資　料

資料 1.　調査団員・氏名
資料 2.　調査行程
資料 3.　関係者（面会者）リスト
資料 4.　討議議事録（M/D）
資料 5.　ソフトコンポーネント計画書
資料 6.　概略設計図

1. 調査団員・氏名

第 1 回現地調査時（期間：2023 年 6 月 7 日～7 月 27 日）

氏　名	担　当	所　属	備考
南谷　太一	総括	独立行政法人 国際協力機構 地球環境部 防災グループ 防災第一チーム 課長	
坂井田　輝	企画協力	独立行政法人 国際協力機構 地球環境部 防災グループ 防災第一チーム	
松下　剛	業務主任者／河川計画	株式会社建設技研インターナショナル	
進藤　宙	副業務主任者／河川改修（設計）	株式会社建設技研インターナショナル	
内田　善久	水文・水理観測	株式会社国際気象コンサルタント	
松村　剛志	データモニタリングシステム	株式会社国際気象コンサルタント	
片岡　大河	河川改修（施工計画／積算）(2)	株式会社建設技研インターナショナル	
山内　悠太	環境社会配慮	株式会社建設技研インターナショナル	

第 2 回現地調査時（期間：2023 年 9 月 18 日～11 月 9 日）

氏　名	担　当	所　属	備考
坂井田　輝	企画協力	独立行政法人 国際協力機構 地球環境部 防災グループ 防災第一チーム	
松下　剛	業務主任者／河川計画	株式会社建設技研インターナショナル	
進藤　宙	副業務主任者／河川改修（設計）	株式会社建設技研インターナショナル	
内田　善久	水文・水理観測	株式会社国際気象コンサルタント	
松村　剛志	データモニタリングシステム	株式会社国際気象コンサルタント	
佐々木　則之	機材計画／調達計画／積算	株式会社国際気象コンサルタント	
小野　隆	河川改修（施工計画／積算）(1)	株式会社建設技研インターナショナル	
片岡　大河	河川改修（施工計画／積算）(2)	株式会社建設技研インターナショナル	
山内　悠太	環境社会配慮	株式会社建設技研インターナショナル	

概略設計説明調査時（機材）（期間：2024 年 3 月 4 日～3 月 14 日）

氏　名	担　当	所　属	備考
南谷　太一	総括	独立行政法人 国際協力機構 地球環境部 防災グループ 防災第一チーム 課長	
坂井田　輝	企画協力	独立行政法人 国際協力機構 地球環境部 防災グループ 防災第一チーム	
内田　善久	水文・水理観測	株式会社国際気象コンサルタント	
松村　剛志	データモニタリングシステム	株式会社国際気象コンサルタント	

概略設計説明調査時（土木）（期間：2024 年 6 月 26 日～7 月 4 日）

氏　名	担　当	所　属	備考
南谷　太一	総括	独立行政法人 国際協力機構 地球環境部 防災グループ 防災第一チーム 課長	
坂井田　輝	企画協力	独立行政法人 国際協力機構 地球環境部 防災グループ 防災第一チーム	
松下　剛	業務主任者／河川計画	株式会社建設技研インターナショナル	
進藤　宙	副業務主任者／河川改修（設計）	株式会社建設技研インターナショナル	
内田　善久	水文・水理観測	株式会社国際気象コンサルタント	
山内　悠太	環境社会配慮	株式会社建設技研インターナショナル	

2. 調査行程

第 1 回現地調査時（期間：2023 年 6 月 7 日～7 月 27 日）

No.	Date	Day	Team Leader	Planning Management	Consultant's PM / River Planning	River Improvement (Design)	River Improvement (Construction Planning, Cost Estimation) (2)	Environmental and Social Consideration	Hydrologic and Hydraulic Observation	Data Monitoring System
			MINAMITANI Taichi	SAKAIDA Hikaru	MATSUSHITA Tsuyoshi	SHINDO Oki	KATAOKA Taiga	YAMAUCHI Yuta	UCHIDA Yoshihisa	MATSUMURA Takeshi
1	7-Jun	Wed							★	
2	8-Jun	Thu							Meeting with JICA	
3	9-Jun	Fri							Meeting with PMD and FFC	
4	10-Jun	Sat							Meeting & Work	
5	11-Jun	Sun							Meeting & Work	
6	12-Jun	Mon							Site Survey (Central Data Management Centre Islamabad)	
7	13-Jun	Tue							Site Survey (Central Data Management Centre Islamabad)	
8	14-Jun	Wed							Site Survey (Central Data Management Centre Lahore)	
9	15-Jun	Thu							Meeting & Work	
10	16-Jun	Fri							Meeting & Work	
11	17-Jun	Sat			★				Meeting & Work	
12	18-Jun	Sun			Meeting & Work				Meeting & Work	
13	19-Jun	Mon			Meeting with FFC				Field Survey	
14	20-Jun	Tue			Meeting with PID-KP				Field Survey	
15	21-Jun	Wed			Move to Lahore				Field Survey	
16	22-Jun	Thu			Meeting WAPDA, Move to ISB	Meeting with WAPDA			Field Survey	
17	23-Jun	Fri			Meeting with FFC	Meeting with Punjab PID			Meeting with FFC and NDMA	
18	24-Jun	Sat			Meeting & Work				Meeting & Work	
19	25-Jun	Sun			Meeting & Work	Move to Islamabad			Meeting & Work	
20	26-Jun	Mon			Meeting with NDMA				Site Survvey (Central Data Management Centre Islamabad)	
21	27-Jun	Tue			Meeting & Work				Meeting & Work	
22	28-Jun	Wed			Meeting & Work				Meeting & Work ●	Meeting & Work
23	29-Jun	Thu			Meeting & Work				Private	Meeting & Work
24	30-Jun	Fri			Meeting & Work				Private	Meeting & Work
25	1-Jul	Sat			Meeting & Work			★	Private	Meeting & Work
26	2-Jul	Sun			Meeting & Work				★	Meeting & Work
27	3-Jul	Mon			Meeting with ADB				Site Survvey (Central Data Management Centre Lahore)	
28	4-Jul	Tue			Meeting with EPA	Meeting & Work		Meeting with EPA	Field Survey	
29	5-Jul	Wed			Meeting with UNESCO, Stakeholder Meeting, Meeting with PID-KP				Stakeholder Meeting (FFC, WAPDA, PID, IRSA, PMD)	
30	6-Jul	Thu			Meeting with ADB				Field Survey	
31	7-Jul	Fri			Meeting & Work				Field Survey	
32	8-Jul	Sat			Meeting & Work				Field Survey	
33	9-Jul	Sun			Meeting & Work				Meeting & Work	
34	10-Jul	Mon			Meeting & Work				Field Survey	
35	11-Jul	Tue			Meeting & Work				Site Survey (PMD FFD Lahore)	
36	12-Jul	Wed		★	Meeting with EAD, WB				Meeting & Work	
37	13-Jul	Thu		Meeting & Work	Meeting & Work			●	Field Survey	
38	14-Jul	Fri		Meeting & Work	Meeting with UNDP				Survey (Central Data Management Centre Lahore)	
39	15-Jul	Sat		Meeting & Work	Meeting & Work				Meeting & Work	
40	16-Jul	Sun		Meeting & Work	Meeting & Work				Meeting & Work	
41	17-Jul	Mon		Meeting with FFC	Meeting with FFC				Meeting & Work	
42	18-Jul	Tue	★	Meeting with FFC	Meeting with FFC				Reporting to the Embassy of Japan in Pakistan, Reporting to the Chief of JICA Pakistan Office	
43	19-Jul	Wed	Meeting with FFC	Meeting with FFC	Meeting with FFC				▲	
44	20-Jul	Thu	Meeting & Work	Meeting & Work	Meeting & Work					
45	21-Jul	Fri	Reporting to the Embassy of Japan in Pakistan, Reporting to the Chief of JICA Pakistan Office, and M/D Signing Ceremony							
46	22-Jul	Sat	●	Meeting & Work	●					
47	23-Jul	Sun		Meeting & Work						
48	24-Jul	Mon		Meeting & Work						
49	25-Jul	Tue		Meeting & Work						
50	26-Jul	Wed		Meeting & Work						
51	27-Jul	Thu		●						

★Tokyo ⇒ Islamabad ●Islamabad ⇒ Tokyo ▲Lahore ⇒ Tokyo : Eid Holiday

第 2 回現地調査時（期間：2023 年 9 月 18 日～11 月 9 日）

No.	Date	Day	Planning Management	Consultant's PM / River Planning	River Improvement (Design)	River Improvement (Construction Planning, Cost Estimation) (1)	River Improvement (Construction Planning, Cost Estimation) (2)	Environmental and Social Consideration	Hydrologic and Hydraulic Observation	Data Monitoring System	Equipment Plan/Procurement Plan/Cost Estimation
			SAKAIDA Hikaru	MATSUSHITA Tsuyoshi	SHINDO Oki	ONO Takashi	KATAOKA Taiga	YAMAUCHI Yuta	UCHIDA Yoshihisa	MATSUMURA Takashi	SASAKI Noriyuki
1	18-Sep	Mon							★		
2	19-Sep	Tue							Field Survey in KP Province		
3	20-Sep	Wed							Field Survey in KP Province		
4	21-Sep	Thu							Field Survey in KP Province		
5	22-Sep	Fri							Meeting & Work		
6	23-Sep	Sat							Meeting & Work		
7	24-Sep	Sun							Meeting & Work		
8	25-Sep	Mon		★					Meeting & Work		
9	26-Sep	Tue		Meeting & Work					Meeting & Work		
10	27-Sep	Wed		Meeting & Work					Meeting & Work		
11	28-Sep	Thu		Meeting & Work					Meeting & Work		
12	29-Sep	Fri		Meeting & Work					Meeting & Work		
13	30-Sep	Sat		Meeting & Work			★		Meeting & Work		
14	1-Oct	Sun		Meeting & Work					Meeting & Work		
15	2-Oct	Mon		Field Survey in KP Province					Field Survey in Punjab Province		
16	3-Oct	Tue		Field Survey in KP Province					Field Survey in Punjab Province		
17	4-Oct	Wed		Field Survey in KP Province					Field Survey in Punjab Province		
18	5-Oct	Thu		Field Survey in KP Province					Meeting & Work		
19	6-Oct	Fri		Field Survey in KP Province					Meeting & Work		
20	7-Oct	Sat		Meeting & Work					Meeting & Work		★
21	8-Oct	Sun		Meeting & Work					Meeting & Work		
22	9-Oct	Mon		Meeting & Work					Meeting & Work		
23	10-Oct	Tue		Meeting & Work					Meeting & Work		
24	11-Oct	Wed		Meeting & Work					Meeting & Work		
25	12-Oct	Thu		Meeting & Work					Meeting & Work		
26	13-Oct	Fri		Meeting & Work					Meeting & Work		
27	14-Oct	Sat		Meeting & Work					Meeting & Work		
28	15-Oct	Sun		Meeting & Work					Meeting & Work		
29	16-Oct	Mon		Meeting & Work					Meeting & Work		
30	17-Oct	Tue		Meeting & Work					Meeting & Work		
31	18-Oct	Wed		Meeting & Work	●		Meeting & Work	★	Meeting & Work		
32	19-Oct	Thu		Meeting & Work	●		Meeting & Work		Meeting & Work		
33	20-Oct	Fri		Meeting & Work			Meeting & Work		Meeting & Work		
34	21-Oct	Sat		Meeting & Work			Meeting & Work		Meeting & Work		
35	22-Oct	Sun		Meeting & Work			Meeting & Work	Move to Lahore	Meeting & Work		
36	23-Oct	Mon		Meeting & Work			Meeting & Work	Meeting, Move to Islamabad	Meeting & Work		
37	24-Oct	Tue	★	Meeting & Work			Meeting & Work		Meeting & Work		
38	25-Oct	Wed	Meeting & Work	Bidding for Competitive Quotations			Bidding for Competitive Quotations		Meeting & Work		
39	26-Oct	Thu	M/D Meeting	M/D Meeting, Meeting with Local Subcontractors			M/D Meeting, Meeting with Local Subcontractors		M/D Meeting		
40	27-Oct	Fri	M/D Meeting	M/D Meeting, Meeting with Local Subcontractors			M/D Meeting, Meeting with Local Subcontractors		M/D Meeting	M/D Meeting ●	M/D Meeting
41	28-Oct	Sat	Meeting & Work				Meeting & Work		Meeting & Work	●	Meeting & Work
42	29-Oct	Sun	Meeting & Work				Meeting & Work		Meeting & Work		Meeting & Work
43	30-Oct	Mon	Field Survey in KP Province				Field Survey in KP Province		Meeting & Work		Meeting & Work●
44	31-Oct	Tue	Field Survey in KP Province				Field Survey in KP Province		Meeting & Work		●
45	1-Nov	Wed	Field Survey in KP Province				Field Survey in KP Province		Meeting & Work		
46	2-Nov	Thu	Reporting to the Chief of JICA Pakistan Office, Reporting to the Embassy of Japan in Pakistan, M/D Signing Ceremony				Reporting to the Chief of JICA Pakistan Office, Reporting to the Embassy of Japan in Pakistan, M/D Signing Ceremony				
47	3-Nov	Fri	Meeting with EAD	Meeting with EAD ●			Meeting with EAD ●		Meeting with EAD ●		
48	4-Nov	Sat	Field Survey	●			●		●		
49	5-Nov	Sun	Field Survey								
50	6-Nov	Mon	Field Survey								
51	7-Nov	Tue	Field Survey								
52	8-Nov	Wed	Field Survey ●								
53	9-Nov	Thu	●								

★Tokyo ⇒ Islamabad ●Islamabad ⇒ Tokyo ▲Lahore ⇒ Tokyo ■ : Eid Holiday

概略設計説明調査時（機材）（期間：2024 年 3 月 4 日～3 月 14 日）

No.	日付	曜日	水文・水理観測 内田 善久	データ モニタリング システム 松村 剛志
1	3/4	月	★	
2	3/5	火	調査業務及び協議	
3	3/6	水	ラホールにて調査業務及び協議	
4	3/7	木	調査業務及び協議	
5	3/8	金	調査業務及び協議	
6	3/9	土	調査業務及び協議	
7	3/10	日	調査業務及び協議	
8	3/11	月	調査業務及び協議	
9	3/12	火	調査業務及び協議	
10	3/13	水	調査業務及び協議 大使館、JICAパキスタン事務所へ報告 ●	
11	3/14	木	●	

★東京 ⇒ イスラマバード　　●イスラマバード ⇒ 東京

概略設計説明調査時（土木）（期間：2024 年 6 月 26 日～7 月 4 日）

The schedule of consultant team

June 26, 2024 to July 4, 2024

Date			CTII			IMC
			Tsuyoshi Matsushita Team Leader, River Planning, CTII	Oki Shindo Deputy Team Leader, River Improvement (Design), CTII	Yuta Yamauchi Environmental and Social Considerations, CTII	Yoshihisa Uchida Hydrological and Hydraulic Observation, IMC
	Date	Day	Activity Details			
1	2024/6/26	Wed	12:00 Narita TG643 16:30 Bangkok 19:00 Bangkok TG349 22:10 Islamabad	12:00 Narita TG643 16:30 Bangkok 19:00 Bangkok TG349 22:10 Islamabad	12:00 Narita TG643 16:30 Bangkok 19:00 Bangkok TG349 22:10 Islamabad	12:00 Narita TG643 16:30 Bangkok 19:00 Bangkok TG349 22:10 Islamabad
2	2024/6/27	Thu	1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD	1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD	1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD	1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD
3	2024/6/28	Fri	1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD	1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD	1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD	1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD
4	2024/6/29	Sat				
5	2024/6/30	Sun				
6	2024/7/1	Mon	1500: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD	1500: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD	1500: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD	1500: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD
7	2024/7/2	Tue	0915: Meeting with JICA 1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD 1230: Meeting with EAD 1430: Meeting with Japan Embassy	0915: Meeting with JICA 1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD 1230: Meeting with EAD 1430: Meeting with Japan Embassy	0915: Meeting with JICA 1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD 1230: Meeting with EAD 1430: Meeting with Japan Embassy	0915: Meeting with JICA 1030: Meeting with FFC/MoWR/KP-PID/WAPDA/PMD 1230: Meeting with EAD 1430: Meeting with Japan Embassy
8	2024/7/3	Wed	Departure from Islamababd 23:20 Islamabad TG350	Departure from Islamababd 23:20 Islamabad TG350	Departure from Islamababd 23:20 Islamabad TG350	Departure from Islamababd 23:20 Islamabad TG350
9	2024/7/4	Thu	6:25 Bangkok 7:35 Bangkok TG676 15:45 Narita	6:25 Bangkok 7:35 Bangkok TG676 15:45 Narita	6:25 Bangkok 7:35 Bangkok TG676 15:45 Narita	6:25 Bangkok 7:35 Bangkok TG676 15:45 Narita

3. 相手国関係者（面会者）リスト

第 1, 2 回現地調査および概略設計説明調査中に表敬・打合せを行ったパキスタン国関係者のリストは以下の通りである。

氏名	役職	所属
連邦洪水委員会（Federal Flood Commission: FFC）		
Ahmed Kamal	Chairman	FFC
Muhammad Hanif Chachar	Principal River Engineer	FFC
Ashok Kumar	Chief Engineer (Flood)	FFC
Zafar Iqbal	Senior Engineer (Floods-II)	FFC
Muhammad Amir Akram Rao	Deputy Engineering Adviser (Power)	FFC
Manzoor Ahmed	IT Specialist	FFC
Omer Malik	Director (Administration and Accounts)	FFC
水利電力開発公社（Water and Power Development Authority: WAPDA）		
Muhammad Masroor Naqvi	General Manager Hydro Resources Management	WAPDA
Khalid Memon	Chief Engineer Hydrology & Water Management	WAPDA
Shahid Najiz	Executive Engineer	Surface Water Hydrology Project
Afraz Haider	AXEN	Hydrology and Research Directorate
Riaz Ahmed	Project Director	Surface Water Hydrology Project
Faisal Rehman	Executive Engineer	Hydrology & Research
Shahryar Wamique	Assistant Executive Engineer	Hydrology & Research
M. Mohsin Hassan	Radio Tech Mechanic	Hydrology & Research
Shahid Hameed	Advisor & Chairman of WAPDA on Telemetry	WAPDA
Fahad Akram Shah	RE Rasul Hydro Power Station	WAPDA
カイバル・パクトゥンクワ州灌漑局（Khyber Pakhtunkhwa Provincial Irrigation Department: PID-KP）		
Anwar Kamal Khan	Superintending Engineer (SE)	PID-KP
Sardar Zafar	Project Director (PD) / Superintending Engineer (SE)	Pehur Main Canal & Pehur High Level Canal (Swabi) / Emergency Flood Assistance Project (EFAP-ADB) 担当
Zubair Khan	Superintending Engineer (SE)	Hazara Irrigation Circle Abbottabad
Mohammad Shoaib	Executive Engineer/ Sub Divisional Officer (SDO)	Irrigation Division Haripur
Zaheer Shah	Assistant Executive Engineer (AEE) / Sub Divisional Officer (SDO)	Irrigation Division Haripur
Irfan Yousaf	Sub Engineer	Irrigation Division Haripur
Gul Shahzad	Assistant Executive Engineer (AEE) / Sub Divisional Officer (SDO)	Irrigation Division Haripur Khanpur Sub-Division Office
Raja Tahir	Canal Inspector	Irrigation Division Haripur Khanpur Sub-Division Office
Naveed Khan	Subordinate Engineer	Irrigation Division Haripur Khanpur Sub-Division Office
Qamear Shahzad	Executive Engineer	Irrigation Division Mansehra

氏名	役職	所属
Hussain Shah		
Danish Shah	Sub Divisional Officer (SDO)	Irrigation Division Mansehra
Saeed Akhtar	Computer Operator	Irrigation Division Mansehra
Adel Khan	Subordinate Engineer	Irrigation Division Mansehra

国家防災庁（**National Disaster Management Authority: NDMA**）

Nasurullah Brohi	Director Assistant	Disaster Risk Reduction (DRR)
Haris Mir	GIS officer	Risk Assessment Unit (RAU)
Muhammad Idrees Mashud	Member	Disaster Risk Reduction (DRR)
Maqadus Iqubal		DPM
Saleem Shahzad Malik	Member	Disaster Risk Reduction (DRR)
Shafin Syed	AD Response	Disaster Risk Reduction (DRR)

パキスタン気象局（**Pakistan Meteorological Department: PMD**）

Mahr Sahibzad Khan	Director General	PMD
Muhammad Tahir Khan	Director	Planning and Development Division
Asma Jawad Hashmi	Director	Agromet Division
Zaheer Ahmed Babar	Director	National Weather Forecasting Center
Ch. Muhammad Aslam	Chief Meteorologist	Flood Forecasting Division
Shahid Abbas	Director	Regional Meteorological Centre Lahore
Saqib Hussain	Deputy Director	Flood Forecasting Division
Akhtar Mahmood	Deputy Director	Flood Forecasting Division
Ikram Ud Din	Director	Flood Forecasting Division
Usman Ali	Programmer	Flood Forecasting Division
Syed Adeel Abbas	Meteorologist	Flood Forecasting Division

パンジャブ州灌漑局（**Punjab Provincial Irrigation Department: PID-Punjab**）

Sultan Mehmood	Chief Engineer	Drainage and Flood Zone (D&F)
Wakas Karim Awan	Senior GIS Specialist DSS-PMIU	PID Punjab
Muhammad Riaz	Senior Water Resource Model	PID Punjab
Muhammad Salman Bhatti	Electronics Engineer	PID Punjab

シンド州灌漑局（**Sindh Provincial Irrigation Department: PID-Sindh**）

Sajid Ali Bhutto	Chief Engineer, Barrage Management Unit	PID Sindh
Muhammad Shahbaz Aktar	Director Regulation	PID Sindh
M. Anas Islam	Office Assistant	PID Sindh

インダス河流域庁（**Indus River System Authority: IRSA**）

Tahir Ali Khan	Programmer	IRSA
Jalil Ahmed Soomro	Senior Engineer (Operation)	IRSA

パキスタンインダス水利委員会（**Pakistan Commissioner for Indus Waters: PCIW**）

Adnan Muhammad	Deputy Commissioner for Indus Waters	PCIW
Shahida Gul	Deputy Commissioner for Indus Waters	PCIW

氏名	役職	所属
パキスタン環境保護庁（Pakistan Environmental Protection Agency: Pak-EPA）		
Farzana Altaf Shah	Director General	Pak-EPA
Khalid Mehmood Chadar	Deputy Director	Pak-EPA
Sadia Munawar	Deputy Director	Pak-EPA
Habib Ullah Jan	Deputy Director	Forestry, Environment & Wildlife Department
パキスタン経済省経済課（Ministry of Economic Affairs, Economic Affairs Division: EAD）		
Hamid Karim	Deputy Secretary (Japan)	EAD
アジア開発銀行（Asian Development Bank: ADB）		
Nathan Rive	Senior Climate Change Specialist	Environment, Natural Resources and Agriculture Division, Central and West Asia Department
Mian S. Shafi	Unit Head, Water & Emergency Assistance	Pakistan Resident Mission
Asad A. Zafar	Senior Project Officer (Water Resources)	Pakistan Resident Mission
世界銀行（World Bank: WB）		
Ahsun Tehsin	Disaster Risk Management Specialist	Climate Change & Disaster Risk Management
Yoko Okura	Disaster Risk Management Specialist	Climate Change & Disaster Risk Management
Nihan Rafique	Disaster Risk Management Specialist	Climate Change & Disaster Risk Management
Muhammad Hanif	Short Term Consultant Hydromet	World Bank
国連開発計画（United Nations Development Programme: UNDP）		
Nasir Hussain	Program Coordinator	Disaster Risk Management
国立科学技術大学（National University of Science & Technology: NUST）		
Shakil Ahmad	Assistant Professor	National University of Sciences & Technology
在パキスタン日本国大使館（Embassy of Japan in Pakistan）		
Moeto FUKUDA	Second Secretary	Embassy of Japan in Pakistan
JICA パキスタン事務所（JICA Pakistan Office）		
Yasumitsu KINOSHITA	Director General	JICA Pakistan Office
Koki SAWA	Project Formulation Adviser	JICA Pakistan Office
Tsuyoshi HARA	Senior Representative	JICA Pakistan Office

4. 討議議事録（M/D）

4.1 第 1 回現地調査時

No. 4(470) Japan-I/2023
Government of Pakistan
Ministry of Economic Affairs
***

Section Officer (Japan-I)
PH: +92-051-9206167
Fax: +92-051-9104016

Islamabad the August 02, 2023

Subject: **SIGNING ON MINUTES OF DISCUSSIONS (M/D) OF THE "PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT TO PAKISTAN"**

Dear Ms. SAWA,

I am directed to refer to Japan International Cooperation Agency letter No. JICA/Jul-24001/Projects/2023 dated July 24, 2023 on the subject noted above.

2. The requisite two original sets of the Minutes of Discussion on subject project duly signed by the Joint Secretary (Japan) is attached for information/necessary action. One photocopy set retained in Ministry of Economic Affairs for record.

With regards

Yours Sincerely,

(MUHAMMAD CHANZAIB)

Ms. Koki SAWA,
Representative,
Japan International Cooperation Agency,
Islamabad

Minutes of Discussions
on
the Preparatory Survey for the Project for Flood Management Enhancement

In response to the request from the Government of Islamic Republic of Pakistan (hereinafter referred to as "Pakistan"), Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Project for Flood Management Enhancement (hereinafter referred to as "the Project") to Pakistan. The Team held a series of discussions with the officials of the Government of Pakistan and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Islamabad, July 21, 2023

Taichi Minamitani
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Ahmed Kamal
Chief Engineering Advisor & Chairman
Federal Flood Commission
Ministry of Water Resources
Government of Pakistan

Muhammad Masroor Naqvi
General Manager
Hydro Resources Management (HRM)
Water and Power Development Authority
Government of Pakistan

Anwar Kamal
Superintending Engineer (H/Q)
Irrigation Department
Government of Khyber Pakhtunkhwa
Pakistan

Saeed Ashraf Siddiqui
Joint Secretary
Ministry of Economic Affairs
Government of Pakistan

ATTACHMENT

1. Objective of the Project:

The objective of the Project is to improve accuracy of flood forecasts and flood control functions, accumulate basic data that contributes to disaster risk reduction measures, and reducing the risk of loss of human lives and economic losses due to infrastructure damages caused by flood disasters through developing a hydrological and hydraulic observation network and rehabilitating the river structures damaged by the 2022 flood in Indus river and its tributaries, in addition to the capacity building and enhancement of flood management institution, thereby contributing to future flood risk reduction.

※ *Both sides confirmed that the objective is temporal one at the timing of this Survey, and is subject to be revised according to the progress of the Survey.*

2. Title of the Preparatory Survey:

Both sides confirmed the title of the Preparatory Survey as "The Preparatory Survey for the Project for Flood Management Enhancement".

3. Project Site:

Both sides confirmed that the sites of the telemetry related Project are in the Province of the Punjab and the Province of the Khyber Pakhtunkhwa (KP) and AJ&K, as shown in Annex 1, whereas the river structures part shall also be in the Province of KP, Punjab, Sindh.

Detailed project site where the river structure will be constructed shall be finalized by implementing the field survey. The project site could be selected;
- at a place where there is asset to be protected,
- while considering river conditions between right and left river banks, and upstream and downstream, and
- while ensuring its replicability to other river sections.

4. Responsible Authority for the Project:

Both sides confirmed the authorities responsible for the Project are as follows:

4-1. The Federal Flood Commission (hereinafter referred to as "FFC") will be the Administrative Executing Agency for the Project. The Administrative Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementations of the Project and ensure that the undertakings for the Project

shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

4-2. The line Ministry of the Administrative Executing Agency is the Ministry of Water Resources.

5. Items requested by the Government of Pakistan:

5-1. As a result of discussions, both sides confirmed that the items requested by the Government of Pakistan are as follows:

5-1-1. Hydrological and Hydraulic Observation Network

- The locations and information of the sites for the requested Hydrological and Hydraulic Observation Network are described in Annex1.
- Annex 3 describes the overall picture of the river monitoring network requested by the Pakistan side to be established under the Project. The river monitoring network consists of (i) hydrological & hydraulic observation systems; (ii) the Central Data Management Centres, at the premises of FFC in Islamabad and of Water and Power Development Authority (hereinafter referred to as "WAPDA") in Lahore; and (iii) the Data Display Systems, in the premises of FFC, WAPDA, Provincial Irrigation Department(s) (hereinafter referred to as "PID(s)"), National Disaster Management Authority (hereinafter referred to as "NDMA"), Indus River System Authority (IRSA), Pakistan Commissioner for Indus Waters (hereinafter referred to as "PCIW") and Pakistan Meteorological Department (hereinafter referred to as "PMD").

5-1-2. Improvement of River Structures

- The candidate sites for the river structures to be improved are preliminarily described in Annex1. However, it will be finalized based on discussions/field visits to KP, Punjab and Sindh.

5-2. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

6. Procedures and Basic Principles of Japanese Grant:

6-1. The Pakistan side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as agreed in Annex 4 shall be applied to the Project.

6-2. The Pakistan side agreed to take the necessary measures, as agreed in Annex 5, for the smooth implementations of the Project. The contents of the Annex 5 shall be elaborated and refined during the Preparatory Survey and shall be discussed and be agreed mutually in the mission to be dispatched for explanation of the Draft Preparatory Survey Report.

7. Schedule of the Survey:

7-1. The Team will proceed with further survey in Pakistan from September to November 2023.

7-2. JICA will prepare a draft Preparatory Survey Report in English and will dispatch a mission to Pakistan around April 2024 to explain its contents.

7-3. If the contents of the draft Preparatory Survey Report are accepted and the undertakings for the Project are fully agreed by the Pakistan side, JICA will finalize the Preparatory Survey Report and send it to Pakistan around August 2024.

7-4. The above schedule is tentative and subject to change.

8. Environmental and Social Considerations:

8-1. The Pakistan side confirmed to give due environmental and social considerations during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (January, 2022). (https://www.jica.go.jp/Resource/environment/guideline/ei8tc50000005dzu-att/guideline_202201_e.pdf)

8-2. The Project is categorized as "B" from the following considerations:
The project is likely to be site-specific, with few irreversible impacts, and can be addressed by general mitigation measures in most cases under the JICA Guidelines for Environmental and Social Considerations (January 2022).

8-3. After project component is finalized, an EIA/IEE might be requested in accordance with EIA/IEE regulations of related province. The Administrative Executing Agency and the Team confirmed that the EIA/IEE report will be

approved by each Provincial Environmental Protection Agency by the end of Detailed Design Study, if EIA/IEE report is necessary.

8-4. For the Project where land acquisition and involuntary resettlement cannot be avoided, the related PID in line with guidelines of Planning Commission of Pakistan shall prepare a Resettlement Action Plan (RAP) and/or an Abbreviated Resettlement Action Plan (ARAP) with the support of the Team, and in accordance with the JICA Guidelines for Environmental and Social Considerations, and shall make it available to the public. In addition, the Pakistan side confirmed that such land acquisition and resettlement shall be implemented based on the RAP/ARAP.

9. Other Relevant Issues:

9-1. Line agency and executing agency

The Administrative Executing Agency for the Project shall be FFC. The Operational Executing Agency for installation, operation & maintenance of Hydrological & Hydraulic Observation Network shall be WAPDA including for the system to be installed in FFC. The Operational Executing Agency for improved river structures shall be the province related. Annex 3 shows detailed information. Thus, the allocation of counterparts and budget for the operations and maintenance are mentioned in Annex 6. Both sides agreed to fulfil their responsibilities.

9-2. River structures design

In designing river structures, the design parameters shall be set comprehensively considering important points such as balance between right and left banks and/or upstream and downstream, historical flood record, and existing river development plan(s). The Design Criteria and Methodology (FFC's criteria prepared for the construction of flood protection and river training works) and other related standards available shall be used for designing.

9-3. Selection of the site(s)

The selection of site(s) for the improvement of river structures shall be finalized after discussions and/or on-site survey in related provinces, which will be performed during the next outline design survey.

9-4. Land acquisition

Both sides agreed that PID shall secure enough lands and spaces for the construction works in case not already available. PID shall complete the land acquisition and/or land lease required for the construction of the improvement of

river structures before the public announcement for prequalification and shall intimate the Administrative Executing Agency accordingly.

9-5. Permission for construction

Both sides agreed that FFC/WAPDA/KP PID/Punjab PID/Sindh PID shall prepare the permission of the construction before the public announcement for prequalification.

9-6. Hand over after the completion

Both sides confirmed that FFC is the Administrative Executing Agency for the project, and the operations and maintenance of any equipment and river structures, covered by the Project, shall be the responsibility of WAPDA and KP/Punjab/Sindh PID after handing over equipment and river structures to them on completion.

9-7. Gender Mainstreaming

Both sides confirmed that following gender elements shall be duly reflected in the scope of Preparatory Survey. The examination of gender-responsive measures based on the assessment, such as:

- ✓ Facility design and selection of equipment that reflects gender-specific needs and ensure usability by women.
- ✓ Discussions will be held to ensure equal pay for equal work between men and women at the construction stage and to introduce working environment improvements, such as toilets for women workers.

9-8. Security Arrangement

The Government of Pakistan in line with its prevailing policy relating to Japan shall take all possible and necessary measures to ensure the safety of the concerned relevant members included in the Project during the implementation of the Project at the Project sites and movement to the Project sites from their accommodations, whenever Japanese side requests in advance.

9-9. Soft Component

Both sides confirmed that the Soft Component providing guidance and the capacity building for installation/transfer and operation & maintenance of the equipment will be included in the Project to support a smooth operation. The contents of the Soft Component will be scrutinized through further discussions between Japanese side and Pakistan side.

9-10. Necessary Clearance/ Permit for the Project and Approval of PC-I

Both sides confirmed the timetable of the following key actions for a smooth implementation of the Project:

1) The Pakistan side shall confirm with the Pakistan Telecommunication Authority (PTA)/Frequency Allocation Board (FAB) that allocation of the radio frequencies used by the equipment to be procured under the Project is not required for the Project. Necessary information for the confirmation will be provided by the Team, if required.

2) In order to obtain the required approval by the Japanese Cabinet for the Grant Aid for the implementation of the Project, the PC-I shall be approved by the relevant forum (Central Development Working Party (CDWP) or Executive Committee of the National Economic Council (ECNEC)), Government of Pakistan by June 30, 2024. The Team will provide necessary technical support and input for preparation of the PC-I within March 2024.

3) PC-IV (Project Completion Report) shall be submitted soon after the completion of the Project, in line with the requirements of the Planning Commission of Pakistan.

9-11. Necessary budget and the number of staff for Operation & Maintenance

The Pakistan side agreed that allocation of necessary budget and staff estimated by the Team for proper Operation & Maintenance including data quality control shall be provided on regular basis to ensure sustainability of the project. The line agencies are referred as 9-1.

9-12. Tax Exemption

The tax exemption including the General Sales Tax (GST), custom duty, and any other taxes and fiscal levies in Pakistan which are to arise from the Project activities shall be ensured by the Government of Pakistan. The Government of Pakistan shall take necessary procedures for the tax exemption.

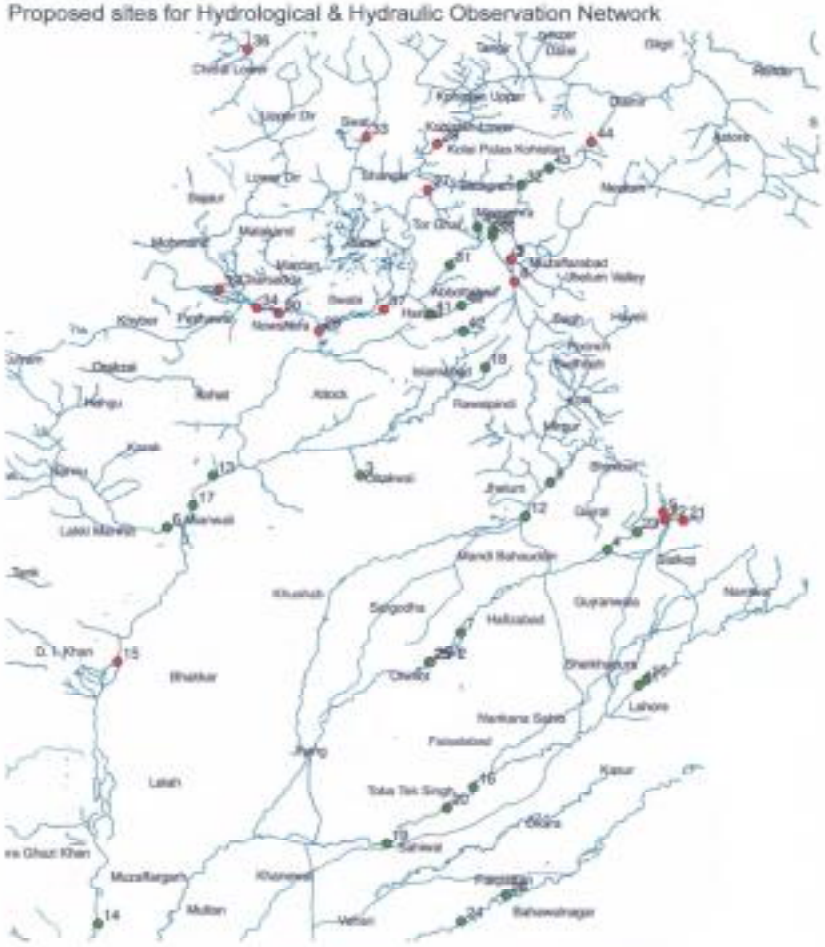
9-13. Confidentiality of the Project

The Team explained that the Preparatory Survey Report to be prepared at the end of the survey would be disclosed to the public in Japan. However, the Team also explained that confidential parts which might affect bidding process such as cost estimation should be kept undisclosed until the bidding has completed.

Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Overall picture of data monitoring system
Annex 4 Japanese Grant
Annex 5 Major Undertakings to be taken by the Government of Pakistan

Annex 1 Project Site

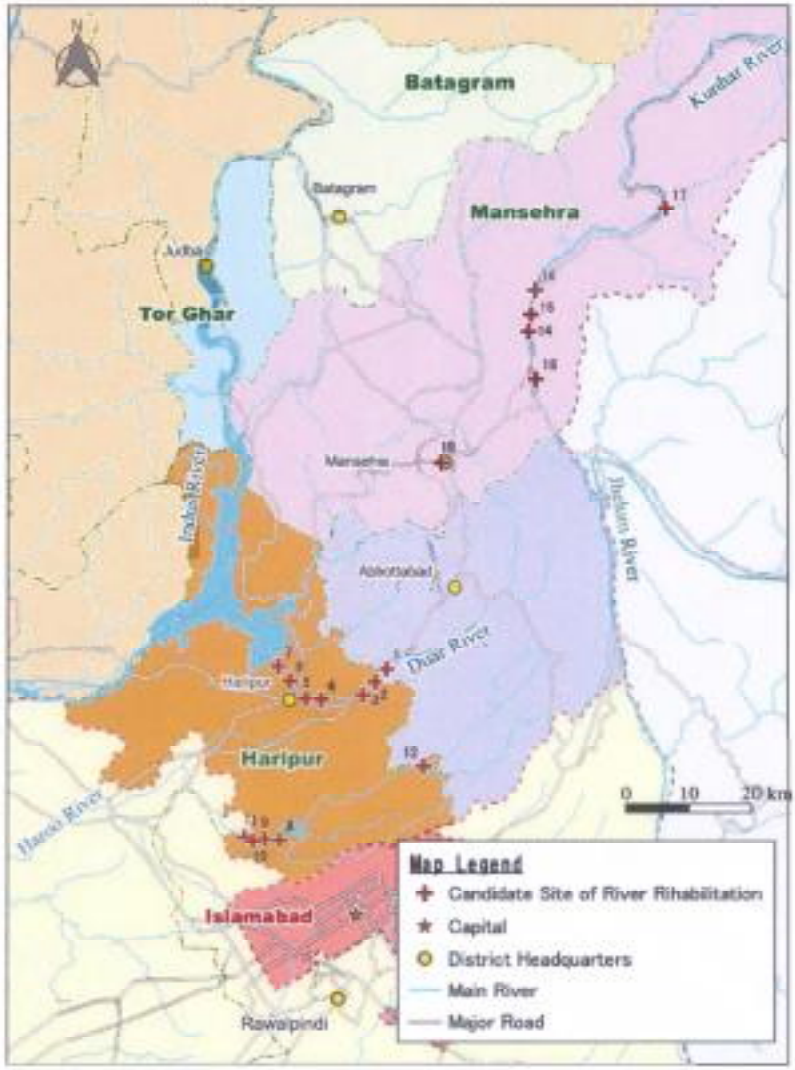
Proposed sites for Hydrological & Hydraulic Observation Network



Information of the proposed sites for Hydrological & Hydraulic Observation Network are indicated in the table below.

Site No.	Latitude	Longitude	Name of Site	Name of River/Tributary	Basin/District	Province	Installation by WAPDA
1	34.354317	73.471802	Domel	Jehlum	Muzaffarabad	AJK	Yes
2	34.358858	73.471751	Muzaffarabad	Neelum	Muzaffarabad	AJK	Yes
3	32.95717	72.561869	Dhenab Bridge.	Dhenab	Chiniot	Punjab	No
4	32.48258	74.091944	Chenab Bridge GT Road	Chenab	Gujranwala	Punjab	No
5	32.723462	74.452723	Road Bridge Maralwar Tavi	Chenab	Gujrat	Punjab	Yes
6	32.62578	71.257806	Kuntarn @ C Pack Bridge	Kuntarn	Bagi Kamer Shah C Pack Campus	Punjab	No
7	31.94908	73.150817	Meter way Bridge Taleb Wala	Chenab	Hafizabad	Punjab	No
8	34.212698	73.494872	Chattar Kalas	Jehlum	Muzaffarabad	AJK	Yes
9	32.91458	73.72415	Jhelum Bridge	Jehlum	Jehlum	Punjab	No
10	31.64425	74.345472	Lahore Sialkot Motorway Bridge	Ravi	Lahore	Punjab	No
11	31.609	74.291472	Shahdara Railway Bridge	Ravi	Lahore	Punjab	No
12	32.69578	73.164083	Rasul Barrage	Jehlum	Mianti Sahauddin	Punjab	No
13	32.95714	71.552083	Kalabagh Mari Indus Railway Bridge	Indus	Isllanwali	Punjab	No
14	30.06372	70.838361	Indus @ Ghazi Ghat Bridge Muzaffargarah	Indus	Muzaffargarah	Punjab	No
15	31.756272	70.944248	Indus @ Bhakkar	Indus	Bhakkar	Punjab	Yes
16	30.84638	73.233139	Mari Pattan Bridge	Ravi	Okara	Punjab	No
17	32.76835	71.424538	Indus @ C Pack Bridge	Indus	GPS, Hindal Wala	Punjab	No
18	33.65709	73.104778	Dhok Chiniot.	Soan	Rawalpindi	Punjab	No
19	30.57868	72.677538	Chichawatni Road Bridge	Ravi	Chichawatni	Punjab	No
20	30.80781	73.86375	Qatab Sharq Bridge	Ravi	Sahiwal	Punjab	No
21	32.689535	74.584276	Bajarat road Bridge Jammu tavi	Chenab	Sialkot	Punjab	Yes
22	32.672299	74.484792	Marala head work	Chenab	Sialkot	Punjab	Yes
23	32.59544	74.184444	Sialkot AirPort Road Bridge (Shahbacpur)	Chenab	Sialkot	Punjab	No
24	30.37869	73.1565	Arifwala to Sharwal Road Bridge	Sutlej	Pakpattan	Punjab	No
25-1	31.75269	72.947472	Chiniot Dam (1)	Chenab	Chiniot	Punjab	No
25-2	31.75289	72.956861	Chiniot Dam (2)	Chenab	Chiniot	Punjab	No
26	30.24717	73.443472	Baba Farid Headworks	Sutlej	Pakpattan	Punjab	No
27	34.033915	72.935463	Thakot	Indus	Thakot	KPK	Yes
28	33.896515	72.2352267	Khairabad Bridge, N-5	Indus	Khairabad	KPK	Yes
29	35.132765	72.594567	Pattan	Indus	Pattan	KPK	Yes
30	34.0032548	71.977945	Kabul River Bridge, N-45	Kabul	Nowshera	KPK	Yes
31	34.3161339	73.075139	Phulra	Siran	Phulra	KPK	No
32	34.820957	73.533297	Kunhar	Naran	Kunhar	KPK	No
33	35.149887	72.538041	Madyan Bridge, N-95	Swat	Swat	KPK	Yes
34	34.042269	71.820711	Pashtun Garhi	Kabul	Nowshera	KPK	Yes
35	34.5109983	73.3494637	Balakot	Kunhar	Balakot	KPK	No
36	35.7154437	71.789964	Ayun	Kalaish	Ayun	KPK	Yes
37	34.0332206	72.6534486	Indus Tarbela Outflow	Indus	Indus Tarbela Outflow	KPK	Yes
38	34.5489895	73.3536636	Kaghan / Balakot	Kunhar	Kaghan	KPK	No
39	34.164880	71.530594	Haji Zai Bridge, Shabqadar Road	Kabul	Peshawar	KPK	Yes
40	34.057572	73.149484	Abbottabad	Dour	Abbottabad	KPK	No
41	34.0032246	72.953968	Haripur	Dour	Haripur	KPK	No
42	33.895667	73.163861	Haripur / Jabri Bridge	Haro	Haripur	KPK	No
43	34.943187	73.710687	Mansehra	Kunhar	Mansehra	KPK	No
44	35.113183	73.394417	Gittidas, N-15	Kunhar	Mansehra	KPK	Yes
45	34.3641189	73.212778	Mansehra	Siran	Mansehra	KPK	No

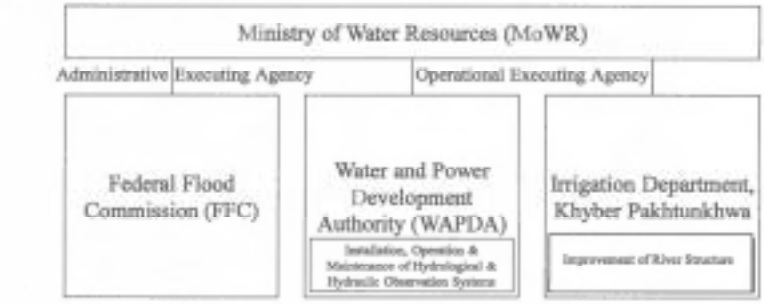
Candidate Site of Improvement of River Structure (Hazara Area)



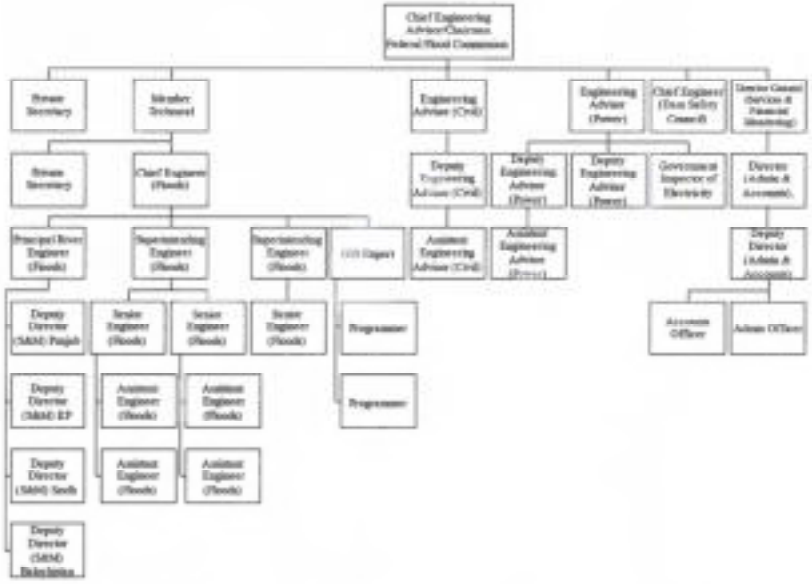
Candidate sites of Improvement of River Structure are listed in the table below.

No.	River	Location	Latitude	Longitude
KP PID Abbottabad Division				
1	Duar River	Kholian	34.024424°	73.095456°
2	Duar River	Balder	34.006153°	73.075104°
3	Duar River	Akhoon Bandi	34.002049°	73.060459°
4	Duar River	Sarai Saleh	33.990080°	72.990171°
5	Duar River	Ali Khan	33.990142°	72.973722°
6	Duar River	Sikander Pur	34.007165°	72.951500°
7	Duar River	Qazian	34.025915°	72.933102°
8	Haroo River	Mohra Ghazan	33.792709°	72.916774°
9	Haroo River	Mumral	33.794095°	72.864645°
10	Haroo River	Sultanpur	33.794030°	72.852203°
11	Haroo River	Chitti	33.796164	72.848826°
12	Haroo River	Dobandi	33.799285°	72.843988°
13	Haroo River	Jabbri	33.897004°	73.171155°
KP PID Mansehra Division				
14	Kunhar River	Bissian	34.466966°	73.346947°
15	Kunhar River	Jageer	34.501524	73.353046°
16	Kunhar River	Balakot	34.546219°	73.351872°
17	Kunhar River	Mahadri	34.689258°	73.573674°
18	Kunhar River	Garhi Habibullah	34.410436°	73.370359°
19	Bahoot Katha	Mansehra City	34.331951°	73.195877°
Other Sites				
20	To be discussed	Punjab Province		
21	To be discussed	Sindh Province		

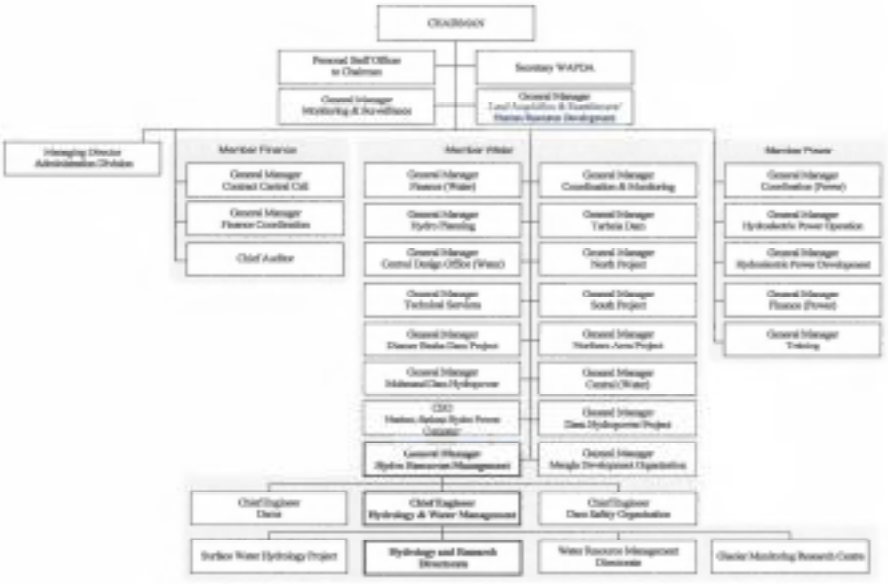
Annex 2 Organization Chart



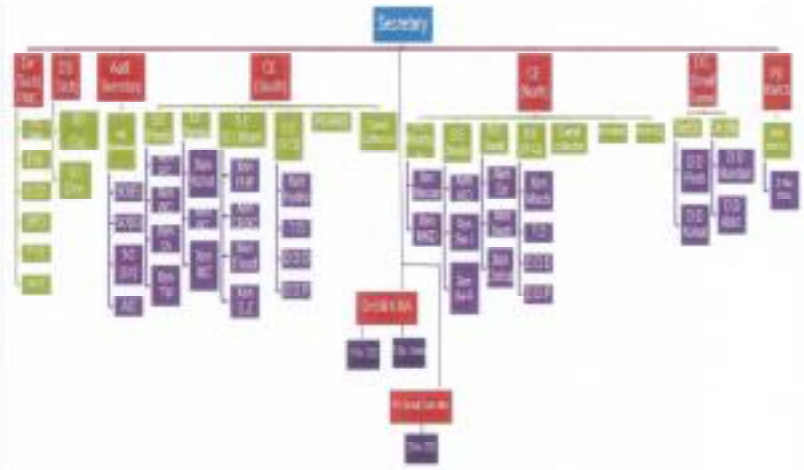
Execution System of the Project



Organization Chart of Pakistan Federal Flood Commission (FFC)



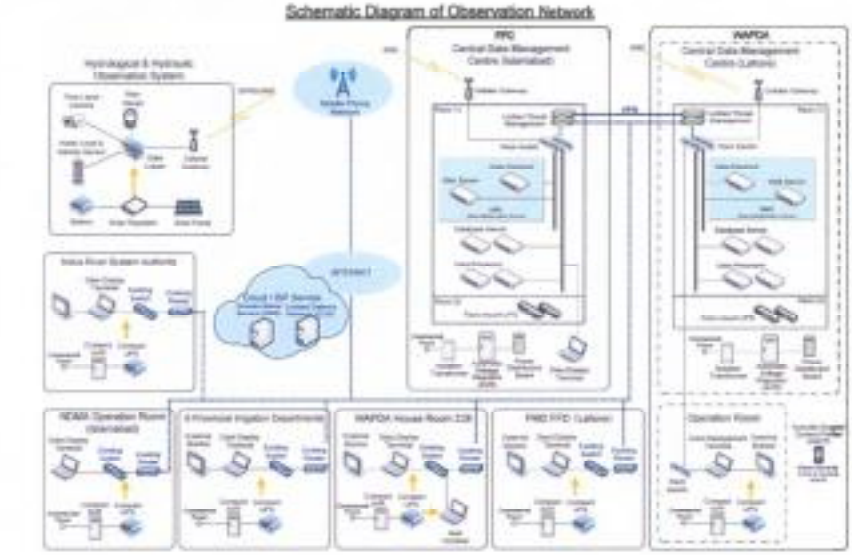
Organization Chart of Pakistan Water and Power Development Authority (WAPDA)



Organization Chart of Irrigation Department, Khyber Pakhtunkhwa

- 14 -

Annex 3 Overall picture of data monitoring system



Annex 4 Japanese Grant

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation
- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal
-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes
-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")
-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")
-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement
-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation
-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Measures to ensure more efficient implementation of the Grant

i) In the event that the E/N and the G/A concerning a project cannot be signed by the end of the following Japanese fiscal year of the cabinet decision concerned by the GOJ, the authorities concerned of the two Governments will discuss the cancellation of the project.

ii) In the event that the period, specified in the G/A, during which the grant is available expires before the completion of the disbursement, the authorities concerned of the GO J will thoroughly review the status, situation and perspective of the implementation of the project concerned before extending the said period. The authorities concerned of the two Governments will discuss the termination of the project including a refund, unless there are concrete prospects for its completion.

iii) Regardless of the period mentioned in ii) above, the authorities concerned of the two Governments will, in the event that five years have passed since the cabinet decision concerned by the GOJ before the completion of the disbursement, except as otherwise confirmed between them, discuss the termination of a project including a refund, unless there are concrete prospects for its completion.

4) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

5) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

Annex 5 Major Undertakings to be taken by the Government of Pakistan

Before the Tender

No.	Items	Deadline	In charge	Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A)).	within 3 months after G/A	FFC		
2	To obtain NOC/permission/consent/acceptance of the owners (National Highway Authority, Punjab Highway Department, etc.) of bridges which have been selected by the WAPDA and the Team together through the site survey.	before notice of the Tender	WAPDA through MoWR		
3	To obtain NOC/permission/consent/acceptance of the improvement of river structures which have been selected by the FFC/PID and the Team together through the site survey.	before notice of the Tender	FFC PID		
4	To secure sufficient spaces at the respective project site/s for temporary facilities such as contractors office, workshop, building material storage, desposal area, etc. needed for construction work.	before notice of the Tender	FFC PID		
5	To undertake the Initial Environmental Examination (IEE) procedures in Pakistan, if required so.	before completion of PC-I	FFC WAPDA PID		
6	To obtain the allocation of the required radio frequencies for the sensors of Hydrological & Hydraulic Observation Systems.	before notice of the Tender	WAPDA		
7	To procure and install the air conditioning units with enough capability to effectively cool all the equipment procured under the Project and by the FFC in future in the Data Centre to be newly established by the FFC.	before notice of the Tender	FFC		

During the Project

No.	Items	Deadline	In charge	Cost	Ref.
1	To pay bank charge (commission) for the issuance of the Authorization to Pay (A/P) and amendments of A/P, if required, for the Consultant and the Contractor.	Every payment	FFC		
2	To undertake all necessary institutional and juridical procedures in Pakistan.	During the Project	FFC WAPDA PID		
3	To bear all the expenses, other than those to be borne by the Japanese Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment.	During the Project	FFC WAPDA through PSDP PID		
4	To ensure prompt unloading, customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation in the country of the Recipient of the products	During the Project	FFC WAPDA PID		
5	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	During the Project	FFC WAPDA PID		
6	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted by its designated authority without using the Grant.	During the Project	FFC WAPDA PID		
7	To remove and relocate the existing facilities for the installation of the equipment in the proposed Central Data Management Centers of Islamabad (FFC) and Lahore (WAPDA Town), if required.	During the Project	FFC WAPDA		

No.	Items	Deadline	In charge	Cost	Ref.
8	To provide free of charge and allocate secure temporary storage area/room/warehouse for the materials, tools and equipment needed during the Project implementation including trainings in Islamabad and Lahore.	During the Project	FFC WAPDA through PSDP		
9	To obtain the required type approval of terminal equipment for wireless radio transceivers with more than 2mW output power for observation data transmission and receiving by the Hydrological & Hydraulic Observation Systems.	Immediately after the Tender	FFC WAPDA		
10	To procure mobile SIM cards (GSM/GPRS) for transmitting/receiving data observed by the Hydrological & Hydraulic Observation Systems and the Central Data Management Systems and bear the recurrent cost.	Before installation of the Equipment	FFC WAPDA through PSDP		
11	To promptly provide reliable high-speed Internet environment at the proposed Central Data Management Centers in Islamabad and Lahore (with each corresponding global/fix IP) for the establishment of a Virtual Private Network between the Central Data Management Centers.	Before installation of the Equipment	FFC WAPDA		
12	To set up the required and new assigned IP addresses and domain names in the computing equipment supplied under the Project and facilitate any required configuration i.e. firewall settings, etc. of the existing equipment which may be made part of the project network communication system, if any.	Before installation of the Equipment	FFC WAPDA		
13	To secure ample space/s at the existing facilities to establish the proposed Central Data Management Centers in Islamabad (FFC) and Lahore (WAPDA Town), if necessary.	Before installation of the Equipment	FFC WAPDA		
14	To assign appropriate number of trainees who will be a member of the WAPDA installation teams and to shoulder their dispatching cost to the proposed sites of the Hydrological & Hydraulic Observation Systems including ADCPs for the trainings, such as daily allowance, transportation fee, accommodation, if any.	Before installation of the Equipment	WAPDA		
15	To assign appropriate number of trainees and shoulder their dispatching cost to the proposed Central Data Management Centers of Islamabad (FFC) and Lahore (WAPDA Town) and some of the proposed sites of the Hydrological & Hydraulic Observation Systems and Data Dispay Systems for the trainings, such as daily allowance, transportation fee, accommodation, if any.	During the Project	FFC WAPDA NDMA PMD PID		
16	To take responsibility for arranging the maximum countermeasures and ensure the appropriate security of the whole Project site/s and of the Japanese and other foreign nationals assigned to the Project.	During the Project	FFC WAPDA PID		

After the Project

No	Items	Deadline	In charge	Cost	Ref.
1	To assign the required staff including responsible personnel from WAPDA, who have reliable technical skill and ample experience for the smooth operation and maintenance of all the Equipment procured under the Project.	After completion of the Project	WAPDA through PSDP		
2	To procure the required spare parts and consumables for the smooth operation and maintenance of the Equipment, and enter into a preventive maintenance service agreement with the equipment supplier if so desired.	After completion of the Project	FFC WAPDA through PSDP		
3	To properly operate and maintain, and also effectively utilize the Equipment procured under the Project.	After completion of the Project	FFC WAPDA through PSDP		

No	Items	Deadline	In charge	Cost	Ref.
4	To maintain and use properly and effectively facilities of river structures constructed under the Project 1) Allocation of maintenance cost 2) Implementation of repair and maintenance works 3) Routine check/Priodic inspection	After completion of the Project	PID		
5	To periodically update the operating system, antivirus and application software(s) of all the computers procured under the Project.	After completion of the Project	FFC WAPDA		
6	To allocate the necessary budget and personnel for the smooth conduct of hydrological and hydraulic observation and provisioning of the observation data to the concerned agencies related to the disaster management.	After completion of the Project	WAPDA through PSDP		
7	To procure the appropriate number and capacity of disk media, hard disks, solid state disks, etc., and dutifully conduct the required periodic archiving of observation data and products.	After completion of the Project	FFC WAPDA through PSDP		
8	To monthly maintain all the air conditioning units including cleaning air filters to keep the effective and efficient cooling of all the Equipment in the Central Data Management Centres.	After completion of the Project	FFC WAPDA through PSDP		
9	To always ensure enough space for entrance/exit of the cooling fans of all the equipment for keeping smooth air-flow procured under the Project in the Central Data Management Centres.	After completion of the Project	FFC WAPDA		
10	To make the maximum countermeasures for protection of the Hydrological & Hydraulic Observation Systems from theft or destruction.	After completion of the Project	WAPDA through PSDP		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable, PSDP: Public Sector Development Programme)

(Note): Progress of the specific obligations of the Recipient may be confirmed and updated from time to time with written agreement between JICA and the Recipient in the form other than the amendment of the G/A.

4.2　第 2 回現地調査時

Minutes of Discussions
on
the Preparatory Survey for the Project for Flood Management Enhancement

In response to the request from the Government of Islamic Republic of Pakistan (hereinafter referred to as "Pakistan"), Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") of the Project for Flood Management Enhancement (hereinafter referred to as "the Project") to Pakistan. The Team held a series of discussions with the officials of the Government of Pakistan and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Islamabad, November 2, 2023

Tsuyoshi Matsushita
Chief Consultant
JICA Preparatory Survey Team
CTI Engineering International Co., Ltd.
Japan

Ahmed Kamal
Chief Engineering Advisor & Chairman
Federal Flood Commission
Ministry of Water Resources
Government of Pakistan

Muhammad Masroor Naqvi
General Manager
Hydro Resources Management (HRM)
Water and Power Development Authority
Government of Pakistan

Muhammad Zubair
Superintending Engineer
Hazara Irrigation Circle Abbottabad
Government of Khyber Pakhtunkhwa
Pakistan

Saeed Ashraf Siddiqi
Joint Secretary
Ministry of Economic Affairs
Government of Pakistan

ATTACHMENT

The description is supplemented by the study and discussion that has been made since the signing of the Minute of Discussions for this project on 23 July 2023.

1. Project Site:

Both sides confirmed that the improvement sites of river structures related to the Project are in the Province of Khyber Pakhtunkhwa (KP) as shown in Annex-1.

As a result of the field survey, these sites are selected based on the following criteria;

- where there is asset to be protected with structural measure;
- where there exists imbalance between right and left river banks, and upstream and downstream; and
- its replicability to other river sections.

2. Items Requested by the Government of Pakistan:

As a result of discussions, both sides confirmed that the items requested by the Government of Pakistan are as follows:

2-1. Hydrological and Hydraulic Observation Network

Equipment for the Hydrological and Hydraulic Observation Network, which was requested by the Government of Pakistan, is summarised in the table below.

Table 1 Equipment Requested by the Government of Pakistan

Items	FFC	WAPDA Town	NDMA	PMD	PCIW	PID	IRSA	WAPDA House	HHOS Sites
Equipment for the Central Data Management Centres									
Data Receiver	1	1	-	-	-	-	-	-	-
Data Processor	1	1	-	-	-	-	-	-	-
Database System	1	1	-	-	-	-	-	-	-
Information Provision System	1	1	-	-	-	-	-	-	-
Data Management System	-	1	-	-	-	-	-	-	-
Alert System	-	-	-	-	-	-	-	1	-
Data Display System	1	-	1	1	1	6	1	1	-
Hydrological & Hydraulic Observation System	-	-	-	-	-	-	-	-	46
Acoustic Doppler Current Profiler (ADCP)	(1)	5	-	-	-	-	-	-	-
Automatic Weather Observation System (AWS)	-	-	-	5	-	-	-	-	-

- FFC: Federal Flood Commission
- WAPDA: Water & Power Development Authority
- NDMA: National Disaster Management Authority
- PMD: Pakistan Meteorological Department (FFD: Flood Forecasting Division)
- PCIW: Pakistan Commissioner for Indus Waters
- PID: Provincial Irrigation Department
- IRSA: Indus River System Authority
- HHOS: Hydrological & Hydraulic Observation System

The relevant organizations, described in the figure at Annex-2 have agreed to cooperate and collaborate with each other to achieve the project goals. Necessary actions, if any,

should be taken by the Pakistan side. The major undertaking is referred to the Minutes of Discussions for this project signed on 23 July 2023.

Data Flow of Hydrological & Hydraulic Observation Network is shown in Annex-3.

The Equipment requested by the Pakistan side is figured as "Systematic Diagram of Hydrological & Hydraulic Observation Network" attached as Annex-4.

Upon the demand from WAPDA and FFC according to their experience, both sides agreed to design the Central Data Management Centres and the Hydrological & Hydraulic Observation Systems with high availability and to include 1 (one) air-conditioning system with solar-power supply system in each Central Data Management Centre to ensure sufficient cooling of the server equipment during power stoppage.

2-1-1. Central Data Management Centres

Both sides confirmed that the Central Data Management Centres will be established under the Project at the following locations. In addition, WAPDA and FFC agreed to continuously operate the existing engine generators for power supply to the server equipment once a power outage would have occurred.

- Central Data Management Centre in Islamabad (FFC): in the existing Main Building of the Ministry of Water Recourses, Islamabad
- Central Data Management Centre in Lahore (WAPDA): in the existing building of WAPDA Town

2-1-2. Hydrological & Hydraulic Observation System

Both sides confirmed that the list and locations of 45 sites (46 systems) of the Hydrological and Hydraulic Observation Systems, as per attached in Annex-5. In order to install the Hydrological and Hydraulic Observation Systems on 45 selected bridges as the Project sites, Pakistan side agreed to complete all the necessary procedures with the drawings provided by the Preparatory Survey Team and obtain necessary approvals/permissions/Non-objection Certificates (NOC) from owners (e.g., National Highway Authority) of the designated bridges by PC-I approval.

Pakistan side agreed to make maximum effort to secure the required budget to be indicated in the Preparatory Study Report for implementation of the Project and also to organize four (04) teams for equipment installation & maintenance (including ADCP operation) in WAPDA and One (01) ADCP operation team in FFC.

2-1-3. Automatic Weather Observation System (AWS)

Both sides confirmed that the list and locations of 5 sites of AWSs as attached in Annex-6.

2-1-4. Training (Soft Component)

In order to operate, and maintain, the equipment installed by the Project, both sides recognized the necessity of trainings listed in the table attached as Annex-7 for a smooth implementation of the Project and appropriate operation and maintenance after completion of the Project.

2-2. Improvement of River Structures

2-2-1. Project Site

Both sides confirmed that improvement works of river structures under the Project will be carried out at the following locations.

Table 2 Selected Project Site of Improvement of River Structure

Priority	Name of Location	River	Latitude / Longitude	Contents of the Construction Works
1	Garhi Habibullah	Kunhar	34.410436° / 73.370359°	- Revetment - Foot Protection (Concrete Block)
2	Sikandarpur	Dor	34.007165° / 72.951500°	- Realignment of Low Water Channel - Revetment
3	Mohra Ghazan	Haro	33.792709° / 72.916774°	- Revetment
4	Ali Khan	Dor	33.990142° / 72.973722°	- Revetment

Detailed contents of the construction works will be further studied in the Preparatory Survey.

2-2-2. Design Flood Level

Detailed contents of the construction works will be studied in the Preparatory Survey. Following the design conditions of PC-1 (2022) for each river, design flood levels are basically set based on the 1/100-year probable flood discharge. However, JICA Preparatory Survey Team will verify the flood discharge which are shown in each PC-1. According to the result of verification of the run-off analysis, the value of the flood discharge may be modified.

2-3. JICA will assess the relevance of the above requested items through the survey, and will report the findings of this Preparatory Survey to the Government of Japan. The final components of the Project would be officially decided by the Government of Japan.

3. Schedule of the Survey:

3-1. The Team will proceed with further survey in Pakistan from March to April 2024.

3-2. JICA will prepare a draft Preparatory Survey Report in English and will dispatch a mission to Pakistan around March to April 2024 to explain its contents.

3-3. The above schedule is tentative and subject to change.

Annex-1

Project Site of Improvement of River Structures

Priority	River	Name of Location	Latitude / Longitude
1	Kunhar River	Garhi Habibullah	34.410436° / 73.370359°
2	Dor River	Sikandarpur	34.007165° / 72.951500°
3	Haro River	Mohra Ghazan	33.792709° / 72.916774°
4	Dor River	Ali Khan	33.990142° / 72.973722°

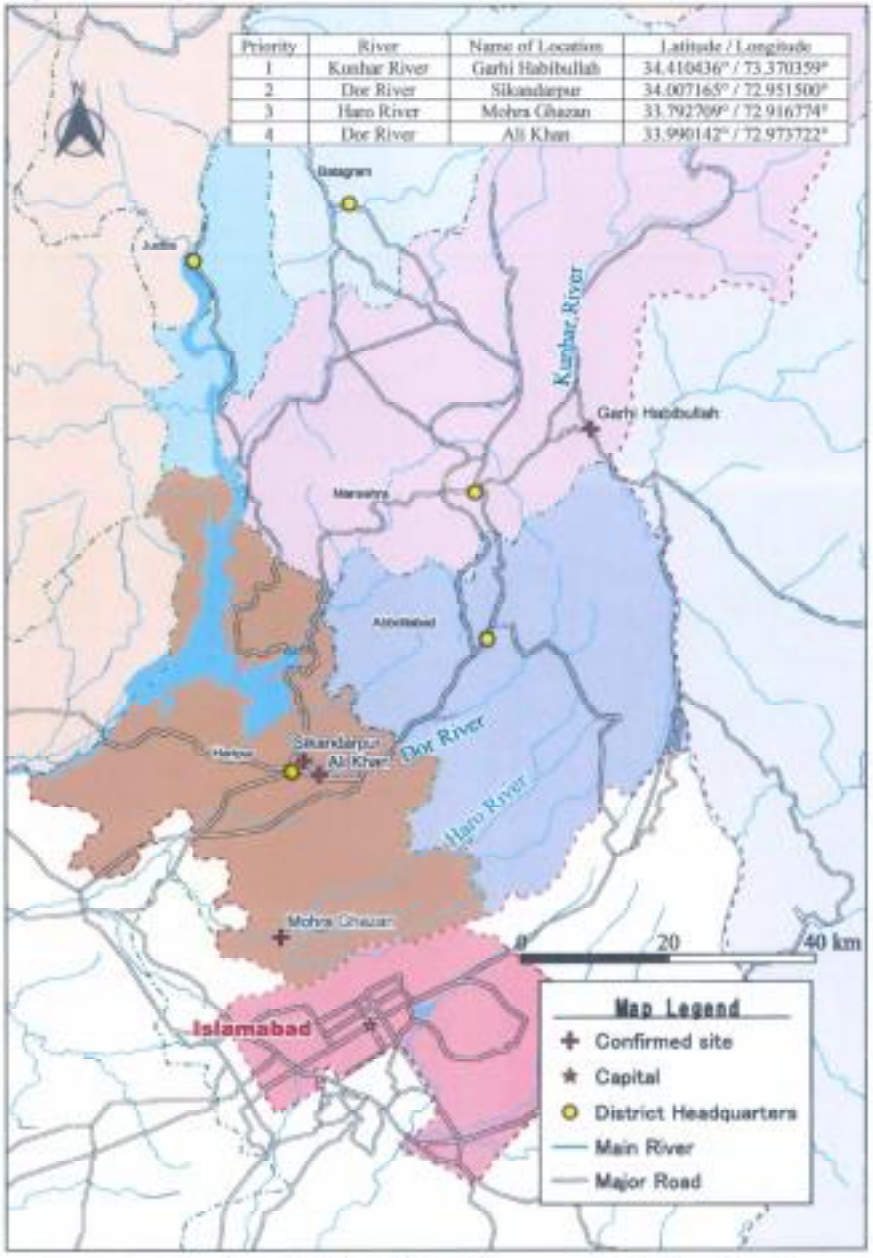
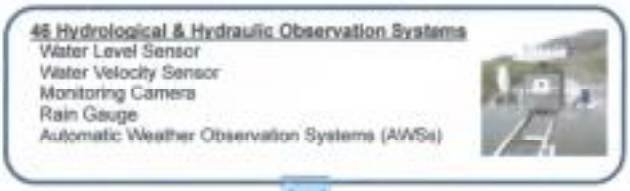


Figure: Location Map of Project Sites of Improvement of River Structures

Annex-2

The outline of the collaboration with the relevant organisations



Observation Data

WAPDA
Operational Executing Agency

FFC
Administrative Executing Agency

PMD
Provider of AWSs Data in Punjab and KP Provinces

NDMA
Evacuation & Relief Action

WAPDA
River Monitoring Operation & Maintenance

FFC
Coordination & Awareness Activities

Mutual Cooperation & Collaboration for Sake of the People of Pakistan

06 PIDs
Irrigation Monitoring & Water Control for Agriculture

PMD
Weather Observation and Flood Forecasting & Warning

PCIW
Collaboration with all National Entities with reference to flows from India

IRSA
Coordination among PIDs for Indus River Water Utilization

- **Improving river monitoring capacity**
- **Improving accuracy of flood forecast & warning**
- **Accumulation of river and weather observation data**

Reducing human and economic losses caused by flood disasters under the spirit of Sendai Framework for DRR

Annex-3

The data flow of the entire system to be established is shown in the figure below. Observation data including water level, flow velocity, discharge, and rainfall observed by 46 Hydrological and Hydraulic Observation Systems, and still images taken by River Monitoring Cameras are transmitted to the Data Receiver at the Central Data Management Centres in Islamabad and Lahore.

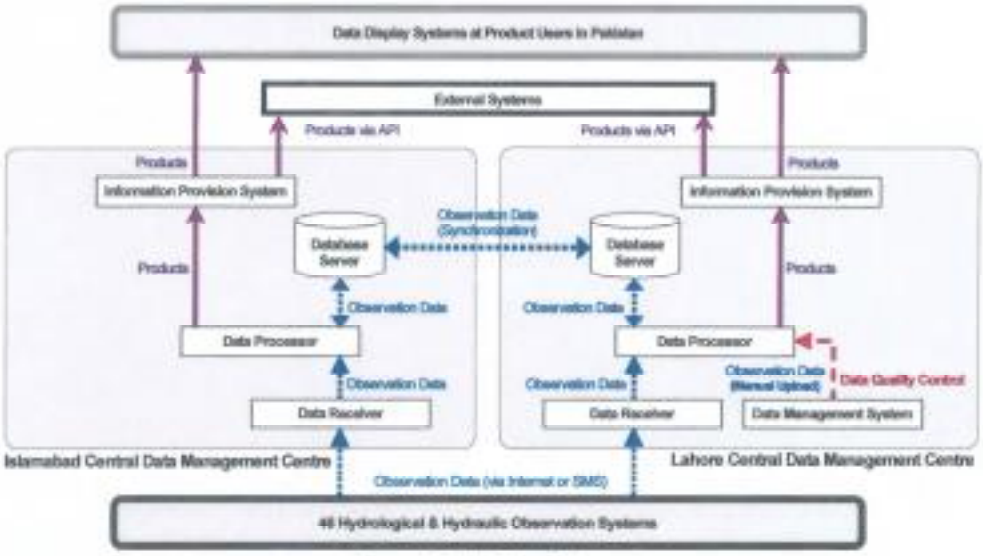


Figure: Data Flow Diagram

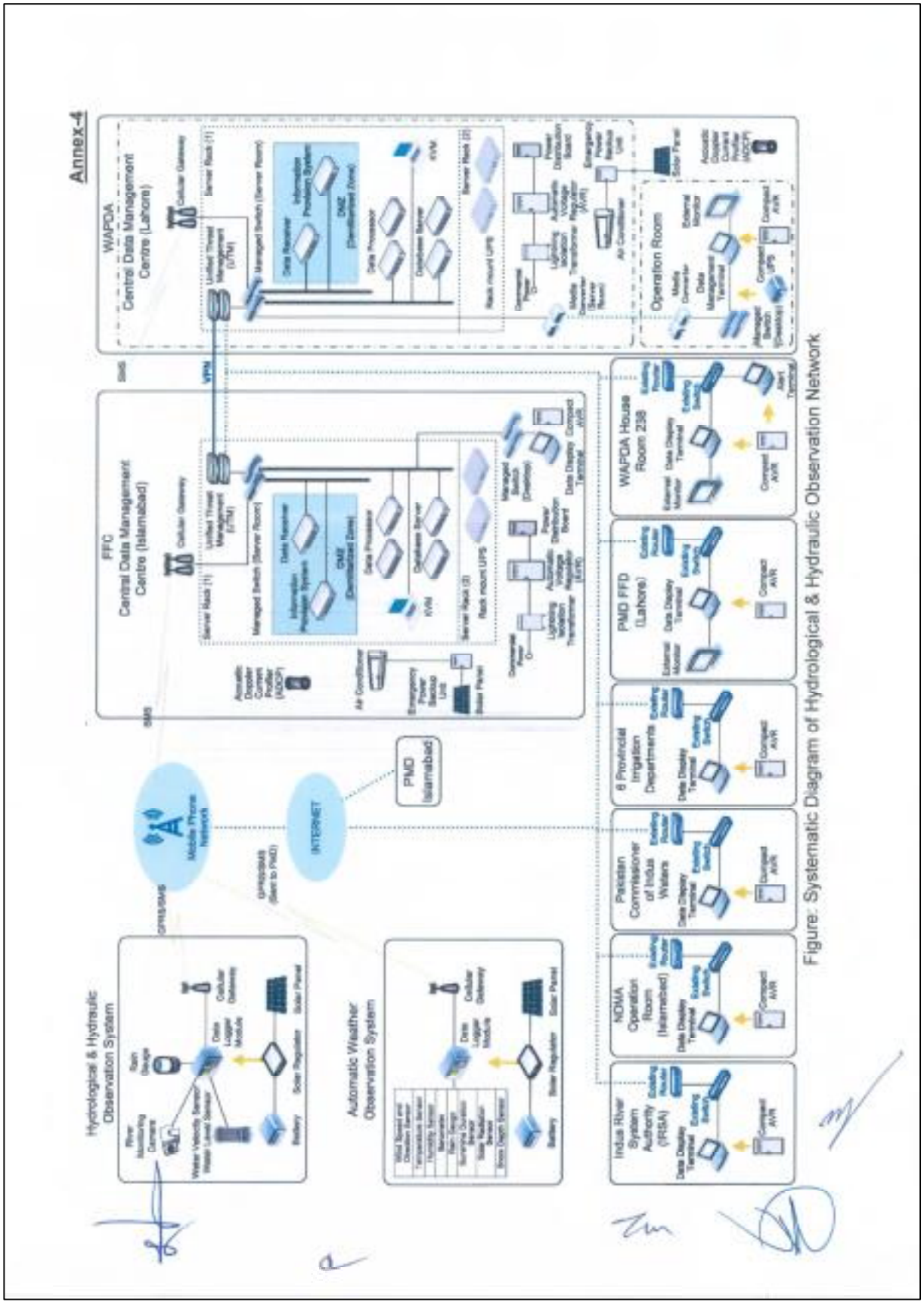


Figure: Systematic Diagram of Hydrological & Hydraulic Observation Network

Annex-5(1)

Table: Bridges (Project Sites) for Installation of Hydrological & Hydraulic Observation Systems

No.	Latitude	Longitude	Name of Site	River	Basin/District	Province	Installation
1	34.354083	73.470167	Domel	Jhelum	Muzaffarabad	AJK	WAPDA
2	34.367556	73.465917	Muzaffarabad	Neelum	Muzaffarabad	AJK	WAPDA
3	32.957167	72.501889	Dharab Bridge.	Dharab	Chakwal	Punjab	Japan
4	32.482528	74.091944	Chenab Bridge GT Road	Chenab	Gujranwala	Punjab	Japan
5	34.234250	73.608861	Garhi Dupatta	Jhelum	Muzaffarabad	AJK	WAPDA
6	32.625778	71.257806	Kurram @ CPEC Bridge M-14	Kurram	Mianwali	Punjab	Japan
7	31.945056	73.150917	Motor way Bridge Talab Wala	Chenab	Hafizabad	Punjab	Japan
8	34.096333	73.499000	Kohala Bridge	Jhelum	Muzaffarabad	AJK	WAPDA
9	32.914528	73.724250	Jhelum Bridge	Jhelum	Jehlum	Punjab	Japan
10	31.644250	74.345472	Lahore Sialkot Motorway Bridge	Ravi	Lahore	Punjab	Japan
11	28.900000	70.442528	Nishtar Ghat Bridge	Indus	Rahim Yar Khan	Punjab	Japan
12	32.695778	73.564083	Rasul Barrage	Jhelum	Mandi Bahauddin	Punjab	Japan
13	32.957139	71.552083	Kalabagh Mari Indus Railway Bridge	Indus	Mianwali	Punjab	Japan
14	30.063722	70.818361	Indus @ Ghazi Ghat Bridge Muzaffargarh	Indus	Muzafargarah	Punjab	Japan
15	31.758306	70.938556	Indus @ Bhakkar	Indus	Dera Ismail Khan	Punjab	WAPDA
16	30.946389	73.233139	Mari Pattan Bridge	Ravi	Okara	Punjab	Japan
17	32.766306	71.424528	Indus @ CPEC Bridge M-14	Indus	GPS, Hindal Wala	Punjab	Japan
18	33.657889	73.304778	Pull Sawan	Soan	Rawalpindi	Punjab	Japan
19	30.576639	72.677528	Chichawatni Road Bridge	Ravi	Chichawatni	Punjab	Japan
20	30.807806	73.063750	Qutab Shahana Bridge	Ravi	Sahiwal	Punjab	Japan
21	32.668472	74.584000	Bajwat road Bridge Jammu tavi	Chenab	Sialkot	Punjab	WAPDA
22	34.120167	73.880194	Chakothi Bridge	Jhelum	Jhelum Valey	AJK	WAPDA
23	32.595444	74.284444	Sialkot AirPort Road Bridge (Shahbazpur)	Chenab	Sialkot	Punjab	Japan
24	30.078694	73.156500	Arifwala to Shawal Road Bridge	Sutlej	Vehari	Punjab	Japan
25-1	31.752694	72.947472	Chiniot Dam (1)	Chenab	Chiniot	Punjab	Japan
25-2	31.752889	72.956861	Chiniot Dam (2)	Chenab	Chiniot	Punjab	Japan
26	30.247167	73.443472	Baba Farid Headworks	Sutlej	Pakpattan	Punjab	Japan
27	34.803528	72.935556	Thakot	Indus	Battagram	KPK	WAPDA
28	33.896861	72.233917	Khairabad Bridge, N-5	Indus	Attock	KPK	WAPDA
29	35.102611	72.994861	Pattan	Indus	Lower Kohistan	KPK	WAPDA
30	34.008972	71.985611	Kabul River Bridge, Nowshera	Kabul	Nowshera	KPK	WAPDA
31	34.316167	73.074972	Phulra	Siran	Phulra	KPK	Japan
32	34.780833	73.520583	Kaghan	Kunhar	Kunhar	KPK	Japan
33	35.053722	72.474250	Bagh Deri Bridge	Swat	Swat	KPK	WAPDA
34	34.042722	71.836278	Mohib Banda, Pashtun Garhi	Kabul	Nowshera	KPK	WAPDA
35	34.414361	73.364194	Balakot	Kunhar	Balakot	KPK	Japan
36	35.715417	71.769972	Ayun	Kalash	Chitral	KPK	WAPDA
37	33.996778	72.423556	Indus Tarbela Outflow	Indus	Swabi/Attock	KPK	Japan
38	30.827528	71.944639	Sultan Bahoo Bridge	Chenab	Jhang	Punjab	Japan
39	34.165444	71.593417	Haji Zai Bridge, Shahqadar Road	Kabul	Charsadda	KPK	WAPDA
40	34.057500	73.149472	Abbottabad	Dor	Abbotabad	KPK	Japan
41	34.001361	72.954583	Haripur	Dor	Haripur	KPK	Japan
42	33.895694	73.162389	Haripur / Jabri Bridge	Haro	Haripur	KPK	Japan
43	32.014611	72.269528	Ghauspur Bridge	Jhelum	Khushab	Punjab	Japan
44	34.644639	72.028694	Chakdara Bridge	Swat	Lower Dir	KPK	WAPDA
45	34.538944	73.252500	Pine Valley Jabori	Siran	Mansehra	KPK	Japan

Annex-5(2)

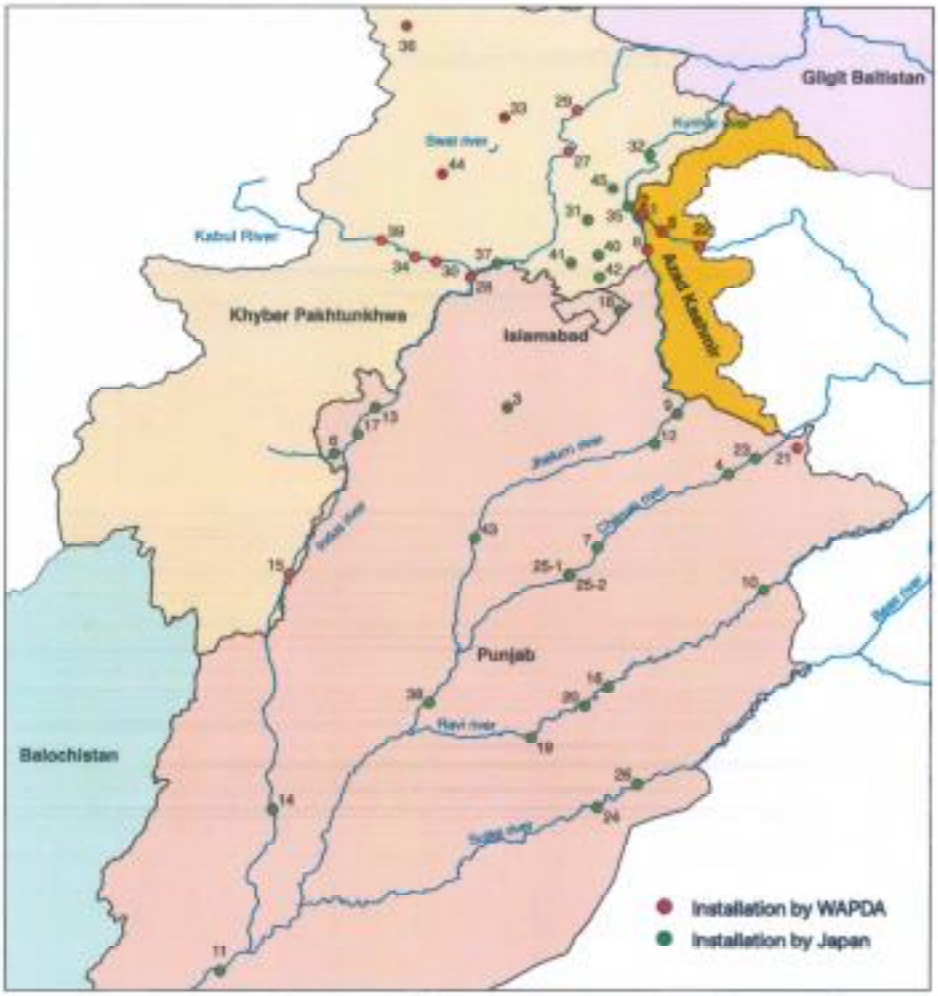


Figure: Location Map of Bridges (Project Sites) for
Installation of Hydrological & Hydraulic Observation System

Annex-6

Table: PMD Observatories for Installation of AWSs in KP Province

No.	Name of Station	Latitude	Longitude	Altitude (m)	District	Installation
1	Balakot	N 34° 32' 54"	E 73° 20' 59"	1013	Mansehra	Japan
2	Kakul	N 34° 11' 32"	E 73° 15' 59"	1355	Abbottabad	Japan
3	Naran	N 34° 54' 20"	E 73° 39' 09"	2450	Mansehra	Japan
4	Saidu Sharif	N 34° 45' 18"	E 72° 21' 10"	935	Swat	PMD
5	Pattan	N 35° 06' 33"	E 73° 00' 20"	752	Kohistan	Japan

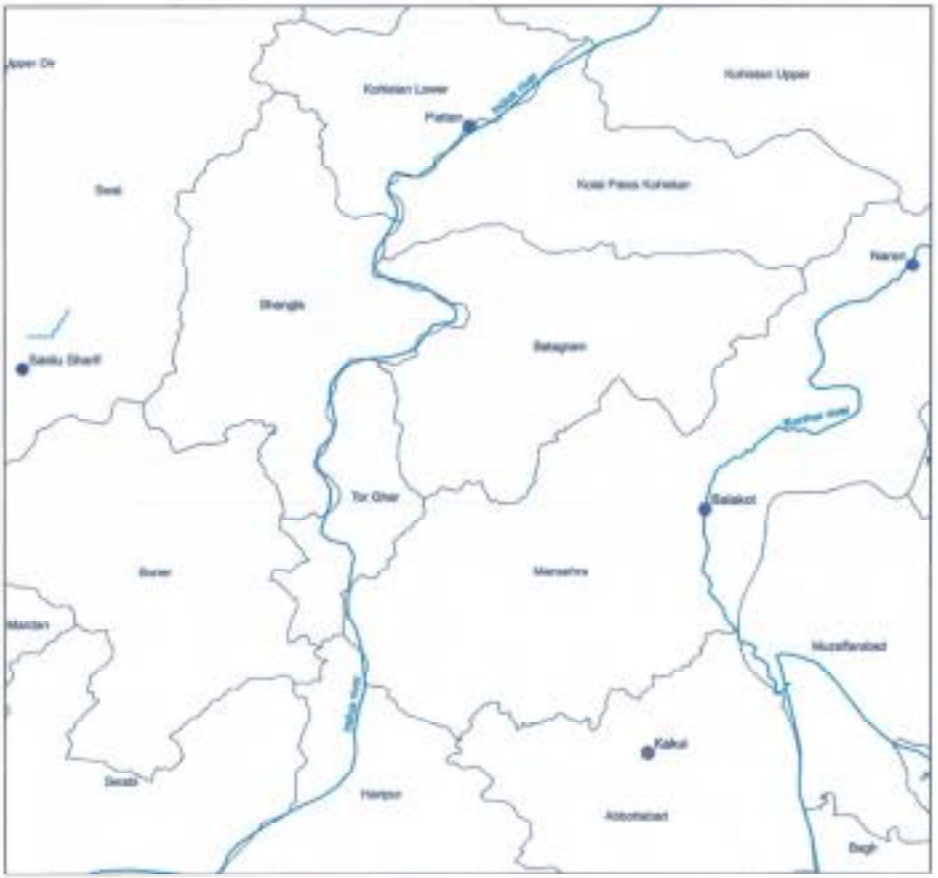


Figure: Location Map of PMD Observatories for Installation of AWSs in KP Province

Annex-7

Table: Training (Soft Component) for Stakeholders(*)

Achievements		Activities
1	WAPDA personnel can install and relocate Hydrologic & Hydraulic Observation Systems.	Training in site selection criteria for the installation of Hydrological & Hydraulic Observation Systems.
		Training in installation procedures for Hydrological & Hydraulic Observation Systems.
		Participation in pouring of concrete for installation of Hydrological & Hydraulic Observation Systems at four installation sites on the Japanese side.
		Participation in installation of Hydrological & Hydraulic Observation Systems at four installation sites on the Japanese side.
		Creating installation manuals for Hydrological & Hydraulic Observation Systems.
		Carrying out the installation at a WAPDA's installation site according to the manual prepared, under remote supervision by the consultant.
2	WAPDA personnel can smoothly operate and maintain the Hydrologic & Hydraulic Observation Systems.	Fundamental knowledge of the sensor technology.
		Creating the Summary of Hydrological & Hydraulic Observation Systems maintenance manual.
		Creating the operation and management record book of Hydrological and Hydraulic Observation Systems.
		Operation by WAPDA personnel in accordance with the Summary of the Manuals for the Operation of Hydrological & Hydraulic Observation Systems and recording in the operation and management record book
		Training in the assembly of delivered spare parts into actual equipment
		Fault finding, recovery and normality confirmation training for failure conditions.
		Training in response to serious breakdowns
3	WAPDA personnel can regularly observe changes in river conditions and reflect them in the calculation of discharge.	Training in assembly, disassembly and storage of ADCP equipment
		Hands-on training in measuring river cross-sectional profile data using ADCP equipment.
4	FFC and WAPDA personnel can smoothly operate, maintain and manage the Central Data Management Centres.	Basic operation of the Linux operating system on servers in the Central Data Management Centre
		Training in operation and maintenance techniques for servers in Central Data Management Centres
		Training in data backup techniques for servers in Central Data Management Centres
		Training in fault handling techniques for servers in Central Data Management Centres.
		Training in information security monitoring techniques for Central Data Management Centres
5	WAPDA personnel can maintain the accuracy of hydrologic and hydraulic observation data.	Verification of observation data from Hydrological and Hydraulic Observation Systems using standards, etc.
		Statistical validation of observation data from Hydrological and Hydraulic Observation Systems.
6	WAPDA personnel can distribute hydrologic and hydraulic observation data.	Technology for providing hydrological and hydraulic observation data via the Information Provision System.
		Technical training in the installation and initial set-up of software for the Alert System
		Technical training in the development of mobile apps for distribution of observation data and alerts
7	The distributed hydrological and hydraulic observation data will be utilized by stakeholders.	Technology for automatic acquisition of observation data from Central Data Management Centres.
		Statistical processing and format conversion technology for hydrological and hydraulic observation data.
8	PMD personnel can install AWSs.	Training in site selection criteria for the installation of AWSs.
		Training in installation procedures for AWSs.
		Participation in pouring of concrete for installation of AWSs at an installation site on the Japanese side.
		Participation in installation of AWSs at an installation site on the Japanese side.
		Creating installation manuals for AWSs.
		Carrying out the installation at a PMD's installation site according to the manual prepared, under remote supervision by the consultant.
9	PMD personnel can smoothly operate and maintain AWSs.	Creating the Summary of AWS maintenance manual.
		Creating the operation and management record book of AWSs.
		Operation by PMD personnel in accordance with the Summary of the Manuals for the Operation of AWSs and recording in the operation and management record book
		Training in the assembly of delivered spare parts into actual equipment
		Fault finding, recovery and normality confirmation training for failure conditions.
		Training in response to serious breakdowns

Note:
The target organisations named in the Achievement of each training item does not exclude other participants from the Stakeholders.
(*) Stakeholders: FFC, WAPDA, NDMA, PMD, PCIW, PIDs, IRSA

4.3　概略設計説明調査時（機材）

No. 4(470) Japan-I/2023
Government of Pakistan
Ministry of Economic Affairs
***

Section Officer (Japan-I)
PH: +92-051-9206167
Fax: +92-051-9104016

Islamabad the 20th March 2024

Subject: **SIGNING ON MINUTES OF DISCUSSIONS (M/D) OF THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT UNDER GRANT ASSISTANCE SCHEME**

I am directed to refer to JICA Pakistan office's letter No. JICA/Mar-18001/Projects/2024 dated 18th March 2024 on the subject.

2. It is stated that Minutes of Discussions have been signed by the Joint Secretary (Japan), Ministry of Economic Affairs and one set is attached for information/necessary action. However, one set has been retained in this Ministry.

With regards

Yours Sincerely,

(Muhammad Ishtiaq Akbar)

KOKI SAWA,
Representative,
Japan International Cooperation Agency,
Islamabad.

RECEIVED
21 MAR 2024
BY:.....

Minutes of Discussions
on the Preparatory Survey for the Project for
Flood Management Enhancement
(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between Federal Flood Commission (hereinafter referred to as "FFC") and Water and Power Development Authority (hereinafter referred to as "WAPDA") and Irrigation Department, Khyber Pakhtunkhwa (hereinafter referred to as "KPPID") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on August 2 and November 2, 2023 and in response to the request from the Government of Islamic Republic of Pakistan (hereinafter referred to as "Pakistan") dated May 05, 2023, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") to explain the current progress and to confirm some important points before discussing the Draft Preparatory Survey Report only for establishment of hydrological & hydraulic observation network (hereinafter referred to as "the Draft Report") for the Project for Flood Management Enhancement (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets (ATTACHMENT, Page 2 TO 42).

Islamabad, March 12, 2024

Taichi Minamitani
Leader
JICA Preparatory Survey Team
Japan International Cooperation Agency
Japan

Ahmed Kamal
Chief Engineering Advisor & Chairman
Federal Flood Commission
Ministry of Water Resources
Government of Pakistan

Muhammad Masroor Naqvi
General Manager
Hydro Resources Management (HRM)
Water and Power Development Authority
Government of Pakistan

Muhammad Zubair
Superintending Engineer
Hazara Irrigation Circle Abbottabad
Government of Khyber Pakhtunkhwa
Pakistan

Sahibzad Khan
Director General
Pakistan Meteorological Department
Ministry of Aviation
Government of Pakistan

Saeed Ashraf Siddiqi
Joint Secretary
Ministry of Economic Affairs
Government of Pakistan

ATTACHEMENT

1. Objective of the Project

The objective of the Project is to improve accuracy of flood forecasts and flood control functions, accumulate basic data that contributes to disaster risk reduction measures, and reducing the risk of loss of human lives and economic losses due to infrastructure damages caused by flood disasters through developing a hydrological and hydraulic observation network and rehabilitating the river structures damaged by the 2022 flood in Indus river and its tributaries, in addition to the capacity building and enhancement of flood management institutions, thereby contributing to future flood risk reduction.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Flood Management Enhancement".

3. Project site

Both sides confirmed that the Project sites are in Islamabad, the Provinces of the Punjab, the Khyber Pakhtunkhwa (KP), Balochistan and Sindh as indicated in following Table 1.

Table 1

Items	FFC	WAPDA Town	NDMA	PMD	PCIW	PID	IRSA	WAPDA House	HHOS Sites
Equipment for the Central Data Management Centres									
Data Receiving System	1	1							
Data Processing System	1	1							
Database System	1	1							
Information Provision System	1	1							
Data Management System		1							
Alert System								1	
Data Display System	3		1	1	1	4	1	1	
Hydrological & Hydraulic Observation System									46
Acoustic Doppler Current Profiler (ADCP)	1	5							
Automatic Weather Observation System				5					
Civil Woks						1 (PID KP)			

- FFC: Federal Flood Commission
- WAPDA: Water & Power Development Authority
- NDMA: National Disaster Management Authority
- IRSA: Indus River System Authority
- PMD: Pakistan Meteorological Department
- PCIW: Pakistan Commissioner for Indus Waters
- PID: Provincial Irrigation Department
- HHOS: Hydrological & Hydraulic Observation System

The Project Sites Map for establishment of Hydrological & Hydraulic Observation Network is shown in Annex 1.

4. Responsible authority for the Project

Both sides confirmed that the authorities responsible for the Project are as follows:

4-1. The FFC, Ministry of Water Resources, will be the Administrative Executing Agency for the Project (hereinafter referred to as "the Administrative Executing Agency"). The Administrative Executing Agency shall coordinate with all the relevant federal and provincial authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be taken care of by the relevant authorities properly

and timely. The organization charts are shown in Annex 2.

5. Finalization of the Report
After the explanation of the progress of the Survey by the Team, the Pakistan side agreed to its progress. JICA will reflect the feedbacks from the Pakistan side to the Preparatory Survey Report based on the confirmed items. The Final Report including the feasibility of the Civil Works will be finalized and sent to the Pakistan side around September 2024.

6. Timeline for the Project Implementation
The Team explained to the Pakistan side that the tentative timeline for the project implementation after signing of the Exchange of Notes (E/N) is approximately 29 months (for the telemetry equipment) and __ months for the civil works (timeline will be known by end of May 2024) as attached in Annex 4 and Annex 5 (relates to Civil Works).

7. Tentatively Expected Outcomes and Indicators
Both sides agreed that key indicators for the expected outcomes are as follows.

The Pakistan side will be responsible for achieving the agreed key indicators, whose target year will be 2030 and shall monitor the indicators for the Ex-Post Evaluation.

[Quantitative Indicators for the Telemetry Equipment]

Indicators	Present (Baseline in 2023)	Target (2030) (3 years after the Project Completion)
Increased density of hydrological and hydraulic observations provided to disaster management related organizations.	Major rivers in KP and Punjab provinces: density of observations Approx. 190 km/station	Major rivers in KP and Punjab provinces: density of observations Approx. 65 km/station
	KP with many tributaries: observation density Approx. 4,800 km2 / station	KP with many tributaries: observation density Approx. 2,500 km2 / station
Improved temporal resolution of meteorological observation data (e.g. rainfall, wind speed and pressure) in KP province, provided to disaster management related organizations	3-hour intervals by PMD observers (manual observations)	10-minute intervals by Automatic Weather Observation Systems.
Total length of major rivers in KP and Punjab provinces (Indus, Sutlej, Ravi, Chenab, Jhelum, Kunhar, Kabul): Approx. 3,230 km. Area of KP province: Approx. 100,900 km2		

[Qualitative Indicators for the Telemetry Equipment]

1) To improve the accuracy of hydrometeorological observations and flood forecasts through the strengthened river monitoring capability, enhance the early warning related to Flood & Water Management (FWM) and hence enable the relevant organizations to timely respond and commence necessary countermeasures against hydrometrological disasters in order to reduce the number of potential disaster victims.
2) To promote the implementation of FWM measures in order to reduce economic losses, through the provision of accurate hydrometrological information to users engaged in industries such as transportation, tourism, agriculture etc.

8. Ex-Post Evaluation
JICA will conduct ex-post evaluation after three (3) years from the project completion, when this Project officially starts, in principle, with respect to six evaluation criteria (Relevance, Coherence, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Pakistan side is required to provide necessary support for the data collection.

9. Technical Assistance ("Soft Component" of the Project)
Considering the sustainable operation and maintenance of the products and services granted through the Project, Soft Component (Training for Stakeholders – Annex 7) is planned under the Project. The Pakistan side understood the tentative contents of the Soft Component, and confirmed to deploy necessary number of counterparts who are appropriate and competent in terms of the purpose of the technical assistance as described in the Draft Report.

10. Undertakings of the Project
Both sides confirmed the undertakings of the Project as described in Annex 5, once the Project officially starts. With regard to the exemption of customs duties, internal taxes and other fiscal levies as stipulated in Annex 5 (During the Project, S. No.6), both sides confirmed that such customs duties, internal taxes and other fiscal levies, shall be clarified in the bid documents by EAD, FFC-MOWR, WAPDA, PMD and PID KP during the implementation stage of the Project.

The Pakistan side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is explained that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides confirmed that FFC-MOWR, WAPDA, PMD, PID KP shall take responsibility for arranging the maximum countermeasures and ensure the appropriate security of the whole Project site/s and of the Japanese and other foreign nationals assigned to the Project in cooperation with relevant authorities during the Project period. Such security measures shall reasonably reflect needs of the Consultant/the Contractor engaging in the Project.
Both sides agreed that in case the additional security cost would be necessary for the implementation of the Project, such cost shall be borne by the Recipient without using the Grant.

11. Monitoring during the implementation
The Project will be monitored by the Administrative Executing Agency in coordination with WAPDA, PMD & PID KP and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 6.

12. Project Completion
Both sides confirmed that the project completes when all the facilities constructed and equipment procured and installed by the Grant are in operation, once the Project starts. The completion of the Project will be reported to JICA promptly by the Administrative Executing Agency based on the completion reports submitted by the WAPDA, PMD and PID KP for their respective components, but in any event not later than six months after completion of the Project.

13. Items and measures for the smooth implementation of the Project

Both sides confirmed the items and measures to be considered for the smooth implementation of the Project as shown in Annex 8 (Outline of collaboration with the relevant organizations).

14. Environmental and Social Considerations

14-1 General Issues for the Civil Works

14-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (January 2022)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as B because the Project is likely to be site-specific, with few irreversible impacts, and can be addressed by general mitigation measures in most cases under the Guidelines.

14-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 9. Pakistan side assured that they shall take the necessary measures in accordance with the Environmental Checklist. Both sides agreed that in case of major modification of the content of the Environmental Checklist, the Pakistan side shall submit the modified version to JICA in a timely manner.

14-2 Environmental Issues

14-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed the EIA report would be required for the Civil Works component only.

14-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides agreed that environmental mitigation measures and monitoring shall be conducted based on the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP), which may be updated during the detailed design stage, if so required.

14-2-3 Consultation with Local Stakeholders

Pakistan side explained that meetings on the Project with the relevant local stakeholders and local residents with particular attention to directly affected peoples by the Project were held at meeting facilities called "Dera" in each local community and relevant stakeholders office on November 22 to December 6, 2023. Advance announcements for consultations with the relevant local stakeholders and local residents were made public through their representatives and stakeholder meetings. Opinions such as the type of floodwall (gabion wall or concrete wall) is not the concern, but durability was raised by the attendees. The outcome of the consultations shared by the Pakistan side was incorporated into the project document. However, there were no objections to the implementation of the Project. Pakistan side explained that appropriate considerations have been given to the attendees during those meetings.

14-3 Social Issues

14-3-1 Land Acquisition and Resettlement for the Civil Works

Both sides confirmed that some of land may be acquired, likewise some households/people may be affected, and households/people may be resettled due to the implementation of the Project (Social survey in progress).

Such land acquisition and resettlement shall be implemented based on the Resettlement Action Plan (RAP) which will be prepared in line with the Guidelines, if so required and authorized by the Pakistan side prior to agreement of G/A. The cost for RAP implementation is estimated as and Pakistan side / PID KP will secure budget for the cost.

14-4 Environmental and Social Monitoring for the Civil Works

14-4-1 Environmental Monitoring

Both sides agreed that the Pakistan side will submit results of environmental monitoring to JICA as a part of Monthly Progress Report by using the monitoring form. In case JICA finds that there is a need for improvement in a situation with respect to environmental considerations after the agreed monitoring period, JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed. The extension of the monitoring will be decided in accordance with the agreement between Pakistan side and JICA.

14-4-2 Social Monitoring

Both sides confirmed that the Pakistan side will implement social monitoring about land acquisition and resettlement / indigenous people plan proposed in the RAP / Indigenous People Plan (IPP). Pakistan side / PID KP agreed that progress of land acquisition and implementation of RAP will be monitored until land acquisition and resettlement activities including livelihood restoration program are completed. The Pakistan side and the Team agreed that the Executing Agency will submit results of social monitoring to JICA by using the monitoring form.

In case there is a remaining issue that needs to be addressed (e.g. insufficient restoration of livelihood of displaced Project Affected Persons (PAPs)), JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed and solved. The extension of the monitoring will be decided in accordance with the agreement between Pakistan side / PID KP and JICA.

14-4-3 Information Disclosure of Monitoring Results

Both sides confirmed that it will take stipulated procedures for information disclosure in accordance with The Khyber Pakhtunkhwa Environmental Assessment Rules 2021. In addition, the Team requested Pakistan side / PID KP to disclose results of environmental and social monitoring to local stakeholders and Pakistan side / PID KP agreed to disclose monitoring results through their website / in their field offices by date.

The Pakistan side agreed that JICA will disclose results of environmental and social monitoring submitted by the Pakistan side / PID KP as the monitoring forms on its website. If the third party request(s) further information, JICA discloses the information, which is subject to approval by the Pakistan side.

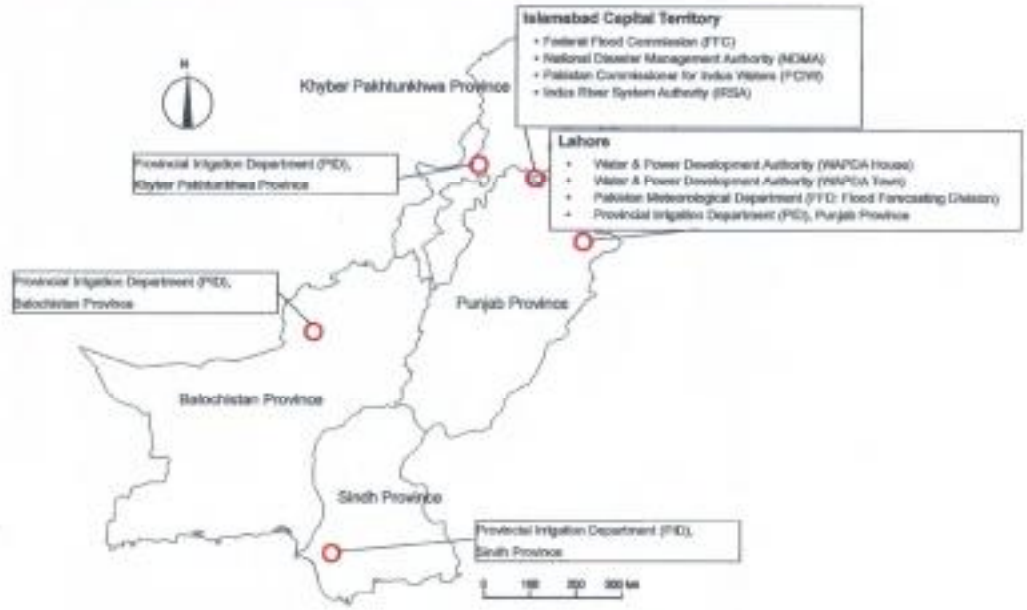
15.Other Relevant Issues

15-1. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

Annex 1 Project Site (Pages 7-10)

Establishment of Hydrological & Hydraulic Observation Network



7

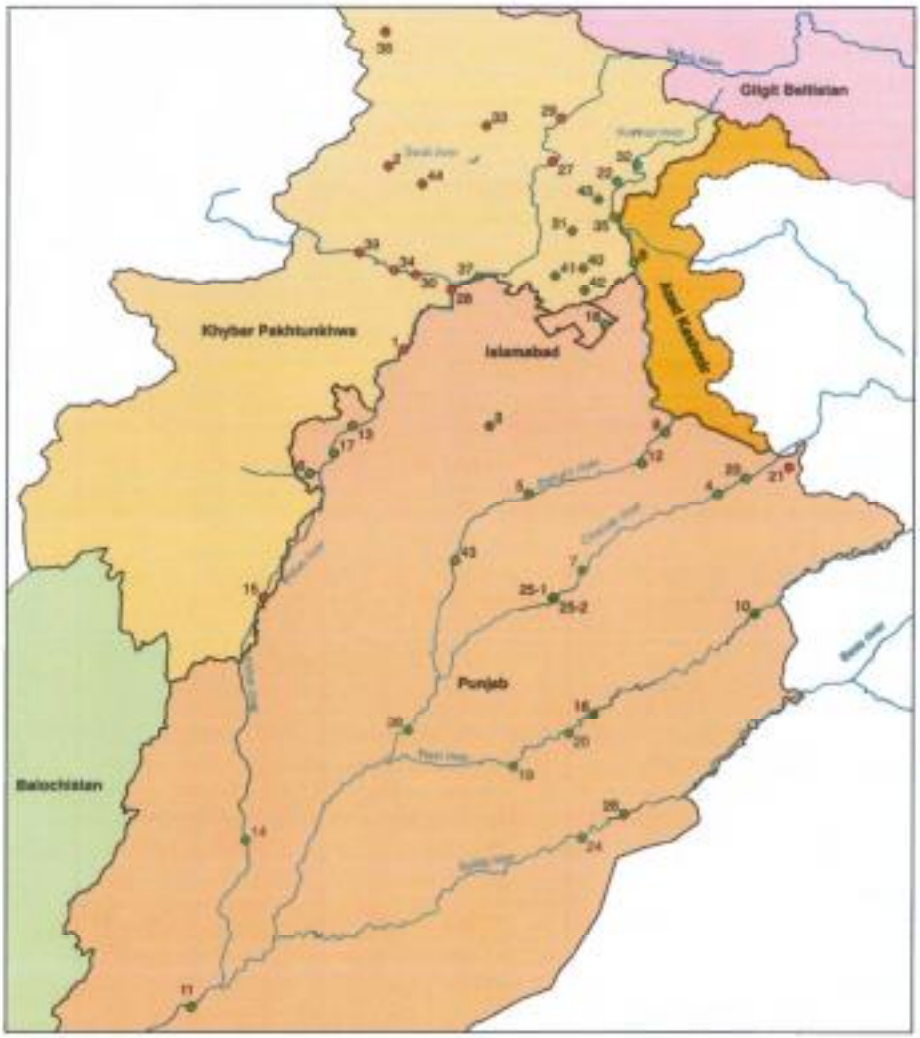


Figure: Location Map of Bridges (Project Sites) for Installation of Hydrological & Hydraulic Observation System

8

Table: Bridges (Project Sites) for Installation of Hydrological & Hydraulic Observation Systems

No.	Latitude	Longitude	Name of Site	River	Basin/District	Province	Installation
1	33.480555	71.909153	Khushal Garh Steel Bridge	Indus	Kohat	KPK	WAPDA
2	34.768037	71.792188	Zulam Bridge	Panjkora	Lower Dir	KPK	WAPDA
3	32.957167	72.501889	Dharab Bridge.	Dharab	Chakwal	Punjab	Japan
4	32.482528	74.091944	Chenab Bridge GT Road	Chenab	Gujranwala	Punjab	Japan
5	32.478882	72.857103	Bhera M-2	Jehlum	Jhelum	Punjab	Japan
6	32.625778	71.257806	Kurram @ CPEC Bridge M-14	Kurram	Mianwali	Punjab	Japan
7	31.945056	73.150917	Motor way Bridge Talab Wala	Chenab	Hafizabad	Punjab	Japan
8	34.096333	73.499000	Kohala Bridge	Jehlum	Abbottabad	KPK	Japan
9	32.914528	73.724250	Jhelum Bridge	Jehlum	Jehlum	Punjab	Japan
10	31.644250	74.345472	Lahore Sialkot Motorway Bridge	Ravi	Lahore	Punjab	Japan
11	28.900000	70.442528	Nishtar Ghat Bridge	Indus	Rahim Yar Khan	Punjab	Japan
12	32.695778	73.564083	Rasul Barrage	Jehlum	Mandi Bahauddin	Punjab	Japan
13	32.957139	71.552083	Kalabagh Mari Indus Railway Bridge	Indus	Mianwali	Punjab	Japan
14	30.063722	70.818361	Indus @ Ghazi Ghat Bridge Muzaffargarh	Indus	Muzafargarah	Punjab	Japan
15	31.758306	70.938556	Indus @ Bhakkar	Indus	Dera Ismail Khan	Punjab	WAPDA
16	30.946389	73.233139	Mari Pattan Bridge	Ravi	Okara	Punjab	Japan
17	32.766306	71.424528	Indus @ CPEC Bridge M-14	Indus	GPS, Hindal Wala	Punjab	Japan
18	33.657889	73.304778	Pull Sawan	Soan	Rawalpindi	Punjab	Japan
19	30.576639	72.677528	Chichawatni Road Bridge	Ravi	Chichawatni	Punjab	Japan
20	30.807806	73.063750	Qutab Shahara Bridge	Ravi	Sahiwal	Punjab	Japan
21	32.668472	74.584000	Rajwat road Bridge Jammu tavi	Chenab	Sialkot	Punjab	WAPDA
22	34.549693	73.354286	Balakot	Kunhar	Mansehra	KPK	Japan
23	32.595444	74.284444	Sialkot AirPort Road Bridge (Shahbazpur)	Chenab	Sialkot	Punjab	Japan
24	30.078694	73.156500	Arifwala to Shawai Road Bridge	Satluj	Vehari	Punjab	Japan
25-1	31.752694	72.947472	Chiniot Dam (1)	Chenab	Chiniot	Punjab	Japan
25-2	31.752889	72.956861	Chiniot Dam (2)	Chenab	Chiniot	Punjab	Japan
26	30.247167	73.443472	Baba Farid Headworks	Sutlej	Pakpattan	Punjab	Japan
27	34.803528	72.935556	Thakot	Indus	Battagram	KPK	WAPDA
28	33.896861	72.233917	Khairabad Bridge, N-5	Indus	Attock	KPK	WAPDA
29	35.102611	72.994861	Pattan	Indus	Lower Kohistan	KPK	WAPDA
30	34.008972	71.985611	Kabul River Bridge, Nowshera	Kabul	Nowshera	KPK	WAPDA
31	34.316167	73.074972	Phulra	Siran	Phulra	KPK	Japan
32	34.780833	73.520583	Kaghan	Kunhar	Kunhar	KPK	Japan
33	35.051722	72.474250	Bagh Dori Bridge	Swat	Swat	KPK	WAPDA
34	34.042722	71.836278	Mohib Banda, Pashtun Garhi	Kabul	Nowshera	KPK	WAPDA
35	34.414361	73.364194	Balakot	Kunhar	Balakot	KPK	Japan
36	35.715417	71.769972	Ayun	Kalash	Chitral	KPK	WAPDA
37	33.996778	72.423556	Indus Tarbela Outflow	Indus	Swabi/Attock	KPK	Japan
38	30.827528	71.944639	Sultan Bahoo Bridge	Chenab	Jhang	Punjab	Japan
39	34.165444	71.593417	Haji Zai Bridge, Shabqadar Road	Kabul	Charsadda	KPK	WAPDA
40	34.057500	73.149472	Abbottabad	Dor	Abbotabad	KPK	Japan
41	34.001361	72.954583	Haripur	Dor	Haripur	KPK	Japan
42	33.895694	73.162389	Haripur / Jabri Bridge	Haro	Haripur	KPK	Japan
43	32.014611	72.269528	Ghaspur Bridge	Jhelum	Khushab	Punjab	Japan
44	34.644639	72.028694	Chakdara Bridge	Swat	Lower Dir	KPK	WAPDA
45	34.538944	73.252500	Pine Valley Jabori	Siran	Mansehra	KPK	Japan

9

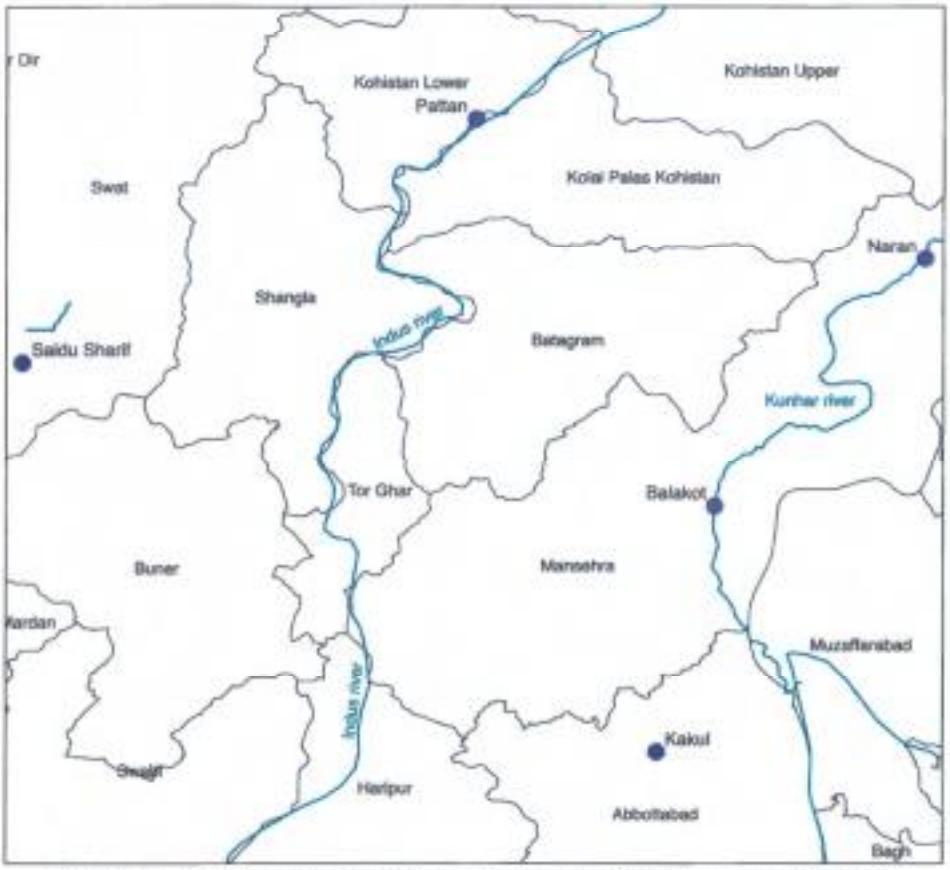


Figure: Location Map of PMD Observatories for Installation of AWSs in KP

Table: PMD Observatories for Installation of AWSs in KP Province

No.	Name of Station	Latitude	Longitude	Altitude (m)	District	Installation
1	Balakot	N 34° 32' 54"	E 73° 20' 59"	1013	Mansehra	Japan
2	Kakul	N 34° 11' 32"	E 73° 15' 59"	1355	Abbottabad	Japan
3	Naran	N 34° 54' 20"	E 73° 39' 09"	2450	Mansehra	Japan
4	Saidu Sharif	N 34° 45' 18"	E 72° 21' 10"	935	Swat	PMD
5	Pattan	N 35° 06' 33"	E 73° 00' 20"	752	Kohistan	Japan

10

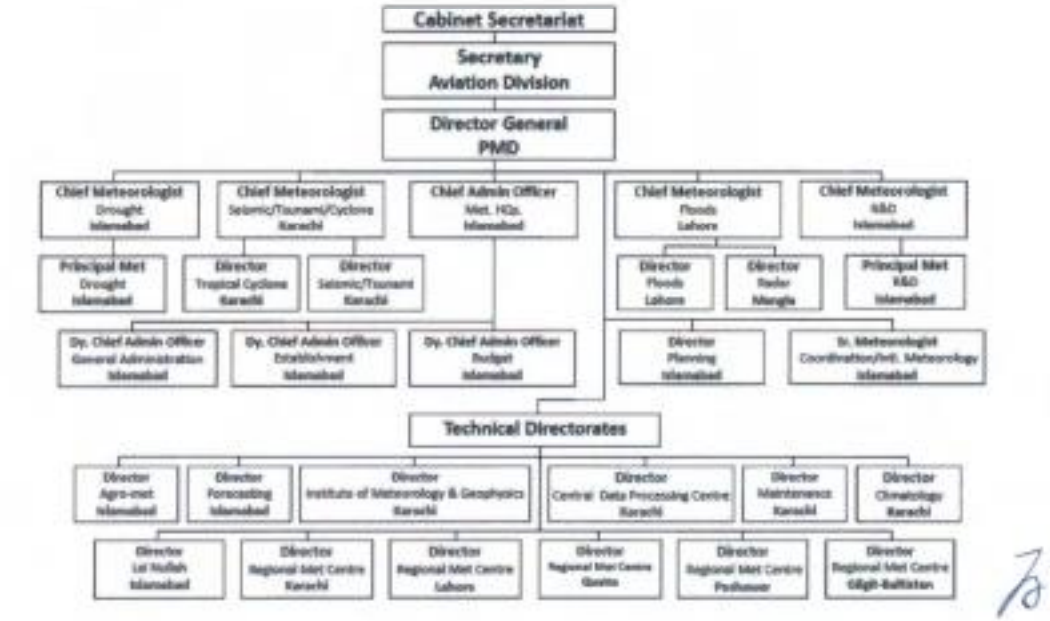
Annex 2 Organization Chart (Pages 11-13)

Execution System of the Project

Ministry of Water Resources			Ministry of Aviation
Administrative Executing Agency	Operational Executing Agency(Equipment Works)	Operational Executing Agency (Civil Works)	Operational Executing Agency (Equipment Works: AWSs)
Federal Flood Commission (FFC)	**Water and Power Development Authority (WAPDA)**	**Irrigation Department, Khyber Pakhtunkhwa**	**Pakistan Meteorological Department (PMD)**

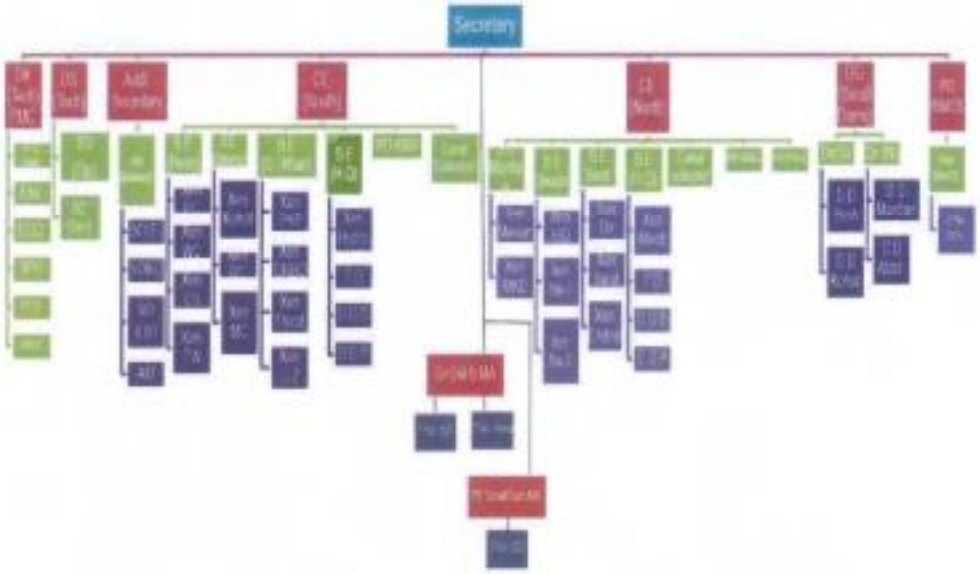
Organization Chart of Pakistan Federal Flood Commission (FFC)

Figure : Organization Chart of Pakistan Water and Power Development Authority (WAPDA)



Organization Chart of Pakistan Meteorological Department (PMD)

12



Organization Chart of Irrigation Department, Khyber Pakhtunkhwa

Annex 3 Japanese Grant (Pages 14-18)

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement

the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to

regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other

fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Measures to ensure more efficient implementation of the Grant

i) In the event that the E/N and the G/A concerning a project cannot be signed by the end of the following Japanese fiscal year of the cabinet decision concerned by the GOJ, the authorities concerned of the two Governments will discuss the cancellation of the project.

ii) In the event that the period, specified in the G/A, during which the grant is available expires before the completion of the disbursement, the authorities concerned of the GO J will thoroughly review the status, situation and perspective of the implementation of the project concerned before extending the said period. The authorities concerned of the two Governments will discuss the termination of the project including a refund, unless there are concrete prospects for its completion.

iii) Regardless of the period mentioned in ii) above, the authorities concerned of the two Governments will, in the event that five years have passed since the cabinet decision concerned by the GOJ before the completion of the disbursement, except as otherwise confirmed between them, discuss the termination of a project including a refund, unless there are concrete prospects for its completion.

4) Proper Use

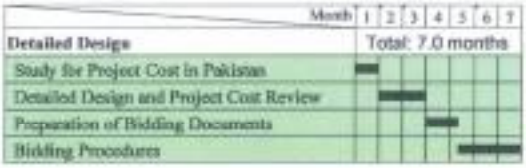
The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

5) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

Annex 4 Project Implementation Schedule

Establishment of Hydrological & Hydraulic Observation Network. Details of the Activities in the Soft Component are found in Annex 7.



Annex 5 Major Undertakings to be taken by the Government of Pakistan (Pages 20-22)

Before the Tender

No.	Items	Deadline	In charge	Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A)).	within 3 months after G/A	FFC, MoWR		
2	To obtain NOC/permission/consent/acceptance of the owners (National Highway Authority, Punjab Highway Department, etc.) of bridges which have been selected by the WAPDA and the Team together through the site survey.	before notice of the Tender	WAPDA		
3	To obtain NOC/permission/consent/acceptance of the rehabilitation of river structures which have been selected by the FFC/PID and the Team together through the site survey.	before notice of the Tender	FFC, MoWR PID		
4	To secure sufficient spaces at the respective project site/s for temporary facilities such as contractors office, workshop, building material storage, disposal area, etc. needed for construction work.	before notice of the Tender	FFC WAPDA PMD PID		
5	To undertake the Initial Environmental Examination (IEE) procedures in Pakistan, if required so.	before completion of PC-I	FFC WAPDA PID		
6	To obtain the allocation of the required radio frequencies for the sensors of Hydrological & Hydraulic Observation Systems.	before notice of the Tender	WAPDA		
7	To procure and install the air conditioning units with enough capability to effectively cool all the equipment procured under the Project and by the FFC in future in the Data Centre to be newly established by the FFC.	before notice of the Tender	FFC		

During the Project

No.	Items	Deadline	In charge	Cost	Ref.
1	To pay bank charge (commission) for the issuance of the Authorization to Pay (A/P) and amendments of A/P, if required, for the Consultant and the Contractor.	Every payment	FFC, MoWR		
2	To undertake all necessary institutional and juridical procedures in Pakistan.	During the Project	FFC, MoWR WAPDA PID PMD		
3	To bear all the expenses, other than those to be borne by the Japanese Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment.	During the Project	FFC, MoWR WAPDA PID PMD		
4	To ensure prompt unloading, customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation in the country of the Recipient of the products	During the Project	FFC, MoWR WAPDA PID PMD		
5	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	During the Project	FFC, MoWR WAPDA PID PMD		
6	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted by its designated authority without using the Grant.	During the Project	FFC, MoWR WAPDA PID PMD		

No.	Items	Deadline	In charge	Cost	Ref.
7	To remove and relocate the existing facilities for the installation of the equipment in the proposed Central Data Management Centres of Islamabad (FFC) and Lahore (WAPDA Town), if required.	During the Project	FFC WAPDA		
8	To remove and relocate the existing facilities for the installation of the equipment, if required.	During the Project	PMD		
9	To provide free of charge and allocate secure temporary storage area/room/warehouse for the materials, tools and equipment needed during the Project implementation including trainings.	During the Project	FFC, MoWR WAPDA PMD		
10	To obtain the required type approval of terminal equipment for wireless radio transceivers with more than 2mW output power for observation data transmission and receiving by the Hydrological & Hydraulic Observation Systems.	Immediately after the Tender	FFC, MoWR WAPDA		
11	To procure mobile SIM cards (GSM/GPRS) for transmitting/receiving data observed by the Hydrological & Hydraulic Observation Systems and the Central Data Management Systems and bear the recurrent cost.	Before installation of the Equipment	FFC, MoWR WAPDA		
12	To procure mobile SIM cards (GSM/GPRS) for transmitting/receiving data observed by the Automatic Weather Observation Systems and bear the recurrent cost.	Before installation of the Equipment	PMD		
13	To promptly provide reliable high-speed Internet environment at the proposed Central Data Management Centres in Islamabad and Lahore (with each corresponding global/fix IP) for the establishment of a Virtual Private Network between the Central Data Management Centres.	Before installation of the Equipment	FFC WAPDA		
14	To set up the required and new assigned IP addresses and domain names in the computing equipment supplied under the Project and facilitate any required configuration i.e. firewall settings, etc. of the existing equipment which may be made part of the project network communication system, if any.	Before installation of the Equipment	FFC WAPDA		
15	To secure ample space/s at the existing facilities to establish the proposed Central Data Management Centres in Islamabad (FFC) and Lahore (WAPDA Town), if necessary.	Before installation of the Equipment	FFC WAPDA		
16	To assign appropriate number of trainees who will be a member of the WAPDA installation teams and to shoulder their dispatching cost to the proposed sites of the Hydrological & Hydraulic Observation Systems including ADCPs for the trainings, such as daily allowance, transportation fee, accommodation, if any.	Before installation of the Equipment	WAPDA		
17	To assign appropriate number of trainees who will be a member of the PMD installation team and to shoulder their dispatching cost to the proposed sites of the Automatic Weather Observation Systems for the trainings, such as daily allowance, transportation fee, accommodation, if any.	Before installation of the Equipment	PMD		
18	To assign appropriate number of trainees and shoulder their dispatching cost to the proposed Central Data Management Centres of Islamabad (FFC) and Lahore (WAPDA Town) and some of the proposed sites of the Hydrological & Hydraulic Observation Systems and Data Display Systems for the trainings, such as daily allowance, transportation fee, accommodation, if any.	During the Project	FFC WAPDA NDMA PID		
19	To take responsibility for arranging the maximum countermeasures and ensure the appropriate security of the whole Project site/s and of the Japanese and other foreign nationals assigned to the Project.	During the Project	FFC WAPDA PID PMD		

After the Project

No	Items	Deadline	In charge	Cost	Ref.
1	To assign the required staff including a responsible personnel from WAPDA and PMD, who have reliable technical skill and ample experience for the smooth operation and maintenance of the Equipment procured under the Project.	After completion of the Project	WAPDA PMD		Note 2
2	To procure the required spare parts and consumables for the smooth operation and maintenance of the Equipment, and enter into a preventive maintenance service agreement with the equipment supplier if so desired.	After completion of the Project	FFC, MoWR WAPDA PMD		
3	To properly operate and maintain, and also effectively utilize the Equipment procured under the Project.	After completion of the Project	FFC WAPDA PMD		
4	To maintain and use properly and effectively facilities of river structures constructed under the Project 1) Allocation of maintenance cost 2) Implementation of repair and maintenance works 3) Routine check/Periodic inspection	After completion of the Project	PID		
5	To periodically update the operating system, antivirus and application software(s) of all the computers procured under the Project.	After completion of the Project	FFC WAPDA PMD		
6	To allocate the necessary budget and personnel for the smooth conduct of hydrological and hydraulic observation and provisioning of the observation data to the concerned agencies related to the disaster management.	After completion of the Project	WAPDA		Note 3
7	To allocate the necessary budget and personnel for the smooth conduct of meteorological observation and provisioning of the observation data to the concerned agencies related to the disaster management.	After completion of the Project	PMD		Note 3
8	To procure the appropriate number and capacity of disk media, hard disks, solid state disks, etc., and dutifully conduct the required periodic archiving of observation data and products.	After completion of the Project	FFC WAPDA PMD		
9	To monthly maintain all the air conditioning units including cleaning air filters to keep the effective and efficient cooling of all the Equipment in the Central Data Management Centres.	After completion of the Project	FFC WAPDA		
10	To always ensure enough space for entrance/exit of the cooling fans of all the equipment for keeping smooth air-flow procured under the Project in the Central Data Management Centres.	After completion of the Project	FFC WAPDA		
11	To make the maximum countermeasures for protection of the Hydrological & Hydraulic Observation Systems from theft or destruction.	After completion of the Project	WAPDA		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

(Note): Progress of the specific obligations of the Recipient may be confirmed and updated from time to time with written agreement between JICA and the Recipient in the form other than the amendment of the G/A.

(Note 2): 2 IT engineers and 2 Electrical sub-engineers will be indicated in the PC-I in order to be hired for appropriate maintenance of the project equipment.

(Note 3): The estimated capital cost and annual recurrent cost will be indicated in the PC-I in order to secure the budget for appropriate maintenance of the project equipment.

Annex 6 Project Monitoring Report (template) (Pages 23-32)

Project Monitoring Report
on

Grant Agreement No. XXXXXXX
20XX, Month

Organization Information

Authority (Signer of the G/A)	Person in Charge Contacts Address: Phone/FAX: Email:
Executing Agency	Person in Charge Contacts Address: Phone/FAX: Email:
Line Agency	Person in Charge Contacts Address: Phone/FAX: Email:

Outline of Grant Agreement:

Source of Finance	Government of Japan: Not exceeding JPY , Government of Pakistan:
Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:

1: Project Description

1-1 Project Objective

1-2 Necessity and Priority of the Project

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

1-3 Effectiveness and the indicators

- Effectiveness by the project

Quantitative Effect (Operation and Effect indicators)		
Indicators	Original (Yr 2017)	Target (Yr 2021)
Qualitative Effect		

2: Project Implementation

2-1 Project Scope

Table 2-1-1a: Comparison of Original and Actual Location

Location	**Original:** *(M/D)* **Attachment(s):Map**	**Actual:** *(PMR)* **Attachment(s):Map**

Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual

2-1-2 Reason(s) for the modification if there have been any.

2-2 Implementation Schedule

2-2-1 Implementation Schedule

Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
Cabinet Approval		-	-
E/N			
G/A			
Approval of consultant contract			
Early Mobilization of consultant			
Detailed Design			
Budget Request for FY2016			
Tender Process of contractor and supplier			
Approval of contractor and supplier contract			
Budget Appropriation and Issuance of A/P			
Construction Period			
Shipment			
Custom Clearance			
Installation and acceptance Check			
Soft component			
Project Completion Date			
Defect Liability Period			

*Project Completion was defined as Completion of Soft component at the time of G/A.

2-2-2 Reasons for any changes of the schedule, and their effects on the project.

2-3 Undertakings by each Government

2-3-1 Major Undertakings

See Attachment 2.

2-3-2 Activities

See Attachment 3.

2-3-3 Report on RD

See Attachment 4.

2-4 Project Cost

2-4-1 Project Cost

Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan
(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original	Actual
Construction of Facilities				
Equipment				
Soft Component				
Consulting Services				
Contingency				
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =**Yen

Table 2-4-1b Comparison of Original and Actual Cost by the Government of **

Items			Cost (Thousand MMK)	
	Original	Actual	Original	Actual

Please state not only the most updated schedule but also other past revisions chronologically.

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =(local currency)

2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

2-5 Organizations for Implementation

2-5-1 Executing Agency:

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original: *(M/D)*
Actual, if changed: *(PMR)*

2-6 Environmental and Social Impacts

- The environmental monitoring is not required in the Project as this project was categorized as category C in accordance with the GUIDELINES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS of JICA as of April 2010.

3: Operation and Maintenance (O&M)

3-1 O&M and Management

- Organization chart of O&M
- Operational and maintenance system (structure and the number ,qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

Original: *(M/D)*
Actual: *(PMR)*

3-2 O&M Cost and Budget

- The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

Original: *(M/D)*

Actual: *(PMR)*

4: Precautions (Risk Management)

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

Original Issues and Countermeasure(s): *(M/D)*	
Potential Project Risks	Assessment
1. Delay of budget appropriation	Probability: H/M/L
	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
3.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
Actual issues and Countermeasure(s)	
(PMR)	

5: Evaluation at Project Completion and Monitoring Plan

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan for the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Undertakings to be taken by each Government
3. Monthly Report
4. Report on RD
5. Yearly disbursement plan
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (Final Report Only)

Annex 7 Training for Stakeholders (Pages 33-34)

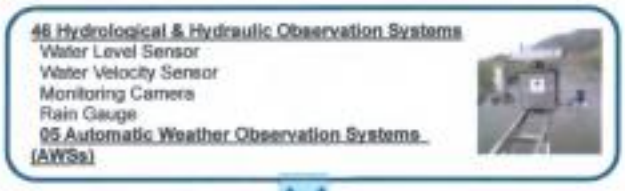
No.	Achievements	Effects from the Soft Component Activities
1	WAPDA staff can install and relocate Hydrological & Hydraulic Observation Systems.	WAPDA staff will learn how to install and relocate the Hydrological & Hydraulic Observation Systems, thereby supporting the safe and reliable installation of the systems by WAPDA staff at sites where Japanese engineers cannot visit for safety management reasons, and facilitating the smooth start-up of the Project. In addition, if the effectiveness of the observation sites decreases in the future due to changes in the shape of the river, WAPDA itself will relocate the observation sites to more effective ones, so that the Hydrological & Hydraulic Observation Systems developed through Japan's grant aid can be used effectively over the long term.
2	WAPDA staff can smoothly operate and maintain Hydrological & Hydraulic Observation Systems.	The Hydrological & Hydraulic Observation Systems to be established through Japan's grant aid will operate well over the long term by WAPDA staff who learn how to maintain the systems and carry out appropriate maintenance, including conducting regular inspections and recording the results according to established procedures.
3	WAPDA and FFC staff can maintain the accuracy of Hydrological & Hydraulic Observation Data.	By familiartzing WAPDA and FFC staff with the measurement of river cross-sectional profiles using the ADCP, and by ensuring regular ADCP measurement and regular checking of the accuracy of Hydrological & Hydraulic Observation Data from the stage of equipment handover, not only will the validity of Hydrological & Hydraulic Observation Data be improved, but also the Hydrological & Hydraulic Observation System will be able to be effectively used over the long term. This will enable early detection of and response to problems with the Hydrological & Hydraulic Observation Systems, and ensure that the Hydrological & Hydraulic Observation Systems developed through Japan's grant aid can be used effectively over a long period of time.
4	WAPDA and FFC staff can smoothly operate, maintain and manage the Central Data Management Centre.	WAPDA and FFC staff learn how to maintain the Central Data Management Centres, conduct regular inspections and record the results in accordance with established procedures and implementing appropriate maintenance management, and acquire the skills to systematically respond to equipment failures and communication problems when they occur, thereby, the Central Data Management Centres, which will be developed through Japan's grant aid, operates well over the long term and the observation data from the Hydrological & Hydraulic Observation Systems are used effectively over the long term.
5	WAPDA and FFC staff can distribute Hydrological & Hydraulic Observation Data.	By creating an environment in which WAPDA and FFC staff can issue alerts on changes in river discharge based on Hydrological & Hydraulic Observation Data , the Hydrological & Hydraulic Observation System to be developed through Japan's grant aid will be used effectively over the long term to reduce flood risks, which is one of the objectives of the Project.
6	The distributed Hydrological & Hydraulic Observation Data are utilized by staff of disaster management agencies.	The users of the relevant organizations learn how to automatically acquire Hydrological & Hydraulic Observation Data stored in the Central Data Management Centres and how to incorporate them into models, etc., so that the observation data from the Hydrological & Hydraulic Observation Systems developed through Japan's grant aid can be used effectively over the long term.
7	PMD staff can install AWS.	By training PMD staff on how to install Hydrological & Hydraulic Observation Systems, the Project will support safe and reliable installation of Hydrological & Hydraulic Observation Systems by PMD staff at sites where Japanese engineers cannot work for safety management reasons, thereby facilitating a smooth start-up of the Project. In addition, the PMD staff's understanding of the AWS will be deepened through training on installation methods, and the quality of operation and maintenance management and fault handling will be improved, leading to effective long-term use of the AWS that will be established through Japan's grant aid.
8	PMD staff can smoothly operate and	The AWS to be established through Japan's grant aid will operate well over the

	maintain the AWS.	long term by PMD staff who learn how to maintain the systems and carry out appropriate maintenance, including conducting regular inspections and recording the results according to established procedures.

Note: Participation to the Soft Component is open to all executing agencies.

Annex 8 Outline of collaboration with the relevant organizations

The outline of the collaboration with the relevant organizations



- Improving river flow monitoring capacity
- Improving accuracy of flood forecast & warning
- Accumulation of river and weather observation data

Reducing human and economic losses caused by flood disasters under the spirit of Sendai Framework for DRR

35

Annex 9 Environmental Checklist (Pages 36-42)

classification	item	Main things to check	Yes: Y No: N	Specific Environmental and Social Considerations (Yes/No reasons, rationale, mitigation measures, etc.)
1 Permits and Licenses and Consultations	(1) Environmental Assessment and Environmental Permits	(a) Have you prepared an environmental assessment report (EIA report)? (b) Is the EIA report written in the official or widely used language of the country concerned? (c) Has the EIA report been approved by the government of the country concerned (if not, the date of approval should be stated in the "Specific Environmental and Social Considerations" column)? (d) Does the approval of the EIA report entail any additional conditions? If there are ancillary conditions, are they satisfied? (e) In addition to the above, have you obtained environmental permits and approvals from the local competent authorities, if necessary? (f) Are the items listed in Annex 2 of the Guidelines comprehensive (the scope and level of detail may be adjusted depending on the potential impact of the project)? (g) Have you checked the environmental and social considerations of the entire scope, cumulative impact, derivative and secondary impact, and integral part of the project?	(a) (b) (c) (d) (e) (f) (g)	(a) (b) (c) (d) (e) (f) (g)
	(2) Explanation and consultation with local residents	(a) Is the analysis and identification of local stakeholders appropriate? (b) Is the content and impact of the project appropriately explained to local stakeholders and gained their understanding through a process to ensure meaningful consultation, including information disclosure? (c) Is a record of the on-site stakeholder consultation recorded, including the gender and other attributes of the participants? (d) Did the comments from residents and others be reflected in the content of the project?	(a) (b) (c) (d)	(a) (b) (c) (d)

classification	item	Main things to check	Yes: Y No: N	Specific Environmental and Social Considerations (Yes/No reasons, rationale, mitigation measures, etc.)
	(3) Consideration of alternatives	(a) Is the scope of multiple alternatives to the project or plan appropriate? (b) Are feasible alternatives in terms of technology, finance, and environmental and social considerations considered from the viewpoint of reducing total greenhouse gas emissions as necessary in terms of environmental and social issues? (c) Have you made any comparisons with proposals that do not implement the project?	(a) (b) (c)	(a) (b) (c)
24 Anti-Contamination Measures	(1) Water quality	(a) As a result of the implementation of the project, will there be sections that do not meet environmental standards, etc., due to changes in downstream river flow (mainly lower water levels)? (b) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b)	(a) (b)
	(2) Waste	(a) If a large amount of excavated soil or dredged soil is generated, is it properly treated and disposed of in accordance with the regulations of the country concerned? (b) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b)	(a) (b)
	(3) Subsidence	(a) Is there a risk of groundwater level decline or land subsidence due to excavation? (b) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b)	(a) (b)
25 Natural environment	(1) Protected areas	(a) Is the site located within a protected area stipulated in the laws of the country concerned or international treaties? (b) Does the project affect the reserve? (c) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b) (c)	(a) (b) (c)

Category	item	Main things to check	Yes: Y No: N	Specific Environmental and Social Considerations (Yes/No reasons, rationale, mitigation measures, etc.)
	(2) Biodiversity	(a) Does the project site include old-growth forests, tropical natural forests, and ecologically important habitats (coral reefs, mangrove swamps, tidal flats, etc.)? (b) Does the project site contain habitats of valuable species that require protection under the laws of the country concerned or international treaties? (c) Does the project involve significant conversion or significant degradation of critical habitats or forests and is concerned about significant impacts on biodiversity? If so, are appropriate measures taken to address the impact on biodiversity? (d) Will the decrease in flow rate or the upstream flow of seawater have a negative impact on aquatic life, flora, fauna, and ecosystems in the downstream area? (e) Will the project's changes in flow conditions have a negative impact on the river water environment? (f) If there are other concerns about serious impacts on biodiversity, will measures be taken to reduce the impacts on biodiversity? (g) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b) (c) (d) (e) (f) (g)	(a) (b) (c) (d) (e) (f) (g)
	(3) Water elephants	(a) Will the changes in the water system due to the project have a negative impact on the flow of surface water and groundwater? (b) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b)	(a) (b)
	(4) Topography and geology	(a) Will the excavation of rivers and waterways result in large-scale changes in the topography and geological structure of the area around the project site? (b) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b)	(a) (b)

Classification	item	Main things to check	Yes: Y No: N	Specific Environmental and Social Considerations (Yes/No reasons, rationale, mitigation measures, etc.)
4 Corporate Environment	(1) Relocation of residents and acquisition of land	(a) Will the implementation of the project result in land acquisition involving involuntary relocation? If it occurs, the scale of land acquisition and relocation of residents is described. (b) Efforts will be made to minimize the impact of the transfer: Will there be other land acquisitions or loss of livelihoods? (c) Will appropriate explanations be given to relocating residents regarding compensation and livelihood reconstruction measures prior to relocation? (d) Will a survey be conducted for the relocation of the population and a relocation plan will be drawn up, including compensation in the form of repurchase prices and the restoration of livelihoods after the relocation? (e) Will compensation be paid prior to the relocation? (f) Is the compensation policy in writing? (g) Does the plan give due consideration to vulnerable populations, particularly women, children, the elderly, the poor, persons with disabilities, refugees and internally displaced persons, and minorities? (h) Will the compensation to be agreed upon be explained to the subject in writing and will there be a pre-relocation agreement for the relocated residents? (i) Is a system in place to properly implement the resettlement? Will there be sufficient implementation capacity and budgetary measures? (j) Is there a plan to monitor the impact of the relocation? (k) Is there a grievance mechanism in place?	(a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k)	(a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k)

classification	item	Main things to check	Yes: Y No: N	Specific Environmental and Social Considerations (Yes/No reasons, rationale, mitigation measures, etc.)
4 Corporate Environment	(2) Life and livelihood	(a) Will the project have a negative impact on the livelihoods of residents? If necessary, will consideration be given to mitigate the impact? (b) Will the project's water use (surface water, groundwater) adversely affect fisheries and water use in the surrounding and downstream areas? (c) Does the project have a negative impact on ecosystem services (supply and regulation) and affect the health and safety of communities, in particular indigenous peoples who depend on the services? (d) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b) (c) (d)	(a) (b) (c) (d)
	(3) Socially vulnerable people	(a) Is appropriate consideration given to vulnerable groups such as women, children, the elderly, the poor, persons with disabilities, refugees and internally displaced persons, and minorities? (b) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b)	(a) (b)
	(4) Cultural heritage	(a) Is there a risk that the project will damage archaeological, historical, cultural, or religious heritage or historic sites? In addition, will the measures stipulated in the domestic law of the country concerned be taken into account? (b) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b)	(a) (b)
	(5) Scenery	(a) If there is a landscape that requires special consideration, will it have a negative impact on it? (b) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b)	(a) (b)

Classification	Item	Main things to check	Yes: Y No: N	Specific Environmental and Social Considerations (Yes/No reasons, rationale, mitigation measures, etc.)
	(6) Ethnic minorities and indigenous peoples	(a) Is consideration given to reducing the impact on the culture and lifestyle of ethnic minorities and indigenous peoples in the country? (b) Will the rights of ethnic and indigenous peoples to land and resources be respected? (c) Where necessary, has an Indigenous Peoples Plan been developed and published? (d) Do you make efforts to obtain free prior consent from ethnic minorities and indigenous peoples with sufficient information? (e) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b) (c) (d) (e)	(a) (b) (c) (d) (e)
	(7) Working environment	(a) Will the occupational health and safety laws of the country to be complied with in the project be complied with? (b) Are there any measures to ensure the safety of the people involved in the project, such as the installation of safety equipment for the prevention of occupational accidents and accidents, and the management of hazardous substances? (c) Is it planned and implemented in terms of soft measures for project stakeholders, such as the formulation of safety and health plans and the implementation of safety education (including traffic safety and public health) for workers, etc.?	(a) (b) (c)	(a) (b) (c)
	(8) Health, safety, and security of local communities	(a) Is there a negative impact on sanitation, such as the occurrence of diseases (including HIV and other infections) due to the influx of workers associated with the project? And will there be mitigation measures in place to deal with the impact? (b) Will the influx of workers associated with the project have a negative impact on the safety of the local community, such as deterioration of public safety? And will there be mitigation measures in place to deal with the impact? (c) Where the partner country employs security personnel or other security personnel employed in the formation and implementation of the project, will appropriate measures be taken to ensure that it does not use its security capabilities except for prevention and self-defense purposes? (d) Will the construction have a negative impact? And will there be mitigation measures in place to deal with the impact?	(a) (b) (c) (d)	(a) (b) (c) (d)

classification	item	Main things to check	Yes: Y No: N	Specific Environmental and Social Considerations (Yes/No reasons, rationale, mitigation measures, etc.)
5 Miscellaneous	(1) Monitoring	(a) Is the monitoring of the business operator planned and implemented for the above environmental and social items that are likely to have an impact? (b) How are the items, methods, and frequency of the plan determined? (c) Will the monitoring system of the operator (organization, personnel, equipment, budget, etc., and their continuity) be established? (d) Is there a stipulation on the method and frequency of reporting of monitoring results from the business operator to the competent authorities, etc.? (e) Will there be a grievance mechanism for environmental and social considerations?	(a) (b) (c) (d) (e)	(a) (b) (c) (d) (e)
6 Bear in mind	(1) Refer to other environmental checklists	(a) If necessary, the relevant checks on the forest checklist should also be added and assessed; (b) If necessary, the relevant checks on the port checklist should also be added and assessed.	(a) (b)	(a) (b)
	(2) Precautions for the use of the Environmental Checklist	(a) If necessary, also confirm the impact on transboundary or global environmental issues (e.g., if there are factors related to transboundary disposal of waste, global warming, etc.). (b) For projects that are expected to generate more than a certain amount of greenhouse gases, are total greenhouse gas emissions estimated before the project is implemented?	(a) (b)	(a) (b)

4.4 概略設計説明調査時（土木）

Minutes of Discussions
on the Preparatory Survey for the Project for
Flood Management Enhancement

(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between Federal Flood Commission (hereinafter referred to as "FFC"), Ministry of Water Resources (MoWR) and Water and Power Development Authority (hereinafter referred to as "WAPDA") and Irrigation Department, Khyber Pakhtunkhwa (hereinafter referred to as "KP-PID") and Pakistan Meteorological Department (hereinafter referred to as "PMD") and Economic Affairs Division (hereinafter referred to as "EAD") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on July 21 and November 2, 2023 and March 12, 2024 and in response to the request from the Government of Islamic Republic of Pakistan (hereinafter referred to as "Pakistan") dated May 05, 2023, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Flood Management Enhancement (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets. (ATTACHMENT, Page 2 to 46)

Islamabad, July 2, 2024

Taichi Minamitani
Leader
JICA Preparatory Survey Team
Japan International Cooperation Agency
Japan

Ahmed Kamal
Chief Engineering Advisor & Chairman
Federal Flood Commission
Ministry of Water Resources
Government of Pakistan

Muhammad Masroor Naqvi
General Manager
Hydro Resources Management (HRM)
Water and Power Development Authority
Government of Pakistan

Muhammad Zubair
Superintending Engineer
Hazara Irrigation Circle Abbottabad
Government of Khyber Pakhtunkhwa
Pakistan

Sahibzad Khan
Director General
Pakistan Meteorological Department
Ministry of Aviation
Government of Pakistan

Saeed Ashraf Siddiqi
Joint Secretary
Ministry of Economic Affairs
Government of Pakistan

1

ATTACHEMENT

1. Objective of the Project
The objective of the Project is to accumulate basic data that contributes to disaster risk reduction measures, and reducing the risk of loss of human lives and economic losses due to infrastructure damages caused by flood disasters through developing a hydrological and hydraulic observation network and rehabilitating the river structures damaged by the 2022 flood in Indus river and its tributaries, in addition to the capacity building and enhancement of flood management institutions, thereby contributing to future flood risk reduction.

2. Title of the Project
Based on the Preparatory survey, the Project title name shall be changed to better clarify the contents of implementation. The Project title shall henceforth be changed to "the Project for Flood Management Enhancement (Flood Observation Network and Hydraulic Structures in the Indus Basin)".

3. Title of the Preparatory Survey
Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Enhancement of Flood Monitoring Network and River Infrastructure of the Indus River Basin in the Islamic Republic of Pakistan".

4. Project Site
Both sides confirmed that the sites of the Project are in Islamabad, the Provinces of the Punjab, the Khyber Pakhtunkhwa (KP), the Balochistan and the Sindh, as indicated in the following Table 1.

Table 1

Items	FFC	H&R WAPDA Office	NDMA	PMD	PCIW	PIDs	IRSA	WAPDA House	HHOS Sites
Equipment for the Central Data Management Centres									
Data Receiving System	1	1							
Data Processing System	1	1							
Database System	1	1							
Information Provision System	1	1							
Data Management System		1							
Alert System								1	
Data Display System	3		1	1	1	4	1	1	
Hydrological & Hydraulic Observation System									46
Acoustic Doppler Current Profiler (ADCP)	1	5							
Automatic Weather Observation System				5					
Civil Woks						3 (KP-PID)			

- FFC: Federal Flood Commission
- H&R WAPDA Office: Hydrology & Research Directorate Water & Power Development Authority Office
- NDMA: National Disaster Management Authority
- IRSA: Indus River System Authority
- PMD: Pakistan Meteorological Department
- PCIW: Pakistan Commissioner for Indus Waters
- PID: Provincial Irrigation Departments
- HHOS: Hydrological & Hydraulic Observation System

The Project Sites Map for the Project is shown in Annex 1.

5. Responsible Authority for the Project
Both sides confirmed that the authorities responsible for the Project are as follows:
The Federal Flood Commission (FFC), under the Ministry of Water Resources (MoWR),

will be the Administrative Executing Agency for the Project (hereinafter referred to as "the Administrative Executing Agency"). The Administrative Executing Agency shall coordinate with all the relevant federal and provincial authorities to ensure smooth implementations of the Project and ensure that the undertakings for the Project shall be taken care by relevant authorities properly and timely. The organization charts are shown in Annex 2.

6. Contents of the Draft Report

After the explanation of the contents of the Draft Report by the Team, the Pakistan side agreed to its contents. JICA will finalize the Preparatory Survey Report by reflecting the feedback from the Pakistan side. The report will be sent to the Pakistan side around July 2024.

The Team explained to the Pakistani side the principles of the following outline design and the Pakistani side appropriately understood those.

Design of all the Equipment of the Hydrological & Hydraulic Observation Systems and the Central Data Management Centres and also the estimated project annual recurrent costs to be borne by the Pakistani side have been finalized on the assumption that regular and proper operation and maintenance will be carried out by the Pakistan side.

The riverbanks, improved or rehabilitated by the Project, have a design flood level, which guarantees the function of the riverbank when the probable flood is below the design flood level. The design flood level is set 1/100 return period. However, the riverbanks could be damaged in the event of a flood with a higher water level and velocity than 1/100 return period flood takes place.

7. Cost Estimation

Both sides confirmed that the estimated cost, including the contingency, explained by the Team, is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost resulting from unexpected conditions including disasters.

8. Confidentiality of the Cost Estimation and Technical Specifications

Both sides confirmed that the estimated cost and the technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

9. Procedures and Basic Principles of Japanese Grant

The Pakistan side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 3 shall be applied to the Project. In addition, the Pakistan side agreed to take necessary measures according to the procedures in effectively and timely manners.

10. Timeline for the Project Implementation

The Team explained to the Pakistan side that it is expected that the timeline of the project implementation is approximately 29 months after signing of the Exchange of Notes (hereinafter referred to as "E/N") for the telemetry equipment and the civil works as attached in Annex 4.

11. Expected Outcomes and Indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Pakistan side will be responsible for the achievement of agreed key indicators targeted in year 2030 and shall monitor the indicators for Ex-Post Evaluation.

[Quantitative Indicators]

Indicators	Present (Baseline in 2023)	Target (2030) (3 years after the Project Completion)
Increased interval and area of hydrological and hydraulic observations provided to disaster management related organizations.	Major rivers in KP and Punjab provinces: interval of observations for water level and flow velocity Approx. 160 km/station	Major rivers in KP and Punjab provinces: interval of observations for water level and flow velocity Approx. 80 km/station
	KP with many tributaries: observation area for rainfall Approx. 4,800 km2 / station	KP with many tributaries: observation area for rainfall Approx. 2,500 km2 / station
Improved temporal resolution of meteorological observation data (e.g. rainfall, wind speed and pressure) in KP province, provided to disaster management related organizations	3-hour intervals by PMD observers (manual observations)	10-minute intervals by Automatic Weather Observation Systems.
Improved and rehabilitated riverbanks in Haripur, Hazara, KP	-	Total length of improved riverbanks is 1,543m.
Protected houses by improved riverbanks at Haripur, Hazara, KP	-	80 houses

[Qualitative Indicators]

1) Improvement of the accuracy of hydro-meteorological observations and flood forecasts through the strengthened river monitoring capability, the enhancement of the early warning related to Flood & Water Management (FWM), as well as the capacity of the relevant organizations to timely respond and commence necessary countermeasures against hydrometeorological disasters to reduce the number of potential disaster victims
2) Promotion of the implementation of FWM measures to reduce economic losses, through the provision of accurate hydrometeorological, hydrological and hydraulic information to users engaged in industries such as transportation, tourism, agriculture etc.
3) Improvement of livelihood in the economic assets and populous communities behind the riverbanks, improved or rehabilitated by the Project

12. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to six evaluation criteria (Relevance, Coherence, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Pakistan side is required to provide necessary support for the data collection.

13. Technical Assistance ("Soft Component" of the Project)

Considering the sustainable operation and maintenance of the products and services granted through the Project, Soft Component (Training for Stakeholders – Annex 7) is planned under the Project. The Pakistan side confirmed to deploy necessary number of counterparts who are appropriate and competent in terms of its purpose of the technical

assistance as described in the Draft Report.

14. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 5, once the Project officially starts. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in in Annex 5 (During the Project, S. No.6), both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by EAD, FFC-MoWR, WAPDA, PMD and KP-PID during the implementation stage of the Project.

The Pakistan side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project.

It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 5 will be used as an attachment of the Grant Agreement (hereinafter referred to as "G/A").

Both sides confirmed that FFC-MoWR, WAPDA, PMD, KP-PID shall take responsibility for arranging the maximum countermeasures and ensure the appropriate security of the whole Project sites of the Japanese and other foreign nationals assigned to the Project, in cooperation with relevant authorities during the Project period. Such security measures shall reasonably reflect needs of the Consultant/the Contractor engaging in the Project, as shown in Annex 5.

Both sides agreed that in case the additional security cost would be necessary for the implementation of the Project, such cost shall be borne by the Recipient without using the Grant.

15. Monitoring during the Implementation

The Project will be monitored by the Administrative Executing Agency in coordination with WAPDA, PMD & KP-PID and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 6. The timing of submission of the PMR is described in Annex 5.

16. Project Completion

Both sides confirmed that the project completes when all the facilities constructed and equipment procured and installed by the Grant are in operation, once the Project starts. The completion of the Project will be reported to JICA promptly by the Administrative Executing Agency, based on the completion reports submitted by the WAPDA, PMD and KP-PID for their respective components, but in any event not later than six months after completion of the Project.

17. Items and Measures to be considered for the Smooth Implementation of the Project

Both sides confirmed the items and measures to be considered for the smooth implementation of the Project as shown in Annex 8 (Outline of collaboration with the relevant organizations).

18. Environmental and Social Considerations for the Civil Works

18-1 General Issues for the Civil Works

18-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (January 2022)' (hereinafter referred to as "the Guidelines") is applicable for the Project.

The Project is categorized as B because the Project is likely to be site-specific, with few irreversible impacts, and can be addressed by general mitigation measures in most cases under the Guidelines.

18-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 9. Pakistan side assured that they shall take the necessary measures in accordance with the Environmental Checklist. Both sides agreed that in case of major modification of the content of the Environmental Checklist, the Pakistan side shall submit the modified version to JICA in a timely manner.

18-2 Environmental Issues for the Civil Works

18-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed the EIA report is not required for the Project in the KP Province's legal system, but Initial Environmental Examination (IEE) or General Environmental Approval (GEA) would be required in the KP Province's legal system.

18-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides agreed that environmental mitigation measures and monitoring shall be conducted based on the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) attached as Annex 10, which may be updated during the detailed design stage, if so required.

18-2-3 Consultation with Local Stakeholders

Pakistan side explained that meetings on the Project with the relevant local stakeholders and local residents with particular attention to directly affected peoples by the Project were held at meeting facilities called "Dera" in each local community and relevant stakeholders office on November 22 to December 6, 2023. Advance announcements for consultations with the relevant local stakeholders and local residents were made public through their representatives and stakeholder meetings. Opinions such as the type of floodwall (gabion wall or concrete wall) is not the concern, but durability was raised by the attendees. The outcome of the consultations shared by the Pakistan side was incorporated into the project document. However, there were no objections to the implementation of the Project. Pakistan side explained that appropriate considerations have been given to the attendees during those meetings.

18-3 Social Issues for the Civil Works

18-3-1 Land Acquisition and Resettlement

Both sides confirmed the 20,130m^2 of land at Sikandarpur, the 3,700m^2 of land at Ali Khan and 3,600m^2 at Mohra Ghazan would be acquired. 30 people at Sikandarpur, 2 people at Ali Khan and 10 people at Mohra Ghazan would be affected as landowners, due to the implementation of the Project.

Such land acquisition and resettlement shall be implemented based on the Abbreviated Resettlement Action Plan (ARAP) which will be prepared in line with the Guidelines, if so required and authorized by the Pakistan side prior to agreement of G/A. The cost for ARAP implementation is estimated at reacquisition value and Pakistan side / KP-PID will secure budget for the cost. The schedule for ARAP is shown in ANNEX 11.

18-4 Environmental and Social Monitoring for the Civil Works

18-4-1 Environmental Monitoring

Both sides agreed that the Pakistan side will submit results of environmental monitoring to JICA as a part of Monthly Progress Report by using the monitoring form attached as Annex 12. The timing of submission of the monitoring form is described in Annex 12. In case JICA finds that there is a need for improvement in a situation with respect to environmental considerations after the agreed monitoring period, JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed. The extension of the monitoring will be decided in accordance with the agreement between Pakistan and JICA.

18-4-2 Social Monitoring

Both sides confirmed that the Pakistan side will implement social monitoring about land acquisition proposed in the ARAP. Pakistan agreed that progress of land acquisition and implementation of ARAP will be monitored until land acquisition are completed. The Pakistan side and the Team agreed that the Administrative Executing Agency will submit results of social monitoring to JICA by using the monitoring form attached as Annex 12.
In case there is a remaining issue that needs to be addressed (e.g. incomplete compensation of landowners), JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed and solved. The extension of the monitoring will be decided in accordance with the agreement between Pakistan and JICA.

18-4-3 Information Disclosure of Monitoring Results

Both sides confirmed that it will take stipulated procedures for information disclosure in accordance with The Khyber Pakhtunkhwa Environmental Assessment Rules 2021. In addition, the Team requested the Pakistan side / KP-PID to disclose results of environmental and social monitoring to local stakeholders and the Pakistan side / KP-PID agreed to disclose monitoring results through their website / in their field offices by date.
The Pakistan side agreed JICA will disclose results of environmental and social monitoring submitted by the Pakistan side / KP-PID as the monitoring forms attached as Annex 12 on its website. If the third parties request further information, JICA disclose the information, which is subject to approval by Pakistan.

19. Other Relevant Issues

19-1 Disclosure of Information

Both sides confirmed that the Preparatory Survey Report, from which project cost is excluded, will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

19-2 Necessary Clearance / Permit for the Project and Approval of PC-I

In order to obtain the required approval by the Japanese Cabinet for the Grant Aid for the implementation of the Project, the PC-I shall be approved by the Central Development Working Party (CDWP), the Government of Pakistan by the end of August 2024. The Team will provide necessary information for preparation of the PC-I by middle of July 2024. Proposed detail schedule is shown in Annex13.

Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Japanese Grant

Annex 4 Project Implementation Schedule
Annex 5 Major Undertakings to be taken by the Government of Pakistan
Annex 6 Project Monitoring Report (template)
Annex 7 Soft Component
Annex 8 Outline of Collaboration with the Relevant Organizations
Annex 9 Environmental Check List
Annex 10 Environmental Management Plan/Environmental Monitoring Plan
Annex 11 Abbreviated Resettlement Action Plan
Annex 12 Environmental and Social Monitoring Form
Annex 13 Proposed Detail Schedule for Approval of PC-1

Annex 1 Project Site (Pages 8-10)

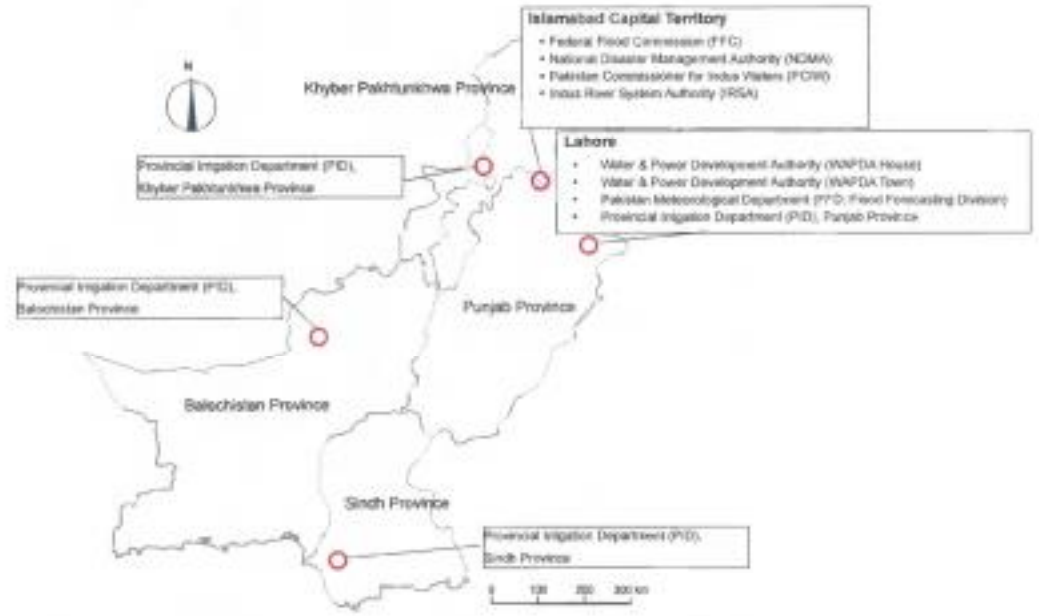


Fig. A1-1 Location Map of Establishment of Hydrological & Hydraulic Observation Network

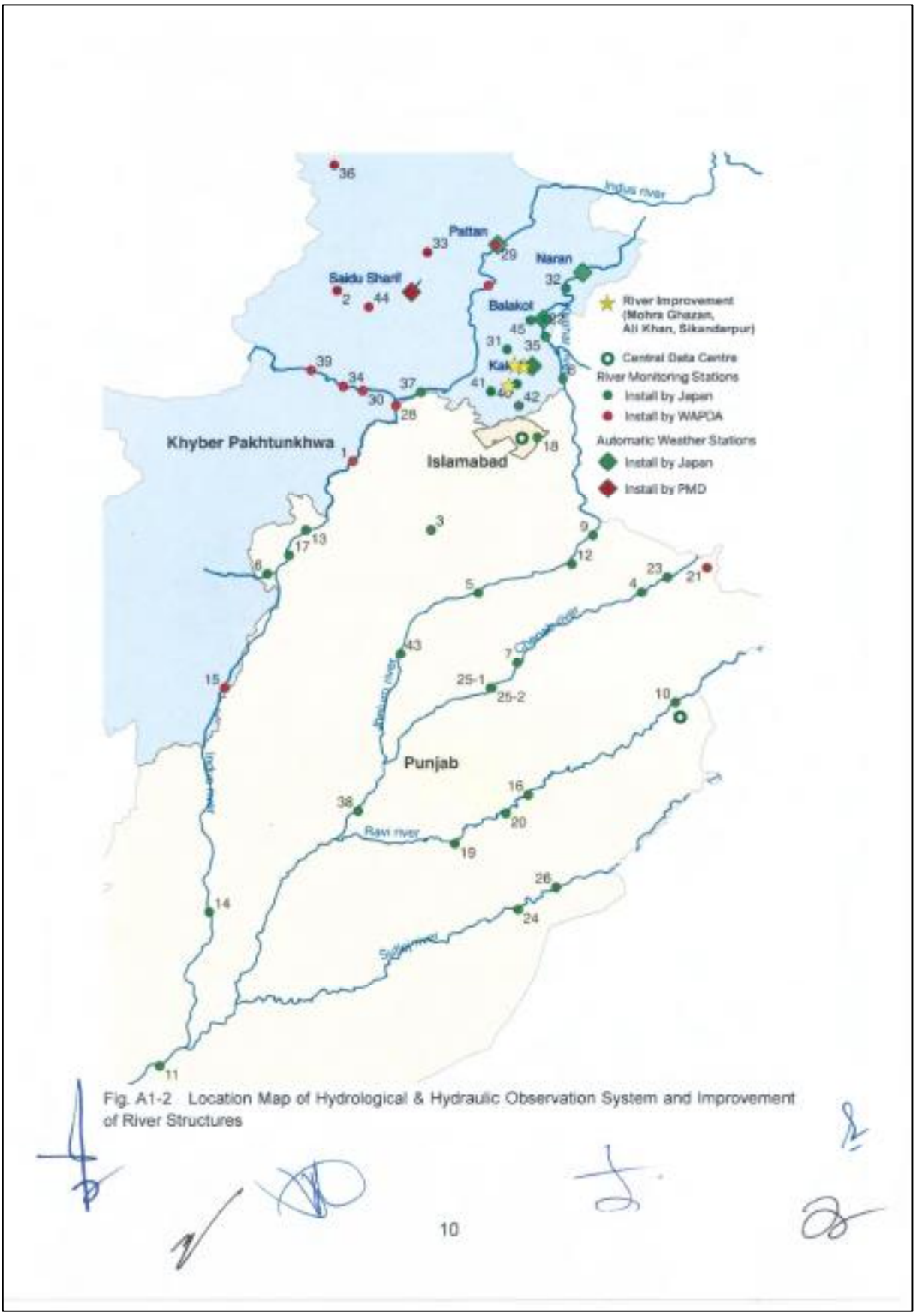


Fig. A1-2 Location Map of Hydrological & Hydraulic Observation System and Improvement of River Structures

Table A1-1 Bridges (Project Sites) for Installation of Hydrological & Hydraulic Observation Systems

No.	Latitude	Longitude	Name of Site	River	Basin/District	Province	Installation
1	33.480555	71.909153	Khushal Garh Steel Bridge	Indus	Kohat	KPK	WAPDA
2	34.768037	71.792188	Zulam Bridge	Panjkora	Lower Dir	KPK	WAPDA
3	32.957167	72.501889	Dharab Bridge.	Dharab	Chakwal	Punjab	Japan
4	32.482528	74.091944	Chenab Bridge GT Road	Chenab	Gujranwala	Punjab	Japan
5	32.478882	72.857103	Bhera M-2	Jehlum	Jhelum	Punjab	Japan
6	32.625778	71.257806	Kurram @ CPEC Bridge M-14	Kurram	Mianwali	Punjab	Japan
7	31.945056	73.150917	Motor way Bridge Talab Wala	Chenab	Hafizabad	Punjab	Japan
8	34.096333	73.499000	Kohala Bridge	Jehlum	Abbottabad	KPK	Japan
9	32.914528	73.724250	Jhelum Bridge	Jehlum	Jehlum	Punjab	Japan
10	31.644250	74.345472	Lahore Sialkot Motorway Bridge	Ravi	Lahore	Punjab	Japan
11	28.900000	70.442528	Nishtar Ghat Bridge	Indus	Rahim Yar Khan	Punjab	Japan
12	32.695778	73.564083	Upper Jhelum Canal U/S Powerhouse Rasul Power Project	Jehlum	Mandi Bahauddin	Punjab	Japan
13	32.957139	71.552083	Kalabagh Mari Indus Railway Bridge	Indus	Mianwali	Punjab	Japan
14	30.063722	70.818361	Indus @ Ghazi Ghat Bridge Muzaffargarh	Indus	Muzafargarah	Punjab	Japan
15	31.758306	70.938556	Indus @ Bhakkar	Indus	Dera Ismail Khan	Punjab	WAPDA
16	30.946389	73.233139	Mari Pattan Bridge	Ravi	Okara	Punjab	Japan
17	32.766306	71.424528	Indus @ CPEC Bridge M-14	Indus	GPS. Hindal Wala	Punjab	Japan
18	33.657889	73.304778	Pull Sawan	Sioan	Rawalpindi	Punjab	Japan
19	30.576639	72.677528	Chichawatni Road Bridge	Ravi	Chichawatni	Punjab	Japan
20	30.807806	73.063750	Qutab Shahana Bridge	Ravi	Sahiwal	Punjab	Japan
21	32.668472	74.584000	Bajwat road Bridge Jammu tavi	Chenab	Sialkot	Punjab	WAPDA
22	34.549693	73.354286	Balakot	Kunhar	Mansehra	KPK	Japan
23	32.595444	74.284444	Sialkot AirPort Road Bridge (Shahbazpur)	Chenab	Sialkot	Punjab	Japan
24	30.078694	73.156500	Arifwala to Shawal Road Bridge	Satluj	Vehari	Punjab	Japan
25-1	31.752694	72.947472	Chiniot Dam (1)	Chenab	Chiniot	Punjab	Japan
25-2	31.752889	72.956861	Chiniot Dam (2)	Chenab	Chiniot	Punjab	Japan
26	30.247167	73.443472	Baba Farid Headworks	Sutlej	Pakpattan	Punjab	Japan
27	34.803528	72.935556	Thakot	Indus	Battagram	KPK	WAPDA
28	33.896861	72.233917	Khairabad Bridge. N-5	Indus	Attock	KPK	WAPDA
29	35.102611	72.994861	Pattan	Indus	Lower Kohistan	KPK	WAPDA
30	34.008972	71.985611	Kabul River Bridge, Nowshera	Kabul	Nowshera	KPK	WAPDA
31	34.316167	73.074972	Phulra	Siran	Phulra	KPK	Japan
32	34.780833	73.520583	Kaghan	Kunhar	Kunhar	KPK	Japan
33	35.053722	72.474250	Bagh Dori Bridge	Swat	Swat	KPK	WAPDA
34	34.042722	71.836278	Mohib Banda, Pashtun Garhi	Kabul	Nowshera	KPK	WAPDA
35	34.414361	73.364194	Balakot	Kunhar	Balakot	KPK	Japan
36	35.715417	71.769972	Ayun	Kalash	Chitral	KPK	WAPDA
37	33.996778	72.423556	Indus Tarbela Outflow	Indus	Swabi/Attock	KPK	Japan
38	30.827528	71.944639	Sultan Bahoo Bridge	Chenab	Jhang	Punjab	Japan
39	34.165444	71.993417	Haji Zai Bridge, Shabqadar Road	Kabul	Charsadda	KPK	WAPDA
40	34.057500	73.149472	Abbottabad	Dor	Abbotabad	KPK	Japan
41	34.001361	72.954583	Haripur	Dor	Haripur	KPK	Japan
42	33.895694	73.162389	Haripur / Jabri Bridge	Haro	Haripur	KPK	Japan
43	32.014611	72.269528	Ghauspur Bridge	Jhelum	Khushab	Punjab	Japan
44	34.644639	72.028694	Chakdara Bridge	Swat	Lower Dir	KPK	WAPDA
45	34.538944	73.252500	Pine Valley Jabori	Siran	Mansehra	KPK	Japan

Table A1-2 PMD Observatories for Installation of AWSs in KP Province

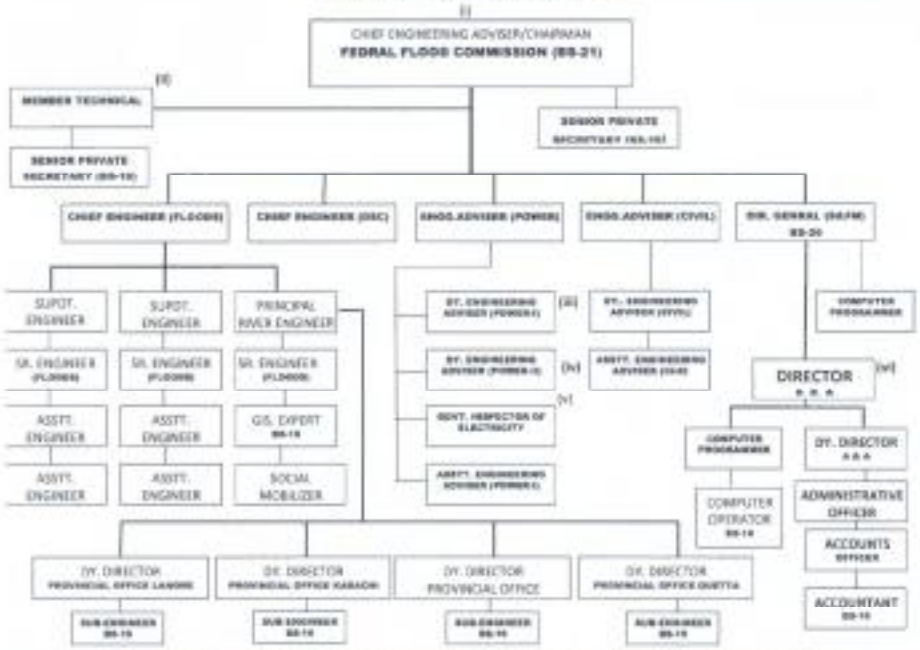
No.	Name of Station	Latitude	Longitude	Altitude (m)	District	Installation
1	Balakot	N 34° 32' 54"	E 73° 20' 59"	1013	Mansehra	Japan
2	Kakul	N 34° 11' 32"	E 73° 15' 59"	1355	Abbottabad	Japan
3	Naran	N 34° 54' 20"	E 73° 39' 09"	2450	Mansehra	Japan
4	Saidu Sharif	N 34° 45' 18"	E 72° 21' 10"	935	Swat	PMD
5	Patton	N 35° 06' 33"	E 73° 00' 20"	752	Kohistan	Japan

Annex 2 Organization Chart (Pages 11-13)

Ministry of Water Resources			Ministry of Aviation
Administrative Executing Agency	Operational Executing Agency (Equipment Work s: HHOS)	Operational Executing Agency (Civil Works)	Operational Executing Agency (Equipment Works: AWSs)
Federal Flood Commission (FFC)	Water and Power Development Authority (WAPDA)	Irrigation Department, Khyber Pakhtunkhwa	Pakistan Meteorological Department (PMD)

Execution System of the Project

ORGANIZATION CHART OF OFFICE OF THE CHIEF ENGINEERING ADVISER/CHAIRMAN
FEDERAL FLOOD COMMISSION



Organization Chart of Pakistan Federal Flood Commission (FFC)

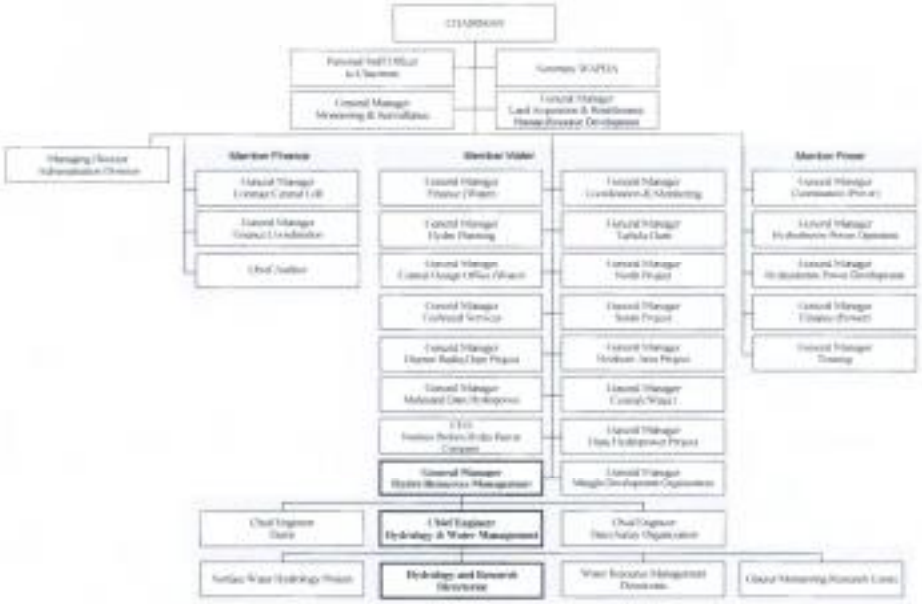
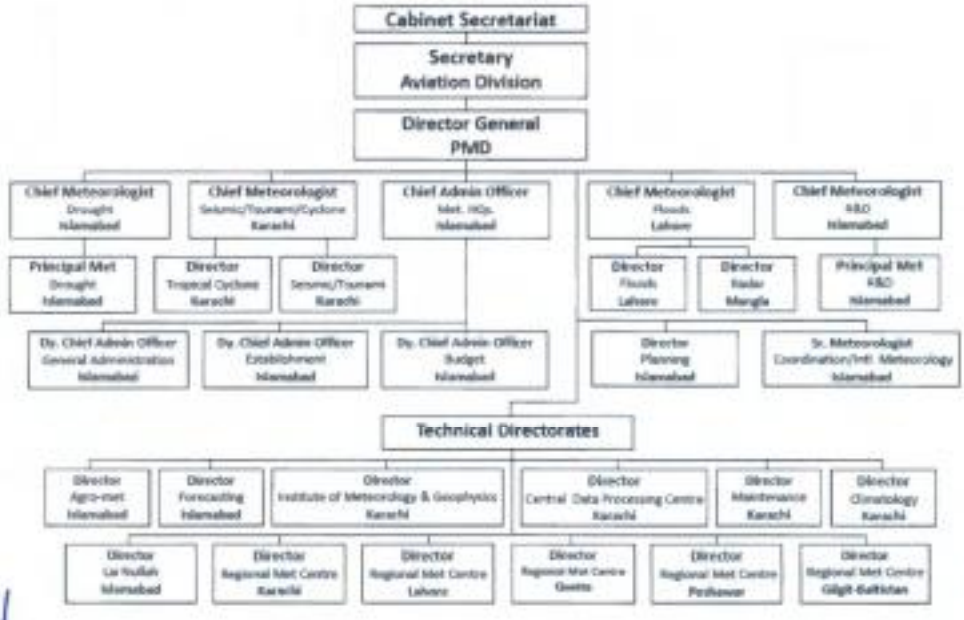
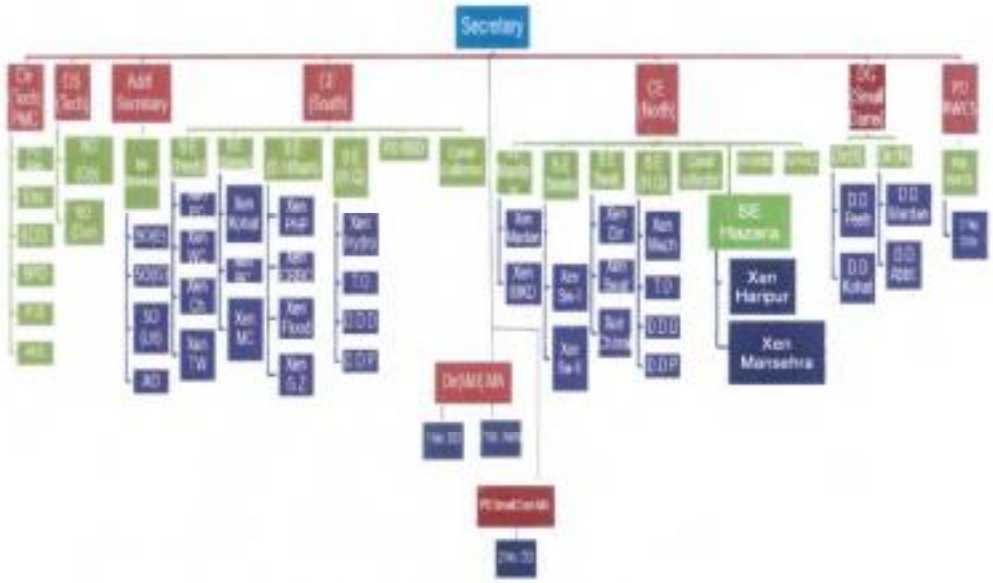


Figure : Organization Chart of Pakistan Water and Power Development Authority (WAPDA)



Organization Chart of Pakistan Meteorological Department (PMD)



Organization Chart of Irrigation Department, Khyber Pakhtunkhwa

Annex 3 Japanese Grant (Pages 14-18)

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation
- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal
- Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes
- The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")
- Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")
- Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement
- Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation
- Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also

institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General

Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Measures to ensure more efficient implementation of the Grant

i) In the event that the E/N and the G/A concerning a project cannot be signed by the end of the following Japanese fiscal year of the cabinet decision concerned by the GOJ, the authorities concerned of the two Governments will discuss the cancellation of the project.

ii) In the event that the period, specified in the G/A, during which the grant is available expires before the completion of the disbursement, the authorities concerned of the GO J will thoroughly review the status, situation and perspective of the implementation of the project concerned before extending the said period. The authorities concerned of the two Governments will discuss the termination of the project including a refund, unless there are concrete prospects for its completion.

iii) Regardless of the period mentioned in ii) above, the authorities concerned of the two Governments will, in the event that five years have passed since the cabinet decision concerned by the GOJ before the completion of the disbursement, except as otherwise confirmed between them, discuss the termination of a project including a refund, unless there are concrete prospects for its completion.

4) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

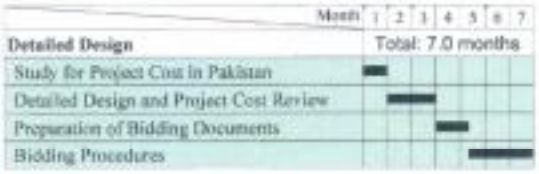
5) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

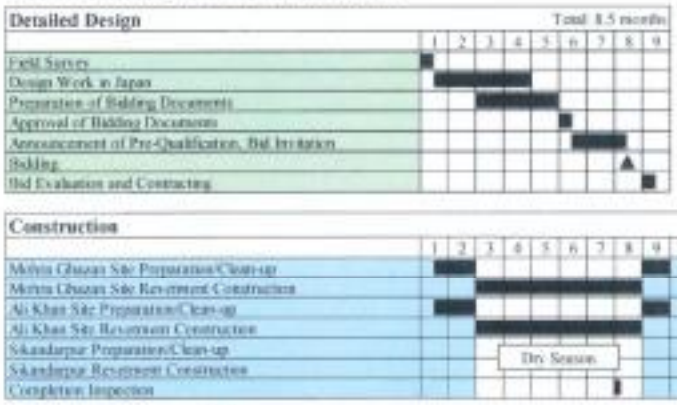
Annex 4 Project Implementation Schedule

Establishment of Hydrological & Hydraulic Observation Network

Details of the Activities in the Soft Component are found in Annex 7.



Improvement of River Structures.



Annex 5 Major Undertakings to be undertaken by the Government of Pakistan (Pages 20-22)

Before the Tender

No.	Items	Deadline	In charge	Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A)).	within 3 months after G/A	FFC, MoWR		
2	To obtain NOC/permission/consent/acceptance of the owners (National Highway Authority, Punjab Highway Department, etc.) of bridges which have been selected by the WAPDA and the Team together through the site survey.	before notice of the Tender	WAPDA		
3	To obtain NOC/permission/consent/acceptance of the rehabilitation of river structures which have been selected by the FFC/PID and the Team together through the site survey.	before notice of the Tender	FFC, MoWR KP-PID		
4	To secure sufficient spaces at the respective project site/s for temporary facilities such as contractors office, workshop, building material storage, disposal area, etc. needed for construction work.	before notice of the Tender	FFC WAPDA PMD KP-PID	EQ: KP-PID: 15,000,000 (land preparation for construction roads, site offices, material yards and block fabrication yards, totalling approximately 60,000 m2 for river structure).	
5	To undertake the Initial Environmental Examination (IEE) or General Environmental Approval (GEA) procedures in Pakistan, if required so.	before completion of PC-I	FFC WAPDA KP-PID		
6	To obtain the allocation of the required radio frequencies for the sensors of Hydrological & Hydraulic Observation Systems.	before notice of the Tender	WAPDA		
7	To procure and install the air conditioning units with enough capability to effectively cool all the equipment procured under the Project and by the FFC in future in the Data Centre to be newly established by the FFC.	before notice of the Tender	FFC		
8	To acquire lands for rehabilitation of revetment at the respective project sites.	before notice of the Tender	KP-PID		
9	To renovate the existing office rooms for setting the Central Data Management Centres	before notice of the Tender	FFC	EQ: 18,000,000 (including air-conditioners, etc.)	
			H&R WAPDA Office	EQ: 1,000,000	

During the Project

No.	Items	Deadline	In charge	Cost	Ref.
1	To pay bank charge (commission) for the issuance of the Authorization to Pay (A/P) and amendments of A/P, if required, for the Consultant and the Contractor.	Every payment	FFC, MoWR	EQ: FFC: 10,000,000	
2	To undertake all necessary institutional and juridical procedures in Pakistan.	During the Project	FFC, MoWR WAPDA PIDs PMD	EQ: 0	
3	To bear all the expenses, other than those to be borne by the Japanese Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment.	During the Project	FFC, MoWR WAPDA PIDs PMD	EQ: 0	
4	To ensure prompt unloading, customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation in the country of the Recipient of the products	During the Project	FFC, MoWR WAPDA PIDs PMD	EQ: 0	
5	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	During the Project	FFC, MoWR WAPDA PIDs PMD	EQ: 0	
6	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted by its designated authority without using the Grant.	During the Project	FFC, MoWR WAPDA PIDs PMD	EQ: FFC: 88,800,000 WAPDA: 503,558,105 PMD: 56,000,000	
7	To remove and relocate the existing facilities for the installation of the equipment in the proposed Central Data Management Centres of Islamabad (FFC) and Lahore (H&R WAPDA Office), if required.	During the Project	FFC WAPDA	EQ: 0	
8	To remove and relocate the existing facilities for the installation of the equipment, if required.	During the Project	PMD	EQ: 0	
9	To provide free of charge and allocate secure temporary storage area/room/warehouse for the materials, tools and equipment needed during the Project implementation including trainings.	During the Project	FFC, MoWR WAPDA PMD	EQ: 0	
10	To obtain the required type of approval of terminal equipment for wireless radio transceivers with more than 2mW output power for observation data transmission and receiving by the Hydrological & Hydraulic Observation Systems and the Automatic Weather Observation Systems.	Immediately after the Tender	FFC, MoWR WAPDA PMD	EQ: WAPDA: 294,000 PMD: 300,000	
11	To assign IT engineer(s) and sub-engineer(s) for implementation of the Project	Immediately after the Tender	WAPDA	EQ: WAPDA: 78,202,092	
12	To procure mobile SIM cards (GSM/GPRS) for transmitting/receiving data observed by the Hydrological & Hydraulic Observation Systems and the Central Data Management Systems and bear the recurrent cost.	Before installation of the Equipment	FFC, MoWR WAPDA	EQ: FFC: 6,000 WAPDA: 150,000	
13	To procure mobile SIM cards (GSM/GPRS) for transmitting/receiving data observed by the Automatic Weather Observation Systems and bear the recurrent cost.	Before installation of the Equipment	PMD	EQ: PMD: 50,000	

No.	Items	Deadline	In charge	Cost	Ref.
14	To promptly provide reliable high-speed Internet environment at the proposed Central Data Management Centres in Islamabad and Lahore (with each corresponding global/fix IP) for the establishment of a Virtual Private Network between the Central Data Management Centres.	Before installation of the Equipment	FFC WAPDA	EQ: 0	
15	To set up the required and new assigned IP addresses and domain names in the computing equipment supplied under the Project and facilitate any required configuration i.e. firewall settings, etc. of the existing equipment which may be made part of the project network communication system, if any.	Before installation of the Equipment	FFC WAPDA	EQ: 0	
16	To secure ample space/s at the existing facilities to establish the proposed Central Data Management Centres in Islamabad (FFC) and Lahore (H&R WAPDA Office), if necessary.	Before installation of the Equipment	FFC WAPDA	EQ: 0	
17	To assign appropriate engineers and staff to shoulder their costs to form four WAPDA equipment installation teams for Hydrological & Hydraulic Observation Systems and Data Display Systems (daily allowance, transportation, lodging, etc.). To procure fuel for vehicles including the required maintenance.	Before installation of the Equipment	WAPDA	EQ: WAPDA: 8,000,000	
18	To assign appropriate engineers and staff to shoulder their costs to form one PMD equipment installation team for Automatic Weather Observation System (daily allowance, transportation, lodging, etc.). To procure fuel for a vehicle including the required maintenance.	Before installation of the Equipment	PMD	EQ: PMD: 500,000	
19	To allocate appropriate training staff and shoulder their dispatching cost (daily allowance, transportation expenses, accommodation expenses, etc.)	During the Project	FFC WAPDA PMD NDMA PIDs	EQ: FFC: 1,800,000 WAPDA: 5,500,000 PMD: 500,000	
20	To assign security guards at 45 Hydrological & Hydraulic Observation Sites	During the Project	WAPDA	EQ: WAPDA: 22,000,000	
21	To take responsibility for arranging the maximum countermeasures and ensure the appropriate security of the whole Project site/s and of the Japanese and other foreign nationals assigned to the Project.	During the Project	FFC WAPDA PIDs PMD	EQ: 0	
22	To monitor the Project and report to JICA by using the form of Project Monitoring Report (PMR). The Report shall be submitted on a monthly basis.	During the Project	FFC WAPDA PIDs PMD	EQ: FFC: 20,000,000	

After the Project

No	Items	Deadline	In charge	Cost	Ref.
1	To assign IT engineer(s) and sub-engineer(s) for maintenance of the Central Data Management Centre and Hydrological & Hydraulic Observation Network procured under the Project.	After completion of the Project	WAPDA PMD	EQ: WAPDA: 3,600,000	Note 2
2	To procure the required spare parts, consumables, stationary, etc. for the smooth operation and maintenance of the Equipment, and enter into a preventive maintenance service agreement with the equipment supplier if so desired.	After completion of the Project	FFC, MoWR WAPDA PMD	EQ: FFC: 800,000 WAPDA: 3,300,000 PMD: 1,200,000	
3	To properly operate and maintain, and also effectively utilize the Equipment procured under the Project (Electricity for the Central Data Management Centre, Internet for data communication at the Central Data Management Centres and data communication (GSM/GPRS: packet communication).	After completion of the Project	FFC WAPDA PMD	EQ: FFC: 1,490,000 WAPDA: 3,730,000 PMD: 300,000	
4	To maintain and use properly and effectively facilities of river structures constructed under the Project. 1) Allocation of maintenance cost 2) Implementation of repair and maintenance works 3) Routine check/Periodic inspection	After completion of the Project	PIDs	KP-PID: 7,820,000	
5	To periodically update the operating system, antivirus and application software(s) of all the computers procured under the Project.	After completion of the Project	FFC WAPDA PMD	EQ: including row 2 above	
6	To allocate the necessary budget and personnel for the smooth conduct of hydrological and hydraulic observation and provisioning of the observation data including operation of engine generator(s) and contingencies to the concerned agencies related to the disaster management.	After completion of the Project	WAPDA	EQ: FFC: 1,300,000 WAPDA: 20,900,000	Note 3
7	To allocate the necessary budget and personnel for the smooth conduct of meteorological observation and including contingencies provisioning of the observation data to the concerned agencies related to the disaster management.	After completion of the Project	PMD	EQ: PMD: 1,000,000	Note 3
8	To procure the appropriate number and capacity of disk media, hard disks, solid state disks, etc., and dutifully conduct the required periodic archiving of observation data and products.	After completion of the Project	FFC WAPDA PMD	EQ: including row 2 above	
9	To monthly maintain all the air conditioning units including cleaning air filters to keep the effective and efficient cooling of all the Equipment in the Central Data Management Centres.	After completion of the Project	FFC WAPDA	EQ: 0	
10	To always ensure enough space for entrance/exit of the cooling fans of all the equipment for keeping smooth airflow procured under the Project in the Central Data Management Centres.	After completion of the Project	FFC WAPDA	EQ: 0	
11	To make the maximum countermeasures for protection of the Hydrological & Hydraulic Observation Systems from theft or destruction (Security guards at 45 Hydrological & Hydraulic Observation Sites).	After completion of the Project	WAPDA	EQ: WAPDA: 22,000,000	

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

(Note): Progress of the specific obligations of the Recipient may be confirmed and updated from time to time with written agreement between JICA and the Recipient in the form other than the amendment of the G/A.

(Note 2): 2 IT engineers and 2 Electrical sub-engineers will be indicated in the PC-I in order to be hired for appropriate maintenance of the project equipment.

(Note 3): The estimated capital cost and annual recurrent cost will be indicated in the PC-I in order to secure the budget for appropriate maintenance of the project equipment.

Annex 6 Project Monitoring Report (template) (Pages 23-29)

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX

20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge	(Designation)
	Contacts	Address: Phone/FAX: Email:
Executing Agency	Person in Charge	(Designation)
	Contacts	Address: Phone/FAX: Email:
Line Ministry	Person in Charge	(Designation)
	Contacts	Address: Phone/FAX: Email:

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant (Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with

Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 **Physical Arrangement**
- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 **Budgetary Arrangement**
- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*
Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks *(at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:

	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan of the Indicators for Post-Evaluation

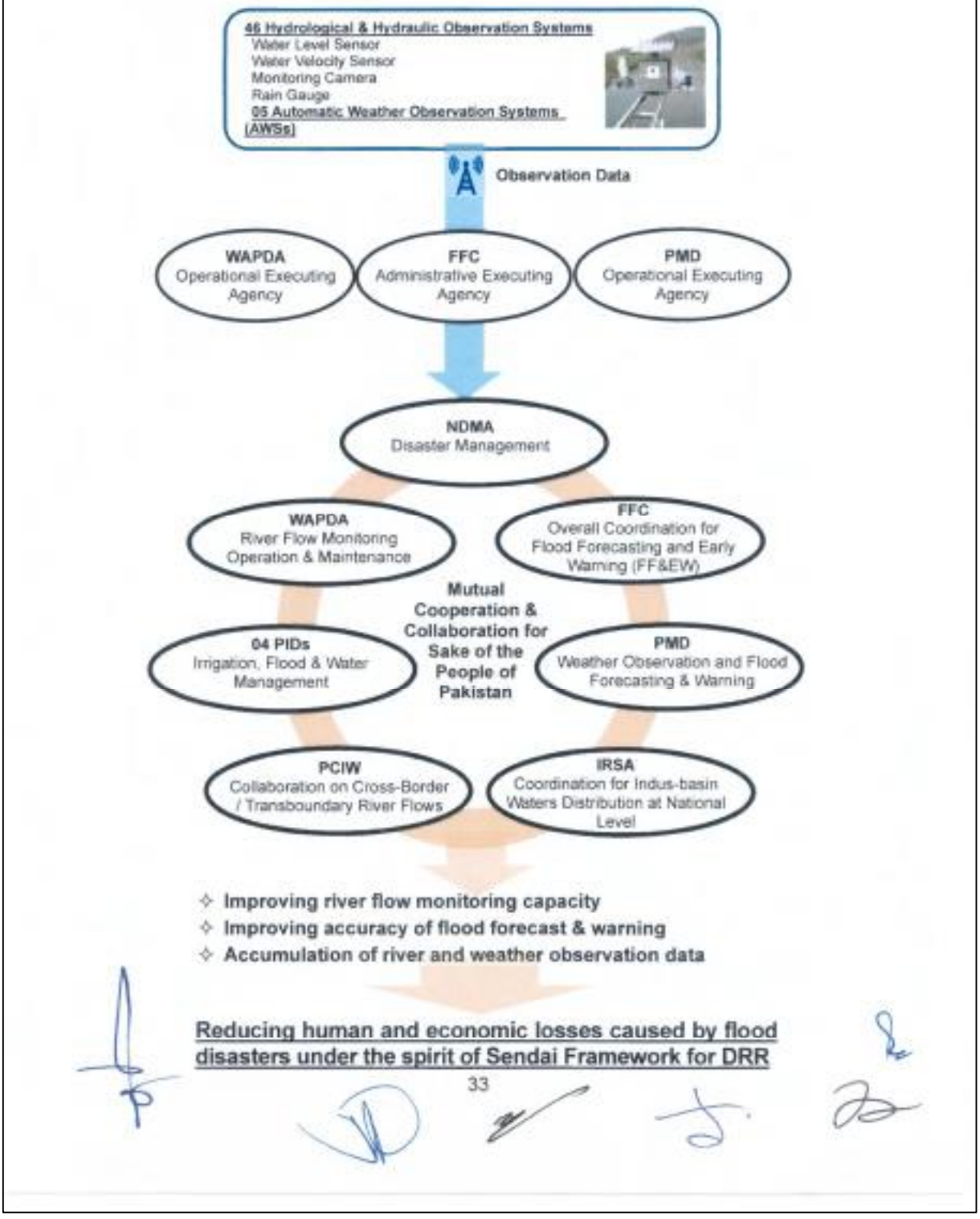
Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Annex 7 Soft Component (Pages 30)

No.	Achievements	Effects from the Soft Component Activities
1	WAPDA staff can install and relocate Hydrological & Hydraulic Observation Systems.	WAPDA staff will learn how to install and relocate the Hydrological & Hydraulic Observation Systems, thereby supporting the safe and reliable installation of the systems by WAPDA staff at sites where Japanese engineers cannot visit for safety management reasons and facilitating the smooth start-up of the Project. In addition, if the effectiveness of the observation sites decreases in the future due to changes in the shape of the river, WAPDA itself will relocate the observation sites to more effective ones, so that the Hydrological & Hydraulic Observation Systems developed through Japan's grant aid can be used effectively over the long term.
2	WAPDA staff can smoothly operate and maintain Hydrological & Hydraulic Observation Systems.	The Hydrological & Hydraulic Observation Systems to be established through Japan's grant aid will operate well over the long term by WAPDA staff who learn how to maintain the systems and carry out appropriate maintenance, including conducting regular inspections and recording the results according to established procedures.
3	WAPDA and FFC staff can maintain the accuracy of Hydrological & Hydraulic Observation Data.	By familiarizing WAPDA and FFC staff with the measurement of river cross-sectional profiles using the ADCP, and by ensuring regular ADCP measurement and regular checking of the accuracy of Hydrological & Hydraulic Observation Data from the stage of equipment handover, not only will the validity of Hydrological & Hydraulic Observation Data be improved, but also the Hydrological & Hydraulic Observation System will be able to be effectively used over the long term. This will enable early detection of and response to problems with the Hydrological & Hydraulic Observation Systems and ensure that the Hydrological & Hydraulic Observation Systems developed through Japan's grant aid can be used effectively over a long period of time.
4	WAPDA and FFC staff can smoothly operate, maintain and manage the Central Data Management Centre.	WAPDA and FFC staff learn how to maintain the Central Data Management Centres, conduct regular inspections and record the results in accordance with established procedures and implementing appropriate maintenance management, and acquire the skills to systematically respond to equipment failures and communication problems when they occur, thereby, the Central Data Management Centres, which will be developed through Japan's grant aid, operates well over the long term and the observation data from the Hydrological & Hydraulic Observation Systems are used effectively over the long term.
5	WAPDA and FFC staff can distribute Hydrological & Hydraulic Observation Data.	By creating an environment in which WAPDA and FFC staff can issue alerts on changes in river discharge based on Hydrological & Hydraulic Observation Data , the Hydrological & Hydraulic Observation System to be developed through Japan's grant aid will be used effectively over the long term to reduce flood risks, which is one of the objectives of the Project.
6	The distributed Hydrological & Hydraulic Observation Data are utilized by staff of disaster management agencies.	The users of the relevant organizations learn how to automatically acquire Hydrological & Hydraulic Observation Data stored in the Central Data Management Centres and how to incorporate them into models, etc., so that the observation data from the Hydrological & Hydraulic Observation Systems developed through Japan's grant aid can be used effectively over the long term.
7	PMD staff can install AWS.	By training PMD staff on how to install Hydrological & Hydraulic Observation Systems, the Project will support safe and reliable installation of Hydrological & Hydraulic Observation Systems by PMD staff at sites where Japanese engineers cannot work for safety management reasons, thereby facilitating a smooth start-up of the Project. In addition, the PMD staff's understanding of the AWS will be deepened through training on installation methods, and the quality of operation and maintenance management and fault handling will be improved, leading to effective long-term use of the AWS that will be established through Japan's grant aid.
8	PMD staff can smoothly operate and maintain the AWS.	The AWS to be established through Japan's grant aid will operate well over the long term by PMD staff who learn how to maintain the systems and carry out appropriate maintenance, including conducting regular inspections and recording the results according to established procedures.

Note: Participation to the Soft Component is open to all executing agencies.

Annex 8 Outline of Collaboration with the Relevant Organizations



Annex 9 Environmental Check List

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) (b)- (c)- (d)-	(a) An EIA is not required for this project. On the other hand, it has been noted that an IEE or GEA may be required, and if necessary, KP-EPA approval must be obtained by the end of the detailed design study. (b)- (c)- (d)-
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) Y	(a) Stakeholder consultations were held from 11/22/2023 to 12/6/2023 and were generally well understood. (b) Comments from residents and others will be incorporated into the project to the extent possible.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a)Y	(a) At each site, alternatives to the revetment alignment, etc., are compared and discussed.
2 Pollution Control	(1) Water Quality	(a) Is there a possibility that changes in river flow downstream (mainly water level drawdown) due to the project will cause areas that do not comply with the country's ambient water quality standards?	(a)-	(a) Although this project will not cause any change in river flow, there is a possibility that sediment will be discharged into the river and turbid water will be generated as a result of the revetment work. During construction, dry construction using temporary embankments and pump drainage will be used to prevent sediment from flowing out of the excavated area into the river.
	(2) Wastes	(a) In the case of that large volumes of excavated/dredged materials are generated, are the excavated/dredged materials properly treated and disposed of	(a)Y	(a) The project will primarily generate excavation overburden, which will be used for backfilling and site development. Concrete debris

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		in accordance with the country's standards?		will also be generated at Mohra Ghazan and will be transported to a KP-PID-designated disposal site for appropriate disposal.
	(3) Subsidence	(a) Is there a possibility that the excavation of waterways will cause groundwater level drawdown or subsidence? Are adequate measures taken, if necessary?	(a)N	(a) The project will involve more than 200,000 m3 of excavation work in Sikandarpur, but no subsidence is anticipated because the strata are sand and gravel and there is no consolidation layer.
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a)N	(a) The target area of this project is outside the protected area.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Is there a possibility that hydrologic changes, such as reduction of the river flow, and seawater intrusion up the river will adversely affect downstream aquatic organisms, animals, vegetation, and ecosystems? (e) Is there a possibility that the changes in water flows due to the project will adversely affect aquatic environments in the river? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?	(a)N (b)N (c)N (d)N (e)N	(a) The project site does not include primary forests, natural tropical forests, or ecologically important habitats. (b) The project site does not include habitats of valuable species that are required to be protected by Pakistani law or international treaties. (c) The project site is not expected to have any significant impact on the ecosystem. (d) The project will not cause a decrease in the flow of water or the upwelling of seawater. (e) During construction, the project will be constructed dry with temporary embankments and pump drainage to prevent sediment from flowing out of the excavated area into the river and to prevent the generation of turbid water.
	(3) Hydrology	(a) Is there a possibility that hydrologic changes due to the project will adversely affect	(a)N	(a) In the Sikandarpur, the low channel is widened in the centre of the river channel, and

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		surface water and groundwater flows?		the left-bank side of the channel is modified to the centre of the channel (set-aside). Therefore, the width of the low channel is widened in the short term, but the meandering (formation of the water way) within the channel does not significantly change the flow regime in the long term. The project will prevent erosion of the riverbanks, which is a problem in all of these areas.
	(4) Topography and Geology	(a) Is there a possibility that excavation of rivers and channels will cause a large-scale alteration of the topographic features and geologic structures in the surrounding areas?	(a)N	(a) No work will be undertaken that will result in major alteration of the topography or geological structure.
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Are the compensations going to be paid prior to the resettlement? (e) Are the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement?	(a)N (b)- (c)- (d)- (e)- (f)- (g)- (h)- (i)- (j)-	(a) No resettlement will occur as a result of the Project. (b)- (c)- (d)- (e)- (f)- (g)- (h)- (i)- (j)-

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?		
	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Is there a possibility that the amount of water (e.g., surface water, groundwater) used by the project will adversely affect the downstream fisheries and other water uses? (c) Is there a possibility that water-borne or water-related diseases (e.g., schistosomiasis, malaria, filariasis) will be introduced?	(a)N (b)N (c)N	(a) Houses and other structures of local residents will be protected from river erosion by the Project. (b) There will be no water use due to the Project. (c) No water-borne diseases are expected due to the Project.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archaeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a)N	(a) The Project will not damage any valuable archaeological, historical, cultural, or religious heritage or historic site.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a)N	(a) There are no adverse impacts on the landscape that require special consideration.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources to be respected?	(a)N (b)-	(a) There are no ethnic minorities or indigenous peoples living in the project area. (b)-
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?	(a)Y (b)Y	(a) The labour and environmental laws of the country concerned to be observed in the project will be complied with. (b) Hard safety measures will

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(c)Y (d)Y	be taken for project personnel. (c) Soft measures for project personnel will be planned and implemented. (d) Appropriate measures will be taken to ensure that security personnel involved in the project do not infringe on the safety of project personnel and local residents.
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(a)Y (b)Y (c)Y	(a) Mitigation measures will be provided for pollution during construction. (b) The construction will not adversely affect the natural environment (ecosystems). (c) Mitigation measures will be provided for possible adverse effects.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the	(a)Y (b)- (c)Y (d)Y	(a) Monitoring is planned for items that may have an impact. (b) The items, methods, frequency, etc. of such plan are judged to be appropriate. (c) The operator establishes an adequate monitoring system. (d) The method and frequency of reporting from the operator to the competent authorities, etc. are specified.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?		
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry checklist should also be checked.	(a)-	(a)-
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a)-	(a)-

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.
In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

Annex 10 Environmental Management Plan (EMP) / Environmental Monitoring Plan (EMoP)

Environmental Management Plan (EMP)

Items (Impacts)	Proposed Mitigation Measures	Implementing Organization	Responsible Organization	Cost
Before & During construction				
Air Pollution	• Properly maintain construction equipment and construction vehicles used on site and keep them in good condition. • Level the construction work schedule to avoid overcrowded transportation and traffic congestion. • To prevent dust dispersion, the beds of construction vehicles should be covered with dustproof sheets, and earth and sand on the bodies and tires should be washed.	Contractor	KP PID	No cost is required due to construction planning and construction innovations.
Water Pollution	• Maintain construction equipment properly and keep it in good condition on site. • Manage drainage by installing temporary toilets in the construction dormitories. • Conduct dry construction using temporary embankments and pump drainage. • If any abnormality is detected, stop work immediately, conduct water quality testing, and report to KP-EPA	Contractor	KP PID	Included in construction costs
Waste	• The main construction waste generated is construction overburden. Of this excavated soil, good quality soil that can be reused as backfill material will be partially used as backfill. In addition, construction fill will be placed in the vicinity of the construction site to dispose of the earth and sand, and the site will be developed to allow for other uses.	Contractor	KP PID	Included in construction costs
Soil Contamination	• Ensure safety of fuel and oil storage and disposal. • Prevent oil leaks, etc. through proper inspection and maintenance of construction equipment.	Contractor	KP PID	No cost is required due to construction planning and construction innovations.
Noise and Vibration	• Nighttime construction should be avoided as much as possible. • Instruct the operator on proper operation methods to prevent abnormal noise and vibration.	Contractor	KP PID	Included in construction costs

Items (Impacts)	Proposed Mitigation Measures	Implementing Organization	Responsible Organization	Cost
	・If there are complaints from residents in the vicinity, the construction work shall be suspended and the operator and contractor shall discuss countermeasures.			
Ground Subsidence	・Included in water pollution control.	Contractor	KP PID	Included in construction costs
Involuntary Resettlement /Land Acquisition	・If land acquisition occurs, it will be handled appropriately in accordance with JICA Guidelines for Environmental and Social Considerations (January 2022) and Pakistani laws and regulations.	Consultant KP PID	Land Revenue Department	Pakistan Side
HIV/AIDS and Other Infectious Diseases	・Instruct workers on appropriate precautionary measures.	Contractor	KP PID	No cost is required due to construction planning and construction innovations.
Working Environment (including occupational safety)	・Regularly conduct awareness-raising activities for workers to reduce the occurrence of accidents.	Contractor	KP PID	No cost is required due to construction planning and construction innovations.
Accident	・Provide safety training for construction workers and drivers.	Contractor	KP PID	Included in construction costs

Environmental Monitoring Plan (EMoP)

Environmental Item	Item	Site	Frequency	Responsible Organization	Supervisory Organ
Before & During construction					
Air Pollution	- Dust (visual)	- Construction Sites	- Every day during construction	・KP-PID ・Contractor	・KP-EPA
	- Dust dispersal prevention measures	- Construction Sites	- During operation of vehicles transporting earth and sand	・KP-PID ・Contractor	・KP-EPA
Water Pollution/ Ground Subsidence	- Turbidity, oil (visual)	- Construction Sites	- Daily during excavation work - Once a week during all other times	・KP-PID ・Contractor	・KP-EPA

Environmental Item	Item	Site	Frequency	Responsible Organization	Supervisory Organ
	- 32 items in National Environmental Quality Standards for Municipal and Liquid Industrial Effluents in Pakistan	- Construction Sites	- In case of abnormality	· KP-PID · Contractor	· KP-EPA
Waste	- Proper disposal of waste	- Construction Sites	- When backfilling and spreading excavation overburden	· KP-PID · Contractor	· KP-EPA
Soil Contamination	- Whether fuel, oil, etc. has leaked into the soil	- Construction Sites	- Every week	· KP-PID · Contractor	· KP-EPA
Noise and Vibration	- Compliance with operating hours (9am-5pm)	- Construction Sites	- Once every six months	· KP-PID · Contractor	· KP-EPA
	- Operational guidance to operators	- Construction Sites	- Once during construction	· KP-PID · Contractor	· KP-EPA
Involuntary Resettlement /Land Acquisition	- Acquisition of appropriate sites	- Construction Sites	- Before construction	· KP-PID · Contractor	· Land Revenue Department
HIV/AIDS and Other Infectious Diseases	- Presence or absence of infectious disease cases - Guidance on infectious disease prevention measures	- Construction Office	- Once a month	· KP-PID · Contractor	· KP-EPA
Working Environment (including occupational safety)	- Safety education	- Construction Office	- Once a month	· KP-PID · Contractor	· KP-EPA
Accident	- Safety Training	- Construction Office	- Once a month	· KP-PID · Contractor	· KP-EPA
Overall	- Complaint Handling	- Construction Office	- Once a month	· KP-PID · Contractor	· KP-EPA

Annex 11 Schedule for Abbreviated Resettlement Action Plan (ARAP)

Annex 12 Environmental and Social Monitoring Form

Monitoring shall be conducted at the frequency described in ANNEX 10 and submitted to JICA as a part of Monthly Progress Report for the month in which the monitoring is conducted.

Air Pollution

Basic Information	Monitoring Item	Result	Remarks
Date/Time: Surveyor's Name: Location:	- Checking the dust level during construction - Implementation of dust dispersion prevention measures		- Visual examination

Water Pollution/ Ground Subsidence

Basic Information	Monitoring Item	Result	Remarks
Date/Time: Surveyor's Name: Location:	- Checking the turbidity and oil during construction - Water quality testing		- Visual examination - When an abnormality occurs

Soil Contamination

Basic Information	Monitoring Item	Result	Remarks
Date/Time: Surveyor's Name: Location:	- Checking waste disposal		- Interviews with workers - Visual examination

Soil Contamination

Basic Information	Monitoring Item	Result	Remarks
Date/Time: Surveyor's Name: Location:	- Checking the fuel, oil, etc. leakage		- Interviews with workers - Visual examination

Noise and Vibration

Basic Information	Monitoring Item	Result	Remarks
Date/Time: Surveyor's Name: Location:	- Checking the working hour - Operational instruction to operators		- Interviews with workers

Involuntary Resettlement /Land Acquisition

Basic Information	Monitoring Item	Result	Remarks
Date/Time:	- Checking the handling of land acquisition		- Interviews with landowner
Surveyor's Name:			
Location:			

HIV/AIDS and Other Infectious Diseases

Basic Information	Monitoring Item	Result	Remarks
Date/Time:	- Presence or absence of infectious disease cases - Guidance on infectious disease prevention measures		- Interviews with workers
Surveyor's Name:			
Location:			

Working Environment (including occupational safety)

Basic Information	Monitoring Item	Result	Remarks
Date/Time:	- Safety awareness		- Interviews with workers
Surveyor's Name:			
Location:			

Accident

Basic Information	Monitoring Item	Result	Remarks
Date/Time:	- Safety Training		- Interviews with workers
Surveyor's Name:			
Location:			

Complaint Handling

Basic Information	Monitoring Item	Result	Remarks
Date/Time:	- Handling complaints		- Interviews with workers
Surveyor's Name:			
Location:			

Annex 13 Proposed Detail Schedule for Approval of PC-1

Required Process for PC-I Form Approval	2024								
	June	July				August				September
		1st week	2nd week	3rd week	4th week	1st week	2nd week	3rd week	4th week	
Data sharing and draft PC-1 by JICA Survey Team		✓								
Completion of PC-I form preparation by FFC (KP-PID and WAPDA)			✓							
PC-1 form submitted by FFC to Ministry of Water Resources				✓						
PC-I form submitted by Ministry of Water Resources to Planning Commission via Economic Affairs Division (EAD)					✓					
Approval of Form PC-I by Central Development Working Party (CDWP) of Planning Commission									✓	
Approval of Grant Aid by Japanese Cabinet										★

JAPAN INTERNATIONAL COOPERATION AGENCY
PAKISTAN OFFICE

JICA/Jul-05006/Projects/2024 July 05, 2024

Mr. Muhammad Ishtiaq Akbar
Section Officer (Japan-I)
Economic Affairs Division
Government of Pakistan
Islamabad

Subject: Signing on Minutes of Discussions (M/D) of the "Project for Flood Management Enhancement". (Explanation on Draft Preparatory Survey Report)

I extend my gratitude to your kind cooperation for JICA supported projects.

With reference to the minutes of discussions signed between Federal Flood Commission and Water and Power Development Authority and Irrigation Department, Khyber Pakhtunkhwa and Pakistan Meteorological Department and the Japan International Cooperation Agency on August 2 and November 2, 2023 and March 12, 2024 and in response to the request from the Government of Islamic Republic of Pakistan dated May 05, 2023, JICA dispatched the Preparatory Survey Team for the explanation on draft Preparatory Survey Report for the Project for Flood Management Enhancement.

As a result of the discussions, all the authorities concerned including JICA, FFC, WAPDA, and PID-KP has signed the Minutes of Discussion M/D document on July 2, 2024 under the Chairmanship of Chief Engineering Advisor/Chairman, Federal Flood Commission at committee room of Ministry of Water Resources Islamabad except the Ministry of Economic Affairs (sign in circulation). The signatories concerned agreed on the main items of the attached Minutes of Discussion M/D document and signed.

It is requested to EAD to sign on the M/D document by July 12, 2024. Kindly, send back the original signed M/D set to JICA for record and to share (copies) to concerned.

JICA Pakistan office will ensure to provide the scanned signed copy to all signatories.

Thank you very much for the cooperation.

Yours sincerely,

Koki Sawa
Representative
JICA-Pakistan office

Enclosed: Original Minutes of Discussion (two sets)
Copy to:
- Joint Secretary, Ministry of Economic Affairs, Islamabad.
- CEA/Chairman, Federal Flood Commission, Ministry of Water Resources Islamababd
- General Manager-Hydro Resources Management (HRM, WAPDA House, Lahore
- Superintending Engineer (H/Q), Irrigation Department, Government of KPK, Peshawar.
- DG Pakistan Meteorological Department, Sector H-8/2, Islamabad.

Address: 4th Floor, Saeaa Office Complex, Plot 17, Ramna 5, Khyaban-e-Suhrewardy, G-5/1, Islamabad. Tel: +92-51-9244500-07, Fax: +92-51-9244508

ソフトコンポーネント計画書

(1) ソフトコンポーネントを計画する背景

パキスタン・イスラム共和国（以下、「パキスタン」と表記）は、南北に 1,500km と長く標高差が大きいことから、多様な気象現象に見舞われ、災害に対する脆弱性が高い国である。近年の人為的な活動に起因する地球温暖化やオゾン層の破壊といった地球規模の環境破壊や、気候変動によるとされる記録的な大雨や熱帯低気圧など、災害を牽引する気象現象の激甚化や頻発化などが取り沙汰されている。パキスタンでも例外ではなく、2022 年 6 月から 8 月にかけて降り続いた大雨により河川氾濫、都市洪水、鉄砲水、氷河融解などが重なり、未曾有の大災害となった。約 3,300 万人が洪水の影響を受け、そのうち約 800 万人が避難を強いられた。また洪水の直接的な影響により、840～910 万人が貧困状態に陥ることが予想されている。2010 年の洪水が、パキスタンの歴史上最悪の洪水と言われてきたが、2022 年の洪水はそれを遥かに凌ぐものとなり、被害総額は 3.2 兆 PKR（149 億米ドル）、損失総額は 3.3 兆 PKR（152 億米ドル）と見積もられている(Ministry of Planning Development & Special Initiatives, 2022)。そのため洪水対策は、人命や財産の損失及び社会経済活動の停滞回避には喫緊の課題であることから、パキスタン政府は国家洪水対策・遠隔計測ネットワークマスタープランを作成し河川の観測網の整備を推進している。しかし現状は、パキスタン北部の KP 州及びパンジャブ州における河川観測網及び観測データを集約するデータセンター整備が途上の状態である。

上述の状況を踏まえ、本プロジェクトでは、パキスタンの KP 州及びパンジャブ州の河川に水文・水理観測システムを展開し、首都のイスラマバードとラホールに中央データ管理センターを整備する計画である。水文・水理観測システムにより観測された全ての河川観測データは中央データ管理センターのデータ収集システムに送信される。そしてデータ処理システムにより各種水文・水理観測プロダクトが生成され、各防災関連機関のデータ表示システムにより可視化されて各種河川監視業務に活用される。加えて、中央データ管理センターの情報提供システムを通じて、水文・水理観測プロダクトが国民や防災関係機関に提供され、洪水に関する注意喚起や避難行動などに役立てられる。また中央データ管理センターのデータベースシステムに水文・水理観測システムの観測データが長期にわたり蓄積され、地球温暖化による洪水の激甚化・頻発化の傾向及び影響の把握や対策立案のための重要な基礎資料となることも期待される。

更に、パキスタンにおける洪水発生の主要因は大雨であるため、気象観測データが各防災関連機関の初動のトリガーともなることから、水文・水理観測システムには雨量計が含まれていることに加え、河川の上流域に当たる KP 州の気象観測データを取得することが、迅速な洪水

による災害の対応には非常に有効である。パキスタン気象局（PMD）に対する日本政府の援助により 45 か所の自動気象観測システムがパンジャブ州とシンド州に整備済みであるが、洪水の監視対象である河川の上流に位置する KP 州には自動気象観測システムが未整備であることから、本プロジェクトでは KP 州の 5 か所に自動気象観測システムを整備する計画である。

(2)　本ソフトコンポーネントの特徴

河川管理及び洪水対策に関与するパキスタン政府の防災関連組織が下表の通り 7 つに細分化されていることから、本プロジェクトで調達された機材（水文・水理観測システム及び自動気象観測システム）の観測データの利用組織が 7 つであることに加え、パキスタン側の本プロジェクトの機材の運用維持管理を行う実施機関は、通常の無償資金協力案での単一組織ではなく、FFC、WAPDA 及び PMD の 3 組織である。そのためソフトコンポーネントの本来の実施意図を踏まえ、本プロジェクトで整備する機材にのみ的を絞り、本プロジェクトが完成後に円滑に立ち上がること（調達された機材の活用）及び協力成果の持続性を最低限確保することを念頭に計画を行っても、ソフトコンポーネントの活動内容が自ずと多岐に渡ってしまう特徴を有している。

表 1　パキスタン政府の防災関連組織と主業務

パキスタン政府の防災関連組織	主業務
National Disaster Management Authority (NDMA)	災害管理（避難・救援活動など）
Pakistan Meteorological Department (PMD)	気象観測及び洪水予警報
Water and Power Development Authority (WAPDA)	河川監視及び運用・維持管理
Federal Flood Commission (FFC)	調整及び啓発活動
Provincial Irrigation Departments (PIDs)	農業用灌漑・洪水・水管理
Pakistan Commissioner for Indus Waters (PCIW)	インドからの越境河川の流入水に関する連携
Indus River System Authority (IRSA)	国家レベルでのインダス川流域における水配分調整

また各機材の据付け、配線、ソフトウェアインストールなどをコントラクター側が全て実施した後にのみ研修を行った場合、各システム内の配線経路や各機材の接続など、分解しないと見えない部位があり、深部の技術移転が困難となる。またソフトウェアインストールに関しても実際に繰り返し行うことが習熟に繋がる。更に、機材の故障時、将来的な河川形状や観測環境の変化などにより機材の移設が余儀なくされた場合には、FFC、WAPDA 及び PMD の技術者が機材の分解やソフトウェアの再インストールをしなくてはいけないケースも発生することから、無償資金協力事業により調達された機材が長く活用されるには、水文・水理学及び気象学的な根拠と判断に基づく水文･水理観測システム及び自動気象観測システム機材据付けに関する技術ノウハウを伝授することが求められる。

加えて、表に示した 7 つのパキスタン政府防災関連組織は、主業務がそれぞれ異なることから、観測データの活用目的と方法が異なるほか、現状は河川や気象の観測データを中央データ管理センターにおいて一元的に自動で収集して、防災関連組織と共有する体制とはなっていな

い。無償資金協力事業により発現した協力対象事業の成果が、より長い期間継続し、本プロジェクトの上位目標である洪水災害の軽減に資するには、本プロジェクトにおいて整備される観測機材の観測データを、それぞれの組織が中央データ管理センターから取得し活用目的に沿って、各自の業務に取り込むことが不可欠となるため、観測データのフォーマット変換などの技術移転は最低限必要となり、パキスタン側の事業実施の促進にも寄与するものと示唆される。

また本プロジェクトでは、水文・水理観測システムによる観測データの精度確保のためにADCP（Acoustic Doppler Current Profiler）が整備される計画である。現状、WAPDA はペシャワールの河川で運用することを目的として、船舶乗員が運用を行う旧式船舶据付式 ADCP（10年以上前に調達）を 1 基保有している。この船舶据付式 ADCP は、大型であることから輸送（移動）が困難であることに加え、河川の流速が早い場合は、船舶が横波により転覆する危険もあることから、運用が特定の河川で且つ河面が比較的穏やかな状況に限定される場合が多い。加えて旧式であるため水深計測が主であり、各水深観測点の蛇行や河川水面の変動などの補正なしに手計算により河川流量を得ていることから、高い精度が確保されていない状態である。そのため前述の事由より、WAPDA が保有している船舶据付式 ADCP は、本プロジェクトで整備される水文・水理観測システムの観測点における河床観測などには活用できないものと判断される。

一方で、本プロジェクトで導入予定の可搬型 ADCP は、45 か所の水文・水理観測サイトに容易に移動が可能であり且つ人命の安全を最優先に橋上からの河床観測用であるため、WAPDA が保有している船舶据付式 ADCP とは、機材組立・運用保守・観測方法のほとんどが異なること、観測項目が増えていること、ADCP による観測データを水文・水理観測システムのデータロガー又は中央データ管理センター機材に取り込んで流量計算を実施させることなどからソフトコンポーネントにて技術移転を行うことは必須である。

(3) 本ソフトコンポーネントで対象とする人材

水文・水理観測網、中央データ管理センター及び自動気象観測システムの整備を通じて、本プロジェクトの目的の一つである将来の洪水リスク削減に寄与するため、以下の人材を本ソフトコンポーネントにより育成する必要がある。

1) 安全管理上、日本人技術者が立ち入ることができないサイトに水文・水理観測システムを設置して、将来の河川の形状変化などに合わせて移設することができる WAPDA 職員

2) 水文・水理観測システムを長期間にわたり良好に稼働させ、精度の高い観測を継続するために、適切に機材の運用維持管理を実施できる WAPDA 職員

3) ADCP（Acoustic Doppler Current Profiler）を操作し、河川流量の算出に必要な河川断面プロファイルを計測し、水文・水理観測システムの観測データの品質管理を実施で

きる WAPDA 及び FFC 職員

4) ラホールとイスラマバードの２か所に整備される中央データ管理センターの障害対応を適切な手順で実施し、長期にわたり高い可用性を維持できる WAPDA 及び FFC 職員

5) 水文・水理観測システムの観測データ及びそこから作成される各種水文・水理観測プロダクトを、提供相手や公開内容を適切に制御した上で、提供・公開できる WAPDA 及び FFC 職員

6) 水文・水理観測システムの観測データ及びそこから作成される各種水文・水理観測プロダクトを、洪水モデルなどのシステムに取り込んで利用するために最低限必要な、中央データ管理センターからのデータの自動取得とデータ変換が行える防災関連機関（WAPDA、FFC、PMD、NDMA、PID、IRSA、PCIW）の職員

7) 安全管理上、日本人技術者が立ち入ることができないサイトにおける自動気象観測システムの設置・移設作業実施監理をすることができる PMD 職員

8) 自動気象観測システムを長期間にわたり良好に稼働させ、精度の高い観測を継続するために、適切に機材の運用維持管理を実施できる PMD 職員

(4) ソフトコンポーネントの目標

無償資金協力にて整備される水文・水理観測システム、中央データ管理センター、自動気象観測システムを実施機関が自ら確実に運用・保守できるようになることをソフトコンポーネントの目標とする。

(5) ソフトコンポーネントの成果と成果達成度の確認方法

ソフトコンポーネントにて期待される成果、成果指標、成果達成度の確認方法は下表のとおりである。

表 2 ソフトコンポーネントの成果及び達成度の確認方法

No.	成果	成果指標	成果達成度の確認方法
1	WAPDA 職員が水文・水理観測システムを設置・移設できる。	WADPA 機材設置チームによる設置や移設などに対応するため、水文・水理観測システムを設置・移設する技術を習得する。	1) 日本人技術者が立ち入ることが可能なサイト４か所における設置指導を通じた手順の理解度、習熟度及び安全性の確認 2) WAPDA 職員による設置工程の映像や設置後の写真による確認

2	WAPDA 職員が水文･水理観測システムを円滑に運用・維持管理できる。	運用・維持管理マニュアルと運用管理台帳に基づき、水文・水理観測システムの運用を実施するための実践的な技術を習得する。	観察及び聞き取りによる、以下の５項目の習熟度の確認 1) 定期保守点検 2) 予備品の実機への組入れ、組入れ後の動作及び観測状況確認 3) 軽微な故障の探求・処置・復旧・動作確認作業 4) 重大な故障発生時の対応 5) 保守管理台帳の記載内容
3	WAPDA職員及びFFC職員が水文・水理観測システムの観測データの観測精度を維持できる。	河川の変化状況を河川流量の計算に反映させるため、水文・水理観測サイトにて ADCP（Acoustic Doppler Current Profiler）を用いて河川断面プロファイルを定期的に計測し、水文・水理観測システム若しくは中央データ管理センターのサーバに設定する技術を習得する。 加えて、中央データ管理センターにおける水文・水理観測システムの観測データの異常値の発見方法を習得する。	1) ADCP を用いた河川断面プロファイルの計測・設定作業の観察及び WAPDA 職員への聞き取りによる作業手順の理解度確認 2) 異常値を含むダミーの観測データを用いた小テスト
4	WAPDA職員及びFFC職員が中央データ管理センターを円滑に運用・維持・管理できる。	システムの早期復旧と障害箇所の特定を系統的に実施する手順を確立し、障害対応に必要な技術を習得する。	観察及び聞き取りによる、以下の７項目の習熟度の確認 1) データの定期的なバックアップ 2) 継続的な監視と障害の早期発見 3) 系統的な障害箇所の特定と復旧 4) 予備品の実機への組入れ、組入れ後の動作及び観測状況確認 5) 冗長化されたサーバの切替手順 6) 重大な故障発生時の対応 7) 保守管理台帳の記載内容
5	WAPDA職員及びFFC職員が水文・水理観測システムの観測データを配信できる。	水文・水理観測システムの観測データ・プロダクトを適切な情報セキュリティ対策を講じて関係機関に提供する技術を習得する。	1) 情報提供システムの運用状況の確認 2) WAPDA 及び FFC の Web サイトなどで観測データ・プロダクトの配信状況を確認 3) 中央データ管理センターで必要な情報セキュリティ対策の理解度の確認 4) 情報提供範囲の設定確認
6	防災関連組織職員が水文・水理観測システムの観測データの自動取得と観測データのフォーマット変換ができる。	情報提供システムにソフトウェアにてアクセスし、水文・水理観測システムの観測データを取得した後、各防災関連組織の主業務に使用するための観測データのフォーマット変換を行う技術を習得する。	データ取得を実装する場を設け、理解度を確認する。
7	PMD 職員が自動気象観測システムを設置・移設及び円滑に運用・維持管理できる。	日本人技術者が安全上の理由から立ち入ることができないサイトへの設置のため、自動気象観測システムを設置・移	1) 日本人技術者が立ち入ることが可能なサイトにおける設置指導を通じた手順の理解度、習熟度及び安全性の確認

		設作業実施の監理方法を習得する。また運用・維持管理マニュアルと運用管理台帳に基づき、自動気象観測システムの運用を実施するための実践的な技術を習得する。	2) PMD 職員による設置工程の映像や設置後の写真による確認 観察及び聞き取りによる、以下の 5 項目の習熟度の確認 1) 定期保守点検 2) 予備品の実機への組入れ、組入れ後の動作及び観測状況確認 3) 軽微な故障の探求・処置・復旧・動作確認作業 4) 重大な故障発生時の対応 5) 保守管理台帳の記載内容

上述のソフトコンポーネントの 7 つの成果を達成することにより、次表に示す各効果が見込まれ、本プロジェクトの目標達成にも貢献するものと考えている。

表 3　ソフトコンポーネントにおいて実施することによる効果

No.	成果	ソフトコンポーネントにおいて実施することによる効果
1	WAPDA 職員が水文・水理観測システムを設置・移設できる。	WAPDA 職員が水文・水理観測システムの設置・移設方法を習得することで、安全管理上の理由から日本人技術者が立ち入ることができないサイトにおける、WAPDA 職員による安全で確実な水文・水理観測システムの設置作業を支援し、プロジェクトの円滑な立ち上がりを促進する。加えて、将来河川の形状の変化により観測場所の有効性が低下した場合に、より有効性の高い観測場所に WAPDA 自身で移設することで、我が国の無償資金協力により整備される水文・水理観測システムが長期に渡り効果的に利用される。
2	WAPDA 職員が水文・水理観測システムを円滑に運用・維持管理できる。	WAPDA 職員が水文・水理観測システムのメンテナンス方法を習得し、定められた手順での定期点検の実施・記録を含めた適切な維持管理を実施することにより、我が国の無償資金協力により整備される水文・水理観測システムが長期にわたり良好に稼働する。
3	WAPDA 職員及び FFC 職員が水文・水理観測システムの観測データの観測精度を維持できる。	WAPDA 職員及び FFC 職員が ADCP を用いた河川断面プロファイルの計測に習熟し、定期的な計測を継続した上で、機材引き渡しの段階から、水文・水理観測システムの観測データの精度確認を継続的に実施するよう習慣付けることで、水文・水理観測システムの観測データの有効性が向上することに加えて、水文・水理観測システムの不具合の早期発見と対応が可能となり、我が国の無償資金協力により整備される水文・水理観測システムが長期に渡り有効利用される。
4	WAPDA 職員及び FFC 職員が中央データ管理センターを円滑に運用・維持・管理できる。	WAPDA 職員及び FFC 職員が中央データ管理センターのメンテナンス方法を習得し、定められた手順での定期点検の実施・記録を含めた適切な維持管理を実施した上で、機器の故障や通信障害発生時に系統的に対応する技術を身につけることで、我が国の無償資金協力により整備される中央データ管理センターが長期にわたり良好に稼働し、水文・水理観測システムによる観測データが長期に渡り有効利用される。
5	WAPDA 職員及び FFC 職員が水文・水理観測システムの観測データ及びそれに基づくアラートを配信できる。	WAPDA 職員及び FFC 職員が水文・水理観測システムの観測データに基づき河川の流量変化に係るアラートを発出できる環境を整備することで、本プロジェクトの目的の一つである洪水リスク削減に向けて、我が国の無償資金協力により整備される水文・水理観測システムが長期に渡り効果的に利用される。
6	防災関連機関職員が水文・水理観測システムの観測デ	ユーザが将来自助努力にて水文・水理観測システムの観測データを防災業務で活用するために（既設データベースやモデルなどへの取り込

	ータの自動取得とデータのフォーマット変換ができる。	み）最低限必要となる、観測データの自動取得及びデータのフォーマット変換方法を習得することで、我が国の無償資金協力により整備される水文・水理観測システムによる観測データが長期に渡り有効利用される。
7	PMD 職員が自動気象観測システムを設置し円滑に運用・維持管理できる。	PMD 職員が自動気象観測システムの設置方法を習得することで、安全管理上の理由から本邦技術者が作業できないサイトにおける、PMD 職員による安全で確実な自動気象観測システムの設置作業を支援し、プロジェクトの円滑な立ち上がりを促進する。加えて、PMD 職員が自動気象観測システムのメンテナンス方法を習得し、定められた手順での定期点検の実施・記録を含めた適切な維持管理を実施することにより、我が国の無償資金協力により整備される自動気象観測システムの長期に渡る良好な稼働と効果的な利用につながる。

(6)　ソフトコンポーネントの活動（投入計画）

ソフトコンポーネントの活動（投入計画）は以下の通りである。表 4 に各活動の内容、必要とされる技術・業種、技術レベルを、表 5 に各活動の実施方法、成果品及び実施リソースを、表 6 に各活動のターゲットグループを記載した。水文・水理観測システムの設置方式は、橋の形状に応じてサイト毎に異なり 17 タイプに分類している。そのため、特に、WAPDA 機材設置チーム（4 チーム）が設置監理を行う計画である渡航制限地域に位置する 13 のサイトにおいて代表的な 4 タイプを抽出して、渡航制限地域外に位置する 4 サイトにおいて、実践的な設置及び移設の実施が可能となるための研修を活動 1 で実施する計画とした。

表 4　ソフトコンポーネントの活動内容

成果 No.	活動	活動内容	必要とされる技術・業種	現状の技術水準	達成すべき技術水準
1	活動 1	水文・水理観測システムの設置と移設研修	電気・電子技術者	既設水位計の運用経験を有するが、設置経験に乏しい。	水文・水理観測システムの設置と移設の技術を有する。
2	活動 2	水文・水理観測システム運用・保守研修	電気・電子技術者	既設水位計の運用経験を有する。	・水文・水理観測システムの点検・調整・故障探求・処置・復旧ができる技術を有する。 ・水文・水理観測システム運用マニュアル要約及び運用管理台帳に沿った運用・管理技術を有する。
3	活動 3	水文・水理観測システムの観測データ品質管理研修	電気・電子技術者	既存の ADCP の運用経験を有する。日毎の観測データにおける異常値の確認に留まる。	・ADCP を用いた河川断面プロファイルの観測と取り込みの技術を有する。 ・水文・水理観測システムの観測データの異常値の発見と原因調査の技術を有する。
4	活動 4	中央データ管理セン	IT 技術者	WAPDA 職員及び FFC 職員	イスラマバードとラホ

		ターの運用・保守研修		ともに Linux ベースのサーバの運用経験・技術に精通していない。	ール2拠点の中央データ管理センターの運用保守技術を有する。
5	活動 5	水文・水理観測システムの観測データ及びアラートを含むプロダクトの公開技術研修	IT 技術者	既存水位計の観測データ公開用ウェブサイトの運用に留まる。	WAPDA の Web サイトでの水文・水理観測システムの観測データ及びプロダクトの公開と継続的な運用ができる技術を有する。
6	活動 6	水文・水理観測システムの観測データ及びプロダクトの利用研修	IT の基礎的な知識を有する防災関連機関職員	フォーマット変換などデータ処理の経験及び技術に精通していない。	・中央データ管理センターから水文・水理観測システムの観測データの自動取得ができる。 ・水文・水理観測システムの観測データのフォーマットを理解し、変換技術を有する。
7	活動 7	自動気象観測システムの設置・運用・保守研修	電気・電子技術者	KP 州には自動気象観測システムの熟練した設置・運用・保守経験者が存在しない。	・自動気象観測システムの設置技術を有する。 ・自動気象観測システムの点検・調整・故障探求・処置・復旧ができる技術を有する。 ・自動気象観測システム運用マニュアル要約及び運用管理台帳に沿った運用・管理技術を有する。

表 5　ソフトコンポーネントの実施内容

活動	実施方法	成果品	実施リソース
活動 1	水文・水理観測システムの設置サイトの選定基準の研修	水文・水理観測システム設置・移設マニュアル	水文・水理観測システム設置技術担当コンサルタント：1.63 人月（現地技術移転期間：49 日間） 直接支援型
	水文・水理観測システム設置手順の研修		
	日本側設置サイト 4 か所にて、水文・水理観測システムの設置研修		
	WAPDA による水文・水理観測システム設置・移設マニュアルの作成		
	作成したマニュアルに従い、日本人渡航制限地域の据付サイトにて設置を実施し、日本側が遠隔で確認（中央データ管理センターにおける観測データの受信確認を含む）		
活動 2	水文・水理観測システム概説	水文・水理観測システム保守マニュアル要約	水文・水理観測システム運用・保守技術担当コンサルタント：1.53 人月（現地技術移転期間：46 日間） 直接支援型
	水文・水理観測システム保守マニュアル要約の作成		
	水文・水理観測システム運用管理台帳の作成	水文・水理観測システム運用管理台帳	
	水文・水理観測システム運用マニュ		

	アル要約に則った、WAPDA 職員による運用業務の実施及び運用管理台帳への記録		
	予備品の実機への組入れ研修	水文・水理観測システム保守管理台帳	
	故障探求・処置・復旧確認研修	水文・水理観測システム故障探求フローチャート	
	重大な故障発生時の対応研修		
活動 3	ADCP の組立、分解と保管方法の研修	ADCP 運用・保守・計測マニュアル	
	ADCP を用いた河川断面プロファイルデータの計測の実地研修		
	水文・水理観測システムの観測データの統計的検証	水文・水理観測システムの観測データ検証マニュアル	
活動 4	中央データ管理センターのサーバの Linux OS の基本操作	Linux OS 基本操作マニュアル	中央データ管理センター運用・保守技術担当コンサルタント：1.30 人月（現地技術移転期間：39 日） 直接支援型
	中央データ管理センターのサーバの運用・保守技術の研修	中央データ管理センター運用・保守マニュアル	
	中央データ管理センターのサーバのデータバックアップ技術の研修		
	中央データ管理センターのサーバの障害対応技術の研修	中央データ管理センター障害対応手順書	
	中央データ管理センターの情報セキュリティ監視技術の研修	中央データ管理センター情報セキュリティ監視マニュアル	
活動 5	情報提供システムを通じた水文・水理観測システムの観測データ提供技術	水文・水理観測システムの観測データ提供マニュアル	
	アラートシステム用ソフトウェアの導入及び初期設定の技術研修	アラートシステム初期導入マニュアル	
	観測データ及びアラート配信のためのモバイルアプリの開発技術研修	観測データ・アラート配信デモアプリ及び解説書	
活動 6	データ表示システムの設置と利用研修	水文・水理観測システムの観測データ利用マニュアル	水文・水理観測システムの観測データ活用技術担当コンサルタント：0.60 人月（現地技術移転期間：18 日） 直接支援型
	中央データ管理センターからの観測データの自動取得技術		
	水文・水理観測システムの観測データの統計処理及びフォーマット変換技術		
活動 7	自動気象観測システム設置サイトの選定基準の研修	自動気象観測システム設置マニュアル	自動気象観測システム担当コンサルタント：1.33 人月（現地技術移転期間：40 日間） 直接支援型
	自動気象観測システム設置手順の研修		
	日本側設置サイトにて、自動気象観測システムの設置研修		
	PMD による自動気象観測システム設置マニュアルの作成		
	作成したマニュアルに従い、日本人渡航制限地域の据付サイトにて設置を実施し、日本側が遠隔で確認（PMD		

	イスラマバードにおける観測データの受信確認を含む)		
	自動気象観測システム保守マニュアル要約の作成	自動気象観測システム保守マニュアル要約	
	自動気象観測システム運用管理台帳の作成	自動気象観測システム運用管理台帳	
	自動気象観測システム運用マニュアル要約に則った、PMD 職員による運用業務の実施及び運用管理台帳への記録		
	納入された予備品の実機への組入れ研修	自動気象観測システム保守管理台帳	
	故障状態を想定した故障探求・処置・復旧確認研修	自動気象観測システム故障探求フローチャート	
	重大な故障発生時の対応研修		

表 6　ターゲットグループ

活動	WAPDA 職員	FFC 職員	PMD 職員	NDMA 職員	PID 職員	IRSA 職員	PCIW 職員
活動 1	30	5			5		
活動 2	30	5	5	5	5	5	5
活動 3	30	5					
活動 4	5	5					
活動 5	5	5					
活動 6	5	5	5	5	10	5	5
活動 7			10				

活動日程詳細計画は以下の通りである。

表 7　各活動の日程詳細計画

日	活動 1（機材設置時）
1	日本発ラホール着
2	研修内容の打ち合わせとスケジュールの確認
3	水文・水理観測システムの設置サイトの選定基準の研修
4	水文・水理観測システム設置手順の研修
5	WAPDA による水文・水理観測システム設置・移設マニュアルの作成
6	
7	
8	日本側据付サイト（サイト 16）向け、水文・水理観測システム機材組立研修
9	日本側据付サイト（サイト 16）向け、水文・水理観測システム機材組立研修 サヒワルへ移動
10	日本側据付サイト（サイト 16）にて、水文・水理観測システム機材据付研修（架台、データロガー）
11	日本側据付サイト（サイト 16）にて、水文・水理観測システム機材据付研修（水位計・流速計、雨量計、河川監視カメラ）
12	ラホールへ移動
13	
14	
15	日本側据付サイト（サイト 19）向け、水文・水理観測システム機材組立研修
16	サヒワルへ移動
17	日本側据付サイト（サイト 19）にて、水文・水理観測システム機材据付研修（架台、データロガー）
18	日本側据付サイト（サイト 19）にて、水文・水理観測システム機材据付研修（水位計・流速計、雨量計、河川監視カメラ）
19	ラホールへ移動

20	
21	
22	日本側据付サイト（サイト 43）向け、水文・水理観測システム機材組立研修
23	ファイサラバードへ移動
24	日本側据付サイト（サイト 43）にて、水文・水理観測システム機材据付研修（架台、データロガー）
25	日本側据付サイト（サイト 43）にて、水文・水理観測システム機材据付研修（水位計・流速計、雨量計、河川監視カメラ）
26	イスラマバードへ移動
27	
28	
29	日本側据付サイト（サイト 18）向け、水文・水理観測システム機材組立研修
30	日本側据付サイト（サイト 18）にて、水文・水理観測システム機材据付研修（架台、データロガー）
31	日本側据付サイト（サイト 18）にて、水文・水理観測システム機材据付研修（水位計・流速計、雨量計、河川監視カメラ）
32	ラホールへ移動
33	日本人渡航制限地域の据付サイト向け、水文・水理観測システム機材組立研修
34	
35	
36	WAPDA による水文・水理観測システム設置・移設マニュアルの更新
37	日本人渡航制限地域の据付サイトにおける水文・水理観測システム機材据付進捗確認・支援
38	日本人渡航制限地域の据付サイトにおける水文・水理観測システム機材据付進捗確認・支援
39	日本人渡航制限地域の据付サイトにおける水文・水理観測システム機材据付進捗確認・支援
40	日本人渡航制限地域の据付サイトにおける水文・水理観測システム機材据付進捗確認・支援
41	
42	
43	WAPDA による水文・水理観測システム設置・移設マニュアルの更新
44	WAPDA による水文・水理観測システム設置・移設マニュアルの更新
45	機材据付研修のレビュー WAPDA GM への報告
46	イスラマバードへ移動
47	JICA 事務所への報告 報告書の作成
48	現地発
49	帰国

	活動 7（機材設置時）
1	日本発イスラマバード着
2	研修内容の打ち合わせとスケジュールの確認
3	PMD による自動気象観測システム据付マニュアルの作成
4	PMD による自動気象観測システム据付マニュアルの作成
5	アボッタバードへ移動
6	
7	
8	日本側据付サイト（アボッタバード）にて、自動気象観測システム機材据付研修（自動気象観測システム筐体、データロガー）
9	日本側据付サイト（アボッタバード）にて、自動気象観測システム機材据付研修（ソーラーパワーシステム）
10	日本側据付サイト（アボッタバード）にて、自動気象観測システム機材据付研修（気温・湿度計、シェルター）
11	日本側据付サイト（アボッタバード）にて、自動気象観測システム機材据付研修（ポール、風向・風速計）
12	日本側据付サイト（アボッタバード）にて、自動気象観測システム機材据付研修（気圧計、日照・日射計、地中湿度センサー）
13	
14	
15	日本側据付サイト（アボッタバード）にて、自動気象観測システム機材据付研修（雨量計、積雪計）
16	日本側据付サイト（アボッタバード）にて、自動気象観測システム機材据付研修（動作確認）
17	イスラマバードへ移動（PMD 据付チーム：サイドゥ・シャリフへ移動）

18	日本人渡航制限地域の据付サイト（サイドゥ・シャリフ）における自動気象観測システム機材据付進捗確認・支援（自動気象観測システム筐体、データロガー） 自動気象観測システムの設置サイトの選定基準の研修
19	日本人渡航制限地域の据付サイト（サイドゥ・シャリフ）における自動気象観測システム機材据付進捗確認・支援（ソーラーパワーシステム） 自動気象観測システムの設置サイトの選定基準の研修
20	
21	
22	日本人渡航制限地域の据付サイト（サイドゥ・シャリフ）における自動気象観測システム機材据付進捗確認・支援（気温・湿度計、シェルター） 自動気象観測システム据付マニュアルの更新
23	日本人渡航制限地域の据付サイト（サイドゥ・シャリフ）における自動気象観測システム機材据付進捗確認・支援（ポール、風向・風速計） 自動気象観測システム据付マニュアルの更新
24	日本人渡航制限地域の据付サイト（サイドゥ・シャリフ）における自動気象観測システム機材据付進捗確認・支援（気圧計、日照・日射計、地中湿度センサー） 自動気象観測システム据付マニュアルの更新
25	日本人渡航制限地域の据付サイト（サイドゥ・シャリフ）における自動気象観測システム機材据付進捗確認・支援（雨量計、積雪計）
26	日本人渡航制限地域の据付サイト（サイドゥ・シャリフ）における自動気象観測システム機材動作確認・支援
27	
28	
29	AWS システム概要と運用・保守手順の解説
30	AWS 保守マニュアル要約の作成
31	AWS 運用管理台帳の作成
32	アボッタバードへ移動
33	AWS 運用マニュアル要約に則った、PMD 職員による運用業務の実施及び運用管理台帳への記録 納入された予備品の実機への組入れ研修（アボッタバード）
34	
35	
36	故障状態を想定した故障探求・処置・復旧確認研修 重大な故障発生時の対応研修（アボッタバード）
37	イスラマバードへ移動
38	報告書作成 （PMD 据付チーム：イスラマバードへ移動）
39	機材据付研修のレビュー PMD DG への報告
40	現地発

日	活動 2・活動 3（引き渡しを目途に日程調整後に実施）
1	日本発ラホール着
2	研修内容の打ち合わせとスケジュールの確認
3	水文・水理観測システム保守マニュアル要約の作成
4	水文・水理観測システム保守マニュアル要約の作成
5	水文・水理観測システム運用管理台帳の作成
6	
7	
8	水文・水理観測システム運用マニュアル要約に則った、WAPDA 職員による運用業務の実施及び運用管理台帳への記録（水位計、流速計、ソーラーパワーシステム）
9	水文・水理観測システム運用マニュアル要約に則った、WAPDA 職員による運用業務の実施及び運用管理台帳への記録（雨量計、監視カメラ、セルラーゲートウェイ）
10	納入された予備品の実機への組入れ研修（水位計、流速計、データロガー）
11	納入された予備品の実機への組入れ研修（ソーラーパワーシステム、雨量計、監視カメラ、セルラーゲートウェイ）
12	故障状態を想定した故障探求・処置・復旧確認研修（水位計、流速計、データロガー）

13	
14	
15	故障状態を想定した故障探求・処置・復旧確認研修（ソーラーパワーシステム、雨量計、監視カメラ、セルラーゲートウェイ）
16	重大な故障発生時の対応研修、研修の理解度確認
17	ADCP 機材の組み立て、分解と保管方法の研修
18	ADCP 機材の組み立て、分解と保管方法の研修
19	ADCP 機材の組み立て、分解と保管方法の研修
20	
21	サヒワルへ移動
22	ADCP 機材を用いた河川断面プロファイルデータの計測の実地研修（サイト 16、チーム 1）
23	ADCP 機材を用いた河川断面プロファイルデータの計測の実地研修（サイト 19、チーム 2）
24	ADCP 機材を用いた河川断面プロファイルデータの計測の実地研修（サイト 25、チーム 3）
25	イスラマバードへ移動 水文・水理観測システムの観測データの統計的検証（FFC、WAPDA）
26	水文・水理観測システムの観測データの統計的検証（FFC、WAPDA）
27	
28	
29	ADCP 機材を用いた河川断面プロファイルデータの計測の実地研修（サイト 18、チーム 4）
30	ADCP 計測実地研修のレビュー（チーム間での実地研修の経験の共有、観測プロファイルの確認） ADCP 運用・保守・計測マニュアルの作成
31	JICA 事務所へ報告、報告書の作成、現地発
32	帰国

日	活動 4・活動 5（引き渡しを目途に日程調整後に実施）
1	日本発イスラマバード着
2	研修内容の打ち合わせとスケジュールの確認
3	中央データ管理センターのサーバの Linux OS の基本操作（FFC）
4	中央データ管理センターのサーバの運用・保守技術の研修（FFC）
5	中央データ管理センターの通信機器の運用・保守技術の研修（FFC）
6	
7	
8	中央データ管理センターのサーバのデータバックアップ、アーカイブ技術の研修（FFC）
9	中央データ管理センターのサーバの障害対応技術の研修（FFC）
10	中央データ管理センターの通信機器の障害対応技術の研修（FFC）
11	中央データ管理センターの情報セキュリティ監視技術の研修（FFC）
12	研修の理解度確認（FFC） イスラマバードからラホールへ移動
13	
14	
15	中央データ管理センターのサーバの Linux OS の基本操作（WAPDA）
16	中央データ管理センターのサーバの運用・保守技術の研修（WAPDA）
17	中央データ管理センターの通信機器の運用・保守技術の研修（WAPDA）
18	中央データ管理センターのサーバのデータバックアップ、アーカイブ技術の研修（WAPDA）
19	中央データ管理センターのサーバの障害対応技術の研修（WAPDA）
20	
21	
22	中央データ管理センターの通信機器の障害対応技術の研修（WAPDA）
23	中央データ管理センターの情報セキュリティ監視技術の研修（WAPDA）
24	情報提供システムを通じた水文・水理観測システムの観測データ提供技術（水文・水理観測システムの登録・削除、ユーザ管理とデータ提供範囲の制限）
25	情報提供システムを通じた水文・水理観測システムの観測データ提供技術（水文・水理プロダクト解説）
26	アラート端末用ソフトウェアの導入及び初期設定の技術研修（ソフトウェアのインストールと初期設定、観測データの取り込み）
27	
28	

29	アラート端末用ソフトウェアの導入及び初期設定の技術研修（主要パラメータの解説、調整、実行）
30	アラート端末用ソフトウェアの導入及び初期設定の技術研修（ソフトウェアの出力の利活用）
31	観測データ及びアラート配信のためのモバイルアプリの開発技術研修（開発環境の導入）
32	観測データ及びアラート配信のためのモバイルアプリの開発技術研修（アプリの画面構成）
33	観測データ及びアラート配信のためのモバイルアプリの開発技術研修（観測データの受信と表示）
34	
35	
36	観測データ及びアラート配信のためのモバイルアプリの開発技術研修（アラートの受信と表示）
37	観測データ及びアラート配信のためのモバイルアプリの開発技術研修（アプリの公開）
38	研修の理解度確認、報告書の作成、現地発
39	帰国

日	活動 6（引き渡しを目途に日程調整後に実施）
1	日本発ラホール着
2	研修内容の打ち合わせとスケジュールの確認
3	水文・水理観測システム概説、画像表示システムの据付研修（WAPDA、PID、PMD）
4	中央データ管理センターからの観測データの自動取得技術（WAPDA）
5	水文・水理観測システムの観測データの統計処理及びフォーマット変換技術（WAPDA）
6	
7	
8	中央データ管理センターからの観測データの自動取得技術（PMD）
9	水文・水理観測システムの観測データの統計処理及びフォーマット変換技術（PMD） イスラマバードへ移動
10	水文・水理観測システム概説、画像表示システムの据付研修（FFC、NDMA、IRSA、PCIW）
11	中央データ管理センターからの観測データの自動取得技術（FFC）
12	水文・水理観測システムの観測データの統計処理及びフォーマット変換技術（FFC）
13	
14	
15	中央データ管理センターからの観測データの自動取得技術（NDMA、IRSA、PCIW）
16	水文・水理観測システムの観測データの統計処理及びフォーマット変換技術（NDMA、IRSA、PCIW）
17	報告書の作成、現地発
18	帰国

日	活動 2・活動 3（瑕疵期間完了時）
1	日本発ラホール着
2	研修内容の打ち合わせとスケジュールの確認
3	水文・水理観測システム運用マニュアル要約に則った、WAPDA 職員による運用業務の実施及び運用管理台帳への記録
4	故障状態を想定した故障探求・処置・復旧確認研修
5	ADCP 機材組立て、分解と保管方法の研修（ADCP 運用・保守・計測マニュアルに従い、手順の再確認）
6	
7	サヒワルへ移動
8	ADCP 機材を用いた河川断面プロファイルデータの計測の実地研修（サイト 16、チーム 1）
9	ADCP 機材を用いた河川断面プロファイルデータの計測の実地研修（サイト 16、チーム 2）
10	ADCP 機材を用いた河川断面プロファイルデータの計測の実地研修（サイト 19、チーム 3）
11	ADCP 機材を用いた河川断面プロファイルデータの計測の実地研修（サイト 19、チーム 4） ラホールへ移動
12	ADCP 運用・保守・計測マニュアルの更新、研修の理解度確認、実地研修のレビュー、報告書の作成
13	現地発
14	帰国

(7)　ソフトコンポーネントの実施リソースの調達方法

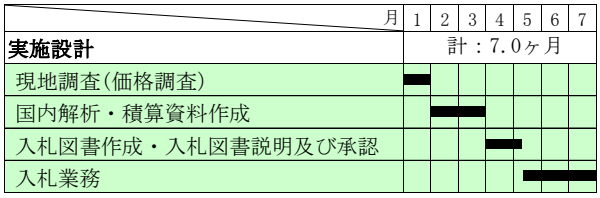
実施リソースは、本プロジェクトの機材調達に関わる本邦コンサルタントによる直接支援型とする。その理由は以下の通りである。

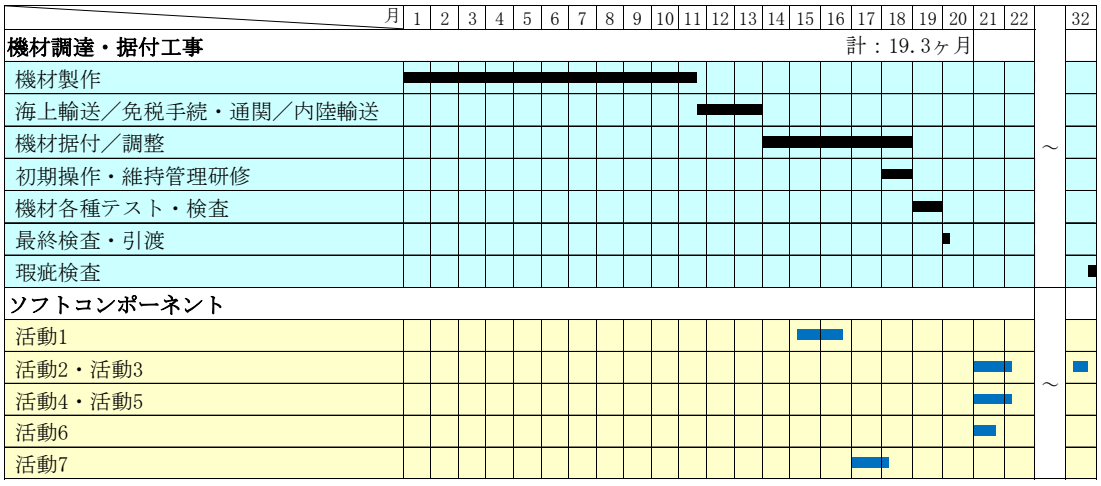
- 水文・水理業務に精通し、本プロジェクトで導入するレーダー式水位計、レーダー式流速計など、水文・水理観測業務に使用される観測機材に関する高度な知識・技術を有する者が不可欠であること。
- 気象業務に精通し、本プロジェクトで導入する自動気象観測システム（自動気象観測システム）に使用される観測機材に関する高度な知識・技術を有し且つ自動気象観測システム設置研修の実績を有する者が不可欠であること。
- 通常、上述のような技術や知識を豊富に有している人材は、水文・水理・気象関連のコンサルティング業務を実際に行っている組織に在籍していること。
- パキスタンにおける水文・水理業務並びに気象業務は政府機関によって実施されており、日本のように民間に開放されておらず、上述のような技術や知識を豊富に有しているコンサルタント人材は、現地にはいないこと。
- 計画されている技術移転と同様の経験を有する人材が必要であること。

(8)　ソフトコンポーネントの実施工程

プロジェクト全体工程及びソフトコンポーネント実施工程を次表に示す。活動 1、7 は機材設置期間中に、その他の活動は機材引渡し後及び瑕疵期間完了時に実施する計画である。

表 8 実施工程表





(9) ソフトコンポーネントの成果品

表 9 ソフトコンポーネントの成果品(アウトプット)

資料名	内容	提出時期	ページ数
水文・水理観測システム設置・移設マニュアル	-設置場所の選択基準及び必要な測量 -水文・水理観測システム設置手順 -水文・水理観測システム移設手順	技術移転実施後	20
水文・水理観測システム保守マニュアル要約	-水文・水理観測システム概要 -定期保守点検手順 -予備品の実機への組入れ手順と組入れ後の動作確認手順 -故障の探求・処置・復旧確認作業実施手順 -重大な故障発生時の対応手順		15
水文・水理観測システム運用管理台帳	-運用・定期点検・清掃の実施日時 -点検項目ごとの結果記録 -運用・定期点検・清掃を行った職員氏名		2
水文・水理観測システム保守管理台帳	-障害の発生日時 -障害の原因（異音、部分的な劣化、その他） -実施した復旧手順 -交換した部品の名称及び数量 -復旧/障害対応を行った職員氏名		2
水文・水理観測システム故障探求フローチャート	-故障の探求手順（フローチャート）		1
ADCP 運用・保守・計測マニュアル	-ADCP 観測概要（計測原理、手順、計測可能条件など） -ADCP 運用・保守手順 -ADCP 障害対応手順 -ADCP 組立て・分解及び計測手順		10
Linux OS 基本操作マニュアル	-Linux OS の概要 -重要なコマンドの解説 -ファイルシステムの解説 -重要なシステムプロセスの解説 -シェルスクリプト（簡易プログラム）作成の基礎		20
中央データ管理センター運用・保守マニュアル	-中央データ管理センターシステム構成、データフロー概要 -中央データ管理センターネットワーク構成概要 -中央データ管理センター電源構成及び停電対応概要 -サーバ・ネットワーク機器のハードウェア構成概要 -サーバ・ネットワーク機器の起動、停止、再起動手順 -サーバ・ネットワーク機器の定期保守点検手順（CPU、メモリ、ストレージ、ネットワーク使用率などの確認） -サーバ・ネットワーク機器の定期清掃手順 -サーバのバックアップ取得及び復旧手順		20
中央データ管理センター障害対応手順書	-故障の探求手順（フローチャート） -故障の探求・処置・復旧確認作業実施手順 -冗長構成のサーバの切替手順 -サーバの冗長電源の交換手順 -サーバのストレージ障害時の予備品への交換と RAID 再構築手順		20
中央データ管理センター情報セキュリティ監視マニュアル	-中央データ管理センター情報セキュリティ概要 -中央データ管理センターにて想定される主要な脅威の解説 -統合脅威管理（UTM）の情報セキュリティ機能及び設定 -サーバ・ネットワーク機器における情報セキュリティ設定 -情報セキュリティ監視項目と確認手順		10
水文・水理観測システムの観測データ検証マニュアル	-標準器などを使用した、水位計、流速計、雨量計の観測データの精度の検証方法 -観測データの統計処理及び外れ値の特定方法		10

水文・水理観測システムの観測データ提供マニュアル	-情報提供システム概要 -水文・水理観測システムの観測データの提供 -ユーザ・グループ単位での提供内容の制限方法を含むユーザ管理		10
アラートシステム初期導入マニュアル	-アラートシステムソフトウェア概要 -アラートシステムソフトウェア導入・初期設定手順 -アラートシステムソフトウェア実行手順		10
観測データ・アラート配信デモアプリ	-観測データ及びアラートの受信・表示機能		※
観測データ・アラート配信デモアプリ解説書	-スマートフォンアプリ開発概要 -デモアプリの開発環境整備 -観測データ・アラート配信デモアプリのソースコード解説 -デモアプリの公開手順		20
水文・水理観測システムの観測データ利用マニュアル	-データ表示システムの操作方法 -情報提供システムからの観測データ自動取得手順 -プログラミング言語を用いた、観測データの統計処理及びフォーマット変換手法		20
自動気象観測システム設置マニュアル	-設置場所の選択基準及び必要な測量 -自動気象観測システム設置手順		15
自動気象観測システム保守マニュアル要約	-自動気象観測システム概要 -定期保守点検手順 -予備品の実機への組入れ手順と組入れ後の動作確認手順 -故障の探求・処置・復旧確認作業実施手順 -重大な故障発生時の対応手順		10
自動気象観測システム運用管理台帳	-運用・定期点検・清掃の実施日時 -点検項目ごとの結果記録 -運用・定期点検・清掃を行った職員氏名		2
自動気象観測システム保守管理台帳	-障害の発生日時 -障害の原因（異音、部分的な劣化、その他） -実施した復旧手順 -交換した部品の名称及び数量 -復旧/障害対応を行った職員氏名		2
自動気象観測システム故障探求フローチャート	-故障の探求手順（フローチャート）		1
ソフトコンポーネント完了報告書	-活動計画と実績 -計画した成果と成果の達成度 -成果の達成度に影響を与えた要因 -効果の持続・発展のための今後の課題・提言など -成果品一式	ソフトコンポーネント実施完了時	50

※成果物がソフトウェアのソースコードであることから、ページ数は指定しない。
開発に 0.5MM の国内作業を想定。

(10) ソフトコンポーネントの概略事業費

ソフトコンポーネントの概略事業費は下表の通りである。

表 10 ソフトコンポーネントの概略事業費

項目	総額（千円）
直接人件費	6,251
直接経費	6,049
間接費（その他原価＋一般管理費など）	13,748
合計	26,048

為替レート：1US ドル＝148.34 円、1 パキスタンルピー＝0.51075 円

(11)　相手国側の責務

ソフトコンポーネントの実施に関して実施機関（WAPDA 及び FFC）側の責務は、以下の通りである。

1)　人的資源開発

a)　継続的に次世代を担う人材を雇用する。
b)　研修と人的資源開発計画を通じて、より優れた人材の育成を行う。
c)　研修受講職員の派遣費用を全額負担する。（日当、交通費、宿泊費など）

2)　プロジェクトにおいて調達された機材の長期運用

a)　定期的にシステム運用維持管理に必要な予算を確保し、プロジェクトで供給された全ての機材の交換部品、消耗品の調達を計画的に行う。
b)　盗難や破損から機材を保護する。

上述の実施機関の責務に関しては、WAPDA の組織的且つ人的能力を鑑みると、水文・水理観測システム及びラホールの中央データ管理センターの運用維持管理は、十分に実施可能であると考えている。また、FFC の組織的且つ人的能力を鑑みると、イスラマバードの中央データ管理センターの運用維持管理は、十分に実施可能であると考えている。特にプロジェクトで導入予定の機材の運用維持管理の中枢を担う WAPDA が自立的に発展するためには、次世代を担う電気・電子関連技術者の継続的な雇用と育成を行い、水文・水理観測システムの運用維持管理の技術・技能の継承を行うことが必要であるほか、日々の保守点検業務の中枢を担う機材設置チーム職員の技術・技能の向上に力点を置くことが重要である。

資料 6　概略設計図

資料 6-1. 概略設計図（機材）
資料 6-2. 概略設計図（土木）

資料 6-1. 概略設計図（機材）

表　概略設計図面リスト（機材）

SHEET NO.	DRAWING NO.	DRAWING TITLE
(1) 中央データ管理センター機材		
1	FFC-PL-001	イスラマバード中央データ管理センター（FFC）機材レイアウト図
2	FFC-PL-002	イスラマバード中央データ管理センター（FFC）避雷システム
3	WAP-PL-001	ラホール中央データ管理センター（H&R WAPDA Office）機材レイアウト図
4	WAP-PL-002	ラホール中央データ管理センター（H&R WAPDA Office）避雷システム
5	WAP-PL-003	河川監視室（WAPDA House Room 238）機材レイアウト図
(2) 水文・水理観測システム		
6	WLV-MF-001	水位・流速センサー取付フレーム 1
7	WLV-MF-002	水位・流速センサー取付フレーム 2
8	WLV-MF-003	水位・流速センサー取付フレーム 3
9	WLV-MF-004	水位・流速センサー取付フレーム 4
10	WLV-MF-005	水位・流速センサー取付フレーム 5
11	WLV-MF-006	水位・流速センサー取付フレーム 6
12	WLV-MF-007	水位・流速センサー取付フレーム 7
13	WLV-MF-T00	水位・流速センサー取付フレームリスト
14	WLV-MF-T01	水位・流速センサー取付フレーム（タイプ A）
15	WLV-MF-T02	水位・流速センサー取付フレーム（タイプ B）
16	WLV-MF-T03	水位・流速センサー取付フレーム（タイプ C）
17	WLV-MF-T04	水位・流速センサー取付フレーム（タイプ D）
18	WLV-MF-T05	水位・流速センサー取付フレーム（タイプ E）
19	WLV-MF-T06	水位・流速センサー取付フレーム（タイプ F）
20	WLV-MF-T07	水位・流速センサー取付フレーム（タイプ G）
21	WLV-MF-T08	水位・流速センサー取付フレーム（タイプ H）
22	WLV-MF-T09	水位・流速センサー取付フレーム（タイプ I）
23	WLV-MF-T10	水位・流速センサー取付フレーム（タイプ J）
24	WLV-MF-T11	水位・流速センサー取付フレーム（タイプ K）
25	WLV-MF-T12	水位・流速センサー取付フレーム（タイプ L）
26	WLV-MF-T13	水位・流速センサー取付フレーム（タイプ M）
27	WLV-MF-T14	水位・流速センサー取付フレーム（タイプ N）
28	WLV-MF-T15	水位・流速センサー取付フレーム（タイプ O）
29	WLV-MF-T16	水位・流速センサー取付フレーム（タイプ P）
30	WLV-MF-T17	水位・流速センサー取付フレーム（タイプ Q）
(3) 超音波ドップラー流速計		
31	ADCP-001	ADCP 揚重クレーン
(4) 自動気象観測システム（AWS）		
32	AWS-TP-01	可倒式ポール 1
33	AWS-TP-02	可倒式ポール 2
34	AWS-ASP-01	AWS 及びソーラーパワーシステム取付フレーム
35	AWS-RG-01	雨量計及び防風シールド
36	AWS-SEP-01	積雪センサー取付ポール

資料 6-2

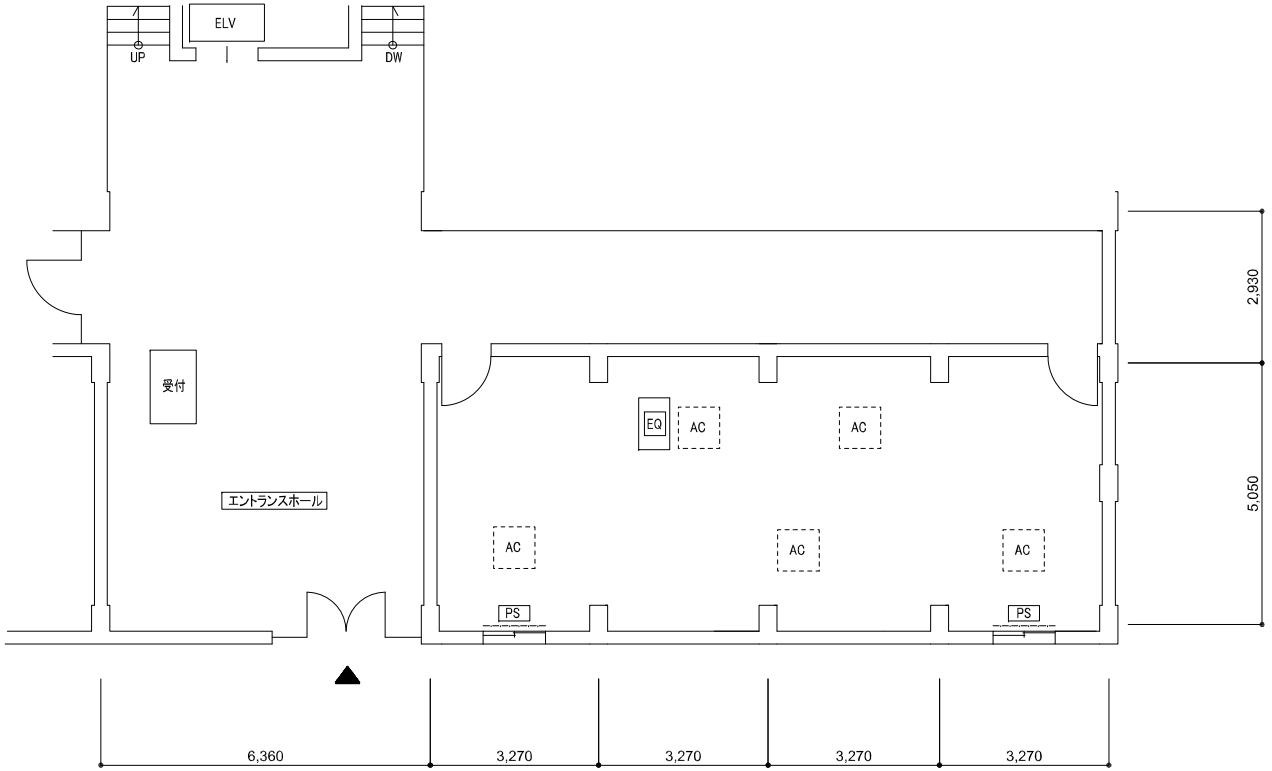
パキスタン側業務範囲

AC エアコン(天井据付タイプ)

日本側業務範囲

EQ 機材ラック

PS ポリカーボネートスクリーン W1200 x H1950



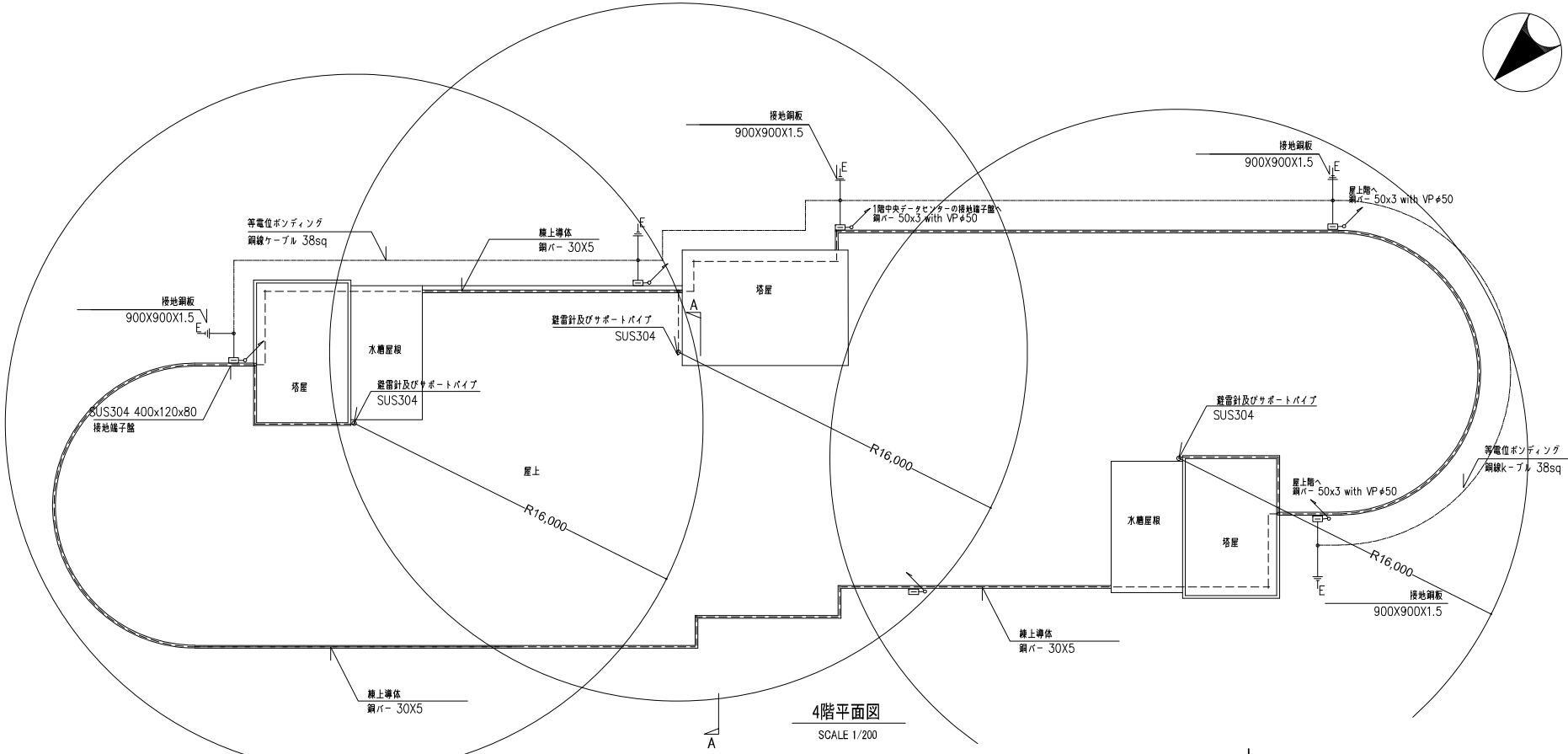
平面図

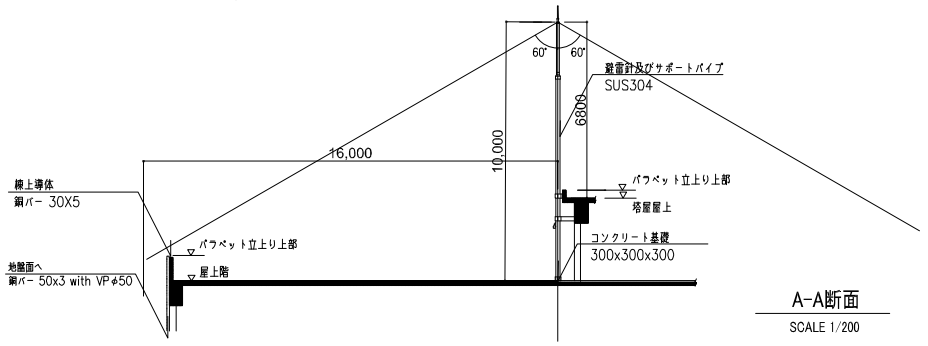
SCALE 1/100

SCALE 1/100 0 2.00 4.00 6.00 8.00m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	中央データ管理センター機材 イスラマバード中央データ管理センター(FFC) 機材レイアウト図	FFC-PL-001

資料 6-3





SCALE 1/200 0 4.00 8.00 12.0 16.0m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	中央データ管理センター機材 イスラマバード中央データ管理センター(FFC) 避雷システム	FFC-PL-002

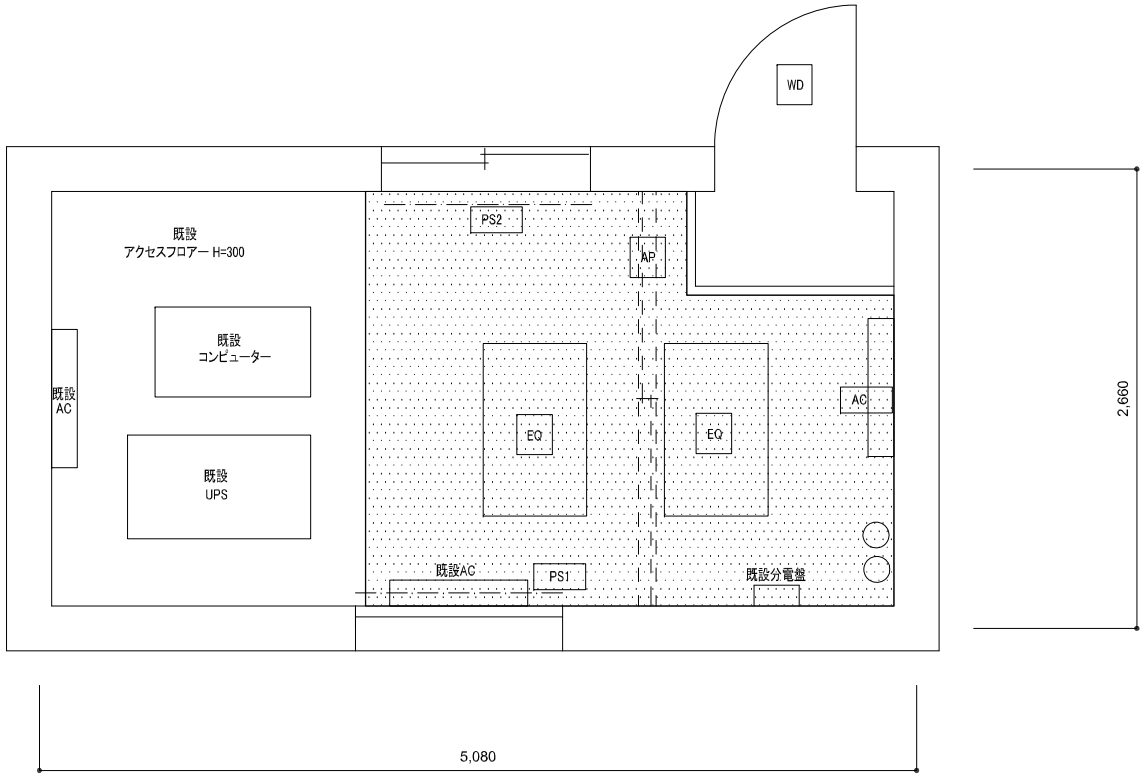
資料 6-4

パキスタン側業務範囲

AC	エアコン (壁付タイプ)
WD	木製ドア W820 x H2200
AP	既設アルミ製パーティション撤去
	アクセスフロアー H=300

日本側業務範囲

EQ	機材ラック
PS1	ポリカーボネートスクリーン W1200 x H1200
PS2	ポリカーボネートスクリーン W1210 x H610

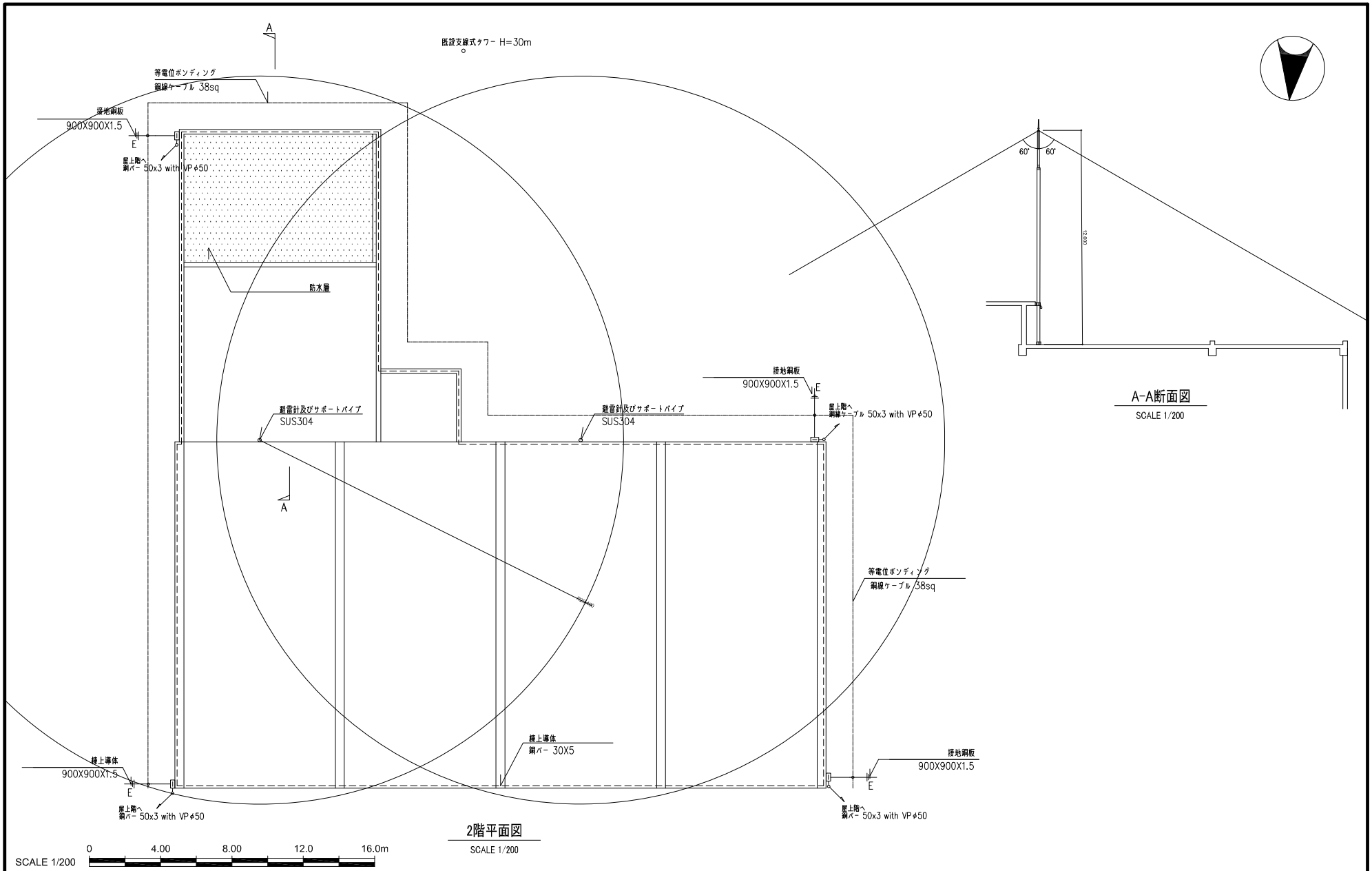


SCALE 1/30 0 0.60 1.20 1.80 2.40m

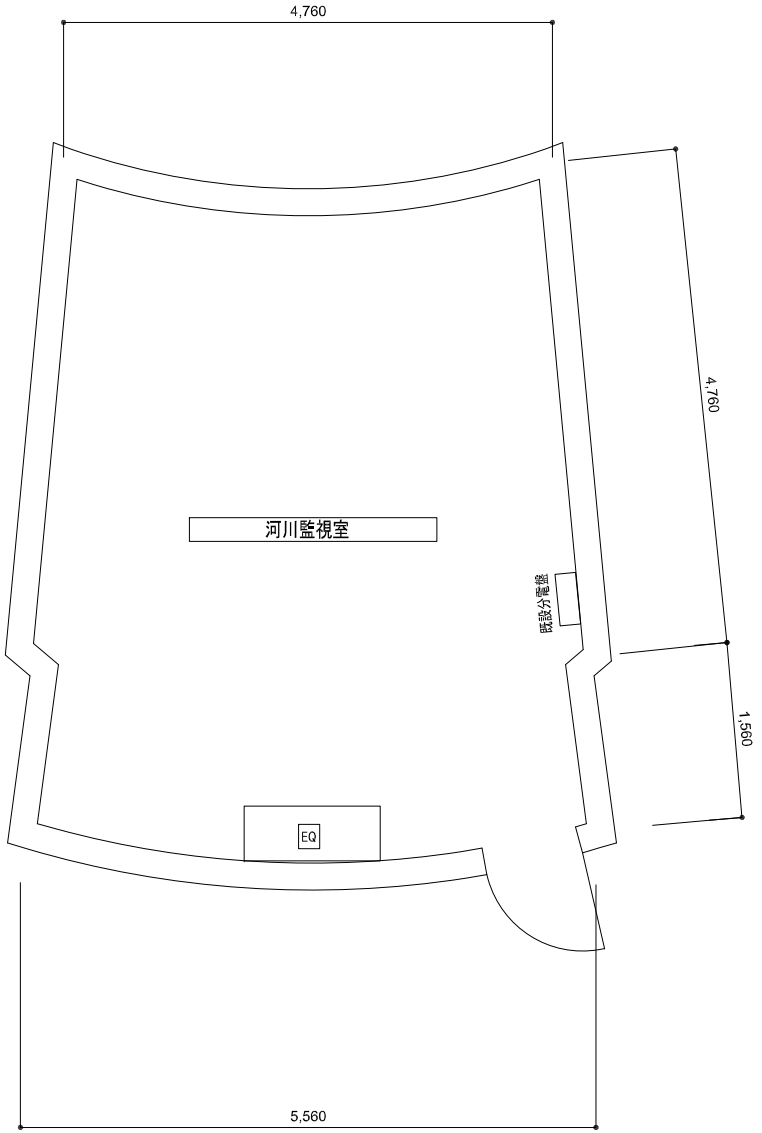
平面図
SCALE 1/30

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	中央データ管理センター機材 ラホール中央データ管理センター(H&R WAPDA OFFICE) 機材レイアウト図	WAP-PL-001

資料 6-5



PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	中央データ管理センター機材 ラホール中央データ管理センター(H&R WAPDA OFFICE) 避雷システム	WAP-PL-002



日本側業務範囲

EQ 機材ラック

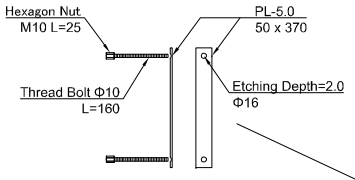
SCALE 1/50

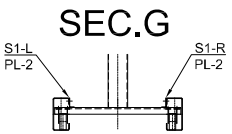
0 1.00 2.00 3.00 4.00m

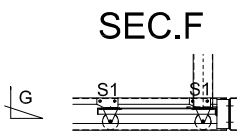
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	中央データ管理センター機材 河川監視室（WAPDA HOUSE ROOM 238） 機材レイアウト図	WAP-PL-003

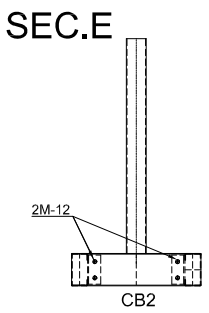
資料 6-7

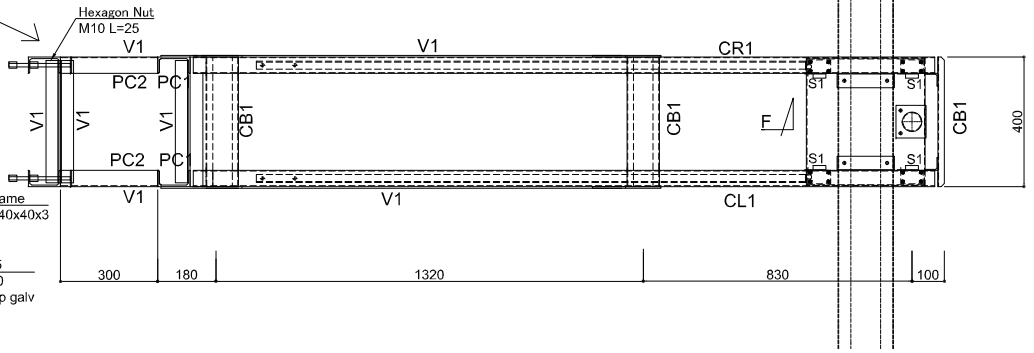
Ref	Descr.	Material
C1 L/R	C-100x50x20x2.0	SUS304
CB1	C-100x50x20x2.0	SUS304
PC1 L/R	[-100x50x4	SUS304
PC2 L/R	[-100x50x4	SUS304
PC3 L/R	[-100x50x4	SUS304
V1	L-40x40x4	SUS304
V2	FB-30x3	SUS304
V3	FB-100x3	SUS304
LS L/R	L-25x25x3	SUS304
CJ1	PL5	SUS304
VJ1	PL5	SUS304
CB2	PL-2	SUS304
S1 L/R	PL-2	SUS304



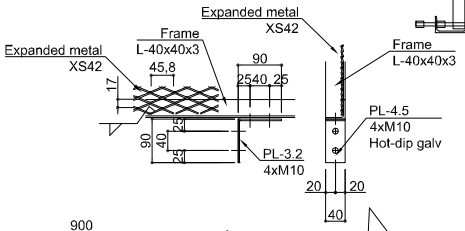


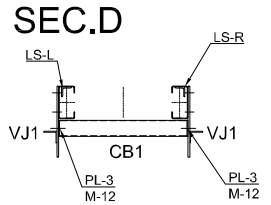




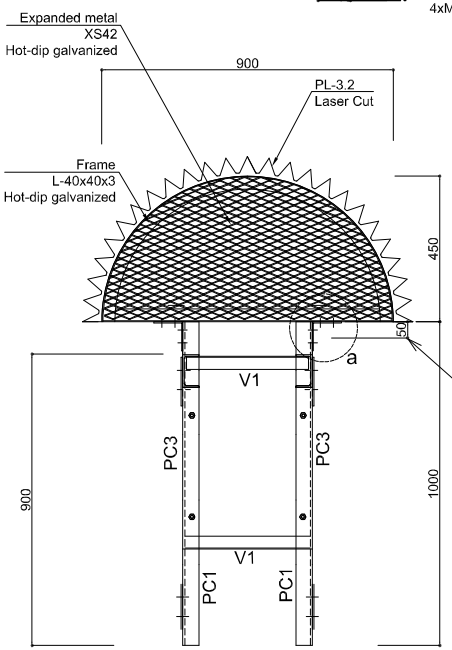


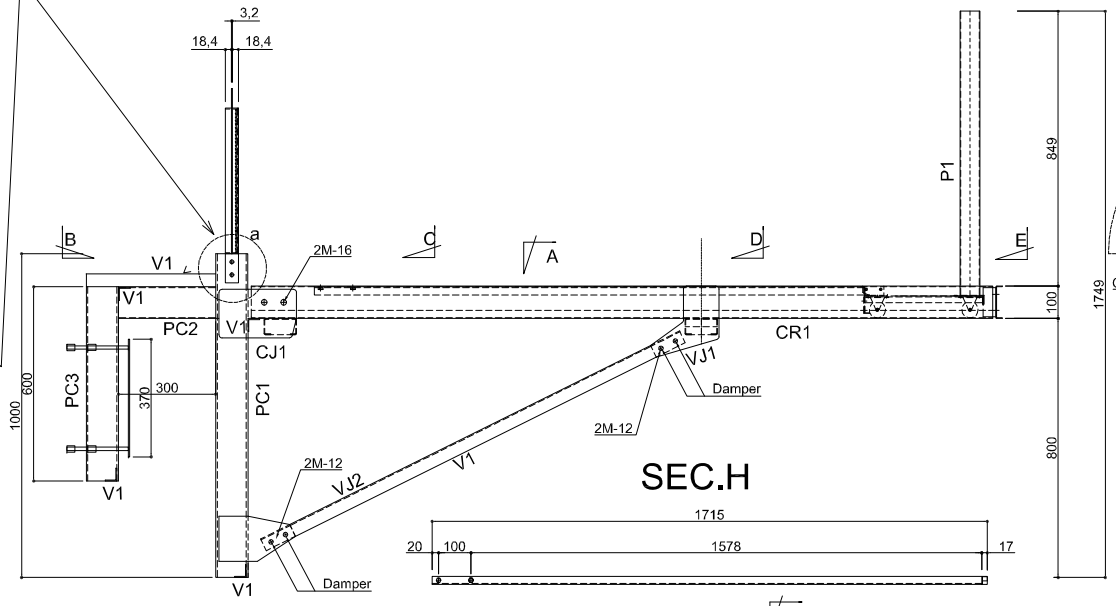
Detail a
S=1:10

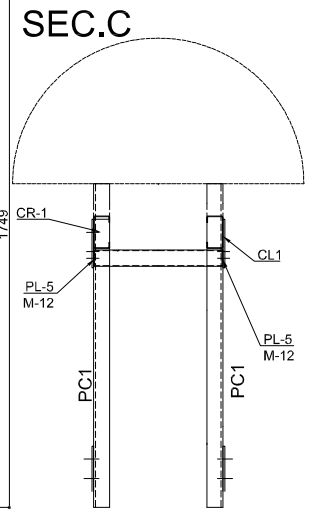




SEC.B







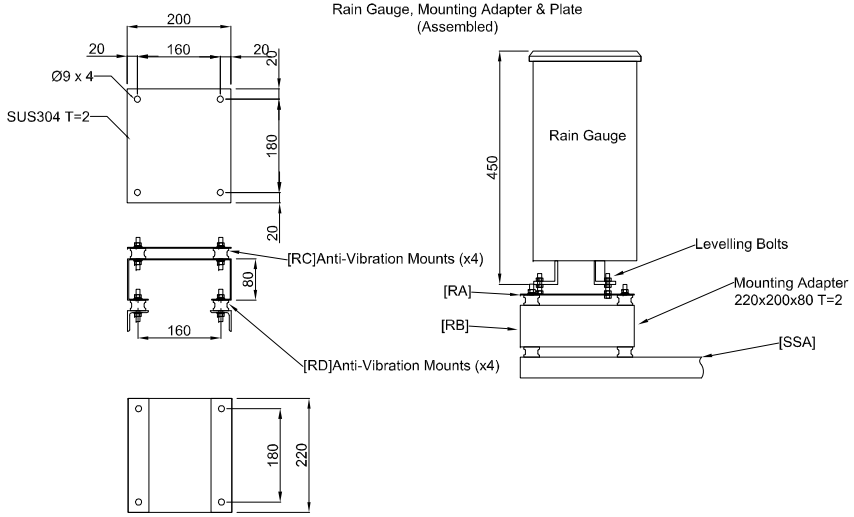
SCALE 1/16
0 0.32 0.64 0.96 1.28m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム1	WLV-MF-001

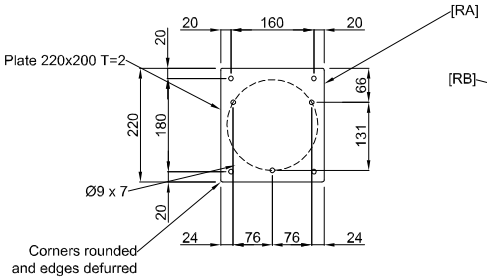
資料 8-9

Rain Gauge

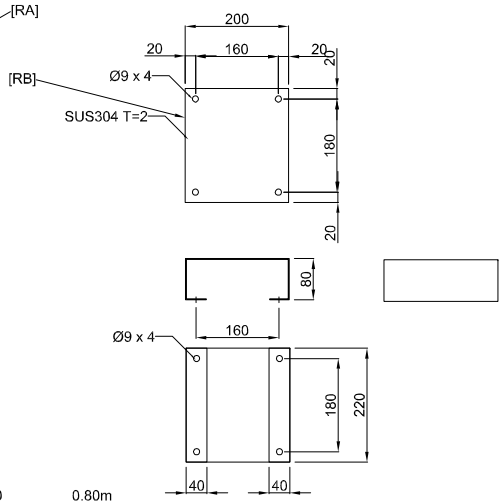
Rain Gauge, Mounting Adapter & Plate
(Assembled)



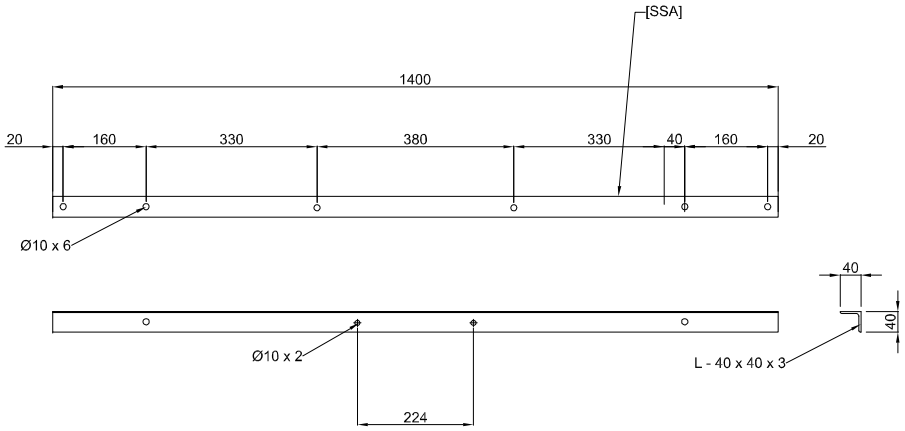
Rain Gauge
Mounting Plate



Rain Gauge
Mounting Adapter

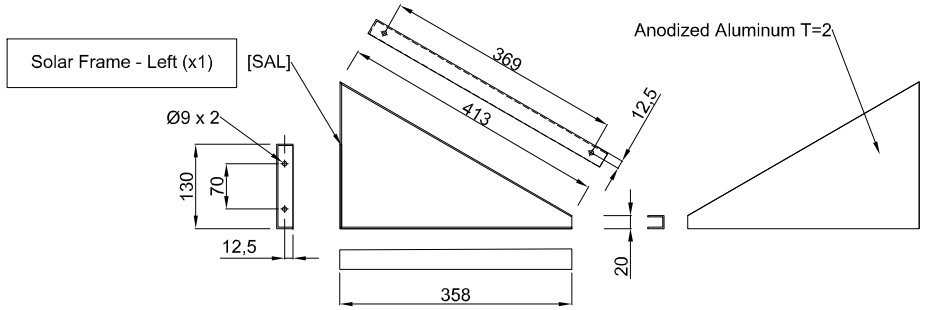


Sensor Support Arm x 2

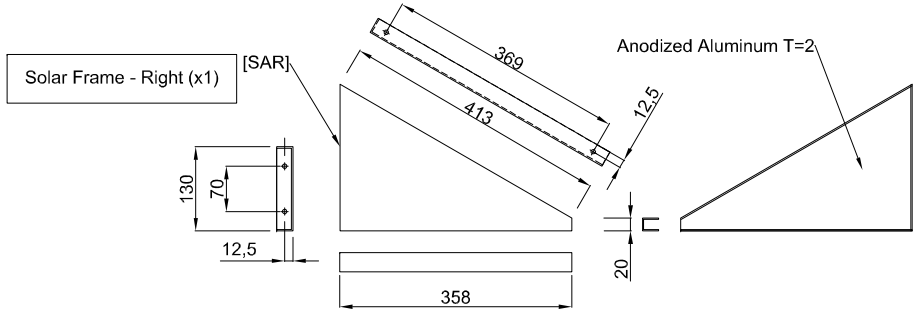


PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム2	WLV-MF-002

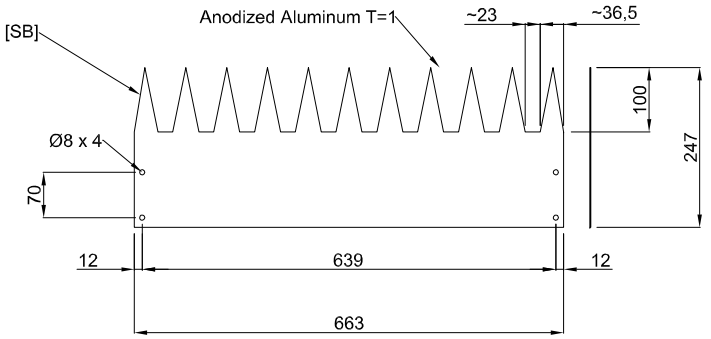
Solar Frame - Left (x1)



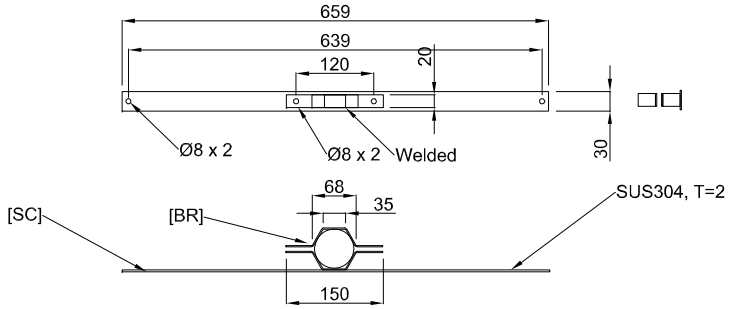
Solar Frame - Right (x1)



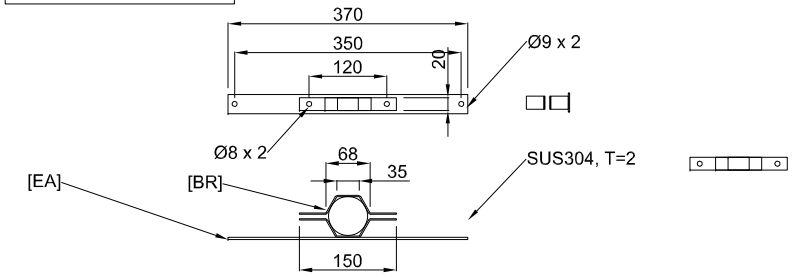
Solar Frame
Bird Spike (x1)



Solar Panel
Pole Bracket (x2)

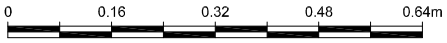


Enclosure
Pole Bracket (x1)

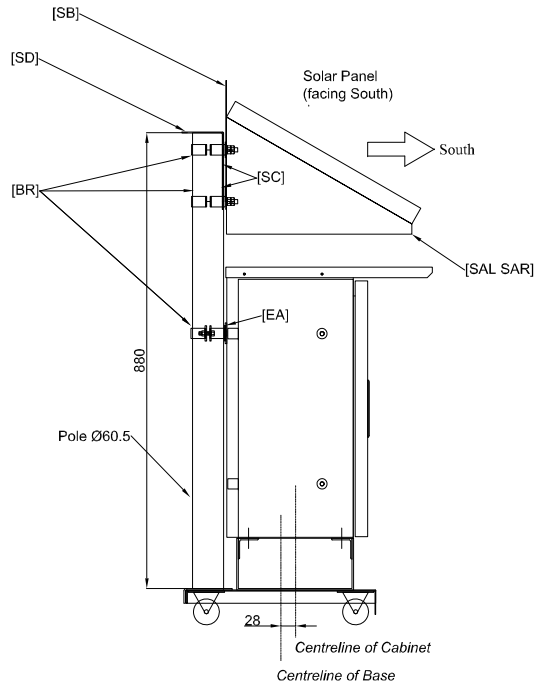


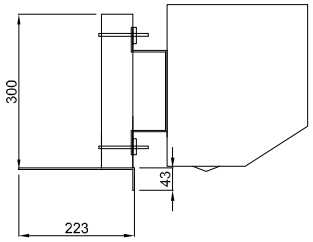
Item	*Qty per set*
Solar Panel Frame Set	
Solar Frame - Left	*1*
Solar Frame - Right	*1*
Solar Frame Bird Spike	*1*
Solar Panel Pole Bracket 2	
M6 x 15 Bolt	*4*
M6 x 25 Bolt	*8*
M6 Washer	*24*
M6 Lock Washer	*12*
Enclosure Pole Bracket Set	
Enclosure Pole Bracket	
M6 x 25 Bolt	*2*
M6 Washer	*4*
M6 Lock Washer	*2*

SCALE 1/8

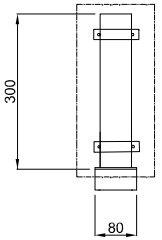


PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム3	WLV-MF-003

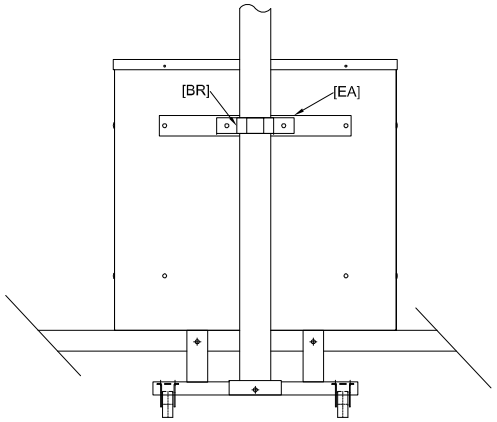




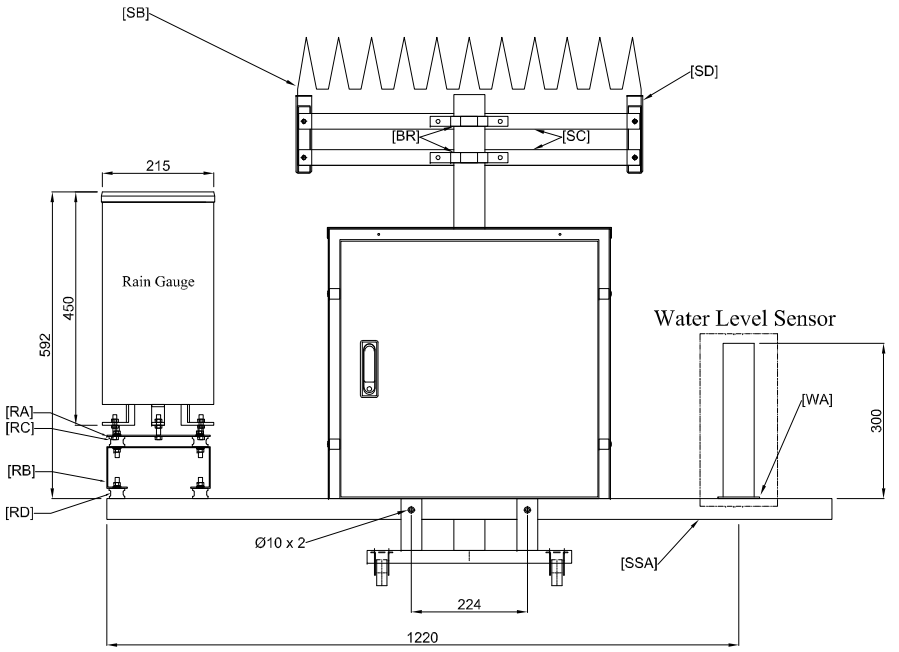
Side View of Water Level Sensor

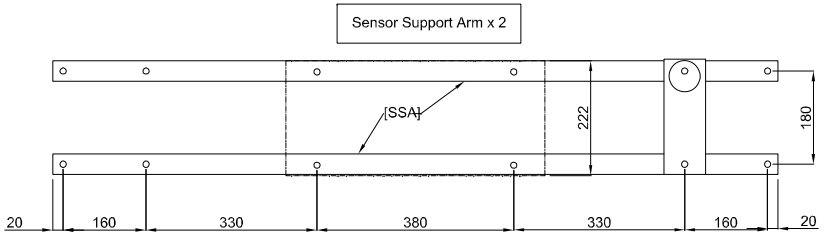


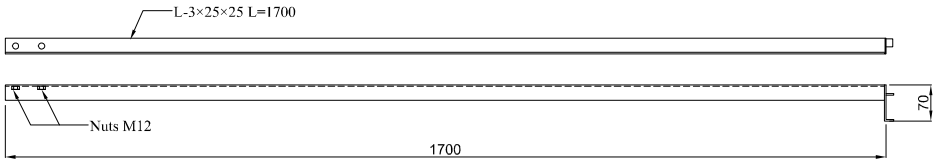
Rear View of Water Level Sensor



Rear View of Enclosure





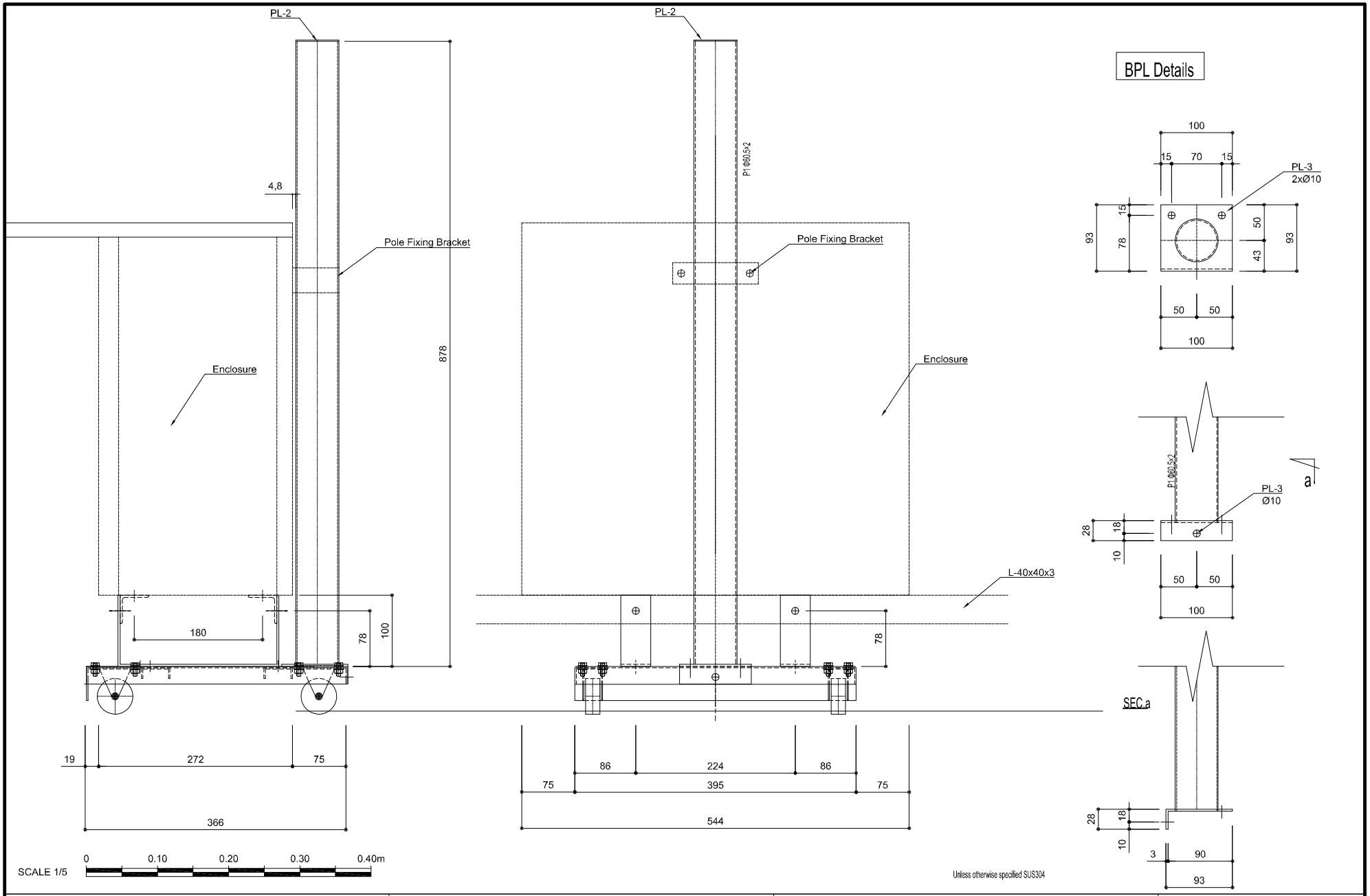


Pulling Bar for Sensor Mounting Frame

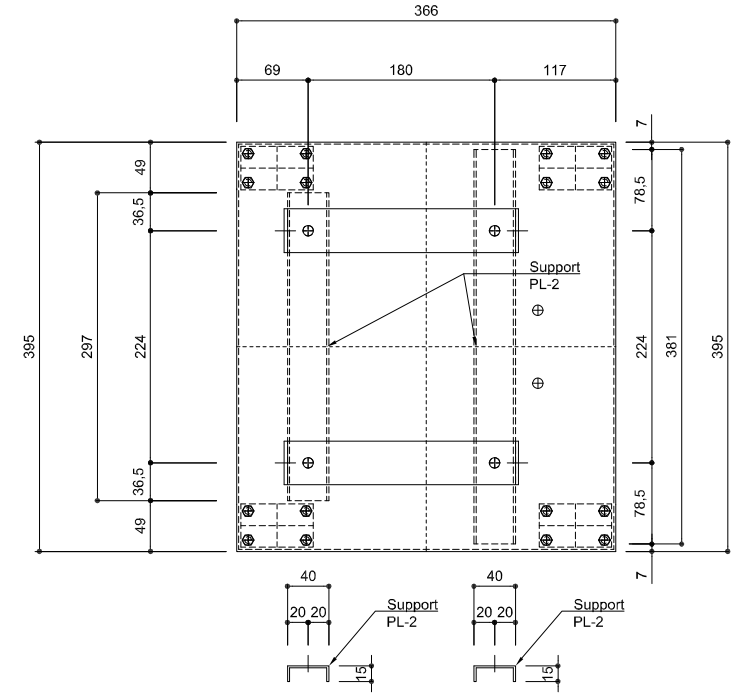
SCALE 1/10 0 0.20 0.40 0.60 0.80m

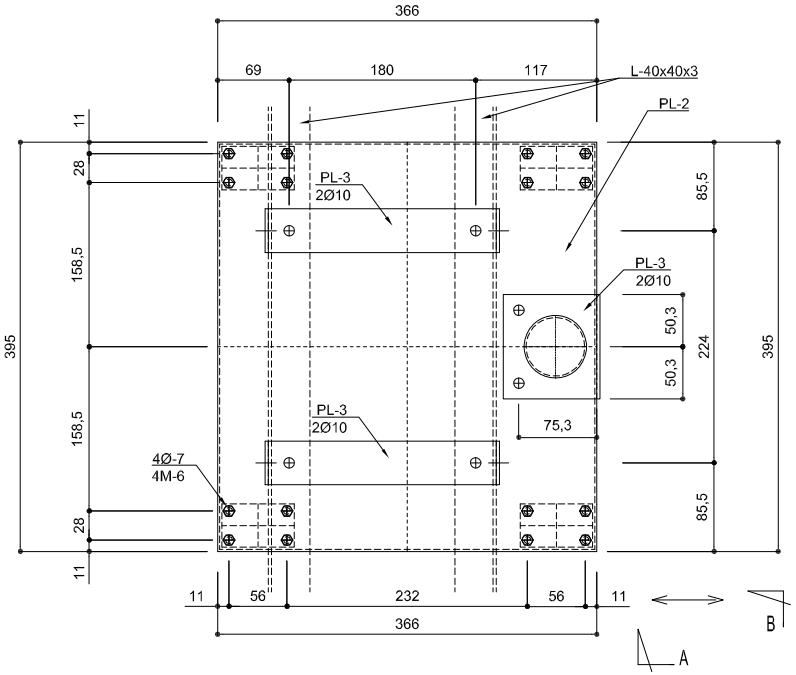
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム4	WLV-MF-004

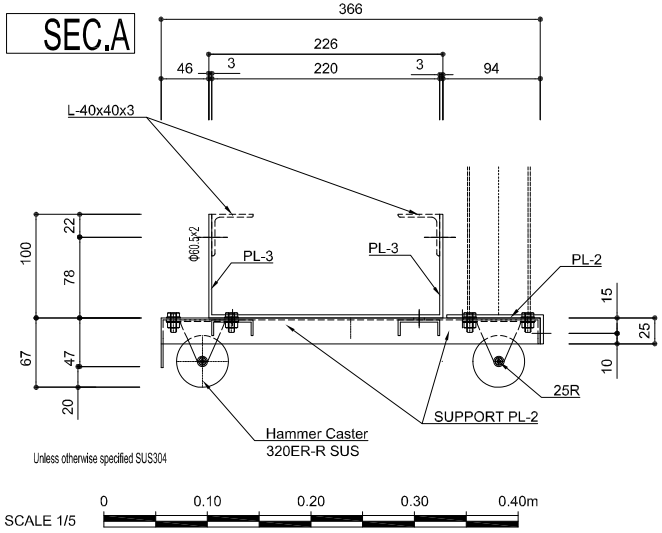
資料 6-10

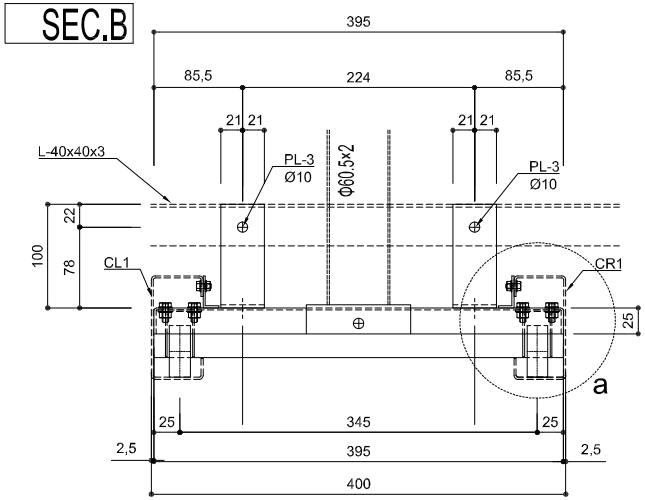


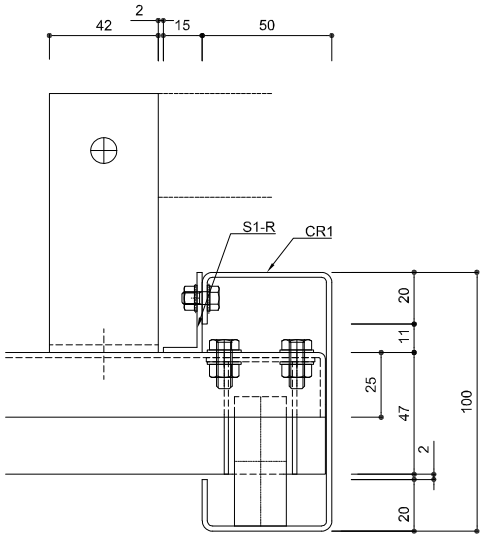
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム5	WLV-MF-005



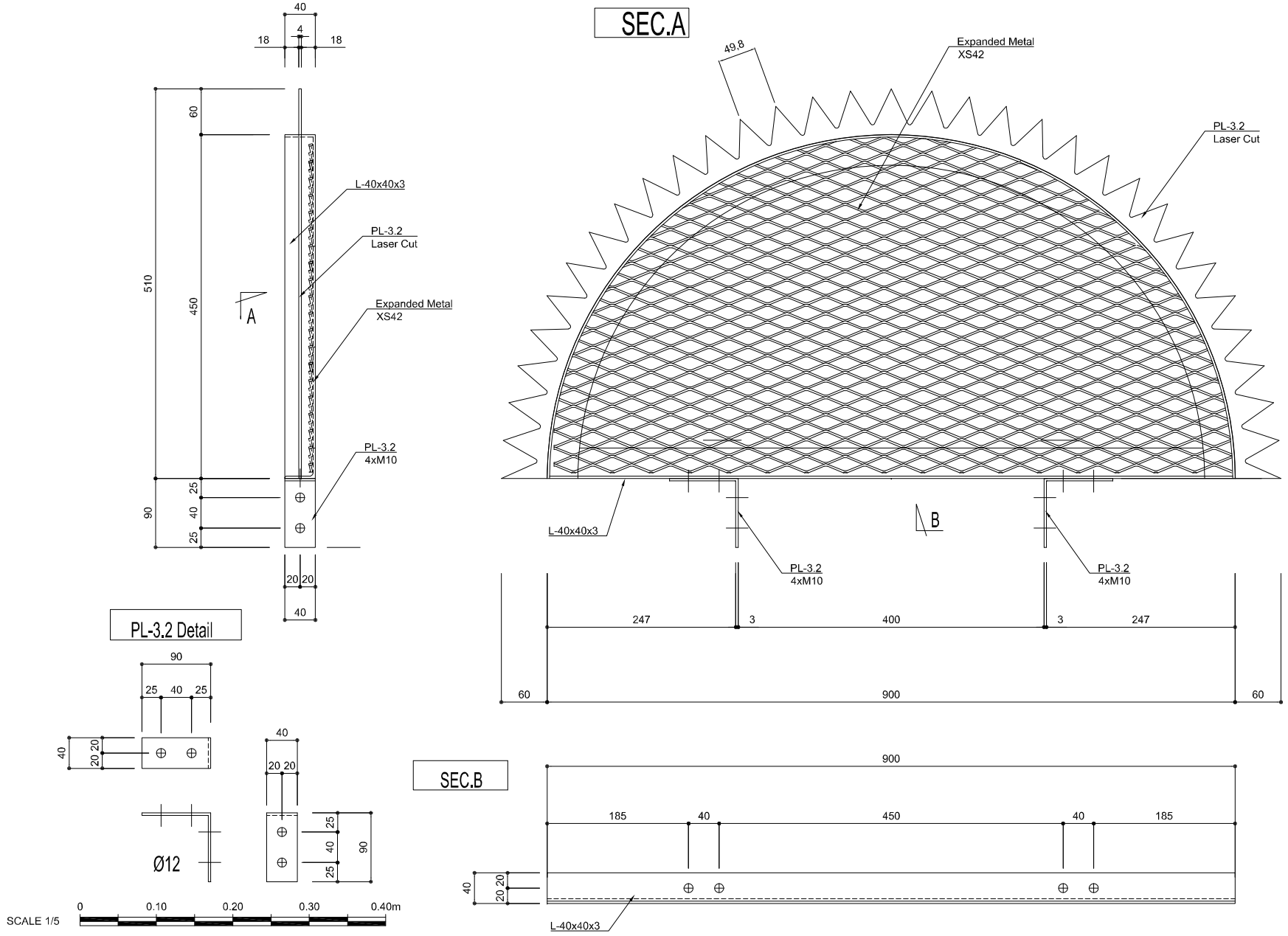








PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム6	WLV-MF-006



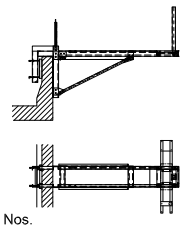
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム7	WLV-MF-007

Site List of Mounting Frame

Site No.	Site Name	Frame Type
1	Khushal Garth Steel Bridge	L
2	Zulam Bridge	C
3	Dharab Bridge	C
4	Chenab Bridge GT Road	B
5	Bhera M-2	A
6	Kurram at CPEC Bridge M-14	A
7	Motor way Bridge Talab Wala	C
8	Kohala Bridge	K
9	Jhelum Bridge	C
10	Lahore Sialkot Motorway Bridge	A
11	Nishtar Ghat Bridge	A
12	Rasul Barrage	J
13	Kalabagh Mari Indus Railway Bridge	E
14	Indus at Ghazi Ghat Bridge Muzafargarah	B
15	Indus at Bhakkar	B
16	Mari Pattan Bridge	C
17	Indus at CPEC Bridge M-14	A
18	Pull Sawan	I
19	Chichawatni Road Bridge	B
20	Qutab Shahana Bridge	D
21	Bajwat road Bridge Jammu tavi	C
22	Balakot	O
23	Sialkot AirPort Road Bridge (Shahbazpur)	D
24	Arifwala to Shawal Road Bridge	C
25-1	Chiniot Dam (1)	A
25-2	Chiniot Dam (2)	A
26	Baba Farid Headworks	H
27	Thakot	A
28	Khairabad Bridge, N-5	D
29	Pattan	C
30	Kabul River Bridge, Nowshera	C
31	Phulra	A
32	Kaghan	Q
33	Bagh Deri Bridge	C
34	Mohib Banda, Pashtun Garhi	C
35	Balakot	M
36	Ayun	P
37	Indus Tarbela Outflow	G
38	Sultan Bahoo Bridge	N
39	Haji Zai Bridge, Shabqadar Road	C
40	Abbottabad	F
41	Haripur	A
42	Haripur/Jabri Bridge	A
43	Ghauspur Bridge	D
44	Chakdara Bridge	A
45	Pine Valley Jabori	C

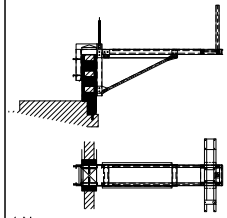
SCALE 1/100 0 2.00 4.00 6.00 8.00m

TYPE A
DWG No. TLM-WLV-MF-T01



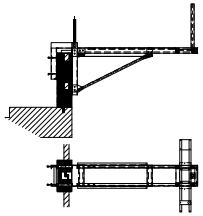
12 Nos.

TYPE B
DWG No. TLM-WLV-MF-T02



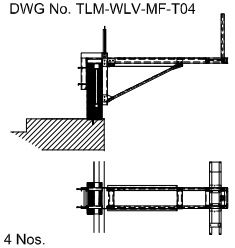
4 Nos.

TYPE C
DWG No. TLM-WLV-MF-T03



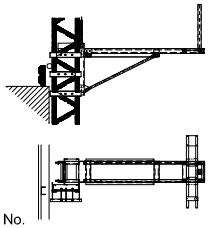
13 Nos.

TYPE D
DWG No. TLM-WLV-MF-T04



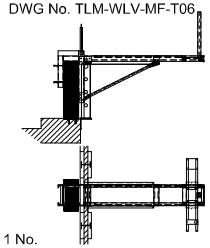
4 Nos.

TYPE E
DWG No. TLM-WLV-MF-T05



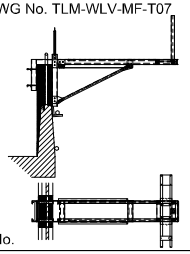
1 No.

TYPE F
DWG No. TLM-WLV-MF-T06



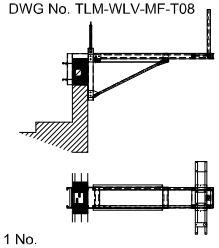
1 No.

TYPE G
DWG No. TLM-WLV-MF-T07



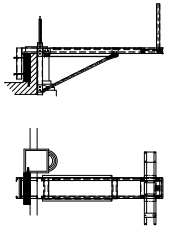
1 No.

TYPE H
DWG No. TLM-WLV-MF-T08



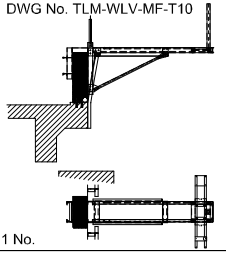
1 No.

TYPE I
DWG No. TLM-WLV-MF-T09



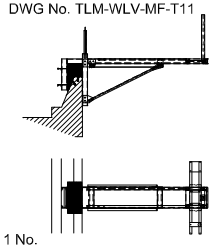
1 No.

TYPE J
DWG No. TLM-WLV-MF-T10



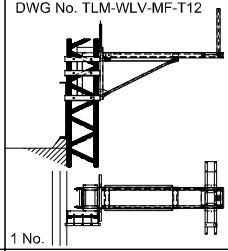
1 No.

TYPE K
DWG No. TLM-WLV-MF-T11



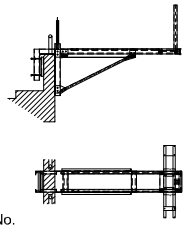
1 No.

TYPE L
DWG No. TLM-WLV-MF-T12



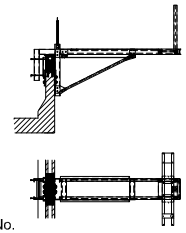
1 No.

TYPE M
DWG No. TLM-WLV-MF-T13



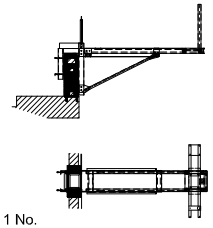
1 No.

TYPE N
DWG No. TLM-WLV-MF-T14



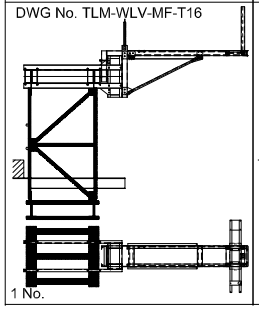
1 No.

TYPE O
DWG No. TLM-WLV-MF-T15



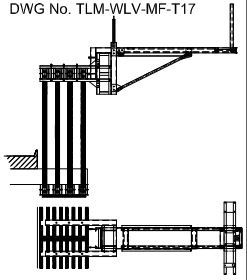
1 No.

TYPE P
DWG No. TLM-WLV-MF-T16



1 No.

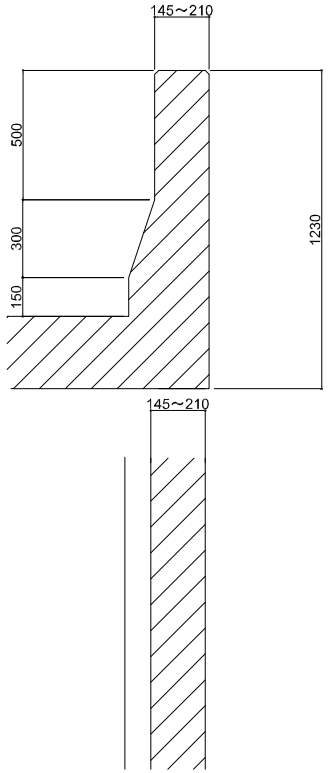
TYPE Q
DWG No. TLM-WLV-MF-T17



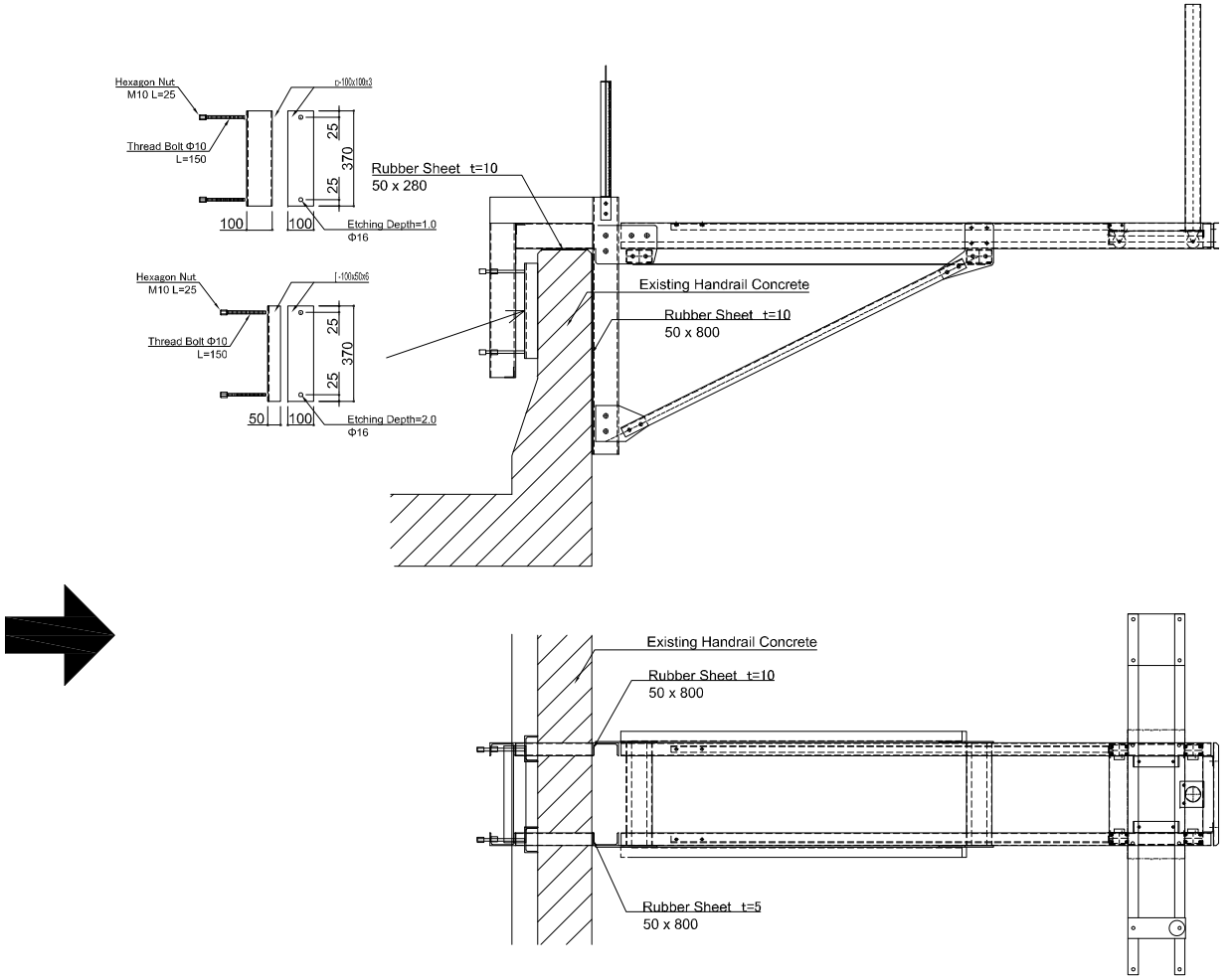
1 No.

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレームリスト	WLV-MF-T00

TYPE A for Site No. 5, 6, 10, 11, 17, 25, 27, 31, 41, 42 and 44



BEFORE

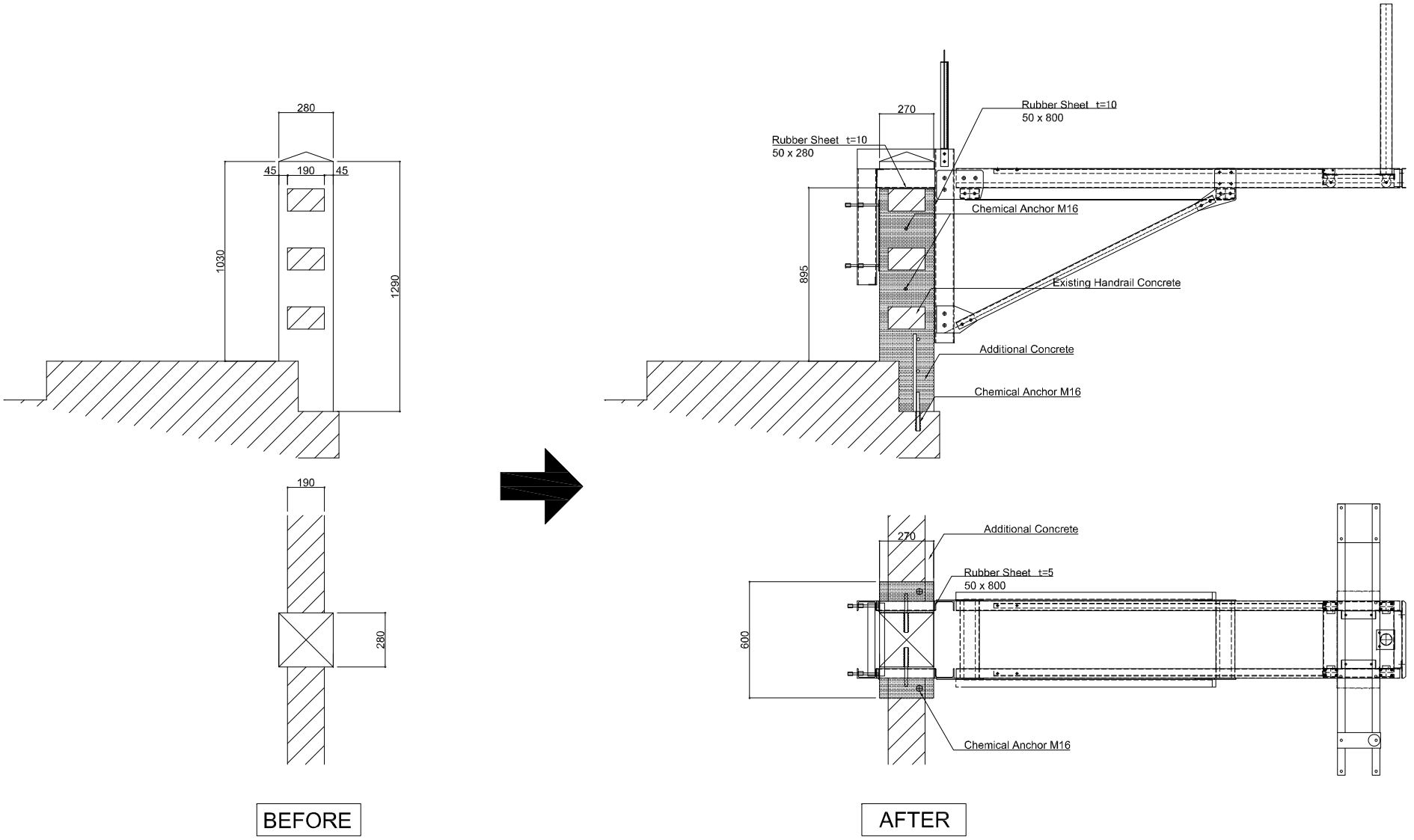


AFTER

SCALE 1/20 0 0.40 0.80 1.20 1.60m

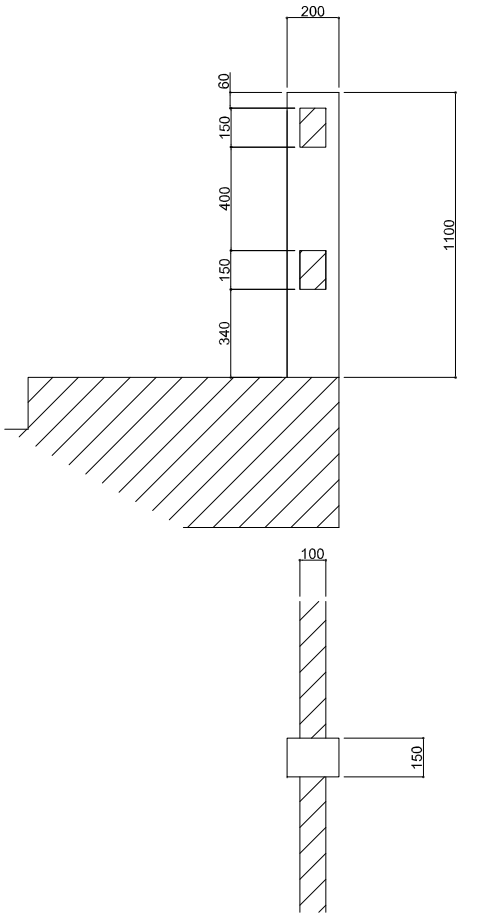
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプA）	WLV-MF-T01

TYPE B for Site No. 4, 14, 15 and 19

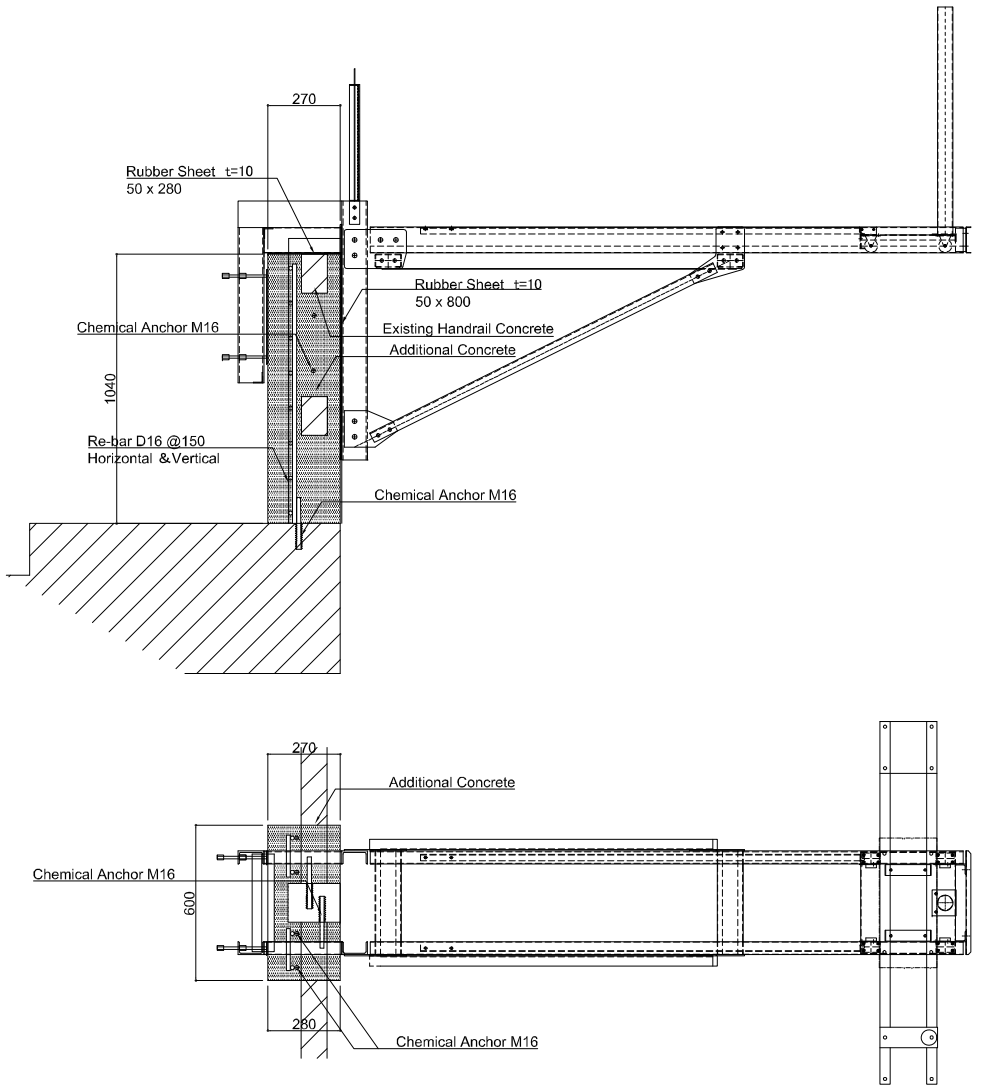


PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプB）	WLV-MF-T02

TYPE C for Site No. 2, 3, 7, 9, 16, 21, 24, 29, 30, 33, 34, 39 and 45



BEFORE

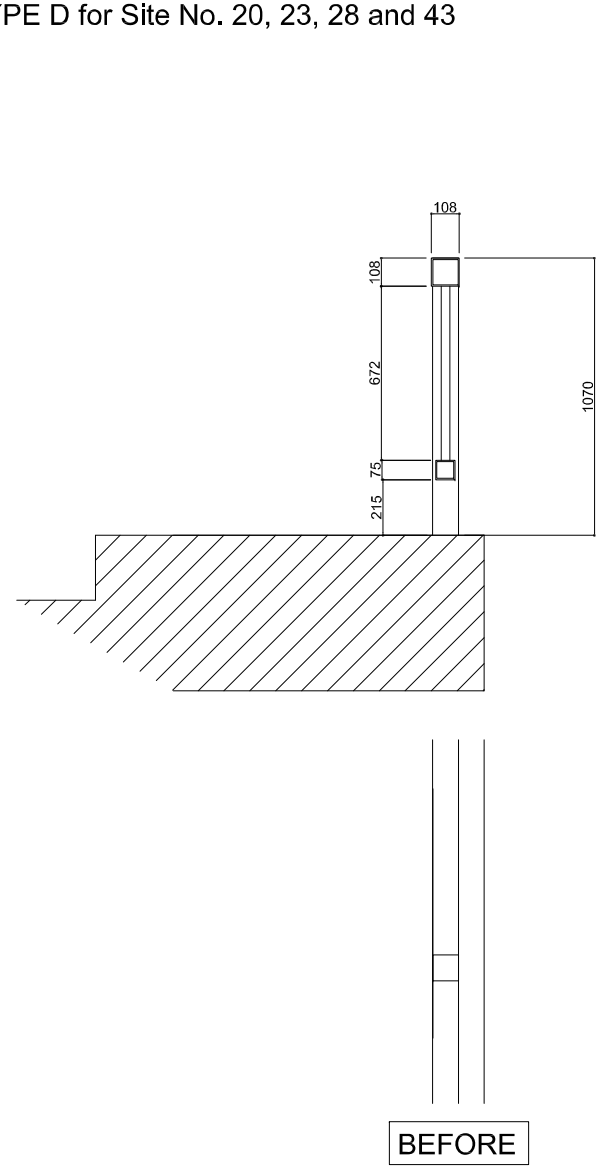


AFTER

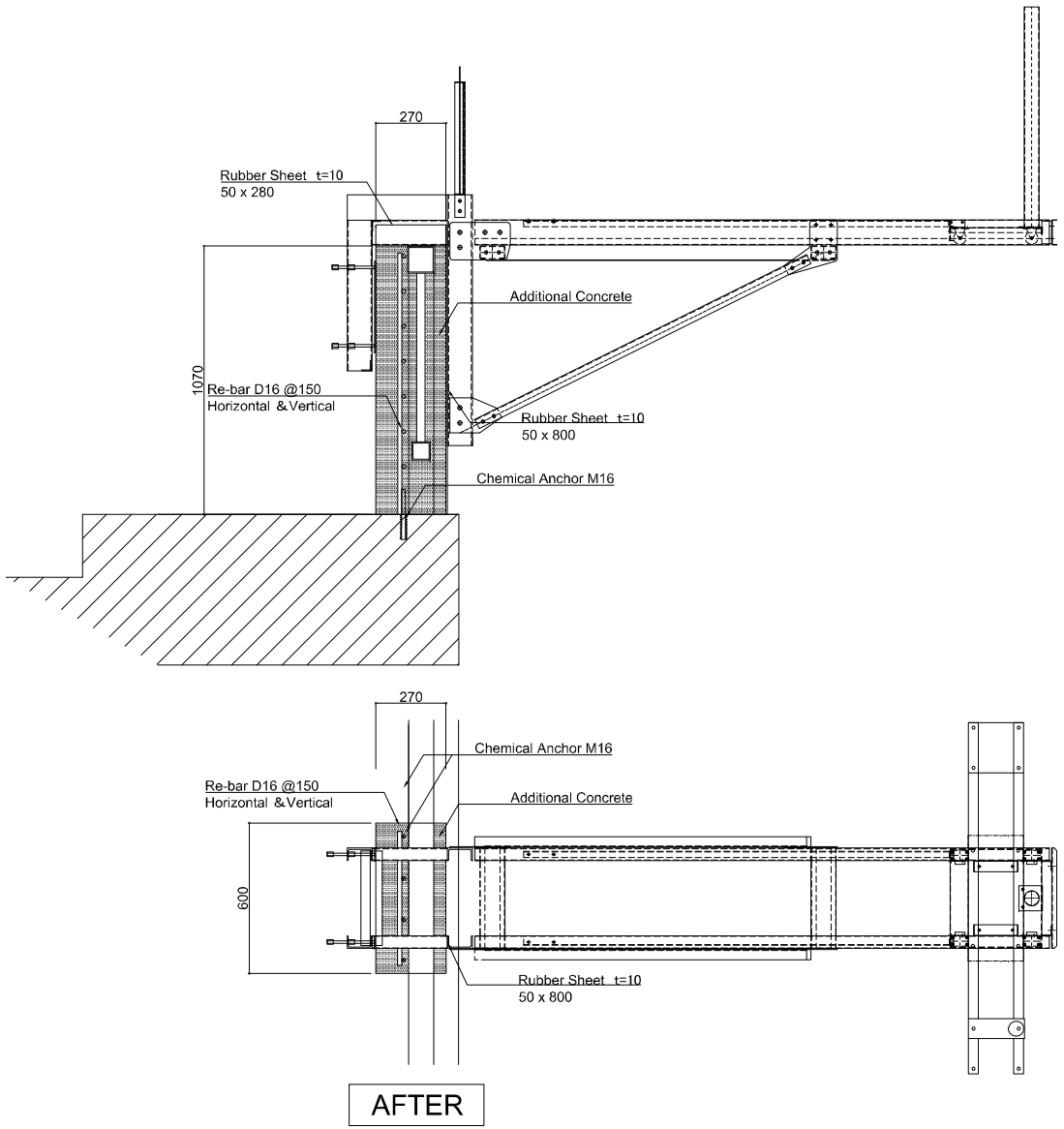
SCALE 1/20 0 0.40 0.80 1.20 1.60m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプC）	WLV-MF-T03

TYPE D for Site No. 20, 23, 28 and 43



BEFORE

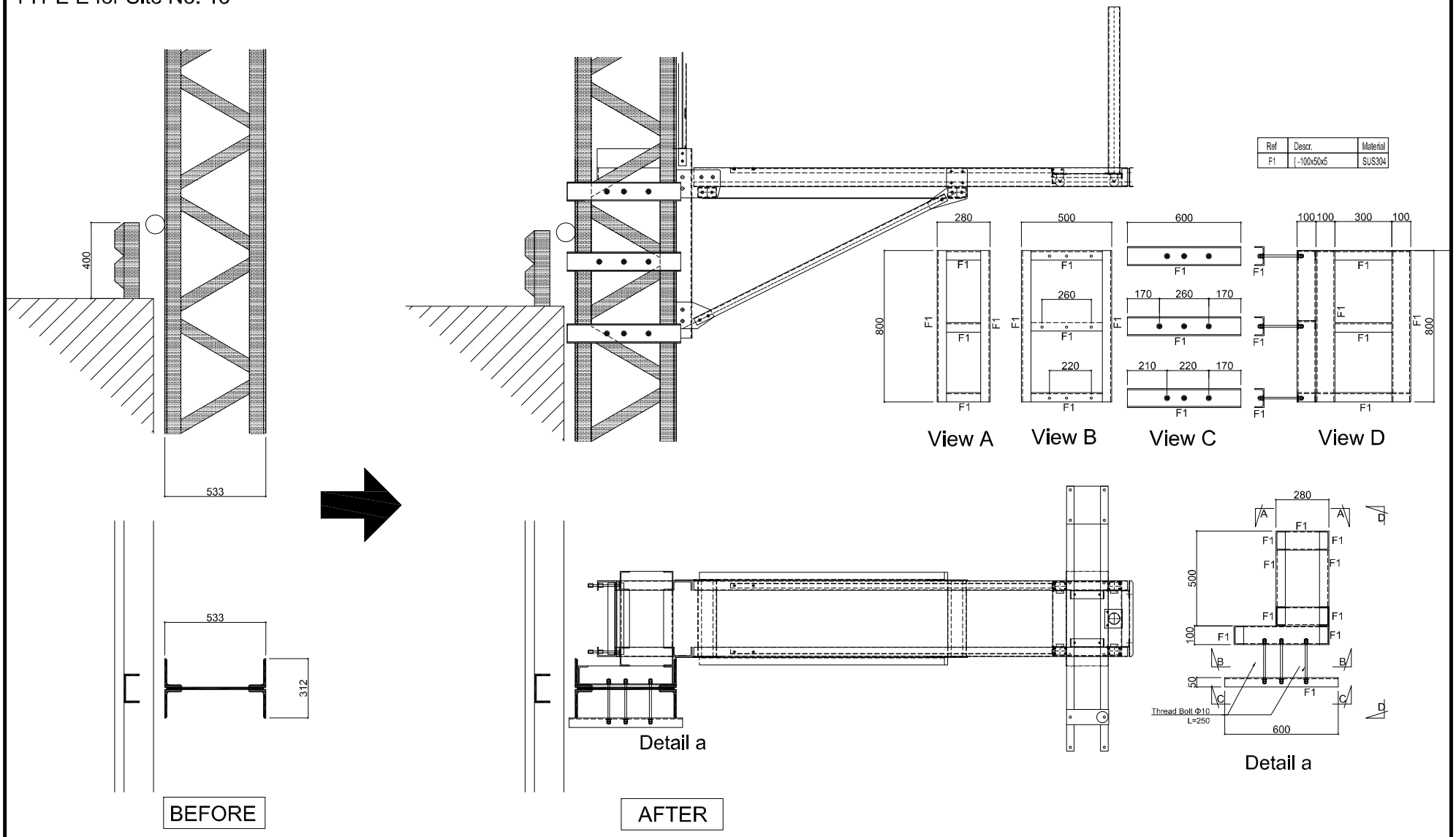


AFTER

SCALE 1/20 0 0.40 0.80 1.20 1.60m

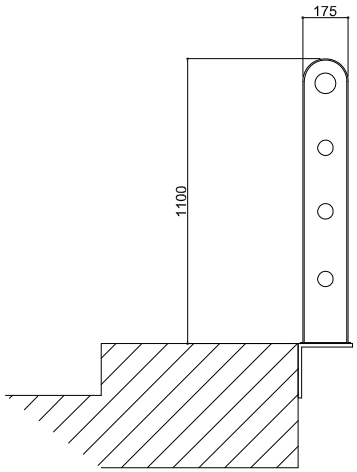
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプD）	WLV-MF-T04

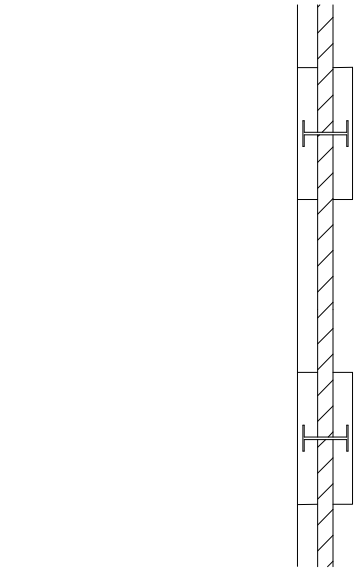
TYPE E for Site No. 13



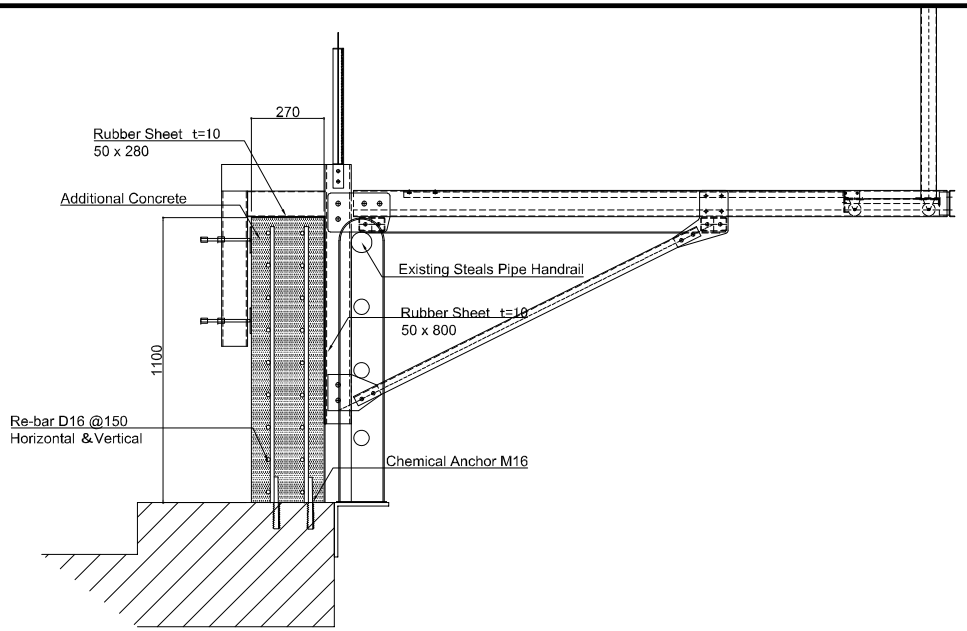
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプE）	WLV-MF-T05

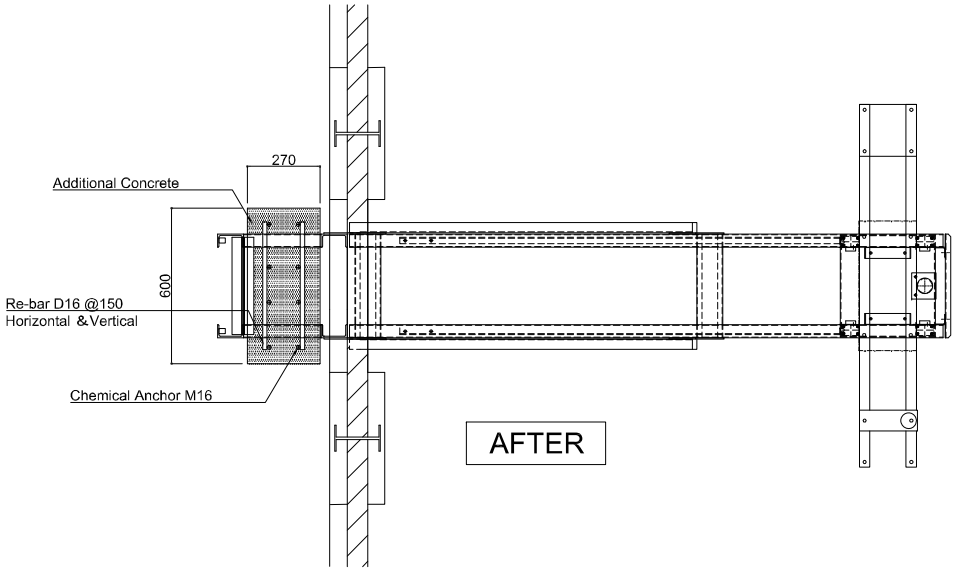
TYPE F for Site No. 40





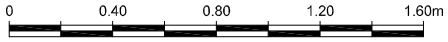
BEFORE





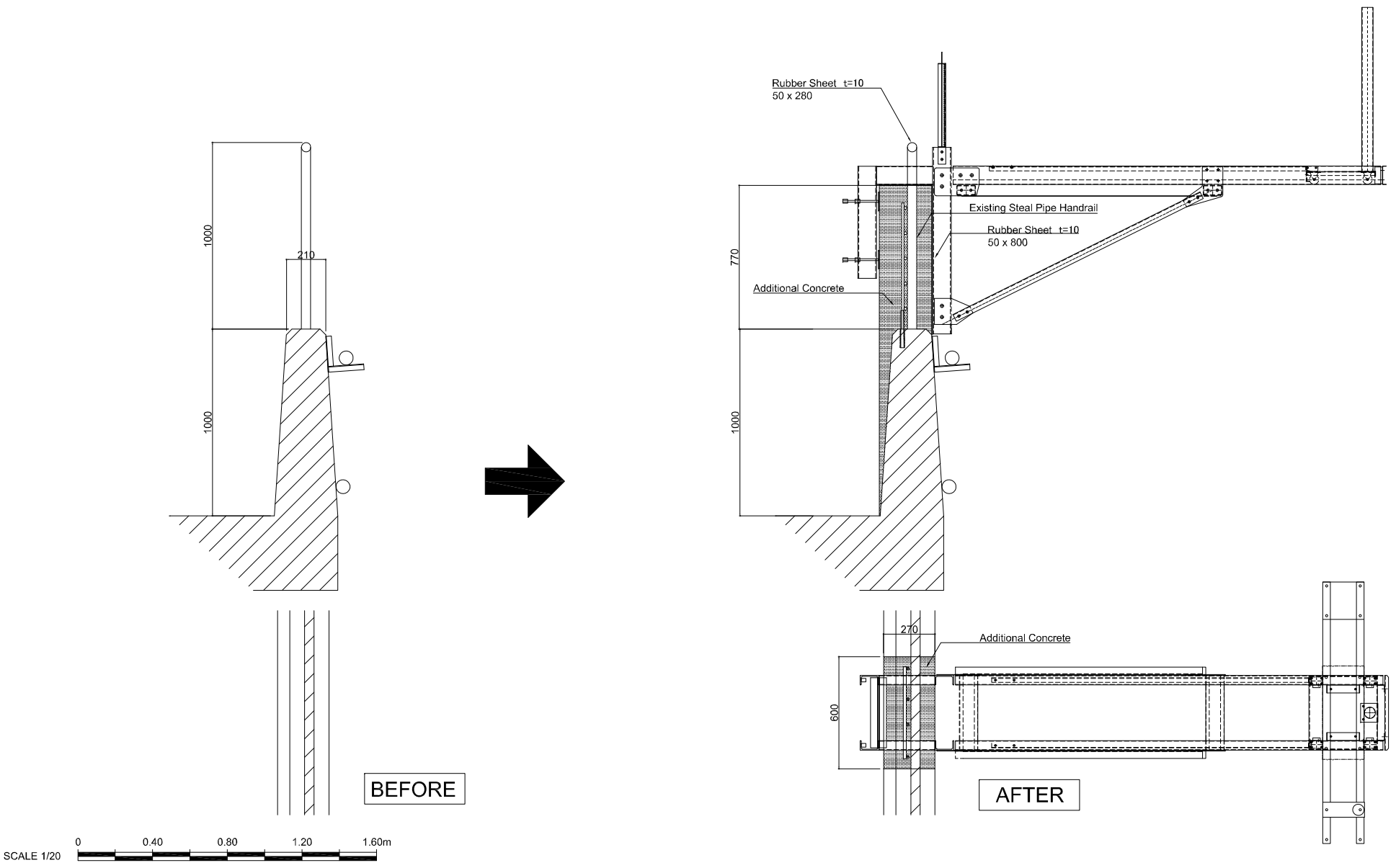
AFTER

SCALE 1/20



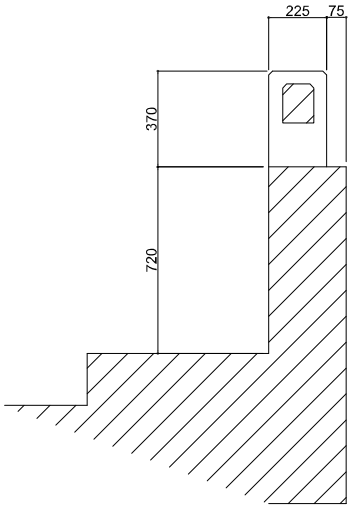
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプF）	WLV-MF-T06

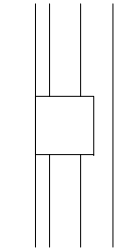
TYPE G for Site No. 37



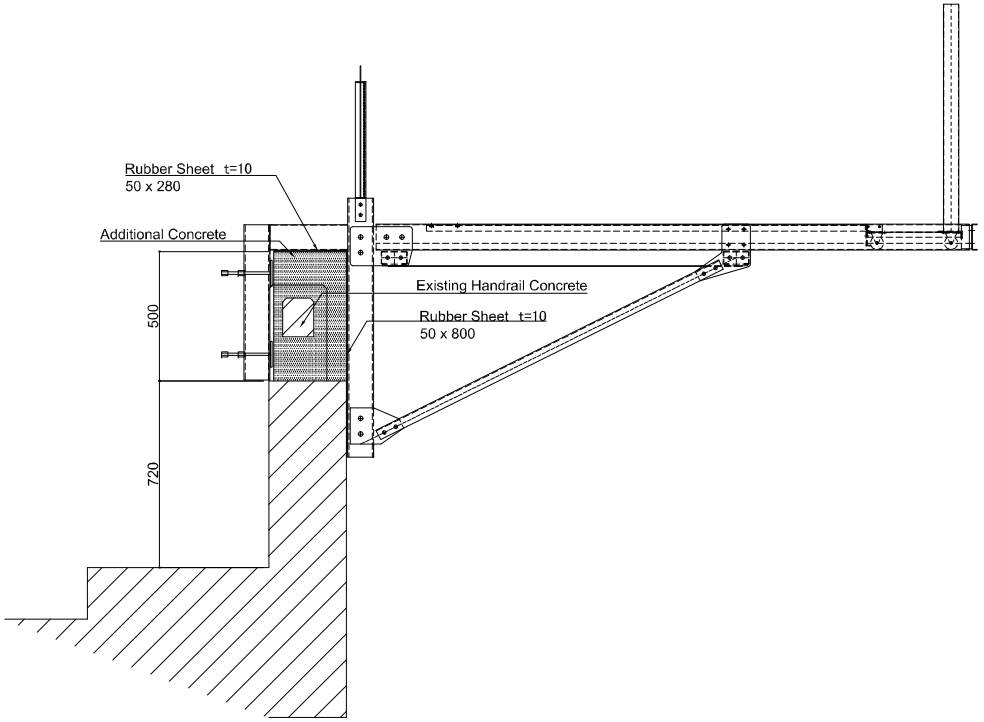
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプG）	WLV-MF-T07

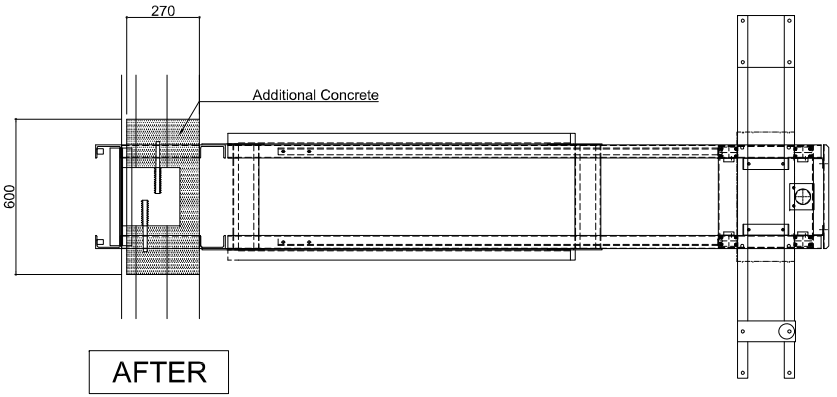
TYPE H for Site No. 26





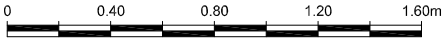
BEFORE





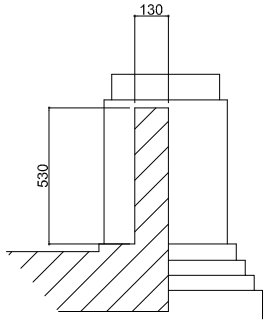
AFTER

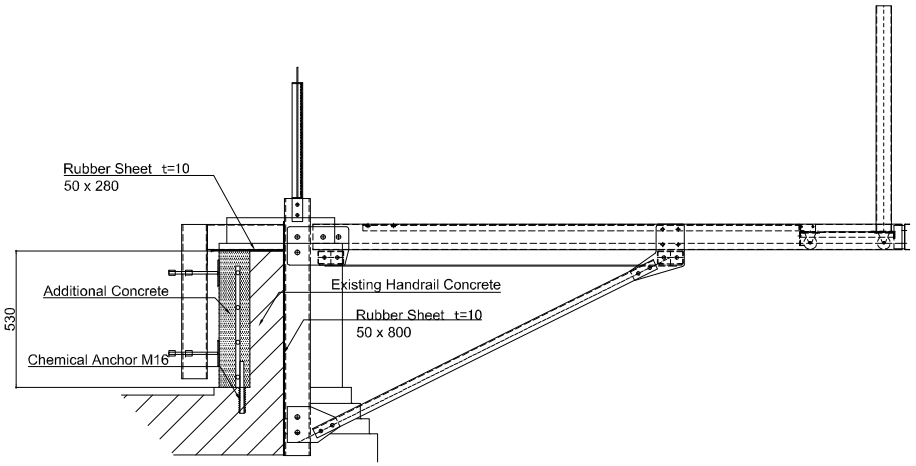
SCALE 1/20

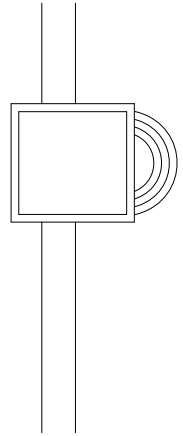


PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプH）	WLV-MF-T08

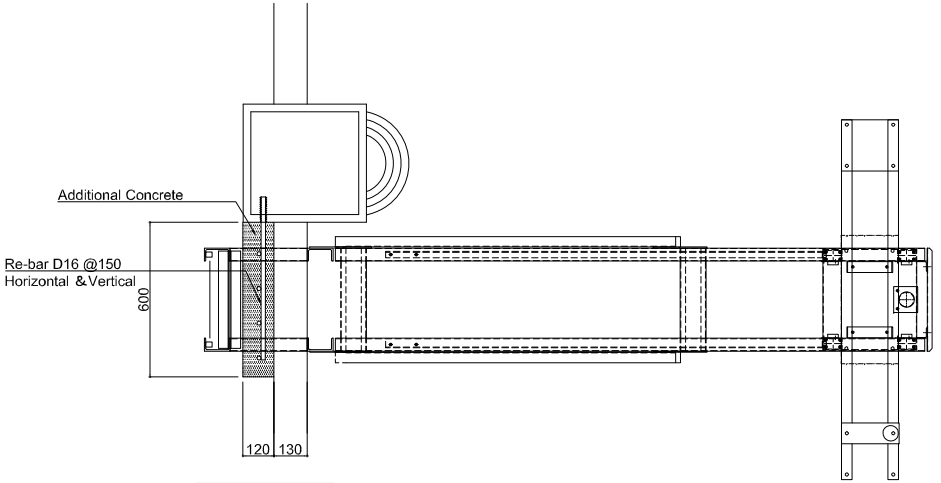
TYPE I for Site No. 18







BEFORE

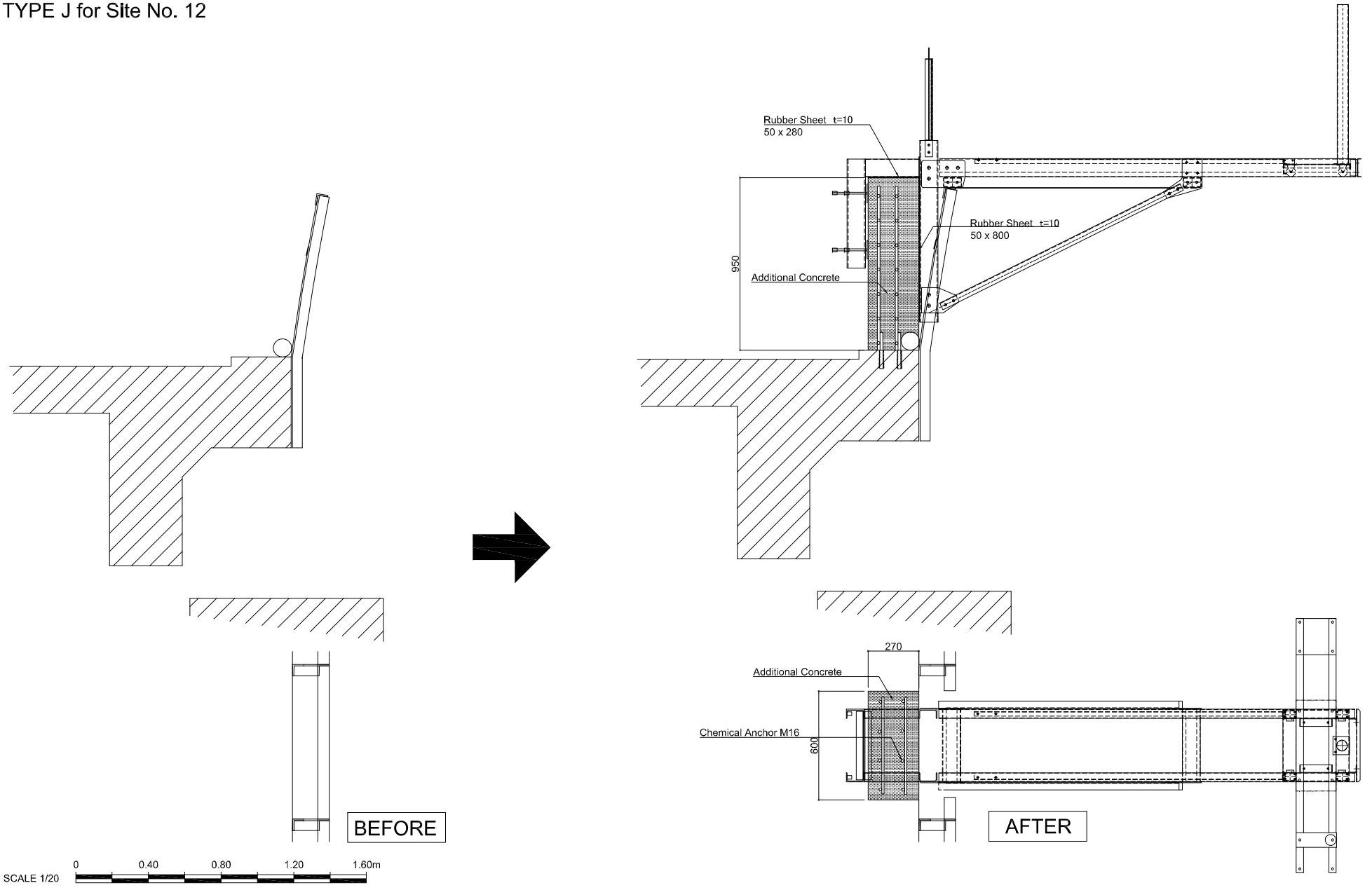


AFTER

SCALE 1/20 0 0.40 0.80 1.20 1.60m

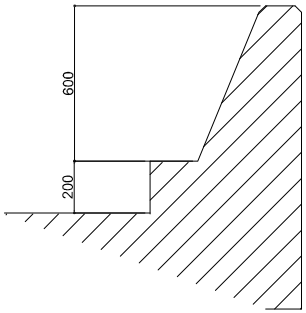
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプI）	WLV-MF-T09

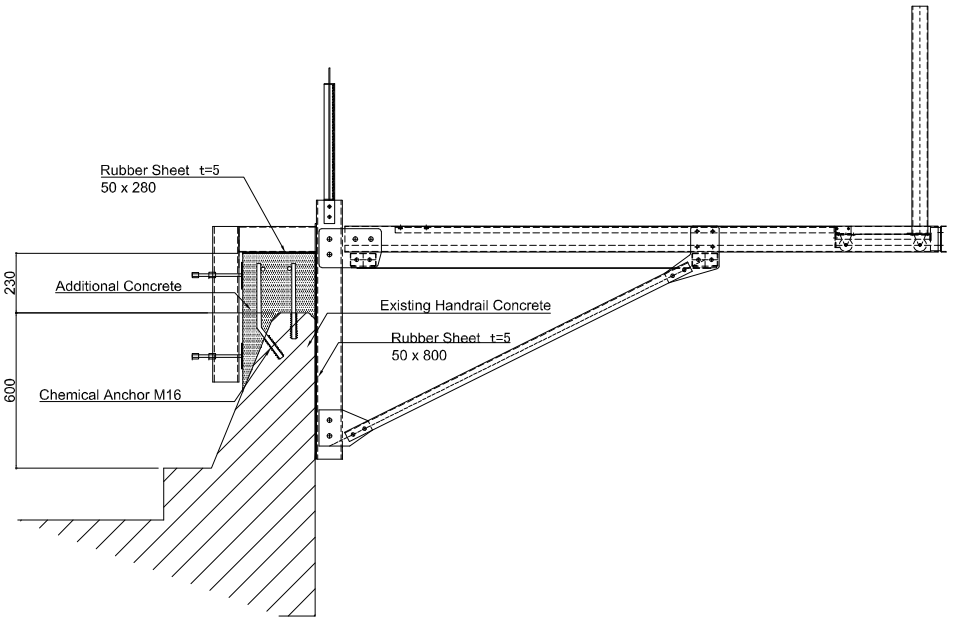
TYPE J for Site No. 12

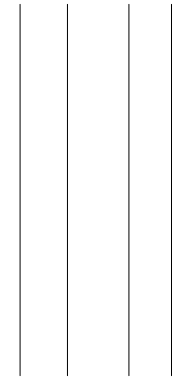


PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプJ）	WLV-MF-T10

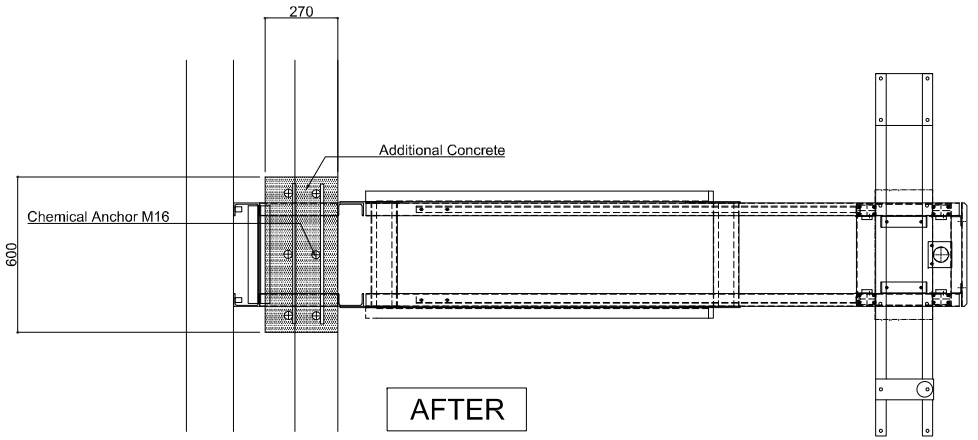
TYPE K for Site No. 8





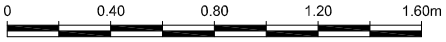


BEFORE



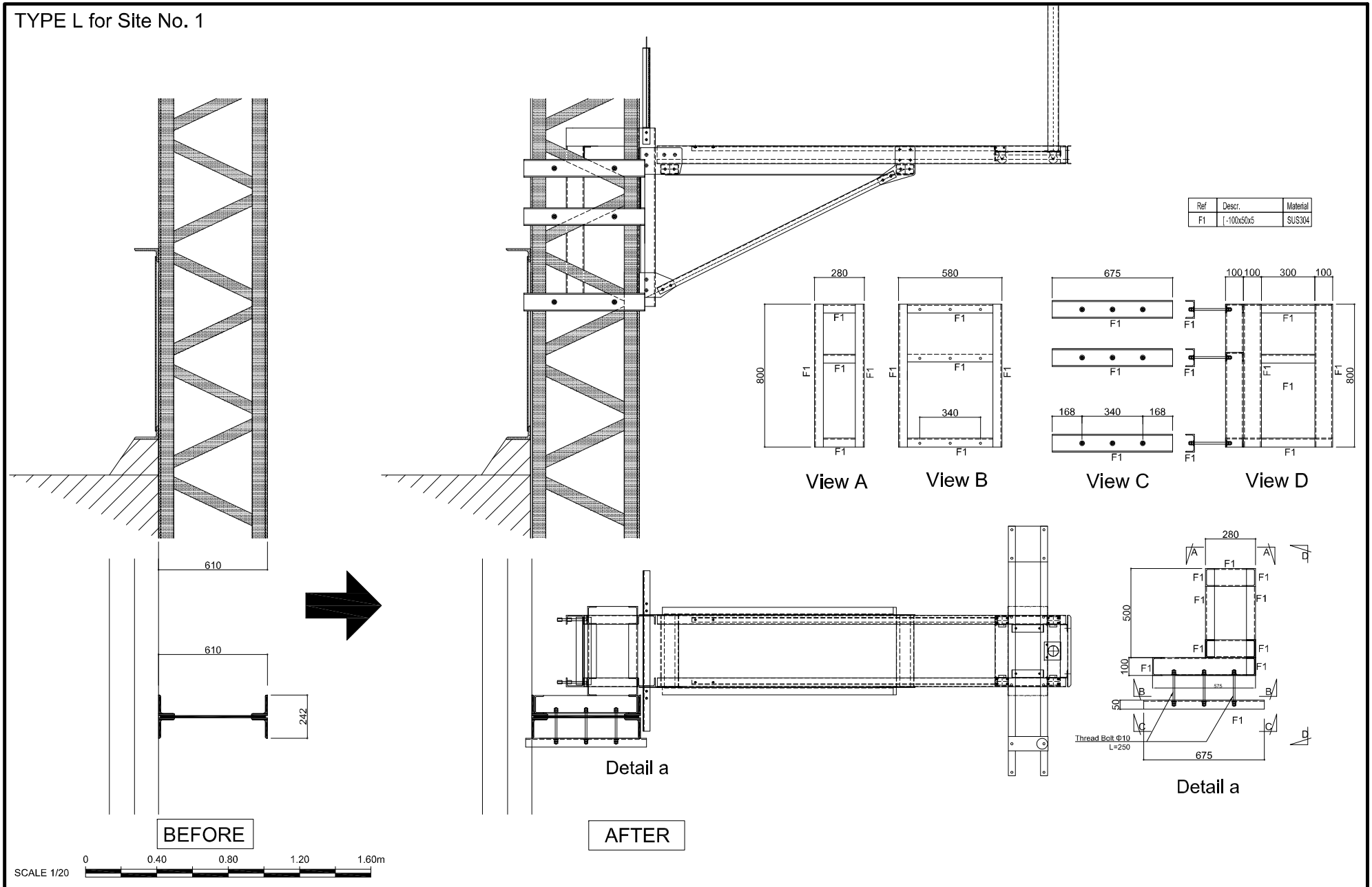
AFTER

SCALE 1/20



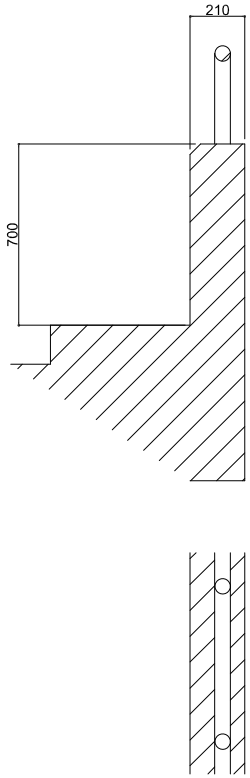
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプK）	WLV-MF-T11

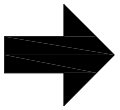
TYPE L for Site No. 1

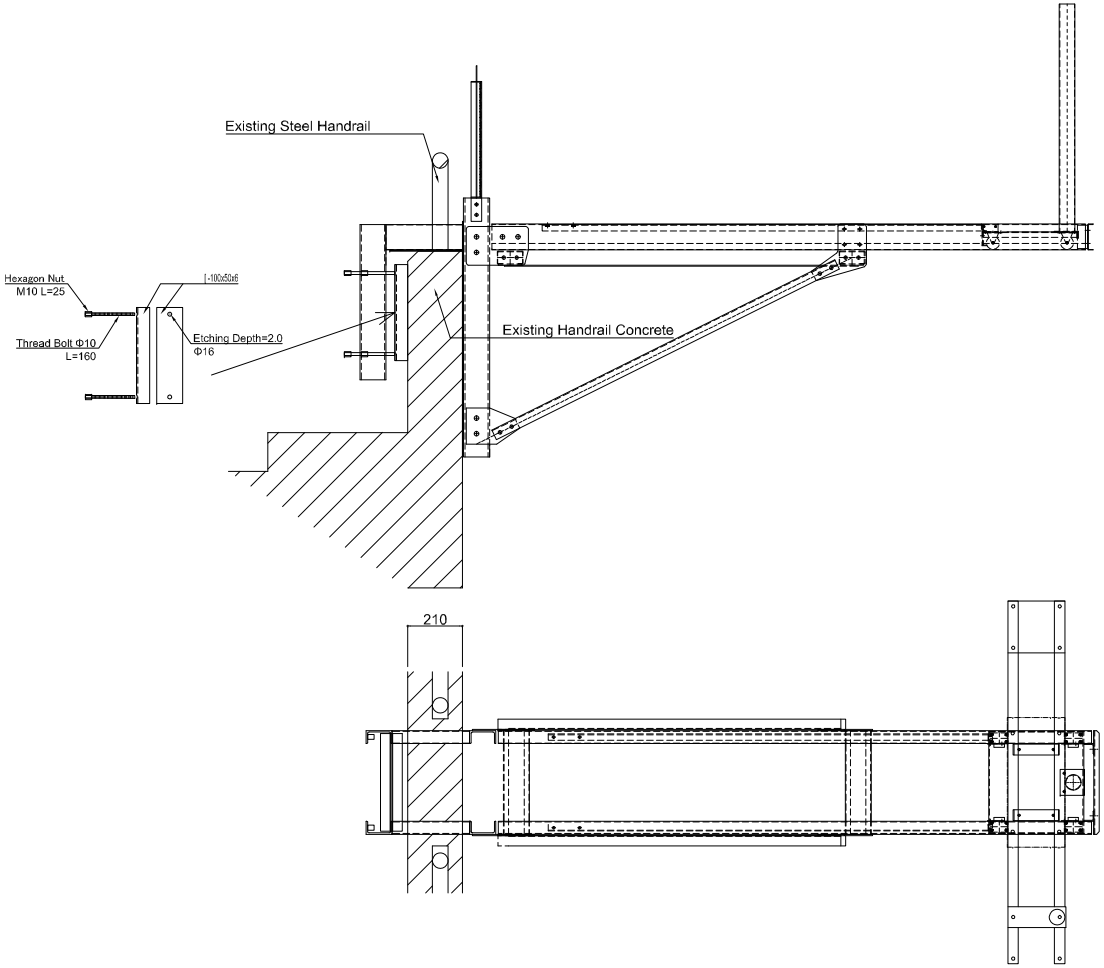


PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプL）	WLV-MF-T12

TYPE M for Site No. 35







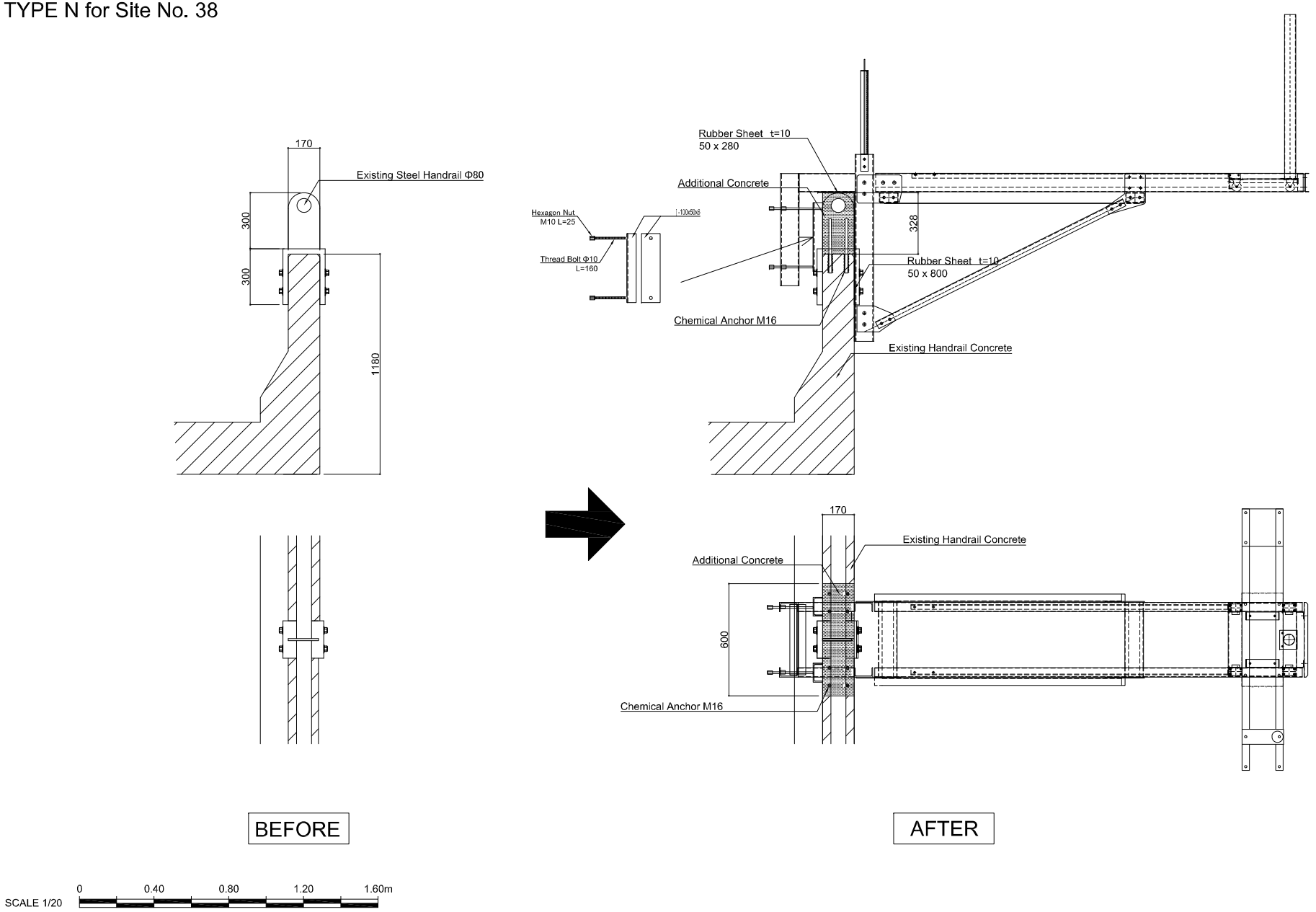
BEFORE

AFTER

SCALE 1/20 0 0.40 0.80 1.20 1.60m

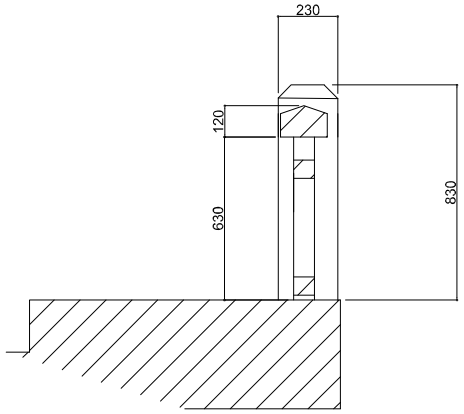
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプM）	WLV-MF-T13

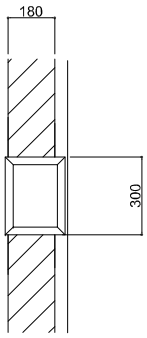
TYPE N for Site No. 38



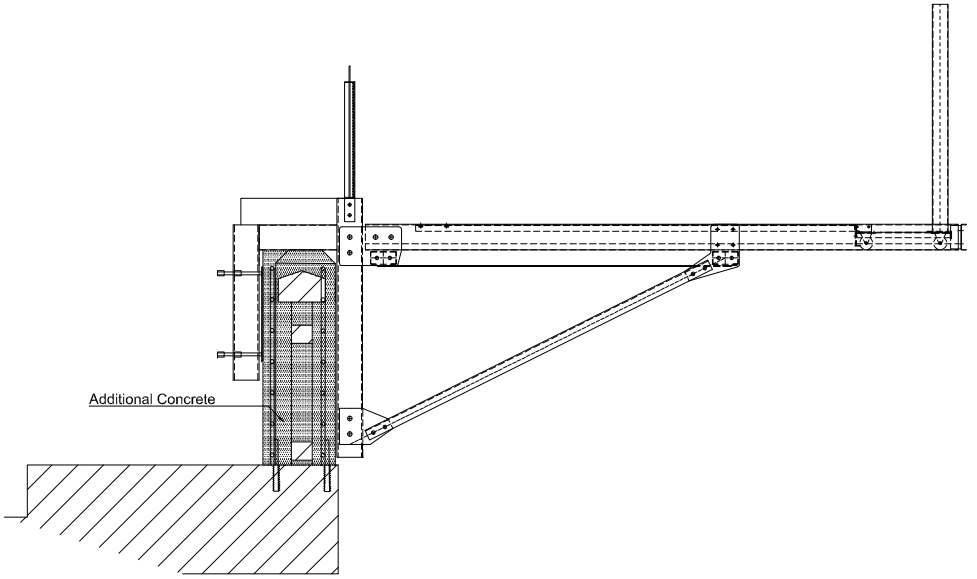
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプN）	WLV-MF-T14

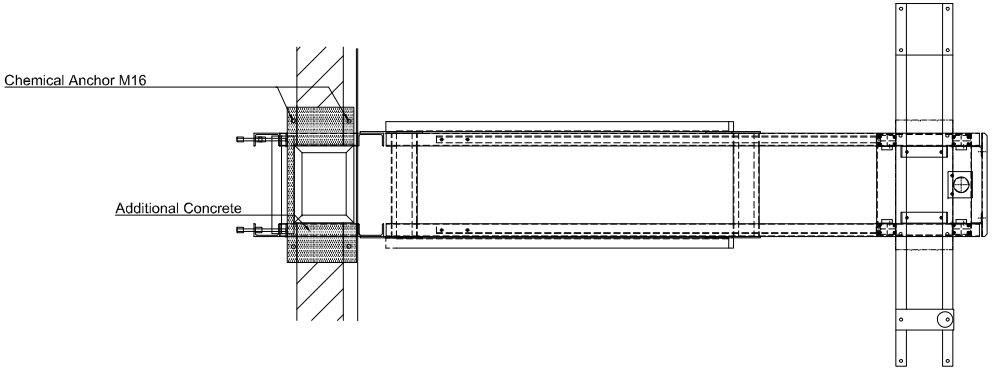
TYPE O for Site No. 22





BEFORE



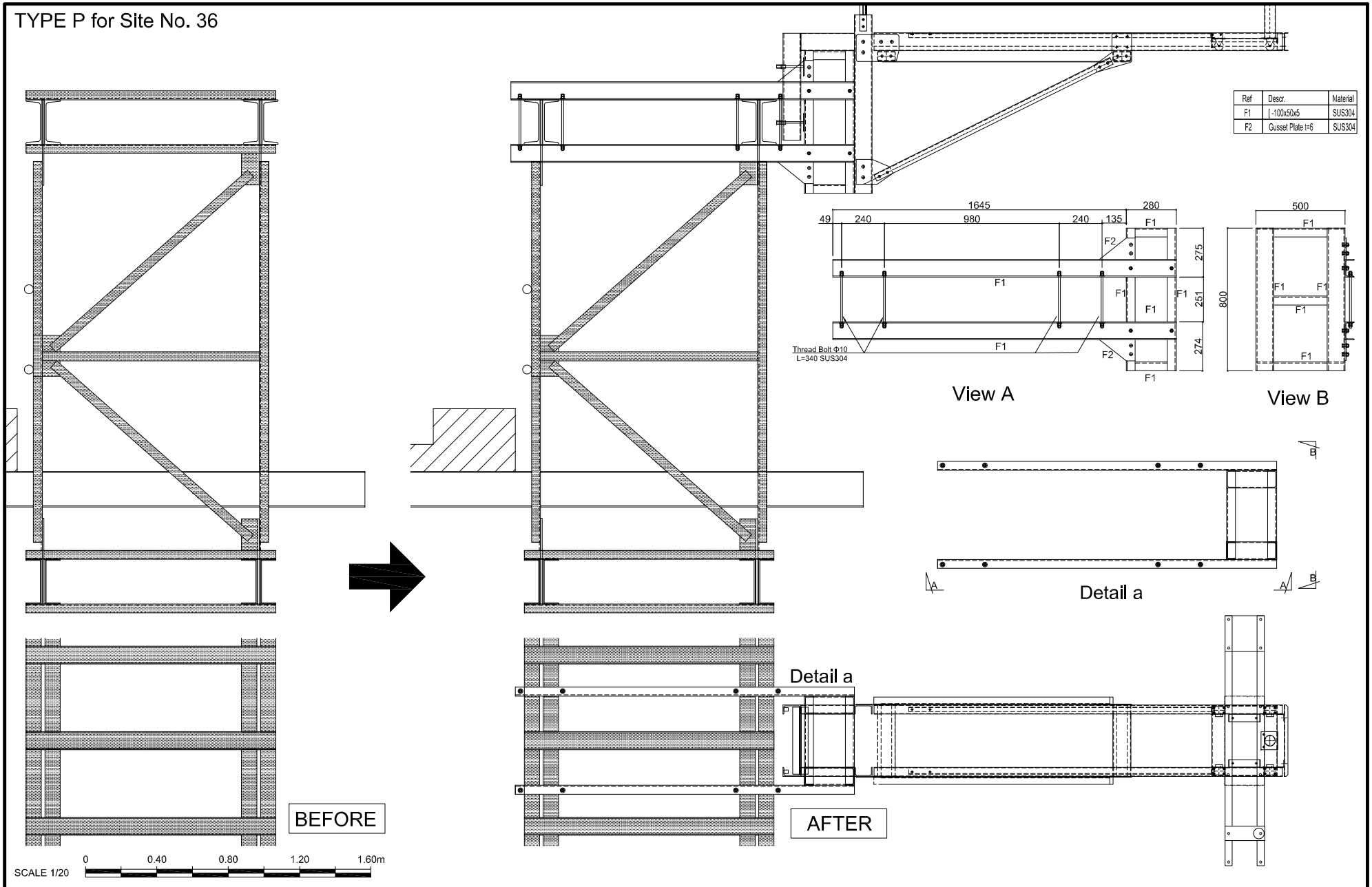


AFTER

SCALE 1/20 0 0.40 0.80 1.20 1.60m

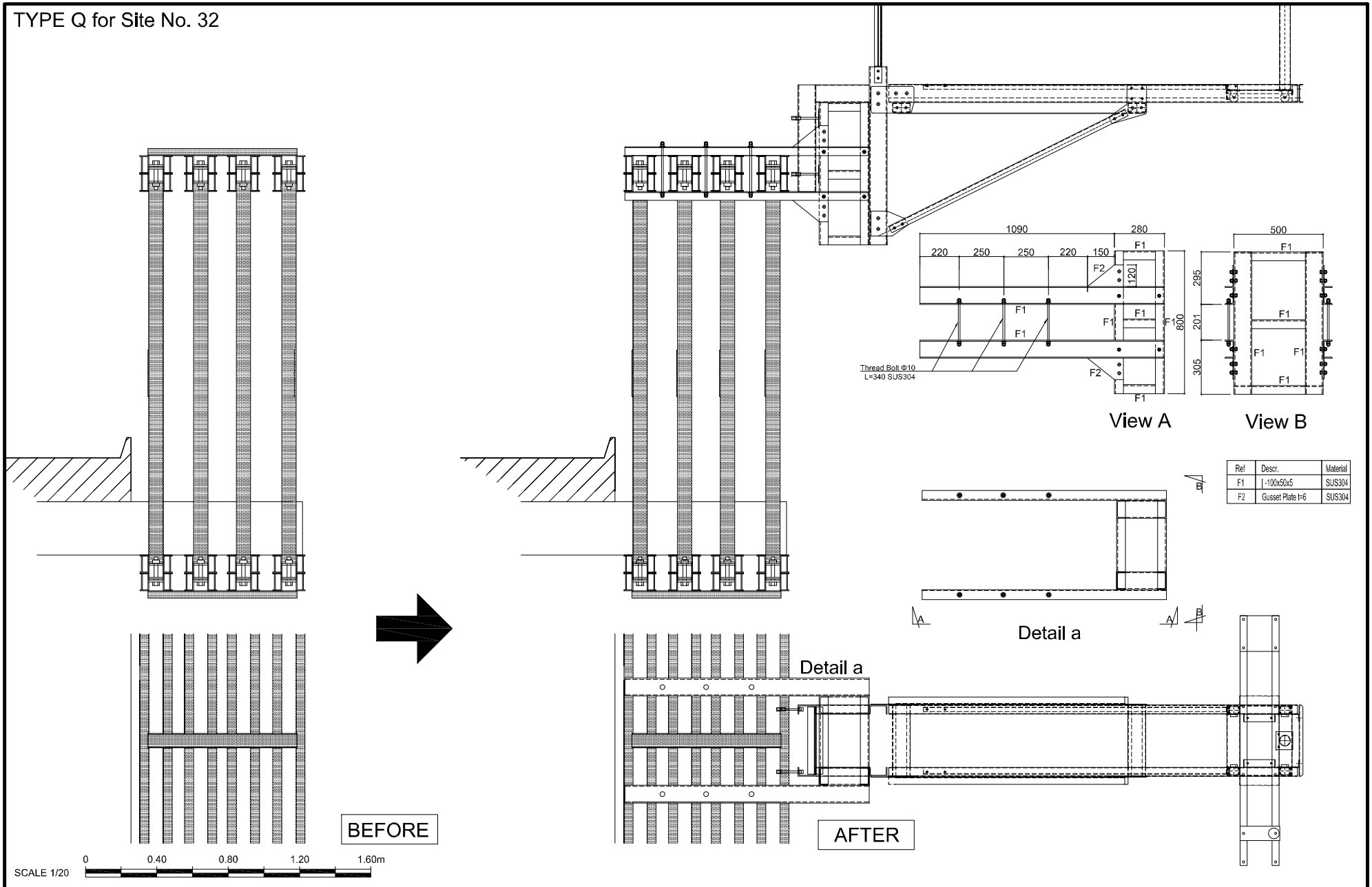
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプO）	WLV-MF-T15

TYPE P for Site No. 36

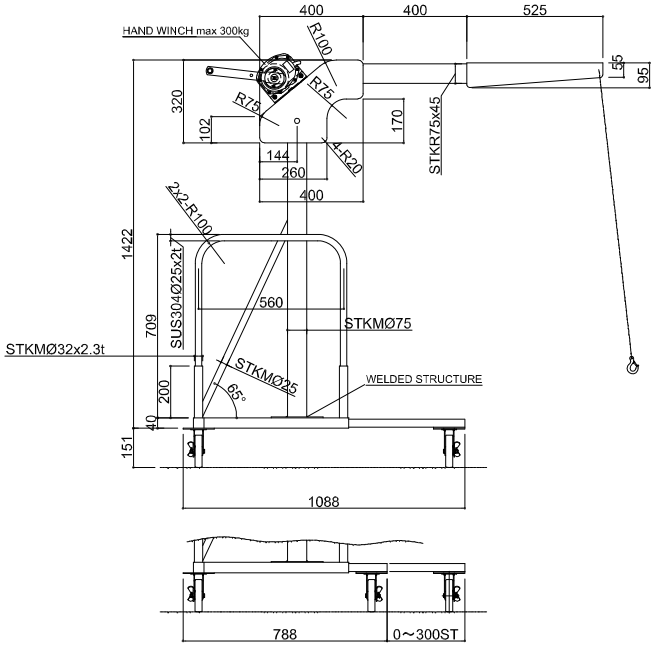


PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプP）	WLV-MF-T16

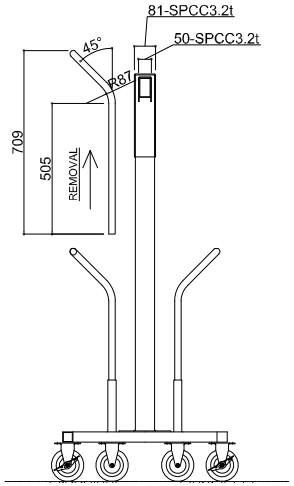
TYPE Q for Site No. 32



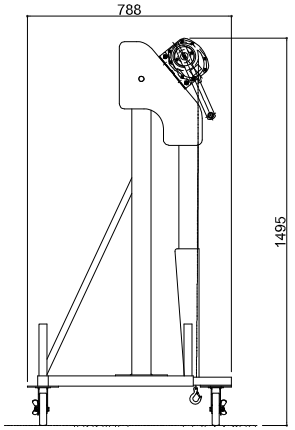
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	水文・水理観測システム 水位・流速センサー取付フレーム（タイプQ）	WLV-MF-T17



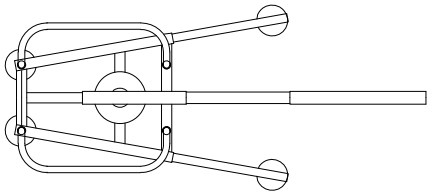
SIDE VIEW



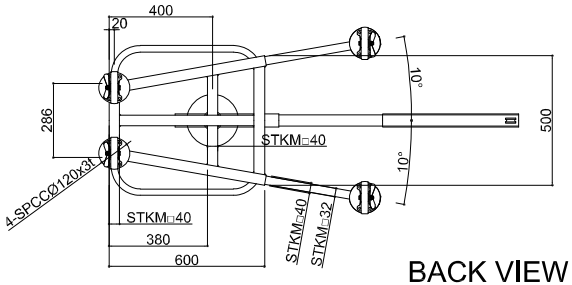
FRONT VIEW



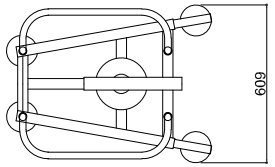
SIDE VIEW OF FOLDING STYLE



TOP VIEW



BACK VIEW



TOP VIEW OF FOLDING STYLE

ADCP Lifting Crane

Total Weight: approx. 30kg

SCALE 1/20 0 0.40 0.80 1.20 1.60m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	超音波ドップラー流速計 ADCP揚重クレーン	ADCP-001

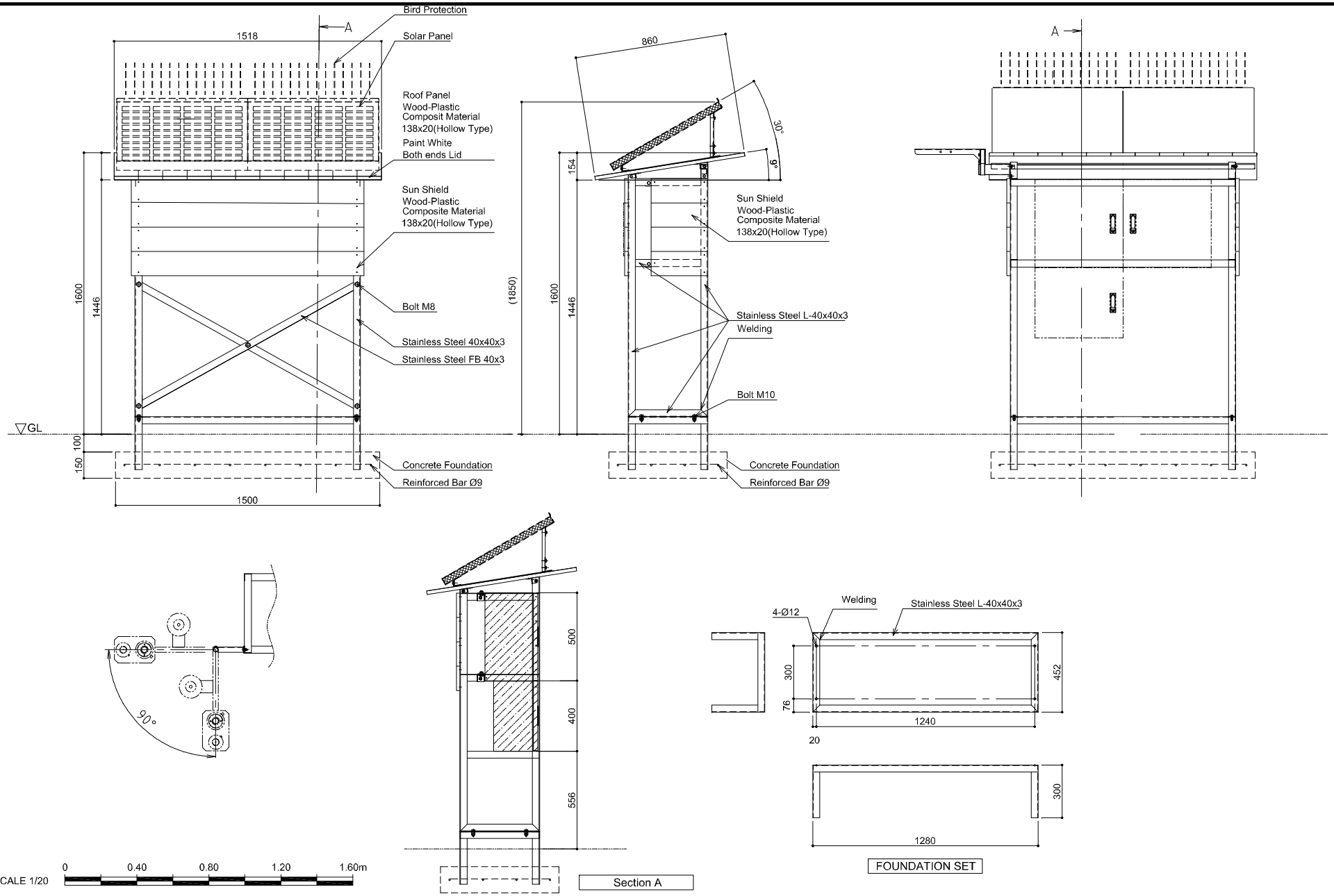
Steel Pole φ48.6×3.2
Welding
Steel Bar φ12
Bolt M16
Tilt Adjust Screw M8
Steel Pole φ60.5×3.8
Eye Bolt M12 for Hand Winch
Shackle
Bolt M16
Tilt Adjust Screw M8
Steel Pole φ76.3×5.2t
Steel Pole φ60.5×3.8
Steel Pole φ48.6×3.2
a DETAIL S=1/10
Steel Pole φ60.5×3.8
Bolt M16
Tilt Adjust Screw M8
Steel Pole φ76.3×5.2t
b DETAIL S=1/10
Steel Pole φ60.5×3.8
Steel Pole φ76.3×5.2t
c DETAIL S=1/10
Steel Pole φ89.1×4.2
100x100x6
Removable Hand Winch
A-A SECTION S=1/10
M20 High Strength Bolt
Welding
100x100x6
B-B SECTION S=1/10
Rubber Block
4Nos. 15x15x30
Aluminum Steplaadder
for supporting the Poles
890
GL
Base Plate 250x250x4
Welding
(See DRAWING No.3)
Concrete Foundation 800x800x1200
Motral
PVCφ200
100x100x6
Removable Hand Winch
Turnbuckle
Pulley
Steel Pole φ89.1×4.2
SUS Wire φ5mm
Steel Pole φ76.3×5.2
SUS Wire φ5mm
Shackle
Eye Bolt M12 for Hand Winch
Tilt Adjust Screw
Steel Pole φ60.5×3.8
Steel Pole φ48.6×3.2
800
200
100
1,000
1,200
1,300
366
1,500
125
2900
2700
2415
1500
9950
GL
A
B
C
a
b
c
f
0
0.60
1.20
1.80
2.40m
SCALE 1/30
PROJECT NAME:
パキスタン国
インダス川流域における洪水管理強化計画
準備調査
CONSULTANTS:
CTI Engineering International Co., Ltd.
International Meteorological Consultant Inc.
DRAWING TITLE:
自動気象観測システム（AWS）
可倒式ポール1
DRAWING NO.
AWS-TP-01

PROJECT NAME:
パキスタン国
インダス川流域における洪水管理強化計画
準備調査

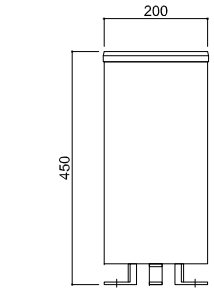
CONSULTANTS:
CTI Engineering International Co., Ltd.
International Meteorological Consultant Inc.

DRAWING TITLE:
自動気象観測システム（AWS）
可倒式ポール2

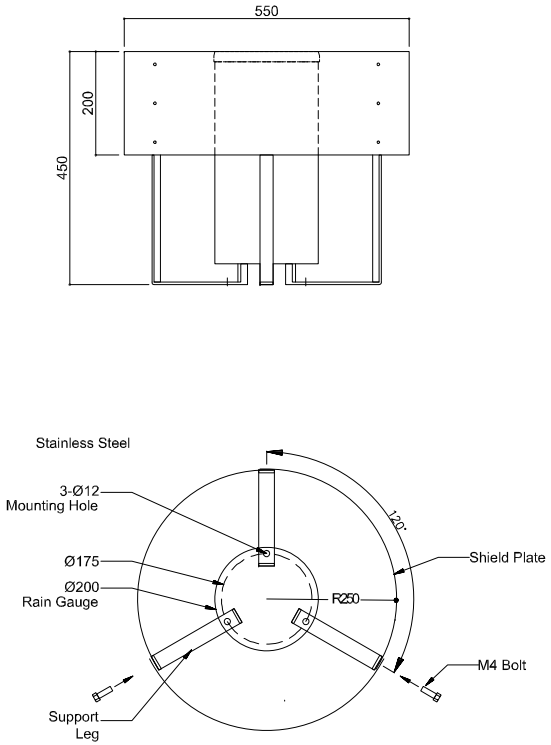
DRAWING NO.
AWS-TP-02



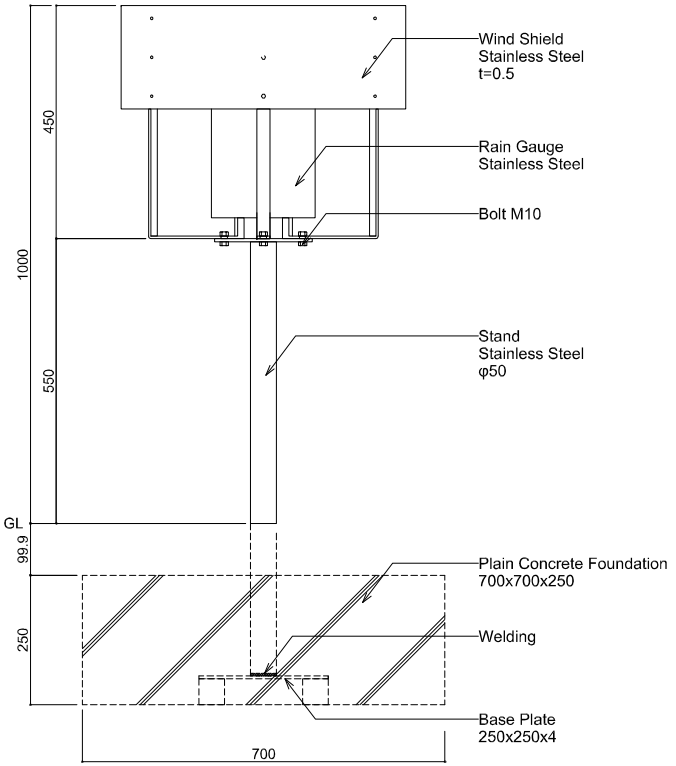
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	自動気象観測システム（AWS） AWS及びソーラーパワーシステム取付フレーム	AWS-ASP-01



RAIN GAUGE



RAIN GAUGE WITH WIND SHIELD

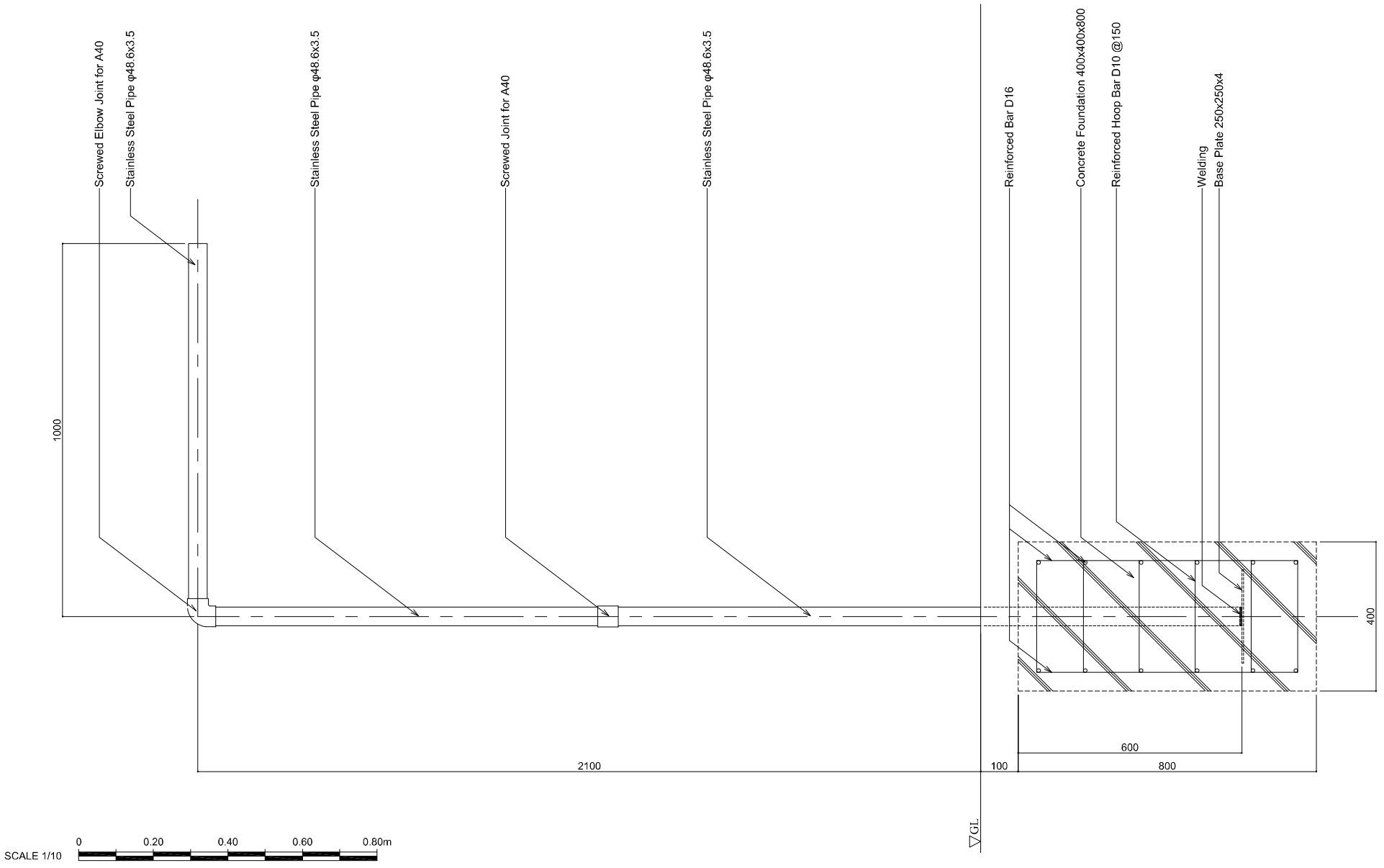


RAIN GAUGE WITH SHIELD STAND

SCALE 1/10

0 0.20 0.40 0.60 0.80m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	自動気象観測システム（AWS） 雨量計及び防風シールド	AWS-RG-01

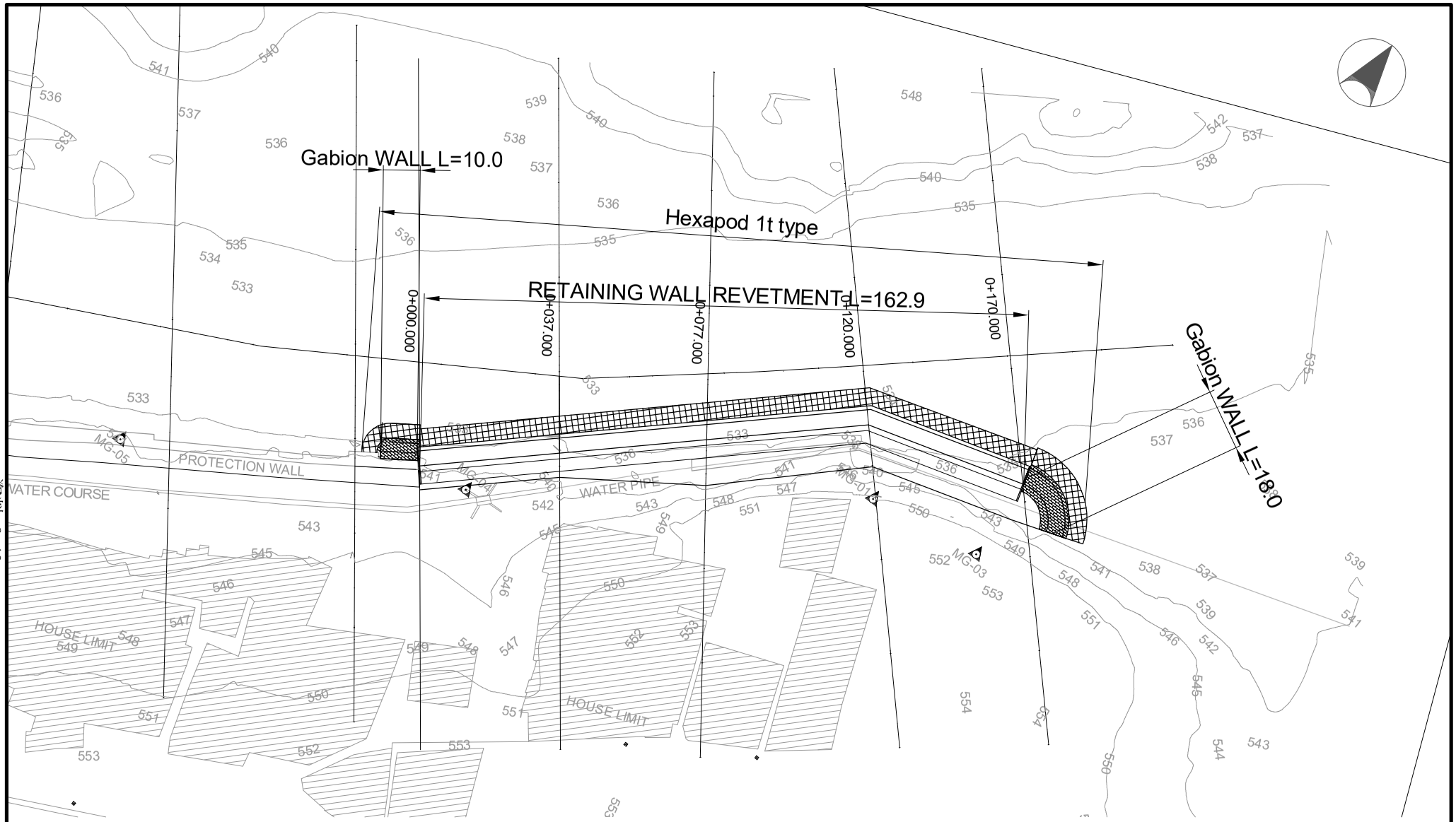


PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
パキスタン国 インダス川流域における洪水管理強化計画 準備調査	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**自動気象観測システム（AWS）** **積雪センサー取付ポール**	AWS-SEP-01

資料 6-2. 概略設計図（土木）

表　概略設計図面リスト（土木）

SHEET NO.	DRAWING NO.	DRAWING TITLE
1	RIV-MG-PL-001	GENERAL LAYOUT PLAN OF THE RIVER STRUCTURE (MOHRA GHAZAN)
2	RIV-MG-PF-001	LONGITUDINAL PROFILE OF THE RIVER STRUCTURE (LEFT BANK) (MOHRAGHAZAN)
3	RIV-MG-GV-001	STANDARD CROSS-SECTION OF THE RIVER STRUCTURE (MOHRA GHAZAN)
4	RIV-AK-PL-001	GENERAL LAYOUT PLAN OF THE RIVER STRUCTURE (ALI KHAN AREA)
5	RIV-AK-PF-001	LONGITUDINAL PROFILE OF THE RIVER STRUCTURE (LEFT BANK) (ALI KHAN AREA)
6	RIV-AK-GV-001	STANDARD CROSS-SECTION OF THE RIVER STRUCTURE (ALI KHAN AREA)
7	RIV-SP-PL-001	GENERAL LAYOUT PLAN OF THE RIVER STRUCTURE (SIKANDARPUR AREA)
8	RIV-SP-PF-001	LONGITUDINAL PROFILE OF THE RIVER STRUCTURE (SIKANDARPUR AREA)
9	RIV-SP-GV-001	STANDARD CROSS-SECTION OF THE LOW WATER CHANNEL (SIKANDARPUR AREA)
10	RIV-SP-GV-002	STRUCTURAL DRAWING OF THE REVETMENT (SIKANDARPUR AREA)
11	RIV-SP-GV-005	STRUCTURAL DRAWING OF GABION RETAINING WALL (SIKANDARPUR AREA)

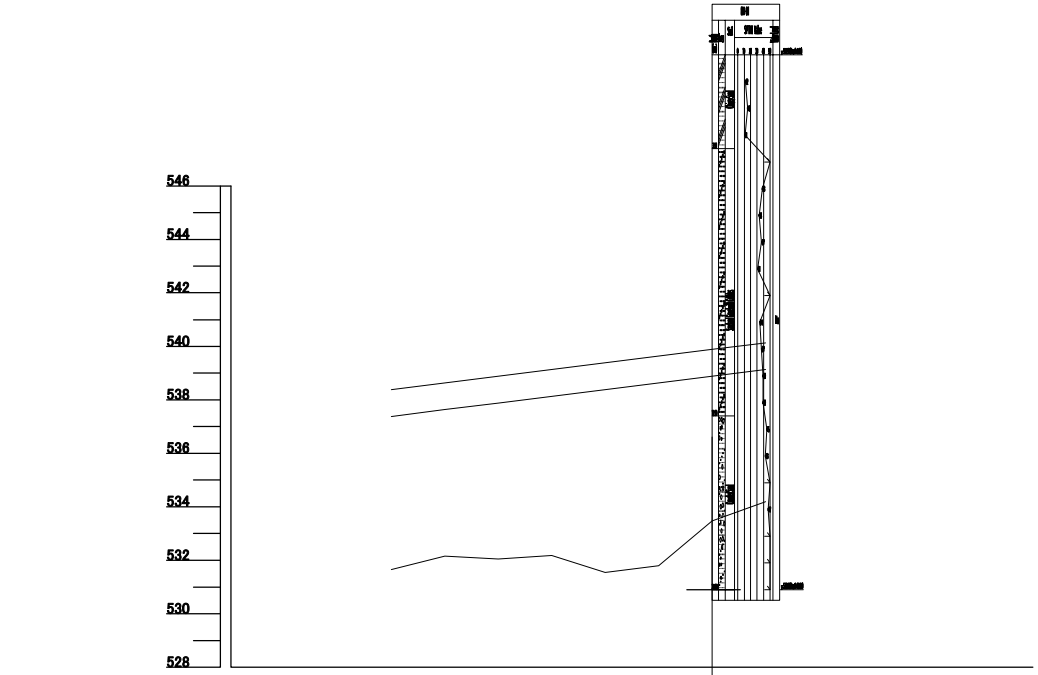


GENERAL LAYOUT PLAN OF THE RIVER STRUCTURE (MOHRA GAHZAN)

SCALE A

SCALE A 0 20.0 40.0 60.0 80.0m

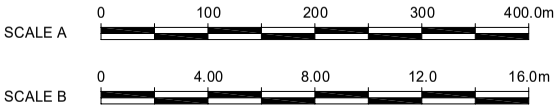
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**GENERAL LAYOUT PLAN OF THE RIVER STRUCTURE (MOHRA GAHZAN)**	RIV-MG-PL-001



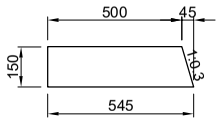
TOP ELEVATION OF THE REVETMENT	538.384	538.634	538.883	539.134	539.384	539.634	539.884	540.134
HIGHEST FLOOD LEVEL (HFL) (M)	537.384	537.634	537.883	538.134	538.384	538.634	538.884	539.134
DEEPEST RIVERBED LEVEL (M)	531.855	532.154	532.049	532.183	531.551	531.800	533.470	534.192
ACCUMULATIVE DISTANCE (M)	00.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000
PARTIAL DISTANCE (M)	00.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000
DESIGN STATION NUMBER	0+000	0+050	0+100	0+150	0+200	0+250	0+300	0+350

LONGITUDINAL PROFILE OF THE RIVER STRUCTURE (LEFT BANK) (MOHRA GAHZAN)

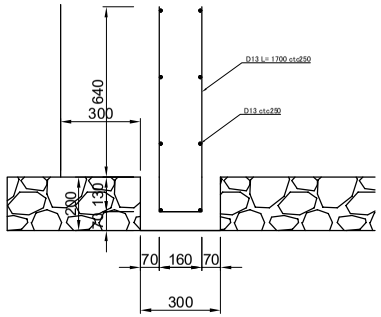
SCALE A,B



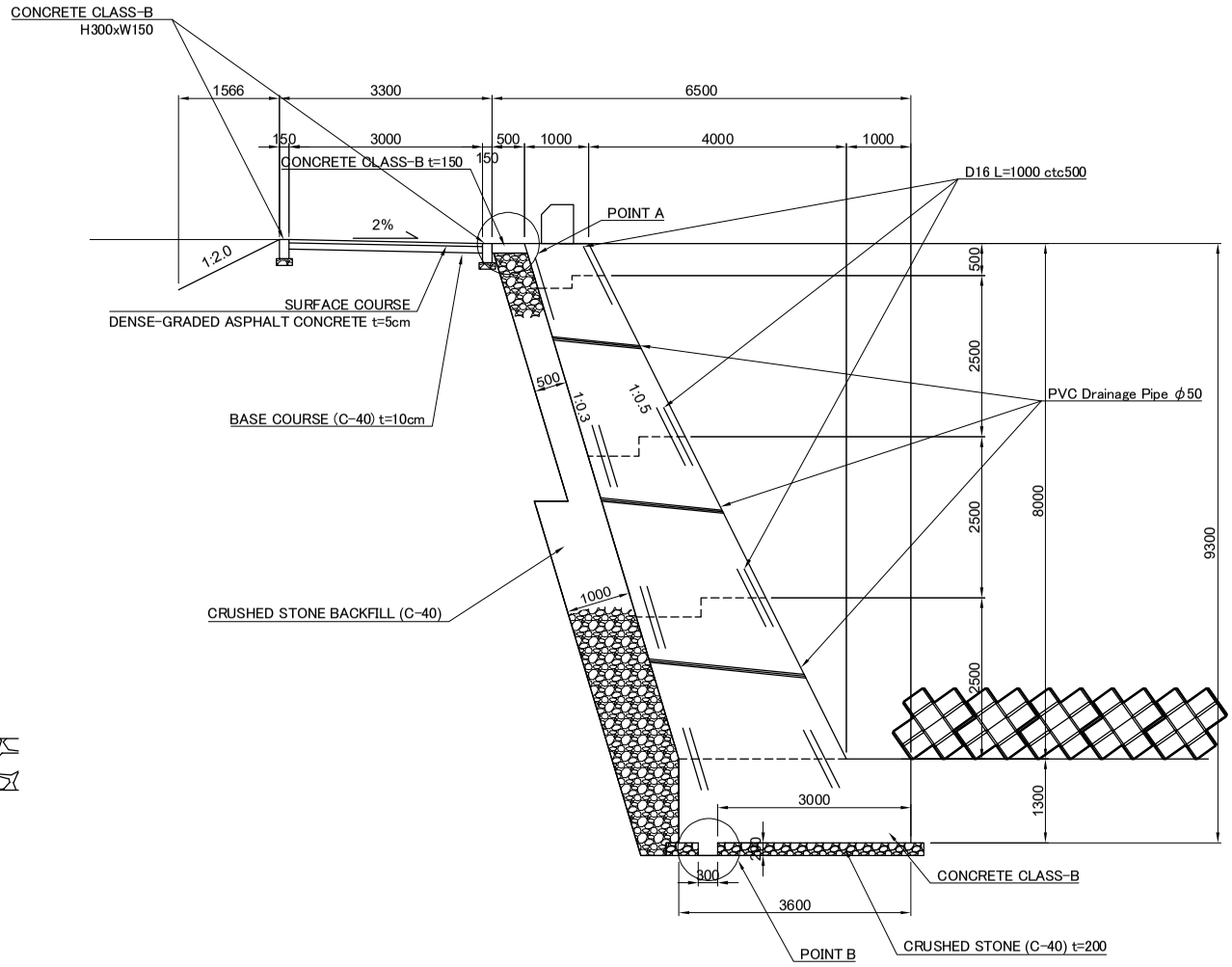
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**LONGITUDINAL PROFILE OF THE RIVER STRUCTURE (LEFT BANK) (MOHRA GAHZAN)**	RIV-MG-PF-001



DETAIL OF POINT A
SCALE B



DETAIL OF POINT B
SCALE B

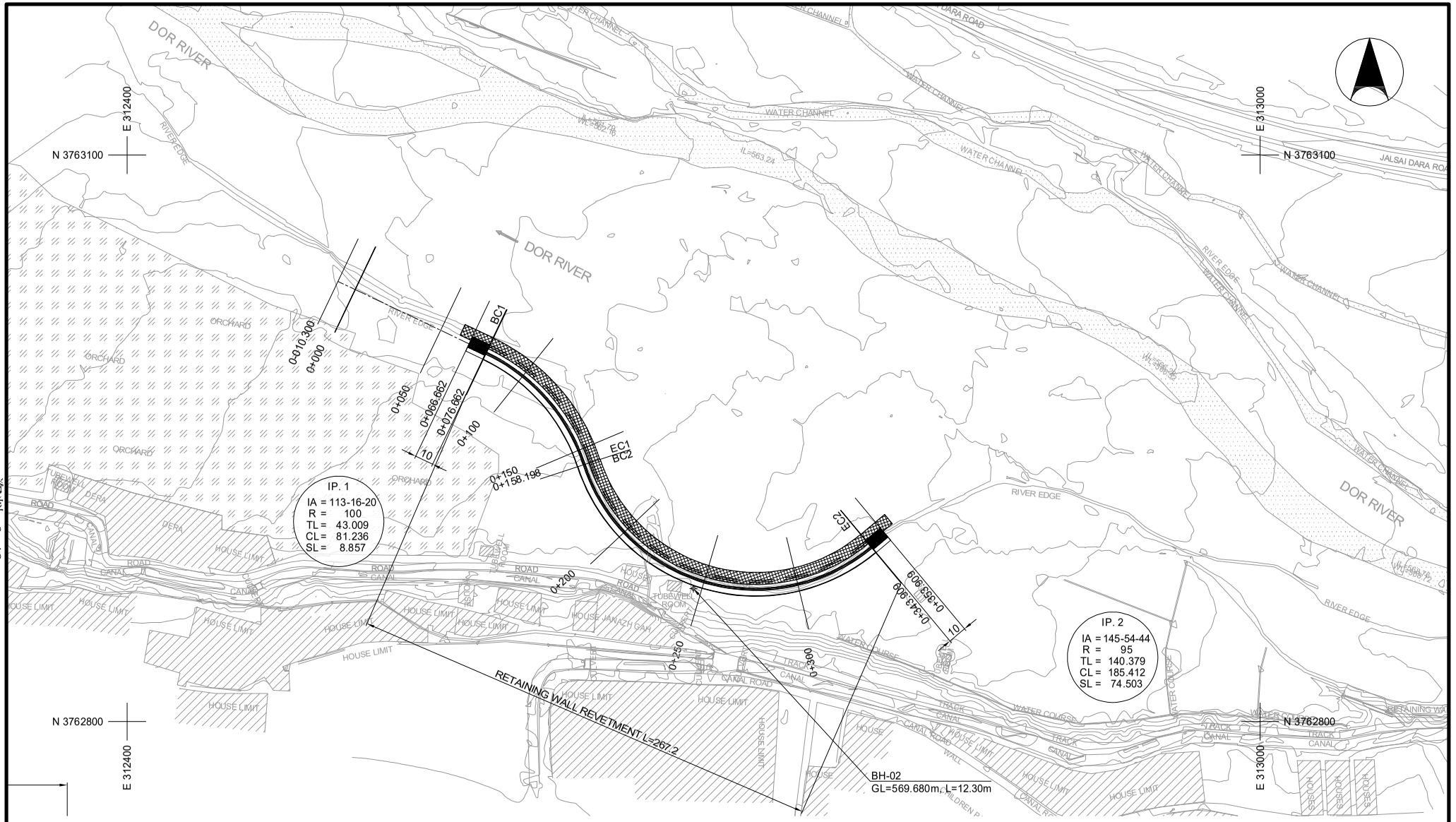


STANDARD CROSS-SECTION OF THE RIVER STRUCTURE (MOHRA GAHZAN)
SCALE A

SCALE A 0 1.60 3.20 4.80 6.40m

SCALE B 0 0.40 0.80 1.20 1.60m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**STANDARD CROSS-SECTION OF THE RIVER STRUCTURE (MOHRA GAHZAN)**	RIV-MG-GV-001

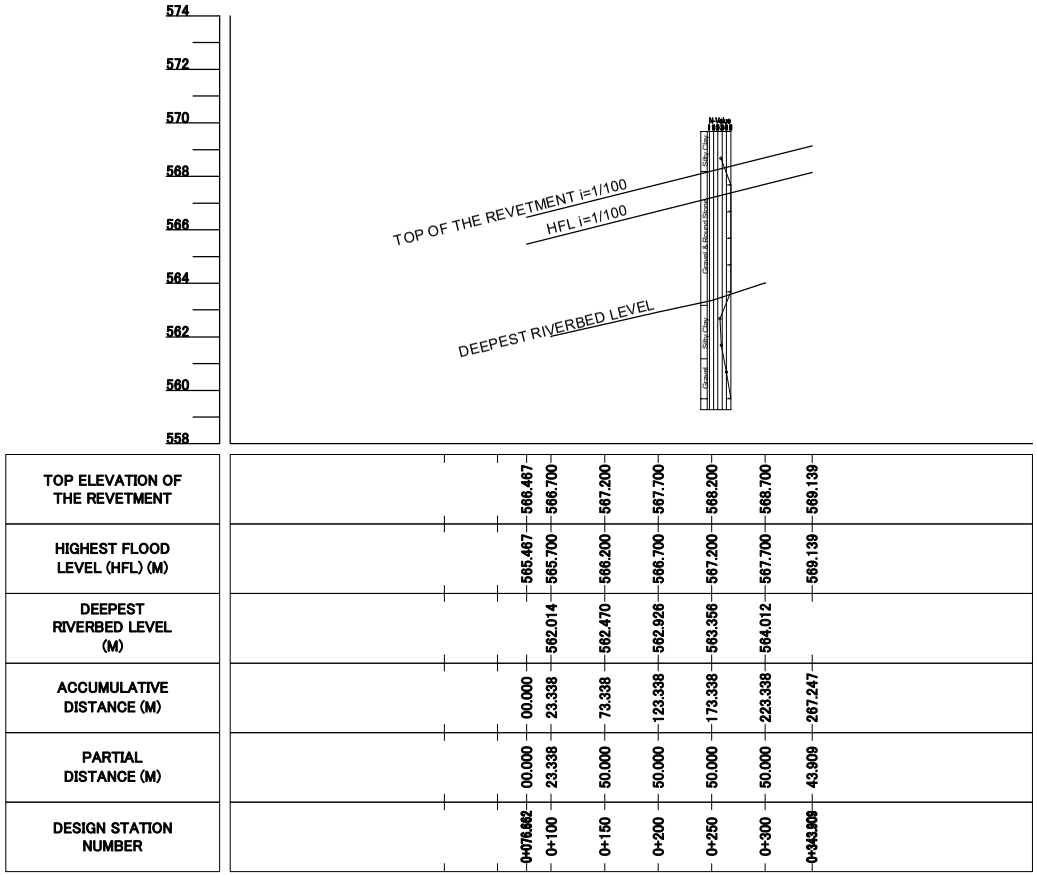


GENERAL LAYOUT PLAN OF THE RIVER STRUCTURE (ALI KHAN AREA)

SCALE A

SCALE A 0 40.0 80.0 120 160.0m

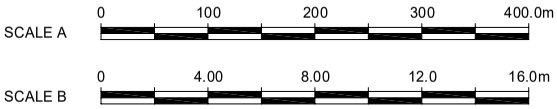
PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**GENERAL LAYOUT PLAN OF THE RIVER STRUCTURE (ALI KHAN AREA)**	RIV-AK-PL-001



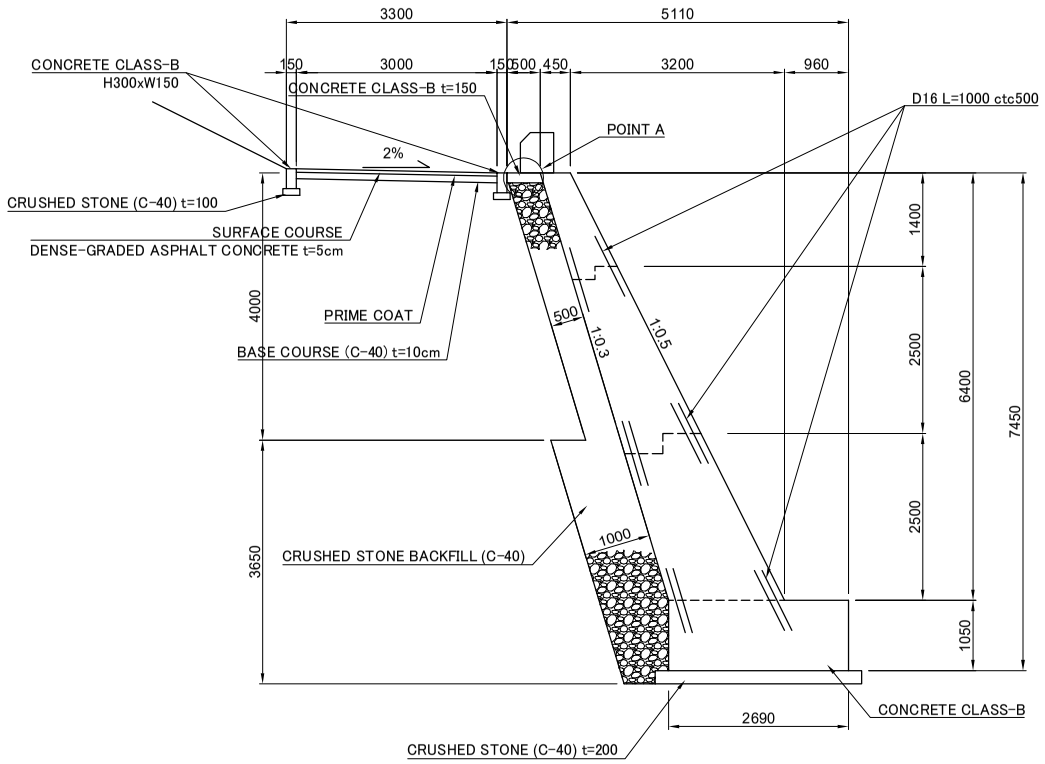
TOP ELEVATION OF THE REVETMENT	566.487	566.700	567.200	567.700	568.200	568.700	569.139
HIGHEST FLOOD LEVEL (HFL) (M)	565.467	565.700	566.200	566.700	567.200	567.700	569.139
DEEPEST RIVERBED LEVEL (M)		562.014	562.470	562.926	563.356	564.012	
ACCUMULATIVE DISTANCE (M)	00.000	23.338	73.338	123.338	173.338	223.338	267.247
PARTIAL DISTANCE (M)	00.000	23.338	50.000	50.000	50.000	50.000	43.909
DESIGN STATION NUMBER	0+076.662	0+100	0+150	0+200	0+250	0+300	0+343.909

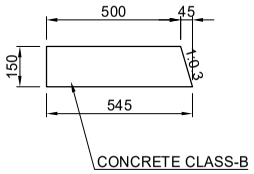
LONGITUDINAL PROFILE OF THE RIVER STRUCTURE (LEFT BANK) (ALI KHAN AREA)

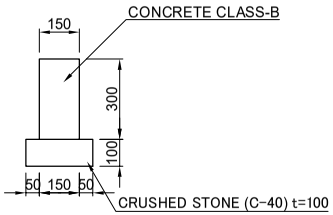
SCALE A,B



PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**LONGITUDINAL PROFILE OF THE RIVER STRUCTURE (LEFT BANK) (ALI KHAN AREA)**	RIV-AK-PF-001







DETAIL OF POINT A

SCALE B

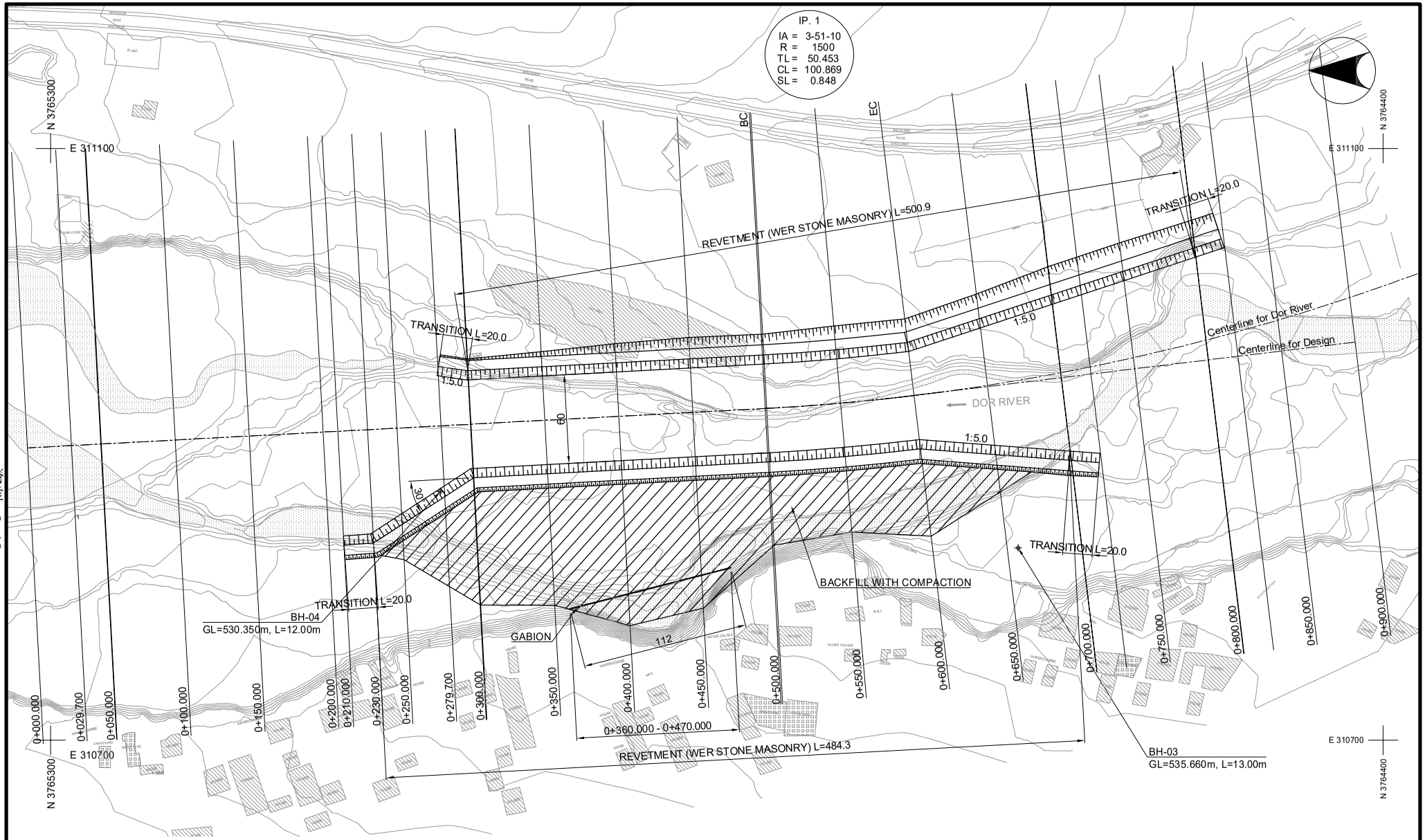
STANDARD CROSS-SECTION OF THE RIVER STRUCTURE (ALI KHAN AREA)

SCALE A

SCALE A 0 1.60 3.20 4.80 6.40m

SCALE B 0 0.40 0.80 1.20 1.60m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**STANDARD CROSS-SECTION OF THE RIVER STRUCTURE (ALI KHAN AREA)**	RIV-AK-GV-001

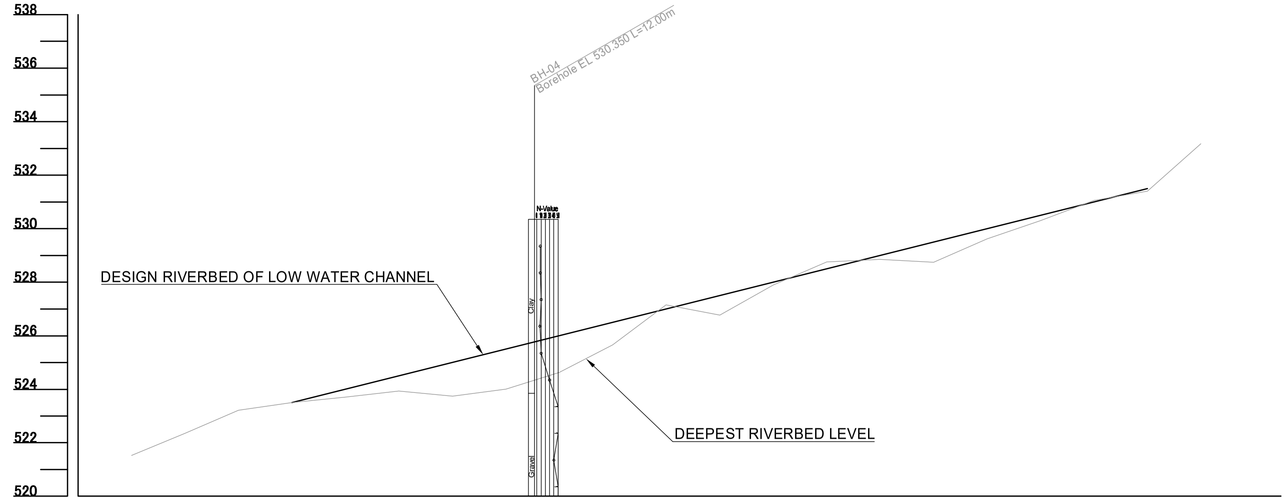


GENERAL LAYOUT PLAN OF THE RIVER STRUCTURE (SIKANDARPUR AREA)

SCALE A

SCALE A 0 50.0 100 150 200.0m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**GENERAL LAYOUT PLAN OF THE RIVER STRUCTURE (SIKANDARPUR AREA)**	RIV-SP-PL-001



SLOPE OF DESIGN RIVERBED				1/100																	
DESIGN RIVERBED OF LOW WATER CHANNEL				523.500	524.000	524.500	525.000	525.500	526.000	526.500	527.000	527.500	528.000	528.500	529.000	529.500	530.000	530.500	531.000	531.500		
HIGHEST FLOOD LEVEL (HFL) (M)																						
DEEPEST RIVERBED LEVEL (M)	521.530	522.350	523.210	523.500	523.710	523.930	523.740	524.010	524.630	525.660	527.160	526.766	527.890	528.760	528.860	528.750	529.620	530.310	531.060	531.410	533.176	
ACCUMULATIVE DISTANCE (M)	000.000	050.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	600.000	650.000	700.000	750.000	800.000	850.000	900.000	950.000	1000.000	1050.000
PARTIAL DISTANCE (M)	00.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000	50.000
DESIGN STATION NUMBER				0+000	0+050	0+100	0+150	0+200	0+250	0+300	0+350	0+400	0+450	0+500	0+300	0+600	0+650	0+700	0+750	0+800	0+850	0+900

SCALE B / SCALE A

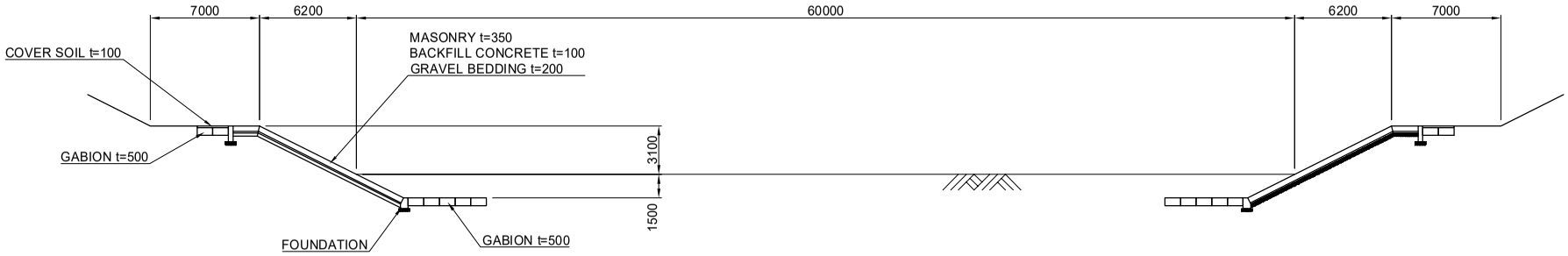
LONGITUDINAL PROFILE OF THE RIVER STRUCTURE (SIKANDARPUR AREA)

SCALE A,B

SCALE A: 0 — 100 — 200 — 300 — 400.0m

SCALE B: 0 — 4.00 — 8.00 — 12.0 — 16.0m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**LONGITUDINAL PROFILE OF THE RIVER STRUCTURE (SIKANDARPUR AREA)**	RIV-SP-PF-001

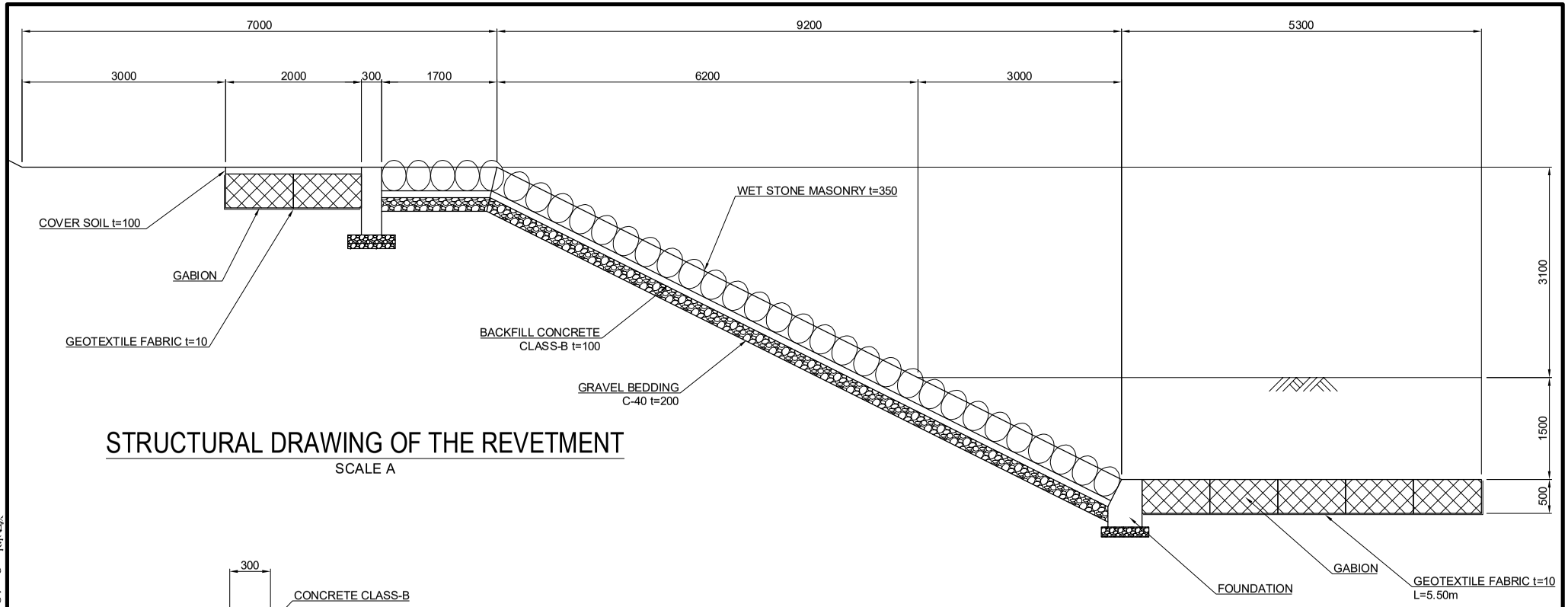


STANDARD CROSS-SECTION OF THE LOW WATER CHANNEL (SIKANDARPUR AREA)

SCALE A

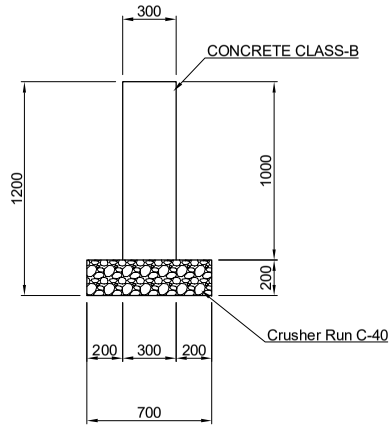
SCALE A 0 6.00 12.0 18.0 24.0m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**STANDARD CROSS-SECTION OF THE LOW WATER CHANNEL (SIKANDARPUR AREA)**	RIV-AK-GV-001



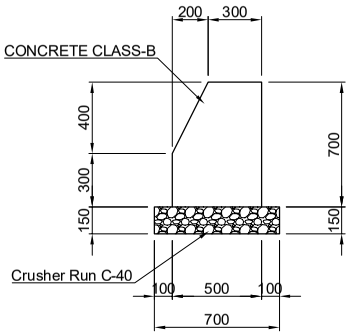
STRUCTURAL DRAWING OF THE REVETMENT

SCALE A



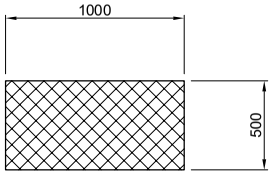
DETAIL OF TOP OF REVETMENT

SCALE B



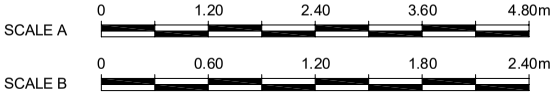
DETAIL OF FOUNDATION

SCALE B



DETAIL OF GABION

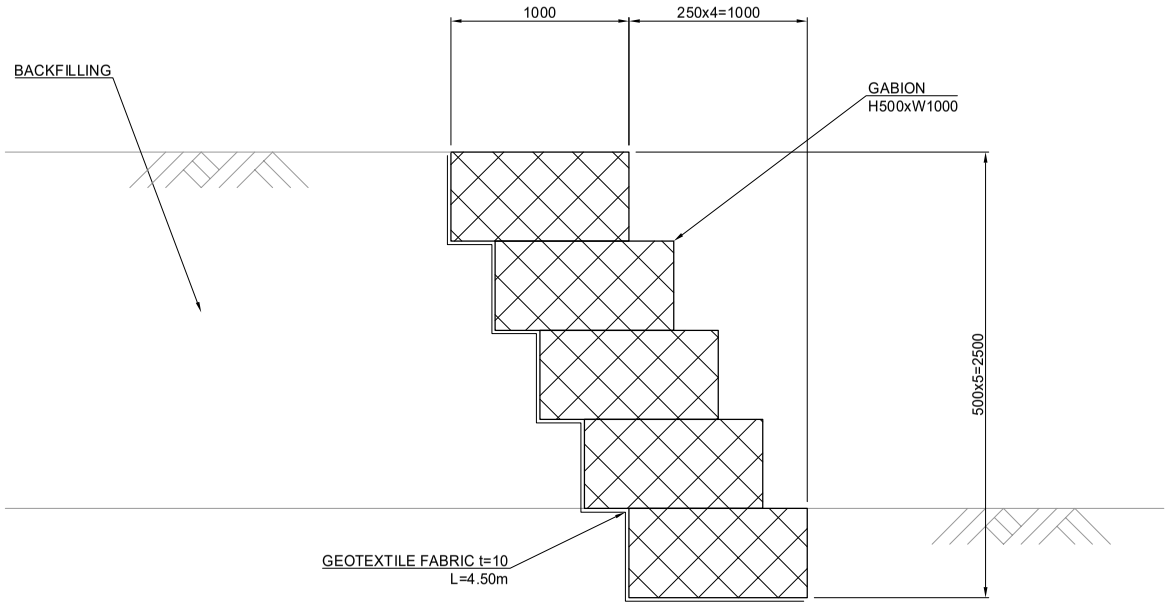
SCALE B



The wet stone masonry shall include the installation of one partition every 50 meters and one expansion joint every 10 meters.

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**STRUCTURAL DRAWING OF THE REVETMENT (SIKANDARPUR AREA)**	RIV-AK-GV-002

資料 6-50



STRUCTURAL DRAWING OF GABION RETAINING WALL

SCALE A

SCALE A 0 0.60 1.20 1.80 2.40m

PROJECT NAME:	CONSULTANTS:	DRAWING TITLE:	DRAWING NO.
PREPARATORY SURVEY FOR THE PROJECT FOR FLOOD MANAGEMENT ENHANCEMENT IN THE INDUS BASIN	CTI Engineering International Co., Ltd. International Meteorological Consultant Inc.	**STRUCTURAL DRAWING OF GABION RETAINING WALL (SIKANDARPUR AREA)**	RIV-AK-GV-005