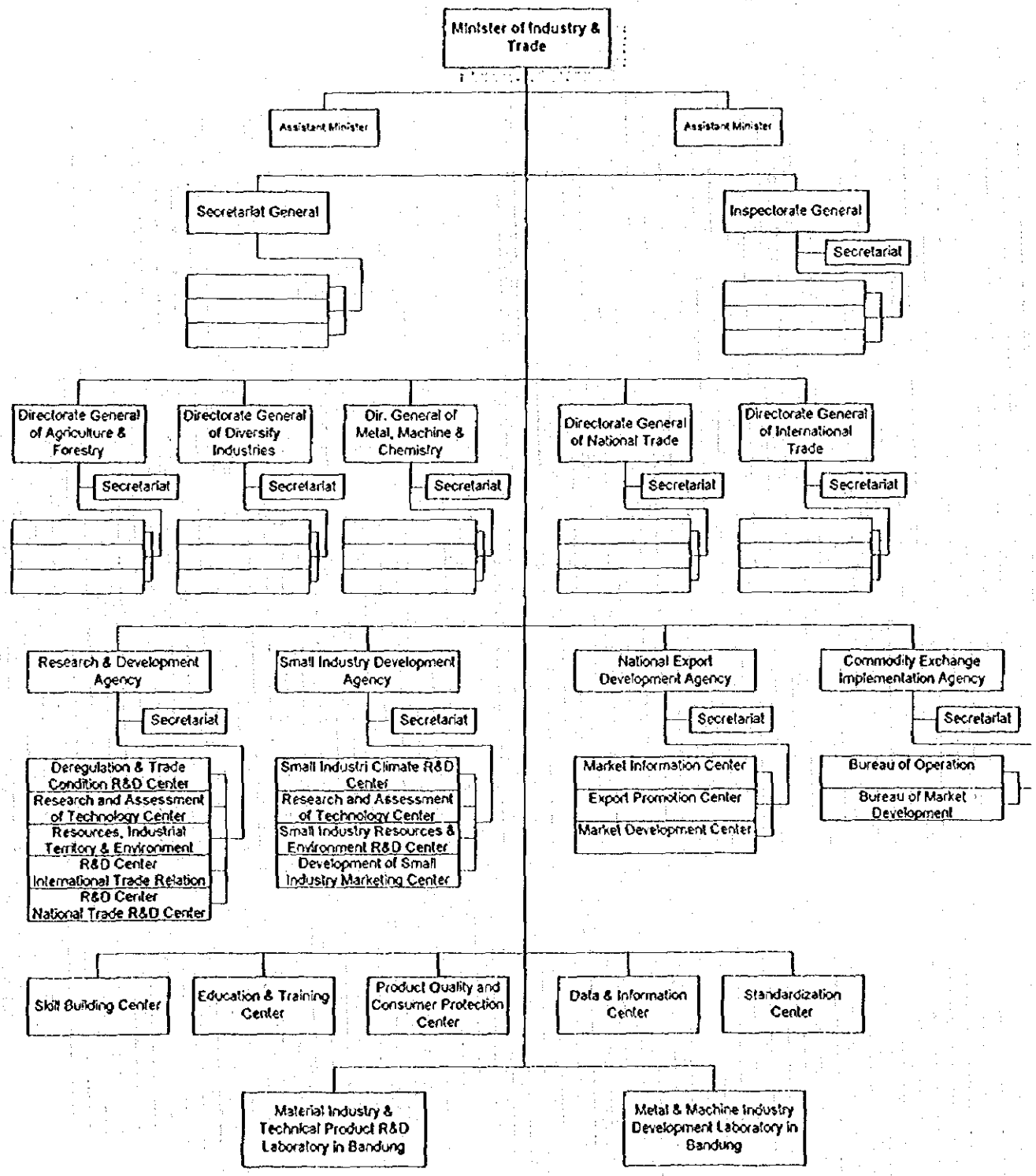
7.1 Organization Chart of BAPEDAL

7.1 Organization Chart of BAPEDAL



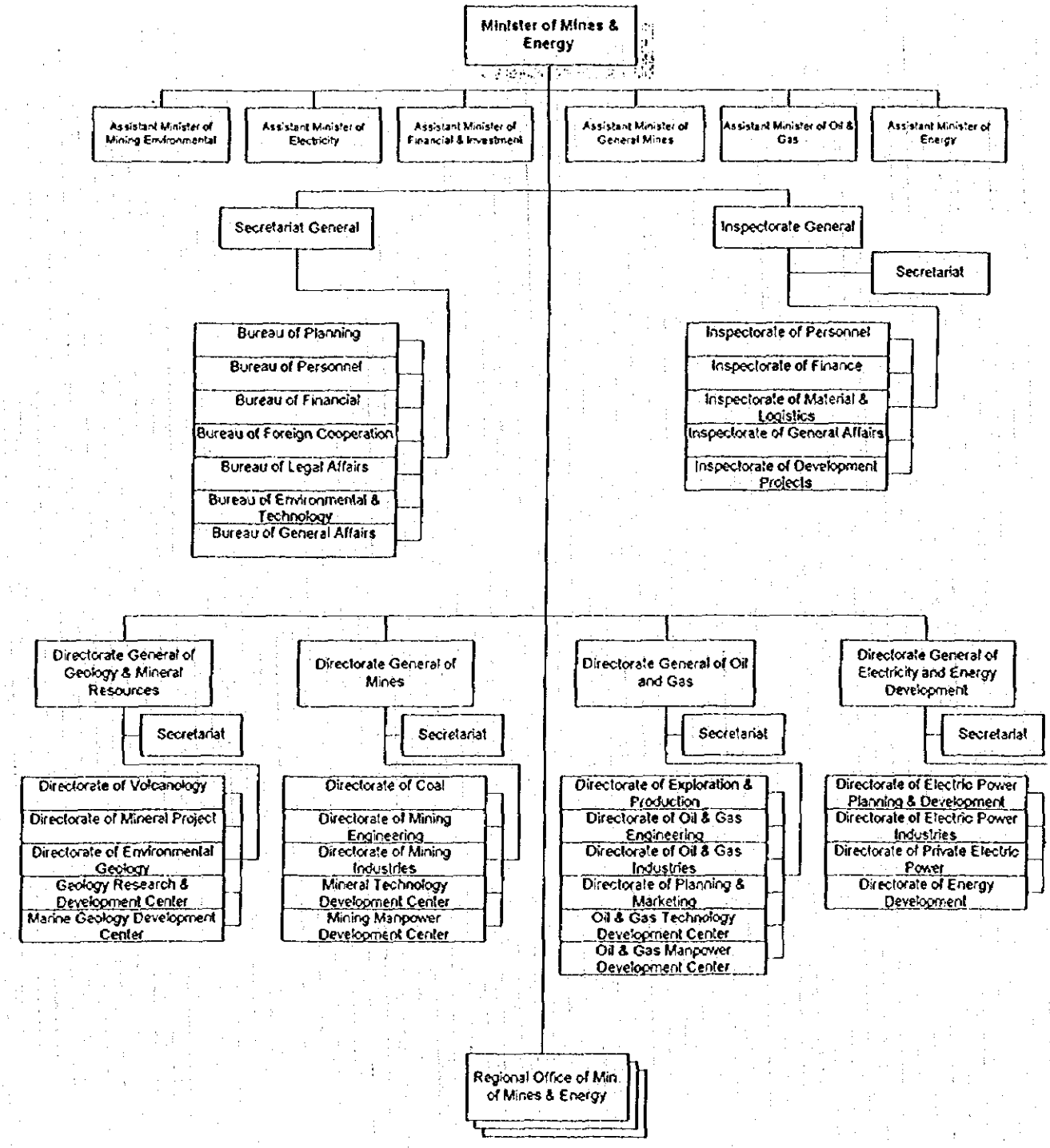
7.2 Organization Chart of The Ministry of Industry & Trade

7.2 ORGANIZATION CHART OF THE MINISTRY OF INDUSTRY & TRADE



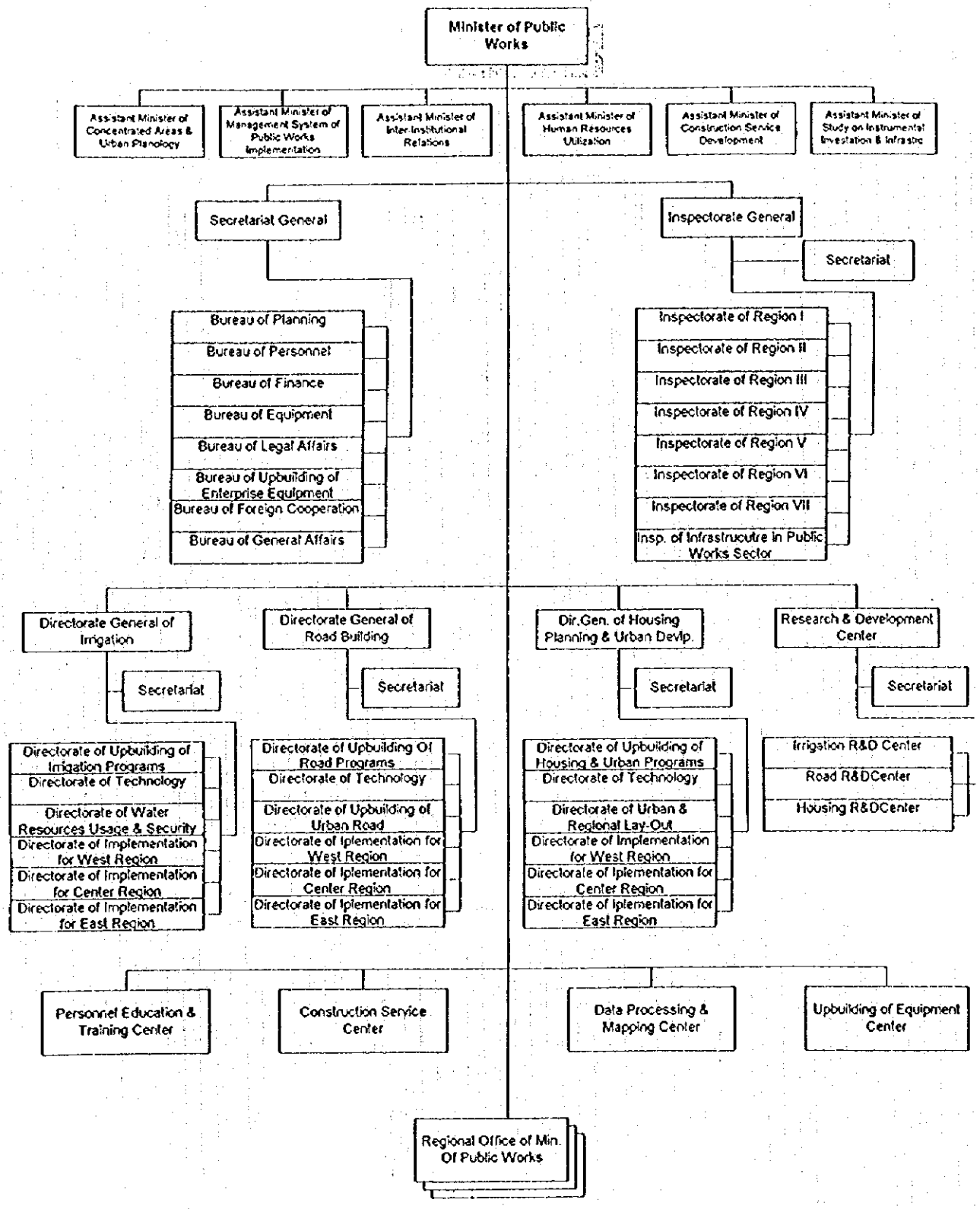
7.3 Organization Chart of The Ministry of Mines & Energy

7.3 ORGANIZATION CHART OF THE MINISTRY OF MINES & ENERGY



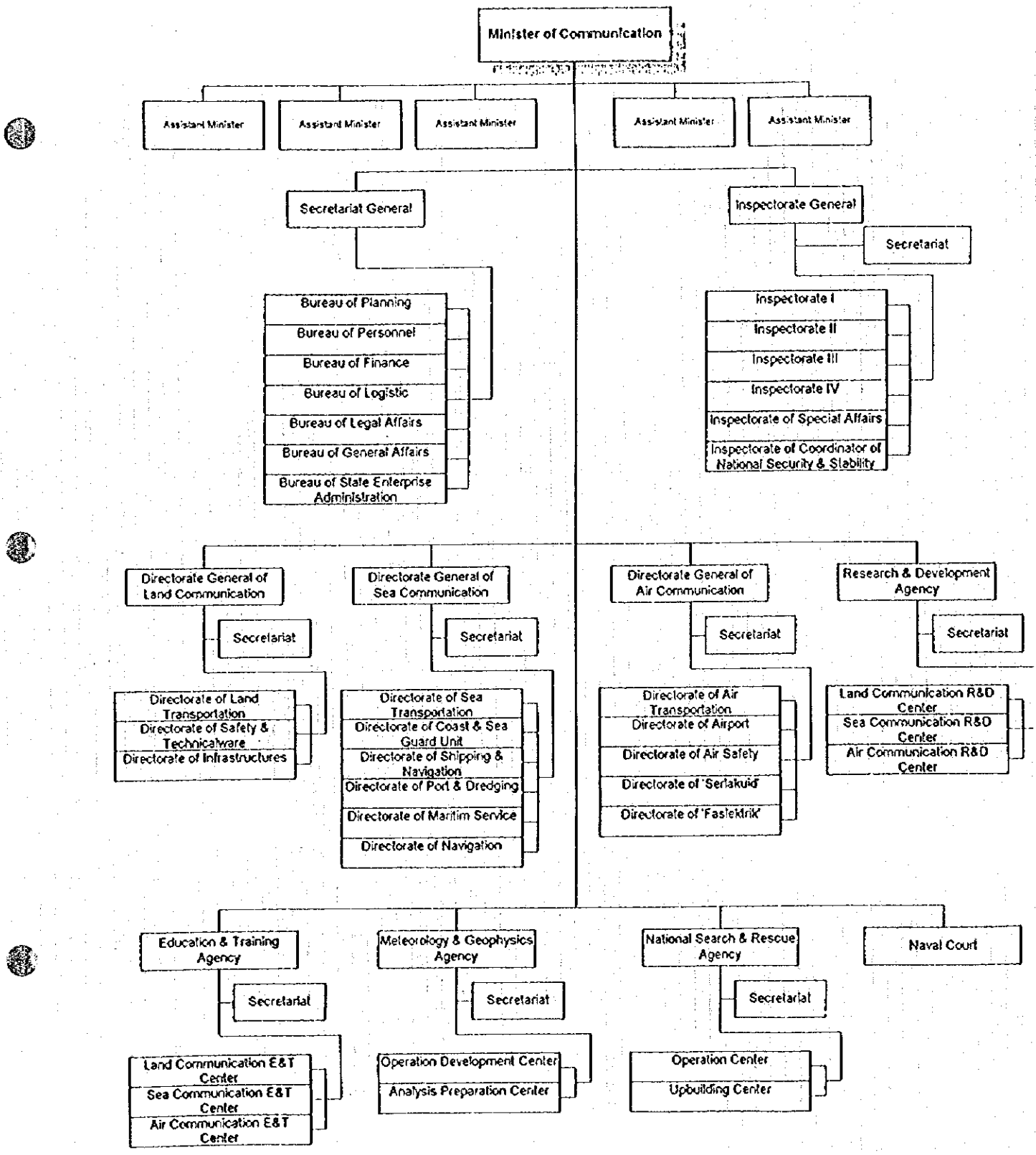
7.4 Organization Chart of The Ministry of Public Works

7.4 ORGANIZATION CHART OF THE MINISTRY OF PUBLIC WORKS



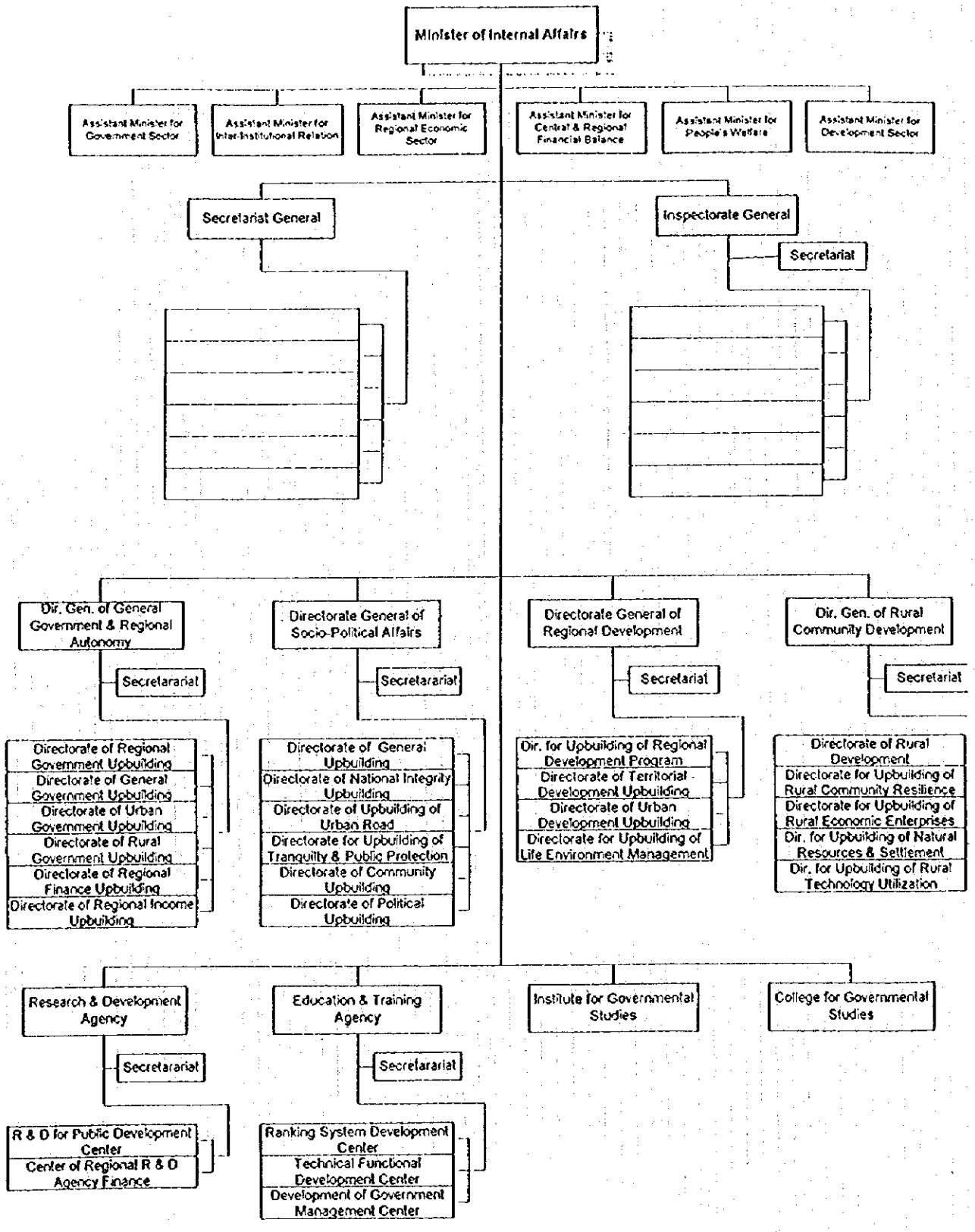
7.5 Organization Chart of The Ministry of Communication

7.5 ORGANIZATION CHART OF THE MINISTRY OF COMMUNICATION



7.6 Organization Chart of The Ministry of International Affairs

7.6 ORGANIZATION CHART OF THE MINISTRY OF INTERNAL AFFAIRS



Appendix 8

SCOPE OF WORK AND MINUTES OF MEETINGS

8.1 Scope of Work

8.1 Scope of Work

SCOPE OF WORK

FOR

THE STUDY

ON

THE INTEGRATED AIR QUALITY MANAGEMENT
FOR JAKARTA METROPOLITAN AREA

IN

THE REPUBLIC OF INDONESIA

AGREED UPON BETWEEN

ENVIRONMENTAL IMPACT MANAGEMENT AGENCY (BAPEDAL)

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Jakarta, April 19, 1994

Nabiel Makarim
Deputy for Pollution Control
Environmental Impact
Management Agency

Hidetsuru Matsushita
Leader, Preparatory Study Team
Japan International Cooperation
Agency

I. INTRODUCTION

In response to the request of the Government of the Republic of Indonesia (hereinafter referred to as "the Government of Indonesia"), the Government of Japan has decided to conduct a Study on the Integrated Air Quality Management for Jakarta Metropolitan Area in the Republic of Indonesia (hereinafter referred to as "the Study") in accordance with the laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with authorities concerned of the Government of Indonesia.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are the followings:

1. to develop strategies for air quality management and implementation plan, including improvement of institutional capacity to manage air quality; and
2. to transfer technologies for air quality management to counterpart personnel in the course of the Study.

III. STUDY AREA

The study area will cover Jakarta Metropolitan area (JABOTABEK).

IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study will cover the followings:

1. Phase I : Basic Study

   1) Collection and review of existing data and information, and relevant studies
   2) Survey for collecting additional data including those on meteorological conditions, ambient air quality and emission sources

2. Phase II : Analysis and Assessment

1) Assessment of present air quality
2) Development of appropriate simulation model
3) Estimation of future air quality
4) Review of organizations, laws and regulations

3. Phase III: Development of Strategies for Air Quality Management and Implementation Plan

1) Development of air quality management strategies
2) Development of implementation plan

4. Technology transfer

Technology Transfer will be undertaken during the Study including air monitoring (Phase I), modelling (Phase II), guidelines and regulations (Phase III) .

V. STUDY SCHEDULE

The Study will be carried out in accordance with the tentative schedule attached in Appendix.

VI. REPORTS

JICA will prepare and submit the following reports in English to the Government of Indonesia.

1. Inception Report:

Thirty (30) copies about one (1) month after the commencement of the Study

2. Progress Report(1):

Thirty (30) copies about fourteen (14) months after the commencement of the Study.

3. Interim Report:

Thirty (30) copies about eighteen (18) months after the commencement of the Study.

4. Progress Report(2):

Thirty (30) copies about twenty-two (22) months after the commencement of the Study.

5. Draft Final Report:

Fifty (50) copies about twenty-four (24) months after the commencement of the Study. The Government of Indonesia will submit its comments to JICA within thirty (30) days after the receipt of the Draft Final Report.

6. Final Report:

Fifty (50) copies within thirty (30) days after JICA's receipt of comments on the Draft Final Report from the Government of Indonesia

VII. UNDERTAKINGS OF THE GOVERNMENT OF INDONESIA

1. To facilitate smooth conduct of the Study, the Government of Indonesia shall take the following necessary measures:

(1) to secure the safety of the Japanese Study Team, (hereinafter referred to as "the Team")

(2) to permit the members of the Team to enter, leave and sojourn in Indonesia for the duration of their assignment there in, and exempt them from foreign registration requirements and consular fees,

(3) to exempt the members of the Team from taxes, duties and any other charges on equipment, machinery and other materials brought into Indonesia for the conduct of the Study,

(4) to exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Study Team for their services in connection with the conduct of the Study

(5) to provide necessary facilities to the Team for remittances as well as utilization of the funds introduced into Indonesia from Japan in connection with the implementation of the Study,

(6) to secure permission for entry into private properties or restricted areas for the implementation of the Study,

(7) to secure permission for the Team to take all data and documents (including photographs and maps) related to the Study out of Indonesia to Japan, and

(8) to provide medical services as needed. Its expenses will be

chargeable on members of the Team.

2. The Government of Indonesia shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of, or otherwise connected with, discharge of their duties in the implementation of the Study, except when such claims a rise from gross negligence or willful misconduct on the part of the members of the Team.

3. Environmental Impact Management Agency(hereinafter referred to as "BAPEDAL") shall act as the counterpart agency to the Team and also as a coordinating body in relation with other relevant organizations for the smooth implementation of the Study.

4. BAPEDAL shall, at its own expense, provide the Team with the followings, in cooperation with other organizations concerned:

(1) available data and information related to the Study,

(2) counterpart personnel,

(3) suitable office space with necessary equipment in the Study Area

(4) credentials or identification cards, and

(5) appropriate number of vehicles with drivers.

VIII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures:

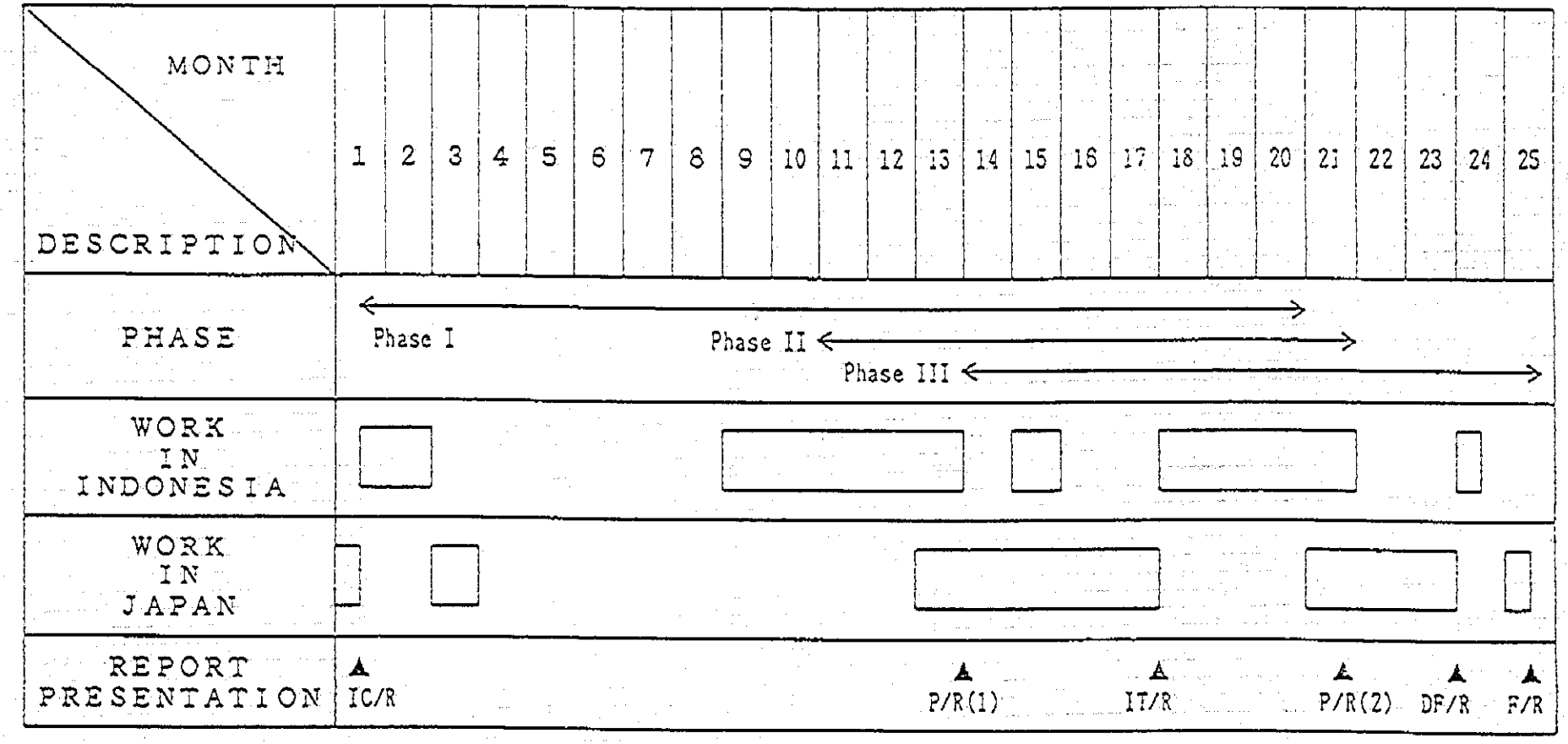
1. to dispatch, at its own expense, the Team to Indonesia; and

2. to pursue technology transfer to the Indonesian counterpart personnel in the course of the Study.

IX. CONSULTATION

JICA and BAPEDAL shall consult with each other in respect of any matter that may arise from or in connection with the Study.

APPENDIX TENTATIVE STUDY SCHEDULE



IC/R: Inception Report
IT/R: Interim Report
F/R: Final Report
P/R: Progress Report
DF/R: Draft Final Report

8.2 Minutes of Meeting on Scope of Work

8.2 Minutes of Meeting on Scope of Work

MINUTES OF MEETING

ON

SCOPE OF WORK

FOR

THE STUDY ON THE INTEGRATED AIR QUALITY MANAGEMENT FOR JAKARTA METROPOLITAN AREA IN THE REPUBLIC OF INDONESIA

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Japan International Cooperation
Agency

In response to the request of the Government of the Republic of Indonesia, the Preparatory Study Team (the Team) of the Japan International Cooperation Agency (JICA) visited Indonesia from April 7 to April 19, 1994 to discuss the Scope of Work for the study on Integrated Air Quality Management for Jakarta Metropolitan Area (the Study).

The Team carried out preliminary field surveys of the concerned area and held a series of discussion with the officials of the Environmental Impact Management Agency (BAPEDAL). The list of attendants is shown in Appendix.

The Scope of Work (S/W) signed on April 19, 1994, was discussed in detail between BAPEDAL and the Team. Main points of the discussion are summarized as follows:

1. (1) Regarding the section II of S/W (Objectives of the Study), both sides agreed that Implementation Plan and Technology Transfer will be the prime focus of this study.

   (2) Implementation Plan will identify specific action items, schedules and resources required for air quality management in the study area. The details of the contents of the Implementation Plan will be discussed in the Inception Report.

   (3) Technology Transfer will include the following, but not limited to:
   - On the job training for monitoring and modelling;
   - Regulations and guidelines including SOP, field inspection guidelines, etc.; and
   - Development of Implementation Plan.

2. Regarding the section II, 1 of S/W (Objectives of the Study, item one), both sides agreed that institutional building will be targeted mainly to BAPEDAL, but, if it is necessary, other agencies involved in the Study will also be included.

3. In reference to the section III of S/W (Study Area), both sides agreed that the Study covers Jakarta Metropolitan Area (JABOTABEK - DKI Jakarta, Bogor, Tangerang and Bekasi). Within the study area, however, the Study will focus on the area(s)

where air quality management is essential and/or significant emission sources are (or planned to be) located.

4. (1) In reference to the section IV, 1 of S/W (Scope of the Study, Phase I: Basic Study), both sides acknowledged that this phase of the Study will include the following items:

- natural conditions such as climate and topography;
- social and economic conditions;
- trend of urban development and land use (including future plans);
- transport and traffic conditions (including future plans);
- existing studies and projects relating to air quality management;
- meteorological data;
- ambient air quality (SO_2, NO_2, HC, CO, O_3, TSP and/or SPM (PM_{10}), and Pb and other major elements);
- adverse effects caused by air pollution;
- identify mobile emission sources including inventories, location and characteristics (traffic composition, distribution of traffic volume, fuel consumption and chemical composition of fuels used, emission factors, etc.);
- identify stationary emission sources including inventories, location and characteristics (type/location of factories, combustion facilities, fuel types and consumption rates, emission factors by combustion facilities, height of chimneys, etc.);
- identify non-point emission sources including inventories, location and characteristics (open burning, domestic coal burning, etc.);
- organizations, functional responsibility of the relevant agencies; and
- laws and regulations relating to air quality management.

(2) Both sides also recognized that additional field surveys and measurements should be conducted in order to supplement the existing data, and the inventory of stationary sources will include factories and commercial buildings.

5. (1) Regarding the section IV, 3 of S/W (Phase III: Development of Strategies for Air

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Quality Management and Implementation Plan), both sides agreed that one of the major items of strategies and the implementation plan should include measures to improve institutional capacity of the relevant agency(ies) in reference to organizational structure, functional responsibilities, and laws and regulations, etc.

(2) Both sides recognized the importance of economic development and other external factors in devising the strategies and the implementation plans.

(3) The target year for the strategies should be the year 2010, and the implementation plan should cover a minimum period of four years after the completion of the study.

6. Regarding the section IV, 4 of S/W (Technology Transfer for the Three Different Phases...), BAPEDAL strongly requested that JICA will provide the necessary equipment for the study and the technology transfer.

7. (1) In reference to the section VII, 1 of S/W (Undertakings of the Government of Indonesia), the Team requested BAPEDAL to issue letters of invitation to the members of the full-scale study team (the JICA Study Team) to facilitate their obtainment of entry visas to Indonesia; and to provide assistance in their customs clearance of the study equipment.

(2) BAPEDAL requested the Team to clarify the meaning of the section VII, 1, (8) "to provide medical services as needed", and the Team pointed out that it was possible to read this phrase as "to provide assistance, other than financial, to the JICA Study Team in receiving appropriate medical services in Indonesia".

8. (1) In reference to VII, 4 of S/W (Undertakings of the Government of the Republic of Indonesia), BAPEDAL expressed a concern over the difficulty of securing office space within the office of BAPEDAL headquarters, and of providing vehicles for the JICA Study Team.

(2) The Team commented that some members of the JICA Study Team can be

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stationed at offices of the relevant agencies other than BAPEDAL headquarters, by considering the expertise of each study member.

9. Both sides agreed to form a steering committee which will have the mandate to provide direction for the study.

10. The outstanding issues would require further follow up prior to initiating the study.

APPENDIX: List of Attendants

Environmental Impact Management Agency (BAPEDAL)

Nabiel Makarim	Deputy for Pollution Control
Saut M. Lubis	Director, Directorate for Marine and Air Pollution Control
Ridwan D. Tamin	Air Pollution Control Sub-directorate
Abd. Manaf Sulton	Air Pollution Control Sub-directorate
Edy Purwanto Moh. Bakri	Air Pollution Control Sub-directorate
Umar Suyudi	Air Pollution Control Sub-directorate
Achmad Gunawan	Air Pollution Control Sub-directorate
M. Ilham Malik	Air Pollution Control Sub-directorate

JICA Preparatory Study Team

Hidetsuru Matsushita	Team Leader, JICA Preparatory Study Team
Yoshiharu Yamada	Study Planner, JICA Preparatory Study Team
Masaharu Yagshita	Air Quality Administration Expert, JICA Preparatory Study Team
Yoshikazu Suzuki	Pollution Sources Control Expert, JICA Preparatory Study Team

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Chiaki Kuranami	Traffic Planning Expert, JICA Preparatory Study Team
Mitsuru Fujimura	Air Quality Monitoring and Equipment Expert, JICA Preparatory Study Team

Observer

Barid Manna	Advisor Air Pollution, Environmental Management Development in Indonesia
Mike Mowle	Air Pollution Advisor, Pollution Control Implementation
Liliansari, H.	KPPL, DKI Jakarta
Hiroshi Kurakata	Assistant Resident Representative, JICA Indonesia Office
Shanti Dewi	JICA Indonesia Office
Masahiro Ohta	JICA Chief Adviser, Environmental Management Center (EMC)
Motokazu Iwata	JICA Expert, Environmental Impact Management Agency (BAPEDAL)