8 ENVIRONMENTAL IMPACT MANAGEMENT PLAN (RKL)

8.1 Background of the Project

Jakarta, the capital of Republic of Indonesia, is undergoing rapid urbanization in recent years, resulting in an intense population growth that its population reached 4.6 million in 1975. In 1990 it had reached 8,259,600 million then to 9,341,400 at the end of 1996. This rapid growth is caused by many factors, such as the rapid urbanization; development of urban infrastructures, demand of urban labor. Among others, the development of urban infrastructures such as the housing areas and the drainage system, including water supply system are not catching up the growth of population. Thus there are still seen in some locations affected by flooding during the rainy seasons.

It is anticipated that the population of Jakarta in 2010 would reach 12.8 million. The Government of Indonesia has been making progress to overcome the flooding problem in Jakarta and many projects have been accomplished to date. One of them was to prepare the Master Plan of Drainage and Flood Control for Jakarta in 1972. However, because of population growth and rapid development in Jakarta, that Master Plan needed to be revised thereafter. In response to this, Japan International Cooperation Agency (JICA) conducted the Study on Urban Drainage and Wastewater Disposal of the City of Jakarta (hereinafter referred to as the "JICA Study") that was completed in 1991. As a consequence, Cengkareng west area (hereinafter referred to as the "project area") has been selected as the area urgently required to conduct rehabilitation of urban drainage system for the following reasons:

- The extent and the frequency of the flood damages are greater than the other areas;
- The drainage requirement to meet future land development is necessary than the other areas;
- The progress rate of urban development is rapid than the other areas;
- The area is already with very high population density; and
- The income level of residents in the project area is relatively low.

There are 12 habitual inundation areas within the project area as shown in Fig 1.These are counted for 273.40 ha while potential inundation area is 474.3 ha. Depth of habitual inundation area within the project area is estimated to be 20 to 50 cm and the

duration of inundation is from 1 day to 7 days. For the potential inundation area, depth goes up to 30 - 60 cm and duration is from 1 day to 10 days.

The project area covers about 38 km^2 including residential, commercial and industrial areas which will increase from 22.44 km^2 in 1990 to 27.98 km^2in 2005. Population in the project area was 263,000 in 1988 and is expected to reach 456,000 in 2010, given the average annual growth rate of 2.53% per year.

As the implementation of drainage development project in the project area takes place, it may cause the impact to the environment. It is therefore according to the Government Regulation of the Republic of Indonesia No.51, Year 1993, Environmental Impact Analysis is required to conduct. Based on this, it is therefore necessary to prepare Environmental Management Plan (RKL) for the project .

8.2 Objectives and Use of Environmental Management Plan (RKL)

8.2.1 Objectives of RKL

The objectives of RKL are as follows:

- Identify all impact management measures against the impacts which are possibly induced by the project activities and that they occur to the local environment.
- Identify feasible and effective measures that may reduce or modify adverse environmental impacts to an acceptable level based on the use of technological approach, socio-economic approach and institutional approach.
- Provide guidance to all the parties concerned with the project on how to protect the local environment and how to handle the significant impacts induced by the project.
- Provide ways to implement the measures and the requirements necessary to ensure that the proposed measures are properly conducted, made effective to the local environment, and timely completed.

8.2.2 Use of RKL

(1) For the Use of Decision Makers

- RKL is to provide information to the decision makers of the members of Indonesian Government on how far RKL could possibly reduce the impacts induced by the project

activities while environmental quality is controlled by the measures suggested to carry out within RKL.

- The owner of the project can make use of RKL as reference for the points of concern on the way the environmental management is conducted when other development project of similar nature takes place within the project area or in other areas within the borders of Indonesia.

(2) For the use of the government of Indonesia

- The Government of Indonesia can make use of RKL as reference for the points of concern on the way the environmental management is conducted when other development project takes place within the project area, or the project of similar nature takes place within the borders of Indonesia.

(3) For the Use of the Local Communities

- RKL provides information to the members of local communities of the government intentions on the ways to protect the local environment disrupted by the project. Thereby, the local residents can cross-check measures of environmental management against their own interests.

8.3 Environmental Components Subject to Observation

8.3.1 Physico-chemical environment

(1) Rainfall and flood events

Since the project is aimed at reducing habitual inundation chronically occurring within the project area, rainfall data maintained at Cengkareng Meteorological Station is necessary in relation to the flood events. Data on the flooded area, depth of water, and duration of the flood should be maintained where possible.

(2) Water quality

Since the project involves major rehabilitation of the drainage channels within the project area, water quality in these drainage channels and that of in the coastal area should be observed during dry and rainy seasons.

(3) Air quality and noise level

Since the project is conducted in the congested residential areas, air quality and noise level during the construction period should be observed.

8.3.2 Biological environment

(1) Fauna

Fauna within the project area is less significant at the moment since all of the project area has already been developed for residential, commercial and industrial activities.

(2) Flora

The mangrove forests remaining on the coastal area within the project area should receive significant impacts upon implementation of the project . Thus, its biological entity and the way it is managed in relation to implementation of the project , or the means to increase area of mangrove forest currently available in Indonesia should be observed.

8.3.3 Socio-economic environment

(1) Demographic characteristics

The most significant impact induced by the project is relocation of the local residents with land certificate as well as the squatters living along the drainage channels. Thus relocation operation, resettlement procedures, and the changes on the demographic characteristics of each kelurahan on the increase and decrease should be observed.

Relocation of the squatters, some of them have been living in the area for more than 30 years, will be the sensitive issue. Thus, assessment of their properties, the rate of compensation, the way the squatters are relocated, government organization responsible for relocation operation, and the destination of the squatters should also be observed.

Destination of the squatters are usually the area similar to where they are living at the moment i.e. riverside areas owned by the government. Relocating them to other riverside areas does not solve the issue on urban slum development. Thus, measures appropriate to reduce urban slum development should be elaborated as a part of environmental management plan.

(2) Economic activities

In relation to the relocation of the local residents, local economic activities as well as that of in the resettlement area will be affected to some extent. Thus small and medium scale economic activities within the project area should be observed.

(3) Land use patterns

Since the project area is under the process of rapid urbanization and that there are a lot of residential, commercial and industrial development schemes undertaken within the project area, it is necessary to observe changes on the patterns of land use.

(4) Infrastructure and traffic conditions

There are a number of places within the project area where major changes on the length of bridge should be made as the drainage channels are widened. During the construction period, diversion of these bridges and the road linked to them are necessary. Thus observing the rearrangement of road link and traffic conditions is necessary in relation to the environmental management measures.

(5) Public health

Public health conditions in relation to waste water and solid waste would be one of the major issues related to the project .Thus public health conditions should be observed as the project is implemented.

(6) Spoil bank

Excavated materials produced from the existing drainage channel is disposed to the area designated as spoil bank. Public dump in Tangerang is the area nominated for this purpose. Haulage and disposal operation should therefore be observed as part of environmental management measures.

8.4 Sub-division of the Period of Environmental Management Plan

Based on the evaluation of the significant impacts which is stated in the document of the Environmental Impact Statement (Analisis Dampak Lingkungan, or ANDAL) of the project , the period of project implementation will be sub-divided into four different stage as shown in Fig 15.

8.4.1 Pre-construction period

As shown in Fig 16, environmental impacts induced by the project during this period are summarized as follows:

- Social unrest as the local residents worries on the rearrangement of job opportunities and family affairs, adjustment to the new living environment in the resettlement area among those of subject to relocation;
- Worries among those of not subject to relocation living next to the drainage area as they will feel unease of up-coming construction works and jealous of those compensated and moving out of the area;
- Incumbent residents living in or around the resettlement areas would have to feel unease momentarily as new comers begin to flow into the resettlement areas.

8.4.2 Construction preparation period

As shown in Fig 17, environmental impacts induced by the project during this period are summarized as follows:

- Increase of non-community members as construction workers are mobilized;
- Traffic congestion should occur to some extent as storage areas for construction equipment and materials are designated;
- Dust and noise emanation during the demolition of the existing houses;
- Increasing demand on water for construction works;
- Disruption of public utilities to some extent as construction works demand; and
- Other minor disturbances.

These impacts will all lead to social unrest and disturbances to some extent among the local residents within the project area.

8.4.3 Construction implemented period

As shown in Fig 18, environmental impacts induced by the project during this period are summarized as follows:

- General road conditions are down-graded as haulage of excavated materials and filling materials are conducted;
- Increase of turbidity in the water of drainage channels;
- Odor, dust and noise emanated from the construction works;

- Possible disruption of public utilities;
- Traffic disruptions by the construction works of the bridges; and
- Mangrove forest on the coastal areas would be affected to some extent as the Tanjungan and Kamal drainage channel excavation works are conducted

8.4.4 Post-construction period

Post-construction period shown in Fig 19 would be the period that there are no negative impacts affect the local residents, or on the natural environment. The following is considered as significant impacts:

- Inspection roads constructed along the drainage channels would provide wider transportation ability than the present congested traffic conditions;
- Prevention of flood events would provide more amenity to the project area than the area used to be. Permanent changes of the topography and river morphology is obvious while it is linked to function as a means to provide more economic activities;
- Protection of the riverside areas would become an important part of the operation and maintenance works not only from the view points of protecting the structures but also preventing squatters from entering into the riverside areas

8.5 Mechanism of Environmental Management Plan

8.5.1 Jurisdiction of government agencies

The mechanism of implementation of the Environmental Management Plan for the project would be as follows:

- To increase the efficiency of implementation of environmental management plan, it is not necessary to form specialized unit to handle the environmental issue, but it is necessary to make use of and to expand the existing organizations;
- To coordinate among the related government agencies, a body of implementation of environmental management plan is necessary.

The owner of the project should play an important role and take initiative to implement the environmental Management Plan. To successfully complete with stable operation, the Environmental Management Plan should be formulated according to the

existing local conditions of jurisdiction for authorization to conduct such plan. Thereby the scope of work would fit with the jurisdiction of each government agency.

8.5.2 Procedure of implementation

Environmental Management Plan will be implemented with the procedures as follows:

- To investigate and evaluate the existing environment in relation to the scope of works of the Environmental Management Plan;
- To investigate and evaluate the works prepared to implement by other government agencies in order to implement the Environmental Management Plan effectively;
- To investigate and evaluate the information provided by the owner of the project and the related government agencies on the implementation of Environmental Management Plan; and
- To conduct the works according to the plan.

8.6 Environmental Management Plan for Pre-construction Period

As shown in Table 17, the most significant environmental management plan conducted during pre-construction period is the relocation of the local residents. Including other activities, the Environmental Management Plan of this period is summarized in this section.

8.6.1 Source of impact

The source of impact is activities on research and survey for determining the project area, drainage area, and the number of houses for relocation.

8.6.2 Classification of impact induced by the project activity

The project area is the densely populated area of the Cengkareng area while Maruya Utara is not the case. Because of the dissemination of information on the project, social unrest among the local residents is created until actual resettlement operation is conducted. Actual relocation operation, demolition of the houses, and land acquisition are also conducted during this period. These impacts are classified as negative and significant in relation to socio-economic environment.

8.6.3 Objectives of the environmental management plan

Objectives of the environmental management plan for the above impacts is to reduce the level of social unrest with a means of precautions in most cases. For relocation operation, proper assessment of the values of houses and land for compensation, formal negotiation between the government and the land owners and the payment made to the land owners with the agreed amount would also function as a means of environmental management plan.

8.6.4 Measures of environmental management

Measures of Environmental Management are conducted for the following reasons:

- To explain the information of the project to the members of the communities directly affected by the project ;
- To disseminate the information on the project to the local government organizations for cooperation; and
- These measures are taken only for the socio-economic environment.

8.6.5 Location and agency conducting environmental management activity

(1) Administrative areas

The locations of conducting environmental management activity for reducing the social unrest is as follows:

Kotamadya	Kecamatana	Kelurahan
Jakarta Utara	Penjaringan	Kamal Muara
Jakarta Barat	Cengkareng	Cengkareng Barat
		Cengkareng Timur
		Kapuk
	Kalideres	Pegadungan
		Tegal Alur
		Kalideres
		Kamal
	Kembangan	Meruya Utara

(2) Government agencies concerned with the environmental management plan

Executing agencies concerned with the Environmental Management Plan during the pre-construction period would be as follows:

(a) Executing agencies;
- Local Government Level II of Jakarta Utara and Jakarta Barat
- Department of Housing, DKI Jakarta

(b) Inspector;
- Inspector of the above departments of the Province of DKI Jakarta

(c) Recipient of the report;
- Governor of DKI Jakarta.

Further, the contractor for EIA study under the supervision of JICA Study Team of the project will play an important role to disseminate information to the local government offices during the period of EIA study, which is a part of the Pre-construction Period.

8.6.6 Implementation schedule

As shown in Table 19, the implementation schedule of environmental management plan begins at the start of the period of determination of the drainage area up to the period of which land acquisition and demolition of the acquired houses are conducted.

8.6.7 Cost of the implementation of the environmental management plan

(1) Cost of environmental management plan

The financing of environmental management plan conducted during this period is borne mainly by DPU DKI Jakarta and the contractor under the supervision of JICA Study Team. Local government offices of kotamadya, kecamatan and kelurahan, are voluntarily acting to conduct the measures.

(2) Cost of compensation for relocation

Cost of compensation including land acquisition is born by DPU DKI Jakarta as follows:

a.	Resettlement of the Local Households with Land Certificate	Rp. 17,438.2 million
b.	Relocation of the Squatters	Rp. 3,639.8 million
	Total	Rp. 21,078.0 million

(3) Cost of the construction of resettlement area

Construction of the low cost apartment as resettlement area is born by the Department of Housing, DKI Jakarta as follows and it is for the construction of low cost apartment complex in Bulak Wadon, Tegal Alur that would cost Rp. 34,676.1 million.

8.6.8 Related laws and regulations

(1) Government Regulation of The Republic Indonesia Number 51 of 1993.
(2) Guidelines for the Implementation of Government Regulation Number 51 of 1994.
(3) Environmental Impact assessment for the Detailed Design of the Urban Drainage Project in the City Of Jakarta.
(4) Decree of the Governor of DKI Jakarta on the formation of Land Procurement Committee to determine the rate of compensation for housing and land affected by the project in Jakarta Barat and Jakarta Utara. The decree is scheduled to issue upon approval of the project by the Government of Indonesia.

8.7 Environmental Management Plan For Construction Preparation Period

As shown in Table 18, there are not large scale environmental management plan conducted during the construction preparation period. It is summarized as follows.

8.7.1 Source of impact

The source of impact during the construction preparation period is as follows:

- Mobilization of work force;
- Mobilization of construction material and equipment; and
- Cnstruction of access road.

During the Packages-1 and 2 construction preparation works, excavation and filling operation for access road are conducted in the area to the north of Jl. Tol Prof. Sediyatmo. This involves opening up of a small part of coastal vegetation mainly mangrove forest.

8.7.2 Classification of impact induced by the project activity

Because of the preparation works for the project is conducted, more physical disturbances begin among the areas within the project area. Thus social unrest of psychological disturbances among the local residents would be topped with physical disturbances. These impacts are classified as negative and significant.

Construction works conducted in the coastal areas would also induce negative impact to mangrove forest area in the coastal area of the project area.

8.7.3 Objectives of the environmental management plan

Objectives of the environmental management plan for the impacts induced during the construction preparation period is as follows:

- To reduce the level of social unrest;
- To reduce dust and noise during the period of construction preparation works with a means of preventive measures such as to install silencer on the construction equipment, spraying water for dust suppression, etc.
- To minimize damages to the mangrove forest on the coastal area while preparation of planting selected species of mangrove is conducted separately.

8.7.4 Measures of environmental management plan

Measures of the Environmental Management Plan would be as follows:

- To explain the information of the project to the members of the communities directly affected by the project .
- To disseminate the information on the project to the local government organizations for cooperation.
- To conduct construction works with regular practice of which dust and noise suppression system is employed.

8.7.5 Location and agency conducting environmental management activity

(1) Administrative areas

The administrative areas that the activities of environmental management plan taking place for reducing the social unrest is as follows:

Kotamadya	Kecamatana	Kelurahan
Jakarta Utara	Penjaringan	Kamal Muara
Jakarta Barat	Cengkareng	Cengkareng Barat
		Cengkareng Timur
		Kapuk
	Kalideres	Pegadungan
		Tegal Alur
		Kalideres
		Kamal
	Kembangan	Meruya Utara

In terms of biological environment, a limited part of mangrove forest in Kamal Muara, Jakarta Utara, will be opened up for drainage area and environmental management plan will take place for this portion of the project area during the post-construction period.

(2) Government agencies concerned with the environmental management plan

(a) Executing agencies

Executing agencies concerned with the Environmental Management Plan during the pre-construction period would be as follows:

- Local Government Level II, Jakarta Utara and Jakarta Barat
- District Office of Public Works, Jakarta Utara and Jakarta Barat
- District Office of Traffic Department, Jakarta Utara and Jakarta Barat
- Traffic Police Department of Jakarta Utara and Jakarta Barat
- District Office of Health Department, Jakarta Utara and Jakarta Barat
- District Office of State Electricity Company (PLN) in Tangerang
- District Office of PT.Telekom Kandatel, Jakarta Utara and Jakarta Barat
- District Company of Water Supply in Jakarta Utara and Jakarta Barat
- Dept. of Gardens, District Office of Public Works, Jakarta Utara and Jakarta Barat
- Dept. of Cleaning, District Office of Public Works, Jakarta Utara and Jakarta Barat

(b) Inspector

- Inspector of the above departments of the Province of DKI Jakarta

(c) Recipient of the report

- Governor of DKI Jakarta

8.7.6 Implementation schedule

The implementation schedule of environmental management plan for the construction preparation period begins at the start of mobilization of work force, construction equipment and construction materials, whichever is the fastest as shown in Table 19.

8.7.7 Cost of the implementation of the environmental management plan

The financing of environmental management plan conducted during this period is borne mainly by DPU DKI Jakarta and the contractor of the construction works. Voluntary effort of the district offices will also contribute to conduct the Environmental Management Plan.

8.7.8 Related laws and regulations

Decrees related to the Environmental Management Plan during this period is as follows:

(1) Government Regulation of The Republic Indonesia Number 51 of 1993;
(2) Guidelines for the Implementation of Government Regulation Number 51 of 1994;
(3) Environmental Impact assessment for the Detailed Design of the Urban Drainage Project in the City Of Jakarta;
(4) Decree of Governor DKI Jakarta Number 582/1995 on water quality;

8.8 Environmental Management Plan For Construction Period

As shown in Table 18, there are relatively extensive scale of Environmental Management Plan conducted during the construction period. It was summarized as follows.

8.8.1 Source of impact

The source of impact during the construction period is as follows:

- Excavation of drainage channel;
- Ancillary structure construction works;

- Main structure construction works; and
- Construction works for bridges;

8.8.2 Classification of impact induced by the project activity

Because of the construction works for the project is conducted, physical disturbances to the general public continues within the project area. During the construction works for bridges, traffic diversion is necessary. This will involve major traffic congestion within the project area. Thus social unrest of psychological disturbances among the local residents in relation to the construction works and subsequently caused traffic congestion would worsen during this period. These impacts are classified as negative and significant.

Changes on the physico-chemical environment within the project area should take place and there will be permanent changes on the natural drainage scheme as excavation work for the drainage channels are conducted.

There would be very limited project activity affecting the biological environment within the project area.

8.8.3 Objectives of the environmental management plan

Objectives of the environmental management plan for the impacts induced during the construction implementation period is as follows:

- To reduce the level of social unrest;
- To reduce dust and noise during the period of construction works with a means of preventive measures such as to install silencer on the construction equipment, spraying water for dust suppression, etc.;
- To minimize traffic congestion thereby general economic activities are not severely disrupted by the construction works;
- To monitor and observe major changes on the physico-chemical environment in the event that environmental management plan has to be implemented during the construction period or post construction period; and
- To monitor and observe major changes on the biological environment in the event that environmental management plan has to be implemented during the construction period or post construction period.

8.8.4 Measures of environmental management plan

Measures of the Environmental Management Plan would be as follows:

- To explain the information of the project to the members of the communities directly affected by the project ;
- To disseminate the information on the project to the local government organizations for cooperation;
- To conduct construction works with regular practice of which dust and noise suppression system is employed; and
- To prevent major traffic congestion.

8.8.5 Location and agency conducting environmental management activity

(1) Administrative areas

The overall administrative areas that the activities of environmental management plan taking place for reducing the general social unrest is as follows:

Kotamadya	Kecamatana	Kelurahan
Jakarta Utara	Penjaringan	Kamal Muara
Jakarta Barat	Cengkareng	Cengkareng Barat
		Cengkareng Timur
		Kapuk
	Kalideres	Pegadungan
		Tegal Alur
		Kalideres
		Kamal
	Kembangan	Meruya Utara

(2) Government agencies concerned with the environmental management plan

(a) Executing agencies

Executing agencies concerned with the Environmental Management Plan during the pre-construction period would be as follows:

- Local Government Level II, Jakarta Utara and Jakarta Barat
- District Office of Public Works, Jakarta Utara and Jakarta Barat
- District Office of Traffic Department, Jakarta Utara and Jakarta Barat
- Traffic Police Department of Jakarta Utara and Jakarta Barat

- District Office of Health Department, Jakarta Utara and Jakarta Barat
- District Office of State Electricity Company (PLN) in Tangerang
- District Office of PT.Telekom Kandatel, Jakarta Utara and Jakarta Barat
- District Company of Water Supply in Jakarta Utara and Jakarta Barat
- Dept. of Gardens, District Office of Public Works, Jakarta Utara and Jakarta Barat
- Dept. of Cleaning, District Office of Public Works, Jakarta Utara and Jakarta Barat

(b) Inspector
- Inspector of the above departments of the Province of DKI Jakarta

(c) Recipient of the report
- Governor of DKI Jakarta

8.8.6 Implementation schedule

The implementation schedule of environmental management plan for the construction period begins at the start of excavation works as shown in Table 19.

8.8.7 Cost of the implementation of the environmental management plan

The financing of environmental management plan conducted during this period is borne mainly by DPU DKI Jakarta and the contractor of the construction works. Voluntary effort of the district offices will also contribute to conduct the Environmental Management Plan.

8.8.8 Related laws and regulations

Decrees related to the Environmental Management Plan during this period is as follows:

(1) Government Regulation of The Republic Indonesia Number 51 of 1993;
(2) Guidelines for the Implementation of Government Regulation Number 51 of 1994;
(3) Environmental Impact assessment for the Detailed Design of the Urban Drainage Project in the City Of Jakarta;
(4) Decree of Governor DKI Jakarta Number 582/1995 on water quality;

8.9 Environmental Management Plan for Post Construction Period

As shown in Table 18, there are not large scale environmental management plan conducted during the post construction period. It is summarized in this section.

8.9.1 Source of impact

The source of impact during the post construction period is as follows:

- Use of the structures constructed for drainage channels;

8.9.2 Classification of impact induced by the project activity

Because of the construction works for the project is completed, physical disturbances to the general public is ceased. Traffic congestion within the project area would be solved to some extent as inspection road along the drainage channels are made use of the general public. Habitual flood events would be drastically reduced as a result of the completion of drainage channel. Thus large part of hitherto social unrest of physical and psychological disturbances among the local residents in relation to the drainage channels and subsequently caused disruption to general economic activities would be normalized to some extent. These impacts are classified as positive and significant.

Physico-chemical environment within the project area taking place during the construction period would lead to the changes on land use as the permanent changes on the natural drainage scheme takes place.

There would be large scale reinstatement of the biological environment of mangrove forest on the coastal areas within the project area.

8.9.3 Objectives of the environmental management plan

Objectives of the environmental management plan for the impacts induced during the post construction period is as follows:

- To ensure impacts caused by construction period does not linger;
- To monitor and observe major changes on the physico-chemical environment in the event that environmental management plan has to be implemented during the post construction period; and

- To monitor and observe major changes on the biological environment in the event that environmental management plan has to be implemented during the post construction period.

8.9.4 Measures of environmental management plan

Measures to be taken during the post construction period would be as follows:

- Planting selected mangrove species in the coastal area in order to reinstate the damaged mangrove forest.

8.9.5 Location and agency conducting environmental management activity

(1) Administrative areas

Kamal Muara in Jakarta Utara is the only administrative area where the Environmental Management Plan would take place.

(2) Government agencies concerned with the environmental management plan

(a) Executing agencies

Executing agencies concerned with the Environmental Management Plan during the post construction period would be as follows:

- Local Government Level II, Jakarta Utara
- Dept. of Gardens, District Office of Public Works, Jakarta Utara
- Dept. of Forestry, DKI Jakarta

(b) Inspector

- Inspector of the above departments of the Province of DKI Jakarta

(c) Recipient of the report

- Governor of DKI Jakarta

8.9.6 Implementation schedule

The implementation of environmental management plan for the post construction period will be started at the completion of structure construction works as shown in Table 19.

8.9.7 Cost of the implementation of the environmental management plan

The financing of environmental management plan conducted during this period within the area to the northeast of Jl.Kamal Muara is borne mainly by PANTURA. Voluntary effort of the kecamatan, kabutaten and kelurahan offices will also contribute to conduct the Environmental Management Plan during this period.

8.9.8 Related laws and regulations

Decrees related to the Environmental Management Plan during this period is as follows:

(1) Government Regulation of The Republic Indonesia Number 51 of 1993;
(2) Guidelines for the Implementation of Government Regulation Number 51 of 1994;
(3) Environmental Impact assessment for the Detailed Design of the Urban Drainage Project in the City Of Jakarta; and
(4) Decree of Governor DKI Jakarta Number 582/1995 on water quality.

9 ENVIRONMENTAL MONITORING PLAN (RPL)

9.1 Objectives of Environmental Monitoring Plan (RPL)

Basic reasons that the Environmental Monitoring Plan is conducted is that it is a means to provide data for which environmental management plan can not be conducted without detailed data. Thus the following is required to conduct:

- Inventory environmental components that require environmental management activities;
- Classify these environmental components that require detailed data before their environmental management activities are conducted; and
- Provide detailed information to the organization(s) designated to conduct environmental management activities so as the organization(s) would be able to conduct environmental management plan in order to optimize the positive impacts, or minimize the negative impacts as considered necessary.

9.2 Environmental Monitoring Plan

9.2.1 Physico-chemical environment

Environmental monitoring works during the construction period is mainly monitoring on the air, noise, and water quality which are all related to the performance of construction equipment.

(1) Air quality and noise level

(a) Air quality

Reference data have been taken during the EIA Study Period. Measured Parameters as follows should be analyzed against the reference data as well as the standard of air quality in DKI Jakarta:

- Total Suspended Solid Particles (TSSP, $\mu g/m^3$)
- Nitrogen Dioxides (No_x, $\mu g/m^3$)
- Carbon Monoxide (CO, ppm)
- Hydrocarbons (HC, ppm)
- Sulfur Oxides (So_x, $\mu g/m^3$)
- Lead (Pb, $\mu g/m^3 \mu g/m^3$)

The above monitoring works are the obligation of the contractor as it is included in the contract as standard practice during the implementation of the construction works.

(b) Noise level

Measuring noise level in decibels (dB) at the selected locations as shown in Fig 5 is conducted. Obtained data is compared with reference data during the construction period as noises is generated from each construction machinery. The result is also compared with the standardized maximum values of the noise being adopted by DKI Jakarta.

(2) Water quality

Sampling locations for water quality is in and around the Tanjungan drainage channel. Parameters to be measured are as follows:

- Total Suspended Solids (TSS)
- Dissolved Oxygen (DO)
- Biological Oxygen Demand (BOD)
- Chemical Oxygen Demand (COD)
- pH (pH)
- Other chemical parameters as per the Standard of Water Quality being adapted to use in DKI Jakarta.

Based on the obtained data, each value is compared to the standard of water quality for fishpond and for the growth of mangrove being adapted by DKI Jakarta.

(3) Method of conducting monitoring works for air and water quality

Period and interval of monitoring is shown in Table 19. Air quality, noise level, dust and vibration as well as the water quality sampling works should be conducted by the Contractor of the project . Alternatively, it could be sublet together with the analysis of the samplings, which should be conducted by the competitive third party specialized in the field of air quality and water measurement and analysis. Cost of monitoring work should be included in the construction works.

9.2.2 Biological environment

Over and above water quality monitoring plan, mangrove growth area should be monitored during the construction period of the Tanjungan drainage channel. Turbidity is

the major parameter specifically concerned with the growth of mangrove during the construction implementation period. However, depending on the discharge of industries in the upstream area, monitoring of water quality described in the section 9.2.1 (2) should be applied.

Period of monitoring should be from the commencement of the construction works to the completion of it in the section of the Tanjungan drainage channel to the northeast of Jl. Tol. Prof. Sediyatmo. Department of Forestry, DKI Jakarta would be the organization conducting the monitoring work. It would also be the source of the ideas of recommendations for conducting mitigation measures. For conducting monitoring works, a formal request has to be made by the contractor via DPU DKI Jakarta.

9.2.3 Socio-economic environment

As shown in Table19, socio-economic survey on the resettlement area should be conducted 6 months after the resettlement operation is completed. General living conditions should be surveyed by using questionnaire. Questionnaire to be used for the socio-economic survey is subject to elaboration at the time of survey to suit the conditions of living in the resettlement area. Generally, it could be based on the questionnaires used during the period of "Social Impact Management Study". Annex I shows a sample of the "Questionnaire for Monitoring and Evaluation of the Resettlement Program".

The same survey should also be conducted for the squatters who are subject to resettlement in the designated rented land areas with in the project area.

For the monitoring works of the survey and evaluation of the resettlement areas, the following survey team has to be formed to conduct the work:

1	Team Leader	AMDAL Certificate A with more than 15 years of experiences in the field of resettlement plan
2	Sociologist	AMDAL Certificate B with more than 8 years of experiences in the field of resettlement plan
3	Socio-economist	AMDAL Certificate B with more than 8 years of experiences in the field of resettlement plan
4	Public Health Expert	AMDAL Certificate B with more than 8 years of experiences in the field of resettlement plan

Tables

Table 1 AVERAGE MAXIMUM RAINFALL (MM) AT CENGARENG METEOROLOGICAL STATION: FROM THE YEAR 1986 TO 1995

No.	Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total (mm)
1	1986	503	369	146	164	77	23	93	268	124	53	114	237	2,171
2	1987	644	384	103	116	89	111	27	0	5	5	82	280	1,846
3	1988	371	237	106	73	76	67	17	50	17	98	52	313	1,477
4	1989	209	441	155	68	208	41	51	0	64	35	35	-	1,307
5	1990	462	171	73	104	162	57	124	153	53	35	61	352	1,807
6	1991	334	135	256	75	17	28	0	10	0	6	91	117	1,069
7	1992	384	151	328	94	98	35	35	118	88	107	131	272	1,841
8	1993	494	345	88	108	74	54	41	60	36	71	102	177	1,650
9	1994	383	401	364	166	116	19	3	19	18	5	311	157	1,962
10	1995	403	328	198	131	98	112	115	18	48	102	244	250	2,047

Source : Meteorology and Geophysical Agency , Jakarta

Table 2 AVERAGE MAXIMUM TEMPERATURES (°C) AT CENGKARENG METEOROLOGICAL STATION FROM THE YEAR 1985 TO 1995

No.	Year	Jan.	Feb.	MRT	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	MAX. Temp.(°C)
1	1985	-	-	-	-	33.1	33.0	33.0	32.8	32.0	33.6	34.5	34.0	34.5
2	1986	31.6	32.6	33.4	32.9	33.4	33.6	33.9	33.9	32.5	32.5	33.5	32.8	33.9
3	1987	31.0	32.0	33.2	32.8	33.4	33.2	33.6	33.4	33.8	34.8	35.2	31.2	35.2
4	1988	32.8	32.4	33.4	33.4	33.3	32.6	32.5	33.2	34.0	34.2	34.4	33.5	34.4
5	1989	31.4	30.0	32.8	33.3	32.6	33.0	33.2	32.6	33.9	34.2	33.6	-	34.2
6	1990	32.1	32.8	32.6	33.0	34.9	33.0	31.8	32.0	32.8	32.8	34.4	32.5	34.9
7	1991	31.4	31.0	32.0	33.2	33.2	34.4	33.2	33.2	34.2	34.9	33.4	-	34.9
8	1992	30.0	30.9	31.2	31.6	31.5	31.8	31.2	31.2	32.7	33.0	33.0	-	33.0
9	1993	29.8	30.0	31.4	31.5	31.8	31.9	31.2	31.5	32.0	32.1	32.0	31.0	32.1
10	1994	31.2	32.0	33.0	32.4	32.8	32.7	32.3	33.0	34.2	35.0	34.4	33.6	35.0
11	1995	32.4	32.0	32.0	33.2	33.2	32.9	32.1	33.2	33.2	33.1	32.8	33.4	33.4

Source : Meteorology and Geophysical Agency , Jakarta

Table 3 AVERAGE MINIMUM TEMPERATURES (°C) AT CENGKARENG METEOROLOGICAL STATION FROM THE YEAR 1985 TO 1995

No.	Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Minimum Temp.(°C)
1	1985	-	-	-	-	22.8	22.2	21.7	21.6	21.7	22.3	22.5	22.3	21.6
2	1986	22.8	22.9	22.4	23.3	22.9	21.3	21.7	21.6	22	21.4	21.8	23.2	21.3
3	1987	23.3	23.2	23.4	23.6	23.4	23.5	21.3	21.8	22.6	23.4	23	23.6	21.3
4	1988	23.8	23.5	23.7	23.6	24.1	22.9	22.6	22.5	22.5	23.2	23.6	22.9	22.5
5	1989	23.3	22.8	23.2	23.3	23.5	22.9	22.5	22.6	22.6	23.2	23.5		22.5
6	1990	20.2	23.6	23.5	23.8	23.5	23.1	22.5	23	22.9	23.2	23.7		20.2
7	1991	23.7	23.3	23.7	23.7	23.4	22.8	22.3	22.1	22.3	22.9	23.4	23.3	22.1
8	1992	23.2	23.3	23.7	23.7	23.8	23.4	22.5	22.7	21.8	22.5	22.1		21.8
9	1993	23.3	22.9	22.9	23.1	23.8	23.2	22.8	22.8	22.4	23	23.2	23.5	22.4
10	1994	22	21.6	22.7	22.6	21	21	18.6	17.4	19.7	21.2	22.8	22.6	17.4
11	1995	22.6	22.4	22.6	22.8	22.2	22.9	21.8	21.4	21.4	22.8	22.5	22.3	21.4

Source : Meteorology and Geophysical Agency , Jakarta

Table 4 AVERAGE HUMIDITY AT CENGKARENG METEOROLOGICAL STATION FROM THE YEAR 1985 TO 1995

No.	Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1	1985	-	-	-	-	85	84	84	82	83	83	81	82
2	1986	88	86	85	86	83	83	82	82	83	83	84	83
3	1987	87	88	84	84	82	81	79	76	76	76	77	84
4	1988	86	85	85	84	86	83	80	81	78	81	81	85
5	1989	87	87	88	82	86	83	81	80	78	81	81	85
6	1990	87	87	86	83	83	83	83	85	82	89	80	87
7	1991	89	89	87	87	84	83	80	80	77	77	83	96
8	1992	88	88	87	86	86	83	82	82	83	85	83	
9	1993	87	87	83	85	84	84	81	82	79	80	83	84
10	1994	86	86	87	85	82	80	78	76	75	75	85	82
11	1995	87	87	87	85	85	85	83	80	80	83	85	84

Source : Meteorology and Geophysical Agency , Jakarta

Table 5 CHARACTERISTICS OF PREVAILING WIND AT CENGKARENG METEOROLOGICAL STATION FROM THE YEAR 1986 TO 1995

No.	Year	Jan.	Feb.	Mar.	Apr.	May	Jun	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1	1986	NW/18	NW/24	NW/18	NE/16	NE/18	E/25	NE/18	N/20	NE/20	NW/20	NW/28	NW/16
2	1987	NW/18	NW/18	NW/16	E/18	S/20	E/20	E/16	E/18	E/18	NE/24	W/22	
3	1988	NW/18	E/18	W/28	E/22	NW/24	E/22	NE/22	S/24	NE/24	SW/34	W/28	W/34
4	1989	N/20	W/28	W/42	W/36	S/18	SW/28	S/26	S/24	N/24	S/22	W/26	
5	1990	W/38	W/28	W/32	NE/26	NE/38	SE/20	S/26	NE/27	S/31	S/32	SW/52	W/33
6	1991	W/27	W/34	E/28	W/27	E/26	S/28	E/28	E/36	E/26	E/19	S/38	SW/30
7	1992	N/50	N/50	NE/34	NE/50	NE/36	NE/36	E/44	S/36	SW/44	W/36	N/46	
8	1993	W/54	W/54	W/44	SW/42	E/38	NE/40	E/36	E/38	NE/38	NE/44	W/52	
9	1994	NW/60	NW/52	W/44	N/40	E/46	NE/40	NE/38	E/42	NE/34	NE/42	NE/40	W/50
10	1995	W/52	W/52	W/42	E/58	W/60	N/46	S/46	NE/34	NE/42	NE/44	SW/56	W/46

Note: direction/speed(knot) Source : Meteorology and Geophysical Agency , Jakarta

Table 6 RESULT OF WATER QUALITY ANALYSIS

No.	Parameters	Unit	Sampling Location											
			W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	W-11	W-12
A	Physical Parameters													
1	Tempeature	°C	28	29	27	28	28	27	27	27	27	29	29	29
2	Suspended	mg/lt	734	118	113	252	1696	1040	1433	516	472	2	3	140
B	Chemical Parameters													
1	Mercury (Hg)	mg/lt	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
2	Amonia (NH-N)	mg/lt	5.44	1.14	1.33	2.13	7.19	5.83	5.74	3.36	3.05	0.16	0.21	1.41
3	Arsen (As)	mg/lt	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
4	Fluoride (F)	mg/lt	0.4	0.13	0.12	0.23	0.45	0.42	1.68	0.41	0.35	-	-	0.16
5	Cadnium (CD)	mg/lt	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
6	Free Clorine (C12)	mg/lt	0.02	0.02	0.04	0.06	0.03	0.03	0.02	0.14	0.15			0.02
7	Cromium (Cr 6 +)	mg/lt	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01
8	Nitrit (N02-N)	mg/lt	0.038	0.101	0.212	< 0.005	< 0.002	< 0.005	< 0.005	< 0.005	0.091	< 0.005	< 0.005	< 0.005
9	Diluted Oxigen (DO)	mg/lt	0	2.5	1.7	1.5	0	0	0	0	0	5.6	6.1	2.5
10	pH	mg/lt	6.5	6.6	6.7	6.8	7.1	6.9	7.2	7	6.8	7.6	7.7	7
11	Selentium (Se)	mg/lt	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
12	Zeng (Zn)	mg/lt	0.57	0.01	< 0.02	0.04	0.04	0.05	0.03	0.06	0.05	0.05	0.05	0.05
13	Cianide (Cn)	mg/lt	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
14	Sulfide (H2S)	mg/lt	1.468	< 0.002	< 0.002	< 0.002	1.244	0.308	0.549	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
15	Cuprum (Cu)	mg/lt	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
16	Plumbum (Pb)	mg/lt	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.01	< 0.01	< 0.03
17	Fenol	mg/lt	< 0.001	< 0.001	< 0.001	< 0.001	0.787	0.685	0.85	0.203	0.114	-	-	< 0.001
18	Oil and Fat	mg/lt	5.2	2	3.2	4.8	6.4	4	2.4	4.8	4.4	2	1.2	2.8
19	Detergent	mg/lt	3.42	2.48	1.69	1.31	12.88	7.45	6.22	2.78	2.06	-	-	1.48
20	BOD	mg/lt	35.8	7.6	8.5	19	47	32.8	45.5	15.2	23.8	15.4	12.2	10
21	COD	mg/lt	83.6	17.6	21	46.2	118.8	70.4	96.8	45.1	63.8	41.3	37.5	24.2

Note:

1. Fresh water quality analysis is based on the SK.GUB.KDKI Jakarta, No. 582/1995.
2. Sea water quality analysys is based on Kep.02/MENKLH/I/1988.

Table 7 STANDARD OF RIVER WATER QUALITY IN DKI JAKARTA(1/2)

No.	Parameter	Unit	MAXIMUM LIMITS A Drinking Water	B Drinking Water Source	C Fishery and Animal Husbandry	D Agriculture and Industry
I	Physical					
1	Odor		Odorless			
2	Total dissolved Soli	mg/l	1000	500		1000
3	Turbidity	NTU	5			
4	Color	TCU	15			
5	Condustivity	µms/cm				1000
II	Chemical					
A	Inorganics					
1	Hg	mg/l	0.001	0.0005	0.002	0.0005
2	Al	mg/l	0.2			
3	As	mg/l	0.05	0.05	0.5	0.05
4	Ba	mg/l	1	1		
5	Fe	mg/l	0.3	2		
6	F-	mg/l	0.5	1.5	1.5	
7	Cd	mg/l	0.005	Nil	0.01	0.01
8	$CaCO_3$	mg/l	500			
9	Cl-	mg/l	250	250	0.003	
10	Cr^{+6}	mg/l		Nil	Nil	0.05
11	Mn	mg/l	0.1	0.05		1
12	Na	mg/l	200			40 µg/l
13	NO_3 -N	mg/l	10	5		
14	NO_2 -N	mg/l	1	0.1	0.06	
15	Ag	mg/l	0.05			
16	pH	units	6.5 - 8.5	6.0 - 8.5	6.0 - 8.5	6.0 - 8.5
17	Se	mg/l	0.01	0.01	0.05	0.05
18	Zn	mg/l	5	1	0.2	1
19	CN-	mg/l	0.1	0.05	0.01	1
20	SO_4	mg/l	400	50		
21	S - H_2S	mg/l	0.05	0.1	0.002	
22	Cu	mg/l	1	0.05	0.03	0.05
23	Pb	mg/l	0.05	0.05	0.03	0.05
24	NH_4 - N	mg/l		0.5	0.02	
25	Disolved Oxygen	mg/l		>6	>3	
26	B	mg/l				1
27	Co	mg/l				0.02
28	Ni	mg/l				0.05
29	Residual Sodium Carbonate (RSC)	mg/l				1.25 - 2.5
30	Sodium Absorption Ratio (SAR)	mg/l				10

Table 7 STANDARD OF RIVER WATER QUALITY IN DKI JAKARTA(2/2)

No.	Parameter	Unit	MAXIMUM LIMITS A Drinking Water	B Drinking Water Source	C Fishery and Animal Husbandry	D Agriculture and Industry
B	Organics					
1	Aldrin & Dieldrin	mg/l	0.0007	0.017		
2	Benzene	mg/l	0.01			
3	Benzo (a) Pyrene	mg/l	0.00001			
4	Chlordane (isomer)	mg/l	0.0003	0.003		
5	Chloroform	mg/l	0.03			
6	2, 4 - D	mg/l	0.1			
7	DDT	mg/l	0.03			
8	Detergent	mg/l	0.5			
9	1,2 Dichloroethane	mg/l	0.01			
10	1,1 Dichloroethane	mg/l	0.0003			
11	Heptachlor and Heptaclhor Epoxide	mg/l	0.0003	0.018		
12	Heptachlorobenzen	mg/l	0.00001			
13	Lindane	mg/l	0.004	0.056		
14	Methoxychlor	mg/l	0.03	0.035		
15	Pentachlorophenol	mg/l	0.01			
16	Total Pestcicides	mg/l	0.1			
17	2,4,6 Trichlorophen	mg/l	0.01			
18	Organics ($KMNO_4$	mg/l	10			
19	Endrin	mg/l		0.001	0.004	
20	Phenol	mg/l		0.002	0.001	
21	Carbon Chloroform	mg/l		0.5		
22	Oil and Grease	mg/l		Nil	0.5	
23	Organophosphates Carbamates	mg/l		0.1	0.1	
24	PCB	mg/l		Nil		
25	Methylene Blue	mg/l		0.5	0.2	
26	Toxaphene	mg/l		0.01		
27	BHC	mg/l			0.21	
III	Microbiological					
1	Tinja Coliform	per/100cc	0	2000		
2	Total Coliform	per/100cc	3	10000		
IV	Radioactivity					
1	Alpha Activity	Bq/L	0.1	0.1	0.1	0.1
2	Beta Activity (ß)	Bq/L	1	1	1	1

Source : Decree on Water Quality, No. 582 of the Year 1995, DKI Jakarta

Table 8 ANALYSIS OF AIR QUALITY

No.	Parameter	Unit	Sampling Location								DKI Air standard *
			A - 1	A - 2	A - 3	A - 4	A - 5	A - 6	A - 7	A - 8	
1	Dust Particles (TSP)	ug/m3	39	102	58	82	549	116	177	151	0.26 mg/m3 (260 ug/m3)
2	Sulfur dioxide (S_o2)	ug/m3	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.1 mg/m3 (260 ug/m3)
3	Nitrogen dioxide (N_o2)	ug/m3	13.07	10.59	6.21	7.52	4.52	6.8	9.34	7.27	0.05 PPM (92.5 ug/m3)
4	Oxidant (O_3)	ug/m3	1.56	n/d	0.06	1.39	14.36	3.23	n/d	n/d	0.08 PPM (42 ug/m3)
5	Carbon monoxide (CO)	PPM	0.5	0.8	2	1.5	1.5	2	1.2	1	20 PPM
6	Hydrocarbon (HC)	PPM	0.0021	0.023	0.025	0.024	0.02	0.023	0.024	0.02	0.24 PPM
7	Plumb	ug/m3	29	30	29	30	31	30	31	30	0.06 mg/m3 (1.5 ug/m3)
8	Temperature	°C	29	30	29	30	31	30	31	30	-
9	Speed of wind	m/knot	0.5-0.9	0.5 - 2	0.8 - 1.6	0.5-2	0.8 - 1.7	1.2-3	0.5 - 1.8	0.5 - 1.1	-
10	Humidity	%	72	67	74	79	62	62	68	63	-
11	Noise	dB	50 - 90	50 - 90	50 - 90	50 - 90	50 - 90	50 - 90	50 - 90	50 - 90	-

Note: * - According to the Decree of the Governor of DKI Jakarta, No. 587/1980

n/d - Parameters not detected.

Samples of air have been taken during December 1996, the wet season in DKI Jakarta.

Table 9 RESULT OF NOISE MEASUREMENT(1/4)

a. Location: Riverside Area in Kelurahan Kamal (Date: 13 / 01 / 1997

Time	1	2	3	4	5	6	7	8	9	10	Average
10.00	69.1	66.9	68.8	69.5	68.1	69.9	70.9	66.3	66.1	67.6	68.32
13.00	68.5	66.3	68.1	67.7	67.2	66.7	70.1	67.7	68.9	68	67.92
16.00	70.5	72.8	71.7	70.1	71.4	71.8	69.9	68.1	68.6	69.2	70.41
19.30	70.8	66.2	65.5	64.5	73.3	66.5	66.7	68.1	65.3	65.8	67.27
Noise Level: L50 (90 %), range = 50 - 90 dB								Average of the Location			68.48

b. Location: Industrial Area in Tegal Alur (N - 2) Date: 13 / 01 / 1997

Time	1	2	3	4	5	6	7	8	9	10	Average
10.30	84.4	86.6	79.2	89.9	78.6	67.6	70.1	72.0	86.7	76.2	79.13
13.30	75.5	74.0	74.9	74.3	74.6	74.7	75.5	76.0	78.1	75.2	75.28
16.30	67.5	78.1	73.6	72.9	77.4	81.3	77.1	53.1	85.6	73.4	74
20.00	71.7	69.3	62.8	70.5	68.4	66.1	60.5	66.4	68.1	62.7	66.65
Noise Level: L50 (90 %), range = 50 - 90 dB								Average of the Location			73.77

Table 9 RESULT OF NOISE MEASUREMENT(2/4)

c. Location: Mosque in Tegal Alur (N -32) Date: 14 / 01 / 1997

Time	1	2	3	4	5	6	7	8	9	10	Average
10.00	68.3	76.2	81.5	68.7	77.6	86.8	72.2	69.8	65.3	70.9	73.73
13.00	70.8	70.9	81.3	77.4	71.5	77.3	83.8	77.1	78.9	71.5	76.05
16.30	71.9	69.5	60.8	66.4	62.9	59.5	58.4	61.3	60.5	61.3	63.25
19.30	71.3	69.8	70.4	73.5	75.1	75.3	84.3	72.1	63.7	64.1	71.96
Noise Level: L50 (90 %), range = 50 - 90 dB									Average of the Location		71.25

d. Location: Jakarta Barat Health Service Office (N - 4) Date: 14 / 01 / 1997

Time	1	2	3	4	5	6	7	8	9	10	Average
10.30	73.1	76.2	74.1	74.3	75.4	74.8	75.4	73.3	76.5	74.3	74.74
13.30	79.4	83.9	79.2	78.6	81.1	80.2	80.2	82.9	80.7	68.1	79.43
16.30	78.0	78.1	79.9	78.6	82.9	81.7	83.1	78.3	79.9	78.9	79.94
20.00	79.7	80.4	73.1	77.3	78.1	79.6	76.5	78.1	79.8	78.3	78.09
Noise L50 (90 %), range = 50 - 90 dB									Average of the Location		78.05

Table 9 RESULT OF NOISE MEASUREMENT(3/4)

e. Location: Cengkareng Indah Housing Estate (N - 5) Date:15 / 1 / 1997

Time	1	2	3	4	5	6	7	8	9	10	Average
10.00	66.8	76.5	63.5	64.3	65.0	65.8	65.7	65.5	64.7	68.0	66.58
13.00	64.7	66.1	65.2	64.4	63.6	64.6	63.7	65.8	65.2	65.7	64.9
16.00	70.1	69.5	74.5	67.2	68.8	69.4	76.8	76.3	72.5	74.4	71.95
19.30	61.3	65.7	63.8	62.8	63.6	63.1	63.1	64.3	65.2	65.7	63.86
Noise L50 (90 %), range = 50 - 90 dB								Average of the Location			66.82

f. Location: Trigonal Intersection in Kelurahan Kapuk (N-6) Date: 15 / 01 / 1997

Time	1	2	3	4	5	6	7	8	9	10	Average
10.30	80.9	81.2	83.7	75.8	78.3	83.9	76.2	73.5	73.1	77.8	78.44
13.30	76.7	78.1	75.1	76.4	76.9	77.5	84.6	80.7	83.5	76.4	78.59
16.30	77.7	77.8	78.4	77.6	84.6	85.3	85.4	82.8	85.0	83.6	81.82
20.00	83.7	75.4	75.8	83.3	82.5	77.9	79.3	79.9	80.4	74.6	79.28
Noise L50 (90 %), range = 50 - 90 dB								Average of the Location			79.53

Table 9 RESULT OF NOISE MEASUREMENT(4/4)

g. Location: Saluran Cengkareng Drain(N-7) Date: 20 / 01 / 1997

Time	1	2	3	4	5	6	7	8	9	10	Average
10.30	64.3	64.7	63.8	72.3	66.9	70.1	64.9	63.1	72.6	73.3	67.6
12.30	74.6	71.0	73.9	64	63.4	63.2	62.9	63.1	61.6	61.8	65.95
15.30	75.3	70.5	71.6	59.8	68.9	70.5	69.4	65.7	64.2	63.7	67.96
19.00	68.1	65.5	63.3	68.9	65.5	70.7	67.5	69.3	64.9	66.9	67.06
Noise L50 (90 %), range = 50 - 90 dB									Average of the Location		67.14

h. Location: Security Guard Post for R/W 07 in Meruya Uta Date: 20 / 01 / 1997

Time	1	2	3	4	5	6	7	8	9	10	Average
10.00	68.0	66.3	64.6	63.7	68.8	71.6	73.1	69.0	66.4	66.2	67.77
13.00	66.6	62.3	64.4	61.2	61.3	62.3	63.7	67.5	65.9	63.2	63.84
16.00	63.5	59.7	60.4	65.4	65.3	58.8	59.1	58.4	58.8	58.0	60.74
19.30	61.6	63.3	63.9	71.3	67.7	61.5	73.2	64.9	60.6	81.0	66.9
Noise L50 (90 %), range = 50 - 90 dB									Average of the Location		64.81

Table 10 COMPOSITION OF PLANKTON IN THE STUDY AREA

No.	Sampling Location	Number of Types	Number of ind/lit.	H	X	E	C
1	W-1	23	30.46	0.93	-0.50	0.30	0.65
2	W-2	20	15.38	1.64	-0.56	0.55	0.26
3	W-3	30	12.77	2.00	-0.88	0.59	0.19
4	W-4	28	11.01	1.95	-0.54	0.59	0.21
5	W-5	8	2.35	0.57	-1.40	0.27	0.76
6	W-6	18	16.05	0.84	-1.00	0.29	0.70
7	W-7	21	16.43	0.95	-1.40	0.31	0.62
8	W-8	12	2.88	0.98	-1.00	0.40	0.56
9	W-9	22	90.91	0.87	-1.75	0.28	0.54
10	W-10	16	13.16	0.27	1.50	0.10	0.10
11	W-11	16	141.14	0.58	1.00	0.21	0.72
12	W-12	21	8.01	1.54	-0.71	0.51	0.30

Notes :
Date of Sampling: December 14, 1996
H : Shanon Diversity Index
E : Mean Index
X : Saprobity Index
C : Diminance Index
ind/lit. : individuals per litre

Table 11 COMPOSITION OF BENTHOS IN THE STUDY AREA

No.	Sampling Location	Number of Types	Number of ind/lit.	H	H max	E	Dominance
1	W-1	-	-	-	-	-	-
2	W-2	-	-	-	-	-	-
3	W-3	2	700	0.15	0.69	0.22	0.93
4	W-4	2	200	0.37	0.69	0.54	0.78
5	W-5	1	50	0.15	0	0	1
6	W-6	5	600	1.39	1.61	0.86	0.28
7	W-7	2	50	0.69	0.69	0	0.5
8	W-8	-	-	-	-	-	-
9	W-9	5	250	1.36	1.61	0.84	0.32
10	W-10	4	40.300	0.05	1.38	0.03	0.98
11	W-11	8	65.275	0.11	2.08	0.05	0.96
12	W-12	1	100	0	0	0	1

Note: H : Shanon Diversity Index
E : Mean Index

Table 12 FISH SPECIES IN THE STUDY AREA

No.	Local Name	Scientific Name	Sea	Marshland	River / Canal
	UDANG	**CRUSTACEAN**			
1	Udang jerbung	*Penaeus merguensis*	+		
2	Udang windu	*Penaeus Monodon*	+		
3	Rajungan	*Plotunus pelagicus*	+		
	IKAN	**FISH**			
4	Sembilang	*Plotosus canius*	+		
5	Ikan manyung	*Arius spp*	+		
6	Ketang-ketang	*Drepane punctata*	+		
7	Terigi	*Balistodes spp*	+		
8	Tengkek	*Megalaspis cordyla*	+		
9	Kerapu'	*Epinephelus spp*	+		
10	Kembung	*Rastrelliger bracchysoma*	+		
11	Petek	*Leiognathus sp*	+		
12	Belanak	*Mugil spp*	+		
13	Cumi-cumi	*Lolygo sp*	+	+	
14	Baronang	*Siganus spp*	+		
15	Mujair	*Oreochromis mosambiqus*	+	+	
16	Golok-golok	*Chirecentrus dorab*	+		
17	Nila hitam	*Oreaehromis niloticus*	+	+	
18	Bandeng	*Chanos chanos*	+		
19	Ekor kuning	*Chaesio erythrogester*	+		
20	Bawal batik	*Caranx spp*	+		
21	Cakalang	*Scomberomorus Comersiinii*	+		
22	Gabus	*Ophiocephalus sp*			
23	Sepat	*Trichigaster sp*			
24	Betok	*Anabas testudineus*			
25	Lele	*Clarias batrachus*			
26	Sapu-sapu	*Hyposarcus sp*			
	KERANG	**CRUSTACEAN**			
27	Kerang darah	*Anadara sp*	+		
28	Alu-alu	*Sphyraena jello*	+	+	
29	Bulan-bulan	*Megalops cyprinoides*	+	+	
30	Kerang buluk	*Anadara indica*	+	+	+
31	Kerang hijau	*Perna viridis*	+	+	
32	Siput laut	*Olivella sp*	+		

+ : Exist, - : Non exist

Table 13 VEGETATION IN THE STUDY AREA(1/2)

No.	Local Name	Botanical Name	Value Index in the Drainage Channel				
			Kamal D/Channel	Cengkareng D/Channel	Tunjungan D/Channel	PIK Junction D/Channel	Mangrove Growth Area
	PEPOHONAN	**TREES**					
1	Akasia	*Accacia auriculiformis*	2.07	3.71			
2	Ambon	*Excocerca sp*	2.72	11.66	8.55	25.65	
3	Angsana	*Pterocarpus indicus*	28.23	5.26	15.25		
4	Api-api	*Avicenia sp*					128.98
5	Asam kranji	*Pithellobium dulce*	8.81	7.56			
6	Bakau	*Rhizopora sp*			9.96		18.78
7	Bakau	*Bruguiera sp*					
8	Belimbing	*Averhoa carambola*	4.35				
9	Beringin	*Ficus benjamina*	6.96			9.75	
10	Dadap	*Erythrina variegata*	5.66				
11	Glodogan tihang	*Garcinea edulis*		3.85			
12	Jalu jaran	*Lannea coromandellca*	2.72	3.43			
13	Jambu air	*Euginea aqua*	4.79	3.71			
14	Jambu biji	*Fsidium guajava*	4.35	4.56	8.55		
15	Kedondong	*Spondias pinnata*	12.48				
16	Kelapa	*Cocos mucifera*	13.91	37.08	39.64		
17	Keluwih	*Arthocarpus sp*	2.07	3.85			
18	Kersen	*Muntingia calabura*	4.24	2.72			
19	Ketapang	*Terminalia catapa*	5.76	2.58			
20	Mahoni	*Switzenia macrophylla*	10.98	6.11		36.91	
21	Mangga	*Mangifera indica*	5.87	3.85			
22	Mindi	*Melia azedarach*	12.7	24.93		20.35	
23	Nangka	*Arthocarpus integra*	4.35	2.58			
24	Randu	*Ceiba petendra*	4.35	3.85			
25	Petai	*Parkia speciasa*	4.35				
26	Rambutan	*Nephelum lapecum*		2.58			
27	Sonokeling	*Dalbergia lactifolia*	14.00				

Table 13 VEGETATION IN THE STUDY AREA(2/2)

No.	Local Name	Botanical Name	Value Index in the Drainage Channel				
			Kamal D/Channel	Cengkareng D/Channel	Tunjungan D/Channel	PIK Junction D/Channel	Mangrove Growth Area
	BELUKAR	**SHRUB**					
28	Pace	*Morinda citrifolia*	2.94	2.86			
29	Palem	*Arecha sp*			15.25		
30	Pepaya	*Carica papaya*	2.07	7.28		10.41	
31	Pisang	*Musa paradisiaca*	9.03	5.02	43.76	22.34	
32	Salak	*Salaca edulis*		3.00			
33	Turi	*Sesbania citrifolia*		2.58			
34	Waru	*Hibiscus tiliaceus*		2.58			
35	Bambu	*Bamboosa sp*	4.35	2.58			
36	Srikaya	*Annoa squamosa*		2.86			
37	Jarak	*Jathropa curcas*	3.37				
38	Jeruk	*Citrus sp*					
39	Kangkungan	*Ipomomea sp*	2.94		14.18		
40	Ketela	*Manihot sp*	4.14	2.86			
41	Kirai	*Nyha sp*			9.96		
42	Lamtoro	*Leucaena glauca*	5.44	4.13	8.55	9.75	
43	Bogenvil	*Bogenvillea sp*		2.58	9.84		
44	Bunga Kuning	*Caesalpinea sp*			9.84	10.42	
	RERUMPUTA	**GRASS**					
45	Bayam	*Amaranthus sp*				19.02	
46	Eceng gondok	*Eichornia crassipes*			8.55		
47	Lobak	*Elephantopus sp*				22.34	
48	Talas	*Colocasia esculenta*		4.98			
49	Tebu	*Sacharum sp*		9.78			

Table 14 FAUNA IN THE STUDY AREA

No.	Local Name	Scientific Name	Kamal D/Channel	engkaren D/Channel	Tunjungan D/Channel	PIK Jctn. D/Channel	Coastal Area
	Memamah Biak	**Mamalia**					
1	Kera	*Maraca fascicularis*	-	-	-	-	+
2	Babi hutan	*Sus barbatus*	-	-	-	-	+
3	Anjing	*Canis sp*	+	+	+	+	-
4	Kucing	*Flis sp*	+	+	+	+	-
5	Tikus	*Retus sp*	+	+	+	+	+
	Malata	**Reptilia**					
6	Ular Sawah	*Phyton sp*	-	-	-	-	+
7	Kadal	*Mabouya multifaciata*	+	+	+	+	+
8	Biawak	*Veramus salvator*	+	+	+	+	+
9	Ular hijau	*Drylis orasianus*	+	+	+	+	+
	Bulung	**Aves**					
10	Cangak abu	*Ardea purpurea*	-	-	-	+	+
11	Cangak merah	*A. purpurea*	-	-	-	-	+
12	Bangau tontong	*Leptoptillus javanicus*	-	-	-	-	+
13	Camar	*Larus sp*	-	-	-	-	+
14	Belibis	*Amas gibberifrons*	-	-	+	+	+
15	Belibis kembang	*Dendrocygna javanica*	-	-	-	-	+
16	Bluwok'	*Ibis cinerens*	-	-	+	-	+
17	Bangau	*Egretta sp*	-	-	+	-	+

Note) + : Existing - : Non existing

Table 15 CHARACTERISTICS OF THE POPULATION IN THE PROJECT AREA(1/2)

a. Administrative Area and the Population

City Region	Kecamatan	Kelurahan	Area (km2)	Population	Pop.Density (Persons/km)
1 Jakarta Utara	Penjaringan	Kamal Muara	10.53	3,193	303
2 Jakarta Barat	Kembungan	Meruya Utara	4.76	25,242	5,303
	Cengkareng	Kapuk	7.18	48,965	6,820
		Cengkareng Tim	4.18	43,568	10,423
		Cengareng Barat	4.26	41,481	9,737
	Kalideres	Kalideres	4.93	30,366	6,159
		Pegadungan	5.95	19,163	3,221
		Tegal Alur	7.78	33,348	4,286
		Kamal*	2.76	16,568	6,003
Total			52.33	261,894	5,806

Note: * - Not directly affected by the Project

Table 15 CHARACTERISTICS OF THE POPULATION IN THE PROJECT AREA(2/2)

b. Age Distribution

Kotamadya / Kecamatan	Age										
	0 - 14		15 - 19		20 - 49		50 - 59		60 <		
	No.	%	No.	%	No.	%	No.	%	No.	%	Total
1 Jakarta Utara											
1) Penjaringan	10,913	4.2	3,638	1.4	17,784	6.8	4,285	1.6	3,880	1.5	40,500
2 Jakarta Barat											
2) Cengkareng	26,410	10.1	16,694	6.4	72,794	27.8	9,881	3.8	7,676	2.9	133,454
3) Kalideres	17,259	6.6	4,600	1.8	19,930	7.6	2,927	1.1	2,201	0.8	46,917
4) Kembangan	11,101	4.2	3,682	1.4	18,022	6.9	4,311	1.6	3,908	1.5	41,023
Total	65,683	25.1	28,618	10.9	128,529	49.1	21,407	8.2	17,664	6.7	261,894

c. Occupation

Occupation	Jakarta Barat						Jakarta Utara			
	Kembangan		Kalideres		Cengkareng		Penjaringan		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Agriculture	2,143	0.8	2,757	1.1	1,958	0.7	2,819	1.1	9,678	3.7
Industry	1,654	0.6	10,302	3.9	86,738	33.1	8,596	3.3	107,290	41.0
Artisan/Technici	7,464	2.9	2,535	1.0	5,509	2.1	2,323	0.9	17,830	6.8
Trading	1,908	0.7	4,313	1.6	27,018	10.3	2,628	1.0	35,868	13.7
Commerce	1,642	0.6	379	0.1	2,641	1.0	614	0.2	5,275	2.0
Government	5,994	2.3	2,682	1.0	15,371	5.9	2,501	1.0	26,548	10.1
Transportation	2,174	0.8	1,795	0.7	9,478	3.6	1,684	0.6	15,131	5.8
Others	5,200	2.0	6,905	2.6	26,161	10.0	6,007	2.3	44,273	16.9
Total	28,180	10.8	31,668	12.1	174,874	66.8	27,172	10.4	261,894	100.0

d. Level of Income (Rp.Thousand/month)

Kelurahan	<100	100-300	300-400	400-600	600-800	>800	Total
Kamal Muara*	-	-	-	-	-	-	0.0
Cengkareng Tim	-	9.0	2.7	-	0.9	0.9	13.5
Cengkareng Bara	-	0.9	3.6	-	-	1.8	6.3
Kapuk	-	1.8	0.9	4.5	0.9	-	8.1
Pegadungan	1.8	1.8	-	-	1.8	-	5.4
Tegal Alur	2.7	13.5	10.8	9.0	4.5	3.6	44.1
Meruya Utara	3.6	9.0	-	4.5	2.8	2.7	22.6
Total	8.1	36.0	18.0	18.0	10.9	9.0	100.0

Table 16 OPINION ON THE RELOCATION OF THE LOCAL RESIDENTS WITHOUT LAND CERTIFICATE

	Cases of the Degree of Development	Contents of the Demands of the Resettlement Areas	Responce (%)
1	Social Facilities	Health Facility, Local Market, Primary School and High School, Convention Centre, Mosque or Church, Postal Services, Public Transportation, Electricity and Library.	14.29
2	Infrastructure	Access Road and Local Road, General Public Facilities, Potable Water Supply and Sanitation System	10.20
3	Non-physical Development	Job Opportunity, Granting Land Certificate, Cooperation Between Incumbent Residents and Non-moslem Community	6.12
4	Social Facilities and Infrastructure	Job Opportunity, Granting Land certificate, Cooperation Between Incumbent Residents and the Non-moslem Community	22.45
5	Social facilities + Non-physical Development	Job Opportunity, Ganting Land Certificate, Cooperation Between Incumbent Residents and the Non-moslem Community	16.33
6	Infrastructure + Non-physical Needs	Job Opportunity, Ganting Land Certificate, Cooperation Between Incumbent Residents and the Non-moslem Community	6.12
7	Social Facilities + Infrastructure+ Non-physical Needs	Job Opportunity, Ganting Land Certificate, Cooperation Between Incumbent Residents and the Non-moslem Community	24.49
		Total	100.00

Table 17 MATRIX OF ENVIRONMENTAL IMPACT ASSESSMENT(1/9)

a. Pre-construction Period

Item of Works	Source of Impact (Project Activity)	Affected Environment	Classification of Impact	Affected Administrative Area Kotamadia Kecamatan Kelurahan
1 Site Investigation	* Core boring for geological investigation	* Physico-chemical Environment	* Light disturbance: Trace of bore holes left on site * Slight Social Unrest: General public would be eager to obtain the reason of conducting site investigation	As listed below
2 Topographic Survey	* General map making activity	* Socio-economic Environment	* Slight Social Unrest: General public would be eager to obtain the reason of conducting site investigation	As listed below
3 EIA Study	* Environmental study for physico-chemical environment * Environmental study for biological environment * Socio-economic Survey and survey for relocation of the local residents	* Socio-economic Environment * Socio-economic Environment * Socio-economic Environment	* Slight Social Unrest: General public would be eager to obtain the reason of conducting site investigation * Slight Social Unrest: General public would be eager to obtain the reason of conducting site investigation * Social Unrest: General public begin warrying on the potential relocation	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Utara Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kalideres 5) Pegadungan* 6) Tegal Alur 7) Kalideres* 8) Kamal* Kembangan 9) Meruya Utara
4 Relocation Operation 1) Package I Area: (Kamal Drainage Channel - Main and Branch)	* Land acquisition and demolition of the houses, mosque, factory, school and government offices	* Socio-economic Environment	* Very Significant: Arrangement for relocation, assessment of the rate of compensation, and negotiation of compensation	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur

Table 17 MATRIX OF ENVIRONMENTAL IMPACT ASSESSMENT(2/9)

a. Pro-construction Period

Item of Works	Source of Impact (Project Activity)	Affected Environment	Classification of Impact	Affected Administrative Area Kotamadia Kecamatan Kelurahan
2) Package II Area: (Tanjungan and PIK Junction Drainage Channel)	* Land acquisition and demolition of the houses, mosque, factory, school and government offices	* Socio-economic Environment	* Very Significant: Arrangement for relocation, assessment of the rate of compensation, and negotiation of compensation	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur
3) Package III Area: (Saluran Cengkareng, Gede/ Bor and Meruya D/Channel)	* Land acquisition and demolition of the houses, mosque, factory, school and government offices	* Socio-economic Environment	* Very Significant: Arrangement for relocation, assessment of the rate of compensation, and negotiation of compensation	Jakarta Barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Meruya Utara
5 Resettlement Area	* Construction of low cost apartment and resettlement	* Socio-economic Environment	* Significant: Rearrangement of commuting to work, school, and family life as well as the job opportunities * Slight social disturbance as resettling residents and the incumbent residents in the resettling areas would have to face the period of adjustment to the new living environment	Jakarta Barat Cengkareng 1) Cengkareng Barat

Table 17 MATRIX OF ENVIRONMENTAL IMPACT ASSESSMENT(3/9)

b. Construction Preparation Period

Item of Works	Source of Impact (Project Activity)	Affected Environment	Classification of Impact	Affected Administrative Area Kotamadia Kecamatan Kelurahan
1 Mobilization of Work Force, Equipment and Materials to: 1) Package I Area: (Kamal Drainage Channel - Main and Branch)	* Creation of workers camp and storage areas	* Socio-economic Environment	* Slight Social Unrest: General public would feel that they have to stay alert with the advent of outsiders. * Traffic Congestion is expected.	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur
2) Package II Area: (Tanjungan and PIK Junction Drainage Channel)	* Creation of workers camp and storage areas	* Socio-economic Environment	* Slight Social Unrest: General public would feel that they have to stay alert with the advent of out-siders. * Traffic Congestion is expected.	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur
3) Package III Area: (Saluran Cengkareng, Gede/ Bor and Meruya D/Channel)	* Creation of workers camp and storage areas	* Socio-economic Environemnt	* Slight Social Unrest: General public would feel that they have to stay alert with the advent of out-siders. * Traffic Congestion is expected.	Jakarta Barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Meruya Utara
4) Preparation of Water and Electricity Supply for Construction Works	* Connection of water and electricity supply system] to the existing systems	* Socio-economic Environment	* Temporary/Occasional disruption to the utility sysptem	To be determined.
2 Clearing the Construction Area	* Demolition of houses	* Socio-economic Environment	* Slight social unrest, dust and noise pollution as well as the disruption of traffic	As above listed
	* Excavation and Hauling of construction debris	* Physico-chemical Environemnt	* Slight change on the land use	As above listed

Table 17 MATRIX OF ENVIRONMENTAL IMPACT ASSESSMENT(4/9)

b. Construction Preparation Period (continued)

Item of Works	Source of Impact (Project Activity)	Affected Environment	Classification of Impact	Affected Administrative Area: Kotamadia / Kecamatan / Kelurahan
2 Clearing the Construction Area (continued)	* Removal of Vegetation	* Bological Environment	* Slight change on the local vegetation	As above listed
3 Construction of Access Road 1) Package I Area: (Kamal Drainage Channel - Main and Branch)	* Excavation and Filling operation	* Socio-economic Environment	* Slight social unrest, dust and noise pollution as well as the disruption of traffic	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur
		* Biological Environment	* Slight damages made to the mangrove forest	
		* Physico-chemical Environment	* Temporary increase on the turbidity of the water in the drainage channel * Permanent changes on the natural drainage system	
2) Package II Area: (Tanjungan and PIK Junction Drainage Channel)	* Excavation and Filling operation	* Socio-economic Environment	* Slight social unrest, dust and noise pollution as well as the disruption of traffic	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur
2) Package II Area: (Tanjungan and PIK Junction Drainage Channel: continued)		* Biological Environment	* Slight damages made to the mangrove forest	
		* Physico-chemical Environment	* Temporary increase on the turbidity of the water in the drainage channel * Permanent changes on the natural drainage system	

Table 17 MATRIX OF ENVIRONMENTAL IMPACT ASSESSMENT(5/9)

b. Construction Preparation Period (continued)

Item of Works	Source of Impact (Project Activity)	Affected Environment	Classification of Impact	Affected Administrative Area Kotamadia Kecamatan Kelurahan
3) Package III Area: (Saluran Cengkareng, Gede/ Bor and Meruya D/Channel)	* Excavation and Filling operation	* Socio-economic Environment	* Slight social unrest, dust and noise pollution as well as the disruption of traffic	Jakarta barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Meruya Utara

c. Construction Implementation Period

Item of Works	Source of Impact (Project Activity)	Affected Environment	Classification of Impact	Affected Administrative Area Kotamadia Kecamatan Kelurahan
1 Excavation of Drainage Channel 1) Package I Area: (Kamal Drainage Channel - Main and Branch)	* Excavation works * Haulage of silt materials * Noise, odor and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period * Slight change on the land use scheme	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur
		* Biological Environment	* Very light disturbane to the local vegetation	
		* Physico-chemical Environment	* Temporary increase on the turbidity of the water in the drainage channel * Permanent changes on the natural drainage system	

Table 17 MATRIX OF ENVIRONMENTAL IMPACT ASSESSMENT(6/9)

c. Construction Implementation Period

Item of Works	Source of Impact (Project Activity)	Affected Environment	Classification of Impact	Affected Administrative Area Kotamadia Kecamatan Kelurahan
2) Package II Area: (Tanjungan and PIK Junction Drainage Channel)	* Excavation works * Haulage of silt materials * Noise, odor and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period * Slight change on the land use scheme	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur
		* Biological Environment	* Slight damages made to the mangrove forest	
		* Physico-chemical Environment	* Temporary increase on the turbidity of the water in the drainage channel * Permanent changes on the natural drainage system	
3) Package III Area: (Saluran Cengkareng, Gede/ Bor and Meruya D/Channel)	* Excavation works * Haulage of silt materials * Noise, odor and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period * Slight change on the land use scheme	Jakarta Barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Meruya Utara
		* Biological Environment	* Very light disturbane to the local vegetation	
3) Package III Area: (Saluran Cengkareng, Gede/ Bor and Meruya D/Channel: continued)		* Physico-chemical Environment	* Temporary increase on the turbidity of the water in the drainage channel * Permanent changes on the natural drainage system	
2 Main Structure Construction Works 1) Package I Area: (Kamal Drainage Channel - Main and Branch)	* Haulage of filling materials * Noise, odor, vibration and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur

Table 17 MATRIX OF ENVIRONMENTAL IMPACT ASSESSMENT(7/9)

c. Construction Implementation Period (continued)

Item of Works	Source of Impact (Project Activity)	Affected Environment	Classification of Impact	Affected Administrative Area Kotamadia Kecamatan Kelurahan
2) Package II Area: (Tanjungan and PIK Junction Drainage Channel)	* Haulage of filling materials * Noise, odor, vibration and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur
		* Biological Environment	* Occasional and temporary disturbance to mangrove forest on the coastal area	
3) Package III Area: (Saluran Cengkareng, Gede/ Bor and Meruya D/Channel)	* Haulage of filling materials * Noise, odor, vibration and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	Jakarta Utara Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Meruya Utara
3 Ancillary Structure Construction Works	* Haulage of filling materials * Noise, odor, vibration and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	To be determined
4 Bridge Construction Works 1) Package I Area: (Kamal Drainage Channel - Main and Branch)	* Noise, odor, vibration and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur
	* Disruption to the traffic			

Table 17 MATRIX OF ENVIRONMENTAL IMPACT ASSESSMENT(8/9)

c. Construction Implementation Period (continued)

Item of Works	Source of Impact (Project Activity)	Affected Environment	Classification of Impact	Affected Administrative Area Kotamadia Kecamatan Kelurahan
2) Package II Area: (Tanjungan and PIK Junction Drainage Channel)	* Noise, odor, vibration and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur
	* Disruption to the traffic			
3) Package III Area: (Saluran Cengkareng, Gede/ Bor and Meruya D/Channel)	* Noise, odor, vibration and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	Jakarta Barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Meruya Utara
	* Disruption to the traffic			

Note 1) PANTURA is an Indonesian abbreviation for "Jakarta Waterfront Implementation Board" that is responsible for the north coast reclamation and present coastal area revitalization projects.

Table 17 MATRIX OF ENVIRONMENTAL IMPACT ASSESSMENT(9/9)

d. Post-construction Period

Item of Works	Source of Impact (Project Activity)	Affected Environment	Classification of Impact	Affected Administrative Area Kotamadia Kecamatan Kelurahan
1 Operation and Maintenance	* Use of the structures of the drainage channels	* Socio-economic Environment	* Positive impact as the inspection road along the drainage channels are made available to the general public * Positive impact as flood events are reduced * Positive impact as amenity in the Project Area is increased * Land use and the price of land are changed * Public health scheme is changed	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kalideres 5) Pegadungan* 6) Tegal Alur 7) Kalideres* 8) Kamal* Kembangan 9) Meruya Utara
		* Physico-chemical Environment	* Water quality in the drainage channels improved * Permanent changes on the natural drainage system is ensured	As above listed As above listed
		* Biological Environment	* Slow growth of vegetation upon completion of the Project	As above listed
			* Temporarily damaged mangrove forest	1 Jakarta Utara Penjaringan 1) Kamal Muara

Table 18 ENVIRONMENTAL MANAGEMENT PLAN(1/6)

a. Pre-construction Period

Item of Works	Source of Impact (Project Activity)	Sector of Environment Receiving the Impact	Classification of Impact	Objectives of the Environmental Management Plan	Activity of the Environmental Management Plan	Affected Administrative Area: Kotamadia / Kecamatan / Kelurahan	Government Agencies Related to the Environmental Management Plan: Executing Agency	Government Agencies Related to the Environmental Management Plan: Supervisor	Cost of the Environmental Management Plan*
1 Site Investigation	* Core boring for geological investigation	Physico-chemical Environment	* Light disturbance: Trace of bore holes left on site	-	-	As listed below	Local Govt., Level II Kotamadya Office of Jakarta Barat and Jakarta Utara	Inspector of Local Govt., Level I, DKI Jakarta	* Contractor's cost to reinstate the boring site
			* Slight Social Unrest: General public would be eager to obtain the reason of conducting site investigation	* Reduce the social unrest	* Explanation to the local residents	As listed below	ditto	ditto	* Contractor's cost to disseminate information
2 Topographic Survey	* General map making activity	Socio-economic Environment	* Slight Social Unrest: General public would be eager to obtain the reason of conducting site investigation	* Reduce the social unrest	* Explanation to the local residents	As listed below	ditto	ditto	* ditto
3 EIA Study	* Environmental study for physico-chemical environment	Socio-economic Environment	* Slight Social Unrest: General public would be eager to obtain the reason of conducting site investigation	-	* Explanation to the local residents	As listed below	ditto	ditto	* Contractor's cost to disseminate information
	* Environmental study for biological environment	Socio-economic Environment	* Slight Social Unrest: General public would be eager to obtain the reason of conducting site investigation	-	* Explanation to the local residents	As listed below	ditto	ditto	* ditto
	* Socio-economic Survey and survey for relocation of the local residents	Socio-economic Environment	* Social Unrest: General public begin warrying on the potential relocation	* Reduce the social unrest	* Explanation to the local residents and cooperation by the	As listed below	ditto	ditto	* ditto * Volutary effort made by the local government offices would also be made.
4 Relocation Operation	* Land acquisition and demolition of the houses	Socio-economic Environment	* Very Significant: Arrangement for relocation, assessment of the rate of compensation, and negotiation of compensation	* Compensation	* Dissemination of Information and disbursement of the compensation	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Utara Cengkareng	ditto	ditto	* DPU, DKI Jakarta (Rp.50,789.9 million)
	* Construction of the low cost apartment and resettlement	Socio-economic Environment	* Significant: Rearrangement of commuting to work, school, and family life as well as the job opportunities	* Reduce the social unrest	* Preparation of the resettlement areas with infrastructure and social services	2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kalideres 5) Pegadungan*	ditto	ditto	* DPU, DKI Jakarta and Dept.of Housing (Rp.34,676.1 million)
			* Slight social disturbance as resettling residents and the incumbent residents in the resettling areas would have to face the period of adjustment to the new living environment	* Reduce the social unrest	-	6) Tegal Alur 7) Kalideres* 8) Kamal* Kembangan 9) Meruya Utara	ditto	ditto	

Table 18 ENVIRONMENTAL MANAGEMENT PLAN(2/6)

b. Construction Preparation Period

Item of Works	Source of Impact (Project Activity)	Sector of Environment Receiving the Impact	Classification of Impact	Objectives of the Environmental Management Plan	Activity of the Environmental Management Plan	Affected Administrative Area: Kotamadya / Kecamatan / Kelurahan	Government Agency implementing the Environmental Management Plan: Executing Agency	Government Agency implementing the Environmental Management Plan: Supervisor	Cost of the Environmental Management Plan
1 Mobilization of Work Force, Equipment and Materials to:									
1 Package I Area: (Kamal Drainage Channel - Main and Branch)	* Creation of workers camp and storage areas	Socio-economic Environment	* Slight Social Unrest: General public would feel that they have to stay alert with the advent of outsiders. * Traffic Congestion is expected.	* Reduce the social unrest	* Dissemination of information to the general public. * Conducting the works during the "Off-peak" hours. * Coordination with the local govt. organization.	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur	* Each Kecamatan and Kelurahan Office * Office of Telekom, Water Supply and State Electricity	* Inspector of Local Govt., Level I, DKI Jakarta	Contractor's responsibility
2 Package II Area: (Tanjungan and PIK Junction Drainage Channel)	* Creation of workers camp and storage areas	Socio-economic Environment	* Slight Social Unrest: General public would feel that they have to stay alert with the advent of outsiders. * Traffic Congestion is expected.	* Reduce the social unrest	* Dissemination of information to the general public. * Conducting the works during the "Off-peak" hours. * Coordination with the local govt. organization.	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur	ditto	ditto	Contractor's responsibility
3 Package III Area: (Saluran Cengkareng, Grdo/ Bor and Meruya D/Channel)	* Creation of workers camp and storage areas	Socio-economic Environment	* Slight Social Unrest: General public would feel that they have to stay alert with the advent of outsiders. * Traffic Congestion is expected.	* Reduce the social unrest	* Dissemination of information to the general public. * Conducting the works during the "Off-peak" hours. * Coordination with the local govt. organization.	Jakarta Barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Meruya Utara	ditto	ditto	Contractor's responsibility
4 Preparation of Water and Electricity Supply for Construction Works	* Connection of water and electricity supply system) to the existing systems	Socio-economic Environment	* Temporary/Occasional disruption to the utility system	* Reducing social unrest	* Precautionary measures to be taken	To be determined.	ditto	ditto	Contractor's responsibility
2 Clearing the Construction Area	* Demolition of house	Socio-economic Environment	* Slight social unrest, dust and noise pollution as well as the disruption of traffic	* Reducing the social unrest, dust and noise	* Coordination with the local govt. organization. * Dissemination of information to the general public. * Conducting the works during the "Off-peak" hours * Implementation of a proper construction method such as to spray water to suppress dust, install silencer on the construction equipment	As above listed As above listed As above listed As above listed	ditto	ditto	Contractor's responsibility
	* Excavation and Hauling of construction debris	Physico-chemical Environment	* Slight change on the land use	-	-				
	* Removal of Vegetation	Biological	* Slight change on the local	-	-	As above listed			

Table 18 ENVIRONMENTAL MANAGEMENT PLAN(3/6)

b. Construction Preparation Period

Item of Works	Source of Impact (Project Activity)	Sector of Environment Receiving the Impact	Classification of Impact	Objectives of the Environmental Management Plan	Activity of the Environmental Management Plan	Affected Administrative Area: Kotamadia / Kecamatan / Kelurahan	Government Agency Implementing the Environmental Management Plan: Executing Agency	Government Agency Implementing the Environmental Management Plan: Supervisor	Cost of the Environmental Management Plan
3 Construction of Access Road 1 Package I Area: (Kamal Drainage Channel - Main and Branch)	* Excavation and Filling operation	Socio-economic Environment	* Slight social unrest, dust and noise pollution as well as the disruption of traffic	* Reducing the social unrest, dust and noise	* Coordination with the local govt.organization. * Dissemination of information to the general public. * Conducting the works during the "Off-peak" hours. * Implementation of a proper construction method such as to spray water to suppress dust, install silencer on the construction equipment	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur	* Each Kecamatan and Kelurahan Office * Office of Telekom, Water Supply and State Electricity	* Inspector of Local Govt., Level I, DKI Jakarta	Contractor's responsibility
		Biological Environment	* Slight damages made to the mangrove forest	* Minimize damages to mangrove forest	-				
		Physico-chemical Environment	* Temporary increase on the turbidity of the water in the drainage channel * Permanent changes on the natural drainage system	-	-				
2 Package II Area: (Tanjungan and PIK Junction Drainage Channel)	* Excavation and Filling operation	Socio-economic Environment	* Slight social unrest, dust and noise pollution as well as the disruption of traffic	* Reducing the social unrest, dust and noise	* Coordination with the local govt.organization. * Dissemination of information to the general public. * Conducting the works during the "Off-peak" hours. * Implementation of a proper construction method such as to spray water to suppress dust, install silencer on the construction equipment	Jakarta Utara Penjaringan 1) Kamal Muara Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur	ditto	ditto	Contractor's responsibility
		Biological Environment	* Slight damages made to the mangrove forest	* Minimize damages to mangrove forest	-				
		Physico-chemical Environment	* Temporary increase on the turbidity of the water in the drainage channel * Permanent changes on the natural drainage system	-	-				
3 Package III Area: (Saluran Cengkareng, Gede/ Bor and Maruya D/Channel)	* Excavation and Filling operation	Socio-economic Environment	* Slight social unrest, dust and noise pollution as well as the disruption of traffic	* Reducing the social unrest, dust and noise	* Coordination with the local govt.organization. * Dissemination of information to the general public. * Conducting the works during the "Off-peak" hours. * Implementation of a proper construction method such as to spray water to suppress dust, install silencer on the construction equipment	Jakarta Barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Maruya Utara	ditto	ditto	Contractor's responsibility

Table 18 ENVIRONMENTAL MANAGEMENT PLAN(4/6)

a Construction Implementation Period

Item of Works	Source of Impact (Project Activity)	Sector of Environment Receiving the Impact	Classification of Impact	Objectives of the Environmental Management Plan	Activity of the Environmental Management Plan	Affected Administrative Area: Kecamatan / Kelurahan	Government Agency implementing the Environmental Management Plan: Executing Agency	Government Agency implementing the Environmental Management Plan: Supervisor	Cost of the Environmental Management Plan[a]
1 Renovation of Drainage Channel 1) Package I Area: (Kamal Drainage Channel - Main and Branch)	Excavation works Haulage of silt materials Noise, odor and dust emanated from the construction site	• Socio-economic Environment	• Constant disturbance to the general public during the construction period • Slight change on the land use scheme	• Reduce the social unrest -	• Conduct the haulage during "Off-peak" hour • Install silencer on the construction equipment, spray water for dust suppression and conduct regular practice in order to reduce dust and noise	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur	• Traffic Dept., DKI Jakarta • Traffic Police Dept., DKI Jakarta • Office of Telekom, Water Supply and State Electricity • Dept. of Gardens, DKI Jakarta	• Inspector of Local Govt., Level I, DKI Jakarta	• Contractor's Responsibility • PANTURA's Responsibility[b]
		• Biological Environment	• Very light disturbance to the local vegetation	• Minimize damages to mangrove forest					
		• Physico-chemical Environment	• Temporary increase on the turbidity of the water in the drainage channel • Permanent changes on the natural drainage system	- -	• Plant selected species of mangrove				
2) Package II Area: (Tanjungan and PIK Junction Drainage Channel)	Excavation works Haulage of silt materials Noise, odor and dust emanated from the construction site	• Socio-economic Environment	• Constant disturbance to the general public during the construction period • Slight change on the land use scheme	• Reduce the social unrest -	• Conduct the haulage during "Off-peak" hour • Install silencer on the construction equipment, spray water for dust suppression and conduct regular practice in order to reduce dust and noise	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur	• Traffic Dept., DKI Jakarta • Traffic Police Dept., DKI Jakarta • Office of Telekom, Water Supply and State Electricity	dato	• Contractor's responsibility
		• Biological Environment	• Slight damages made to the mangrove forest	• Minimize damages to mangrove forest					
		• Physico-chemical Environment	• Temporary increase on the turbidity of the water in the drainage channel • Permanent changes on the natural drainage system	- -	• Plant selected species of mangrove		• Dept. of Gardens, DKI Jakarta		• PANTURA's Responsibility[b]
3) Package III Area: (Saluran Cengkareng, Gede/ Bor and Meruya D/Channel)	Excavation works Haulage of silt materials Noise, odor and dust emanated from the construction site	• Socio-economic Environment	• Constant disturbance to the general public during the construction period • Slight change on the land use scheme	• Reduce the social unrest -	• Conduct the haulage during "Off-peak" hour • Install silencer on the construction equipment, spray water for dust suppression and conduct regular practice in order to reduce dust and noise	1 Jakarta Barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Meruya Utara	• Traffic Dept., DKI Jakarta • Traffic Police Dept., DKI Jakarta • Office of Telekom, Water Supply and State Electricity	dato	• Contractor's Responsibility
		• Biological Environment	• Very light disturbance to the local vegetation	-					
		• Physico-chemical Environment	• Temporary increase on the turbidity of the water in the drainage channel • Permanent changes on the natural drainage system	- -					
2 Main Structure Construction Works 1) Package I Area: (Kamal Drainage Channel - Main and Branch)	Haulage of filling materials Noise, odor, vibration and dust emanated from the construction site	• Socio-economic Environment	• Constant disturbance to the general public during the construction period	• Reduce the social unrest -	• Install silencer on the construction equipment, spray water for dust suppression and conduct	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur	• Traffic Dept., DKI Jakarta • Traffic Police Dept., DKI Jakarta • Office of Telekom, Water Supply and State Electricity	dato	• Contractor's Responsibility

Table 18 ENVIRONMENTAL MANAGEMENT PLAN(5/6)

b. Construction Preparation Period

Item of Works	Source of Impact (Project Activity)	Sector of Environment Receiving the Impact	Classification of Impact	Objectives of the Environmental Management Plan	Activity of the Environmental Management Plan	Affected Administrative Area: Kotamadya / Kecamatan / Kelurahan	Government Agency implementing the Environmental M: Executing Agency	Government Agency implementing the Environmental M: Supervisor	Cost of the Environmental Management Plan*
2) Package II Area: (Tanjungan and PIK Junction Drainage Channel)	Haulage of filling materials Noise, odor, vibration and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	* Reduce the social unrest	* Install silencer on the construction equipment, spray water for dust suppression and conduct regular practice in order to reduce dust and noise	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur	* Traffic Dept., DKI Jakarta * Traffic Police Dept., DKI Jakarta * Office of Telekom, Water Supply and State Electricity	* Inspector of Local Govt., Level I, DKI Jakarta	* Contractor's Responsibility
		* Biological Environment	* Occasional and temporary disturbance to mangrove forest on the coastal area	* Minimize damages to mangrove forest	* Plant selected species of mangrove		* Dept.of Gardens, DKI Jakarta		* PANTURA's Responsibility[1]
3) Package III Area: (Saluran Cengkareng, Gede/ Ber and Meruya D/Channel)	Haulage of filling materials Noise, odor, vibration and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	* Reduce the social unrest	* Install silencer on the construction equipment, spray water for dust suppression and conduct regular practice in order to reduce dust and noise	1 Jakarta Barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Meruya Utara	* Traffic Dept., DKI Jakarta * Traffic Police Dept., DKI Jakarta * Office of Telekom, Water Supply and State Electricity	ditto	* Contractor's Responsibility
3 Auxiliary Structure Construction Works	Haulage of filling materials Noise, odor, vibration and dust emanated from the construction site	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	* Reduce the social unrest	* Install silencer on the construction equipment, spray water for dust suppression and conduct regular practice in order to reduce dust and noise	To be determined	* Traffic Dept., DKI Jakarta * Traffic Police Dept., DKI Jakarta * Office of Telekom, Water Supply and State Electricity	ditto	* Contractor's Responsibility
4 Bridge Construction Works									
1) Package I Area: (Kamal Drainage Channel - Main and Branch)	Noise, odor, vibration and dust emanated from the construction site Disruption to the traffic	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	* Reduce the social unrest	* Install silencer on the construction equipment, spray water for dust suppression and conduct regular practice in order to reduce dust and noise * Plan appropriate traffic diversion	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Barat Cengkareng 2) Cengkareng Timur Kalideres 3) Tegal Alur	* Traffic Dept., DKI Jakarta * Traffic Police Dept., DKI Jakarta * Office of Telekom, Water Supply and State Electricity	ditto	* Contractor's Responsibility
2) Package II Area: (Tanjungan and PIK Junction Drainage Channel)	Noise, odor, vibration and dust emanated from the construction site Disruption to the traffic	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	* Reduce the social unrest	* Install silencer on the construction equipment, spray water for dust suppression and conduct regular practice in order to reduce dust and noise * Plan appropriate traffic diversion	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Barat Cengkareng 2) Kapuk Kalideres 3) Tegal Alur	* Traffic Dept., DKI Jakarta * Traffic Police Dept., DKI Jakarta * Office of Telekom, Water Supply and State Electricity	ditto	* Contractor's Responsibility
3) Package III Area: (Saluran Cengkareng, Gede/ Ber and Meruya D/Channel)	Noise, odor, vibration and dust emanated from the construction site Disruption to the traffic	* Socio-economic Environment	* Constant disturbance to the general public during the construction period	* Reduce the social unrest	* Install silencer on the construction equipment, spray water for dust suppression and conduct regular practice in order to reduce dust and noise * Plan appropriate traffic diversion	1 Jakarta Barat Cengkareng 2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk Kembangan 9) Meruya Utara	* Traffic Dept., DKI Jakarta * Traffic Police Dept., DKI Jakarta * Office of Telekom, Water Supply and State Electricity	ditto	* Contractor's Responsibility

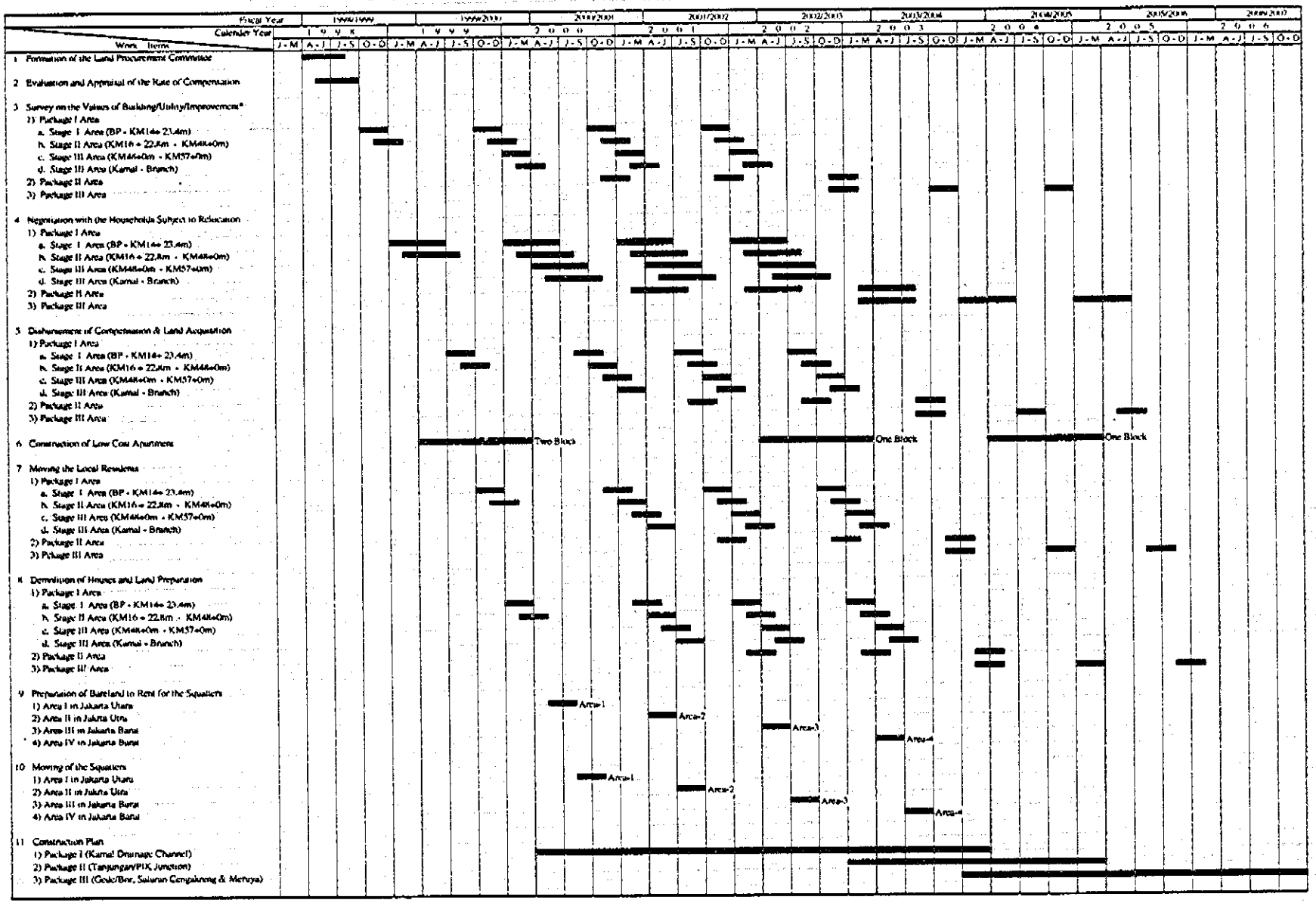
Note: 1) PANTURA is an abbreviation for "Jakarta Water Front Implementation Board" that is responsible for the north coast reclamation and present coastal area revitalization projects.

Table 18 ENVIRONMENTAL MANAGEMENT PLAN(6/6)

d. Post-construction Period

Item of Works	Source of Impact (Project Activity)	Sector of Environment Receiving the Impact	Classification of Impact	Objectives of the Environmental Management Plan	Activity of the Environmental Management Plan	Affected Administrative Area: Kotamadia / Kecamatan / Kelurahan	Government Agency Implementing the Environmental Management Plan: Executing Agency	Government Agency Implementing the Environmental Management Plan: Supervisor	Cost of the Environmental Management Plan*
1 Operation and Maintenance	* Use of the structures of the drainage channels	* Socio-economic Environment	* Positive impact as the inspection road along the drainage channels are made available to the general public	-	-	1 Jakarta Utara Penjaringan 1) Kamal Muara 2 Jakarta Barat Cengkareng	-	Inspector of Local Govt., Level I, DKI Jakarta	-
			* Positive impact as flood events are reduced	-	-	2) Cengkareng Timur 3) Cengkareng Barat 4) Kapuk	-	ditto	-
			* Positive impact as amenity in the Project Area is increased	-	-	Kalideres 5) Pegadungan* 6) Tegal Alur	-	ditto	-
			* Land use and the price of land are changed	-	-	7) Kalideres* 8) Kamal*	-	ditto	-
			* Public health scheme is changed	-	-	Kembangan 9) Meruya Utara	-	ditto	-
		* Physico-chemical Environment	* Water quality in the drainage channels improved	-	-		-	ditto	-
			* Permanent changes on the natural drainage system is ensured	-	-		-	ditto	-
		* Biological Environment	* Slow growth of vegetation	* Enhancement of the amenity in the Project Area	* Planting trees on the riverside area		DPU DKI Jakarta	ditto	DPU DKI Jakarta
			* Temporarily damaged mangrove forest	* Enhancement of the amenity in the Project Area	* Planting selected mangrove species on the coastal area	1 Jakarta Utara Penjaringan 1) Kamal Muara	PANTURA	ditto	PANTURA

Table 19 IMPLEMENTATION OF THE RESETTLEMENT PROGRAM



Note: Area I - 4 denote suggested resettlement areas for the squatters indicated on the Figure 6.