The structures to be built in the retarding channel such as warning signboard, gate door or playing facilities should be rigid structures with concrete foundations underground to prevent them from being washed out. A gentle drainage gradient and some ditches will be installed to minimize inundation duration.

It is suggested that asphalt pavement be provided for tennis courts or volleyball courts when installed, and structures and facilities which may suffer damage by inundation such as flower bed, fountain and arbor should be located in the upper zone which has a low frequency of inundation.

8.2.3 Drainage Outlet

A total of 37 drainage outlets located at either the right or left banks will be reconstructed in the Percut River Improvement Works. For four sites where the ground height is lower than the design high water level (DHWL) of the river, the gates are installed at the end of sluiceway. Among the four sites, one sluiceway with a small flap gate does not need any operation of gate. At the other three sites with steel slide gates, manual operation of gates will be necessary to prevent back-flow from the river and protect the lowland.

Main Features of Sluice

Three sluices (SL2, SL3 and SL4) with slide gates will be located along the left bank between Bandar Sidoras Weir and Tembung Bridge. The main features of sluice are as given below. The hoisting system of gates is a kind of manually driven spindle.

Drainage Number	SL2	SL3	SL4
Location	PE 95+35 Left Bank	PE 138+55 Left Bank	PE 155+90 Left Bank
Box Culvert Size (B×H×Set)	2.0m×1.5m×2	1.5m×1.5m×1	2.0m×1.5m×1
Sill Elevation	EL 5.300 m	EL 11.000 m	EL 12.500 m
Riverbed of Percut River	EL 2.925m	EL 7.694m	EL 9.855m
DHWL of Percut River	EL 8.63m	EL 13.80m	EL 15.97m
Ground Level	EL 7.000 m	EL 12.800 m	EL 15.400 m
Flow Capacity at GL	149 m^3/s	215 m^3/s	259 m^3/s
Corresponding Probability	2-year	5-year	10-year
Gate			
- Type	Steel Slide Gate		
- Hoisting System	Manually Driven Spindle		
- Hoisting Speed	More than 20 cm/min		
- Manual Force	Less than 15 kg		

Gate Operation Rule

Sluice gates are usually opened to drain inland water behind dike. The flow capacity at each river section where the sluice will be installed is estimated for the ground height shown in the table above that corresponds to the flood discharge of a 2-year return period at SL2 site (ground height EL 7.000 m), a 5-year flood discharge at SL3 site (ground height EL 12.800 m), a 10-year flood discharge at SL4 site (ground height EL 15.400 m). Therefore, the sluice gate shall be closed for a flood larger than the flow capacity, otherwise, the lowland behind the dike will be inundated by back flow from the river.

The design height of gates is 1.5 m at all three sites and the hoisting speed of spindle is at 0.2 m per minute. The operation time of gate is hence estimated at about 8 minutes which allows a quick operation. On the other hand, the flood hydrograph in Percut River is sharp and the rising of water level for the design flood of a 25-year return period reaches 1.6 m per hour at the maximum. Therefore, an earlier gate operation is required.

The gate operation conditions are as given below.

(1) Gates are fully opened in usual time.

(2) When the river water level rises and reaches the conditions given below in flood time, the gate should be promptly closed by hoisting down the spindle. The index levels are supposed to be marked clearly at gate piers.

  (a) When the river water level exceeds the elevation of 1 m below ground level, and the river water intrudes into the lowland behind the dike.

  (b) When the river water level exceeds the elevation of 0.5 m below ground level.

(3) After closing the gate, when the water level in the river goes down lower than the elevation of 1 m below ground level, the gate should be opened again by hoisting up the spindle.

8.3 Maintenance Plan

In order to accomplish an effective maintenance work, it is indispensable to carry out periodical and routine inspections over the river channel and river structures, as well as bridge foundations and drainage outlets. Although the maintenance works for bridges and drainage facilities will be conducted by Medan City and/or Deli Serdang District, the inspection could be carried out by the proposed O&M organization.

The objectives of inspection are not only to locate trouble spots and/or obstacles which may cause destruction to the project works but also to grasp the actual conditions such as channel flow, illegal occupancy or utilization of the project works and to monitor environmental conditions including sand mining and water quality. The items of inspection are given in Table 8.3.1.

8.3.1 River and Floodway

Periodical Channel Survey

It is necessary to conduct a longitudinal survey and cross section survey along the rivers and sea depth sounding in and around the river mouth. These shall be done at least twice a year, before and after each rainy season, based on the following indications.

(1) Longitudinal and Cross Section Survey

There exist a number of control points of concrete piles for river survey, which are to be established during construction works for the Project. The elevation of the following points shall be measured at the river sections of the above control points:

(a) Shoulder of dike
(b) Toe of dike
(c) Shoulder of low water channel
(d) Slope and its end of channel
(e) Channel bed (about 10 m interval)
(f) Deepest channel bed

After measurement, designed figures such as high water level, elevation of dike channel bed shall be indicated on the drawings together with the survey results and filed for periodical analysis.

(2) Depth Sounding

To grasp the growth or change of sand bar and sediment condition of the sea and channel bed downstream of Percut River and urban drainage channels, sea and river depth sounding shall be conducted at least twice a year, before and after each rainy season.

The sea depth survey at the estuary of Percut River shall cover about 600 m distance from the river mouth to the sea and about 2,000 m wide along the seashore. The survey area of about 1.2 km^2 shall be divided into a mesh with 200 m intervals, and the

measurement of sea bed and sea level shall be done at 33 points at the crossing points of the mesh lines.

On the other hand, for the estuary of the drainage channels, a smaller but appropriate area to monitor the bed fluctuation must be determined and surveyed.

Earth Dike Slope

It takes about three years, in general, for a dike to become stable and for sod to completely cover the slope of the dike after completion of embankment work. Therefore, special care should be taken during these years.

Maintenance work such as repairing of dike and weeding will be necessary even after the above-said period, because the dike could be damaged due to weathering and passing of people and animals on the slope of dike and the sod may also be spoiled by weeds.

Sodding is one of the most suitable means of slope protection. Thus, protection by sodding is an important factor for the maintenance of dike. Weeds found in the sodding area shall be dug out, because weeds generally become taller than the sod and likely to kill the sod when they grow. Therefore, weeding twice a year is required because weeds grow so fast.

Scoured section shall be immediately and temporarily repaired by sandbags, etc., and rehabilitated by permanent means in dry season.

Waste Disposal and Aquatic Plant

Waste, whenever found, shall be removed without delay as they spoil the scenic environment of channel, and wastes on the slopes also cause damage to the slopes by nesting of field mice and moles.

For the disposal of wastes in the channel, it is desirable that they be brought to a specified garbage incineration plant or a garbage dump where they are incinerated. At areas covered by wastes for a long time, sods die in most cases. To rehabilitate such area, clean soil may have to be placed and mixed with the deteriorated soil and re-sodding has to be done if necessary.

Aquatic plants represented by water hyacinth grow rapidly and thickly in areas where water is available. Such plants which clog the flow section shall be removed immediately and treated as described above for waste.

Channel Section

It is necessary to maintain the standard cross sectional shape of the channel by excavation or dredging when a decrease of the effective cross sectional area of the channel is found. Weeds,

bamboo and other plants grown in the channel not only hamper the smooth flow of stream but also accelerate sedimentation and, as the result, they reduce the flow section of the channel. This is the other reason why weeding is necessary together with the clearing of bamboo and plate. Sediment deposits shall be carefully observed and removed from the channel bed during dry season.

Estuary

Monitoring and management of siltation at the estuary of river and drainage channels shall be made by collecting data on the growth of riverbed elevation by silting or sand bar.

8.3.2 Riparian Structures

Revetment (Wet Stone Masonry, Gabion Cylinder and Riprap)

(1) Revetment is usually constructed of durable materials, but careful attention is required because the revetment faces the flood flow and it is affected by bed variation.

(2) Slope protection shall be maintained well even in a trouble spot, because it is important to prevent initial destruction which, in general, does not require much difficulty for repairing.

(3) Slope foundation shall be taken cared of where the foundation is exposed above the bed. Additional foot protection shall be set steadily and, especially for sections without foot protection, some reinforcements such as riprap and gabions are required to be provided if local scouring is found and the foundation is caving in.

Groin

In general, each groin installed upstream of each groin group is susceptible to damage by flood. Local scouring at foot portion as well as logs and drifts are main causes of damage. Whenever local scouring is observed, the portion shall be temporarily strengthened and be rehabilitated during dry season by the construction of a more permanent structure at the same place and/or upstream. Logs and drifts shall be promptly removed so that they will not give excessive flow pressure to the groin.

Diversion Weir and Goundsill

Groundsill is susceptible to scouring at its foot from either up and downstream, bringing sections of riverbed materials resulting in foundation sinking and tumbling. Groundsill concrete

is also subject to cracking and abrasion by riverbed materials. Additional sheet piling and/or waterproofing works shall be provided.

Strict control of sand mining operations is the best protection against damage to the groundsill. When the structure is only damaged, it must be rehabilitated in the next dry season.

8.3.3 Drainage Facility

Since the Public Works Office of Medan City or Kab. Deli Serdang shall be responsible for the operation of sluice gate, the maintenance work for drainage facilities is to be undertaken by the same office. Observation and information for drainage outlets may be carried out in the course of inspection work by the proposed O&M organization.

The following matters shall be taken into consideration:

(1) Operation of the gate is most important, and the conditions for smooth opening and closing shall be confirmed especially before rainy season. Painting shall be done at least once every three years to protect the gate from rust.

(2) Weeds and sediments are often observed on the bottom of culvert. They shall be removed and checking work has to be done during patrol.

8.3.4 Bridges

The maintenance work for bridges and its approach roads shall be handed over to and maintained by the respective responsible agencies. However, the substructure and protection works of the bridges and the flow section under the superstructure shall be observed carefully by the proposed O&M organization. The responsible agencies for bridges are as follows:

National Road Bridge	DG. Bina Marga or PT. Jasa Marga
Provincial Road Bridge	North Sumatra Provincial Public Works
Town Road Bridge	Public Works of Medan City or Kab. Deli Serdang
Railway Bridge	PJKA
Water Pipe Bridge	PDAM Tirtanadi, Medan

8.3.5 Waterfront Facilities

Waterfront facilities are designed in the retarding channel upstream of Deli River Weir, meandering portions of Percut River and along the Floodway. Firstly, some open spaces adjacent to river water are provided for multipurpose uses such as park, playground and walkway (promenade). Steps on the dike/bank slope may ease access to the river water and tree planting along the river channel should improve the scenic view.

Open Space

A wide staged-terrace in the retarding channel is subject to inundation sometimes in the flood season. After the inundation, cleaning of the area and some facilities is required by removing driftwood, grasses or wastes. The deposition of sediment, debris and solid wastes in the river channel shall be prevented by periodic clearing work. Water quality of river flow shall also be observed, whether contaminated by industrial effluents and residential sewerage.

Soddings and walkway in the terraces at the retarding channel and open spaces at the meandering sections shall be carefully preserved not only to keep the flood control function but also to maintain the scenic condition. Intensive cleaning work after floods and periodical cleaning works are required.

Step and Tree Planting

The inspection work for river channel shall include detection of deterioration and failures in steps and tree plantings. Steps on the dike/bank slope are prone to erosion by rainwater, therefore, the observation shall be emphasized on the bedding materials whether or not they are loosened by erosion. Cracks in the steps shall also be immediately corrected for the safety of pedestrians.

TABLES

CHAPTER 8

OPERATION AND MAINTENANCE

Table 8.1.1 (1/2) LAWS AND POLICY STATEMENTS FOR WATER MANAGEMENT IN INDONESIA

Document	Purpose and Relevance
Law No. 11 (1974) pertaining to Water Resources	- use of surface water - use of groundwater - water supply - irrigation needs - water pollution control - flood control - swamp reclamation - river improvements - direct beneficiaris participate in O&M - Central and Local Government have O&M responsibility
Government Regulation No. 6 (1981) pertaining to contribution for O&M. Cost for Water Resources Development Infrastructure	- provides for Public Water Corporation - provides for Beneficiary Water Charges (use or pollution) - provides fee levels (though Ministries of Finance and Home Affairs)
Government Regulation No. 22 (1982) pertaining to Water Resources Management	- details O&M responsibilities - Central Government assistance to beneficiaries - Central Government responsibility for projects - specifies water basin boundaries and inclusion of small drainage basins - Provincial jurisdiction for Provincial river basins - Central Government (MPW) jurisdiction for important and interprovincial river basins - Requests individual basin Water Resources Plans as part of National Water Resources Plan
Ministerial Regulation (MPW) No. 39 (1989) pertaining to Division of River Basins	- defines 90 river territories
Ministerial Regulation (MPW) No. 48 (1990) pertaining to management of Water Sources in River Basins	- defines river basin jurisdictions - 73 Provincial - 15 National - 2 Public Corporations
Government Regulation No. 23 (1982) pertaining to Irrigation	- O&M responsibilities for irrigation - delegates responsibility for O&M and tertiary construction to Villages and User Groups
Government Regulation No. 27 (1991) pertaining to Swamps	- O&M responsibilities for swamps - delegated responsibility of local reclamation projects to users

Table 8.1.1 (2/2) LAWS AND POLICY STATEMENTS FOR WATER MANAGEMENT IN INDONESIA

Document	Purpose and Relevance
Ministerial Regulation (MPW) No. 49 (1990) pertaining to procedure of licensing requirements for Water and or Water sources Utilization	- requires licensing of water users for : . urban areas . settlement areas . drinking water . agricultural irrigation . livestock watering . plantation uses . fisheries . industrical and mining uses . floating facilities . submersed facilities . navigation . recreation . waste disposal . alterations to river structures - Central Government licensing by Minister PW for important and interprovincial river basins - Governor licensing for Provincial river basins
Ministerial Regulation (MPW) No. 458 (1986) pertaining to provision of River protection in relation with mining of Group C materials	- licensing of sand mining by MPW
Law No. 4 (1982) pertaining to management of living environment	- provisions for management of the environment
Government Regulation No. 20 (1990) pertaining to Water Quality Control	- regulations for water pollution control
Presidential Decree No. 32 (1990) pertaining to establishment of environmental impact management agency	- established Environmental Impact Management Agency
Government Regulation No. 35 (1991) pertaining to Rivers	- confirms administration of rivers may be delegated to local governments or state owned companies - definition of O&M - scope of O&M activities
Ministerial Regulation (MHA) No. 39 (1992) pertaining to Guidelines of Regional Organization	- provides guidelines for organization of local governments - permits establishment of Provincial Technical Implementation Units (UPTs) that could apply to river basin pilot projects
Local Government Regulations	- covering several aspects

Table 8.1.2 NINETY RIVERS NOMINATED BY MINISTERIAL REGULATION NO.39/1989

No.	Name of River Basin	Province	Juris-diction
1	Krueng Aceh	Aceh	Prov
2	Meureudu Ureun	Aceh	Prov
3	Pase Peusangan	Aceh	Prov
4	Jambu Aye	Aceh	Prov
5	Tamiyang Langsa	Aceh	Prov
6	Woyla Lambesi	Aceh	Prov
7	Singkulat Tripa	Aceh	Prov
8	Singkil	Aceh/North Sumatera	CGC
9	Wampu Besitang	North Sumatera	Prov
10	Belawan Belumai Ular	North Sumatera	Prov
11	Bahbolon	North Sumatera	Prov
12	Asahan	North Sumatera	Prov
13	Barumun Kualuh	North Sumatera	Prov
14	Batang Gadis/Batang Toru	North Sumatera	Prov
15	Rokan	Riau/West Sumatera	CGC
16	Siak	Riau/West Sumatera	CGC
17	Kampar	Riau/West Sumatera	CGC
18	Indragiri	Riau/West Sumatera	CGC
19	Silaut	West Sumatera	Prov
20	Anai Sualang	West Sumatera	Prov
21	Batang Hari	Jambi/West Sumatera	CGC
22	Sugihan	South Sumatera	Prov
23	Baturusa/Cerucut	South Sumatera	Prov
24	Musi	South Sumatera	CGC
25	Mesuji/Tulang Bawang	Lampung/South Sumatera	Prov
26	Seputih/Sekampung	Lampung	Prov
27	Semangko	Lampung	CGC
28	Kanal-Alas Talo	Bengkulu	CGC
29	Lais-Bintunan Ketahuan	Bengkulu	Prov
30	Ipuh-Teramang Manjunto	Bengkulu	Prov
31	Ciujung-Ciliman	West Java	Prov
32	Cisadane-Ciliwung	West Java/DKI Jakarta	CGC
33	Cisadeg-Cikuningan	West Java	Prov
34	Citarum	West Java	PC
35	Cimanuk	West Java/Central Java	CGC
36	Ciwulan	West Java	Prov
37	Citanduy	West Java/Central Java	CGC
38	Pemali Comal	Central Java	Prov
39	Serayu	Central Java	Prov
40	Jratun Seluna	Central Java	Prov
41	Progo-Opak-Oyo	Central Java/Yogykarta	CGC
42	Bengawan Solo	Central Java/East Java	CGC
43	K. Brantas	East Java	PC
44	Pekalen Sampean	East Java	Prov
45	Madura	East Java	Prov
46	Bali	Bali	Prov
47	Lombok	West Nusatenggara	Prov
48	Sumbawa	West Nusatenggara	Prov
49	Sumba	East Nusatenggara	Prov
50	Flores	East Nusatenggara	Prov
51	West Timor	East Nusatenggara	Prov
52	East Timor	East Timor	Prov
53	Cengal-Batulicin	South Kalimantan	Prov
54	Barito	South Kalimantan/ Central Kalimantan	CGC
55	Kahayan	Central Kalimantan	Prov
56	Mendawai	Central Kalimantan	Prov
57	Sampit	Central Kalimantan	Prov
58	Pembuang	Central Kalimantan	Prov
59	Pawan	West Kalimantan	Prov
60	Kapuas	West Kalimantan	Prov
61	Mempawah Sambas	West Kalimantan	Prov
62	Sesayap	East Kalimantan	Prov
63	Kayan	East Kalimantan	Prov
64	Berau Kelai	East Kalimantan	Prov
65	Karangan	East Kalimantan	Prov
66	Mahakam	East Kalimantan	Prov
67	Ronowangko Tondano	North Sulawesi	Prov
68	Limboto Bone	North Sulawesi	Prov
69	Paguyaman/Randangan	North Sulawesi	Prov
70	Lambunu Bual	Central Sulawesi	Prov
71	Parigi Poso	Central Sulawesi	Prov
72	Bongka Malik	Central Sulawesi	Prov
73	Lombok Mantawa	Central Sulawesi	Prov
74	Laa-Tambalako	Central Sulawesi	Prov
75	Palu-Lariang	Central Sulawesi	CGC
76	Lasolo-Sumpara	South East Sulawesi	Prov
77	Paleang-Roraya	South East Sulawesi	Prov
78	Towari Susua	South East Sulawesi	Prov
79	Kaluku-Karama	South Sulawesi	Prov
80	Pompengan-Kalaena-Larona	South Sulawesi	Prov Prov
81	Sadang	South Sulawesi	Prov
82	Walanae-Cenranae	South Sulawesi	Prov
83	Jenebrang	South Sulawesi	Prov
84	South East Maluku	Maluku	Prov
85	Central Maluku	Maluku	Prov
86	North Maluku	Maluku	Prov
87	Wasi-Kais-Omba	Irian Jaya	Prov
88	Membrano	Irian Jaya	Prov
89	Eilanden-Edera	Irian Jaya	Prov
90	Digul Bikuma	Irian Jaya	Prov

PC : Public Corporation
CGC : Central Government Control
Prov : Province

Table 8.1.3 NUMBER OF ENGINEERS AND STAFF OF PPSAPB-SU

OFFICE LEVEL			NUMBER OF STAFF				
Main	Division/Branch	Section	Sr. Engineer	Jr. Engineer	Technician	Adm. Officer	Adm. Staff
PPSAPB			1: Manager				
			2			2	
	Office of Staff		1: Chief				
		Planning	2	2	4		
		Construction	5	2			
		Operation	1	3	13		
		Keuangan				4	4
		Umum				3	14
	North Sumatra		1: Chief			1	
		Technical	1	3	6		
		Administration				4	7
		Package I		1	36		
		Package II	2		11		
		Package III	2		4		
		Package IV		1	17		
	Bahbolon River		1: Chief			1	
		Technical	1	3	17		
		Administration				4	25
		Package I	1	1	21		
	Medan Flood		1: Chief			1	
		Technical	1	3	4		
		Administration				4	10
		Package I	1		18		
		Package II		1	11		
TOTAL			23	20	162	24	60

Table 8.1.4 ANNUAL BUDGET FOR PPSAPB-SU (1991/92 - 1995/96)

(Unit: 1,000 Rp.)

Project and Work Item	1991/92	1992/93	1993/94	1994/95	1995/96	Total
I. Rehabilitation of Rivers in North Sumatra	2,714,964	3,224,213	4,446,028	10,704,085	6,749,736	27,839,026
I.1 Project Administration	101,731	85,070	102,253	286,967	294,678	870,699
I.2 Land Acquisition	19,875	44,350	365,000	1,779,830	1,500,000	3,709,055
I.3 Provision of Motorcycle	-	32,845	-	-	-	32,845
I.4 Construction/Rehabilitation of Dike	1,254,110	-	2,197,111	3,072,058	1,669,359	8,192,638
I.5 Channeling Work	258,725	-	1,054,670	2,275,779	-	3,589,174
I.6 Repair of Damage	1,080,523	2,978,538	-	-	-	4,059,061
I.7 Revetment Retaining Wall	-	11,000	660,544	2,513,615	3,189,699	6,374,858
I.8 Installation of Water Pipe	-	10,000	-	-	-	10,000
I.9 Survey and Design	-	62,410	-	159,000	96,000	317,410
I.10 Processing of Hydrology Data	-	-	66,450	-	-	66,450
I.11 Rehabilitation of Jetty	-	-	-	148,280	-	148,280
I.12 O&M of Rivers	-	-	-	468,556	-	468,556
II. Rehabilitation of Wampu River	2,954,050	2,664,410	2,864,389	-	-	8,482,849
II.1 Project Administration	116,049	102,473	117,473	-	-	335,995
II.2 Land Acquisition	495,063	24,625	204,320	-	-	724,008
II.3 Repair of Damage	-	1,445,820	-	-	-	1,445,820
II.4 Rehabilitation of Check Dam	-	-	45,269	-	-	45,269
II.5 Channeling Work	-	-	681,802	-	-	681,802
II.6 Construction/Rehabilitation of Dike	1,521,007	678,998	1,162,974	-	-	3,362,979
II.7 Irrigation Improvement	-	-	649,151	-	-	649,151
II.8 Flood Fighting	-	-	3,400	-	-	3,400
II.9 Rehabilitation of Drainage Channel	821,931	346,423	-	-	-	1,168,354
II.10 Survey and Design	-	66,071	-	-	-	66,071
III. Binjai City Flood Control	150,986	966,026	1,618,628	-	-	2,735,640
III.1 Project Administration	28,443	30,956	33,234	-	-	92,633
III.2 Land Acquisition	-	381,337	623,144	-	-	1,004,481
III.3 Revetment/Retaining Wall	122,543	495,324	962,250	-	-	1,580,117
III.4 Survey and Design	-	25,564	-	-	-	25,564
III.5 Provision of Motorcycle	-	32,845	-	-	-	32,845
IV. Rehabilitation of Ular River	-	551,479	775,488	-	-	1,326,967
IV.1 Project Administration	-	56,563	67,185	-	-	123,748
IV.2 Revetment/Retaining Wall	-	444,585	685,371	-	-	1,129,956
IV.3 Rehabilitation of Dike	-	19,302	19,932	-	-	39,234
IV.4 Flood Fighting	-	-	3,000	-	-	3,000
IV.5 Survey and Design	-	31,029	-	-	-	31,029
V. Rehabilitation of Bahbolon River	-	-	-	2,173,844	1,273,094	3,446,938
V.1 Project Administration	-	-	-	114,776	204,249	319,025
V.2 Survey and Design	-	-	-	-	20,155	20,155
V.3 Construction/Rehabilitation of Dike	-	-	-	191,178	1,048,690	1,239,868
V.4 Construction of Division Work	-	-	-	1,867,890	-	1,867,890
VI. Medan City Flood Control	-	-	-	25,091,108	12,765,433	37,856,541
VI.1 Project Administration	-	-	-	137,173	128,445	265,618
VI.2 Land Acquisition	-	-	-	6,908,745	1,798,693	8,707,438
VI.3 Survey and Design	-	-	-	35,442	130,000	165,442
VI.4 Channeling Work	-	-	-	1,028,575	1,576,012	2,604,587
VI.5 Repair of Dredger	-	-	-	795,000	-	795,000
VI.6 Revetment/Retaining Work	-	-	-	1,031,173	2,243,941	3,275,114
VI.6 Contract Work	-	-	-	15,155,000	6,888,342	22,043,342
6-1 Consulting Contract	-	-	-	1,116,000	541,283	1,657,283
6-2 Construction Contract	-	-	-	14,039,000	6,347,059	20,386,059
TOTAL	5,820,000	7,406,128	9,704,533	37,969,037	20,788,263	81,687,961
(Foreign Assistant Portion)	-	-	-	15,950,000	6,888,342	22,838,342

Table 8.2.1 GATE OPENING - WATER LEVEL - DISCHARGE RELATION OF RIGHT INTAKE AT BANDAR SIDORAS WEIR

Gate Opening a (m)	Gate Width b (m)	River Water Level H1 (EL.m)	Upstream Water Depth h_1=H1-2.9 (m)	Downstream Water Depth h_2 (m)	Coeff. C	Intake Discharge Q (m^3/s)
0.20	2.50	4.06	1.16	0.902	0.3309	0.79
0.20	2.50	4.10	1.20	0.915	0.3418	0.83
0.20	2.50	4.20	1.30	0.943	0.3657	0.92
0.20	2.50	4.30	1.40	0.969	0.3861	1.01
0.20	2.50	4.40	1.50	0.989	0.4060	1.10
0.20	2.50	4.50	1.60	1.007	0.4230	1.18
0.20	2.50	4.60	1.70	1.023	0.4377	1.26
0.20	2.50	4.70	1.80	1.039	0.4509	1.34
0.20	2.50	4.80	1.90	1.055	0.4624	1.41
0.20	2.50	4.87	1.97	1.065	0.4698	1.46
0.40	2.50	4.06	1.16	1.027	0.2690	1.28
0.40	2.50	4.10	1.20	1.047	0.2829	1.37
0.40	2.50	4.20	1.30	1.092	0.3134	1.58
0.40	2.50	4.30	1.40	1.133	0.3390	1.78
0.40	2.50	4.40	1.50	1.172	0.3607	1.96
0.40	2.50	4.50	1.60	1.208	0.3800	2.13
0.40	2.50	4.60	1.70	1.239	0.3983	2.30
0.40	2.50	4.70	1.80	1.267	0.4149	2.46
0.40	2.50	4.80	1.90	1.289	0.4318	2.63
0.40	2.50	4.87	1.97	1.314	0.4384	2.72
0.60	2.50	4.06	1.16	1.092	0.2211	1.58
0.60	2.50	4.10	1.20	1.119	0.2346	1.71
0.60	2.50	4.20	1.30	1.182	0.2647	2.00
0.60	2.50	4.30	1.40	1.239	0.2929	2.30
0.60	2.50	4.40	1.50	1.291	0.3182	2.59
0.60	2.50	4.50	1.60	1.339	0.3401	2.86
0.60	2.50	4.60	1.70	1.382	0.3610	3.13
0.60	2.50	4.70	1.80	1.419	0.3816	3.40
0.60	2.50	4.80	1.90	1.456	0.4004	3.66
0.60	2.50	4.87	1.97	1.480	0.4115	3.84
0.80	2.50	4.06	1.16	1.126	0.1832	1.75
0.80	2.50	4.10	1.20	1.158	0.1956	1.90
0.80	2.50	4.20	1.30	1.234	0.2254	2.28
0.80	2.50	4.30	1.40	1.304	0.2541	2.66
0.80	2.50	4.40	1.50	1.369	0.2794	3.03
0.80	2.50	4.50	1.60	1.425	0.3068	3.44
0.80	2.50	4.60	1.70	1.478	0.3306	3.82
0.80	2.50	4.70	1.80	1.528	0.3516	4.18
0.80	2.50	4.80	1.90	1.575	0.3706	4.52
0.80	2.50	4.87	1.97	1.697	0.3825	4.75
1.00	2.50	4.06	1.16	1.144	0.1537	1.83
1.00	2.50	4.10	1.20	1.179	0.1646	2.00
1.00	2.50	4.20	1.30	1.264	0.1941	2.45
1.00	2.50	4.30	1.40	1.344	0.2210	2.89
1.00	2.50	4.40	1.50	1.418	0.2495	3.38
1.00	2.50	4.50	1.60	1.485	0.2765	3.87
1.00	2.50	4.60	1.70	1.549	0.3002	4.33
1.00	2.50	4.70	1.80	1.610	0.3220	4.78
1.00	2.50	4.80	1.90	1.673	0.3346	5.11
1.00	2.50	4.87	1.97	1.722	0.3398	5.28

Note : $F(C) = AC4 + BC2 + D = 0$

$A = \{a/h_1 - (1/C^2)(h_1/2)\}^2$, $D = (h_1/a)^2 - (h_2/a)^2$

$B = 2\{a/h_1 - (1/C_2)(h_1/a))(h_1/a) - 4\{h_1/h_2 - h_1/Ca\}$

Trial calculation is rquired as to satisfy h_2 rating in the downstream channel.

Table 8.2.2 GATE OPENING - WATER LEVEL - DISCHARGE RELATION OF LEFT INTAKE AT BANDAR SIDORAS WEIR

Gate Opening a (m)	Gate Width b (m)	River Water Level H1 (EL.m)	Upstream Water Depth h_1=H1-2.9 (m)	Downstream Water Depth h_2 (m)	Coeff. C	Intake Discharge Q (m^3/s)
0.20	2.00	4.06	1.16	0.804	0.3987	0.76
0.20	2.00	4.10	1.20	0.817	0.4058	0.79
0.20	2.00	4.20	1.30	0.848	0.4213	0.85
0.20	2.00	4.30	1.40	0.878	0.4346	0.91
0.20	2.00	4.40	1.50	0.906	0.4461	0.97
0.20	2.00	4.50	1.60	0.931	0.4569	1.02
0.20	2.00	4.60	1.70	0.954	0.4673	1.08
0.20	2.00	4.70	1.80	0.975	0.4767	1.13
0.20	2.00	4.80	1.90	0.995	0.4853	1.18
0.20	2.00	4.87	1.97	1.009	0.4902	1.22
0.40	2.00	4.06	1.16	0.992	0.3075	1.17
0.40	2.00	4.10	1.20	1.013	0.3162	1.23
0.40	2.00	4.20	1.30	1.066	0.3359	1.36
0.40	2.00	4.30	1.40	1.115	0.3529	1.48
0.40	2.00	4.40	1.50	1.162	0.3677	1.59
0.40	2.00	4.50	1.60	1.205	0.3814	1.71
0.40	2.00	4.60	1.70	1.244	0.3951	1.82
0.40	2.00	4.70	1.80	1.281	0.4076	1.94
0.40	2.00	4.80	1.90	1.317	0.4189	2.05
0.40	2.00	4.87	1.97	1.341	0.4256	2.12
0.60	2.00	4.06	1.16	1.079	0.2429	1.39
0.60	2.00	4.10	1.20	1.108	0.2512	1.46
0.60	2.00	4.20	1.30	1.178	0.2700	1.64
0.60	2.00	4.30	1.40	1.242	0.2894	1.82
0.60	2.00	4.40	1.50	1.303	0.3072	2.00
0.60	2.00	4.50	1.60	1.360	0.3231	2.17
0.60	2.00	4.60	1.70	1.415	0.3372	2.34
0.60	2.00	4.70	1.80	1.468	0.3501	2.50
0.60	2.00	4.80	1.90	1.519	0.3614	2.65
0.60	2.00	4.87	1.97	1.554	0.3691	2.75
0.80	2.00	4.06	1.16	1.121	0.1963	1.50
0.80	2.00	4.10	1.20	1.155	0.2037	1.58
0.80	2.00	4.20	1.30	1.235	0.2232	1.80
0.80	2.00	4.30	1.40	1.312	0.2419	2.03
0.80	2.00	4.40	1.50	1.386	0.2589	2.25
0.80	2.00	4.50	1.60	1.456	0.2743	2.46
0.80	2.00	4.60	1.70	1.524	0.2880	2.66
0.80	2.00	4.70	1.80	1.589	0.3011	2.86
0.80	2.00	4.80	1.90	1.652	0.3128	3.05
0.80	2.00	4.87	1.97	1.694	0.3217	3.20
1.00	2.00	4.06	1.16	1.142	0.1621	1.55
1.00	2.00	4.10	1.20	1.178	0.1691	1.64
1.00	2.00	4.20	1.30	1.266	0.1875	1.89
1.00	2.00	4.30	1.40	1.351	0.2052	2.15
1.00	2.00	4.40	1.50	1.434	0.2210	2.40
1.00	2.00	4.50	1.60	1.514	0.2352	2.63
1.00	2.00	4.60	1.70	1.592	0.2483	2.87
1.00	2.00	4.70	1.80	1.666	0.2614	3.11
1.00	2.00	4.80	1.90	1.737	0.2745	3.35
1.00	2.00	4.87	1.97	1.786	0.2826	3.51

Note : $F(C) = AC4 + BC2 + D = 0$

$A = \{a/h_1 - (1/C^2)(h_1/2)\}^2$, $D = (h_1/a)^2 - (h_2/a)^2$

$B = 2\{a/h_1 - (1/C_2)(h_1/a)\}(h_1/a) - 4\{h_1/h_2 - h_1/Ca\}$

Trial calculation is rquired as to satisfy h_2 rating in the downstream channel.

Table 8.2.3 REQUIRED GATE OPENING FOR IRRIGATION DISCHARGE AT RIVER WATER LEVEL OF BANDAR SIDORAS WEIR SITE

River Water Level H1 (EL.m)	Upstream Water Depth h_1=H1-2.9 (m)	Gate Opening (m)		
		Left Intake		Right Intake
		Present Q=1.36m³/s a (m)	Future Q=1.68m³/s a (m)	Present Q=2.09m³/s a (m)
4.06	1.16	0.56	1.00	1.00
4.10	1.20	0.50	1.00	1.00
4.15	1.25	0.44	0.79	0.81
4.20	1.30	0.40	0.65	0.66
4.25	1.35	0.37	0.57	0.57
4.30	1.40	0.35	0.51	0.51
4.35	1.45	0.33	0.47	0.47
4.40	1.50	0.31	0.44	0.44
4.45	1.55	0.30	0.41	0.41
4.50	1.60	0.29	0.39	0.39
4.55	1.65	0.28	0.37	0.37
4.60	1.70	0.27	0.36	0.36
4.65	1.75	0.26	0.34	0.34
4.70	1.80	0.26	0.34	0.33
4.75	1.85	0.25	0.33	0.32
4.80	1.90	0.24	0.32	0.31
4.87	1.97	0.23	0.30	0.30

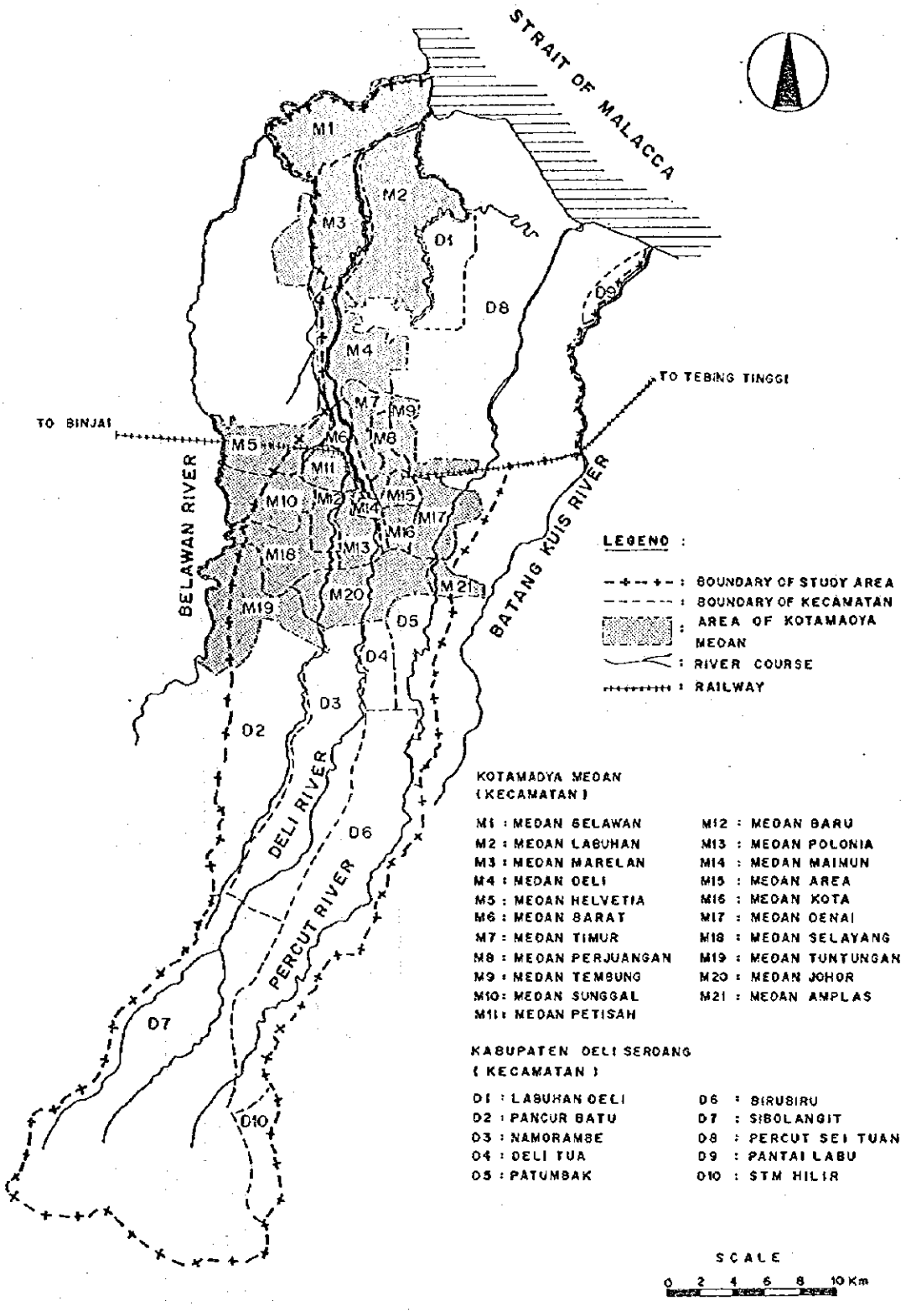
Table 8.3.1 ITEMS FOR INSPECTION WORKS

Works of Inspection	Item of Inspection	Frequency of Inspection
1. River/Floodway	- Sedimentation or scouring condition of bed - Flow condition - River mouth condition - Illegal occupation - Waste disposal and water quality	Weekly
2. Dike/Bank	- Weed and crack - Seepage and erosion - Illegal occupation	Weekly
3. Revetment	- Crack on slope and foot - Foundation	Weekly
4. Diversion Weir	- Obstacles (tree, grass and solid waste) - Sedmentation - Local seepage ad scouring - Crack in apron and retaining wall	Weekly
5. Intake Weir	- Sedimentation and obstacles - Sliding condition of gates - Painting	Weekly
6. Groundsill	- Obstacles (tree, grass and solid waste) - Sedimentation - Local seepage and scouring - Crack in apron and retaining wall	Weekly
7. Groin	- Crack and destruction - Foot protection	Weekly
8. Drainage Outlet	- Sedimentation and obstacles - Crack on concrete	Weekly

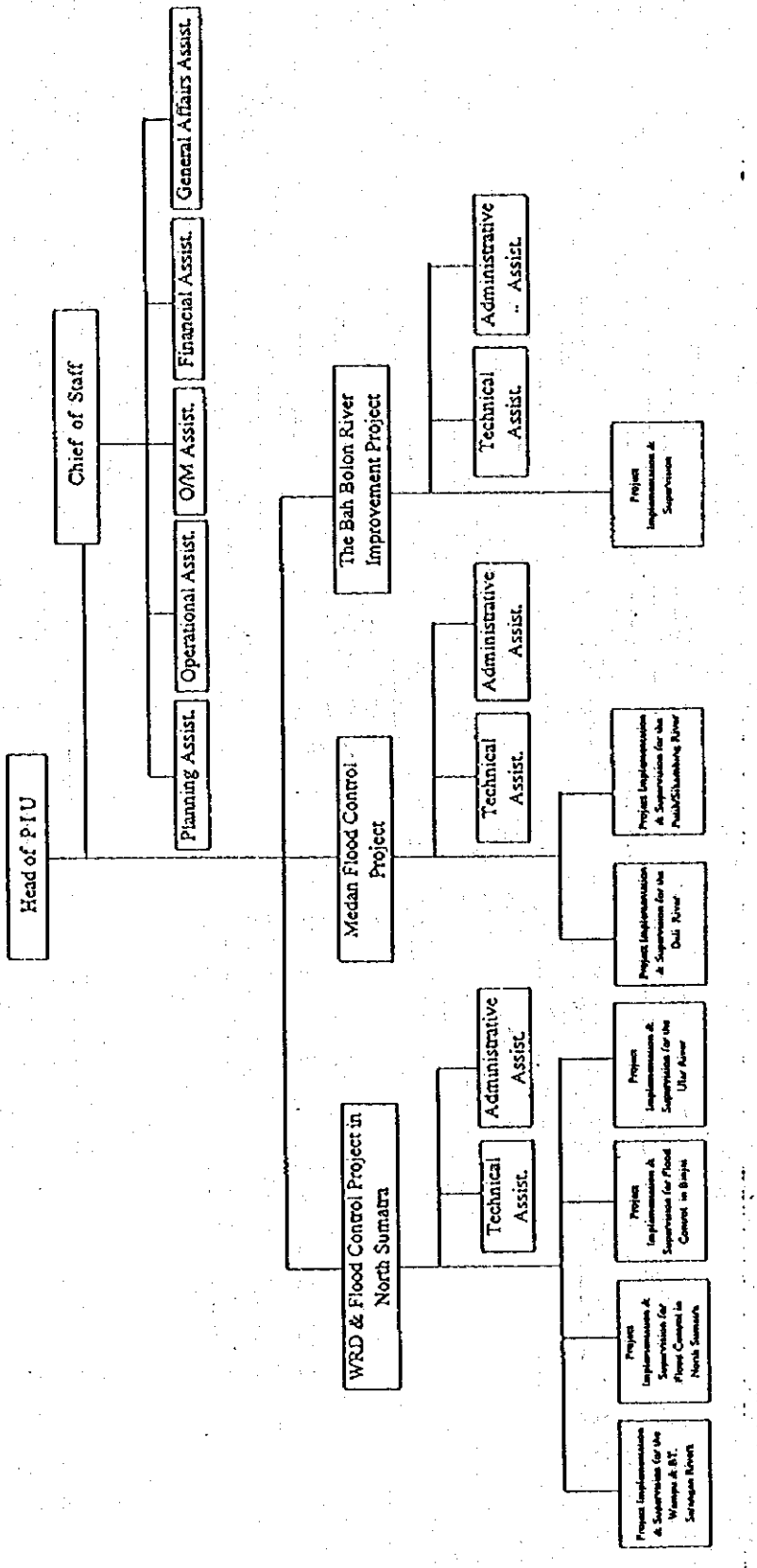
FIGURES

CHAPTER 8

OPERATION AND MAINTENANCE



DETAILED DESIGN STUDY ON MEDAN FLOOD CONTROL PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 8.1.1 ADMINISTRATION BOUNDARY OVER THE PROJECT AREA

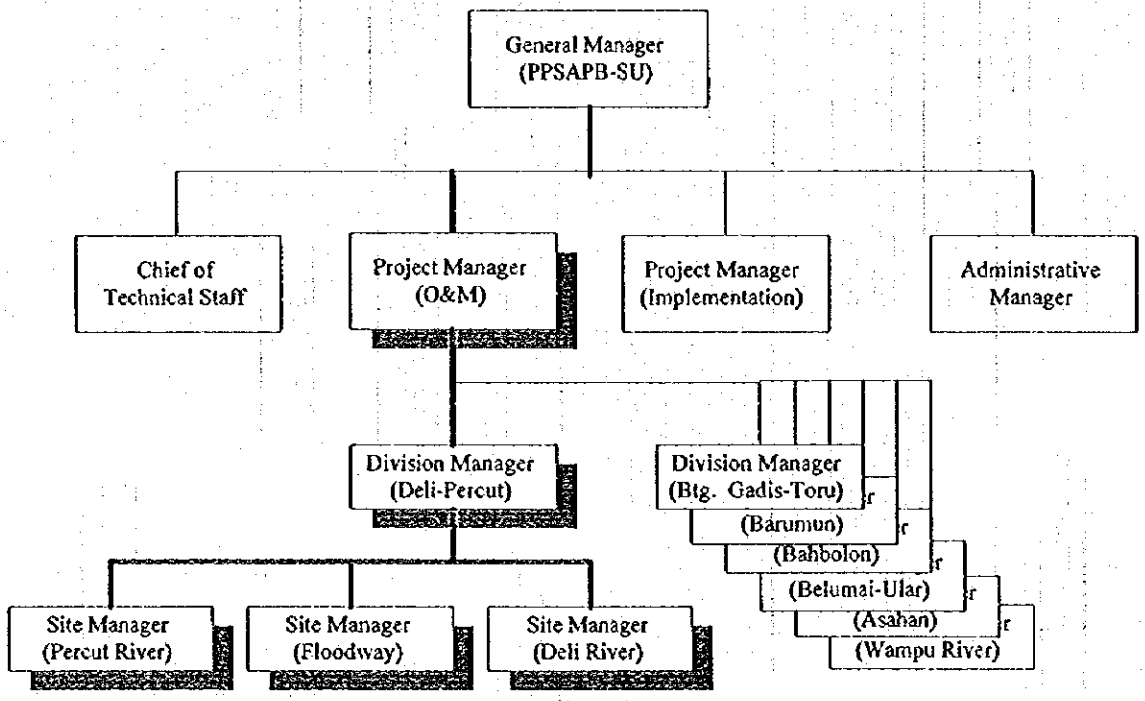


DETAILED DESIGN STUDY ON MEDAN FLOOD CONTROL PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 8.1.2 ORGANIZATIONAL STRUCTURE OF PPSAPB-SU

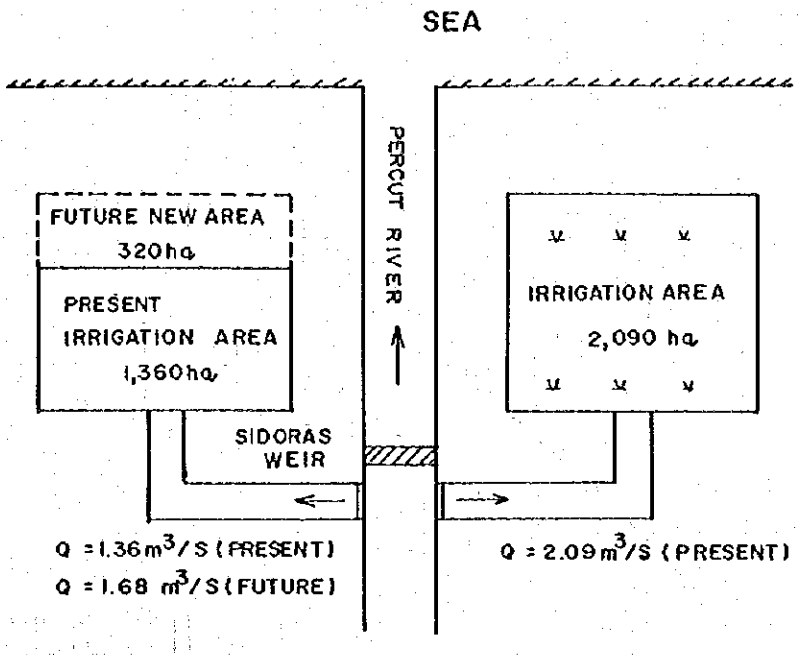
DETAILED DESIGN STUDY ON
MEDAN FLOOD CONTROL PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

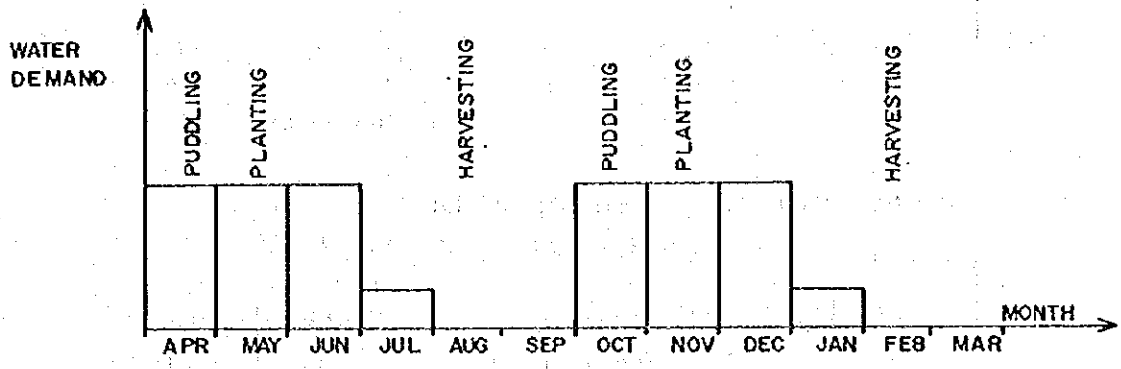
Fig. 8.1.3
ORGANIZATIONAL STRUCTURE OF NORTH SUMATRA PROVINCIAL OFFICE OF WATER RESOURCES DEVELOPMENT



DETAILED DESIGN STUDY ON MEDAN FLOOD CONTROL PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 8.1.4 PROPOSED ORGANIZATIONAL STRUCTURE FOR O&M

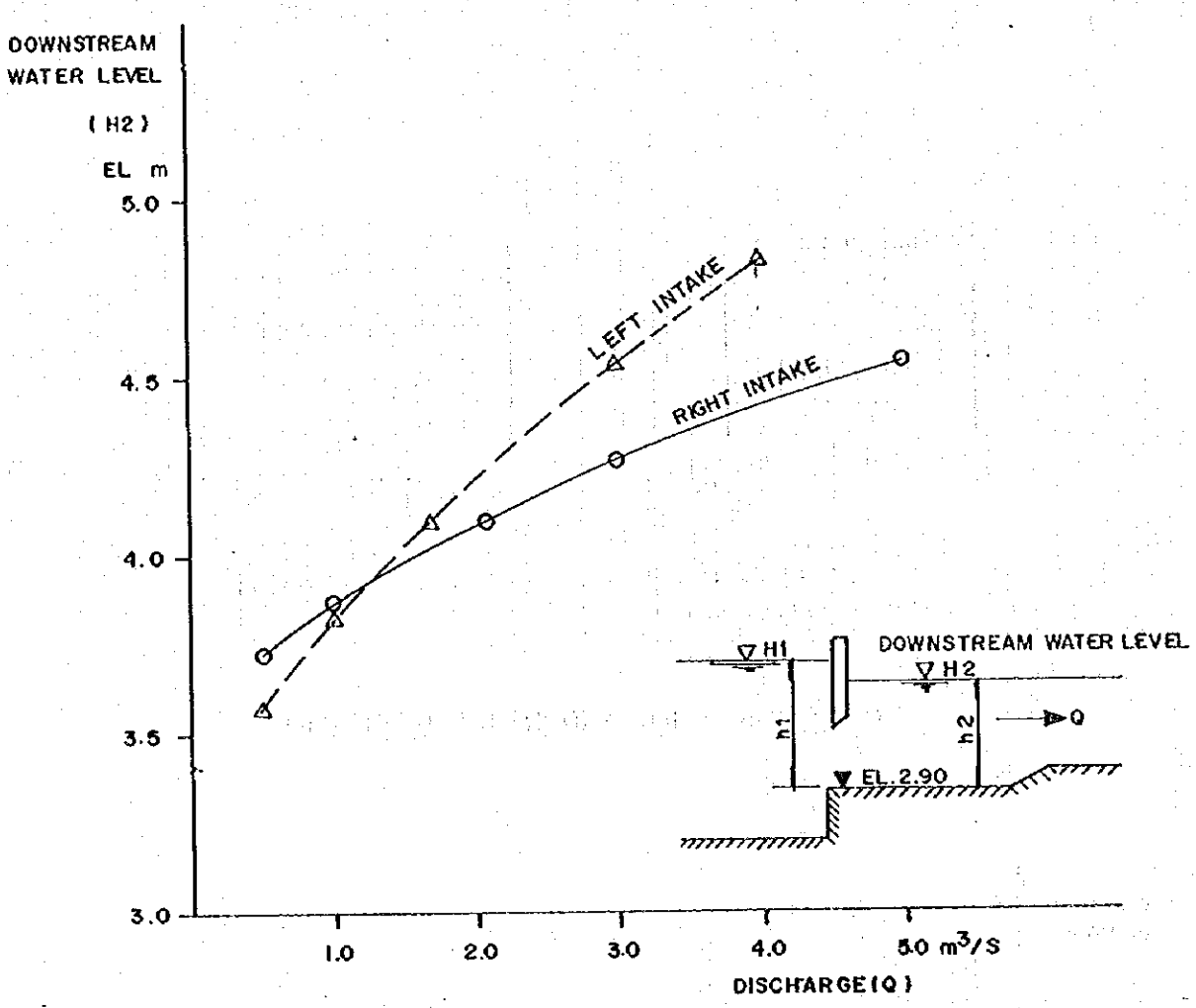


IRRIGATION AREA AND INTAKE DISCHARGE



CROPPING AND WATER DEMAND PATTERN

DETAILED DESIGN STUDY ON MEDAN FLOOD CONTROL PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 8.2.1 PRESENT CONDITION OF WATER USE AT BANDAR SIDORAS WEIR



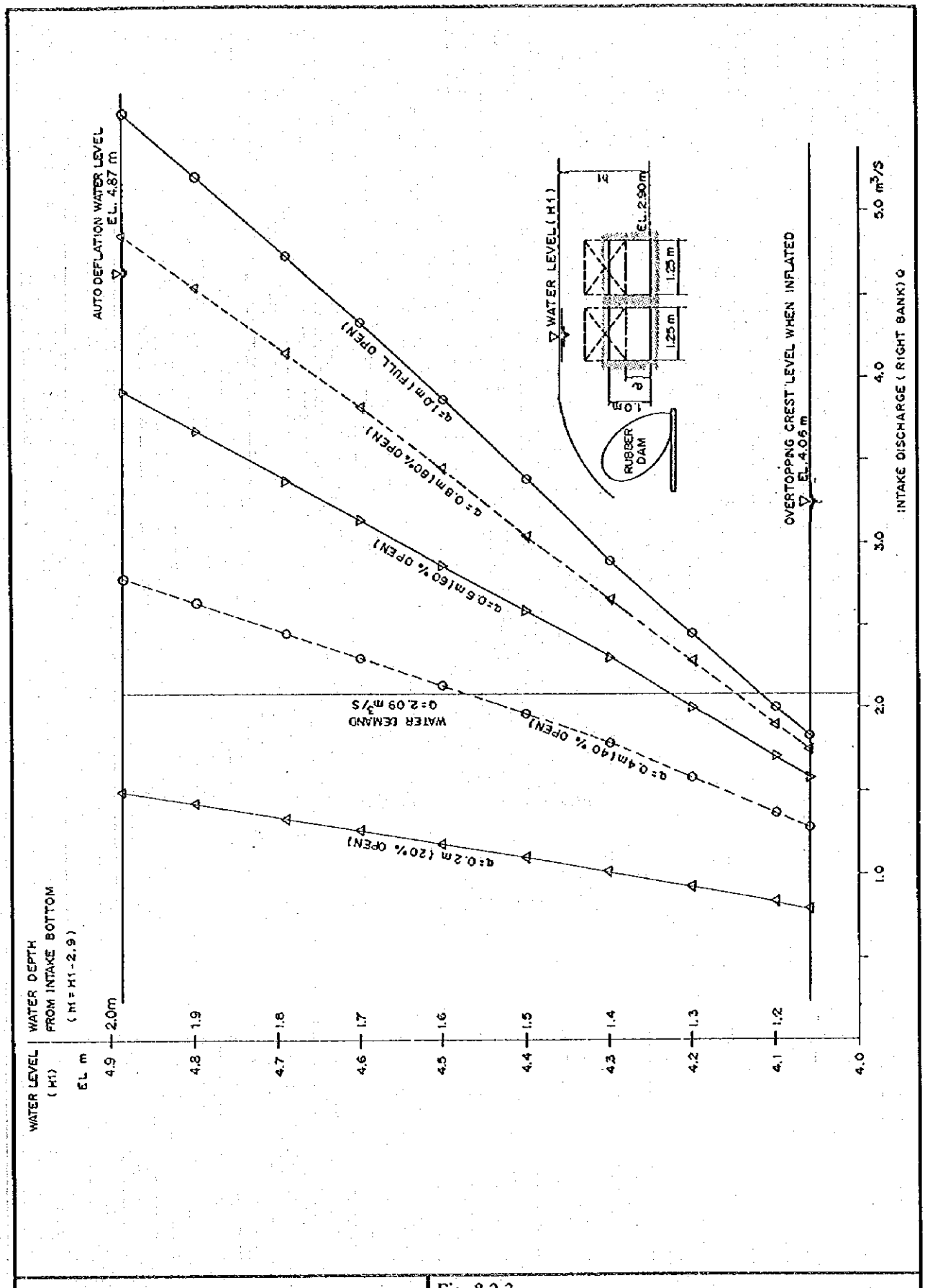
RATING CURVE AT DOWNSTREAM CHANNEL
BY NON-UNIFORM FLOW CALCULATION

LEFT INTAKE			RIGHT INTAKE		
Q (m³/S)	H2(EL m)	h2 (m)	Q (m³/S)	H2 (EL.m)	h2(m)
0.5	3.575	0.675	0.5	3.713	0.813
1.0	3.821	0.921	1.0	3.866	0.966
1.68	4.095	1.195	2.09	4.100	1.200
3.0	4.537	1.637	3.0	4.264	1.364
4.0	4.828	1.928	5.0	4.541	1.641

DETAILED DESIGN STUDY ON
MEDAN FLOOD CONTROL PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

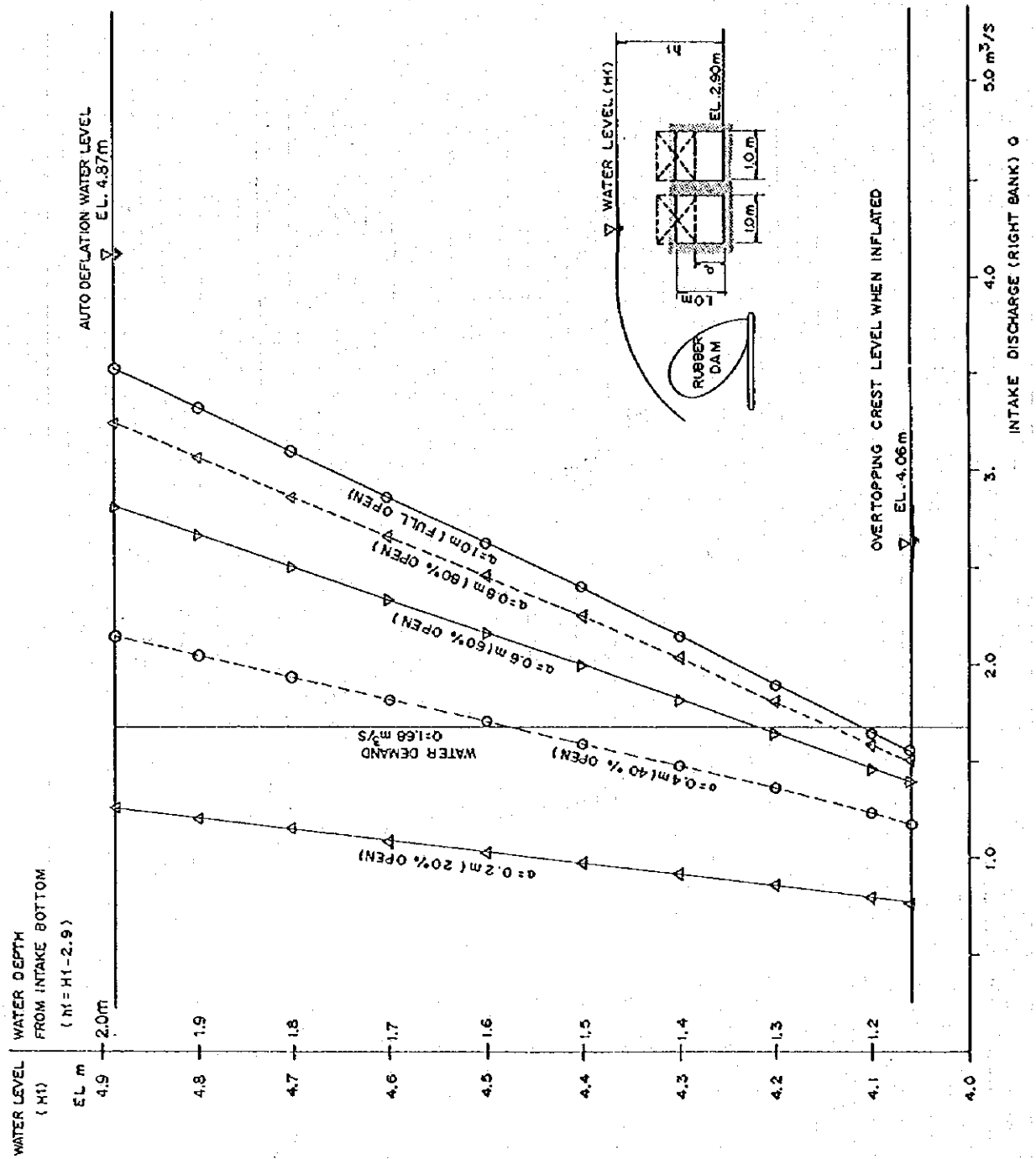
Fig. 8.2.2
RATING CURVE OF INTAKE CANAL OF
BANDAR SIDORAS WEIR



DETAILED DESIGN STUDY ON
MEDAN FLOOD CONTROL PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

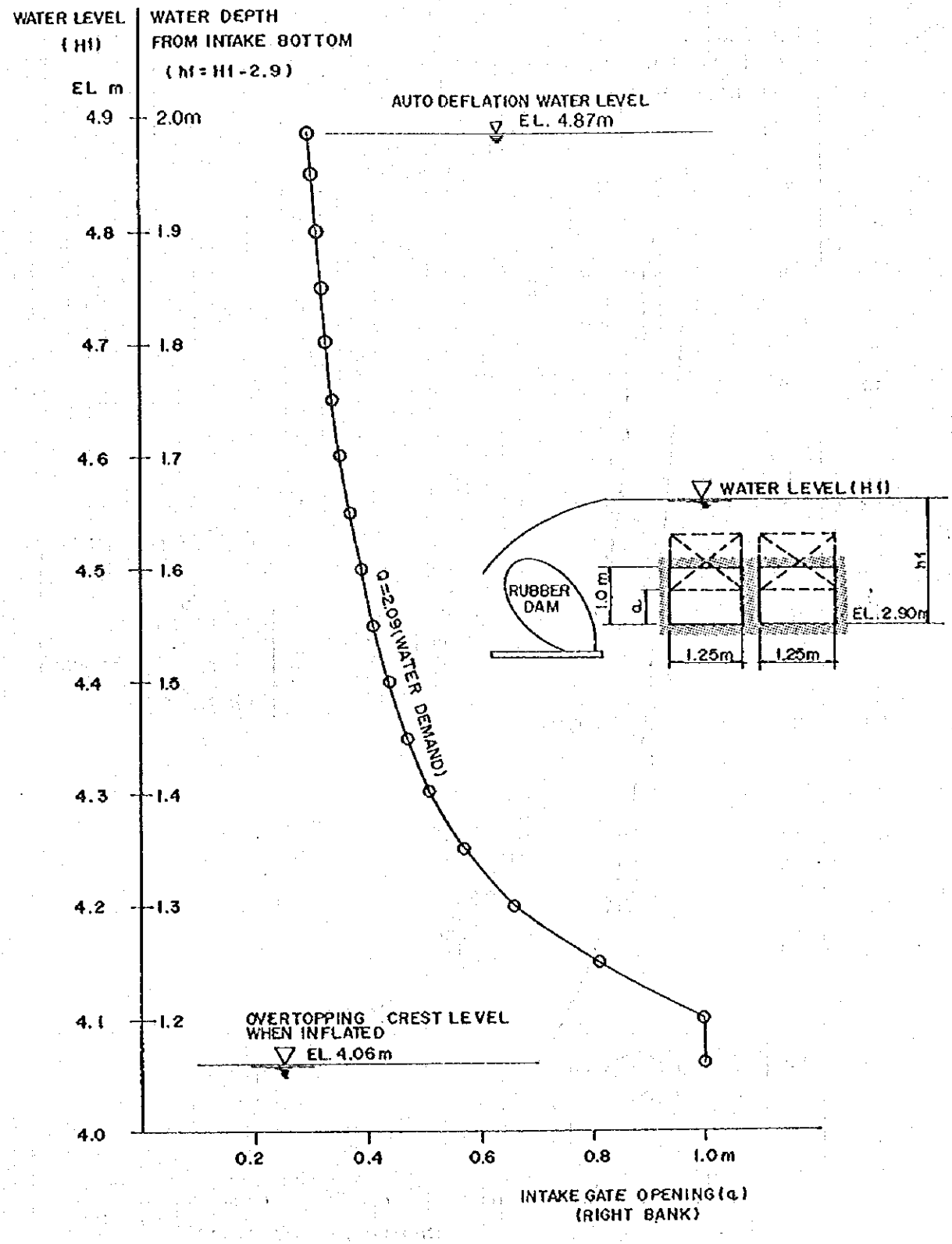
Fig. 8.2.3
RATING CURVE OF RIGHT INTAKE AT
BANDAR SIDORAS WEIR



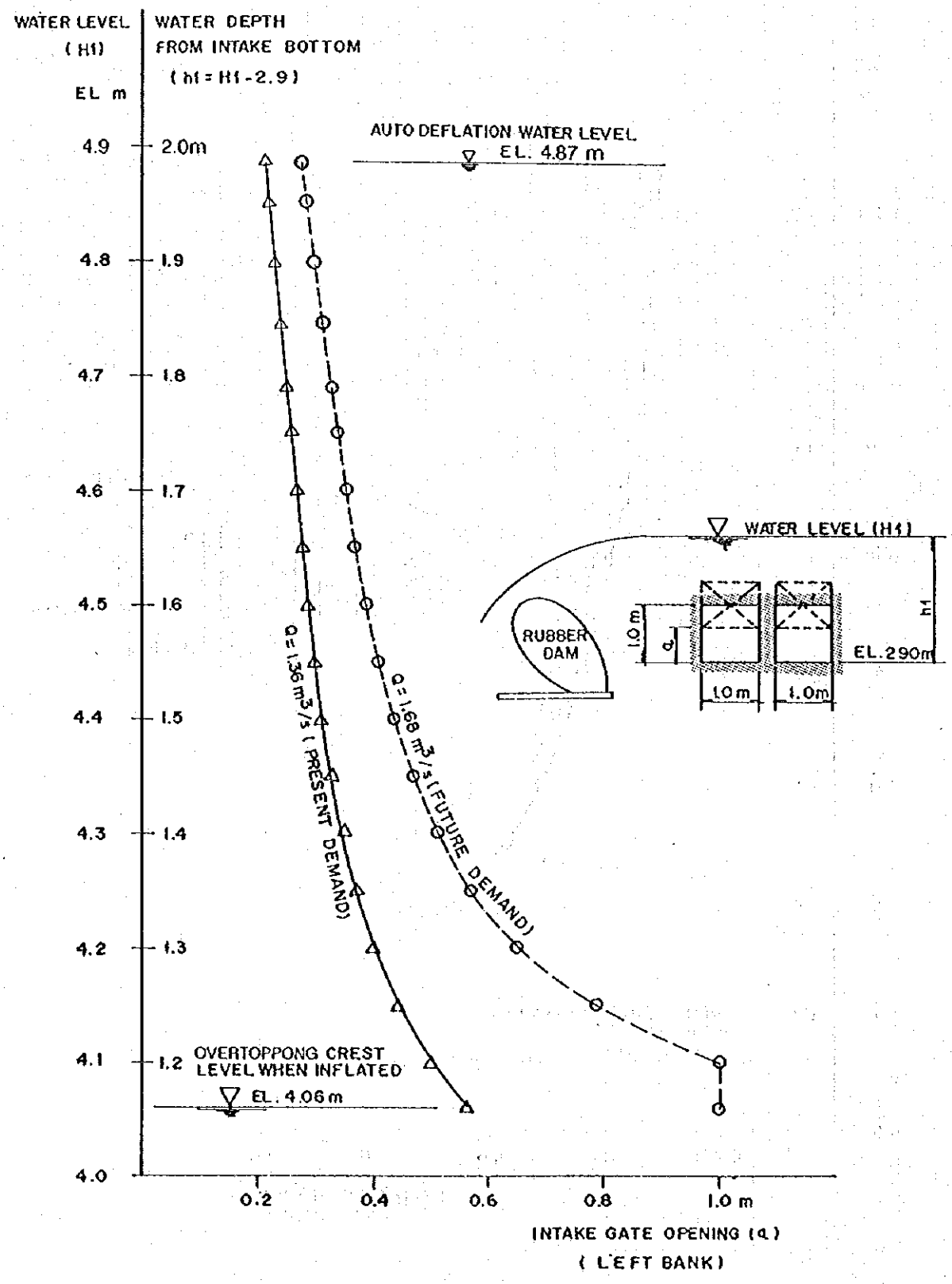
DETAILED DESIGN STUDY ON
MEDAN FLOOD CONTROL PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

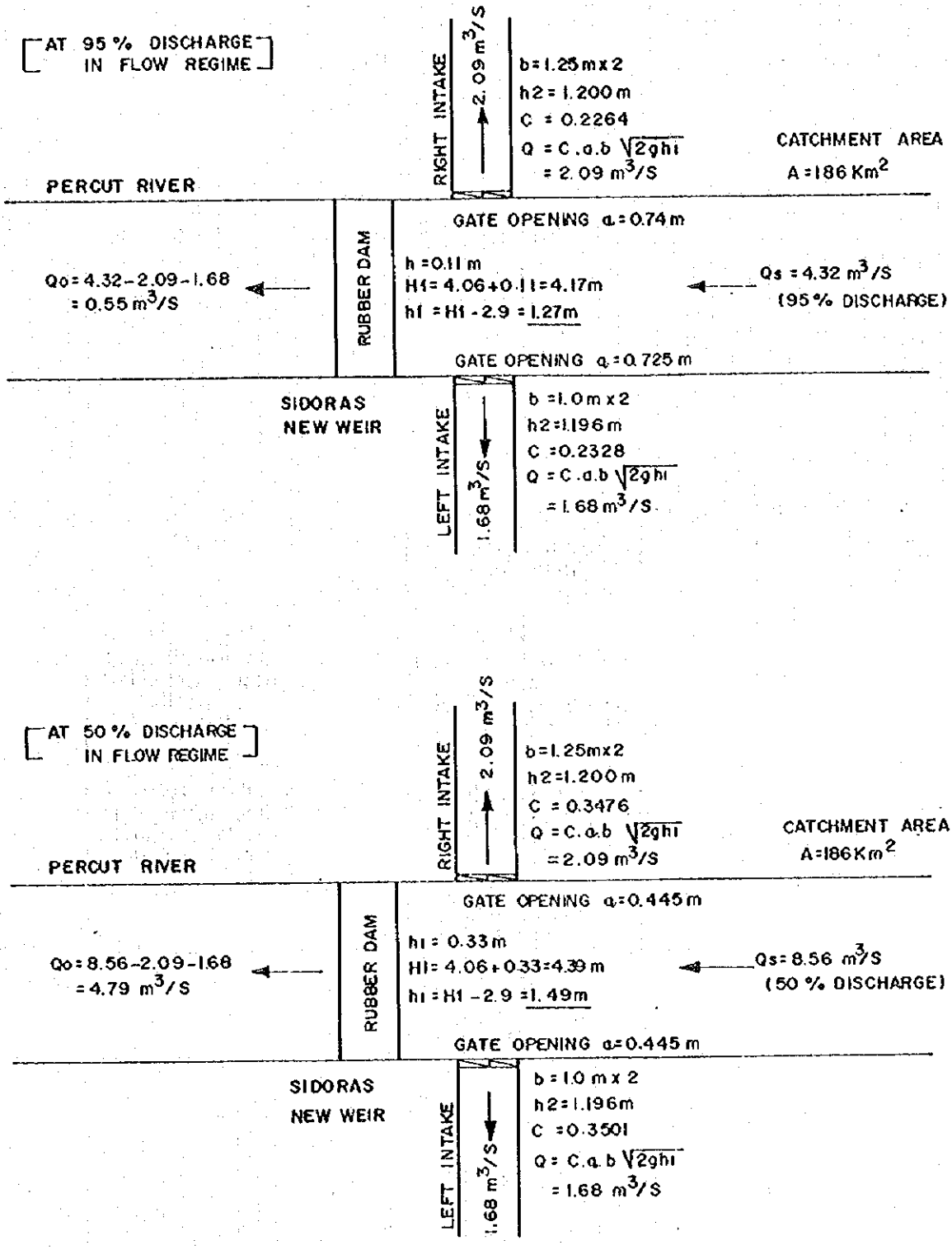
Fig. 8.2.4
RATING CURVE OF LEFT INTAKE AT
BANDAR SIDORAS WIER



DETAILED DESIGN STUDY ON MEDAN FLOOD CONTROL PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 8.2.5 GATE OPENING AND RIVER WATER LEVEL OF RIGHT INTAKEAT BANDAR SIDORAS WEIR



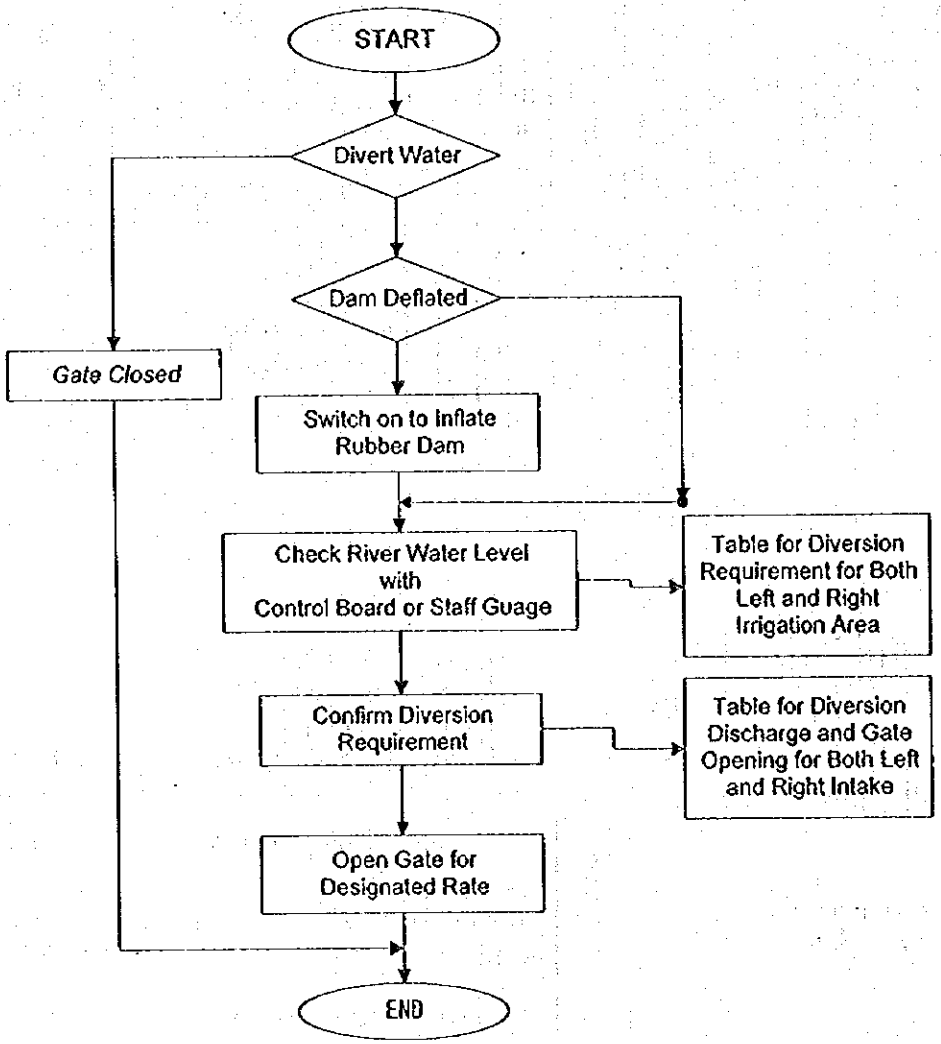
DETAILED DESIGN STUDY ON MEDAN FLOOD CONTROL PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 8.2.6 GATE OPENING AND RIVER WATER LEVEL OF RIGHT INTAKEAT BANDAR SIDORAS WEIR



DETAILED DESIGN STUDY ON
MEDAN FLOOD CONTROL PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 8.2.7
OPERATION OF PROPOSED INTAKE GATE AND WATER BALANCE AT BANDAR SIDORAS WEIR



DETAILED DESIGN STUDY ON MEDAN FLOOD CONTROL PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 8.2.8 FLOW DIAGRAM OF OPERATION OF BANDAR SIDORAS WEIR

CHAPTER 9

PROJECT IMPLEMENTATION

CHAPTER 9. PROJECT IMPLEMENTATION

9.1 Implementation Method and Time Schedule

9.1.1 Executing System

Executing Organization

The organization for project implementation is expected to be the Directorate General of Water Resources Development (DGWRD), Ministry of Public Works (MPW). Actual project execution is to be entrusted to the Project Office for Flood Control in Medan and Vicinity (Bagian Proyek Pengendalian Banjir Medan dan Sekitarnya) under the North Sumatra Water Resources and Flood Control Project Office (Proyek Pengenlolaan Sumber Air dan Pengendalian Banjir Sumatera Utara, PPSAPB-SU).

This D/D Study is presently being managed by the Directorate of Technical Guidance, DGWRD, under a Steering Committee composed of officials of MPW offices such as the Directorate of Planning and Programming, the Directorate of Construction Guidance for West Indonesia, and the North Sumatra Public Works Service. A Technical Working Group also is organized under the Committee to deliberate on the results of the D/D Study.

The members of the Steering Committee and the Technical Working Group are shown in Table 9.1.1.

Executing Method

As mentioned before, the detailed engineering design for the Project is being conducted under the JICA Development Survey Program. It is expected that construction of the Project will be carried out immediately after this D/D Study.

The construction of the Project is expected to be undertaken with financial assistance from the Overseas Economic Cooperation Fund of Japan (OECF). Therefore, the procedure for execution of construction will follow the guidelines of OECF as well as the laws and regulations of the Government of Indonesia for the procurement of engineering services and construction contractors. The implementation schedule as well as the acquisition of project funds, which are discussed below, are prepared assuming that the Project will be partly financed by loan funds from the Overseas Economic Cooperation Fund (OECF) of Japan.

9.1.2 Construction Schedule

In consideration of the nature of the work, locations of project site and volume of work items, the project construction works are divided into the following two components:

(1) Percut River Improvement Works; and

(2) Construction of Medan Floodway and Diversion Works.

Based on the construction plan, each work, with regard to construction time, is allocated as shown in the Implementation Schedule. As the figure shows, the whole construction period is estimated to be 36 months.

9.1.3 Implementation Schedule

The implementation schedule is prepared to achieve prompt construction of the Project so as to release properties from flood damage and improve the environmental conditions in and around Medan City. Necessary undertakings and activities are incorporated in the Implementation Schedule, as shown in Fig. 9.1.1.

This D/D Study was completed in August 1996, and the final report was submitted in October 1996. During the D/D Study, environmental impact assessment and compensation works were simultaneously undertaken and either the local currency portion or the foreign currency portion (loan) of funds for the Project will be prepared for the pre-construction works including land acquisition and compensation. Then, construction of the Project is expected to be started in April 1998 and completed in March 2001.

The implementation period of major work items is estimated, as shown below:

Major Work Items		Period
I.	Detailed Design	
I-1	Basic Study/Design	Apr. 1995 to Aug. 1995
I-2	Detailed Design including Tender Documents	Nov. 1995 to Sep. 1996
I-3	Approval on ANDAL and RKL/RPL	Jun. 1995 to Jan. 1996
I-4	Inventory Survey for Compensation Works	Sep. 1995 to Mar. 1996
II.	Required Administration Works	
II-1	Fund Requirement (APBN and APBD)	Sep. 1996 to Nov. 1996
II-2	Land Acquisition and Compensation	Dec. 1996 to Feb. 1998
III.	Loan (OECF) Acquisition	
III-1	Request for Loan	Nov. 1996 to Jan. 1997
III-2	Loan Appraisal	Mar. 1997 to Apr. 1997
III-3	Pledge/Loan Agreement	Aug./Nov. 1997
IV.	Construction of the Project	
IV-1	Selection and Contract of Consultant	Aug. 1997 to Dec. 1997
IV-2	P/Q, Tendering and Contract for Construction	Aug. 1997 to Feb. 1998
IV-3	Construction	Apr. 1998 to Mar. 2001
(3-1)	Percut River Improvement Works	Apr. 1998 to Mar. 2001
(3-2)	Medan Floodway	Apr. 1998 to Mar. 2001

9.2 Fund Requirements

9.2.1 Project Cost and Loan Amount

The total project cost is estimated at Rp. 263,118 million, excluding value added tax. Assuming that the Project is implemented with financial assistance from the OECF-Japan, the loan amount is estimated as follows:

(1) Upper limit of total loan amount shall be 75% (as of July 1996, but subject to change in the future) of the total project cost or the total foreign exchange cost, whichever is larger.

(2) In case the total non-eligible cost is larger than 25% of the total project cost, the total loan amount shall be the total project cost minus the total non-eligible cost.

Non-eligible costs are considered for the following categories, but they could be included in the total project cost:

(1) Land acquisition fee
(2) Compensation
(3) Taxes and duties as well as government administration cost
(4) Interest during construction

The total project cost is adjusted so as to estimate the loan amount, as follows:

Item	Amount (million Rp.)
1. Construction Base Cost	176,913
2. Compensation Cost	38,160
3. Administration Cost	11,383
4. Engineering Services Cost	12,743
5. Sub-Total (Items 1 to 4)	239,199
6. Physical Contingencies (10%)	23,919
7. Total	263,118
8. Value Added Tax	26,312
9. Grand Total	289,430

From the table above, the ratio of eligible cost (construction base cost and engineering services cost) is estimated at Rp. 208,622 million corresponding to 72.1% of the total project cost. Therefore, the total loan amount including physical contingencies is estimated to be Rp. 208,622 million.

9.2.2 Disbursement Schedule

The disbursement schedule is prepared as discussed below.

(1) Annual Disbursement Schedule

The annual disbursement schedule for the Project is prepared in accordance with the implementation schedule, as presented in Table 9.2.1.

(2) Operation, Maintenance and Replacement Cost

Operation, maintenance and replacement cost is estimated at 1% of the total amount of construction cost. It covers ordinary operation and maintenance works and replacement of spare parts of rubber-made dam, weirs, fences and other appurtenant facilities.

9.3 Works Required for Project Implementation

9.3.1 Clearance of Environmental Issue

In Indonesia, environmental issues have to be discussed as a prerequisite for the implementation of all kinds of projects. The Ministry of State for Environment has established BAPPEDAL, the agency responsible for environmental impact management, to strengthen the surveillance system in collaboration with provincial governments and district offices in order to protect the natural and social environment all over the country.

In 1992, the Bureau of Population and Environment of the North Sumatra Provincial Government compiled regulations and standards issued by and collected from various government institutions and agencies concerned, and those regulations are currently in use for the environmental impact assessment of work proposed to be carried out in North Sumatra.

PROKASIH

Proyek Kali Bersih (PROKASIH, Clean River Project) has been promoted as a nationwide campaign to clean rivers. In North Sumatra, the Bureau of Population and Environment in the Provincial Government is undertaking monitoring work on the quality of river water for the Deli, Asahan, Sei Semayang and Merbau rivers. The monitoring is carried out in such a way that water samples are taken every three months from the same location for the analysis of four parameters: BOD, COD, DO and pH. With regard to the Deli River, the monitoring has been ongoing since November 1991.

Knowing the fact that discharge water from Kawasan Industri Medan (KIM, Medan Industrial Area) causes significant degradation of the Deli River, wastewater from the factories are also controlled in collaboration with the Ministry of Industry. Four manufacturing companies are selected every year from those operating along the Deli and three samples are taken from each

company, one from the wastewater and two from the river, at upstream and downstream from the point where the wastewater is discharged.

BOD and SS are considered to be the most significant parameters in this connection. If these parameters show values higher than standards, the Government advises the company to control the discharge of pollutant and to take appropriate measures for improving the quality of wastewater. The standard quality of wastewater is applicable to only the following industries:

(1) Caustic Soda	(8) Sugar
(2) Metal Laying	(9) Tapioca
(3) Tanning	(10) Textile
(4) Oil Refinery	(11) Urea
(5) Palm Oil	(12) Ethanol
(6) Pulp and Paper	(13) Glutamic Sodium
(7) Rubber	(14) Plywood

Environmental Impact Assessment (AMDAL)

Under the Ministry of Public Works (DPU), the study on environmental impact analysis is conducted taking account of the importance for the protection of natural and social environment, since problems on nature or land tend to be triggered by the implementation of public works. The study on AMDAL has to be carried out at the stage of feasibility study, and its results seem to be of great significance to judge whether the project is feasible or not feasible. Based on Government Regulation No. 51/1993, the following reports shall be duly prepared and submitted to the Central Committee (KOMPUS) for approval:

(1) Terms of Reference of the Environmental Impact Statement (KA-ANDAL)
(2) Environmental Impact Statement (ANDAL)
(3) Environmental Management Plan (RKL)
(4) Environmental Monitoring Plan (RPL)

The results of AMDAL are discussed in three official meetings to evaluate the project in terms of environment. The first meeting is organized by the regional committee called KOMDA chaired by the Chief of BAPPEDA I or Vice-Governor. With respect to comments provided by the KOMDA, the second meeting is held in Jakarta by the Technical Team of DPU which generally consists of 16 members, 11 permanent and 5 non-permanent as shown in Fig. 9.3.1, and if there is nothing to obstruct the procedure, the third meeting is organized by KOMPUS within one month after evaluation and recommendation by the Technical Team. The Director General of Research and Development is the chairman of KOMPUS, and its members consists of 21 as a whole; 12 permanent, 5 non-permanent and 4 coordinators from the environmental

guidance unit of each Directorate General. Fig. 9.3.1 shows the structure of the committee and its members.

KOMPUS has been dealing with 50 to 60 projects annually since the new government regulation on AMDAL was established in 1993. Consequently, the meeting is held every Friday to put things forward, while the Technical Team has a regular meeting every Tuesday. The number of projects rejected by KOMPUS is so far only 2 by reason that the project is judged unfavorable from the environmental aspect. Environmental issues should be cleared before the project starts, which means that the approval of KOMPUS is a prerequisite for project implementation. Nevertheless, if the project would not start in 3 years after the AMDAL has been approved, it has to be reviewed and approved again by going through the same process.

Following the above procedure, the meeting on AMDAL for Medan Flood Control Project was held by the Technical Team on August 29, 1995, and ANDAL, RKL and RPL documents have been modified as suggested and advised in the meeting. Under these circumstances, the meeting of KOMPUS was held on November 3, 1995 in the presence of a representative of KOMDA. Final approval was issued on January 10, 1996.

9.3.2 Compensation Works

Procedure

Land acquisition is the most significant element to provide an easy access to project implementation. It is unavoidable to make tough negotiations with residents in an effort to reach an agreement on land issues. First of all, the project owner informed the Governor, on December 15, 1995, the necessity of land acquisition at the minimum scale possible for project execution. The Mayor or Bupati was also appraised on this matter after the project was approved by the Governor on January 30, 1996. Since no objection was received in this process, the Mayor organized a Land Acquisition Committee (Panitia Pembebasan Tanah) composed of the following nine members from different agencies/institutions concerned:

(1) Mayor or Bupati as Chairman
(2) Chief of National Land Agency (Badan Pertanahaan Nasional)
(3) Chief of Taxation Office for Land and Building
(4) Chief of Local Government Office responsible for public works
(5) Chief of Local Government Office responsible for agriculture
(6) Chief of Subdistrict (Kecamatan) affected by the Project

(7) Chief of Village (Desa) affected by the Project

(8) Section Chief of Mayor or Bupati's Secretariat as Secretary I

(9) Section Chief of National Land Agency as Secretary II

Public hearings took place under the direction of the Camat (Chief of Subdistrict) and the Kepala Desa (Chief of Village) to explain the significant impacts of the project and to ask the people's understanding and cooperation. The Project Office also requested the National Land Agency to conduct an inventory survey in the project site, which shall include cadastral survey, land ownership, land use, etc. The general procedure of land acquisition is as shown in Fig. 9.3.2.

The inventory survey has to be carried out at an early stage to provide basic data for the land compensation. It has to cover all assets and public utilities existing in the proposed area. The other agencies should collaborate with the survey team in the evaluation of assets and taxes to be imposed. The survey results shall be such documents as provided and approved by the Committee, which are currently used in North Sumatra for the legal procedure on land acquisition. The items to be studied are land, house/building, cemetery, power supply, water supply (by PDAM or wells), plantation and public facilities such as school, mosque/church, community center, etc.

All survey data and information are to be collected and compiled in due form, and the negotiation with each landowner or project-affected family will then start. If the owner agrees to release his land under the proposed payment condition, he is asked to sign an agreement on land compensation stating that his title to the land is abandoned and transferred to the Government. Those who live in the site illegally, so called squatters, are also supposed to be paid compensation for house evacuation. In North Sumatra, payment is a common way for compensation, and resettlement is not considered for project-affected people. However, if a resettlement plan is proposed by the local government, it will certainly be incorporated in the project. In the meantime, public facilities can be relocated at the nearest place possible from the present location.

Land Price

Land prices are determined by the Committee, but payment is made by the Project Office to make up for the loss of land and house evacuation. Recently, local governments have also taken a share in the budget for land acquisition, but no specific share rate with the Central Government is mentioned. It may be decided in accordance with the financial capability of the local government.

With regard to the Medan Flood Control Project, the total area of land to be expropriated is estimated to be 222.8 ha, i.e., 19.6 ha for the floodway, 158.1 ha for the improvement of Percut River and 45.1 ha for the area submergible by the proposed weir on the Deli. Houses involved in those areas are around 268, 125 and 9, respectively. The compensation for housing/building is subject to the value of its assets after depreciation, while land price is estimated based on the following three base prices:

(1) Government price decided by the Mayor or Bupati
(2) Market price
(3) Tax-related price

It has been reported that the price of land compensation in Medan for 1995 was 60% of the average of the above three base prices. The prices vary depending on the location and present land use, as tabulated in Table 9.3.1. Information on government price for the subdistrict of Percut Sei Tuan, Deli Serdang District was not available. Tax is imposed at the rate of 1.5% of the total amount of compensation.

House Price

Compensation prices for private house/building were determined in the decree of the Mayor of Medan enacted in 1990. As of August 1995, the prices are still effective but could be revised by the end of this year. According to the decree, houses are classified into four categories on the basis of durability and materials used. These are described as high-class permanent, permanent, semi-permanent and provisional or temporary, and the definition of each is as given below.

(1) High Class Permanent	First category in the permanent house category
(2) Permanent	House built with permanent material; Guarantee period is more than 50 years.
(3) Semi-Permanent	House built with some permanent material; Guarantee period is not more than 20 years.
(4) Provisional/Temporary	Shabby house built with non-permanent material; Guarantee period is not more than 5 years.

In addition to the above categories, house prices may change according to the number of stories. For example, a building of three stories will cost twice as much as a one-storied house, while the price of a two-storied house is 50% higher than that of a one-storied permanent flat. Details are as tabulated below:

(Unit: Rp./m^2)

Structural Type	Permanent	Semi-Permanent	Temporary
One-story (Earth Floor)	135,000	67,500	33,750
One-story (Floored)	145,125	72,563	-
Two-story	217,168	79,849	-
Three-story	290,250	-	-
Four-story	362,813	-	-
Five-story	362,813	-	-
Basement	108,444	-	-

Source: City Planning Office (Tata Kota)

TABLES

CHAPTER 9

PROJECT IMPLEMENTATION

Table 9.1.1 MEMBER OF STEERING COMMITTEE AND WORKING GROUP OF DETAILED DESIGN STUDY

No.	Name/Position	Position
	STEERING COMMITTEE	
1	Ir. M. Hardjono, Dipl. HE Director of Bina Teknik, Directorate General of Water Resources	Chairman
2	Ir. Martono Director of Binlak in West Region, Directorate General of Water Resources	Secretary
3	Ir. A. Pane Chief of Bappeda in North Sumatera Province	Member
4	Ir. H. A. Daulay Kakanwil of Public Work in North Sumatera Province	Member
5	Ir. Mustadjab Kadis of Water Resources in North Sumatera Province	Member
	TECHNICAL WORKING GROUP	
1	Ir. Ketut Kaler, M. Eng. Kasudit, River, Directorate Bina Teknik	Chairman
2	Ir Pudjartono, M. Eng. Kasi of West Region, Subdit. River, Directorate Bina Teknik	Secretary
3	Ir. Ruchyat K, Dipl. HE Kasi PEV West Region, Subdit General Affair Planning Directorate of Bina Program Pengairan	Member
4	Ir. S. Soekirno Kasi. Pengembangan SDA in West Region II Directorate Binlak in West Region	Member
5	Ir. R.B. Sumarsono, M. Eng. Kasi River, Subdit, Bina Pengamanan SDA Directorate PPSDA	Member
6	Ir. Lauren Gultom, M. Eng. Chief of Staff in PSAPB Project North Sumatera	Member
7	Ir. Yani Sulastri S, Dipl. HE Operational Assistant in PSAPB Project North Sumatera	Member

Table 9.2.1 ANNUAL DISBURSEMENT SCHEDULE

(Unit : Million Rp.)

Description	Amount			1997/1998		1998/1999		1999/2000		2000/2001	
	F.C.	L.C.	Total	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.
1. Construction Base Cost	81,147	95,766	176,913	0	0	21,554	20,403	35,830	43,240	23,764	32,123
1.1 MFC-1	5,471	6,511	11,982	0	0	4,122	4,198	1,349	2,313	0	0
1.2 MFC-2	14,346	11,260	25,606	0	0	10,217	7,026	4,129	4,234	0	0
1.3 MFC-3	14,000	12,948	26,948	0	0	384	564	6,167	4,555	7,450	7,829
1.4 MFC-4	9,707	9,125	18,832	0	0	389	578	4,864	3,622	4,453	4,925
1.5 MFC-5	11,278	11,374	22,652	0	0	4,417	4,078	6,861	7,296	0	0
1.6 MFC-6	9,701	11,722	21,423	0	0	311	407	4,542	5,335	4,848	5,980
1.7 MFC-7	9,716	12,489	22,205	0	0	477	642	4,877	6,970	4,362	4,877
Sub-total	74,219	75,429	149,648	0	0	20,316	17,493	32,789	34,325	21,114	23,611
1.5 Price Escalation	6,928	20,337	27,265	0	0	1,237	2,911	3,040	8,915	2,650	8,512
2. Compensation Cost	0	38,160	38,160	0	18,346	0	19,814	0	0	0	0
2.1 Land Acquisition	0	29,302	29,302	0	14,651	0	14,651	0	0	0	0
2.2 House Evacuation	0	4,672	4,672	0	2,336	0	2,336	0	0	0	0
Sub-total		33,974	33,974	0	16,987	0	16,987	0	0	0	0
2.3 Price Escalation	0	4,186	4,186	0	1,359	0	2,827	0	0	0	0
3. Administration Cost	0	11,383	11,383	0	917	0	3,196	0	4,227	0	3,042
3.1 Administration (5% of 1+2)	0	9,181	9,181		849		2,740		3,356		2,236
3.2 Price Escalation	0	2,202	2,202	0	68	0	456	0	872	0	806
4. Engineering Services	8,846	3,897	12,743	419	169	2,838	1,199	3,172	1,406	2,416	1,123
4.1 Construction Supervision	8,132	3,126	11,258	407	156	2,676	1,028	2,903	1,116	2,147	825
4.2 Price Escalation	714	771	1,485	12	13	163	171	269	290	269	297
5. Physical Contingency (10% of 1+2+3+4)	8,999	14,920	23,919	42	1,943	2,439	4,461	3,900	4,887	2,618	3,629
6. Total (1+2+3+4+5)	98,992	164,126	263,118	461	21,375	26,831	49,074	42,902	53,760	28,798	39,917
7. Value Added Tax (10% of 6.)	0	26,312	26,312	0	4,821	0	9,198	0	8,256	0	3,992
8. Grand Total	98,992	190,438	289,430	461	26,196	26,831	58,271	42,902	62,016	28,798	43,908

Table 9.3.1 LAND PRICE

Government Price (1994)

Location	Business Center	Around Main Road	Industrial Office Area	Public Settlement	Paddy & Upland	Swampy Area
Medan Floodway						
- Titi Kuning/M. Johor	-	-	198	69	-	-
- Suka Maju/M. Johor	-	154	-	25	-	-
- Harjosari/M. Amplas	-	154	-	31	-	-
Percut River						
- Timbang Deli/M. Amplas	-	154	-	28	-	-
- Tembung/M. Tembung	-	198	-	25	-	-
- Bandar Setia/P. Sei Tuan	-	-	-	-	-	-
- Saetis/P. Sei Tuan	-	-	-	-	-	-
- Cinta Damai/P. Sei Tuan	-	-	-	-	-	-
- Percut/P. Sei Tuan	-	-	-	-	-	-

Market Price (1992)

Location	Business Center	Around Main Road	Industrial Office Area	Public Settlement	Paddy & Upland	Swampy Area
Medan Floodway						
- Titi Kuning/M. Johor	120	100	85	60	45	-
- Suka Maju/M. Johor	-	150	100	65	40	-
- Harjosari/M. Amplas	225	150	-	65	40	-
Percut River						
- Timbang Deli/M. Amplas	125	100	85	60	35	-
- Tembung/M. Tembung	75	65	50	25	10	-
- Bandar Setia/P. Sei Tuan	22	20	-	10	16	-
- Saetis/P. Sei Tuan	25	20	-	10	17	-
- Cinta Damai/P. Sei Tuan	30	25	15	12	18	-
- Percut/P. Sei Tuan	60	75	35	20	25	10

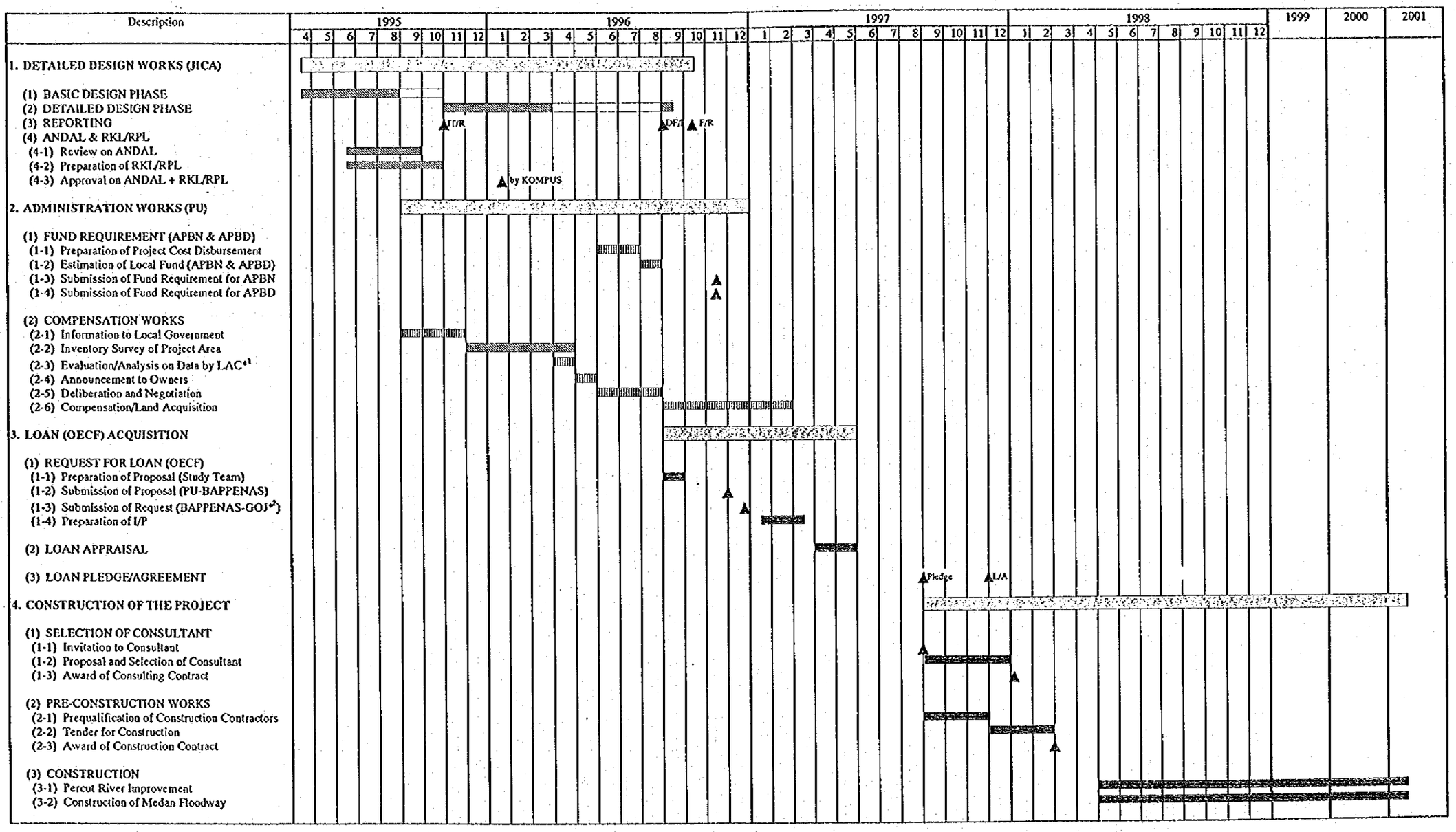
Tax-Related Price (1994)

Location	Business Center	Around Main Road	Industrial Office Area	Public Settlement	Paddy & Upland	Swampy Area
Medan Floodway						
- Titi Kuning/M. Johor	240	200	170	120	90	-
- Suka Maju/M. Johor	-	300	200	130	80	-
- Harjosari/M. Amplas	450	300	-	130	80	-
Percut River						
- Timbang Deli/M. Amplas	375	300	255	240	105	-
- Tembung/M. Tembung	131	110	84	42	17	-
- Bandar Setia/P. Sei Tuan	33	30	-	15	24	-
- Saetis/P. Sei Tuan	38	30	-	15	26	-
- Cinta Damai/P. Sei Tuan	-	-	-	-	-	-
- Percut/P. Sei Tuan	113	113	65	38	47	19

FIGURES

CHAPTER 9

PROJECT IMPLEMENTATION



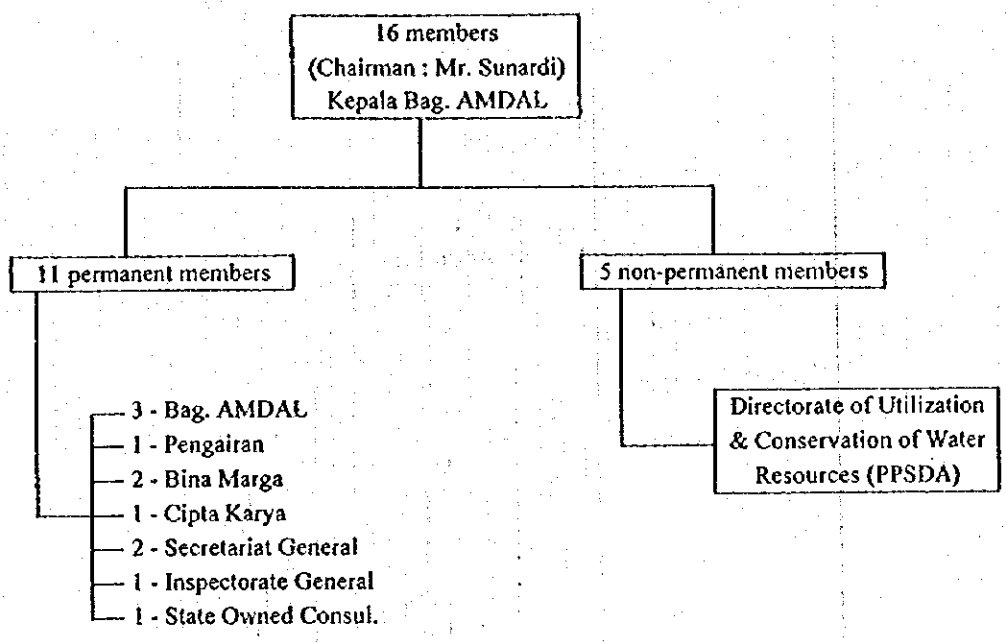
Legend : *1 LAC = Land Acquisition Committee IT/R = Interim Report, DF/R = Draft Final Report, F/R = Final Report
*2 GOJ = Government of Japan

DETAILED DESIGN STUDY ON
MEDAN FLOOD CONTROL PROJECT

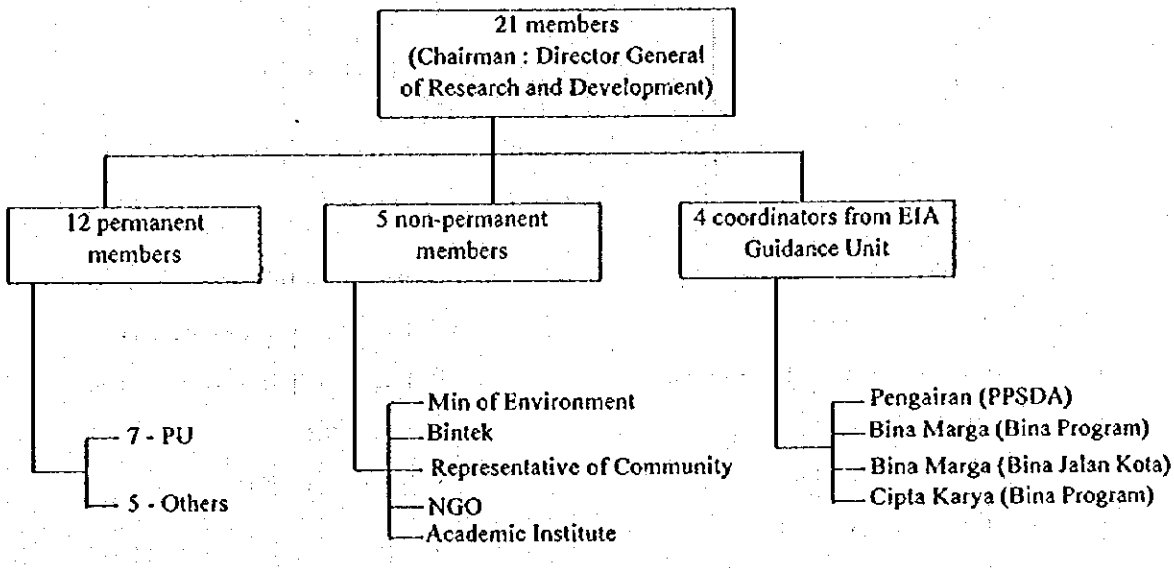
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 9.1.1
IMPLEMENTATION SCHEDULE OF MEDAN FLOOD CONTROL PROJECT

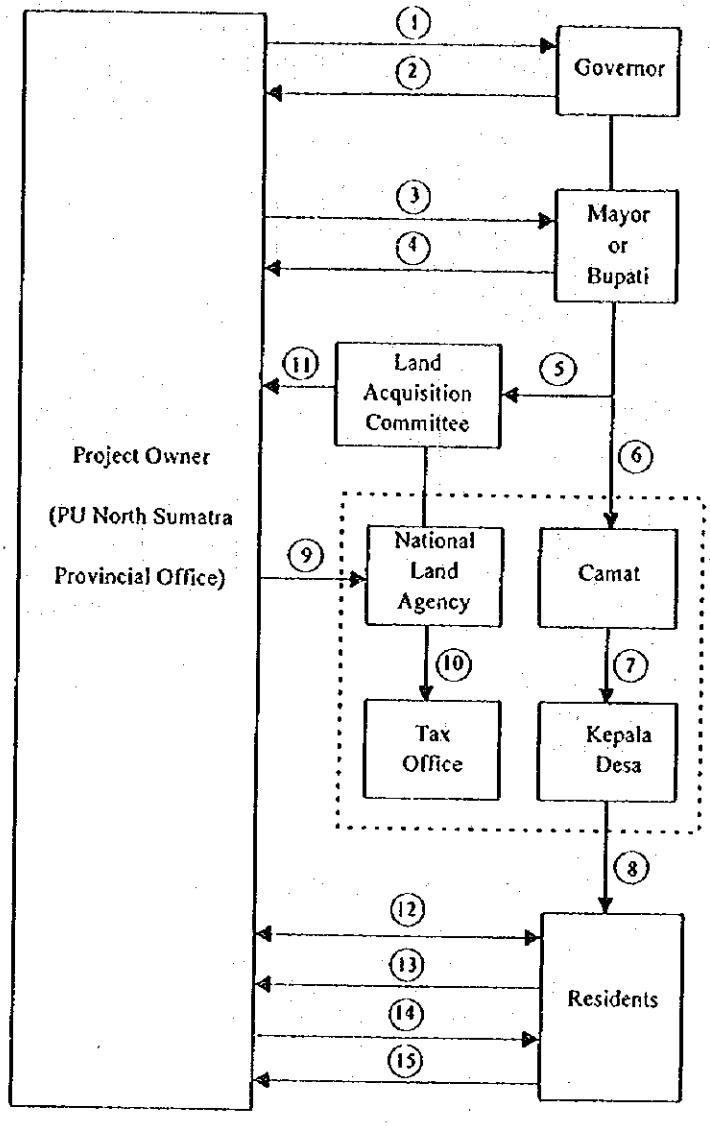
Structure of Technical Team



Structure of KOMPUS



DETAILED DESIGN STUDY ON MEDAN FLOOD CONTROL PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 9.3.1 STRUCTURES OF TECHNICAL TEAM AND KOMPUS



1. Proposal of the project
2. Issuance of approval letter
3. Delivery of approval letter of the Governor
4. Confirmation of the above
5. Establishment of Committee
6. Instruction to local authorities
7. Schedule arrangement for public hearings
8. Public hearings/briefing
9. Request for land inventory survey
10. Evaluation of assets and taxation
11. Decision of price of compensation
12. Negotiation
13. Signing agreement
14. Payment
15. Change of ownership

DETAILED DESIGN STUDY ON MEDAN FLOOD CONTROL PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 9.3.2 GENERAL PROCESS OF LAND ACQUISITION

ANNEX

MINUTES OF MEETING

ANNEX 1

MINUTES OF MEETING
ON INTERIM REPORT (1)

MINUTES OF MEETING
ON
INCEPTION REPORT (1)
OF
THE DETAILED DESIGN STUDY
ON
MEDAN FLOOD CONTROL PROJECT

A meeting chaired by Mr. M. Harjono, the Director of Technical Guidance, was held at the conference room of the Directorate General of Water Resources Development (DGWRD) on April 27, 1995 in the presence of a represetative of the Japan International Cooperation Agency (JICA) between DGWRD, Ministry of Public Works (hereinafter referred to as Indonesian Side) and JICA Study Team headed by Mr. Hitoshi Kin (hereinafter referred to as the Team) for the Detailed Design Study on Medan Flood Control Project (hereinafter referred to as the Study). The attendants are listed in the attached sheet.

The presentation of the Inception Report (1) was made by the Team at the beginning of the meeting, subsequently discussion was made to exchange ideas of their mutual concerns, and the following were confirmed by and between the Indonesian Side and the Team.

1. The Team submitted thirty (30) copies of the Inception Report (1) to the Indonesian Side on April 19, 1995, as it is concluded in the Scope of Works. .

2. All the contents of the Inception Report (1) have been in principle understood and accepted by the Indonesian Side. The main points discussed during the meeting are summarized as follows:

   (1) In the course of preparation of the basic design of which scale is presumed to be a 15 to 20 years return period, some countermeasures for the flood discharge exceeding the design scale and environmental development plans for the riparian area shall be studied.

   (2) For the smooth implementation of the Medan Flood Control Project, social issues such as house evacuation and land acquisition as well as environmental impacts shall be carefully studied through a close coordination with DGWRD and local governments.

   (3) The study on environmental management and monitoring plans shall be carried out together with the review of ANDAL which was prepared in 1992 for the urgent plan in the Study on Belawan-Padang Integrated River Basin Development. The Indonesian Side shall take necessary measures promptly in order to obtain an official approval of the Central Commission (KOMPUS).

(4) Others are discussed and confirmed as follows:

- Master plan and urgent plan shall be referred to as a long-term plan and a mid-term plan, respectively.

- The regular meeting between the North Sumatra Provincial Public Works and the Team shall be held every two weeks in Medan.

- The Indonesian Side shall provide the topographical maps and aerophoto prepared in the Study on Belawan-Padang Integrated River Basin Development to the Team at the earliest time possible.

- On the design of bridges, a meeting and discussion with related agencies such as the Directorate General of Bina Marga, Department of National Railway, provincial governments, etc. shall be held in the course of the Study.

- Sediment movement shall be reviewed to analyze its effect on the river course, especially near the river mouth and seashore.

Jakarta, April 28, 1995

Ir. M. HARDJONO
Director of Technical Guidance
Directorate General of
Water Resources Development
Ministry of Public Works

HITOSHI KIN
Team Leader
JICA Study Team

LIST OF ATTENDANTS

Indonesian Side :

Name	Occupation
1. Ir. Mohamad Hardjono	Director of Technical Guidance
2. Ir. Ketut Kaler	Chief, Sub-Directorate of Rivers, Directorate of Technical Guidance
3. Ir. Nurachim Dipl.	Chief, Sub-Directorate of Region II North Sumatra, Directorate of Construction Guidance West Region
4. Ir. Marhuarar Napitupulu	Chief, Sub-Directorate of Large Structure, Directorate of Technical Guidance
5. Ir. Santoso. Soekirno	Chief, Sec. of Development & Conservation of Natural Resources, Sub-Directorate of Region II North Sumatra, Directorate of Construction Guidance West Region
6. Ir. Ruchiyat Kustomi	Chief, West Region Sec., Sub-Directorate of General Planning, Directorate of Planning & Programming
7. Ir. R. Sumarsono	Chief, River Sec., Sub-Directorate of Conservation of Water Resources, Directorate of Utilization and Conservation of Water Resources
8. Dr. Widyawati MSc	Chief, Water Resources Potential Analysis Sec., Sub-Directorate of Development Conservation of Water Resources, Directorate of Utilization and Conservation of Water Resources
9. Ir. Lauren Gultom	Chief of Staff, Medan Flood Control Project, North Sumatra Provincial Public Works
10. Ir. Pudjartono	Chief, West Region Sec., Sub-Directorate of Rivers, Directorate of Technical Guidance
11. Ir. Ridwan Rahman	Staff, Sub-Directorate of Large Structure, Directorate of Technical Guidance
12. Ir. Harmode	Staff, Sub-Directorate of Large Structure, Directorate of Technical Guidance
13. Ir. Robert Sitohang	Staff, Sub-Directorate of Large Structure, Directorate of Technical Guidance
14. Ir. Edy Juharsyah	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance
15. Ir. Deliana	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance
16. Ir. Sarosa	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance

Japanese Side

Name	Occupation
JICA Study Team	
1. Hitoshi Kin	Team Leader
2. Makoto Migita	River Design Engineer/Hydraulic Model Test Engineer
3. Kazuyoshi Kageyama	Environmentalist
4. Yuzo Mizota	Soil Mechanics Engineer/Specfications Writer
JICA	
1. Kiyotaka Otsuki	Representative of JICA

ANNEX 2

MINUTES OF MEETING
ON INCEPTION REPORT (2)

MINUTES OF MEETING
ON
INCEPTION REPORT (2)
OF
THE DETAILED DESIGN STUDY
ON
MEDAN FLOOD CONTROL PROJECT

A meeting chaired by Mr. M. Hardjono, the Director of Technical Guidance, was held at the conference room of the Directorate General of Water Resources Development (DGWRD) on May 29, 1995 between DGWRD, Ministry of Public Works (hereinafter referred to as Indonesian Side) and JICA Study Team headed by Mr. Hitoshi Kin (hereinafter referred to as the Team) for the Detailed Design Study on Medan Flood Control Project (hereinafter referred to as the Study). The attendants are listed in the attached sheet.

1. The Team submitted thirty (30) copies of the Inception Report (2) to the Indonesian Side on May 8, 1995, as compiled on the basis of the results of the meeting for the Inception Report (1), which was held on April 27, 1995.

2. Comments/questions on the Inception Report (2) were given by the Indonesian Side, and the Team explained for them. Further the Team briefed the progress of the Study as of the date, and the following were confirmed by and between the Indonesian Side and the Team.

3. All the contents of the Inception Report (2) have been in principle accepted by the Indonesian Side. The main points discussed during the meeting are summarized as follows:

   (1) A guideline for flood control works ("Flood Control Manual", Ministry of Public Works/Canadian International Development Agency, June 1993), although which is not officially adopted by the Indonesian Side, will be carefully studied in the course of preparation of the basic design of the Study.

   (2) For the smooth implementation of the Medan Flood Control Project, the Indonesian Side will take some necessary actions to ease the compensation works such as house evacuation and land acquisition through a close coordination with local governments.

   (3) Others are discussed and confirmed as follows:

   The minutes of regular meeting in Medan between the North Sumatra Provincial Public Works and the Team shall be sent to the offices concerned with the Study in the DGWRD, Ministry of Public Works.

- The Team will provide the approximate area to be affected by the implementation of the proposed Project, and Indonesian Side give the announcement to the local government to undertake the zoning program at the earliest time possible.

- The meeting on the Progress Report (1), in which all results of the field works in the Basic Design Phase will be compiled, is tentatively scheduled to be held on August 24, 1995.

Jakarta, May 29, 1995

Ir. M. HARDJONO
Director of Technical Guidance
Directorate General of
Water Resources Development
Ministry of Public Works

HITOSHI KIN
Team Leader
JICA Study Team

LIST OF ATTENDANTS

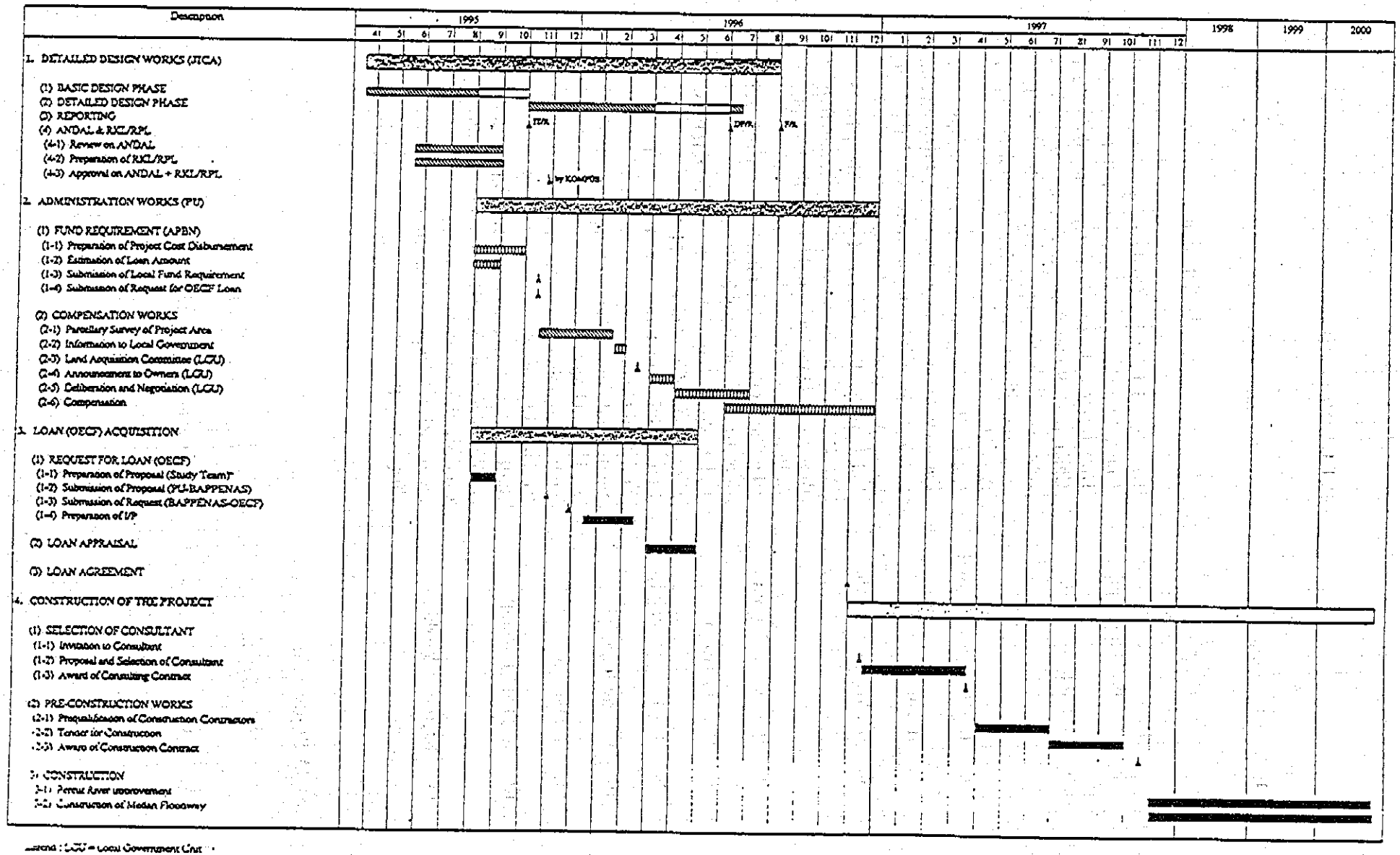
Indonesian Side :

Name	Designation
1. Ir. Mohamad Hardjono	Director of Technical Guidance
2. Ir. Nurachim Dipl.	Chief, Sub-Directorate of Region II North Sumatra, Directorate of Construction Guidance West Region
3. Ir. Santoso Soekirno	Chief, Sec. of Development & Conservation of Natural Resources, Sub-Directorate of Region II North Sumatra, Directorate of Construction Guidance West Region
4. Ir. Ruchiyat Kustomi	Chief, West Region Sec., Sub-Directorate of General Planning, Directorate of Planning & Programming
5. Ir. Rusli Rois	Coordinator, EIA, Directorate of Utilization and Conservation of Water Resources
6. Dr. Widyawati MSc	Chief, Water Resources Potential Analysis Sec., Sub-Directorate of Development Conservation of Water Resources, Directorate of Utilization and Conservation of Water Resources
7. Ir. Lauren Gultom	Chief of Staff, Medan Flood Control Project, North Sumatra Provincial Public Works
8. Ir. Pudjartono	Chief, West Region Sec., Sub-Directorate of Rivers, Directorate of Technical Guidance
9. Ir. Djoko Sasongko	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance
10. Ir. Edy Juharsyah	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance
11. Ir. Deliana	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance
12. Ir. Daud Joesoef	Staff, Sub-Directorate of Development Conservation of Water Resources, Directorate of Utilization and Conservation of Water Resources
13. Kiyofumi Yoshino	JICA River Expert, Directorate of Planning & Programming

JICA Study Team

Name	Designation
1. Hitoshi Kin	Team Leader

Fig. IMPLEMENTATION SCHEDULE OF THE PROJECT



Legend : LGU = Local Government Unit
ITR = Interim Report
DFR = Draft Final Report
FR = Final Report

ANNEX 3

MINUTES OF MEETING
ON PROGRESS REPORT (1)

MINUTES OF MEETING
ON
PROGRESS REPORT (1)
OF
THE DETAILED DESIGN STUDY
ON
MEDAN FLOOD CONTROL PROJECT

Prior to the termination of the field work of Basic Design for the captioned Study, the Directorate of Technical Guidance, Directorate General of Water Resources Development (DGWRD), Ministry of Public Works (hereinafter referred to as the Indonesian Side) has organized a meeting with the JICA Study Team (hereinafter referred to as the Team) to discuss the study results on the basis of the Progress Report (1) prepared and submitted by the Team. The meeting was held on August 24, 1995 at the conference room of DGWRD and by chaired by Ir. Ketut Kaler, Chairman of Technical Working Group (Chief of Sub-Directorate of Rivers, Directorate of Technical Guidance). The attendants are listed in the attached sheet.

Based on the study results, the Basic Design was briefly explained by Mr. Hitoshi Kin, the Team Leader at the beginning of the meeting, subsequently discussion was made to exchange ideas of their mutual concerns, and the following were confirmed by and between the Indonesian Side and the Team.

1. The Team submitted thirty (30) copies of the Progress Report (1) to the Indonesian Side on August 18, 1995, as it is concluded in the Scope of Works. .

2. All contents of the Progress Report (1) have been in principle understood and accepted by the Indonesian Side. The main points discussed during the meeting are summarized as follows:

   (1) Rubber Dam

      (a) To justify the adoption of a rubber dam as a replacement of the existing weir at Bandar Sidoras, a comparative study shall be made in terms of efficiency in functions of flood control and water intake as well as cost for construction and operation/maintenance. For the operation and maintenance of the rubber dam, a manual shall be prepared for successful water intake and flood control operation.

      (b) Another rubber dam shall be recommended on the Deli River for purpose of river flushing, with its location and structural dimension.

(2) Utilization of Excessive Excavated Materials

(a) Excavated materials of approximately 2,000,000 m^3 will be remained after use for embankment of river dike. The excessive materials shall be effectively used for such purpose as land reclamation, instead only for spoil. The project office shall make coordination with the related agencies in order to identify a suitable location for the excessive materials.

(b) The Team will submit the details of the excessive excavated materials to the project office.

(3) Others are discussed and confirmed as follows:

- Regarding the construction of the railway bridge across the proposed Floodway, the Indonesian Side shall continue to take action in order to know the PJK's future plan of the said railway.

- In designing the protection work for the Tollway Bridge, the design shall be consulted with the agency responsible for the operation of the Tollway through the coordination of the Indonesian Side.

- The Team shall provide the Steering Committee and the Technical Working Group with the copy of progress report of the hydraulic model test conducted by the Research Institute of Water Resources Development.

- As groundwater level may be affected due to the construction of floodway, mounting work needs to be undertaken by the Indonesian Side (the project office in Medan) during and after construction.

3. The Indonesian Side again emphasizes the need of Japan's assistance to conduct a study of social impact management (inventory study).

Jakarta, August 24, 1995

Ir. MARTONO
Director of Construction Guidance
in West Region
Directorate General of
Water Resources Development
Ministry of Public Works

HITOSHI KIN
Team Leader
JICA Study Team

LIST OF ATTENDANTS

Indonesian Side :

Name	Occupation
1. Ir. Amas Muda Daulay	Ka-Kanwil, North Sumatra Provincial Public Works
2. Ir. Ketut Kaler	Chief, Sub-Directorate of Rivers, Directorate of Technical Guidance
3. Ir. Mustadjab	Chief, Dinas Pengairan, DPUP-SU
4. Ir. Nurachim Dipl. HE.	Chief, Sub-Directorate of Region II North Sumatra, Directorate of Construction Guidance West Region
5. Ir. Santoso. Soekirno	Chief, Sec. of Development & Conservation of Natural Resources, Sub-Directorate of Region II North Sumatra, Directorate of Construction Guidance West Region
6. Ir. Ruchiyat Kustomi	Chief, West Region Sec., Sub-Directorate of General Planning, Directorate of Planning & Programming
7. Ir. R. Sumarsono	Chief, River Sec., Sub-Directorate of Conservation of Water Resources, Directorate of Utilization and Conservation of Water Resources
8. Ir. Yani Sulastri S.	Asst. Chief of Staff, North Sumatra Water Resources and Flood Control Project, Provincial Public Works
9. Ir. Pudjartono	Chief, West Region Sec., Sub-Directorate of Rivers, Directorate of Technical Guidance
10. Ir. Harmodi	Staff, Sub-Directorate of Large Structure, Directorate of Technical Guidance
11. Ir. B. Situmorang	Chief of Section, City and Land Use Planning, BAPPEDA Tk.I, North Sumatra
12. Ir. Irman	Staff, BAPPEDA Tk.II, Medan City
13. Ir. B. Prihono	Staff, Sub-Directorate of Irrigation, Directorate of Technical Guidance

Japanese Side

Name	Occupation
JICA Study Team	
1. Hitoshi Kin	Team Leader
2. Masashi Furutaguchi	River Structure Planner (Asst. Team Leader)
3. Makoto Migita	River Design Engineer/Hydraulic Model Test Engineer
4. Kazuyoshi Kageyama	Environmentalist
5. P. Tarigan	Bridge Engineer

ANNEX 4

MINUTES OF MEETING ON INTERIM REPORT

MINUTES OF MEETING
ON
INTERIM REPORT
OF
DETAILED DESIGN STUDY
ON
MEDAN FLOOD CONTROL PROJECT

Through the site observation and serial meetings with the member of the Steering Committee as well as officials concerned, as its schedule attached hereto, by the Advisory Team for the captioned study headed by Mr. K. Nakagawa and the Study Team, the following point were discussed and agreed by and between the Steering Committee and the Study Team, and confirmed by the Advisory Team.

1. Minutes of Meeting (as enclosed herein) which was agreed by and between the Technical Working Group and the Study Team on November 16, 1995 is confirmed.

2. Attentions shall be given to disseminate information to and to obtain understand/cooperation from the project affected families in order to attain a smooth and prompt implementation of the Medan Flood Control Project.

Jakarta, November 30, 1995

Confirmed by

Ir. M. HARDJONO
Director of Technical Guidance

HITOSHI KIN
Team Leader
JICA Study Team

Witnessed by

KAZUO NAKAGAWA
Director, Planning Division
Social Development Study Dept.
Japan International Cooperation Agency

SCHEDULE

Advisory Team for the Detailed Design Study on Medan Flood Control Project to the Directorate General of Water Resources Development, Ministry of Public Works

No.	Date (Day)	Time	Schedule	Remarks
1	Nov. 23, 1995 (Thu)		Tokyo - Jakarta	GA873 * Meeting with Study Team
2	24 (Fri)	09:00	Jakarta	Courtesy Call on Mr. TSUKAHARA First Secretary, Embassy of Japan
		10:00		- Ir. Sayid Subchan, M.Sc. Head, Bureau of Water Resources and Irrigation, BAPPENAS Jl. Taman Suropati No. 2, Jakarta Pusat Tlp. (021) 334.711
		11:00		- Mr. SASAKI A., Senior Representative, OECF
		14:00		- Ir. Martono, Director of Dit. of Construction Guidance of West Region, DGWRD, DPU
		15:00		- Ir. Djoko S. Sardjono Secretary, Dit. Gen. of Water Resources Dev., DPU (Ms. Darti)
3	25 (Sat)	12:30-14:40	Medan	* Jakarta - Medan (GA152) * Site Observation - Floodway
4	26 (Sun)		Medan	* Site Observation - Percut River
5	27 (Mon)	10:00	Medan	* Courtesy Call on : - Consul General, Consulate General of Japan in Medan - Head of Regional Office of Public Works North Sumatra (KAKANWIL) - Head of Water Resources Office North Sumatra (KA Dinas Pengairan) - Head of Regional Development Planning Agency - North Sumatra Province - Ms. R. Sitompul Pimpro PSAPB.SU

6	28	(Tue)	12:10- 14:20	Medan Bandung	* Medan-Jakarta (GA151) Jakarta-Bandung * Meeting with RIWRD
7	29	(Wed)		Bandung Jakarta	* Inspection on Hydraulic Model Test in RIWRD (Bandung) * Bandung - Jakarta
8	30	(Thu)	 08:30	Jakarta	* Report to : - Ir. Moh. Hardjono Director, Dit. of Technical Engineering, DGWRD, DPU Jl. Pattimura No. 20, Keb. Baru Tlp. (021) 720.8803 (Ms. Aneke) - Ir. Ketut Kaler, M. Eng. Chief, Sub-Dit. of Rivers, Directorate of Engineering Guidance, DGWRD, DPU Jl. Pattimura No. 20, Keb. Baru Tlp. (021) 739.8604
			10:00 11:30		- Embassy of Japan (Mr. TSUKAHARA) - JICA Office
			14:30		* Jakarta-Singapore (SQ157)

MINUTES OF MEETING
ON
INTERIM REPORT
OF
THE DETAILED DESIGN STUDY
ON
MEDAN FLOOD CONTROL PROJECT

A meeting chaired by Ir. Ketut Kaler, Chairman of Technical Working Group (Chief of Sub-Directorate of Rivers, Directorate of Technical Guidance) was held at the conference room of the Directorate General of Water Resources Development (DGWRD) on November 15, 1995 between DGWRD, Ministry of Public Works (hereinafter referred to as Indonesian Side) and JICA Study Team headed by Mr. Hitoshi Kin (hereinafter referred to as the Team) for the Detailed Design Study on Medan Flood Control Project (hereinafter referred to as the Study). The attendants are listed in the attached sheet.

The presentation of the Interim Report was made by the Team at the beginning of the meeting, subsequently discussion was made to exchange ideas of their mutual concerns, and the following were confirmed by and between the Indonesian Side and the Team.

1. The Team submitted thirty (30) copies of Interim Report to the Indonesian Side on October 31, 1995, as it is concluded in the Scope of Works for the Study.

2. All the contents of the Interim Report have been in principle accepted by the Indonesian Side. The main points discussed during the meeting are summarized as follows :

   (1) Social Impact Study shall be carried out without a lapse of time in order to clear the negative impacts to be brought by the implementation of the Medan Flood Control Project, such as land acquisition and house evacuation as well as to clarify the detailed procedures of them.

   (2) Operation and maintenance system and methods of the project facilities will be studied, and the manuals will be prepared and provided to the Indonesian Side.

   (3) Others are discussed and confirmed as follows :
   - As discussed in the meeting on Progress Report (1) on August 24, 1995, a utilization of excessive excavated materials shall be carefully studied in order to avoid any environmental aggravation and to attain effective uses of them.

- In comparison of gates for intake weir to be reconstructed, not only an initial construction cost but also an operation and maintenance cost shall be evaluated by terms of net present value (NPV).
- Title block of the drawing sheet was submitted by the Team to the Indonesian Side for concurrence.

Jakarta, November 16, 1995

DEPARTEMEN PEKERJAAN UMUM
DIREKTORAT BINA TEKNIK
DIREKTORAT JENDERAL PENGAIRAN

Ir. M. HARDJONO
Director of Technical Guidance
of Directorate General
of Water Resources Development
Ministry of Public Works

HITOSHI KIN
Team Leader
JICA Study Team

LIST OF ATTENDANTS

No.	Name	Occupation
Indonesian Side		
1.	Ir. Ketut Kaler	Chief, Sub-Directorate of Rivers, Directorate of Technical Guidance
2.	Ir. Santoso Soekirno	Chief, Sec. of Development & Conservation of Natural Resources, Sub-Directorate of Region II North Sumatra, Directorate of Construction Guidance West Region
3.	Ir. Ruchiyat Kustomi	Chief, West Region Sec., Sub-Directorate of General Planning, Directorate of Planning & Programming
4.	Ir. Lauren Gultom	Chief of Staff, Medan Flood Control Project, North Sumatra Provincial Public Works
5.	Ir. Yani S. Siregar	Planning Assistant, Medan Flood Control Project, North Sumatra Provincial Public Works
6.	Ir. Pudjartono	Chief, West Region Sec., Sub-Directorate of Rivers, Directorate of Technical -Guidance.
7.	Ir. Djoko Sasongko	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance
8.	Ir. Sukanwa	Staff, Sub-Directorate of Large Structure, Directorate of Technical Guidance
9.	Ir. Harmodi	Staff, Sub-Directorate of Large Structure, Directorate of Technical Guidance
10.	Ir. Edy Juharsyah	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance
11.	Ir. Sigit D.	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance
12.	Ir. Daud Joesoef	Staff, Sub-Directorate of Development Conservation of Water Resources, Directorate of Utilization and Conservation of Water Resources.
13.	Mr. Bintara Thahir	Chief of Physical Division BAPPEDA.
14.	Mr. Kiyofumi Yoshino	JICA Expert on Water Resources
15.	Mr. Masaaki Hanaoka	JICA Expert on Sabo Engineering
JICA Study Team		
1.	Mr. Hitoshi Kin	Team Leader
2.	Mr. Makoto Migita	River Design Engineer/Hydraulic Model Test Engineer
3.	Mr. Hiroshi Shimizu	Structural Engineer
JICA		
1.	Ms. Dinur Krismasori	Project Officer, JICA

ANNEX 5

MINUTES OF MEETING
ON PROGRESS REPORTS (2)

MINUTES OF MEETING
ON
PROGRESS (2) REPORT
OF
THE DETAILED DESIGN STUDY
ON
MEDAN FLOOD CONTROL PROJECT

Prior to the termination of the second field work for the captioned Study, a meeting chaired by Ir. Ketut Kaler, Chairman of Technical Working Group (Chief of Sub-Directorate of Rivers, Directorate of Technical Guidance) was held at the conference room of the Directorate General of Water Resources Development (DGWRD) on March 28, 1996 between DGWRD, Ministry of Public Works (hereinafter referred to as Indonesian Side) and JICA Study Team headed by Mr. Hitoshi Kin (hereinafter referred to as the Team) for the Detailed Design Study on Medan Flood Control Project (hereinafter referred to as the Study). The attendants are listed in the attached sheet.

After Ir. Marhuarar Napitupulu, Director of Technical Guidance, addressed the opening of the meeting, the presentation of the Progress Report (2) was made by the Team at the beginning of the meeting, subsequently discussion was made to exchange ideas of their mutual concerns, and the following were confirmed by and between the Indonesian Side and the Team.

1. The Team submitted thirty (30) copies of Progress Report (2) to the Indonesian Side, twenty two (22) copies for DGWRD, Jakarta and eight (8) copies for DPUP Medan, on March 22, 1995, as it is concluded in the Scope of Work.

2. All the contents of the Progress Report (2) have been in principle accepted by the Indonesian Side. The main points discussed during the meeting are summarized as follows :

   (1) Modification of Basic Design

   As a result of the study, the following modification of the Basic Design were made and accepted by the Indonesian Side.

   ① To minimize the land acquisition, a leaning wall was employed for the upstream of Floodway from FW28+50 to the Floodway weir.

   ② Based on the results of hydraulic model tests, a rounded crest was applied to the diversion weirs to attain a smooth flow at the crest. Accordingly, the basic dimensions of the weirs and modification method of weir crests for the Urgent Plan were revised.

   ③ Assuring a safe pass of the design flood discharge and preventing a heavy scouring at the river section of National Road Bridge, riverbed and slope protection works are employed instead of the extension of the bridge.

④ A basic design has been only prepared for the Railway Bridge at the section FW32 (Medan-Deli Tua Line which has not been operated) in compliance with the request from PJKA.

⑤ Three main water transmission pipes with a diameter of more than 60 cm along the existing bridges are newly designed as an independent water pipe bridge.

(2) Change of Shore Line and Sedimentation at River Mouth

The change of deposition rate of sediment along Percut River and Deli River mouths are estimated rather small after a part of flood discharge of Deli River be diverted to Percut River through the proposed Floodway. Therefore, serious problems such as river mouth clogging and erosion of coastal area will not arise.

(3) Disposal of Excessive Excavated Material

The suitable location of disposal area for excessive excavated material should be proposed by the Project Office in consideration of the resettlement plan. In addition, since the toxic materials are observed in the riverbed, a special attention should be paid for disposing the materials.

(4) Inspection Road

The inspection road designed by the Team (3.0 m wide, gravel pavement) is basically accepted. The future widening of the road by the Project Office may be possible.

Jakarta, March 29, 1996

Ir. Marhuarar Napitupulu
Director of Technical Guidance
of Directorate General
of Water Resources Development,
Ministry of Public Works

JICA Study Team

LIST OF ATTENDANTS

Indonesian Side :

Name	Designation
1. Ir. K. Kaler	Chief, Sub-Directorate of River, Directorate of Technical Guidance
2. Ir. Nurachim, Dipl.	Chief, Sub-Directorate of Region II North Sumatra. Directorate of Construction Guidance West Region
3. Ir. Ruchyat Kustomi	Chief, West Region Sec., Sub-Directorate of General Planning, Directorate of Planning and Programming
4. Ir. Darwin Lubis	Chief, West Region Sec., Sub-Directorate of Irrigation, Directorate of Technical Guidance
5. Ir. Pudjartono	Chief, West Region Sec., Sub-Directorate of Rivers, Directorate of Technical Guidance
6. Ir. Harun Al Rasjid	Chief, Sec. of Development and Conservation of Natural Resources, Directorate of Construction Guidance West Region
7. Ir. Yani Sulastri Siregar	Ass. Chief of Staff, North Sumatra Water Resources and Flood Control Project
8. Ir. Rusli Rais	Coordinator, EIA, Directorate of Utilization and Conservation of Water Reources
9. Ir. Harmadi	Staff, Sub-Directorate of Large Structure, Directorate of Technical Guidance
10. Ir. Tagor Sinurat	Planning and Design of West Region
11. Ir. Deliana	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance
12. Ir. Edy Juharsyah	Staff, Sub-Directorate of Rivers, Directorate of Technical Guidance
13. Ir. Daoed Joesoef	Staff, Sub-Directorate of Development Conservation of Water Resources, Directorate of Utilization and Conservation of Water Resources.

JICA Study Team

Name	Designation
1. Mr. Hitoshi Kin	Team Leader
2. Mr. Masashi Furutaguchi	Ass. Team Leader/River Engineer
3. Mr. P. Tarigan	Bridge Engineer
4. Mr. Yuzo Mizota	Spec. Wrighter
5. Mr. Hiroshi Shimizu.	Structural Engineer
6. Mr. Shuji Kaku	Construction Plan/Cost Estimate

JICA

Name	Designation
1. Ms. Dinur Krismasari	Project Officer, JICA Office

ANNEX 6

MINUTES OF MEETING ON DRAFT FINAL REPORT

MINUTES OF MEETING
ON
DRAFT FINAL REPORT
OF
THE DETAILED DESIGN STUDY
ON
MEDAN FLOOD CONTROL PROJECT

A meeting on Draft Final Report of the Detailed Design Study on Medan Flood Control Project (hereinafter referred to as the Study), chaired by Ir. Ketut Kaler, Chief of Sub-Directorate of Rivers, Directorate of Technical Guidance, was held at the conference room of the Directorate General of Water Resources Development (DGWRD), Ministry of Public Works on August 7, 1996 between DGWRD (hereinafter referred to as Indonesian Side) and the Study Team of Japan International Cooperation Agency (JICA) headed by Mr. Hitoshi Kin (hereinafter referred to as the Study Team) with the presence of the JICA Advisory Team headed by Mr. Masayuki Watanabe. Successively, an explanatory meeting was held, chaired by Ir. Moestadjab, Head of Provincial Water Resources Development, at the conference room of the North Sumatra Public Work Office on August 9, 1996. The attendants are listed in the attached sheet.

The presentation of the Draft Final Report was made by the Study Team at the beginning of the meeting, subsequently discussions were made to exchange ideas of their mutual concerns, and the following were confirmed by and between the Indonesian Side and the Study Team.

1. The Study Team submitted the Draft Final Report of the Study consisting of nine (9) volumes as enumerated below to the Indonesian Side.

Vol. I	: Summary	40 copies (10 copies)
Vol. II	: Main Report	40 copies (10 copies)
Vol. III	: Design Note	6 copies (3 copies)
Vol. IV	: Pre-qualification Document	6 copies (3 copies)
Vol. V	: Tender Document	6 copies (3 copies)
Vol. VI	: Cost Estimate	3 copies (1 copies)
Vol. VII	: Work Quantities	6 copies (3 copies)
Vol. VIII	: Drawings	5 copies (2 copies)
Vol. IX	: Data Book	6 copies (3 copies)

Number of copies in the parentheses are those which were sent to the Office of North Sumatra Water Resources and Flood Control Project (PPSAPB-SU) in Medan. Further, Vol. VI: Cost Estimate will be submitted with sealed to the designated office through this meeting.

2. All the contents of the Draft Final Report have been in principle accepted by the Indonesian Side. The main points discussed during the meeting are summarized as follows :

(1) The Study Team shall prepare a hazard map showing the flood inundation area in the Deli-Percut river basin based on the hydraulic analyses as well as the past floods.

(2) The Implementation Program the Project shall be prepared by the DGWRD with the assistance of the Study Team in accordance with the latest output of the Study and the parcellary survey conducted by the PPSAPB-SU.

(3) The JICA Advisory Team and the Study Team have emphasized that earlier and careful undertakings for land acquisition and compensation works are key issues for a smooth implementation of the Project.

(4) The Final Report of the Study shall be compiled and submitted as follows with number of copies indicated in the parentheses:

Design Reports

Vol. I	: Summary	(50)
Vol. II	: Main Report	(50)
Vol. III	: Design Note	(5)
Vol. IV	: Work Quantities	(5)
Vol. V	: Data Book	(5)
Vol. III	: Cost Estimate	(3)
Pre-qualification Document		(5)
Tender Documents		(5 for each volume)

Vol. I : Invitation to Tender,
: Instructions to Tenderers,
: Particular Instructions to Tenderers,
: Form of Tender and Appendices,
: Form of Contract Agreement,
: Bond Specimens, and
: Bill of Quantities

Vol. II : General and Special Conditions of Contract

Vol. III : General and Technical Specifications

Vol. IV : Drawings

(4) Other technical matters discussed are as follows:

i) Additional explanation of the riverbed protection around the proposed groundsill shall be incorporated in the Design Note.

ii) The Design Note shall be checked by the Indonesian Side as well as the Study Team before the compilation and submission of the Final Report.

(5) All comments on the Draft Final Report shall be given by the Indonesian Side by September 11, 1996 to the Study Team through the JICA Indonesia Office.

(6) The Final Report will not be opened to the public for at least three (3) years upon the submission.

Jakarta, August 12, 1996

Ir. Marhuaral Napitupulu Dipl. HE.
Director of Technical Guidance
of Directorate General
of Water Resources Development,
Ministry of Public Works

Hitoshi Kin
Team Leader
JICA Study Team

Conformed by:

Dr. Ir. Koensatwanto I. Dipl HE. M. Sc
Head, Bureau of Water Resources and Irrigation
BAPPENAS

Masayuki Watanabe
Team Leader
JICA Advisory Team

LIST OF ATTENDANTS
(Meeting in Jakarta on August 7, 1996)

No.	Name	Occupation
Indonesian Side		
1.	Ir. Marhuatat Napitupulu Dipl. HE.	Director of Technical Guidance of Directorate of Water Resources Development
2.	Ir. Ketut Kaler	Chief, Sub-Directorate of Rivers, Directorate of Technical Guidance
3.	Ir. Nurachim	Chief, Sub-Directorate of Region II North Sumatra. Directorate of Construction Guidance West Region
4.	Ir. Ruchiyat Kustomi	Chief, West Region Sec., Sub-Directorate of General Planning, Directorate of Planning & Programming
5.	Ir. Lauren Gultom	Chief of Staff, Medan Flood Control Project, North Sumatra Provincial Public Works
6.	Ir. Yani S. Siregar	Planning Assistant, Medan Flood Control Project, North Sumatra Provincial Public Works
7.	Ir. Pudjartono	Chief, West Region Sec., Sub-Directorate of Rivers, Directorate of Technical -Guidance.
8.	Ir. Tagor Sinurat	Staff, Sub-Directorate of Region II North Sumatra. Directorate of Construction Guidance West Region
9.	Ir. Sumartoyo	Staff, Sub-Directorate of Region II North Sumatra. Directorate of Construction Guidance West Region
10.	Ir. Sutardi	Staff, Sub-Directorate of General Planning, Directorate of Planning & Programming
11.	Ir. Sumarsono	Staff, Sub-Directorate of Rivers, Directorate of Water Resources Conservation
12.	Ir. R. Zamuddin	Staff, Sub-Directorate of Irrigation on Directorate of Technical Guidance
13.	Ir. Simon Himawan	Staff, Bureau of Water Resources and Irrigation, BAPPENAS
14.	Kazuo Umeda	JICA Expert on River Engineering
15.	Hiroaki Shintaku	JICA Expert on Water Resources
16.	Koji Hata	JICA Expert on Sabo Engineering
JICA Study Team		
1.	Mr. Hitoshi Kin	Team Leader
2.	Mr. Masashi Furutaguchi	Asst. Team Leader/River Engineer
3.	Mr. Hiroshi Shimizu	Structural Engineer
JICA Adovisary Team		
1.	Mr. Masayuki Watanabe	Team Leader, JICA
JICA		
1.	Mr. Satoshi Kimura	Coordinator, JICA
OECF		
1.	Ms. Myra Lubis	Staff, OECF Indonesia Office

LIST OF ATTENDANTS
(Explanatory Meeting in Medan on August 9, 1996)

No.	Name	Occupation
Indonesian Side		
1.	Ir. Moestadjab	Head, North Sumatra Provincial Water Resources Development Office (DPUP-SU)
2.	Ir. Roslila Sitompul	Project Manager, North Sumatra Water Resources and Flood Control Project (PPSAPB-SU)
3.	Ir. Lauren Gultom	Chief of Staff, PPSAPB-SU
4.	Ir. Yani S. Siregar	Planning Assistant, PPSAPB-SU
5.	Ir. Ndebi Barus	Project Engineer, PPSAPB-SU
6.	Ir. Maruli Pasaribu	Chief, Planning Section, DPUP-SU
7.	Ir. Isoar A. Siregar	Staff, DPUP-SU
8.	Ir. Banjaraahor MSc.	Staff, Planning Section, DPUP-SU
9.	Ir. Perasaan Ginting	Staff, Construction Section, DPUP-SU
10.	Ir. Nur Lubis	Staff, DPUP-SU
11.	A. F. Napitupulu	Staff, Irrigation Section, DPUP-SU
12.	W. S. Napitupulu	Staff, Sub-Project of Medan Flood Control, PPSAPB-SU
13.	Darmawan	Staff, Sub-Project of Medan Flood Control, PPSAPB-SU
14.	M. Simanungkalit	Administration Assistant, PPSAPB-SU
15.	Dr. Ir. Sastra Sebayang	Director, PT. Melius Kesuma (Local Consultant)
16.	Ir. Yusak	Staff, PT. Melius Kesuma (Local Consultant)
JICA Study Team		
1.	Mr. Hitoshi Kin	Team Leader
2.	Mr. Masashi Furutaguchi	Asst. Team Leader/River Engineer
3.	Mr. Hiroshi Shimizu	Structural Engineer
JICA Advisory Team		
1.	Mr. Masayuki Watanabe	Team Leader, JICA
JICA		
1.	Mr. Satoshi Kimura	Coordinator, JICA

JICA