
ANNEX-62

**ENVIRONMENTAL IMPACT
ASSESSMENT**

CONTENTS OF ANNEX-62

ENVIRONMENTAL IMPACT ASSESSMENT, JAKARTA WATER SUPPLY DEVELOPMENT PROJECT

- ENGLISH VERSION
- INDONESIAN VERSION

The Environmental Impact Assessment was conducted by the Indonesian Consultants as sub-contracting works of the JICA Study Team and was conducted conforming to the Indonesian laws and regulations concerning the environmental impact assessment.



DIRECTORATE GENERAL OF HUMAN SETTLEMENTS
MINISTRY OF PUBLIC WORKS
J A L A N R A D E N P A T A H , K A B A Y O R A N B A R U
J A K A R T A - S E L A T A N

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ENVIRONMENTAL IMPACT ASSESSMENT
JAKARTA WATER SUPPLY DEVELOPMENT PROJECT

March, 1997

JICA STUDY TEAM

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CHAPTER I INTRODUCTION

1.1. BACKGROUND

The JICA Study Team has conducted on the Revise of Jakarta Water Supply Development Project from July 1995, considering future population growth and water demand increase. The service area is planned to be expanded to the Fringe Area of DKI Jakarta, namely Bogor, Tangerang and Bekasi. The service area will be expanded along with expansion of water treatment plants, transmission mains and distribution systems together with distribution centers.

Detailed assessment on every project component are necessary to avoid environmental damage which will be caused by development activities and to save useful natural resources. Objective of this assessment is to understand the basic changing in environment as the impact of the development plan.

The Government of Indonesia had regulated the Law No. 4 - 1982 regarding Basic Definition for Environment Management and the Government Regulation No. 51 - 1993 regarding Environmental Impact Assessment. Any activities, which could affect the nature or cause significant impact to the environment, should be completed with EIA - Environmental Impact Assessment (ANDAL).

In the water supply sector, according to the decree (Men LH) No. 11/MEN.LH/3/1994 issued by the Ministry of Environment stated that any activities, using water from the lake, river, spring or others with the capacity of more than 2 M³/sec or within the protected area, EIA should be carried out.

Some activities for Jakarta Water Supply Development Project are predicted to cause impacts on the environment, during pre-construction, construction and post-construction stages. Therefore, the EIA study with the appropriate approach conforming to the Indonesian regulations should be conducted to have clear figure on possible impacts in

either physics, chemistry, biology, socio-economic and socio-culture aspects in and surrounding project area.

Likewise, the EIA could be used for preparation of effort for preventative management together with monitoring for the negative impact and positive impact in the future, which will be planned in Environment Management Plan (RKL) and Environment Monitoring Plan (RPL).

1.1.1. Legal Basis for Preparation of EIA.

The construction works of Treatment Plant, either during the construction, preparation or operational stage, have close relation with natural resources and environment. Therefore, the basic reference in preparation of IEE are to validate regulations / laws which relate with natural resources and environment.

Those regulations / laws are as follows :

1. Law No. 5/1994 regarding Local Government Fundamental.
2. Law No. 13/1980 regarding Road.
3. Law No. 4/1992 regarding Basic Definition for Environmental Management.
4. Law No. 5/1990 regarding Conservation of Biological Water Resources and Ecosystem.
5. Law No. 4 / 1992 regarding Housing and Settlement.
6. Law No. 24 / 1992 regarding Spatial Planning
7. Government Regulation No. 6 / 180 regarding Local Institution Coordination.
8. Government Regulation No. 20 / 1990 regarding Water Pollution Control.
9. Government Regulation No. 51 / 1993 regarding Environmental Impact Assessment.
10. Presidential Decree No. 55 / 1993 regarding Land for Development of Public Interest.
11. Ministry of Environmental Decree No. 02/MENKLH/6/1988 regarding Environmental Ambient.

12. Ministry of Environmental Decree No. 11/MENLH/3/1994 regarding Activities that Required Environmental Impact Assessment.
13. Ministry of Environmental Decree No. Kep/MENLH/3/1994 regarding Guidance for Preparation of Environmental Impact Assessment.
14. Head of Environmental Management Institution Decree No. KEP-056/1994 regarding Guidance for Major Impact Measurement.
15. Ministry of Public Work Regulation No. 69/PRT/1995 regarding Technical Guideline for EIA in Public Work Project.
16. Ministry of Public Work Decree No. 58/KPTS/1995 regarding Implementation Guidelines for EIA.
17. Ministry of Public Work decree No. 148/KPTS/1995 regarding Technical Guidelines for Preparation of Environmental Management Plant (RKL) and Environmental Monitoring Plant (RPL).
18. Other Local Government Regulations.

1.1.2. Relationship between the Project and Major Environmental Consequences.

Identification made on hypotentie significant impact of the existing problem and the environment condition may have several main issues and have close relation with expansion of Buaran WTP and new Construction of Cipayung WTP as follows :

1.1.2.1. Pre-Construction Phase.

Survey for land acquisition for the WTP, transmission main and distribution system may make the community nervous due to dissatisfied compensation fee they used to receive.

1.1.2.2. Construction Phase

1. The resident may be jealous in case the labor are to be brought in from outside of the project location.

2. Deterioration of air quality due to increase of CO, Sox, Nox, HIC, Pb and Dust, in addition to increment of noise level during the following works :

- Contractor's field office activities
- Land clearing and access road construction, especially at Cipayung WTP location.
- Implementation of WTP Construction.
- Installation of transmission and distribution pipes.

1.1.2.3. Post Construction Phase

1. Increase of noise level and deterioration of air quality due to operation of WTP.
2. Pollution increase at the river bed due to sludge disposal from WTP to the river.

1.2. PURPOSE AND BENEFIT OF THE STUDY

1.2.1. Purpose

The purpose of EIA for Jakarta Water Supply Development Project are :

- a. To fulfill the Law No. 4 / 1982, that any activities or activities planned which was or predicted significant impact, should be completed with the study of Environmental Impact Assessment (EIA).
- b. To assist in preparing plan, decision making on the management and maintenance of the natural resources and environment especially within and also surrounding the construction area of the WTP, transmission main and distribution system.
- c. Applying the government policy on implementation of development project, so that the quality and sustainability can be maintained during all activities.

1.2.2. Purpose on Preparation of EIA

The purpose of the study are as follows :

- a. To identify components of all activities in both WTPs that may have significant impacts into the environment from pre-construction stage to post-construction stage.
- b. To identify pre-condition of environment at the project location which relates with the development area and its surrounding that may receive impact cause by construction and operation of the WTP process.
- c. To predict and evaluate the significant impact by WTPs, transmission mains and distribution pipes, which can be as the basis for decision making during construction and operation of these facilities.

- d. To predict either negative or positive significant impact which was or would be occurred either the magnitude or importance of the impact caused by the activities of the project.
- e. To evaluate the significant impact which would be occurred due to the construction activities and the treatment process and the consequence to the study area, especially the component of river water and soil condition which considering :
 - relation between cause and results during the construction and operation activities of the Jakarta Water Supply facility with the environment within the study work area.
 - the character on the importance of impact, either positive or negative, duration of impact, cumulative character, area of impact distribution and other factors.
- f. To formulate the action plan for Environmental Management and monitoring in the framework of significant impact management. Those action plan is necessary to protect, manage, cope with the environmental impact.

1.2.3. Benefit of the Study

The result of EIA study is expected to be used for :

1. Input for the regional development planning process.
2. As consideration material for detail engineering phase of Buaran and Cipayung WTPs, distribution centers, transmission main and distribution system.
3. As the guidance for the environmental management and monitoring activities.

CHAPTER II METHODOLOGY OF THE ASSESSMENT

2.1. SCOPE OF ASSESSMENT

The scope of the assessment consists of activity components and environmental components inside the boundary of the study area. These components interact each other and also relate to the human activities with the natural ecosystem and social system which will be the basis of determination of the study area. On the other hand, the relation and inter-action of these ecosystem components are necessary to determine the environmental components.

2.1.1. Activity Component

a. Pre-Construction Phase

The activity components to be assessed consist of :

1. Survey at the additional area for Buaran III WTP and required land for acquisition of proposed Cipayung WTP. This process generally investigates land condition and willingness to use the land for WTP.
2. Land acquisition and re-settlement of the people. For the project purpose, the required land area are estimated at 5 ha additionally for Buaran WTP and 15 ha for Cipayung WTP. The potential impact which may occur in this mater is unhappy or the compensation fee for the re-settlement people.

b. Construction Phase

The construction phase is divided into two parts, that is, preparation and execution parts.

1. Preparation for the Construction.

1) Material and Equipment Mobilization.

This activity consists of the transportation of material / equipment to the project location.

Heavy equipment to be used for this project area :

- Bulldozer
- Roller
- Excavator
- Back Hoe
- Dump Truck
- Crane
- Pile Hammer

Other potential impacts to be assessed are :

- deterioration of air quality and noise pollution,
- damage on the road facility and traffic jam

2) Manpower Mobilization

Manpower to execute the project are estimated at about 200 peoples, who usually come from other region or rural area. The analysis on this matter is required onto social-economic impact to the community, especially for WTP Cipayang which area is still kept as cemetery area.

3) Base Camp Construction and Operation.

Generally the base camp is to keep construction materials and equipments and place for labor.

Potential impact predicted on these activities among others are :

- decreasing the environmental quality (air, water) caused by sewerage, and noise pollution.
- Social-economic impact onto the community surrounding the base Camp.

2. Construction

1) Land Preparation and Clearing

Land clearing within the area of Kelurahan Pondok Rangun (Cipayung) which is still reserved as cemetery.

The potential impact which is necessary to examine are :

- deterioration on water quality, air quality and noise,
- biological component disturbance (flora and fauna varieties), and
- disturbance on the road facility and other public facilities due to construction of WTPs, Distribution centers, Transmission and distribution facilities.

2) Soil Work

This activity consists of soil excavation, backfill, stripping and compaction for base of access road to the project location including other associated facilities. Examination on the potential impact are :

- deterioration on air and water qualities as well as noise, besides disturbance on surface water flow, and
- soil erosion and slope stability, especially river bed of Sunter river.

c. Post Construction or Operational Phase

1. Operation of WTP

During the beginning time of treatment plant operation, some important impacts which necessary to be evaluated, which are :

- sludge production of 15,000 x 86,400 mg/day or about 6,000 tons per day (in case 24 hours operation), at the high turbidity (exp 5,000 jtu)
- noise surrounding WTP caused by electric generator set,

2.1.2. Environmental Component

a. Physical Component.

1. Climate

The parameters for physical assessment are type of climate, temperature, humidity, rainfall including number of rainy days, direction and velocity of wind, sun shine intensity, and micro climate pattern.

2. Air Quality and Noise.

Measurement of air quality and noise would be directly conducted at the location of Buaran WTP and the proposed location of Cipayung WTP, in order to understand the condition prior to the construction. The analysis of air quality and noise in the study area covers measurement of the pollution level caused by heavy vehicles for materials and equipments transportation to and from the project site (Co, Nox, Sox, HC, Pb, Dust and noise level).

3. Water Quality.

Water Quality measurement shall be conducted at WTC as the raw water sources, especially on the turbidity.

However, to get the overall evaluation, effluent water quality test is necessary to execute at WTC and Sunter River, which consist of physical, chemical and microbiological tests referred to the valid quality standard.

4. Physiography.

Analysis on this component is to understand land topography, geological structure and soil condition, including its stability.

5. Hydrology

The physical character of river is investigated for hydrology components (such as discharge, sedimentation erosion, besides existing drainage condition, flooding area, quality and level of ground water).

6. Land Use

The analysis would cover the inventarization of present land use and future plan along the alignment of transmission and distribution pipes.

The result of the analysis is expected to predict the land use cause by the construction activity.

7. Road and Traffic Facilities

The assessment would be investigated on road and traffic condition, especially the access road to the Cipayung WTP and all roads along the alignment of transmission and distribution pipes. Assessment shall be

focused on the road damage and traffic disturbance during the construction, excavation and installation of pipes, and traffic condition.

b. Biological Components.

EIA Study specify the biological component, such as investigation and analysis of flora and fauna at the project area. These investigation and analysis are focused especially to the protected flora and fauna. However, during survey and investigation either at Buaran or Cipayung WTPs, those protected flora and fauna are not found and existed.

c. Socio - Economic and Socio - Cultural Components

1. Population.

The population component is analyzed for the number, density, growth rate, composition, education level and work force as well as the other population characteristics.

2. Socio - Economy

Analysis of the socio - economy are for economical matter of community activities, means of livelihood and community income surrounding the study area. Analysis also includes local area income and existing condition of the economical facilities such as trade centre, shops, market, etc.

The socio - economic analysis shall be emphasized on working and business opportunity of the people surrounding the project area, land compensation, socio - economic impact of the people lived along the

alignment of transmission and distribution pipes, and the local / community income growth after completion of WTP.

3. Socio - Culture

Socio - cultural analysis covers the community customs in the study area, community existence patterns, community perception to the project, social facilities and culture preservation in relation with the natural resource and environmental conservation.

4. Safety and orderliness of the people consist of type and level of safety disturbance, and the attitude and perception of the people on KAMTIBMAS.

5. Community Health

The analysis on community health are concerning sanitation condition, health facilities, disease pattern, and the influence of activities planned to the people surrounding.

d. Public Facilities

Investigation and data analysis regarding number and location of the facilities in the study area, such as high voltage electric cable, irrigation and drainage channels etc.

2.2. DELINEATION OF THE STUDY AREA

The delineation of the study area is based on the boundary of project activities and ecological, social and administrative boundaries.

a. Project Boundary

The project area covers Buaran WTP and Cipayung WTP of about 5 ha and 15 ha respectively, and area along the transmission and distribution pipelines.

b. Ecological Boundary

Ecological boundary covers about 500 meter from the WTP.

c. Social Boundary

The social boundary would be determined based on project activities which has strong interaction with the surrounding people and community.

d. Administrative Boundary

The administrative boundary covers all the government area of the project location, which means all DKI Jakarta including all Kecamatan of :

- Kodya Jakarta Utara,
- Jakarta Barat,
- Jakarta Timur,
- Jakarta Selatan, and
- Jakarta Pusat,

as well as some area beyond DKI such as :

1. Kodya Tangerang

- Kecamatan Cipondoh
- Kecamatan Cileduk

2. Kabupaten Bekasi

- Kecamatan Jati Asih
- Kecamatan Pondok Gede

3. Kabupaten Tangerang

- Kecamatan Ciputat
- Kecamatan Pamulang
- Kecamatan Pondok Aren

4. Kabupaten Bogor

- Kecamatan Limo

The study area of the EIA are shown on Figure 2.1.

2.3. RELATIONSHIP WITH OTHER ACTIVITIES

Other activities around Buaran and Cipayang WTPs, at least will give reciprocal impact to the both WTPs.

The other visible activities are :

1. Toll road plan Kp. Melayu - Jagorawi - Cikunir,
2. Toll road plan Lingkar Luar WI, and
3. Toll road plan Kp. Melayu - Kalimalang - Bekasi.

2.4. METHODOLOGY

2.4.1. Method of Data Collection and Data Analysis

The environmental components to be analyzed are obtained from :

- Primary data, directly measurement at the field and/or interview with local people.
- Secondary data, from the institutions concerned and environmental component study.

a. Climate Component

1. Method on Data Collection

The collected data are both primary and secondary data. Secondary data collected as minimum series of ten years period is obtained from the nearest meteorology station. Some climate parameters has also collected directly at the field as primary data.

2. Method of Data Analysis

Data of climate are analyzed for change of micro climate condition caused by the activities at the study area at present and in the future. Climate analysis is to get the maximum and minimum climate parameter and its inclination every year.

b. Air Quality Component

1. Method of Data Collection

Measurement on the air quality for primary data collection had been conducted by 'multiple impinger' with calorimetric spectrophotometer. Noise measurement by sound level meter equipment was conducted during night and day time.

2. Method of Data Analysis

The comparison is made between the investigated data on various air and noise pollution level in the study area with the standard.

3. Investigation

The air quality and noise pollution investigations were conducted at the six points in the study area i.e. :

1. Working area WTP Buaran,
2. Working area WTP Cipayung,
3. Transmission / Distribution main Cakung ,
4. Transmission / Distribution main Kebun Jeruk,
5. Cirendem, and
6. West Tarum Canal.

(See Figure 2.1)

Result of investigations shown in the following table.

No.	Parameter	Unit	Result	NAB
I.	Physics			
	1. Noise (range)	dB		
	2. Noise (average)	dB		
II	Chemist			
	1. Dust			
	2. Carbon dioxide (CO ₂)			
	3. Sulfurdioxide (SO ₂)			
	4. Nitrogendioxide (NO ₂)			
	5. Amonia (NH ₃)			

c. **Land Physiography**

1. **Method of Data Collection**

The sources of data are from secondary data, laboratorium analysis and field investigation.

The secondary data for the land use were obtained from :

- 1) Geology map containing the information of geological formation and main material.
- 2) Topography map and land use map containing the information of shape of land.

Blank table for result of land analysis is as follows.

Parameters	Unit	Method
1. Physics		
a. Texture	%	pipet
b. Structure	-	field investigation
c. Porosity	cm/hour	gravimetri
2. Chemist		
a. pH	-	pH
b. C organic	%	Kjeldahl
c. N total	%	Kjeldahl
d. P available	ppm	Bray I
e. (K, Na, Ca, Mg)	me/100g	N NH4OAC pH 7
f. Al and H	me/100g	N KCL

2. Method of Data Analysis

The physical and chemical soil data is analyzed to determine the soil characteristics in the study area with reference to the Data Evaluation Criteria of Soil Characteristic Analysis (PPT, 1983).

3. Investigation

The location of investigation is concentrated at Buaran WTP, Cipayung WTP and Distribution Centers.

d. Water Quality

1. Method of Data Collection

The Water sampling are conducted for groundwater and surface water surrounding Buaran WTP and Cipayung WTP , in order to get the influence of the treatment plant construction.

Both ground and surface water samples are analyzed at the laboratory for environmental evaluation. While the secondary data is obtained from the research and available publication.

The analysis method for each water quality parameter is referred to the table for water quality.

2. Method of Data Analysis

The result of laboratory analysis is compared with the standard quality for groundwater and surface water regulated in Kep. 02/MENLH/I/1988.

3. Sampling Location

The water sampling is referred to IEE TOR :

- Groundwater
 - two at WTP Buaran
 - two at WTP Cipayung

- Surface water
 - one at the intake Buaran WTP
 - one at the outlet Buaran WTP
 - one at the inlet Cipayung WTP
 - one at the outlet Cipayung WTP
 - one at Moro river, Bekasi.

Results of water quality test on surface water and groundwater are filled in sample forms of table (a) and table (b) attached hereby.

e. **Hydrology**

1. Method of Data Collection and Analysis

- 1) The illustration on physical characteristic of the river is executed by measuring the cross section, river gradient and rain catchment area. Data for this parameter is obtained by direct measured on site, map analysis and secondary data compiling. Those input are significantly to get the illustration of the river environmental condition as the hydrology aspect.

2) **River Discharge, Flood and Puddle Area**

Discharge and Flood analysis are done in accordance with the available data by the following method.

- a. On site discharge measurement
- b. Discharge analysis based on catchment area and rainfall.
- c. Correlation between rainfall and discharge Flooding analysis is for return period of 2, 5, 10, 20, 50 and 100 years.

3) **Sedimentation and River Erosion**

Sedimentation is next process of erosion occurred at the river or rain catchment area. The investigation is conducted through the river and confirmed directly at site.

2. Investigation Location

The hydrology aspect investigation is conducted at WTC, Sunter and Moro river in the study area, which expect impact to the environment surrounding the study area.

f. Water Biology

1. Data collection

The data collection method is as follows :

1) Method of sampling

Water of 30liters is filtered by using plankton net No. 25. The sample water is taken from upper layer at point sampling. By using kemmerer water sampler, the water is filtered at the container at 25 cuc, then preserved by formalin 4 % or lugol. Microscopic identification is done at the laboratory.

2) Nekton / Fish data collection

- direct investigation at site
- secondary data analysis from statistical data, scientific publication, report etc.

3) Fitobentic community data collection by sediment sampling at site using 'Eikman Grab' Equipment.

2. The parameters for amount of gen, diversity of gen be analyzed for plankton, while the analysis of Nekton / Fish will be on the ecological value.

1) Amount

$$N = n \times \frac{A}{B} \times \frac{C}{D} \times \frac{1}{E} \times \frac{2}{p}$$

Where

- N = amount of plankton / liters
- n = number of individual species
- A = area of covering glass (qmm)
- C = filtered water (cuc)
- D = one drop water volume (cuc)
- E = filtered water
- p = total overview site

2) Equitability by Brower and Zar, 1997

3) Nekton ecology value

From the interview and secondary data on the nekton resources, with analysis is conducted on gen composition and benefit amount of nekton resources by local people.

To know the rare and protected gen of nekton, the official guidance issued by Directorate General PHPA is used.

3. Location of Investigation

The primary data collection is conducted at the bay site.

g. Socio Economy and Culture

1. Data collection method

The data collection on socio economy and culture is conducted by questionnaire survey and interview in the impact area of the investigation site.

The secondary data is also necessary to be complete the primary data, population information surrounding Buaran and Cipayung as well as along the transmission and distribution pipeline.

The investigated aspects are the population structure, means of livelihood, structure of culture value, community security and community perception on the project planned.

2. Data analysis method

Data are analyzed by cross tabulation / matrix system quantitatively. In case the data as the time series, the trend analysis is used with the formulas and performed in graphical system.

The content analysis technique is used for the quantitative data.

Generally the quantitative and qualitative analysis shall be integrated.

The qualitative analysis is more phenomena description. The type of data, analysis method are shown on **Table-1.2**.

Sample of interview is as follows :

- 1) Formal and informal figure in the community such as RT, RW and community leader.
- 2) Number of sampling depend on percentage the number of family, 10 % has been taken.

2.4.2. Process of Study

The process of the study shall be developed prior to analysis of the impact which was and will be occurred. The process diagram of EIA for Jakarta Water Supply Development is shown in Diagram 2.1.

The study is to determine the target, type of activities and process method, including the parties involved, responsibility and the project scale based on :

1. Project activity scale due to large area and project complexity.
2. Environmental impact due to intensity, scale of impact distribution, time of impact performance and number of environmental component.

This process would be basis for EIA document preparation and impact prediction analysis with reference to Ministry of Environmental Decree No. Kep.50/MENKLH/6/1987 Attachment II.

The approach for study will be as follows :

1. Environmental Impact Approach

This approach is used to analysis of the existing and predicted impacts, due to the project implementation about the environment.

Basic change on the environmental component will be analyzed simultaneously with the environmental impact in the study area. Prediction on each environmental component, overall preference evaluation with consideration to impact distribution pattern and local environmental impact characteristic are analyzed physically or socially.

Based on the field survey, literature research and team discussion, several existing and predicted environmental problems could be identified, which are caused by the water supply facility operation and its development plan.

Main issues are :

- a. Water quality at the study area surrounding Buaran WTP and proposed Cipayung WTP either physically, chemically or bacteriologically, compared with the standard quality decided by local Government of West Java Province.
- b. Air pollution and noise pollution occurred due to traffic during construction and operation of WTP.
- c. Erosion of the channel edge due to water velocity increase providing negative impact to the intake structure.
- d. Water resources conflict, especially during construction of intake structure.

2.4.3. Prediction of significant Impact

The source identification to determine the characteristic of significant impact are :

- a. Project owner
- b. People surrounding activities
- c. Expert and resources person
- d. Government institution related to the activity

The analysis will be conducted on the planned project in order to identify the primary and secondary impacts due to water supply development including existing facilities, and facilities under construction by on-going project at the study area.

The steps for impact identification process are :

a. Impact Value Prediction

1. Format Method

Mathematic is used as follows.

- volume and area of river water intake
- velocity increasing and erosion of river edge
- water and air pollution

2. Non Formal Method

This method is used for the professional judgment by the expert, in case of :

- No secondary data available to illustrate the dynamic of environment component.
- No existing method which is able to illustrate the impact behavior.
- Prediction method for socio - economy and culture impact and existing activities interaction impact.

3. Analogy Method

This method is used to study the phenomena occurred on previous similar activity / existing WTP.

b. Prediction on significant impact level

The environmental change could be important although it is categorized as law impact. This the importance will be depend on :

1. significant change to the stability of ecosystem

2. significant change to the community, socio - economy and culture life.

Considering the above, the following method are used for prediction of importance impacts.

1. **Great deviation from normal condition for environmental impact would be categorized as important impact.**
2. **Exceeding the environment standard level**

The references used are Government Regulation No. 20/1990, Kep. Men KLH No. 02/MENKLH/I/1988 and Local Government West Java Province Regulation.

3. **Threatened sensitive area**

The impact will become important if the ecology of sensitive area receive disturbance.

4. **Preliminary site investigation**

The aim of this activity is to identify the potential impact which will be occurred. The activities during this preliminary investigation are :

- a. General observation on the present activities of Buaran WTP.
- b. General observation on the present natural condition, socio - economy and culture condition.
- c. Short interview with the people.

c. **Literature Study**

To get input in relation with Water Supply Development activities, several literature had been collected i.e :

1. Technical Guidance for preparation of UPL, ANDAL, PEL, SEL Water Supply sectors.
2. West Java Governor Decree No. 38/1991.
3. Government Regulation No. 22/1982, regarding water arrangement.
4. Government Regulation No. 35/1991, regarding river condition.
5. Ministry of Environmental Decree No. Kep. II/MENLH/3/1994, regarding water collection.
6. Report of Jakarta Water Supply Development Study prepared by JICA Team.

d. Discussion and Brainstorming.

This is to evaluate the result obtained by initiative parties with the consultant who prepares the IEE.

The result of brainstorming will be the main issues which are classified based on relation and importance scale.

The potential and characteristic impact identification and the above steps would be shown in the matrix of identification, as follows :

1. Simple checklist method

The list of environmental component for prediction of impact, either positive or negative due to project activities on pre-construction phase, construction phase and post-construction phase.

2. Simple matrix method

List of project activities at horizontal and environmental component at vertical axis, in order to cover the weakness of simple checklist method.

3. Flow Diagram Method

In order to clearance the impact problem, the interaction of the causal factors and the environmental factor are illustrated.

2.4.4. Hypotetic Environmental Problem

Based on the preliminary survey, literature study, and discussion, the environment problem could be identified :

- a. decreasing water quality due to water treatment process.
- b. Air and noise pollution .

2.4.5. Potential Impact Evaluation

It is necessary for decision making on activities planned to evaluate the potential impact.

Potential impact are interrelation each other, therefore the evaluation conducted partially shall consider the following matters :

- a. To use flexible method to accommodate the diversity of data.
- b. To use the analytical method.
- c. To use comprehensive method considering the holistic evaluation.
- d. The method used can be applied as directive for decision making.
- e. To use numerical scale method to avoid arithmetic errors.

The holistically impact evaluation is to identify the impact described, i.e :

- a. Holistically study on all environmental component.

- b. Impact distribution study on conforming time and space.
- c. Overall study for consideration of environmental management and monitoring.

Based on the above consideration, the impact evaluation method will be used as mutually matrix evaluation and flow diagram methods.

Those evaluation would be formulated as the direct environmental management and monitoring for a basic for Environment Management and monitoring Plan (RKL & RPL).

Evaluation on all potential problem identified is shown as main issues of analysis in IEE.

Centralized and Organized those main issue are to obtain complete and integrated illustration where prepare based on importance scale.

CHAPTER III INITIAL ENVIRONMENT CONDITION

3.1. CLIMATE

The climate component to be investigated in this study will consist of type of climate, temperature and humidity, rain fall and rain days, wind velocity, sun radiation intensity and evaporation.

a. Type of Climate

Based on the geographical location for Jakarta the type of climate is categorized in AW climate which is the tropical climate that identify by high temperature and high humidity and also by seasoning rain (Barry and Charley, 1976).

b. Temperature and Humidity

The average monthly temperature is 26-27o C, with the maximum and minimum average temperature is 24.3 and 34.6o C. While the relative average humidity is 70 to 81 %.

The maximum and minimum average air temperature and relative average humidity are obtained from the meteorology station at Tanjung Priok during 1993 and shown on the Table-3.1 below.

Table-3.1 **MAXIMUM AND MINIMUM AIR TEMPERATURE
FLUCTUATION AND HUMIDITY
AT METEOROLOGY STASION TANJUNG PRIOK**

Month	Air Temperature (°C)		Humidity (%)
	Maximum	Minimum	
January	29,8	24,3	81
February	30,4	24,3	79
March	32,6	24,5	75
April	33,4	25,0	76
May	34,6	25,4	74
June	34,6	25,2	74
July	33,1	24,7	72
August	33,6	24,7	74
September	-	-	-
October	34,2	25,1	70
November	33,8	25,1	74
December	31,9	25,1	71

Sources : Bureau of Statistic Centre, 1994

c. Rain Fall and Rain Days

The average rain fall and monthly rain days in Jakarta and surrounding area during 1993 are shown on Table-3.2.

Table-3.2 **AVERAGE RAIN FALL IN JAKARTA, BOGOR, TANGERANG AND
BEKASI IN 1993**

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Jakarta	14.9	13.6	5.7	3.8	1.2	0.0	1.8	3.5	-	0.8	2.5	4.9
Bogor	16.7	17.5	12.3	19.6	7.3	2.9	6.3	19.8	14.3	17.5	16.2	16.8
Tangerang	8.8	12.5	8.4	4.3	3.5	7.2	1.7	0.67	0.6	2.6	6.0	11.8
Bekasi	15.4	5.6	5.6	0.0	1.2	0.7	0.0	5.7	0.4	1.8	4.0	3.6

Sources : Bureau of Statistic Centre, 1994

d. **Wind Velocity**

The average monthly wind velocity at the proposed project area has variation depend on season. The fluctuation of wind velocity are shown on Table-3.3.

Table-3.3 WIND VELOCITY IN JAKARTA (TANJUNG PRIOK) 1993

No.	Month	Wind Velocity (Knot)
1.	January	7.0
2.	February	35.0
3.	March	30.0
4.	April	28.0
5.	May	27.1
6.	June	28.1
7.	July	24.7
8.	August	25.0
9.	September	-
10.	October	26.3
11.	November	25.0
12.	December	29.0

Based on the data shown on Table-3.3, these wind velocity ranges from 24.7 to 35.0 knot with the average at 29.8 knot. It means these velocities are categorized low to medium.

The impact of wind velocity during construction are to the air pollution caused by dust as well as noise caused by soil work and by equipment. While the impact during operation from the direction and velocity of wind have influence on smell dissemination may occur by treatment waste.

3.2. AIR QUALITY

a. Dust Concentration

The air quality data are concentrated on dust concentration due to this parameter only may get direct influence by the project activities.

The result of measurement on dust concentration for the study area are shown on Table-3.4. Which concludes that the dust concentration on the location of sampling is still below the standard quality issued by Ministry of Environment No. 02/MENKLH/1988, regarding quality limit of air.

**Table-3.4 DUST CONCENTRATION IN THE STUDY AREA
MARCH 1997**

No.	Location No.	Dust Concentration (mg / m ³)	Quality Standard 02/MENKLH/1988 (mg / m ³)
1.	B I	10	260
2.	B II	30	260
3.	B III	20	260
4.	B IV	10	260
5.	B V	9	260
6.	B VI	7	260

Source : Air Quality Laboratorium Analysis
Lab. SEAMEOBIOTROP (March 1997)

b. Noise

Noise level had been measured at 6 (six) location surrounding Buaran WTP, proposed Cipayung WTP and Distribution Centre. The Results are shown on Table-3.5.

From the Table-3.5, it was observed that the noise level ranging from 41 to 68 dBA and they are mostly caused by the traffic. Comparing with the noise standard issued

by Ministry of Environment No. 02/MENKLH/1988, could be concluded that noise level is not so high.

3.3. GEOLOGY AND PHYSIOGRAPHY OF LAND

The land physiography of Jakarta is generally flat with ground elevation ranging from 0m to 50m above sea level. While the geological condition consists of sediment stone miocene to pliocene, green napal soil to grey, lime stone and sand stone. This tertiary sediment stones is covered by thick quaternary sediment.

Generally, performed in alternate layers from clay and general under delta and sea area.

The thickness of quaternary sediment at northern could up to 250 to 300m, while at the southern area surrounding Depok only less than 50m.

It seems that these quaternary sediment come from two sources, broken andesitic fragment at south and part of north seine.

The geology condition of Jakarta and surrounding area are shown in **Figure-3.1**.

3.4. HYDROLOGY

The rainfall and river flow system are the most influence to the hydrology condition at the study area.

The rainfall along the north coast of Jakarta in less than 2,000mm per year, while at the south surrounding Bogor could be up to 5,000mm per year.

In Jabotabek and surrounding area, there are several rivers, among others Cimanuk river, one of the biggest river in West Java with the catchment area is about 6.700sqkm and yearly

average discharge is 179 cum / sec. There is the Cisadane river at western side of Jakarta with yearly average discharge is 97.9 cum/sec.

3.5. WATER QUALITY

The result of water sample analysis at 9 (nine) point investigation are shown on Table-3.5. From the Table-3.5, it could be summarized that water quality in the channel at the study area is generally in acceptable level.

Physical characteristics shows that at AP 1, AP 3, AP 4, the color and temperature value are higher than standard quality. This results may conclude that the water has been polluted by industrial waste.

3.6. BIOLOGY

a. Natural Vegetation

The study area generally as the working land, so the existing natural vegetation is limited. However, the data collection has focused to the yard planting.

There are about 18 types of species had been found on the sampling area besides some decoration plants, see Table-3.6.

Table-3.6 ECONOMY PLANT SPECIES IN THE STUDY AREA

No.	Local Name	Latin Name
I.	Economy Okabts	
1.	Bacang	
2.	Belimbing	
3.	Belimbing Wuluh	
4.	Durian	Durio Cariantus
5.	Flamboyan	
6.	Gamal	
7.	Jambu Air	Elenia Aquea
8.	Jambu Biji	Psidium Quajava
9.	Kecapi	
10.	Kedondong	
11.	Keluwih	
12.	Kelapa	
13.	Mangga	Mangifera Indica
14.	Melinjo	
15.	Nangka	Artocarpus Helerophyla
16.	Pete	
17.	Rambutan	
18.	Sengon	
II.	Decorated Plants	
1.	Sri Rejeki	Agloonia Simplek B.1
2.	Melati	Yasminim Sambao
3.	Kuping Gajah	Atturium Sp.
4.	Kembang Sepatu	Habicus Ronasimensis

b. Fauna

The type of fauna of the study area is very limited and ignorable, such as, rat, cat, dog, bird and few type of insect, are founded.

3.7. WATER BIOLOGY

a. Plankton

Based on the laboratory analysis, the plankton at these 5 (five) point investigation (AP1, AP2, AP3, AP4, WTC) consist of about 34 types of plankton, where 28 types are Fetoplankton and 6 types are zooplankton.

The Fetoplankton, qualitatively found in several classification, such as Cyanophyceae, Chbrophyceae and Bacillariophyceae. Most of them are Bacillariophyceae. These two types of plankton are potential food for fish and other type of fauna which as feeder filtration.

Quantitatively, diversity index analysis result are about 1.33 to 2.47 that means the diversity index of plankton still high and concluded the environmental carrying capacity are still in acceptable level and enough to support lifehood and plankton community expansion, see Table-3.7 for more detailed data.

b. Benthos

Based on field investigation and quantitative analysis result that fauna benthos (macrozoobenthos) had obtained generally in good enough conditions. Those conclusion is indicated by the diversity of benthos is about 0.81 to 0.97 as shown in Table-3.8.

Table-3.8 BENTHOS ANALYSIS RESULT

Benthos	AP 1	AP 2	AP 3	AP 4	WTC
GASTROPODA					
Melonoides	150	-	-	-	-
OLIGOCHAETA					
Lumbriculus sp	-	375	-	-	-
DIPTERA LARVA					
Chyptonchironomus sp	100	125	-	-	-
Total Taxa (s)	2	2	0	0	0
Total Ind/m ² (N)	250	500	0	0	0
Diversity	0.97	0.81	0	0	0
H - Max	1	1	0	0	0
Uniformity (E)	0.97	0.81	0	0	0
Domination (D)	0.52	0.63	0	0	0

Source : Result of Laboratorium Analysis by SEAMEOBIOTROP

3.8. SOCIO - ECONOMY AND CULTURE

a. Demography

The study area is located in 5 Jakarta region, Bogor in 4 Kecamatan, Bekasi in 4 Kecamatan, Tangerang in 5 Kecamatan and Kodya Tangerang in 4 Kecamatan, see Table-3.9 for more information.

Table-3.9 POPULATION, AREA AND POPULATION DENSITY

Location	Area (Ha)	Population (people)	Density (people/ha)
Jakarta Selatan	14,537	1,865,712	129
Jakarta Timur	18,773	1,867,498	100
Jakarta Pusat	4,790	1,118,325	234
Jakarta Barat	12,615	1,443,172	115
Jakarta Utara	15,411	1,100,291	72
Bogor	13,864	435,838	32
Bekasi	14,706	487,856	33
Kab. Tangerang	16,310	672,106	41
Kodya Tangerang	10,009	623,720	63

From the above table, the highest population is at Jakarta Timur and Jakarta Selatan. The highest density is 234 people/ha at the Jakarta Pusat and 129 people/ha at Jakarta Selatan.

b. Socio Economy

In whole study area, there are 418 Kelurahan with area of 2,948ha and population of 941,682 people. The people in this area are with daily income about Rp. 10,000 to Rp. 20,000. Part of them, workers as driver of bus or taxi, construction labour etc, with average daily income between Rp. 7,000 to Rp. 24,000.

CHAPTER IV JAKARTA WATER SUPPLY DEVELOPMENT PLAN

4.1. TARGET OF JAKARTA WATER SUPPLY DEVELOPMENT

4.1.1. Problems

The target of previous master plan for water supply services (1983 - 1985) could not be satisfied mainly because of:

- rapid increase of water demand caused by urbanization
- delay of treatment plant construction
- delay of water resources development

Under the such situation, improvement of water supply services for Jakarta people becomes an urgent issue.

4.1.2. Target

The study on the revise of Jakarta Water Supply Development Project has been conducted in order to solve these problems in water supply services.

The target of Jakarta Water Supply Development are :

- to improve the water supply services to satisfy not only domestic demand but also industrial and commercial demand.
- to expand services to Fringe Area of DKI Jakarta, namely Bogor, Tangerang and Bekasi.

Immediate activities to be taken are as follows :

Part 1 of 2nd Phase 2nd Stage, year 2005

- Construction of WTP Buaran III with capacity of 5,000 l/sec
- Construction of Distribution Centre R6
- Expansion of Distribution R1

Transmission main installation from Distribution Centre 1 to DC-R6.

4.1.3. Jakarta Development Project Plan

The basic strategy of Jakarta Water Supply Development study is to improve the present water supply condition in the following aspects.

- area of services, stability of services, quality of services
- administrative condition for efficiency of services.

The study also has prepared basic parameters and implementation schedules indicating the priory projects, considering water demand and potential water resources.

The progress after the Master Plan in 1985, has also reviewed. The study includes the followings:

- Analysis on the water supply facilities requirement.
- Evaluation on the Water Supply Management System implemented by PAM Jaya.
- Investigation on the private participation.

4.1.4. Implementation of the Project

Major 4(four) activities in the development program is summarized as follows:

1. Expansion of Buaran WTP

Expansion of Buaran WTP (Buaran I and II) from the capacity of 10,000 l/sec to 5,000 l/sec taking raw water from West Tarum Canal.

The Buaran III is planned to supply water to DC-R1 and DC-R6 through transmission pipeline of which length is 33.5km.

2. Construction of Cipayang WTP / New East Treatment plant.

The construction is planned with two phases: treatment capacity of 5,000 l/sec for Phase I and the capacity of 10,000 l/sec for Phase II. The required area of Cipayang WTP is to be around 15ha.

Cipayang WTP is planned to supply to Distribution Centres R4 and R5 through 41.5km and 23.5km transmission mains.

CHAPTER V IMPACT ASSESSMENT

5.1. SPACE AND TIME FACTORS

5.1.1. Area Impact

Scope of the project consists of:

- Buaran Treatment Plant III
- Cipayung Treatment Plant
- R1, R4, R5, and R6 Distribute Centres
- Transmission mains and distribution mains

To assess impacts, current condition of existing service area was taken into account. On the other hand, to assess future impacts, site impacts were analyzed which will take place in future service area where water supply services will be expanded.

5.1.2. Time of Impact Study

a. Impact already occurred

The present construction activities of R4 Distribution Centre, gives an opportunity to study on already occurring impacts such as vehicular traffic of human activities in the surrounding area.

b. Future Impacts

Future impacts assessment will be categorized into two, these are : those assessed to be occurring as a consequence of present activities, and those due to future development activities.

In this we envisage future impacts as an accumulation of :

1. Impacts due to past activities, which are expected to be continued until development activities will take place.
2. Impacts which will occur due to the project implementation.

5.1.3. External Activities Factors

Occurring environmental changes in the surrounding of the study area in fact originate not valley from water supply. Thus other development activities will be accounted for those activities onsite the study are, occurring in parallel with the water supply project, to gather will exert accumulation environmental impacts, such as :

1. The natural scene : rain fall, ebb and fide. This environmental component belongs to the category which are beyond the human control.
2. Operational activities for the Buaran I & II Water Treatment Plant and traffic along the transmission pipe line and around the distribution centre, belong to the category of noise-pollution.

5.2. IMPACTS WITHIN THE STUDY AREA

5.2.1. Impacts in general

Impact assessment for each different categories of activities is presented in Flow Diagram No. 5.1.

The development of Jakarta Water Supply contains five sub activities, which may cause impacts. Such impacts generated by each sub activity are presented in Flow Diagram No. 5.2.

Based on the No. 5.2, general impacts of each activity are as follows :

a. Treatment Plant Construction

1. Raw Water Intake

1) Erosive forces to the river bank

Auxiliary works for constructing related coffer dam and other earth works, will develop aggressive erosion forces to the river banks, as a result of increase in the flow velocity of the river water.

2) Noise pollution

Pile hammering activities for the foundation of the Water Intake Structure will increase the intensity of noise pollution. This is also the case for the operational activities of pumps and the electrical generating set.

3) Social Conflict

Some social conflict may occur among present water user of the same river, especially during drought when the river water volume is very limited.

2. Construction of the Water Treatment Plant

1) Social Conflict

Resettlement problem will occur during the land acquisition procedure. Careful communication with and consent of land owners are indispensable.

2) Damaged roads

Big construction vehicle for the project will damage existing roads to the treatment site.

3) Traffic nuisance

Along the access roads to the site. Severe traffic jam may occur.

4) Air Pollution

Construction activities in the Water Treatment Plant, will produce more dust. Also water quality is impaired because of more sludge will be disposed from sludge settling tanks and filters.

5) Noise

The noise in the surrounding of the WTP will be generated from the operation activities of earth works, equipment's and cranes, pumps and generators.

3. The Construction of Transmission Mains and Distribution Centre

1) Social Unrest

This is connected to land acquisition activities, notably during surveys and site investigations. Possibly the social approach was being carried out without care. Also, problems may be arised from disagreements on land price and compensation for resettlement.

2) Noise

Increase of noise will occur from earth works involving equipment's and cranes to install big diameters of pipes.

3) Air Quality

In areas where the transmission pipe line are to be laid and sites of R4, R5 and R6, activities related, will increase occurrence of dust due to excavation of land along the road.

4) Nuisance to daily activities

Along the roads where transmission and distribution pipeline are to be laid, daily activities would be hampered due to temporary construction of access to their houses.

5) Public Utility Damage

In this category includes, telephone, electrically, gas, which could be damaged due to careless excavation activities for laying of pipes.

5.2.2. Chemical and Physical Component

a. Climate

1. Impact on air temperature and humidity

1) Already occurring impacts

The existence of Buaran WTP I and II have changed the scenery from open land fields to built-up condition and this could influence ultimate conditions for WTP Buaran III due to the nearness of its location.

In Buaran I and II, operational activities changes circumstances due to the use of pumps and generators, also AC units operated in the building. Therefore, air temperature might be increased slightly outside these facilities.

Also in hammering of concrete piles using heat energy machinery, vibration problem may occur.

b. Air Quality and Noise Nuisance

Activities influencing air quality are as follows :

1. Dust of Concrete

1) Impact which has occurred

It has been reported that piling activities for R4 in Kebun Keruk increased the dust in the air.

Dust counted on site was 10 $\mu\text{g}/\text{m}^3$. It was very small comparing to the allowable limit of 260 $\mu\text{g}/\text{m}^3$, according to Environmental Standard as 02/MENKLH/1988.

2) Future Impact

Future dust increase could be expected during construction activities for Treatment Plant, transmission pipe installation and construction of Distribution Centre, as result of vehicular transports of material.

2. Gas content in the air and smell

1) Future Impact

Emitted gas could be expected from vehicular traffic, the operational activities of the Treatment Plant, such as smell of chemicals/ H_2S , SO_2 , Nox, CO_2 thus decreasing the air quality.

Such gas and smell could cover large areas, expectable from vehicles operated during construction and during operational activities of the WTP.

3. Noise

1) Impact which has occurred

During pile driving works, noise will be exerted from generators and other mechanical machinaries being operated. At the time of pile driving, 56 dB (A) was reported while conditions during the time without pile

driving activities where reported 50 dB (A). These 2 figures certainly exceeds standard.

2) Future Impacts

It is assessed that noise nuisance may be increased during the construction phase of WTP and laying of transmission/ distribution pipes. Certainly such occurrence are expectable in the operational phase of WTP.

4. Water Quality

Water quality study to be undertaken covers :

- groundwater
- surface water (river)

It is assessed that construction activities of WTP, pipelines and Distribution Centres, could give rise of sludge concentration which could give influence the quality of groundwater. Later on sludge settling tanks will produce sludge which will be treated and disposed to near rivers (S. Nowo and S. Tarum Barat).

5.2.3. Social Economy and Cultural Aspect

The Social Economy as well as Cultural aspects will be discussed as follows :

a. Need for work and job opportunity

The implementation of the Water Supply Development Project could provide for work and job-opportunities, especially during the construction phase, it will provide work for labor. After Construction, it can provide opportunities for, operators, office-workforce and general worker. These are some of the positive impacts, and important for the development of job-opportunities.

b. Density of Traffic

1) Future Impacts

The transmission pipe corridor, including the distribution centre site is situated in a very dense vehicular traffic area. It is needless to mention that during the pipeline construction phase, traffic jam may occur.

c. Public Perception

1) Future Impact

The implementation of Water Supply Development Project may give rise to accumulated positive impacts due to urgent program as well as long term programs. This impacts is positive in terms of job opportunity provisions.

d. Public Health

1) Future Impacts

Improvement of water supply service will cause a positive impact on public health.

e. Public facility and utilities

The pipe laying works may damage the electrical, telephone network and others. Problems may arise, in the case of uncoordinated planning and management thereof.

f. Impact Assessment

Hydrology

Among such a great deal of activities in the Jakarta Water Supply Project, it has been assessed as those possessing potentials to affect the hydrological components are : the construction activities of water intakes at the Bekasi Pump

Station and Transmission. Pipeline approaching Cipayung WTP, it was assessed to affect in habit directly the water flow in the Kali Malang, and as the other hand as an indirect impact in the rekerction of water quality due to adverse pollution materials.

During the operational stage, the direct impact is on the volume of water downstream the two intakes structures due to absorption of those quantities treated.

Physiography and Geology

1) Physiography Impact

Physiographical impact may occur during the excavation of soil for the transmission pipe and other tanks within the WTP. These excavating activities will influence the physiographical conditions of the sites. Such change will result in short time only during construction except for WTP activities. Whereby flat lands are being converted into water tanks necessary for the WTP process.

In this way the Physiographical Impact of the site is negative but it will be not serious.

2) Geological Impact

During construction, especially slope stability of excavations such as for transmission pipe and water tanks in the WTP, geological impacts could be observed.

This slope protection solution is relatively easy. For Jakarta, the geological condition, consists of sedimentary rocks and for the site of the project, geologically spealing no significant conditions to be observed. The Geological impact is negative but not serious.

CHAPTER VI THE EVALUATION OF IMPORTANT IMPACTS

6.1. MAJOR ENVIRONMENTAL ISSUES

Based on Preliminary assessments and analysis of data collected on site, there are five main environmental issue these are :

1. Quality of water in the project area in terms of physical, chemical as well as biological aspects.
2. Air Pollution (Mainly dust), Noise nuisance during construction period and operation activities of WTP, and distribution centres.
3. Traffic problems and road degradation during construction period
4. Sludge discharge and its impact on river flows
5. Social impacts and job opportunity

6.2. EVALUATION OF IMPORTANT IMPACTS

The change of environmental component in the project area in the framework of Jakarta Water Supply Project will be evaluated as positive impact and negative impact. These environmental impact will be evaluated through short, medium and long term project life. These evaluation is shown on Flow Pattern attached hereto.

For more details, current and future environmental impacts are summarized in the figure of matrix as attached.

6.2.1. Tendencies of Already Occurring Impacts

Based on the above mentioned matrix, it is observed that the tendencies of occurring impacts cover a spectrum of less important to important impacts and negative influences.

a. Noise

Air quality is one of the environmental component, and this air quality is affected by the Project in terms of :

- contractor's base camp activities, land clearing and access road
- construction of WTP
- construction of transmission/distribution pipe mains
- operation of WTP, including pump and generator.

Accumulating impacts caused by Buaran WTP I and II then Buaran III which is nearby located, then noise pollution is an important negative impact on the surroundings.

b. Decrease of Air Quality

Decrease of air quality will occur because of

- contractor's base camp, land clearing and access roads
- construction of WTP
- construction of transmission/distribution pipelines

Such impact will occur during the project life, affecting labours on site and inhabitants in the surroundings.

c. Quality of Water

In the preliminary phase such as contractor's base camp activities, the disposal of human waste and oil waste by workers could pollute water.

This could also occur during the WTP operation, by which sludge will be disposed of as a result of setting process and washing of filters. This affect the downstream parts of the WTP. Further impacts will cause :

- other activities in the downstream part
- sedimentation in the river
- public health of people residing downstream of the WTP

Declining of water quality can be categorized as negative important impacts.

d. Traffic Problem

Roads planned to be installed pipeline have rather heavy traffic. This is also valid for the access road to the WTP. During construction works for pipe laying and Distribution Centre, traffic will be affected and passers by hampered.

Although these impacts occurred only during construction activities, the development thereof could impair public activities of which indicated that such impacts are negative and important.

6.2.2. Evaluation of Impact

Hydrology

Impact towards the hydrological component, which is the smoothness and the improvement of the river flow. If evaluated based on the Decree of the Chief of BAPEDAL no. 056, year 1994, the result will be as follows :

- Number of population affected : Such impact is of the category important, because water users upstream of the river will be affected by the fluctuation of the river flow, and those living downstream will experience shallowing impacts due to settlement of sludge.
- The extents of area affected : This impact is important as it affects the river as a whole.
- Duration of impact : This impact is not important because it occurs only during the construction phase.

- Intensity of impact : This impact is not important as the rise of water level is not too much
- Number of components affected : This impact is not important, because it affects in second degree on the water components
- Commutative of impacts. These impacts are not important because the fluctuation of river water level only occurred during the construction phase.
- Reversible or irreversible of impact : Such impact are not important, because the sedimentation phenomenon can be surmounted by people.

From the above evaluation, it can be concluded that impact of activities during construction on the hydrology component can be categorized as not important.

The construction of treatment plant, pipelines and related infrastructure will not cause substantial disturbance. The environmental consequences associated with these impacts are not considered to be significant if managed during and after construction as stipulated in the environmental management plan.

CHAPTER VII APPROACH ON ENVIRONMENTAL MANAGEMENT AND MONITORING

7.1. APPROACH ON ENVIRONMENTAL MANAGEMENT

1. Approach on System

Environmental Management is integration of efforts in arrangement, maintenance, inspection controlling, recovery and environmental development.

At the approach on system, the environmental management would be based on systematical relation between the standard of energy and the ambient standard, the standard of energy is used for minimizing the pollution, while the ambient standard is the tools for controlling. With implanted the basic environment understanding reflected the system understanding, therefore the approach of system shall be applied on every stage of environmental management.

2. Approach on Technology

a. To mitigate the pollution at the source :

- to treat the polluter prior to disposal
- technology innovation, so the polluter could be minimized prior to come out from the source
- to recover the environment at the polluted area

These efforts are applicable to biological and non-biological environment aspect. The technology approach which will be applied, shall be needed to be considered the technology activities of the local community.

b. To recover decreased quality of the environmental element due to pollution that caused by the activities.

3. **Economical Approach**

The economical approach for environmental management is in connection with taxes and subsidy to push the private economy behavior in order to improve the environmental quality, as well as the regulation and prohibition in line with government competence, to restrict the private property in use up the land, air, water and other environmental resources.

In the case of the environmental pollution allowable higher, so the social cost also higher, while social benefit could be higher while the social cost will be lower. The optimum point is the crossing point of the those two types of social benefit line which determined based on the valid environment standard quality.

If the standard as not available yet, the criteria could be priory determined.

4. **Institutional Approach**

Institutional approach for developing the integrated environmental management system are as follows :

- developing the inter-institution cooperation
- developing regulation and law
- developing inspection

In the institutional approach, the prior both aspect, technology and economy approach should also be considered, so that all aspect of approach had inter-relationship.

7.2. APPROACH ON ENVIRONMENTAL MONITORING

1. Spatial Dimension Approach

The monitoring in this method on several environmental impact especially negative impact is executed at the exact location.

2. Time Dimension Approach

To execute the monitoring for such dynamic manner, so the monitoring have to consider time concern. The environment could be considered as the space which the content is changing from time to time that provide impact also to the environmental change. Therefore, the time dimension should be considered in the environment monitoring.

3. Integrated Approach

Integrated approach means dealing with negative impact. Integrated Approach is necessary from planning, implementation, monitoring and evaluation through sharing of duty among the related institution.

7.3. DIRECTIVE ENVIRONMENTAL MANAGEMENT

1. To manage negative impact by noise, the working time management could be applied, besides information give to the people surrounding on the construction of intake, treatment plant and distribution centres.

Further condition during the operation of intake and treatment process, such noise could be mitigated by :

- selection of location as far as possible from sensitive area
- pump station and power generator house shall be sound proofed

- the equipment shall be well maintained.
2. To reduce the dust during the construction period and access road construction as well as during construction, distribution centers and pipe installation, to the following effort shall be considered :
- Working time arrangement
 - Periodical water splashing
 - Backfill arrangement
3. To reduce the pollution on surface water :
- locate public lavatory
 - solid waste/disposal arrangement
 - oil pit disposal or recycling

During land clearing and access road construction

- adequate drainage arrangement
- Dike for mud protection

After construction of WTP

- adequate waste / sludge disposal
- operational capability improvement, especially storage and chemical using material.

4. To avoid traffic jam during mobilization of material, equipment and workforce shall consider :
- route and best time identification
 - traffic arrangement
 - coordination with high way authority and police

To minimize traffic disturbance during pipe installation :

- traffic arrangement
- staging of work execution

- traffic sign board/lamp
 - coordination with high way authority and police.
5. To prevent damage of the public facilities (electricity, telephone, etc.) shall :
- preliminary identification
 - information to relates institution.

7.4. DIRECTIVE ENVIRONMENTAL MONITORING

1. Noise monitoring caused by
- piling work
 - WTP Civil Work

While noise caused by WTP operation, especially pump and generator could be monitored with :

- noise level
- people perception and attitude.

2. Monitoring of air quality, during :
- treatment plant construction
 - transmission pipe installation

shall be :

- air quality measuring
- people perception and attitude

3. Pollution impact to water shall be :
- water quality investigation
 - sanitation facilities maintenance and arrangement
 - site cleaning

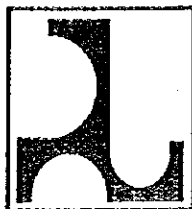
While during land clearing, could be monitored with :

- rain water flow on work site
- water bed condition

During the operation of WTP, especially sedimentation impact, could be monitored through :

- performance quality of the equipment
- operator supervision

4. To monitor on traffic impact, could be monitored through the level of traffic smoothness.



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J A K A R T A - S E L A T A N

KONSEP LAPORAN AKHIR
STUDI ANALISA DAMPAK LINGKUNGAN
PROYEK PENGEMBANGAN AIR BERSIH
JAKARTA

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JICA STUDY TEAM

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BAB I

PENDAHULUAN

BAB I

PENDAHULUAN

1.1. LATAR BELAKANG

Pada periode tahun 1995-1996, HCA Studi Team melaksanakan pekerjaan Review "Studi Master Plan and Feasibility Study for Jakarta Water Supply Development Project", yang dituangkan kedalam bentuk "Proyek Pengembangan Air Bersih Jakarta".

Mempertimbangkan perkembangan penduduk dan kegiatan serta nilai kebutuhan akan air bersih, pada studi ini telah diperoleh suatu kesepakatan dengan instansi-instansi terkait, untuk meningkatkan atau mengembangkan rencana induk air bersih yang telah digariskan dalam studi Master Plan dan feasibility study yang terdahulu.

Adapun rencana pengembangan yang dimaksud adalah melaksanakan perluasan daerah pelayanan "Fringe Area" DKI Jakarta seperti Bogor, Tangerang, Bekasi secara bertahap melalui upaya peningkatan kapasitas instalasi Pengolahan di Buaran dan Pembangunan IPA di Cipayang serta perluasan jaringan transmisi dan distribusi, pusat distribusi.

Untuk mewujudkan seluruh pembangunan diatas yang berwawasan lingkungan serta dapat dikendalikannya pemanfaatan sumber daya alam secara bijaksana, pengkajian secara seksama setiap kegiatan tersebut dari sejak awal perlu dilakukan. Pengkajian ini dimaksudkan untuk mengetahui perubahan mendasar terhadap lingkungan, sebagai akibat pembentukan suatu kondisi lingkungan yang baru.

Dalam konteks pembangunan yang berwawasan lingkungan pemerintah telah menetapkan Undang-undang No. 4 tahun 1982 tentang Ketentuan-ketentuan Pokok

Pengelolaan dan Peraturan Pemerintah No. 51 tahun 1993 tentang Analisis Dampak Lingkungan, ditetapkan bahwa semua kegiatan yang mengubah tentang alam dan diperkirakan menimbulkan dampak penting terhadap lingkungan wajib dilengkapi dengan Analisis Dampak Lingkungan (AMDAL).

Di sektor Air Bersih, KEPMENLH No. Kep. 11/MEN.LH/3/1994 menyebutkan bahwa setiap kegiatan yang mengambil air danau, sungai, mata air atau sumber air lainnya dengan kapasitas lebih besar dan 2 M³/dik atau terletak dikawasan lindung perlu dilengkapi dengan Dokumen AMDAL.

Pada pelaksanaan pembangunan tersebut diatas, baik dalam tahap pra konstruksi, konstruksi dan pasca konstruksi berbagai kegiatan diperkirakan akan menimbulkan dampak penting terhadap lingkungan. Oleh karena itu studi ANDAL adalah cara pendekatan yang tepat dalam memperoleh gambaran secara jelas tentang dampak yang timbul dan dampak yang mungkin timbul dalam rangka pengembangan air bersih jakarta, baik berupa fisika, kimia, biologi, sosial ekonomi dan sosial budaya, yang berkaitan dengan wilayah/areal pembangunan dan sekitarnya.

Dengan demikian ANDAL dapat menjadi bahan masukan dalam melakukan upaya-upaya pencegahan, pengendalian dan penanggulangan dampak negatif serta dampak positif yang akan timbul dikemudian hari dalam bentuk Rencana Pengelolaan Lingkungan (RKL) dan Rencana Pemantauan Lingkungan (RPL).

1.1.1. Dasar Hukum Penyusunan ANDAL

Sebagaimana diketahui di dalam kegiatan lingkungan instalasi pengolahan air bersih baik dalam masa persiapan pembangunan konstruksi maupun operasional, memiliki hubungan erat dengan sumber daya alam dan lingkungan hidup. Oleh sebab itu acuan yang mendasar dalam penyusunan ANDAL adalah peraturan-peraturan/perundang-undangan yang berlaku dan terkait dengan pengelolaan sumber daya alam dan lingkungan hidup.

Peraturan-peraturan/perundang-undangan yang dimaksud antara lain :

1. Undang-undang No. 5 Tahun 1994 tentang Pokok-pokok Pemerintahan di Daerah.
2. Undang-undang No. 13 Tahun 1980 tentang Jalan.
3. Undang-undang No. 4 Tahun 1982 tentang Ketentuan-ketentuan Pokok Pengelolaan Lingkungan Hidup.
4. Undang-undang No. 5 Tahun 1990 Konservasi Sumberdaya Air Hayati dan Ekosistimnya.
5. Undang-undang No. 4 Tahun 1992 tentang Perumahan dan Permukiman.
6. Undang-undang No. 24 Tahun 1992 tentang Penataan Ruang.
7. Peraturan Pemerintah Nomor 6 Tahun 1988 tentang Koordinasi Kegiatan Instansi Vertikal di Daerah.
8. Peraturan Pemerintah Nomor 20 Tahun 1990 tentang Pengendalian Pencemaran Air.
9. Peraturan Pemerintah Nomor 51 Tahun 1993 tentang Analisis Mengenai Dampak Lingkungan.
10. Keputusan Presiden RI Nomor 55 Tahun 1993 Pengadaan Tanah bagi Pelaksanaan Pembangunan untuk Kepentingan Umum.
11. Keputusan Menteri Negara Kependudukan dan Lingkungan Hidup No. Kep. 02/MENKLH/6/1988 tentang Pedoman Penetapan Baku Mutu Lingkungan.
12. Keputusan Menteri Negara Lingkungan Hidup No. Kep. 11/MENLH/3/1994 tentang Jenis Usaha atau Kegiatan Yang Wajib Dilengkapi dengan Analisis Mengenai Dampak Lingkungan.
13. Keputusan Menteri Negara Lingkungan Hidup No. Kep/MENLH/3/1994 tentang Pedoman Umum Penyusunan Analisis Mengenai Dampak Lingkungan.
14. Keputusan Kepala Badan Pengendalian Dampak Lingkungan No. KEP-056 Tahun 1994 tentang Pedoman Mengenai Ukuran Dampak Penting.
15. Peraturan Menteri Pekerjaan Umum No. 69/PRT/1995 tentang Pedoman Teknis AMDAL Proyek Bidang PU.

16. Keputusan Menteri Pekerjaan Umum No. 58/KPTS/1995 tentang Petunjuk Tata Laksana Analisis Mengenai Dampak Lingkungan.
17. Keputusan Menteri Pekerjaan Umum No. 148/KPTS/1995 tentang Petunjuk Teknis Penyusunan RKL dan RPL
18. Peraturan Daerah Lainnya yang terkait.

1.1.2. Kaitan Kegiatan Dengan Dampak Penting yang Mungkin Timbul.

Berdasarkan hasil identifikasi dampak penting hipotensi dari permasalahan yang ada dalam kaitannya dengan kondisi lingkungan, diperkirakan terdapat beberapa isu utama yang terkait erat dengan rencana Pengembangan Instalasi Pengolahan Air (IPA) di Buaran dan Cipayung, PDAM, DKI Jakarta sebagai berikut :

1.1.2.1. Tahap Pra Konstruksi

Survey dan pengadaan tanah untuk lokasi IPA dan jaringan transmisi serta jaringan distribusi dapat menimbulkan keresahan masyarakat akibat ketidakpuasan besarnya nilai ganti rugi yang diberikan.

1.1.2.2. Tahap Konstruksi

1. Kemungkinan timbulnya kecemburuan sosial pada saat mobilisasi tenaga kerja jika tenaga kerja kasar didatangkan dari luar daerah.
2. Menurunnya kualitas udara karena meningkatnya emisi gas CO, Sox, Nox, HC, Pb dan debu, serta naiknya tingkat kebisingan yang diakibatkan oleh :
 - Pengoperasian Base Camp.
 - Pembersihan lahan dan pembuatan jalan masuk khususnya di IPA Cipayung

- Pelaksanaan konstruksi IPA
- Pemasangan jaringan pipa transmisi dan jaringan pipa distribusi

1.1.2.3. Tahap Pasca Konstruksi

1. Naiknya tingkat kebisingan dan menurunnya kualitas udara yang disebabkan oleh penggunaan dalam pengoperasian IPA
2. Meningkatnya pencemaran di wilayah hilir badan air apabila sludge atau lumpur hasil pengolahan dibuang kembali ke badan air (S. Sunter untuk IPA Cipayung dan Saluran Tarum Barat untuk IPA Buaran).

1.2. TUJUAN DAN MANFAAT STUDI

1.2.1. Maksud

Maksud dilaksanakan ANDAL pengembangan air bersih Jakarta adalah :

- a. Memenuhi ketentuan sebagaimana yang dimaksud dalam undang-undang no. 4 tahun 1982, setiap kegiatan dan rencana kegiatan yang sudah maupun yang diperkirakan menimbulkan dampak penting wajib dilengkapi dengan studi mengenai evaluasi dampak lingkungan atau Analisis Mengenai Dampak Lingkungan
- b. Membantu dalam penyusunan perencanaan, pengambilan keputusan dalam pengelolaan dan pemeliharaan sumber daya alam dan lingkungan hidup yang merupakan landasan pokok dalam pemanfaatan sumber daya alam dan kelestarian lingkungan, terutama didalam dan disekitar daerah lingkungan kerja pembangunan instansi air bersih, jaringan pipa transmisi dan distribusi.

- c. Menerapkan kebijaksanaan pemerintah didalam melaksanakan pembangunan yang berwawasan lingkungan, sehingga kualitas dan kelestarian lingkungan hidup tetap terpelihara didalam pelaksanaan kegiatan pembangunan dan operasional pengembangan air bersih yang meliputi instalasi air bersih, jaringan pipa transmisi dan distribusi

1.2.2. Tujuan Penyusunan ANDAL

Adapun tujuan daripada pelaksanaan studi ini adalah sebagai berikut :

- a. Mengidentifikasi Komponen-komponen kegiatan Pembangunan IPA Buaran dan Cipayung yang diperkirakan berpotensi menimbulkan dampak penting terhadap lingkungan mulai dari tahap pra konstruksi, konstruksi dan pasca konstruksi.
- b. Mengidentifikasi rona lingkungan awal di wilayah studi, yang berkaitan dengan kawasan pembangunan sekitarnya yang kelak akan menerima dampak akibat kegiatan pembangunan dan operasional sarana air bersih, dan proses pengolahan air bersih, terutama komponen-komponen lingkungan hidup yang sensitif terhadap perubahan dan dapat membangkitkan dampak lanjutan terhadap kelangsungan operasional instalasi air bersih dan pengaruh buruk yang timbul terhadap kawasan wilayah studi tersebut.
- c. Memperkirakan dampak penting lingkungan sekaligus mengevaluasinya secara holistik terhadap kegiatan pembangunan IPA Buaran dan Cipayung, pemasangan pipa transmisi dan pipa distribusi, sehingga dapat dijadikan dasar untuk mengambil keputusan terhadap kelangsungan rencana pembangunan dan operasional kegiatan yang disebutkan diatas dengan memperhatikan sifat kepentingan.
- d. Memperkirakan dampak penting lingkungan baik negatif maupun positif yang telah dan akan timbul baik segi dampak yang ditimbulkan

(magnitude) maupun derajat kepentingan (Importance) dampak yang diakibatkan oleh kegiatan pembangunan IPA Buaran dan Cipayung, pemasangan pipa transmisi dan pusat distribusi dan pipa transisi distribusi dalam wilayah studi.

- e. Mengevaluasi dampak penting lingkungan yang akan timbul secara holistik akibat kegiatan pembangunan sarana air bersih dan proses pengolahan air bersih, dan akibatnya terhadap wilayah studi, terutama komponen air sungai, tanah dan lain-lain yang menjadi dasar untuk mengambil keputusan dalam pembangunan pengembangan air bersih Jakarta dengan memperhatikan :
- hubungan sebab akibat antara kegiatan pembangunan dan operasional prasarana sarana air bersih Jakarta dengan lingkungan hidup didalam daerah kerja studi
 - sifat kepentingan dampak, yakni positif atau negatif ditinjau dari segi terbalik atau tak terbalik, lama dampak berlangsung, sifat kumulatif, luas wilayah sebaran dampak dan faktor-faktor lainnya.
- f. Merumuskan saran tindak dalam pengelolaan dan pemantauan lingkungan dalam rangka penanganan dampak penting yang timbul akibat rencana pembangunan IPA Buaran dan Cipayung, pusat-pusat distribusi air, pemasangan pipa transmisi serta distribusi. Saran tindak pengelolaan dan pemantauan lingkungan ini berguna dalam mencegah, mengendalikan dan menanggulangi dampak lingkungan dengan mempertimbangkan kemampuan pihak pengelolaannya, yang selanjutnya dirumuskan lebih lanjut dalam dokumen RKL dan RPL.

1.2.3. Manfaat Studi

Hasil Studi Analisis Dampak Lingkungan ini diharapkan dapat digunakan untuk :

1. Bahan masukan bagi proses perencanaan pembangunan daerah
2. Membantu pengambilan keputusan dalam rangka mengamankan lokasi IPA yang paling layak dari segi lingkungan
3. Bahan pertimbangan dalam tahap perencanaan rinci (detail engineering phase) pembangunan IPA Buaran dan Cipayung, pusat-pusat distribusi dan jaringan pipa transmisi serta distribusi
4. Pedoman dalam kegiatan pengelolaan dan pemantauan lingkungan terhadap dampak penting yang timbul