Chapter 6

Decentralization and Changes in Transportation Administration

6. Decentralization and Changes in Transportation Administration

6.1 General

This chapter sets out the roles and responsibilities of the central and local governments regarding transport policy and infrastructure development. Furthermore, it illustrates the major changes in their relationship due to the forthcoming decentralization regime which begins from the year 2001.

6.2 Role and Function of Agencies for Transportation Administration

6.2.1 Function and Responsibility of Present Organization

The current government administration is structured into three levels: the central government, provincial and regency/municipality (kabupaten/kota) governments. The Law No. 5 (1974) defines dual characteristics of the local authorities. Administrative boundary is defined by the geographical subdivisions of the government administration, and an autonomous region coexist as province and regency/municipality. Autonomous regions have a regional representative body, parliament, own jurisdiction and budget generated from their region. Because of the dual characteristics, local authorities have a unique organizational structure.

As it can be seen in Table 6.2.1, at province level, there is Kanwil and Kandep at the regency/municipality level which coexist with their own agency, Dinas, mirroring the functional structure of Kanwil/Kandep. Kanwil/Kandep is defined as a delegation agency, i.e. representative office of the central government ministries. They report to the head of the local authority as the representative of the central government, and also provide technical assistance to local government officials. Generally, Kanwil is responsible for planning, coordination, monitoring and evaluation of projects funded by APBN (central government budget), while Dinas performs daily operation and implementation. Nevertheless, in practice, their duties overlap and they are inter-dependent to some extent. This parallel administrative structure, without a clear delineation of roles or division of tasks between Dinas and Kanwil/Kandep has resulted in substantial confusion.

Table 6.2.1 Level of Administration and Structure

Level of Government	Level of Administration	Representa-tive Body	Chief Executive	Administration Unit		Planning Body
Central Govt.	Central Government	MPR DPR	President	Department/ Non-Department Agency		Bappenas
Local Govt Level I	Province	DPRD I	Governor	Kanwil	Dinas	Bappeda I
Local Govt Level II	Regency/ Municipality (Kabupaten / Kota)	DPRD II	Bupati/ Walikota	Kandep	Dinas	Bappeda II

MPR: Consultative Assembly, DPR: House of Representatives, DPRD: Regional House of Representatives
Source: Study on Comprehensive Regional Development Plan for the West Part of Kalimantan, JICA

Since the cabinet reshuffle in August 2000, a new cabinet was composed from 16 ministries and 5 non departmental institutions (non-ministry institutions). A major change made to the transport sector by the reshuffle was the fact that the Public Works is no longer a state-ministry but has been merged into the Ministry of Settlement and Regional Infrastructure (Kimpraswil), which was previously called the Ministry of Human Settlements (Kimbangwil).

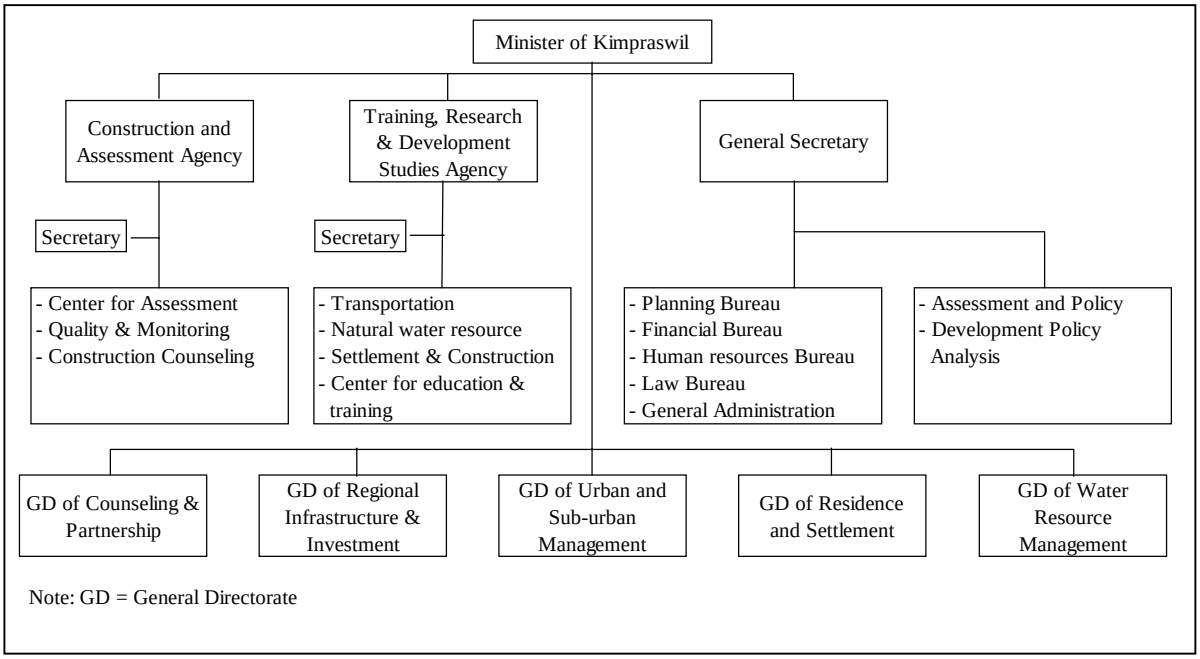


Figure 6.2.1 Organizational Structure of Kimpraswil (as of Oct 2000)

There are five ministries involved in the transport sector, namely the Ministry of Home Affairs, Finance, Mining and Energy, Kimpraswil, Ministry of Transportation and Communications, and Bappenas, which is not a ministry but it is positioned under a coordination minister. Other than ministries, the Traffic Police, called Polantas, within the national police is in charge of enforcing traffic laws, administering driver's license examination centers, vehicle registration and road accidents record. Recently the national police was separated from the army (TNI) and it is now directly responsible to the president. The National Planning Development Board, Bappenas, plays a central role in the planning, coordination and monitoring of development programs. The Ministry of Finance is responsible for fuel taxation. The Ministry of Mines and Energy sets the fuel prices and is responsible for the technical specifications of fuel. The Ministry of Home Affairs oversees local governments and their operational departments, i.e. Dinas, and also issues guidelines for the smooth transition towards of decentralization which is currently underway.

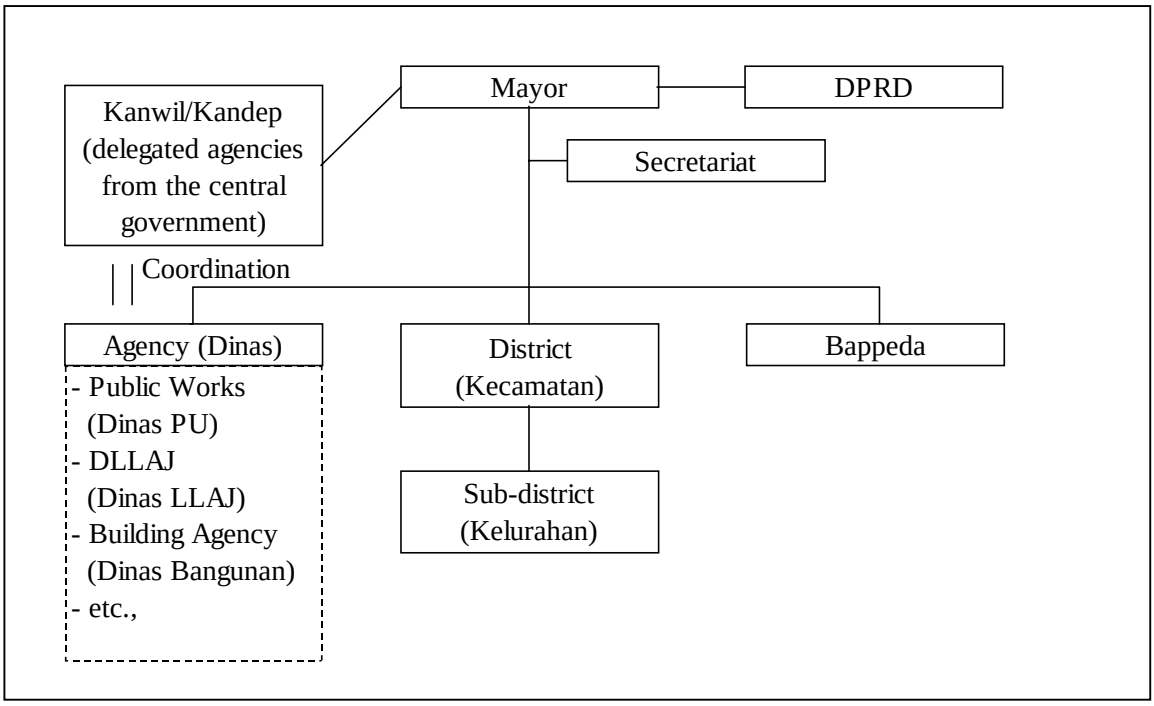


Figure 6.2.2 Organizational Structure of Local Government

(1) Planning

Bappeda is responsible for producing a spatial plan in close coordination with the respective local agencies, under the guidance of the central government. As with the national plan, the spatial plan includes a transport network and land-use plan, while Bappenas is the key player of planning and coordination among sectoral development programs. Dinas Tata Kota issues development recommendations according to the spatial plan. The preparation and updating of the detailed land development plan and regulation is also under its responsibility. Tata Kota oversees the operation of regional development, while Bappeda is responsible for the more broad outlook in terms of regional development. Kantor BPN, a delegation agency has a function similar to Tata Kota and issues a location permit for development according to the land-use plan, and Dinas Bangunan (building agency) issues building permits.

(2) Physical Infrastructure Development

The physical infrastructure development is the responsiblity of Dinas PU (Public Works), in general. Bina Marga in Kimpraswil is responsible for the planning, constructing and monitoring all national and provincial roads. The delegation agencies of Public Works and Dinas PU share the responsibility for infrastructure development. Within Bina Marga, the Urban Road division, Binkot, is responsible for the national roads in urban areas.

(3) Traffic Management

In general, the Directorate General of Land Transport (DGLT) in the Ministry of Transportation and Communications has the principal responsibility to supervise all passenger transport, railways, traffic management, regulations and road freight services. As part of the decentralization/deconsentralization exercise, part of the transport planning and function have been devolved to local authorities since

1985. Thus, DLLAJ now plays a main role in traffic management at regency/municipality level.

The tasks and responsibilities of DLLAJ include 1) junction design, 2) traffic lights management, 3) road signs, 4) one-way system, 5) parking controls, 6) bus operation and route licensing, 7) control on bus and freight terminals, 8) vehicle inspection and 9) general road safety, and not exclusive to the above. The responsibilities and tasks are broad and most of the tasks need collaboration with other corresponding agencies, such as the traffic police, Bina Marga and Bappeda. For instance, current legislation allows a local authority to control and charge for on-street parking, yet the implementation of parking policy is heavily dependant on co-operation between the traffic police and DLLAJ. Most local authorities now have a forum to foster collaboration between DLLAJ, the traffic police and Bina Marga, in the form of Bakorlintas, which is under the mayor's office.

DLLAJ Level II, which is at the regency/municipality level, issues the Transport Undertaking License for the operation of public buses as well as the route license for each bus. However, if a bus route crosses an administrative boundary within the province, DLLAJ level I, at the province level, becomes the agency responsible for the issuance of licenses.

(4) Coordination Agency: BKSP

The Jabotabek area has an unique institution for coordination between two provinces, which consist of five willayah and seven regencies/municipalities. BKSP (Badan Kerjasama Pembangunan Jabotabek) was established in 1976 by the joint decree of the governors of DKI Jakarta and Jawa Barat. Later on, in 1980, the organizational function was reinforced by "Mentari Dalam Negeri (MHA's Instruction) No. 29/1980", issued by the Ministry of Home Affairs. BKSP was established as a coordination forum to assist in the integrated development of Jabotabek, and its main task is to prepare and determine a cooperation policy, implementation plan and support the realization of integrated regional development. Its tasks include the establishment of development planning policies for all sectors within Jabotabek, resolution of economic, social and spatial development issues and control of all development activities in Jabotabek.

The mission is considerably ambitious, and in reality, its main function as a coordinating agency has not been fully respected by the local authorities. In addition, BKSP faces difficulties in carrying out their tasks because it does not have adequate funds, human resources and enforcement tools.

6.2.2 Decentralization

Indonesia is now in the middle of the transition period toward decentralization. Tangible results began to emerge in 1998, and they have accelerated since a new president and cabinet was formed in 1999. Government restructuring and decentralization will inevitably exert a cast significant influence on the urban and regional development process, especially to the Jabotabek region which is the capital of the nation. However, it is also difficult to accurately foresee the impacts of decentralization and whether the expected outcomes will be realized. As the details of budget transferred to the local authorities from the central

government have not yet been finalized, it is impractical to discuss further about next year's fiscal situations.

The key regulations, which mostly affect local authorities, are Law No. 22/1999 on local administration and Law No. 25/1999 on financial demarcation (equalization) between central and local governments. The laws empower local governments to establish new mechanisms to replace the weak capability resulting from the domination by the central government. In order to respond to this requirement, clear and concise guidelines should be issued by the central government to the local governments. However, the relevant central government agencies, mainly the Ministry of Home Affairs, have had to contend with other reform measures, and as a result there is insufficient guidelines regarding decentralization. In line with the Law No. 22/1999, all local governments are scheduled to complete the change in organizational structure by December 2000. As of November 2000, finalized organizational structures and task descriptions are not available.

Thus, it is assumed that the function of existing agencies at local authorities will be maintained as they are until new instructions are announced by the central government.

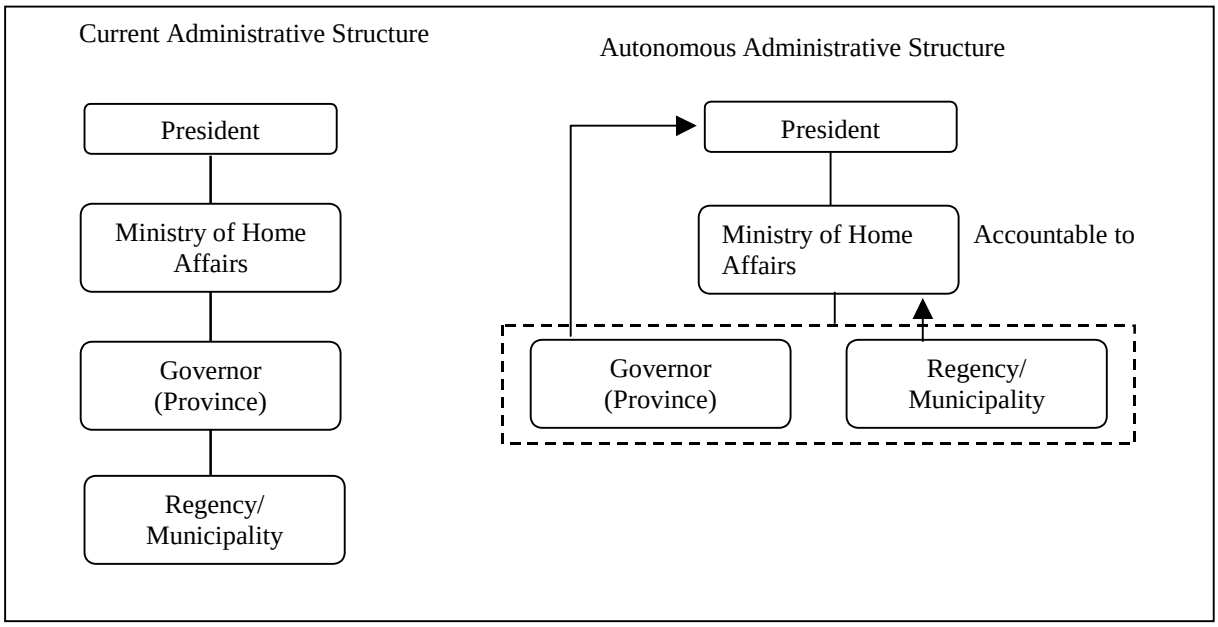


Figure 6.2.3 Comparison of Administrative Structure

Under the local autonomy and Law No. 22/1999, transportation and public works is the responsibility of the local governments (regency/municipality), and the role of provincial government is to act as an arm of the central government. Yet, when each sector, or each administrative task is considered, it is not such easy task to tackle. For instance, from next year, who will be in charge of planning national, provincial and local roads? The project development cycle starts with planning and moves on to implementation, monitoring and evaluation, and operation and maintenance. If all tasks and funds for project implementation are devolved to local authorities, all responsibilities will transfer to the local governments accordingly. However, since there are also national interests,

provincial interests and strategic plans on regional development, the responsibilities should be also allocated to each level of authorities. At this moment, a share of responsibilities is unclear and has not been legislated yet.

In addition to the decentralization exercise, the government of Indonesia is also making efforts to enhance the quality of public service delivery. In the Letter of Intent (Aug. 1, 2000) to the IMF, the government clearly mentions that it is working on a comprehensive reform strategy for the civil service. The plan will be finalized by the end of 2000, and its implementation will commence in the year 2001 once decentralization laws have been fully executed.

(1) Law 22/1999 Regional Administration

Law 22/1999 sets to devolve greater autonomy to regencies and municipalities than ever before and remove the hierarchical structure between province (Level I) and regency/municipality (Level II). They are now positioned at the same level and each head of local authority is now accountable to their respective parliament. The provincial government maintains its role as a coordinator and is responsible for inter-regency administration and affairs which concern the province as a whole.

(2) Law No. 25/1999 Fiscal Equalization

The main difference in the budget is the subsidy known as "general allocation," which has been transferred from the central to the local governments without any conditions on its usage. In addition, 25 percent of the central government' revenue will be distributed according to a formula to local governments. The local governments will also enjoy more freedom with regard to budgeting, while losing some transfer that they had received previously. The crucial point for the local governments is that the central government reserves the authority on the tax collection policy; thus, although they do receive more autonomous control on fiscal management and expenditures, they cannot enact a regional tax collection law to improve their financial balance.

Under the current fiscal system, regency/municipality can finance relatively small projects, such as road rehabilitation, and major projects are financed and controlled by the province and the central government. Furthermore, as the budgetary requests are appraised on a project basis first by the province and then by the central government, the final project list were likely to be intervened by many interests of central and provincial governments. Yet, because of the new autonomous administrative regime, regency/municipality will gain more control over the decision-making and be able to reflect the needs of local communities in the budget.

Currently, the local governments' revenue is heavily dependant on subsidies and contributions from the central government. Locally raised revenues in Botabek is not very high. Although the percentage of share transferred to local governments has not confirmed yet, it is likely that a personal income tax, which now goes towards the central government revenue, will be shifted to the regency/municipality level. Therefore, local governments will receive more share from the tax revenue collected by the central government and be able to increase their revenue.

6.2.3 Organizational Changes and Issues

Now that the decentralization regime is being fully implemented, it is expected that the dual administrative system at the regency/municipality level will be demolished, i.e. Kandep, and various agencies, sections and divisions will be merged gradually at the central level. Consequently, a large number of civil servants who are now based at the central government will probably be transferred to local governments. Estimates by the central government suggests that more than 2.6 million of central government employees will be transferred to provincial administrations and others.

In terms of the transportation sector, a major hurdle will be role sharing and collaboration with other agencies within the local governments as well as with the provincial and central governments. For instance, the revision of Law No. 13 is now underway at Kimpraswil, which stipulates among other regulations, but the role sharing of road sector becomes more complicated than current situations. According to Kimpraswil, the road administration will be divided into three stages and in the each stage, the central, provincial and local governments will be involved to some extent based on their responsibilities. The central government will come up with a basic policy. After then, the policy will be drawn into tangible plans by local governments. The central government will do the pre-feasibility study for national roads, but the engineering design to the construction and road operation will be the local governments' responsibility. The final inspection of every level of road is the central government's responsibility.

In terms of traffic management, institutional coordination will become more complicated. DLLAJ will have to be involved in the light of intersection design, and the traffic police may need to provide road accident records. Following above process, the central and local governments will need to have closer collaboration between them than ever and each responsibility and task will have to be supported by the appropriate financial and human resources. More importantly, the allocation of responsibility among the various levels of government will have to be clearly established by law.

In terms of daily operation and administrative procedures, there are more complicated and unforeseen issues that will have to be resolved in the course of decentralization. Therefore, a clear and consistent line of command line with in the agency and a section to resolve conflicts within and among agencies should be established as soon as possible to avoid any unnecessary disruption in public service delivery.

There are three key issues which need to be tackled for the efficient implementation of the urban transportation policies in the Jabotabek region, once decentralization is completed. The first is to sort out the roles and responsibilities of the related agencies and to out line that area of accountability. The second one is to reconfirm the manner of collaboration among the agencies. The last one is to enhance the human resources capability to accommodate the devolved responsibilities and establish a concrete mechanism for capacity building.

The first issue is evidently explained from the role sharing of road sector introduced above. Unless clearly defined role sharing mechanisms, overlap or overlook on tasks could be easily expected.

As pointed out not only by this report but also in several others regarding transport policy, land-use plans should be closely connected to the transport policy. In the current institutional structure, more than a few agencies are involved in the planning of the road network and land-use. In addition, there are no guidelines for checking the impact of traffic generation and the possible local distraction caused by new developments. Carefully organized and consistent cooperation mechanisms should be established to avoid any inconsistent developments from the spatial plan.

Considering the nature of the Jabotabek region, a well-communicated integrated development is especially crucial. As the "Urban Transport Strategy Review" issued by the World Bank pointed out, the multiple jurisdictions of equivalent size and status seen in the Botabek region may be unwilling to concede any power or financial control to another authority at the same hierarchical level, a situation often seen in cities like Manila or Caracas. The Jabotabek region is considered to be more inter-dependent than the other regions because significant transport interaction occurs across the administrative boundaries. Thus, close communication is also significant to implement traffic management measures. For instance, regencies and municipalities presently have a forum for coordination called Bakorlintas, consisting of DLLAJ, Dinas Bina Marga and the traffic police. Among others, traffic lights management, bus operation, and route licensing should be planned regionally to achieve coherent systems and services.

The enhancement of human resource is not necessarily limited to the achievement of technical skills, administrative capability and managerial capacity. It also covers the enhancement of official discipline and morale. The delivery of public service should be maintained at the same quality level without any disruptions even after the devolution to local governments.

Some law enforcement will always be necessary to implement traffic management measures. Therefore, a poor image of the police certainly deteriorates the credibility of any traffic measures which rely heavily on strict enforcement.

According to the hearings and data collected, transport related agencies are not short in the number of officials, but they do not have enough skilled personnel with a background of transport. Compared with other agencies, Bappeda has more post-graduates and university graduates among its personnel. However, the background of the majority is in social science, such as public administration and economics, and there are few urban planners.

Although structural training programs have been designed and carried out at each administrative level, they are not intended to provide specific knowledge or skills, such as urban planning, transport planning or GIS, but they are mandatory training courses for promotion. Advance degrees are not always necessary in general operations, and short courses to provide broad knowledge should be taken into consideration.

This problem is closely related to the institutional issues that the Botabek government faces in the transport sector, which were pointed out in this chapter. Major obstacles in the effective implementation of projects are the overlapping of responsibilities and the difficulty in coordinating among related agencies. Although it cannot be attributed only to the lack of coordination or skilled

personnel, the project realization in some regencies in relation to the budget is not unsatisfactory at around 80 percent or less. Many reasons can be considered, yet, generally it is due a lack of project management skills, including planning, operation, financial management and managerial skills. Therefore, a structural training system shall be considered to enhance the overall capacity of the local governments.

6.3 Public Finance

6.3.1 Public Investment in the Transport Sector

Before the economic crisis, the government had heavily invested in transport infrastructure compared to other sectors. Table 6.3.1 shows that the transport sector had taken up on average nearly 20 percent of the total development expenditure. It is especially notable that during Repelita V (1989/90 – 1993/94), a quarter of the development budget was allocated to the transport sector. Compared simply to social development expenditures, such as education, which is about 10 percent and social welfare, which is 4 percent, the transport sector expenditure was considerably substantial. During the period of Repelita V and VI, the transport sector was a recipient of a significant amount of foreign assisted funds, being the second biggest benefactor after regional development.

Table 6.3.1 Transport Sector in Development Expenditure

Period	Transport[1] (Rp billion)	Total[2] (Rp billion)	Share (%)
Repelita I (1969/70 – 1973/74)	212.4	1,084.4	19.7
Repelita II (1974/75 – 1978/79)	1,169.4	7,479.2	15.6
Repelita III (1979/80 – 1983/84)	4,013.1	31,753.8	12.6
Repelita IV (1984/85 – 1988/89)	8,185.9	51,293.2	16.0
Repelita V (1989/90 – 1993/94)	27,810.5	112,053.6	24.8
Repelita VI (1994/95 – 1998/99)	34,699.3	226,616.9	15.3

Note:1 Tourism is included between Repelita I and Repelita V
2 Encompassing the amount of 15 sectors between Repelita I and Repelita V while the amount of 20 sectors during the Repelita VI period.
Source: Bappenas

When the Asian financial crisis has spread through East Asia, the government responded promptly by postponing or reviewing its infrastructure projects. A presidential decree was issued in September 1997, in which 81 projects were postponed and 62 others were reviewed. The estimated total project costs including both public and private funds amounted to Rp.165 trillion, which was close to the public transport's budget for 24 years.[1] In 1998, correspondingly, the government shifted its budget focus to the social safety net and other poverty alleviation programs implemented under the regional development and agricultural programs. As a result, the transport sector is share, which was steady at 19 percent of the total state development budget during the first four years of Repelita VI, dropped to 10.4 percent in the last fiscal year, 1998/99. It declined slightly to 10.2 percent in fiscal year 1999/00.

However, the spending on transport sector is not considerably high when compared with some other Asian countries. Although the government has

[1] The calculation is based on the assumption that the 1997's investment volume would continue.

addressed the importance of the transport sector in the past, the magnitude of public investment to its GDP ranged from 1.1 percent to 1.5 percent during the period of 1993 to 1998. Malaysia and the Philippines spent about 2 percent and Thailand allocated some 7 percent to the transport sector during this same period.

Table 6.3.2 Trend in Public Transport Funding as Percent of GDP

Year	Public Transport Funding (Rp billion)	GDP (Rp trillion, at current prices)	Share (%)
1993	3,986	330	1.2
1994	5,658	389	1.5
1995	5,777	457	1.3
1996	6,771	540	1.3
1997	6,850	624	1.1
1998	9,643	882	1.1
1999	8,427	974	0.9
2000	4,240[1]	1,127	0.4

Note: 1 The figure is estimated by the Study Team based on the Year 2000 State Budget Draft (for 9 months)
2 GDP figures are estimated by the Study Team based on the GDP figures at 1993 constant prices and inflation rates.
Source: Bappenas, IMF

The revenue of the central government constitutes almost 90 percent of all revenues in the country, and local governments heavily depend on subsidies/contributions and tax shares from the central government. Almost 60 percent of the local governments' spending is transferred from the central government. Yet, this is attributed to a heavily centralized taxation mechanism in Indonesia.

However, regarding to the Jabotabek region, the share of contribution/subsidy, which is the redistribution from the central government's revenue, is not the same at the revenue of first level local government, DKI Jakarta and Jawa Barat. This is attributed to the difference in the revenue from local tax. DKI Jakarta derives around 40 percent of its revenue from its own source, i.e. local tax, retribution and others, while the Jawa Barat province only has about 12 percent on average, and only 9.7 percent in FY 1998/99. DKI Jakarta locally generates more than three times the revenue than Jawa Barat. As a matter of fact, DKI Jakarta itself composes 40 percent of locally raised revenue over the country. The local tax revenue per household in DKI Jakarta is ten times more than that of Jawa Barat. Therefore, DKI Jakarta has a significant advantage since it has more control over budgets, which makes possible for the authority to make long term plan.

Table 6.3.3 Locally Raised Revenue

(Unit: Million)

Fiscal Year	1995/1996	1996/1997	1997/1998	1998/1999
DKI Jakarta	1,672,650 (43%)	1,787,375 (41%)	1,830,739 (39%)	1,225,922 (40%)
Jawa Barat	469,830 (12%)	542,304 (13%)	592,619 (13%)	301,560 (9.7%)
Indonesia	3,854,280	4,318,562	4,656,530	3,093,675

Source: Financial Statistics of the First Level Local Government. BPS. February 2000.

Although the amount of subsidy and contribution from the central government to DKI Jakarta is smaller than that received by Jawa Barat, in terms of amount per household, the situation is reversed.[2] DKI Jakarta receives on average 1.5 times more subsidy than Jawa Barat per household.

Therefore, DKI Jakarta has a larger budget than the local governments in Botabek and receives a substantial subsidy and contribution from the central government, even though the amount is about a third to a half of what Jawa Barat receives. This shows that the resources for development has been unevenly distributed by the central government to the Jabotabek region, and also that accessibility to resources generated within their own jurisdiction is appreciably varied.

Table 6.3.4 Contribution and Subsidy from the Central Government

(Unit: Million)

Fiscal Year	1995/1996	1996/1997	1997/1998	1998/1999
DKI Jakarta	360,459	384,269	452,884	601,405
Jawa Barat	942,471	963,720	920,876	304,052
Indonesia	5,489,016	5,926,034	6,246,487	3,610,050

Source: Financial Statistics of the First Level Local Government. BPS. February 2000.

It must be sought for the local authorities in Botabek to improve locally raised revenue. Yet, under the existing regulatory framework, there is no provision for local governments to raise substantial amounts of their own revenue. Local governments have some but very limited autonomy over the determination of rates and bases regarding taxation. Local governments can propose new taxes under some circumstances, although approval of the central government is necessary.[3] Even the two autonomous laws, which will soon be stipulated fully do not provide locally controlled tax instruments for revenue.

6.3.2 Changes in Revenues and Expenditures

The recurrent transfer that is largely used for personnel expenditure of local civil servants, and also general development transfers known as Instruksi Presiden, or Blok Inpres will be abolished. These two transfers will instead be combined into a general allocation fund whose total amount will be 25 percent of the central government's revenue and this will be distributed according to a formula which is under discussion as of November 2000. Whereas Law 25/1999 specifies that the local government's resources be decentralized, the two laws give indistinct indication of spending responsibilities. Besides, since the role sharing and responsibility of development between the central government and local governments have not been clearly decided nor regulated by legislation at the central level, it is more than challenging to estimate the necessary budget for the respective local government.

The proportion of recurrent expenditure jumped notably in fiscal year 1998/99, which is mainly due to the economic crisis. Because of high inflation, the local governments needed to raise the personnel expenditures to compensate for the increase in product prices, and reduce the proportion of the other sectors. For

[2] Since the budget and expenditures of fiscal year 1998/1999 was greatly largely affected by the economic crisis, they were excluded from the analysis.
[3] "Indonesia: Public Spending in a Time of Change" World Bank. April 2000.

instance, the percentage of personnel expenditure doubled in fiscal year 1998/1999 in DKI Jakarta, and the proportion of recurrent expenditure exceeded development expenditure in Kota Tangerang. Yet, inflation rates have been returning to normal level recently to an average of 2 percent in 1999 compared to the yearly average of 78 percent in 1998, and so budget allocation is likely to shift back to pre-economic crisis situations.

DKI Jakarta has invested a significant amount on the transport sector, although surprisingly in terms of monetary value it has not always ranked at the top of development expenditures in the past four years. The transportation expenditure is followed by Development and Transmigrations, Civil Servants and Control, and Dwelling and Residence.

The Botabek area has a similar pattern expenditure as DKI Jakarta, but its first priority is the transportation sector followed by either the Civil Servants and Control, or local governments' strategic development sectors. The major difference from DKI Jakarta is that local governments in Botabek allocate a greater share of their budget on transportation sector development. For instance, in Kota Tangerang, the local government has devoted a third of its development budget to the transportation sector. A similar trend can be seen in other regencies and municipalities concerned except Kota Depok. Since Kota Depok was given its full autonomy in 1999, data is not available unlike other jurisdictions. The fiscal year 1999/2000 budget shows that 22 percent was allocated for the transportation sector and 10 percent in 2000.

Table 6.3.5 Comparison of Transport Sector Expenditures

(Unit: Million Rp.)

Fiscal Year	1995/1996	1996/1997	1997/1998	1998/1999
DKI Jakarta	183,218 (20%)	161,674 (13%)	138,110 (12%)	32,787 (13.6%)
Kota Tangerang	12,188 (29%)	24,569 (45%)	27,633 (41%)	18,027 (32%)
Kab. Tangerang	21,346 (37%)	n.a.	26,526 (37%)	16,147 (28%)
Kota Depok	-	-	-	-
Kota Bekasi	-	-	-	5,047 (19%)
Kab. Bekasi	18,126 (37%)	25,011 (40%)	20,311 (28%)	8,049 (29%)
Kota Bogor	4,831 (20%)	n.a.	11,749 (35%)	4,361 (21%)
Kab. Bogor	26,577 (32%)	n.a.	n.a.	30,914 (41%)

Note: The percentage shows a proportion to the development expenditure in the governments
Source: Financial Statistics of the Second Level Local Government. BPS. 1995 – 2000.
Collected from Kabupaten/Kotamadya. JICA Study Team. 2000.

Whether the transportation sector budget is sufficient or not cannot be known unless an elaborate study is carried out by comparing the budgetary requests and approved budget, and the spatial plan is thoroughly assessed. However, it is prevailingly understood that an absolute amount of development fund is in short,

especially after the economic crisis. Correspondingly, the transportation sector has also suffered from inflated commodity prices in its development and maintenance of transport infrastructure and facilities. For instance, the national and provincial road development and rehabilitation has been funded by a sectoral program loan from JBIC due to at the central government limited resources.

It is foreseen from the Law 25/1999 that the share of resources from APBD will increase significantly among others, and a transfer from provincial governments will become marginal. At the same time, the Law allows DPRD to have a greater power with respect to development planning, budgeting and project-operation monitoring. Its power devolution could affect some development policies. For a local authority, a key issue will be how to realize programs based on its spatial plan and to allocate budget and receive the approval from the local parliament (DPRD). In line with Law 25/1999, the leader of local governments will be chosen by the respective elected council rather than be appointed by the president, so that they will be accountable to their own council. Thus, when local government's decisions become more responsible to the voice of its constituents, the public services delivered will correspond more closely to the demands and needs of the individuals within the jurisdiction. If it is the case, it is likely to anticipate that social-welfare oriented development is preferred to transportation development. The local government needs to seek more revenue to achieve the desired development by either setting up a locally raise tax revenue or requesting a fund transfer from the central government. However, considering the streamline of decentralization and limited resources at the central government, it is unlikely to expect for local governments to solely rely on the central government's revenue.

Chapter 7

Future Perspective of the Jabotabek Region

7. Future Perspective of the Jabotabek Region

7.1 General

In this chapter, firstly, the existing spatial development plan as the well as transportation system development plans prepared by the central and local governments are reviewed in Section 7.2. Based on the review of the existing plans, a social and economic framework for the Jabotabek region is proposed in Section 7.3. Then in Section 7.4, expected social and economic changes such as suburbanization and the further concentration of job opportunity in the central area, are examined as factors affecting the transportation system. The present problems argued in Chapter 5 and expected future changes lead to identification of planning issues summarized in Section 7.5.

7.2 Review of Spatial Development Plan

7.2.1 Review of National Level Spatial Development Plan

Spatial plans are regarded as statutory city planning documents in Indonesia. Both central and local governments must be prepared them at proper intervals, i.e., 25 years for a national plan and 5 years for a detailed local plan.

The development policies for the Jabotabek region are outlined in the second National Spatial Plan 1994 (RTRWN: Rencana Tata Ruang Wilayah Nasional, the target year of 2020).

1) Designate Jakarta as the center for national activities (PKN: Pusat Kegiatan Nasional) which is the national center/hub for government and public services, manufacturing, financial and banking services, and the national transportation network where international gateways are available. It is also expected to stimulate the development of the surrounding regions.
2) Designate Jabotabek as the fast growing region (Kawasan Tertentu Cepat Tumbuh), where the national strategic functions are concentrated.
3) Give priority to the handling and control of clean water, seawater intrusion, ground water and floods especially managed by major rivers (Citarum, Ciliwung, Cisadane, Ciujung, Kali Bekasi and Cideng).
4) Designated the surrounding regions (Kawasan Penyangga) as Jakarta's a supporting area, including Bekasi, Bogor, Tangerang, Depok, Parung, Serpong, Pontang, Balaraja, Cikande, Purwakarta, Karawang, Cikampek, Cikarang and Jatiluhur. As directed by INPRES (Presidential Instruction) No.13/1976, cities in the supporting area are expected to act as counter magnets to Jakarta.

7.2.2 Review of Provincial Government Level Spatial Development Plan

Administratively two Provincial (Class-I) local governments are involved in the study area's physical management.

(1) DKI Jakarta

Jakarta had its first master plan in 1965, and it was published in 1967. This plan emphasized physical development and mapped out a strategy for the period from 1965 to 1985. In this plan, the population growth of Jakarta was to be slowed by immigration control measures such as KTP (resident ID, Kartu Tanda Penduduk), and potential new residents were directed to growth centers beyond the city limits. Sector plans were prepared for transport, water supply, sewerage, railways, and toll roads, though the coordination between the departments responsible for these activities was poor. Although a number of sector plans were drafted for Jakarta, they were largely ignored in practice. In the late 1970s, it became clear that the city-wide planning process was unable to cope with the urbanization process.

In response to INPRES No. 13/1976, a comprehensive Jabotabek Metropolitan Development Plan (JMDP) was established in 1980. In this plan, emphasis was given to the social, economic and financial aspects of urban development, and not merely to the provision of infrastructure. While the strategy emphasized promoting the development of the Botabek area, JMDP sought to limit the further spread of the city to the south due to restricted ground water supplies. The plan opted for development to the west through Tangerang and to the east through Bekasi.

Although there is no formal functional planning mechanism for Jabotabek as a region, JMDP had an important influence on the subsequent master plan for the city of Jakarta. The second master plan was prepared by the Jakarta Regional Planning Board (Bappeda DKI Jakarta) and published in 1987 under the title of Jakarta 2005. It adopted the same spatial form for Jakarta that was delineated in JMDP, i.e., directing growth to the east and west, although the Botabek area was not included in the spatial plan of Jakarta.

A similar planning relationship can be seen between the review of the 1980 Jabotabek Metropolitan Development Plan Review (JMDPR, 1993) and the third master plan document for Jakarta, namely, Jakarta 2010, published in 1999. In the 1990s the urbanization trend clearly went through the boundary of Botabek and extended further to Karawang eastward and to Serang westward. At the same time, reclamation projects and coastal tourism projects were vigorously discussed. JMDPR developed PANTURA (Pantai Utara) as a concept to express such development trend while “Jakarta 2010” intends to promote the north reclamation project, the so-called Waterfront City, in the document.

(2) West Java Province

In the West Java Spatial Plan, a provincial growth corridor is proposed along the Java Sea’s coastline through Bojonegara, Jakarta and Cirebon by the year 2009. However the viability of this growth corridor is now questionable. During the mid of 1990s, Bojonegara, a small port town in Banten Bay located at the utmost northwest corner of West Java Province, was supposed to have been developed as an alternative port to Tanjung Priok.

Today, the project to construct this port by the private financing initiative (PFI) has been was cancelled completely. The other eastern wing of the province, Cirebon, has suffered from sluggish economy and continuous population outflow since the 1980s. Nevertheless, these two seaports are still maintained as

important outlets to the Java Sea which are alternatives to the Tanjung Priok Port and consequently, to induce industrial development corridors westward from Tangerang or further eastward from Cikarang/Karawang.

The spatial plan identifies a set of problems in the current structure of West Java Province as well as its spatial utilization as follows:

- Expansion of the urban area by transforming productive large-scale agricultural land to industrial and housing estates,
- Management of urban structure and size, and shortage of urban infrastructure,
- Development and control of land, water and forest resources,
- Unsuitable use of land uses and natural environmental resources,
- Lack of priority consideration/plan to develop a scarce land designated as a cultivation area for economic activities, and
- Imbalance of city sizes among the North, Central and South areas.

To develop a hierarchical urban center system, the spatial plan divides the territory into three development areas, i.e. West, Central and East. The Botabek area belongs to the central area, together with Bandung, Cianjur and Karawang. The three development areas consist of main and support areas as defined by the structure plan presented in Table 7.2.1.

Table 7.2.1 Area Development Structure for West Java Province

Development Area	Development Center	Main Area	Supporting Area
West Development Area	Bojonegara	Kab. Serang	Kab. Pandeglang Kab. Lebak
Central Development Area	DKI Jakarta & Bandung	Kab. & Kota Tangerang Kab. & Kota Bogor Kab. & Kota Bandung Kab. & Kota Bekasi Kab. Karawang Kab. Purwakarta Kab. Sumedang Kab. Subang	Kab. & Kota Sukabumi Kab. Cianjur Kab. Garut
East Development Area	Cirebon	Kab. & Kota Cirebon Kab. Indramayu Kab. Majalengka	Kab. Tasikmalaya Kab. Kuningan Kab. Ciamis

Source: Regional Spatial Structure Plan 2010 of West Java

The main area functions as the main activator engine for West Java economy as well as the stimulator or growth center for the hinterland area, and its main economic activities have a strong relationship with inter-regional and international economies. Northern area creates a east-west development corridor of economic agglomeration comprised mainly of industry, trading, services, settlement and wetland cultivation. The supporting area supports economic growth in the main development area, and it is located to the south of the West Java Province.

The structure plan recognizes the northern area as being the zone with the most potential to lead the development of its hinterland area, and it establishes the following development strategies:

- Growth centers located in the central area are directed to carry out economic activities for regional, inter-regional and international levels,
- Growth centers located in the central area are directed to carry out collection and distribution activities for regional level, and
- Growth centers located in the south area are directed to serve as production centers for the neighboring and local levels

The growth center development was directly linked to the hierarchical city development with different levels of function as defined in Table 7.2.2, and eventually potential cities categorized by function as presented in Table 7.2.3.

Jabotabek is located in the Central Area with DKI Jakarta and Bandung being development centers of hierarchy I cities, and such as Tangerang, Ciputat, Depok, Bekasi, Bogor, Pondok Gede and Cikarang being hierarchy IIA cities, as shown in Figure 7.2.1.

Table 7.2.2 City Hierarchy and Function in West Java Province

City Hierarchy	City Function
Hierarchy I	Main growth center and trading gate to areas outside of the area, and has a national scale of service.
Hierarchy II	Center for services and trading, housing and industry with an interregional scale of service.
Hierarchy III	Production center, collection and distribution cities that have a regional scale of services.
Hierarchy IV	Agriculture production centers cities that have a local scale of services and support the upper city hierarchy.

Source: Regional Spatial Structure Plan 2010 of West Java

Table 7.2.3 Cities by Functional Hierarchy and Development Area

City Hierarchy	Located in Main Area
Hierarchy I	DKI Jakarta & Bandung
Hierarchy IIA	Tangerang, Ciputat, Depok, Bekasi, Bogor, Pondok Gede, Cikarang, Cikampek, Cimahi, Padalarang and Jatinangor
Hierarchy IIIA	Balaraja, Pasar Kemis, Cikupa, Tigaraksa, Parung, Cileungsi, Serpong, Cibinong, Tambun, Jonggol, Karawang, Pamanukan, Purwakarta, Kalijati, Subang, Soreang, and Sumedang
Hierarchy IVA	Teluknaga, Babakan, Leuwiliang, Rumpin, Jasinga, Rengasdengklok, Pangalengan, Lembang, Cicalengka, Majalaya, Ciparay and Banjaran.
	Located in Supporting Area
Hierarchy IIIA	Pelabuhan Ratu, sukabumi, Cianjur, Garut
Hierarchy IVA	Cibadak, Cimanggu, Segaranten, Sukanegara, Sindangbarang, Ciranjang, Cisaat, Cikajang, Cidaun, Ujunggenteng, Pameungpeuk.

Note: Each of the above hierarchy categorized into category-A that has higher intencity, volume and frequency of activity than category B.
Source: Regional Spatial Structure Plan 2010 of West Java

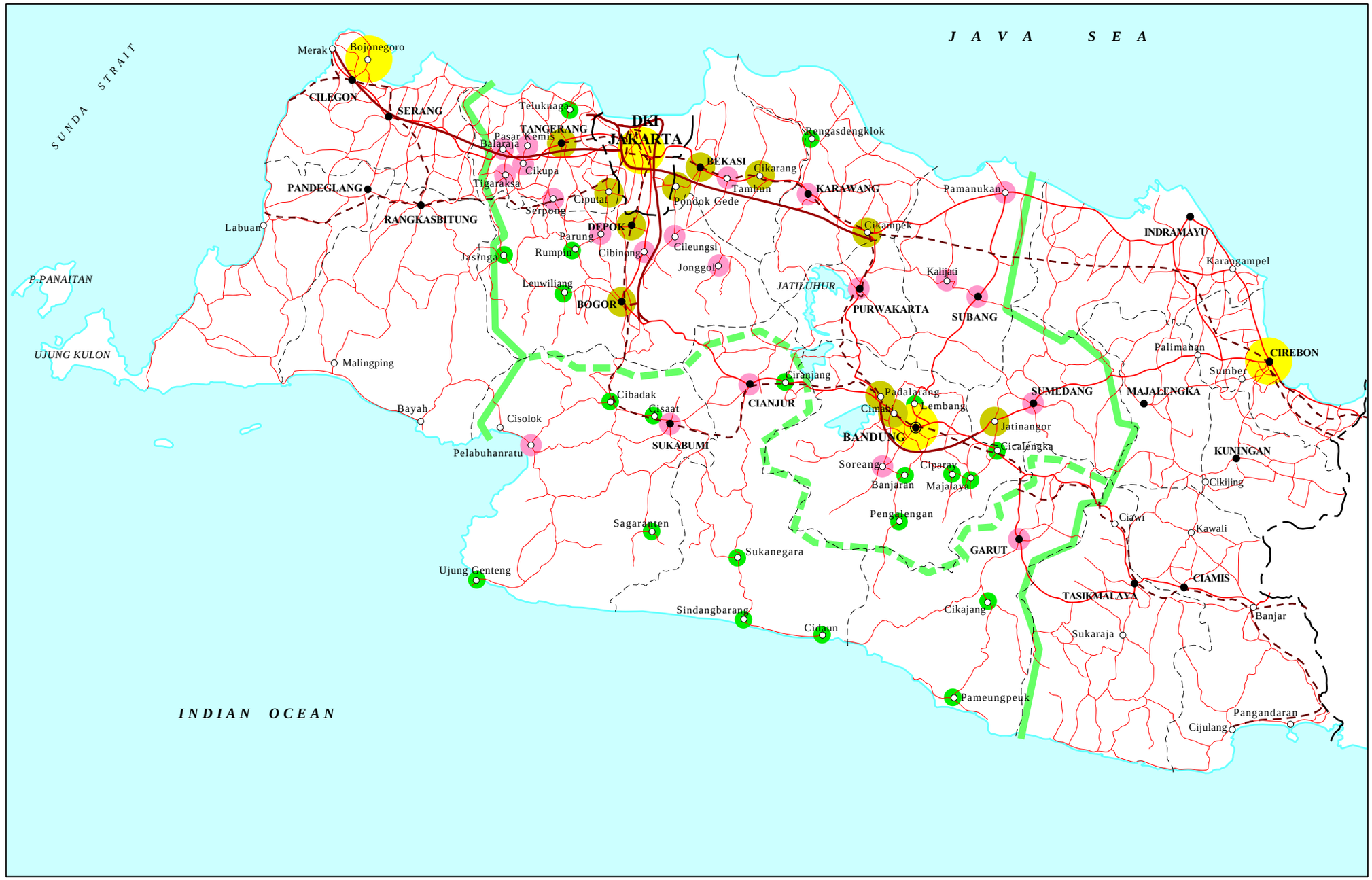


Figure 7.2.1

CITY HIERARCHY
and
DEVELOPMENT AREAS

LEGEND :

- PROVINCE BOUNDARY
- KABUPATEN BOUNDARY
- NATIONAL ROAD
- PROVINCIAL/KABUPATEN ROAD
- TOLLWAY
- RAILWAY
- DEVELOPMENT AREA BOUNDARY
- MAIN AREA AND SUPPORTING AREA BOUNDARY
- HIERARCHY I
- HIERARCHY IIA
- HIERARCHY IIIA
- HIERARCHY IVA

SOURCE : RENCANA TATA RUANG WILAYAH PROPINSI DT.I JAWA BARAT

N

Figure7.2.1 City Hierarchy and Development Areas

7.2.3 Review of Regional Development Direction designated in "Jabotabek 2015"

(1) Understanding the Development Policy and Direction of Jabotabek

The southern part of the Jabotabek region is designated as a restricted area for water reservoir. Therefore the primary urban development direction is in the east–west direction and buffer zones have been designated between settlement areas.

Technically irrigated agricultural lands, which located mainly in the northern part of Kabupaten Bekasi, are restricted for development. On the other hand, although development toward the south is limited, the Jakarta – Depok – Cibinong – Bogor corridor where urban development has been realized has been accepted for moderate land use development.

In the context of urban development policy for Jabotabek, the role of a transportation system would be to support the urban development in the east-west direction by improving accessibility. Furthermore several cities in the surrounding areas have been designated as urban centers and the plan is to enhance the urban functions in these centers to avoid an over-concentration of urban functions in Jakarta. In order to encourage the growth of the centers, not merely accessibility between these centers and Jakarta but those among the urban centers of Botabek should be strengthened.

7.3 Review of Transport System Development Master Plan

7.3.1 Development Policy of Transportation System in "Jabotabek 2015"

"Jabotabek 2015" proposed the following transportation system development policy in the region;

(1) Development Policy of the Transportation Infrastructure and Services

The transportation system development is to be focused on the east-west direction by improving the primary road network and proposing MRT and LRT systems in the Jabotabek region. Access to the southern part of the region would be limited in order to comply with the development policy in that area.

- Develop an integrated system of MRT, bus and railway.
- Strengthen the role of the railway system in both the urban and non-urban areas.
- Improve both national and inter-provincial trunk lines in order to support economic activities.

(2) Policy and Strategy of Transportation System Development in "Jabotabek 2015"

- Integrate the MRT system with other public transport, railway and buses
- Increase usage of passenger train transport
- Improvement of Non Toll Road Network
- Increase the road network into resettlement areas

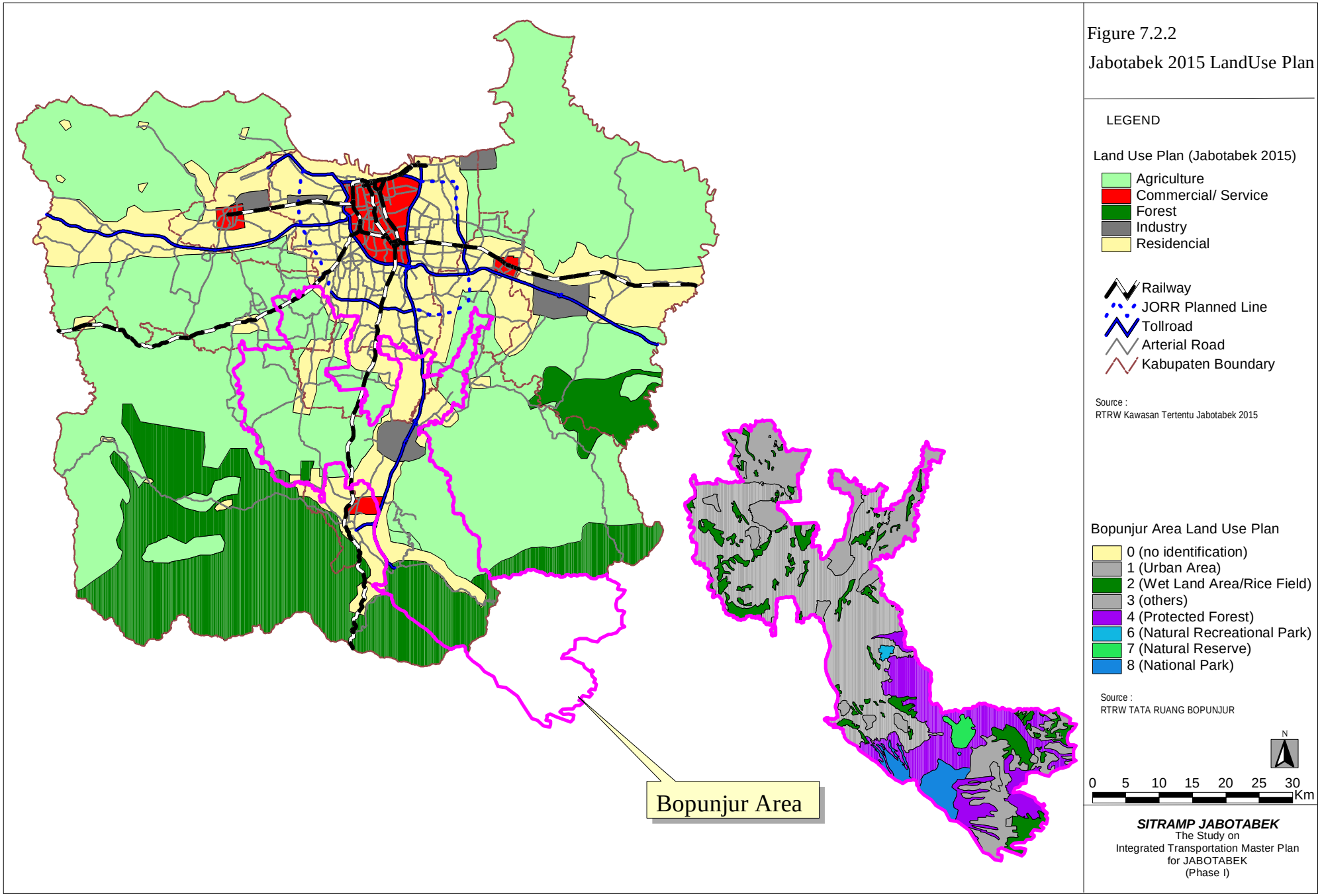
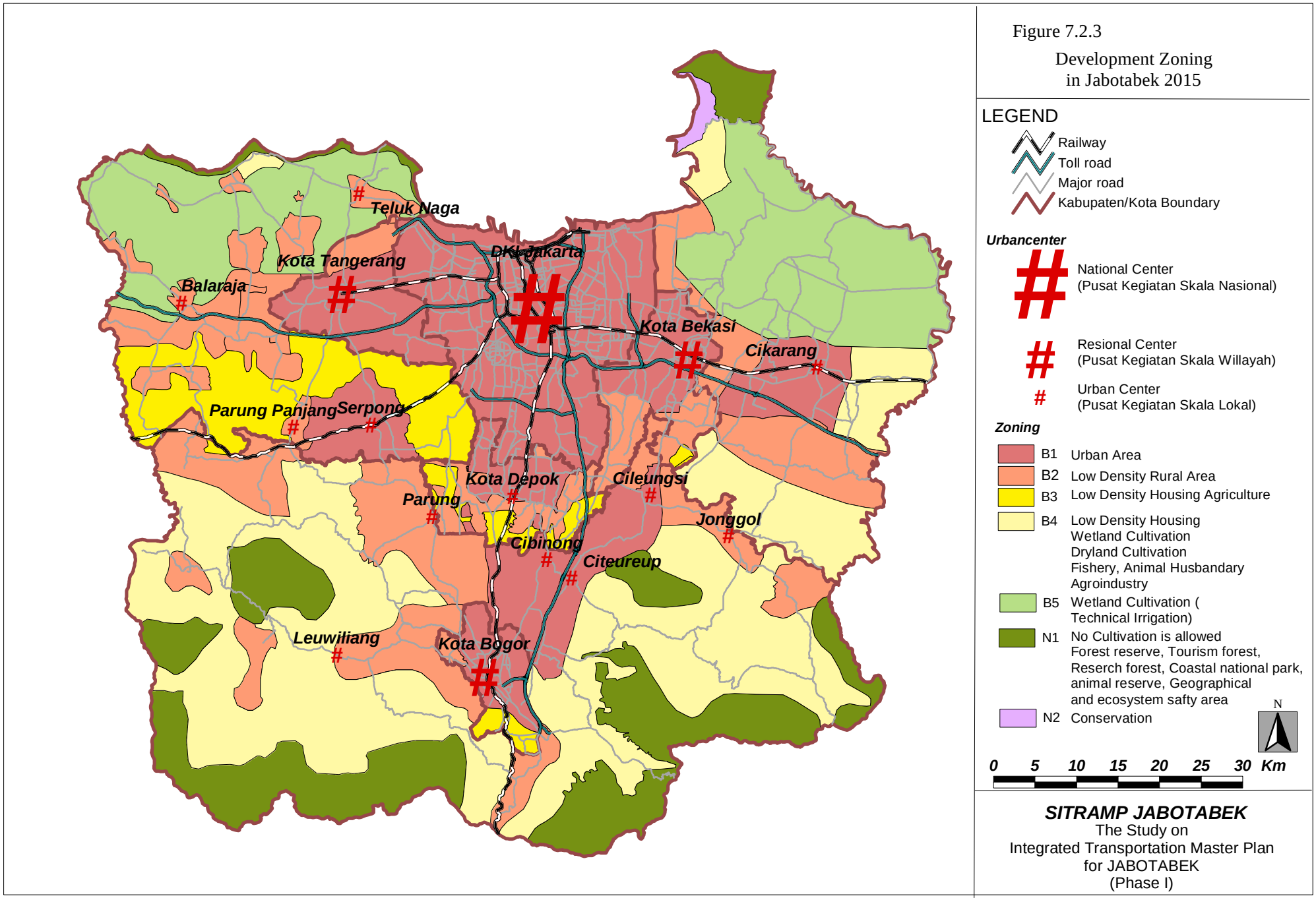


Figure 7.2.2
Jabotabek 2015 LandUse Plan


Teluk Naga
DKI Jakarta
Kota Tangerang
Balaraja
Kota Bekasi
Cikarang
Parung Panjang
Serpong
Kota Depok
Cileungsi
Parung
Jonggol
Cibinong
Citeureup
Leuwiliang
Kota Bogor
Figure 7.2.3
Development Zoning
in Jabotabek 2015
LEGEND
Railway
Toll road
Major road
Kabupaten/Kota Boundary
Urbancenter
National Center
(Pusat Kegiatan Skala Nasional)
Resional Center
(Pusat Kegiatan Skala Willayah)
Urban Center
(Pusat Kegiatan Skala Lokal)
Zoning
B1 Urban Area
B2 Low Density Rural Area
B3 Low Density Housing Agriculture
B4 Low Density Housing
Wetland Cultivation
Dryland Cultivation
Fishery, Animal Husbandary
Agroindustry
B5 Wetland Cultivation (
Technical Irrigation)
N1 No Cultivation is allowed
Forest reserve, Tourism forest,
Reserch forest, Coastal national park,
animal reserve, Geographical
and ecosystem safty area
N2 Conservation
N
0 5 10 15 20 25 30 Km
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- Develop the road network in the urbanized areas, especially access roads to toll roads
- Maintain the road network

(3) Directions for Regional Spatial Development in "Jabotabek 2015"

The general direction of transportation system development in the Jabotabek region was designated as follows in accordance with the regional spatial development;

- Socialize the mass rapid transportation system
- Enhance the primary road network, LRT and MRT on the east-west axis
- Increase accessibility from the industrial areas to Tanjung Priok Port, Bojonegara and Soekarno Hatta Airport
- Increase accessibility to the rural areas for the distribution of agricultural produce
- Increase the non-toll road network and to develop new roads.
- Encourage usage the railway and bus transport

7.3.2 Review of Road Network Development Plan in "Jabotabek 2015"

The road Development Plan in "Jabotabek 2015" is shown in Figure 7.3.1. (Road Network Development Plan Jabotabek 2015 with the land use plan) and Figure 7.3.2. (Road Network Development Plan Jabotabek 2015 with the development zoning)

(1) Toll Road Development Plan in "Jabotabek 2015"

In the Jabotabek 2015 the following toll road developments are proposed

- Jakarta Outer Ring Road
- Jakarta - Serpong Toll Road
- Jakarta - Bekasi Elevated Toll Road (Kali Malang Toll Road)
- Kota Bogor Ring Toll Road
- Serpong - Parung Panjang Toll Road (Extension of Jakarta - Serpong Toll Road)
- Cikarang-– Tg. Priok Toll Road (the road is not indicated in the Figure)

It should be noted that the Outer Outer Ring Road is not included in the list but is indicated in the Figure.

(2) Arterial Road Network Development Plan in "Jabotabek 2015"

As for the arterial road network development, the plan proposed the development of in the area surrounding Jakarta in order to raise the service level for commuter trips. Improvement of the existing roads is emphasized and a limited number of new road developments were proposed.

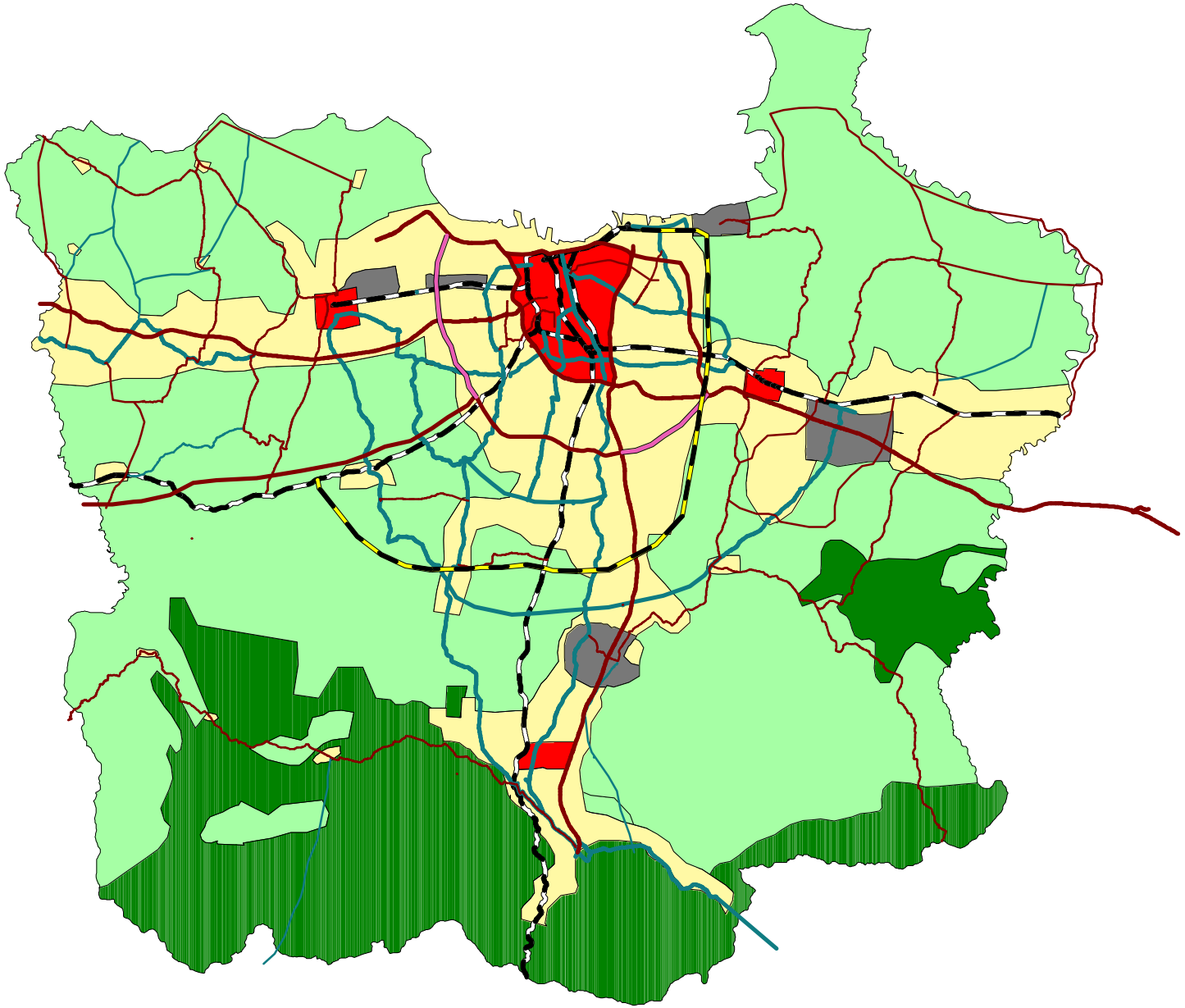

Figure 7.3.1
Jabotabek 2015
Road Development Plan and
LandUse Plan

LEGEND

Existing Railway
Planned Railway
Planned Tollroad
Primary Arterial
Primary Collector
Secondary Arterial
Secondary Collector

Land Use Plan

Agriculture
Commercial/ Service
Forest
Industry
Residencial

N

0 5 10 15 20 Km

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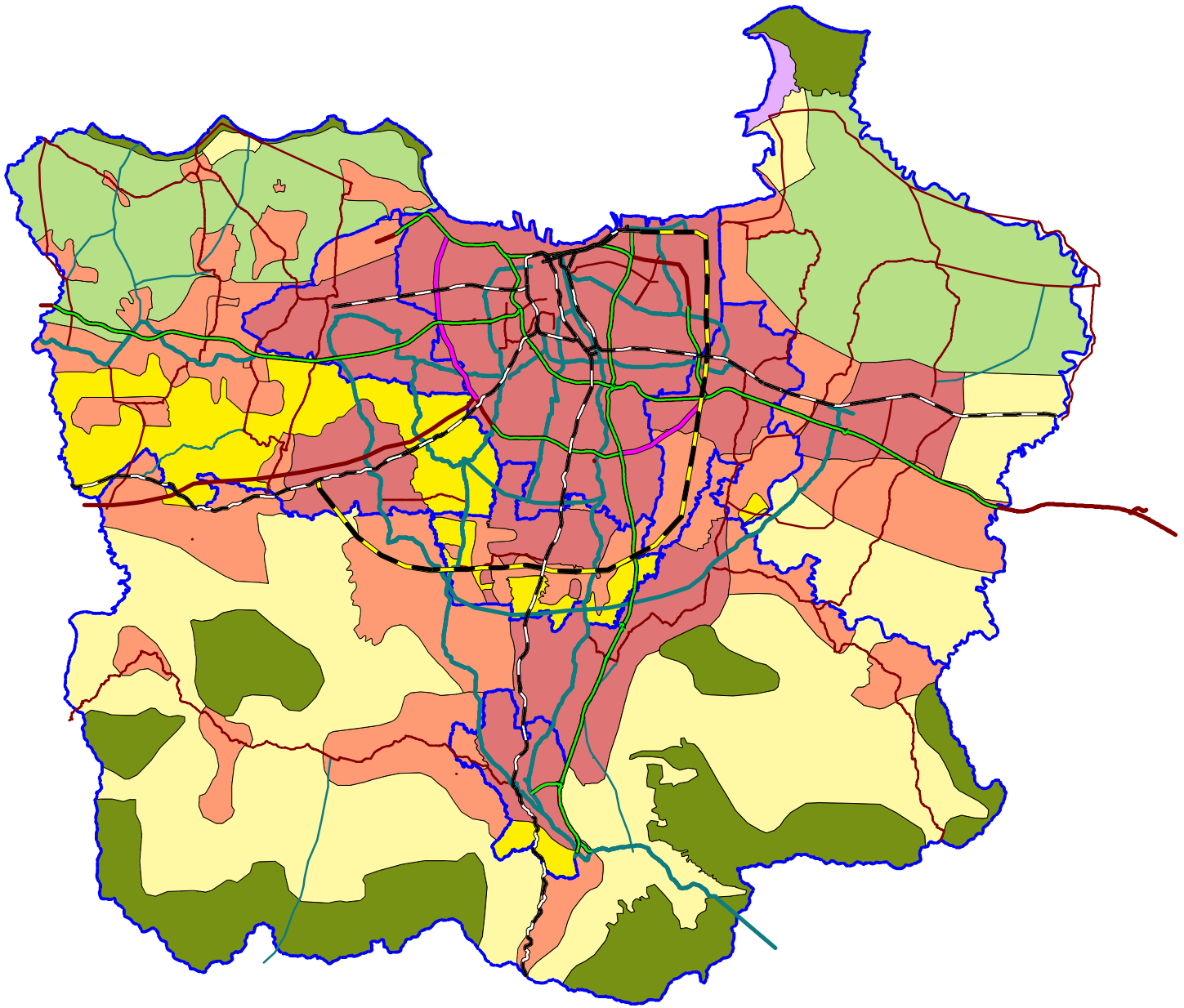

Figure 7.3.2

Jabotabek 2015
Road Development Plan and
Development Zoning

LEGEND

- Existing Railway
- Planned Railway
- Planned Tollroad
- Primary Arterial
- Primary Collector
- Secondary Arterial
- Secondary Collector

Development Zoning

- B1 Urban Area
- B2 Low Density Rural Area
- B3 Low Density Housing Agriculture
- B4 Low Density Housing Wetland Cultivation/ Dryland Cultivation Plantation, Fishery, Animal husbandary, Agroindustry
- B5 Wetland Cultivation (Technical Irrigation)
- N1 No cultivation is allowed Forest reserve, tourism forest, reserch forest, Coastal national park, animal reserve, Geographical and ecosystem safety area
- N2 Conservation

N

0 5 10 15 20 Km

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7.3.3 Transportation System Development Plan prepared by DKI Jakarta and Local Governments in Botabek

The road development plan has been reviewed based on the transportation system development plans contained in the Spatial Plan prepared by Kabupaten and Kota as listed in Table 7.3.1. Several inconsistencies have found between the plans of the neighboring Kabupaten and Kota due to the difference in planning direction, and the year in which they were prepared.

Table 7.3.1 Spatial Plan of DKI Jakarta and Kabupaten and Kota in Botabek

Kabupaten / Kota	Spatial Plan	Prepared Year	Target Year
DKI Jakarta	Jakarta 2010	2000	2010
Kabupaten Bogor (including Depok)	Rencana Tata Ruang Wilayah Kabupaten Bogor	Under preparation	2010
Kota Bogor	Rencana Tata Ruang Wilayah (RTRW) Kota Bogor	1999/2000	2009
Kota Depok	Under Preparation Rencana Tata Ruang Wilayah Kota Depok Tahun 2000 – 2010 (Laporan Draft Rencana)	2000	2010
Kabupaten Tangerang (Former Plan*)	Under Revision Rencana Umum Tata Ruang Wilayah Kabupaten Daerah Tingkat II Tangerang*	1994*	2005*
Kota Tangerang	Review Rencana tata Ruang Wilayah Kota Tangerang	March 2000	2010
Kabupaten Bekasi	Revisi Rencana Tata Ruang Wilayah Kabupaten Daerah Tingkat II Bekasi	Revised in 1998	2003
Kota Bekasi	Rencana Tata Ruang Wilayah Kota Bekasi Tahun 2000 – 2010	1999/2000	2010

The road development plans and land use plans proposed by each local government are depicted in Figure 7.3.3. The land use classification is different among local governments, thus the original land use classification is used to reflect original idea but a similar color is used for similar use. The road network development plan prepared by each local government is depicted in Figure 7.3.4 and each road development plan is drawn within its jurisdiction. Several roads have been found to be not connected to each other at the boundaries. This implies that a metropolitan wide transportation planning is needed especially for roads connecting areas in different regencies and cities.

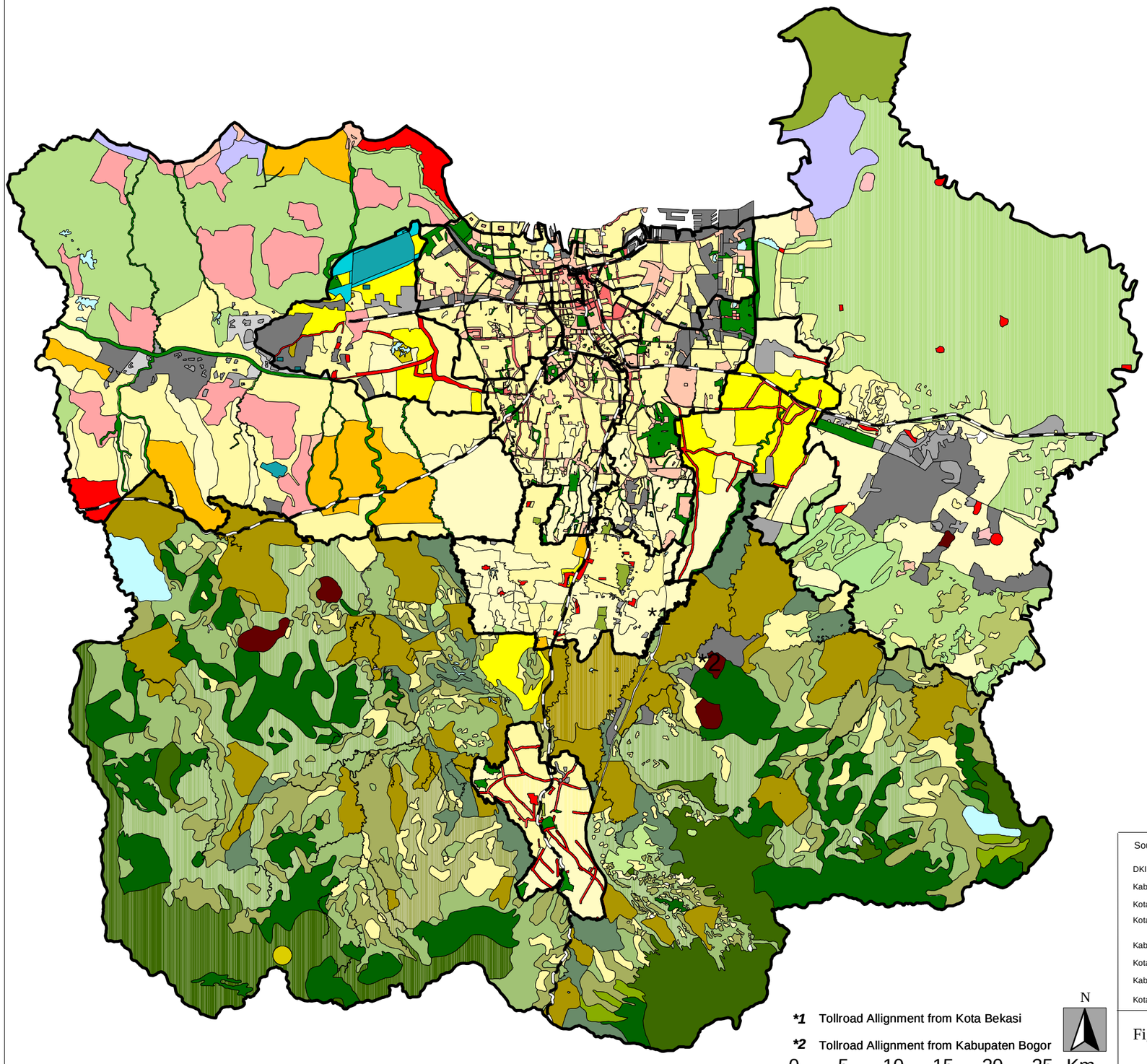
The road network development plan of DKI Jakarta and each Kabupaten and Kota in Botabek were summarized below and comments are made on each plan.

a) Road Network Development Plan in DKI Jakarta

In “Jakarta 2010” a few number of new arterial roads are planned. In fact it is difficult to build new roads in DKI since almost all of the areas are built up areas. Thus most road improvements in DKI Jakarta are basically the widening of roads and the construction of flyovers or underpasses.

b) Road Network Development Plan in Kabupaten Tangerang

In reference to the master plan study on arterial road development study in Jakarta



Kota Bogor
- Industry
- Low Building Coverage Ratio
- Military Area
- Mix Garden
- Office/Government
- Park/ Sports Area
- Residencial
- Trading & Service

Kabupaten Tangerang
- Existing Industry
- Industrial Zone
- Kecamatan Development
- Budiarto Airport
- Tourism
- Wet Agriculture
- New City Development
- Tourism Development
- Service & Commerce
- Fishery
- Fishery and Tourism
- Urban Residencial
- Limited Residencial
- Industry and Warehouse
- Swamp/Lake
- Rice Field
- Garden

Kabupaten Bekasi
- Lake/Pound
- C Mine
- Existing Industry
- Green Area
- Industrial Zone
- Protected/Conservation Area
- Tourism
- Residence
- Residence Development
- Mix Landuse/Commerce
- Fishery
- Wet Agriculture
- Dry Agriculture
- Service Center (Education)
- Plantation
- Industy Area

Kabupaten Bogor
- AGRO
- Bungalau
- Lake
- Protected Area
- Production Forest
- Industry
- Wet Agriculture
- Dry Agriculture
- Rural Residencial
- Urban Development
- Urban Development
- Tourism
- Great River
- Plantation
- Mine
- Gold Mine

DKI Jakarta
- Green Area/Park/Open Space
- Industy & Warehouse
- Lake/Pound/Water Related
- Public Sector & Residence
- Public Sector
- Residence Low Density
- Residence

Exsisting Road
- Arterial
- Collector
- Primary Arterial
- Primary Collector
- Primary Local
- Secondary Arterial
- Secondary Collector
- Tollroad

Planned Road
- Arterial
- Local Primer
- N_Tollroad, Toll, Toll Road
- Primary Arterial
- Primary Collector
- Secondary Arterial
- Secondary Collector
- Class Unknown

- Existing Railway
- Kabupaten Boundary

Kota Depok
- Public Sector
- Industry
- Government Office
- Sub Central Service & Commerce Area
- Specifically Area
- Central Service & Commerce Area
- Farm
- Residence Middle Density (35%-45%)
- Residence Middle Density (45%-60%)
- Residence High Density (60%-75%)
- Residence Low Density (Less than 35%
- Education Plan Area
- Rice Field/Agriculture
- Lake
- UI (University Of Indonesia)

Kota Tangerang
- Alternatif Dryport
- Airport
- Industrial Zone
- Non Polutant Industy & Warehouse
- IPLT (Waste Water Treatment Plant)
- Military
- Tourism
- Special Event Market
- Airport Development
- Limited development for Flight Safety
- Service & Commerce
- Residence & Service Facilities
- Mix Residence For Small & Middle Industry
- Mix Residence Non Polutant Handycraft Industry
- Controlled Residence & Airport Support Facilies
- Residence Low Density for Agriculture
- Residence for Industry
- City Central
- Open Space/Green Area
- Cipondoh Lake

Kota Bekasi
- Industry
- Green Area
- Service and Commerce
- Agriculture
- Residence Low Density
- Residence Middle Density
- Residence High Density

*1 Tollroad Allignment from Kota Bekasi

*2 Tollroad Allignment from Kabupaten Bogor

0 5 10 15 20 25 Km

N

Source:

DKI Jakarta	Jakarta 2010
Kab. Bogor	Rencan Tata Ruang Wilayah Kabupaten Bogor 2000 (Draft) (Target Year 2010)
Kota Bogor	Rencana Tata Ruang Wilayah Kota Bogor 1999/2000 (Target Year 2009)
Kota Depok	Rencana Tata Ruang Wilayah Kota Depok Tahun 2000-2010 (Laporan Draft Rencana)
Kab. Tangerang	Rencana Umum Tata Ruang Wilayah Kabupaten Daerah Tingkat II Tangerang (Target Year 2005)
Kota Tangerang	Review Rencana Tata Ruang Wilayah Kota Tangerang (Target Yeaar 2010)
Kab. Bekasi	Revisi Rencana Tata Ruang Wilayah Kabupaten Daerah Tingkat II Bekasi 1998 (Target Year 2003)
Kota Bekasi	Rencana Tata Ruang Wilayah Kota Bekasi Tahun 2000-2010

Figure 7.3.3

Road Network Development Plan and Land Use Plan Prepared by Local Governments

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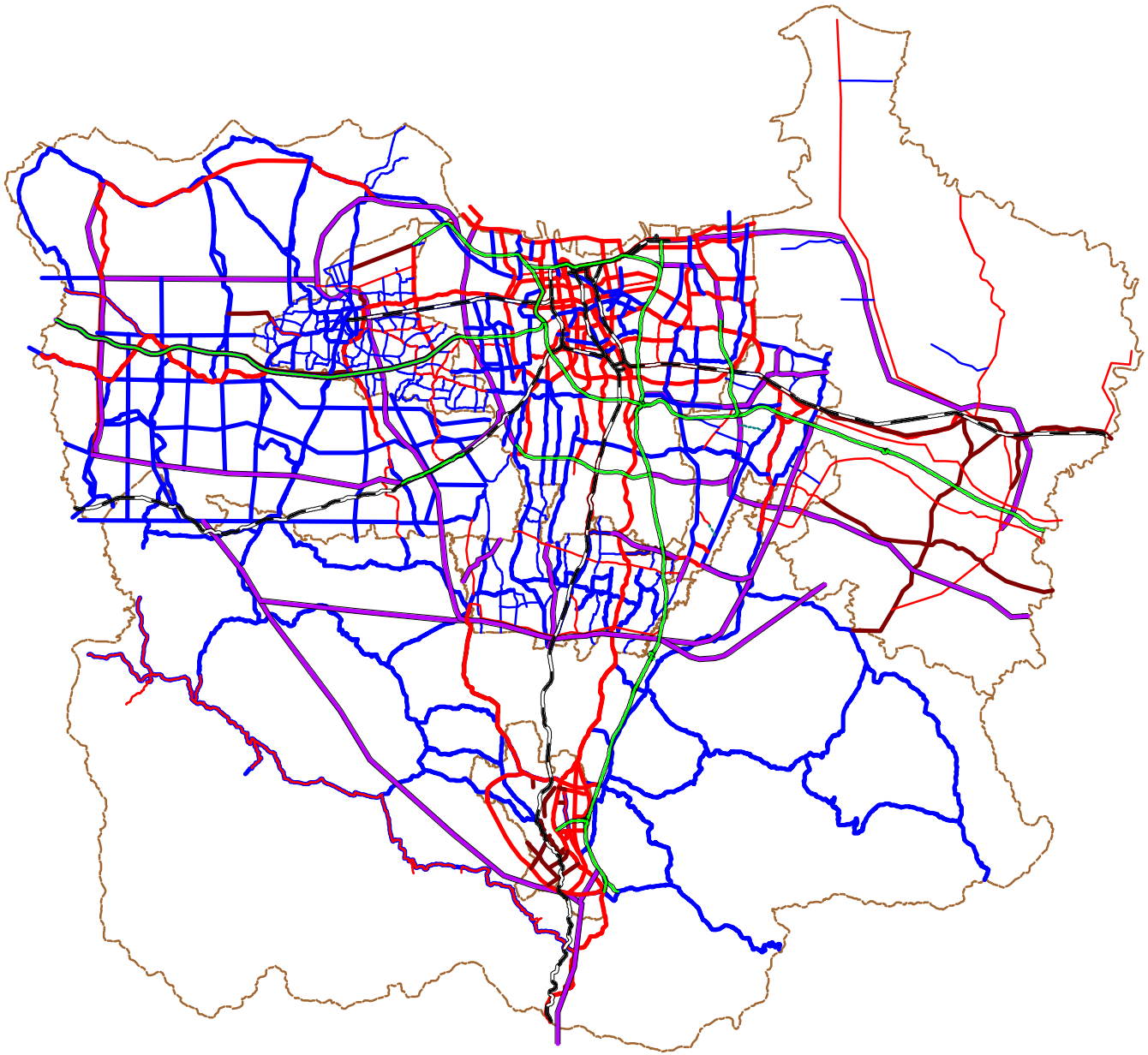

Figure 7.3.4

Road Network Development Plan
Prepared by Local Governments

LEGEND

- Tollroad
- Railway
- Arterial
- Primary Arterial
- Primary Collector
- Secondary Arterial
- Secondary Collector
- Kabupaten Boundary

N

0 5 10 15 20 25 Km

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Metropolitan Area (1987) (hereinafter referred to as "ARSDS"), a grid pattern road development has been planned in order to develop the urbanized area in the east-west direction. The proposed road network is composed of almost new roads. A toll road is planned for the southern side of the grid road network. This road is an extension of the currently suspended Jakarta–Serpong Toll Road. The road network plan has been adopted because it is consistent with the regional development policy for Jabotabek.

c) Road Network Development Plan in Kota Tangerang

In the previous spatial plan, Kota Tangerang set the grid pattern road development plan in accordance with Kabupaten Tangerang, in reference to the ARSDS (1) study. In the spatial plan revision of 1999, Kota Tangerang modified the plan since urban development such as housing complexes have progressed and it seemed unrealistic to construct new roads according to the previous plan. As a consequence, the plan still includes some new road construction but the major components of the road development are the improvement of the existing roads.

A toll road has been proposed starting from the north of the Cenkareng airport and going around the airport. This toll road is considered to be a part of the Outer Outer Ring Road and connected with Serpong. It is of great importance to provide better access among urban centers in Botabek to augment their urban functions.

d) Road Network Development Plan in Kota Depok

In the draft spatial plan of Kota Depok, there are three toll roads in north-south direction and two toll roads in the east – west direction. One of the north-south toll roads is the existing Jagorawi toll road. These new toll roads were initially proposed by private investors and later all of the proposals were cancelled by the former Ministry of Public Works. At present the implementation of these projects seems difficult. The toll road development in the north-south direction would accelerate the development towards the south, which is against the regional development policy.

e) Road Network Development Plan in Kota Bogor

A ring road has been proposed and a part of the road has been constructed to alleviate traffic congestion in the central area of the city. This road would act as a bypass for traffic entering the city center and reduce traffic congestion, since at present the access road from Jagorawi toll road enters directly into the city center causing traffic congestion. If the planned road is developed to connect with Sentul Selatan I.C. on Jagorawi toll road, this would provide an alternative route for traffic heading into Jakarta.

f) Road Network Development of Kabupaten Bogor

Arterial road development in Kabupaten Bogor consists mainly of the existing road improvements.

Two toll roads were proposed in the spatial plan 1994/95. One is the Outer Outer Ring Road and the other a toll road connecting Kota Bogor with Kabupaten Tangerang in the south-west region. The latter road would serve little traffic

since it passes agricultural lands. The alignment of the Outer Outer Ring Road is different from that of the neighboring Kabupaten.

g) Road Network Development Plan in Kota Bekasi

Several roads have been planned as toll roads; 1) Outer Outer Ring Road, 2) South Jakarta - Cikampek Toll Road, 3) Kali Malang Toll Road.

The Outer Outer Ring Road connects urban the centers of Botabek.

As the existing Jakarta – Cikampek toll road is saturated with traffic demand in the Jakarta – Cikarang section, another toll road running parallel to the existing Jakarta – Cikampek toll road is planned. The South Jakarta – Cikampek toll road would provide road capacity to accommodate the increasing traffic demand on the corridor. Since the northern part of Kota Bekasi and Kabupaten Bekasi is a technical irrigation area thus protected from urban development, the southern part should be developed. Furthermore Ibu Kota Kabupaten Bekasi is planned to develop to the south of the existing Jakarta-Cikampek Toll Road as well as several industrial estates have been developed in the south and further development is planned. Consequently the new toll road would encourage development to the east and support the deployment of desirable urban development.

The Kali Malang Toll Road, on the other hand, is located close to the existing Jakarta – Cikampek Toll Road. The closest interval between the toll roads is as narrow as 500 m. Thus it is considered as inadequate from the interval of toll roads running in parallel. In addition, the plan is for the road to connect with the Cawang-Tg. Priok Toll Road, which would cause a merging problem at the section near the Cawang Interchange. Taking the factors mentioned above, the toll road is excluded as a toll road section in the road development master plan, although a part of the road construction has already started and is currently suspended.

Most of the arterial road developments are the road widening of the existing roads.

h) Road Network Development Plan in Kabupaten Bekasi

The arterial road development plan in Kabupaten Bekasi, in principle, emphasizes the improvement of the existing roads.

Two toll roads have been proposed in Kabupaten Bekasi; 1) Southern Jakarta – Cikampek Toll Road and 2) Cikarang–Tg. Priok Direct Toll Road. The former road is consistent with the urban development policy to support development in the east-west direction. The latter road is proposed to transport industrial products produced in the Cikarang Industrial Zones to Tg. Priok Port and also to transport materials from the port. The road however passes the technically irrigated agricultural lands in the northern part of Kabupaten Bekasi. It is questionable whether this road should be developed out of the fear that of may induced urban development of the restricted area. If this toll road were built as an viaduct structure, the construction cost would be very expensive.

Flyovers connecting the north of the railway line to the south should be built in order to minimizing the division of the community and to alleviate traffic

congestion at bottleneck railway crossings once the Bekasi line double-double tracking project is realized.

7.3.4 Review of Bus Transport Improvement Plan

Bus transport improvement can be achieved in the short term. Bappeda DKI Jakarta has prepared the concept of the Bus Demonstration Project and at present Dinas LLAJ is preparing the implementation program. In this project, a busway will be introduced on the Pramuka-Pemuda-Diponegoro corridor of the end of the year 2001. A second busway will be introduced on the Jl. Thamrin and Jl. Sudirman corridor.

7.3.5 Review of Rail-based Transport Development Plan

(1) Review of Rail-based Transport System Development Plan in "Jabotabek 2015"

The rail-based transportation system development plan proposed in Jabotabek 2015 is basically identical to the Consolidated Network, as shown in Figure 7.3.5. Thus the Consolidated Network is regarded as the base network development master plan for rail-based transport. The development plan includes the following components;

- New construction of the MRT
- Improvement of the Jakarta – Tangerang Line
- Improvement of the Jakarta – Serpong – Rangkasbitung Line
- Construction of the Cengkareng - Tangerang – Jakarta Line
- Construction of the Cilincing – Cakung – Nambo – Citayam – Serpong Line for freight transport
- Construction of a subway between Fatmawati – Kota
- Construction of the Serpong – Kebayoran Lama – Kota Line
- Improvement of the Tg. Priok – Kota – Bekasi Line

The improvements and constructions are described below;

a) Track Elevation of Eastern Line

Since the railway crossing of the Eastern line is intersected at grade by the road network, when the railway crossing is closed traffic congestion occurs on the roads intersecting the line. As the train operation frequency and the operation speed are planned to increase, grade separation of the railway lines from the road network is one of the important transport planning issues in Jakarta.

b) Double Tracking and Electrification of Serpong Line

There is a plan to upgrade the section between Tanah Abang – Serpong (21 km) into a double track electrified line. With this improvement the Serpong line will be able to transport more passengers as a commuter railway line.

c) Double Tracking and Electrification of Tangerang Line

Track improvement and the electrification of Tangerang Line's single track was completed in 1999. Since land and other facilities are already available for the double tracking and electrification, the work can be started immediately.

d) Extension of Tangerang Line to Soekarno Hatta International Airport

There is a plan to extend the Tangerang Line to Soekarno Hatta international airport to provide direct rail access from central Jakarta to the airport.

e) Tg. Priok – Citayam – Parung Panjan New Railway Line

This line is planned to transport cargo by connecting Tanjung Priok, Cakung (Bekasi Line), Nambo (Cibinong Cement), Citayam (Bogor Line), Parung Panjang（Merak Line）. The section between Citayam and Nambo has been completed with a single non-electrified track but freight train operation has not commenced yet. Freight transport demand has been decreasing in recent years. Freight transport demand should be monitored to determine whether to continue with this railway line development. Furthermore, land acquisition for the section between Tg. Priok and Cakung is difficult.

f) Grade Separation at Manggarai Station (Manggarai Central Station)

Middle and long distance train operation to the Gambir and Jakarta Kota stations will be terminated in order to use the semi-loop line as an urban railway. The middle and long distance trains will stop at the Manggarai station and urban rail services will be provided in a semi-loop operation. To provide frequent urban rail service on the semi-loop line, it is necessary to separate the semi-loop line from the middle and long distance line, as well as the central line, by grade separation at the Manggarai station. This project is to be included in the double-double tracking project of the Bekasi line.

(2) Review of Jabotabek Railway Operation Plan

The Jabotabek Train Operation Improvement Plan, established in 1990, is divided into three stages as shown in Table 7.3.2. According to the plan, headway for commuter train on the Central Line is set at three minutes during peak hours, while headway for the other commuter train is set at six-minute intervals. The target of the Jabotabek Railway Project is divided into three stages, according to the service level of train operation for commuters as shown Table 7.3.2. Although the implementation of the improvement plan is behind the original schedule, this plan can be regarded as a basis of operation improvement plan.

Table 7.3.2 Target of Jabotabek Railway Operation Improvement

Stage	Stage 1 Preliminary Commuter Service Stage	Stage 2 Commuter Service Stage	Stage 3 Sophisticated Commuter Service Stage
Period	1990 – 1999	2000 - 2005	2006 –2010
Train Operation	12’/20’ Headway	6’/10’ Headway	3’/6’ Headway
Passenger Capacity	1,100,000 persons/day	2,000,000 persons/day	5,100,000 persons/day
Railway Share	6 %	9 %	20 %

Source: PT. KAI

In the final stage of the train operation improvement, the eastern and western lines will be connected and semi-loop operation will commence to serve urban travelers. On the other, Tangerang, Serpong, and Bekasi lines, trains stop at stations on the semi-loop line as depicted in Figure 7.3.6.

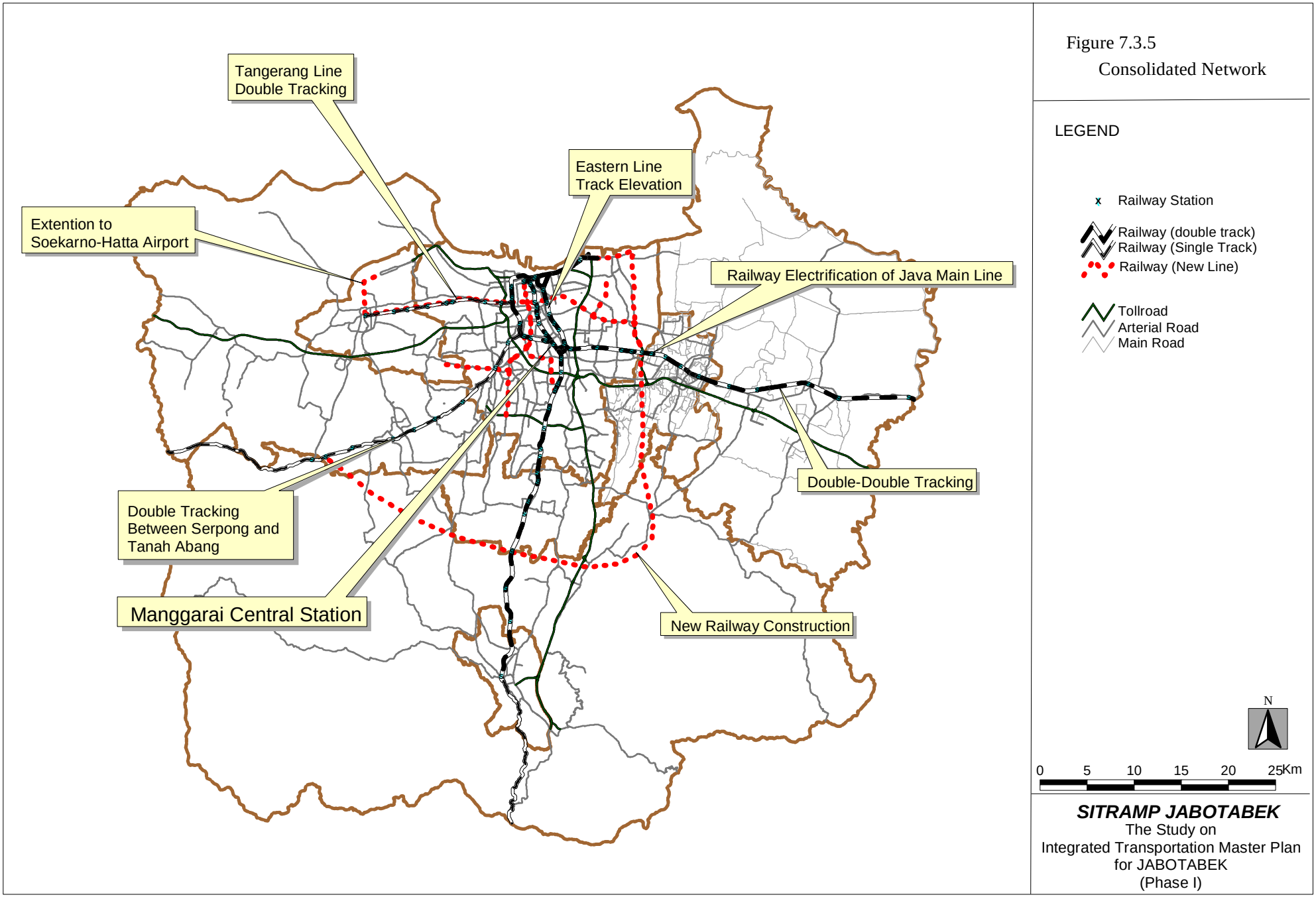
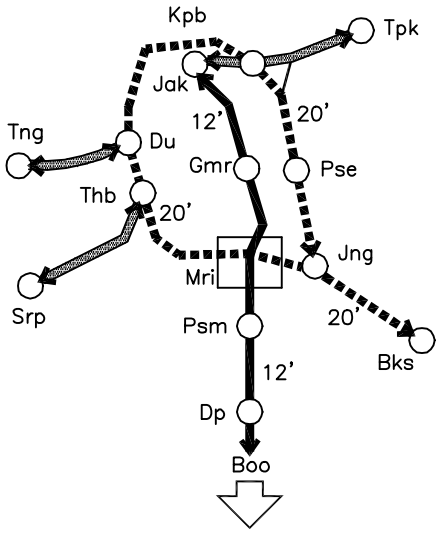


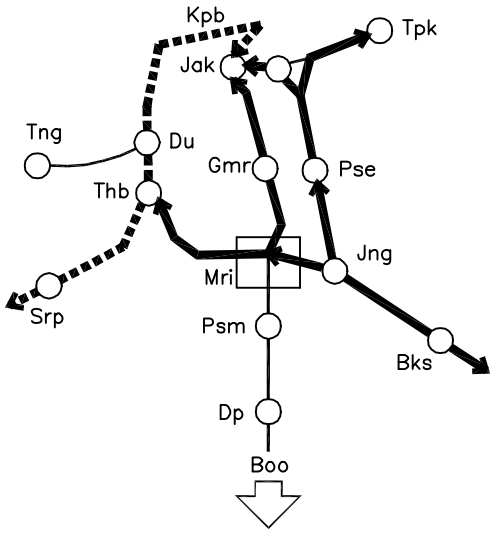
Figure 7.3.5
Consolidated Network

SITRAMP JABOTABEK
The Study on
Integrated Transportation Master Plan
for JABOTABEK
(Phase I)

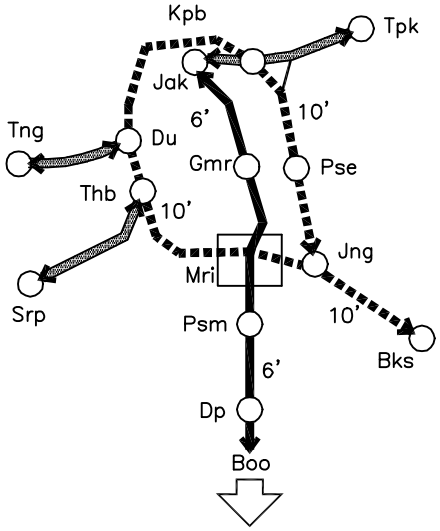
1st Stage for Commuter Train (12'/20' HW)



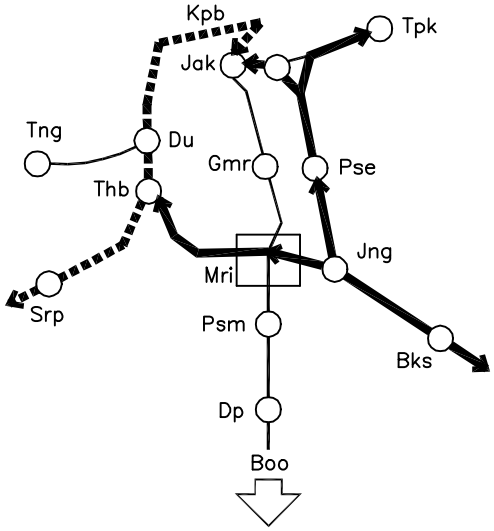
1st Stage for L/M Distance Train (12'/20' HW)



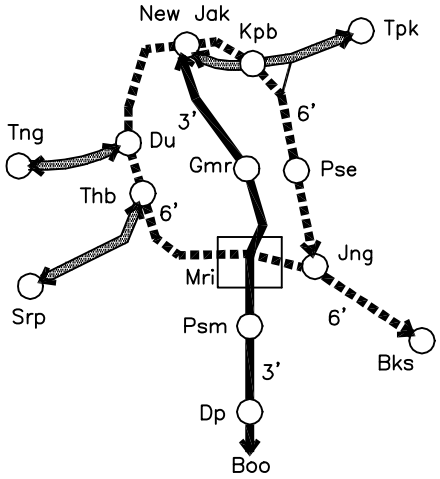
2nd Stage for Commuter Train (6'/10' HW)



2nd Stage for L/M Distance Train (6'/10' HW)



3rd Stage for Commuter Train (3'/6' HW)



3rd Stage for L/M Distance Train (3'/6' HW)

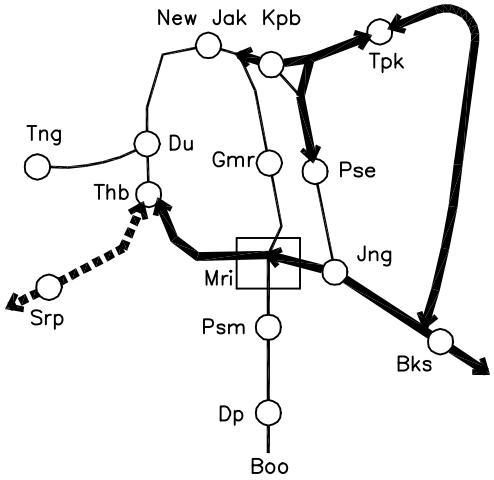


Figure 7.3.6 Train Operation Plan in Jabotabek

7.3.6 Review of Intercity Bus Terminal Development Plan

Major inter-city bus terminals exist of Kampung Rambutan (South), Lebak Bulus (South-west), Kali Deres (West), and Pulo Gadung (East). Among the four terminals, the two terminals, Kampung Rambutan and Lebak Bulus, are located along the Jakarta Outer Ring Road. When all sections of the Jakarta Outer Ring Road are open to the public, the road will function as a distributor of inter-city bus passengers who proceed to their final destination in the city from these terminals.

a) Kali Deres Bus Terminal Relocation Plan

The Kali Deres bus terminal is scheduled to relocate to a new bus terminal near the Batu Ceper station in Kota Tangerang. The location for the new inter-city bus terminal, however, would cause traffic congestion in the central area of Kota Tangerang due to the considerable number of large buses plying the city center. As alternative locations, the intersection of the Jakarta Outer Ring Road and Tangerang railway line, near the Rawa Buaya station, or somewhere near the junction of JORR and Jakarta –Merak toll road are recommended.

b) Pulo Gadung Bus Terminal Relocation Plan

The eastern inter-city bus terminal, Pulo Gadung, is already saturated and overcrowded. It also causes traffic congestion in the surrounding areas. The relocation of the existing terminal to the vicinity of the Jakarta Outer Ring Road is urgent for efficient intercity bus operation and for alleviating traffic congestion. Recently DKI announced that it would relocate the terminal to Pulo Gebeng along the Jakarta Outer Ring Road. (Similar to the relocation of Kali Deres bus terminal, the ideal location would be by the interchange between the Jakarta Outer Ring Road and Railway Bekasi Line, or near the junction of the Jakarta Outer Ring Road and the Jakarta – Cikampek toll road.)

c) Intercity Bus Terminal Development Plan in Kota Bekasi and Kabupaten Bekasi

Kota Bekasi plans to develop an intercity bus terminal at either north of the Bekasi railway station or near the Jakarta – Cikampek toll road interchange. Kabupaten Bekasi also plans to develop an intercity bus terminal near the Jakarta – Cikampek toll road. As both intercity bus terminals are far from the Jakarta Outer Ring Road these locations are not suitable for an intercity bus terminal for Jakarta. These terminals should function as an intercity bus terminal for each jurisdiction.

d) Intercity Bus Terminal Development Plan Kota Bogor and Kabupaten Bogor

Kota Bogor plans to relocate the Baranang Siang bus terminal to a new location along the new arterial road, R1, near the Sentul Selatan bus terminal. An integrated public transport terminal is planned at Bojong Gede and will be located close to the Bojong Gede railway station. Access roads should be developed to connect this terminal with the arterial roads, Jalan Raya Parung and Jalan Raya Bogor.

7.4 Social and Economic Framework in Jabotabek

7.4.1 Future Population Framework for Jabotabek

As introduced previously, the Ministry of Settlement and Regional Development is presently finalizing "*Rencana Tata Ruang Wilayah Kawasan Tertentu Jabotabek 2015*" or "Jabotabek 2015". This plan will then proceed to public hearings and other socialization measures prior to its authorization by a Presidential Decree. However the summary report does not provide the entire population framework for Jabotabek except for major urban centers.

DKI Jakarta has its own population framework, i.e., 12.5 million in 2010. The class-II local governments within Botabek also have their population frameworks but the projection methods vary and the results are likely to indicate their aspirations, more urban population in line with active development.

As for the previous metropolitan planning documents, both JMDP and JMDPR have forecasted future population in conjunction with future land use. The main reason to review JMDP in the early 1990s was the unprecedented population growth of the 1980s, especially in the Botabek area. Thereafter actual population growth has more or less traced the JMDPR projection up to today. (Refer to Table 7.4.1)

Since the Study collected the latest urban development activities and plans, local analysis of urbanization may differ at many places from JMDPR's. Even so, the Study considers that the JMDPR projection will be meaningful as a metropolitan population indicator for the next ten-years, featuring constant population growth with rapid urbanization in the Botabek area.

In projecting future population, the Study employs a bottom-up method to reflect local urban development undertakings while the JMDPR projection is treated as the regional total, i.e., around 26-27 million in 2005 and around 32-33 million in 2015.

Table 7.4.1 Comparison of Population Data and Forecast (x1000 persons)

Year	Census Data*			JMDP			JMDPR		
	Jakarta	Botabek	Jabotabek	Jakarta	Botabek	Jabotabek	Jakarta	Botabek	Jabotabek
1971	4,579	3,761	8,340						
1980	6,503	5,414	11,917						
1990	8,254	8,878	17,132	8,827	6,874	15,701			
1995	9,113	11,046	20,159				8,964	11,077	20,041
2000	8,400	12,700	21,100				9,730	13,536	23,266
2005							10,487	16,103	26,590
2010				12,585	11,000	23,585	11,178	18,732	29,910
2015						(26-27 mil.)			(32-33 mil.)

Note: The number in ( ) was estimated by JICA Study Team for comparison with Jabotabek 2015 projection..
Source: Census data in 1971, 1980, 1990 and 1995; and Intercensus Survey in 1995.

7.4.2 Projection of Local Population

(1) Analytical Level

There are several local administration levels in Indonesia: province, kabupaten/kota, kecamatan, desa/kerulahan. Major urban development projects are important factors to change an urban structure, ranging from several hundred hectares to several thousands. To analyze such undertakings, the kabupaten/kota level is too big in that one kabupaten may contain many projects. On the other hand, the desa/kerulahan level is too small in that one large project may encompass several desa. Therefore to forecast local urban development move effectively, the Study decided to analyze each kecamatan in terms of the existing population and density, existing land use, future development direction, and proposed and on-going large projects.

(2) Confirmation of Existing Population

It is not unusual for different data from different sources to coexist in the same category and population is no exception. The existing kecamatan population as of 1998 was confirmed based on the following data sources:

- Statistical data published by class-II local governments, and
- Aggregated desa/kelurahan population in the same kecamatan collected by the Study Team

(3) Methods to Project Local Population

1) Jakarta

According to "Jakarta 2010", DKI Jakarta expects to increase its population to 12.5 million by the year 2010. But "Jabotabek 2015" indicates the same volume for Jakarta in the year 2015.

To achieve the DKI's projection, the population will have to increase by 2.2 percent annually until the target year of 2010. However, the DKI's population growth has slowed down in recent years, i.e., 2.4% annually between 1980 and 1990, 1.9% annually between 1990 and 1998. The population outflow from Jakarta has exceeded the inflow to Jakarta since 1985 and its gap is widening gradually.

Taking the above conditions into account, the Study projects 12.5 million for Jakarta by 2015, with an annual increase of 1.6 percent on average. With regard to the kecamatan population, the projection figures from "Jakarta 2010" are just slated for the year 2015 figures.

2) Botabek

The Study examined four data sources in order to project the kecamatan population in the Botabek area. They are:

i) "Jabotabek 2015", particularly its zonal development directions and future urban centers,

ii) The Cipta Carya's projection from "*Strategi Pengembangan Kawasan Jabotabek dan Sekitarnya, 1997*" in which urban and industrial

development projects were duly examined although this was prior to the regional economic crisis,

iii) The latest data on urban and industrial development projects collected by the Study Team, and

iv) Individual spatial plans prepared by the authorities of the three kabupaten and four kota within Botabek.

(4) Directions of Population Forecast

In forecasting the regional population, its directions are discussed in terms of population density by kecamatan between 1998 and 2015. the major characteristics are pointed out below.

1) Jakarta

Jakarta will become a densely populated city from 148 persons per ha in 1998 to 192 persons per ha in 2015. With regard to city administration, presently only Jakarta Central already exceeds this amount with its density of more than 200 persons per ha. Jakarta West will go beyond this high-density level by the year 2005 and Jakarta South will do so by the year 2015. Densely urbanized areas need a more sophisticated urban management. Medium-storied apartments (*rumah susun*) will be able to absorb the population increase in the existing urban kampungs. However, this will intensify traffic and water demand considerably.

Jakarta is expected to provide more housing units throughout the city except for some extremely inhabited districts. For instance, Tambora and Taman Sari both in Jakarta West and Matraman in Jakarta East have more than 500 residents per ha. This may have been brought about by the past housing shortage and other local reasons. However, the population of those districts will decrease gradually to a rationally sustainable level.

Some districts which have maturely urbanized will receive modest immigrants. On the other hand, new urban centers and their environs are expected to provide newcomers with collective housing units. They are:

New Urban Center	Kecamatan	Projected Population Increase (1998 – 2015)
New Eastern Primary Center	Cakung	170,000
New Western Primary Center	Kembangan	218,000
Integrated Trading Center (Waterfront City)	Penjaringan	219,000
	Pademangan	149,000

2) Bogor

Kota Depok is a new city administration which was established in April 1999. So far there is neither a spatial plan nor local rules/regulations concerning land use. Taking its proximity to Jakarta and the spacious land for available for urbanization into account, the present density of 45 persons per ha is quite low. In

Depok, the east-west connection is very weak compared with the historically developed north-south corridors such as Jagorawi Toll road, Bogor Raya, Jl. Margonda, Bogor Rail Line, Cinangka Raya. Therefore urban developments always occur along the north-south corridors. In particular, the area between the Jogorawi Toll road and Bogor Rail Line will be densely developed in the coming ten years. All of the six kecamatan expect a substantial population increase, e.g., Cimanggis (420,000) and Sukuma Jaya (190,000).

Although Kota Bogor has no large-scale urban development under consideration, urbanization will go on continuously and constantly to a matured level. According to the related spatial plan, most of the existing agricultural land (940 ha) will be converted to residential land (479 ha), transport land (317 ha) and others by the year 2009. With this transformation in land use, every kecamatan will have more urban land and urban residents except for Bogor Tengah which is densely inhabited, since there locate the Presidential Palace and the Botanical Garden. The magnitude of population increase will not be significant compared with other local governments within Botabek. For example, Bogor Barat expects the largest increase in the city up till the year 2015, i.e., 76,000 persons.

The area of Kabupaten Bogor is 4.4 times larger than that of DKI Jakarta. Various discussions are acute between environmental protection and urban development. For physical planning works, the related spatial plan divides the whole of Bogor into seven sub-areas:

- Sub-area I: Jasinga, Parung Panjang
- Sub-area II: Leuwilliang, Cibung Bulang
- Sub-area III: Parung, Gunung Sindur, Rumpin
- Sub-area IV: (Kota Depok)
- Sub-area V: Cibinong, Citeureup, Cileungsi
- Sub-area VI: Jonggol, Cariu
- Sub-area VII: (Kota Bogor)

The spatial plan designates massive environmental protection areas (*Fungsi Kawasan Lindung*) in the sub-areas of I, II, VI and VII. In spite of those areas, the urbanization trend will be widely recognized. Since a low-density kecamatan with less than 20 persons per ha is regarded as being rural, the number of such rural kecamatan will decrease from the present 19 to 17 in 2005 and 15 in 2015. Remarkable population increase is expected at the areas next to Jakarta and between Kota Depok and Kota Bogor. Only sub-area V directly adjoins DKI Jakarta, the kecamatan of Cibinong, Gunug Putri and Cileungsi will increase more than 100,000 residents, respectively. Kabupaten Bogor allows medium to large factories at Cileungsi to the east and Parung to the west. The Jonggol New Capital concept has been suspended and may not be materialized during the projection period.

3) Tangerang

According to “Jabotabek 2015 (draft)”, the population of Kota Tangerang will double from 1.4 million in 1998 to 2.8 million in 2015. It means that high-to-medium urban areas will continue in 2015, stretching from Jakarta Central (282

persons/ha) via Jakarta West (234 persons/ha) to Kota Tangerang (174 persons/ha). The difference in matured urban density may provide distinguishable living environments, particularly better environments in the orderly planned housing settlements such as Modern Land and Lippo Village. In terms of population by Kecamatan, all of them will more or less be doubled.

Although Kota Tangerang can be characterized as a residential oriented development, two areas will be treated separately. The first is the roadside land along Jl. Daan Magot for industrial development and the second is the area surrounding Soekarno-Hatta Airport for urban management facility's center such as electricity and water supply/disposal.

Different development types will become a reality simultaneously in Kabupaten Tangerang during the projection period. They are:

i) Sprawling development of the area next to DKI Jakarta under strong urban pressure from Ciputat and Pondok Aren,

ii) Burgeoning new towns at Serpong (Bumi Serpong Damai, Alam Sutera), Legok (Gading Serpong), Curug (Lippo Village), Tigaraksa (Citra Raya, Ibu Kota) and Pasar Kamis (Kedaton, Puri Jaya),

iii) Intensive location of new industrial estates and intermediate transport facilities for the Jakarta – Merak Toll road at Balaraja, and

iv) Promotion of coastal tourism development at Teluk Naga and Mauk, provided that a coastal toll road is operational.

As a whole, the population of Kabupaten Tangerang will increase from 2.7 million in 1998 to 4.3 million in 2015. Substantial population increase is expected at Balaraja (264,000), Tigaraksa (200,000), Ciputat (149,000). The projection also forecast a reduction from the present eight rural kecamatan, defined as having less than 20 persons per ha, to only one (Rajeg) by the year 2015.

4) Bekasi

According to "Jabotabek 2015 (draft)", the population of Kota Bekasi will increase to 2.2 million in 2015. The yearly increase rate of 2.3 percent is quite a bit lower than that of Kota Tangerang, i.e., 4.2 percent. Compared with Kota Tangerang, Kota Bekasi has rather weak transport connections with DKI Jakarta. Since the JORR Section E1 becomes fully operational during the projection period, Jati Asih and Pondok Gede will see a change in their low-density residential areas (around 50 persons/ha) into medium-density areas (more than 100 persons/ha). On the other hand, Bantar Gebang where the land is underdeveloped due to low accessibility, will be continue to be excluded from the still aside from urbanization trend.

Kabupaten Bekasi has developed productive agricultural lands with a good irrigation network. Under strong urbanization pressure, however, urban development will occur at selective areas as follows:

i) Sporadic urban development in the areas adjoining Jakarta and Kota Bekasi such as Tarumajaya and Tambun,

ii) Intensive industrial development at Cibitung and Cikarang, and

iii) Isolated but internally comprehensive urban development at Lemah Abang and Serang

The above stated kecamatan expects a considerable population increase of more than 100,000 residents. The number of rural kecamatan, less than 20 persons/ha, will decrease from twelve in 1998 to six in 2015. Even in 2015, the agricultural sector will have a dominant position in the local economies of northern Kabupaten.

(5) Preliminary Results of Population Census 2000

From the population census conducted in June 2000 the preliminary survey result was made available in October 2000 up to the Kota and Kabupaten level. According to the census result, the population in Jakarta was 8.36 million inhabitants, which was far below the estimated figure of 10.0 million (based on the Inter-census population in 1995: 9.11 million). The Census 2000 population in Botabek indicated 12.75 million, while the estimation based on the inter-census population (1995: 11.0 million) was quite close at 12.72 million.

Although detailed analytical results of the census 2000 will become available some time in near future, it was an urgent requirement for this study to determine the future as well as present population in Jabotabek. Therefore, as discussed previously the analysis of population growth trends and future directions for the respective regions were adopted, and only the control totals of the regional population were adjusted as derived from the preliminary Census 2000 figures. Consequently, the future population in Jabotabek was projected as shown in Table 7.4.2.

Table 7.4.2 Proposed Demographic Framework for Jabotabek

Local Administration	Area (Sq.Km)	Population (million)			Population Density (/ha)		
		2000*	2005	2015	2000	2005	2015
DKI Jakarta	650	8.4	9.3	10.9	128.7	143.4	167.4
Kab. Bogor	2,868	3.5	3.9	4.8	12.2	13.5	16.6
Kota Bogor	119	0.7	0.9	1.0	62.5	72.0	87.2
Kota Depok	200	1.1	1.5	1.9	57.3	76.8	95.0
Kab. Tangerang	1,113	2.8	3.2	4.2	24.9	28.8	37.9
Kota Tangerang	158	1.3	1.9	2.4	83.0	119.9	154.7
Kab. Bekasi	1,274	1.6	2.0	3.0	12.9	15.6	23.6
Kota Bekasi	210	1.6	2.0	2.3	78.1	96.3	107.8
BOTABEK	5,943	12.7	15.4	19.6	21.5	25.9	33.0
JABOTABEK	6,593	21.1	24.7	30.5	32.0	37.5	46.3

Source: JICA Study Team
*: Preliminary survey results of Census 2000, BPS Jakarta and BPS West Java Province

7.4.3 Future Labor Force and School Attendance in Jabotabek

Statistically, the work age population in Indonesia is considered to be "10-year and over". Recently, this was changed to "15-years and over" in the labor force statistics, which indicates that employment of the low age group has declined, while the school attendance of this age group has increased. The work population is categorized by type of activities as shown below:

a) Economically Active Population (Labor Force):

- Working (Employed)
- Looking for work

b) Not-economically Active Population:

- Attending School
- House keeping
- Others

The labor force participation rate, an employment rate (1- unemployment rate) and a school attendance rate were defined as follows:

- Labor force participation rate (%)= (Economically active pop.)/(Work age pop.) x 100
- Employment rate (%)= (Working pop.)/(Work age pop.) x 100
- School attendance rate (%)= (School attending pop.)/(Not-economically active pop.) x 100

These activity rates vary depending on such elements as the age structure of population, urban/rural areas, cultural backgrounds and income levels. The past development trends of these rates were gathered and summarized in Table 7.4.3 for comparison and to perceive the most likely directions to be used as a basis for estimating the future labor force and those attending school.

The future population by type of activities was projected in view of the following perceptions of the future:

- The present unemployment condition will be improved equally in Jakarta as well as Botabek to the 1990 level, i.e. 10% by 2005 and 5% by 2015.
- The labor force participation ratio in Jakarta is a little higher than Botabek, and this will be maintained in future but the ratio will have increased to 58% for Jakarta and 55% for Botabek in 2015.
- The work age structure in Botabek will become closer as its urbanization progresses rapidly, and this age group will increase from 85% in 2000 to 90% by 2015.
- The ratio of the population that attend school in Botabek will reach the same level as Jakarta, 55%, by 2015.
- Reflecting regional differentials found at present in the above activity rates will be narrowed to the Jakarta and Botabek averages in future.

Based on the above, the future activity rates were assumed as summarized in Tables 7.4.4 and 7.4.5, and the future population by type of activity was forecast for the administrative regions in the Jabotabek region as presented in Tables 7.4.6 and 7.4.7.

Table 7.4.3 Past Trends of Activity Structures in Jabotabek

[1-Unemployment Ratio] (%)

Year	Pop. Aged 15 & Over		Population Aged 10 years and Over								
	Jakarta	West Java	Jakarta	West Java	Botabek	*Kab. Bogor	**Kab. Tangerang	***Kab. Bekasi	Kota Bogor	Kota Tangerang	Bogor Total
1980	96.2	98.0	96.1	97.9	98.0	98.0	98.4	98.0	96.1	-	97.8
1985	94.4	97.0	94.4	97.0	-	-	-	-	-	-	-
1990	93.0	96.2	92.9	95.9	95.7	95.4	96.4	96.1	90.8	-	95.1
1995	88.1	89.8	88.0	89.1	88.1	88.8	86.5	88.5	82.8	89.5	88.4
1998	87.7	92.3	-	-	-	-	-	-	-	-	-
1999	85.0	90.2									

Labor Force Participation Rate

Year	Pop. Aged 15 & Over		Population Aged 10 years and Over								
	Jakarta	West Java	Jakarta	West Java	Botabek	*Kab. Bogor	**Kab. Tangerang	***Kab. Bekasi	Kota Bogor	Kota Tangrnag	Bogor Total
1980	50.0	51.5	42.7	45.0	41.5	41.7	39.7	44.8	36.7	-	41.2
1985	49.4	56.9	42.6	48.2	-	-	-	-	-	-	-
1990	55.7	57.8	48.7	49.7	45.9	44.9	46.9	47.0	41.3	-	44.6
1995	55.2	60.0	48.6	51.8	46.6	43.6	48.6	49.1	46.3	49.9	43.8
1998	58.2	60.4	-	-	-	-	-	-	-	-	-
1999	60.2	61.9	-	-	-	-	-	-	-	-	-

% Work Age Population

Year	Pop. Aged 15 & Over		Population Aged 10 years and Over								
	Jakarta	West Java	Jakarta	West Java	Botabek	*Kab. Bogor	**Kab. Tangerang	***Kab. Bekasi	Kota Bogor	Kota Tangerang	Bogor Total
1980	61.0	59.1	72.3	69.6	66.9	66.3	67.0	66.8	73.2	-	66.9
1985	64.8	59.9	75.6	72.5	-	-	-	-	-	-	-
1990	68.1	62.4	78.8	74.6	72.4	71.9	72.5	72.1	79.9	-	72.4
1995	72.3	66.2	82.7	78.3	82.0	88.4	76.5	77.6	81.9	79.2	88.0
1998	0.0	n.a.	-	-	-	-	-	-	-	-	-
1999	0.0	n.a.	-	-	-	-	-	-	-	-	-

% Attending School Rate

Year	Pop. Aged 15 & Over		Population Aged 10 years and Over								
	Jakarta	West Java	Jakarta	West Java	Botabek	*Kab. Bogor	**Kab. Tangerang	***Kab. Bekasi	Kota Bogor	Kota Tangerang	Bogor Total
1980	23.5	10.0	41.6	31.0	28.9	29.2	29.0	24.7	42.4	-	30.6
1985	31.1	16.8	47.0	39.1	-	-	-	-	-	-	-
1990	28.8	13.6	45.7	34.1	37.8	37.3	38.8	36.3	45.7	-	37.9
1995	33.1	18.0	48.6	40.4	39.4	34.5	39.6	46.2	42.2	46.1	34.9
1998	31.2	21.4	-	-	-	-	-	-	-	-	-
1999	28.4	20.6	-	-	-	-	-	-	-	-	-

Source: Population Census 1980 and 1990; Inter-census 1985 and 1995, BPS
Labor Force Situation in Indonesia, August 1998 and 1999, BPS
Note: * Include Kota Depok; ** : Include Kota Tangerang by 1990; *** : Include Kota Bekasi

Table 7.4.4 Assumed Future Activity Rates by Region in Jabotabek

	Year	Population Aged 10 years and Over								
		Jakarta	Botabek	Kab. Bogor	Kab. Tangerang	Kab. Bekasi	Kota Bogor	Kota Depok	Kota Tangerang	Kota Bekasi
1-Unemploy-ment Ratio (%)	2000	85%		86%	83%	90%	83%	84%	85%	81%
	2005	90%		93%	87%	92%	85%	86%	90%	88%
	2015	95%		95%	95%	95%	95%	95%	95%	95%
Labor Force Participation Rate	2000	53%		46%	52%	50%	50%	48%	52%	54%
	2005	55%		52%	53%	51%	55%	54%	53%	55%
	2015	58%		55%	55%	55%	55%	55%	55%	55%
% Work Age Population	2000	85%		84%	82%	80%	87%	87%	85%	84%
	2005	87%		87%	87%	85%	87%	87%	87%	89%
	2015	90%		90%	90%	90%	90%	90%	90%	90%
% School Attendance Rate	2000	45%		32%	34%	38%	41%	40%	46%	46%
	2005	48%		38%	40%	40%	45%	43%	50%	50%
	2015	55%		55%	55%	55%	55%	55%	55%	55%

Source: JICA Study Team

Table 7.4.5 Assumed Future Activity Rates by Region in DKI Jakarta

	Year	Population Aged 10 years and Over					
		Jakarta	South Kota	East Kota	Central Kota	West Kota	North Kota
[1-Unemployment Ratio] (%)	2000	85%	85%	85%	85%	85%	85%
	2005	90%	90%	90%	90%	90%	90%
	2015	95%	95%	95%	95%	95%	95%
Labor Force Participation Rate	2000	53%	53%	53%	53%	53%	53%
	2005	55%	55%	55%	55%	55%	55%
	2015	58%	58%	58%	58%	58%	58%
% Work Age Population	2000	85%	86%	85%	86%	85%	83%
	2005	87%	87%	87%	87%	87%	87%
	2015	90%	90%	90%	90%	90%	90%
% School Attendance Rate	2000	45%	46%	45%	42%	45%	45%
	2005	48%	48%	48%	48%	48%	48%
	2015	55%	55%	55%	55%	55%	55%

Source: JICA Study Team

Table 7.4.6 Future Employed and School Attending Population in Jabotabek

	Year	Population (x 1000)								
		Jakarta	Botabek	Kab. Bogor	Kab. Tangerang	Kab. Bekasi	Kota Bogor	Kota Depok	Kota Tangerang	Kota Bekasi
Population	2000	8,364	12,749	3,490	2,775	1,643	743	1,146	1,312	1,639
	2005	9,321	15,390	3,882	3,209	1,991	857	1,536	1,894	2,022
	2015	10,882	19,624	4,752	4,221	3,005	1,038	1,900	2,445	2,263
Employed Population	2000	3,203	4,491	1,160	982	591	268	399	493	598
	2005	4,014	6,342	1,633	1,278	794	349	622	786	871
	2015	5,397	9,228	2,234	1,985	1,413	488	894	1,150	1,064
School Attendance	2000	1,504	2,009	507	371	250	133	209	246	293
	2005	1,752	2,677	616	525	332	151	259	387	407
	2015	2,262	4,370	1,058	940	669	231	423	545	504

Source: JICA Study Team

Table 7.4.7 Future Employed and School Attending Population in DKI Jakarta

	Year	Population (x 1000)					
		Jakarta	South Kota	East Kota	Central Kota	West Kota	North Kota
Population	2000	8364	1790	2342	889	1908	1435
	2005	9321	2223	2307	966	2130	1695
	2015	10882	2881	2315	1099	2492	2095
Employed Population	2000	3203	694	897	344	731	536
	2005	4014	957	994	416	917	730
	2015	5397	1429	1148	545	1236	1039
School Attendance	2000	1054	333	421	151	343	252
	2005	1752	418	434	182	400	318
	2015	2262	599	481	229	518	436

Source: JICA Study Team
*Note: Population aged 10 years and over

7.4.4 Future Employment by Major Industry and Economic Growth

The industrial employment data is available from the population census, and they are on residential basis. The Jabotabek region's future development plans are not elaborated in depth to project future employment by industry. Therefore, indicative development directions and potentials of industrial estates, large-scale housing and urban centers were the basis, together with past trend analysis, on which future changes in the industrial structure by the region were forecasted.

(1) DKI Jakarta

Employment by the agriculture sector in Jakarta has now diminished to less than 1% (0.7% in 1999 from 1.0% in 1990) as shown in Table 7.4.8.

Table 7.4.8 Employment Structure by Industry in Jabotabek

Main Industry	DKI Jakarta				BOTABEK					
	1990	1995	1998	1999	1990			1995		
	Urban	Urban	Urban	Urban	Urban	Rural	Total	Urban	Rural	Total
Agriculture, etc.	1.0%	0.8%	0.9%	0.7%	4.6%	31.9%	16.4%	2.8%	26.1%	9.8%
Mining/Quarrying	0.6%	0.4%	0.3%	0.1%	1.0%	2.1%	1.5%	0.5%	1.3%	0.7%
Manufacturing	20.5%	17.7%	16.5%	18.4%	28.0%	18.1%	23.7%	28.3%	19.4%	25.7%
Electricity, gas & water	0.6%	0.9%	0.3%	0.1%	0.7%	0.2%	0.5%	0.7%	0.3%	0.6%
Construction	6.4%	5.4%	5.1%	3.5%	6.6%	6.2%	6.4%	6.8%	6.1%	6.6%
Whole sale, retail trade	26.6%	28.2%	33.7%	35.2%	21.0%	21.6%	21.2%	23.8%	23.2%	23.6%
Transportation	7.4%	7.3%	7.5%	6.7%	7.7%	6.8%	7.3%	7.9%	8.4%	8.0%
Finance, insurance	7.3%	7.4%	5.8%	2.6%	3.5%	0.6%	2.3%	2.4%	0.5%	1.8%
Social services, etc.	29.1%	31.9%	30.0%	32.7%	25.9%	11.6%	19.7%	26.9%	14.6%	23.2%
Others	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Not Stated	0.4%	0.0%	0.0%	0.0%	1.0%	0.8%	0.9%	0.0%	0.0%	0.0%
Total Employed	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Population Census in 1980, 1990, BPS
Inter-census Population Surveys in 1985, 1995, BPS
Labor Force Situation in Indonesia, August 1998 and 1999, BPS

The employment structure of Jakarta in 1999 was characterized by the dominant share held by "Services" (32.7%) followed by "Whole sale, retail trade" (35.2%) and "Manufacturing" (18.4%) in 1999.

The manufacturing sector in 1999 seemed to have recovered from the low point of 16.5% in 1998, but the sector's share has dropped from the 20.5% it had recorded in 1990. Employment by the "Finance, insurance" sector seems to be still on the decline from 7.4% in 1995 to 2.6% in 1999. Likewise, the "Construction" sector which was damaged severely by the economic crisis does not appear to be recovering.

(2) Botabek

The industrial employment data for Botabek is only available in terms of the census or inter-census population data. According to this data, the Botabek urban employment structure is characterizes by a relatively higher share of the "Manufacturing" (28.3%) sector, followed by "Services" (26.9%) and "Whole Sale/Retail Trade" (23.8%).

Another distinguishing feature of Botabek employment is that the "Agriculture" sector in rural Botabek absorbed only 26.1 percent of total rural employment in 1995, which is significantly lower than the 1995 national rural average of 60.8 percent. Rural Botabek holds a comparatively higher share of such economic sectors as "Whole Sale/Retail Trade" (23.2%), "Manufacturing" (19.4%) and "Services" (14.6%), relative to the national rural average of 12.2%, 9.8% and 9.0%, respectively.

The rural Botabek region is viewed as being semi-urbanized, as the conurbation keeps growing from Jakarta in an east-west and a south direction.

The employment structure of Botabek is summarized for its constituent regions of Bogor (Kabupaten Bogor and Kota Bogor), Tangerang (Kabupaten Tangerang and Kota Tangerang) and Bekasi (Kabupaten Bekasi and Kota Bekasi) as below:

Comparing the three regions with each other, the Tangerang and Bekasi regions have similar employment structures which consist mainly of "Manufacturing", "Whole Sale/Retail Trade" and "Services" sectors ranging between 21 percent and 29 percent. Bogor exhibits a relatively higher "Agriculture" component. Actually, Bogor still maintains agricultural and forest land in the region.

The "Manufacturing" sector in Botabek provides the major employment opportunity in Botabek, and particularly in Tangerang and Bekasi, manufacturing sector employment is found to be very high in the urban as well as rural areas ranging between 22 percent and 30 percent.

Rural employment in Bogor is characterized by the relatively higher share held by the "Agriculture" sector (29.2 percent), and this is also true of rural Bekasi (30.3 percent). Rural Bekasi is agriculture oriented in the north territory but the current manufacturing development in Bekasi (22.0 percent) appears to be occurring extensively on the rural area as well, just as in the rural Tangerang (25.8 percent).

Table 7.4.9 Employment Structure by Industrial Sector in Bogor, Tangerang and Bekasi

(unit: percent)

*Main Industry		Bogor,1995			Tangerang,1995			Bekasi,1995		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
(1)	Agriculture	5.1%	29.2%	12.6%	1.4%	19.8%	7.6%	0.8%	30.3%	7.8%
(2)	Mining/Quarrying	0.2%	2.1%	0.8%	0.6%	0.9%	0.7%	0.8%	0.3%	0.7%
(3)	Manufacturing	26.9%	13.1%	22.6%	30.3%	25.8%	28.8%	28.3%	22.0%	26.8%
(4)	Utility	0.9%	0.2%	0.7%	0.8%	0.7%	0.8%	0.3%	0.0%	0.2%
(5)	Construction	7.6%	8.1%	7.8%	7.7%	5.0%	6.8%	4.5%	3.5%	4.3%
(6)	Commerce	21.1%	23.3%	21.8%	23.6%	24.4%	23.9%	28.1%	20.8%	26.3%
(7)	Transportation	6.5%	7.5%	6.8%	7.6%	8.3%	7.9%	10.2%	10.4%	10.2%
(8)	Finance, Insurance	1.8%	0.8%	1.5%	2.8%	0.4%	2.0%	2.8%	0.3%	2.2%
(9)	Social services	29.8%	15.7%	25.4%	25.1%	14.6%	21.6%	24.2%	12.4%	21.4%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: *(1) Agriculture, hunting, forestry and fishery (2) Mining and quarrying (3) Manufacturing (4) Electricity, gas and water (5) Construction (6) Whole sale/retail trade, restaurant/hotels (7) Transportation, storage and communication (8) Finance, insurance, property and business services (9) Community, social, personal and other services (10) Others

Source: Population of Indonesia, Results of the 1995 Intercensal Population Survey; Central Bureau of Statistics

(3) Forecast of Future Industrial Employment

Taking into account the current changes in the employment structure by region and the future development directions and policies, the future industrial employment was projected for the major industrial categories under the following assumptions:

- The share of agriculture sector employment in Jakarta will decline further from 0.7% in 2000 to 0.3% in 2015.
- The share of the manufacturing sector employment in Jakarta will also be substituted by the trade and service sector, which will increase 77% in 2000 up to 84% in 2015.
- The share of the agricultural sector in Botabek will decrease as the urbanization progresses further, i.e. 11% in 2000 to 3% in 2015.
- Because of the relatively high potentials in Tangerang and Bekasi, the share of the manufacturing sector employment will keep growing from 23% in 2000 to 28% in 2015.
- The share of the trade and service sector employment will remain unchanged from the present level, i.e. 60% in 2000.

Based on the above, the future employment by industrial sector was forecast as shown in Tables 7.4.10 and 7.4.11.

Table 7.4.10 Forecast Future Employment by Industry in DKI Jakarta

(unit: persons)

Year 2000						
Main Industry	Selatan	Timur	Pusat	Barat	Utara	Total
Agriculture, etc.	2,651	4,204	1,187	3,837	10,540	22,419
Manufacturing	72,047	175,091	47,766	167,752	126,638	589,293
Other 2nd Industry	34,611	35,023	10,043	24,407	14,415	118,499
Trade and Services	584,768	682,665	285,446	534,767	384,822	2,472,469
Total	694,077	896,983	344,442	730,763	536,415	3,202,680
Year 2005						
Main Industry	Selatan	Timur	Pusat	Barat	Utara	Total
Agriculture, etc.	2,555	3,208	983	3,336	9,989	20,070
Manufacturing	98,225	190,964	56,303	207,183	169,852	722,527
Other 2nd Industry	19,927	15,025	4,785	12,350	8,125	60,211
Trade and Services	836,643	784,506	353,971	694,315	541,797	3,211,232
Total	957,350	993,702	416,042	917,183	729,762	4,014,040
Year 2015						
Main Industry	Selatan	Timur	Pusat	Barat	Utara	Total
Agriculture, etc.	2,239	2,079	734	2,638	8,500	16,190
Manufacturing	122,150	183,731	61,033	236,247	206,325	809,486
Other 2nd Industry	13,899	7,757	2,844	7,773	5,503	37,776
Trade and Services	1,290,466	954,366	480,621	989,058	818,613	4,533,124
Total	1,428,755	1,147,934	545,232	1,235,715	1,038,940	5,396,576

Source: JICA Study Team

Table 7.4.11 Forecast Future Employment by Industry in Botabek

(unit: persons)

Year 2000								
Main Industry	Kab. Bogor	Kota Bogor	Kota Depok	Kab. Tangerang	Kota Tangerang	Kab. Bekasi	Kota Bekasi	**Botabek Total**
(1) Agriculture	233,890	4,493	45,009	130,721	10,798	107,272	6,782	538,964
(2) Manufacturing	263,729	63,056	40,976	222,770	158,825	158,546	125,112	1,033,014
(3) Other 2nd Industry	80,818	15,710	9,613	58,680	20,589	24,017	15,142	224,568
(4) Trade and Services	581,220	185,175	302,981	570,089	302,612	301,628	451,116	2,694,820
Total	1,159,657	268,433	398,579	982,260	492,823	591,463	598,152	4,491,367
Year 2005								
Main Industry	Kab. Bogor	Kota Bogor	Kota Depok	Kab. Tangerang	Kota Tangerang	Kab. Bekasi	Kota Bekasi	**Botabek Total**
(1) Agriculture	225,165	3,730	48,610	114,013	11,279	98,092	6,492	507,381
(2) Manufacturing	412,560	86,160	70,943	319,010	265,703	237,143	194,048	1,585,566
(3) Other 2nd Industry	163,873	27,882	21,520	109,116	44,522	46,623	30,422	443,958
(4) Trade and Services	831,586	230,784	481,151	745,032	464,430	412,062	640,314	3,805,358
Total	1,633,184	348,556	622,223	1,287,172	785,934	793,919	871,276	6,342,264
Year 2015								
Main Industry	Kab. Bogor	Kota Bogor	Kota Depok	Kab. Tangerang	Kota Tangerang	Kab. Bekasi	Kota Bekasi	**Botabek Total**
(1) Agriculture	110,333	1,725	25,221	63,534	5,531	67,969	2,529	276,841
(2) Manufacturing	647,248	128,058	115,798	546,754	411,917	478,530	255,546	2,583,851
(3) Other 2nd Industry	295,800	47,680	40,329	214,097	79,259	106,986	46,373	830,523
(4)Trade and Services	1,181,044	310,555	712,179	1,160,611	652,894	759,743	759,796	5,536,823
Total	2,234,425	488,017	893,527	1,984,995	1,149,602	1,413,228	1,064,244	9,228,038

Source: JICA Study Team

7.5 Expected Social and Economic Changes and their Implications

7.5.1 Deployment of Suburbanization

Since the population of Jabotabek will continue to expand steadily, and relatively high growth is expected in Botabek compared to Jakarta.

The population will be dispersed throughout the Jabotabek region, and it is predicted that the eastern and western areas will grow more rapidly than the southern areas as illustrated in Figure 7.5.1.

Residential areas will therefore be developed further in Botabek. The real estate housing developments being planned can be seen from the approved real estate housing developments illustrated in Figure 7.5.2. Most of real estate type housing developments are planned in the east and west. According to the SITRAMP mini-person trip survey, many households in high or upper-middle income group households reside in these types of residences developed by the real estate developers. They are very much dependent on cars for their travel needs. When they move to the suburbs to purchase or rent a new residence, they seem to look for an appropriate housing and its location to meet their needs on the basis of private car use. With the poor level of public transportation service at present, this tendency will continue and result in dispersed residential area development in the Botabek suburbs.

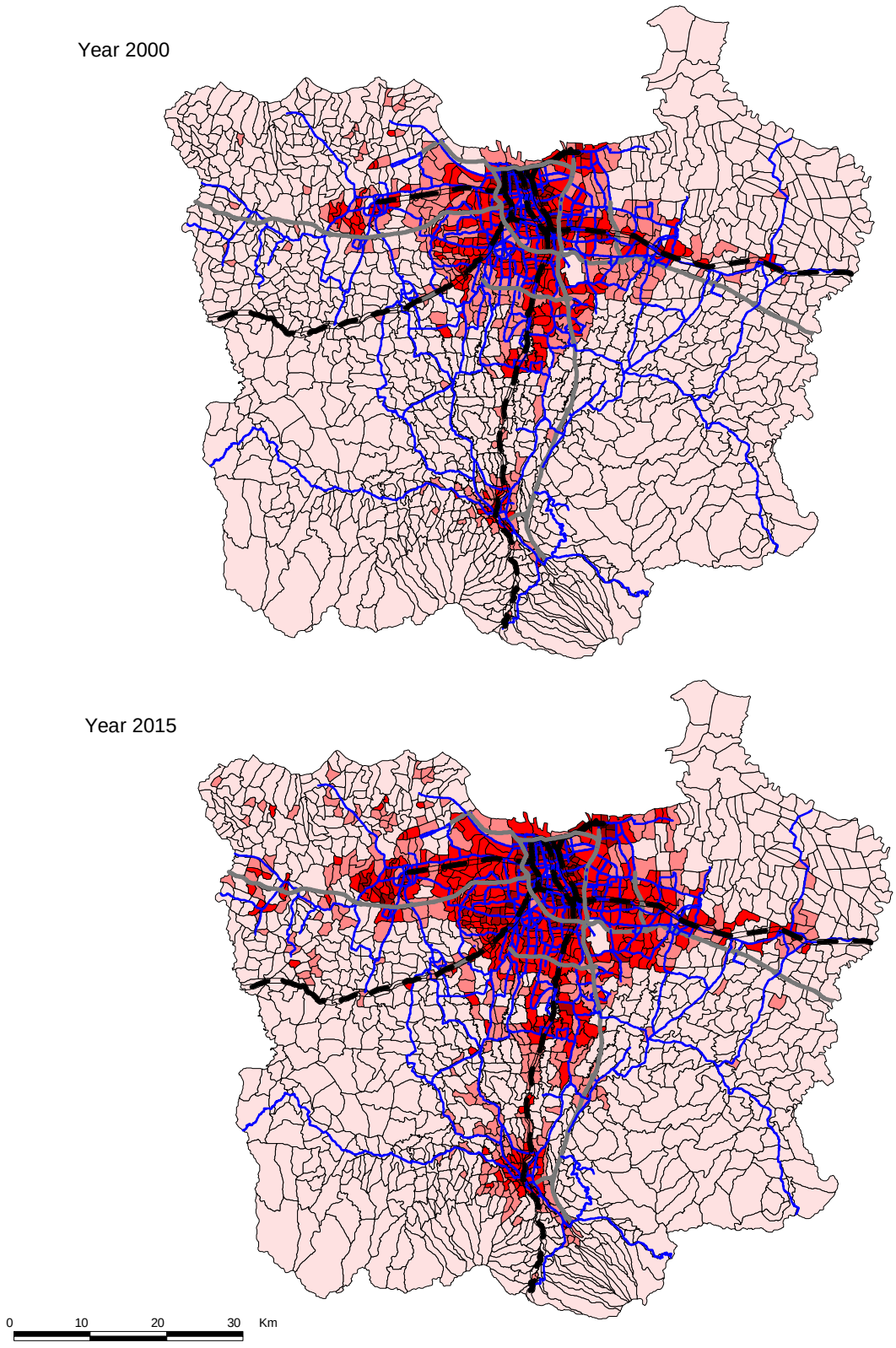
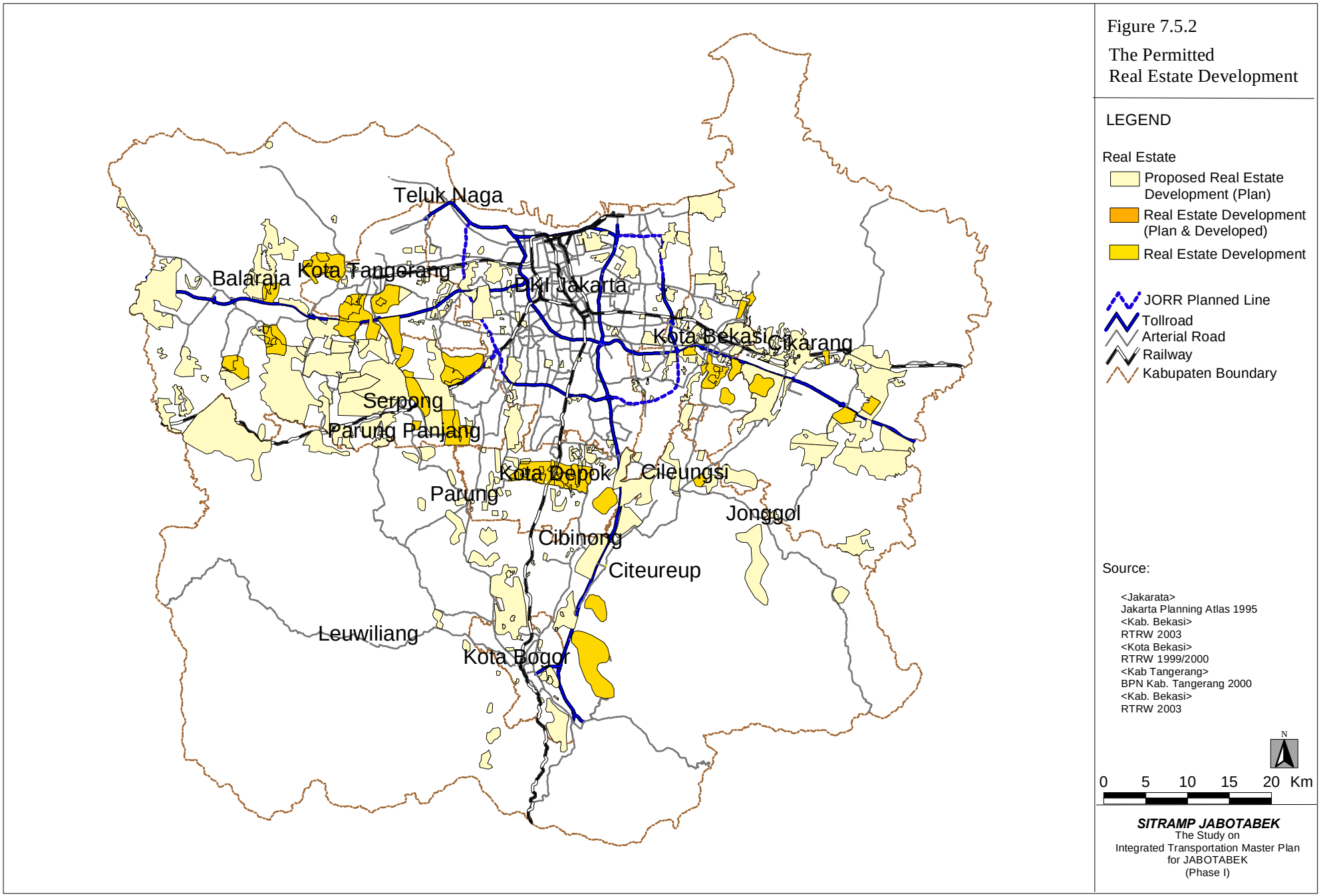


Figure 7.5.1
Expansion of
Sub Urbanization : 2000 - 2015

SITRAMP JABOTABEK
The Study on
Integrated Transport Master Plan
for JABOTABEK
(Phase I)


Teluk Naga
Balaraja
Kota Tangerang
DKI Jakarta
Kota Bekasi
Cikarang
Serpong
Parung Panjang
Kota Depok
Cileungsi
Parung
Jonggol
Cibinong
Citeureup
Leuwiliang
Kota Bogor
Figure 7.5.2
The Permitted
Real Estate Development
LEGEND
Real Estate
Proposed Real Estate Development (Plan)
Real Estate Development (Plan & Developed)
Real Estate Development
JORR Planned Line
Tollroad
Arterial Road
Railway
Kabupaten Boundary
Source:
<Jakarata>
Jakarta Planning Atlas 1995
<Kab. Bekasi>
RTRW 2003
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RTRW 1999/2000
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BPN Kab. Tangerang 2000
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0 5 10 15 20 Km
SITRAMP JABOTABEK
The Study on
Integrated Transportation Master Plan
for JABOTABEK
(Phase I)

7.5.2 Concentration of Job Opportunity

Jakarta will continue to play a significant role as the gateway for international trade and business and social communication. Jakarta also provides a variety of services as the national center and the primary center of the region.

Up to present, a considerable number of industrial estates have been established in Botabek and further development of industrial estates are being planned as depicted in Figure 7.5.3.

It is expected that the manufacturing industry will take the leading role in providing job opportunity in the Botabek area. In contrast, agriculture will decrease its share in economic activities under the pressure of urbanization. Presently the service sector is still weak in Botabek and it does not absorb employed population from local communities. It at most provides population related services including local government services in the suburbs and the rural areas. As mentioned in Chapter 2, as many as 70 to 80 percent of the workers in the areas surrounding Botabek, excluding those who are employed by the manufacturing or neighborhood services, commute to Jakarta every day.

If urban centers in Botabek cannot provide sufficient job opportunities for the surrounding communities, many people will have to commute to Jakarta for work.

In this regard, foster of urban centers in Botabek is of great importance not merely for balanced and sustainable regional development but also for alleviating excessive concentration of economic activities and travel demand in Jakarta.

7.5.3 Increasing Commuting Trips

As the urbanized area expands, the number of commuters from Botabek to Jakarta will increase even further as shown in Table 7.5.1. The total number of commuters from Botabek to Jakarta will increase from 762,000 persons in 2000 to about 1.8 million in 2015, which would be 2.4 times the present demand. To deal with this enormous commuter trip demand, it will be necessary to develop transportation facilities and emphasis should be given to the development of an efficient mass rapid transit system connecting Botabek and Jakarta as it seems difficult to meet the increasing demand by merely developing the road network.

Table 7.5.1 Commuter Trips from Botabek to Jakarta: 2000 and 2015

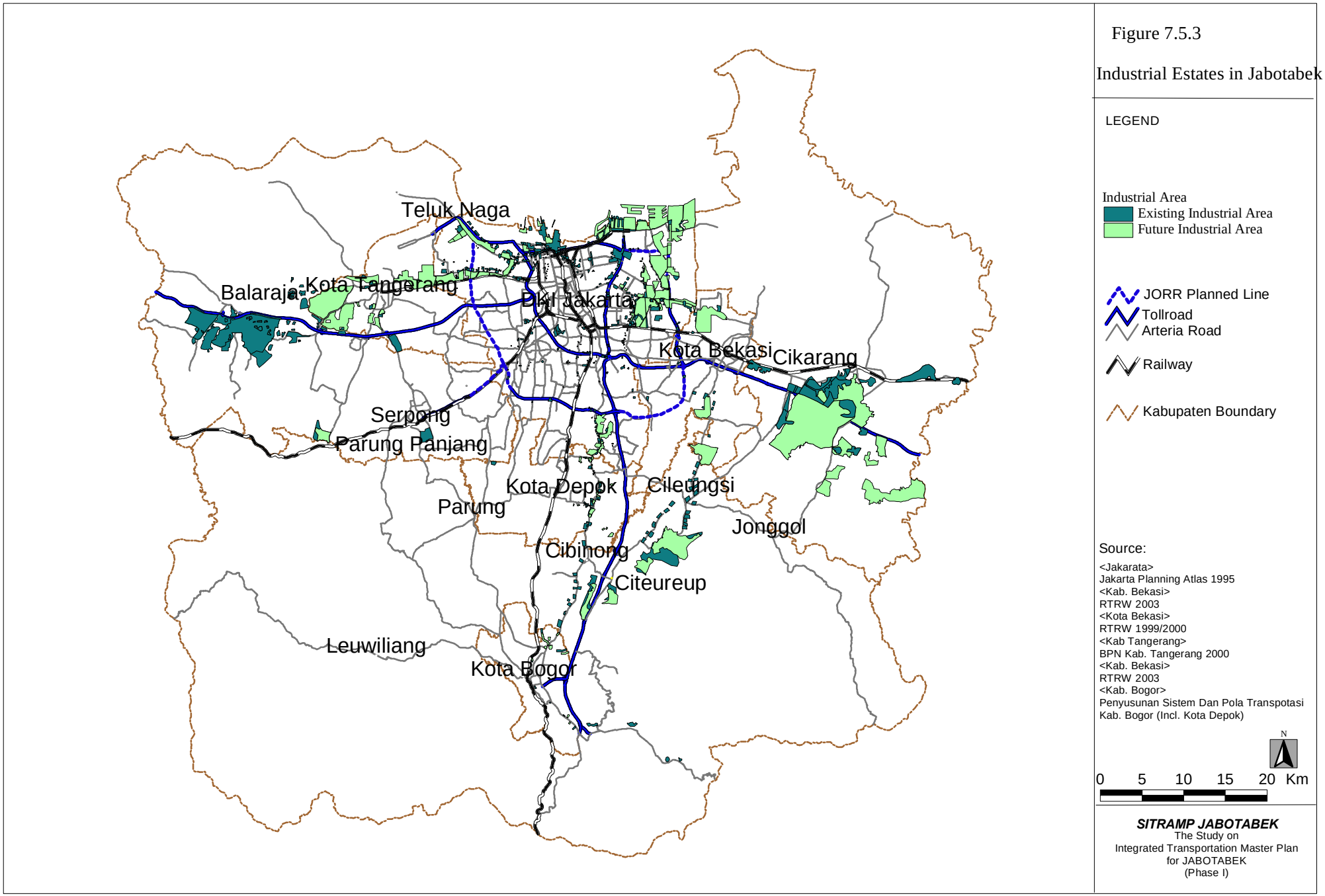
(Unit : thousand person trips per day)

	2000	2015	Growth Rate
Tangerang	279	735	2.63
Bekasi	232	463	2.00
Bogor	251	596	2.37
Total	762	1794	2.35

Source: SITRAMP Estimate

7.5.4 Increase in Private Car Use

Vehicle ownership will increase in accordance with the increase in real household income. At present, the ownership of a private passenger car directly implies the use of private cars for travel needs. Compared to the current poor level of public transport, private cars provide a much higher level of convenience, comfort, and


Teluk Naga
Balaraja
Kota Tangerang
DKI Jakarta
Kota Bekasi
Cikarang
Serpong
Parung Panjang
Kota Depok
Cileungsi
Parung
Jonggol
Cibinong
Citeureup
Leuwiliang
Kota Bogor
Figure 7.5.3
Industrial Estates in Jabotabek
LEGEND
Industrial Area
Existing Industrial Area
Future Industrial Area
JORR Planned Line
Tollroad
Arteria Road
Railway
Kabupaten Boundary
Source:
<Jakarata>
Jakarta Planning Atlas 1995
<Kab. Bekasi>
RTRW 2003
<Kota Bekasi>
RTRW 1999/2000
<Kab Tangerang>
BPN Kab. Tangerang 2000
<Kab. Bekasi>
RTRW 2003
<Kab. Bogor>
Penyusunan Sistem Dan Pola Transpotasi
Kab. Bogor (Incl. Kota Depok)
N
0 5 10 15 20 Km
SITRAMP JABOTABEK
The Study on
Integrated Transportation Master Plan
for JABOTABEK
(Phase I)

security. Private passenger cars are considerably expensive for most households of the society, thus once people purchase a car, even a second-hand car, they attempt to maximize their investment by using their vehicles as much as possible for any occasion. Increase in car ownership therefore implies an increase in vehicular trips.

If the government does not take any action such as increase the fuel cost by decreasing the fuel subsidy, or introduce transportation demand management measures such as road pricing and support the improvement of public transport, traffic congestion will surely deteriorate from the present situation.

7.5.5 Institutional Change

Decentralization will commence from 2001, this change in government organization and changes in responsibility would require substantial changes of institutional arrangement and needs for strengthening planning, monitoring, and supervising capability of local governments as argued in Chapter 6. In addition, Kabupaten and Kota Tangerang will be a part of the emerging Banten Province. Thus the Jabotabek region will straddle three provinces, namely, DKI Jakarta, West Java Province, and Banten Province. Even at present coordination between DKI Jakarta and West Java is complicated and a lot of inconsistencies are found in the planning between DKI and the local governments. More confusion may happen in the future.

7.5.6 Infrastructure Development Projects

Large-scale transportation infrastructure influences the scale and pattern of travel demand. The impact of such a transportation infrastructure development should be taken into consideration when establishing a transport system development plan. For example, the development of the Jakarta Outer Ring Road would induce a large amount of traffic demand along the corridor and it would attract more traffic demand in the areas along this road. Therefore improvement of the arterial streets connecting the interchanges of JORR is also needed.

Another example is the double-double tracking of the Bekasi line between Manggarai and Bekasi section. This development enables the operation of the commuter train independent of the middle and long distance trains. By doing this the Jabotabek railway can increase its frequency on this line. Residents along this railway line would enjoy a higher railway service on one hand but on the other they would have to face with a much longer wait at railway crossings.

These kinds of large-scale infrastructure developments should be taken into consideration during urban transportation planning.

7.6 Overview of Planning Issues

Urban transportation problems were identified in Chapter 5. Dealing with the existing problem is a planning issue to be tackled. In addition to the current problems other issues will be raised in the future due to inevitable changes in the social and economic circumstances.

Table 7.6.1 summarizes the urban transport issues which have been identified through the analyses of the present condition and to be raised in the future.

Table 7.6.1 Urban Transport Issues (1/5)

Sector	Cause	Problems and Issues	Remedy
Road	--	Shortage of collector roads connecting arterial and local streets in DKI Jakarta	Establish a road network development plan including more collector streets
	--	Shortage of arterial and collector roads in Botabek	Establish a comprehensive road network development plan
	Lack of road development funds	Slow development of arterial and collector road network	Secure road development and maintenance budget
	--	Weak east-west road network.	Give priority to road development which enhance east –west connection
	• Real estate development apart from road network development • Responsibility for the construction of roads in real estate developments is unclear	Inconsistency between the street network in real estate development and the arterial road network development plan	• Clarify the responsibility for the development of arterial roads in new housing development areas • Establish a road network development plan and make land development consistent with the road network development plan
	Insufficient policy consideration on pedestrian facility	Insufficient pedestrian facility, i.e. sidewalks and crossing	Improve pedestrian facility
	Physical bottleneck due to inconsistent carriageway width.	Traffic congestion	Road widening at the bottleneck section
	Illegally occupation by street market/vendors		Relocation of street venders to appropriate locations
	Irregular stop for bus passenger boarding and alighting		Stricter enforcement of bus operation
	On-street parking		Stricter enforcement of illegal parking
	Bus terminal		Stricter enforcement of stopping at entrance and exit
	U-turn facility		Introduce synchronized traffic signals at U-turn point or construct protected U-turn facilities
	Railway crossing		Improve railway crossing in the short term and construct grade-separated facilities in the intermediate or long term.

Table 7.6.1 Urban Transport Issues (2/5)

Sector	Cause	Problems and Issues	Remedy
Traffic Control and Management	Consolidation of different signal systems	Coexistence of three different traffic signal systems	Consolidate into a single signal system
	More than 50 % of vehicle detectors are out of order	Signal timing does not respond to real time traffic demand	Improve vehicle detectors
	Communication costs with the central system is expensive	Many traffic signals are isolated from the ATC system	Connect isolated signals with the central traffic control system
	No periodical and systematic timing review	Insufficient updating of signal timing	Execute traffic count survey and review the signal timing
	Lack of funds and human resources for repair	Shortage of traffic signals in Botabek	Install more traffic signals
	--	Difficult application of one-way system	--
	Peculiar road network design	One-way system with irregular network configuration	--
	--	Right-turn prohibition policy	Review the right turn prohibition policy
	3-in-1 policy	Congestion on streets parallel to the restricted streets	Employ area wide traffic restraint scheme
		Jockey problem (No fund raising mechanism) and no revenue for local authority	Introduce road pricing policy and raise funds for improvement urban transport system
		Inflexibility for the altering policy	Introduce road pricing policy
Bus Transport Service	No comprehensive review of the bus route structure and lack of control	Complexity of bus route structure	Survey the existing bus route structure and restructure the bus route network
	Largest demand along the corridor	Concentration of bus routes on Jl. Sudirman	Review the bus route structure
	Lack of road network for bus operation	Insufficient bus service coverage	Build roads in order to operate large buses
	--	Inadequate bus transport facilities, i.e. bus shelter, terminal and lack of priority bus lane	Improve bus transport facilities
	Weak Rupiah in relation to foreign currencies due to Asian Economic Crisis	Increase in operation costs, especially, spare-part costs	Financial support for bus operators
	Government's policy to keep bus fares low	Insufficient cost recovery	Study the real bus operation cost and provide subsidy if necessary
	Bus revenue sharing system	Bus revenue sharing systems, i.e. Borongan, WAP and Komisi	Reform bus operation regime from bus rental system to new system (salary system)
	--	Inflexibility in altering bus operation	Establish a monitoring system for bus passenger demand and Bus route restructuring
Bus Transport Service	Lack of human resource and data collection capacity of DLLAJ	Lack of monitoring and law enforcement capability	Introduce bus location system (real time monitoring system)
	--	Discrepancy between bus operation and bus transport policy	Disseminate bus transport policy to the public and get cooperation from the society

Table 7.6.1 Urban Transport Issues (3/5)

Sector	Cause	Problems and Issues	Remedy
Railway	--	Limited share of railway as a motorized mode of transport in Jabotabek	Integrate with the other modes of transport
	Shortage of rolling stock	Low frequency and transport capacity shortage of the Jabotabek railway	Purchase additional rolling stock
	--	Limited coverage area of the Jabotabek railway	Develop new rail-based lines and bus priority corridors
	• Shortage of technical staff • Defective maintenance of facilities • Defective maintenance of rolling stock • Low passenger's discipline	Low level of railway transport safety	• Repair of railway facilities and rolling stock • Public relation for railway transport safety • Prepare technical training program for railway staff
	--	Insufficient level of station facilities for passengers, especially low platform	Improve railway station facilities
	Lack of financial resources	Insufficient number of electric cars and spare parts	Raise funds raising for procurement of railway electric cars and spare-parts
	Deteriorated and damaged safety equipment due to collision by vehicles	Frequently collision accidents	Repair damaged facilities and purchase of spare-parts
	Natural disaster and inefficient repair	Damaged railway signaling system	Restore damaged signaling facilities
	--	Damaged communication facility at the Manggarai station	Restore damaged communication facilities
Integration of Urban Transportation System	--	Lack of integration between land use and transport system	Establish land use plan and set the preferred floor area ratio for public transport use
	--	Lack of integration between different modes of transport	Develop transport interchange facilities Join development of arterial roads and public transport
	Lack of Station plaza development plan	Insufficient railway station plaza	Develop station plaza to improve accessibility to railway stations
	Different to develop new access roads in built-up area	Lack of access road to railway stations	Develop access roads to improve accessibility to railway stations

Table 7.6.1 Urban Transport Issues (4/5)

Sector	Cause	Problems and Issues	Remedy
Travel Demand & Characteristics	Increasing trip length	Heavier burden on transport network in terms of person kilometers	Foster sub-centers in Botabek area
	Income gap	Limited modes of transport available according to income levels	Provided variety of transport modes to meet various types of transport demand
	--	Concentration of person trip demand during peak hours	Flatten peak demand • Staggered working time system and • Flexible working system
	--	Concentration of trips in CBD	• Foster urban centers in Botabek • Control excessive traffic demand in congested area by employing traffic demand restraint scheme
Environment	• Concentration and population and economic activities • Drastic increase of traffic demand and industries • Lower wind speed in Jabotabek • High- rise buildings	Deterioration of ambient air quality	• Decrease exhaust gas from vehicles • Upgrade the environmental standard gradually and disseminate the upgrading schedule to the public
	--	Ineffective vehicle inspection system	• Enhance the vehicle inspection system and expand coverage to private vehicles
	--	Unpopular unleaded gasoline	• Phase out leaded gasoline • Disseminate the advantage of unlead gasoline to the public
	• Lack of maintenance and calibration of measurement equipment • Lack of budget • Shortage of technical staff	Insufficient number and quality of ambient air quality monitoring stations	• Increase and enhance ambient air monitoring stations • Add air quality measurement quality and have proper maintenance • Prepare technical training program

Table 7.6.1 Urban Transport Issues (5/5)

Sector	Cause	Problems and Issues	Remedy
Social Factors	Development of toll roads and railway network	Division of community	Provide flyovers and underpasses
	• Lack of transparency in land acquisition • Unclear land tenure • Lower compensation price than market price	Land acquisition	• Apply the market land value for land acquisition • Clarification of land tenure
	Lack of dissemination efforts, publication and law enforcement	Lack of cultural climate to comply with laws and regulations	• Disseminate information on laws and regulations • Enhance law enforcement
	--	Distrust of politics, tendency to refuse proposed policies	Involve general citizens in urban transport policy making and planning
	Lack of respect for laws and traffic regulations	Undisciplined drivers	• Traffic safety education program for drivers and • Transport education for school children
Expected Social and Economic Changes	Deployment of suburbanization	--	• Guide land development with road network • Develop hierarchical road network
	Concentration of job opportunity	Concentration of traffic demand in CBD and the central area	• Foster urban centers in Botabek
	--	Enormous amount of commuting trips from Botabek to Jakarta	• Develop mass transit system to accommodate increasing commuter demand
	Increase in real household income	Increase in private car use	• Divert private car users to public transport by improving service level of public transport as well as by employing traffic restraint policy
	Institutional changes Emergence of Banten Province	Difficult coordination among three provinces	Establishment of a new agency which can deal with metropolitan-wide urban transportation planning and management
	Large-scale infrastructure development	• Division of community • Traffic congestion in the surrounding area	Develop relevant transport facilities

Chapter 8

Urban Transportation Policies and Strategies

8. Urban Transportation Policies and Strategies

8.1 General

Present urban transportation problem was analyzed in Chapter 5 and the planning issues were identified based on the future perspective of the Jabotabek region in Chapter 7.

Private car traffic demand had dropped at one time due to the decline in economic activities but it has since recovered to the pre-crisis level as explored in the analyses of the economic crisis in Section 3.4. As a consequence, traffic congestion has returned again to the urban road network and caused enormous economic losses as well as further deterioration of the urban environment.

It is difficult, however, to increase road capacity through the construction of new roads or by widening the existing roads, especially in the central area. In fact according to the Jakarta 2010, the master plan of DKI Jakarta does not outline the building of many new arterial streets. Thus the road network capacity in the central area will have to be mainly augmented through the grade separation of intersections by the construction of flyovers and underpasses. The resulting increase in road capacity would not be sufficient to accommodate the predicted increase in traffic demand.

Although public modes of transport still carry more than a half of the residents to fulfill their travel needs, the public transport system's level of service has deteriorated significantly, especially after the crisis. As many citizens have complained about the public transport, in particular, lack of security, and the present level of service does not attract people to use public modes of transport. After full recovery of regional economy, it is expected that the shift to private modes would again be accelerated.

To prevent people from shifting from public modes of transport to private cars to even to attract present car users or motorcyclists to public transport, the mass public transport system must be enhanced and a satisfactory level of service should be provided. Traffic congestion could be alleviated by promoting public transport and this would it will improve economic efficiency by reducing delay in travel. At the same time the improvement of public transport would provide a better means of transport for the transportation poor and contribute to the alleviation of air pollution by reducing emissions. The improvement of public transport system therefore should be the primary policy in dealing with the Jabotabek urban transportation issues. In this chapter, first of all, the objectives of the urban transportation system development are identified based on urban transportation problems and planning issues in Section 8.2. Then, in the following Section 8.3, urban transportation policies, which formulate the framework of the master plan, are recommended to achieve the objectives and possible policy measures are proposed and examined from the viewpoint of applicability in the context of the Jabotabek region. The transportation system development policy is established in Section 8.4 and in line with the development policy, the conceptual long-term transportation system development plan for Jabotabek is proposed in Section 8.5. The strategy for developing an integrated

urban transportation system is discussed in terms of prioritizing and packaging policy measures in Section 8.6.

8.2 Objectives of Urban Transportation System Development

The analysis of the present urban transportation problems and the planning issues in the Jabotabek region have resulted in the identification of four major objectives, which the urban transportation system development needs to pursue.

- Efficiency required to support economic growth,
- Equity in mobility among all the members of society,
- Improvement of the urban environment by minimizing the adverse effects of vehicle emissions and noise, and
- Safety to reduce victims of transportation accidents.

(1) Efficiency in Transport System to Support Economic Activities in Metropolitan Area

Traffic congestion is a chronic phenomena in Jabotabek due to the lack of road density and increased traffic demand as described in Section 5.2, and this has resulted in a considerable amount of economic loss to the society because of longer travel times and the deterioration of the environment. An efficient urban transport system, therefore, should be developed with a view to strengthen the urban function and to support economic growth in the Jabotabek region. Efficiency in transportation can be achieved by balancing transportation demand and transportation network capacity. Thus efficiency in transport can be achieved through the alleviation of traffic congestion and the reduction of vehicular traffic should be realized by the promotion of public transportation usage.

Alleviation of traffic congestion can be dealt with by the following three ways,

1) by increasing road capacity through the development and improvement of the road network,
2) by optimizing utilization of the existing road capacity by using a traffic control system and providing traffic information,
3) by decreasing excessive vehicular traffic demand through transportation demand management and diverting private mode users to public modes of transport

At the same time the promotion of public transport usage would also contribute toward economic efficiency by reducing vehicular traffic demand on the congested urban road network. Mass transit systems have an advantage over private modes of transport in terms of travel costs and lesser consumption of space in the context in urban area.

(2) Equity in Transport for All the Members in the Society

A minimum level of transportation service should be provided to all members of the society in order to secure a civil minimum. There are two types of "transportation poor"; one is the economically poor, who cannot afford to pay

expensive transportation cost, and the other is the physically handicapped citizens, who have difficulties in their mobility.

In Jabotabek the mobility of the low-income group is limited due to their insufficient income. As shown in Subsection 5.2.4, the low-income group depends heavily on non-motorized modes of transport; around 40 percent of their trips are made by foot or bicycles. This means that the activity area of low income group is limited due to the available transport modes and they losing out on job opportunities as well as being unable to enjoy various urban services.

The role of public transport is thus of great importance in providing affordable means of transport for the lower income people to access urban services. A sufficient level of public transportation service should be provided to these people at reasonable costs. In setting the fare for public transport, the fare level should be determined from the viewpoint of "ability to pay."

At the same time it is necessary to develop transportation facilities for the handicapped. Such facilities are seldom seen in Jabotabek at present time and a gradual improvement of the transport facilities is needed.

(3) Environmental Betterment related to Transport

Although the level of Nitrogen Oxide (NO_x) is within the allowable range at all stations surveyed and the daily maximum value of Sulfur Dioxide (SO_2) is also below the environmental standard, the daily maximum of Total Suspended Particles (TSP) exceeded the air quality standard value at two thirds of the survey locations in Jakarta and at all locations in Bekasi as described in Section 5.9. 40 percent of the emission load of TSP in Jabotabek is generated by automobiles, following 57 percent by factories. The measured daily maximum values of Lead (Pb) meet the Indonesian National Standard but exceed one third of survey stations in DKI Jakarta. In Jabotabek 90 percent of the lead emissions is estimated to be due to the use of leaded gasoline. Unleaded gasoline has not gained popularity despite the efforts made by the government such as the promotion of unleaded gasoline under the Blue Sky Program.

Air pollution caused by motorized vehicles should be minimized through the promotion of public transport and traffic demand control, especially, in the congested areas. Countermeasures to reduce TSP and Lead should be focused in particular the Study area.

(4) Transport Safety

Transport safety is one of the concerns of urban transportation in Jabotabek. Although the total number of victims involved in traffic accidents on non-toll roads has gradually decreased in recent years, the number of lives lost in traffic accident has not been decreased as argued in Section 5.5. Similar to non-toll roads, the rate of traffic accidents on toll roads has been gradually decreasing but the fatality rate is still high compared to developed countries.

Since lives are invaluable and death and injury due to traffic accidents will bring great grief to family members and friends, traffic safety should be enhanced and the number of accident victims should be minimized through the enforcement of laws and regulations, intensive public campaigns, and training and education for

drivers as well as the general public. Improvement of traffic facilities through engineering design would contribute to the reduction of traffic accidents.

Railway accidents should also be minimized by improving the signal facilities as well as the dissemination of information regarding the danger of riding on the roof of trains, and the enforcement of closed-door operation.

8.3 Urban Transportation Policies and Measures

8.3.1 Urban Transportation Policies

The following four major urban transportation policies are recommended in order to achieve the four objectives of urban transportation system development. Each policy is to be achieved through various urban transport policy measures.

- Alleviation of Traffic Congestion
- Promotion of Public Transport
- Reduction of Air Pollution and Noise
- Improvement of Transport Safety

8.3.2 Urban Transportation Policy Measures

There are a variety of countermeasures, such as infrastructure development, traffic control and transportation demand management to address urban transportation problems and issues.

(1) Urban Transport Policy 1 : Alleviation of Traffic Congestion

a) Urban Transport Policy 1A: Development and Improvement of Road Network

Infrastructure development and improvement is a supply side approach to increase transportation capacity. Since Jakarta lacks collector streets and Botabek suffers from a shortage of both arterial and collector streets as pointed out in Section 5.2, the road network should be developed with adequate hierarchy. A long-term road network development plan for Jabotabek should be established from this road network hierarchy point of view.

In Jakarta, more collector streets should be newly constructed or upgraded, since the Jakarta road network has quite a few major arterial streets with wide carriageway but lacks lower level streets, namely, collector streets, which supplement arterial streets and connect arterial streets to local streets. On the other hand, in Botabek the arterial and collector roads should be developed more intensively because of the low road density.

There are various causes for traffic congestion as identified in Subsection 5.3.4 but one of the most principle causes is the reduction of road capacity at major intersections due to the red phases of traffic signals. Thus the development of flyovers and underpasses is one way to increase intersection capacity in the relatively short term compared to new road development.

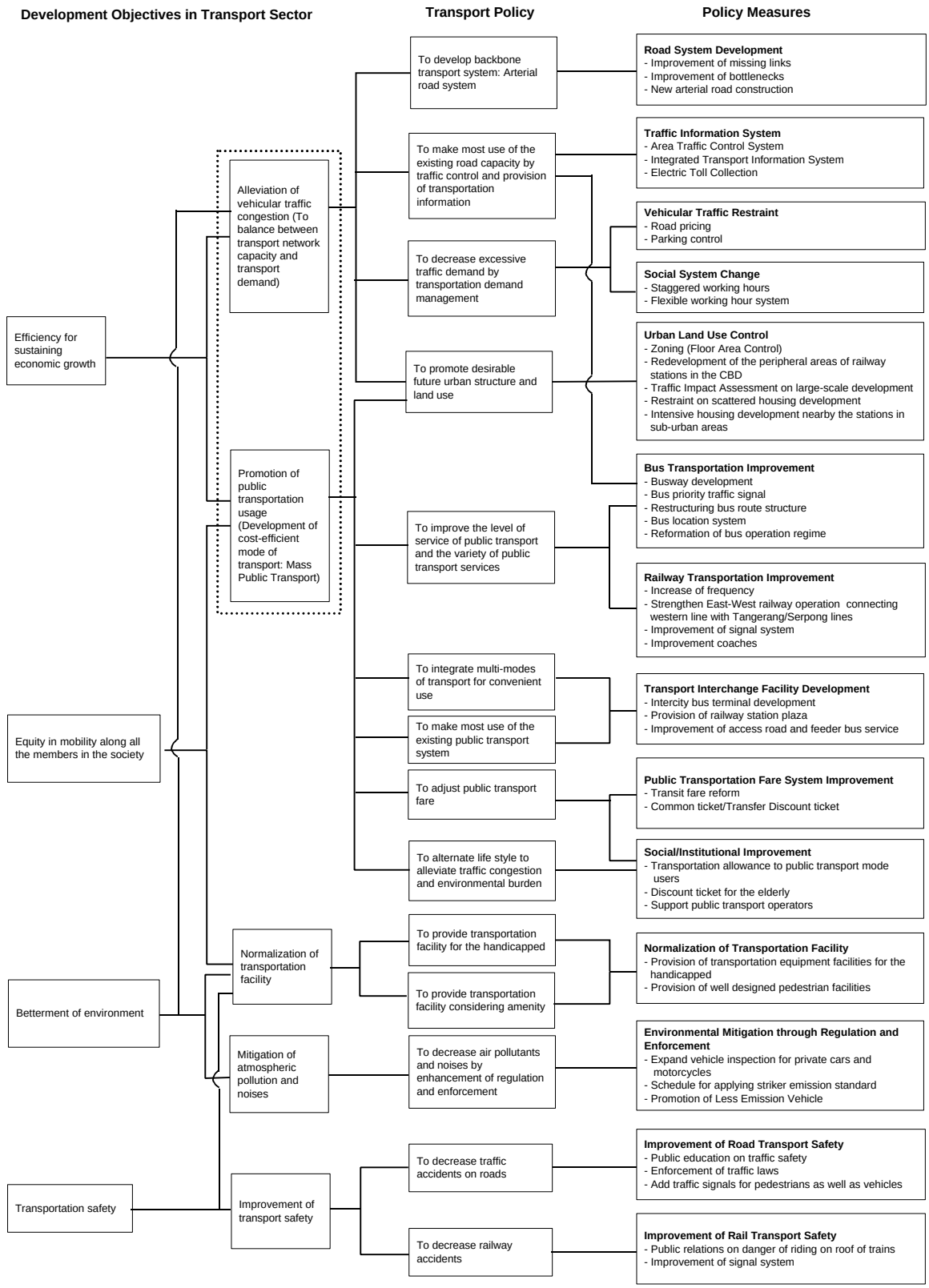


Figure 8.3.1 Objectives of Urban Transportation System Development and Policy Measures

Furthermore, in terms of transportation system, integration the road network development plan in the past did not pay attention to the integration of bus transport. In view of the difficulty in giving priority to bus transport on the urban street network, the inclusion of a busway when a new road is being constructed should be taken into consideration to develop an integrated transportation system.

Table 8.3.1 Policy Measures for Road Network Development

Code	Policy Measure
1A-1	Maintenance of the existing roads
1A-2	Road widening at bottleneck sections
1A-3	Improvement of bottleneck intersections
1A-4	Development of collector streets in DKI Jakarta
1A-5	Development of arterial / collector streets in botabek
1A-6	Development of flyovers and underpasses at bottleneck intersections
1A-7	Development of arterial streets to accommodate busway

b) Urban Transport Policy 1B : Optimal Utilization of the Existing Road Network

Traffic control improvement is an effective way to with traffic woes by optimizing the utilization of the existing road facilities. Traffic capacity in the urban area is mostly reduced at intersections as mentioned before. Reduced road capacity can be increased not merely by flyovers but also by improving the geometric design and the traffic control system, such as a coordinated signal system or an area traffic control system. Other improvements in the field of traffic control include U-turn control, review of right turn prohibitions, and the introduction of a transportation information system.

Table 8.3.2 Policy Measures for Optimal Utilization of Road Network

Code	Policy Measure
1B-1	Development of area traffic signal control system
1B-2	Improvement of coordinated traffic signals
1B-3	Improvement of traffic signal phasing
1B-4	Introduction of traffic information system

c) Urban Transport Policy 1C : Vehicular Traffic Restraint

It is commonly observed that increases in road capacity hardly catch up with increases traffic demand. Thus in recent years transportation planners and government officers in charge of transportation have paid more attention to transportation demand management techniques. In principle, transportation demand management aims at reducing excessive traffic demand through various types of measures. This category of policy measures include road pricing, parking demand control, traffic impact assessment, introduction of traffic generation fee, fuel price increase, higher vehicle occupancy, and flattening peak traffic demand.

Table 8.3.3 Policy Measures for Vehicular Traffic Restraint

Code	Policy Measure
1C-1	Congestion Pricing (Road Pricing/Area Pricing)
1C-2	Parking Demand Control
1C-3	Traffic Impact Assessment
1C-4	Traffic Generation Fee
1C-5	Increase of Fuel Price
1C-6	Increase Occupancy of Vehicle to reduce Vehicular Traffic
1C-7	Flatten Peak Traffic Demand

Policy Measure 1C-1 : Road Pricing

Area licensing, cordon pricing or other forms of road pricing are countermeasures for controlling excessive traffic demand entering or passing congested areas.

Policy Measure 1C-2 : Parking Demand Control

Parking policy is also often applied to restrain excessive traffic demand in urban areas. There are several types of parking policies, such as on-street parking restrictions, parking supply control, parking charge control, parking tax, and the removal of parking allowance.

Policy Measure 1C-3 : Traffic Impact Assessment

Traffic impact assessment is one of vehicular restraint measures through the assessment of the impact of trip generation caused by new facility development. Traffic impact assessment is employed by the developer of a large-scale facility to assess the traffic impact of the development to the surrounding area and urge required countermeasures when influence is significant.

Policy Measure 1C-4 : Traffic Generation Fee

Traffic generation fee is a more general application than traffic impact assessment. It is applicable not only to new developments but all urban facilities. This fee is utilized for transportation system development and the rate of the fee collected is in accordance with the magnitude of road use, since the number of vehicular trips attracted or generated varies from facility to facility. Thus, the funds for developing or improving transport facilities should be collected according to the magnitude of trip attraction/generation.

Policy Measure 1C-5 : Fuel Price Increase

In general the price of fuel in Indonesia should be increased by the reducing the fuel subsidy, in order to assist in the recovery of the external costs of congestion and pollution caused by vehicle use.

Policy Measure 1C-6 : Increase Occupancy of Vehicles to reduce Vehicular Traffic

A HOV (High Occupancy Vehicle) lane aims to increase occupancy of private cars by giving priority to vehicles with high occupancy and thereby reducing the number of vehicular trips. The “3 in 1” policy is one of the schemes under this policy.

Policy Measure 1C-7 : Flatten Peak Traffic Demand

A staggered working system or flexible working system aims to reduce the excessive travel demand by alternating departure time.

(2) Urban Transport Policy 2: Improvement of Public Transport Services

As discussed in Chapter 5, the present public transportation system does not provide a satisfactory level of service. The service level has deteriorated further due to the economic crisis. However the role of the public transport system in the Jabotabek region is significant because more than 50 percent of the people still use by public modes of transport.

Urban Transport Policy 2A : Improvement of Railway Transport Service

Railway transport should play a role as a backbone of the public transport network in the Jabotabek region. It should provide a better level of service for passengers and improve facilities especially with regard to safety. To improve service level, PT. KAI should make efforts to collect revenues properly from the railway passengers, and the fare level should be reviewed.

Table 8.3.4 Policy Measures for of Railway Transport Service Improvement

Code	Policy Measure
2A-1	Construction of new railway line Tg. Priok – Citayam – Parung Panjang
2A-2	Double tracking of Serpong and Tangerang lines
2A-3	Track elevation of Eastern line
2A-4	Addition of railway track (short cut) Serpong line – Western line, Tangerang line – Western line
2A-5	Addition of electric cars(Ecs)
2A-6	Reinforcement of stabling yard
2A-7	Construction of MRT
2A-8	Provision of semi-loop urban railway operation
2A-9	Raising/extending platform
2A-10	Improvement of signal facility
2A-11	Construction of over-track station/ underground passage
2A-12	Adjustment of Railway Fare and Proper Fare Collection
2A-13	Improvement of Railway Management

Urban Transport Policy 2B : Improvement of Bus Transport Service

The present bus licensing system is based on quantity licensing, which restricts entry to the market and thus competition. The maximum bus fare for economy class has been set by the Government and bus operators are not allowed to raise the fare freely even if their operation costs increase. After the economic crisis, operators have faced financial problems, due to increases in cost for maintenance and purchase of spare parts. This has resulted in a reduction in the number of operational buses and consequently to increase in load factors. If the bus fare is maintained at the present low level, bus transport would not be able to improve its services. The Government should outline the minimum level of service to be provided by public transport to meet the needs of citizens instead of setting the maximum fare level and quantity of the services. On the other hand, the Government should provide infrastructure such as bus priority lanes and busways to create a better environment for bus operation.

DLLAJ should monitor bus operation more intensively to maintain the minimum level of public transport. Maximum fare control should be retained for regular bus services in order to secure transport means for the poor. However, the authorities should provide more freedom in setting fare levels to bus operators so that they can provide a variety of bus services.

Table 8.3.5 Policy Measures for Bus Transport Service Improvement

Code	Policy Measure
2B-1	Provide bus services to supplement railway network in the areas where railway services are not available
2B-2	Restructuring bus routes
2B-3	Improvement of feeder bus services to railway stations
2B-4	Introduction of busway
2B-5	Adjustment of bus fare system to meet the cost for operation and services
2B-6	Reformation of bus operation regime such as introduction of bus route tendering system
2B-7	Introduction of bus location system
2B-8	Introduction of bus priority signal system
2B-9	Addition of contra-flow bus lanes
2B-10	Improve bus shelter standard
2B-11	Relocate bus stops
2B-12	Review of standard of pedestrian bridge

Urban Transport Policy 2C : Integration of Modes of Transport

Railway transport should be integrated with bus transport for the passengers' convenience. Thus, interchange facilities between the railway and bus services should be improved as well as operations at bus terminals.

Table 8.3.6 Policy Measures for Transport Mode Integration

Code	Policy Measure
2C-1	Improvement of intercity bus terminals
2C-2	Development of integrated public transport terminal
2C-3	Development of station plaza and access road to railway station
2C-4	Provide feeder bus service for railway passengers
2C-5	Improve usage of bus terminal
2C-6	Introduce common ticket/transfer discount ticket
2C-7	Preferential tax scheme for public transport usage

Urban Transport Policy 2D: Integration between land use and transportation system

Currently major urban facilities are being built along arterial streets, while the areas surrounding the Jabotabek railway stations are less developed. There is a need to promote land use patterns suitable for the public transport system and encourage the use of public transportation, especially along the railway corridors.

Table 8.3.7 Policy Measures for Integration between Land Use and Transportation

Code	Policy Measure
2D-1	Allocate high floor area ratio in land use zoning for the designated areas surrounding railway stations
2D-2	Developing high-rised office and commercial buildings near the railway stations is preferable to increase ridership of railway system.
2D-3	Development of medium, high-raised apartment near suburban stations
2D-4	Develop east-west transportation corridor to encourage urban development in the desirable direction.

(3) Urban Transport Policy 3: Normalization of Transport Facilities

Transportation facilities and services for the handicapped should be improved to augment their mobility since these facilities have not been taken care of until present.

Trips made by non-motorized modes of transport should be facilitated by improving the necessary facilities such as sidewalks, pedestrian crossings, pedestrian bridges and traffic signals for pedestrians. Pedestrian facility improvement is of importance not merely for pedestrians but also for promoting the use of public transport.

Table 8.3.8 Policy Measures for Normalization of Transport Facilities

Code	Policy Measure
3-1	Transportation facilities for handicapped citizens and transportation poor
3-2	Improvement of transport facilities for non-motorized mode of transport

(4) Urban Transport Policy 4: Reducing Air Pollution

Vehicle inspection is an effective countermeasure to reduce emissions from vehicles. Currently only commercial vehicles are subject to periodical vehicle inspection. The vehicle types subject to vehicle inspection should be extended to cover private vehicles to reduce air pollution as well as traffic accidents due to vehicle mechanical problems. Furthermore vehicle emission standards should be revised periodically, and an implementation schedule for upgrading such standards should be established. In addition, introduction of less emission vehicles (LEV), such as vehicles equipped with CNG or LNG engines, should be taken into account.

Table 8.3.9 Policy Measures for Reducing Air Pollution

Code	Policy Measure
4-1	To decrease air pollutants and noise through enhancement of regulation and strict enforcement
4-2	To minimize exhaust emissions through vehicle inspection
4-3	To expand vehicle inspection system to non-commercial vehicles
4-4	To develop vehicle inspection facilities
4-5	To strengthen air pollution monitoring system
4-6	To upgrade of environmental standard gradually
4-7	To seek alternative energy sources for vehicles, such as natural gas or electricity

(5) Urban Transport Policy 5: Improvement of Transport Safety

The reduction of traffic and railway accident victims is an urgent issue which needs to be tackled as pointed out in Section 5.5. For private cars and motorcycles, the driving manners should be improved through law enforcement, driver education and public campaigns. In addition, the traffic control system should be enhanced to reduce traffic accidents on the roads. Vehicle inspection for private vehicles would also reduce traffic accidents due to mechanical problems of the vehicles. In addition, bus transport safety should be enhanced through the provision of education and training for bus drivers and the enforcement of driving practices. Railway accidents should also be reduced through public campaigns on the danger of riding on the roof of trains, improvement of signal systems and grade separation at railway crossings.

Table 8.3.10 Policy Measures for Improvement of Transport Safety

Code	Policy Measure
5-1	To improve drivers' behavior through traffic safety education programs
5-2	To provide traffic safety education for pupils at schools
5-3	To encourage people to use seat-belt through public campaign
5-4	To expand vehicle inspection systems to private cars to check mechanical failure
5-5	To strengthen vehicle inspection to reduce traffic accidents due to inappropriate maintenance of vehicles
5-6	To strengthen traffic enforcement on the road
5-7	Improvement of traffic safety reporting system and analyze cause of accidents
5-8	Improvement of traffic facilities at black spots

8.4 Transport System Development Policy

In the previous section, overall urban transport policy for Jabotabek was proposed and the potential urban transport policy measures were listed. Among the various types of urban transport policies, transport system development requires a long time and transportation system development policy must be consistent with the regional development policy. Therefore, this section further elaborates the transport system development policy. Based on the understanding of regional development policy for Jabotabek and review of the transportation system development policy proposed in "Jabotabek 2015," the Study Team consolidated the transport system development policies as follows;

(1) Development of Primary Transportation System to support Inter-regional Transport Demand

Inter-regional transportation demand will increase as population in the region increases, the regional economy grows and interactions with other regions are amplified. Since the transportation demand will soon reach the capacity of the existing network, the primary transport network system, which serves inter-regional passenger and commodity movements, should be enhanced to meet increasing demand and to improve access to important transportation facilities such as the primary centers, seaport and airport, namely, Tg. Priok Port and Soekarno Hatta International Airport.

(2) East-West Strategic Transport Corridor Development

To support the urban development policy of Jabotabek's east-west direction discussed in Chapter 7, transportation system development should be utilized as a tool for guiding urban structure in the desired direction. Special attention should be paid to the east-west direction to induce urban development in the designated area. For the north - south direction, the transport corridor in Jakarta – Depok – Cibinong – Bogor corridor should be enhanced to meet the existing and future travel demand.

(3) Strengthening Accessibility between Urban Centers in Botabek

The development of urban centers in Botabek has been emphasized for a long time. Although the population in Kota and Kabupaten has been increasing rapidly, the functions of urban centers are still limited to merely serving the population in the neighborhood, except in certain areas with a concentration of manufacturing industries. The centers provide neither sufficient job opportunities nor urban services for the residents. As a result commuters from Botabek to Jakarta is around 700,000 persons every day. If this trend of relying on Jakarta continues, coupled with an increase in private car use, road development will not be able to catch up with the increasing traffic demand. Hence the development of urban centers in Botabek should be regarded as a primary measure for decreasing the commuter flows from Botabek to Jakarta by increasing job opportunities in the centers. Accessibility between the urban centers in Botabek should be enhanced to achieve sustainable development of urban centers in Botabek by augmenting mutual interaction between centers.

(4) Improving Accessibility between Jakarta and Urban Centers in Botabek

In line with improving accessibility between urban centers in the Botabek area, accessibility to them from Jakarta and vice versa should also be strengthened to support the social and economic activities in the urban centers in Botabek. This is because the urban centers in Botabek cannot provide all of the urban services available in Jakarta. If good accessibility to Jakarta is attained, the services which are not available in Botabek can be supplemented by Jakarta. In this way urban functions in the centers are supplemented, otherwise the centers will be isolated and they can provide limited urban services. Therefore good accessibility to Jakarta would support the growth of these urban centers in Botabek. This improvement will provide better transportation services for commuters between Jakarta and Botabek as well.

(5) Formulating Urban Unit

Although road network density was much lower in Botabek in the previous decades than present, there was ample space for road development. As argued in Section 2.3, urban sprawl has progressed in suburban areas and many real estate type housing complexes have been developed. As a consequence road development has become more difficult than in the past because the developed housing complexes disturb the continuity of the arterial roads. To deal with this problem, road system development should be regarded as a tool to guide the desirable urban structure. The road network should be developed in a

hierarchical manner with appropriate road spacing to develop settlement areas in a well-organized manner.

At present the responsibility for developing arterial streets within the housing complexes is not clear and housing developers tend to make them closed from outside for security reasons.

8.5 Conceptual Transport System Development Plan

In line with the transport system development policy proposed in Section 8.4, this section recommends a long-term transport system development plan at a conceptual level.

(1) Inter-regional Freight Transport Corridor Development

The primary transport system should accommodate both inter-regional commodity and passenger movements. Major commodity flows from the other regions are attracted to Tg. Priok port, industrial areas and warehouses in the region. Inter-regional freight transport demand therefore should be accommodated by strengthening the freight transportation corridors. As examined in Chapter 7, industrial zones are planned to develop further in Kabupatens Tangerang and Bekasi. Inter-regional freight transport corridors should be enhanced to provide linkage between the existing and planned industrial zones and the Tg. Priok seaport and the Soekarno Hatta international airport. (Figure 8.5.1)

- Develop additional inter-regional expressways parallel to the existing ones to augment capacity
- Improve accessibility to Tg. Priok Port by constructing the Jakarta Outer Ring Road (E-3 Section)
- Improve accessibility to the Soekarno Hatta International Airport by constructing the Jakarta Outer Ring Road (W-1 Section and W-2 Section)
- Improve accessibility to Tg. Priok port by constructing the new Tg.Priok-Citayam-Parung Panjang railway line for freight transport

(2) Inter-regional Passenger Transport Corridor Development

Inter-regional passenger travel is made mainly by railway, bus, private passenger car and air transport. To provide better inter-regional passenger transport services, both line haul and access/egress to terminal nodes should be improved.

As for inter-regional railway transport, the plan is to separate long and middle distance train operation from commuter train operation in order to increase transport capacity on the line thus middle/long distance trains will stop at the Manggarai station. The Double Double Tracking of Bekasi line project is currently being prepared for implementation. When the project is completed, the number of commuter trains and middle/long distance trains can be increased significantly. Once the Manggarai integrated public transport terminal is developed, inter-regional railway passengers will arrive at Manggarai and so improvement of access to the Manggarai station should be considered.

As for road transport, such as private passengers cars and buses, the improvement of these services is directly affected by the future road network configuration.

Additional expressways should be developed in the future to meet the expected growth of inter-regional passenger demand. Since inter-regional expressways, especially at the section between Cikarang and Cawang on the Jakarta – Cikampek toll road, are almost saturated, and the regional development policy aims to expand the urban structure in the east - west direction, inter-regional expressways should be added parallel to the existing toll roads.

The inter-regional road system should be integrated with the intra-urban road system. The suspended Jakarta Outer Ring Road would have functioned as an intermediate road link, connecting inter-regional expressways with the intra-urban arterial road system. For this reason, the development of the JORR should be urgently completed.

On the other hand, inter-regional bus passengers arrive at intercity bus terminals such as Pulo Gadung, Kampung Rambutan, Lebak Bulus, and Kali Deres. Of the four inter-regional bus terminals, the Pulo Gadung and Kali Deres bus terminals should be relocated along the Jakarta Outer Ring Road for efficient distribution of bus passengers to their final destination in the metropolitan area. The JORR plays a key role in distributing inter-regional bus passengers and is a prerequisite for inter-city bus terminal development as well.

The other important passenger flows into the metropolitan area are the domestic and international air passengers. Air passengers going to the Soekarno Hatta international airport utilize cars and buses mainly through the toll road. However the existing Cenkareng Access is often flooded and cannot be used. The development of the W-1 and W-2 sections of the Jakarta Outer Ring Road will provide a detour in the event of flooding. The planned railway extension of the Tangerang line would also provide alternative access in the future. (Figure 8.5.2)

- Develop additional inter-regional expressways parallel to the existing toll roads to augment capacity
- Improve accessibility to the Soekarno Hatta International Airport by constructing the Jakarta Outer Ring Road (W-1 Section and W-2 Section)
- Extend the Tangerang Line to the Soekarno Hatta International Airport

(3) East-West Strategic Transport Corridor Development

To achieve the transport development policy of "strategic corridor development," the east-west corridor development should be enhanced to encourage urban development in this direction. The east-west corridor should serve various types of transport demand according to the variety of travel needs in the metropolitan area; thus multi-mode transport corridors shall be developed. The corridor should be formulated with inter-regional expressways, primary roads, and a rail-based transport system. (Figure 8.5.3)

- Strengthen the Tangerang – Jakarta – Bekasi east-west corridor
- Develop the MRT East-West Line development (Tangerang – Duri – Bekasi)
- Improve the Jakarta – Depok – Cibinong – Bogor north-south corridor

(4) Strengthening Connection between Jakarta and Urban Centers in Botabek and between Urban Centers in Botabek

To achieve the urban transportation system development policy of strengthening accessibility between the urban centers in Botabek as well as with Jakarta, the linkages between Jakarta and these centers should be improved. Accessibility between the major urban centers in Botabek can be improved by the Outer Outer Ring Road development, while other linkages can be strengthen by developing the arterial road system. Further enhancement of the Bogor line, and the improvement of the Tangerang, Serpong and Bekasi lines of the Jabotabek railway can accommodate the increasing commuter flows. (Figure 8.5.4)

- Development of the Outer Outer Ring Road to improve accessibility between the urban centers in Botabek
- Development of the other arterial road system connecting the urban centers in Botabek
- Public transportation system development between Jakarta and the urban centers in Botabek
- Arterial road development between Jakarta and the urban centers in Botabek

(5) Hierarchical Road System Development

To develop a well-organized road system as well as well-ordered settlement areas, a road network development master plan should urgently be established. In addition, the responsibility for road development should be clearly outlined among the different levels of government agencies and also between the public and private sectors. (Figure 8.5.5)

- Linear road network development with a grid pattern arterial road system in the Tangerang-Jakarta-Bekasi corridor
- Linear road network development with a grid pattern arterial road system in the Jakarta – Depok – Cibinong – Bogor corridor
- Collector road development in Jakarta

(6) Overview of the Proposed Conceptual Transportation System Development Master Plan

The proposed major components of the Jabotabek transportation system developments have been explained separately according to its function. All of these components are combined in Figure 8.5.6 to understand the overall structure of the Jabotabek integrated transportation system.

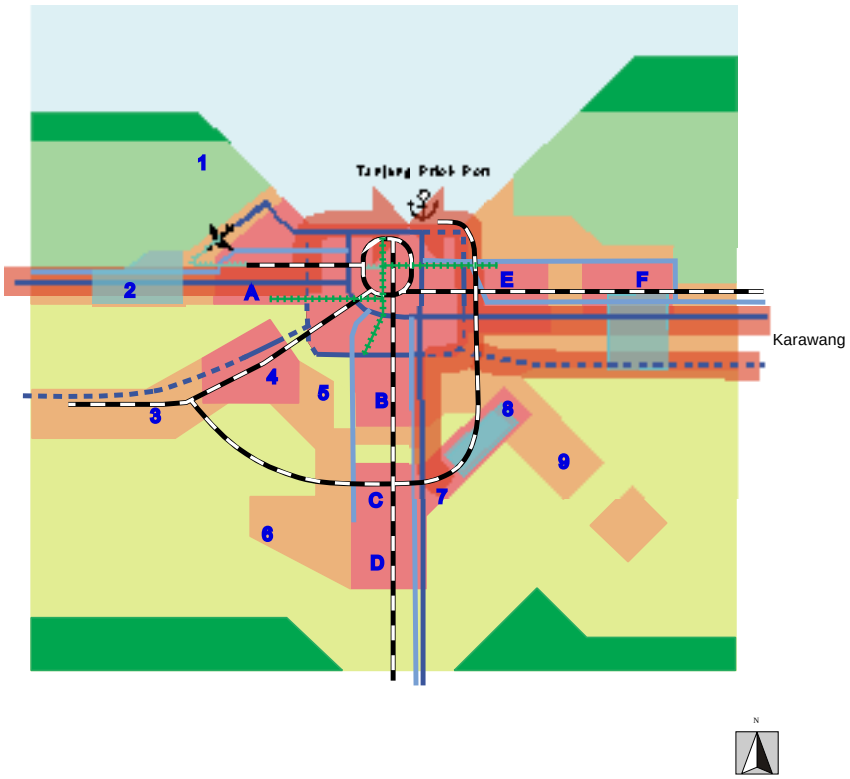


Figure 8.5.1

Inter-regional Freight Transport Corridor Development

- Urban Area
- Low Density Area
- Rural Agriculture
- Wetland Cultivation
- Conservation
- Industrial Zone
- Freight Transport Corridor
- F Regional Center
- 9 Local Center

A. Tangerang
B. Depok
C. Cibinong
D. Bogor
E. Bekasi
F. Cikarang

1. Teluknaga
2. Balaraja
3. Parung Panjang
4. Serpong
5. Parung
6. Leuwiliang
7. Cileungsi
8. Cibarusah
9. Jonggol

- Toll Road
- Primary Road
- Railway
- Planned Railway
- MRT Line

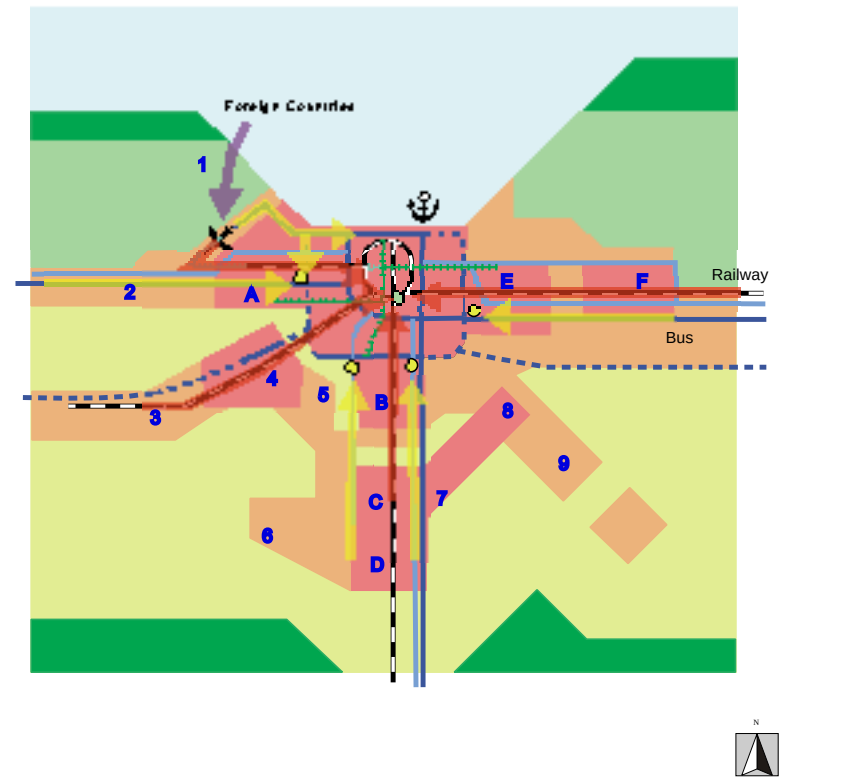


Figure 8.5.2

Inter-regional Passenger Transport Corridor Development

- Urban Area
- Low Density Area
- Rural Agriculture
- Wetland Cultivation
- Conservation
- Inter-regional Bus Passenger Transport
- Inter-regional Railway Passenger Transport
- F Regional Center
- 9 Local Center

A. Tangerang
B. Depok
C. Cibinong
D. Bogor
E. Bekasi
F. Cikarang

1. Teluknaga
2. Balaraja
3. Parung Panjang
4. Serpong
5. Parung
6. Leuwiliang
7. Cileungsi
8. Cibarusah
9. Jonggol

- Toll Road
- Primary Road
- Railway
- Planned Railway
- MRT Line

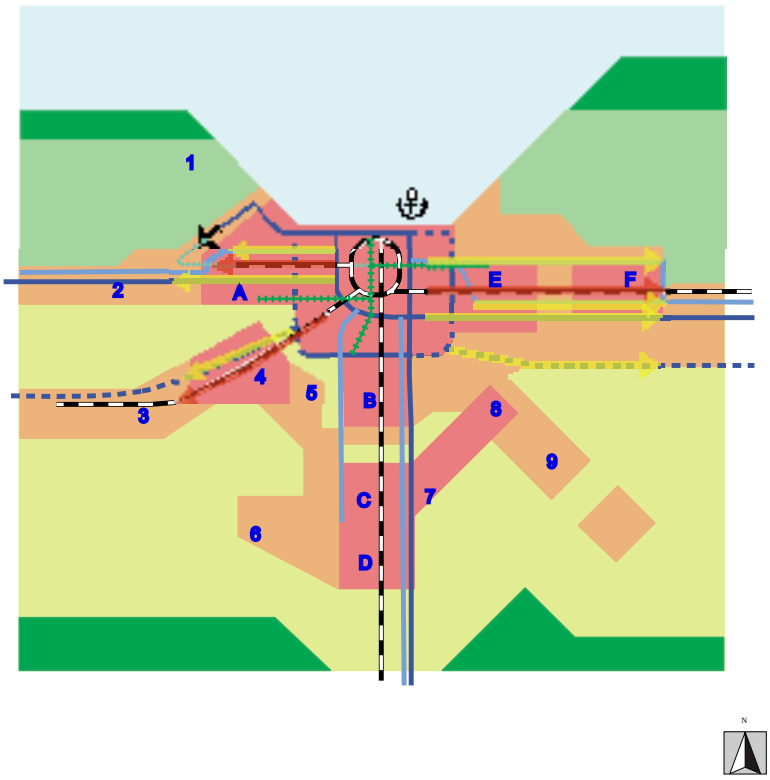


Figure 8.5.3

East-West Strategic Transport Corridor Development

Urban Area
Low Density Area
Rural Agriculture
Wetland Cultivation
Conservation

East - West Strategic Corridor

F Regional Center
9 Local Center

A. Tangerang
B. Depok
C. Cibinong
D. Bogor
E. Bekasi
F. Cikarang

1. Teluknaga
2. Balaraja
3. Parung Panjang
4. Serpong
5. Parung
6. Leuwiliang
7. Cileungsi
8. Cibarusah
9. Jonggol

Toll Road
Primary Road
Railway
Planned Railway
MRT Line

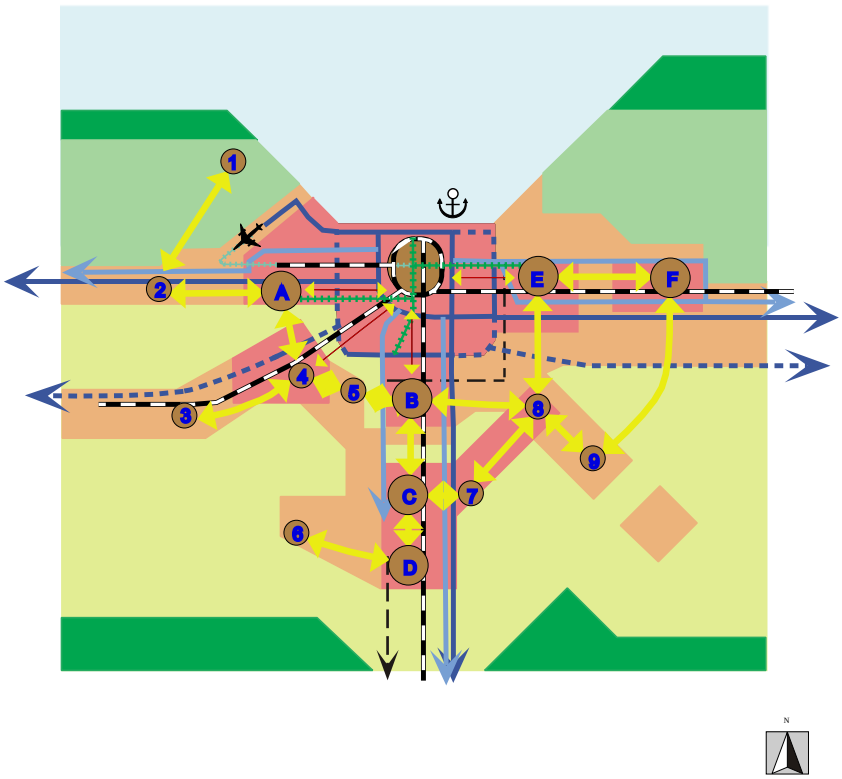


Figure 8.5.4

Strengthening Connection between the National Center (Jakarta) and Urban Centers in Botabek and between Urban Centers in Botabek

Urban Area
Low Density Area
Rural Agriculture
Wetland Cultivation
Conservation

Linkages between Urban Centers

National Center

F Regional Center
9 Local Center

A. Tangerang
B. Depok
C. Cibinong
D. Bogor
E. Bekasi
F. Cikarang

1. Teluknaga
2. Balaraja
3. Parung Panjang
4. Serpong
5. Parung
6. Leuwiliang
7. Cileungsi
8. Cibarusah
9. Jonggol

Toll Road
Primary Road
Railway
Planned Railway
MRT Line

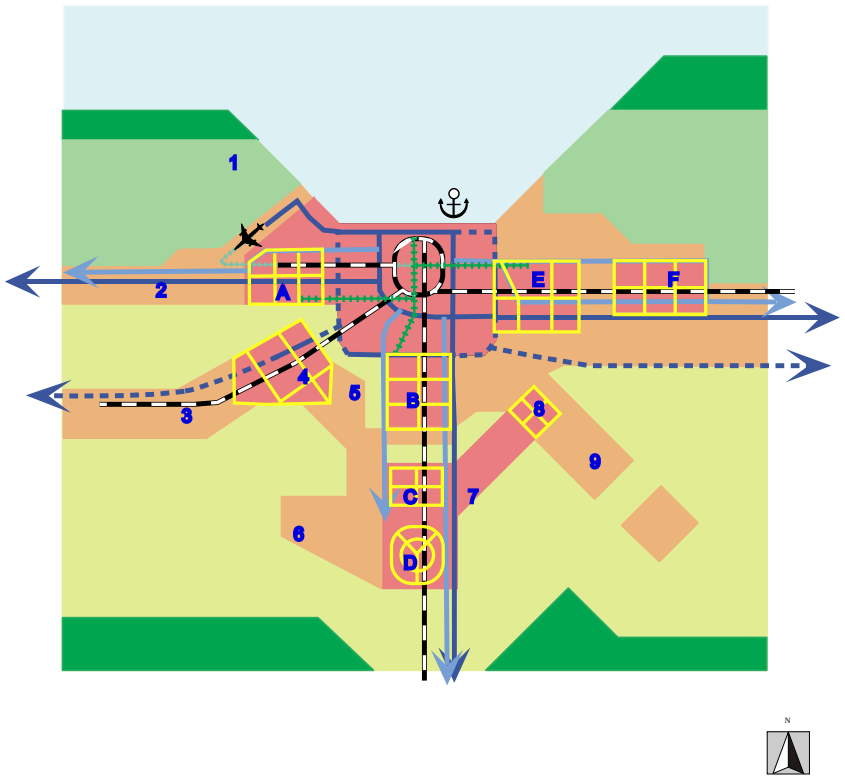


Figure 8.5.5

Hierarchical Road System Development

Urban Area
Low Density Area
Rural Agriculture
Wetland Cultivation
Conservation

Hierarchical Road System Within Urban Centers

F Regional Center
9 Local Center

A. Tangerang
B. Depok
C. Cibinong
D. Bogor
E. Bekasi
F. Cikarang

1. Teluknaga
2. Balaraja
3. Parung Panjang
4. Serpong
5. Parung
6. Leuwiliang
7. Cileungsi
8. Cibarusah
9. Jonggol

Toll Road
Primary Road
Railway
Planned Railway
MRT Line

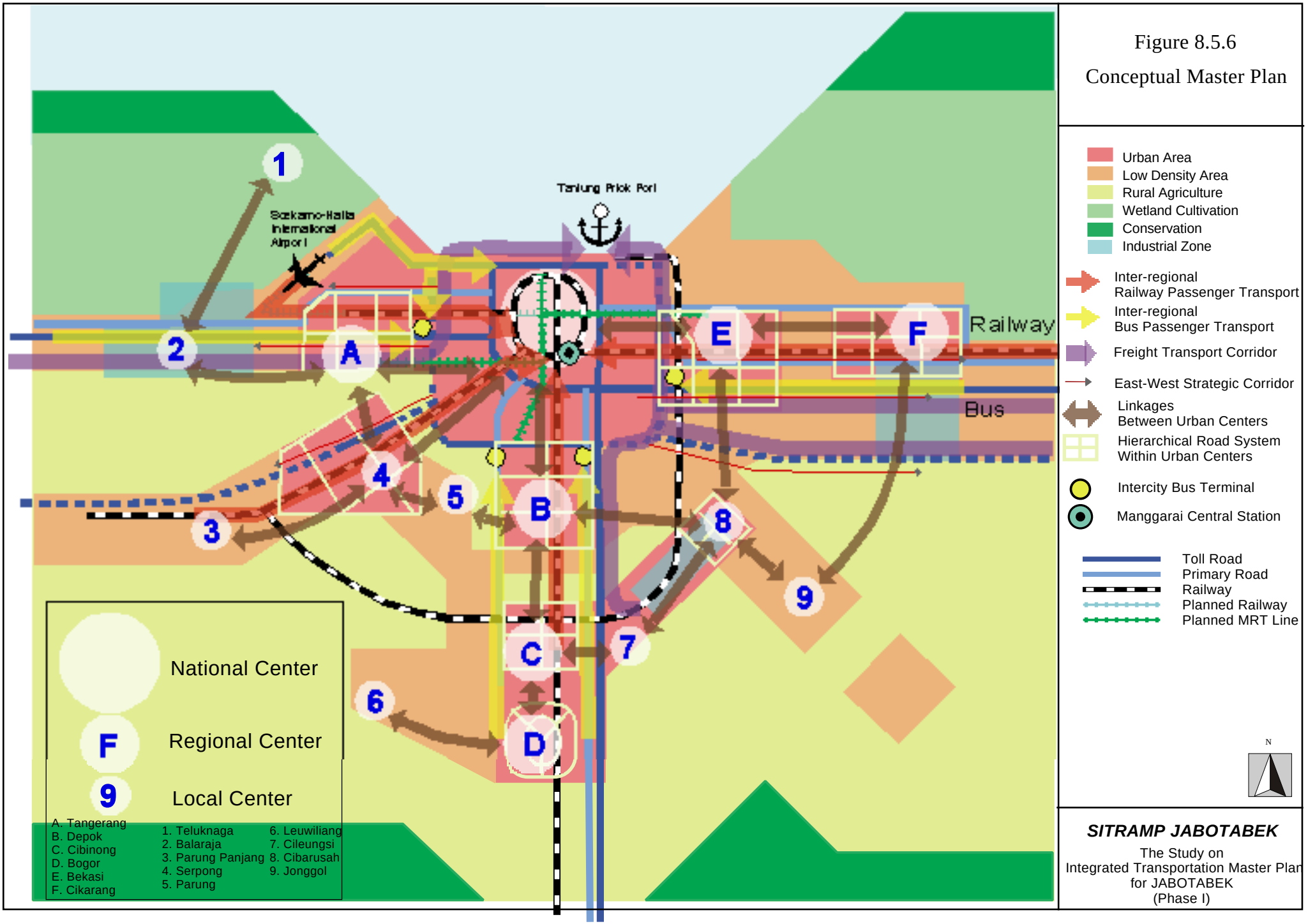


Figure 8.5.6

Conceptual Master Plan

SITRAMP JABOTABEK

The Study on
Integrated Transportation Master Plan
for JABOTABEK
(Phase I)

8.6 Strategy for Developing an Integrated Urban Transportation System

8.6.1 Understanding Current Situation for Formulating Urban Transportation Strategy in Jabotabek

As identified in Chapters 5 and 7, the core urban transportation issue is the alleviation of vehicular traffic congestion and the promotion of public transportation to reduce the usage of private cars. Since at present economic activities are gradually recovering after the economic crisis, traffic demand will increase again to the pre-crisis level. The increase in road capacity is, however, limited especially in the central area due to both financial constraint and land availability. Merely increasing the road capacity will not be enough to catch up with the increasing traffic demand. As a consequence, public transport should play a more important role in the Jabotabek transportation system in the future and the level of service and capacity will have to be improved to meet the demand.

However, as analyzed in Chapter 5, it is not easy to divert people from private cars and motorcycles to public transport because the current service level of public transport is unsatisfactory, making it unattractive to the middle and high income groups. Thus it is essential to combine vehicular traffic restraint with public transport service improvement to divert travelers from private transport to public transport. It should be noted that public transport must be improved prior to the implementation of the traffic restraint scheme, because, if alternative modes with a satisfactory level of service are not available, car users would express strong objections to the policy.

Furthermore the public transport system should be developed as a network, incorporating the existing railway network. The improvement of only one or two routes does not result in a sufficient service level of public transport as a whole. Consequently overall upgrading of the existing public transport system should be made comprehensively.

The government has been facing financial difficulties due to the economic crisis and the subsequent reduction of revenue as well as the increased expenditure required to rescue the economy, as argued in Chapters 3 and 6. This constraint should be taken into consideration when short-term policy measures are selected.

Based on the present situation of urban transportation in Jabotabek mentioned above, a strategy for developing an integrated urban transportation system should be established.

8.6.2 Needs for Prioritization of Urban Policy Measures

An urban transportation system cannot be developed in the short-term. It requires a long-term framework and continuous efforts in order to culminate in an integrated transportation system. In order to reach the final configuration of the integrated transportation system, the combination of measures should be carefully arranged, taking time-sequence and logical order among the various countermeasures into consideration, and a strategy should be established by prioritizing and packaging transportation policies and measures. Several

measures are consolidated and integrated into packages with a view to develop an efficient urban transportation system.

Prioritizing of policy measures need to be prioritized since all of the urban transport policy measures listed in the previous section cannot be accomplished at once. Some of the policy measures can be upgraded gradually to a higher system standard, whereas coverage areas can be extended in phases.

Effective policy measures should be selected from the various policy measures to achieve the identified objectives, while the possibility of project/program implementation should also be examined.

8.6.3 Evaluating Urban Transport Policy Measures

The urban transport policy measures were assessed for their effectiveness in achieving the objectives and ease of implementation. The effectiveness of the urban transport policy measures were evaluated for the following,

- Impact in promoting public transportation usage,
- Impact in alleviating traffic congestion,
- Impact on environmental betterment, and
- Impact on transport safety

a) Impact in alleviating traffic congestion

Needless to say, traffic congestion is the most significant urban transportation problem and most people are aware and concerned with this problem. Traffic congestion results in longer travel time and enormous economic losses. People are irritated when they are in a traffic jam and are late for an appointment. Traffic congestion also causes ambient air pollution. Therefore policy measures that contribute toward alleviating traffic congestion should be selected.

b) Impact in promoting public transportation usage

Promotion of public transportation usage is a key urban transportation policy that contributes towards the establishment of an efficient transportation system and affordable modes of transport. Promotion of public transportation leads to the reduction of vehicular traffic demand, thus it contributes toward the alleviation of traffic congestion.

c) Impact on environmental betterment

As argued in Section 5.7, the environment in the region has deteriorated significantly due to the increase in vehicular traffic. In particular, ambient air pollution caused by exhaust gases emitted by automobiles is a serious problem. Countermeasures such as wider implementation of vehicle inspection are urgently required. It should be noted that the reduction of car traffic by shifting to public transport is one of the essential policy measures for the reduction of automobile exhaust gas.

d) Impact on transport safety

Transport safety is one of the most important objectives of urban transport system development. In the study area, not just road traffic accidents but also railway accidents have resulted in a considerable number of victims. The minimization of transport accident victims is an urgent issue.

Table 8.6.1 Evaluation of Urban Transport Measures (1)

Transportation Policy and Direction	Code	Policy Measures	Effectiveness				Constraint		Applicability in Short term	Remarks
			Promoting Public Transport	Alleviating Traffic Congestion	Environmental Betterment	Transport Safety	Fund Requirement	Land Acquisition Problem		
Development and Improvement of Road Network										
Increase road capacity by construction and improvement of road network	(1A-1)	Maintenance of existing roads	–	△	△	–	○	○	**Yes**	Maintenance of existing roads should be continuously conducted.
	(1A-2)	Road widening at bottleneck sections	–	◎	○	△	△	△×	**Yes**	Road widening at bottleneck sections would have significant effect for minimize cost.
	(1A-3)	Improvement of bottleneck intersections	–	◎	○	△	○	△	**Yes**	Same as above
	(1A-4) (1A-5)	New road construction · Toll roads · Outer Outer Ring Road · Arterial roads · Collector roads	△	○	△	–	×	△×		Road development master plan should be established.
	(1A-6)	Grade separation at major intersections (construction of flyovers/ underpasses)	–	○	○	○	×	△		Same as above
	(1A-7)	Development of arterial streets to accommodate busway	◎	◎	△	–	×	×		
Optimal Utilization of the Existing Road Network										
Smoothing traffic flows by making best use of the existing facilities	(1B-1) (1B-2)	Area traffic control system or coordinated traffic signals	–	○	○	△	△	–		Consolidation of existing traffic signal system is required
	(1B-3)	Improvement of traffic signal phasing (from 4-phase into 2-phase	–	○	–	○	○	–	**Yes**	Two phase system enables provide a longer time for pedestrians crossing.
	(1B-4)	Dissemination of detour information through traffic information system	–	○	–	–	△	○	**Partly**	To make use of the limited road network, traffic information system provides detour information for drives.
Restraint of Automobile Use										
Restraint of excessive traffic demand on road	(1C-1)	Congestion pricing (Area Pricing/Road Pricing)	–	◎	○	–	○	–	**Yes**	Improvement of public transport services should be made prior to congestion pricing.
	(1C-2)	Increase parking charge	○	◎	○	–	○	–	**Yes**	Study on the existing parking supply and demand should be conducted.
	(1C-2)	Increase parking surcharge	○	◎	○	–	○	–	**Yes**	Same as above
	(1C-2)	Charge for excessive parking spaces of buildings in congested area	○	○	○	–	○	–	**Yes**	Same as above
	(1C-2)	Obligatory supply of parking spaces to decrease on-street parking	–	○	△	–	○	–	**Yes**	Already employed but the standard should be reviewed based on inventory of parking facilities as well as parking demand.
Reduce excessive vehicular traffic concentration	(1C-3)	Traffic impact assessment for large-scale development	○	○	△	–	○	–	**Yes**	It would take time to prepare the draft of regulation.
	(1C-4)	Traffic generation fee according to type of facility	○	○	△	–	○	–	**Yes**	Study on trip generation by facility type is required.
Reduce vehicular trip demand through increasing opeartion cost	(1C-5)	Reduce subsidy for fuel gradually	△	◎	△	–	○	–	**Yes**	This policy is politically difficult to implement.
Reduce number of cars by increasing occupancy	(1C-6)	HOV lane on arterial streets or toll roads	○	○	△	–	○	○	**Yes**	HOV lane should be employed on congested sections.
	(1C-6)	Car pool, van pool	△	○	△	–	○	–	**Yes**	Car pool and van pool should be encouraged to reduce number of vehicles.
Flatten Traffic Demand										
Decrease traffic demand in peak period	(1C-7)	Promotion of staggered working hours and flexible working hour system	△	○	△	–	○	–	**Yes**	Public acceptance is uncertain.

Note:
◎ Excellent
○ Good
△ Moderate
× No/ Negative Effect
– Not Related Directly

Table 8.6.1 Evaluation of Urban Transport Measures (2)

Transportation Policy and Direction	Code	Policy Measures	Effectiveness				Constraint		Applicability in Short term	Remarks
			Promoting Public Transport	Alleviating Traffic Congestion	Environmental Betterment	Transport Safety	Fund Requirement	Land Acquisition Problem		
Improvement of Railway Transport Services										
Increase railway passenger capacity	(2A-1)	Construction of New Railway Line Tg. Priok-Ciatayam-Parung Panjang	△	△	○	○	×	×		In-depth study is needed for cargo transportation system development plan.
	(2A-2)	Double Tracking of Serpong and Tangerang Lines	◎	○	○	○	×	×		For Tangerang line ROW is already prepared.
	(2A-3)	Track Elevation of Eastern Line	◎	○	○	◎	×	×		Railway crossing causes traffic congestion thus track elevation is needed to alleviate traffic congestion on this corridor.
	(2A-4)	Addition of railway tracks (Short-cut)· Serpong line and Western line · Tangerang line and Western line	◎	○	○	○	×	×		This short cut makes smooth east - west train operation.
	(2A-5)	Purchase of Additional Electric Cars for Jabotabek Railway	◎	○	–	–	×	○		Additional electric cars are required to increase frequency on the existing lines.
	(2A-6)	Reinforcement of stabiling yard	–	–	–	○	△	△	**Yes**	Reinforce stabling yard will help efficient train operation
	(2A-7)	Construction of new MRT lines · MRT Fatmawati – Kota · MRT East – West line	◎	○	○	○	×	×		Feasibility study should be conducted.
Improve operational efficieny	(2A-8)	Provision of urban railway service (Semi-loop line)	◎	◎	○	○	×	×		It requires huge amount of fund for urban railway development.
	(2A-9)	Raising / extending platform	△	–	–	○	△	△	**Yes**	Raising and extending platform enables quick boarding and alightning
Improving railway safety	(2A-10)	Improvement of signal facilities	△	–	–	◎	△	○	**Yes**	Signal system should be improved urgently to secure transport safety.
	(2A-11)	Construction of over-track station/ underground passage	△	△	–	◎	△	○	**Yes**	Over-track station and underground passage provide safe passage for railway passengers
Improve financial efficiency	(2A-12)	Adjustment of railway fare and proper fare collection	×	–	–	△	○	–	**Yes**	Proper fare collection needs related facility improvement.
	(2A-13)	Improvement of railway management	◎	–	–	○	○	–	**Yes**	In-depth study is required to reform railway management.
Improve of Bus Transport Services										
Improve overall efficiency of bus operation	(2B-1)	Provide high level of bus services for the areas where rail-based services are not available	◎	◎	–	–	△	△		It requires new street development to accommodate busway or bus priority lanes.
	(2B-2)	Bus Route Restructuring	◎	○	–	–	○	–	**Yes**	Present bus operation and bus passenger demand pattern should be investigated
Give more priority to bus transport	(2B-3)	Improvement of feeder bus services to railway stations	○	○	–	–	△	△	**Partly**	If sufficient access roads are available, this measure can be implemented in short term, otherwise development of access roads should be executed in advance.
	(2B-4)	Extension of bus lanes or introduction of busway	◎	×	–	–	△	△	**Yes**	Busway can be installed on the streets of six lanes and more. For other streets reversible lane can be introduced.
	(2B-5)	Reformation of Bus Operation Regime (Tendering System)	◎	△	–	○	○	–	**Yes**	To improve bus operation reformation of bus operation regime is essential.
	(2B-6)	Adjustment of bus fare system to cover the operation cost for each type of service	△	△	–	○	○	–	**Yes**	In-depth study on bus operation cost should be implemented. Bus Demonstration Project will cover the analyses on bus operation costs.
Decrease uncertainty of bus operation by disseminating information	(2B-7)	Introduction of bus location system	△	△	–	–	△	○	**Yes**	Bus location system contributes to provide information not merely passengers but also bus operators and regulatory agency
	(2B-8)	Installment of bus prioritized traffic signals	○	△[1)] ×[2)]	–	△	△	○	**Yes**	This should be synchronized with busway development.
	(2B-9)	Addition of contra-flow bus lanes	○	△[1)] ×[2)]	–	–	○	○	**Yes**	Contra-flows have been proven to be effective.
Improve comfort for waiting	(2B-10)	Revise Bus Shelter Standard	△	–	–	–	○	△	**Yes**	Minor improvement but it should be taken into consideration
Improve accessibility to bus services	(2B-11)	Relocation of bus stops	△	–	–	–	△	–	**Yes**	Same as above
	(2B-12)	Review of clearance of pedestrian bridge in urban area	△	–	–	△	○	–	**Yes**	Same as above

Note: Road capacity for private vehicles would be decreased in short-term, however, it would contribute to reduce traffic congestion by shifting to public transport. 1) intermediate term 2) short-term

Note: ◎ Excellent
○ Good
△ Moderate
× No/ Negative Effect
– Not Related Directly

Table 8.6.1 Evaluation of Urban Transport Measures (3)

Transportation Policy and Direction	Code	Policy Measures	Effectiveness				Constraint		Applicability in Short term	Remarks
			Promoting Public Transport	Alleviating Traffic Congestion	Environmental Betterment	Transport Safety	Fund Requirement	Land Acquisition Problem		
Integration of Modes of Transport										
Improve convenience of transfer at public transport terminals	(2C-1)	Relocation of intercity bus terminals · Pulo Gadung bus terminal · Kali Deres bus terminal	○	○	–	–	△	△		Manggarai central station will be a hub public transport terminal
	(2C-2)	Development of new integrated transport terminal Manggarai Central Station	○	○	–	–	△	△		Manggarai central station will be a hub public transport terminal
Improve smooth transfer at interchange facilities	(2C-3)	Development of railway station plaza	○	–	–	–	△	○	**Yes**	At many stations land for station plaza is available.
	(2C-3)	Preparation of park and ride facilities	○	–	–	–	△	○	**Yes**	Parking facilities can be included in station plazas.
	(2C-3)	Improvement of access roads to railway stations	○	–	–	–	△	△		New access road construction requires land acquisition.
	(2C-4)	Provision of bus feeder services	○	–	–	–	△	△		
	(2C-5)	Improvement of usage of bus terminal	○	–	–	–	○	○	**Yes**	Stricter enforcement id needed.
Encourage public transport use through improving conveinence	(2C-6)	Common ticket	○	–	–	–	△	–		It needs time to coordinate different public transport operators.
	(2C-6)	Discount fare for transfer	○	△	–	–	○	–	**Yes**	In depth study on public transport fare system is necessary.
Promote public transport use through tax incentives	(2C-7)	Deduction of public transport allowance from business tax	◎	○	–	–	×	–		Legal issues should be studied.
Promotion of Public Transport Usage										
Promote public transport usage by guided land use	(2D-1)	Promote high-density land use surrounding railway station and terminals by setting high floor area ratio	◎	○	–	–	○	–	**Yes**	Review of land use plan and floor area ratio is recommended.
	(2D-2)	Urban redevelopment of office building and commercial facilities surrounding railway stations in central area	◎	○	–	–	×	×		Urban redevelopment requires long time.
	(2D-3)	Development of medium, high-raised apartment near suburban stations	◎	○	–	–	△	×		Realization of urban development requires long time.
	(2D-4)	Development of east-west transport corridor to induce urban structure	-	–	◎	–	×	×		Guide urban development in a desirable direction
Normalization of Transport Facility										
Normalize transport facilities	(3-1)	Development of transport facility for handicapped and transport poor	–	–	–	○	△	–	**Partly**	This facility development should be continuously made.
	(3-2)	Improvement of non-motorized mode of transport and its related facilities	○	△	○	○	△	△	**Partly**	Same as above
Reducing Air Pollution										
Reduce generation of air pollutants	(4-1)	To decrease air pollutants and noise through enhancement of regulation and strict enforcement	–	–	○	–	○	△	**Yes**	Stricter enforcement can be executed in short term.
	(4-2)	To minimize exhaust emissions through vehicle inspection	–	–	◎	–	○	–	**Yes**	It needs sufficient number of equipment for inspection.
	(4-3)	To expand vehicle inspection system to non-commercial vehicles	–	–	○	○	△	–		It requires of sufficient vehicle inspection facilities (4-7).
	(4-4)	To develop vehicle inspection facilities	–	–	△	△	△	–	**Yes**	Inventory and study on the existing inspection facilities is required.
	(4-5)	To strengthen air pollution monitoring system	–	–	△	–	△	–		Installment of monitoring equipment is required.
	(4-6)	To upgrade of environmental standard gradually	–	–	○	–	○	–	**Yes**	Discussion with automobile industry is required.
Reduce use of fuel for vehicles	(4-7)	To seek alternative energy sources for vehicles, such as natural gas or electricity	–	–	○	–	△	–		R & D is required.

Note:
◎ Excellent
○ Good
△ Moderate
× No/ Negative Effect
– Not Related Directly

Table 8.6.1 Evaluation of Urban Transport Measures (4)

Transportation Policy and Direction	Code	Policy Measures	Effectiveness				Constraint		**Applicability in Short term**	Remarks
			Promoting Public Transport	Alleviating Traffic Congestion	Environmental Betterment	Transport Safety	Fund Requirement	Land Acquisition Problem		
Improvement Transport Safety										
Reduce traffic accidents through traffic safety education and public campaign	(5-1)	To improve drivers' behavior through traffic safety education programs	–	–	–	○	○	–	**Yes**	Education program for drivers can be established in short term.
	(5-2)	To provide traffic safety education for pupils at schools	–	–	–	◎	○	–	**Yes**	Education program for school children can be established in short term.
	(5-3)	To encourage people to use seat-belt	–	–	–	◎	○	–	**Yes**	Maintenance of existing roads should be continuously conducted.
Reduce traffic accidents due to lack of maintenance	(5-4)	To expand vehicle inspection systems to private cars	–	–	◎	◎	○	–	**Yes**	Same as (4-5)
	(5-5)	To strengthen vehicle inspection to reduce traffic accidents due to inappropriate maintenance of vehicles	–	○	◎	◎	○	–	**Yes**	Same as (5-3)
Reduce traffic accident through enfoecement	(5-6)	To strengthen traffic enforcement on the road	–	–	–	○	○	–	**Yes**	
Reduce traffic accidents through analysis of causes	(5-7)	Improvement of traffic safety reporting system and analyze causes of accidents	–	–	–	○	○	–	**Yes**	Form for traffic accident report can be prepared in short term.
	(5-8)	Improvement of traffic facilities at black spots	–	–	–	◎	△	–		Needs time for data storing.

Note:
◎ Excellent
○ Good
△ Moderate
× No/ Negative Effect
– Not Related Directly

8.6.4 Selecting Short-term Policy Measures

Among the items for evaluating urban transport policy measures, the possibility of project implementation should be accentuated for selecting short-term policy measures. Thus short-term policy measures plan have been selected from the projects from the followings;

- Projects that do not require a huge amount of funds, and
- Projects without land acquisition problems

(1) Less Fund Requirement

As discussed in Chapter 3, at present the central as well as the local governments are still suffering from the economic crisis. In view of the severely diminished government revenues and budget, it is difficult to implement large-scale infrastructure developments that require enormous funds. Therefore the fund required by a project is used as criteria in selecting short-term measures. In general, it is difficult to adopt a large-scale infrastructure development project, which requires a considerable amount of capital, as a short-term solution. This is especially true, under the very tight financial situation that the Government of Indonesia faces at present. In contrast, some policy measures, such as road pricing and increase in gasoline tax, would generate revenues for the Government. Hence, both the expenditure and revenue sides of a policy should be taken into consideration.

(2) Land acquisition problem

Land acquisition has been one of the obstacles of project implementation. People are now more than ever concerned about the justification for their relocation. Obviously, projects that need a sizable amount of land acquisition may require a long project realization period. Projects for short-term implementation should therefore be chosen from those without any significant land acquisition problem.

Table 8.6.2 shows the initial assessment of the possible urban transport policy measures.

First of all, priority should be given to the maintenance of existing transport facilities since many transport facilities have deteriorated due to the economic crisis. Failure to carry out proper maintenance would result in further deterioration of the facilities and higher repair costs. In addition, soft measures should also be focused as short-term policy measures because they do not require large amount of funds.

8.6.5 Logical Order and Linkage of Urban Transportation Policy Measures

Some policy measures can be regarded as being prerequisites for other measures. In other words, success of some policies are based on the condition that other related policies are properly implemented. Thus an attention should be paid for logical linkage of each policy measure when strategy is developed. At the same time packaging of measures often brings about multiplier effects.

(1) Pull and Push Approach for Diverting travelers from Private Modes to Public Transport

It is widely recognized that a car restraint scheme would work well only if there are reasonable alternative modes of transport for car drivers and passengers. Therefore, a satisfactory level of public transportation services should be provided to the present car users, prior to employing a car traffic restraint scheme; otherwise, the policy would not be successful due to strong opposition from the car users. Thus, a combination of a "pull" policy, which attracts more public transport passengers, and a "push" policy, which gives additional cost or restriction to car users, would be effective in achieving a shift from the private to the public mode.

It is recommended that the bus transport be improved by introducing busway and changing this bus operation regime prior to the introduction of the traffic restraint scheme.

(2) Bus Demonstration Project as an Experimental Project for JKT-MRT

As described in Volume II, the JKT-MRT project is difficult to implement from the financial point of view. Several conditions should be met before proceeding with the implementation of the project. The most crucial factor is the raising of funds for the project. Since fully private investment is practically not feasible, thus it implies the needs of financial support by public sector for the project in terms of subsidy.

Under the current serious public financial situation, the central and local governments are expanding a shortage of tax revenues due to the economic downturn and also since a significant portion of the budget is being allocated for the rescue program. If the government cannot find new financial sources, it will not be able to provide a subsidy for the MRT project. In this regard, the reduction of gasoline subsidy and the introduction of road pricing are two new options for generating funds from the transport sector. However, these two transport policies are not popular with the public. In the current new era of democracy, public acceptance of those policies is crucial.

Another concern is the uncertainty over the future passenger demand for the JKT-MRT. As experienced in the metropolitan areas of neighboring countries such as Kuala Lumpur, Manila, and Bangkok, the future passenger demands on LRTs and MRTs were often overestimated. The people's actual preference with regard to modal choice is rather difficult to capture before the commencement of the LRT/MRT operation since people are not familiar with the performance of the new transit system.

To deal with uncertainties over future passenger demand, it is recommended to introduce high level of bus services in speed, punctuality, reliability, and comfort similar to rail-based transport, and see how people response to the new system. Therefore bus demonstration project can be regarded as an experiment for the Jakarta MRT project.

(3) Bus Demonstration Project as an Experimental Project for JKT-MRT

As described in Volume II, the JKT-MRT project is difficult to implement from financial points of view. Several conditions should be met before proceeding

implementation of the project. The most crucial factor is fund raising for the project. Since fully private investment is practically not feasible, thus it implies the needs of financial support by public sector for the project in terms of subsidy.

Under the current serious public financial situation, the central and local governments have been facing lack of tax revenues due to economic downturn and due to the fact that a significant portion of the budget was and will be allocated for the rescue program. If the government cannot find new financial sources, the government will not be able to provide subsidy for the MRT project. In this regard, reducing subsidy for gasoline and introduction of road pricing are new major fund generator in the transport sector. However, these two transport policies are not popular to the public. In face with the new era of democracy, public acceptance of those policies is a crucial issue of the policy.

Another concern is uncertainty on future passenger demand of JKT-MRT. As experienced in the metropolitan areas in neighboring countries such as Kuala Lumpur, Manila, and Bangkok, the future passenger demands on LRTs and MRTs were often overestimated. Actual people's preference on modal choice is rather difficult to capture before commencement of the LRT/MRT operation since people are not aware of the real performance of the new transit system.

To deal with uncertainties of future passenger demand it is recommended to introduce high level of bus services in terms of speed, punctuality, reliability, and comfort similar to rail-based transport, and see how people response to the new system. The bus demonstration project therefore can be regarded as an experiment for Jakarta MRT project.

8.6.6 Phased Implementation of Urban Transport Policy Measures

(1) Urban Transport Policy Measures in Short-term

a) Rail-based Transport

Improve a accessibility to railway stations such as the development of station plazas and an access roads to the station can be carried out in the relatively short term, although it depends on the availability of land. Greater railway passenger capacity can also be achieved in the relatively short term by the addition of electric rail cars, although a considerable amount of funds is required for the purchase of rail cars. Such an increase in transport capacity is required especially for the Bogor line, where passenger demand has already reached capacity. The addition of railway cars will require the further improvement of relevant facilities such as substations and the signal system.

b) Bus Transport

Bus transport still serves around 50 percent of person trips made by motorized mode of transport, and it is the most important mode of transport in Jabotabek. A change in the bus operation regime can be achieved in the short term because it does not require a large amount of funds, through it requires consensus between the regulating agency, bus operators and bus crews. Since bus operation suffers from traffic congestion and ordinary bus lanes are easily encroached upon by private vehicles, busways which are physically separated from the other lanes, should be introduced to ensure smooth bus operation.

The bus demonstration project, including a change in bus operation and the introduction of busway, should be implemented shortly, as planned by Bappeda and DLLAJ, DKI, to confirm the possibility of bus operation improvement. To reform bus operation regime, bus operation specifications should be established.

c) Road Network

As for the road network, priority should be given to proper road maintenance because many roads have been damaged due to the shortage of maintenance funds as a result of the economic crisis. In addition, on-going or suspended road development projects should also be continued as long as the projects can still be justified even at present situation.

d) Traffic Control and Management

Traffic control and management measures are usually viewed as short and intermediate term policy measures. The traffic signal system in DKI Jakarta, consists of three different types and thus cannot be consolidated into an integrated system in the short term. Traffic information system is a modest investment compared to new road construction and it can help alleviate traffic congestion by providing information on traffic congestion and alternative routes. The information system should be introduced not merely on toll roads but also on arterial streets because traffic congestion is seen more frequently on arterial streets than toll roads.

Since in DKI Jakarta the "3 in 1" policy has been employed, a shift from the existing policy to road pricing may get the consensus of the general public since people are aware of drawbacks of the current policy. A restricted area as well as other aspects of road pricing scheme or other traffic restraint schemes should be studied based on the person trip data to be obtained by the Person Trip Survey.

e) Transport Safety

For the improvement of traffic safety, traffic safety education program for drivers as well as pupils at school can be initiated in short term.

Black spot analysis is essential for understanding location-specific causes of traffic accidents and for preparing countermeasures to reduce traffic accidents. The present reporting system, however is inappropriate for the location specific analysis, thus as a first step the traffic accident record storing system should be improved. The location specific traffic accident analysis system can be developed in cooperation with the DKI's on-going GIS system development.

Vehicle inspection is effective not only in reducing air pollutants but also in reducing traffic accidents caused by mechanical problems of vehicles.

Traffic safety education and training programs for bus drivers and the enforcement of driving practices can be implemented in the short term.

For railway transport PT. KAI should continue to make efforts in terms of public campaigns on the danger.

f) Urban Land Use Plan and Floor Area Control

It is well known that density of land use around public transport nodes significantly influences public transport usage. DKI has already prepared the

concept of a Special Development Zone, which allows more intensive land development of the areas surrounding MRT stations. This intensive land development concept should be extended to the Jabotabek railway stations. According to this concept, the existing land use zoning and floor area ratios should be reviewed and revised. The intensity of land use should be determined based on the study of the impact on transportation network in terms of demand and other relevant sectors in urban planning such as water supply, sewage, electricity and so forth.

g) Urban Environment Betterment

The environmental standard on ambient air quality should be amended to reflect the existing vehicle population. A study on the gradual application of stricter standards and the schedule for upgrading such standards should be made in the short term.

Vehicle inspection is an effective countermeasure to reduce emissions generated from vehicles according to the environmental standard. Thus the vehicle inspection system should be expanded to private vehicles to reduce the total exhaust emission in short-term.

h) Local Administration

According to the on-going decentralization, it is urgently needed to reinforce the planning capability of local governments. At the same time the necessity and appropriate form of the new agency "Jabotabek Transport Authority (tentative)" should be studied, in order for it to make consistent metropolitan-wide transportation system development plan and to manage and control transportation demand in Jabotabek.

(2) Urban Transport Policy Measures in Intermediate/Long term

a) Rail-Based Transport

Although commuter flows in the east-west direction grew more rapidly than north south direction, the majority of trains operates between Tangerang and Kota via the western line, between Serpong and Kota via the western line and between Bekasi and Kota through the eastern line. Passengers cannot go directly from these lines to the Dukuh Atas station which is the station nearest to CBD along Jl. Sudirman and Jl. Thamrin. The provision of direct railway services for east- west direction would attract a considerable amount of passengers. In the short term this can be done by changes in the train operation, although this will require a switch back operation at the Duri station for the Tangerang line and at the Tanah Abang station for the Serpong line. Connecting these lines by adding short tracks at the junction points will enable direct operation. Since this short cut will not require huge funds, this improvement may be made in the intermediate term.

The Jabotabek railway should be operated as an urban rail service in the long run. Loop operation should be started to cater for urban travelers. At the same time the Jakarta MRT systems should become a part of rail-based network by connecting with the Jabotabek railway at several stations.

b) Bus Transport

If the bus demonstration project succeeds in realizing its objective, then the bus

priority schemes can be extended to the other corridors. Other potential corridors for introducing the bus priority scheme include the Metro Pondok Indah corridor, the Rasuna Said corridor, the Pasar Minggu corridor, and the Bogor Raya corridor for north-south direction, and the Daan Mogot corridor, the Suprapto/Bekasi Raya; Pramuka/Pemuda corridor, the Casablanca corridor and the Ciledug corridor for east-west direction.

Among these corridors, part of the Bekasi Raya corridor, the Pasar Minggu corridor and the Ciledug corridors have only four lanes for both directions, and road widening should be implemented before the development of a busway. Intercity bus terminals, Pulo Gadung and Kali Deres, should be relocated along the Jakarta Outer Ring Road.

In the long run, when passenger demand exceeds the capacity of the busway, it should be converted into a LRT/MRT system.

c) Road Network

In the intermediate term, road widening to accommodate the busway should be categorized as an intermediate road network development.

In DKI Jakarta, road network development should be focused on collector streets and grade separation at intersections; construction of flyovers and underpasses, while in Botabek hierarchical road network should be developed.

The road network should be further developed in the long term and an appropriate funding scheme should be prepared from the long-term road network development.

d) Traffic Control and Management

The current multiple traffic signal system should be consolidated into one system in the intermediate term.

In the final stage the traffic information system should be upgraded into an integrated transport information system.

e) Transport Safety

After the establishment of a traffic accident record analysis system and storing sufficient data and analyses on location-specific causes of traffic accidents be made and countermeasures should be taken to reduce traffic accidents.

f) Urban Land Use Plan and Floor Area Control

According to the established land use plan and floor area control plan, approval for urban development should be strictly controlled. In DKI Jakarta urban redevelopment should be carried out, while land development should be guided by the arterial street network to create well-organized resettlement areas in Botabek

g) Urban Environment

The introduction of less emission vehicles (LEV), such as vehicles equipped with CNG or LNG engines, should be taken into account.

The transportation policy measures are consolidated and placed according to a time framework in Figure 8.6.1.

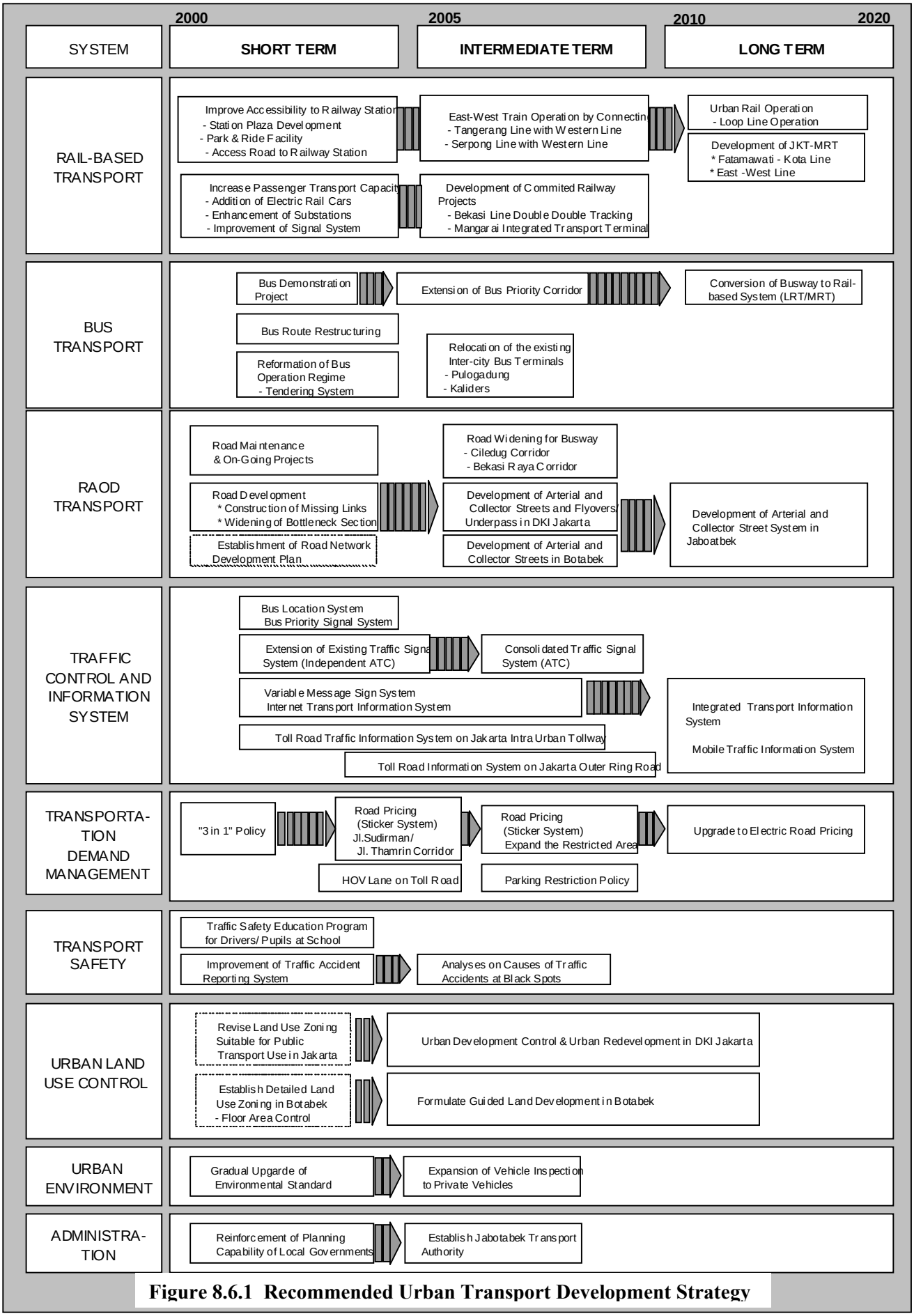


Figure 8.6.1 Recommended Urban Transport Development Strategy

Chapter 9

Short-term Implementation Plan

9. Short Term Implementation Plan

9.1 General

In Chapter 8, urban transportation policies were proposed based on the identified objectives of the urban transportation system development. For each urban transport policy, policy measures have been recommended and the strategy for developing an integrated urban transportation system was recommended from time framework and logical order. Various short-term implementation policy measures have been selected based on their suitability for immediate implementation, namely, ease implementation and low fund requirement. In this chapter, several urgent projects and programs, which were selected from the short-term policy measures are further elaborated or, taking the maturity of the projects and programs into account.

Urgent projects and programs can be largely categorized into the following three groups,

1) Public transport enhancement projects
2) Road development project and traffic control/management measures
3) Various soft measures

(1) Public Transport Enhancement Projects

The improvement of public transport service is the core element of the short-term implementation plan. The short-term public transport-enhancement projects include the improvement of the both bus transport and the railway. Due to the severe financial constraints forced by the Government, it is recommended that maximum use be made of the existing public transport facilities rather than constructing new transport facilities in the short term. In addition, in order to divert people from private mode to public mode of transport, more priority should be given to public transport. Conversion of ordinary roads into dedicated bus lanes is a way of supporting more efficient and reliable bus operation using the existing transport facilities.

The short-term railway transport improvement plan includes;

- Improvement of railway station facility
- Reinforcement of stabling yard at Bogor station
- Rehabilitation of electric facilities
- Rehabilitation of damaged communication facilities
- Rehabilitation of level crossing equipment
- Procurement of additional electric cars

The short-term bus transport improvement plan includes;

- Reformation of Bus Operation Regime
- Bus Priority Corridor Development
- Bus Route Restructuring
- Bus Transport Facility Improvement

(2) Road development project and traffic control/management measures

Constructing roads to increase road capacity is one of alleviating traffic congestion. For the short term, however, cost efficient measures should be selected in view of the current severe financial condition faced by the Government. With this in mind, urgent road development projects were selected from the on-going road development projects, those which help to relieve bottleneck sections or create missing links. The following two projects were deemed to be urgent road development projects:

- Kota Bogor Ring Road Development Project, and
- Jakarta – Bekasi Connection Road Project.

Other measures include traffic control and management.

- Traffic signal improvement
- Traffic control device improvement
- Geometric improvement
- Pedestrian facility development
- Traffic information system development

(3) Various soft measures

Soft measures can be implemented in the short term because they do not require a lot of funds. These include the following;

- Traffic demand management
- Environmental improvement program
- Traffic safety enhancing program
- Urban development plan related to transportation system development
- Establishment of Jabotabek Transport Authority
- Human resource development

(4) Urban Transportation System Improvement Demonstration Projects

- Bus Demonstration Project
- Railway East-West Connection and Improvement of Access to Stations
- HOV Lanes on Regional Expressway
- Traffic Management Plan at Bottleneck Intersections

9.2 Short-term Bus Transport Improvement Plan

9.2.1 Reformation of Bus Operation Regime

As discussed in Chapter 5, the current bus revenue sharing system, Borongan, WAP, and Komisi, results in profit oriented operation by the bus crew and the passengers' welfare is neglected. The bus operation regulatory agency, DLLAJ, believes that under this system the required improvement of the bus transport services cannot be achieved; thus DLLAJ is attempting to change the bus operation regime from the current system to a tendering system.

(1) Specification of Bus Services

In order to Introduce a tendering system for bus operation, the specification for bus services must be established. The specification of bus operation should include bus route, schedule, safety standard, bus size, passenger capacity, and so on.

(2) Fare Collection System

Another issue which needs to be settled is the responsibility for fare collection. A tendering system varies according to the type of fare collection system. There are two possible alternatives for fare collection as shown in Figure 9.2.1.

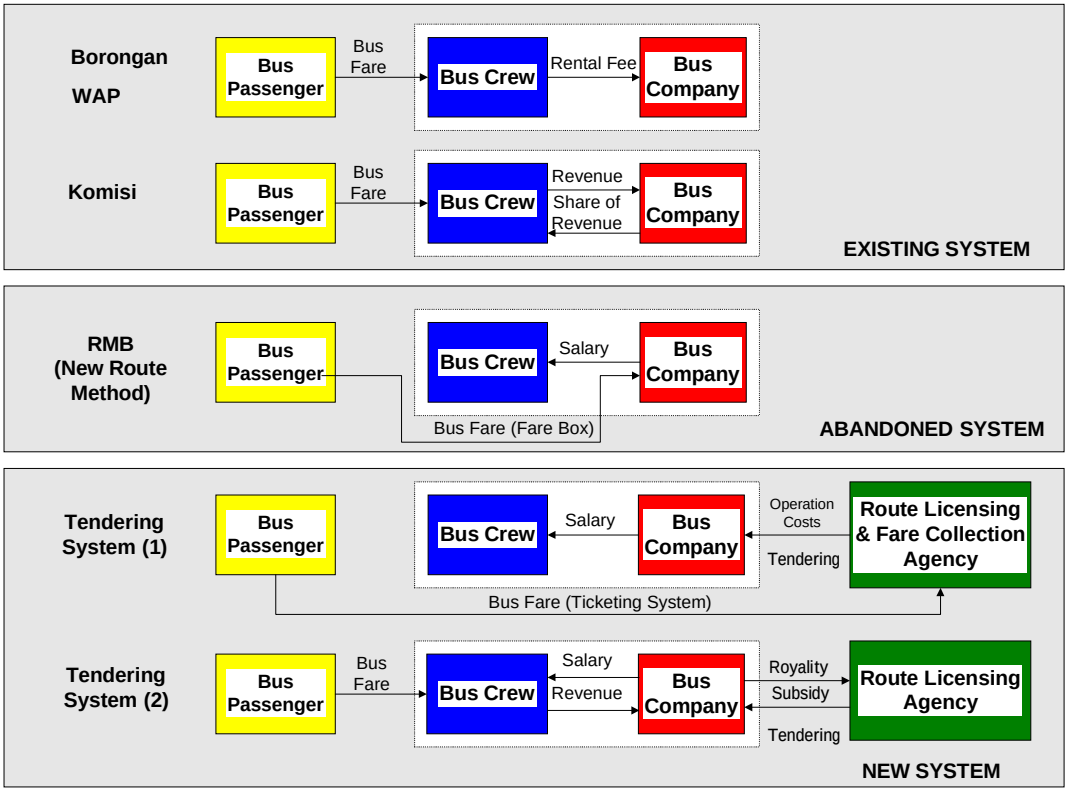


Figure 9.2.1 Bus Operation System

1) Fare Collection System (A) by Fare Collection Agency

One method of fare collection is collection by a fare collection agency, which is completely different from the existing practice. Thus fare collection is separated from bus operation. However this would be efficient only if a considerable number of bus routes were under the licensing authority, as the placement of a substantial number of ticket sales personnel would be costly. This fare collection system may also require closed bus shelters to collect bus fare properly. Under this fare collection system, bus fare revenues are collected by a fare collection agency. Consequently, a bus company does not receive any revenue directly from the passengers and the company simply provides passenger transport service. In this case the bus company bids at a price which can cover its operation cost and some profit for the company.

2) Fare Collection System (B) by Bus Operator

Another fare collection system is the same as the current practice of bus fare collection. Bus crews collect bus fare from the passengers and hand over the collected revenue to the management of the bus company and in turn, receive a salary from the company. Under this scheme the bus company collects bus fare revenue, meaning that when a bus company bids for a specific route with a positive price, it can be regarded as being royalty for operating the route since the company estimates a certain amount of profit from its operation. On the contrary, if the company bids at minus value because they regard the route to be unprofitable, the bid amount can be regarded as being a subsidy to the operator.

With regard to the bus fare collection, the possibility of introducing magnet or IC cards should be further studied. This kind of fare card enables for a variety of fare systems, such as a transfer discount fare system between different modes of transport.

(3) Bus Operation Monitoring System (Bus Location System)

1) Project Background

To reform the bus operation regime, proper monitoring of bus operation is by regulatory agency required. In addition, a reporting system regarding on real bus operation such as bus travel time from origin and destination, the number of bus passengers and so forth should be established.

2) Project Profile

A bus location system would be useful for monitoring bus operation by the licensing agency. A bus location system gathers information regarding the location of buses on the route using a wireless method. It displays the bus location information at bus stops as a service to passengers waiting for the bus and, at the same time, it sends the location data to the bus operator for operation management purpose. Bus passengers are able to know the location of the next bus and its approximate arrival time and need not become frustrated by the long wait. If they see that their desired bus will not arrive for a long time, they have the freedom to take a bus of another route or use another mode of transportation.

The bus location system provides a bus operator with operational data regarding the fleet and drivers which are useful for bus operation management and bus service improvement. If the bus operation is disrupted for some reason, countermeasures can be taken to maintain the service level.

The bus location system consists of the following components;

- Control center facility,
- Software,
- On board unit, and
- Display at bus stops

3) Estimated Cost of bus location system

In the pilot project, the plan is for 35 buses to be operated under the bus location system and a display showing the location of buses are to be placed at 6 bus stops. Under this system configuration, the cost for the installation of the bus location system is estimated as shown in Table 9.2.1.

Table 9.2.1 Cost Estimate for Bus Location System

	unit	Unit Price (mil Rp.)	Qty	Amount (mil Rp.)
Control Center Facility (A)				
Main Server		375	1	375
Web Server		225	1	225
Communication Unit		150	1	150
LAN & miscellaneous	Set	150	1	150
Sub total				900
Software (B)				
Bus Location	Set	1,350	1	1,350
Digital Map	Set	150	1	150
Web Server	Set	240	1	240
Human-machine interface	Set	113	1	113
Sub total				1,853
On-board unit (C)		90	35	3,150
Bus Stop Display (D)		225	6	1,350
Subtotal (A)+(B)+(C)+(D)				7,253
Overhead (20%)				1,451
Total				**8,703**

4) Implementation Agency

The bus location system can be implemented through public-private partnership. The central center facility, software and bus stop display will be the responsibility of the DLLAJ and the on-board units will be equipped by the bus operators.

5) Implementation Plan

The implementation schedule of the bus location system should be synchronized with the development of the bus priority corridor, and it has been incorporated into the bus priority corridor development project.

9.2.2 Bus Priority Corridor Development Plan

(1) Project Background

Improvement of the bus transport service is urgently required to promote bus transport use. Although the road density is still low in Jabotabek and this limits the coverage area of the bus service, especially, for large buses, it is fortunate that several arterial streets have spacious road space and area able to accommodate a dedicated bus lane.

In fact, the development of a busway was proposed in the "Transportation Demand Management Plan," prepared by Bappeda DKI. A Bus Demonstration Project is one of the components of the transportation demand management plan. Priority was given to the Pemuda – Pramuka corridor by Bappeda DKI.

(2) Project Profile

A public transport network should be developed as a web so that people can travel by using only the public transport network. Bus priority corridors should be developed to complement the railway system. In the short term, bus priority corridors should be developed as support for the existing Jabotabek railway. On

wide streets with three lanes or more in one direction, a physically separated dedicated busway can be developed. On the other hand, on streets with only two lanes in one direction, it is difficult to include a dedicated bus lane because the traffic capacity for private vehicles will decrease drastically. Therefore it is proposed that a reversible (tidal flow) lane system be introduced on two-lane per direction streets to accommodate a dedicated bus lane during peak hours. The proposed bus priority corridor development is illustrated in Figure 9.2.2.

In cases where the physically separated dedicated bus lanes cannot be developed, the section for bus priority lanes have not to be long, rather it is proposed to select the short section where traffic congestion appears. If a bus priority lane is long, enforcement becomes difficult and it many personnel will be required on the street.

(3) Implementing Agency

DLLAJ, DKI Jakarta and the other DLLAJ of the relevant Kota are responsible for infrastructure development such as busways and facilities for reversible flow bus lanes. On the other hand, bus operators are responsible for bus operation.

(4) Cost Estimates

The cost for busway development varies according to the alignment of the busway; namely, contra operation and center (or with flow) operation. The following illustrates the difference in construction costs by the type of busway.

Table 9.2.2 Cost Estimates for Busway Development

Corridor	Distance (km)	Bus Flow	Cost (mil. Rp.)	Unit Cost (mil. Rp./km)
Puramuka/Pemuda	11.4 km	With flow operation	7,903	694
Sudirman/Thamrin	8.2 km	With flow operation	8,436	1,028
		(Contra flow operation)	6,230	760

(5) Implementation Plan of Bus Priority Corridor Development including Bus Location System Development Plan

The implementation schedule of the bus location system is depicted in Figure 9.2.3.

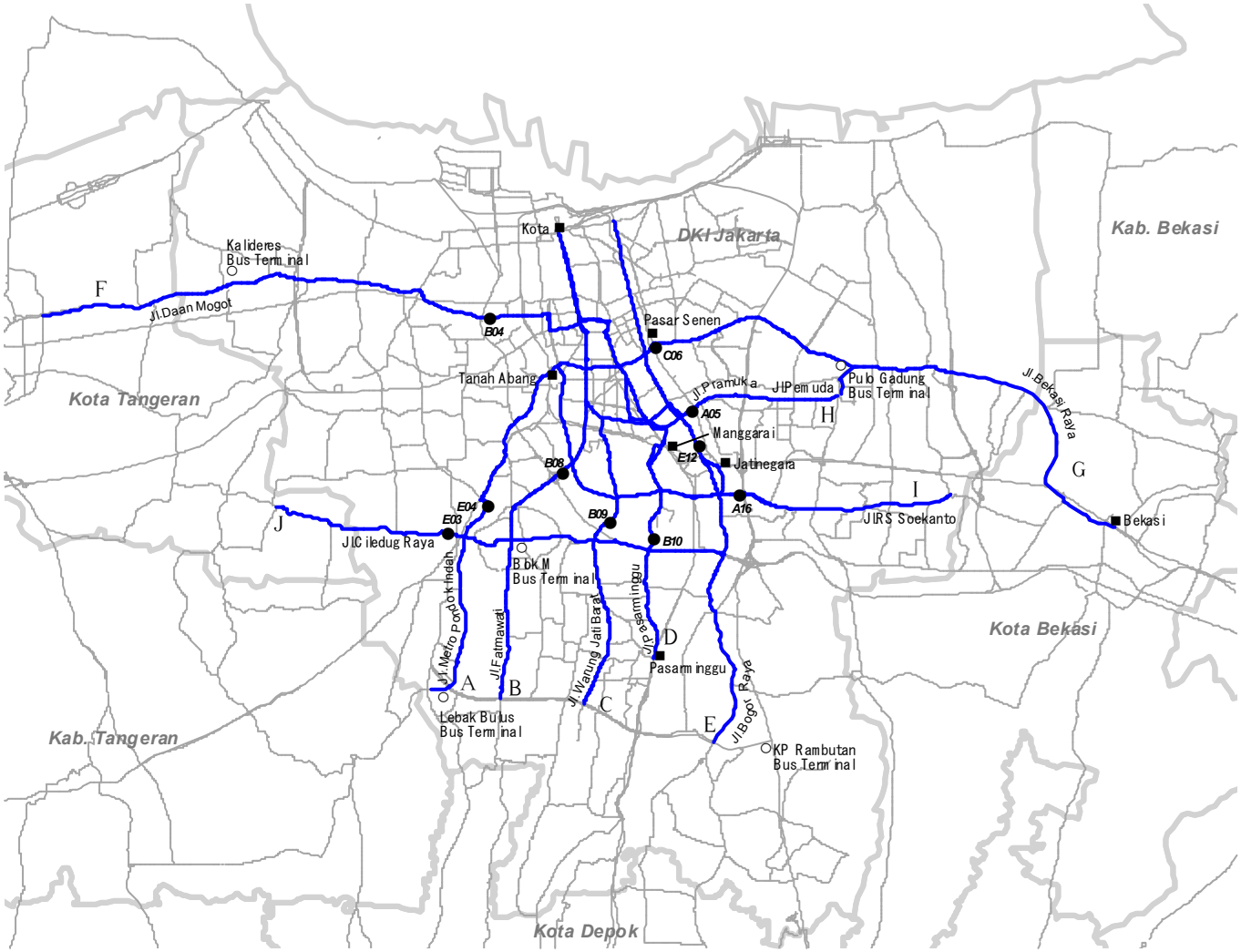


Figure 9.2.2
Candiddate Bus corridors

LEGEND

- Busway
- Bus Terminal
- Station
- Survey Station

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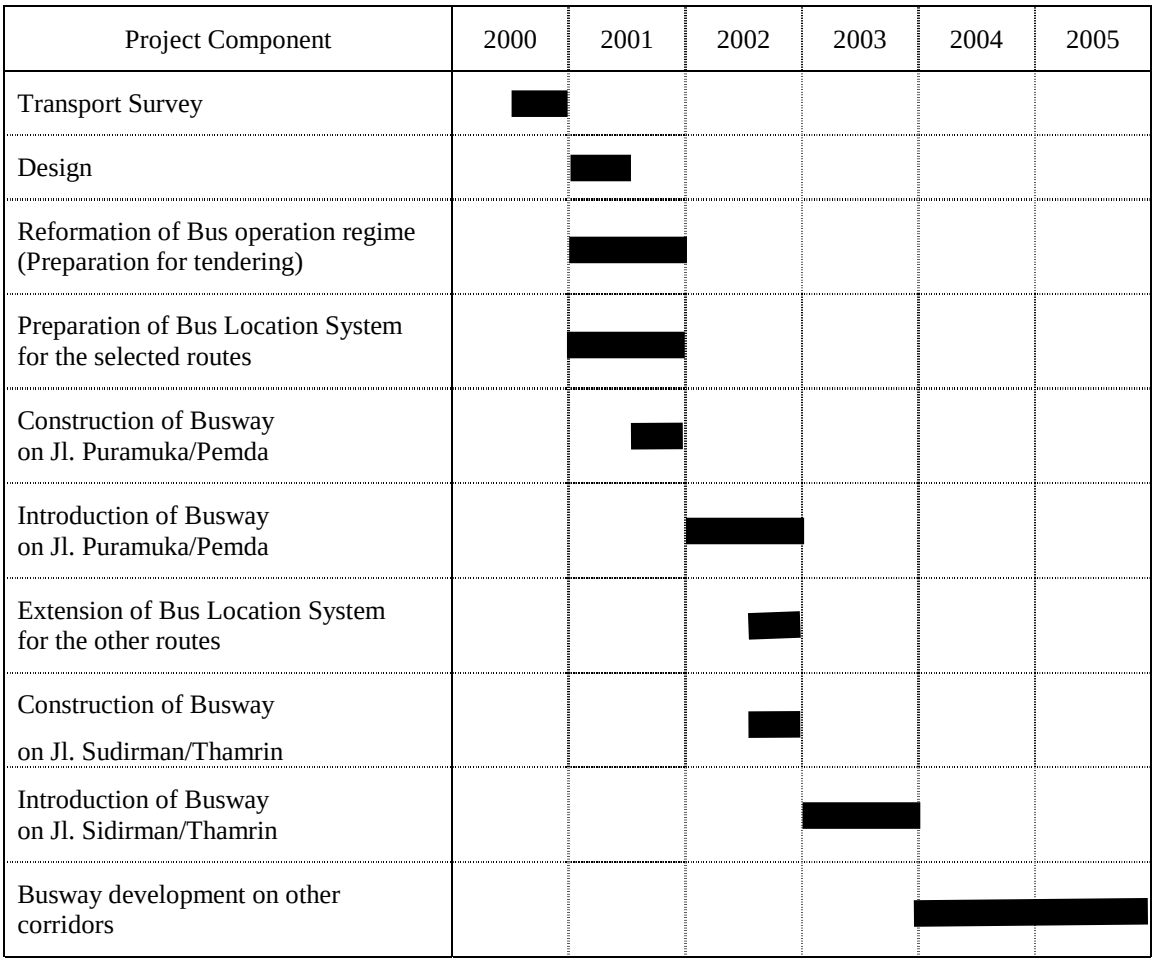


Figure 9.2.3 Schedule of Implementation Plan

9.2.3 Bus Priority Signal System

The bus priority signal system detects the bus approaching an intersection and adjusts the signal timing to minimize the wait due to a red signal. It extends the green signal if a bus approaches the intersection at the end of green phase, or shortens the red signal if the bus arrives at the intersection during a red phase. It is necessary, therefore, to detect the approaching buses with the accuracy of several seconds. The signal controller must be capable of the receiving bus signal and either extending the green time or shortening the red signal if detection is made within the preset duration.

9.2.4 Bus Route Restructuring

The existing bus route structure is complicated and there is a lack of hierarchy in the bus services. In principle, bus routes have been added to the previous bus routes according to the change in demand. An overall review of the existing bus route structure, however, has not been conducted due to the lack of information on the comprehensive bus passenger demand.

After the execution of the Person Trip Survey planned in Phase 2 of the Study, it is proposed that the bus route structure be received based on the existing passenger demand pattern and volume.

During the review of bus routes in Jabotabek, new type of bus services such as express commuter bus service, CBD circular service and feeder bus services should be taken into consideration.

9.3 Short-term Railway Improvement Plan

9.3.1 Project Background

As analyzed in Chapter 5, the existing railway facilities need to be improved for better transport safety and service level. In the short term, the emphasis should be on the improvement of the railway system to make the most use of the existing railway facility for passenger transport. Furthermore passenger transport capacity can also be augmented by increasing the frequency of train operation on the existing lines.

Many railway stations are difficult to access at present, and access to them should be improved through the development of access roads and railway station plazas. To secure railway transport safety, over-track station, pedestrian bridges/underground passages should be constructed. Rehabilitation of the signaling equipment and level crossing facilities would also contribute toward safe railway operation. Rehabilitation of the communication facilities and the raising and extension of platforms would improve both train operation efficiency and safety. In order to increase the passenger transport capacity, the mere addition of electric cars is insufficient but reinforcement of the stabling yard and enhancement of the substations are also needed.

9.3.2 Project Profile of Railway Improvement Plan

(1) Improvement of Station Plaza and Access Road

Neither station plazas nor access roads to railway stations have been well developed. To provide easier access to railway stations, stations without any land acquisition problems should be given priority for station plaza development. At the same time, construction of access roads should also be given high priority.

On the Bogor line, the stations to undergo station plaza and access road development were selected according to the passenger volume. For the Tangerang and Serpong lines, station plaza development is proposed for the terminal stations of Tangerang and Serpong.

Table 9.3.1 Improvement of Station Plaza and Access Road

Station	Railway Line	Required Improvement
Depok Lama	Bogor line	Station Plaza and Access Road
Citayam	Bogor line	Station Plaza and Access Road
Bogor	Bogor line	Station Plaza and Access Road
Tangerang	Tangerang line	Station Plaza and Access Road
Serpong	Serpong line	Station Plaza and Access Road

(2) Construction of Pedestrian Bridge/Underground Passage

Passenger bridges or underground passage have been provided at St. Pasar Senen, St. Depok Baru, St. Dukuh Atas, St. Tanah Abang and the seven stations on the Central line. Many stations on the Bogor line, however, have not been equipped with pedestrian bridges. Thus three stations, St. Cawang, Pasar Minggu, and Depok Lama were selected for the construction of a pedestrian deck or underground passage, taking the passenger demand into account as listed in Table 9.3.2. As for the Bekasi line, the construction of pedestrian decks will be included in the on-going "Bekasi Line Double-Double Tracking Project."

Table 9.3.2 Improvement of Pedestrian Deck/Underground Passage

Station	Railway Line	Required Improvement
Cawang	Bogor line	Pedestrian Deck
Pasar Minggu	Bogor line	Pedestrian Deck
Depok Lama	Bogor line	Underground Passage

(3) Construction of Over-Track Station

At present, an over-track station structure is available only at St. Tanah Abang and seven stations of the Central line. Additional over-track station should be constructed at the major stations of the Bogor line. The four selected stations include Cawang, Pasar Minggu, Depok Lama and Bogor as listed in Table 9.3.3.

Table 9.3.3 Construction of Over-Track Station

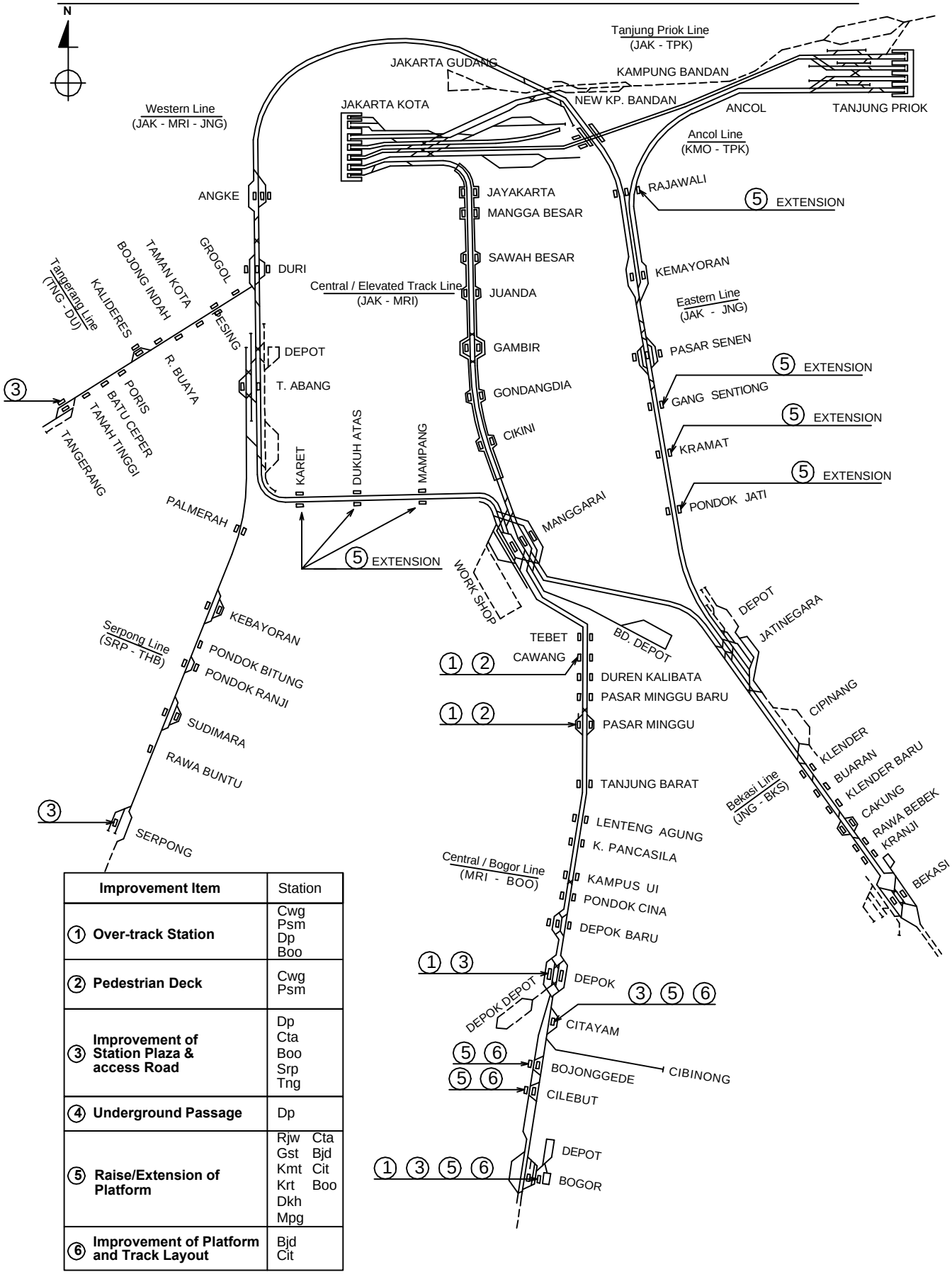
Station	Railway Line	Required Improvement
Cawang	Bogor line	Over-Track Station
Pasar Minggu	Bogor line	Over-Track Station
Depok Lama	Bogor line	Over-Track Station
Bogor	Bogor line	Over-Track Station

(4) Raise/Extension of Platform and Improvement of Track Layout

The platforms of the stations are still low and the length is too short to accommodate commuter trains. Therefore the height of the platforms should be raised to 90 – 100 cm and the platform should be extended at the stations listed in Table 9.3.4 to improve passengers' safety and operational efficiency by reducing the time required for boarding and alighting.

(5) Summary of Railway Station Facility Improvement

Various types of station facility improvements as summarized in Table 9.3.5 are proposed under a short-term implementation plan. The components shall be packaged as the implementation plan of station facilities. The improvement work items above of each station facilities are shown in Figure 9.3.1



Improvement Item	Station
① **Over-track Station**	Cwg Psm Dp Boo
② **Pedestrian Deck**	Cwg Psm
③ **Improvement of Station Plaza & access Road**	Dp Cta Boo Srp Tng
④ **Underground Passage**	Dp
⑤ **Raise/Extension of Platform**	Rjw Cta Gst Bjd Kmt Cit Krt Boo Dkh Mpg
⑥ **Improvement of Platform and Track Layout**	Bjd Cit

Figure 9.3.1 Short-term Implementation Plan of Station Facilities

Table 9.3.4 Raise / Extension of Platform & Improvement of Track-layout

Station	Railway Line	Required Improvement
Rajawali	Eastern line	Extension of Platform
Gang Sentiong	Eastern line	Extension of Platform
Kramat	Eastern line	Extension of Platform
Pondok Jati	Eastern line	Extension of Platform
Citayam	Bogor line	Raising platform
Bojonggede	Bogor line	Raising platform
Cilebut	Bogor line	Raising platform
Bogor	Bogor line	Raising platform
Bojonggede	Bogor line	Improvement of Track Layout
Cilebut	Bogor line	Improvement of Track Layout
Karet	Western line	Extension of Platform
Dukuh Atas	Western line	Extension of Platform
Mampang	Western line	Extension of Platform

Table 9.3.5 Improvement of Railway Station Facilities

	Station	Railway Line	Over-Track Station	Pedestrian Bridge	Station Plaza/ Access road	Under-Ground Passage	Improve-ment of Platform
1	Bogor	Bogor line	○		○		○
2	Cilebut	Bogor line					○
3	Bojonggede	Bogor line					○
4	Citayam	Bogor line			○		
5	Depok Lama	Bogor line	○		○	○	
6	Pasar Minggu	Bogor line	○	○			
7	Cawang	Bogor line	○	○			
8	Rajawali	Eastern line					○
9	Gang Sentiong	Eastern line					○
10	Kramat	Eastern line					○
11	Pondok Jati	Eastern line					○
12	Karet	Western line					○
13	Dukuh Atas	Western line					○
14	Mampang	Western line					○
15	Tangerang	Tangerang line			○		
16	Serpong	Serpong line			○		
	Total		4	2	5	1	10

(6) Reinforcement of Stabling Yard in Station Bogor

Although 72 recycled electric cars have been added for operation, the stabling tracks are unable to accommodate these additional cars, especially on the Bogor line, which was given 20 additional train cars. The stabling tracks for electric cars at Bogor should be reinforced and the major work items are listed in Table 9.3.6.

Table 9.3.6 Reinforcement of Stabling Yard at Station Bogor

Item	Volume
Track works and Over-head works	400m
Installation of Stabling Track	400m
Safety Facilities (Fence, Lighting)	500m
Improvement of Signaling	1 L/S

(7) Rehabilitation of Electric Facilities

a) Countermeasure of Lightning for Signaling

Repairs on the signaling system after lightning damage cannot be made promptly because there is insufficient spare parts and repair work, including breaking down of equipment, require a long time. Therefore, the following countermeasures should be urgently taken on the Bogor line, the Western line and the Eastern line.

Reinforcement of lightning-proof measure for electrical signal equipment

- Signal Equipment Room: 7 lots
- Signal Equipment for Outdoor: 7 lots

Improvement of repair process for breaking down of equipment

- Signal Tool Box: 120 lots

b) Rehabilitation of Damaged Communication Facilities

The configuration of the communication line should be rearranged as a countermeasure against to the frequent communication system failure and required upgrading of train operation. As a reliable communication system is necessary for safe and efficient train operation, the overall rehabilitation of the communication facility is urgently required.

- Improvement of Optical Cable Laying: Improvement of existing optical cable between Jakarta Kota – Tanah Abang – Manggarai
- Laying New Optical Cable on the Western line: Manggarai - Jatinegara
- Laying New Optical Cable on the Bekasi line: Jakarta Kota - Pasar Senen
- Installation of Station Equipment: Jakarta Kota, Pasar Senen, Gambir, Manggarai, Depok, Bogor, Duri, Parung Panjang, Tangerang and Bekasi

(8) Rehabilitation of Level Crossing Equipment

Collision accidents with electric cars occur frequently due to the deterioration of the level crossing equipment and damages hit by automobiles. Therefore, the following countermeasures should be taken on the Western line and the Eastern line.

The level crossings requiring rehabilitation on the Western line includes Jl. Kampung Bandan, Jl. Bandengan Utara, Jl. Tubagus Angke, Jl. Kerendang, Jl. KH. Mas Mansyur, Jl., Hasyim Ashari, and three other level crossings. On the other hand, the level crossings which should be rehabilitated on the Eastern line includes Jl. Mangga Dua, Jl. Gunung Sahari, Jl. Industri, Jl. Angkasa, Jl. Gang Sampi, Jl. Garuda, and eight other level crossings.

- Repair/improvement of railway equipment at the exiting level crossings
- Installation of level crossing alarm
- Installation of circuit breaker of level crossing
- Preparation of tool box including control circuit for level crossing

(9) Procurement of Additional Electric Cars

The number of electric cars is not sufficient for a satisfactory commuter service train operation. The total number of electric cars after the additional of 72 recycled ECs granted by the Tokyo Metropolitan Government is shown in Table 9.3.7. The number of additional electric cars required for planned operation in 2002 is estimated to be at least 32 cars. Additional electric cars should be installed to increase the train operation frequency. PT. KAI should purchase or seek for used ECs from a donor country.

Table 9.3.7 Number of Existing Electric Cars

Railway Line		Number of Electric Cars		
		March 2000		Sept. 2000
		in peak two hours	Per day	Per Day
Central/Bogor		13 (a)	136	152
Bekasi		5	40	96
Eastern		2 (b)	(d)	
Western		1 (c)	(d)	
Serpong		3	20	24 (f)
Tangerang		3	8	16 (f)
Tanjung Priok		1	(d)	(d)
Total	For Operation	28	204	288
	For Stop/ Overhaul	-	60 (e)	64 (e)
	Total	-	264	352

(a): Including the ECs for Tanah Abang via Manggarai from Bogor or Depok
(b): Including the ECs from the Bekasi line
(c): Including the ECs from the Bekasi line, the Serpong line and the Tangerang line
(d): Accommodating the ECs from the Bekasi line, the Serpong line and the Tangerang line
(e): Including the grounded ECs
(f): All cars with 8 ECs

BOGOR LINE

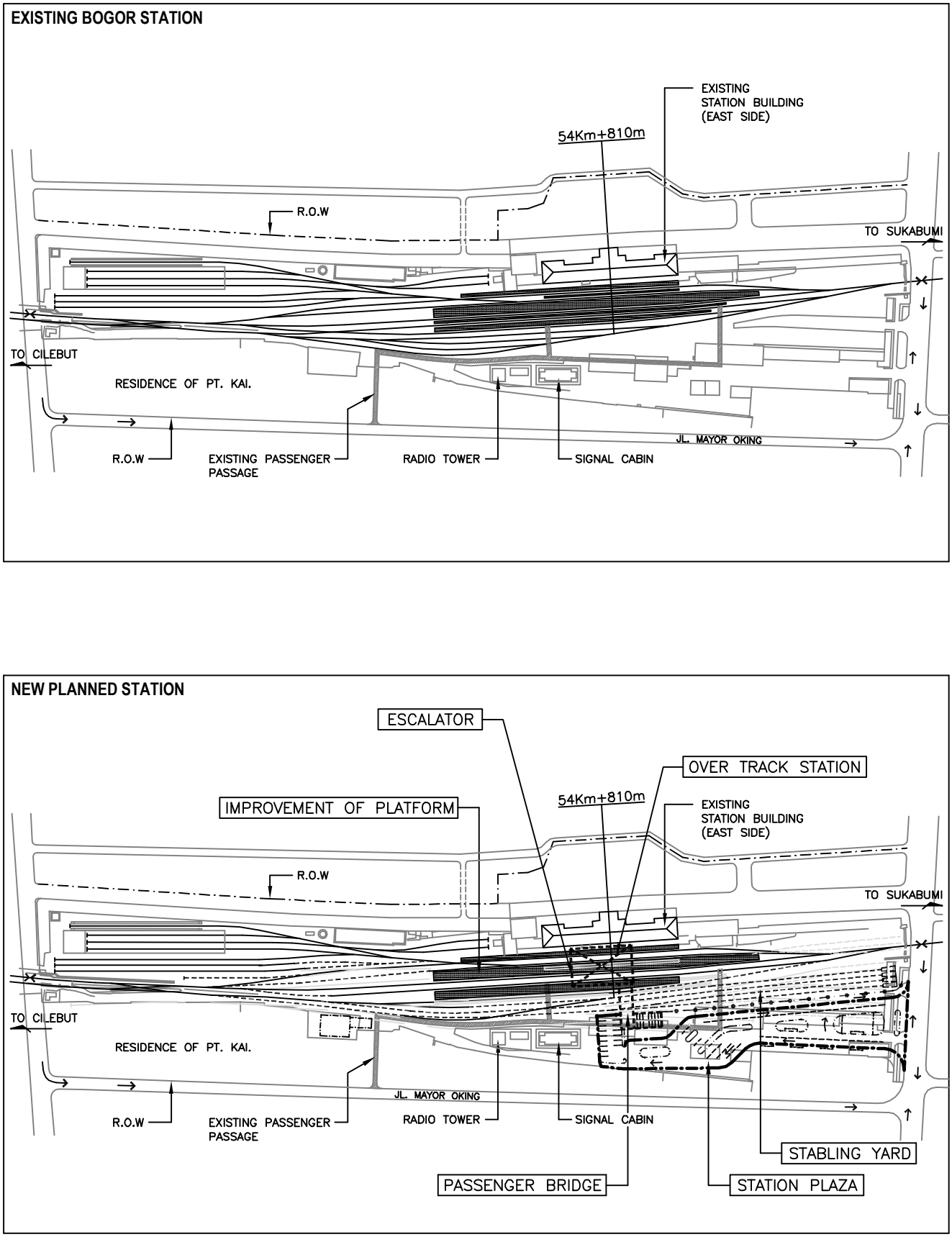
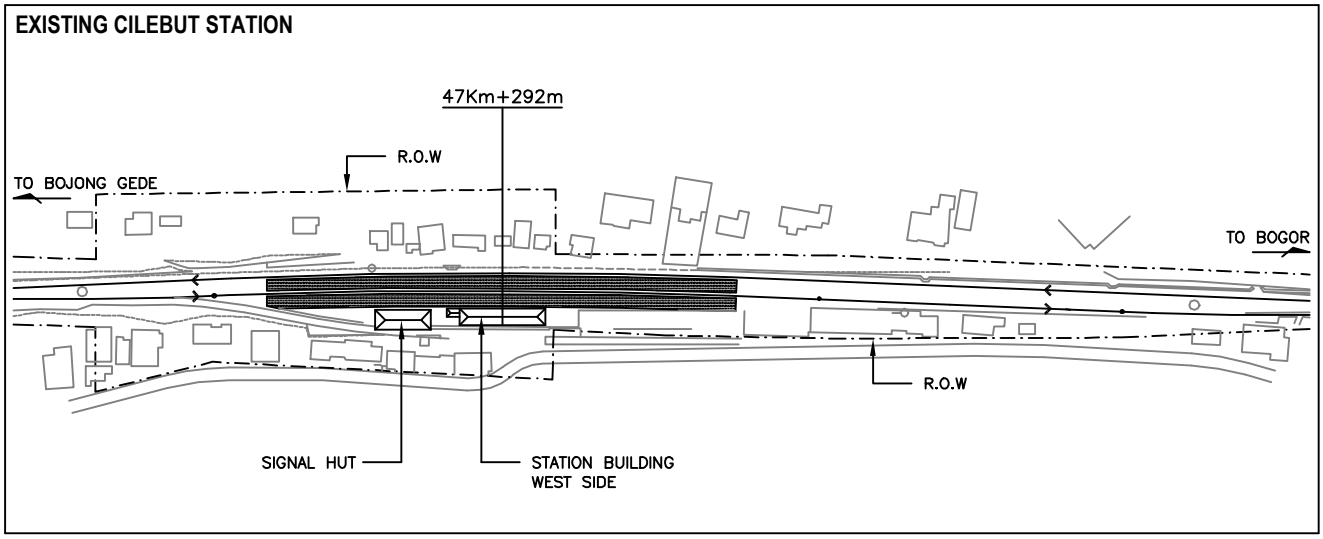
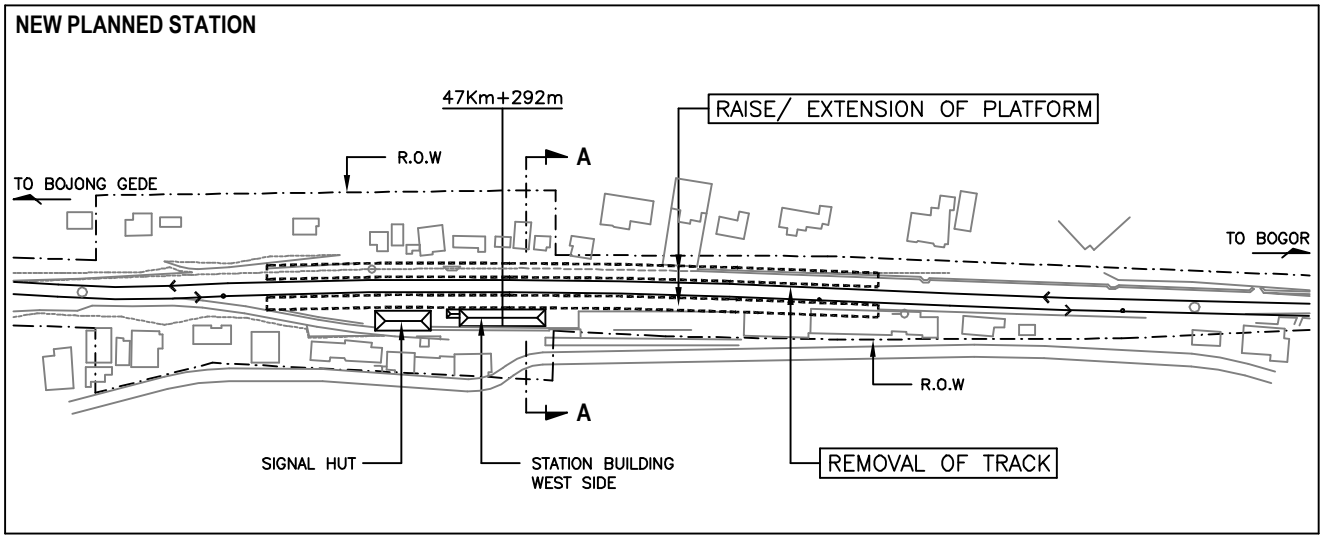


Figure 9.3.2 Improvement Plan of St. Bogor

BOGOR LINE





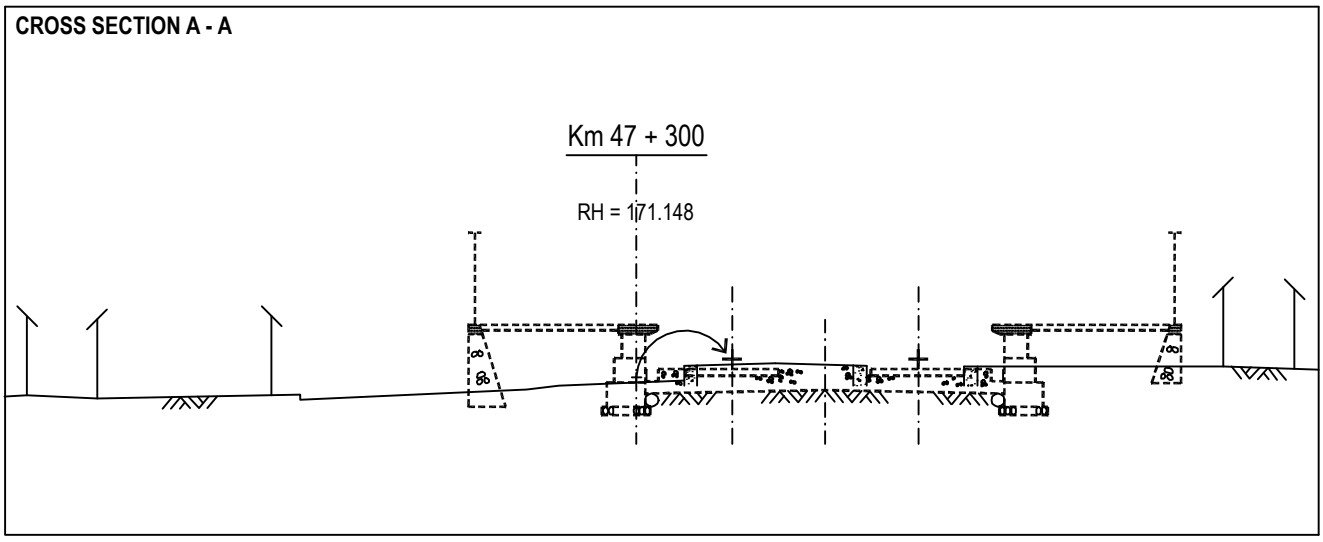


Figure 9.3.3. Improvement Plan of St. Cilebut

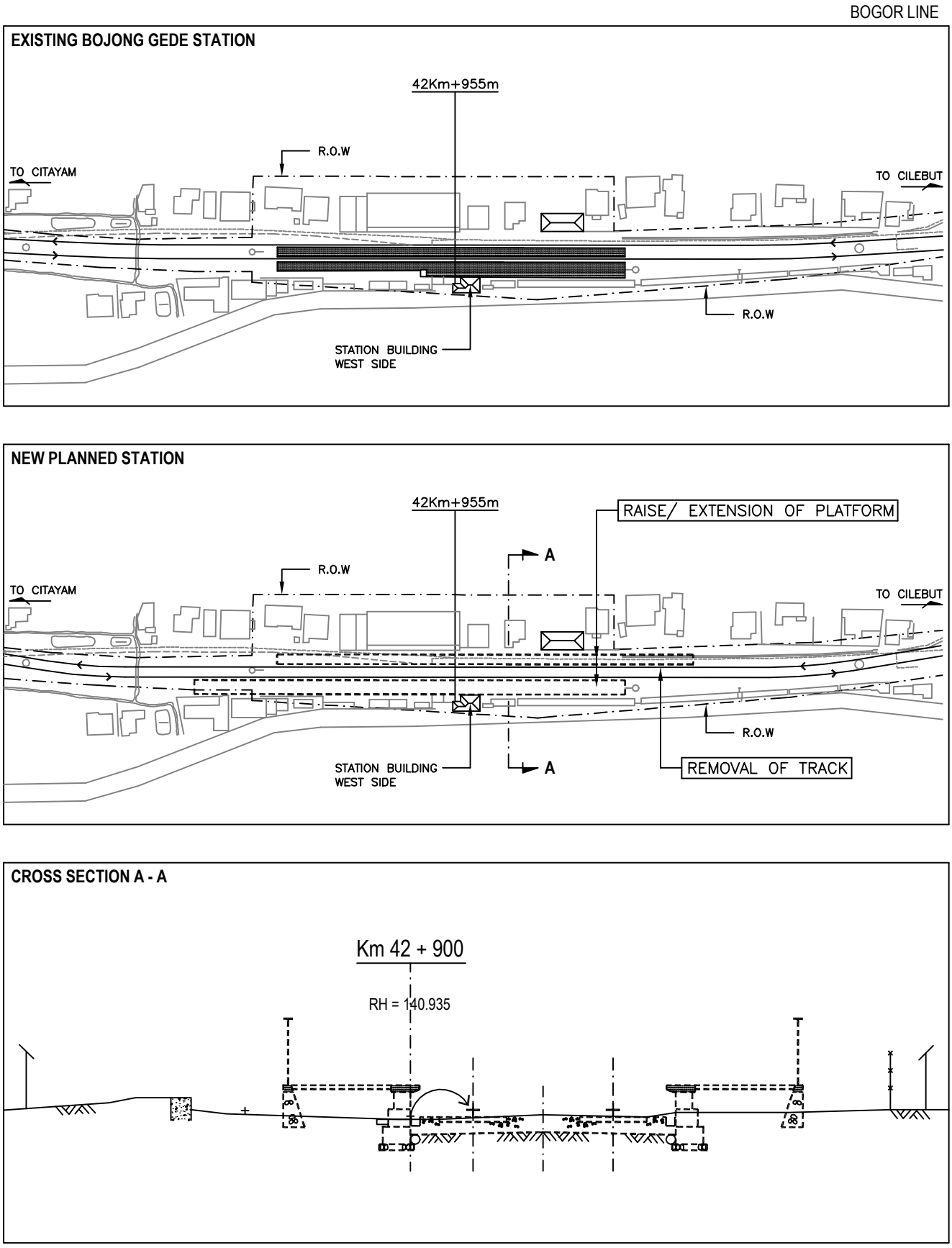


Figure 9.3.4 Improvement Plan of St. Bojong Gede

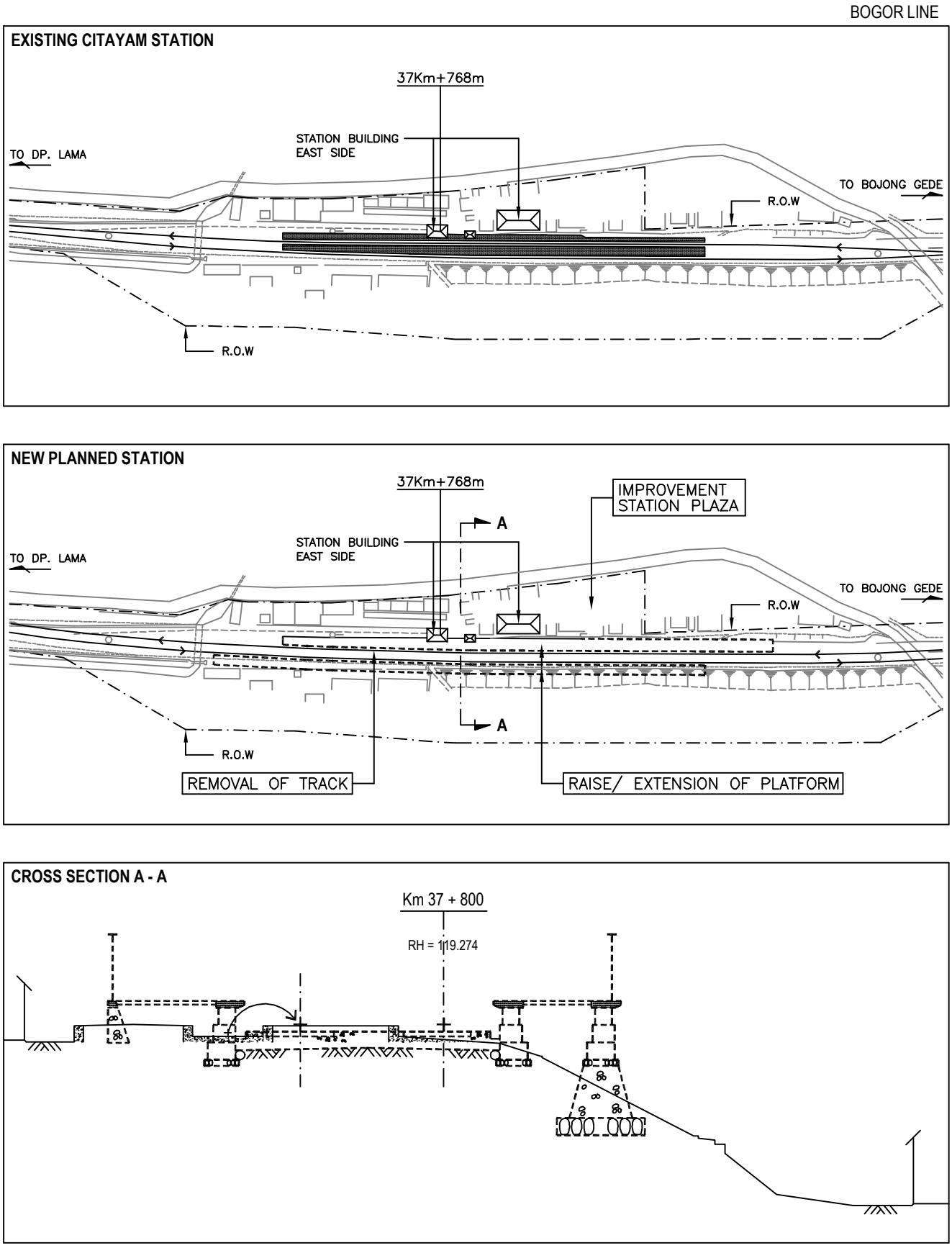


Figure 9.3.5 Improvement Plan of St. Citayam

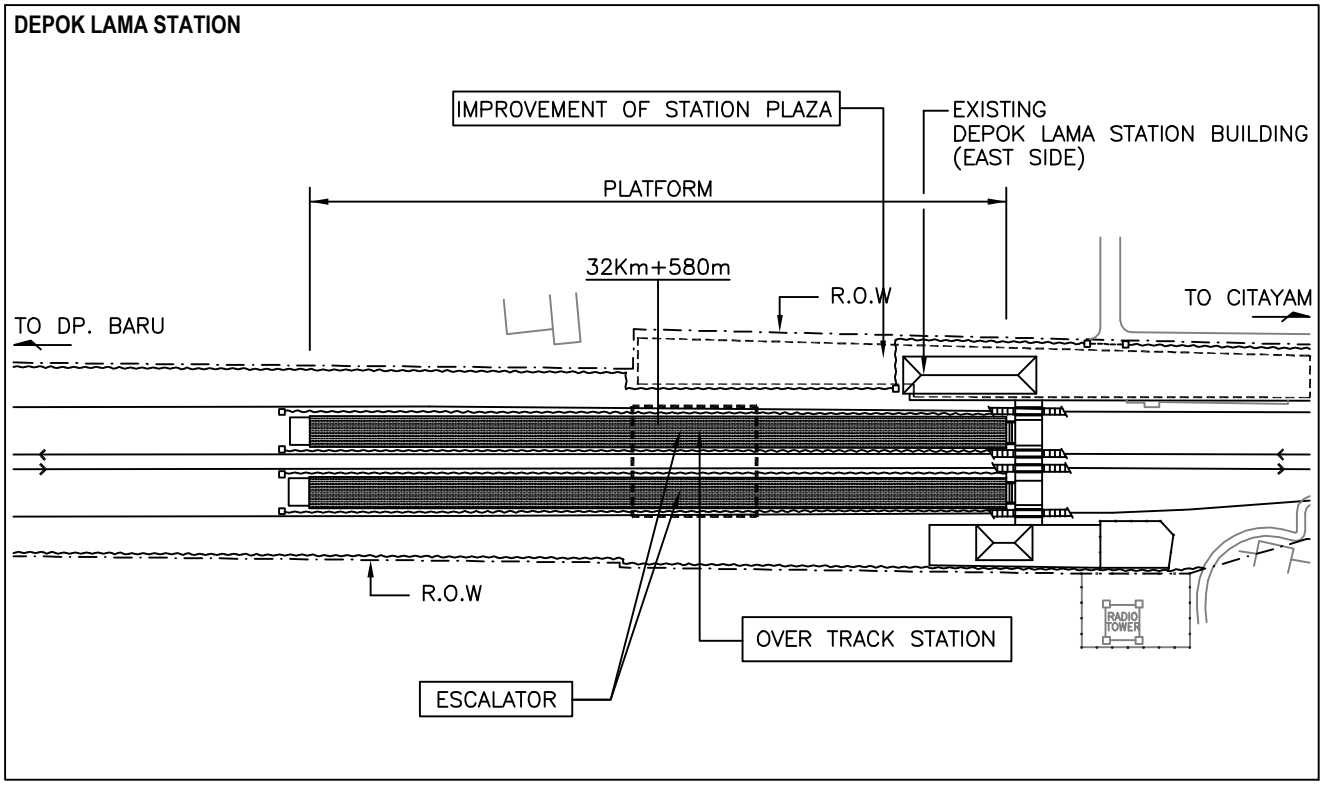
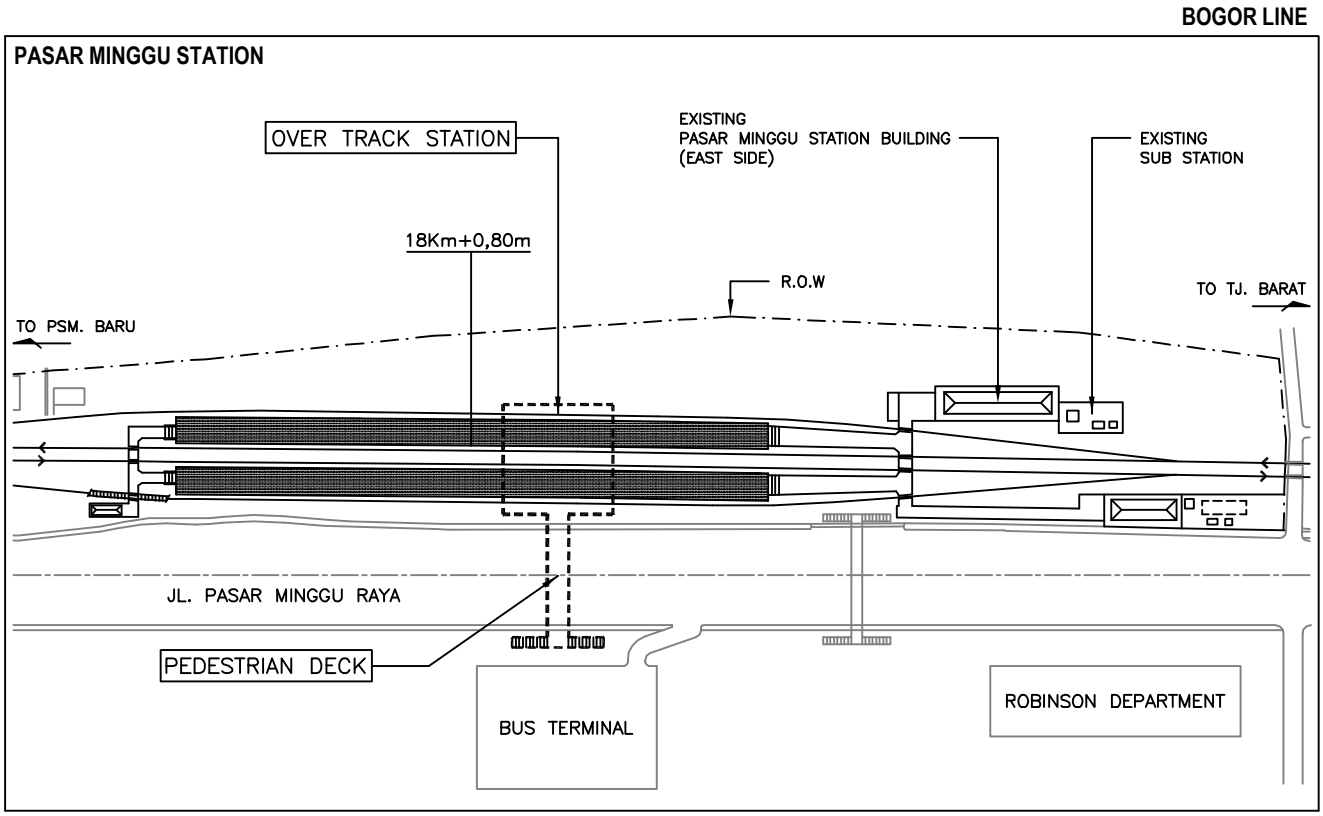


Figure 9.3.6 Improvement Plan of St. Depok Lama



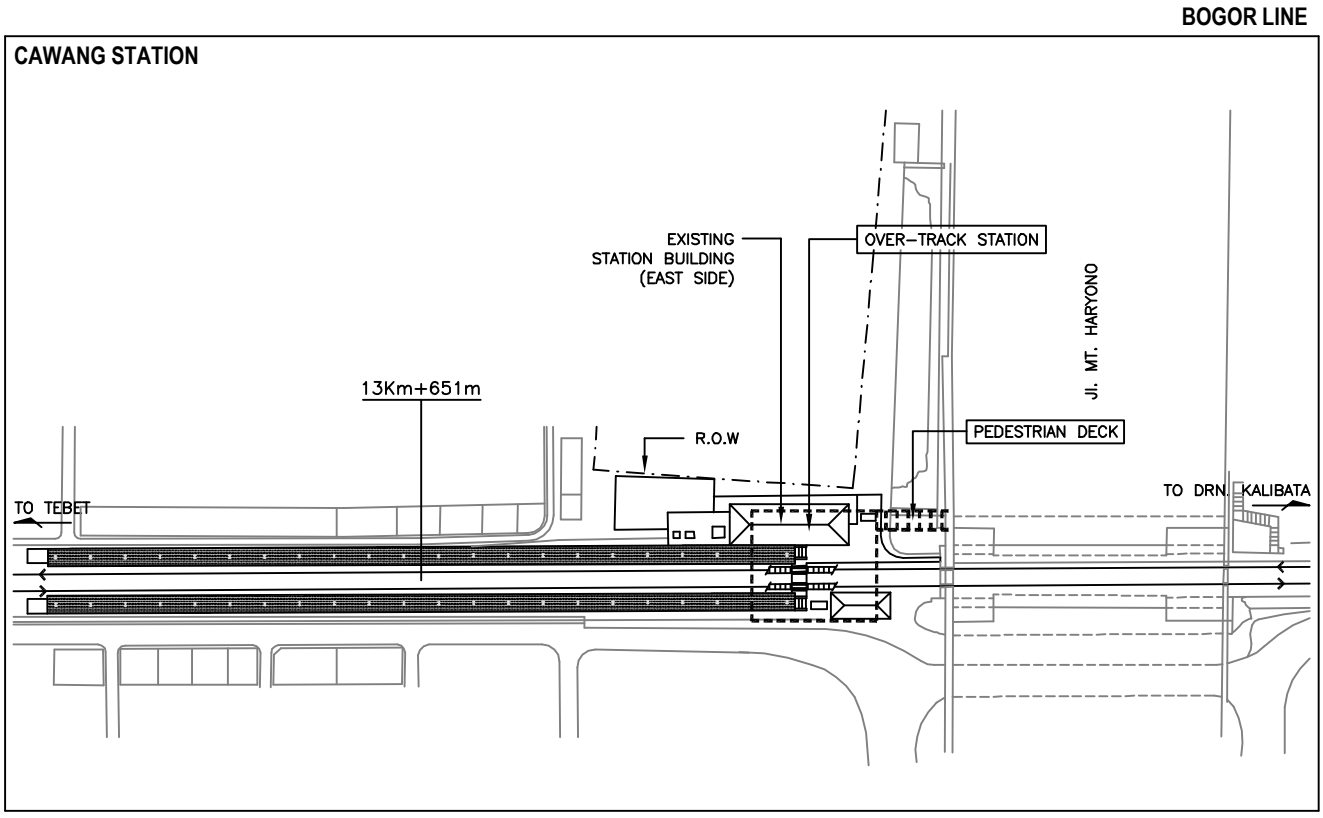


Figure 9.3.7 Improvement Plan of St. Pasar Minggu / Cawang

9.3.3 Implementing Agency

PT. KAI shall be the implementing agency for the short-term railway system improvement project.

9.3.4 Project Costs

(1) Improvement of Railway Station Facilities

The project costs of the improvement of railway station facilities are presented in Table 9.3.8.

Table 9.3.8 Cost Estimate for Station Facility Improvement

Unit: Million Rupiah

Station		Capital Cost Components		
		Foreign Currency	Domestic Currency	Total
1	Bogor	14,199	16,210	30,409
2	Cilebut	668	819	1,487
3	Bojonggede	668	819	1,487
4	Citayam	803	1,161	1,964
5	Depok Lama	7,330	5,565	12,895
6	Pasar Minggu	9,198	10,621	19,819
7	Cawang	4,118	3,411	7,529
8	Rajawali	525	930	1,455
9	Gang Sentiong	310	557	867
10	Kramat	310	557	867
11	Pondok Jati	310	557	867
12	Karet	310	557	867
13	Dukuh Atas	199	239	438
14	Mampang	310	557	867
15	Tangerang	72	167	239
16	Serpong	119	278	397
Subtotal		39,449	43,005	82,454
Physical Contingency (10%)		3,945	4,301	8,246
Insurance (3.5 %)		1,519	1,656	3,175
Total		44,913	48,962	93,875

Source: SITRAMP Estimates

(2) Rehabilitation of Electric Facilities

The estimated project costs for the rehabilitation of electric facilities and communication facilities are presented in Tables 9.3.9 and 9.3.10 respectively.

(3) Rehabilitation of Level Crossing Equipment

The estimated project costs for the rehabilitation of level crossing equipment are presented in Tables 9.3.11.

Table 9.3.9 Cost Estimate of Countermeasure of Lightning for Signaling

Unit: Million Rupiah

Work Item	Capital Cost Components		
	Foreign Currency	Domestic Currency	Total
1. Material of Signal Equipment Rooms	13,277	-	13,277
2. Material of Signal Equipment for Outdoor	1,542	-	1,542
3. Material of Signal Tool Box	254	-	254
4. Spare Parts	6,599	-	6,599
5. Installation Works	4,452	159	4,611
6. Engineering Services	6,599	-	6,599
Subtotal	32,723	159	32,882
Physical Contingency (10%)	3,275	16	3,291
Insurance (3.5 %)	1,256	8	1,264
Total	37,254	183	37,437

Source: SITRAMP Estimates

Table 9.3.10 Cost Estimate of Rehabilitation of Communication Facilities

Unit: Million Rupiah

Work Item	Capital Cost Components		
	Foreign Currency	Domestic Currency	Total
1. SDH Transmission Equipment	9,445	1,892	11,337
2. Digital Radio Equipment	5,152	1,034	6,186
3. OPTICAL Cable	6,869	684	7,553
4.Train Radio System	20,591	4,118	24,709
5. Power Supply	12,005	2,385	14,390
6. MUX Equipment	6,869	1,375	8,244
7. Spare Parts	11,130	0	11,130
8. Installation/Test Equipment	13,197	3,975	17,172
9. Fire Extinguisher System	4,770	954	5,724
Subtotal	90,028	16,417	106,445
Physical Contingency (10%)	8,999	1,646	10,645
Insurance (3.5 %)	3,466	636	4,102
Total	102,493	18,699	121,192

Source: SITRAMP Estimates
Note: SDH; Optical Terminal Equipment, MUX; Multiplex, PABX; Public Automatic Branch Exchange, DDF; Digital Distribution Frame, MDF; Main Distribution Frame

Table 9.3.11 Cost Estimate of Improvement of Level Crossings

Unit: Million Rupiah

Work Item	Capital Cost Components		
	Foreign Currency	Domestic Currency	Total
1. Improvement of Level Crossing (Wide)	17,077	541	17,618
2. Improvement of Level Crossing (Middle)	16,782	334	17,116
3. Improvement of Level Crossing (Narrow)	3,069	64	3,133
4. Spare Parts	1,471	-	1,471
5. Engineering Services	5,303	1,320	6,623
Subtotal	43,702	2,259	45,961
Physical Contingency (10%)	4,370	226	4,596
Insurance (3.5 %)	1,685	87	1,772
Total	49,757	2,572	52,329

Source: SITRAMP Estimates

(4) Additional Recycled Electric Cars

Cost estimation was made based on the assumption that 32 additional used electric cars, which are required by 2002 according to the train operation plan prepared by PT. KAI, will be obtained from some railway company in Japan. Table 9.3.12 shows the cost of procuring 32 used cars.

Table 9.3.12 Cost Estimate of Addition of Recycled Electric Cars

Unit: Million Rupiah

Work Item	Capital Cost Components		
	Foreign Currency	Domestic Currency	Total
1.Transport Cost for Shipping 32 cars @ 46,000US$/car	11,702	-	11,702
2. Repair of Pantograph & Adjustment of Wheel (32 cars)	-	4,691	4,691
Subtotal	11,702	4,691	16,393
Physical Contingency (10%)	1,170	469	1,639
Insurance (3.5 %)	453	1,813	636
Total	13,325	5,343	18,668

Source: SITRAMP Estimates

9.3.5 Schedule of Implementation Plan

The implementation schedule is depicted in Figure 9.3.8.

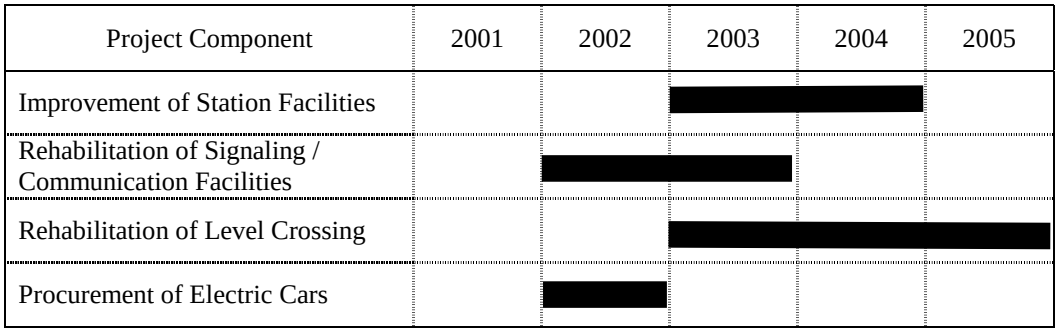


Figure 9.3.8 Schedule of Implementation Plan

9.3.6 Intermediate Term Implementation Plan

(1) Project Background

As analyzed in Chapter 5, person trip demand has been increasing in the east-west direction compared to the north-south direction. As residential areas have expanded to suburbs, many workers now commute to the central area. The city center has also expanded to the south and the center of gravity has moved towards to the south. Therefore the improvement of access from Tangerang, Serpong and Bekasi to the city center is urgently required to deal with the increasing commuter demand in the metropolitan area. Thus a direct railway operation from Tangerang, Serpong, and Bekasi to Dukuh Atas/Manggarai is proposed.

(2) Project Profile

a) East-West Connection by Short-Cut on the Tangerang Line

The plan aims to provide direct operation between Tangerang and Manggarai/Bekasi through the Western line. At present only 20 trains operate on the Tangerang line per day between Tangerang and Duri and direct service to Mangarai/Bekas is not provided. The plan for the east-west connection taking a short cut on the Tangerang line is shown in Figures 9.3.9 (Please see "Connection A") and 9.3.10.

The outline of the major works is as follows;

- Embankment works of double tracking; L= 1,050 m
- Construction of bridge L= 159 m
- New station of over track station 1 L/S
- Track works L=3,400 m

b) East-West Network by Short-Cut on the Serpong Line

Similar to the plan described above, thus plan aims to provide direct train operation between Serpong and Manggarai/Bekasi through the Western line. At present 46 commuter trains on the Serpong line are operated per day, excluding the eight middle/long distance trains and 14 freight trains per day between Serpong/Merak and Tanah Abang. However direct train operation is not provided from Serpong to Manggarai/Bekasi.

The plan for the east-west connection by taking a short cut on the Serpong line is shown in Figures 9.3.9 (Please see "Connection B") and 9.5.11.

The outline of the major works is as follows;

- Embankment works of double tracking; L= 1,000 m
- Construction of bridge L= 100m
- Track works L=2.000 m

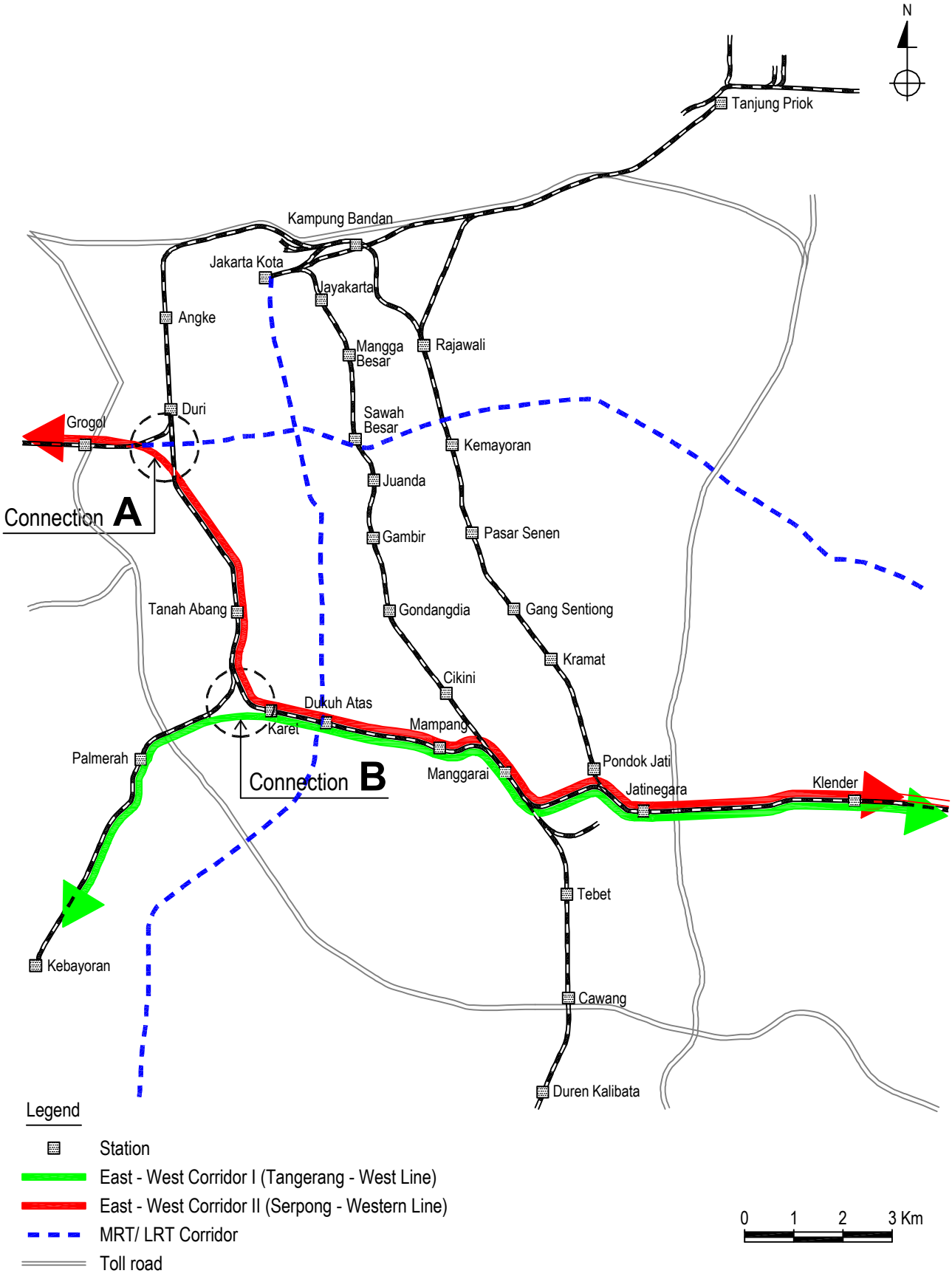


Figure 9.3.9 Concept of East - West Network by Short Cut

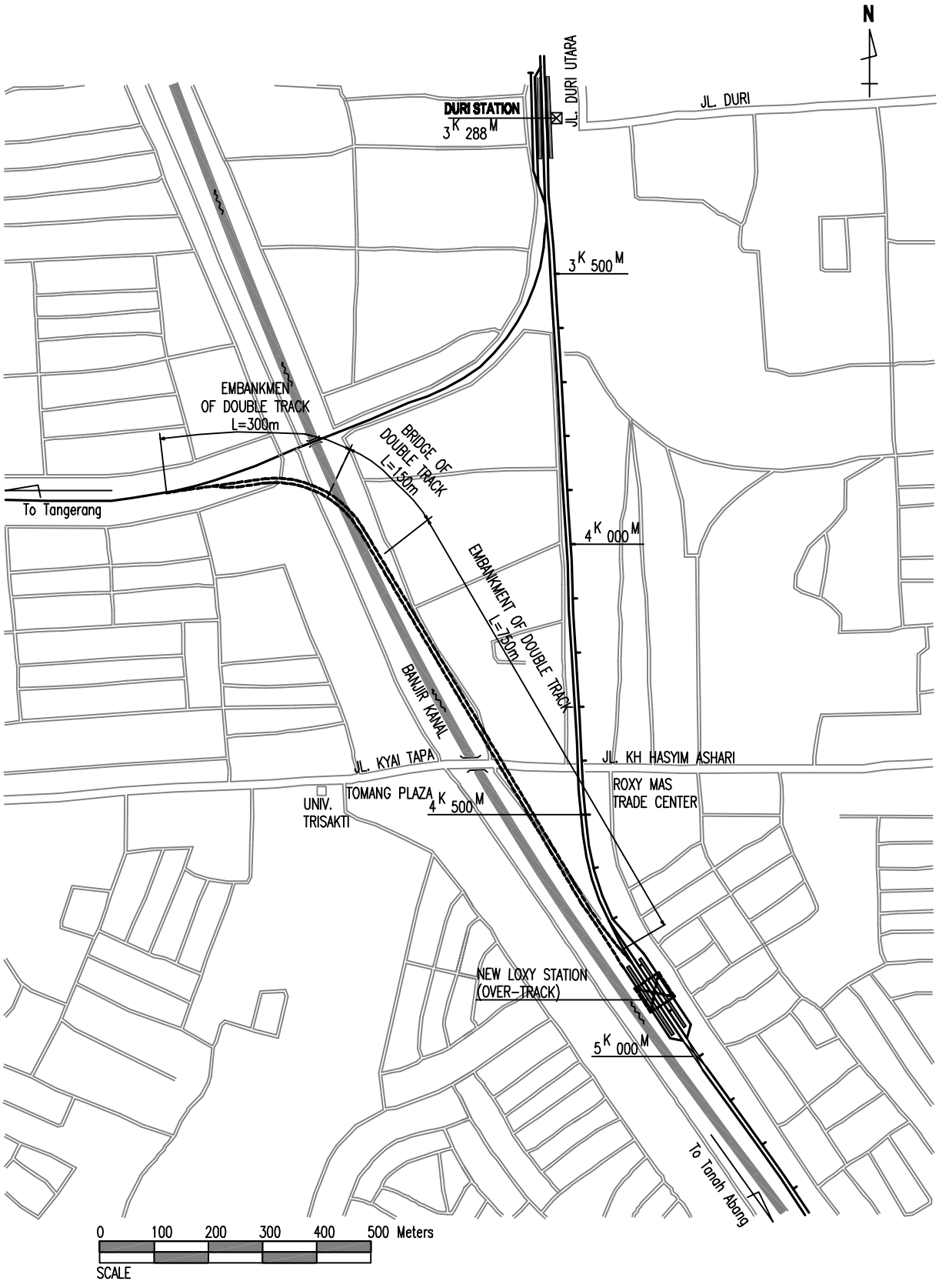


Figure 9.3.10 East-West Network by Short-Cut on Tangerang Line

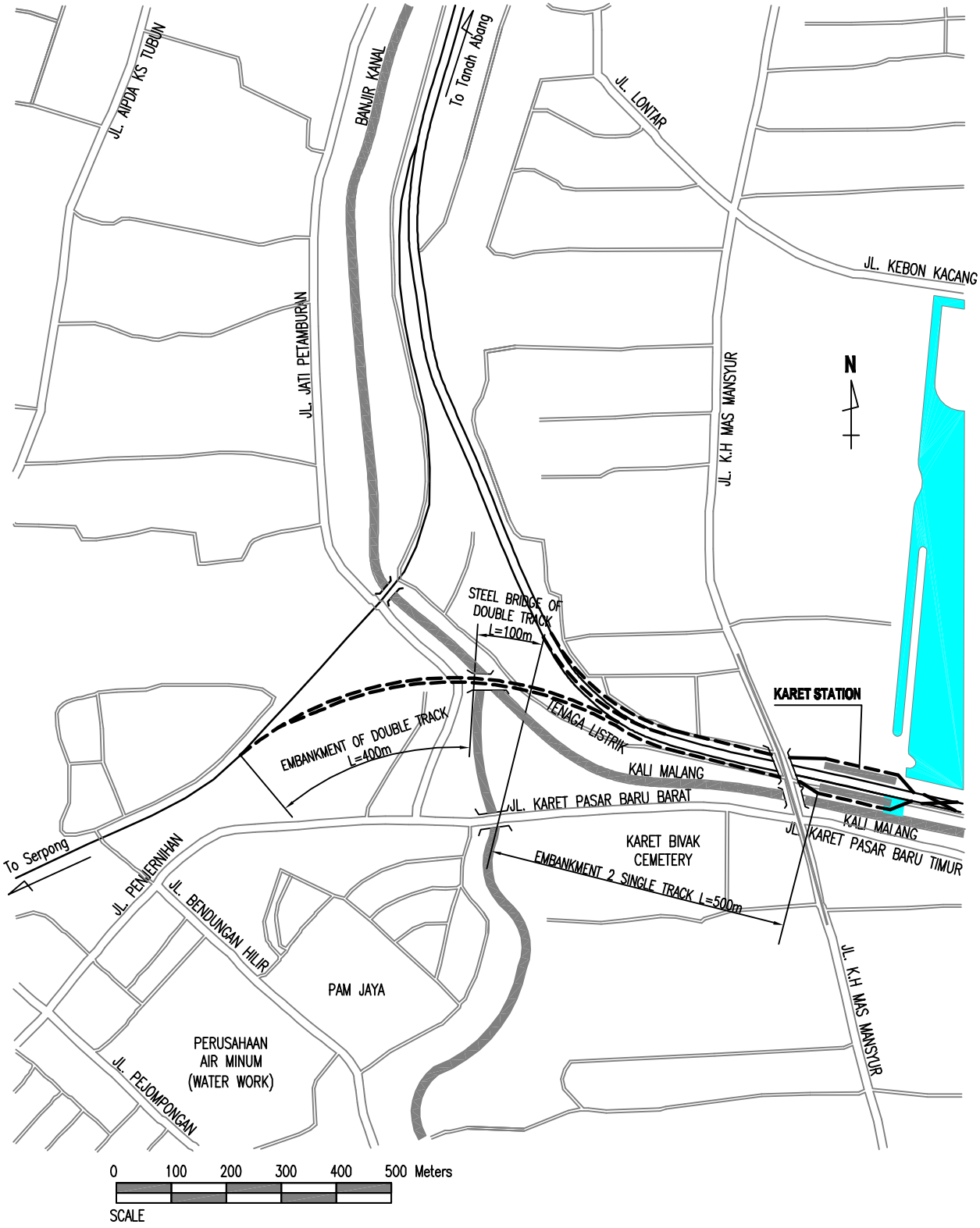


Figure 9.3.11 East-West Network by Short-Cut on Serpong Line

(3) Cost Estimates of East-West Connection by Short-Cut

The estimated construction costs of the two short cuts are presented in Table 9.3.13.

Table 9.3.13 Cost Estimates of East-West Connection by Short-Cut

Unit: Million Rupiah

Work Item	Capital Cost Components		
	Foreign Currency	Domestic Currency	Total
1. Short-Cut on Tangerang Line	69,125	42,731	111,856
2. Short-Cut on Serpong Line	45,824	27,809	73,633
Subtotal	**114,949**	**70,540**	**185,489**
Physical Contingency (10%)	11,495	7,054	18,549
Insurance (3.5 %)	4,428	2,719	7,147
Total	**130,872**	**80,313**	**211,185**

Source: SITRAMP Estimates

(4) Schedule of Implementation Plan

The implementation schedule for the two short cuts are shown in Figure 9.3.12.

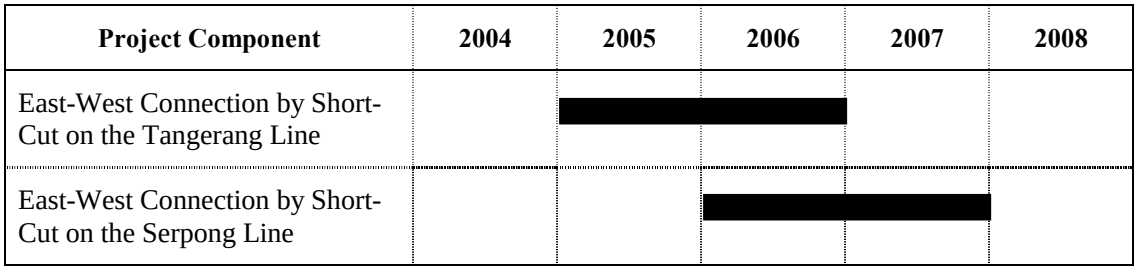


Figure 9.3.12 Implementation Schedule for Two Short-cuts Development

9.4 Short-term Road Development Projects

9.4.1 Kota Bogor Ring Road Project

This project intends to connect with the Jagorawi toll road and to complete the northern segment of the planned ring road in order to distribute the north-south traffic. The project cost is estimated at Rp. 36,664 million.

(1) Project Background

a) Function of the Bogor Ring Road

The Bogor Ring Road has been planned to encircle the outer edge of Bogor city. The sections named as R0, R1 and R2 are part of the ring road, crossing from east to west in the northern part of Kota Bogor, consisting of Kecamatans Kota Bogor Barat, Tanah Sareal, and Kota Bogor Utara. Section R2 will connect the northern part with the Jagorawi Toll Road at the Sentul Selatan Interchange, which is already in operated and connects only with the road of the opposite side. The location of the Project road is presented in Figure 9.4.1.

In this area, several trunk roads, such as the Jagorawi Tollway, Jl. Raya Bogor, and Jl. Kemang, enter the central area of Bogor city from the north. The purpose of the ring road is to distribute traffic from these trunk roads into the central area and to prevent through traffic from passing the central area.

The Bogor interchange is presently the sole entrance from the Jagorawi Toll Road to Bogor city and the access road from the interchange connects to the busy central area of the city. Traffic from Jagorawi Toll Road is not able to reach any areas in the city without passing this congested central area.

The ring road connecting with the Sentul Selatan interchange would alleviate traffic congestion in the central area by providing a bypass function as well as strengthening the linkage between the northern part of Kota Bogor and the Jakarta Metropolitan area through Jagorawi Toll Road. The Bogor ring road consists of the three sections as listed in Table 9.4.1.

Table 9.4.1 Road Section of Bogor Ring Road

Section Code	Section	Length
Section R1 (West Side)	Boundary with Kabupaten Bogor to Jl. Raya Taman, Cimanggu	4.3 Km
Section R0 (Central)	Jl. Raya Taman Cimanggu to Jl. Gunungede	4.1Km
Section R2 (East Side)	Jl. Gunungede to Jagorawi Tollway	3.9Km

b) Present Situation

The construction of section R0, the central portion of 4.1 km in length, is selected as a short term project, after reviewing the conditions of the area along the ring roads and preparation for implementation. Land acquisition is the most significant issue in the preparation and the land of the R0 section has been purchased by Kota Bogor. This section plays an important role in providing linkage for the traffic from/to Tangerang and to/from CBD of Kota Bogor. High traffic volume on the section causes traffic congestion at the railway level crossing and at the subsequent intersection, both of which are located 100 m from each other. The roadside is developed and restaurants, commercial complexes and small shops have been built along the road.

On section R0 open areas have been reserved on both sides of the existing road, which is paved approximately 7 to 8 meter width. The right of way has been reserved for road widening. The southern side of the reserved area is approximately 20 m wide and the eastern side is approximately 7 m wide.

Four rivers/waterways cross the Project road. A waterway at No.2 + 890 with 2 colgate pipes (2.5 meter diameter) with approximately 7 meter earth cover and Kali Ciliwung at No.3 + 670 providing a steel truss structure of which span is 50 meters. The road crosses two waterways with pipe culverts. A railway level crossing is located at No.3 + 020.

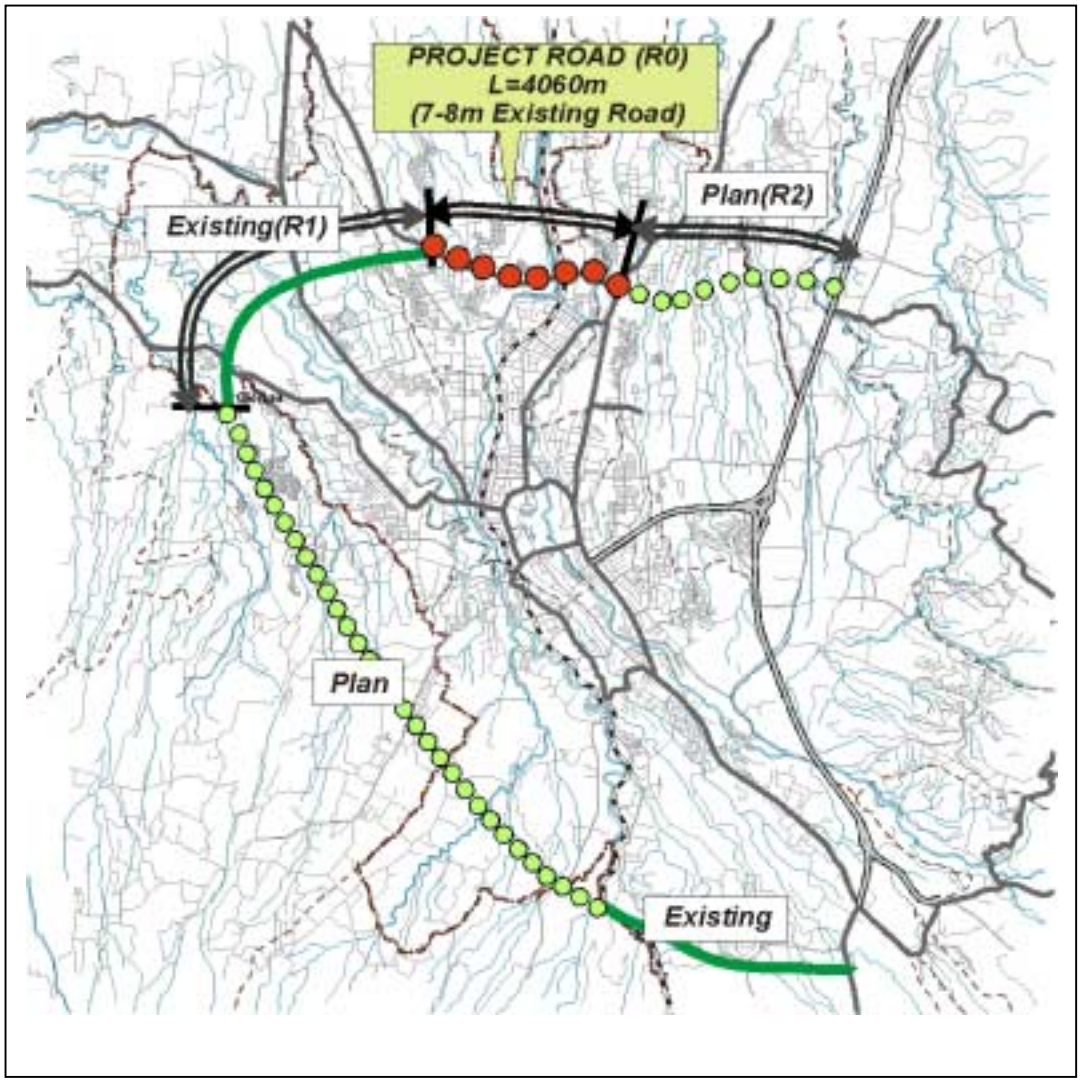


Figure 9.4.1 Project Location Map of Bogor Ring Road

Generally the roadsides are of a flat terrain but gaps of 3 to 10 meter between the carriageway and the roadside exists at several places. At No. 2+920 there is an intersection with a busy road. Traffic from/to the southern side of the road to/from Tangerang are prominent flow. The distance between the intersection and the railway level crossing is approximately 80 to 100 meters and traffic flows passing these two facilities interfere with each other.

(2) Project Profile

a) Typical Cross Section

The typical cross section to be applied for section R0 is illustrated in Figure 9.4.2.

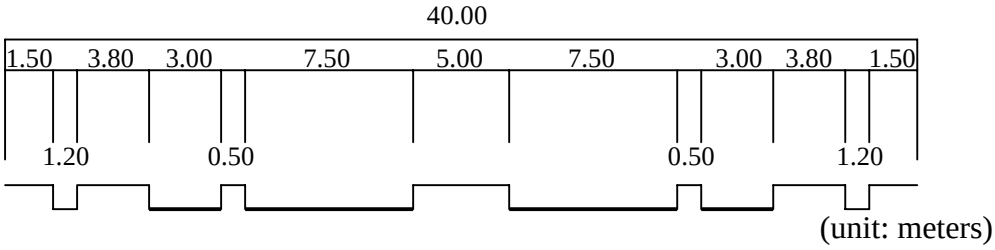


Figure 9.4.2 Typical Cross Section of Bogor Ring Road

b) Design Feature

The design feature of the Project road is listed in Table 9.4.2.

Table 9.4.2 Design Feature of Project Road

Classification	Secondary Arterial Road (Type II Class 1)
	Arterial road above 10,000 DTV(pcu)
Design Speed	60 Km/h (Type II Class 1)
Number of Lanes	2 fast speed with 1 slow speed lanes in one direction
Pavement	Asphalt concrete pavement
Bridges	
No. 2+890	Span 30m concrete bridge above a waterway
No. 3+670	50m of steel truss bridge above Ciliwung River
Railway crossing	
No. 3+020	Level Crossing
Road crossings	
No.0+000	Beginning Point: No Signal
No.0+200	Y shape intersection, Jl. Kemang Salvage the existing signals and Signal Controlled
No.1+270	Jl. Cimangis Permai: No Signal
No.2+920	Signal Controlled
No.4+060	Jl. Gunung Gede End Point: Signal Controlled
Drainage System	Open Ditches
Traffic Safety Facilities	Guard rail for pedestrians, Regulatory/guide signs, Street lights, Lane marks, Street trees, Pedestrian crossings, Traffic signals

(3) Implementing Agency

Since section R1 had been constructed by the Ministry of Public Works, Bina Marga, Kota Bogor had planned to construct R0 section under the Bina Marga's budget. However under the concept of local autonomy starting from the year 2001, the local government is responsible for the implementation of projects under its jurisdiction. Therefore Kota Bogor is new the implementing agency of the Project.

(4) Cost Estimates

The construction cost is estimated to be 36,664 million Rupiah as of September 2000, including a 10 percent VAT. 8,942 million Rupiah is the unit construction cost per kilometer. The unit cost excludes the two extra bridges, which is 5,660 million Rupiah.

(5) Project Implementation Plan

The project implementation schedule is illustrated in Figure 9.4.3.

Traffic demand as well as the progress of land acquisition are basically the criteria on which priority is given to the sections.

The section R1 has been opened to the public, although only half of the planned cross section has been constructed. Bina Marga, National Highway Department, was the agency responsible for the design and construction. Work to widen the cross section to the planned of width 40 meters will be executed in the second stage.

In section R0, a two-lane road has been opened to traffic. Land acquisition has been finalized for widening this section to the 40-meter width planned cross section as the first stage of the section. Construction work to widen the road into a 40-meter cross section is the 2nd stage and the construction an elevated structure at the cross point with the railway Bogor line will be in the third stage.

Kota Bogor is now planning to construct Section R2 by contribution of private sectors. The area where section R2 runs is of hilly terrain and suitable for development. Kota Bogor is planning to open an inter city bus terminal in this area under the BOT scheme. The construction of section R2 may become a condition of the concession. Land acquisition will be done in the second stage after finalizing the concessionaire agreement with an investor in the first stage. Construction of section R2 will be carried out in the last stage.

Second priority is given to section R2. The process of inviting and negotiating with the private sector may take long time; therefore, action should be taken at an earlier date.

Widening section R0 to full width would increase its current traffic capacity by four times, resulting in the alleviation of the present traffic congestion at the intersections. Therefore an elevated structure will not be necessarily constructed an elevated structure in the second stage. Once section R2 is opened, either an elevated structure, an underpass or a flyover, should be constructed at the railway crossing on the section R0 because direct connection of the section R0 with Jagorawi Toll Road would bring about a drastic increase of traffic volume on the section R0. Although the construction of an elevated structure is not included in the second stage of section R0, it is necessary to secure the land required for the elevated structure.

The third stage of Section R1 is the lowest priority in the Project. The time to begin this stage must be determined by monitoring the traffic demand and it should also be coordinated with the progress of the other sections of the Project road.

Section	Stage	Project Component	2000	2001	2002	2003	2004	2005
R1	1	Land Acquisition	Completed					
	2	Half Width Construction	Completed					
	3	Full Width Construction	After 2005					
R0	1	Land Acquisition	Completed					
	2	Full Width Construction						
	3	Construction of an Elevated Structure						
R2	1	Finalization of Concessionaire						
	2	Land Acquisition						
	3	Full Width Construction						

Figure 9.4.3 Implementation Plan of Kota Bogor Ring Road Project

9.4.2 Jakarta - Bekasi Connecting Road Project

(1) Project Background

This project intends to complete the missing link of about 4 kilometers, which lies parallel to the Bekasi railway line, to cross the administrative boundary between DKI Jakarta and Kota Bekasi. The road starts from Jl. Bekasi Timur Raya, east of the Cipinang Prison in DKI Jakarta, and heads east toward the west side of Kender Baru Station of Bekasi Line of the Jabotabek Railway's Bekasi Line. This road, Jl. I. G. Ngurah Rai, runs closely in the south side of the railway track. However the road is planned to extend to Jl. Sultan Agung, the extension of Jl. Bekasi Raya in DKI Jakarta, approximately 4.13 km in length.

The road originates at the Jatinegara Station and will become a trunk road which connects Jakarta and Bekasi if the Project road is extended to Jl. Sultan Agung. Many vehicles traveling from Bekasi to Jakarta presently use Bekasi Raya, which is very congested every day. The connection of the project section would offer an alternative route between these cities. Figure 9.4.4 presents the location of the Project road, Jl. I. Gustin Ngurah Rai Extension. This extension runs in the jurisdiction of both DKI Jakarta and Kota Bekasi and the local governments are responsible for land acquisition.

There are three railway stations along the 4.3 km of the missing road section and the reserved land for the road construction is prepared close to the railway station buildings. There is no room available for station plaza development. Klender Baru and Cakung are stations which have almost no space in front of them for transferring bus passengers to the railway. At the same time these small buses waiting for passengers on the narrow roads cause serious traffic jam. This section of the railway is scheduled for improvement under the Bekasi Line Double-double Tracking Project but details of the project is not known.

Present situation of the Project road is as follows;

1) Progress of the ROW acquisition of Kota Bekasi territory is approximately 63 percent complete.
2) Land acquisition activity has not started except land inventory in DKI Jakarta.
3) The project office of Kinpraswil is ready to start construction after the completion of land acquisition by both local governments (The office received a 100 percent completion report from DKI Jakarta office).
4) DKI Jakarta is waiting for information on the confirmed budgetary arrangement for the Project from Kinpraswil. DKI cannot start land acquisition without the confirmation from Kinpraswil.
5) Design has been carried out by the Kinpraswil head office but it has not been finalized yet.
6) Classification of the road is Secondary Arterial Road in both Bekasi and DKI.
7) The width of Right of Way (ROW) in the two administrations are different. Bekasi is purchasing the land of 22 meters in width and 40 meter is the width proposed under the DKI Jakarta road network development plan. The actual width of DKI Jakarta may be 28 meters excluding ditches.

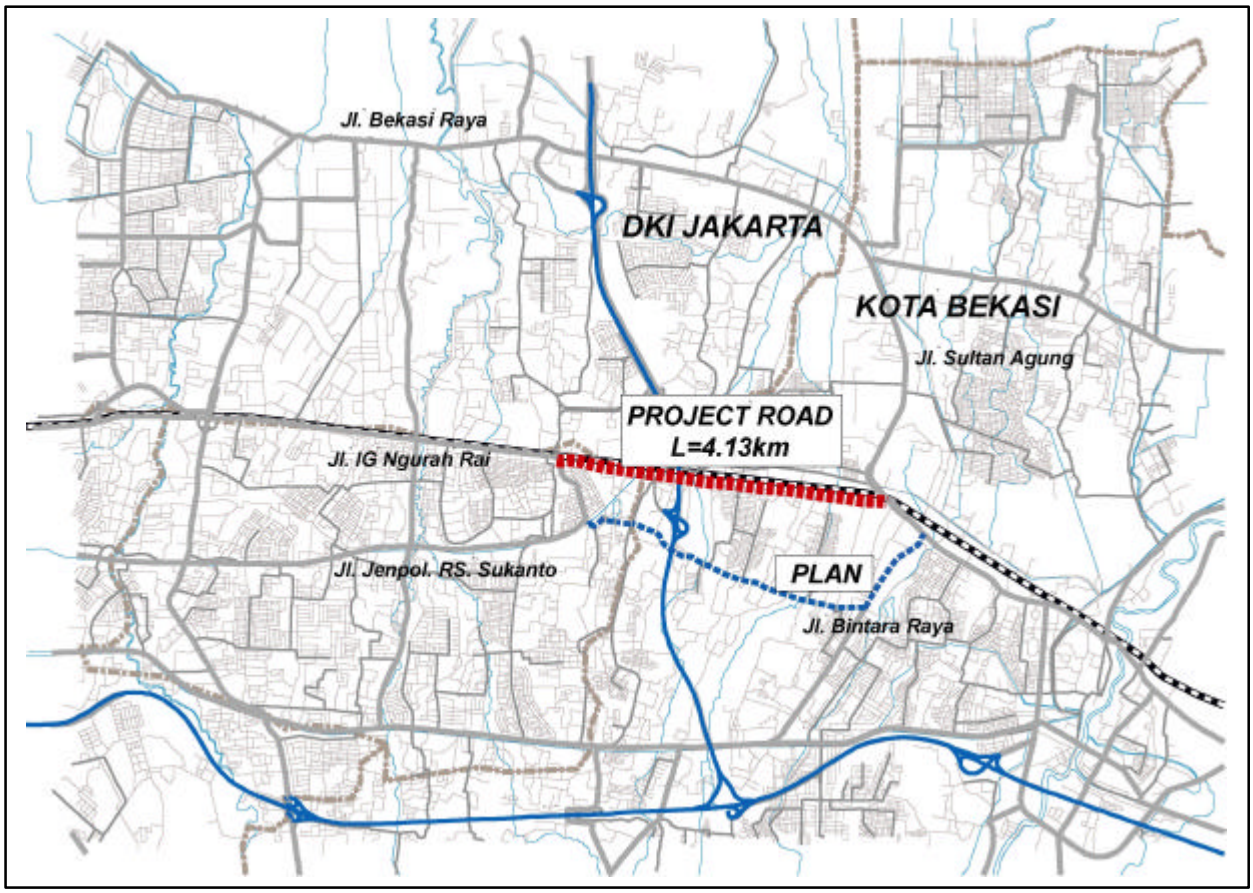


Figure 9.4.4 Project Location Map of Jakarta – Bekasi Connecting Road

Chapter 10

Conclusions

10. Conclusions

The Jakarta Metropolitan area will grow and the population in Jabotabek will reach thirty million persons in 2015. Although traffic demand declined for a couple of years after the economic crisis, traffic congestion has already come back on the streets. In line with the increasing population and revitalized economy in the future, it is expected that traffic situation in the region will worsen. There is an urgent need to promote public transport usage; otherwise the road network in Jabotabek will not be able to deal with the increasing traffic demand.

The level of public transport services, however, has deteriorated due to the economic crisis. At present not just the low level of services in terms of convenience, amenity and travel time but also the lack of security is recognized as being the concern of public transport users. At the current level of service, it is difficult to divert people using private cars to public modes of transport; Therefore, improvement of public transport services is urgently required .

However, taking into account the current budget constraint of the government, it is recommended that projects which do not require a huge amount of funds in short term be implemented. In line with this, the existing transport facilities should be utilized. At the same time, projects requiring difficult land acquisitions should be avoided when selecting short-term implementation projects.

Although the financial resources of the public sector is currently limited, the government has been facing various urban transportation problems and countermeasures should be taken to tackle such problems as traffic congestion. A way to lessen the financial burden on the government is to pursue a private-public partnership when developing transportation system so that private sectors can be involved.

10.1 Recommended Short-term Urban Transport Policy Measures

As mentioned above, the primary urban transport policy is the promotion of the public transport system. In order to promote public transport, the improvement of the existing Jabotabek railway and enhancement of bus transport are the key components of short-term public transport improvement.

Railway Transport Improvement Plan

To increase passenger convenience and to secure transport capacity, the main railway transport improvements should focus on the rehabilitation of existing facilities such as railway station facilities, signal system, level crossing facilities, and communication facilities. To increase passenger transport capacity, the number of electric cars should be increased and the stabling yard should be reinforced.

Furthermore, to cater to the increasing commuter flow in the east-west direction, the construction of two short-cut sections connecting the Western line and the Tangerang/Serpong lines are proposed. The short cuts will enable direct train operation between Tangerang/Serpong and Dukuh Atas/Manggarai. Although the projects are categorized as being intermediate term plans since they require the acquisition of land, an earlier implementation period is recommended because

the distance is short and the investment cost is relatively small compared to the development of a new line. Once direct operation commences, the Jabotabek trains should be integrated with the trunk bus system plying the busway on Jl. Sudirman in short term and the future development of the Jakarta MRT System at the Dukuh Atas station. The Dukuh Atas Station's functions should be enhanced for the smooth transfer of passengers.

Bus Transport Improvement Plan

For bus transport improvement, it is essential to reform the bus operation regime. The bus licensing system should be changed from the existing one to a tendering system by establishing the specifications and standard of bus services. To achieve a more efficient and reliable bus operation, the possibility of bus fare collection by the public sector should be explored and the introduction of a bus operation monitoring system should also be discussed between the regulatory agency, bus operators, bus drivers and bus passengers. Cooperation between the public and private sectors to improve bus operation should be explored.

It is recommended that bus transport be given a higher priority by developing busways or bus priority lanes. However, strong objection from car users is expected, since the introduction of a busway or exclusive bus lane takes away one lane from private car use and reduces the existing road capacity. The government should make efforts to obtain the society's consensus on this. If a preferential public transport policy is not taken, the shift from public transport to private modes of transport would be inevitable and result in worsen traffic congestion.

Traffic Restraint Scheme

At the same time, a traffic restraint scheme should be employed in congested areas to the control excessive traffic demand. It should be recognized that without a "Push" policy private car users will not change their mode of transport. A traffic restraint policy such as road pricing should be implemented after providing a sufficient level of public transport services.

Road Construction Project

In the short term road maintenance and rehabilitation should be given priority because the road condition has deteriorated due to the lack of budget for road maintenance. Road construction should focus on missing links, bottleneck sections, and suspended on-going road projects. The Jakarta – Bekasi Connecting Road, Jl. I.G. Ngurah Rai extension, is a missing link. Construction of the road would increase the road capacity between Bekasi and Jakarta and reduce traffic congestion on the parallel road of Jl. Raya Bekasi because some of the cars will be diverted to the new road. This reduction in private vehicles would make it easier to introduce a busway on Jl. Raya Bekasi.

Another proposed road construction project is the Bogor Ring Road. This road aims to provide a bypass for through traffic to the Bogor City and to also connect the northern part of the city to the Jagorawi Toll Road. In conjunction with this road development project, the existing intercity bus terminal located in the heart of the city will be moved to the area along the Project road.

Traffic Control and Management

Traffic control and management are short term measures in nature. This includes the improvement of the traffic signal system, installment of traffic control devices, geometric improvement, pedestrian facility improvement and traffic control system.

Soft Measures

Soft measures can be implemented even in the short term since they require a relatively small amount of funds. Some of them require a long time before the effect is seen but action should be taken at the earliest time. The soft measures include traffic safety enhancement program, environmental improvement program, land use zoning and so forth.

Institutional Setup

To materialize the short term implementation plan, the establishment of a new organization that deals with metropolitan-wide urban transportation planning and travel demand management is recommended.

10.2 Toward the Phase 2 Study

A variety of information is needed in order to establish an integrated urban transportation master plan for Jabotabek. In the Phase 1 study, eventually, various data were collected through the cooperation of the city and regencies. It has been revealed, however, that some data important for urban transportation planning such as the number of employees at work places are not available in the Study area. Employment data is important because “to work place” and “to school” trips are the two major constituents of urban travel demand and these trips form the morning and afternoon peak trip demand. It is essential to understand the travel pattern of commuting trips. Therefore the surveys to be conducted in the Phase 2 Study should explore these types of missing data.

In addition, under the Phase 2 Study, person trip survey and other relevant transport surveys are planned. Statistical data and the data obtained through field surveys are important not merely for the master plan study but also for transport studies to be conducted in the future and research on urban transportation. An urban transportation database system, which can be opened to the public, should be developed in the course of the Study and an agency should be established for the maintenance and updating of the database.

As genuine decentralization starts from the year 2001, local governments will bear more responsibility for infrastructure development including the transportation network in their jurisdictions. In the Phase 2 Study, an in-depth study should be conducted on road network development in the jurisdictions of local governments. A road network development master plan shall be established to guide future urban development and to avoid urban sprawl in the suburban area. In addition, according to the change in administration, responsibility of infrastructure development and maintenance should be reviewed and clarified. Budget allocation shall be examined in accordance with the responsibility for transport infrastructure, which is determined by analysis based on a comprehensive trip demand data to be obtained from the person trip survey and other surveys.

In the Phase 1 Study a conceptual master plan was proposed to avoid conflicts between the short-term implementation plan and the urban transportation master plan. However the conceptual master plan has not given a concrete picture of the future urban transportation system and merely provides the direction of transportation infrastructure development. In the Phase 2 Study the conceptual transport master plan should be a concrete proposal based on more reliable travel data. The short-term implementation plan should also be re-examined and should be more specific in order for the plan to materialize.

Demonstration projects proposed in the Phase 1 Study shall be executed to pursue the viability of the projects during the Phase 2 Study. Discussion with relevant agencies is essential prior to the implementation. Evaluation of the demonstration projects will give valuable insights for full-scale implementation. Special attention should be paid to understand the level of public transport service that attracts private car users.

In formulating the master plan, emphasis should be placed on developing consensus within the society. In this regard, the Study should make efforts to involve the general public and to reflect feedbacks from public opinion in as many occasions as possible. Stakeholder meetings and public hearings provide good opportunities for receiving such feedbacks.

Appendix to Chapter 5

Appendix to Chapter 5

5.1 Base Data for Transport Model Development

In the Phase (1) study, several type of transport survey were conducted to understand the existing travel demand as well as to assess the performance of the existing transport system. The transport surveys executed in this phase include (a) Traffic count survey, (b) Travel speed survey, (c)Bus passenger survey, (d) Railway passenger survey, (e) Mini person trip survey and (f) Opinion survey. Transport demand forecast models were basically developed through the analysis on person trip data obtained in the Mini person trip survey, although sample size is limited at 950 households and accuracy of the transport models is not high.

5.2 Overview of Transport Demand Forecasting

Transportation demand forecasting follows a conventional four-step method, consisting the following sequent modules;

1) Trip production and attraction
2) Trip distribution
3) Modal split
4) Traffic assignment on highway network or transit network

5.3 Trip Production Rates

Trip production rates were estimated by trip purpose and by income group based on the trip data obtained in Mini Person Trip Survey. For a Home-based Work the trip rate was calculated per employee, on the other hand Home-based School trip rate was estimated per student. For the other trip purposes, trip rate were obtained based on per person.

Table AP 5.1 Home Based Work Trip Production Rate per Employee

Income Group	Home to Work Place	Work Place to Home
High	0.870	0.826
UM	0.815	0.815
H&UM	*0.823*	*0.816*
LM	0.824	0.839
Low	0.796	0.784
All Income	0.813	0.812

Source: SITRAMP Mini Person Trip Survey, 2000

Table AP 5.2 Home Based School Trip Rate per Student

Income Group	Home to School	School to Home
High	0.976	1.024
UM	0.985	0.937
H&UM	*0.984*	*0.951*
LM	0.984	0.981
Low	0.974	0.988
All Income	0.980	0.976

Source: SITRAMP Mini Person Trip Survey, 2000

Table AP 5.3 Trip Production Rates for Other Trip Purposes

(unit: trips per person per day)

Income Group	All Purpose	Home to Others	Others to Home	Non Home Based Business	Non Home Based Others	Non Home Based Total
High	1.797	0.188	0.180	0.060	0.150	*0.211*
UM	1.856	0.217	0.234	0.032	0.100	*0.132*
H&UM	*1.846*	*0.212*	*0.225*	*0.037*	*0.109*	*0.146*
LM	1.699	0.161	0.160	0.017	0.064	*0.081*
Low	1.604	0.163	0.163	0.010	0.029	*0.039*
All Income	1.701	0.175	0.178	0.019	0.062	*0.082*

Source: SITRAMP Mini Person Trip Survey, 2000

In the Phase (1) Study, trip production and attraction by zone could not be obtained from the survey because the Mini Person Trip Survey did not cover the whole Jabotabek region. Thus the trip production and attraction models for Non-Home Based trips developed in the previous study, ARSDS (1), have been adopted in the Phase (1) Study.

- Private Matters: Trip Attraction = 0.226 x (Daytime Population) - 2848
- Shopping: Trip Attraction = 1.0858 x (Jobs in Commercial Industry)+2166
- Business: Trip Attraction = 0.1259 x (Jobs in Secondary Industry)
  + 0.1189 x (Jobs in Tertiary Industry)+961

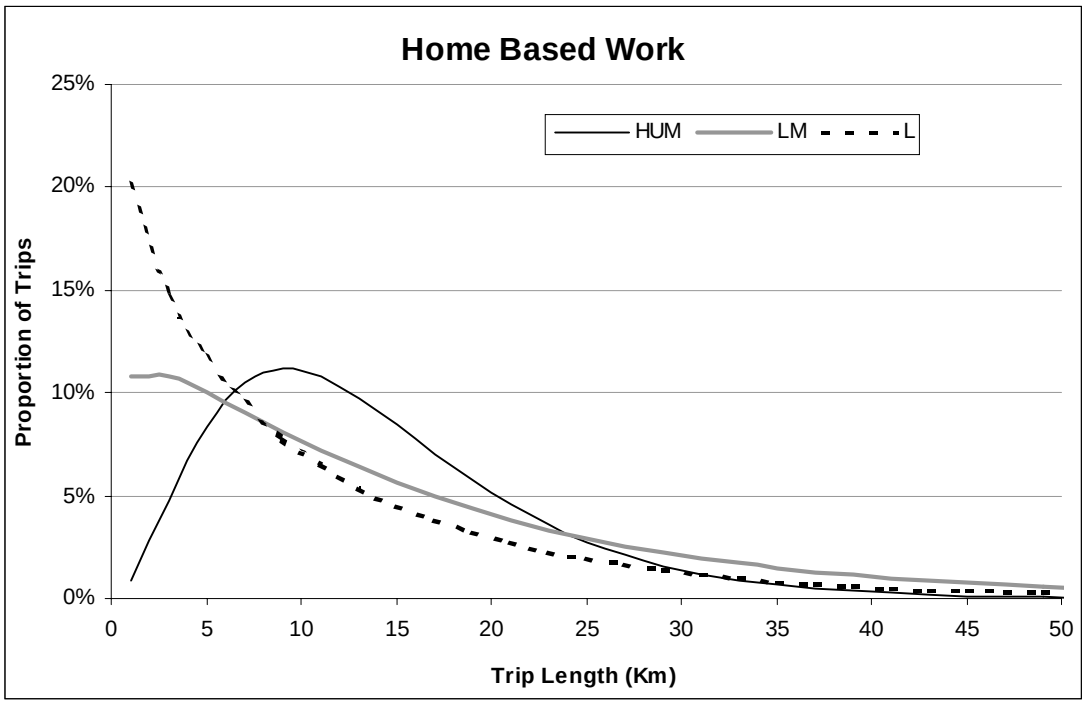
5.4 Trip Distribution Model

Trip distribution models were also developed based on Mini-Person Trip survey. Similar to the trip production and attraction models, trip ends were not obtained through the Phase (1) Study, thus one-side constraint distribution models were established. Formula of trip distribution models for each trip purpose by income level are listed in Table AP 5.4.

Table AP . 5.4 Gravity Model by Trip Purpose and Income Group

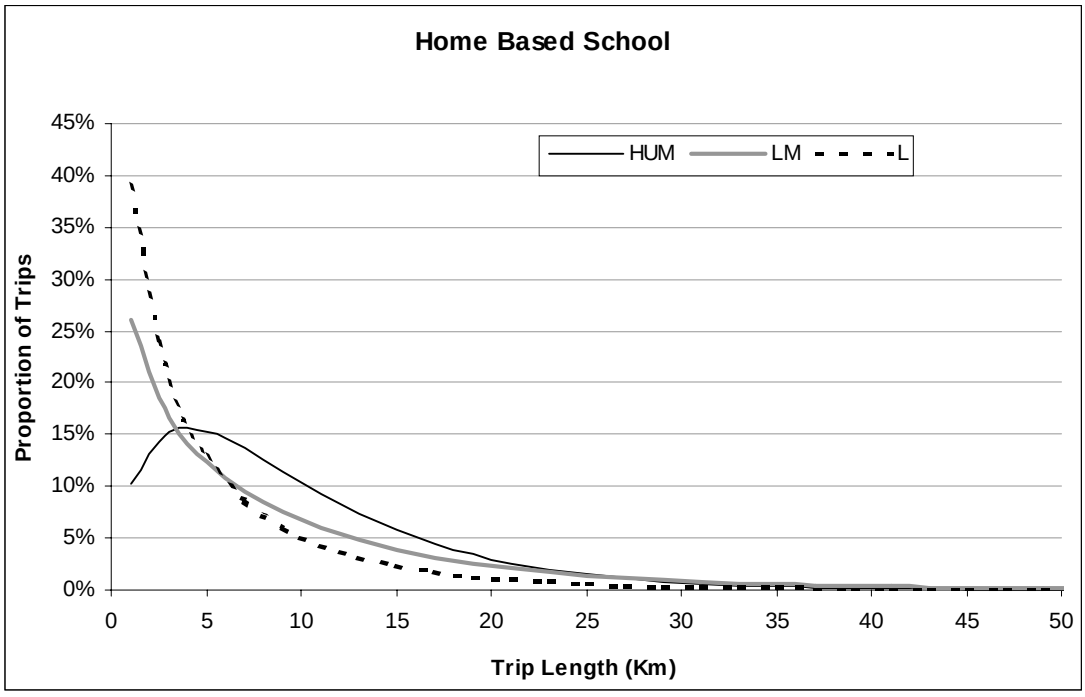
No	HHS Income Group	Equation	R^2	Average Trip Length	
				Sample	Model
1	High & Upper Group – HBW	$0.01087\ X^{1.9189}\ e^{-0.2099X}$	0.65	14.02	13.61
2	High & Upper Group – HBS	$0.1215\ X^{0.6763}\ e^{-0.1715X}$	0.63	8.25	8.50
3	High & Upper Group – HBO	$0.1053\ X^{0.7328}\ e^{-0.1722X}$	0.66	9.22	9.48
4	High & Upper Group – NHB	$0.0935\ X^{0.9504}\ e^{-0.1928X}$	0.88	8.04	7.98
5	Lower Middle – HBW	$0.1165\ X^{0.1289}\ e^{-0.0717X}$	0.88	12.49	13.49
6	Lower Middle – HBS	$0.2853\ X^{-0.2497}\ e^{-0.0884X}$	0.79	7.59	8.29
7	Lower Middle – HBO	$0.04599\ X^{1.5692}\ e^{-0.2838X}$	0.91	10.46	9.34
8	Lower Middle – NHB	$0.0358\ X^{2.0355}\ e^{-0.3411X}$	0.85	9.24	8.83
9	Low Income Group – HBW	$0.2175\ X^{-0.1436}\ e^{-0.0789X}$	0.82	9.36	9.67
10	Low Income Group – HBS	$0.4457\ X^{-0.3679}\ e^{-0.1319X}$	0.94	4.66	4.83
11	Low Income Group – HBO	$0.3739\ X^{-0.6687}\ e^{-0.0429X}$	0.95	6.46	7.15
12	Low Income Group – NHB	$0.0763\ X^{0.8323}\ e^{-0.1595X}$	0.97	11.25	11.25

Source: SITRAMP Mini Person Trip Survey, 2000



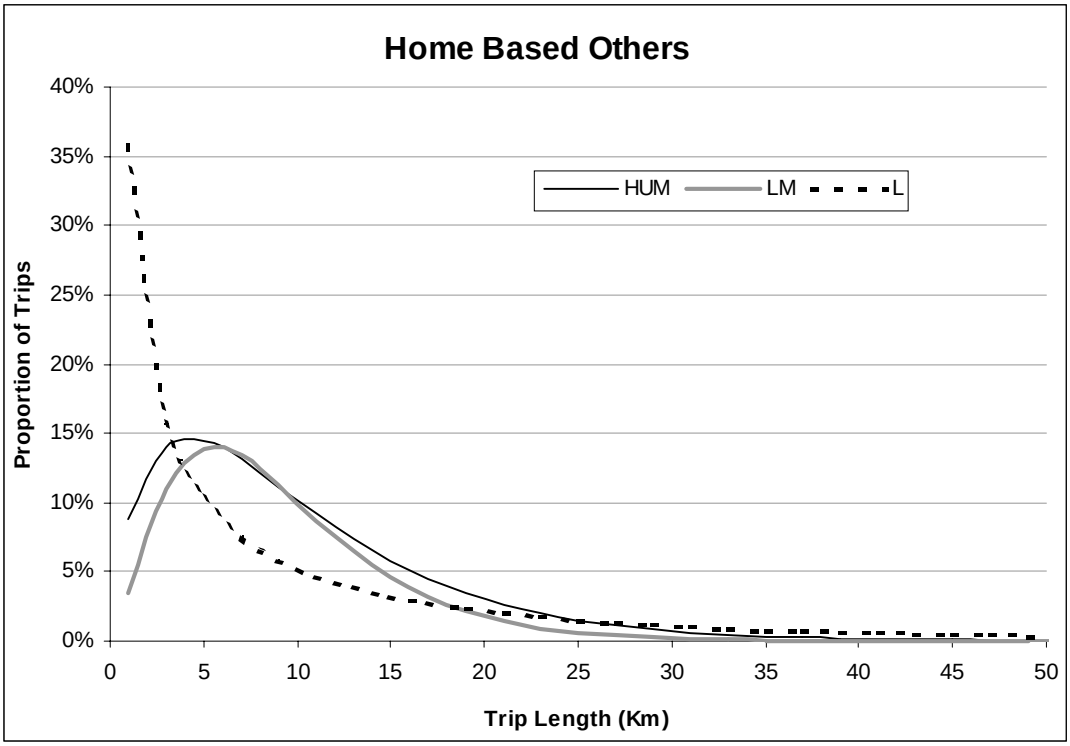
Source: SITRAMP Mini Person Trip Survey, 2000

Figure AP 5.1 Trip Distribution Model for Home Based Work by Income Level



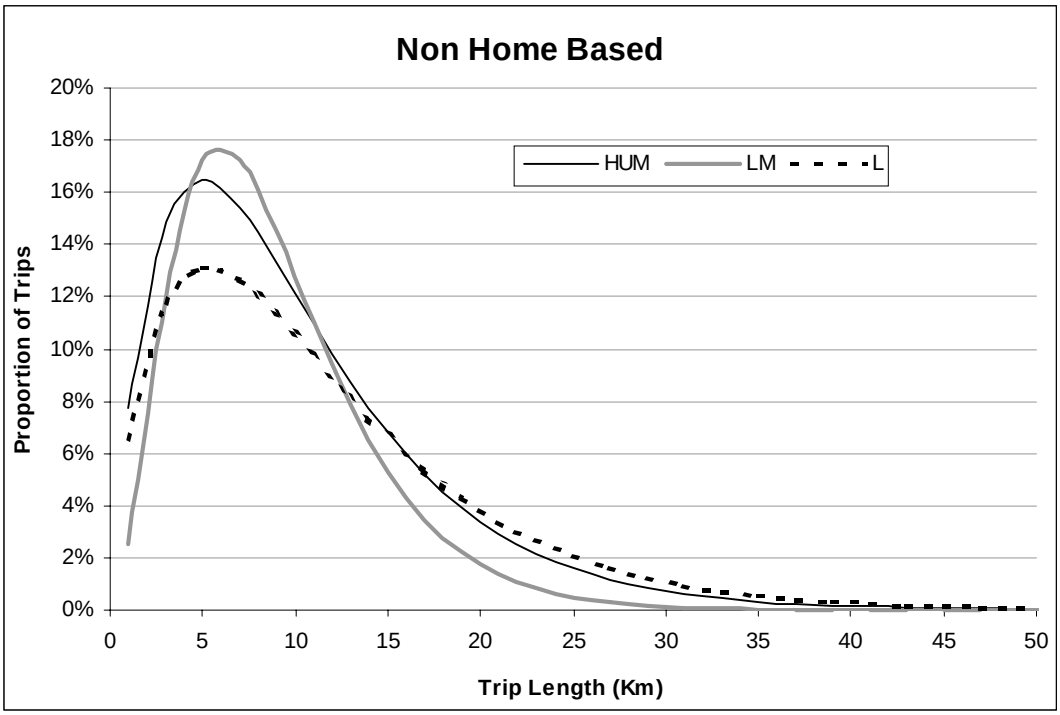
Source: SITRAMP Mini Person Trip Survey, 2000

Figure AP 5.2 Trip Distribution Model for Home Based School by Income Level



Source: SITRAMP Mini Person Trip Survey, 2000

Figure AP 5.3 Trip Distribution Model for Home Based Others by Income Level



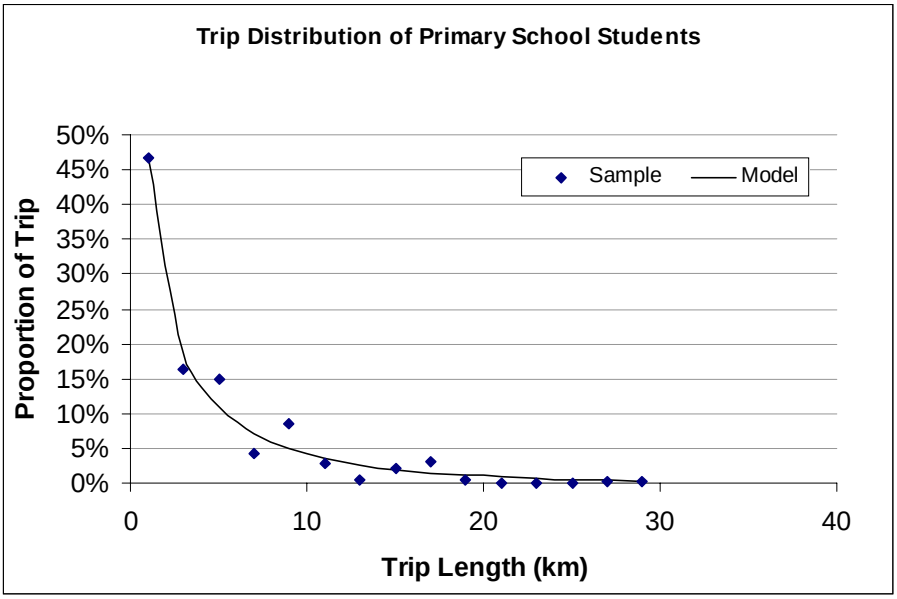
Source: SITRAMP Mini Person Trip Survey, 2000

Figure AP 5.4 Trip Distribution Model for Non-Home Based by Income Level

Table AP 5.5 Trip Distribution Model by School Type

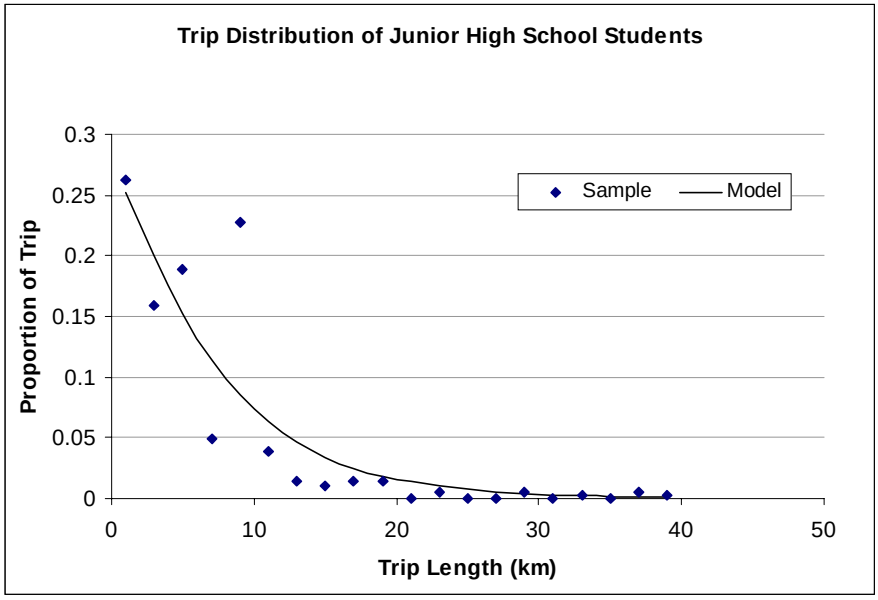
No	Trip By Occupation	Equation	R^2	Average Trip Length	
				Sample	Model
1	SD (Primary School)	$0.5123\ X^{-0.648}\ e^{-0.0998X}$	0.97	4.15	4.63
2	SMP (Junior High School)	$0.2954\ X^{0.0832}\ e^{-0.1588X}$	0.78	6.02	6.73
3	SMA (Senior High School)	$0.0946\ X^{1.223}\ e^{-0.267X}$	0.71	8.33	8.25
4	University	$0.0652\ X^{0.6372}\ e^{-0.1142X}$	0.76	13.05	13.69

Source: SITRAMP Mini Person Trip Survey, 2000



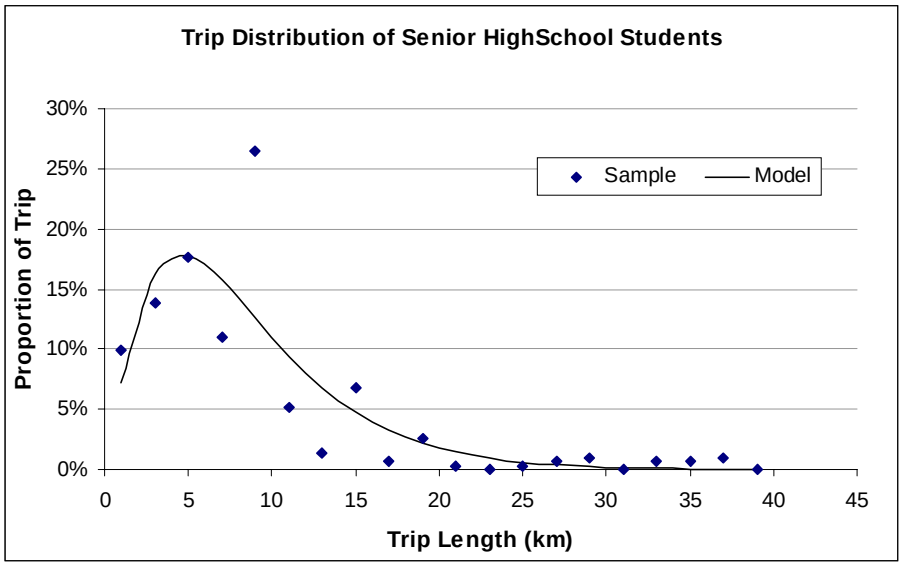
Source: SITRAMP Mini Person Trip Survey, 2000

Figure AP 5.5 Trip Distribution Model for Home Based School : Primary School



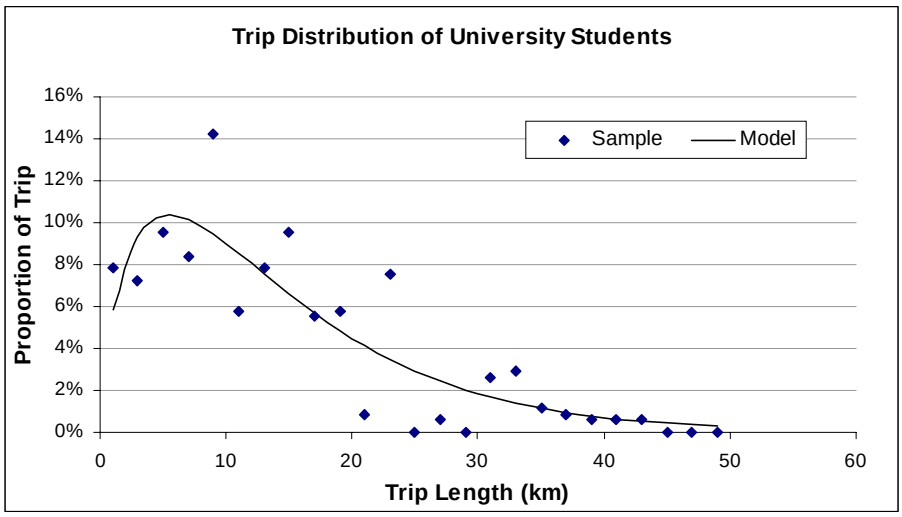
Source: SITRAMP Mini Person Trip Survey, 2000

Figure AP 5.6 Trip Distribution Model for Home Based School : Junior High School



Source: SITRAMP Mini Person Trip Survey, 2000

Figure AP 5.7 Trip Distribution Model for Home Based School : Senior High School



Source: SITRAMP Mini Person Trip Survey, 2000

Figure AP 5.8 Trip Distribution Model for Home Based School : University

5.5 Modal Choice Model

(1) Modal Choice Model by Trip Purpose

Discrete choice (multinomial logit) models were developed for modal choice among five different modes; namely, cars, motorcycles, buses, railway, air-conditioned express buses, through the analysis of the Mini Person Trip Survey data. The models were developed by the following procedure.

Modal Split Model Application Steps:

1. Prepare number of person trips by trip purpose (4) for each OD pairs.
2. Prepare for each trip purpose the proportion of trips that have:
   - All alternative modes (mc, car, and train are all available)
   - Bus, Bus AC, Train and Car (car available and have access to train)
   - Bus, Bus AC, Train and MC (MC available and have access to train)
   - Bus, Bus AC, Train (neither car nor MC available, but have access to train)
   - Bus, Bus AC, Car and MC (car and MC available, but no access to train)
   - Bus, Bus AC, Car (only car available and no access to train)
   - Bus, Bus AC, MC (only MC available and no access to train)
   - Bus, Bus AC (neither car not MC available and no access to train)
3. Now we have 4*8 = 32 OD matrices by trip by available mode.
4. Prepare estimated future data of the variables:
   - **Time**, in minute, which is total travel time for each mode (mc, car, bus, train, bus-ac) in minute for each OD pairs.
   - **Cost,** in Rp., which is the total travel costs for each mode estimated as fuel cost, parking and toll (car), fuel cost and parking (MC), and fare for public transport (bus, bus_ac, train).
   - **Income,** in Rp., which is the mid value income for each income level in Rupiah.
   - **Distance,** in km, which is the estimated distance between OD pairs.
   - **Generalised costs,** in Rp., which is the summation of total travel cost and total travel time multiplied by future value of time (for each income level)
5. Calculate the utility value of each mode (by trip purpose), by substituting the estimated future variables into the above models. For example, utility value for MC for trip purpose 1 will be equal to

   U_{mc} =-0.8316 – 0.01354 * **time-mc** – 207.2561 * **cost-mc/income**

   U_{car} = – 0.01354 * **time-car** – 207.2561 * **cost-car/income**

   U_{bus} = -2.9655 – 0.01354 * **time-bus** – 207.2561 * **cost-bus/income**

   U_{train} = -4.6386 – 0.01354 * **time-train** – 207.2561 * **cost-train/income**

   $U_{bus\text{-}ac}$ = -4.2784 – 0.01354 * **time-bus-ac** – 207.2561 * **cost-bus-ac/income**
6. Calculate the probability for each mode, by substituting the utility value into:

   Pmc = exp(Umc)/ (exp(Umc)+exp(Ucar)+exp(Ubus)+exp(Utrain)+exp(Ubus ac)

   Pcar = exp(Ucar)/ (exp(Umc)+exp(Ucar)+exp(Ubus)+exp(Utrain)+exp(Ubus ac)

   Pbus = exp(Ubus)/ (exp(Umc)+exp(Ucar)+exp(Ubus)+exp(Utrain)+exp(Ubus ac)

   Ptrain = exp(Utrain)/ (exp(Umc)+exp(Ucar)+exp(Ubus)+exp(Utrain)+exp(Ubus ac)

   Pbus-ac = exp(Ubus-ac)/ (exp(Umc)+exp(Ucar)+exp(Ubus)+exp(Utrain)+exp(Ubus ac)

Note that these probabilities depend on the number of the available modes, for instance if there are only bus, bus-ac and train available, then we only calculate

Pbus = exp(Ubus) / (exp(Ubus)+exp(Utrain)+exp(Ubus ac)

Ptrain = exp(Utrain) / (exp(Ubus)+exp(Utrain)+exp(Ubus ac)

Pbus-ac = exp(Ubus-ac) / (exp(Ubus)+exp(Utrain)+exp(Ubus ac)

7. Calculate the proportion of trips using each mode by multiplying the probability with the total number of trips by purpose and available mode for each OD pairs.
8. The following table shows the proportion of each trip purpose by mode availability of the existing data (samples).

Table AP . 5.6 indicates the modal split model formulation by trip purpose.

Table AP 5.6 Modal Choice Models

Variable	Trip Purpose			
	Home Based Work	Home Based School	Home Based Others	Non Home Based
Motor Cycles constant (1)	-0.8316 (-3.45)	-0.8882 (-3.27)	-1.5666 (-4.68)	-2.7390 (-4.47)
Bus constant (3)	-2.9655 (-12.84)	-1.5441 (-6.45)	-2.2214 (-7.38)	-3.9052 (-7.86)
Train constant (4)	-4.6386 (-18.41)	-4.1629 (-13.98)	-6.4822 (-12.13)	-5.8252 (-8.36)
Bus AC constant (5)	-4.2784 (-20.24)	-4.3754 (-17.26)	-5.6159 (-16.31)	-5.0367 (-9.43)
Time (1,2,3,4,5) ; in minute	-0.01354 (-3.49)	-0.03374 (-3.76)	-	-
Cost/Income (1,2,3,4,5) ; in Rp./Rp.	-207.2561 (-3.93)	-297.0044 (-2.33)	-	-
1/Generalized-cost* (1,2,3,4,5); in 1/Rp.	-	-	906.6932 (2.54)	1727.9700 (1.81)
Distance specific to bus (3); in km.	-	-	-0.0847 (-5.14)	-
Distance specific to train (4); in km	-	-	0.02329 (1.57)	-
Rho-sqrd.	0.512	0.663	0.688	0.653
Sample size	1387	1007	784	225

Note:
1=motorcycles; 2=car; 3=bus; 4=train; 5=bus ac
Figures in brackets indicate t-value.
*Generalized-cost = travel cost + value of time * travel time
where : value of time = Rp. 6000,-/hour for high and upper middle income people
= Rp. 3,000- /hour for lower middle income people
= Rp. 1500,- /hour for lower middle and low income people

Table AP 5.7 Composition of Sample Data

	All	HBW	HBS	HBO	NHB
All modes	1.46%	2.00%	0.62%	1.28%	2.67%
Bus, Bus-ac, train	26.86%	28.05%	28.51%	25.64%	14.67%
Bus, Bus-ac, train, car	12.08%	14.06%	7.59%	11.99%	21.33%
Bus, Bus-ac, train, MC	9.56%	12.96%	4.32%	10.46%	9.33%
Bus, Bus-ac, Car, MC	1.11%	0.58%	1.59%	0.89%	3.11%
Bus, Bus-ac, Car	13.40%	8.90%	14.30%	16.84%	28.00%
Bus, Bus-ac, MC	10.97%	14.25%	6.44%	11.99%	7.56%
Bus, Bus-ac	24.56%	19.21%	36.63%	20.92%	13.33%
	100.00%	100.00%	100.00%	100.00%	100.00%

Source: SITRAMP Mini Person Trip Survey, 2000

(2) Model Performance by Trip Purpose

By comparing predicted mode of transport against observed mode, the model performance was examined as shown in Tables AP 5.8 to 5.12.

Table AP 5.8 Model Performance for All Trip Purpose

	Model Prediction					
Observed	1	2	3	4	5	Grand Total
1 Car	555	30	87	0	3	675
2 Motorcycle	2	908	2	0	0	912
3 Bus	50	72	1626	1	14	1763
4 Railway	11	6	105	3	0	125
5 Patas AC	15	16	183	4	0	218
Grand Total	633	1032	2003	8	17	3693
Note: Total matched observed vs. model = 83.73%						

Source: SITRAMP Mini Person Trip Survey, 2000

Table AP 5.9 Model Performance for Trip Purpose 1 (HBW)

	Model Prediction					
Observed	1	2	3	4	5	Grand Total
1 Car	381	12	0	0	0	393
2 Motorcycle	2	343	2	0	0	347
3 Bus	22	24	550	0	0	596
4 Railway	8	2	63	0	0	73
5 Patas AC	11	11	118	2	0	142
Grand Total	424	392	733	2	0	1551
Note: Total matched observed vs. model = 82.1%						

Source: SITRAMP Mini Person Trip Survey, 2000

Table AP 5.10 Model Performance for Trip Purpose 2 (HBS)

	Model Prediction					
Observed	1	2	3	4	5	Grand Total
1 Car	0	12	86	0	0	98
2 Motorcycle	0	220	0	0	0	220
3 Bus	0	34	712	0	1	747
4 Railway	0	4	28	0	0	32
5 Patas AC	0	3	33	0	0	36
Grand Total	0	273	859	0	0	1133
Note: Total matched observed vs. model = 82.3%						

Source: SITRAMP Mini Person Trip Survey, 2000

Table AP 5.11 Model Performance for Trip Purpose 3 (HBO)

	Model Prediction					
Observed	1	2	3	4	5	Grand Total
1 Car	148	5	0	0	0	153
2 Motorcycle	0	226	0	0	0	226
3 Bus	27	10	324	1	0	362
4 Railway	1	0	12	3	0	16
5 Patas AC	0	2	23	2	0	27
Grand Total	176	243	359	6	0	784
Note: Total matched observed vs. model = 89.4%						

Source: SITRAMP Mini Person Trip Survey, 2000

Table AP 5.12 Model Performance for Trip Purpose 4 (NHB)

	Model Prediction					
Observed	1	2	3	4	5	Grand Total
1 Car	26	1	1	0	3	31
2 Motorcycle	0	119	0	0	0	119
3 Bus	1	4	40	0	13	58
4 Railway	2	0	2	0	0	4
5 Patas AC	4	0	9	0	0	13
Grand Total	33	124	52	0	16	225
Note: Total matched observed vs. model = 82.2%						

Source: SITRAMP Mini Person Trip Survey, 2000

5.6 Modal Choice Model for MRT and New Bus System

Modal choice model for MRT and new bus system were developed based on the stated preference data obtained in the Opinion Survey in CBD. The models were formulated in the binary logit model as shown in Table AP 5.13.

The developed modal split model is binary choice model, since each observation is faced with only two options, namely, MRT vs car, MRT vs bus, and MRT vs motorcycle. A straightforward way to develop model is by estimating parameters of utility function for each of car, bus and motorcycle user separately, but the rho-bar square for each model turned to be very low, indicating less satisfactory "goodness of fit".

Thus further analysis was made using combined data. For MRT case, all car, bus and motorcycle user data were used to develop one model, and use MRT as the base mode (MRT constant equals zero). In every data set one of the two mode options is the same for all observations (i.e. for MRT case, one of the two options is MRT). The model is a binary model since each observation is still exposed with only two options.

Table AP 5.13 Modal Choice Models for MRT and New Bus System

Variables	To work				To School			
	MRT		New Bus		MRT		New Bus	
	coefficient	t-value	coefficient	t-value	coefficient	t-value	coefficient	t-value
Car constant	0.58034	9.29	0.74164	15.96	0.55249	8.80	0.71791	14.00
Motorcycle constant	0.64066	11.68	0.88019	22.47	0.58564	10.44	0.83366	19.38
Bus constant	0.15980	6.14	0.13358	5.80	-0.01015	-0.35	0.00924	0.38
Road Pricing (1,2), in Rp.	-0.00026	-18.43	-0.00025	-17.64	-0.00031	-20.29	-0.00034	-21.51
Parking charge (1,2), in Rp.	-0.00016	-5.74	-0.00019	-6.89	-0.00021	-6.76	-0.00029	-9.28
Basic Cost, in Rp.	-0.00015	-27.74	-0.00013	-24.16	-0.00017	-25.90	-0.00015	-23.12
In-vehicle travel time, in minute	-0.01900	-21.47	-	-	-0.01449	-14.67	-	-
Waiting time (3,4,5), in minute	-0.02926	-10.93	-	-	-0.02106	-7.71	-	-
Access time (3,4,5), in minute	-0.02947	-11.01	-	-	-0.02445	-8.94	-	-
Total time, in minute			-0.02219	-36.45			-0.02315	-41.38
SV of travel time, in Rp./hr	7387		-		5159		-	
SV of waiting time, in Rp./hr	11375		-		7500		-	
SV of access time, in Rp./hr	11460		-		8707		-	
SVOT, in Rp./hr.	-		10267		-		9141	
Rho-bar sq.	0.55		0.54		0.54		0.55	
Sample size	25110		25085		23230		23217	

Note: Basic cost= fuel cost for car and motor-cycle or fare for others
Figures in brackets indicate the applicable modes (1=car, 2=mc, 3=bus, 4=mrt, 5=newbus)

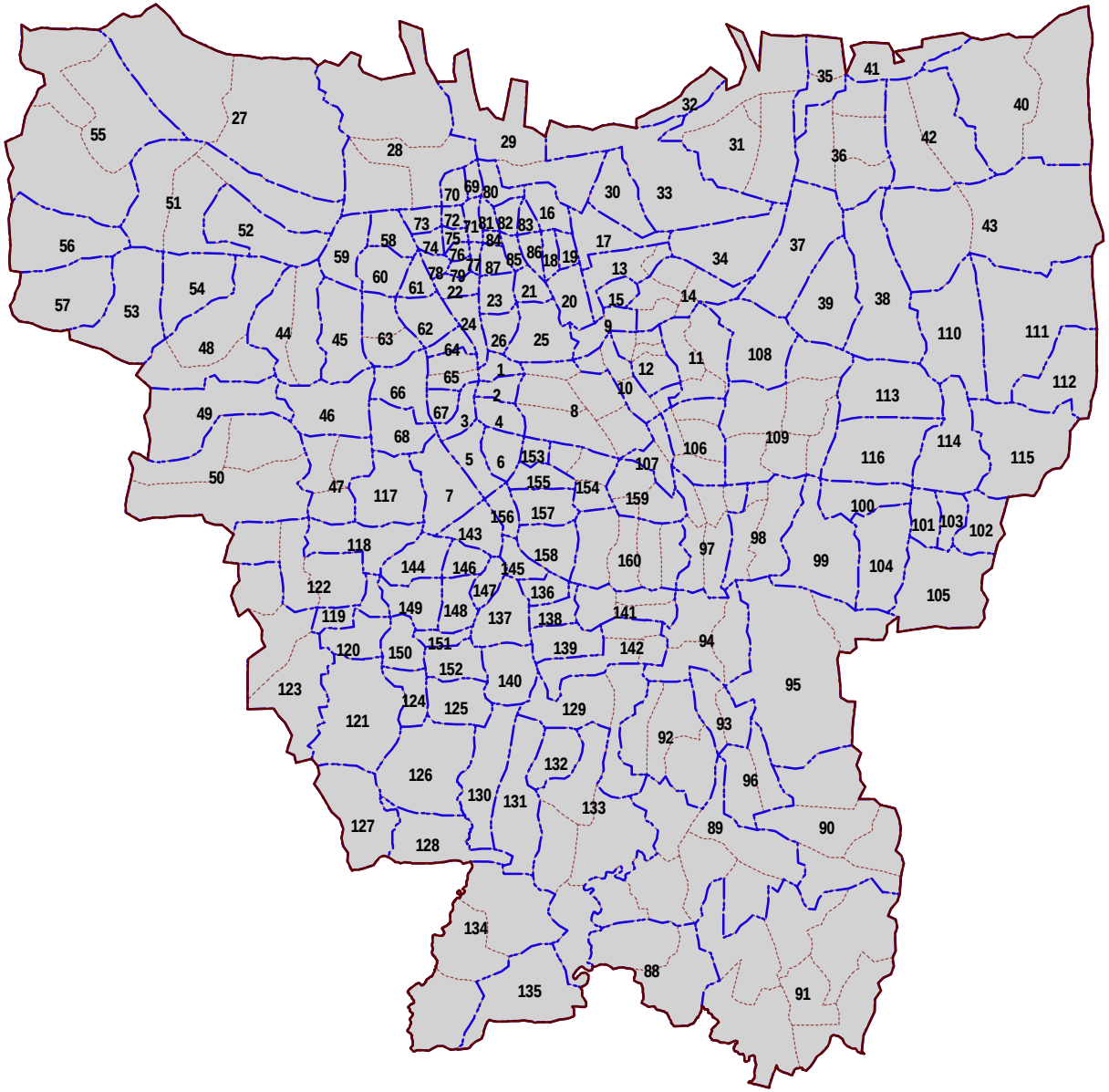


Figure AP 5.9

Traffic Analysis Zone
- DKI Jakrta

LEGEND

Traffic Analysis Zone Boundary

1 - 160 :
Traffic Analysis Zone Number

Kabupaten Boundary

Desa/Kelurahan Boundary

N

0 3 6 9 Km

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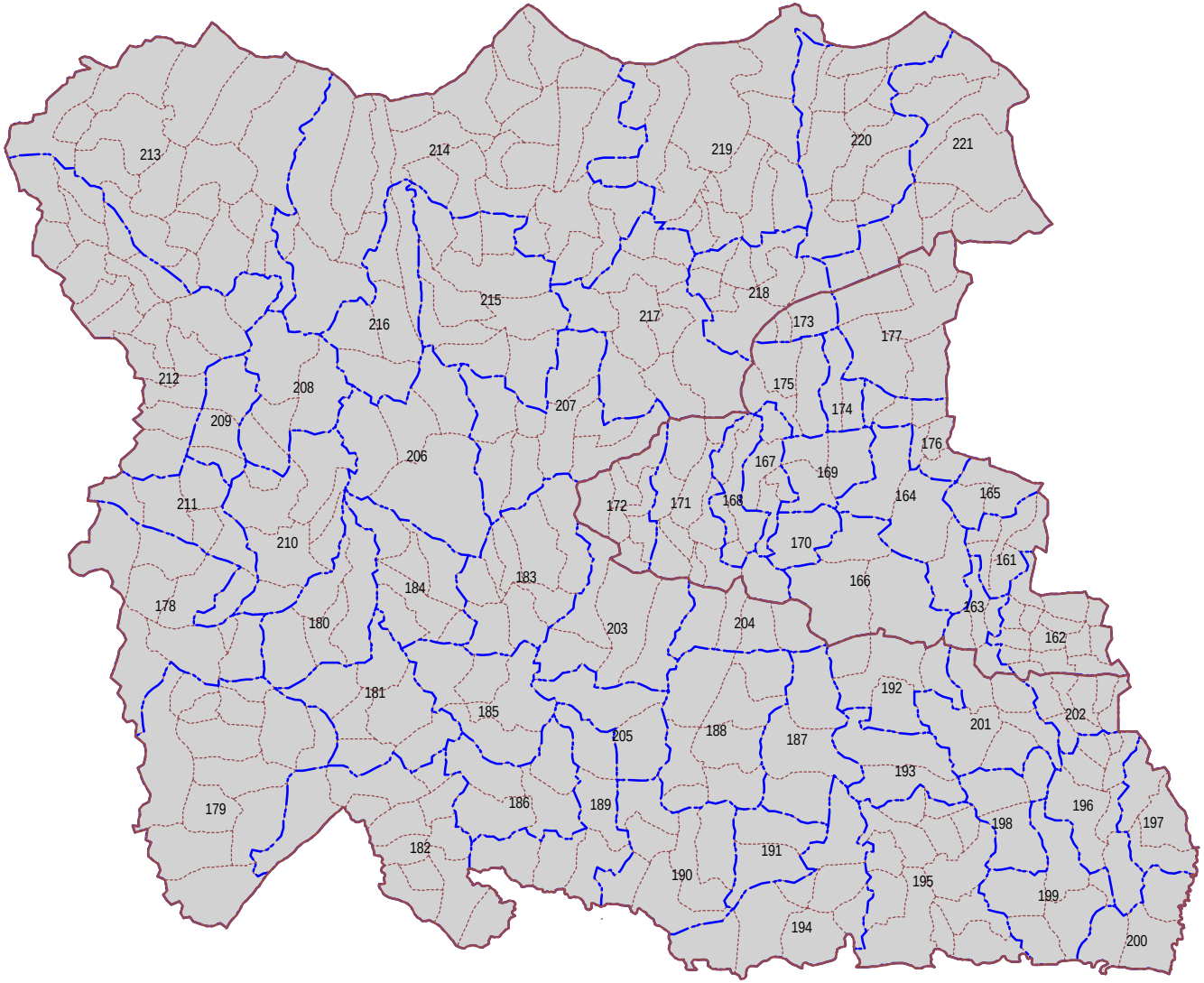

Figure AP5.10

Traffic Analysis Zone
- Kabupaten Tangerang
- Kota Tangerang

LEGEND

Traffic Analysis Zone Boundary

161 - 221 :
Traffic Analysis Zone Number

Kabupaten Boundary

Desa/Kelurahan Boundary

N

0 3 6 9 12 Km

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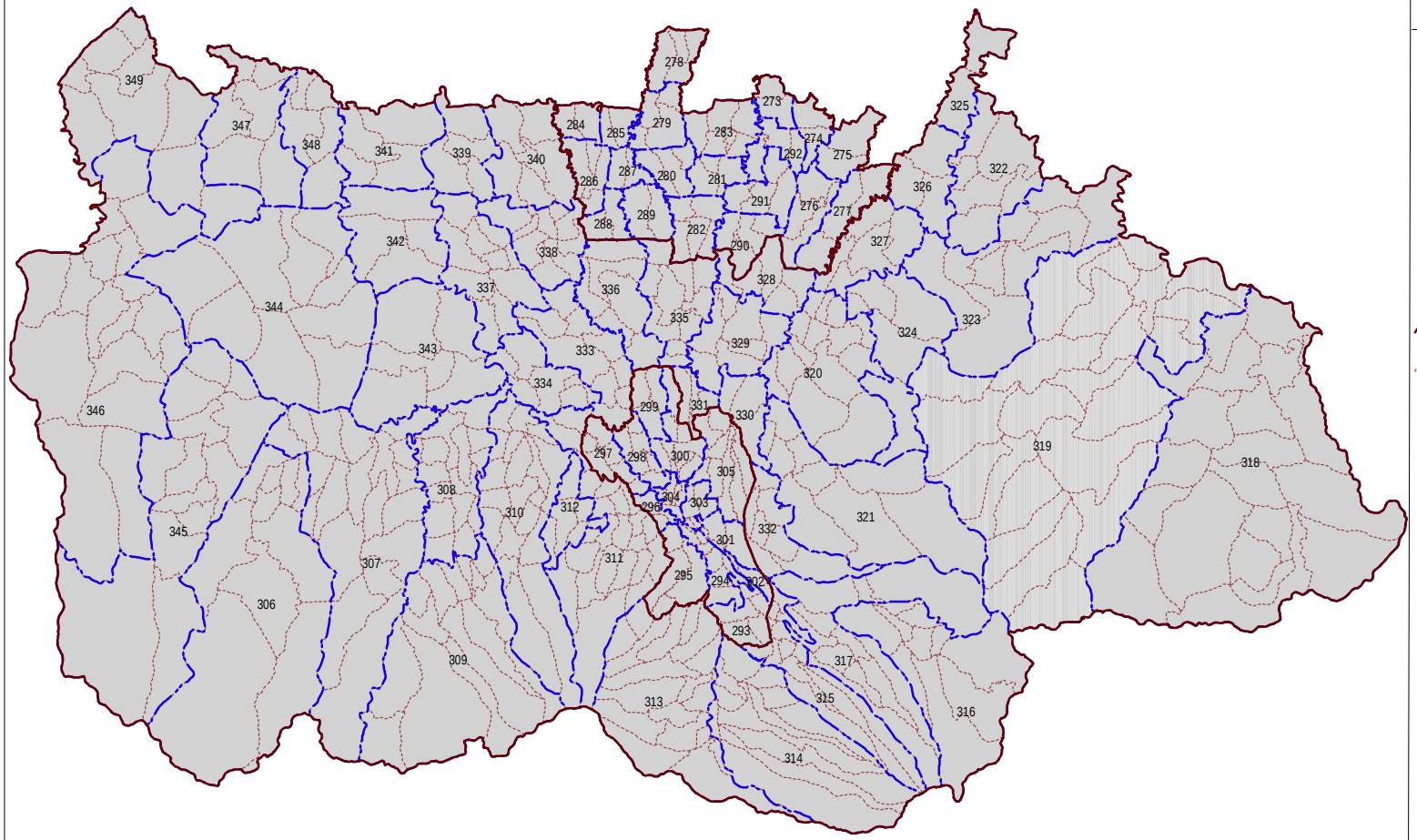

Figure AP5.11

Traffic Analysis Zone
- Kabupaten Bogor
- Kota Bogor
- Kota Depok

LEGEND

Traffic Analysis Zone Boundary

273 - 349 :
Traffic Analysis Zone Number

Kabupaten Boundary

Desa/Kelurahan Boundary

N

0 3 6 9 12 15 18 Km

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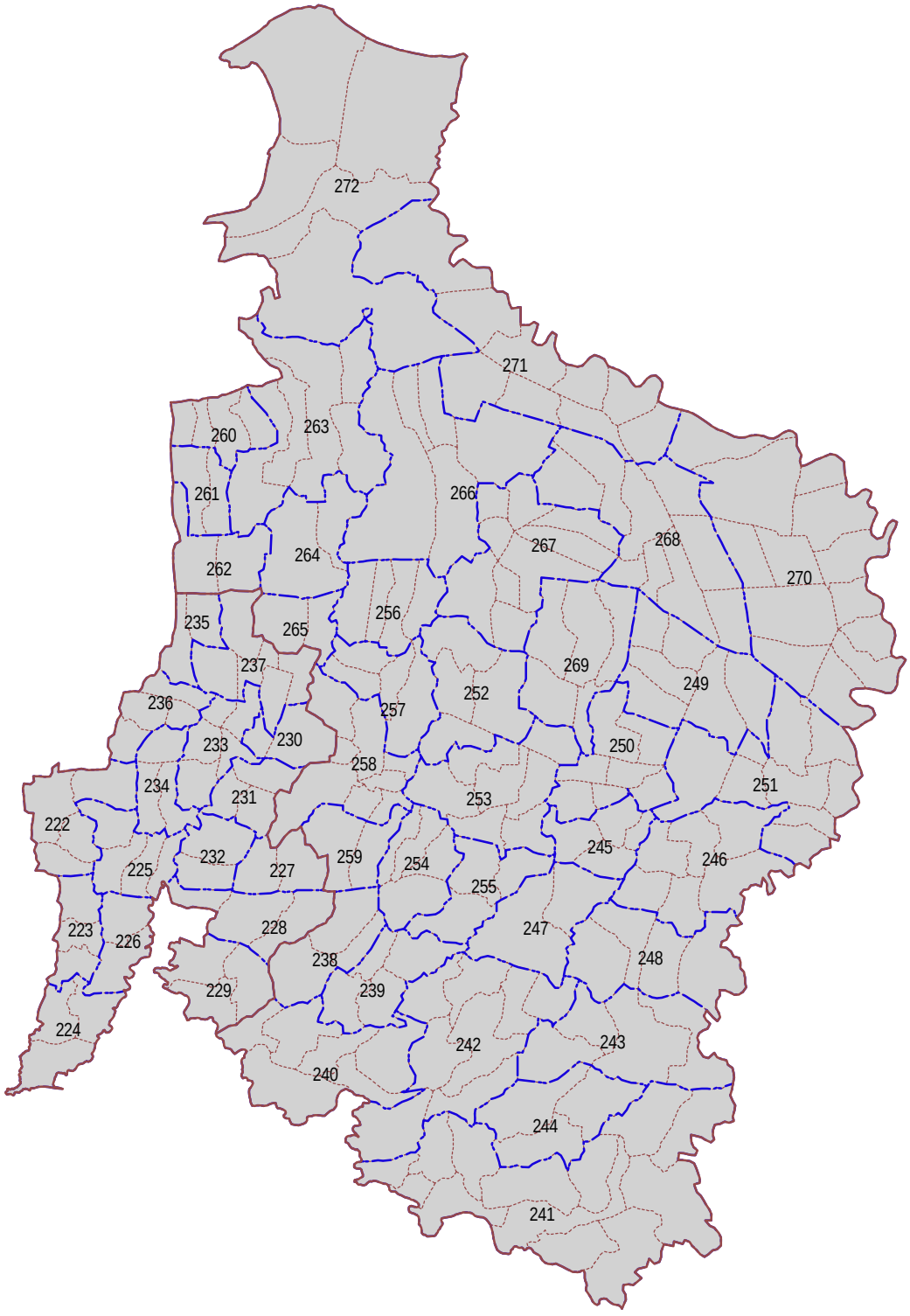

LEGEND

Traffic Analysis Zone Boundary

Kabupaten Boundary

Desa/Kelurahan Boundary

222 - 272 :
Traffic Analysis Zone Number

N

0 3 6 9 Km

Figure AP5.12

Traffic Analysis Zone
- Kabupaten Bekasi
- Kota Bekasi

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