7-6 Model of Replotting Design

7-6-1 General

The models of replotting designs were formulated through workshops in participation with BPN counterparts and the JICA study team. In response to the BPN's request, three kinds of models were conducted through the workshops; by unified contribution method, frontage contribution method and valuation replotting design method respectively. The unified contribution method and the frontage contribution method are classified into the area replotting design method, and the valuation replotting design method is also called as proportional replotting design method. These methods were sufficiently understood by BPN counterparts through the workshops, and it is expected that the BPN will effectively use these methods for its L/C projects in the near future depending on the respective condition.

Among those models of replotting design, the result of the valuation replotting design method is shown in this section, because it is deemed the that introduction of the replotting design based on street value is a desirable method in Indonesia in order to distribute the benefits of the project to landowners fairly.

7-6-2 Preparatory Work for Replotting Design

(1) Assumptions

The normal process of undertaking replotting design work involves intensive formal and informal consultations with landowners and other participants. However, in this study, neither direct contacts with landowners nor their representatives were made possible either before preparing the plan or the objective of this case study. Therefore, it should be noted that the replotting design work carried out in this study are based on the following assumptions:

1) The project area will be covered under the Spatial plan
2) Land rights have been confirmed, and;
   - the boundary of the project area has been determined by survey in the presence of relevant landowners,
   - areas of public facilities have been confirmed by administrators,
   - the difference in the area between the registered and actual one will be proportionally distributed to individual lots,
   - the area of the block has been determined by the block final assurance survey, and,
   - no other land rights, except registered ownership, have been declared.
3) The planned land use in the project area has been approved by landowners.
4) The location of replots is determined based on the request from landowners.

It is assumed that all these are the results of consultations with landowners and the adjustment process.

(2) Distribution of Original Lots

As shown in Figure 7-6-1, the road network in the project area is very poor so that most of the lots do not face to any roads. Parcels of small size, around 200 square meters, are concentrating in the northern part of the project area. Most of the lots are defined as land for agricultural use, except mosques and schools.

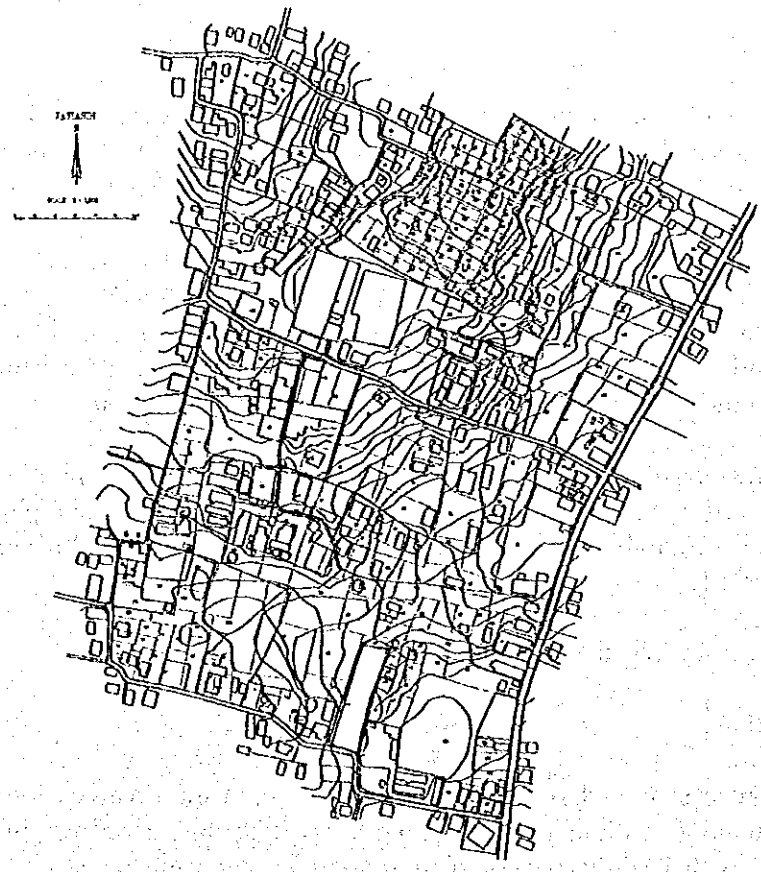


Figure 7-6-1 Distribution of Original Lots

This figure was used for the land evaluation before the project.

(3) Conditions of Land Rights

Although most of the lots in the project area are not registered, they are recorded on taxation documents with ownership, location and area. Those areas are not assured by topographical survey; accordingly they are not equal to the areas assumed by those topographic features. However, since there are not any other official documents to identify those areas, in this study, it is better to use those areas on taxation documents to carry out the replotting design.

(4) Determination of Original Lot Areas

The total of the areas on taxation documents is not equal to the project area calculated by the topographic survey. Thus, the differences are proportionally allocated to each area on the taxation map in order to determine those datum areas. The proportional ratio is calculated from the following formula.

Proportional ratio for datum area
= surveyed area within project boundary / total area of original lots on taxation documents

(5) Adjusted Cadastral Map and Overlapped Map

The cadastral map adjusted by the site survey is shown as follows:

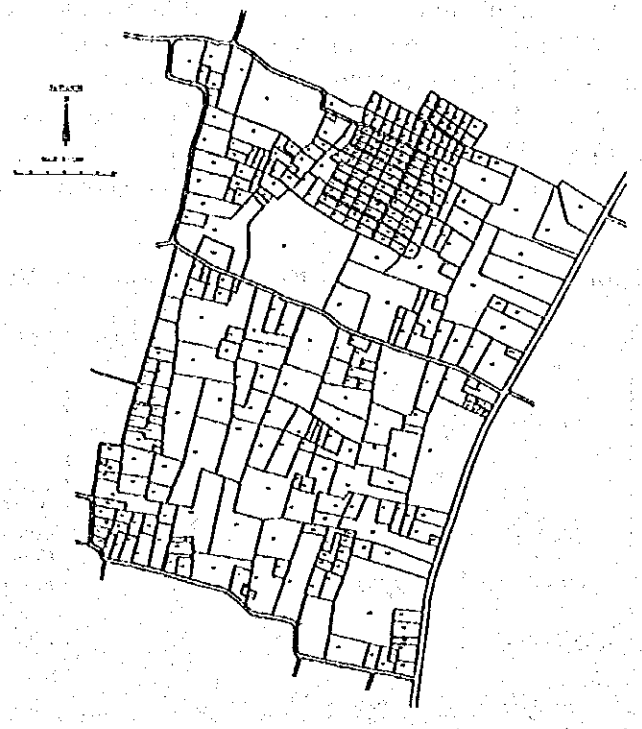


Figure 7-6-2 Adjusted Cadastral Map of the Project Area

The adjusted cadastral map is overlapped by the finalized block plan as an overlapped map, which is used for the replotting design. The overlapped map is shown as follows:

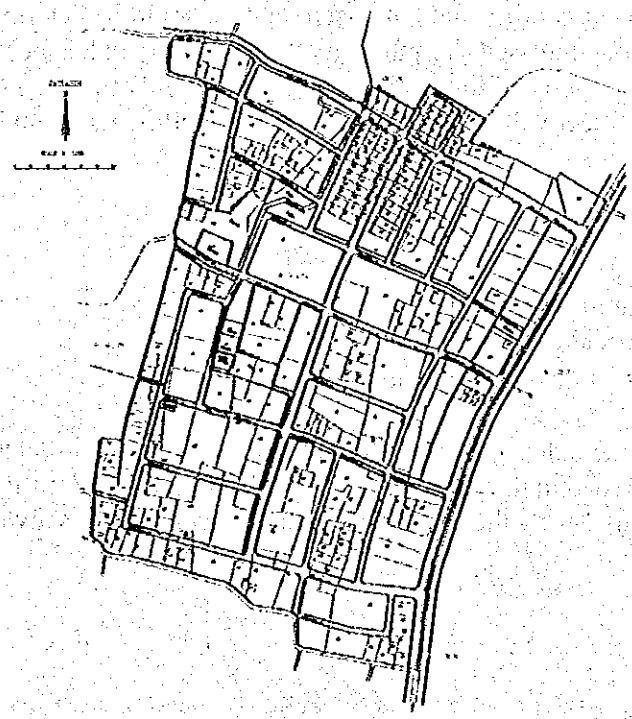


Figure 7-6-3 Overlapped Map of the Project Area

7-6-3 Replotting Design

(1) Consideration for Particular Private Land

There are several private schools in the project area. Although the average contribution ratio has been calculated at 27.6% in the project implementation plan, it is deemed that the particular private lands for school are better to secure the present acreage and location even after the project, from the viewpoint of its public and social purpose in the community. Accordingly, the replotting design was proceeded with distinction between particular private land and general private land, and those contribution ratios were calculated as shown in the following table:

Table 7-6-1 Contribution Ratio for Replotting Design

	Before Project (m2)	After Project (m2)	Contribution Ratio (%)	Remarks
Total Private Land (A)	256,710.00	210,817.00	17.9	
Reserve Land (B)	-	25,143.00	9.7	
A-B	256,710.00	185,674.00	27.6	Average contribution ratio in the project implementation plan
Private School Land (C)	9,353.89	9,353.89	0.0	Contribution ratio of particular private land
A-(B+C)	247,356.11	176,136.88	28.7	Average contribution ratio of general private land

(2) Land Valuation by the Street Value Method

The street value is defined as the utility value per square meter of a standard lot fronting a road at right in the middle portion of a block. The value is affected by factors concerning the conditions of road, accessibility and land itself, and it should be determined by objective view. The street value is not expressed as a monetary unit, but as an index, because it is convenient for valuers to neglect inflation and time and to pay attention only to physical changes in relation to lots by the project. Street values are calculated by the following formula:

$$Se = Sb \times \{1 + \Sigma (\alpha / 100)\}$$

Where,
Se : street value index for each road
Sb : standard street value index (1,000)
α : coefficient value by each factor

A standard street value index at 1,000 before project was applied to Jalan Raya Jatiluhur, which is the most valuable road in the project area. And the affected factors and the coefficient values were determined considering the conditions of the project area, as shown in the following table:

Table 7-6-2 Factors and Coefficient Values for Street Value Calculation in Jatiasih

Factors	Conditions	Coefficient Value
Conditions of Street (Character, Continuity, etc.)	Very Good	+ 10%
	Good	+ 5%
	Normal	0
	Bad	– 5%
	Very Bad	– 10%
Amenity (Neighborhood Status)	Good	+ 50%
	Normal	0
	Bad	– 5%
Accessibility (Shopping, Bus Line, Park and School, Others)	Very Near	+ 10%
	Near	+ 5%
	Normal	0
	Far	– 5%
	Very Far	– 10%
Width of Street	Very Wide	+ 10%
	Wide	+ 5%
	Normal	0
	Narrow	– 5%
Type of Road	Pavement	0
	Not paved	– 5%
Sewerage / Drainage	Good	+ 5%
	Bad	– 5%
Water Supply	Reticulated water supply	+ 10%
	Individual well	0

Individual lots are valued using the street values according to adjustment factors, which are unique to lots. The valuations of individual lots are calculated by the following formula:

$$Ai = Aa \times Se \times \{1 + \Sigma (\alpha / 100)\}$$

Where,
Ai : individual lots value index
Aa : individual lot areas
Se : street value index for lot
α : coefficient value by each factor

The affected factors and the coefficient values for individual lots were determined considering the conditions of the project area, as shown in the following table:

Table 7-6-3 Adjustment Factors and Coefficient Values for Individual Lots

Factors	Condition	Coefficient Value
Category of Land Use	Commercial	+ 50%
	Residential	0
	Agriculture, swamp, etc.	– 10%
Size	Very Large (more than 10,000m²)	– 5%
	Normal and small	0
Shape	Standard	0
	Bad	– 5%
Corner Lot	Residential	+ 2%
	Commercial	+ 5%
	Corner lot adjoining to footpath	+ 1%
Land adjoining to Road in Front and Back	Residential	+ 2%
	Commercial	+ 5%
	Adjoining to footpath in back	+ 1%
Land not adjoining to any road		– 10%
Cul-de-sac		– 5%

The results of land valuation in the project area are tabulated as follows:

Table 7-6-4 Results of Land Valuation before and after Project

Average Lot Value Index before Project	Average Lot Value Index after Project		Average Increase Ratio
	Land Use	Lot Value Index	
737	Commercial	3,037	4.121
	Residential	1,842	2.499
	Average in Project Area	1,907	2.587

Increase ratio at 2.587 was calculated from land valuation for individual lots based on street value index, while it has been estimated at 2.567 in the implementation plan based on actual land price as whole project area. These increase ratios resulted from approximation, and it can be judged that the results of land valuation are proper for the basis of replotting design.

The proportional ratio, which applies to the replotting design can be calculated from the following formula:

Proportional ratio
= *(1-Average contribution ratio)* ×*Average increase ratio*

The calculation of the proportional ratio is shown in the following table:

Table 7-6-5 Statement on Proportional Ratio

				Project Area	264,804m²
Private Land	Before Project		After Project		Remarks
	Basis Area (m²)	Total Valuation Index	Replotting Area (m²)	Total Valuation Index	
Commercial			10,852.50	32,961,542	
Residential	247,356.11	182,371,553	187,879.84	346,096,890	
Sub-total	247,356.11	182,371,553	198,732.34	379,058,432	General private land
School	9,353.89	7,015,418	9,350.54	16,811,591	Particular private land
Total	256,710.00	189,386,971	208,082.88	395,870,023	

Calculation for Proportional Ratio of General Private Land

Reserved Land Area	= 25,143.43m²
Average Contribution Ratio of Private Land	d = 1-(198,732.34-25,143.43)/ 247,356.11 = 0.298
Unit Valuation Index before Project	a = 182,371,553 / 247,356.11 = 737
Unit Valuation Index after Project	e = 379,058,432 / 198,732.34 = 1,907
Increase Ratio of Private Land	y = e/a = 1,907 / 737 = 2,587
Proportional Ratio of General Private Land	α = (1-0.298)×2.587 = 1.816

(3) Replotting Design

The area of replot was determined by the following formula:

$$Ei = (Ai \times ai \times \alpha)/ei$$

Where,
Ei : area of replot
ei : index per m² on the replot
Ai : area of the original lot
ai : index per m² on the original lot
α : proportional ratio of general private land (1.816)

Based on the above calculations, the model of replotting design by the valuation replotting design method was carried out as shown in the following figure:

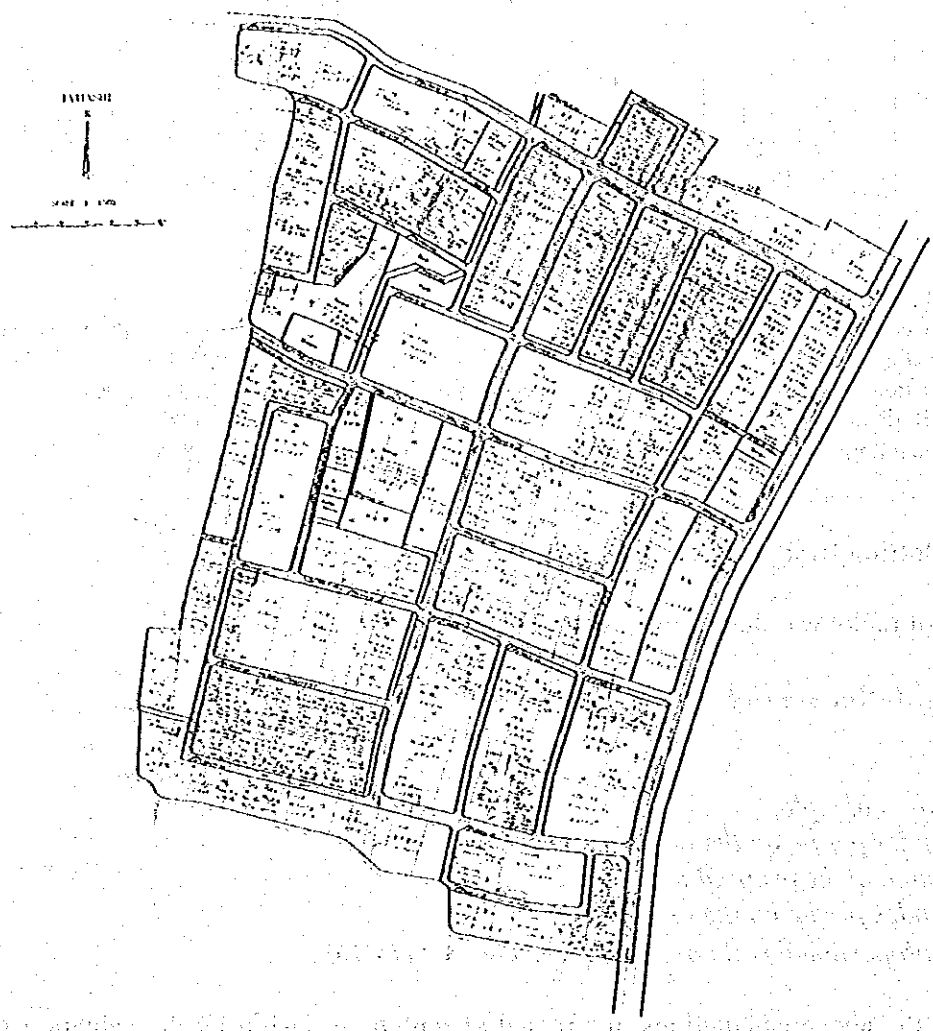


Figure 7-6-4 Replotting Design in the Project Area of Jatiasih

(4) Consideration in the Replotting Design

In an actual L/C project, the replotting design is proceeded through negotiation with landowners. Although the process to formulate this model of replotting design has not been undertaken with such negotiation, it was clarified that the following items should further be considered in the actual replotting design.

Acreage and location of reserve lands : In the model of replotting design, the reserve lands were allocated along wider roads in which the valuation indexes are relatively high. As a result, the total area of reserve lands was at approx. 24,100 m^2, which was 25,100 m^2 less than expected by the project implementation plan. In an actual L/C project, the locations of the reserve land are regulated by the design standard of replotting, which will be approved by a general meeting of the L/C association.

Small-sized parcels : Small-sized parcels of around 200 m^2, without any buildings, are orderly concentrating in swampy areas in the northern part of the project area. The characteristics of these parcels should be further examined in terms of the purpose and intention of those landowners, in order to replot those parcels properly.

Replots with a higher contribution ratio : The contribution ratio became high (more than 40%) when an original lot was not faced to any roads before the project and replotted along a road in a higher street value index. If the landowner does not agree with the contribution ratio, it is needed to relocate the replot to another location.

7-7 Conclusion and Recommendation

(Conclusions and recommendations related to L/C system improvement are included in section 4-9)

Effective self-financing urban and infrastructure development system in Jakarta Metropolitan area

The case study of L/C in Jatiasih showed around 30% of land contribution, while that in Parung Panjang showed as high as 63-73%. As 20-30% is recognized to be the practical level of L/C in the past projects in Japan and other countries, it may be generalized that within a certain distance from Jakarta, L/C can be applied and utilized as an effective self-financing urban and infrastructure development system.

Case study		Distance from center of Jakarta	Land contribution ratio
Parung Panjang		35 km	63-73 %
Jatiasih	(288 ha)	20 km	37.5 %
	(25.7 ha)		27.7 % (25.3%)
			(Arterial road by government)

Pilot project formation and implementation

The L/C project covering 25.7 ha was scrutinized, lowering the land contribution ratio to 25.3% (public land: 17.9%, reserve land: 9.8%). Based on the results of this Case study, it is recommended that the pilot project be implemented in the study area. Project formation and promotional activities for the pilot project must be started in consultation and coordination with the community and the landowners.

Chapter 8 Environmental Study

8-1 Environmental Management

8-1-1 Environmental Legislation

(1) Government Policy on the Environment

In the Republic of Indonesia, the basic law concerning the environment is Government Act No.23 of 1997 (amendment of Act No.4 of 1982), regarding basic provisions for the management of the living environment. As stated in the introduction of the Act, the Basic Environmental Law makes an appeal for protection of the environment while making effective use of natural resources, as stated in the Constitution of 1945. This is in accordance with the increasing worldwide awareness of the environment and the responsibility of each country to carry out environmental management based upon an integrated and comprehensive national policy.

Act No.23 of 1997 adopts 'sustainable development' as a basic policy for environmental management. 'Sustainable development' can be defined as development that provides economic, social, and environmental benefits in the long term and for future generations. Establishment of an environmental impact assessment system has therefore been stressed in the Act as one of the actions for the protection of environment. The act consists of 11 sections: i.) General provisions, ii.) Principles, objectives and targets, iii.) Rights, obligations and community's role, iv.) Authorities in environmental management, v.) Preservation of environmental functions, vi.) Requirements on environmental arrangement, vii.) Solution of environmental dispute, viii.) Investigations, ix.) Penalties, x.) Transitional provisions and xi.) Closing provisions.

Targets for environmental management, stated in the Act, are as follows:

- to achieve harmony, compatibility and balance between human-being and environment
- to nurture the environmental consciousness of the Indonesians in order to preserve the living environment
- to guarantee the interests of present and future generations
- to achieve the preservations of environmental functions
- to control the utilization of natural resources properly/wisely
- to protect the Republic of Indonesia against the influence from outside the State's territory which cause environmental pollution and/or destruction of the environment

(2) Environmental Regulations Related to the Study

Based on Act No. 23 of 1997, the government has put forward various regulations and decrees on environment management. Table 8-1-1 shows the regulations/decrees related to housing development and its environment. These regulations/ decrees will be used as guides for the environmental impact assessment of the study.

Table 8-1-1 Environmental Regulations Related to the Housing Development

Number	Content/Description
(1) Government Act	
No. 5 of 1960	Principles for the Agrarian
No. 5 of 1990	Principles for the Conservation of Ecosystem and Natural Resources
No. 4 of 1992	Housing and Settlement
No. 14 of 1992	Traffic and Transportation
No. 24 of 1992	Spatial Arrangement
No. 23 of 1997	Principles for the Management of Living Environment (amendment of No. 4 of 1982)
(2) Government Regulation	
No. 12 of 1988	Perum Perumnas
No. 20 of 1990	Water Pollution Control
No. 51 of 1993	Environment Impact Analysis (AMDAL)
(3) Presidential Decree	
No. 32 of 1990	Conservation Area Management
No. 55 of 1993	Acquisition of Land for Development in the Public Interest
No. 34 of 1994	Institution of Policy and National Housing and Settlement Development Control
(4) State Minister of Environment Decree	
No. KEP-49/MENKLH/1/1987	Guidelines for the Determination of Significant Quality
No. KEP-50/MENKLH/1/1987	Guidelines for the Analysis of Environmental Impacts of Proposed Projects
No. KEP-02/MENKLH/1/1988	Manual on Determining Standard Environmental Quality
No. KEP-12/MENLH/3/1994	General Guidelines on UKL and UPL
No. KEP-14/MENLH/3/1994	General Guidelines on AMDAL
No. KEP-57/MENLH/12/1995	AMDAL for Integrated or Multi-sector Activities
No. KEP-14/MENLH/8/1996	AMDAL Screening
No. KEP-39/MENLH/8/1996	Types of Businesses or Activities Required for AMDAL
No. KEP-55/MENLH/11/1996	Regional AMDAL
No. KEP-299/MENLH/11/1996	Technical Guidelines on Social Aspect Assessment of AMDAL
(5) Head of the Environmental Impact Management Agency Decree	
No. KEP-056/1994	Guidelines for the Determination of Significant Impact
(6) Ministry of Public Works Regulation	
No. 46/PRT/1990	Technical Manual on Environmental Impact Assessment
No. 69/PRT/1995	Technical Guidelines of AMDAL for Public Works Projects
(7) Ministry of Public Works Decree	
No. 531/KPTS/1989	Criteria for Settlement Project where AMDAL is necessary
No. 126/KPTS/1990	Determination of Projects in Public Work Department where AMDAL is necessary
No. 506/KPTS/1992	Guidelines of AMDAL, Department of Public Works (DPU)
No. 211/KPTS/1994	Organization and Working Procedures of DPU
No. 04/KPTS/1995	Formation of AMDAL Central Committee in DPU
No. 58/KPTS/1995	AMDAL Approval Guidelines
No. 69/KPTS/1995	Technical Guidelines of AMDAL for Public Works Projects
No. 147/KPTS/1995	Technical Guidelines of KA-ANDAL for Public Works Projects
No. 148/KPTS/1995	Technical Guidelines of RKL and RPL
No. 296/KPTS/1996	Technical Guidelines of UKL and UPL
No. 39/KPTS/1997	Technical Guidelines of AMDAL for Irrigation Project (related to Groundwater and Surface-water)
No. 41/KPTS/1997	Technical Guidelines of AMDAL for Water Supply Project
No. /KPTS/1997	Technical Guidelines of AMDAL for Housing and Settlement Project
(8) Minister of Agriculture / Head of National Land Agency Regulation	
No. 4 of 1991	Concerning Land Consolidation
No. 2 of 1993	Guidelines for Land Concession
No. 1 of 1994	Land Acquisition
(9) Environmental Management Agency Decree	
No. KEP-56 of 1994	Guidelines for Determination of Important Impact
(10) Perum Perumnas Guideline	
1997	Technical Guideline for AMDAL
(11) Governor Decree TK.1 Jawa Barat	
No. 660.31/SK/694-BKPMD/82	Guidelines for Impact Management and Criteria of Industrial Environmental Pollution
No. 38 of 1991	Water Use and Standards of Water Resources

8-1-2 Environmental Impact Assessment (EIA/AMDAL) in Indonesia

Act No. 23 of 1997 prescribes that every plan/project which is considered likely to have a significant impact on the environment must be accompanied with an environmental impact assessment (EIA/AMDAL: *analisa meganai dampak linkungan*). An environmental impact assessment system has been established accordingly to meet this requirement. Figure 8-1-1 shows an integration of environmental impact control measures, including AMDAL activities for each stage of a project. Necessary processes of AMDAL are specified in the government regulation No. 51 of 1993, while, the type of businesses and activities for which AMDAL is required are specified in the decree of the state minister of environment No. KEP-39/MENLH/8/1996 according to the scale of the plan/project. Figure 8-1-2 shows the AMDAL screening process for a housing development project.

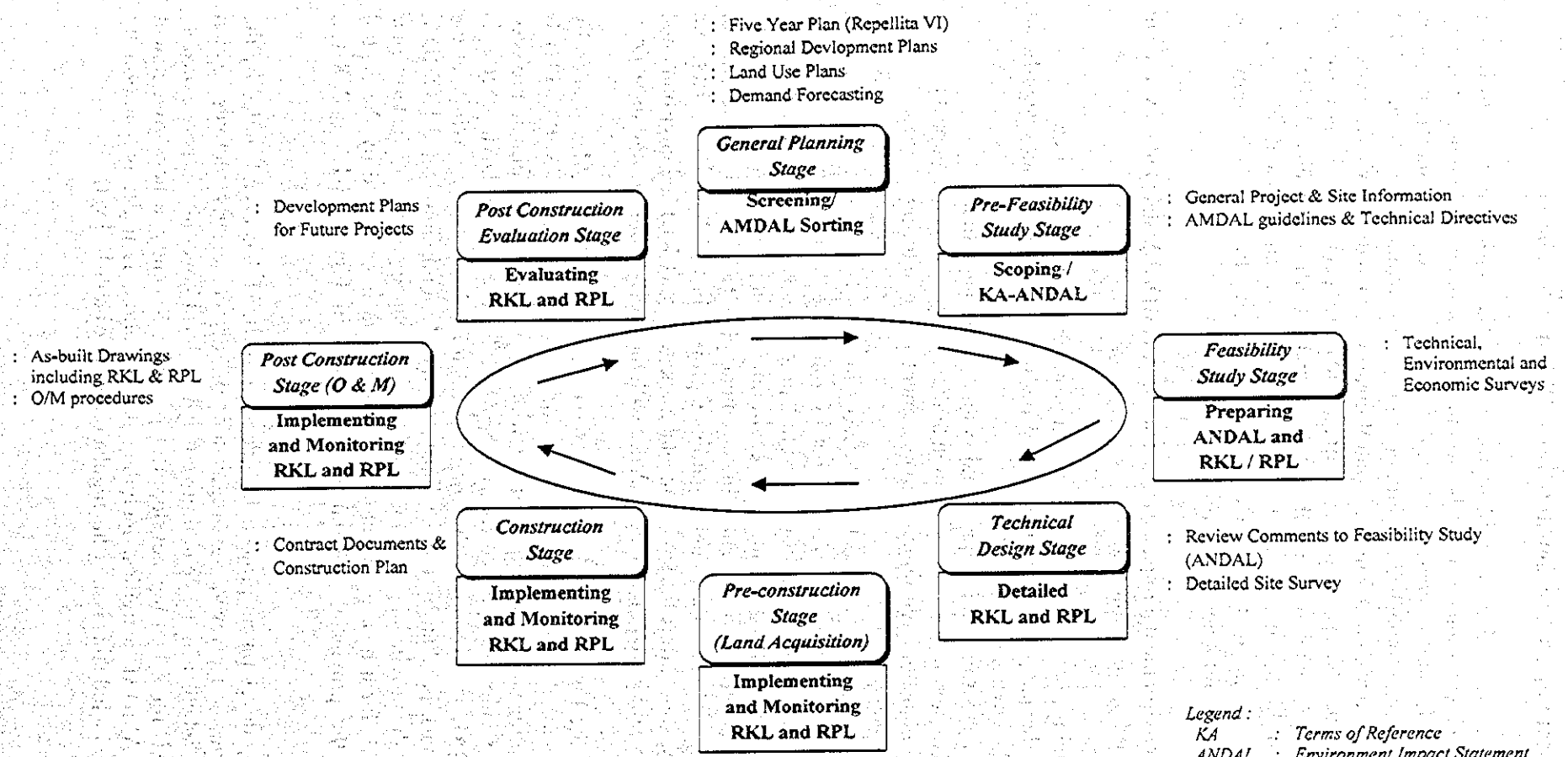
The objectives of the environmental impact assessment (EIA/AMDAL), stated in Government Regulation No. 51 of 1993, are as follows;

- to understand the present condition of the environment in the project area
- to identify the particular activities of the project which may induce significant impact on the environment
- to predict the environmental impacts and evaluate their magnitudes
- to propose countermeasures for mitigation of the envisaged negative impacts
- to formulate plans for environmental management and monitoring

For a project which requires the full scaled AMDAL, in accordance with the Indonesian Guidelines summarized in Figure 8-1-2, a terms of reference of environmental impact statement (KA-ANDAL) is prepared and submitted for approval as a first step of the AMDAL study. The output of the AMDAL includes an environmental impact statement (ANDAL: analysis dampak linkungan), environmental management plan (RKL) and environmental monitoring plan (RPL). On the other hand, regarding a project for which ANDAL, RKL and RPL are not necessary, some effort for environmental management (UKL) and environmental monitoring (UPL) may still be required in accordance with the project contents and its scale.

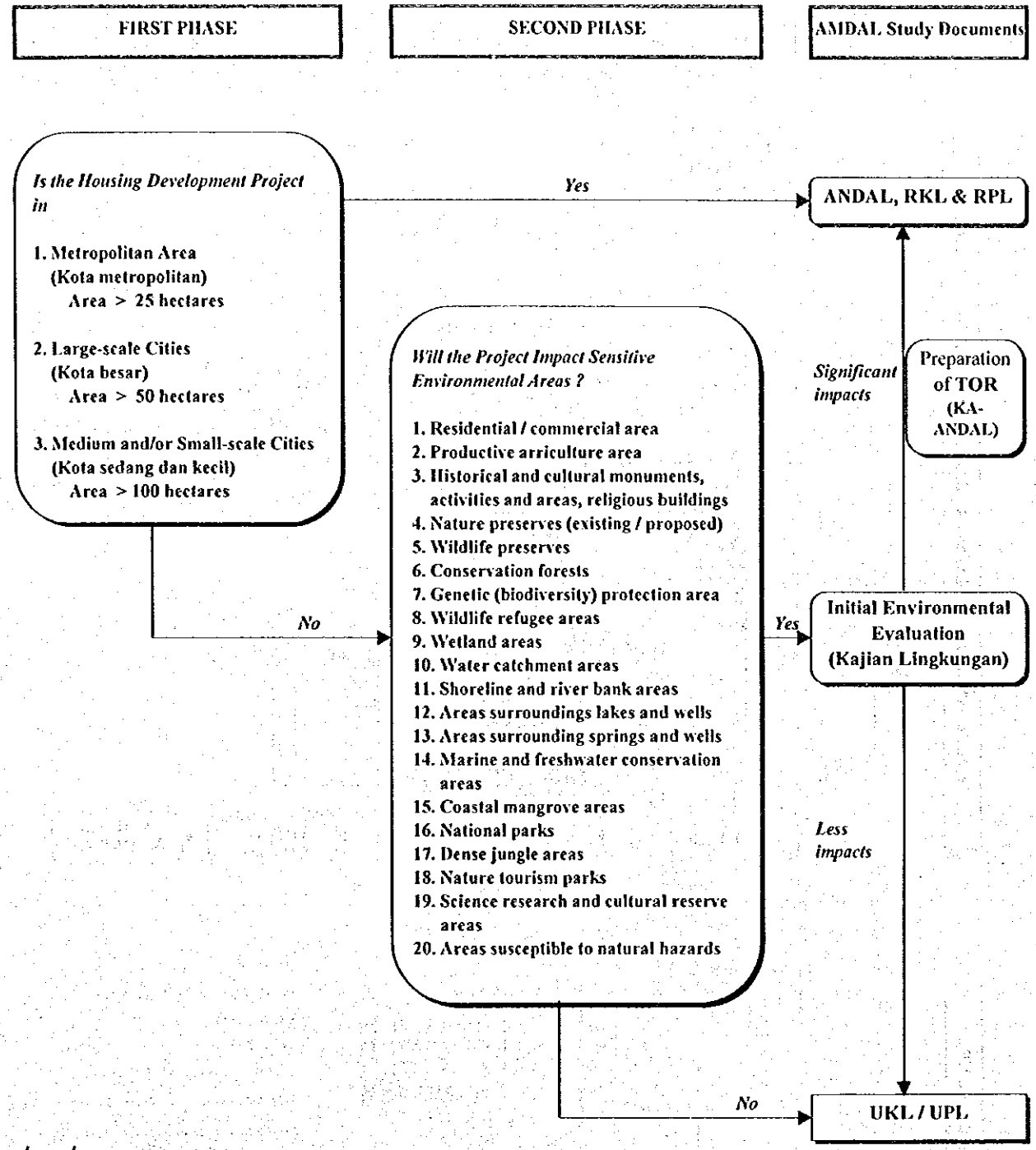
At the national level, the Environmental Impact Assessment Board (BAPEDAL), headed by the Minister of State for the Environment (KLH), or Ministry of Public Works (PU) is responsible for environmental management along with the housing development projects. The Central AMDAL Commission, called KOMPUS, which handles the AMDAL process, is organized by BAPEDAL or PU with its chairman appointed by the minister. While, at the provincial level, this task is taken by the Regional AMDAL Commission, called KOMDA, which is organized by the provincial government with its chairman appointed by the Governor. Procedures of AMDAL for a housing development project that is organized by the central government and by the provincial government are shown in Figures 8-1-3 and 8-1-4, respectively.

In most of the housing development projects in Indonesia, AMDAL has been handled by the provincial government. However, no regulation or decree clearly defines which governmental agency, whether in the central government or local government, is responsible to implement AMDAL for a housing development project. Recently, a new government regulation regarding AMDAL activities, including its formation, is under preparation by BAPEDAL and it may include this issue (this regulation is not established yet).



(Source : Technical Guideline of AMDAL for Public Works Project, March 1995
: Technical Guidelines for AMDAL by Perum Perumnas 1997)

Figure 8-1-1 Integration of Environmental Impact Control Measures



Legends :
KA : Terms of Reference
ANDAL : Environmental Impact Statement
AMDAL: Environmental Impact Analysis
RKL/UKL : Environmental Management Plan
RPL/UPL : Environmental Monitoring Plan

Source: Analysis from: - State Minister of Environment Decree No.KEP.39/MENLH/8/199
- State Minister of Environment Decree No.KEP-11/MENLH/3/1994
- State Minister of Environment Decree No.KEP-12/MENLH/3/1994

Figure 8-1-2 AMDAL Screening Process for Housing Development Project

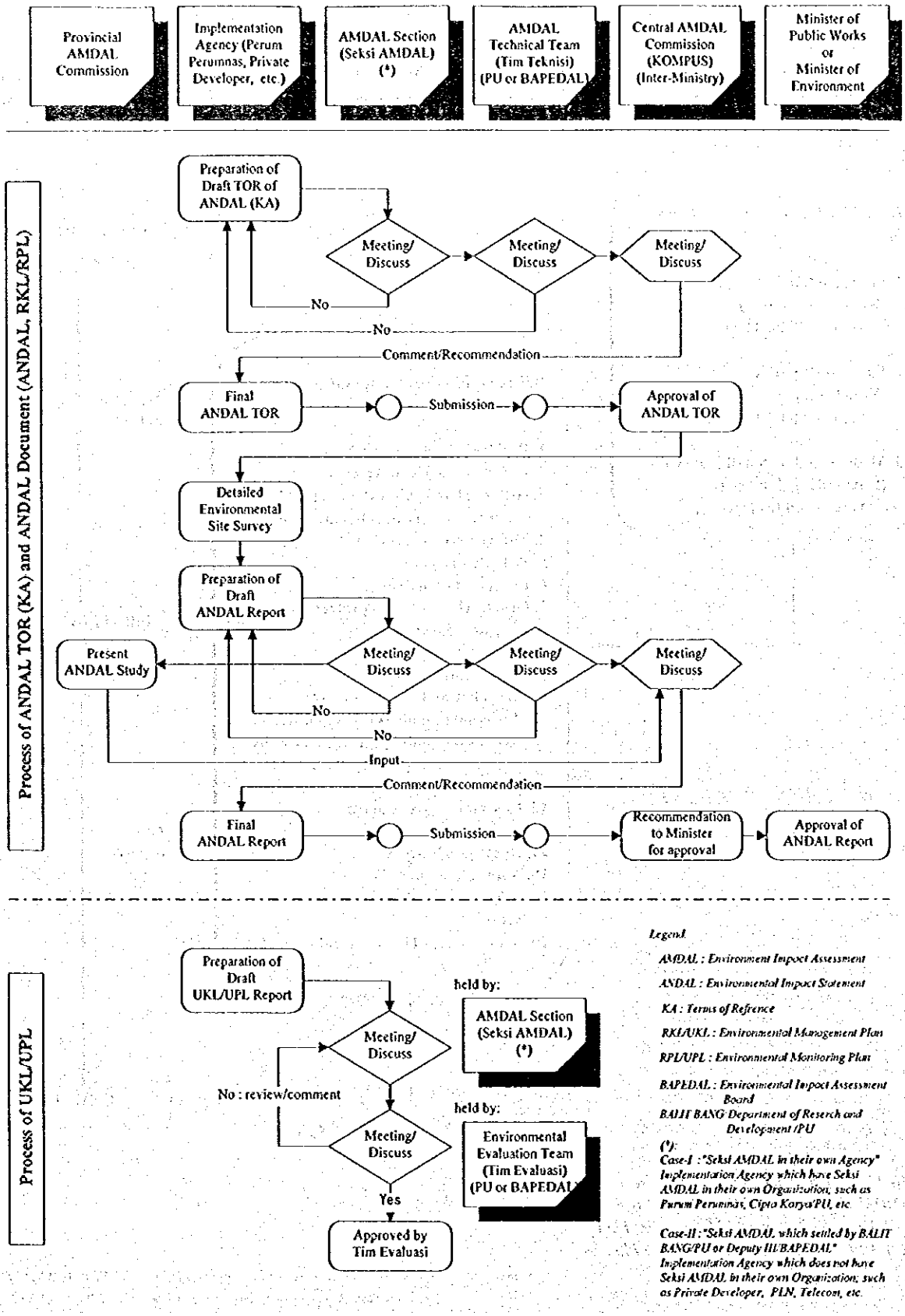


Figure 8-1-3 Procedure of AMDAL/EIA for Housing Development Project
(Organized by the Central Government)

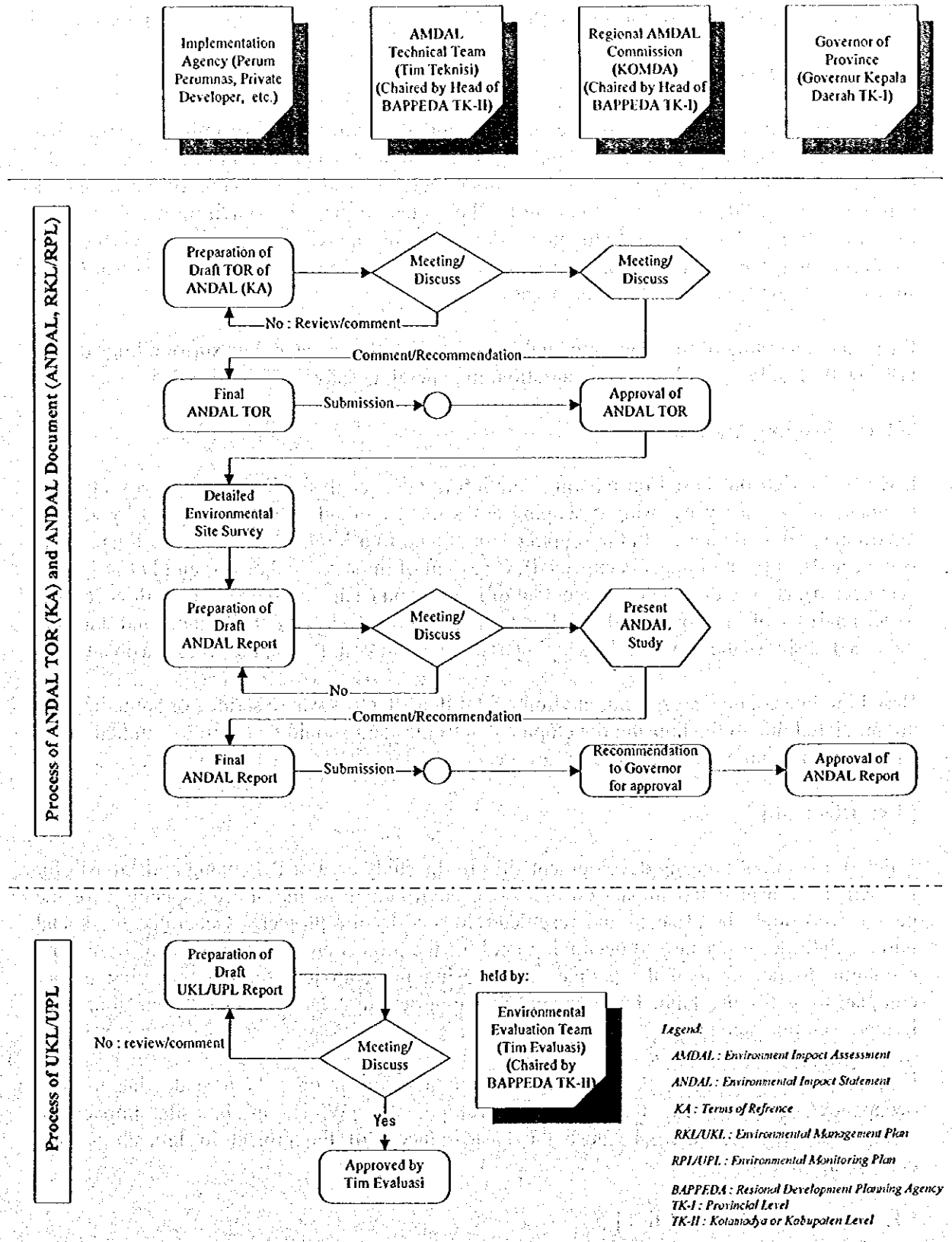


Figure 8-1-4 Procedure of AMDAL/EIA for Housing Development Project
(Organized by the Provincial Government)

8-2 Initial Environmental Examination (IEE)

8-2-1 Introduction

In the master plan (M/P) stage of the study, an initial environmental examination (IEE) has carried out in order to prepare an outline of the environmental conditions/settings of the project sites which are located in P. Panjang and Jatiasih (total area of each site is approximately 1,000 hectares), to identify the potential negative environmental impacts resulting from the housing/settlement development activities and to envisage the environmental items/factors to be considered for the environmental impact assessment (EIA) study in the next feasibility study (F/S) stage.

Basic understanding of the environmental issues in the urban area and its surroundings due to urbanization and/or population concentration, in general, is shown in Figure 8-1-5.

8-2-2 Scoping Assessment

IEE was carried out based on existing data/information analysis, interview survey and site reconnaissance survey by using a scoping assessment method, which is defined by JICA's environmental guidelines. In the scoping assessment, four kinds of marks; A (serious impact is expected), B (some impact is expected), C (extent of impact is unknown) and D (no impact is expected), are used to identify the extent of impacts on each environmental factor according to an analysis of environmental conditions at the project sites of P. Panjang and Jatiasih. Table 8-1-2 shows the result of the scoping assessment in both P. Panjang and Jatiasih sites.

Based on the scoping assessment, environmental items/factors where serious or some impacts are predicted due to the housing development activities and should be carefully studied in the next stage are summarized as follows.

[Resettlement]

A determination of housing development sites in the study area of P. Panjang and Jatiasih for F/S will have a potential impact on the social environment as its unrest, especially for the people who might be affected and resettled/relocated by the project. Generally, the social unrest might occur because of occupying land for the project and inflicting loss of living and economic foundations on the people, and causing them anxiety for not receiving proper compensation for the land, building and prime-agricultural land which is their source of living/economic activities.

[In the study area of P. Panjang, resettlement may occur on a large-scale due to land occupancy/acquisition for the housing development. While, in Jatiasih, impact on resettlement will be small, because the basic concept of the project in Jatiasih is land consolidation.]

[Traffic and Public Facilities]

Due to housing development activities, a gap in the service level of public infrastructures/services, such as electricity supply, water supply, telephone lines, road/traffic conditions, waste collection/transport/disposal, storm-water drainage, etc., between the housing development area and the surrounding existing housing area/villages, may happen.

The potential impact of this gap may create social and economic unrest and/or jealousy of the surrounding residents. While, an increase of the load on the existing transportation system/ facilities may cause the worsening of local traffic congestion in the region and/or surroundings.

[Waste]

Due to the large increase in the population of the region because of the housing development, the waste amount generated will also increase. Should the generated waste volume exceed the capacity of waste collection, transport and disposal services provided by the local government, the uncollected waste might be illegally dumped into ditches, rivers, etc. The illegally dumped waste may cause water contamination, offensive odor, generation of vector, etc. creating a negative impact on the health and sanitation conditions in the region.

[Hazard (Risk)]

In general, increased runoff and flooding may occur due to the increased impervious area by pavement, and removal of trees/vegetation and disruption of natural drainage patterns, by the large-scale housing development (especially in the rainy season).

[Groundwater]

Depletion of groundwater resources and drying up of wells may happen due to the over-drafting of groundwater following the usage of a large quantity of groundwater in response to demand increase for water supplies, in accordance with the population increase and commercial/industrial development by the housing development. The lowering of the groundwater also sometimes causes land subsidence.

[Hydrological Situation]

Increase of the runoff coefficient and hastening of flood peak occurrence due to large-scale pavement and/or vegetation removal by the housing development may cause floods and/or inundation in the down stream area of the region.

[In the study area of Jatiasih, the two rivers existing in the site flow into Jawa Sea through Buarau and Cakung River located in the east part of DKI Jakarta. Along these rivers, several flooded and/or inundated areas have been found in Jakarta *Utara*. Therefore, it may be predicted that the housing development/land consolidation in Jatiasih may have an impact on the acceleration of this flood process.]

[Water Pollution]

An impact on the groundwater contamination, caused by the usage of septic tanks for toilets in large numbers, may be predicted. In addition, an impact on the river water pollution, due to free discharge of untreated wastewaters and illegal waste dumping to the river, may also be predicted. In case people in the region are using shallow well water (depth is between 10 to 20m) and/or river water for living activities, especially for drinking, special attention should be paid. (Water pollution is mainly characterized by the high level of the BOD load.)

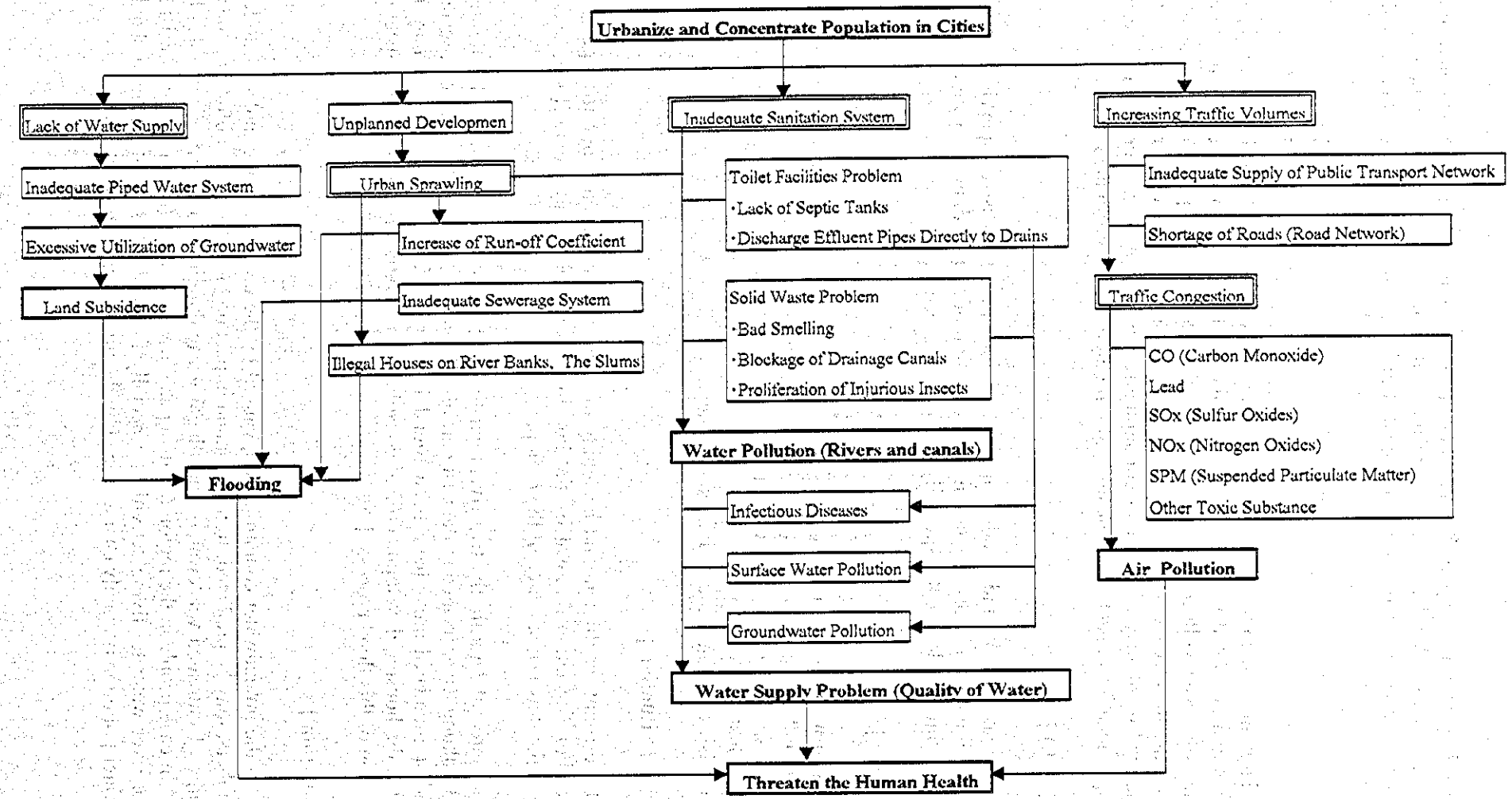


Figure 8-2-1 Diagram for the Environmental Issues in the Urban Area and Surroundings

Table 8-2-1 Scoping Result for the Master Plan Study Area in Parung Panjang and Jatiasih

No	Environmental Item/Factor	Evaluation		Reasons
		P.Panjang	Jatiasih	
A. Social Environment				
1.	Resettlement	A	D/C	• Loss of living foundations of the inhabitants due to land occupancy for the housing development (including impacts on WID and/or vulnerable groups)
2.	Economic Activities	B	D/C	• Social unrest due to loss of basis of economic activities because of resettlement and/or loss of prime-agricultural land • Social/economic structure in the region may be changed due to significant increase in the population
3.	Traffic/Public Facilities	A	B/C	• Worsening of local traffic congestion by increase of the load on existing transportation system/facilities • Gap of service level of public infrastructures (electric cable, water supply, telephone line, waste collection, etc.) between development area and surroundings may cause social/economic jealous/gap of residents • Impact on the life-style of residents due to shortage of public facilities caused by population increase; such as schools, hospitals, mosques, public services, etc.
4.	Split of Communities	B/C	D/C	• Large-scale housing development may introduce split of local community/ social network, change of living patterns • Isolation of certain villages may happen
5.	Cultural Property	D	D	• Cultural/historical properties do not exist in the study area
6.	Water Rights and Rights of Common	D	D	• Nature reserves, such as national parks, nature conservation areas, forest protection areas, etc. do not exist in the study area
7.	Public Health Condition	C	C	• Outbreak of epidemics caused by increase of vermin and the usage of contaminated water due to concentration of population by housing development which surpasses the capacity of waste collection/disposal and sewerage treatment • Dust and noise due to construction activities of the project may have an impact on public health
8.	Waste	B	B/C	• In case the generated waste volume exceeds the capacity of waste collection/disposal, the waste may be illegally dumped into ditches, rivers, etc. The illegally dumped waste may cause water contamination, offensive odor, vector generation, etc. creating health and sanitation issues. • Generation of construction and demolition wastes due to the construction activities
9.	Hazards (Risk)	B/C	B/C	• Increased runoff and flooding occur due to the increased impervious area by pavement, and removal of trees/vegetation and disruption of natural drainage patterns, by the large-scale housing development. • Landslides or failure of cut or filled slopes may cause damage to residents' land and houses.
B. Natural Environment				
1.	Topography and Geology	D	D	• The project site is located on flat and/or hilly area. No large-scale topographic/geological change will occur as a result of the project.
2.	Soil Erosion	C	C	• Large-scale exposure of topsoil due to the land reclamation and vegetation removal may cause river pollution resulting in soil erosion and siltration by heavy-rain
3.	Groundwater	C	B/C	• Depletion of groundwater resources and dry up of wells due to the over-drafting of groundwater may occur following the usage of a large quantity of groundwater in response to demand increase for water supplies according to population increase and commercial/industrial development. • Large-scale pavement of ground surface causes less rain water seepage, resulting in the lowering of the groundwater table.

No	Environmental Item/Factor	Evaluation		Reasons
		P.Panjang	Jatiasih	
4.	Hydrological Situation	B/C	B/C	• Increase of runoff coefficient and hastening of the flood peak occurrence due to housing development and/or vegetation removal may cause the flood and/or inundation in the down stream area of the region. • Disturbance on the existing/natural drainage system of the region by the housing development.
5.	Coastal Zone	D	D	• Both project sites are not located at the coastal zone
6.	Fauna and Flora	B/C	D/C	• Nature reserves, where protected/endemic fauna and flora are found, do not exist in the study area. • However, obstruction of breeding and extinction of species due to change of habitat conditions caused by housing development; such as inflow of people, generation of noise, vibration, and water/air pollution, may be predicted.
7.	Meteorology	D	D	• No meteorological impacts are predicted.
8.	Landscape	D	D	• No special landscape values for religious, tourism, etc. in the region and surroundings are found.
C. Pollution				
1.	Air Pollution	B/C	B/C	• Traffic increase due to activation of the living/economic activities in the region may cause negative effects on the public health of inhabitants, and on vegetation/ crops, fauna and flora in the region and surroundings by the exhaust gas and dust from vehicles. • Exhaust gas and dust produced by construction equipment and vehicles used for land reclamation and facility construction may cause negative effects.
2.	Water Pollution	B/C	B	• Groundwater contamination by using septic tanks for toilets in large-number. • Increase of amount of river water pollution due to free discharge of untreated waste-water and illegal dumping of the solid waste, following population increase/concentration by housing development, may cause negative effects on the public health and/or water usage of inhabitants.
3.	Soil Contamination	D	D	• Toxic substances will not be handled by the project
4.	Noise and Vibration	B/C	B/C	• Noise and vibration due to operation of heavy equipment and vehicles for land reclamation work may cause negative effects on the living environment (residents).
5.	Land Subsidence	D	D/C	• Land subsidence may occur in the alluvial and clay soil areas due to the lowering of the groundwater table. • (Special attention should be paid in case the lowering of the groundwater table and land subsidence has already progressed in the study area.)
6.	Offensive Odor	D	D	• Impact on the offensive odor by the housing development is small.

Source of format: "JICA Environmental Guidelines"

Note : Evaluation categories:

A: Serious impact is expected.
B: Some impact is expected.
C: Extent of impact is unknown (Examination is needed. Impact may become clear as study progresses).
D: No impact is expected.

8-3 Environmental Impact Assessment (EIA)

8-3-1 General

(1) EIA Objectives

The principal objectives of the environmental impact assessment (EIA) for Housing and Settlement Development are to:

- Understand the present condition of the environment in the project area
- Identify the particular activities of the project which may induce significant impact on the environment
- Predict the environmental impacts and evaluate their magnitudes
- Propose countermeasures to mitigate of the envisaged negative impacts
- Formulate plans for environmental management and monitoring

(2) Project Description

Regarding to the project description of housing development in P. Panjang/*KASIBA* and Jatiasih/*Land Consolidation*, refer to Chapter 6 for P. Panjang and Chapter 7 for Jatiasih.

(3) Environmental Elements and Issues

The environmental elements, to be identified by the result of an initial environmental examination (IEE) conducted in the master plan (M/P) study stage and an environmental site survey carried out in the feasibility study (F/S) stage as items on which potential significant or possible negative impacts are envisaged, and to be considered for the environmental impact assessment (EIA), are shown in Table 8-3-1, by using an environmental examination matrix. The vertical axis consists of rows of environmental elements grouped in three categories: i.e. social environment and natural environment, and horizontal axis consists of columns of project activities; i.e. pre-construction, construction and post-construction stage.

As a result, a significant negative impacts are identified on environmental element *Resettlement/relocation* and *social unrest* in P. Panjang, and possible negative impact is envisaged on eight environmental elements in P. Panjang and ten in Jatiasih due to some project activities.

Table 8-3-1 Environmental Examination Matrix

Major Facilities/Activities			Housing and Settlements Development					
			Pre-Construction Stage		Construction Stage		Post-Construction Stage	
Environmental Elements			P.Panjang	Jatiasih	P.Panjang	Jatiasih	P.Panjang	Jatiasih
Social Environment	1	Resettlement / Relocation	XX	X				
	2	Social Unrest	XX	X				
	3	Traffic / Transportation					X	X
	4	Public Facilities					X	X
Natural Environment	5	Groundwater					X	X
	6	Hydrological Situation			X	X	X	X
	7	Flood (Hazard)					X	X
	8	Wastewater					X	X
	9	Solid waste					X	X

Remarks; xx : The environmental elements to which special attention has to be paid. They might cause serious negative impacts that may affect the project formulation depending on the magnitude of the impacts and the possibility of the measures.

x : The environmental elements which may have a possible negative impact depending on the scale of the project and site conditions.

No mark: The environmental items requiring no impact assessment since the anticipated impacts are, in general, not significant.

8-3-2 Present Environmental Conditions

Present environmental conditions for the study area of P. Panjang and Jatiasih (total area of each site is approximately 300 hectares) are shown in Figure 8-3-1 and Figure 8-3-2, respectively. Also, scenery photos of both sites are shown in the next two following figures.

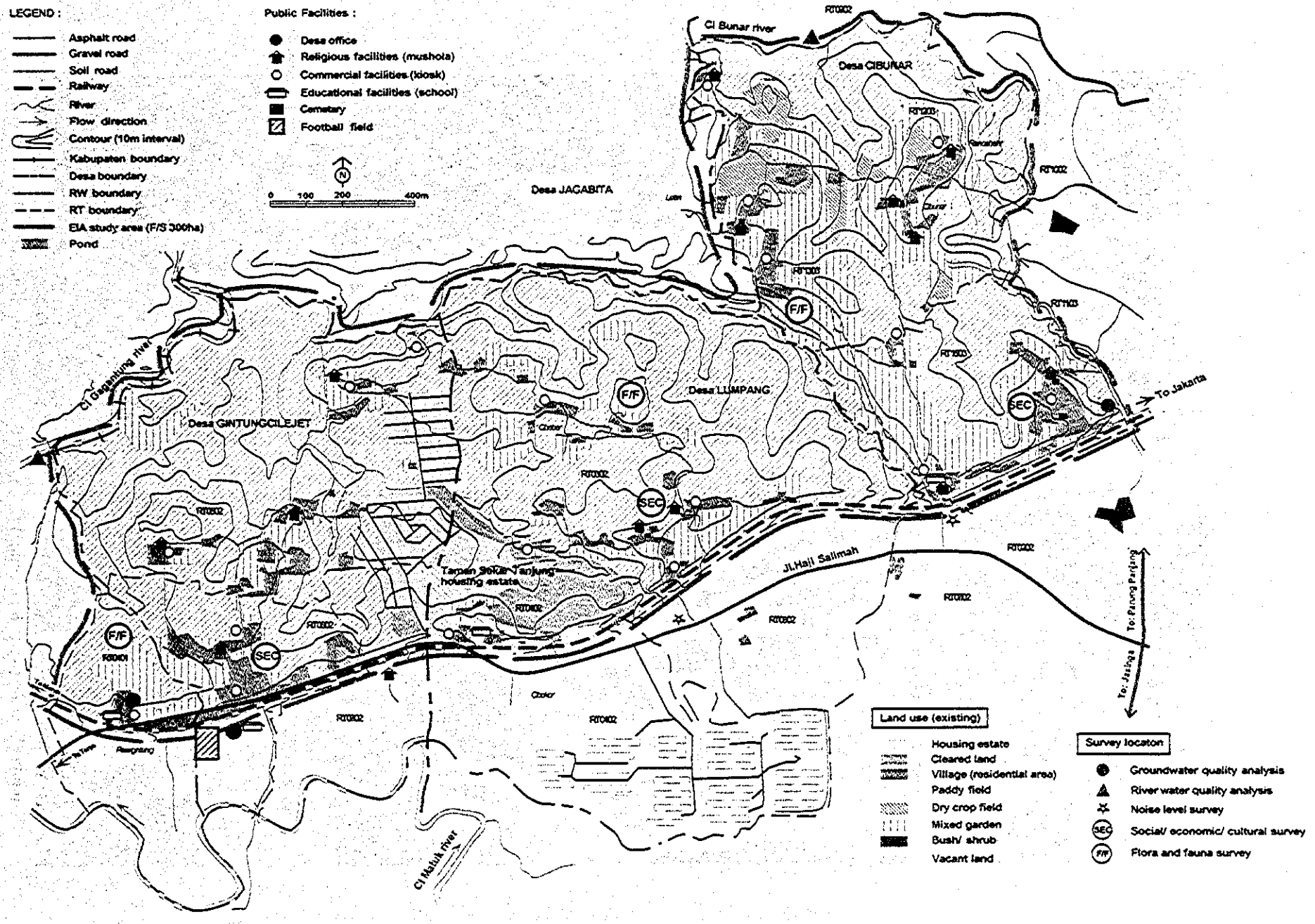
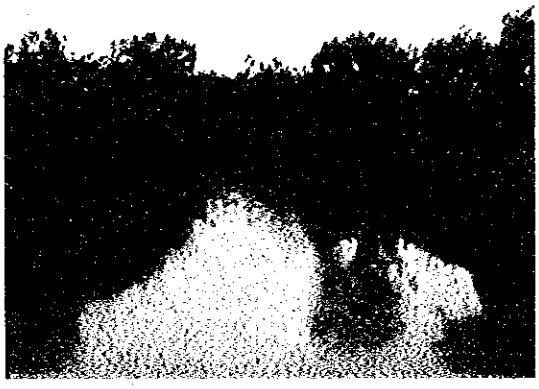


Figure 8-3-1 Present Environmental Map of EIA Study Area for Parung Panjang

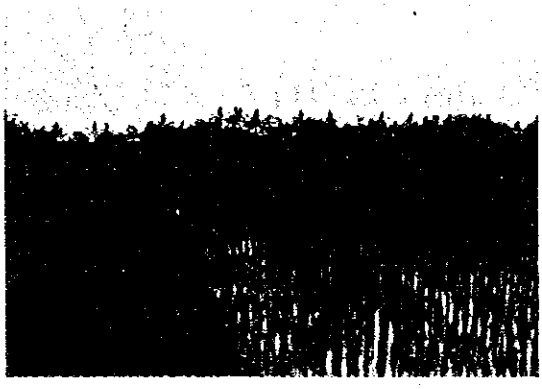
Soil road in Desa Lumpang



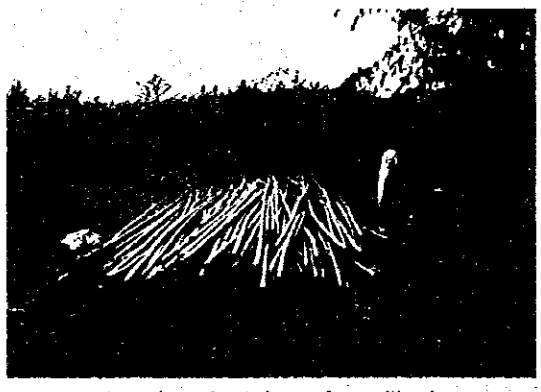
Cimatuk river

Jakarta – Merak Railway

Rail station (Parung Panjang)



Paddy field in Desa Cibunar



Bamboo (cut down for selling)

Perumnas housing (Road & Drainage)

Soil erosion (surroundings of housing estate)

Scenery of EIA Study Area in Parung Panjang

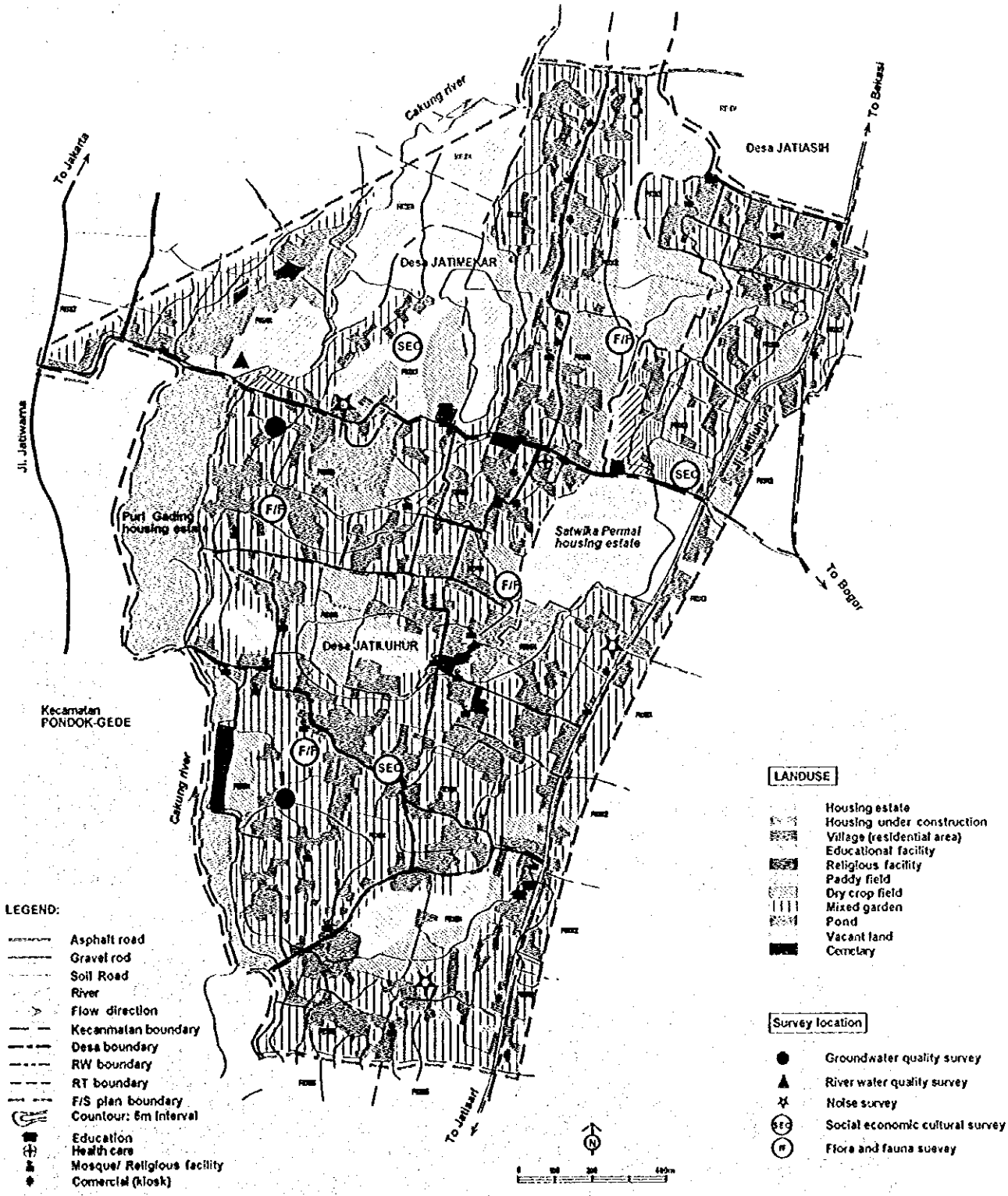
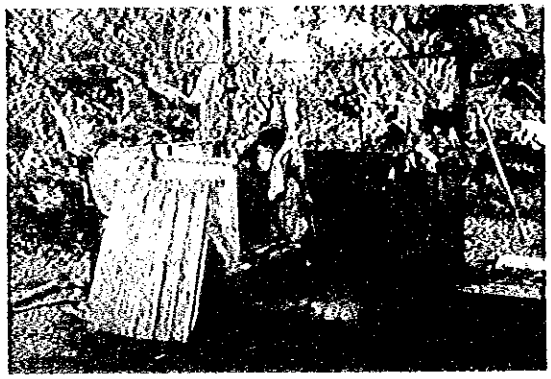


Figure 8-3-2 Present Environmental Map of EIA Study Area in jatiasih



Digging well (washing & bathing)

Pump well

Jl. Jatiluhur (Kabupaten road)

Soil road in Desa Jatiluhur

Farming field in Desa Jatimekar

Satwika Permai housing estate

Cikeas river

Fish pond (storm water & wastewater)

Scenery of EIA Study Area in Jatiasih

(1) Social Environment

1) Demography

[Parung Panjang]

The study area, which was located in Kecamatan Parung Panjang, is composed of three Desas; i.e. Desa Cibunar, Lumpang and Gintung Cilejet. The population of study area in 1998 was 2,265 persons. The range of population density by RW level was 4 to 12 person/ha. The highest density area was in Dusun Salimah (RW 2 RT 6) and the lowest density was in the same Dusun (RW 2 RT 5). The number of households in the study area in 1998 was 563. Table 8-3-2 shows the population of each Desa, Dusun, RW and RT, the population density and household numbers.

[Jatiasih]

The population of the study area in 1998 was 6,168 persons and number of household was 1,578. The population density by RW level is ranged between 12 to 40 person/ha. Table 8-3-3 shows population of each Desa, Dusun and RW, and its population density and household numbers.

2) Economic Activities and Educational Level

Based on the result of *Opinion poll survey* conducted by the JICA Study Team, major economic activities of the residents in the study area of P. Panjang were labor (38.8%), merchant (20.6%) and farmer (20.6%), while in Jatiasih, merchant (40.3%), farmer (21.7%) and labor (14.6%).

The majority of the population has an elementary school educational background: 42.5% in P. Panjang and 35.4% in Jatiasih. The population who an academy and/or university educational background is minor, 1.4% in P. Panjang and 5.1% in Jatiasih.

3) Traffic/Transportation

[Parung Panjang]

Existing major roads in the M/P study area are Jl. Parung Panjang (Kabupaten road) and Jl. K.H. Salimah (Desa road) which connect the study area with the Tenjo District in the west and Tangerang in the east. While, most of the internal local roads in the F/S area are not paved/soil road with a width of less than 4m. In the rainy season, there will be some mud, which will disrupt the automobile traffic.

The railway Jakarta-Merak passes through the west-east direction in the study area. The railway station, named Parung Panjang, is located close to the eastern boundary of M/P study area. The number of passengers between P. Panjang and Jakarta in peak hour (5:00-8:00 and 17:00-20:00) is about 2,500 persons per hour, according to the railway station officer. Jl. K.H Salimah (Desa road) and seven internal local roads cross this railway in the study area, however, no railway gate and/or fence are found at the road crossings.

Buses/micro-buses and *ojeks* (two-wheeled motorcycle) constitute the main form of public transportation in the study area. All buses/micro-buses are connected to Jl. Raya Parung Panjang, while ojek drivers are usually waiting for customers at the road corners and other strategic places like railway stations and markets.

Table 8-3-2 Population and Households in Parung Panjang

Desa	Dusun	RW	RT	Population 1996	Population 1997	Population 1998	Density 1998	H.Hold 1998	Pop* 1998	Density* 1998	H.Hold* 1998
1. Cibunar					1,028	1,091	12	226	1,091	12	226
	Alaban				1,028	1,091	12	226	1,091	12	226
		3			1,028	1,091	12	226	1,091	12	226
			12		361	364	12	52	364	12	52
			13		303	365	11	65	365	11	65
			15		364	362	11	109	362	11	109
2. Lumpang				881	886	891	6	214	507	4	118
	Lumpang I			881	886	891	6	214	507	4	118
		2		881	886	891	6	214	507	4	118
			3	424	427	431	5	99	431	5	99
			4	457	459	460	8	115	76	5	19
3. Gintung Cilejet					1,072	1,081	4	334	667	4	219
	Salimah				1,072	1,081	8	334	667	8	219
		1			259	260	11	85	73	8	24
			4		259	260	11	85	73	8	260
		2			813	821	15	249	594	5	195
			5		254	258	4	97	258	4	97
			6		359	362	16	110	289	17	88
			7		200	201	10	42	47	7	10
Total					2,986	3,063	8	774	2,265	7	563

Source: 1) Kecamatan Office; 2) Field Survey, JICA Study Team, 1998
*Note : * Demographic data in the study area ; Unit of density is 'person / ha'*

Table 8-3-3 Population and Household in Jatiasih (1998)

Desa	Dusun	RW	Population 1996	Population 1997	Population 1998	Density 1998	H.Hold 1998	Pop * 1998	Density* 1998	H.Hold * 1998
1. Jati Asih			913	975	1,095	20	254	955	26	226
	1. Kebantenan (Dusun I)		913	975	1,095	20	254	955	26	226
		8	719	776	879	23	212	869	26	208
		7	194	199	216	14	42	86	28	18
2. Jati Mekar			609	634	2,419	14	465	1,991	19	368
	1. Rawa Bogo (Dusun I)		609	634	785	3	164	357	14	67
		4	609	634	642	8	135	292	12	55
		7			143	8	29	65	40	12
	2. Pamahan (Dusun II)				1,634	13	301	1,634	19	301
		1			1,171	17	219	1,171	19	219
		2			463	12	82	463	21	82
3. Jati Luhur			4,481	4,606	4,737	18	1,241	3,526	20	984
	1. Bulak (Dusun I)		1,467	1,516	1,564	18	328	353	30	71
		1	578	602	623	14	134	180	29	36
		2	889	914	941	21	194	173	31	35
	2. Wadas (Dusun II)		2,747	2,817	2,890	18	848	2,890	18	848
		3	1,256	1,276	1,307	18	396	1,307	18	396
		4	1,491	1,541	1,583	18	452	1,583	18	452
	2. Batu Tumbuh		267	273	283	31	65	283	31	65
		5	267	273	283	31	65	283	31	65
Total					7,947	19	1,960	6,168	20	1,578

Source: 1) Kecamatan Office; 2) Field Survey, JICA Study Team, 1998
*Note : * Demographic data in the study area ; Unit of density is 'person / ha'*

[Jatiasih]

The present major road which passes through in the M/P study area is Jl. R. Pondok Gede–Bekasi which connects to toll road, named Cawang–Cikampek, at the toll gate of Bekasi Barat in the north and at the Pondok Gede in the west. Jl. Jatiasih - Jatiluhur (Kabupaten road) passes through in the F/S area at the east end, and several Desa roads and internal local roads (small road inside Desa) connect to this road.

Micro-buses/mikrolets and *ojeks* are the main public transportation in the study area.

4) Land Use and Public Facilities

Present Land use in the study area, P. Panjang (292 ha) and Jatiasih (324 ha), is shown in Table 8-3-4. In P. Panjang, the study area is mostly occupied by paddy field (168 ha: 57.4%), following mixed garden (64 ha: 22.1%), housing settlement (21 ha : 7.3%), etc. While in Jatiasih, the study area is mostly occupied by mixed garden (115 ha: 35.4%), housing settlement (82 ha: 25.3%), following dry cropland, paddy fields, etc.

Electricity is distributed in both P. Panjang and Jatiasih study area, however, there are no services/utilities such as piping water supply, garbage collection and gas distribution facilities. In Jatiasih, telephone lines serve some parts of the study area, but not in P. Panjang.

Table 8-3-4 Existing Land Use in 1998

No	Land Use	Parung Panjang		Jatiasih	
		Area (ha)	Ratio (%)	Area (ha)	Ratio (%)
1	Housing Settlement	21.16	7.3	81.89	25.3
2	Mixed Garden	64.48	22.1	114.60	35.4
3	Dry Crop Land	11.63	4.0	1.92	0.6
4	Bush	1.39	0.5	-	-
5	Vacant Land	0.72	0.3	9.61	3.0
6	Cemetery	0.08	0.03	1.92	0.6
7	Land Clearing (for Housing)	8.53	2.9	8.53	8.5
8	Paddy Field	167.58	57.4	32.63	10.1
9	Religion	0.17	0.1	0.68	0.2
10	Education	0.10	0.03	0.90	0.3
11	Road	3.02	1.0	3.02	3.0
12	Housing Estate	13.17	4.5	10.42	3.2
13	Pond	-	-	10.76	3.3
	T o t a l	292.03	100.0	323.87	100.0

Source: Aerial photo, 1992/ BPN Bekasih local office, 1998

(2) Natural Environment

1) Meteorology

JABOTABEK is located in the tropics, as it is common in the tropics, rainfall intensity of this region is rather high. There are distinctive wet and dry seasons; that is, the wet/rainy season between October to April and the dry season between May to September. The mean annual rainfall between 1992 to 1996 recorded in *Curug Budiarto* station in Kab. Tangerang, near P. Panjang site, was 2,340mm with 216 rainy days. While, annual rainfall in *Halim* station in DKI Jakarta, near Jatiasih site, was 2,547mm with 154 rainy days. Table 8-3-5 shows

monthly rainfall data in the study area.

Table 8-3-5 Rainfall in the Study Area 1992 - 1996

(unit: mm)

Year/Rainfall / Month	1992		1993		1994		1995		1996	
	P.P	JT	P.P	JT	P.P	JT	P.P	JT	P.P	JT
January	292	298	376	417	435	384	423	564	284	378
February	256	330	270	328	331	401	211	254	310	485
March	225	247	197	351	235	364	389	298	205	130
April	203	427	429	399	339	166	241	201	288	160
May	233	371	159	186	107	116	95	101	140	11
June	149	--	193	208	102	19	116	445	89	80
July	81	50	25	34	--	3	124	117	66	39
August	258	--	74	125	1	190	11	1	104	84
September	204	186	--	30	--	8	197	125	128	31
October	322	241	234	184	59	5	230	367	233	410
November	150	299	256	293	254	311	256	298	--	257
December	175	--	260	351	154	157	221	174	293	247
Total	2,548	2,449	2,473	2,906	2,020	2,124	2,515	2,945	2,142	2,312

Source: Curug Budiarto Station, Kabupaten Tangerang, for P.P (Parung Panjang)
Halim Perdana Kusuma Station, DKI Jakarta, for JT (Jatiasih)

2) Groundwater/Water Supply

[Parung Pajang]

In P. Panjang, groundwater level is between 6 to 8m from the ground surface in wet season and between 10-18m in dry season, in average. According to the hearing/interview survey at the site conducted by JICA study team, no drying-up of wells are reported, even in the dry season.

Most of the residents in the study area using the shallow groundwater by the digging wells and/or pump wells for domestic use, such as drinking, cooking, bathing, washing and toilet. Generally, each household has its own well, while, in some cases, well is shared by 2 to 4 households at the communal level.

The groundwater quality which samples have taken from one digging well (PG1) and one pump well (PG2) located in the study area have analyzed. As a result, all analyzed figures of meet the clean-water standard settled by the Ministry of Health No.416/1990. Table 8-3-6 shows its result.

[Jatiasih]

In Jatiasih, the groundwater level is between 3 to 6m from the ground surface in the wet season and between 8-12m in dry season, in average, which is slightly higher than P. Panjang site. According to the hearing/interview survey at the site conducted by the JICA study team, drying of shallow digging wells has been reported in the dry season, however, for the pump wells, no such a information was obtained. Further, some residents have complained about the groundwater turbid in the dry season.

Most of the residents in the study area are using the shallow groundwater via digging wells and/or pump wells for the domestic use. In Dusun (village) Wadas, digging wells are commonly used at the communal level.

The groundwater qualities, which samples have been taken from two digging wells (JG1 and JG2) located in the study area have been analyzed. As a result, all analyzed figures meet the clean-water standard No.416/ 1990, except pH values. In natural water, the pH is controlled by a balance of carbondioxide – bicarbonate – carbonate. The pH value is affected by temperature, and chlorination tends to decrease its value. Table 8-3-7 shows its result.

Table 8-3-6 Groundwater Quality Analysis in Parung Panjang

No.	Parametric	Unit	Standard *) (max. figure)	Result	
				PG1	PG2
A.	PHYSICAL				
1.	Odor		No odor	No odor	No odor
2.	Total Dissolved Solid (TDS)	Mg/l	1,500	226	83
3.	Clearance	NTU	25	8	4
4.	Taste	-	No taste	No taste	No taste
5.	Temperature	^{o}C	Air ± 3°C	28	28
6.	Color	Pt-Co	50	15	22
B.	CHEMICAL				
1.	pH (lab)	-	6.5-9.0	6.8	7.7
2.	Mercury (Hg)	Mg/l	0.001	< 0.001	< 0.001
3.	Arsenic (As)	Mg/l	0.05	< 0.005	< 0.005
4.	Ferro (Fe)	Mg/l	1.0	< 0.03	< 0.03
5.	Fluoride (F)	Mg/l	1.5	0.08	0.02
6.	Cadmium (Cd)	Mg/l	0.05	< 0.005	< 0.005
7.	Calcium Carbonate ($CaCO_3$)	mg/l	500	88.3	49.9
8.	Chloride (Cl)	mg/l	600	46.2	5.7
9.	Chromium VI (Cr 6*)	mg/l	0.05	< 0.01	< 0.01
10.	Manganese (Mn)	mg/l	0.5	0.02	0.04
11.	Nitrate (NO_3N)	mg/l	10	7.8	6.6
12.	Nitrite (NO_2N)	mg/l	1.0	0.034	0.018
13.	Selenium (Se)	mg/l	0.01	< 0.002	< 0.002
14.	Zinc (Zn)	mg/l	15	0.03	0.02
15.	Cyanide (CN)	mg/l	1.0	< 0.005	< 0.005
16.	Sulfate (SO_4)	mg/l	400	28.9	8.7
17.	Surfactant anion (MBAS)	mg/l	0.5	0.10	0.04
18.	Lead (Pb)	mg/l	0.05	< 0.03	< 0.03
19.	Organic Compound ($KMnO_4$)	mg/l	10	4.3	6.4

Notes : * : Clean-water (drinking water) Standard/ M. of Health No.416/1990
< : less
PG1 : Rt.04 Desa Gintung Cilejet (Digging well)
PG2 : at Kampung Lumpang (Pump well)

Table 8-3-7 Groundwater Quality Analysis in Jatiasih

No.	Parametric	Unit	Standard *) (max. figure)	Result	
				JG1	JG2
A.	PHYSICAL				
1.	Odor		No odor	No odor	No odor
2.	Total Dissolved Solid (TDS)	Mg/l	1,500	15	132
3.	Turbidity	NTU	25	9	1
4.	Taste	-	No taste	No taste	No taste
5.	Temperature	°C	Air ± 3 °C	27	27
6.	Color	Pt-Co	50	3	1
B.	CHEMICAL				
1.	pH (lab)	-	6.5-9.0	5.6	6.0
2.	Mercury (Hg)	mg/l	0.001	< 0.001	< 0.001
3.	Arsenic (As)	mg/l	0.05	< 0.005	< 0.005
4.	Ferro (Fe)	mg/l	1.0	< 0.03	< 0.03
5.	Fluoride (F)	mg/l	1.5	0.02	0.02
6.	Cadmium (Cd)	mg/l	0.05	< 0.005	< 0.005
7.	Calcium Carbonate ($CaCO_3$)	mg/l	500	7.7	67.2
8.	Chloride (Cl)	mg/l	600	1.9	16.0
9.	Chromium VI (Cr 6+)	mg/l	0.05	< 0.01	< 0.01
10.	Manganese (Mn)	mg/l	0.5	< 0.02	< 0.02
11.	Nitrate (NO_3N)	mg/l	10	1.8	7.2
12.	Nitrite (NO_2N)	mg/l	1.0	< 0.005	< 0.005
13.	Selenium (Se)	mg/l	0.01	< 0.002	< 0.002
14.	Zinc (Zn)	mg/l	15	0.03	0.03
15.	Cyanide (CN)	mg/l	1.0	< 0.005	
16.	Sulfate (SO_4)	mg/l	400	0.6	1.3
17.	Surfactant anion (MBAS)	mg/l	0.5	0.05	0.21
18.	Lead (Pb)	mg/l	0.05	< 0.03	< 0.03
19.	Organic Compound ($KMnO^4$)	mg/l	10	1.2	1.8

Notes : * : Clean-water (drinking water) Standard / M. of Health No.416/1990
< : less
JG1 : RT.17/03 Dusun Wadas (Digging well)
JG2 : RT 12/03 Dusun Wadas (Digging well)

3) Hydrological Situation/Flood (Hazard)

No flood and/or river overflowing is recorded in both P. Panjang and Jatiasih study area. This is because of the topographic feature of the study area does not have potency for the river flood/inundation. Table 8-3-8 shows major rivers flow into/through the master plan study area (approx. 1000ha in each) of both P. Panjang and Jatiasih sites.

Table 8-3-8 Rivers in Parung Panjang and Jatiasih

No.	Name of River	Jurisdiction	Width (m)	Depth (m)	Length (km)	Water-flow (permanent/ seasonal flow)
Parung Panjang						
1	Cimatuk	Kabupaten	9	1.5	4	Permanent
2	Cimanceuri	Kabupaten	10	2	7.5	Permanent
3	Cibunar	Kabupaten	6	2	3.5	Permanent
4	Cigagantung	Kabupaten	10	2	6	Permanent
Jatiasih						
1	Cikeas/Bekasi	Kabupaten	10 - 25	5	1.1	Permanent
2	Cakung	Kabupaten	5	2.5	4.8	Permanent
3	Kali Baru	Kabupaten	5	2.5	2.0	Permanent

Source: JICA Study Team, 1998

4) Wastewater/Toilet

Generally in Indonesia, including the P. Panjang and Jatiasih region, there are two types of night soil/human waste sanitation system.

The first is conventional type called "*cubluk* (traditional digging toilet)". Night soil is discharged into *cubluk* directly and its water-content, which contains high BOD load, may penetrate the ground. Filter-layer does not facilitate the *cubluk*. While, wastewater produced at MCK by domestic activities such as washing, cooking, bathing, etc. may directly be discharged into ditches and/or rivers without any filtration treatment.

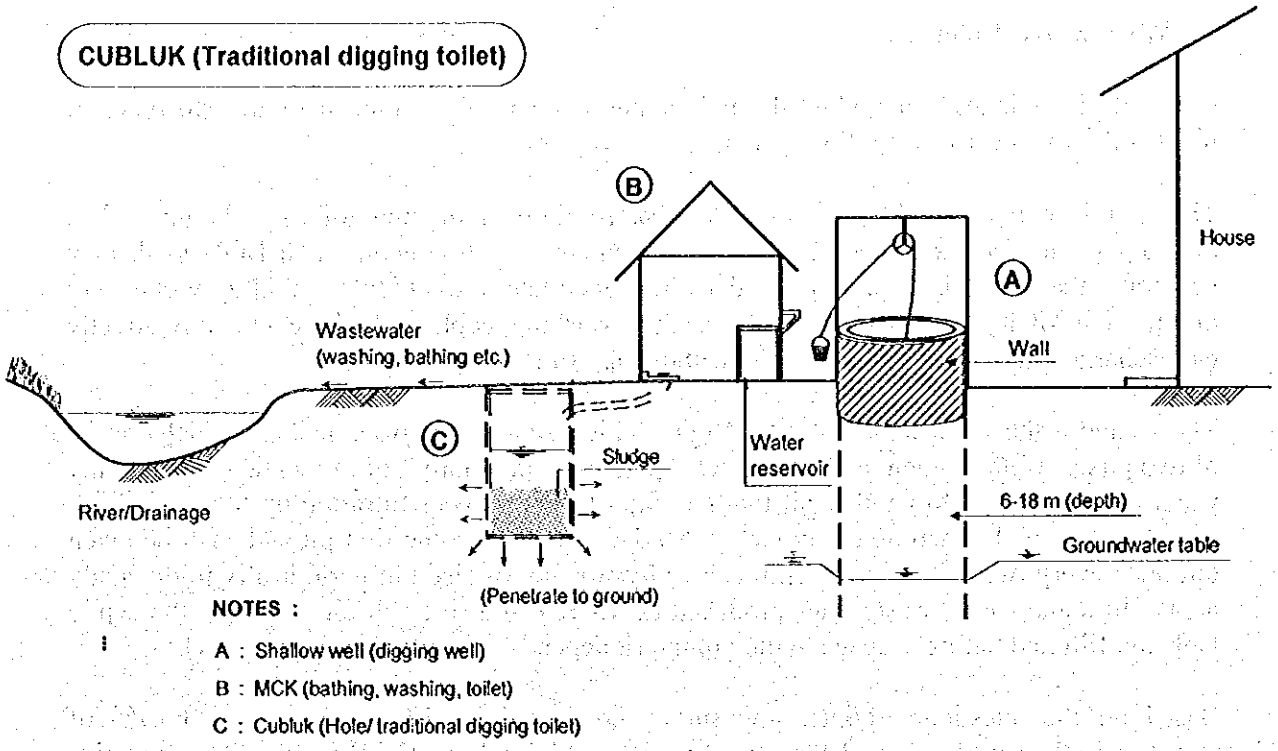
The second is the septic tank system. Night soil is discharged into septic tanks which consist of two pits. Water-content and sludge are separated in the first-pit of the septic tank and only water-content flow into another pit that has filter-layers. After filtration by the second pit, water-content will penetrate the ground. Sludge remained in the first pit and shall be taken out once every two years, however, this activity was not carried out periodically in the study area. In some cases, wastewater produced at MCK can also be discharged into the septic tank and filtrated before seepage to the ground (it depends on the type of septic tank).

Based on the questionnaire/interview survey conducted by JICA study team, 66.7% of residents in the study area of P. Panjang are using *cubluk*, while, 73.0% in Jatiasih. Remains are using septic tank; 21.7% in P. Panjang and 24.0% in Jatiasih, and others. Figure 8-3-3 shows a diagram of sewage (wastewater and night soil) flow and types of well in the study area.

5) Solid Waste

No waste collection/disposal service is provided by the local government in the study area of both P. Panjang and Jatiasih. This is because of the low density of population in these regions.

Wastes are commonly self-treated/disposed by filling-up digged holes in each household, burned and covered by soil, etc. While, residents living near the river usually thrown the waste into rivers.



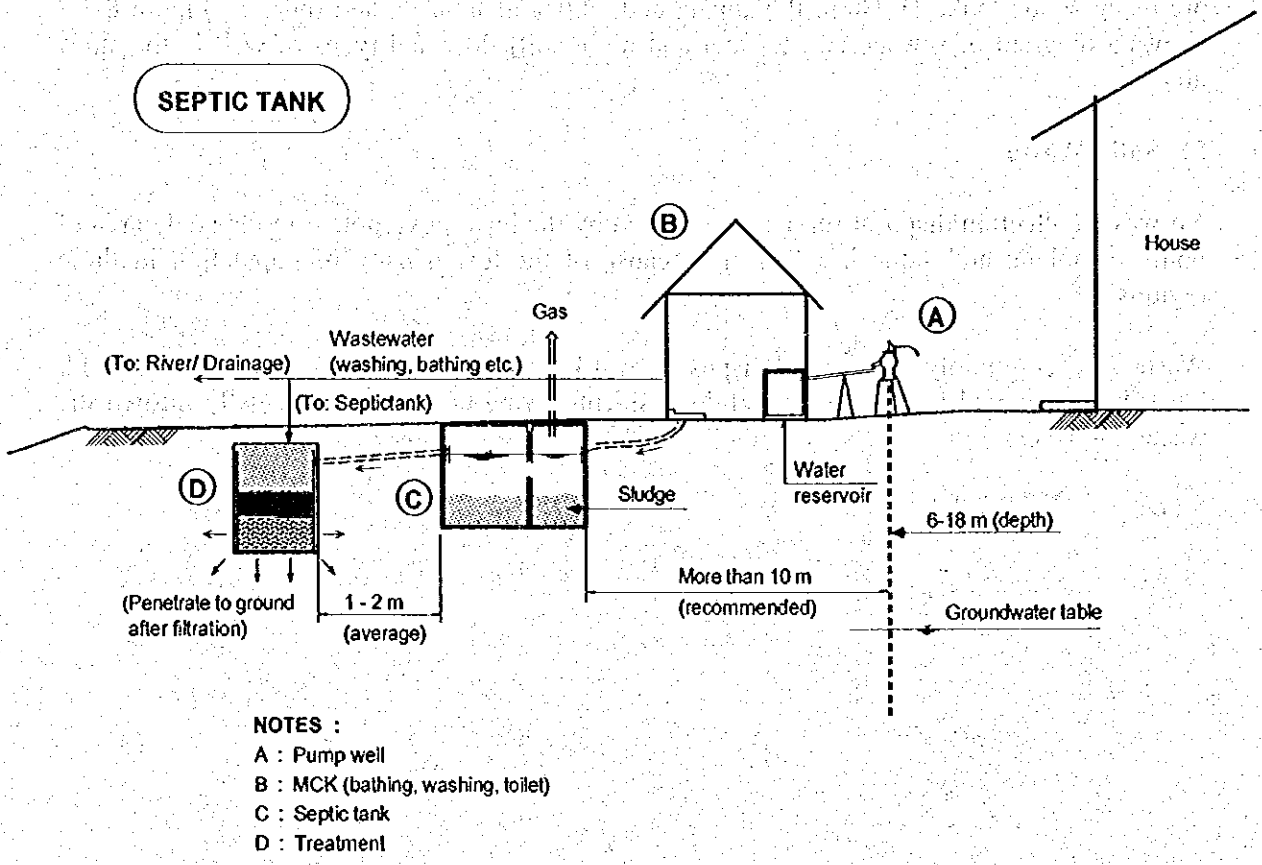


Figure 8-3-3 Sewage Flow Diagram and Well Types in the Study Area