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FLOOD CONTROL MANUAL (目次)
9. 現地再委託費調査



No. 1715(A)

The Embassy of Japan presents its compliments to the Department of Foreign Affairs of the Republic of Indonesia and has the honor to refer to the recent discussions held between the representatives of the Government of Japan and the representative of the Republic of Indonesia concerning the request for the Detail Design of Semarang Flood Control and Urban Drainage Project and to propose the following arrangement:

1. The Government of Japan will conduct the Study through the Japan International Cooperation Agency (JICA) in accordance with the relevant laws and regulations of Japan.
2. The Republic of Indonesia will accord to the Japanese study team privileges and other benefits or facilities necessary for the conduct of the Study and will agree that Department of Public Works (DPW) shall be as the executing agency of the project, responsible for the results of the execution of the project on the basis of all documents and drawings of the detailed design prepared through the Study.
3. The details and procedures for cooperation in the present arrangement, including the points as mentioned in paragraph 2 above, shall be provided for in the implementing arrangement (the Scope of Work) to be signed between JICA and DPW.

The Embassy of Japan will be most grateful if the Department of Foreign Affairs could inform the Embassy whether the Japanese proposal is agreeable to the Indonesian authorities.

The Embassy of Japan avails itself of this opportunity to renew to the Ministry of Foreign Affairs of the Republic of Indonesia the assurances of its highest consideration.





DEPARTMENT OF FOREIGN AFFAIRS  
REPUBLIC OF INDONESIA

No. : D. 0400 196/35

The Department of Foreign Affairs of the Republic of Indonesia presents its compliments to the Embassy of Japan and with reference to the Embassy's Note No. 1715 (A) dated November 29, 1996 has the honour to confirm the contents of the above Note.

The Department of Foreign Affairs of the Republic of Indonesia avails itself of this opportunity to renew to the Embassy of Japan the assurances of its highest consideration.

Jakarta, November 29, 1996



The Embassy of Japan  
JAKARTA



**2. Terms of Reference**

**TERMS OF REFERENCE  
FOR  
DETAILED DESIGN  
OF  
SEMARANG FLOOD CONTROL AND URBAN DRAINAGE PROJECT**

## I. INTRODUCTION

### 1. Background

Semarang City and suburbs is located on the plains between the hilly land to the south and the Jawa Sea to the north. Due to the topographic condition and the inadequate flood control facilities, Semarang City and suburbs suffer from habitual inundation in rainy seasons.

The recent big flood damages were recorded in 1973, 1988 and 1990. The flood in January 1990 particularly brought out 47 casualties and damaged 151 houses in the downstream of Garang River. Total damage was estimated at 8.5 billion Rupiah (about US\$ 4.3 million), the largest in the recent seventy years.

Semarang City and suburbs also suffer from the chronic shortage of water supply in dry seasons, particularly, municipal and industrial water supply. The problem on water supply is further aggravated by the concentration of population in the urban area.

To cope with the water shortage, proposed is the water conveyance from Kedung Ombo Dam Reservoir which was constructed recently. In spite of the water conveyance plan and the other ongoing development plans for new water sources, it may be difficult to meet the water demand of 6,500 l/s estimated for Semarang City at the year 2000.

Appropriate measures against flood damage and shortage of water supply in Semarang City and suburbs are indispensable for the economic development and stabilization of people's livelihood leading to the further economic development of not only Central Jawa but the whole of Indonesia as well. To this end, the Government of Indonesia requested the Government of Japan to extend technical cooperation for the Study (titled as "The Master Plan on Water Resources Development and Feasibility Study for Urgent Flood Control and Urban Drainage in Semarang City and Suburbs").

In response to the request of the Government of Indonesia, the Government of Japan decided to undertake the Study. The Study has been entrusted to the Japan International Cooperation Agency (JICA), the office responsible for implementing the technical cooperation programs of the Government of Japan.

The Study was conducted from April 1992 to September 1993, consisting three stages; Urgent Project Study, Master Plan Study and Feasibility Study with the objectives as follows :

- (1) To formulate a Master Plan at the target year 2015 for flood control, urban drainage and water resources development in Semarang City and suburbs. Priority projects under each field are to be selected in the Master Plan Study.
- (2) To carry out a Feasibility Study at the target year 2000 for the Urgent Project of river improvement works for West Floodway/Garang River and its tributaries where the flood of January 1990 caused channel overflow resulting in the recent largest flood damage in Semarang City. The Urgent Project Study is to be done simultaneously with the Master Plan Study so as to attain earlier project implementation.

- (3) To carry out a Feasibility Study at the target year 2005 for the priority projects which are to be selected in the Master Plan Study as the objectives requiring urgent solution.

Throughout the Feasibility Study, the priority and urgent project, namely SEMARANG FLOOD CONTROL AND URBAN DRAINAGE PROJECT (hereinafter referred to as "the Project") was formulated to mitigate flood and inundation damage and improve municipal water supply in Semarang and its suburban area.

## 1.2 Objectives of the Project

The objective of the Project is to solve the problems of flood disasters and water shortage, further to create a pleasant urban environment in Semarang and its suburban area.

## 1.3 Institutional Framework

The entire works specified in this Terms of Reference (TOR) shall be under the general direction and cooperation of the Directorate General of Water Resources Development (DGWRD) and the Directorate General of CIPTA KARYA (DGCK), Ministry of Public Works, Government of Republic of Indonesia. Technical and financial assistance are expected to be provided by overseas aid. Counterpart and logistic support to the extent necessary for the satisfactory completion of the Project will be provided by the DGWRD and DGCK, and other local government and departments concerned will be arranged through the counterpart personnel.

## 2. PROJECT DESCRIPTION

The project consist of the improvement works of West Floodway/Garang River, the construction of Jatibarang Dam and the improvement of urban drainage system in the central area of Semarang City.

### 2.1 River Improvement of West Floodway/Garang River

The objective stretch for the improvement works is 9.6 km from the river mouth of West Floodway to the confluence of Garang River and Kreo River, and it administratively belongs to Semarang City (Kotamadya Semarang), which has 204 km<sup>2</sup> of catchment area.

The improvement works consist of three main work items, namely widening the low water channel of West Floodway by excavation of the existing high water channels, reconstruction of the fixed type Simongan Weir to a movable weir with water gates and the excavation of the riverbed of Garang River.

### 2.2 Construction of Jatibarang Dam

Jatibarang Dam is a multipurpose dam having functions of the flood control, water supply and hydropower generation.

Jatibarang Dam is located on Kreo River, one of the main tributary of Garang River, 7 km upstream from the confluence with Garang River.

The construction works of Jatibarang Dam consist of the main works of construction of diversion tunnel, temporary cofferdam, foundation treatment, excavation, construction of a main dam, construction of a power house and the construction of an auxiliary spillway.

The structural features are as follows :

#### Dam

- Dam type : Concrete gravity
- Dam height : 81.0 m
- Crest length : 240.0 m
- Design flood : 1,800 m<sup>3</sup>/s (PMF)
- Diversion : Tunnel with 200 m<sup>3</sup>/s

#### Reservoir

- Gross storage capacity : 27.8 MCM
- Flood control capacity : 4.3 MCM
- Water supply capacity : 16.7 MCM
- Sediment capacity : 6.8 MCM

It is noted that no house evacuation is required both the improvement works of West Floodway/Garang River and the construction of Jatibarang Dam.



### 2.3 Improvement Urban Drainage System

The objective drainage area which has 6.322 km<sup>2</sup> is located along the Semarang River in the center of Semarang City.

The project consists of two works, namely construction of pumping stations with retarding basins and improvement of the drainage channels such as Semarang River, Asin River and Banger River.

The structural features are as follows :

#### Pumping Stations

- Number of pumping stations : 3 places
- Total pump capacity : 8.5 m<sup>3</sup>/s
- (5.7m<sup>3</sup>/s, 0.8 m<sup>3</sup>/s, 2.0 m<sup>3</sup>/s)
- Total capacity of Retarding Basin : 124,700 m<sup>3</sup>/s

#### Improvement of Existing Drainage Channel

- Dredging of Semarang River : 87,000 m<sup>3</sup>
- Channel Improvement and Raising Dike and Retaining Wall : 6.3 km
- Reconstruction of existing Bridge : 1 bridge
- Reconstruction of existing Control Gate : 1 unit

### 3. PLAN OF OPERATION

#### 3.1 Scope of Works

The detailed design will be carried out for the Project consisting of :

- (1) Improvement Works of West Floodway/Garang River;
- (2) Construction of Jatibarang Dam; and
- (3) Improvement of Urban Drainage System.

#### 3.2 Specific Scope of Works

The detailed design will be divided into two phases; a formulation of definitive plan together with detailed investigation works, and a detailed design together with preparation of tender documents.

##### Formulation of Definitive Plan

- (1) Collection of Additional Data and Information

To update data and information of the Project area, especially to collect designs of river improvement works and studies related to the Project.

- (2) Topographic Survey and Mapping

To prepare topographic maps for the project sites, the survey shall be carried out on the following conditions :

Project Site	Scale	Area (ha)
(1) West Floodway/Garang River	1/1,000	200
(2) Simongan Weir and Other Structure Sites	1/200	5
(3) Jatibarang Dam	1/500	20
(4) Drainage Area	1/100	51

- (3) River and Channel Survey

Along the improvement stretch of West Floodway/Garang River and the existing drainage channels, the longitudinal profile and cross-section survey will be carried out as follows :

River/Channel	Profile (m)	Cross-section
(1) West Floodway	5,290	60
(2) Garang River	4,250	50
(4) Drainage Channels	9,800	240

(5) Geological Investigation and soil Mechanical Tests

For river improvement, improvement of urban drainage channels, reconstruction of Simongan Weir and construction of Jatibarang Dam, the following geological investigation and soil mechanical tests will be required :

(a) West Floodway

- Drilling with standard penetration test : 26 holes with 390m in total
- Physical test : 26x3 = 78 samples
- Unconfined compression test with undisturbed sampling : 13 samples
- Consolidation test : 4 samples

(b) Garang River

- Drilling with standard penetration test : 24 holes with 360m in total
- Physical test : 24x3 = 72 samples
- Unconfined compression test with undisturbed sampling : 12 samples
- Consolidation test : 3 samples

(c) Simongan Weir

- Drilling with standard penetration test : 6 holes with 120m in total
- Physical test : 6x3 = 18 samples
- Unconfined compression test with undisturbed sampling : 12 samples

(d) Jatibarang Dam

- Seismic prospectation : 8 lines with 4,000m in total
- Core boring with in-situ permeability test : 30 holes with 2,400m in total
- Lugeon test : 400 stages

Adit tunnel	: 4 tunnels with 200m in total
Laboratory test	: Compression test Shear stress test Triaxial compression test

(e) Pumping Stations

Drilling with standard penetration test	: 9 holes with 270m in total
Physical test	: $9 \times 3 = 27$ samples
Unconfined compression test	: 27 samples
Consolidation test	: 27 samples

(f) Drainage channels

Drilling with standard penetration test	: 20 holes with 200m in total
Physical test	: $20 \times 2 = 40$ samples
Unconfined Compression test	: 20 samples
Consolidation test	: 20 samples

(6) Study on Environment Improvement

In the course of the detailed design of the Project, the environmental study will be carried out aiming at;

- (a) Improvement of river environmental including river water quality and scenery of riparian area; and
- (b) Improvement of urban environment including clean, healthful and pleasant living conditions

The said improvement plans will be incorporated into the detailed design.

Further, in accordance with the Managing Guideline on Environmental Impact Assessment within the Ministry of Public Works (Decree of the Minister of Public Works), the environmental management plan (RKL) and the environmental monitoring plan (RPL) shall be prepared during the design works of the Project.

(7) Formulation of Definitive Plan

Through the collection and review on relevant studies and designs, and the results of survey and investigation, the definitive plan will be formulated,

which includes the revision of the preliminary design prepared in the feasibility study.

### Detailed Design

(1) Structural Analysis and Detailed Drawing

To carry out the detailed structural analysis for dam body, dike embankment, pumping stations and other hydraulic structures, and to prepare drawings and bill of quantities.

(2) Hydraulic Model Test

To confirm hydraulic conditions and detailed structural dimensions of dam spillway, hydraulic model test will be carried out by the government-owned hydraulic research center. As the hydraulic model, three dimensional distorted model of 1:20 scale will be applied from the overflow portion to the downstream.

(3) Construction Planning and Cost Estimate

The construction plan will be prepared in compliance with the guideline of the Government which indicates use of Indonesian Products and facilities.

(4) Preparation of Tender Documents

The necessary documents for the tendering construction of the projects such as pre-qualification documents, specifications, tender documents and drawings will be prepared.

(a) Preparatory works

- Access road, workshop and warehouse;
- Water and electricity supply; and
- Field laboratory and safety facilities.

(b) Civil works

- River improvement of West Floodway/Garang River : Excavation and dike embankment, riparian structures
- Reconstruction of Simongan Weir : Diversion structure and mechanical works
- Jatibarang Dam : Dam body, spillway diversion

- Pumping stations : structure and outlet works  
: Inlet structure, pump house,  
surge tank, outlet structure and  
retarding basin
- Improvement of drainage  
channel : Raising existing dike and  
retaining wall, dredging  
Semarang River, channel  
improvement, reconstruction  
of a bridge and a control gate,  
and improvement of secondary  
channels.

(5) Preparation of Operation and Maintenance Manuals

For the successful operation and proper maintenance of the project structures/facilities after the completion, the operation and maintenance manual will be prepared.

3.3 Work Schedule

The total period of the detailed design works for the Project is estimated at 15 months, as shown in the attached Time Schedule of Detailed Design Works.

#### 4. EXTERNAL AND GOVERNMENT INPUT

##### 4.1 External Input

##### Expertise Required

The total man-month (M/M) required for the detailed design works are estimated at 136 man-months, detailedly shown as follows :

No.	Designation	Man-month
1	Team Leader	15
2	Dam Engineer (Asst. Team Leader)	10
3	River Engineer	8
4	Hydrologist	5
5	Hydraulic Engineer (Hydraulic Model Test)	5
6	Geologist	5
7	Seismic Prospecting Engineer	3
8	Soil Mechanics Engineer	4
9	Dam Structure Engineer	5
10	Structure Engineer (1) (River)	4
11	Structure Engineer (2) (Drainage)	4
12	Structure Engineer (3) (Drainage)	4
13	Drainage Engineer (1)	8
14	Drainage Engineer (2)	4
15	Bridge Engineer	6
16	Tunnel Engineer	3
17	Mechanical Engineer	6
18	Electrical Engineer	4
19	Construction Plan Engineer	4
20	Cost Estimator	5
21	Environmental Analyst	6
22	Socio-economist	4
23	Survey Expert	10
24	Specification Writer	4
	Total	136

Staffing schedule of the respective expert is shown in the attached Staffing Schedule.

### Equipment

To ensure the efficient and timely completion of the detailed design works, the following equipment will be provided to the Project by the donor country.

- (1) Four four-wheel drive vehicles;
- (2) Office space and equipment and communication equipment; and
- (3) Field work equipment for hydrologist, geologist and soil mechanics engineers.



## 5. REPORTING

The following reports will be prepared and submitted within the period indicated, as follows :

(1) Inception Report (25 copies)

Two (2) months after the commencement of the detailed design works, to present the detailed work plan and program of the works including recommendations for possible alternative plan/design, if any, for discussion.

(2) Definitive Plan Report (25 copies)

Eight (8) months after the commencement of the works, to summarize all the works after completion of the survey, investigation and study on the optimum flood control and drainage system and environmental improvement including the review of the feasibility study.

(3) Draft Design Report (20 copies)

Twenty-two (22) months after the commencement of the works, with all the results of the design works, to be submitted to the DGWRD and DGCK for review and comments. The comments of the DGWRD and DGCK shall be given within one (1) month after receipt of the report.

(4) Final Design Report (25 copies)

At the completion of the detailed design, compiling all the output of design with narrative explanation of design criteria, design concepts and method of calculation for all the components of the works.

(5) Draft Tender Document (25 copies)

At the end of the detailed design works, the draft tender documents will be prepared for the international competitive bidding.

(6) Operation and Maintenance Manuals (25 copies)

Operation and maintenance manuals containing technical method and procedure to operate and maintain the facilities for West Floodway/Garang Rjyer, Simongan Weir, Jatibarang Dam as well as Urban Drainage System including the institutional arrangement after the completion of the Project.

(7) Environmental Management and Monitoring Plan (25 copies)

For the smooth implementation of the Project together with its successful operation and maintenance works after the completion, the management and monitoring plan of environmental conservation and sustainable development of the Project will be prepared. This report shall be

referred to the all activities of the government agencies responsible for the implementation, operation and maintenance of the Project.

(8) Bimonthly Progress Report (15 copies)

To present the details of expert personnel mobilization, progress of the works, problems encountered and anticipated activities for the next period.

Estimated Cost of the Works

		Unit : US\$ 1,000
No.	Item	Cost
(1)	Expert services of 136 man-months	4,080
(2)	Equipment	125
(3)	Topographic, river and channel survey	227
(4)	Geological investigation	425
(5)	Soil mechanical test	85
(6)	Environmental study	113
(7)	Hydraulic model test	95
(8)	Report and Drawing	90
Total		5,240

4.2 Input by the Government of Indonesia

The Government of Indonesia will undertake the following :

- (1) Provision of Indonesia project personnel as counterpart and support staff;
- (2) Vehicles for the counterpart staff;
- (3) Provisions of available maps, aerial photographs, data and reports, and other materials relevant to the detailed design; and
- (4) Exemption from import duties and taxes of personal effects of the experts and all equipment brought in for the detailed design.

**TIME SCHEDULE OF DETAILED DESIGN WORKS**

WORK ITEMS	MONTH															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
<b>A. FORMULATION OF DEFINITIVE PLAN</b>	[Shaded bar from month 1 to 6]															
1. Collection of Additional Data	[Shaded bar]															
2. Review of Relevant Studies and Designs	[Shaded bar]															
3. Topographic Survey and Mapping	[Shaded bar]															
4. River and Channel Survey	[Shaded bar]															
5. Geological Investigation and Soil Mech. Test	[Shaded bar]															
6. Study on Environmental Improvement	[Shaded bar]															
7. Formulation of Definitive Plan			[Shaded bar]													
8. Preliminary Cost Estimate							[Shaded bar]									
<b>B. DETAILED DESIGN</b>	[Shaded bar from month 8 to 15]															
1. Structural Analysis and Detailed Drawing								[Shaded bar]								
2. Hydraulic Model Test					[Shaded bar]											
3. Construction Planning and Cost Estimate									[Shaded bar]							
4. Preparation of Tender Documents										[Shaded bar]						
5. Preparation of O & M Manual										[Shaded bar]						
6. Preparation of Environmental Management and Monitoring Plan														[Shaded bar]		
<b>C. REPORTING</b>		(1)		*		(2)		*		*		(3)	(5)	(4)	(6)	(7)

- (Note) \* : Bimonthly Report
- |  |                              |
|--|------------------------------|
| (1) : Inception Report                             | (2) : Definitive Plan Report |
| (3) : Draft Design Report                          | (4) : Design Report          |
| (5) : Tender Documents                             | (6) : O & M Manuals          |
| (7) : Environmental Management and Monitoring Plan |                              |

STAFFING SCHEDULE

DESIGNATION	MONTH															MAN MONTHS	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1. Team Leader	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	15
2. Dam Engineer (Asst. Team Leader)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	10
3. River Engineer	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	8
4. Hydrologist	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	5
5. Hydraulic Engineer (Model Test)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	5
6. Geologist	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	5
7. Seismic Prospecting Engineer	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3
8. Soil Mechanics Engineer	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4
9. Dam Structure Engineer	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	5
10. Structure Engineer (1) (River)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4
11. Structure Engineer (1) (Drainage)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4
12. Structure Engineer (1) (Drainage)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4
13. Drainage Engineer (1)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	8
14. Drainage Engineer (2)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4
15. Bridge Engineer	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	6
16. Tunnel Engineer	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	3
17. Mechanical Engineer	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	6
18. Electrical Engineer	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4
19. Construction Planning Engineer	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4
20. Cost Estimator	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	5
21. Environmental Analyst	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	6
22. Socio - Economist	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	4
23. Survey Expert	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	10
24. Specification Writer	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	1
<b>TOTAL</b>																	<b>136</b>

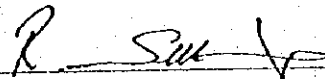
3. Scope of Work

SCOPE OF WORK  
FOR  
THE DETAILED DESIGN  
OF  
FLOOD CONTROL, URBAN DRAINAGE, AND WATER RESOURCES DEVELOPMENT  
IN SEMARANG  
IN  
THE REPUBLIC OF INDONESIA  
AGREED UPON BETWEEN  
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT,  
AND  
DIRECTORATE GENERAL OF HUMAN SETTLEMENTS,  
MINISTRY OF PUBLIC WORKS  
AND  
THE JAPAN INTERNATIONAL COOPERATION AGENCY

JAKARTA, November 29, 1996



Mr. Krenius MARPAUNG  
Director for Planning and Programming  
Directorate General of Water Resources  
Development  
Ministry of Public Works

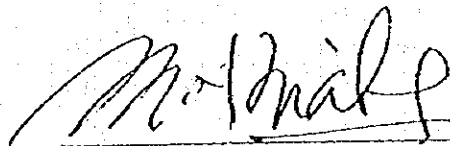


Mr. Ryu SUWA  
Resident Representative  
Indonesia Office

Japan International Cooperation Agency



Mr. Hari SIDHARTA  
Director for Technology Guidance  
Directorate General of Human Settlements  
Ministry of Public Works



Mr. Masayuki WATANABE  
Leader  
Preparatory Study Team  
Japan International Cooperation Agency

## I. INTRODUCTION

In response to a request by the Government of the Republic of Indonesia (hereinafter referred to as "the Government of Indonesia"), the Government of Japan decided to conduct a detailed design study for the Flood Control, Urban Drainage, and Water Resources Development in Semarang in the Republic of Indonesia (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

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

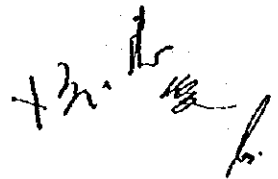
The present document sets forth the scope of the work with regard to the Study.

## II. OBJECTIVES OF THE STUDY

The objectives of the Study are to carry out a detailed design of the Flood Control, Urban Drainage, and Water Resources Development Project in Semarang indicated in "IV. STUDY AREA", the Project consisting of the three(3) sub-projects described in I. Project Components in the ANNEX-II, and to pursue technology transfer to counterpart personnel in the course of the Study.

## III. STUDY ORGANIZATION

1. The Directorate General of Water Resources Development, Ministry of Public Works (hereinafter referred to as "DGWRD"), and the Directorate General of Human Settlements, Ministry of Public Works (hereinafter referred to as "Cipta Karya"), shall act as the counterpart agency to the Japanese study team (hereinafter referred to as "the Team") and also as the coordinating body in relation with other relevant governmental and non-governmental organizations for the smooth implementation of the Study.
2. DGWRD and Cipta Karya shall act as the executing agency of the Project, responsible for the results of the execution of the Project on the basis of all documents and drawings of the detailed design prepared through the Study.



#### IV. STUDY AREA

The study area shall cover Semarang City and the catchment area of Garang River, which were project areas covered under the Feasibility Study for Urgent Flood Control and Urban Drainage in Semarang City and Suburbs conducted by JICA since 1991 to 1993, and shall consist of the numbers of sub-systems respectively described in the project component in ANNEX-II.

Location Map of the Projects is shown in ANNEX-I.

#### V. SCOPE OF THE STUDY

In order to achieve its objectives, the study shall cover the following items(refer to ANNEX-II for details):

##### Phase I

1. Collection and review of relevant studies including Feasibility Study by JICA
2. Investigation and studies
3. Geotechnical investigation and laboratory test
4. Design criteria and basic design
5. Survey and establishment of environmental conditions and resettlement/removal requirements of inhabitant

##### Phase II

1. Detailed design (project components for the detailed design are listed in ANNEX-II).
2. Preparation of construction plan
3. Project cost estimation including updating economic analysis
4. Preparation of implementation program
5. Preparation of tender and contract documents
6. Preparation of operation and maintenance plan

#### VI. STUDY SCHEDULE

The tentative schedule of the Study to be carried out is shown in the ANNEX-III attached herewith.

*Handwritten signature/initials*

## VII. REPORTS

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

1. Inception report  
Thirty (30) copies  
Within one (1) month after the commencement of the Study.
2. Interim report (1)  
Thirty (30) copies  
At the end of the First work period in Indonesia.
3. Progress report (1)  
Thirty (30) copies  
At the completion of the definitive plan for WEST FLOODWAY /GARANG RIVER during the Second work period in Indonesia.
4. Interim report (2)  
Thirty (30) copies  
At the end of the Second work period in Indonesia.
5. Progress report (2)  
Thirty (30) copies  
At the end of the Third work period in Indonesia.
6. Progress report (3)  
Thirty (30) copies  
At the end of the Fourth work period in Indonesia.
7. Interim report (3)  
Thirty (30) copies  
At the end of the Fifth work period in Indonesia.
8. Draft Final Report  
Forty (40) copies  
After the third work period in Japan.  
The Government of Indonesia will provide JICA with its comments within one (1) month after the receipt of the Draft Final Report.
9. Final Report  
Fifty (50) copies  
Within two (2) months after the receipt of the comments by the Indonesian side.

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## VIII. UNDERTAKINGS OF THE GOVERNMENT OF INDONESIA

1. To facilitate the smooth conduct of the study, the Government of Indonesia shall take necessary measures as follows:

- (1) to secure the safety of the Team;
- (2) to permit members of the Team to enter, leave and sojourn in Indonesia for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,
- (3) to exempt the members of the Team from taxes, duties and other charges on equipment, machinery and other materials brought into Indonesia for the conduct of the study,
- (4) to exempt the non-Indonesian members of the Team from income tax and any charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the study,
- (5) to provide necessary facilities to the Team for remittance as well as utilization of funds introduced into Indonesia from Japan in connection with the implementation of the study,
- (6) to secure permission for the members of the Team to obtain data regarding private properties or restricted areas from Local Government for the implementation of the study, if necessary,
- (7) to secure all relevant data (including maps, photographs and so on) and documents related to the study; and
- (8) to provide medical services as needed, the expenses for such being chargeable to members of the Team.

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

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3. The Indonesian Side (i.e. DGWRD, Cipta Karya and Provincial Government of Central Java) shall, at its own expense, provide the Team with the following, in cooperation with other organization concerned:

- (1) available data and information related to the Study,
- (2) counterpart personnel and supporting staff,
- (3) suitable office space with necessary equipment in Semarang, and
- (4) credentials or identification cards to the members of the Team.

#### IX. UNDERTAKINGS OF JICA

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

1. to dispatch, at its own expense, the Team to Indonesia, and
2. to pursue technology transfer to the Indonesian counterpart personnel in the course of the Study.

#### X. CONSULTATION

The JICA and Indonesian sides shall consult with each other in respect to any matters that arise from or in connection with the study.

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## ANNEX - II

### I. Project Components

The project consists of three projects which are improvement work to the West Floodway/Garang River, detailed design for construction of the Jatibarang Dam and improvement of the urban drainage system in the central area of Semarang City.

#### I-1. River Improvement of West Floodway/Garang River

The area designated for the improvement works is 9.54km from the river mouth of the West Floodway to the confluence of the Garang River and Kreo River, and it administratively belongs to Semarang City (Kotamadya Semarang), which has 204km<sup>2</sup> of catchment area. Location of the West Floodway/Garang River is shown in the ANNEX-I.

The improvement works consist of three main work items, namely, widening the low water channel of the West Floodway by excavation of the existing high water channels, reconstruction of the fixed type Simongan Weir converting it to a weir with movable water gates and the excavation of the riverbed of the Garang River.

#### I-2. Construction of Jatibarang Dam

Jatibarang Dam is a multipurpose dam whose functions will be flood control, water supply and hydropower generation.

Jatibarang Dam is located on the Kreo River, one of the main tributaries of the Garang River, 7km upstream from the confluence with the Garang River. The site location for the dam is shown in ANNEX-II-10.

The construction works of Jatibarang Dam consist of the main works of construction of a diversion tunnel, a temporary cofferdam, foundation treatment, excavation, construction of the main dam, construction of a power house and the construction of an auxiliary spillway.

The structural features proposed in the Feasibility Study are as follows:

<Dam>

- Dam type: Concrete gravity
- Dam height: 81.0m
- Crest length: 240.0m
- Design flood: 1800 m<sup>3</sup>/s (PMF)
- Diversion: Tunnel with 200m<sup>3</sup>/s

*J. W. P. K.*

<Reservoir>

-Gross capacity	27.8 MCM
-Flood control capacity	4.3 MCM
-Water supply capacity	16.7 MCM
-Sediment capacity	6.8 MCM

I-3. Improvement of Urban Drainage System

The targeted drainage area, which has 6,322km<sup>2</sup>, is located along the Semarang River in the center of Semarang City. Site area is shown in ANNEX-II-11.

The project consists of two works, namely one is construction of pumping station retarding basins and the other improvement of the drainage channels such as the Semarang River, Asin River and Baru River. Proposed Facilities are shown in ANNEX-II-12.

The structural features proposed in the Feasibility Study are as follows:

<Pumping Station>

- Number of pumping station: 3 stations
- Total pump capacity: 8.5m<sup>3</sup>/s (5.7m<sup>3</sup>/s, 0.8m<sup>3</sup>/s, 2.0m<sup>3</sup>/s)
- Total capacity of Retarding Basin: 124,700 m<sup>3</sup>

<Improvement of Existing Drainage Channel>

- Dredging of Semarang River: 87,500 m<sup>3</sup>
- Channel Improvement of Raising Dike and Retaining Walls: 6.3km
- Reconstruction of existing Bridge: 1 bridge
- Reconstruction of existing Control Gate: 1 unit

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## II. Detailed Scope of the Study

The detailed design will be divided into two phases: Phase I is formulation of a definitive plan together with detailed investigation works, and Phase II a detailed design together with preparation of tender documents.

### II-1. Phase I

#### 1) Collection and review of relevant studies

All existing data, reports, including the feasibility study completed in 1993, and materials, as well as design of the dam, river and channel improvement works conducted under Ministry of Public Works, should be reviewed for the purpose of specifying works required for preparation of the final design, specifications and tender documents for construction of the project.

#### 2) Areal Photo shooting, Topographic survey and mapping

To prepare topographic maps for the project sites, the survey shall be carried out on the following conditions:

##### a) Aerial Photographs of Reservoir area

Project Site	Scale	Area (km <sup>2</sup> )	Remarks
1) Areal Photograph Shooting	1/10000	3	
2) Mapping of Areal Photos	1/2000	3	

##### b) Topographic survey and mapping

Project Site	Scale	Area (ha)	Zone
1) West Floodway/Garang River	1/1000	200	200m x 10km
2) Simongan Weir and Others structures Sites	1/200	5	200m x 250m
3) Jatibarang Dam	1/500	15	500m x 300m
4) Drainage Area			
-Asin pumping station	1/200	9	350m x 250m
-East Bandarharjo pumping station	1/200	6	600m x 100m
-West Bandarhajo pumping station	1/200	3	200m x 150m
-Drainage Channel	1/200	40	100m x 4000m

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### 3) River and Channel Survey

Along the improvement stretch of the West Floodway/Garang River and the existing drainage channels, the longitudinal profile and cross-section survey will be carried out as follows:

#### Longitudinal profile

River /Channel	Profile(m)	Scale(V)	Scale(H)
1) West Floodway	5,290	1/100	1/2000
/ Garang River	4,250	1/100	1/2000
4) Drainage channels	4,000	1/100	1/1000
Semarang River	6,900	1/100	1/2000
Retarding pond	3,500	1/200	1/2000

#### Cross-Section

River/Channel	Width (m)	Interval (m)	Section No.	Scale(V)	Scale(H)
1) West Floodway / Garang River	150	100	100	1/100	1/200
4) Drainage channels	50	50	90	1/100	1/200
Semarang River	70	50	150	1/100	1/200
Retarding pond	Avg.400	50	10	1/200	1/2000

### 4) Geological Investigation and Soil Mechanical Tests

4)-1 Work items and number of geological surveys for the Jatibarang Dam

#### a. Foam Boring (D=86mm)

No.	Depth (m)	Lugeon Test	Location
B-1	120	23	Dam Axis, Left Bank
B-2	70	13	Dam Axis, River Bed
B-3	130	25	Dam Axis, Right Bank
Total	320	61	

#### b. Standard Boring (D=66mm)

No.	Depth (m)	Lugeon Test	Location
B-4	70	13	River Bed, Lower Stretch
B-5	70	13	River Bed, Upper Stretch
B-6	80	15	Dam Axis, Left Bank Ridge
B-7	80	15	Dam Axis, Left Bank Ridge
B-8	90	17	Dam Axis, Right Bank Ridge
B-9	720		Quarry Site, 9 holes x 80 m/hole
Total	1,110	73	

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c. Adit Excavation

No.	Depth (m)	Lugeon Test	Location
T-1	20	2.0 x 1.5	Dam Axis, Left Bank, River Bed
T-2	30	2.0 x 1.5	Dam Axis, Left Bank, Half Way Up
T-3	30	2.0 x 1.5	Dam Axis, Left Bank, Upper
T-4	30	2.0 x 1.5	Dam Axis, Right Bank, Upper
Total	110		

d. Shearing Strength Test

No.	Adit No.	No. of Test
1	T-1	4
2	T-2	4
3	T-3	4
4	T-4	4
Total		16

e. Laboratory Test

Alkali - Aggregate Reaction Test for Quarry Site  
 3 holes x 5 samples = 15 samples

f. Boring in the Reservoir (D=66mm)

No. of Boring: 25 holes  
 Depth: 30 m  
 Total Length: 750 m  
 Standard Penetration Test: 750 times

g. Trench Excavation

Width: 5.0 m  
 Depth: 1.5 m  
 Length: 2500 m  
 Location: Dam Axis, Land Slide Area and Fault

h. Seismic Prospecting at Quarry site

Length: 1 km, 3 lines  
 Total: 3 km

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4)-2 Number of Soil Mechanical Surveys for River Improvement and Drainage

a. West Floodway / Garang River Improvement

Core Drilling with Standard Penetration Test	750m =50 holes x 15m/hole
Physical Test	150 samples =50 holes x 3samples/hole
Unconfined Compression Test with Undisturbed Sample	25 samples
Consolidation Test	7 samples

b. Simongan Weir

Core Drilling with Standard Penetration Test	120m =6 holes x 20m
Physical Test	18 samples =6 holes x 3samples/hole
Unconfined Compression Test with Undisturbed Sample	12 samples
Consolidation Test	12 samples

c. Urban Drainage

Core Drilling with Standard Penetration Test	270m= 9 holes x 30m/hole 200m= 20 holes x 10m/hole total: 470m
Physical Test	27 samples = 9 holes x 3 samples/hole 40 samples =20 holes x 2 samples/hole total:67samples
Unconfined Compression Test with Undisturbed Sample	47 samples
Consolidation Test	47 samples

Note: Physical Tests include tests of unit weight, grain size distribution, specific gravity, water contents and Atterberg limits.

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5) Study of Environmental Improvement

- a. Investigation of environmental conditions in the Project Area
- b. Baseline survey on socio economic conditions of the project affected people along drainages, rivers and on the dam site
- c. Assessment of the impact of the project on the river environment including river water quality and scenery in the riparian area.
- d. Assessment of the impact of the project on the urban environmental condition.
- e. Formulation of counter-measures to mitigate adverse effects.
- f. Preparation of the environmental management plan (RKL) and the environmental monitoring plan (RPL), in accordance with the Managing Guidelines on Environmental Impact Assessment within the Ministry of Public Works (decree of the Ministry of Public Works.)

6) Design Criteria

Prior to commencement of the detailed design work, the design criteria on which the structural design will be based shall be established.

7) Formulation of Definitive Plan

Through the collection and review of relevant studies and designs, and the results of the survey and investigation, the definitive plan will be formulated, which includes the revision of the preliminary design prepared in the feasibility study.

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II-2. Phase II

1) Detailed design

To carry out detailed structural analysis of the dam body, dike embankment, pumping stations and other hydraulic structures, and to prepare drawings.

Work item	
a) Preparatory work -Access road, workshop and warehouse -Water and electricity supply -Field laboratory and safety facilities	
b) Civil works	
-Improvement of West Floodway/Garang River	-Excavation and dike embankment associate structures
-Reconstruction of Simongan Weir	-Diversion structure and mechanical works
-Jatibarang Dam	-Dam body, spillway, diversion structure and outlet works
-Pumping Stations	-Inlet structure, pump house, surge tank, outlet structure and retarding basin
-Improvement of drainage channel	-Raising existing dike and retaining wall, dredging Semarang River, channel improvement, reconstruction of a bridge and a control gate

2) Construction Planning

The construction plan to ensure smooth progress in the construction work and successful completion of the project in time shall be prepared.

The construction plan shall contain the construction schedule indicating the key dates/milestones and particularly the critical paths, the schedule of necessary construction equipment together with its type, capacity, number and period, and construction method and sequence.

3) Bill of Quantities

Quantity of all structures design shall be calculated and compiled in the quantity calculation report. A detail Bill of Quantities shall be prepared.

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#### 4) Cost Estimate

The project cost estimation shall be prepared based on the technical specification/dimensions of all the structural components including the preparatory works for construction, engineering and administration cost, updated economic analysis, physical contingency, price contingency and interest during construction. The unit prices used shall be those prevailing at the time when the cost estimation is prepared.

#### 5) Preparation of Tender Document

##### 5)-1 Prequalification Document

The prequalification document shall include the necessary items to qualify tenderer for the Project prior to the tender.

##### 5)-2 Tender Document

The tender and contract documents shall include the following items:

- a. Instruction to tenderer
- b. General conditions of contract
- c. Contract Forms
  - Form of tender with Bill of Quantities
  - Form of Agreement
  - Form of Tender Bond
  - Form of Performance Bond
- d. General Specification
- e. Technical Specification
- f. Tender Drawings
- g. Bill of Quantities

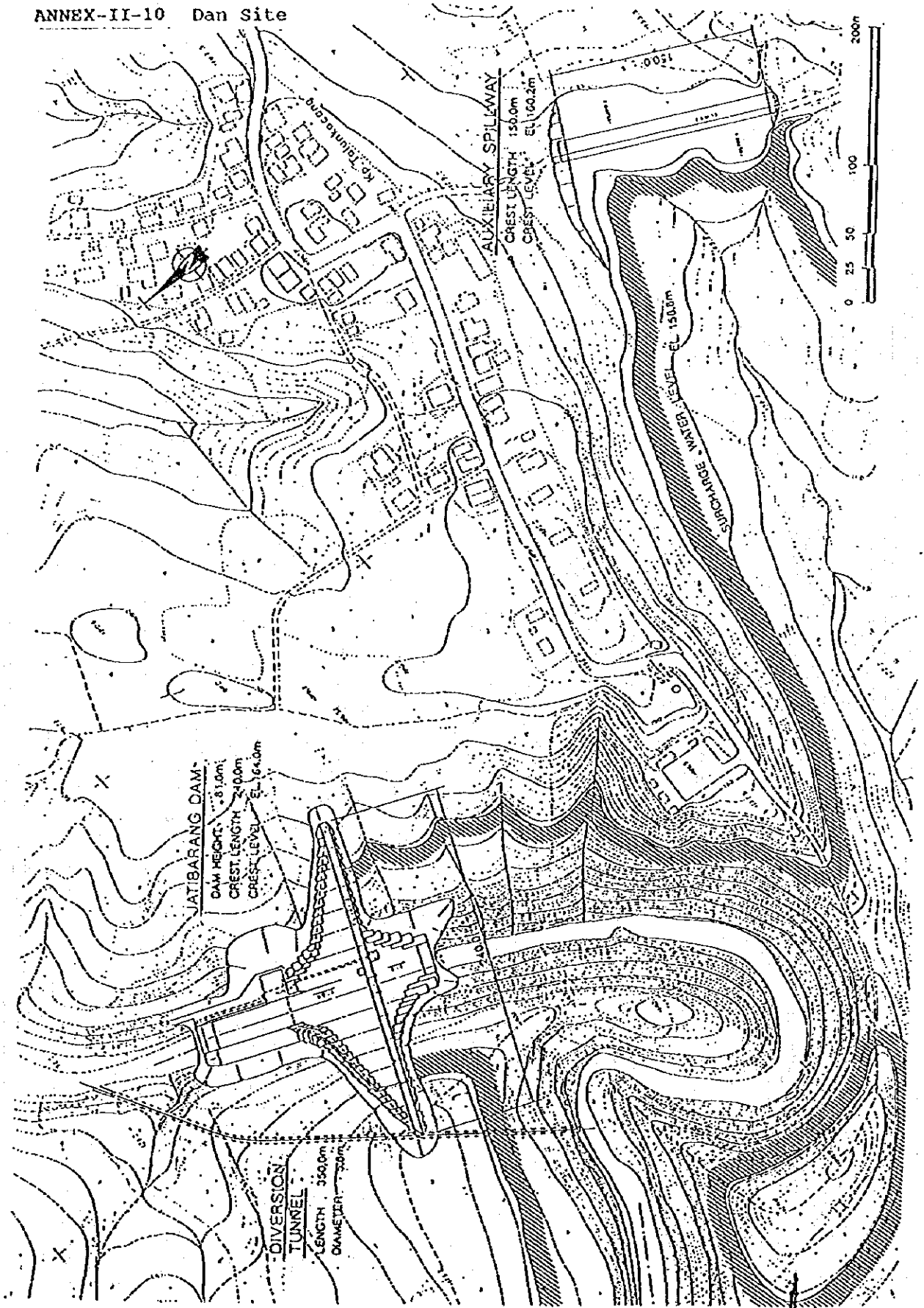
Preparation of the construction plan and cost estimation in the form of a priced Bill of Quantities with detailed breakdown of unit rates and prices to facilitate the tender evaluation.

#### 6) Operation and Maintenance Manuals

For the successful operation and proper maintenance of the project structures/facilities after their completion, an operation and maintenance manual shall be prepared.

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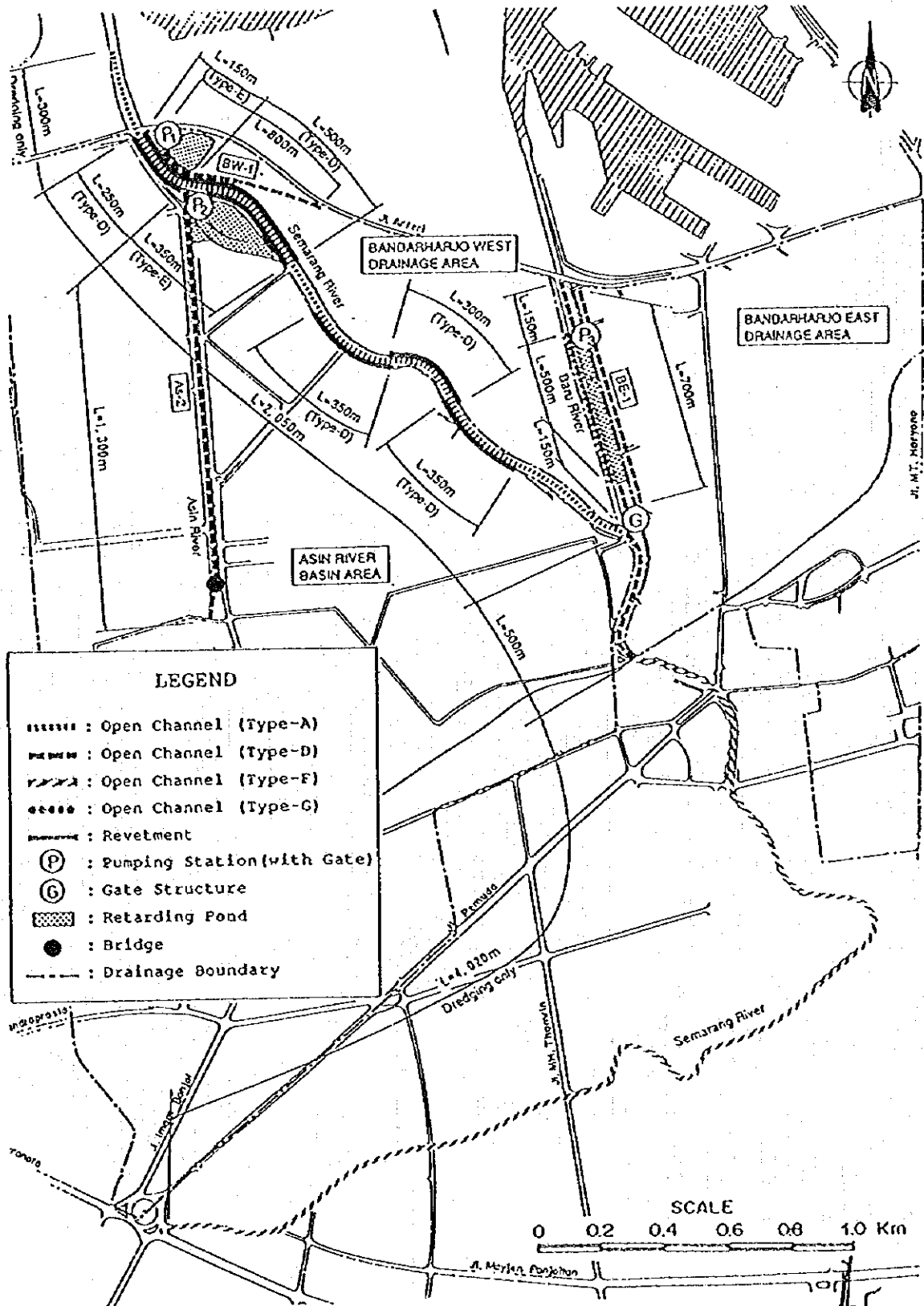
ANNEX-II-10 Dan Site



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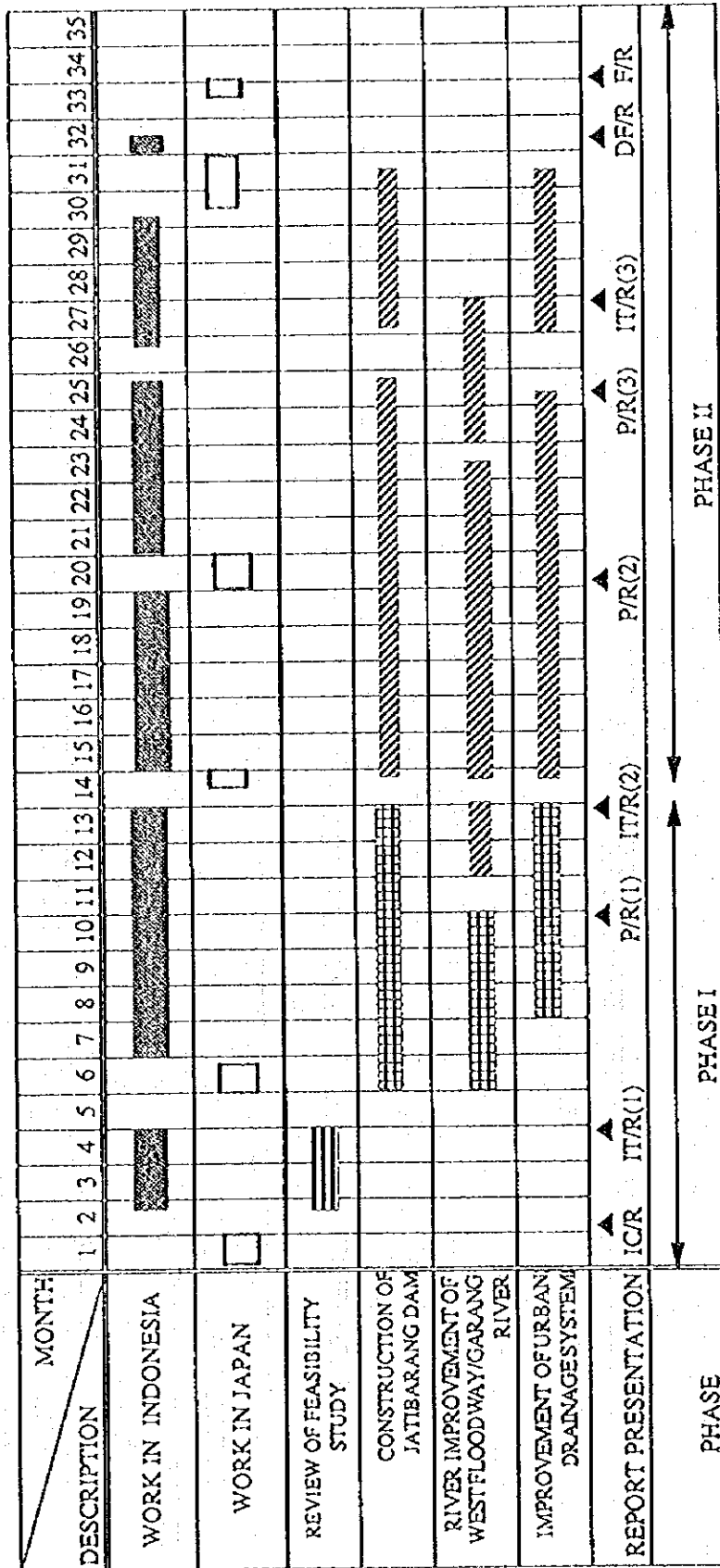


ANNEX-II-12 Proposed Urban Drainage Facilities



The Detailed Design of Semarang Flood Control and Water Resources Development in the Republic of Indonesia

TENTATIVE SCHEDULE



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

▨ : Definitive Plan Stage  
▩ : Detailed Design Stage

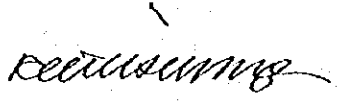
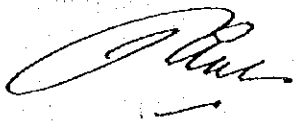
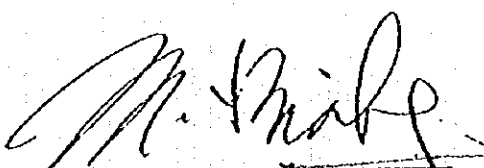
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4. Minutes of Meeting

MINUTES OF MEETINGS  
ON  
THE SCOPE OF WORK  
FOR  
DETAILED DESIGN  
OF  
FLOODCONTROL, URBAN DRAINAGE, AND WATER RESOURCES  
DEVELOPMENT IN SEMARANG  
AGREED UPON BETWEEN  
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT,  
AND  
DIRECTORATE GENERAL OF HUMAN SETTLEMENTS,  
MINISTRY OF PUBLIC WORKS  
AND  
JAPAN INTERNATIONAL COOPERATION AGENCY

JAKARTA, 22nd NOVEMBER, 1996

		
Mr. Krenius MARPAUNG Director for Planning and Programming, Directorate General of Water Resources Development Ministry of Public Works	Mr. Hari SIDHARTA Director for Technology Development, Directorate General of Human Settlements Ministry of Public Works	Mr. Masayuki WATANABE Leader, Preparatory Study Team Japan International Cooperation Agency

Based on the official request of the Government of the Republic of Indonesia, the Japan International Cooperation Agency ( hereinafter referred to as " JICA ") dispatched the Preparatory Study Team (hereinafter referred to as " the Preparatory Team ") headed by Mr. Masayuki Watanabe from 11th to 22nd November, 1996 to discuss the scope of work for the study on the Detailed Design of Flood Control, Urban Drainage, and Water Resources Development in Semarang in the Republic of Indonesia, (hereinafter referred to as " the Study ").

The Preparatory Team had a series of discussions with the Indonesian authorities concerned such as Directorate General of Water Resources Development (hereinafter referred to as " DGWRD"), Directorate General of Human Settlements (hereinafter referred to as "Cipta Karya "), the Ministry of Public Works, and those agencies which are concerned in the above Project. The list of those who attended these discussions is shown in the ANNEX - I. Both sides agreed on the scope of work for the study.

This document sets forth main items discussed.

1. Responsibility of the result of the study

The both sides confirmed that Indonesian side shall be responsible for the results of the execution of the Project on the basis of all documents and drawings of the detailed design prepared through the Study.

2. Effectiveness of the scope of work

The both sides agreed that this scope of work shall be effective after confirmation of completion of the exchange of the verbal note regarding the responsibility stated above, with the signing by the JICA Indonesian Office resident representative. And the conclusion date of the scope of work is the same day of verbal note exchange.

3. Scope of the study

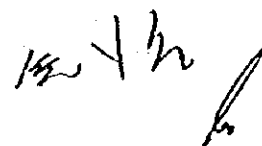
The both sides agreed that the Study area shall cover Semarang City and the catchment of Garang River, which were in project areas covered under " the Feasibility study for Urgent Flood Control and Urban Drainage in Semarang City and Suburbs " conducted by JICA since 1991 to 1993, and shall consist of the numbers of sub - systems respectively described in the project components in the ANNEX II of the Scope of Work, and that formulation of the flood warning system in allocation and monitoring plan shall be included in the Study.

4. Contact Agency

The both sides agreed that the DGWRD will be prime contact agency of the Indonesian side for the project.

5. Supporting Unit

The Preparatory Team requested Indonesian side to set up a supporting unit and



a technical supporting unit prior to the arrival of the Study Team member in order to ensure a smooth conducting of the study.  
These units shall be composed of the agencies listed in the ANNEX - II.

6. **Technology to be transferred through the Study**

The both sides agreed that principal items to be transferred to Indonesian counterpart personnel are as follows :

- Overall catchment basin management
- Technology for survey, planning, designing and construction
- Technology for monitoring and maintenance
- Institutional arrangement and coordination

7. **Contents of the baseline study**

Regarding resettlement for the project, the Study shall include the relevant questionnaires as follows :

- Type of compensation of inhabitants prefer, in case that they should be resettled
- Level of compensation requested
- and others.

8. **Review of the Feasibility Study**

The both sides agreed that the analysis of water demand for Semarang City and Suburbs should be reviewed in the Study for the cases of possible scenarios on future socio economic condition.

9. **Proposed additional works**

Outside the study area, the Government of Indonesia officials strongly proposed to include some additional work covering the following items :

- (i) East floodway
- (ii) Sringin River and Tenggang River
- (iii) Pumping Station at the Banger River

The Preparatory Team agreed to convey the proposal to the JICA Headquarters.

10. **Allocation of the counterpart personnel**

To guarantee the smooth conducting of the Study and to promote technology transfer through on-the-job training, Indonesian side shall designate the appropriate number of counterpart personnel including the supporting staff as follows :

- i). Secretary/typists/office clerks (full time)
- ii). Drivers.

The number of the member of the Study Team and its rough manning schedule are estimated respectively as 18 persons and as 205 M/M through the Study.

11. Undertaking of the Government of Indonesia

The Preparatory Team requested the Indonesian side to prepare an office in Semarang in Jratunseluna River Basin Development Project for the full scale Study Team. This office is should be equipped whith the following :

- a). Desks, chairs, and air conditioners.
- b). Telephone and Facsimile.
- c). Lighting and Electricity supply.

Bill for telephone, and facsimile shall be charged to the StudyTeam.

Indonesian side accepted the above request of the Preparatory Team and will prepare an office in Jratunseluna River Basin Development Project.

12. Regulations

The Indonesian side requested the Preparatory Team to follow Indonesian regulations in case of taking out of some aerial photograph and maps related to the Study to Japan.

13. Study equipment

The Indonesian side requested the Preparatory Team to supply the equipment in the ANNEX-III in conjuction with the Study.

The Preparatory Team clarified that request is subject to the strict evaluation by JICA of necessity of these equipment to conduct the Study.

14. Counterpart personnel training

The Indonesian side requested the Preparatory Team to give training to counterpart personnel in Japan during the Study.

The Preparatory Team took note of the request.

15. Reports

Regarding the publication of the reports to be made during the Study, Indonesian side requested to the Preparatory Team that up Draft Final Report, all kinds of report shall not be published. And regarding Final Report, it shall be determined to be published or not at the time of presentation of the Draft Final Report.

The Preparatory Team informed the Indonesian side that because the Final Report may include information on cost estimation of the Project, it shall not be opened to public until contract for construction is finalized, in order to keep fairness among those competitors who are interested to participate to the construction tender.

16. Technology transfer Seminar

Thye both sides agreed to hold series of Seminar as a part of technology transfer mentioned in the scope of work.

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LIST OF ATTENDANTS

I. Directorate General of Water Resources Development

1. Directorate for Planning and Programming

- 1). Ir. K. Marpaung
- 2). Ir. M. Hasan Dipl, HE
- 3). Ir. Ruchiyat K. Dipl, HE
- 4). Purnomo Harisusanto M. E
- 5). Dr. Ir. F. Putuhena.
- 6). Ir. Oloan Siahaan
- 7). Drs. Dhono Bantolo

2. Directorate for Technical Guidance

- 1). Ir. M. Napitupulu Dipl, HE
- 2). Ir. Dicky Supodo Dipl, HE
- 3). Ir. Budi Santoso Dipl, HE
- 4). Ir. Bambang Sigit

3. Directorate of Water Resources and Conservation

- 1). Ir. Bekly S

4. JRATUNSELUNA River Basin Development Executing Office

- 1). Ir. Pudjoko Dipl, HE
- 2). Ir. Mestika Dipl, HE
- 3). Ir. Bambang S Dipl, HE
- 4). Ir. Imam S Dipl, HE
- 5). Ir. Nursalim

5. JICA Expert

- 1). Kazuo Umeda
- 2). Hiroaki Shintaku

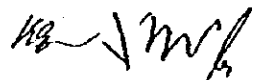
II Directorate General of Human Settlement

1. Directorate for Technology Guidance

- 1). Ir. Hari Sidharta

2. Directorate for Planning and Programming

- 1). Ir. Suwanda



3. Semarang Surakarta Urban Development Project

- 1). Ir. Tata Pradana
- 2). Ir. Leo Gunardi
- 3). Ir. Rachmat
- 4). Ir. Mudzakir
- 5). Ir. Wayan Budiarsa
- 6). Suhartono ATM

4. JICA Expert

- 1). Mitsunobu Nobura
- 2). Fumihiko Tanaka

III Regional Office Public Works at Central Java Province

- 1). Ir. Bambang Kuswidodo Dipl, HE
- 2). Ir. Soenjoto
- 3). Ir. Samikun

IV PT Indah Karya Semarang

- 1). Ir. Iskandar Zulkarnain
- 2). Ir. Sugeng M.E
- 3). Zamzam

V PDAM Kodya Semarang

- 1). Ir. Gunawan Wibisono

VI BAPPEDA TK. I Jawa Tengah

- 1). Ir. Bayu Sutanto

VII BAPPEDA TK. II Kodya Semarang

- 1). Ir. Aunurrofiq

VIII PEMDA Kodya Semarang

- 1). Kol. Inf. Trisno. S

VIII JICA Preparatory Study Team

- 1). Watanabe Masayuki
- 2). Miyata Nobuaki
- 3). Uchida Tsutomu
- 4). Ohnishi Wataru
- 5). Ueda Shigeru
- 6). Watanabe Kanji
- 7). Ibaraki Hiroshi

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## AGENCIES FOR SUPPORTING UNIT

- |    |   |                 |
|----|---|-----------------|
| 1. | Directorate General of Water Resources Development    | ( DGWRD )       |
| 2. | Directorate General of Human Settlements              | ( Cipta Karya ) |
| 3. | Provincial Government of Central Java                 |                 |
| 4. | Semarang City   |                 |
| 5. | Regional Office Public Works at Central Java Province | ( KANWIL )      |

## AGENCIES FOR TECHNICAL SUPPORTING UNIT

- |    |   |                 |
|----|---|-----------------|
| 1. | Directorate General of Water Resources Development    | ( DGWRD )       |
| 2. | Directorate General of Human Settlements              | ( Cipta Karya ) |
| 3. | Provincial Government of Central Java                 |                 |
| 4. | Semarang City   |                 |
| 5. | Regional Office Public Works at Central Java Province | ( KANWIL )      |
| 6. | Jratunseluna River Basin Development Project          |                 |
| 7. | Office of Dinas Pengairan TK I Jawa Tengah            |                 |

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## List Equipment Requested

No.	ITEM	Quantity
1	Long Chassis four wheels drive vehicle with VHF communication tools, A/C roof carder and traller hook.	5
2	Geo electric prospecting equipment	2 set
3	Electronic distance meter	5
4	Electric conductivity meter	2
5	Basic soil-mechanic test equipment	2
6	Standard sieves	2
7	PC Pentium 90, 1.3 GB Hard Disk, ZIP Drive	5
8	Laser Printer	5
9	Photocopy machines	2
10	Photocamera with full set of lenses	2
11	Video camera	2
12	Lap Top Computer Hard Disk	5
13	Voltage stabilizer, 50 Kw 220 Volt	5
14	Topographic Survey Equipment	5
15	Plotter and Scanner	2 Set
16	Global Position System for Survey	2 Set

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## 5. 主要関係者リスト

### 主要関係者リスト

#### 1. 公共事業省 水資源総局 (Directorate General of Water Resources Development)

##### 1) Directorate for Planning and Programming

Mr. Ir. K. Marpaung  
Mr. Ir. M. Hasan Dipl, HE  
Mr. Ir. Ruchiyat K. Dipl, HE  
Mr. Purnomo Harisusanto M. E  
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##### 2) Directorate for Technical Guidance

Mr. Ir. M. Napitupulu Dipl, HE  
Mr. Ir. Dicky Supodo Dipl, HE  
Mr. Ir. Budi Santoso Dipl, HE  
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##### 3) Directorate of Water Resources and Conservation

Mr. Ir. Bekty S

##### 4) JRATUNSELUNA River Basin Development Execcuting Office

Mr. Ir. Pujoko Dipl, HE  
Ms. Ir. Mestika Dipl, HE  
Mr. Ir. Bambang S Dipl, HE  
Mr. Ir. Imam S Dipl, HE  
Mr. Ir. Nursalim

##### 5) JICA Expert

Mr. Kazuo Umeda  
Mr. Hiroaki Shintaku

#### 2. 公共事業省人間居住総局

(Directorate General of Human Settlement (Cipta Karya))

##### 1) Directorate for Technology Guidance

Mr. Ir. Hari Sidharta

##### 2) Directorate for Planning and Programming

Mr. Ir. Suwanda

##### 3) Semarang Surakarta Urban Development Project

Mr. Ir. Tata Pandana  
Mr. Ir. Leo Gunardi  
Mr. Ir. Rachmat  
Mr. Ir. Mudzakir  
Mr. Ir. Wayan Budiarsa  
Mr. Suhartono AIM

- 4) JICA Expert  
Mr. Mitsunobu Nomura  
Mr. Fumihiko Tanaka
3. 中央ジャワ州 州政府公共事業局  
(Regional Office Public Works at Central Java Province)  
Mr. Ir. Bambang Kuswidodo Dipl, IIE  
Mr. Ir. Soenjoto  
Mr. Ir. Samikun
4. PT Indah Karya Semarang Office  
Mr. Ir. Iskandar Zulkarnain  
Mr. Ir. Sugeng M. E  
Mr. Zamzam
5. PDAM Kodya Semarang  
Mr. Gunawan Wibisono
6. BAPPEDA TK. I Jawa Tengah  
Mr. Ir. Bayu Sutanto  
Mr. Ir. Agus Purwadi
7. BAPPEDA TK.II Kodya Semarang  
Mr. Ir. Aunurrofiq
8. PEMDA Kodya Semarang  
Kol. Inf. Trisno S
9. 運輸省鉄道局橋梁部  
(Ministry of Transportation, Department of Railway, Bridge Division)  
Mr. Ir. Heru Susetyo  
Mr. Suryadi Rachmat  
Mr. Armadi
10. 運輸省海上輸送局スマラン港技術部  
(Ministry of Transportation, Sea Transportation Department,  
Semarang Harbour Authority, Technical Division)  
Mr. Herry Subagyo  
Mr. Sartono
11. 鉱山エネルギー省地質鉱物資源総局地質研究開発センター  
(Ministry of Mines and Energy,  
Directorate General of Geology and Mineral Resources,  
Geological Research and Development Centre)
- 1) Directorate of Environmental Geology  
Mr. Ir. Untung Sudarsono
- 2) Hydrogeology Division, Directorate of Environmental Geology  
Mr. Sutrisno Sukiban
- 3) JICA Expert, Senior Advisor

Dr. Atsuo Aihara  
Pro. (cm.) Kyushu University

- 1 2. ディポネゴロ大学工学部土木工学科  
(Diponegoro University, Faculty of Engineering,  
Civil Engineering Department)  
Prof. Ir. Joetata Hadihardaja  
Mr. Sutarto Edhisono  
Ms. Sri Sangkawati Sachro
- 1 3. 在インドネシア日本大使館  
Mr. Kenichi Tsukahara      First Secretary
- 1 4. 海外経済協力基金ジャカルタ駐在員事務所  
Mr. Atsushi Sasaki  
Mr. Atsushi Kaneko
- 1 5. 国際協力事業団インドネシア事務所  
Mr. Ryo Suwa  
Mr. Osamu Nakagaki  
Mr. Hiroyuki Katayama  
Ms. Tomoko Takeuchi  
Ms. Dinur Krismasari

## 6. 質問表

### Questionnaires (回答)

#### 1. Regarding Drainage Facility and Plan

Item	Data / Contents	Availability
1.1 Drainage System	Existing urban drainage system Section for the maintenance Organization / responsibility for the maintenance Way to confirm the boundary of channel	DINAS PU (州政府公共事業局)
1.2 Drainage project	Selection of the project implementing Organization / responsibility of the project implementing Ongoing project Under planning Fund Source for the project	DGWRD (水資源総局) / DINAS PU  Yes

#### 2. Present situation and Development plan on / around the Study Area

Item	Data / Contents	Availability
2.1 Water supply system	Existing water supply system Organization / responsibility for the maintenance	PDAM (水道公社)
2.2 Hydropower generation system	Existing hydropower generation system Organization / responsibility for the maintenance	PLN (電力公社)
2.3 Sewerage system	Existing sewerage system Organization / responsibility for the maintenance	CIPTA KARYA (人間居住総局)
2.4 Road / Bridge	Organization for the maintenance	
2.5 Railway / Bridge	Organization for the maintenance	運輸省鉄道局
2.6 Facilities of underground	Organization for the maintenance Drawings such as; Water supply Sewerage Electricity Telecommunication	PDAM CIPTA KARYA PLM
2.7 River Management	Organization	DGWRD etc.
2.8 Land use plan	Organization of the planning Future land use plan	スマラン市役所 Yes
2.9 Development plan related to the Project		

### 3. Regarding Existing Data related to the Project

Item	Data / Contents	Availability
3.1 Maps and aerial photographs to be used for reconnaissance	Topographic maps covering the Study Area Aerial photographs covering the Study Area	Yes Yes (1980 and 1993)
3.2 Geological data	Geological Maps covering the Study Area Existing report on such data / information as; Active fault Distribution of soft ground Result of geological / soil investigation Result of boring Possible location of borrow pits / quarry sources and material types Geotechnical problems on / around the study area such as; Salt weathering on concrete Sulfate attack on concrete Swelling ground Collapsible soil	Yes
3.3 Geodetic data	Existing horizontal ground controls networks such as; Triangulation Traversing GPS system Existing vertical ground controls networks such as first and second order leveling Coordinates and elevation data of existing horizontal and vertical ground controls mentioned above	
3.4 Meteorological data	Monthly, daily, hourly rainfall data Temperature and humidity Wind direction, velocity and others	Yes Yes Yes
3.5 Hydrological data of rivers and ocean	Flow direction, velocity, volume and high water level Tide table	Yes Yes
3.6 Data / information on related roads in the Study Area	Road maps Road and bridge inventories Record of past disaster / damages	
3.7 Transportation network map	Network maps and capacity of national transport system such as; Roads Railways Commercial flights	Yes

#### 4. Regarding Environmental Affairs

Item	Data / Contents	Availability
<b>4.1 Environmental data / Government regulation</b>		
	Legislation related to land acquisition, compensation and resettlement / removal	Yes
	Responsible ministry or agency	DPU (公共事業省)
	Laws and guidelines	Yes
	Resettlement plan on similar projects	Yes
	Present situation of the Study Area	
	Socioeconomic environment	
	Natural environment	
	Environmental guidelines	Yes

#### 5. Others

Item	Data / Contents	Availability
<b>5.1 Sample of tender and contract documents</b>		
	Documents for tendering	Yes
	General specification	Yes
	Technical specification	Yes
	Drawings	Yes
<b>5.2 Local consultant for design</b>		
	Classification of engineer	Yes
	Payment	Yes
	Equipment of CAD system such as;	
	Personal computer	
	Plotter	
<b>5.3 Unit cost of construction</b>		
	Labor cost	Yes
	Construction material such as;	
	Cement	
	Aggregate	
	Reinforcing bar	
	Machinery cost	
	Fuel / oil	
	Wet masonry	
	Sluice gate	
	Wood pile	
<b>5.4 Criteria, Specification and Standard</b>		
	Dam and hydraulic structure criteria	
	Geometric standards	
	Bridge / structure standards	Yes
	Pavement standards	
	Maintenance manual	Yes
	Technical specification on survey and mapping	
	Cost estimation standard	
<b>5.5 Hydraulic Model Test</b>		
	Objectives	
	Contents	
	Term	
	Cost	
<b>5.6 Conditions of Resettlement Area</b>		
	Social structure	
	Period of settlement	
	Mean income	
	Main Market	

7. 収集資料リスト

収集資料リスト

1. 調査報告書

SEMARANG FLOOD CONTROL PROJECT FINAL PROJECT PREPARATION  
DRAFT REPORT (Vol.1 Main Repot, Vol.2 Appendix, Vol.3 Resettlement Action Plan)  
Sep. 1996 World Bank (コピー、5冊、英文)

LAPORAN SURVEY SOSIAL - EKONOMI UNTUK PENYUSUNAN RESETTLEMENT PLAN  
(住民移転のための社会・経済調査報告書)  
1996 GADJAH MADA University (コピー、インドネシア語、サマリーのみ英語)

KERANGKA ACUAN ANALISIS DAMPAK LINGKUNGAN WADUK PIDEKSO  
(ワドゥックダム環境影響調査報告書)  
May 1994 Ministry of Public Works (コピー、インドネシア語)

2. 設計基準・ダム管理基準・法律など

PERATURAN BETON BERTULANG INDONESIA  
(コンクリート設計基準)  
1971 Ministry of Public Works (コピー、インドネシア語)

TATA CARA PENGHITUNGAN STRUKTUR BETON UNTUK BANGUNAN BETON  
(コンクリート構造物設計基準)  
1991 Ministry of Public Works (コピー、インドネシア語)

GENERAL STIPULATIONS REGARDING STEEL BRIDGES AND PILLARS for RAIL and  
TRAMWAYS in INDONESIA  
1932 INDONESIAN STATE RAILWAYS (コピー、インドネシア語)

DAM SAFETY PROJECT/OPERATION and MAINTENANCE TECHNICAL DOCUMENTS  
Sep. 1996 (コピー)

DAM SAFETY PROJECT/PROFESSIONAL SKILLS UPGRADING SMALL CONCRETE DAMS  
Sep. 1996 (コピー)

NGANCARダムリハビリ工事  
技術仕様書、特記仕様書 (コピー)

PROFESSIONAL SKILLS UPGRADING, INSTRUMENTATION and SURVEILLANCE  
Nov. 1995 (コピー)

DAM SAFETY PROJECT/PROFESSIONAL SKILLS UPGRADING CONCRETE DAMS,  
ROLLER COMPACTED CONCRETE (RCC) DAMS  
Sep. 1996 (コピー)

KEPUTUSAN PRESIDEN NOMOR 55 TAHUN 1993, PEMGADAAN TANAH BAGI  
PELAKSANAAN PEMBANGUNAN UNTUK KEPENTINGAN UMUM  
(公益利益のための開発にともなう土地の準備 大統領令第55号)  
(コピー、インドネシア語)



### 3. 入札関連資料

JATILUHUL ダム入札書類 (コピー)

CENGKLIK ダム一般仕様書 (Sep. 1996) (コピー)

CIMANUK 河洪水調整サブ・プロジェクト入札書類 (Aug. 1995) (コピー)

### 4. 地形図・地質図・土地利用図など

Geological Map of the Magelang and Semarang Quadrangles, Jawa 1996 1:100,000

Geology of the Salatiga Quadrangle, Jawa 1:100,000

Geology of the Kudus Quadrangle, Jawa 1:100,000

Geological Map of the Magelang and Semarang Quadrangles, Jawa 1975 1:100,000

Hydrogeological Map of Indonesia, Semarang 1:250,000

Map of Susceptibility to Landslide, Magelang and Semarang Quadrangles, Jawa 1:100,000

Program Outline of Ground Monitoring and Control Pilot Project Semarang (コピー)

Topographical Map — Tugu — 1:25,000

— Boja — 1:25,000

— Semarang Utara — 1:25,000

— Semarang Selatan — 1:25,000

∠ Distribution Map of Accereration in Indonesia (コピー)

∠ Poject Location Map around Semarang (コピー) 1:3,300 approximately

City Drainage and Flood Control System Map (コピー)

Distribution Map of Industry and Residence Zone (コピー) 1:25,000

Map of Semarang City Plan (コピー) 1:40,000

### 5. その他

Tidal Data at The Semarang Harbour 1991 to 1995, Every January (コピー)

Location Map of the Tidal Gage installed at Semarang Harbour (コピー)

Illustrated Cross Section of Railway Bridge on West Floodway (コピー)

8. インドネシア国公共事業省 FLOOD CONTROL MANUAL (目次)

# FLOOD CONTROL MANUAL

## VOLUME I SUMMARY OF FLOOD CONTROL CRITERIA AND GUIDELINES

Project No WSTCF 091/011

A Sub-project of



**WSTCF**  
Water Sector Technical Cooperation Fund

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**FLOOD CONTROL MANUAL**

**VOLUME II**

**GUIDELINES FOR PLANNING AND SURVEY**

**Project No WSTCF 091/011**

**A Sub-project of**



**WSTCF**  
**Water Sector Technical Cooperation Fund**

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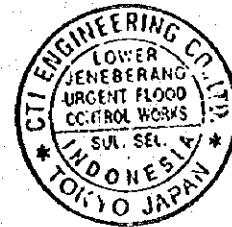
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# FLOOD CONTROL MANUAL

## VOLUME III GUIDELINES FOR DESIGN AND IMPLEMENTATION

Project No WSTCF 091/011



A Sub-project of

*PAMPANG*



**WSTCF**

Water Sector Technical Cooperation Fund

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## 9. 現地再委託費調査

### 9-1 測量業務費

	Unit	Rp.
1. 空中写真撮影		192,150,000
2. グランドコントロール		432,795,000
3. 地形測量		87,817,000
4. 河川縦断測量		25,942,000
5. 河川横断測量		547,030,000
6. 沿岸部深淺測量		28,125,000
⑦ その他		38,000,000
調査管理 (測量士)	4カ月	20,000,000
レンタカー	4カ月	18,000,000
8. 技術経費	10%	131,386,000
9. 諸経費	30%	444,973,000
10. 税金	10%	192,822,000
11. 総計	Rp	2,121,040,000
	US \$	\$1=Rp 2300
	¥	¥1=Rp 20
		922,191
		106,052,000

### 9-2 地質・土質調査費

	Unit	Rp.
1. ジャティバラダム		1,302,757,000
2. 西放水路・ガラン川改修		288,333,000
3. シモンガン堰		49,144,000
4. 市内排水		179,990,000
5. 報告書作成		10,000,000
6. その他		38,000,000
管理 (地質調査技師)	4カ月	20,000,000
レンタカー	4カ月	18,000,000
7. 技術経費	10%	183,022,000
8. 諸経費	30%	615,374,000
9. 税金	10%	266,662,000
10. 総計	Rp	2,933,282,000
	US \$	\$1=Rp 2300
	¥	¥1=Rp 20
		1,275,340
		146,664,100

9-3 環境調査 (社会影響基礎調査を含む) (参考)

調査スケジュール

SCHEDULE OF  
THE REVIEW ENVIRONMENT IMPACT ANALYSIS STUDY (ANDAL) FOR  
JATIBARANG DAM, FLOOD CONTROL WEST FLOODWAY / GARANG RIVER,  
URBAN DRAINAGE IN SEMARANG CITY - INDONESIA

NO	PROJECT NAME	MONTH			
		1	2	3	4
1	TERM OF REFERENCE (PREPARATION & APPROVAL)				
2	JATIBARANG DAM				
3	FLOOD CONTROL WEST FLOODWAY / GARANG RIVER				
4	URBAN DRAINAGE IN CENTRAL SEMARANG AREA				

ジャティバラングム

FINANCIAL PROPOSAL RECAPITULATION FOR  
THE REVIEW ENVIRONMENT IMPACT ANALYSIS STUDY (ANDAL) FOR  
JATIBARANG DAM

I. REMUNERATION .....	Rp.	43,775,000
II. OPERATIONAL BUDGET .....	Rp.	7,600,000
III. EQUIPMENT AND OFFICE SUPPLIER .....	Rp.	3,300,000
IV. REPORT PREPARATION .....	Rp.	5,500,000
V. DISCUSSION .....	Rp.	0,500,000
VI. MISCELLANEOUS .....	Rp.	700,000
<b>TOTAL .....</b>	<b>Rp.</b>	<b>60,375,000</b>
		or
	<b>Yen</b>	<b>3,102,330</b>

ガラン川・西放水路河道改修およびシモンガン堰・取水口の改築

FINANCIAL PROPOSAL RECAPITULATION FOR  
THE REVIEW ENVIRONMENT IMPACT ANALYSIS STUDY (ANDAL) FOR  
FLOOD CONTROL WEST FLOODWAY / GARANG RIVER

I. ENUMERATION .....	Rp.	30,775,000
II. OPERATIONAL BUDGET .....	Rp.	3,940,000
III. EQUIPMENT AND OFFICE SUPPLIER .....	Rp.	3,050,000
IV. REPORT PREPARATION .....	Rp.	5,500,000
V. DISCUSSION .....	Rp.	8,500,000
VI. MISCELLANEOUS .....	Rp.	700,000
TOTAL .....	Rp.	52,465,000
		or
	Yen	2,406,651

市内排水施設

FINANCIAL PROPOSAL RECAPITULATION FOR  
THE REVIEW ENVIRONMENT IMPACT ANALYSIS STUDY (ANDAL) FOR  
URBAN DRAINAGE IN CENTRAL SEMARANG AREA

I. ENUMERATION .....	Rp.	42,150,000
II. OPERATIONAL BUDGET .....	Rp.	7,340,000
III. EQUIPMENT AND OFFICE SUPPLIER .....	Rp.	3,050,000
IV. REPORT PREPARATION .....	Rp.	5,500,000
V. DISCUSSION .....	Rp.	8,500,000
VI. MISCELLANEOUS .....	Rp.	700,000
TOTAL .....	Rp.	67,240,000
		or
	Yen	3,004,404

Note : Applied exchange rate : ¥ 1.00 = Rp.21.00







JICA