

REPUBLIC OF INDONESIA  
MINISTRY OF PUBLIC WORKS  
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT

MASTER PLAN STUDY  
ON  
LOWER ASAHAN RIVER BASIN DEVELOPMENT

INTERIM REPORT  
(APPENDIX III)

JICA LIBRARY



1034299[6]

October 1985.

JAPAN INTERNATIONAL COOPERATION AGENCY

INTERIM REPORT  
FOR  
MASTER PLAN STUDY  
ON  
LOWER ASAHAN RIVER BASIN DEVELOPMENT

LIST OF REPORT

EXECUTING SUMMARY

MAIN REPORT

APPENDIX I

APPENDIX A	METEOROLOGY AND HYDROLOGY
APPENDIX B	SOIL MECHANICS
APPENDIX C	SOCIO-ECONOMY
APPENDIX D	AGRICULTURE AND IRRIGATION
APPENDIX E	SEDIMENTATION

APPENDIX II

APPENDIX F	PRESENT CONDITIONS OF RIVERS
APPENDIX G	FLOOD DISCHARGES AND DAMAGES
APPENDIX H	FLOOD CONTROL PLAN
APPENDIX I	REGULATION OF WATER LEVEL OF LAKE TOBA

APPENDIX III DRAWINGS OF URGENT FLOOD CONTROL PLAN

DATA BOOK

VOL. I	DATA ON RAINFALL, WATER LEVEL AND DISCHARGE
VOL. II	RIVER SURVEY RESULTS
VOL. III	DAILY DISCHARGE RECORD AT SIRUAR AND SIMOREA, DAILY WATER LEVEL RECORD OF LAKE TOBA
VOL. IV A.	OUTPUT OF COMPUTER ON FLOOD DISCHARGE ANALYSIS
B.	OUTPUT OF COMPUTER ON HYDRAULIC ANALYSIS OF RIVER CHANNEL

国際協力事業団	
受入 月日 '86. 2.27	108
登録No. 12495	61.7
	SDS

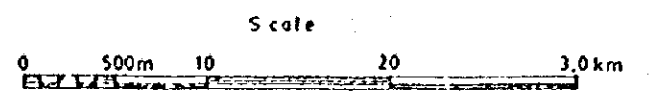
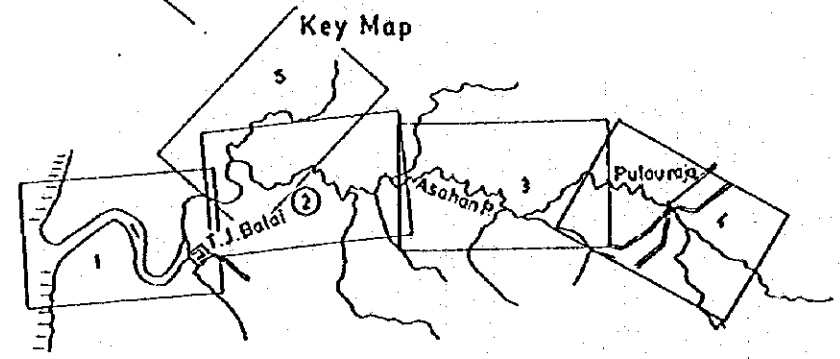
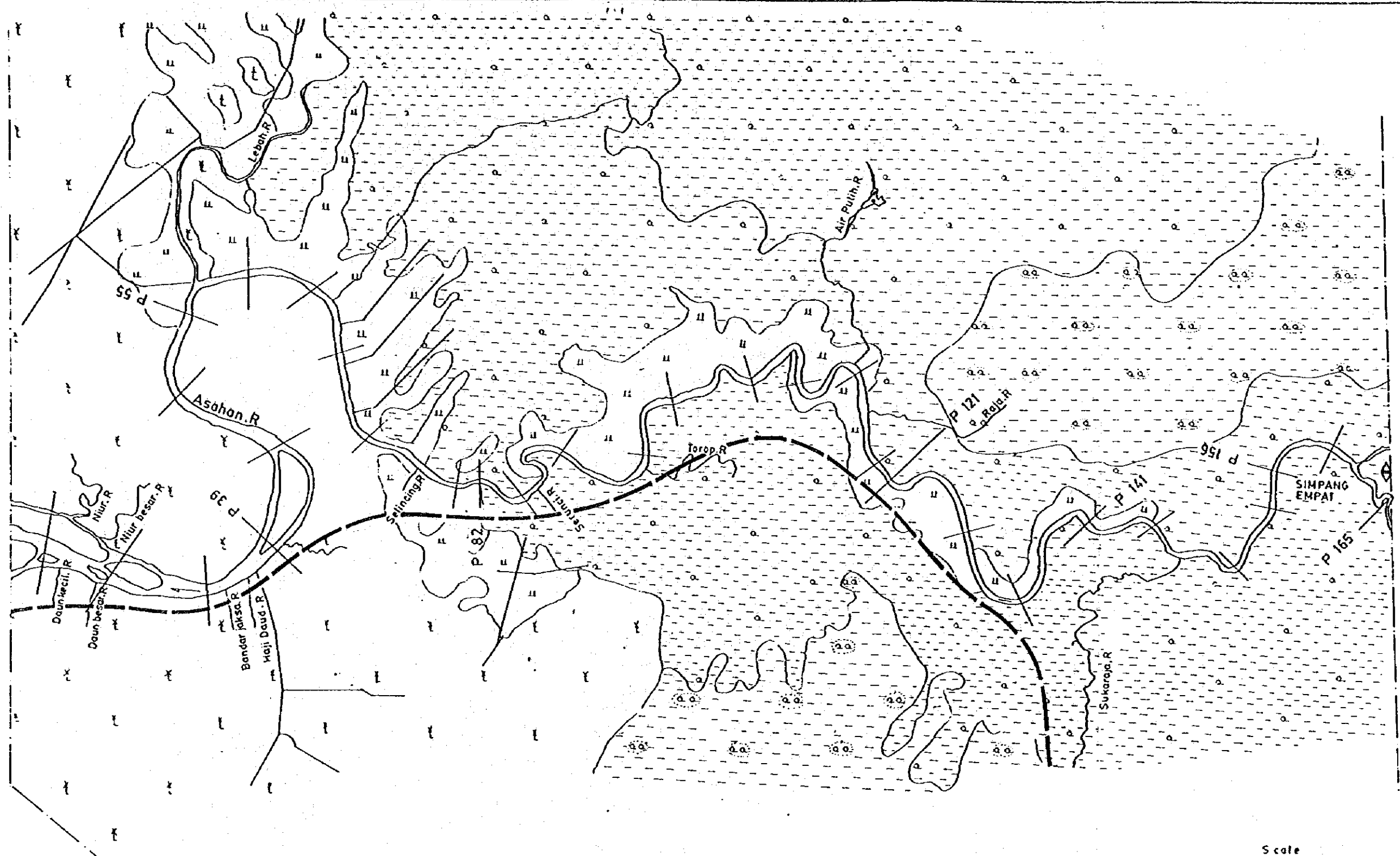
**DRAWING OF URGENT FLOOD CONTROL PLAN**

MASTER PLAN STUDY ON  
LOWER ASAHAN RIVER BASIN DEVELOPMENT  
LIST OF DRAWINGS

DRAWING NO.	TITLE
I. RIVER CHANNEL IMPROVEMENT	
I - 1	PLAN OF PROJECT Asahan River (1/5)
I - 2	PLAN OF PROJECT Asahan River (2/5)
I - 3	PLAN OF PROJECT Asahan River (3/5)
I - 4	PLAN OF PROJECT Asahan River (4/5)
I - 5	PLAN OF PROJECT Asahan River (5/5)
I - 6	PROPOSED PROFILE Asahan River
I - 7	PROPOSED CROSS-SECTION Asahan River (1/6)
I - 8	PROPOSED CROSS-SECTION Asahan River (2/6)
I - 9	PROPOSED CROSS-SECTION Asahan River (3/6)
I - 10	PROPOSED CROSS-SECTION Asahan River (4/6)
I - 11	PROPOSED CROSS-SECTION Asahan River (5/6)
I - 12	PROPOSED CROSS-SECTION Asahan River (6/6)
I - 13	PROPOSED PROFILE AND CROSS-SECTION Asahan Retarding Basin
I - 14	PLAN OF PROJECT Silau River (1/2)
I - 15	PLAN OF PROJECT Silau River (2/2)
I - 16	PROPOSED PROFILE Silau River
I - 17	PROPOSED CROSS-SECTION Silau River (1/3)
I - 18	PROPOSED CROSS-SECTION Silau River (2/3)
I - 19	PROPOSED CROSS-SECTION Silau River (3/3)

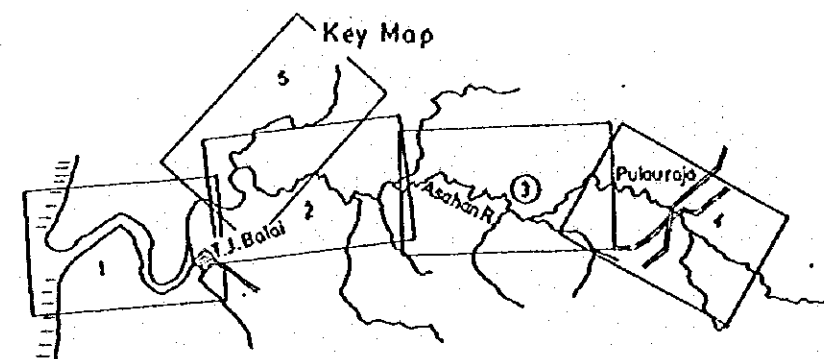
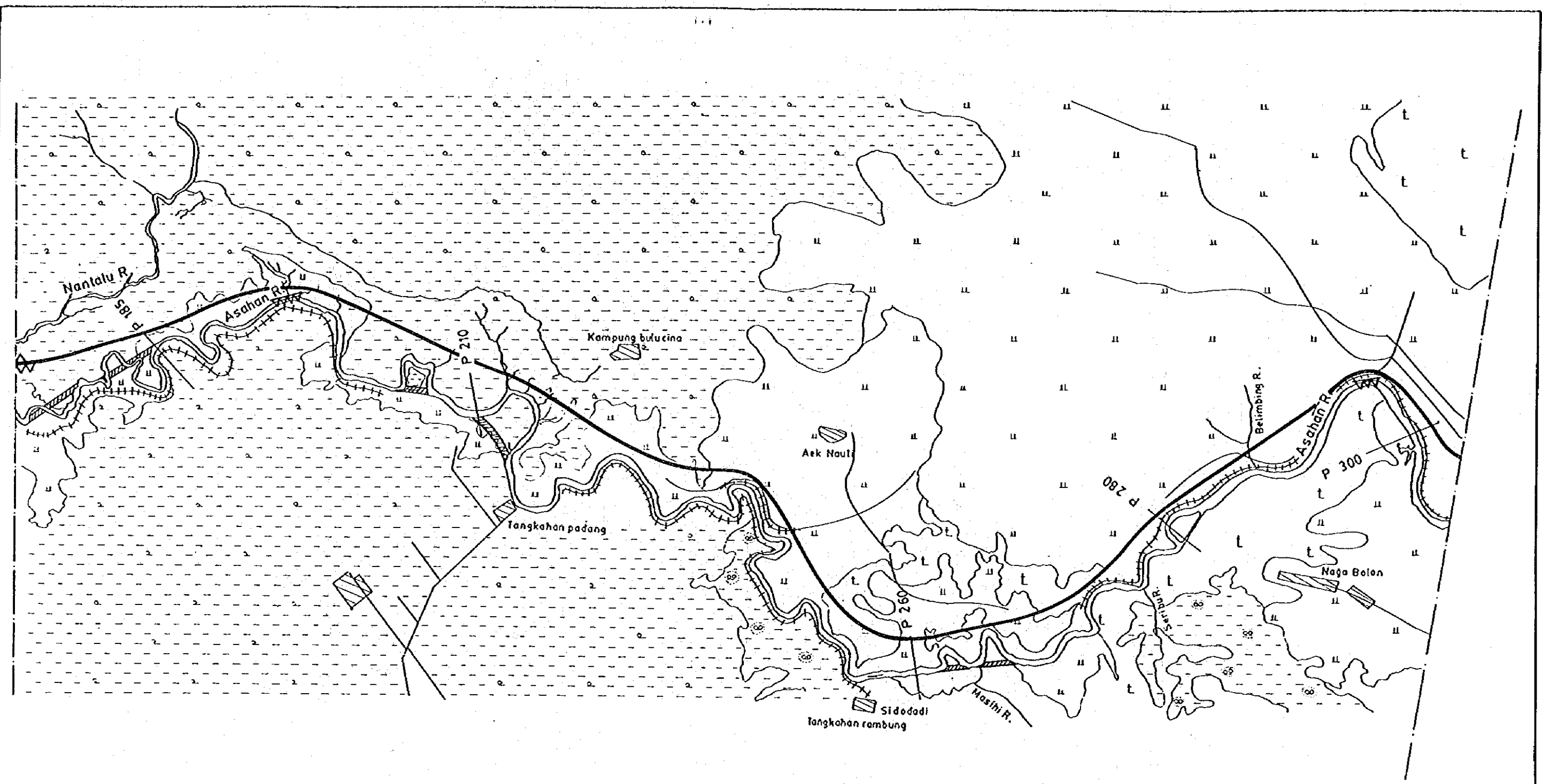
DRAWING NO.	TITLE
II. DRAINAGE FACILITIES	
II - 1	DRAINAGE CULVERT 1.5 m x 1.5 m, 2.0 m x 2.5 m
II - 2	DRAINAGE CULVERT 2.0 m x 2.5 m x 2





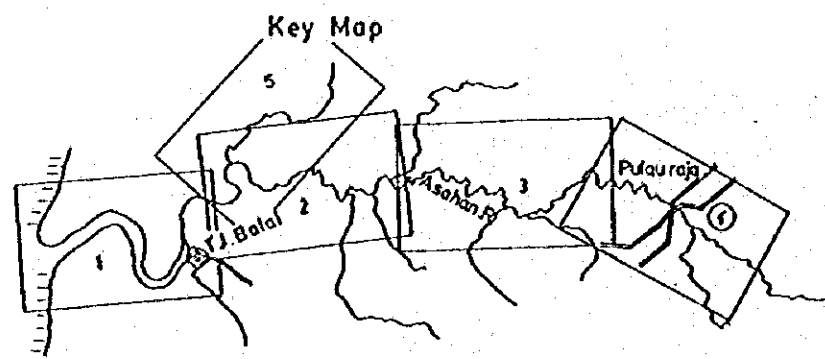
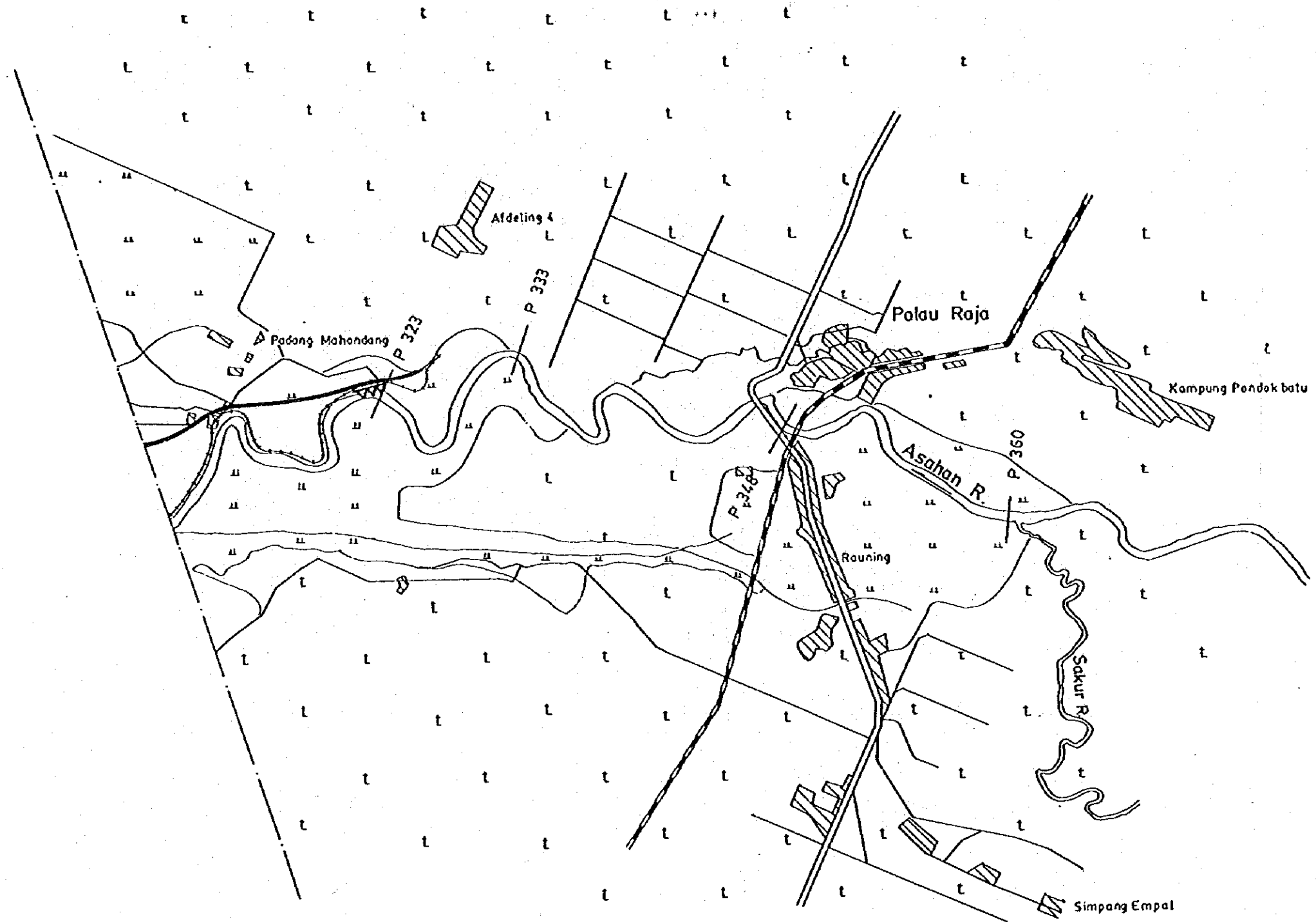
LEGEND					
Residential area		Main road		Cutoff channel	
Paddy field		Road		Bank protection	
Swamp area		Railway		Intake structure/	
a. Forest		Stream		Drainage culvert	
b. Bush		Dike		Section number P185	
a. Oil palm		Existing			
b. Coconut palm		Long-term plan			
		Urgent plan			

MINISTRY OF PUBLIC WORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
 PLAN OF PROJECT  
 Asahan River (2/5)  
 JAPAN INTERNATIONAL COOPERATION AGENCY DWG. NO. I-2



LEGEND					
Residential area		Main road		Cutoff channel	
Paddy field		Road		Bank protection	
Swamp area		Railway		Intake structure/Drainage culvert	
a. Forest		Stream		Section number P185	
b. Bush		Dike			
a. Oil palm		Existing			
b. Coconut palm		Long-term plan			
		Urgent plan			

MINISTRY OF PUBLIC WORKS	
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT	
MASTER PLAN STUDY ON	
LOWER ASAHAN RIVER BASIN DEVELOPMENT	
PLAN OF PROJECT	
Asahan River (3/5)	
JAPAN INTERNATIONAL COOPERATION AGENCY	DWG. NO. 1-3

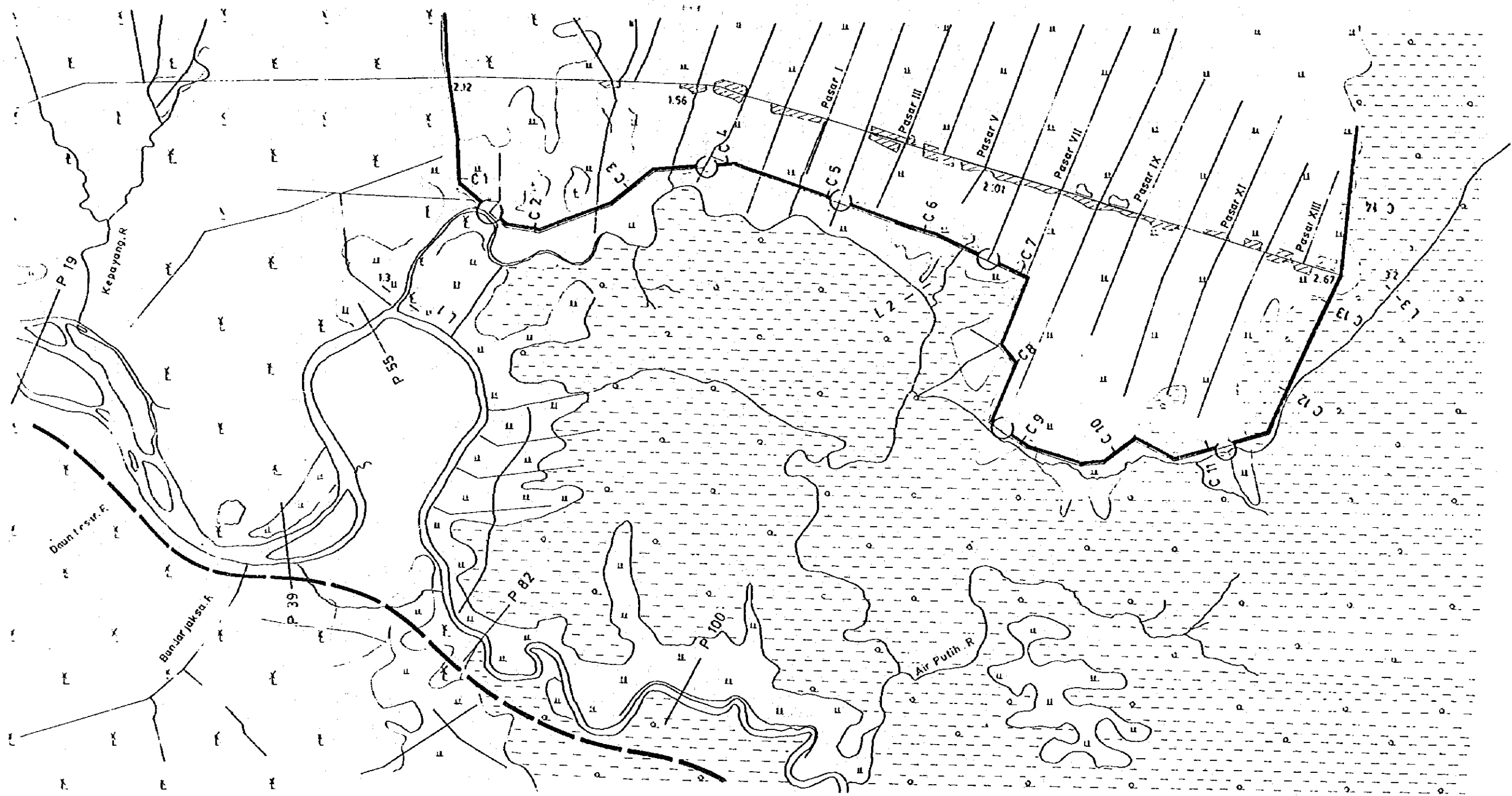


**LEGEND**

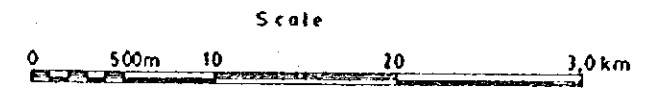
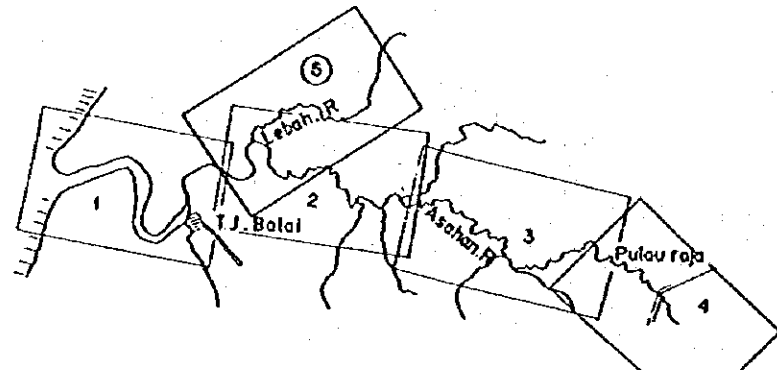
Residential area		Main road		Cutoff channel	
Paddy field		Road		Bank protection	
Swamp area		Railway		Intake structure/ Drainage culvert	
a. Forest		Stream		Section number P185	
b. Bush		Dike			
a. Oil palm		Existing			
b. Coconut palm		Long-term plan			
		Urgent plan			

MINISTRY OF PUBLIC WORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
**MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT**  
**PLAN OF PROJECT**  
**Asahan River (4/5)**  
 JAPAN INTERNATIONAL COOPERATION AGENCY DWG. NO. I-4





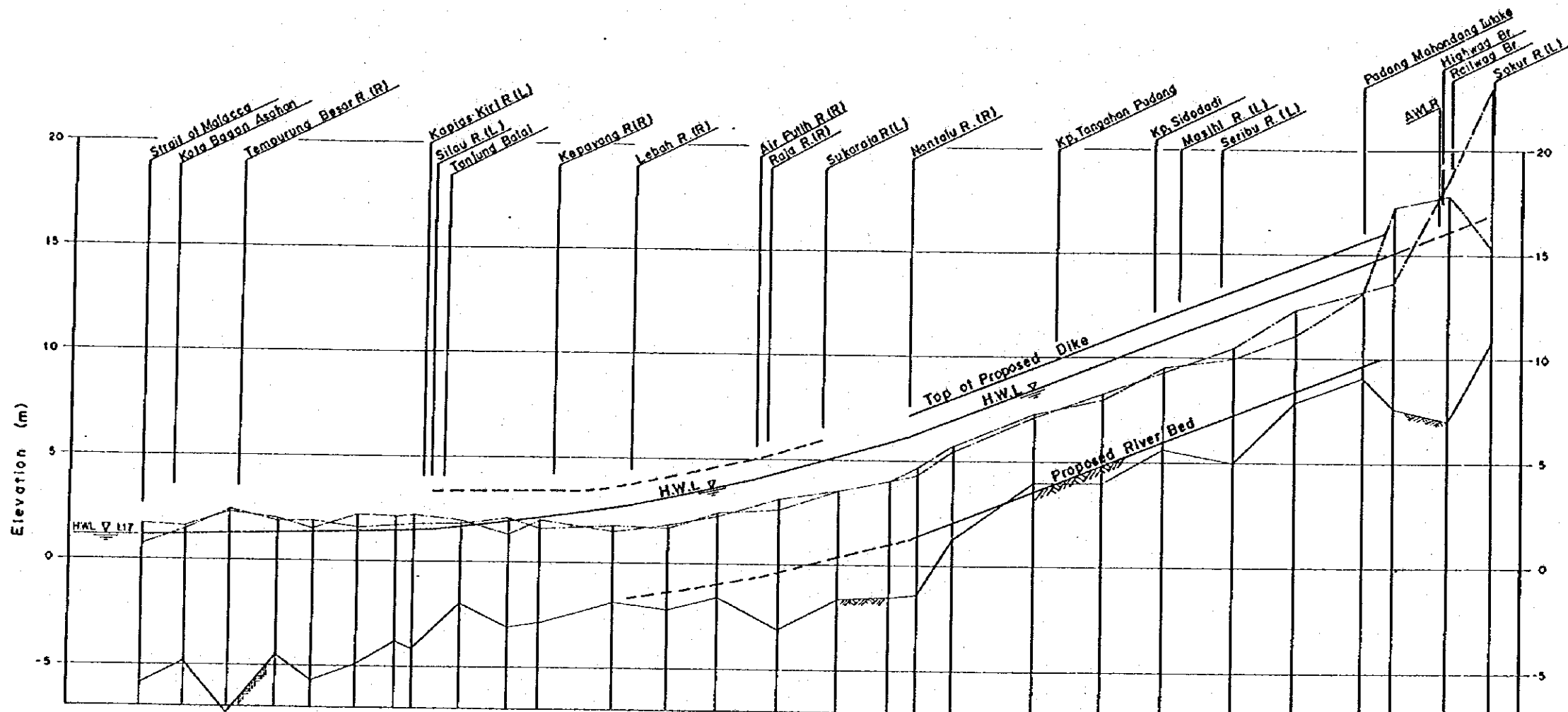
Key Map



LEGEND

Residential area		Main road		Cutoff channel	
Paddy field		Road		Bank protection	
Swamp area		Railway		Intake structure/ Drainage culvert	
a. Forest		Stream		Section number P185	
b. Bush		Dike			
a. Oil palm		Existing			
b. Coconut palm		Long-term plan			
		Urgent plan			

MINISTRY OF PUBLIC WORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
 PLAN OF PROJECT  
 Asahan River (5/5)  
 JAPAN INTERNATIONAL COOPERATION AGENCY DWG. NO. I-5

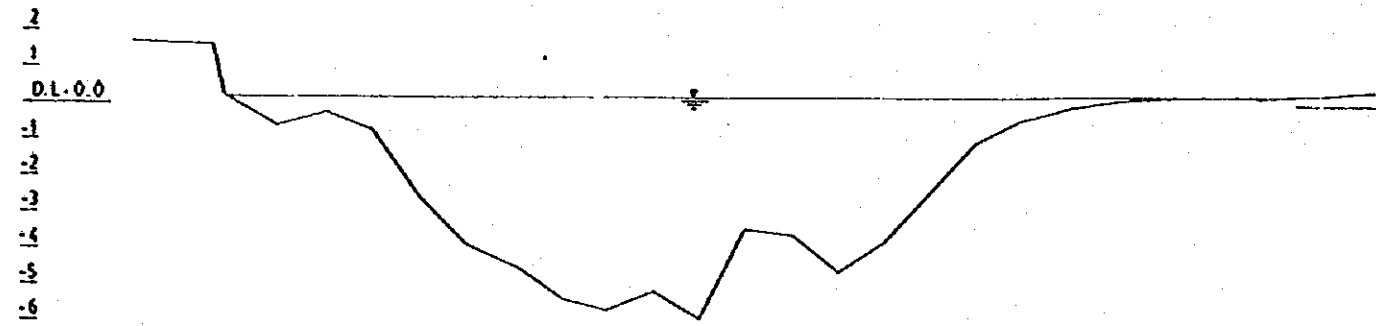


- LEGEND**
- - - - - : Top of Existing Left Dike
  - ..... : Top of Existing Right Dike
  - : Left Bank
  - : Right Bank
  - : Lowest River Bed
  - : Proposed Dike

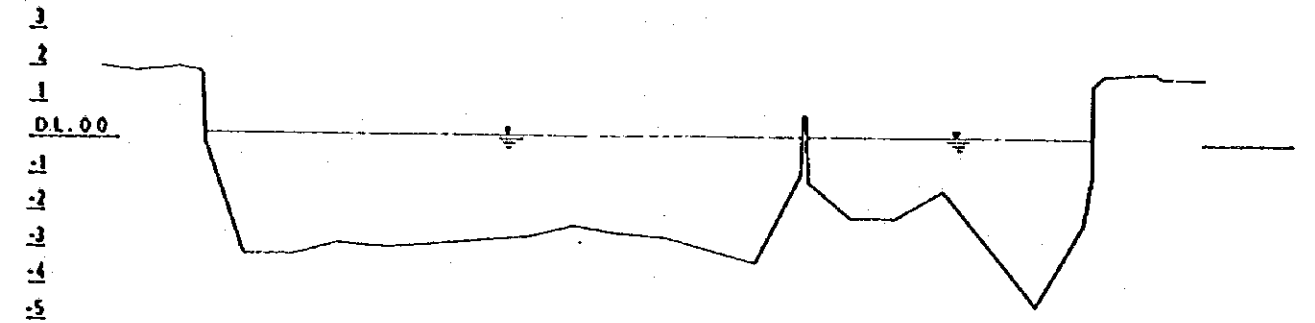
Design Flood Discharge (m <sup>3</sup> /s)	1200		750		Retarding Basin		100																										
Gradient of H.W.L.	1/7400		1/6800		1/4600		1/3500		1/2550																								
Gradient of Channel Bed			1/6000		1/3900				1/2550																								
Top of Proposed Levee (El.m)																																	
Proposed H.W.L. (El.m)	1.17		1.43	1.637	1.922	2.119	2.20	2.604	2.70	3.116	3.631	4.00	4.343	5.151	5.841	6.10	6.274	7.93	8.43	9.693	10.837	13.12	14.265	15.529									
Proposed Channel Bed (El.m)																																	
Distance (m)	0000	2090	4200	6400	8100	10250	12050	12860	13700	15010	17340	18800	1940	22190	22800	24740	27100	28800	30000	32800	35200	36100	36540	38200	42000	45200	48100	51350	54250	57450	58900	61450	63600
Section NO.	A 307	A 296	A 216	A 176	A 131	A 91	A 50	A 35	P 0	P 10	P 19	P 39	P 82	P 100	P 121	P 141	P 156	P 165	P 185	P 210	P 238	P 260	P 290	P 300	P 323	P 333	P 346	P 360					

MINISTRY OF PUBLICWORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
**PROPOSED PROFILE**  
 Asahan River  
 JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. I-6

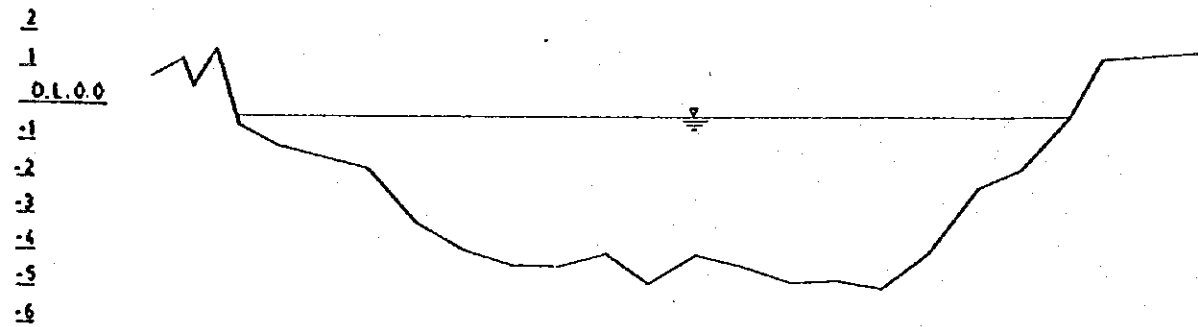
A 307



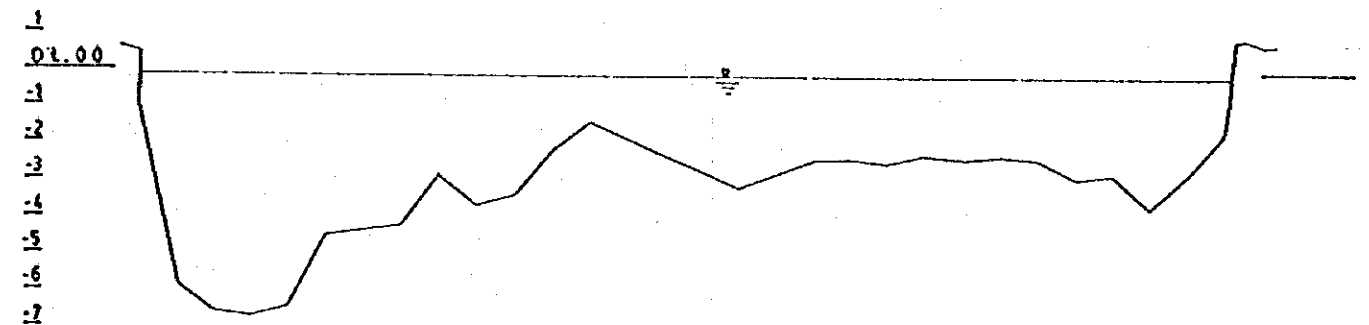
A 176



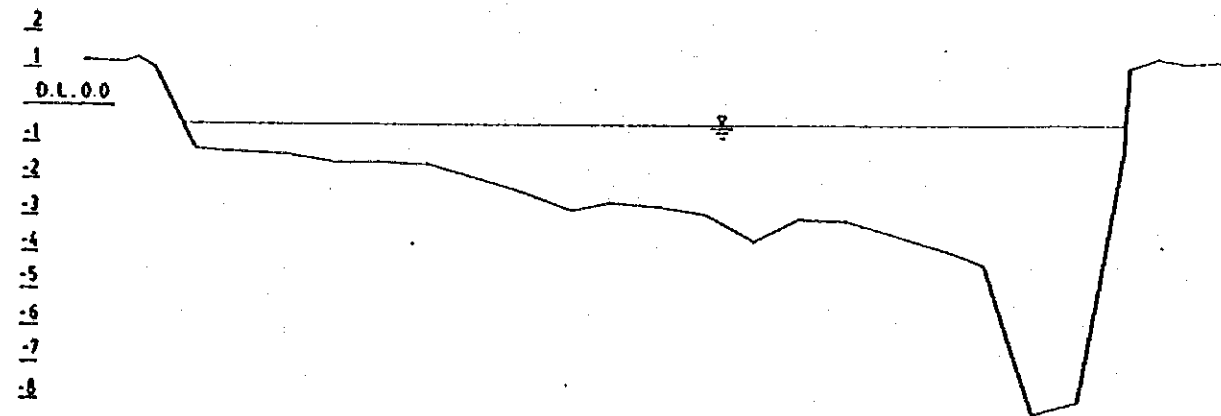
A 258



A 131



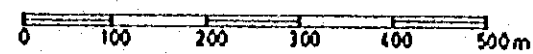
A 216



**LEGEND**

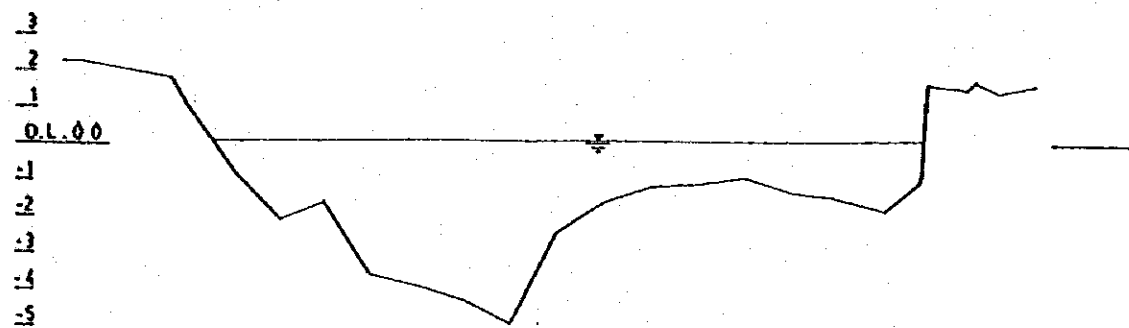
- : EXISTING
- - - : LONG-TERM PLAN
- : URGENT PLAN

Scale

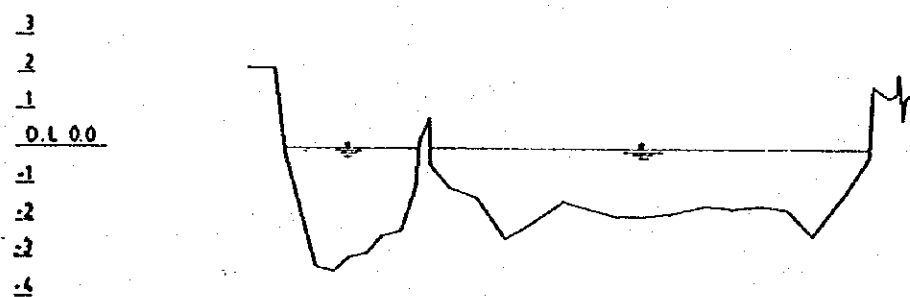


MINISTRY OF PUBLICWORKS	
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT	
MASTER PLAN STUDY ON	
LOWER ASAHAN RIVER BASIN DEVELOPMENT	
PROPOSED CROSS-SECTION	
Asahan River (1/6)	
JAPAN INTERNATIONAL COOPERATION AGENCY	DWG. No. I-7

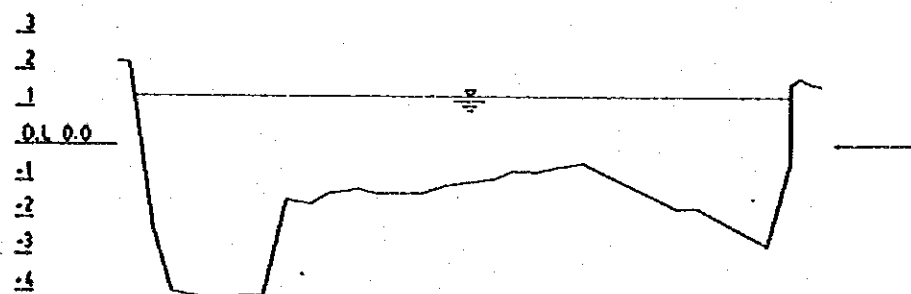
A 81



A 50

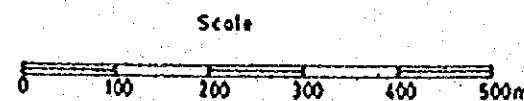


A 35

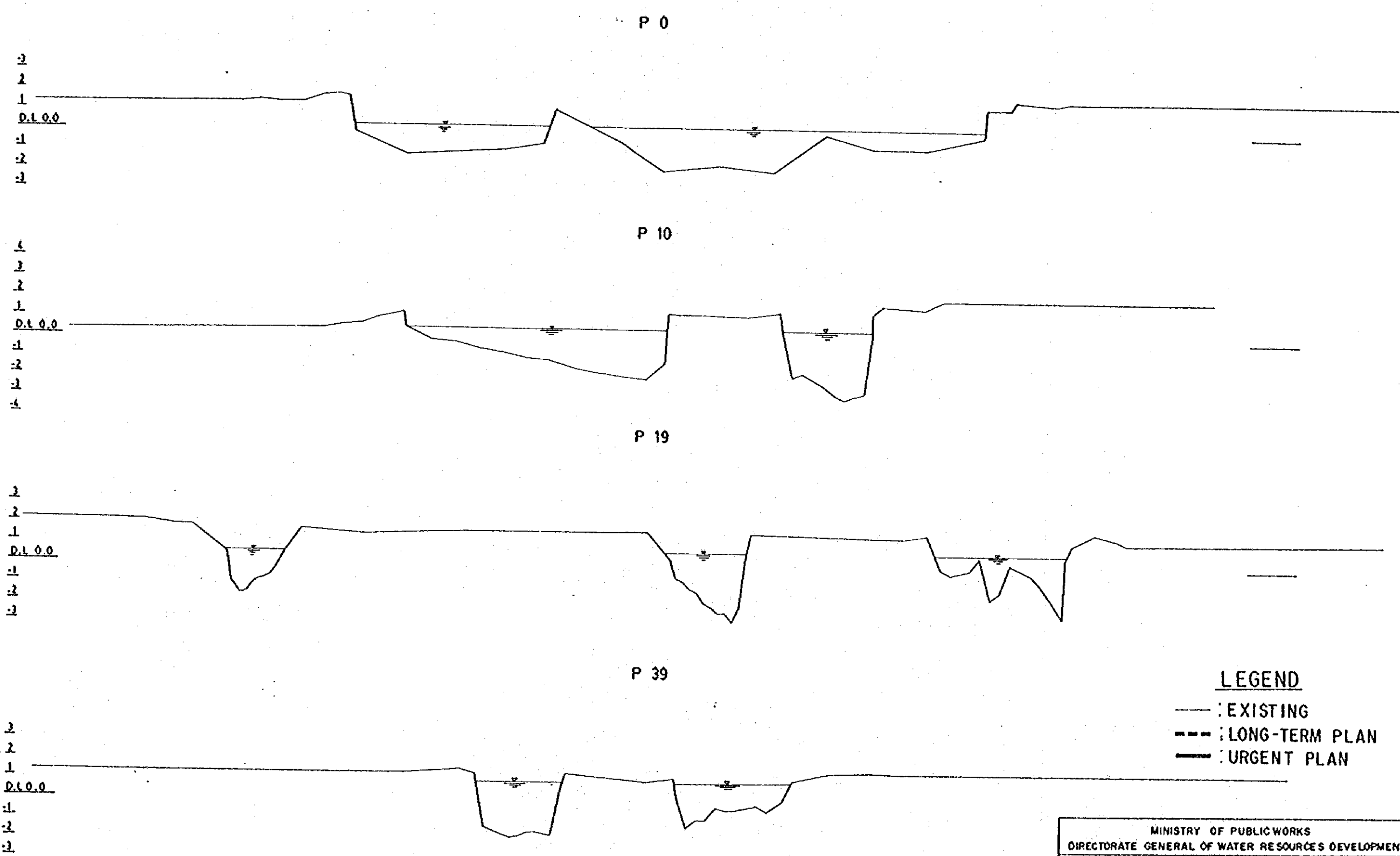


**LEGEND**

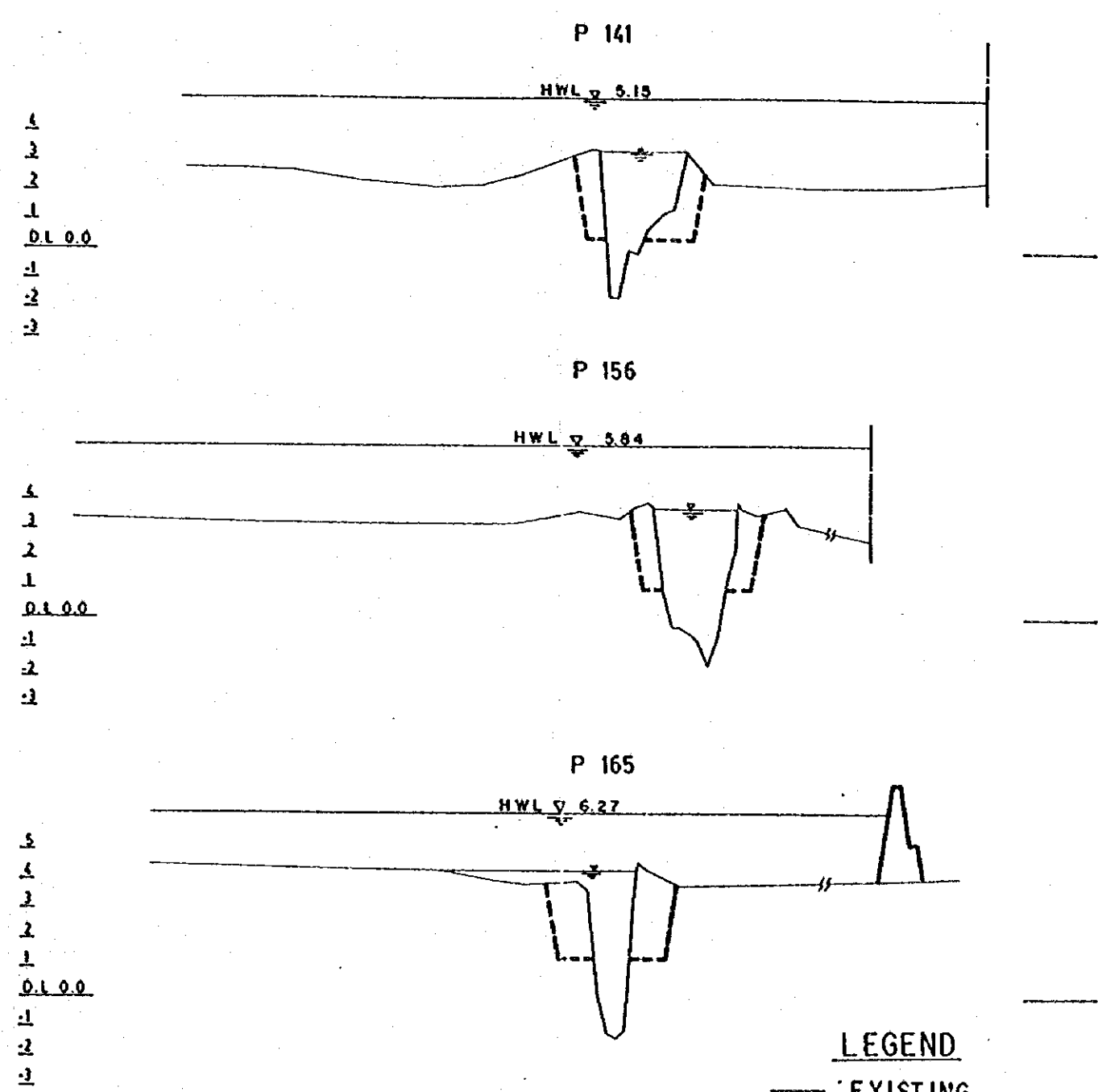
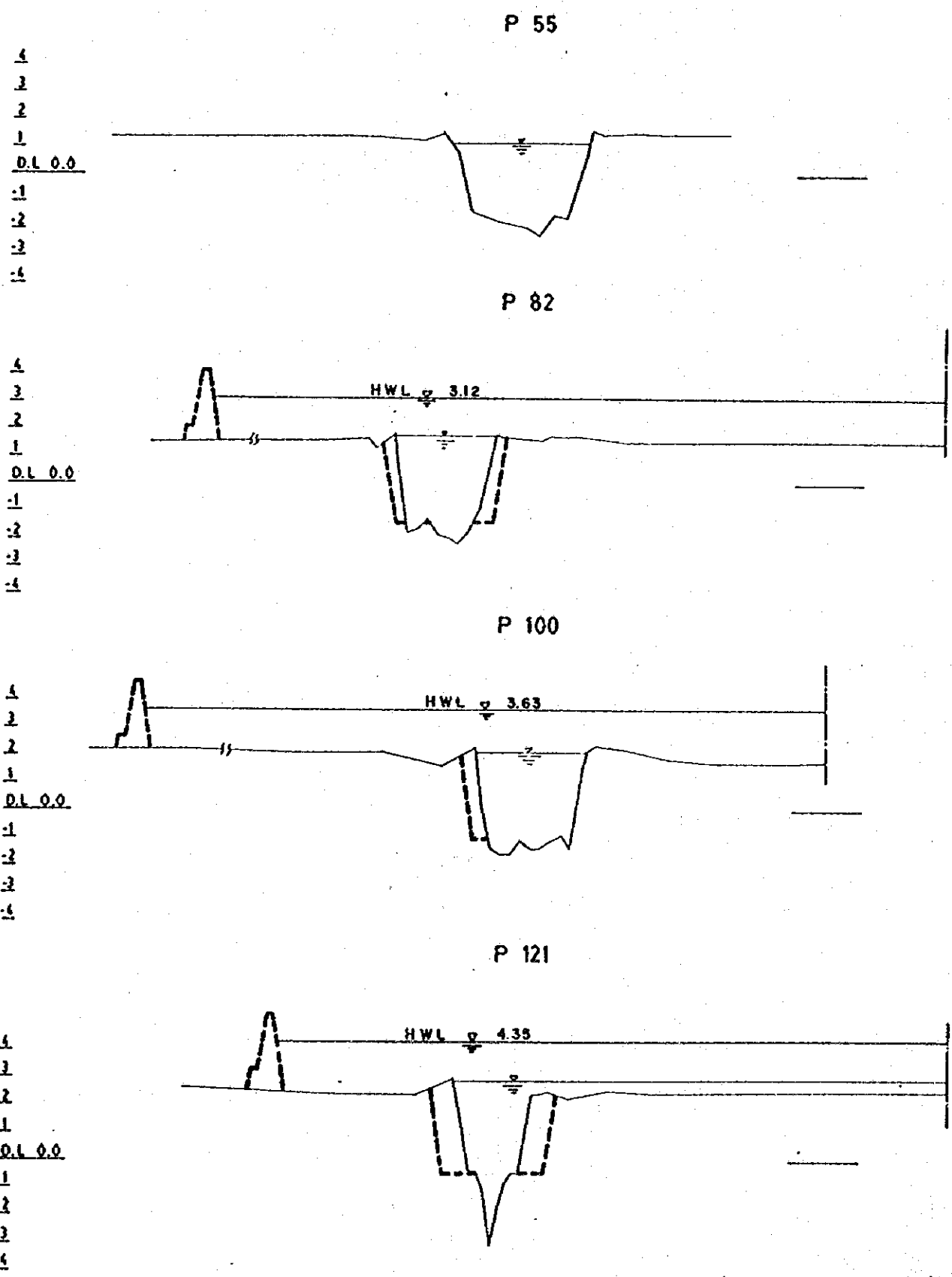
- : EXISTING
- - - : LONG-TERM PLAN
- : URGENT PLAN



MINISTRY OF PUBLIC WORKS	
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT	
MASTER PLAN STUDY ON	
LOWER ASAHAN RIVER BASIN DEVELOPMENT	
PROPOSED CROSS-SECTION	
Asahan River (2/6)	
JAPAN INTERNATIONAL COOPERATION AGENCY	OWD NO. I-8



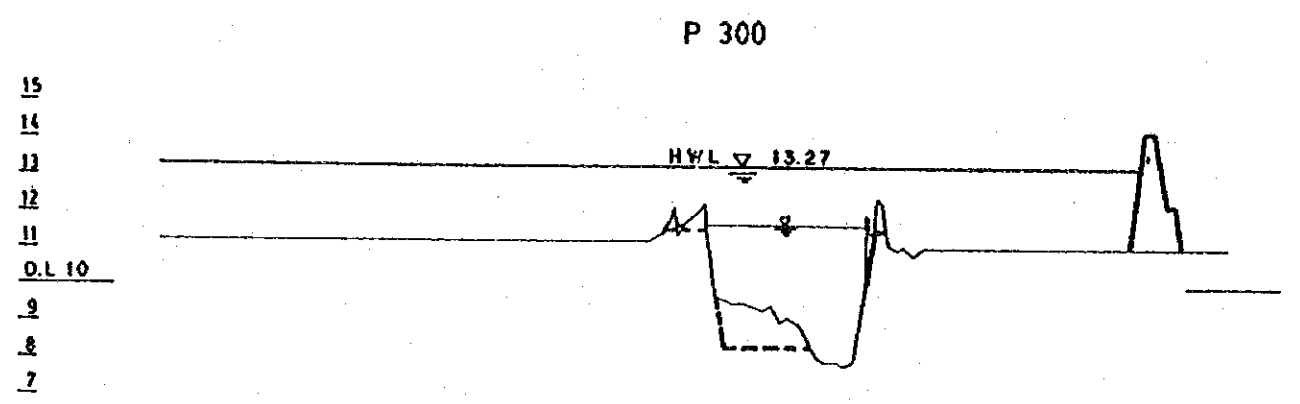
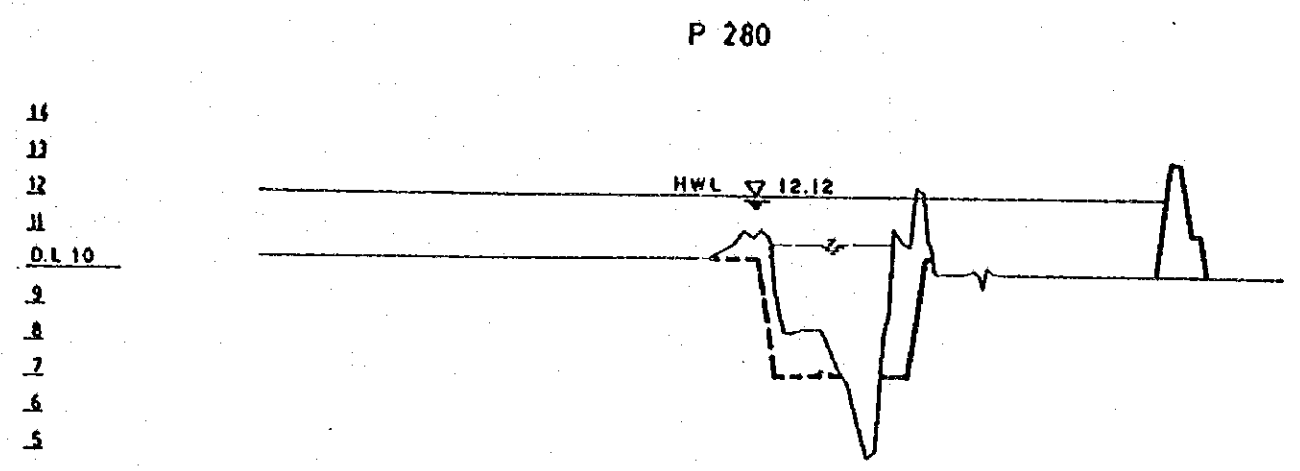
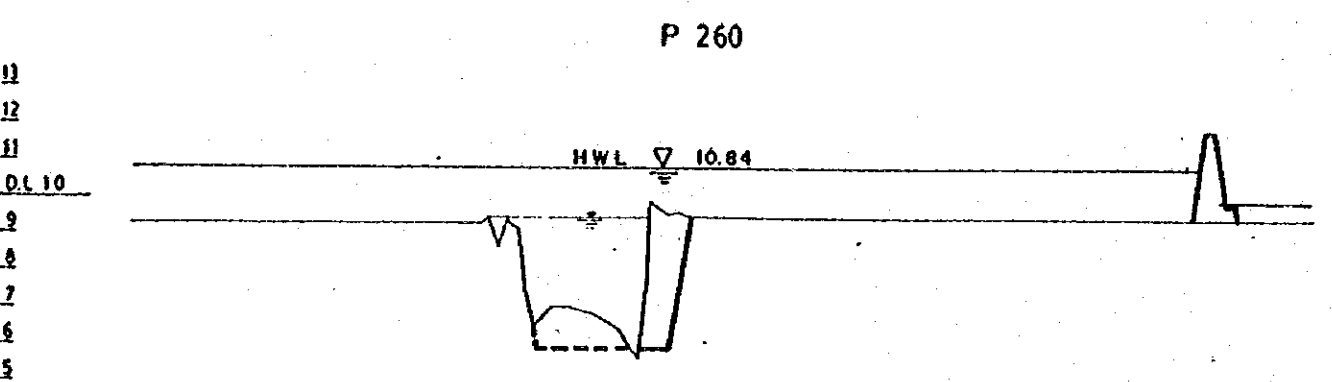
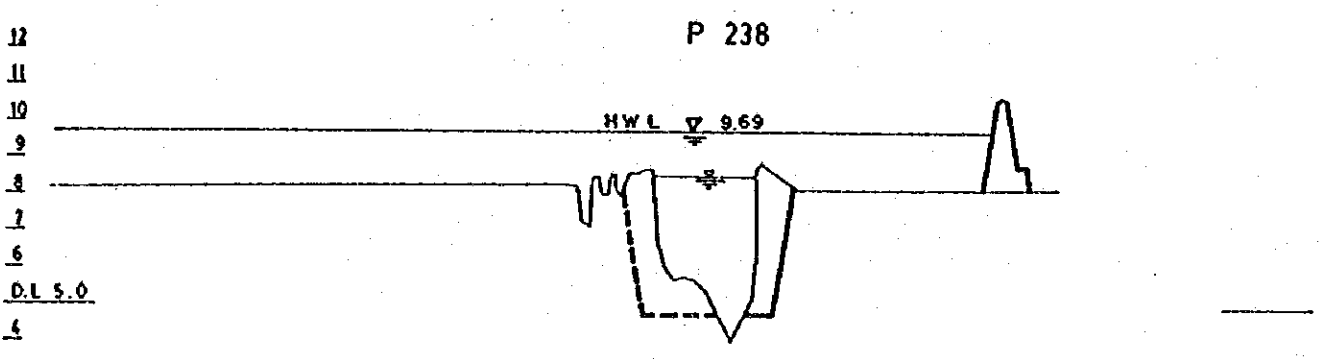
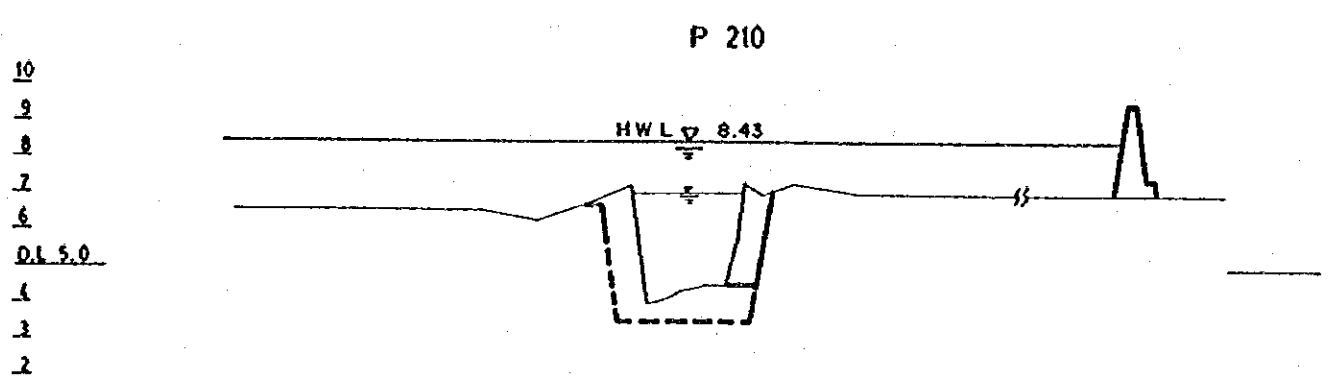
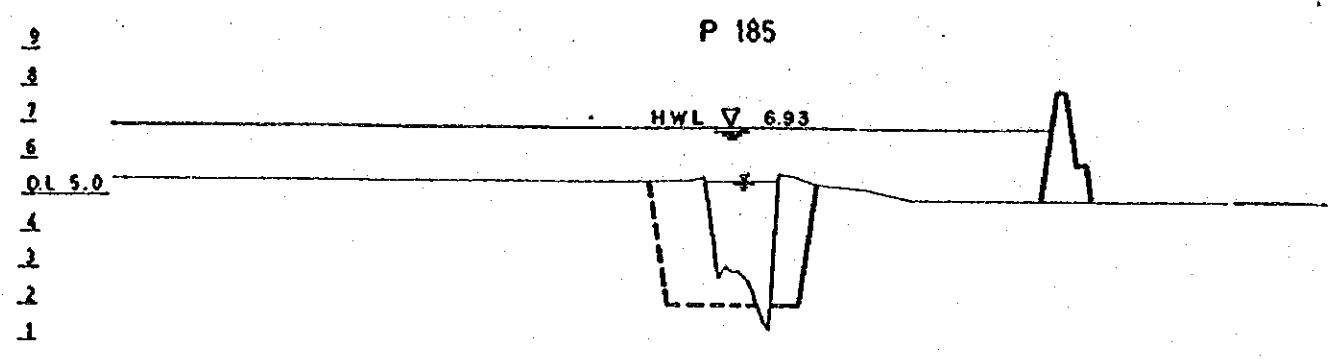
MINISTRY OF PUBLIC WORKS	
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT	
MASTER PLAN STUDY ON	
LOWER ASAHAN RIVER BASIN DEVELOPMENT	
PROPOSED CROSS-SECTION	
Asahan River (3/6)	
JAPAN INTERNATIONAL COOPERATION AGENCY	DWG. NO. I-9



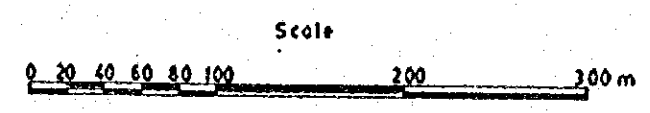
**LEGEND**  
 — : EXISTING  
 - - - : LONG-TERM PLAN  
 — : URGENT PLAN



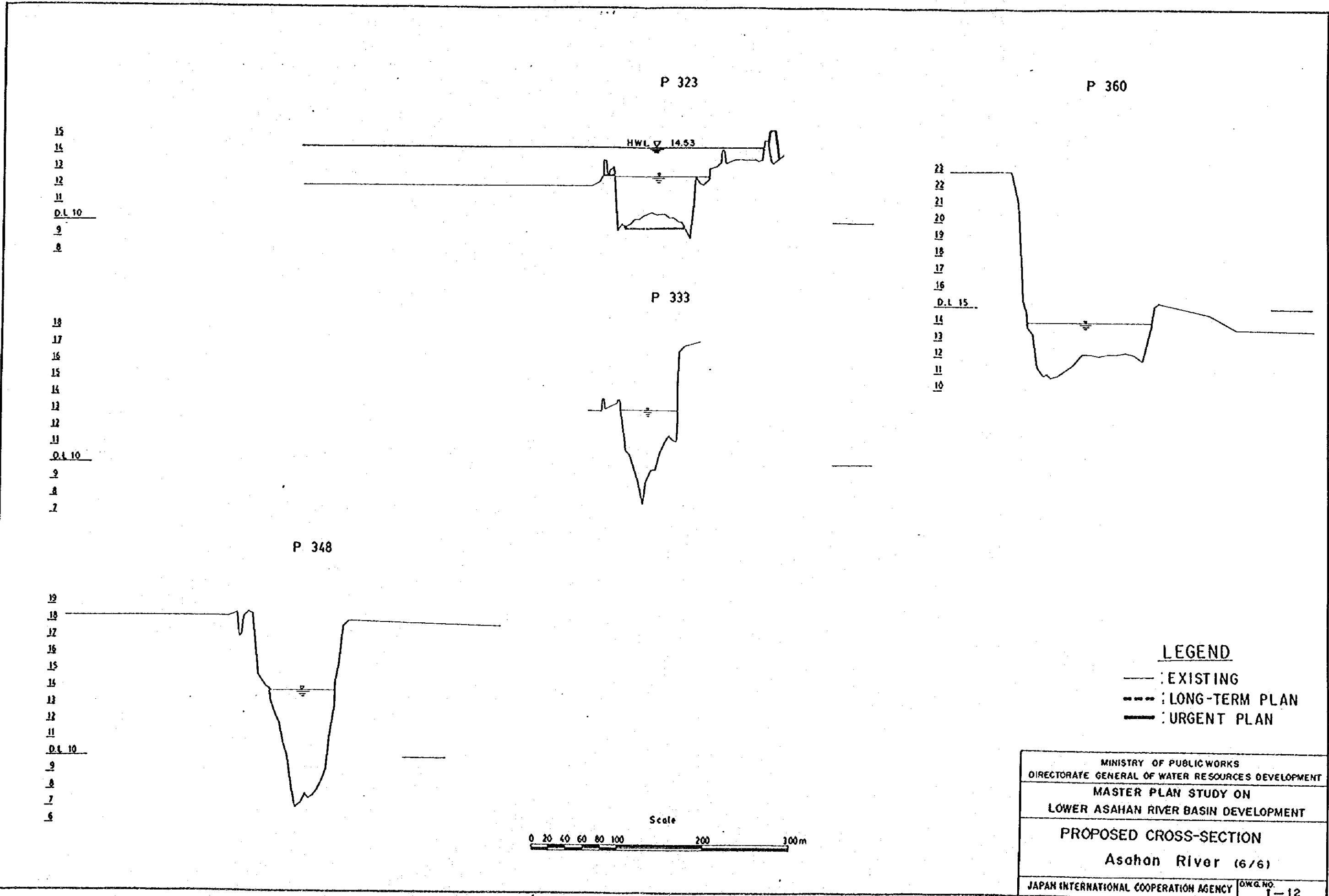
MINISTRY OF PUBLICWORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
 PROPOSED CROSS-SECTION  
 Asahan River (4/6)  
 JAPAN INTERNATIONAL COOPERATION AGENCY DWG. NO.  
 I-10



- LEGEND**
- : EXISTING
  - - - : LONG-TERM PLAN
  - : URGENT PLAN



MINISTRY OF PUBLIC WORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
 PROPOSED CROSS-SECTION  
 Asahan River (5/6)  
 JAPAN INTERNATIONAL COOPERATION AGENCY DWG. NO. I-11

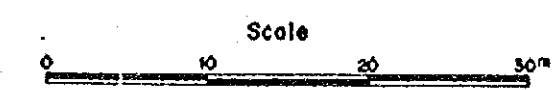
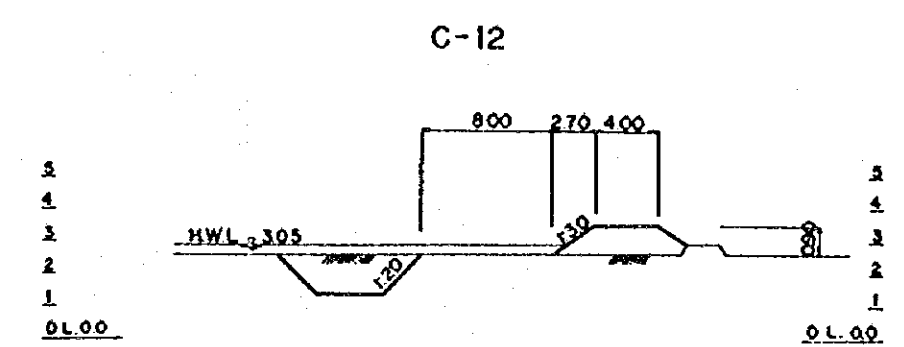
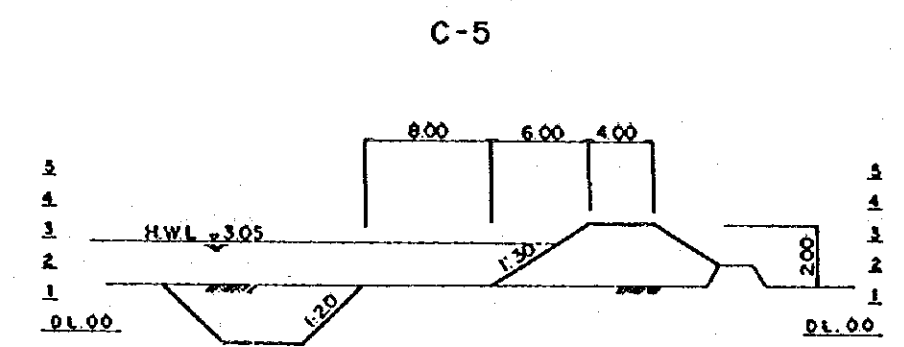
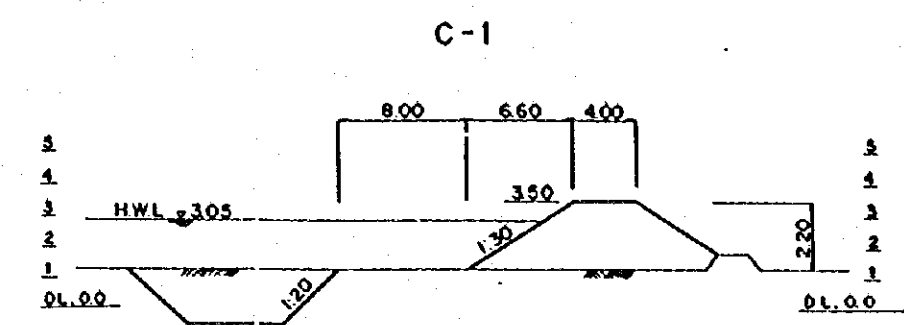
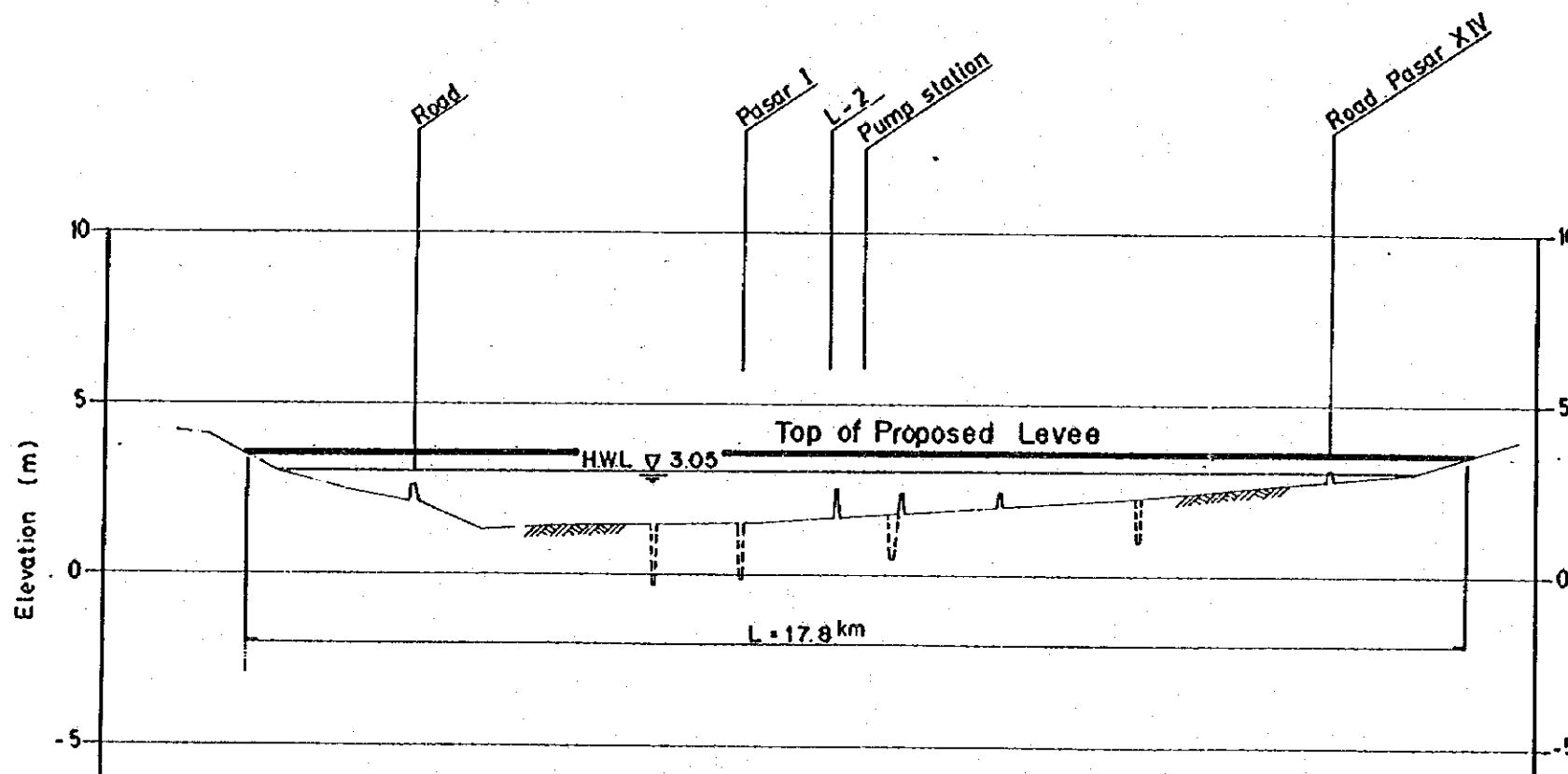


**LEGEND**

- : EXISTING
- - - : LONG-TERM PLAN
- (thick) : URGENT PLAN

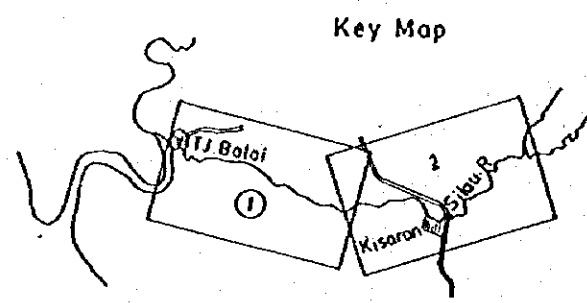
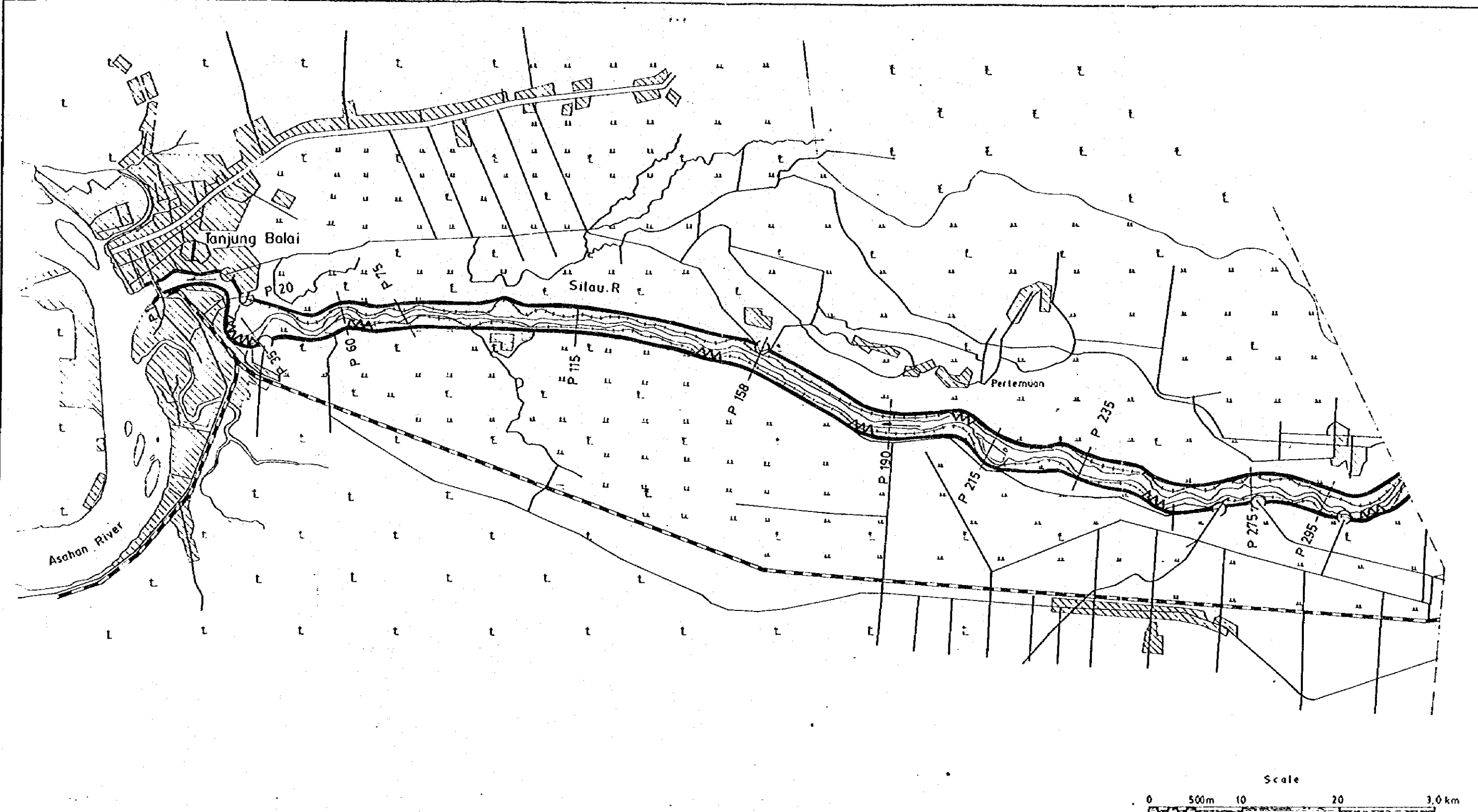
MINISTRY OF PUBLIC WORKS	
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT	
MASTER PLAN STUDY ON	
LOWER ASAHAN RIVER BASIN DEVELOPMENT	
PROPOSED CROSS-SECTION	
Asahan River (6/6)	
JAPAN INTERNATIONAL COOPERATION AGENCY	OWG. NO. I-12





Top of Proposed Levee (EL.m)				3.50	3.50	3.50				3.50						3.50				3.50
Proposed H.W.L (EL.m)				3.05	3.05	3.05				3.05						3.05				3.05
Ground Hight (EL.m)	4.0	3.0	2.5	2.1	1.3	1.4				1.5					2.2				2.8	
Distance (Km)	-3.00	-2.00	-1.00	0	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00
Section No	-3	-2	-1	C 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

MINISTRY OF PUBLICWORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
 PROPOSED PROFILE  
 AND CROSS-SECTION  
 Asahan Retarding Basin  
 JAPAN INTERNATIONAL COOPERATION AGENCY DWG. NO. I-13

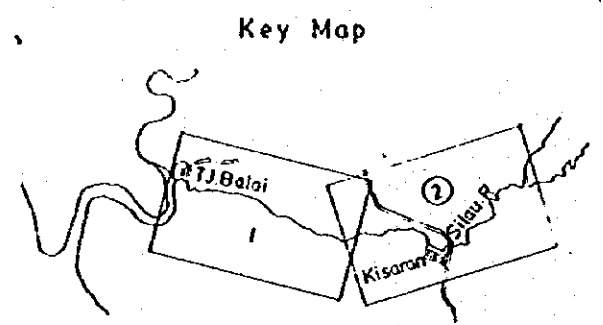
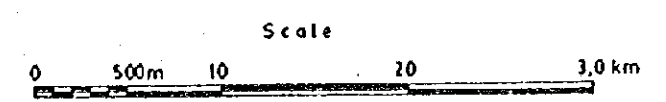
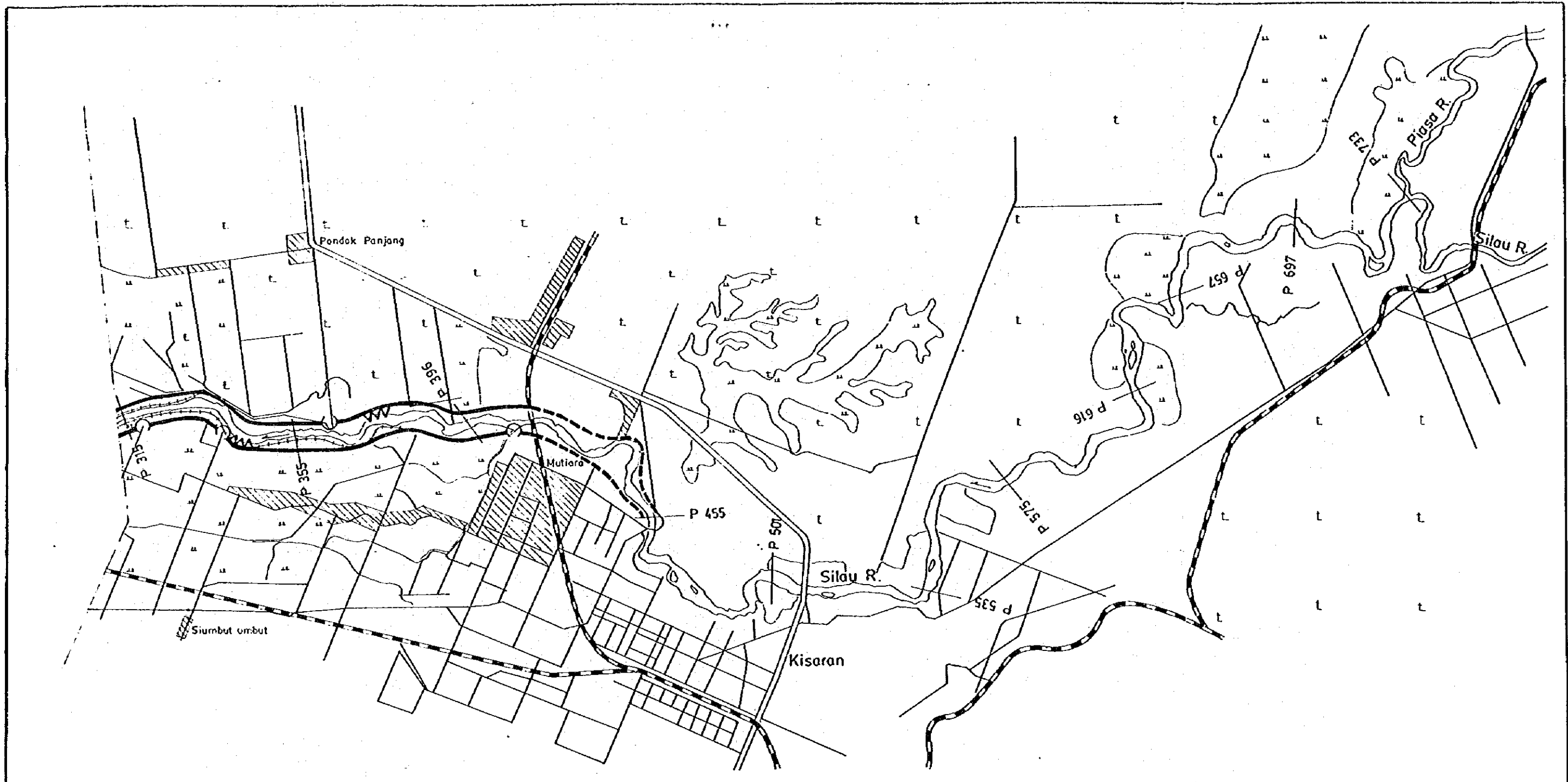


**LEGEND**

Residential area		Main road		Cutoff channel	
Paddy field		Road		Bank protection	
Swamp area		Railway		Intake structure/ Drainage culvert	
a. Forest		Stream		Section number P155	
b. Bush		Dike			
a. Oil palm		Existing			
b. Coconut palm		Long-term plan			
		Urgent plan			

MINISTRY OF PUBLIC WORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
 PLAN OF PROJECT  
 Silau River (1/2)  
 JAPAN INTERNATIONAL COOPERATION AGENCY

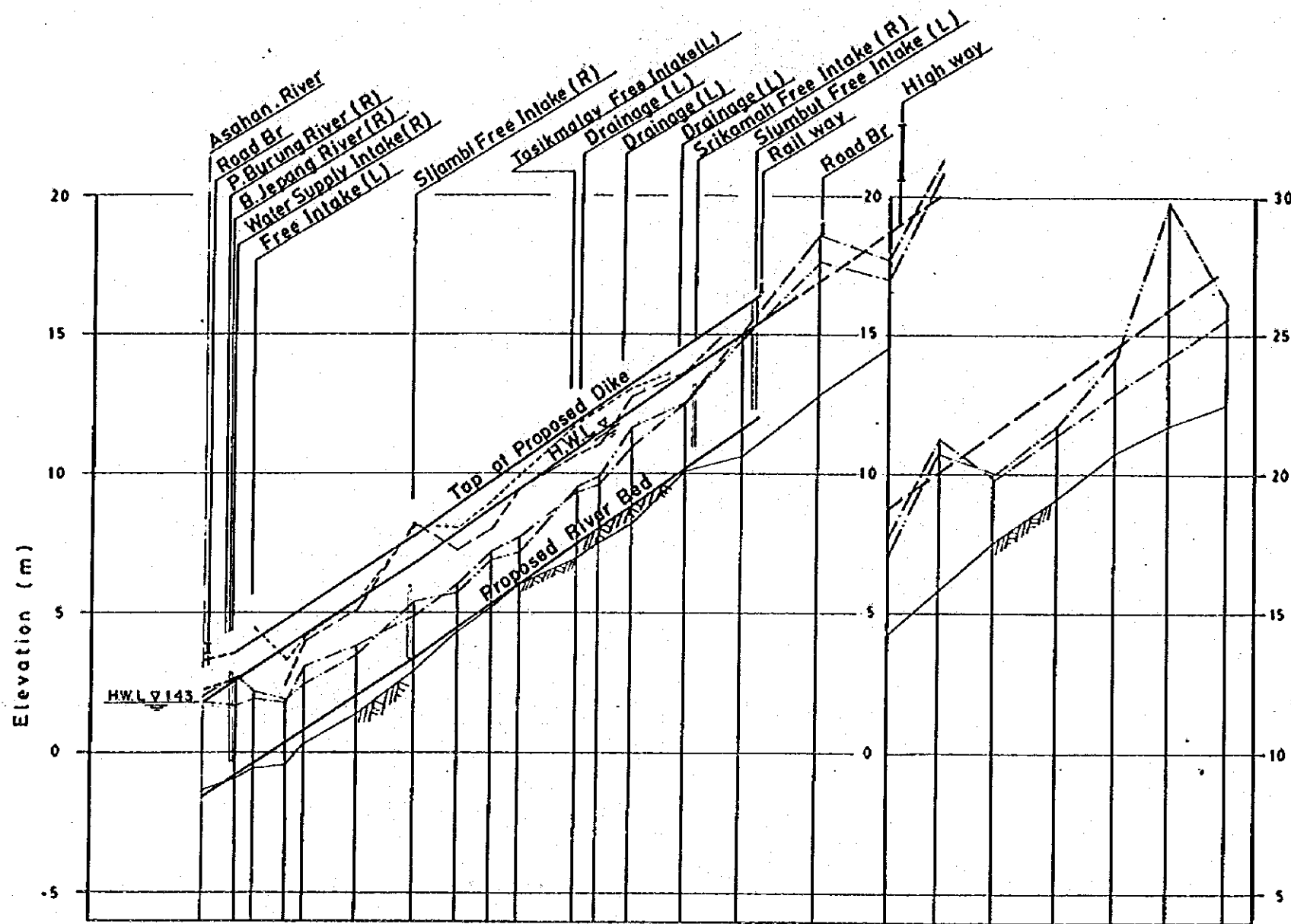
OWG. NO.  
I-14



**LEGEND**

Residential area		Main road		Cutoff channel	
Paddy field		Road		Bank protection	
Swamp area		Railway		Inlet structure/Drainage culvert	
a. Forest		Stream		Section number P185	
b. Bush		Dike			
a. Oil palm		Existing			
b. Coconut palm		Long-term plan			
		Urgent plan			

MINISTRY OF PUBLIC WORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
 PLAN OF PROJECT  
 Silau River (2/2)  
 JAPAN INTERNATIONAL COOPERATION AGENCY DWG NO. I-15

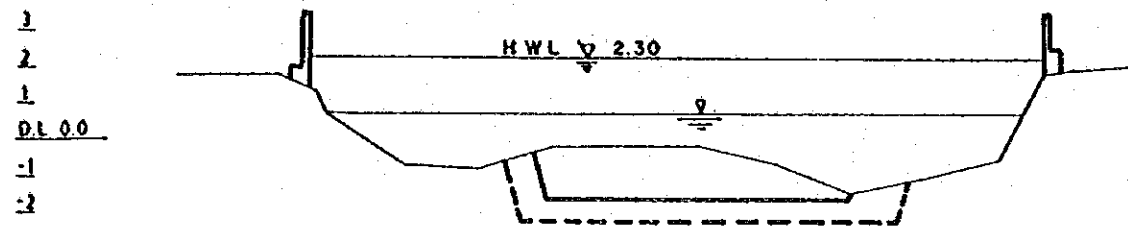


- LEGEND**
- : Top of Existing Left Dike
  - ..... : Top of Existing Right Dike
  - : Left Bank
  - : Right Bank
  - : Lowest River Bed
  - : Proposed Dike

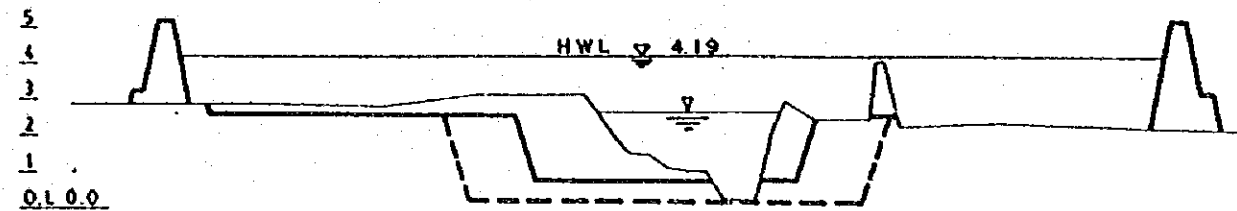
Design Flood Discharge (m <sup>3</sup> /s)	600																						
Gradient of H.W.L	1/1000	1/1500										1/1400											
Gradient of Channel Bed	1/1500										1/1400												
Top of Proposed Levee (El.m)	3.30	3.60	4.00	4.76	5.187	6.413	7.747	8.814	9.733	10.447	11.876	12.447	13.247	14.604	15.990								
Proposed H.W.L (El.m)	2.30	2.60	3.00	3.76	4.187	5.413	6.747	7.814	8.733	9.447	10.876	11.447	12.247	13.604	14.990								
Proposed Channel Bed (El.m)	-1.60	-0.80	-0.40	0.36	0.787	2.013	3.347	4.418	5.433	6.047	7.476	8.047	8.847	10.204	11.590								
Distance (m)	0.000	1.200	1.800	2.940	3.580	5.420	7.420	9.020	10.200	11.200	13.200	14.000	15.120	17.020	18.960	21.660	24.150	25.930	27.930	30.130	32.200	34.130	36.170
Section NO	P 1	20	35	60	75	115	158	190	215	235	275	295	315	355	396	455	501	535	575	616	657	697	733

MINISTRY OF PUBLIC WORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
**PROPOSED PROFILE**  
 Silau River  
 JAPAN INTERNATIONAL COOPERATION AGENCY

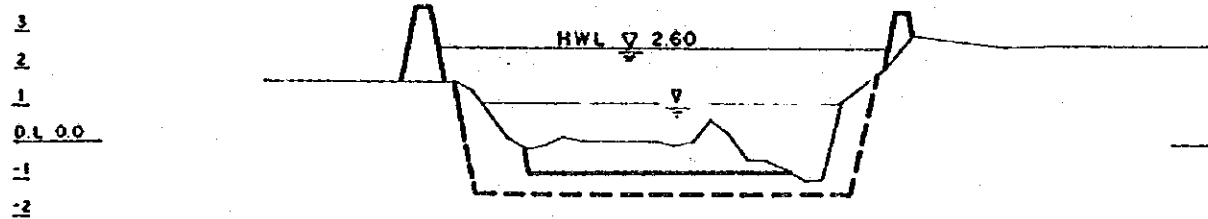
P.1



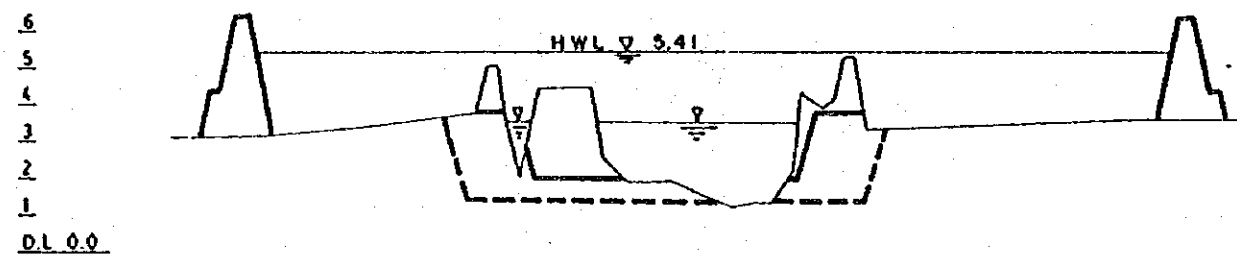
P.75



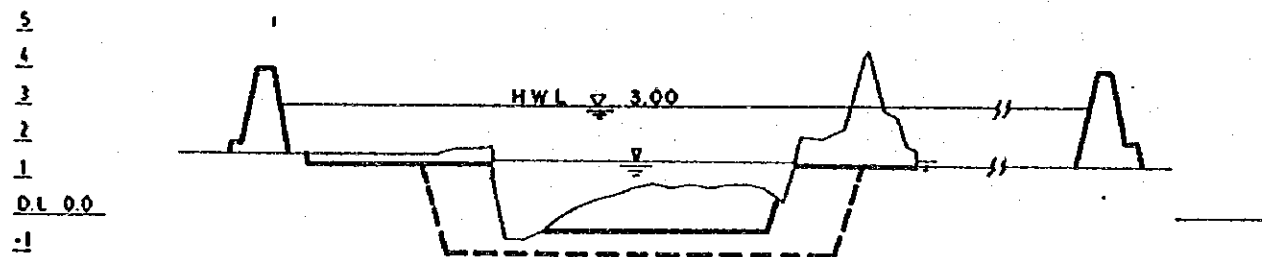
P.20



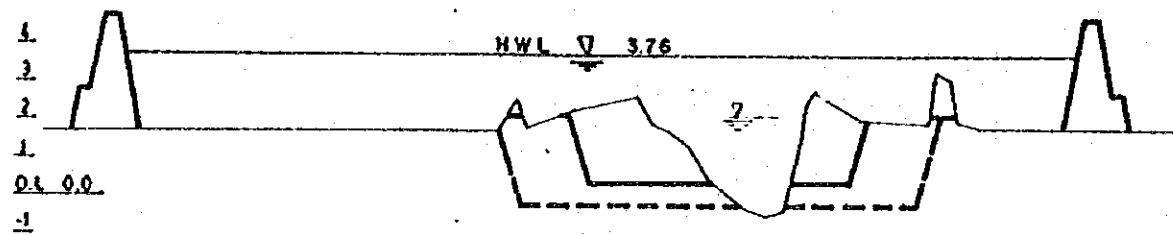
P.115



P.35



P.60



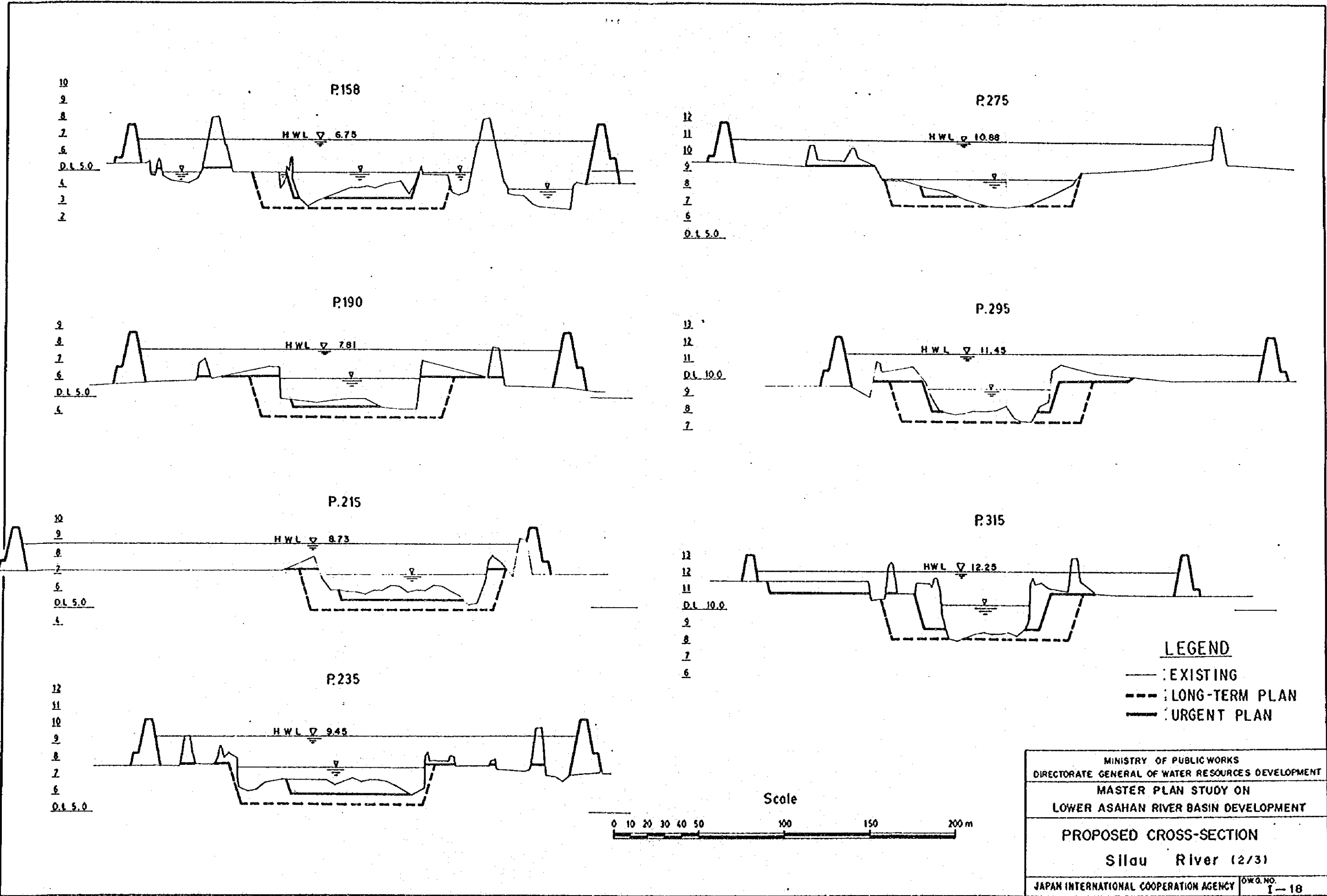
LEGEND

- : EXISTING
- - - : LONG-TERM PLAN
- : URGENT PLAN

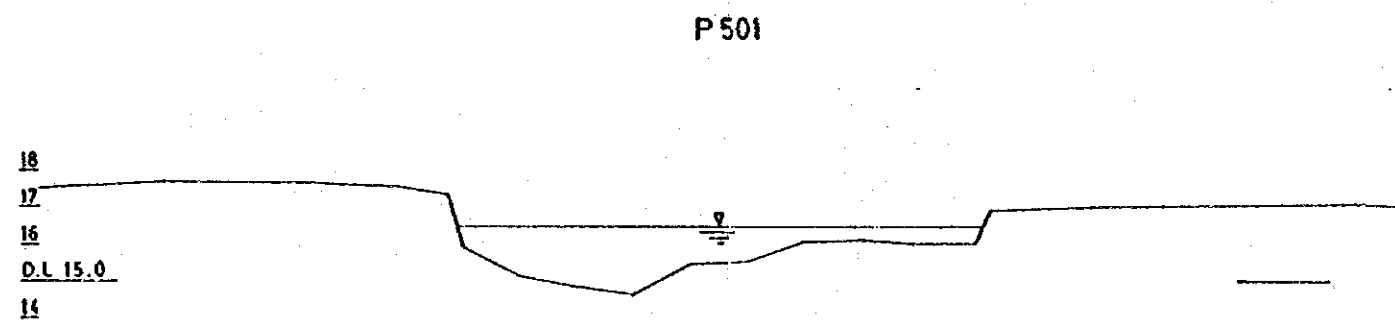
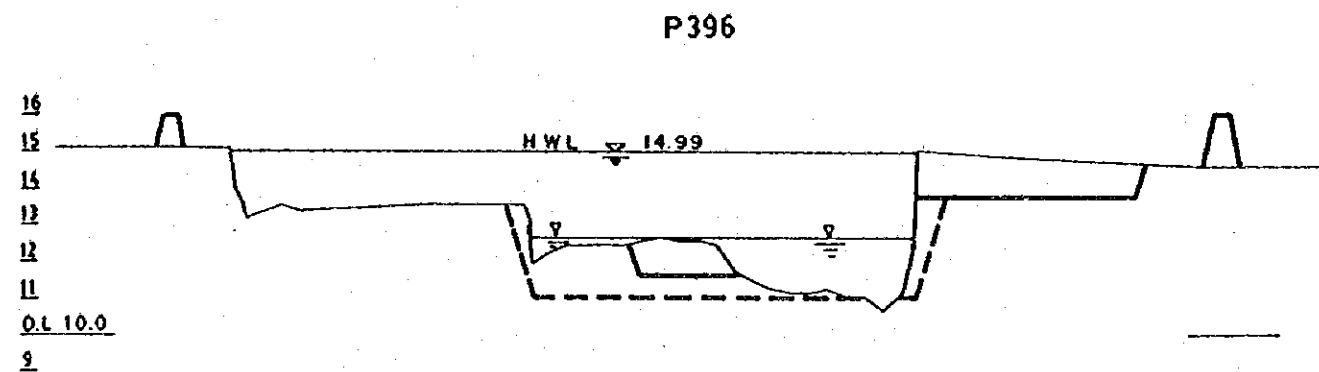
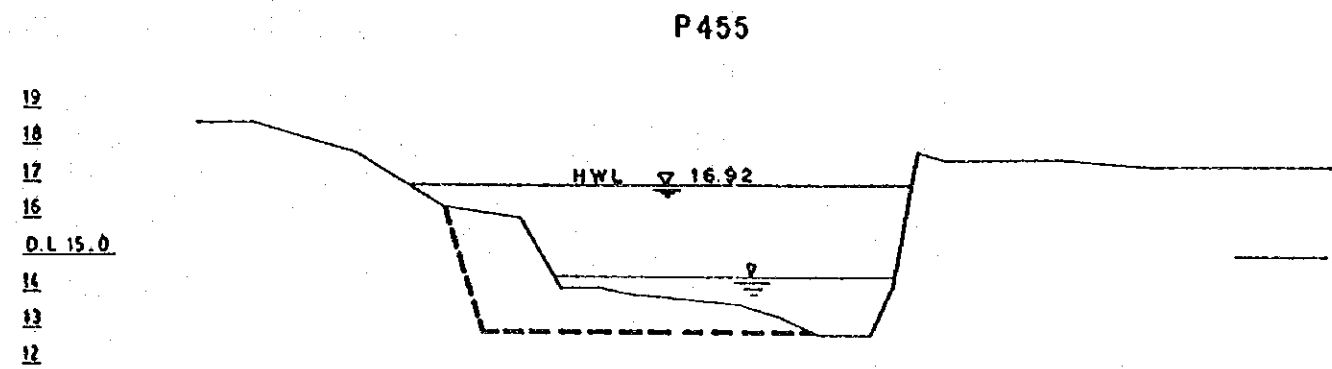
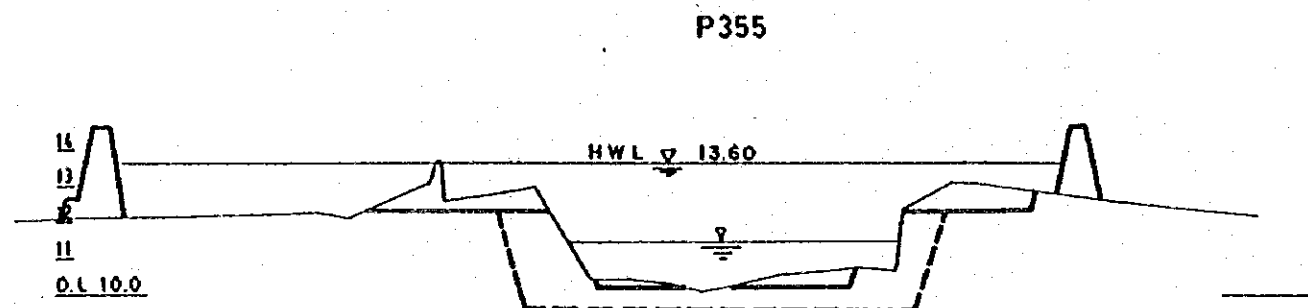
Scale



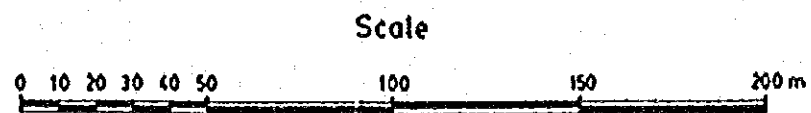
MINISTRY OF PUBLICWORKS DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
MASTER PLAN STUDY ON LOWER ASAHAN RIVER BASIN DEVELOPMENT
PROPOSED CROSS-SECTION Sllau River (1/3)
JAPAN INTERNATIONAL COOPERATION AGENCY <small>OWG NO.</small> I-17



MINISTRY OF PUBLIC WORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
 PROPOSED CROSS-SECTION  
 Silau River (2/3)  
 JAPAN INTERNATIONAL COOPERATION AGENCY OWG. NO. I-18



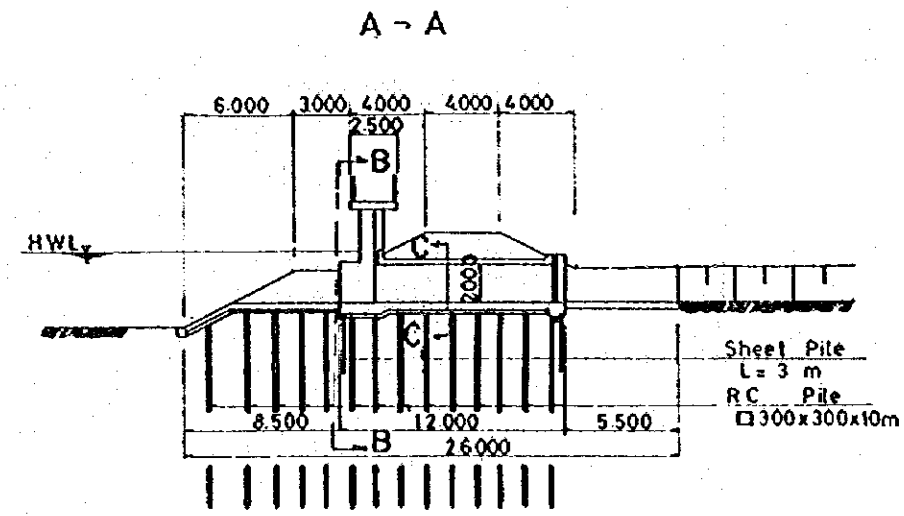
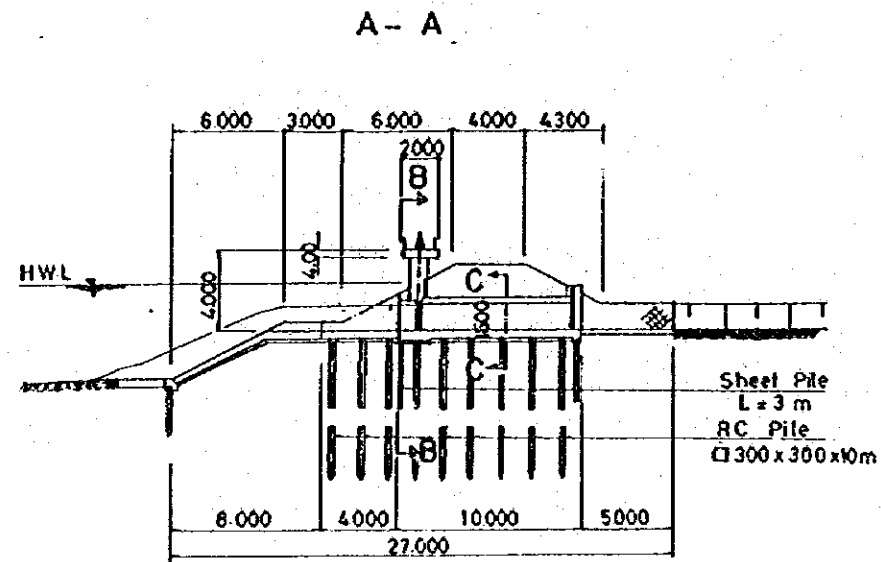
- LEGEND**
- : EXISTING
  - - - : LONG-TERM PLAN
  - (thick) : URGENT PLAN



MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
MASTER PLAN STUDY ON LOWER ASAHAN RIVER BASIN DEVELOPMENT
PROPOSED CROSS-SECTION Silau River (3/3)
JAPAN INTERNATIONAL COOPERATION AGENCY <small>OWG. NO.</small> 1-19

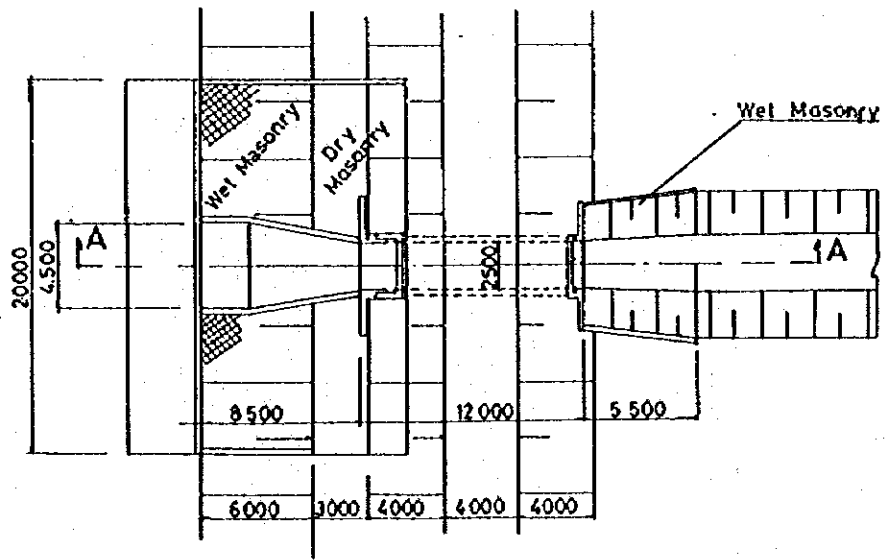
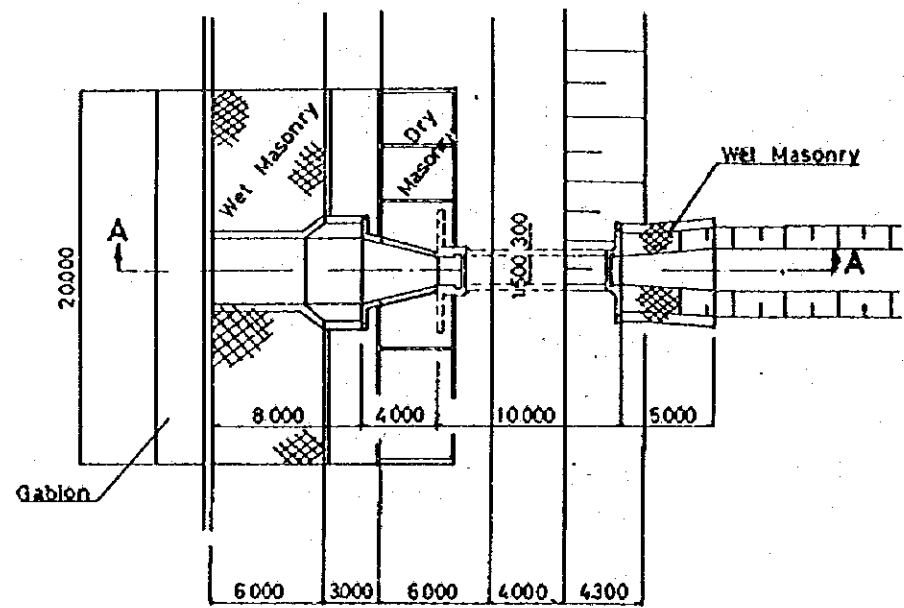
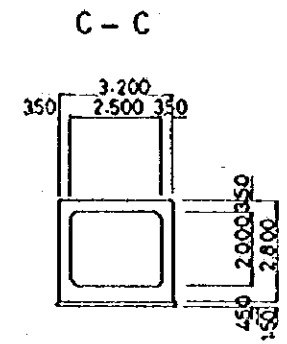
DRAINAGE CULVERT ( 1.5m x 1.5m )

DRAINAGE CULVERT ( 2.0m x 2.5m )

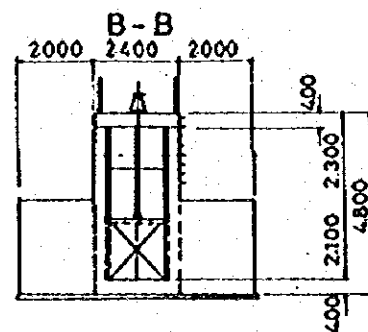
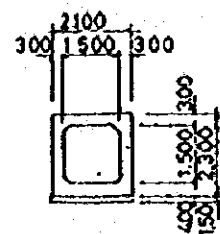


PLAN

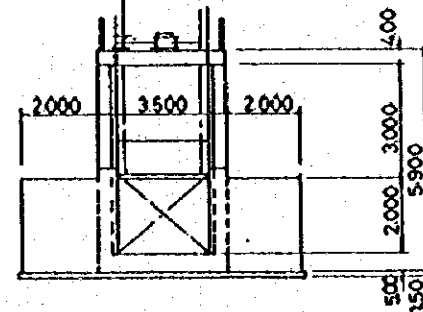
PLAN



C-C



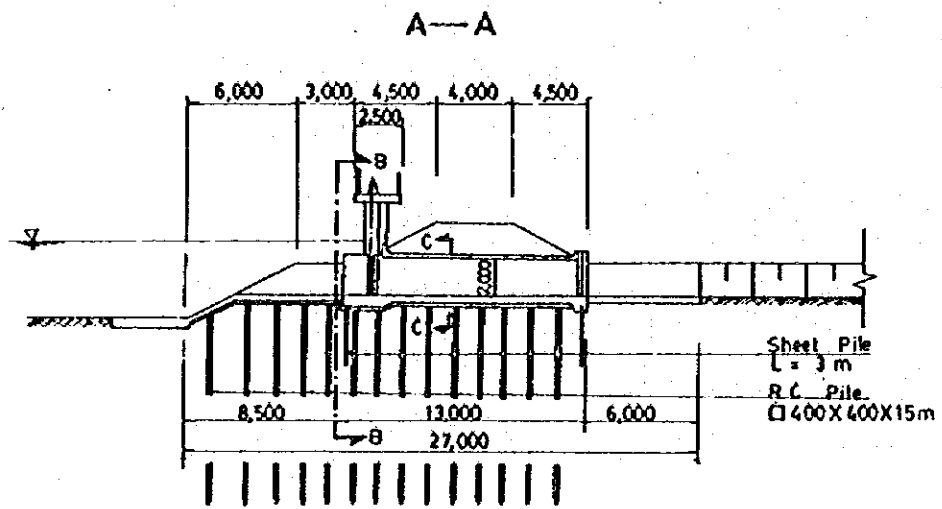
B-B



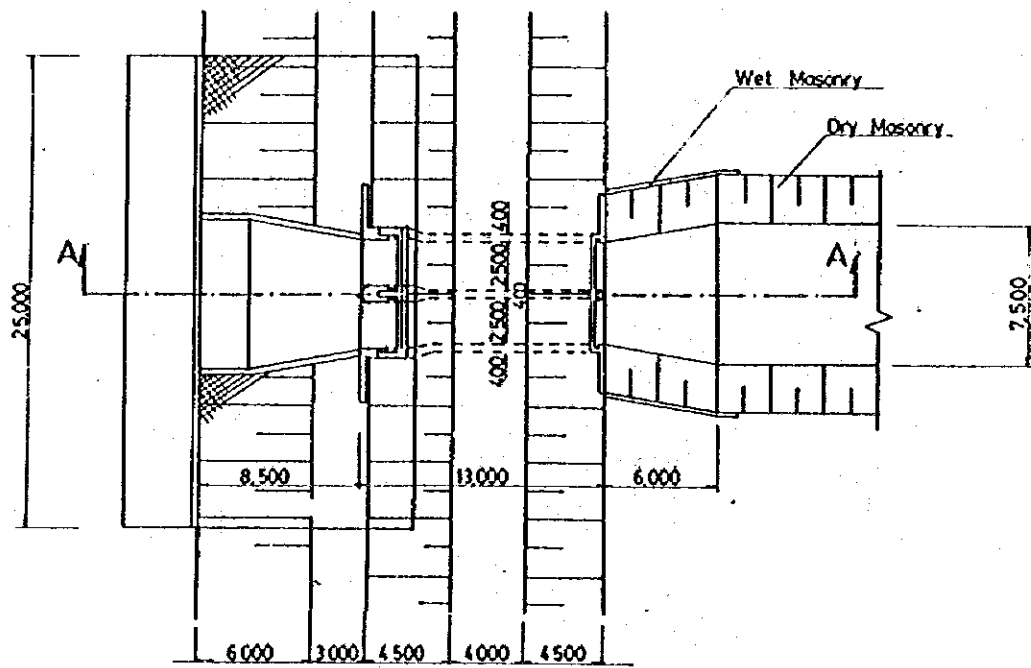
MINISTRY OF PUBLIC WORKS  
 DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT  
 MASTER PLAN STUDY ON  
 LOWER ASAHAN RIVER BASIN DEVELOPMENT  
**DRAINAGE CULVERT**  
 1.5m x 1.5m , 2.0m x 2.5m  
 JAPAN INTERNATIONAL COOPERATION AGENCY DWG. NO. 1-1



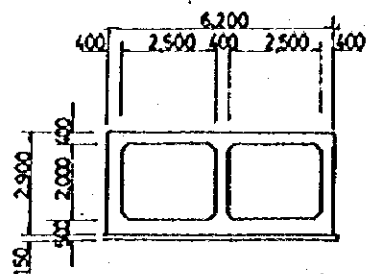
DRAINAGE CULVERT (2.0m x 2.5m x 2)



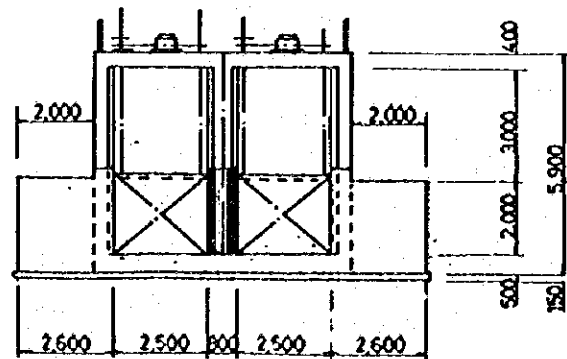
PLAN



C-C



B-B



MINISTRY OF PUBLIC WORKS	
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT	
MASTER PLAN STUDY ON	
LOWER ASAHAN RIVER BASIN DEVELOPMENT	
<b>DRAINAGE CULVERT</b>	
<b>2.0m X 2.5m X 2</b>	
JAPAN INTERNATIONAL COOPERATION AGENCY	OWG NO. II-2