

Appendix 1

Member List of the Study Team

Appendix1 Member List of the Study Team

First Field Survey

No.	Title	Name	Organization
1	Team Leader	Yoichi INOUE	Acting Director, Disaster Risk Reduction Team 1, Disaster Risk Reduction Group, Global Environment Department, JICA
2	Project Planning	Satoshi KAWAMORITA	Disaster Risk Reduction Team 1, Disaster Risk Reduction Group, Global Environment Department, JICA
3	Operations Chief / Flood Forecasting and Warning / Operation and Maintenance	Yasushi AZUMA	NIPPON KOEI CO., LTD.
4	Vice Operations Chief / Hydrology / Natural Condition Survey	Shiro HISHINUMA	NIPPON KOEI CO., LTD.
5	Hydrological Observation Equipment / Radar Equipment Plan	Yoshiyuki SHINJI	NIPPON KOEI CO., LTD.
6	Communication Equipment Plan	Toshihiro KATSUMATA	NIPPON KOEI CO., LTD.
7	Civil Design / Construction Plan / Quantity Survey (Civil Works)	Narihiro MORISAKI	NIPPON KOEI CO., LTD.

Second Field Survey

No.	Title	Name	Organization
1	Operations Chief / Flood Forecasting and Warning / Operation and Maintenance	Yasushi AZUMA	NIPPON KOEI CO., LTD.
2	Vice Operations Chief / Hydrology / Natural Condition Survey	Shiro HISHINUMA	NIPPON KOEI CO., LTD.
3	Hydrological Observation Equipment / Radar Equipment Plan	Yoshiyuki SHINJI	NIPPON KOEI CO., LTD.
4	Communication Equipment Plan	Toshihiro KATSUMATA	NIPPON KOEI CO., LTD.
5	Civil Design / Construction Plan / Quantity Survey (Civil Works)	Narihiro MORISAKI	NIPPON KOEI CO., LTD.
6	Procurement Plan / Equipment Plan / Quantity Survey	Takao TSUCHIYA	NIPPON KOEI CO., LTD.

Third Field Survey

No.	Title	Name	Organization
1	Team Leader	Masahiro UEKI	Director, Disaster Risk Reduction Team 1, Disaster Risk Reduction Group, Global Environment Department, JICA
2	Project Planning	Satoshi KAWAMORITA	Disaster Risk Reduction Team 1, Disaster Risk Reduction Group, Global Environment Department, JICA
3	Operations Chief / Flood Forecasting and Warning / Operation and Maintenance	Yasushi AZUMA	NIPPON KOEI CO., LTD.
4	Vice Operations Chief / Hydrology / Natural Condition Survey	Shiro HISHINUMA	NIPPON KOEI CO., LTD.
5	Hydrological Observation Equipment / Radar Equipment Plan	Yoshiyuki SHINJI	NIPPON KOEI CO., LTD.

Appendix 2

Study Schedule

Appendix2 Study Schedule

First Field Survey

Day (2017)	JICA			Consultant			
	Inoue	Kawamorita	Azuma	Hishinuma	Shinji	Katsumata	Morisaki
13 Mon	Arrival at Manila						
14 Tue	Courtesy call to PAGASA Administration						
15 Wed	DAM: Discussion w/ PAGASA HMD						
16 Thu	Meeting w/ PAGASA PRSD, Meeting w/ CDO CDRRMO						
17 Fri	Site Survey						
18 Sat	Site Survey						
19 Sun	Departure from CDO						
20 Mon	Discussion with PAGASA for M/D			Arrival at Manila			
21 Tue	Signing with PAGASA for M/D, Departure from Manila			Preparation Works	Meeting with JICA (Security Briefing)		
22 Wed			Preparation Works	Meeting with PAGASA@Quezon			
23 Thu			Arrival at CDO				
24 Fri			Meeting with CDORMMD and PAGASA@PRSD				Arrival at Manila
25 Sat			Preparation Works				Arrival at CDO
26 Sun			Preparation Works				
27 Mon			Site Survey for WL and Rain Gauge Stations	Site Survey (Macayapa)		Site Survey for WL and Rain Gauge Stations	
28 Tue			Site Survey for WL and Rain Gauge Stations	Site Survey (Libona Site16)		Site Survey for WL and Rain Gauge Stations	
29 Wed			Meeting at DPWH-X, Site Visit for WL and Rain Gauge Stations	Preparation of Mirror Test@PRSD		Meeting at DPWH-X, Site Visit for WL and Rain Gauge Stations	
30 Thu			Site Survey for WL and Rain Gauge Stations	Site Survey (Talakag)		Site Survey for WL and Rain Gauge Stations	
31 Fri			Site Survey for WL and Rain Gauge Stations	Mirror Test (Macapaya - MPRSD)		Site Survey for WL and Rain Gauge Stations	
1 Sat			Site Survey for WL and Rain Gauge Stations	Mirror Test (Site16 - MPRSD)		Site Survey for WL and Rain Gauge Stations	
2 Sun			Documentation				
3 Mon			Site Survey for WL and Rain Gauge Stations	Mirror Test (Site16 - Dagumbaan)		Site Survey for WL and Rain Gauge Stations	
4 Tue			Site Survey for WL and Rain Gauge Stations	Mirror Test (Bon2 - Macapaya)		Site Survey for WL and Rain Gauge Stations	
5 Wed			Pre-bid meeting at MPRSD	Mirror Test (Bon2 - Macapaya)		Pre-bid meeting at MPRSD	
6 Thu			Documentation	Site Survey with candidate sub-contractors	Radar Site Survey (Macapaya, Poblacion)		Site Survey with candidate sub-contractors
7 Fri			Documentation	Site Survey with candidate sub-contractors	Radar Site Survey (Dagumbaan, Poblacion)		Site Survey with candidate sub-contractors
8 Sat			Site survey	Documentation			
9 Sun			Documentation				
10 Mon			Meeting with NIA-X and DPWH-X		Preparation of VHF Propagation Test@PRSD		Meeting at NIA-X, Meeting at DPWH-X
11 Tue			Meeting at CDO-CDRRMD, Site Survey for WL and Rain Gauge Stations		VHF Propagation Test (Borja, Pealez)		Meeting at CDO-CDRRMD, Site Survey for WL and Rain Gauge Stations
12 Wed			Departure from CDO	Meeting at MPRSD, Meeting at DPWH-X	VHF Propagation Test (Borja, Cabula)		Meeting at MPRSD, Meeting at DPWH-X
13 Thu			Departure from Manila	Documentation	VHF Propagation Test (Mumbuyan)		Documentation
14 Fri				Documentation, Meeting with MPRSD	VHF Propagation Test (Uguabán, Pealez)		Departure from CDO
15 Sat				Site Survey with candidate sub-contractors	Documentation		Departure from Manila
16 Sun			Documentation				
17 Mon				Pre-award meeting, contract sign	VHF Propagation Test (Bubunawan, Liboran)		
18 Tue				Documentation	VHF Propagation Test (Nangka, Imbatug)		
19 Wed				Site Survey for WL and Rain Gauge Stations	VHF Propagation Test (Bureau Fire, Taluban)		
20 Thu				Site Survey for WL and Rain Gauge Stations, Meeting at DENR-X Centro Talakag Office	VHF Propagation Test (Taluban, Tikalan)		
21 Fri				Meeting at MPRSD	VHF Propagation Test (Masimag, Mirayon)		
22 Sat			Documentation				
23 Sun				Meeting with sub-contractors	Documentation		
24 Mon			Reporting to PAGASA@PRSD				
25 Tue			Departure from CDO				
26 Wed			Reporting to JICA Philippines, Pagasa@Quezon				
27 Thu			Departure from Manila				

Second Field Survey

Day (2017)	Consultant						
	Azuma	Hishinuma	Shinji	Katsumata	Morisaki	Tsuchiya	
May	10 Wed	Arrival at Manila				Arrival at Manila	
	11 Thu	Meeting with JICA (Security Briefing)	Meeting with PAGASA			AM:JICA briefing PM:Meeting with PAGASA HMD	
	12 Fri	Meeting with PAGASA HMD	Arrival at CDO			Research in prices of construction company	
	13 Sat	Documentation	Meeting with PAGASA@PRSD			Documentation	
	14 Sun	Documentation					
	15 Mon	Meeting with PAGASA HMD	Supervision of sub-contract works	Site Visit to pick up power logger @Dagumbaan Meeting with Talakag DRRMO		Arrival at Manila AM:Research in prices of construction company PM:Meeting with PAGASA HMD	
	16 Tue	Arrival at CDO	Supervision of sub-contract works	Meeting with DICT, PLDT, CDO Airport manager		Arrival at CDO Arrival at CDO	
	17 Wed	Site survey at proposed radar sites	Meeting at DENR-X, Meeting at NIA-X	AM:Meeting with BUSECO PM:Meeting with CDRRMO		Site survey at proposed radar sites AM:Meeting with BUSECO PM:Meeting with CDRRMO	
	18 Thu	Documentation	Site Survey of T win Phoenix and NDMI sites			Documentation Site Survey of T win Phoenix and NDMI sites	
	19 Fri	Stakeholders Meeting					
	20 Sat	Meeting with MPRSD	Supervision of sub-contract works	Documentation			
	21 Sun	Documentation					
	22 Mon	Documentation		AM:Site survey(Existing Stations) PM:Meeting with PLDT		Documentation AM:Site survey(Existing Stations) PM:Meeting with PLDT	
	23 Tue	Meeting with NEDA	Supervision of sub-contract works, Meeting at NEDA-X	AM:Meeting with MPRSD PM:Meeting with CDRRMO		Meeting with NEDA AM:Meeting with PRSD PM:Meeting with CDRRMO	
	24 Wed	Documentation			Departure from CDO	Documentation	
	25 Thu	Documentation			Departure from Manila	Documentation	
	26 Fri	Meeting with MPRSD	Documentation			Meeting with MPRSD Documentation	
	27 Sat	Documentation					
	28 Sun	Documentation					
	29 Mon	Site survey	Meeting at CDO-CDRRMD	Departure from CDO		Site survey Departure from CDO	
	30 Tue	Documentation	Supervision of sub-contract works	Departure from Manila		Documentation Meeting with PAGASA HMD	
	31 Wed	Documentation and Meeting with MPRSD	Meeting at NIA-X			Documentation and Meeting with MPRSD Research in prices from construction company	
	Jun	1 Thu	Meeting with CDO-CDRRMD			Meeting with CDO-CDRRMD	Research in operation & maintenance of PAGASA HMD
		2 Fri	Meeting with DPWH	Supervision of sub-contract works			Meeting with DPWH Research in operation & maintenance of PAGASA HMD
		3 Sat	Departure from CDO			Departure from CDO	Documentation
		4 Sun	Documentation			Departure from Manila	Documentation
		5 Mon	Documentation				Departure from Manila Research in prices from construction company
		6 Tue	Documentation				Research in operation & maintenance of PAGASA HMD
		7 Wed	Meeting with PAGASA HMD and JICA Philippine office				Research in prices from construction company
		8 Thu	Departure from Manila				

Second Field Survey (additional 1)

Day (2017)	Consultant	
	Azuma	Morisaki
Oct	9 Mon	Arrival at Manila
	10 Tue	AM:Meeting with JICA (Security Briefing), PM:Arrival at CDO
	11 Wed	Meeting with CDO-CDRRMD and City Engineer's Office
	12 Thu	Joint Inspection with City Engineer's Office at Pelaez
	13 Fri	Meeting with City Engineer's Office
	14 Sat	Meeting with MPRSD
	15 Sun	Documentation
	16 Mon	Presentation for DPWH-X
	17 Tue	Documentation
	18 Wed	Meeting with DPWH
	19 Thu	Meeting with City Engineer's Office
	20 Fri	Presentation for NIA-X
	21 Sat	Meeting with MPRSD
	22 Sun	Documentation
	23 Mon	Visiting to NCIP-X
	24 Tue	Meeting with MPRSD
	25 Wed	Departure from CDO
	26 Thu	Meeting with PAGASA HMD and JICA Philippine office
	27 Fri	Meeting with JICA Philippine office
	28 Sat	Departure from Manila

Second Field Survey (additional 2)

Day (2018)		Consultant
		Azuma
Jan	18 Thu	AM:Arrival at Manila, PM:meeting with PAGASA
	19 Fri	AM:Meeting with JICA (Security Briefing) , PM:Arrival at CDO
	20 Sat	Meeting with MPRSD
	21 Sun	Documentation
	22 Mon	Meeting with DPWH and MPRSD
	23 Tue	AM:Departure from CDO, PM:Meeting with PAGASA/JICA Philippine office
	24 Wed	Departure from Manila

Third Field Survey

Day (2018)		JICA		Consultant		
		Ueki	Kawamorita	Azuma	Hishinuma	Shinji
Feb	18 Sun			Arrival at Manila		
	19 Mon	Arrival at Manila		Documentation	Arrival at Manila	
	20 Tue	Meeting on Draft Outline Design at PAGASA HQ				
	21 Wed	Meeting on Draft Outline Design at PAGASA HQ				
	22 Thu	Meeting on Draft Outline Design at PAGASA HQ, Signing for Minutes of Discussions				
	23 Fri	Departure from Manila		Documentation		
	24 Sat			Departure from Manila		

Appendix 3

List of Parties Concerned in the Recipient Country

Appendix3 List of Parties Concerned in the Recipient Country

Philippine Atmospheric, Geophysical and Astronomical Administration (PAGASA)	
Dr. Vicente B. Malano	Administrator
Dr. Landrico U. Dalida Jr.	Deputy Administrator for Operations and Services
Engr. Roy A. Badilla	Officer in Charge, Hydrometeorology Division
Ms. Oyie Pagulayan	Weather Specialist II, HMD
Mr. Socrates F. Paat, Jr.	Weather Specialist II, HMD
Engr. Berlin Mercado	Officer in Charge, HMTS
Mr. Anthony Joseph R. Lucero, M.Sc.	Former Officer in Charge, Mindanao PRSD
Ms. Anianita R. Fortich	Officer in Charge, Mindanao PRSD
Mr. Victor B. Flores Jr.	Weather Specialist I, Mindanao PRSD
Mr. Jose P. Frivaldo, Jr.	Weather Specialist I, Mindanao PRSD
Ms. Hannah Lorraine R. Salvador	Weather Specialist I, Mindanao PRSD
Cagayan de Oro City Disaster Risk Reduction and Management Department (CDO-CDRRMD)	
Mr. Allan A. Rorcadilla	Officer in Charge
Mr. Mario Verner S. Monsanto	Overseer
Ms. Cindy S. Sabanal	Unit Chief
Baungon Municipal Disaster Risk Reduction and Management Department (Baungon-MDRRMD)	
Ms. Nenita Navarez	Officer in Charge
Mr. George Magana	Staff
Talakag Municipal Disaster Risk Reduction and Management Department (Talakag-MDRRMD)	
Mr. Rey Dan Gayao	Officer in Charge
Libona Municipal Disaster Risk Reduction and Management Department (Libona-MDRRMD)	
Ms. Luz Eduria	Officer in Charge
Department of Public Works and Highways (DPWH), Region X	
Engr. Arthur M. Cupay	Head of Planning & Design Division
Engr. Andy Sosa	Project Management Office
Engr. Aldrin S. Albano	Engineer II
Engr. Saivan R. Valendez	Engineer II
National Irrigation Administration (NIA), Region X	
Mr. Jimmy L. Apostol	Regional Director
Mr. Remeglo B. Ang	Head of Engineering Section
National Economic Development Authority (NEDA), Region X	
Engr. Leon M. Dacanay, Jr., CESO III	Regional Director
Engr. Jaime H. Pacampara	Engineer
Department of Environment and Natural Resources (DENR), Region Office X	
Ms. Agnes A. Dejoras	Head of Surveys and Mapping Division
Mr. Leonard R. Buted	Officer in Charge, CENRO Talakag Office
Office of Civil Defence (OCD), Region X	
Ms. Josephine M. Lumacang	Officer
Department of Information and Communications Technology (DICT), Field Operation Office- Region X	
Engr. Philip Vicerra	Officer in Charge, Network Operations Center
Cagayan de Oro City Engineer's Office	
Mr. Lailane P. Dolores	Engineer
Civil Aviation Authority of the Philippines (CAAP), Area Office, Laguindingan Airport	
Engr. Jose G. Budiongan	Engineer
Bukidnon Second Electric Cooperative, Inc. (BUSECO)	
Mr. Mike Fallarcuna	Planning Section
Mr. Rey-ann a. Baul	Officer in Charge, Eng. and Tech. Services Department

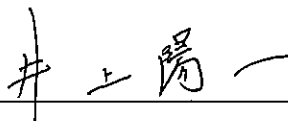
Appendix 4

Minutes of Discussion

Minutes of Discussions
on the Preparatory Survey for the Project for
Improvement of Flood Forecasting and Warning System for Cagayan de Oro River
Basin

In response to the request from the Government of the Republic of the Philippines (hereinafter referred to as “GoP”) through Philippine Atmospheric Geophysical and Astronomical Services Administration (hereinafter referred to as “PAGASA”), 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 Improvement of Flood Forecasting and Warning System for Cagayan de Oro River Baimsin (hereinafter referred to as “the Project”) to the Republic of the Philippines (hereinafter referred to as “the Philippines”), headed by Mr. Yoichi Inoue, Acting Director of Disaster Risk Reduction Team 1, Global Environment Department, from 13th March to , 28th April 2017. The Team held a series of discussions with the officials of the GoP and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Quezon City, 21st March 2017



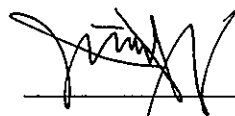
Yoichi Inoue

Leader

Preparatory Survey Team

Japan International Cooperation Agency(JICA)

Japan



VICENTE B. MALANO, PhD MNSA

Administrator

Philippine Atmospheric, Geophysical, and

Astronomical Services (PAGASA)

The Republic of the Philippines

ATTACHMENT

1. Objective of the Project

The objective of the Project is to mitigate damages by flood in Cagayan de Oro River Basin through improvement of Flood Forecasting Warning System (FFWS) in the River Basin, thereby contributing to sustainable development in the Region.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Improvement of Flood Forecasting and Warning System for Cagayan de Oro River Basin”, which was changed from the original title “the Preparatory Survey for the Project for Developing Flood Forecasting and Warning System for Cagayan de Oro River Basin”.

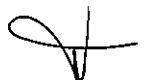
3. Project site

Both sides confirmed that the site of the Project is in Cagayan de Oro River Basin, which is shown in Annex 1.

4. Responsible authority for the Project

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

- 4-1. The PAGASA will be the executing agency for the Project (hereinafter referred to as “the Executing Agency”). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation 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 Executing Agency is the Department of Science and Technology (hereinafter referred to as “DOST”).



5. Items requested by the Government of the Philippines

The Philippines side requested items as follows.

Table 1: Items requested by GoP

	Component	Items	Quantity
1	Establishment of Hydro-meteorological observation stations	(1) Pure rain gauges	7 sites
		(2) water level sensors combined with rain gauges	6 sites
2	Establishment of X-band radars	(3) X-band radar/s	1-2 sets
3	Establishment of telecommunication network	(4) Dedicated radio communication network from Hydro-meteorological stations to Cagayan de Oro River Basin Flood Forecasting and Warning Center (hereinafter referred to as "CDO-RBFFWC")	1 set
		(5) Dedicated radio communication network from CDO-RBFFWC to Cagayan de Oro City Disaster Risk Reduction and Management Office (hereinafter referred to as "CDO-CDRRMO")	1 set
		(6) Repeater Station	1 set
4	Establishment of visualization system to display the monitored/observed data	(7) Display at the CDO-RBFFWC	1 set
		(8) Launch of web-based data monitoring of water level and rainfall intensity for Local Government Unit and other related agencies	1 set
5	Soft Component	(9) Training on Operation and Maintenance of the FFWS	1 set
		(10) Training on information dissemination of flood warnings	1 set
		(11) Training on the Operation and Maintenance of the Monitoring Equipment	1 set

Items and quantity are subject to change through the Survey.

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 (hereinafter referred to as “GoJ”). The final scope of the Project will be decided by the GoJ.

6. Procedures and Basic Principles of Japanese Grant

6-1. The Philippine side agreed that the procedures and basic principles and basic principles of Japanese Grant as described in Annex 3 shall be applied to the Project. As for the monitoring of the implementation of the Project, JICA requires the Philippine side to submit the Project Monitoring Report, the form of which is attached as Annex 4.

6-2. The Philippine side agreed to take the necessary measures, as described in Annex 5, for smooth implementation of the Project. The contents of the Annex 5 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report. The contents of Annex 5 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

7. Schedule of the Survey

7-1. The Team will proceed with further survey in the Philippines until 28th April 2017.

7-2. JICA will dispatch the 2nd Preparatory Survey mission in the beginning of May 2017.

7-3. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to the Philippines in order to explain its contents around the beginning of September 2017.

7-4. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by the Philippines side, JICA will finalize the Preparatory Survey Report and send it to the Philippines around late September.

7-5. The above schedule is tentative and subject to change.

8. Environmental and Social Considerations

8-1. The Philippines side confirmed to give due environmental and social considerations before and during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).



8-2. The Project is categorized as “C” from the following considerations:

Not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

8-3. The Philippines side explained that Environmental Compliance Certificate (hereinafter referred to as “ECC”) is required for this project. Both sides confirmed that the Philippines side will obtain ECC based on the information given by the Team by the end of October 2017.

9. Other Relevant Issues

9-1. Ownership and Responsibility, Operation and Maintenance

Both sides confirmed that PAGASA will take ownership and responsibility of the equipment to be procured in the Project. The Japanese side explained that necessary budget and number of staff for operation and maintenance of the Project after the completion of the Project will be estimated through the Survey. The Philippines side promised to allocate necessary budget and staff for proper and effective operation and maintenance of the equipment.

9-2. Purpose of missions

The Japanese side explained the purpose of missions as follows;

(1) The 1st Preparatory Survey Mission

To collect data and hold meetings with relevant organizations for outline design, to confirm necessary number and candidate locations of hydro-meteorological observation stations and to implement radio wave propagation test for the X-band radar stations, hydro-meteorological observation stations and repeater station.

(2) The 2nd Preparatory Survey Mission

To implement the topographical survey and the geotechnical survey and to explain and discuss on draft outline of the Project (items to be procured, locations of X band radar, repeater station and hydro-meteorological observation stations.)

(3) The Draft Report Explanation Mission

To explain on a draft Preparatory Survey Report including necessary budget and number of staff for operation and maintenance as well as undertakings by the Philippine side for implementation of the Project.



9-3. Data communication

Both sides confirmed that following data communication system will be applied for the Project.

Table 2: Data communication for FFWS in Cagayan de Oro River Basin

Section	Means of Data Communication	Obligation
Hydrological Observation Stations - CDO-RBFFWC	Dedicated radio communication network	The Japanese side
X-Band Radars – CDO-RBFFWC	Dedicated radio communication network or Dedicated internet communication network or Satellite communication network	The Japanese side
CDO-RBFFWC – CDRRMO	Dedicated radio communication network or Dedicated internet communication network	The Japanese side
CDO-RBFFWC – PAGASA Quezon City Central Office	Internet communication network or Satellite communication network	PAGASA/the Japanese side

9-4. Flood Forecast and Warning Protocol

Both sides confirmed that Mindanao PRSD/Cagayan de Oro River Basin Flood Forecasting and Warning Center will share warning and information with following agencies

- CDO-CDRRMO
- Office of Civil Defense (hereinafter referred as “OCD”) Cagayan de Oro Office
- Department of Public Works and Highways (here in after referred to as “DPWH”) Cagayan de Oro Office
- PAGASA Weather Division Quezon City Central Office

Both sides also confirmed that flood warning provided by PAGASA is disseminated to the local residents by CDO-CDRRMO and CDO-CDRRMO will utilize various means including existing dissemination systems of CDO-CDRRMO and Mindanao PAGASA Regional Service Division (hereinafter referred to as “PRSD”) for dissemination of flood forecast and warning developed by the Project.

9-5. Flood warning criteria based on water levels

For the purpose of capacity development of PAGASA Hydrometeorological Division (hereinafter referred to as “HMD”) and CDO-RBFFWC on integral data management and utilization for Flood Forecast and Warning System, JICA’s Technical cooperation project “Project for Strengthening Capacity of Integrated Data Management of Flood Forecasting and Warning (PAGASA-JFReeDAM)” has been implemented since July 2016. This PAGASA-JFReeDAM project will establish flood warning criteria based on water levels in Cagayan de Oro River basin in July 2017, and it will be applied to this flood warning system by the Project.

9-6. Necessary permissions for implementation of the Project

Both sides agreed to identify necessary permissions and its necessary application period for implementation of the Project during the 1st Preparatory Survey Mission and all permissions should be cleared before tender notice at latest.

Both sides also agreed that permissions for 1) use of the lands for installation of equipment, 2) allocation of radio frequencies for the dedicated radio communication and X-band radar have to be acquired by the end of August 2017 with evidential documents and it is the condition for dispatch of the Mission for Explanation of Draft Outline Design scheduled in the beginning of September 2017.

The both sides also agreed that PAGASA will coordinate with relevant authorities for radio transmission test scheduled in March 2017.

9-7. Hydro-meteorological observation stations

The both sides confirmed that locations of Hydrological observation stations will be decided according to following criteria;

- (1) Security, acquisition of and access to the Sites are secured
- (2) There will be no problems for radio transmission
- (3) Availability of land can be confirmed by the end of August 2017
- (4) Other technical conditions

The Team will further survey and have discussions with the Philippine side. The both sides also confirmed that number of hydrological stations is subject to change according to technical necessity and will be discussed as well as candidate locations during the 1st Preparatory Survey Mission period.

9-8. X-band radar/s stations

Likewise, the both sides confirmed that locations of X-band radar/s stations will be determined to comply with the following criteria;



- (1) Security, acquisition of and access to the Sites are secured (access by a car is preferable due to the expected operation and maintenance works)
- (2) Availability of commercial power (essential)
- (3) There will be no problems for radio transmission
- (4) Availability of land can be confirmed by the end of August 2017
- (5) Other technical conditions

Both sides agreed that rain gauges will be installed as long as they can be distributed to upstream area, however, if it is difficult to find the suitable sites in upstream area, the X-band radar/s will be installed in order to monitor precipitation in upstream area of Cagayan de Oro river basin, and precipitation data acquired by X-band radar/s will be incorporated with dataset for this FFWS. In such case, both sides confirmed that PAGASA will secure the permission to use land for the installation of X-band radar/s.

9-9. Construction schedule of CDO-RBFFWC

Both sides confirmed that construction works of CDO-RBFFWC will be completed by September 2018.

9-10. Exemption of Taxes and Duties

Both sides confirmed that in accordance with Japanese Grant aid scheme the Philippine side 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 borne by its designated authority without using the Grant; Such customs duties, internal taxes and other fiscal levies mentioned above include VAT, commercial tax, income tax and corporate tax of Japanese nationals, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract.

9-11. Confidentiality of the Project

The Team explained that 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 a confidential part which might affect bidding process such as cost estimation should be kept undisclosed until the bidding has completed.

9-12. Undertakings of the Philippine side for the Survey

As a response to the request by the Team, the Philippine side agreed to arrange counterpart personnel for the survey and to provide promptly necessary data and information relevant to the Project for the smooth implementation of the survey.



Annex 1 Project Site

Annex 2 Organization Chart

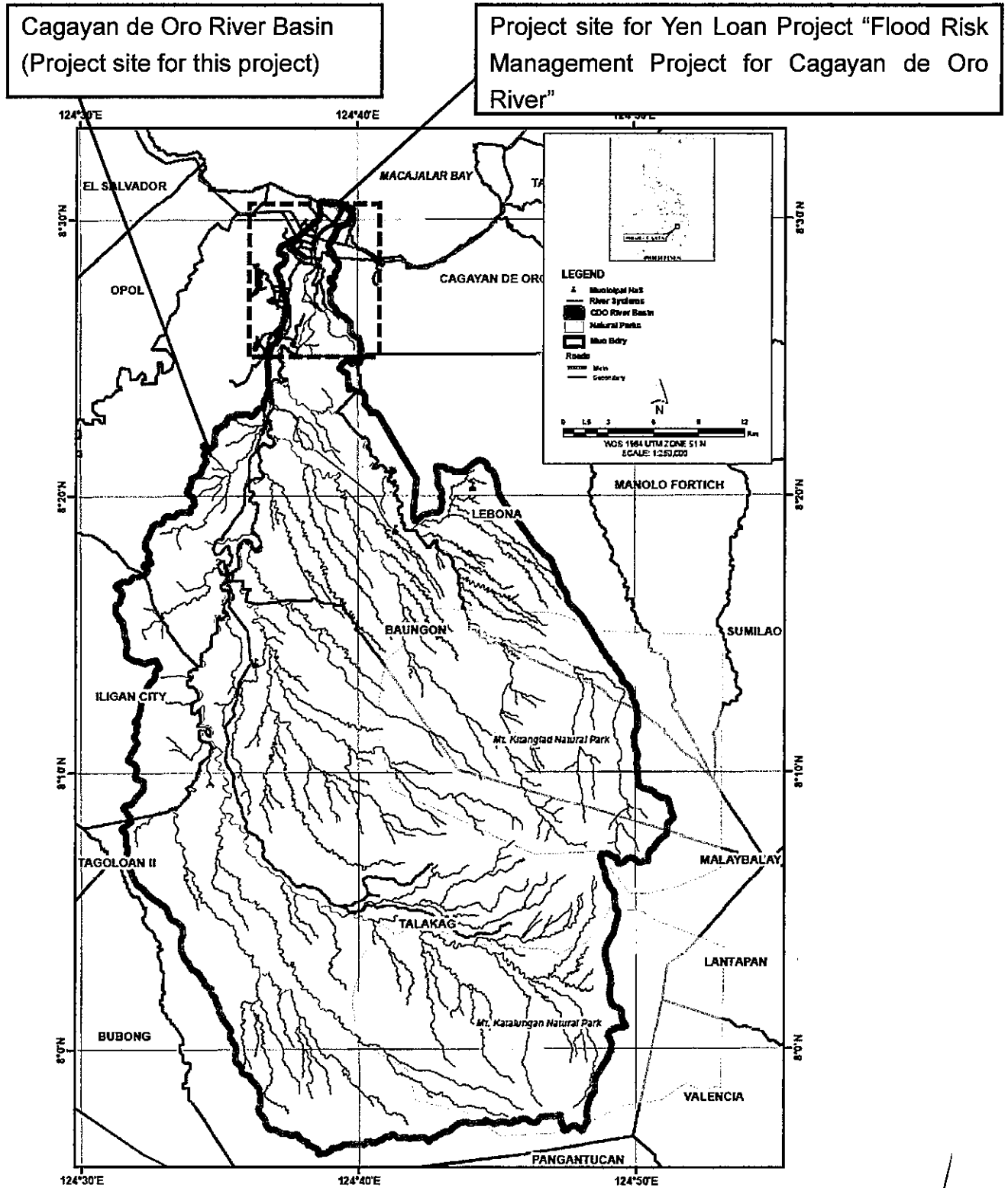
Annex 3 Japanese Grant

Annex 4 Project Monitoring Report (template)

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

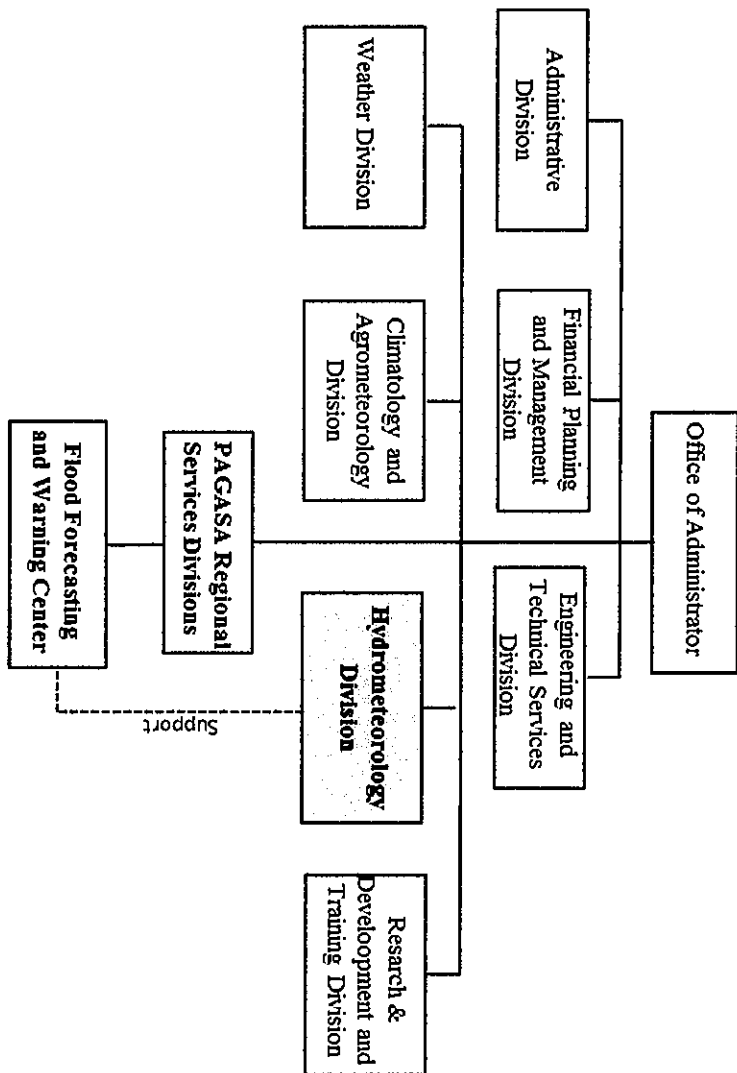


Project for Improvement of Flood Forecasting and Warning System for Cagayan de Oro River Basin
 River Basin Map



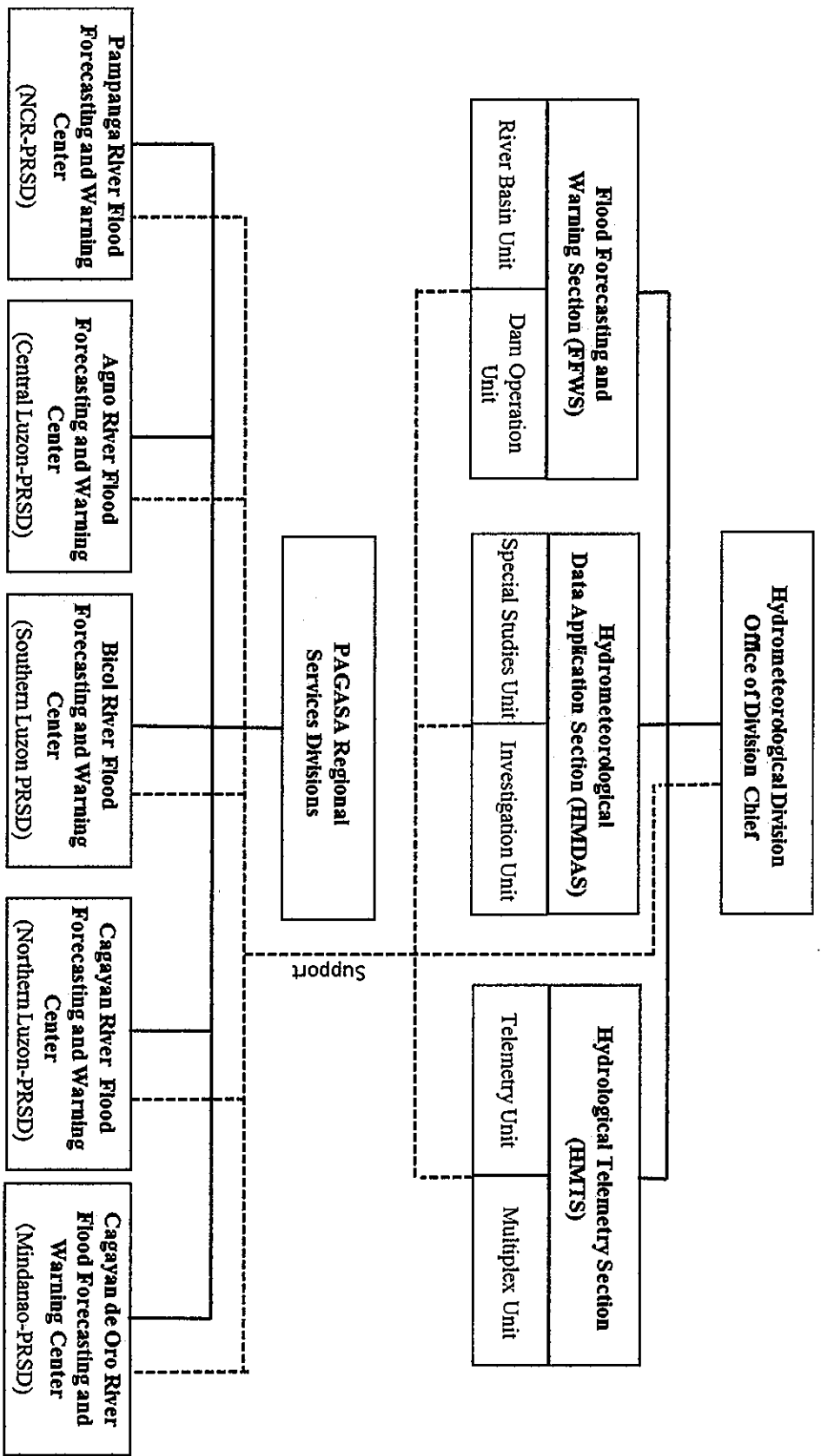
Organization chart

PAGASA Organization Chart



Annex 2

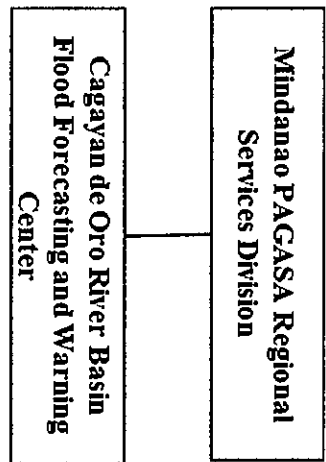
PAGASA HMD Organization Chart



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Mindanao PRSD and Cagayan de Oro River Basin Flood Forecasting and Warning System Organization Chart



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

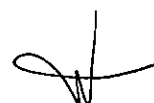
(4) Ex-post Monitoring and Evaluation

-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

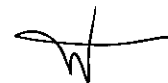
- 1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.
- 2) In principle, JICA will conduct ex-post evaluation of the Project after three years 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) 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.

4) Export and Re-export

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



PROCEDURES OF JAPANESE GRANT

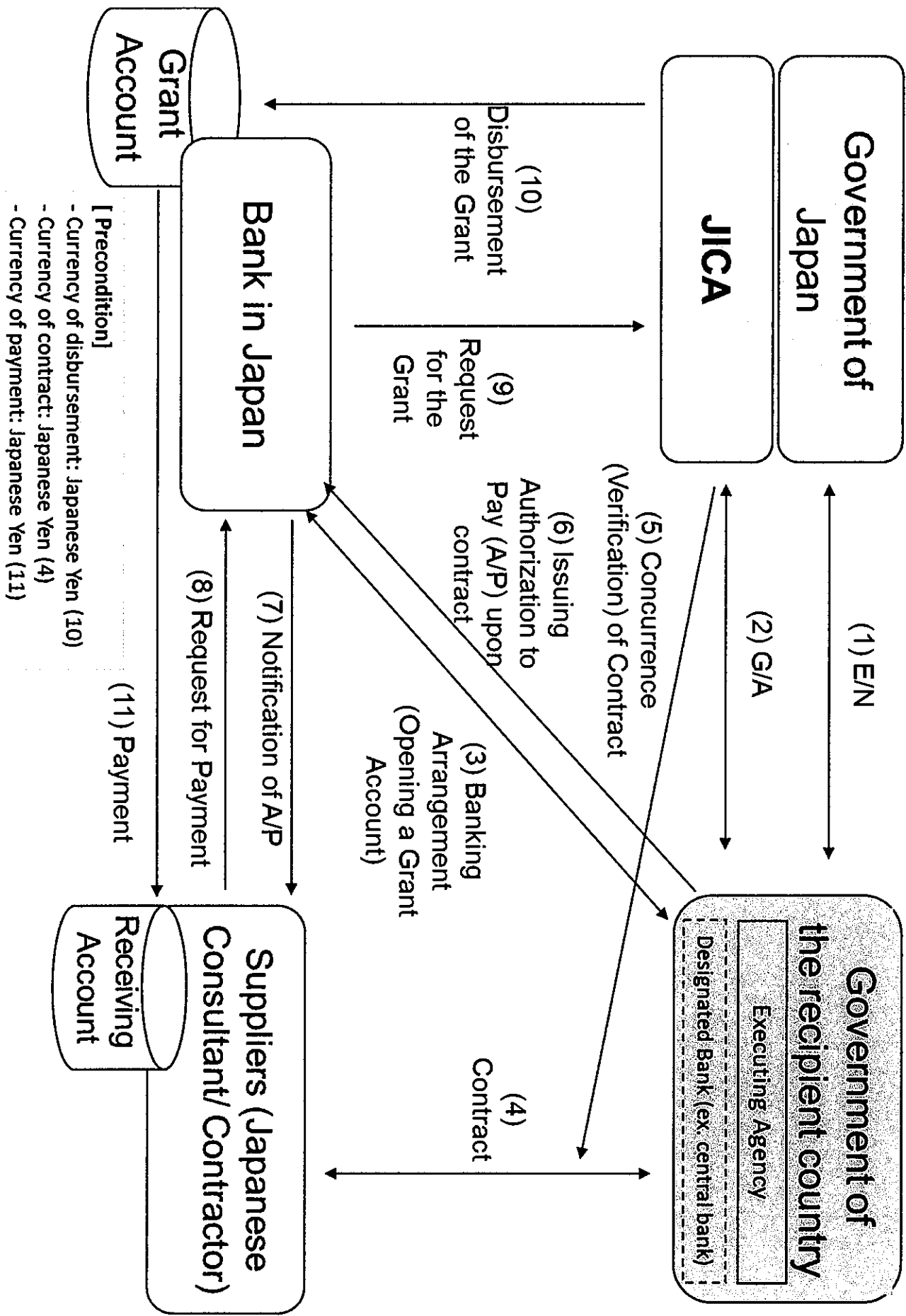
Stage	Procedures	Remarks	Tent	Gover	ese	Gover	JICA	Consu	Itants	Confr	actors	Agent	Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x		x								
1. Preparation	(1) Preparatory Survey												
	Preparation of outline design and cost estimate	—	x				x		x				
2. Appraisal	(2) Preparatory Survey												
	Explanation of draft outline design, including cost estimate, undertakings, etc.		x				x		x				
	(3) Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x		x		x		(E/N)	(G/A)			
	(4) Approval by the Japanese cabinet	—			x								
3. Implementation	(5) Exchange of Notes (E/N)		x		x								
	(6) Signing of Grant Agreement (G/A)		x				x						
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x										x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x						x				x
	(9) Detail design (D/D)	—	x						x				
	(10) Preparation of bidding documents	Concurrence by JICA is required	x						x				
	(11) Bidding	Concurrence by JICA is required	x				—		x	x			
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x								x		x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x						x		x		
	(14) Completion certificate	—	x						x		x		
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x				x						
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x				x						

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

Financial Flow of Japanese Grant (A/P Type)

Attachment 2 for Annex3



Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXXX
 20XX, Month

Organizational Information

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

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 (_____): _____

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 <i>(proposed in the outline design)</i>	Actual
1.		

2-2 Scope of the work

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).




(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

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 <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original ^{1),2)} <i>(proposed in the outline design)</i>	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 <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original ^{1),2)} <i>(proposed in the outline design)</i>	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:
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:
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.



Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
 - Consultant Member List
 - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/ Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
8. Pictures (by JPEG style by CD-R) (PMR (final) only)
9. Equipment List (PMR (final) only)
10. Drawing (PMR (final) only)
11. Report on RD (After project)



1. Initial Conditions (Confirmed)

Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
					Price (Decreased) E=C-D	Price (Increased) F=C+D
1 Item 1	●●t	●	●	●	●	●
2 Item 2	●●t	●	●	●		
3 Item 3						
4 Item 4						
5 Item 5						

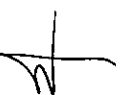
2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
1 Item 1	●	●	●			
2 Item 2						
3 Item 3						
4 Item 4						
5 Item 5						

(3) Summary of Discussion with Contractor (if necessary)



Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	



Major Undertakings to be taken by the Government of the Philippines

1. Specific obligations of the Government of Philippines which will not be funded with the Grant**(1) Before the Tender**

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To open bank account (B/A)	within 1 month after the signing of the G/A			
2	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract			
3	To secure and clear the following lands 1) Project sites for X-Band Radars (1-2 sites) 2) Project sites Repeater stations (1-2 sites) 3) project sites for Hydro-meteorological observation stations 4) Sufficient space for temporary facilities such as a constructor's office, workshop, building material storage, etc. needed for the work	before notice of the bidding document			
4	To obtain the planning, zoning, building permit	before notice of the bidding document			
5	To obtain necessary permission for the use of following radio frequencies 1) Dedicated Radio communication network 2) X band radar	before notice of the bidding document			



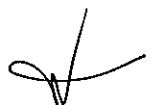

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)	within 1 month after the signing of the contract(s)			
2	To bear the following commissions to a bank in Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)			
	2) Payment commission for A/P	every payment			
3	To ensure prompt unloading and customs clearance at ports of disembarkation in recipient country and to assist the Supplier(s) with internal transportation therein	during the Project			
4	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project			
5	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 borne by its designated authority without using the Grant.	during the Project			
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the Project			
7	1) To submit Project Monitoring Report after each work under the contract(s) such as shipping, hand over, installation and operational training	within one month after completion of each work			
	2) To submit Project Monitoring Report (final)	within one month after signing of Certificate of Completion for the works under the contract(s)			
8	To submit a report concerning completion of the Project	within six months after completion of the Project			
9	To construct access roads	3 months before completion of the installation			
	1) Outside the site				
10	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)				
	1) Electricity The distributing line to the site	before start of the installation			
	2) Water Supply The city water distribution main to the site	6 months before completion of the installation			
	3) Drainage The city drainage main (for storm, sewer and others) to the site	6 months before completion of the installation			

	4) Furniture and Equipment General furniture	1 month before completion of the installation			
11	To take necessary measure for safety construction - traffic control - rope off	during the installation			
12	To provide necessary working spaces with Internet Connection for the implementation of the Project.				
13	To undertake incidental outdoor works such as a guard shed, gardening, fencing, gates, boundary walls and exterior lightings and to renovate the existing buildings and facilities in Observation Stations.	during the Project			
14	To ensure transport for the personnel and to shoulder the dispatching cost of the trainees to the training sites, such as daily allowance, accommodation, etc.	during the Project			
15	To obtain the required frequencies for radar systems.	before notice of the tender document			

(3) After the Project


NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To procure the required spare parts and consumables for the smooth operation and maintenance of the Equipment.	After completion of the installation			
2	To assign the required staff for the smooth operation and maintenance of the Equipment.	After completion of the installation			
3	To provide adequate maintenance of the observation stations and the Radar Tower Buildings constructed under the Project so that they may function long lasting and effectively.	After completion of the installation			
4	To effectively utilize the the Equipment procured/installed under the Project.	After completion of the installation			
5	To allocate the necessary budget for the smooth conduct of meteorological radar observation and forecasting works.	After completion of the installation			

2. Other obligations of the Government of the Philippines funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To install facility and provide equipment 1) To conduct the following transportation a) Marin (Air) transportation of the products from Japan to the recipient country b) Internal transportation from the port of disembarkation to the project site 2) To provide equipment with installation and commissioning		/
2	To implement detailed design, bidding support and procurement supervision (Consulting Service)		
	Total		XXX

* The Amount is provisional. This is subject to the approval of the Government of Japan.

Minutes of Discussions
on the Preparatory Survey for the Project for
Improvement of Flood Forecasting and Warning System for Cagayan de Oro River
Basin
(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between Philippine Atmospheric Geophysical and Astronomical Services Administration (hereinafter referred to as "PAGES") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 21st March 2017 and in response to the request from the Government of the Republic of the Philippines (hereinafter referred to as "GoP") dated 26th July 2017, 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 Improvement of Flood Forecasting and Warning System for Cagayan de Oro River Basin (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Quezon City, February 22nd 2018

榎 不雅浩

Mr. Masahiro Ueki

Leader

Preparatory Survey Team

Japan International Cooperation Agency

Japan



Vicente B. Malano, PhD MNSA

Administrator

Philippine Atmospheric, Geophysical and

Astronomical Services (PAGASA)

The Republic of the Philippines

ATTACHMENT

1. Contents of the Draft Report
After the explanation of the contents of the Draft Report by the Team, the GoP side agreed to its contents.
2. Project Site
Both sides confirmed that the site of the Project is in Cagayan de Oro River Basin, which is shown in Annex 1.
3. Cost estimate
Both sides confirmed that the cost estimate including the contingency described in the Draft Report is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.
4. Confidentiality of the cost estimate and technical specifications
Both sides confirmed that the cost estimate and technical specifications in the Draft Report should never be duplicated or disclosed to any third parties until all the contracts under the Project are concluded.
5. Timeline for the project implementation
The Team explained to the GoP side that the expected timeline for the project implementation is as attached in Annex 2.
6. Expected outcomes and indicators
Both sides agreed that key indicators for expected outcomes are as follows. The GoP side will be responsible for the achievement of agreed key indicators targeted in year 2023 and shall monitor the progress based on those indicators.

③



[Quantitative indicators]

Indicator		Baseline (2017)	Target (2023)
Hydrological observation density	Mesh size for rainfall observation (size of the catchment area / number of rain gauges, or spatial resolution of radar rain gauge) (km ²)	105 km ²	0.022 km ²
	The number of water level gauges	8	15
Missing hydrological data ratio (%)		84.2 %	within 5%

[Qualitative indicators]

- Lives of residents in the river basin will be saved by the appropriate flood forecasting and warning
- Sharing real time hydrological data observation both PAGASA and Cagayan de Oro City Disaster Risk Reduction and Management Office helps Efficient disaster response system
- Stable data transmission will be enhanced by dedicated communication network
- Flood forecasting particularly urban flooding by PAGASA will be improved by increasing the density of rainfall observations.

7. Technical assistance (“Soft Component” of the Project)

Considering the sustainable operation and maintenance of the products and services granted through the Project, following technical assistance is planned under the Project.

- Capacity development for operation and maintenance of flood forecasting and warning system by PAGASA
- Capacity development for flood forecasting with stage correlation method
- Capacity development for X-band radar data analysis technique
- Capacity development for communication with disaster information sharing system by PAGASA and other organizations engaged in disaster risk reduction

The GoP 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.

3) 

8. Undertakings of the Project-

Both sides confirmed the undertakings of the Project as described in Annex 3. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in 1. (2) 5 of Annex 3, both sides confirmed that such customs duties, internal taxes and other fiscal levies include VAT, commercial tax, income tax and corporate tax, which shall be clarified in the bid documents by PAGASA during the implementation stage of the Project.

The GoP 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 3 will be used as an attachment of Grant Agreement (hereinafter referred to as G/A).

9. Monitoring during the implementation

The Project will be monitored by PAGASA as the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 4. The timing of submission of the PMR is described in Annex 3.

10. Project completion

Both sides confirmed that the project completes when all the facilities constructed and equipment procured by the grant are in operation. The completion of the Project will be reported to JICA promptly, but in any event not later than six months after completion of the Project.

11. Ex-Post Evaluation

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

12. 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 described as follows.

(3)



12-1. Operation and Maintenance plan of the Project

The Team explained Operation and Maintenance plan of the Project as described in the Draft Report. The GoP side understood its necessity and agree to take necessary action to implement operation and maintenance plan. Both sides proposed two options. One is to assign personnel and acquire necessary spare parts. And the other is outsourcing maintenance of radar facilities. PAGASA will choose whichever cheaper one. Final estimation of Operation and Maintenance cost will be described in the final report.

The both side confirmed that soft component will support capacity development of the Philippine side in terms of Operation and Maintenance of the Project. Details of the soft component are also described in the Draft Report.

12-2. Necessity of maintenance

The Team explained that accuracy of observation data from data collection equipment could be guaranteed by proper operation and maintenance of data collection equipment by users. Both sides confirmed that following maintenance works are indispensable to keep good accuracy and performance of data collection equipment and the Flood Forecasting and Warning System:


- Annual calibration, regular inspections, and special inspections after flood events are required for rain gauges, water level gauges and X-Band radars
- Preservation of suitable environment (for example removing obstacles such as trees) around data collection equipment and direct communication network
- Continuation of the flood discharge observation
- Updating rating curves in river channels

12-3. Budget and staff allocation for the operation and maintenance of the Project

The GoP side explained that 2 hydrologists are already assigned in Cagayan de Oro River Flood Forecasting and Warning Center (CDO-RFFWC), and 1 Hydrologist and 1 telecommunication engineer will be assigned in addition once the PAGASA Modernization Act is approved.

The Team explained that at least two tele-communication engineers who will be engaged in Operation and Maintenance works for the telemetry are required as written in Draft Report apart from the existing staff in CDO-RFFWC.

As a conclusion of the discussion, the GoP side shall assign staff necessary for the operation and maintenance as follows regardless of approval of PAGASA

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Modernization Act.

(The number of personnel)

Year	Now	2018	2019	2020
Hydrologist	2	2	2	3
Telecom Engineer	0	1	2	2
Total	2	3	4	5

The Team explained that the budget for the operation and maintenance of the Project as written in Draft Report. The GoP side shall allocate the budget for the operation and maintenance.

12-4. Construction of CDO-RFFWC building

The Team explained that the construction of CDO-RFFWC should be completed before the installation of equipment for monitoring devices such as displays and telemetry receiving device due to following reasons..

- There is not enough space for monitoring devices in Mindanao PAGASA Regional Service Division (MPRSD) Office
- Future reinstallation is not easy, that may cause service disruption

The GoP side shall complete the construction of CDO-RFFWC by the end of September 2018 thus solving above-mentioned concerns.

12-5. Rehabilitation of existing flood forecasting and warning system

The Team explained that existing flood warning system shall be rehabilitated by PAGASA for following reasons.

- Providing flood warning system before the completion of the project
- Ensuring the redundancy of the flood forecasting and warning

GoP side agreed the necessity of rehabilitation of existing flood forecasting and warning system by the end of June 2018 and shall take necessary action.

12-6. Security

The team explained that JICA is strengthening safety measures after the Battle of Marawi and Martial law in Mindanao. PAGASA will cooperate with JICA for security information collection and necessary security measures for project. The team also explained that security escort(s) such as police and/or military is required in accordance with JICA security measure. The GoP side agreed to

provide security escort(s) as undertaking of Philippines side by collaborating with Philippines National Police and Armed Forces of the Philippines. PAGASA will assign at least 1 guard for 24 hours to each X-Band radar station. PAGASA will also coordinate with local government unit/police/military to ensure security of the X-Band radar sites.

13. Schedule of the Study

JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the GoP side around end of March 2018.

14. Environmental and Social Considerations

14-1. General Issues

14-1-1. Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as C in the Guidelines because the Project is likely to have minimal adverse impact on the environment under the Guidelines

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.

15-2. Water Supply to the X-Band radar stations

Both sides confirmed that collecting facility for rain water will be provided at the X-band radar stations. In addition, bottled water will be supplied by PAGASA for drinking. If there is possibility to take water from commercial water supply, PAGASA will install the water supply pipeline from the source to the sites.

15-3. Control room in CDO-RFFWC

Both sides confirmed that control room will be provided within the second floor of CDO-RFFWC.

15-4. Display system in HMD

Both sides agreed that information from Cagayan de Oro River Basin shall also be displayed in the same monitor of the Pampanga, Agno, Bicol and Cagayan (PABC) system with switching of video signal.

Annex 1 Project Site

Annex 2 Project Implementation Schedule

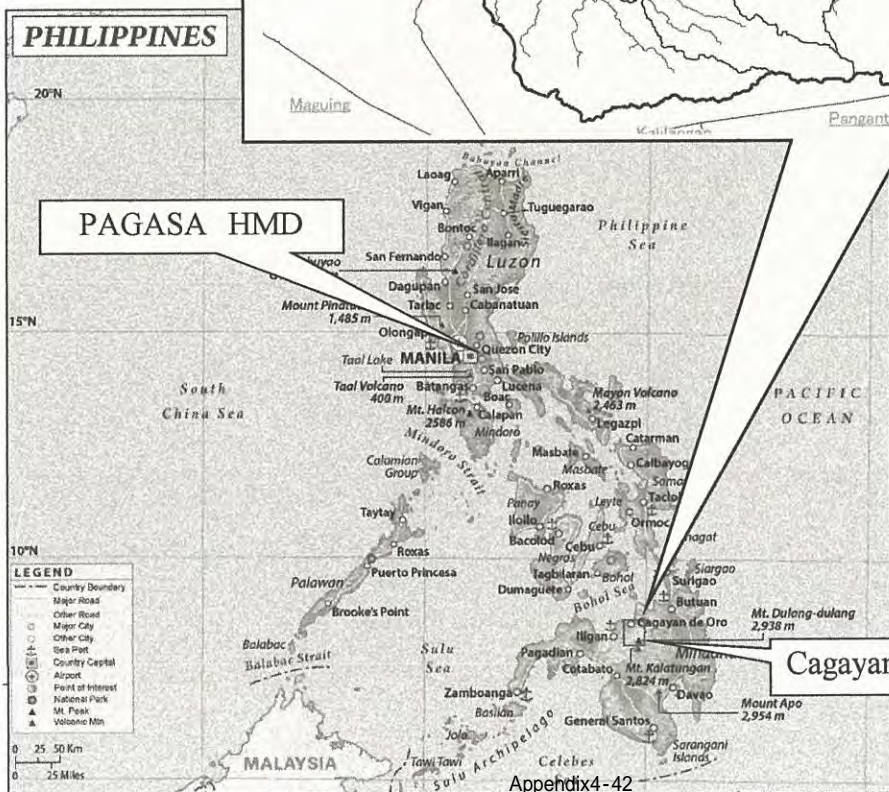
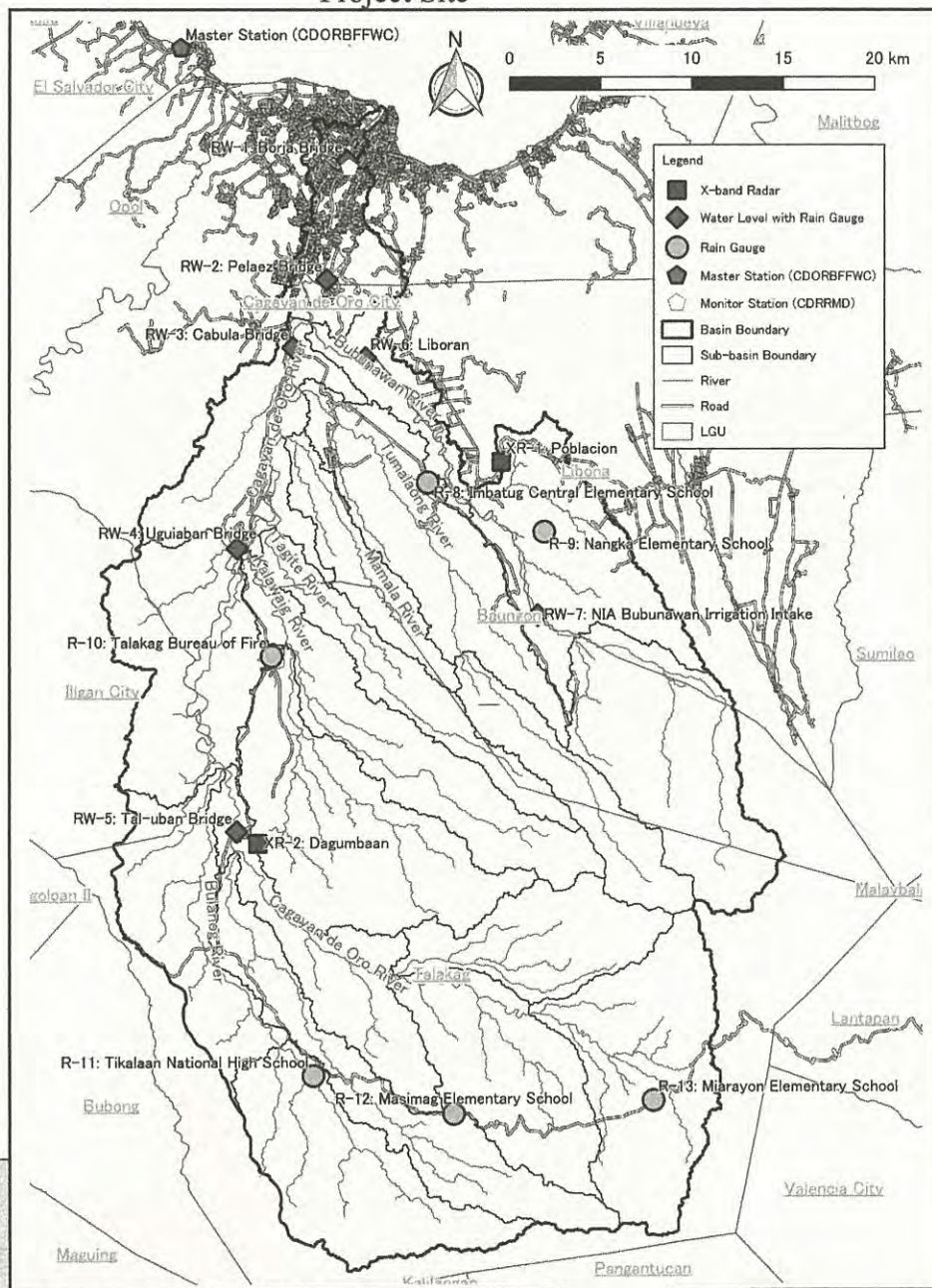
Annex 3 Major Undertakings to be taken by the Government of GoP

Annex 4 Project Monitoring Report (template)

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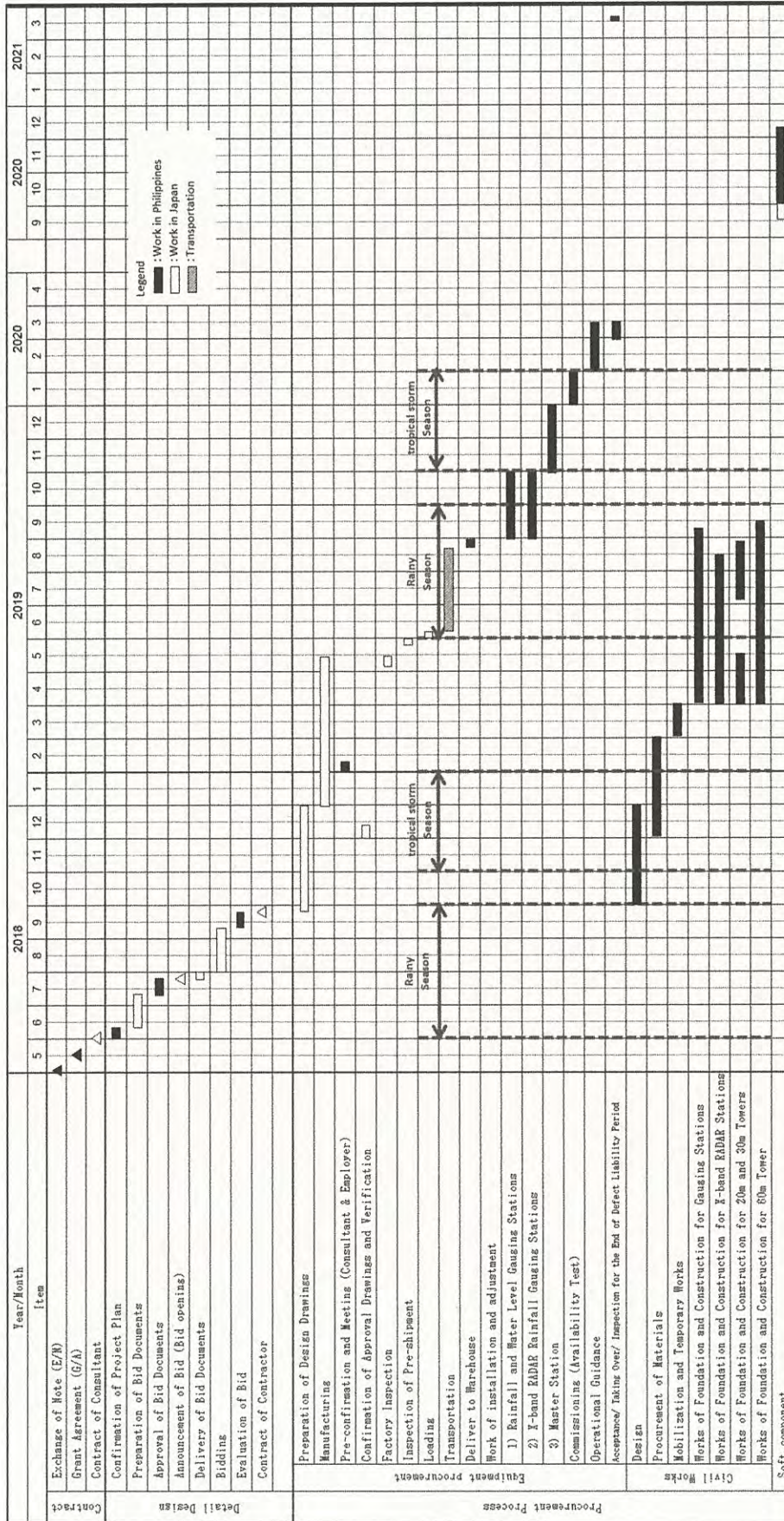


Project Site



3

Project Implementation Schedule



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Major Undertakings to be taken by the GoP

1. Specific obligations of the GoP which will not be funded with the Grant

(1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To open bank account (B/A)	within 1 month after the signing of the G/A	PAGASA in coordination with DOF		
2	To issue Authorization to Pay (A/P) to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract	PAGASA		
3	To secure and clear the following lands 1) Project sites for X-Band Radars/Repeater station (2 sites) 2) project sites for Hydro-meteorological observation stations (13 sites) 3) Sufficient space for temporary facilities such as a constructor's office, workshop, building material storage, etc. needed for the work	before notice of the bidding document	PAGASA	80,000 (PHP)	
4	To obtain necessary permission for the use of following radio frequencies 1) Dedicated Radio communication network X band radars	before notice of the bidding document	PAGASA		
5	2) To obtain necessary permission from National Commission for Indigenous People (NCIP)	before notice of the bidding document	PAGASA		
6	To obtain necessary height clearance from Civil Aviation Authority for following towers X-Band radars (2 sites) CDO-RFFWC	before notice of the bidding document	PAGASA		
7	To obtain agreement with DPWH for building structures in the river channel	before notice of the bidding document	PAGASA		
8	To obtain agreement with DepEd for land use	before notice of the bidding document	PAGASA		
9	To obtain agreement with NIA for land use	before notice of the bidding document	PAGASA		
10	To obtain Certificate of Non-Coverage from DENR	before notice of the bidding document	PAGASA		
11	To obtain installation Permission of X-band radar from DOH and FAD to show no negative impact to health	before the notice of the bidding document	PAGASA		
12	To assign at least one technical personnel in charge of repairing/maintenance of flood forecasting and warning system in Cagayan de Oro/Tagoloan river flood forecasting and warning center	by June 2018	PAGASA		

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(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)	within 1 month after the signing of the contract(s)	PAGASA		
2	To bear the following commissions to a bank in Japan for the banking services based upon the B/A		PAGASA	1,366,181 (PHP)	
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)			
	2) Payment commission for A/P	every payment			
3	To ensure acquisition of necessary customs clearance for the prompt unloading at ports of disembarkation in recipient country and to assist the Supplier(s) with internal transportation therein	during the Project	PAGASA		
4	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	PAGASA		
5	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 borne by its designated authority without using the Grant.	during the Project	PAGASA	20,303,284 (PHP)	
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project such as land acquisition.	during the Project	PAGASA		
7	1) To submit Project Monitoring Report (ANNEX 4) after each work under the contract(s) such as shipping, hand over, installation and operational training using Annex 4	within one month after completion of each work	PAGASA		
	2) To submit Project Monitoring Report (final)	within one month after signing of Certificate of Completion for the works under the contract(s)	PAGASA		
8	To submit a report concerning completion of the Project	within six months after completion of the Project	PAGASA		
9	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the site(s)	before start of the installation	PAGASA		
	1) Electricity The distributing line to the site	before the installation of radar equipment and communication facilities	PAGASA		
	2) Furniture and Equipment General furniture	1 month before completion of	PAGASA		

		the installation			
10	To subscribe IP-VPN	during and after the installation of the equipment	PAGASA		
11	To assist necessary measure for safety construction done by barangay police - traffic control - rope off	during the installation	PAGASA		
12	To arrange security escort(s) such as police and/or military according to JICA security measure	during the Project	PAGASA		
13	To cooperate security information collection with JICA	during the Project	PAGASA		
14	To provide necessary working spaces with Internet Connection for the implementation of the Project.	during the Project	PAGASA		
15	To ensure transport for the personnel and to shoulder the dispatching cost of the trainees to the training sites, such as daily allowance, accommodation, etc.	during the Project	PAGASA		
16	To complete construction of Cagayan de Oro/Tagoloan river flood forecasting and warning center	by September 2018	PAGASA	7,938,630.13 (PHP)	
17	To obtain the planning, zoning, building permit from LGUs	before the mobilization and temporary works	PAGASA		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To procure the required spare parts for the smooth operation and maintenance of the Equipment.	After the warranty period	PAGASA		
2	To procure the required consumables for the smooth operation and maintenance of the Equipment.	After completion of the installation	PAGASA		
3	To assign the required staff for the smooth operation and maintenance of the Equipment.	After completion of the installation	PAGASA		
4	To provide adequate maintenance of the observation stations and the Radar Tower Buildings constructed under the Project so that they may function long lasting and effectively.	After completion of the installation	PAGASA		
5	To effectively utilize the equipment procured/installed under the Project.	After completion of the installation	PAGASA		
6	To allocate the necessary budget for the smooth conduct of meteorological radar observation and forecasting works.	After completion of the installation	PAGASA		

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2. Other obligations of the Government of the Philippines funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To install facility and provide equipment 1) To conduct the following transportation a) Marine (Air) transportation of the products from Japan to the recipient country b) Internal transportation from the port of disembarkation to the project site	during the Project	/
	2) To provide equipment with installation and commissioning		
2	To implement detailed design, bidding support and procurement supervision (Consulting Service)		
3	Contingencies		
	Total		1,277

* The Amount is provisional. This is subject to the approval of the Government of Japan.

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OK

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXXX
20XX, Month

Organizational Information

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

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 (_____): _____

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1: Project Description

1-1 Project Objective

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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 <i>(proposed in the outline design)</i>	Actual
1.		

2-2 Scope of the work

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

3) 4

2-3 Implementation Schedule

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

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 <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original ^{1),2)} <i>(proposed in the outline design)</i>	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 <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original ^{1),2)} <i>(proposed in the outline design)</i>	Actual
1.				

③

- 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.

3



Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
 - Consultant Member List
 - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
8. Pictures (by JPEG style by CD-R) (PMR (final) only)
9. Equipment List (PMR (final) only)
10. Drawing (PMR (final) only)
11. Report on RD (After project)

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Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials		Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C-D	Price (Increased) F=C+D
1	Item 1	●●t	●	●		●	●
2	Item 2	●●t	●	●			
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials		1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
1	Item 1	●	●	●			
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

-
-
-

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

3

Appendix 5

Soft Component (Technical Assistance) Plan

**The Project for Improvement of Flood
Forecasting and Warning System for
Cagayan de Oro River Basin**

Republic of the Philippines

Soft Component Plan

1. Background

When Tropical Storm “Sendong” hit the Northern Mindanao area on December 16, 2011, the storm caused tremendous damages to 1,170 victims and caused about 1,250 deaths. After the flooding by “Sendong”, an ODA loan project was formed to reduce the flooding damage through JICA's Preparatory Survey in March 2014, "Flood Risk Management Project for the Cagayan de Oro River (FRIMP-CDOR)". The loan agreement has been concluded between the Japanese and the Philippine governments in March 2015 and the project is currently ongoing by the Philippine government.

The Cagayan de Oro River basin is selected for the pilot area in the JICA Technical Cooperation Project entitled the “Project for Strengthening Capacity of Integrated Data Management of Flood Forecasting and Warning in the Republic of Philippines”, which aims to improve flood forecasting and warning ability of PAGASA throughout the Philippines.

2. Objectives

Based on the background as mentioned above, the objectives of Soft Component Plan are determined as follows:

- Continuous and proper operation of the FFWS, which is constructed under the Grant Aid project, could be established by CDORFFWC and the concerned disaster risk reduction (DRR) organizations such as CDO-CDRRMD, OCD, and DPWH.
- Improvement and activation of dissemination information capability by DRR organizations.

3. Achievements

The following achievements of the Soft Component are expected:

- ① Improvement of the capabilities of operation and O&M works for PAGASA and related DRR organizations.
- ② Improvement of flood forecasting ability using the stage correlation method.
- ③ Acquirement of analysis technique for the data of X-band radar rain gauge.
- ④ Acquirement of evacuation information skill of PAGASA and the concerned DRR organizations.

Upon the conduct of the said achievements above, proper O&M of the hydrological stations and data monitoring stations (CDORFFWC and CDO-CDRRMD) can be undertaken. In addition, quick action and response can be performed by PAGASA and concerned DRR organizations due to real time data sharing at CDORFFWC and CDO-CDRRMD, which may contribute to the reduction of flood risk in the Cagayan de Oro River basin.

4. Confirmation Method of Achievement

Confirmation Method of Achievement of Soft Components are summarized as shown in Table 1 below.

Table 1 Method of Achievement of Soft Components

Achievement	Achievement	Confirmation Method
① Improvement of operation and maintenance skill of FFWS for Manager of PAGASA and Disaster Risk Reduction (DRR) Organization	The Participants will be able to; 1. Operate Flood Forecasting and Warning with well understanding of type, accuracy and correction timing of necessary information, 2. Carry out operation and maintenance of FFWS with technical and judgement skill, 3. Carry out validation of criterion for Flood forecasting and Flood evacuation criteria with understanding of setting method.	The Consultant confirms the skilled level of participants after this training by interviews and questioners.
② Improvement of flood forecasting ability using the stage correlation method	The Participants will be able to; 1. Arrange and analyze hydrological data which is measured by FFWS and past hydrological data with well understanding of flood runoff model, 2. Create and modify the stage correlation formula from measured flood data with well understanding the stage correlation method, 3. Operate FFWS installed the stage correlation formula with well understanding the process of flood forecasting using real time data.	
③ Acquirement of analysis technic for the data of X-band radar Rainfall Gauge	The Participants will be able to; 1. Calculate average rainfall over river basin for accurately alert criteria of flood forecast warning, 2. Process the data of X-band radar Rainfall Gauge.	
④ Acquirement of evacuation information skill of by PAGASA and Disaster Risk Reduction (DRR) Organizations	The Participants will be able to; 1. Carry out the hazard evacuation information system with understanding of provision method of necessary information, 2. Carry out the hazard evacuation information system with well understanding of contents and process of the system. 3. Plan and carry out on-the-job training	

Source: JICA Study Team

5. Activities

Activities of Soft Component are summarized as shown in Table 2 below.

Table 2 Activities of Soft Components

Achievement	Target Job Title	Current Skill Level and Required Skill Level	Output	Implementation Plan	Target resource and schedule
① Improvement of operation and maintenance skills of FFWS for the Manager of PAGASA and disaster risk reduction (DRR) organization	Administrative engineers who have O&M skills are set for FFWS	Inexperience in O&M of automated telemetry system and operation system. O&M skill of those system for continuous and autonomous operation	<ul style="list-style-type: none"> ● Training materials (O&M manual and hazard information system manual) ● Achievement level check sheet 	<p>The following trainings are provided using FFWS that is installed by this project:</p> <ul style="list-style-type: none"> ● Operation and maintenance of FFWS (2 days) ● Information management (3 days) ● Alarm establishing criteria (3 days) 	<p>Administrative engineer related FFWS</p> <p>Preparation in Japan: 8 days</p> <p>Training in Philippines: 8 days</p>
② Improvement of flood forecasting ability using the stage correlation method	Hydrological engineers who need basic knowledge of the stage correlation method	Although the basic knowledge of the stage correlation method is supposed to be acquired in the technology transfer project, application ability is required for actual flood forecasting	<ul style="list-style-type: none"> ● Training materials (basic FFWS process manual using the stage correlation method) ● Achievement level check sheet 	<p>The following trainings are provided using real data of FFWS that is installed by this project:</p> <ul style="list-style-type: none"> ● Hydrological data about flood runoff (3 days) ● Stage correlation method (5 days) ● Flood forecasting (5 days) ● Closing and evaluation (2 days) 	<p>Hydrological engineer</p> <p>Preparation in Japan: 8 days</p> <p>Training in Philippines: 15 days</p>
③ Acquisition of analysis technique for the data of X-band radar rain gauge	Engineers who need the skills of data processing and operation of X-band radar rain gauge	As FFWS combined with X-band radar is being experienced first in the Philippines, O&M skills of X-band radar is mandatory for continuous and autonomous operation	<ul style="list-style-type: none"> ● Training materials (X-band radar data analysis and process manual) ● Achievement level check sheet 	<p>The following trainings are provided using FFWS that is installed by this project:</p> <ul style="list-style-type: none"> ● Calculation of average rainfall over river basin (5 days) ● Measured hydrological data (method of basic processing, utilization of saved data, etc.) (5 days) ● Closing and evaluation (2 days) 	<p>X-band radar system engineer</p> <p>Preparation in Japan: 8 days</p> <p>Training in Philippines: 12 days</p>
④ Improvement of evacuation information skill of publishing hazard information for the Manager of PAGASA and disaster risk reduction (DRR) organization	Hazard information engineers who are responsible for hazard evacuation information	Although the basic knowledge of the evacuation information is established in the current FFWS, application ability is required for continuous and autonomous operation	<ul style="list-style-type: none"> ● Training materials (operation and maintenance and hazard evacuation information system process manual) ● Achievement level check sheet 	<p>The following trainings are provided using FFWS that is installed by this project:</p> <ul style="list-style-type: none"> ● Evacuation information and cooperation (2 days) ● Drill for the system (2 days) ● Closing and evaluation (3 days) 	<p>Administrative engineer related Hazard information</p> <p>Preparation in Japan: Including item ①</p> <p>Training in Philippines: 6 days</p>

Source: JICA Study Team

Numbers of the Trainees required for the Soft Components are tabled in Table 2-16 below.

Table 3 Number of Trainees

Organization	Job role	Number of trainees	
		Manager	Staff
PAGASA	O&M Administrative engineer	1	4
	Hydrological engineer	1	2
	RADAR data engineer	1	2
CDRRMD	O&M manager	1	2
	Hazard evacuation information engineer	1	3
Hazard risk management board in LGU (3 cities *)	O&M manager	1 per city	2 per city
	Hazard information manager	1 per city	2 per city
DPWH	Hazard information manager	1	2
NIA	Hazard information manager	1	2

Source: JICA Study Team

* 3 cities mean, Libona, Talakag, and Baungon

6. Resource

Resource of the Soft Components shall be procured from the Japanese Consultants by the following reasons:

- Since the equipment/facilities for the FFWS including the X-band radar rain gauge shall be procured within Japanese products, so the training and lecture under the Soft Components also are planned to utilize the actual measurement data. The lecturer/trainer shall acquire the knowledge and skill to utilize such actual measurement data, i.e., local consultant has no such knowledge and skill because such equipment/facilities are not available in the Philippines.
- As there are portable type X-Band Radar Rain Gauge in PAGASA (fixed type X-band radar rain gauge are not available in PAGASA), so the lecturer/trainer shall have knowledge and skill on the fixed type X-band radar rain gauge, i.e., local consultant has no such knowledge and skill.
- Since the knowledge and skill on the Operation and O&M are required, which is closely coordinate with the reasons above, for the lecturer/trainer, so such person is not available in the Philippines.
- As the existing Pampanga and Agno River Basins FFWS have been established and operated under the Japanese Grant Aid, the experiences and lessons learned from the existing FFWS can be applied to the Soft Components activities, and effective technical transfer is also accomplished.

8. Outputs

Outputs of the Sot Components are as follows:

- ① Operating procedure for operation and O&M on the FFWS (text)
- ② Operating procedure for the flood forecasting ability using the stage correlation method (text)
- ③ Analyzing procedure for the X-Band Rader Rain Gauge (text)
- ④ Operating procedure for operation of evacuation information system (text)
- ⑤ Result of Questionnaire (to check result of accomplishment for the trainees)
- ⑥ Photos of the activities
- ⑦ Completion Report to JICA

9. Sow of Philippines side

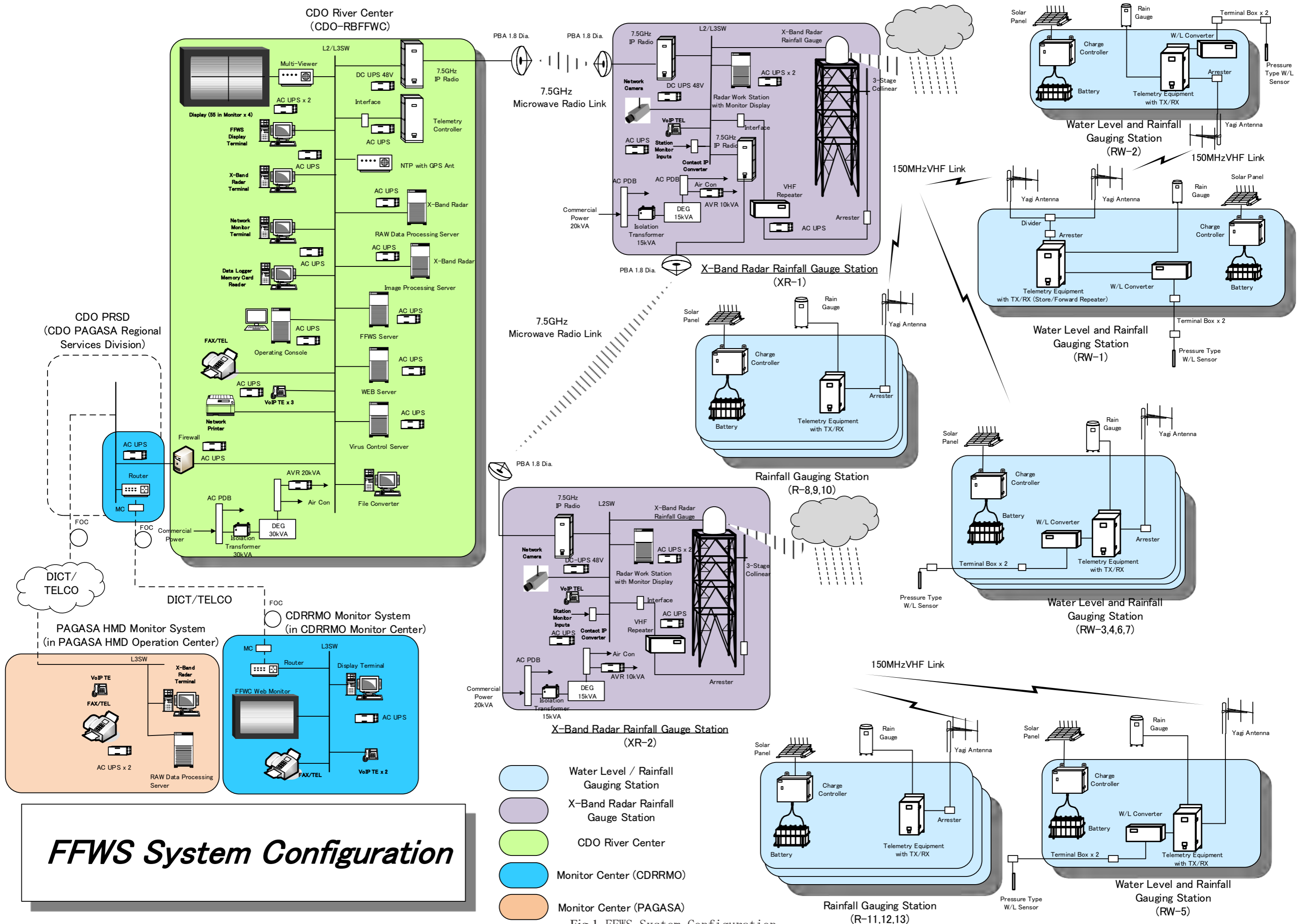
Close cooperation and sustainable activities between PAGASA and the Disaster Risk Reduction (DRR) Organizations such as CDRRMD, OCD, DPWH, LGUs are essential to undertaken not only soft components but also achievements of successful FFWS project completion.

Following are required to continue the Disaster Risk Reduction (DRR) activities confirming to the roles of mutual organizations and operating with close relation each other.

- Utilization of the measured data of the X-Band Rader Rain Gauge for river management and Disaster Risk Reduction (DRR) activities
- Determination of Lead time (responsibility of CDRRMD)
- Accuracy of Flood forecasting and Flood evacuation criteria
- Drill of flood evacuation (flood dissemination drill)

Appendix 6

Outline Design Drawings



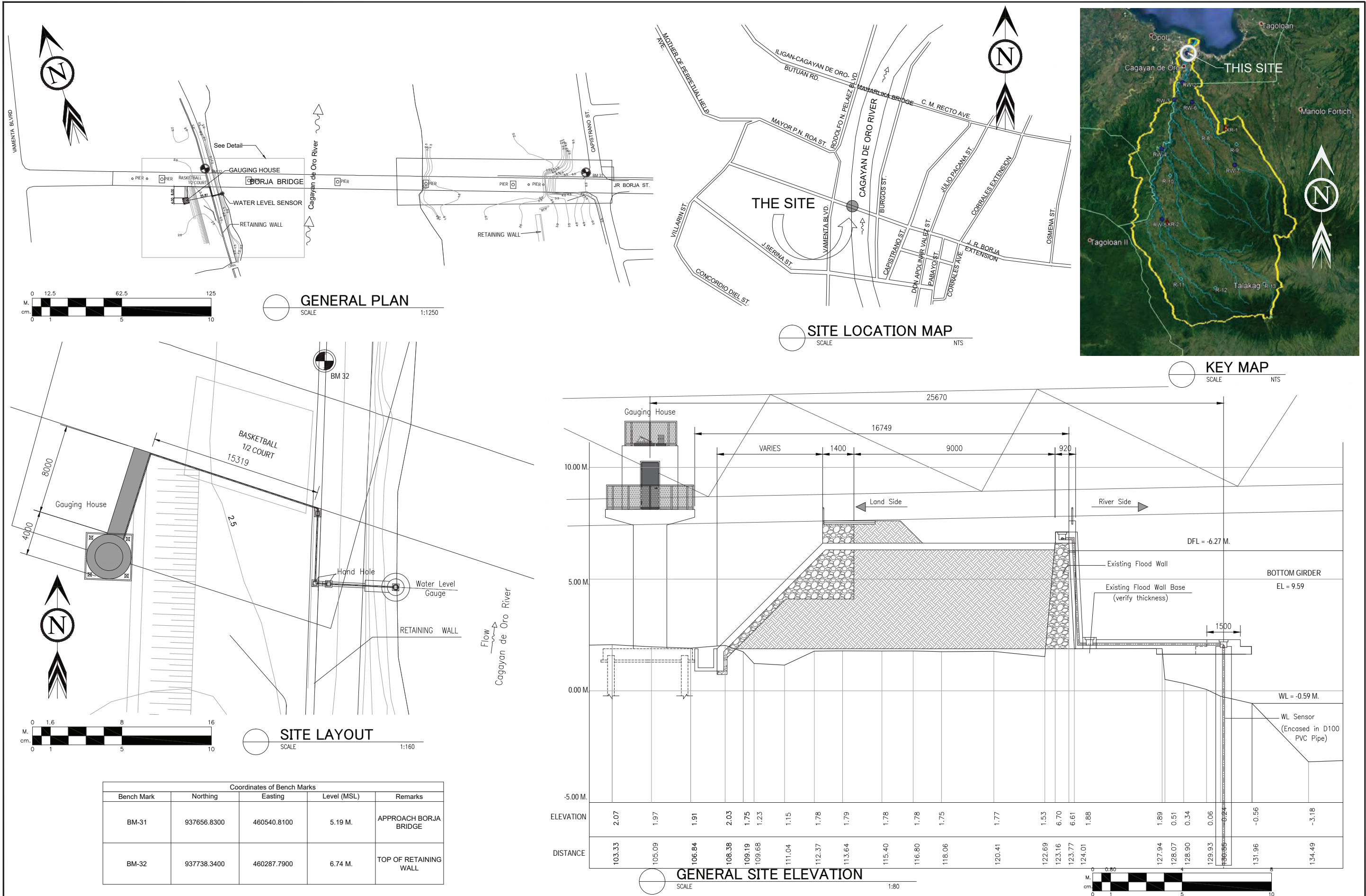


Fig.2 Water Level / Rainfall Gauge Station (RW-1)

PROJECT NAME AND LOCATION: PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN			PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION		NIPPON KOEI CO., LTD. TOKYO, JAPAN		SHEET CONTENTS : RW-1 BORJA BRIDGE GENERAL PLAN, SITE LOCATION, KEY MAP, SITE LAYOUT & GENERAL SITE ELEVATION		DATE : SCALE : UNIT :	- - -
MARK	DETAILS	DATE	RECOMMENDED BY: Office-in-Charge Mindanao PRSD	APPROVED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: CIVIL ENGINEER	CHECKED BY: YASUSHI AZUMA JICA Study Team Leader	DRAWING NO : CVL-SA-1			
REVISIONS			DATE:	DATE:	DATE:	DATE:				

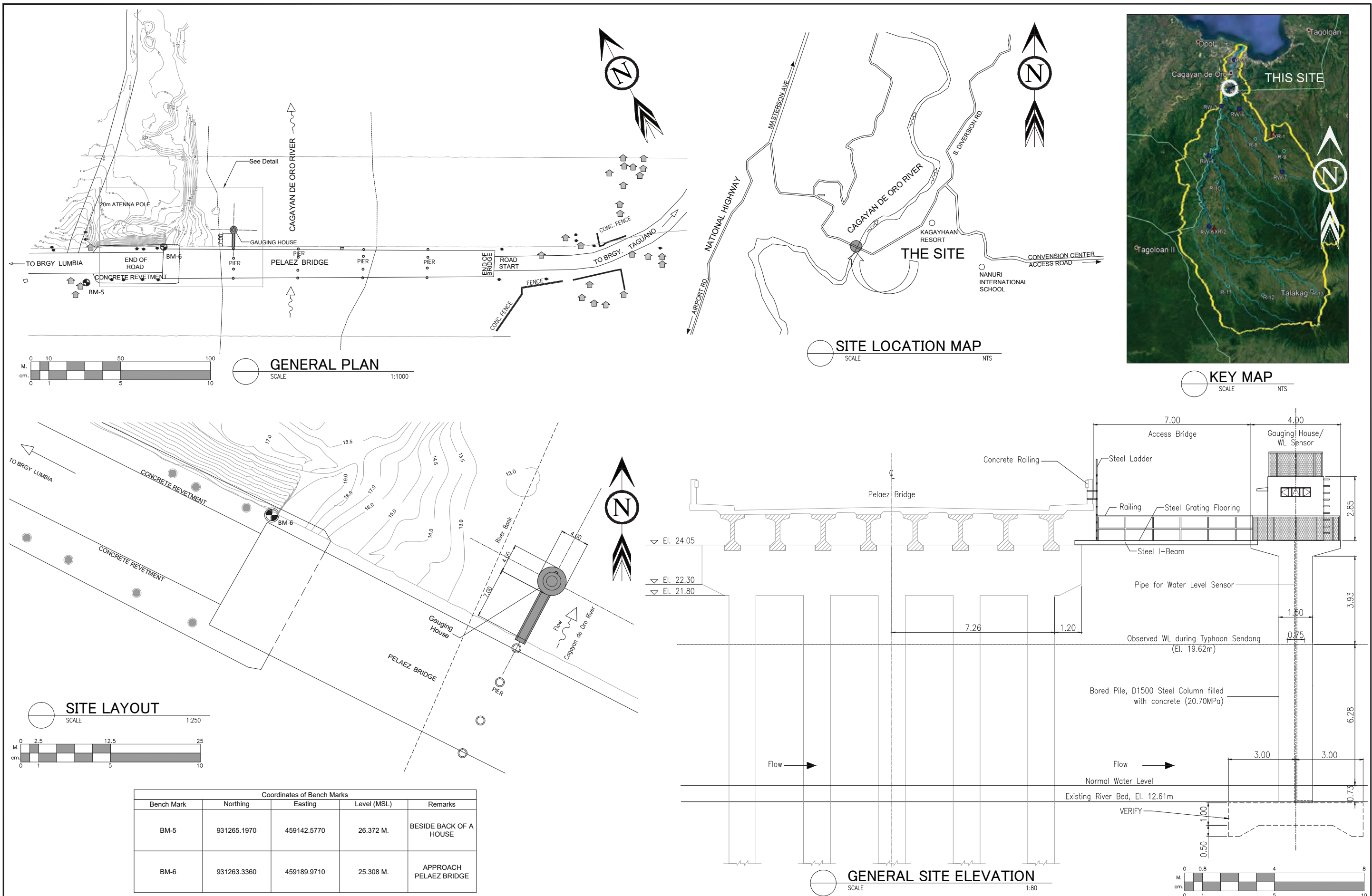


Fig.3 Water Level / Rainfall Gauge Station (RW-2)

PROJECT NAME AND LOCATION: PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN			PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION		NIPPON KOEI CO., LTD. TOKYO, JAPAN		SHEET CONTENTS : RW-2 PELAEZ BRIDGE GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION		DATE : -
MARK	DETAILS	DATE	RECOMMENDED BY: Office-in-Charge Mindanao PRSD	APPROVED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: CIVIL ENGINEER	CHECKED BY: YASUSHI AZUMA JICA Study Team Leader			SCALE : -
REVISIONS			DATE:	DATE:	DATE:	DATE:			UNIT : -
							DRAWING NO : CVL-SB-1		

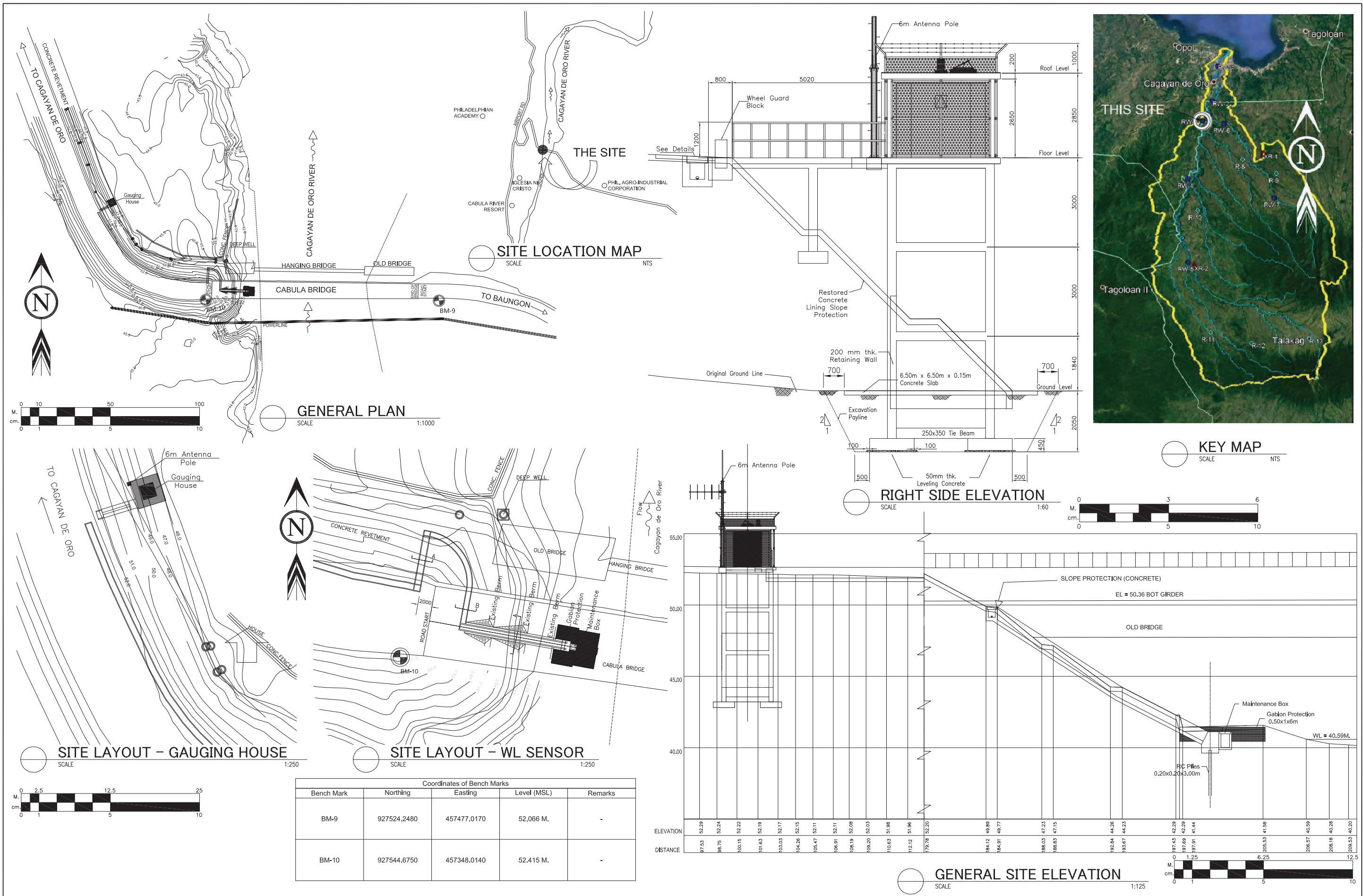
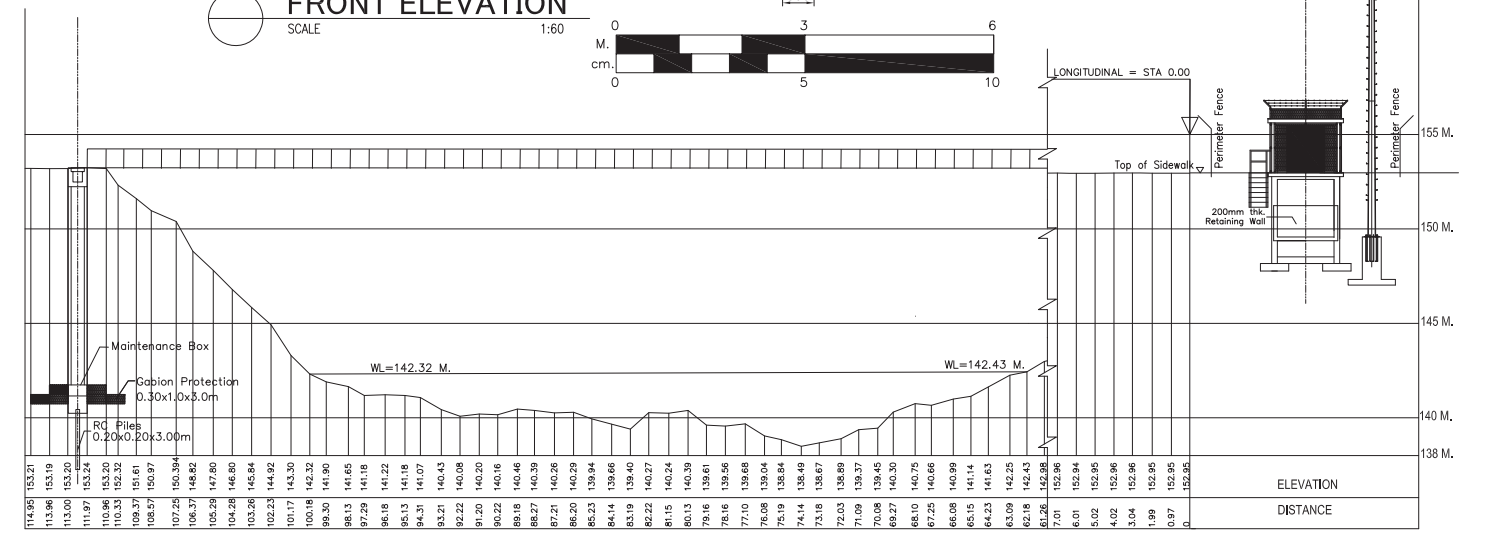
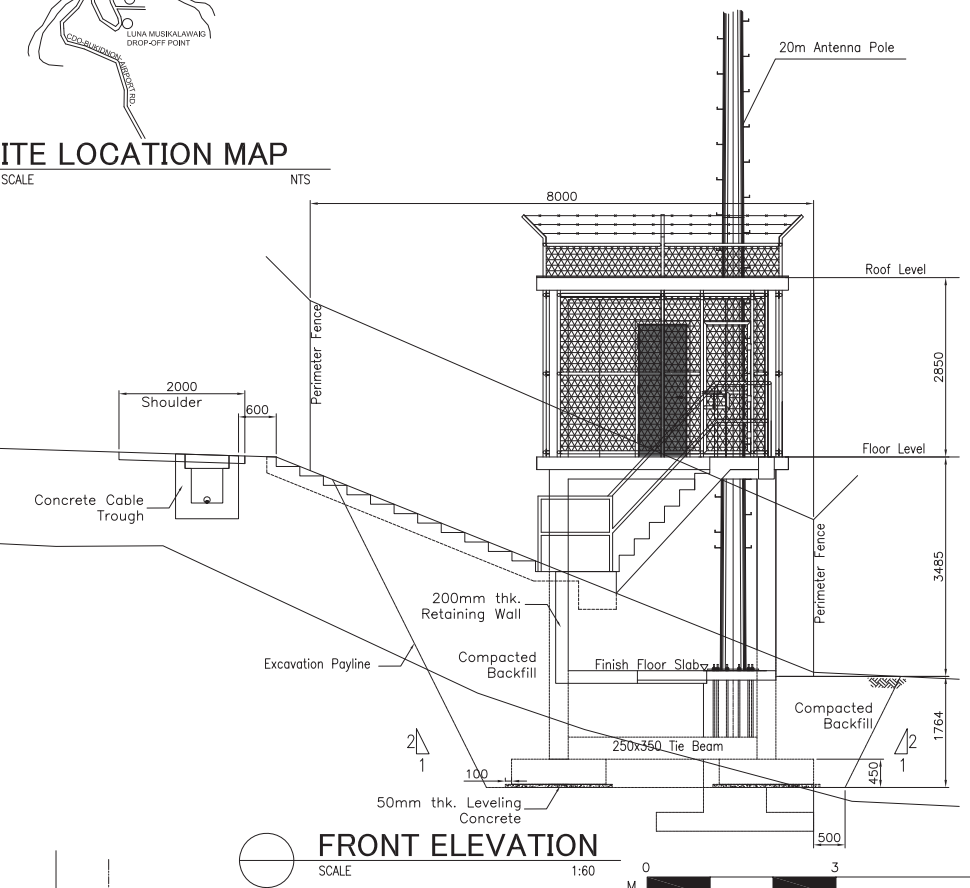
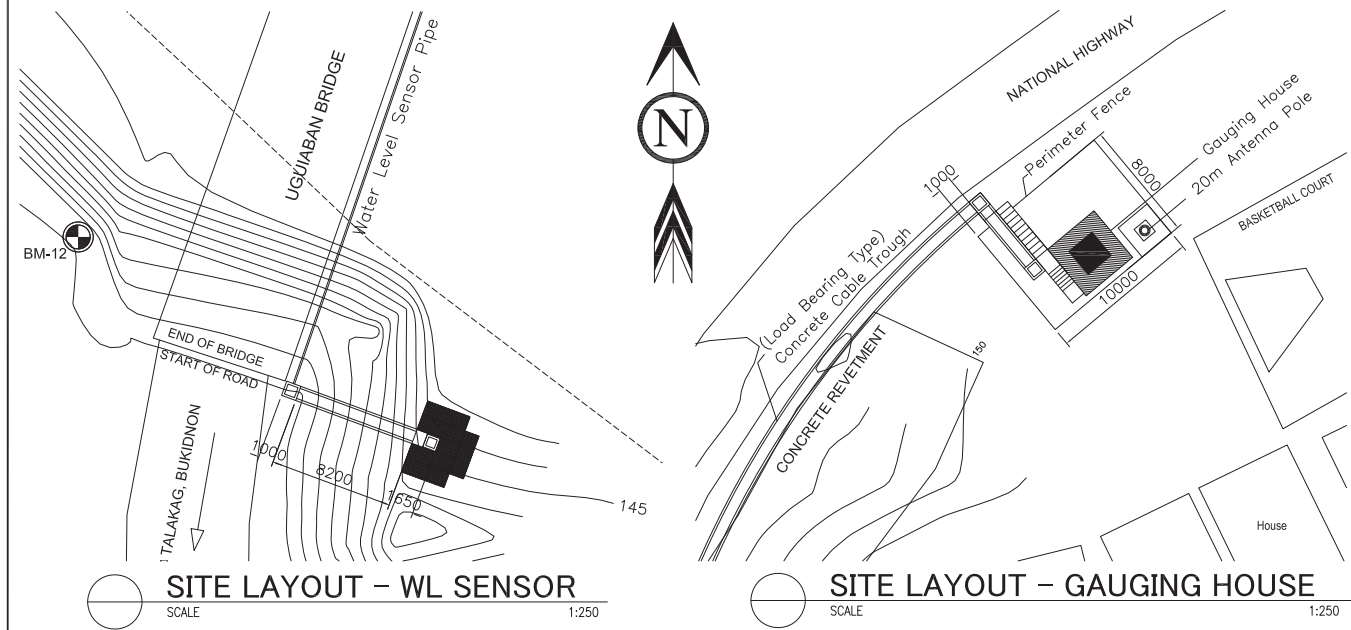
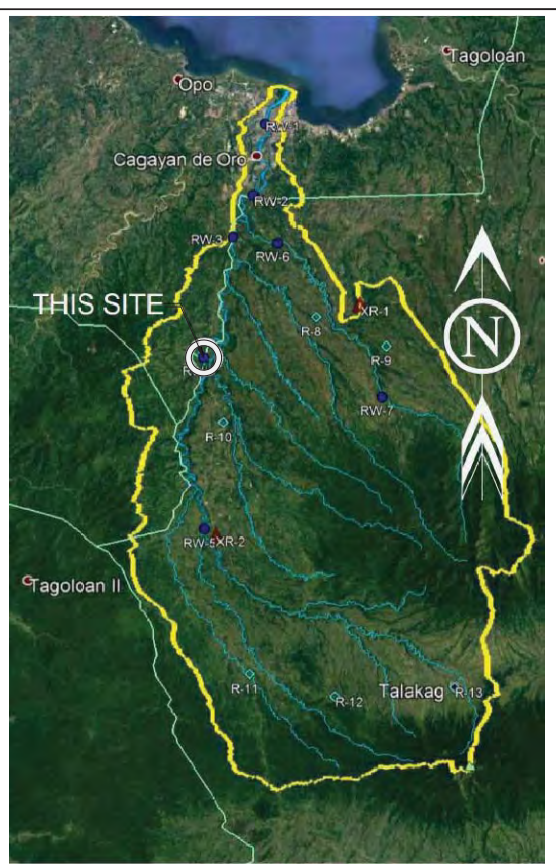
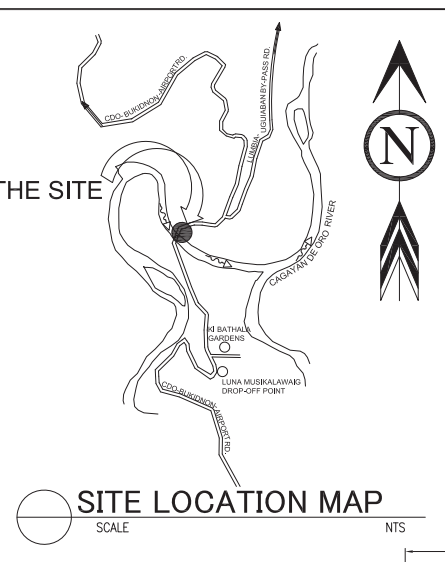
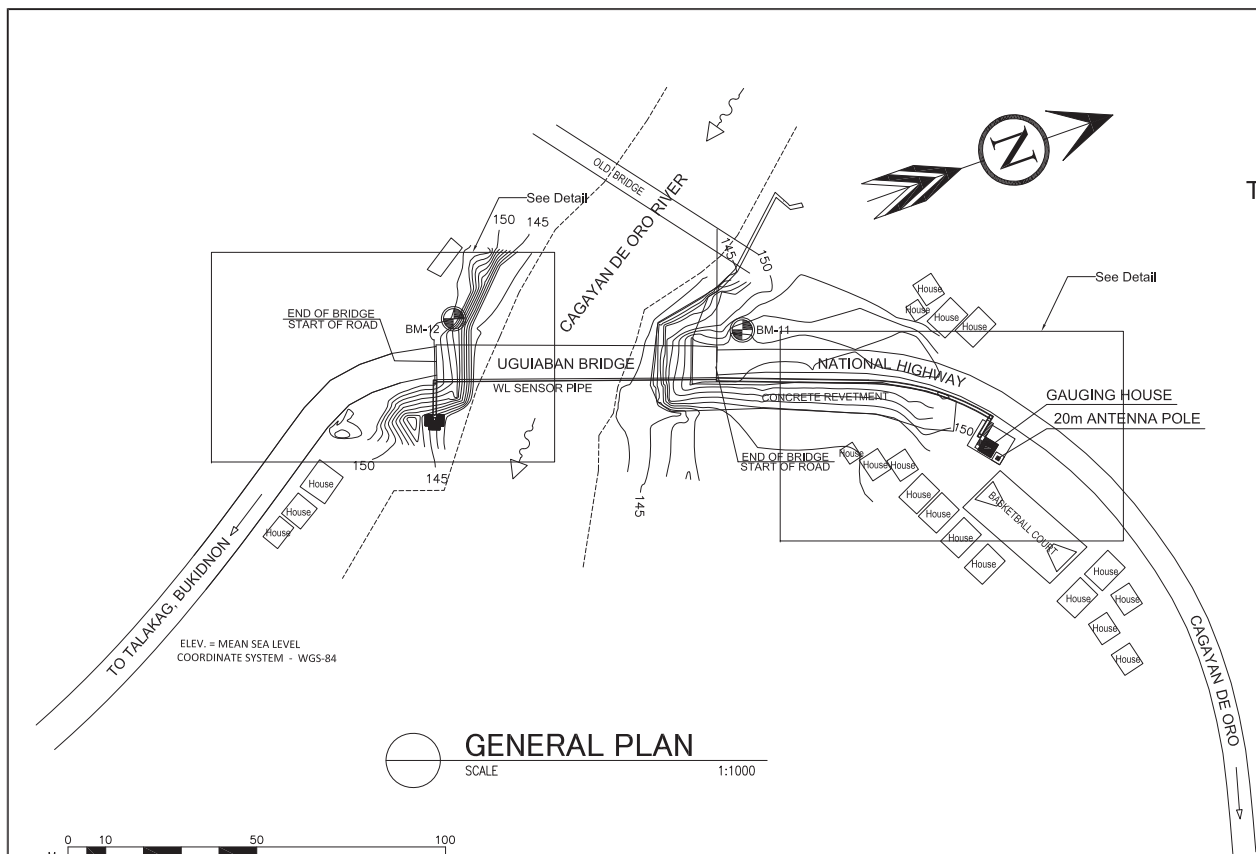


Fig.4 Water Level / Rainfall Gauge Station (RW-3)

PROJECT NAME AND LOCATION: PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN			PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION		NIPPON KOEI CO., LTD. TOKYO, JAPAN		SHEET CONTENTS : RW-3 CABULA BRIDGE GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION		DATE : --
MARK	DETAILS	DATE	RECOMMENDED BY: -- Office-in-Charge Mindanao PRSD	APPROVED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: -- CIVIL ENGINEER	CHECKED BY: YASUSHI AZUMA JICA Study Team Leader	DATE:		SCALE : --
REVISIONS			DATE:	DATE:	DATE:	DATE:	DRAWING NO : CVL-SC-1		UNIT : --



Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-11	916689.1940	454364.1340	152.81 M.	BESIDE OF NATIONAL HIGHWAY
BM-12	9166118.1140	454335.8550	152.878 M.	APPROACH OF NEW BRIDGE

MARK	DETAILS	DATE
	REVISIONS	

PROJECT NAME AND LOCATION:
 PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN

PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION

NIPPON KOEI CO., LTD.
 TOKYO, JAPAN

RECOMMENDED BY: VICENTE B. MALANO, Ph.D., MNSA
 Office-in-Charge
 Mindanao PRSD

APPROVED BY: YASUSHI AZUMA
 JICA Study Team Leader

DESIGNED BY: CIVIL ENGINEER

CHECKED BY:

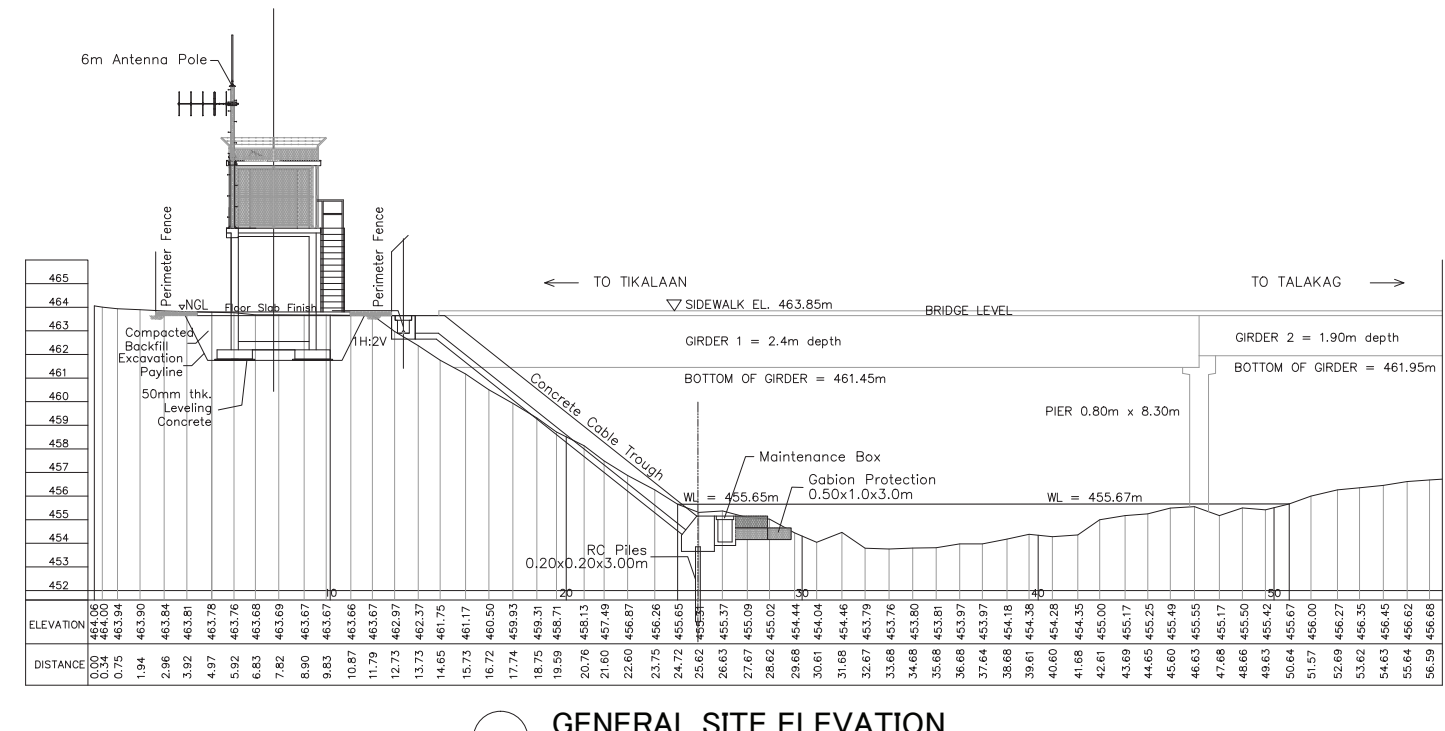
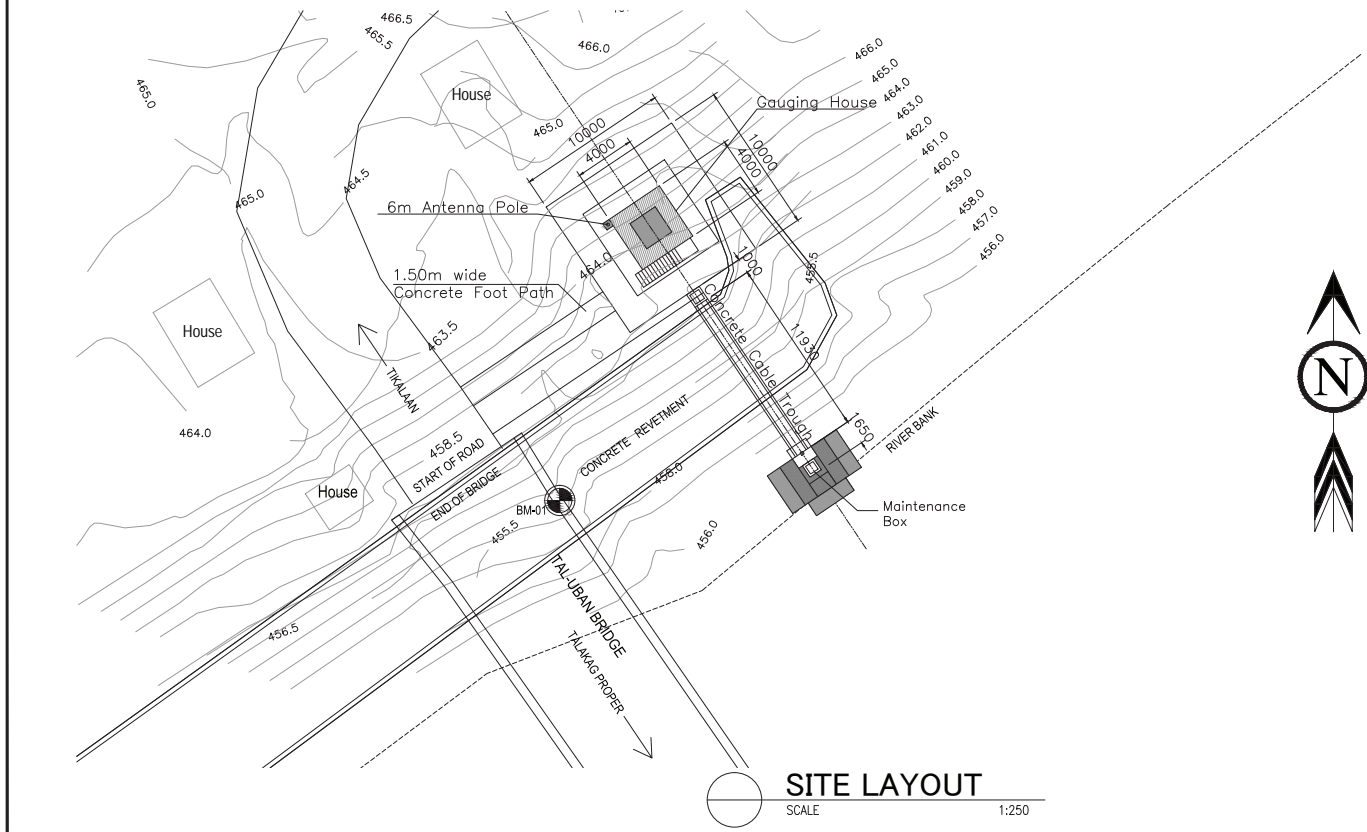
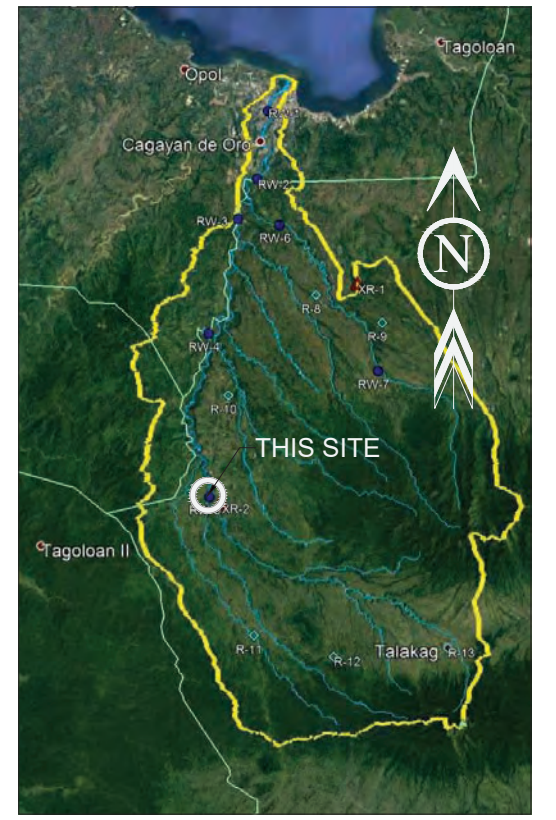
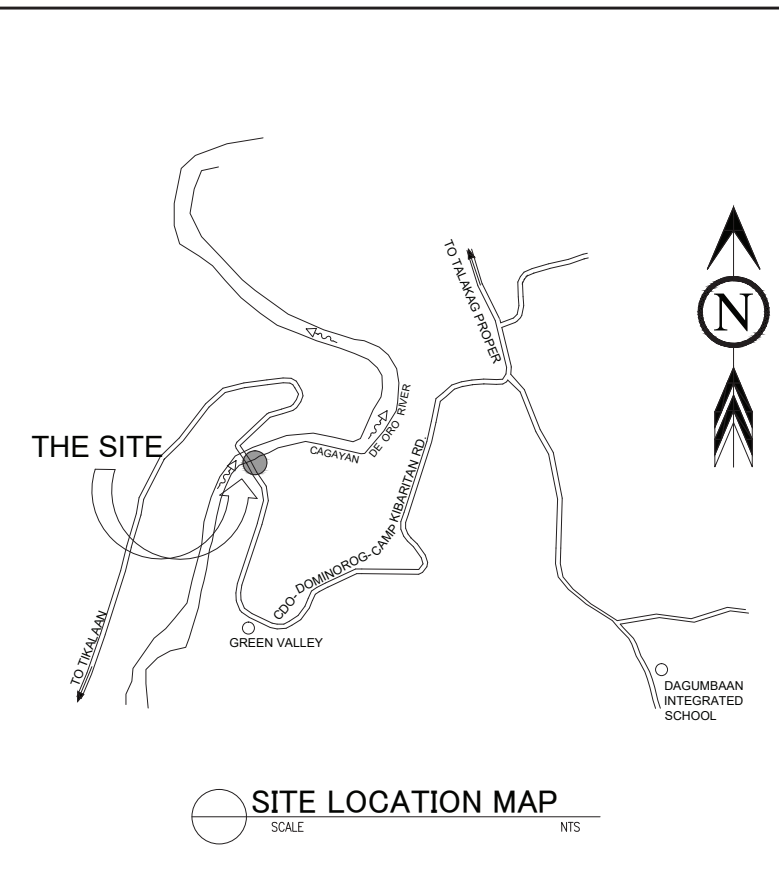
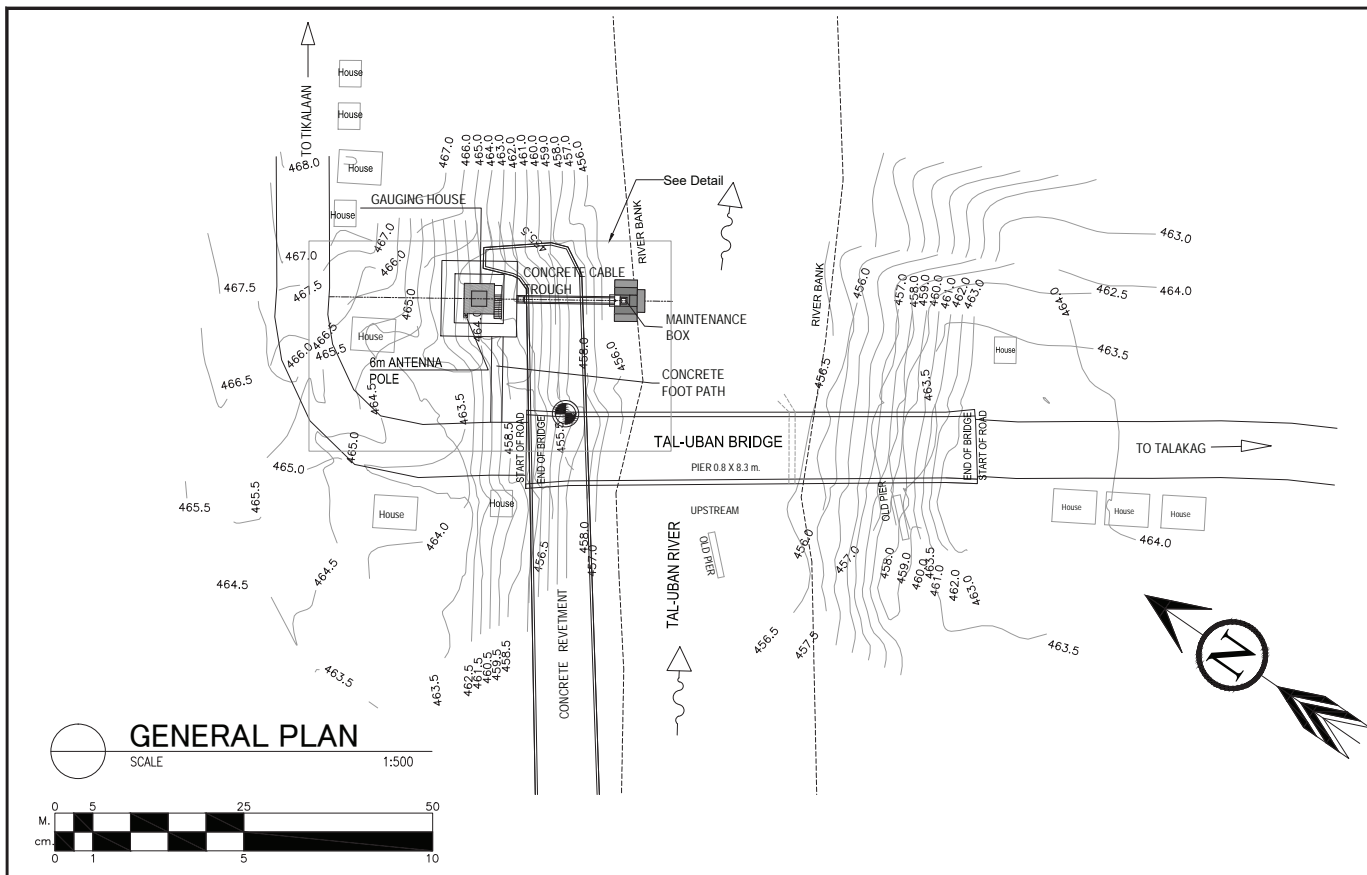
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SHEET CONTENTS :

RW-4 UGUIABAN BRIDGE
 GENERAL PLAN, SITE LOCATION MAP, KEY MAP
 SITE LAYOUT & GENERAL SITE ELEVATION

DATE : -
 SCALE : -
 UNIT : -
 DRAWING NO : CVL-SD-1

Fig.5 Water Level / Rainfall Gauge Station (RW-4)



Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-1 CDO FFWC PAGASA	901288.3100	454287.3970	463.824 M.	-

MARK	DETAILS	DATE	PROJECT NAME AND LOCATION: PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN	PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION	NIPPON KOEI CO., LTD. TOKYO, JAPAN	SHEET CONTENTS : RW-5 TAL-UBAN BRIDGE GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION	DATE :	-	
	REVISIONS	SCALE :					-		
				RECOMMENDED BY: Office-in-Charge Mindanao PRSD	APPROVED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: CIVIL ENGINEER	CHECKED BY: YASUSHI AZUMA JICA Study Team Leader	UNIT :	-
				DATE:	DATE:	DATE:	DATE:	DRAWING NO :	CVL-SE-1

Fig.6 Water Level / Rainfall Gauge Station (RW-5)

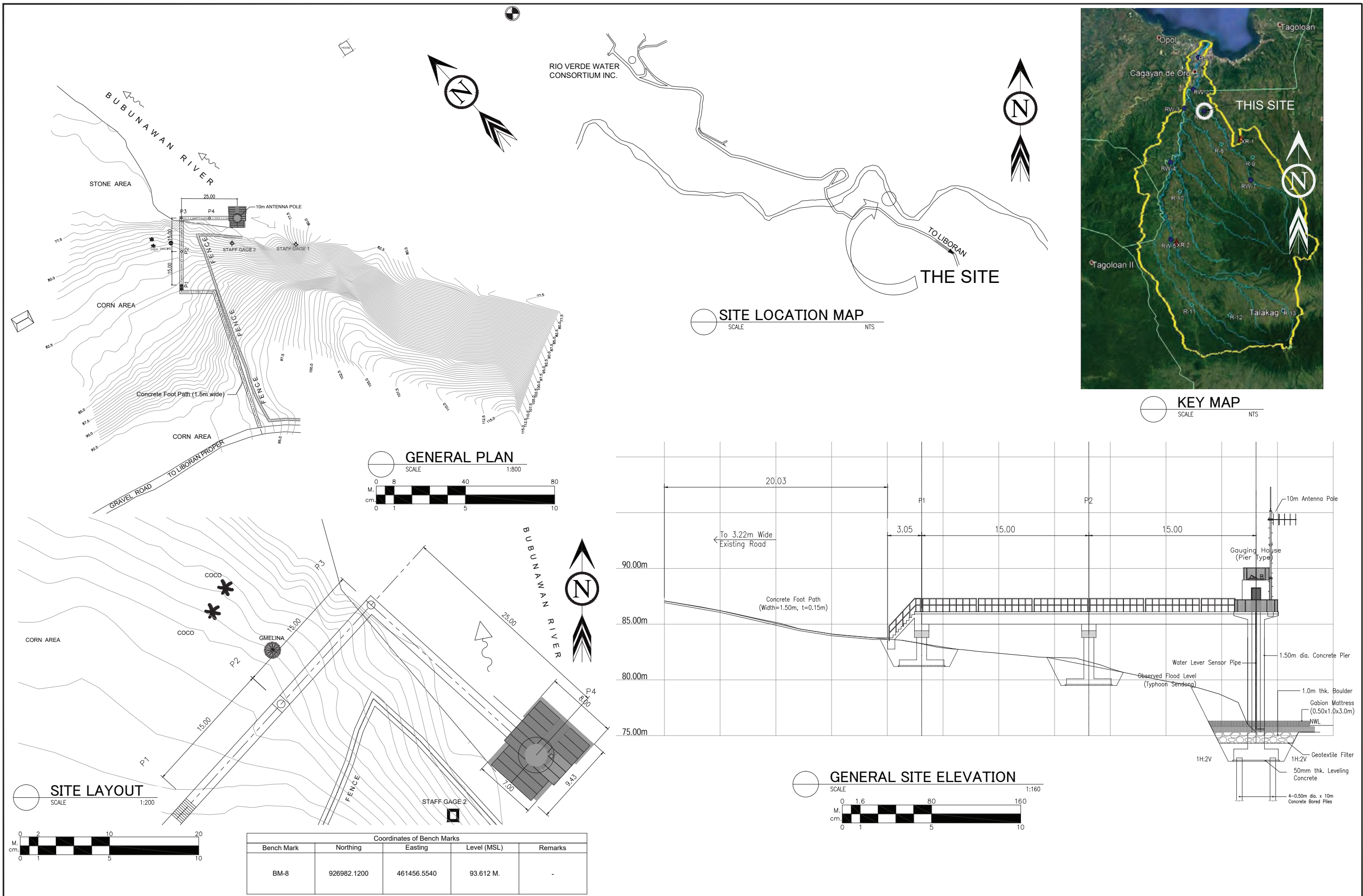
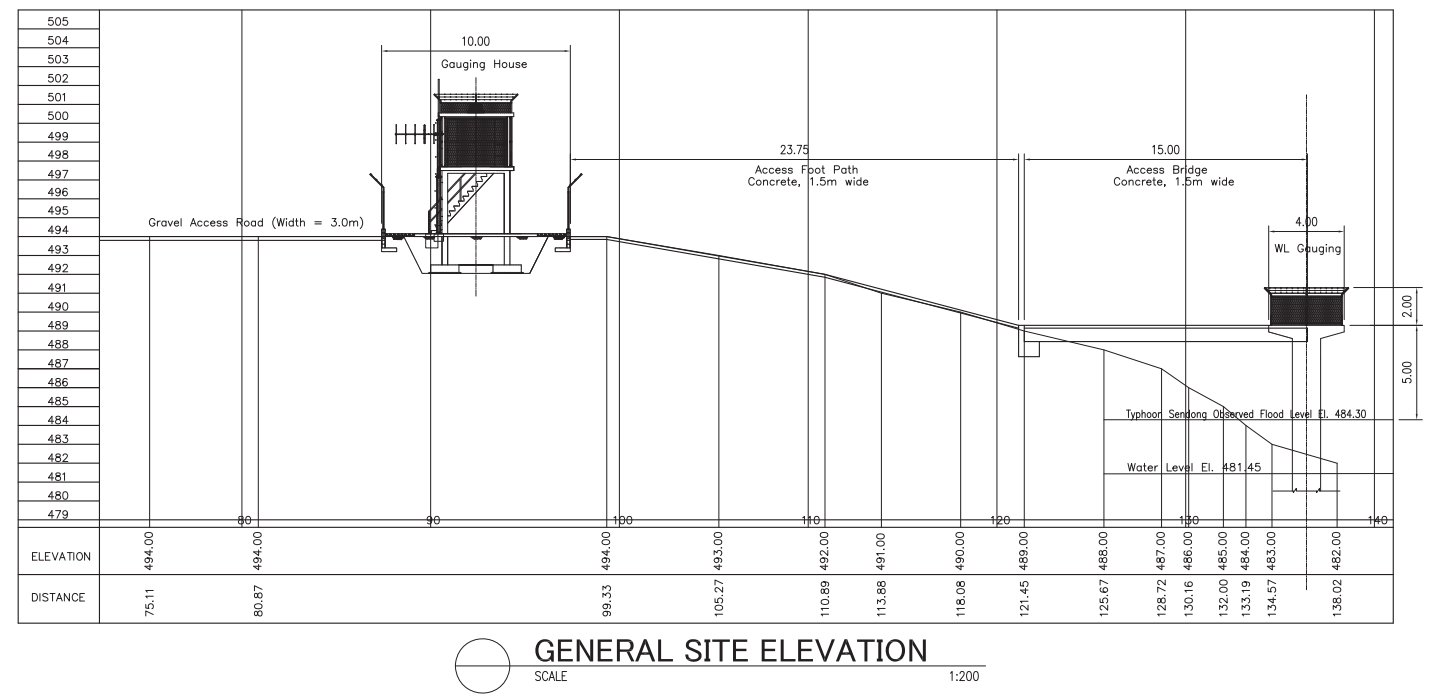
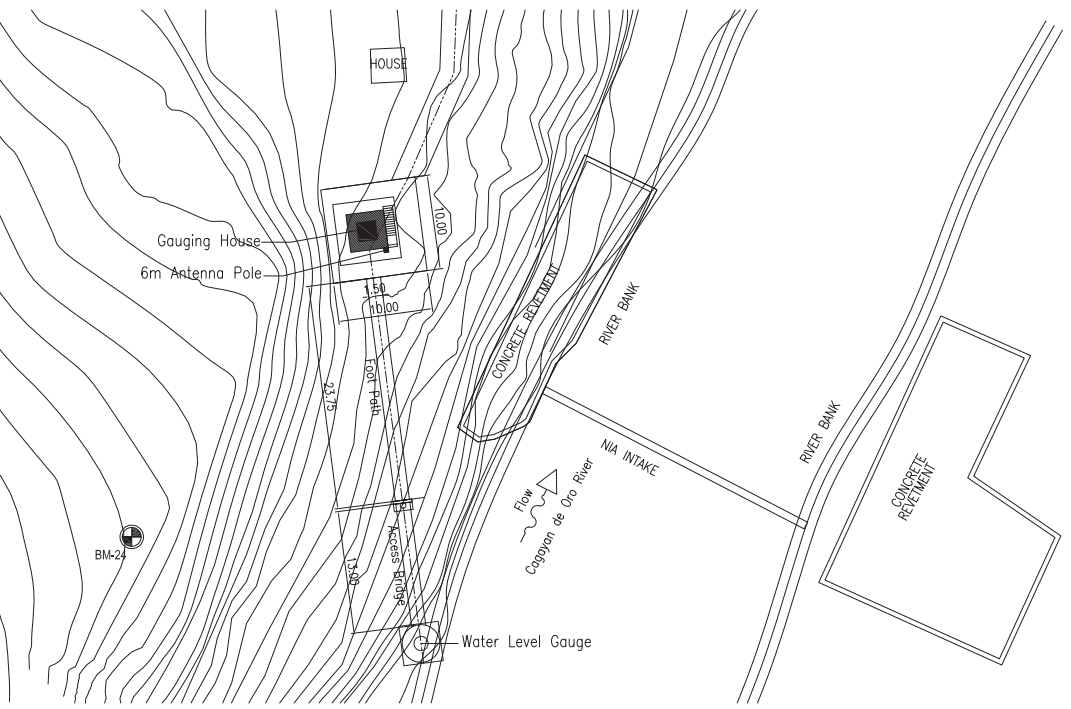
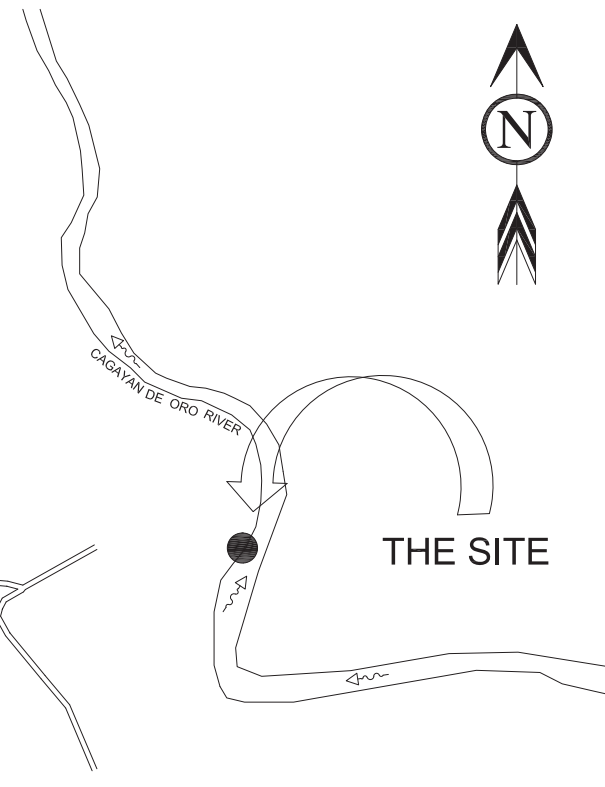
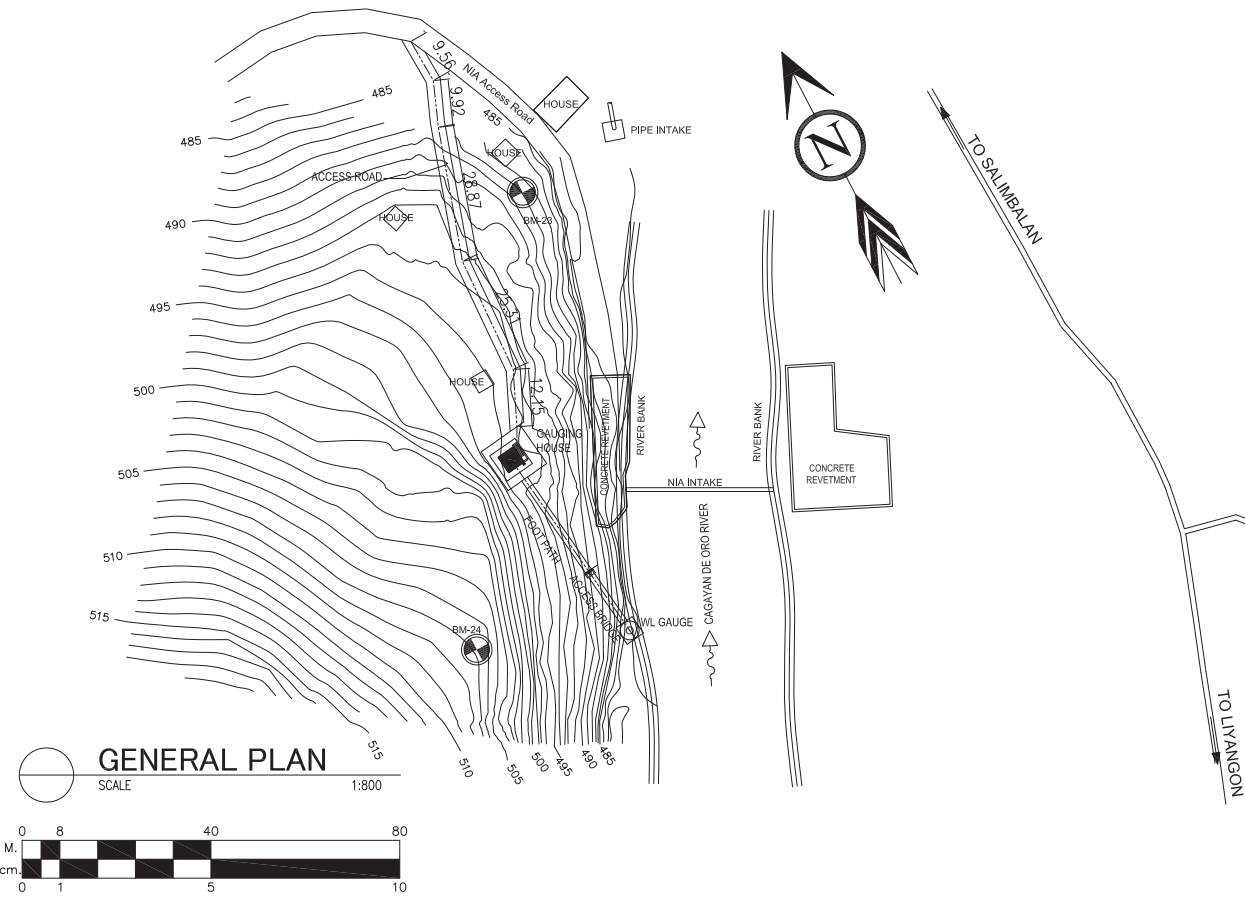


Fig.7 Water Level / Rainfall Gauge Station (RW-6)

PROJECT NAME AND LOCATION: PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN			PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION		NIPPON KOEI CO., LTD. TOKYO, JAPAN		SHEET CONTENTS : RW-6 LIBORAN GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION		DATE : SCALE : UNIT :
MARK	DETAILS	DATE	RECOMMENDED BY: Office-in-Charge Mindanao PRSD	APPROVED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: CIVIL ENGINEER	CHECKED BY: YASUSHI AZUMA JICA Study Team Leader	DRAWING NO : CVL-SF-1		
REVISIONS			DATE:	DATE:	DATE:	DATE:			



Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-23	913048.7340	470602.2080	487.9713 M.	-
BM-24	912977.2220	470549.0510	506.7921 M.	-

MARK	DETAILS	DATE
REVISIONS		

PROJECT NAME AND LOCATION:
 PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN

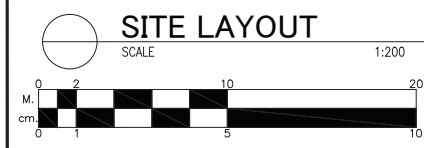
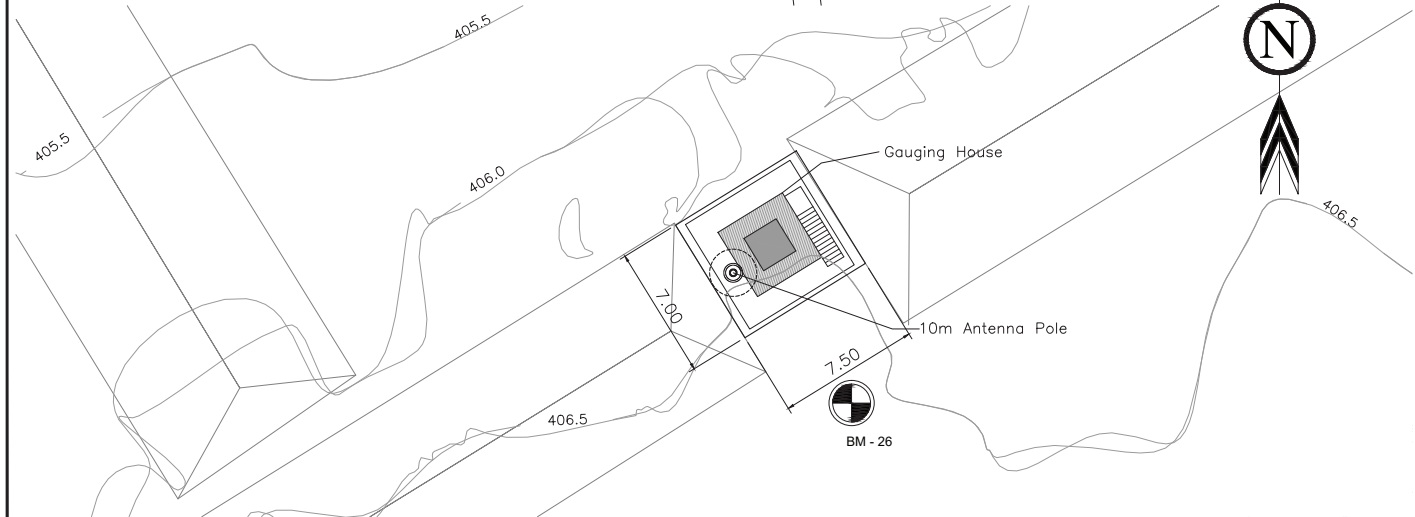
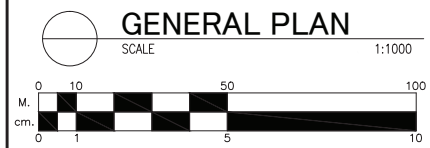
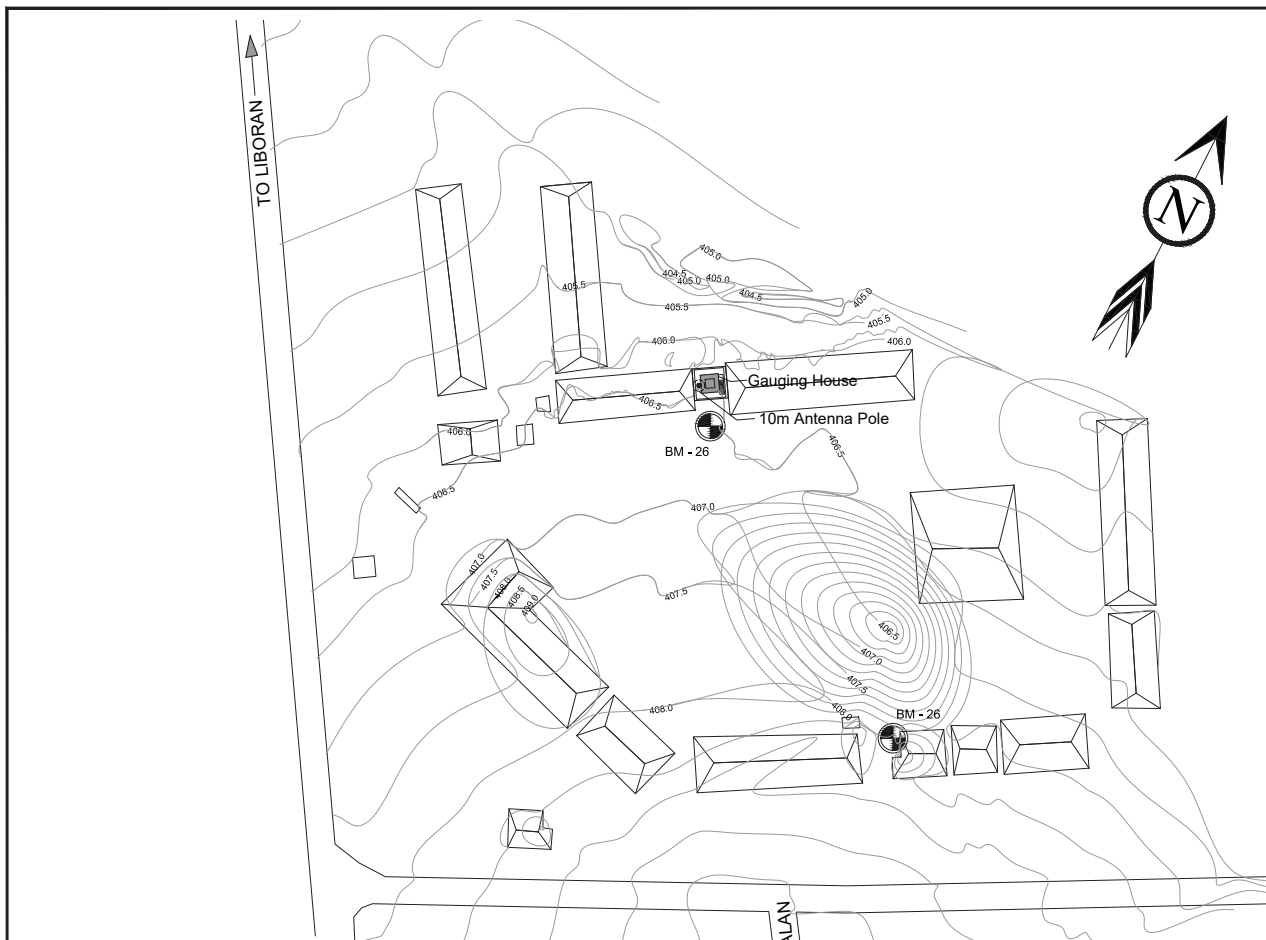
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION

NIPPON KOEI CO., LTD. TOKYO, JAPAN

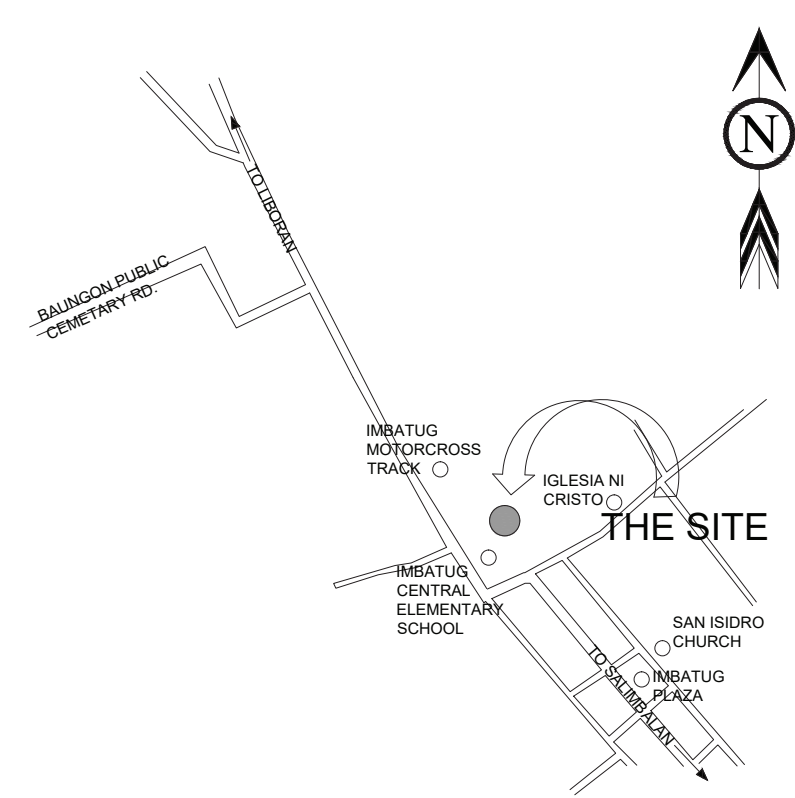
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DATE:	DATE:	DATE:	DATE:

SHEET CONTENTS :	DATE :	-
RW-7 NIA BUBUNAWAN IRRIGATION GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION	SCALE :	-
	UNIT :	-
	DRAWING NO :	CVL-SG-1

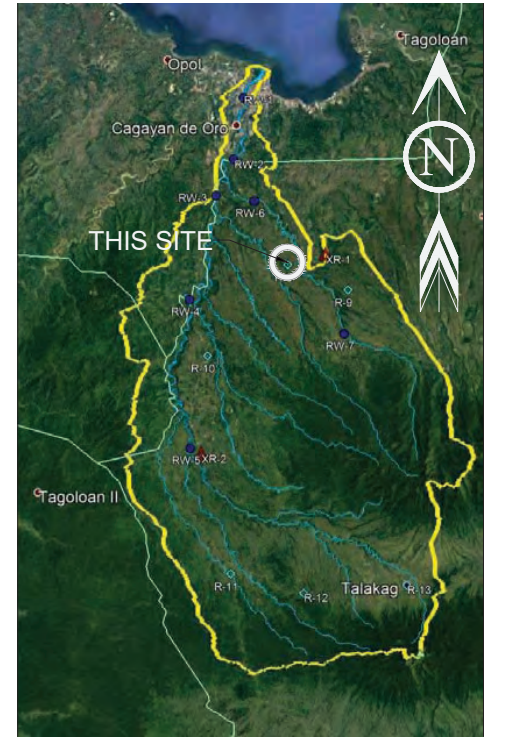
Fig.8 Water Level / Rainfall Gauge Station (RW-7)



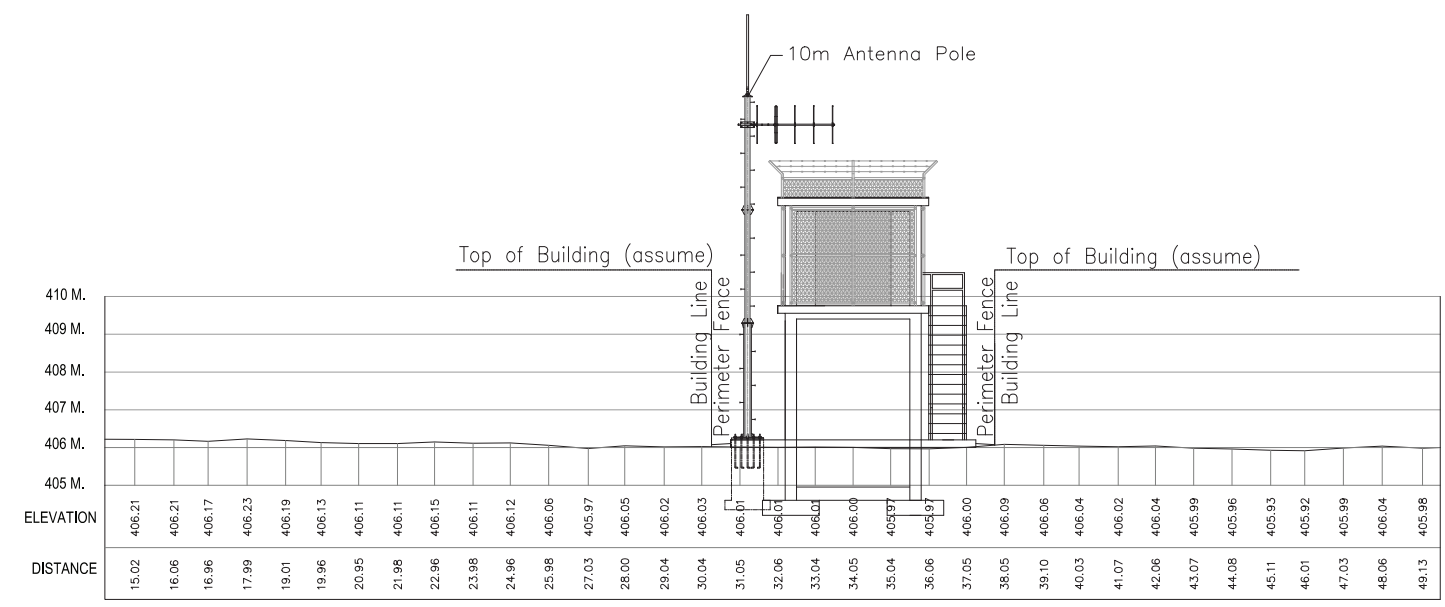
Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-25	919705.0190	465077.8780	408.628 M.	BACK OF SCHOOL BUILDING
BM-26	919748.1980	465010.7930	406.966 M.	BACK OF COVERED STAGE



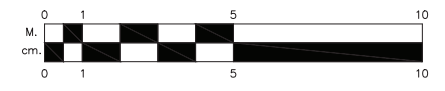
SITE LOCATION MAP
SCALE NTS



KEY MAP
SCALE NTS



GENERAL SITE ELEVATION
SCALE 1:100



MARK	DETAILS	DATE
REVISIONS		

PROJECT NAME AND LOCATION:
 PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN

PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION

RECOMMENDED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA
 OFFICE-IN-CHARGE MINDANAO PRSD

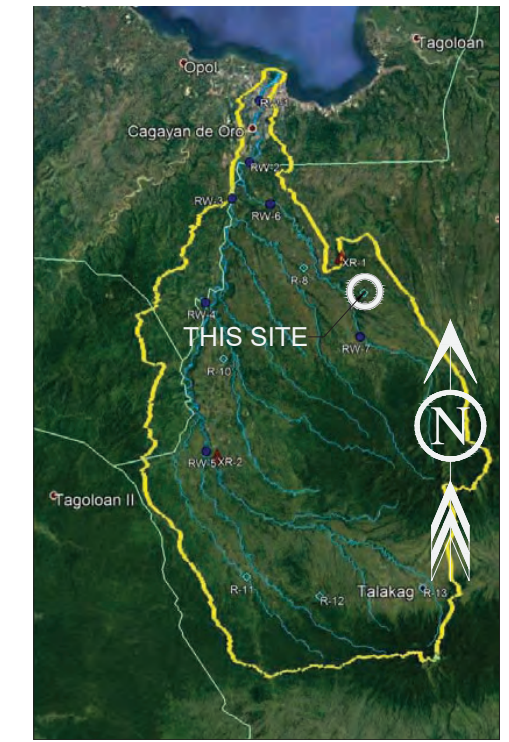
NIPPON KOEI CO., LTD.
 TOKYO, JAPAN

DESIGNED BY: CIVIL ENGINEER
 CHECKED BY: YASUSHI AZUMA JICA Study Team Leader

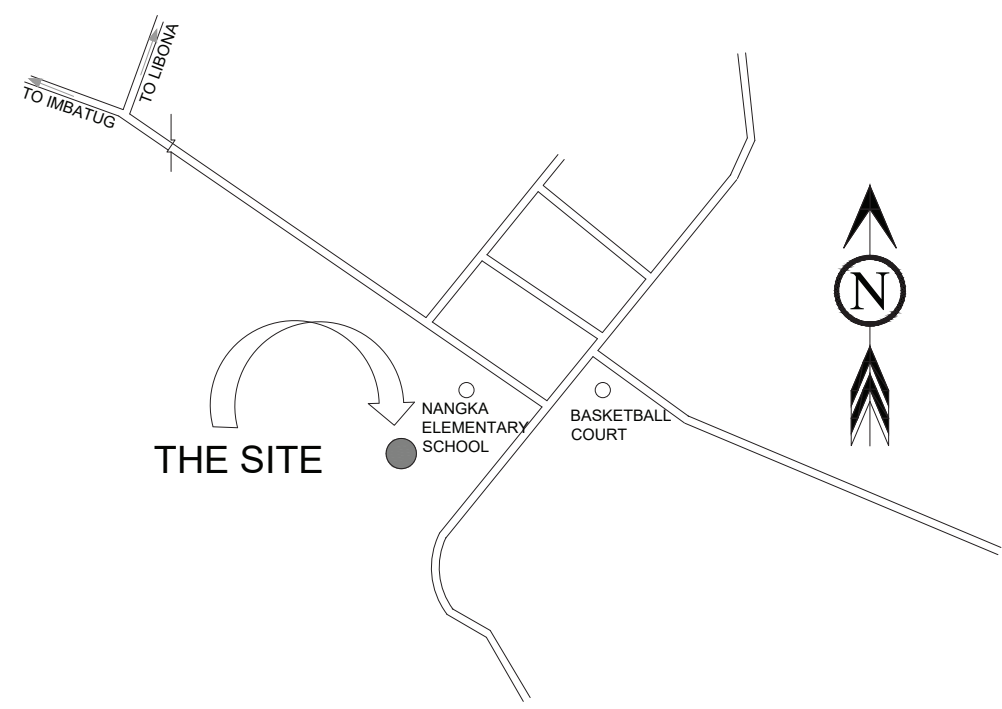
SHEET CONTENTS :
 R-8 IMBATUG CENTRAL ELEMENTARY SCHOOL
 GENERAL PLAN, SITE LOCATION MAP, KEY MAP
 SITE LAYOUT & GENERAL SITE ELEVATION

DATE :
 SCALE :
 UNIT :
 DRAWING NO : CVL-SH-1

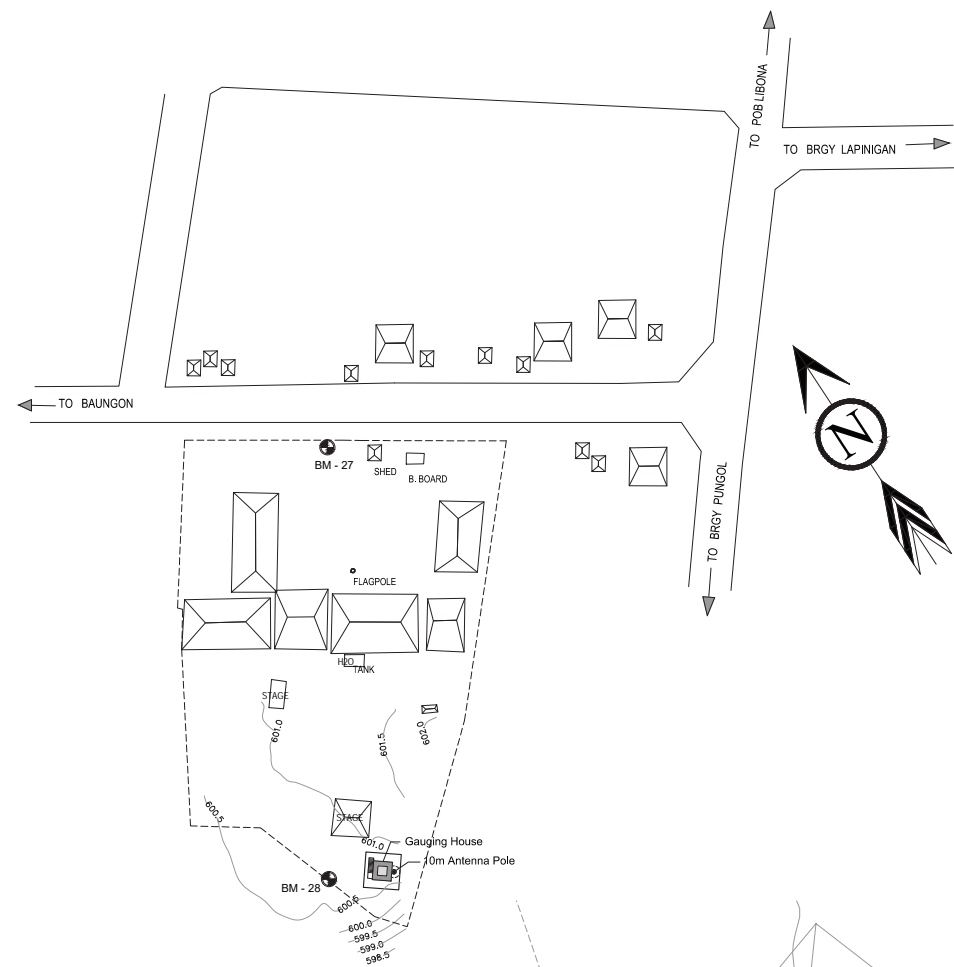
Fig.9 Rainfall Gauge Station (R-8)



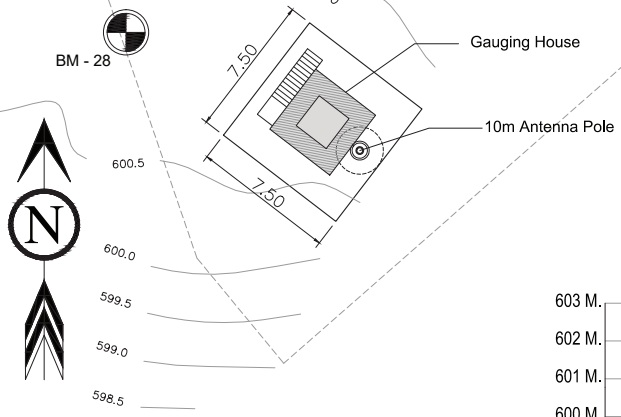
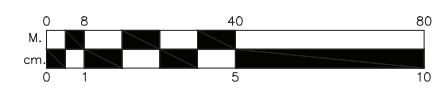
KEY MAP
SCALE NTS



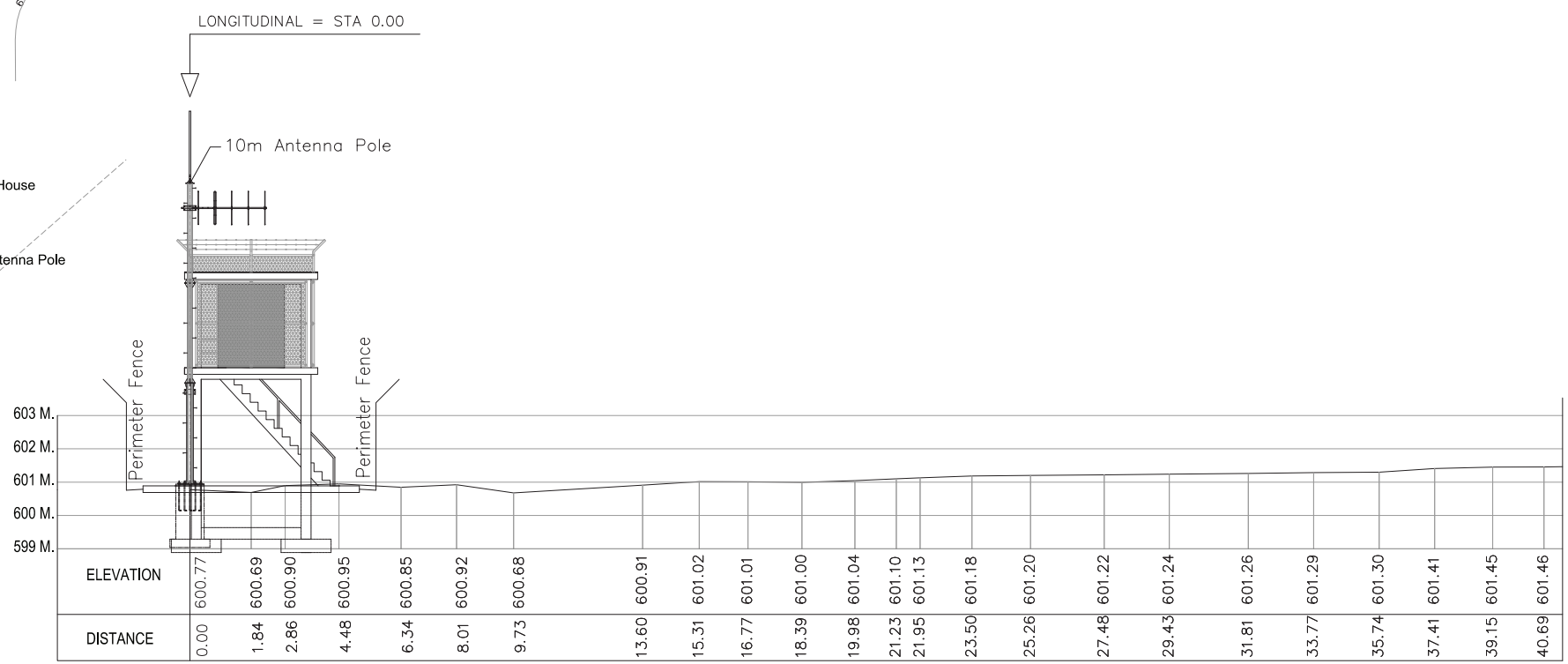
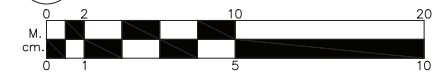
SITE LOCATION MAP
SCALE NTS



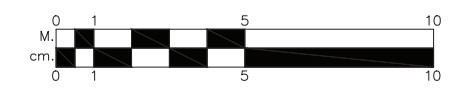
GENERAL PLAN
SCALE 1:800



SITE LAYOUT
SCALE 1:200



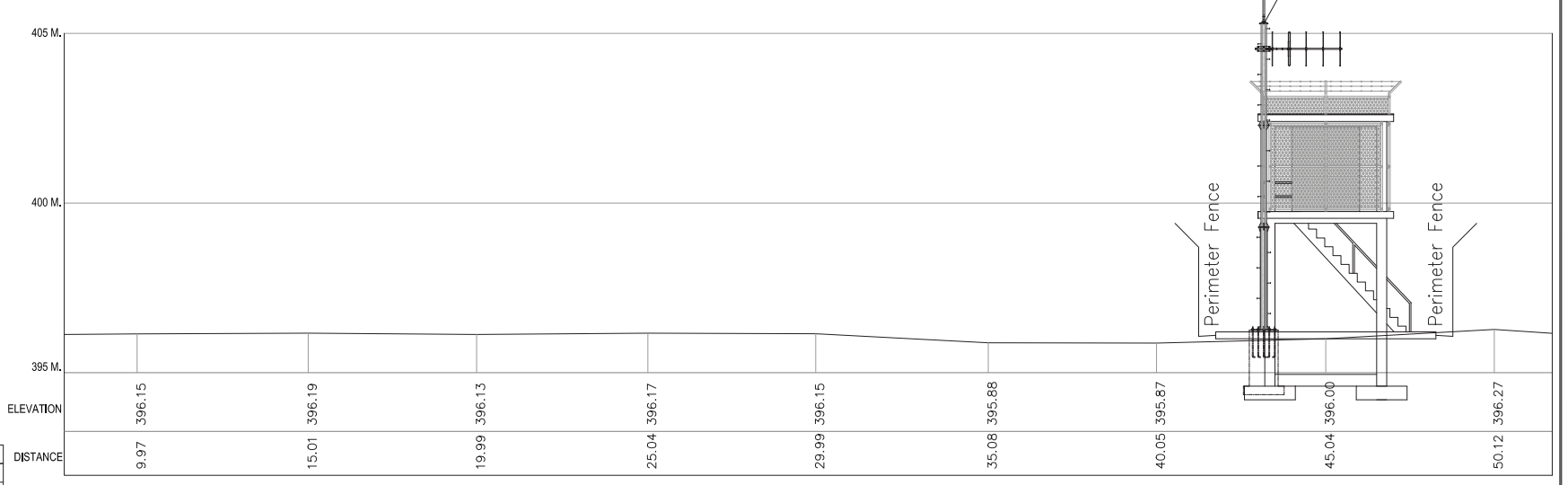
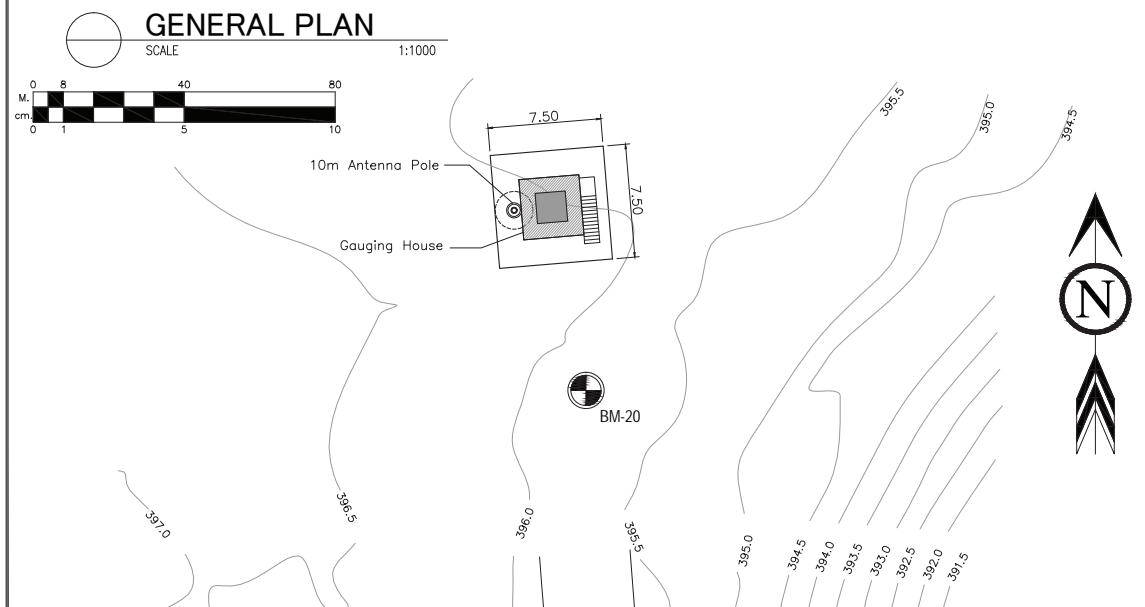
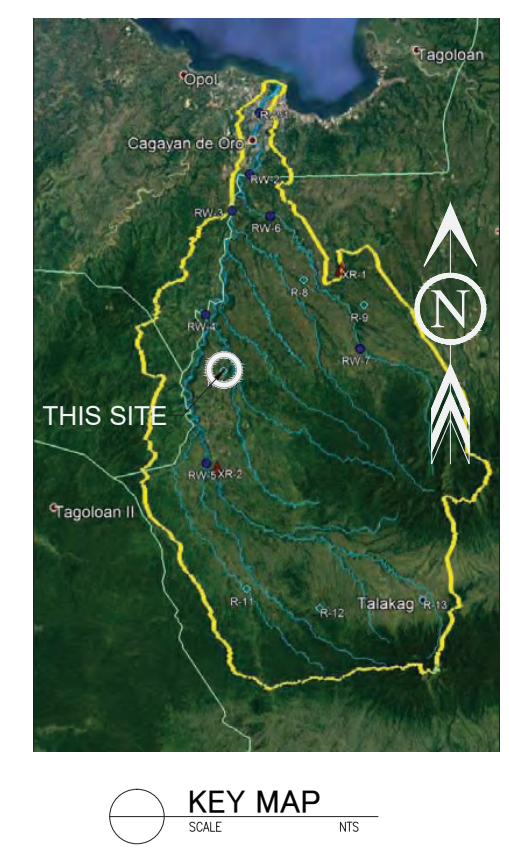
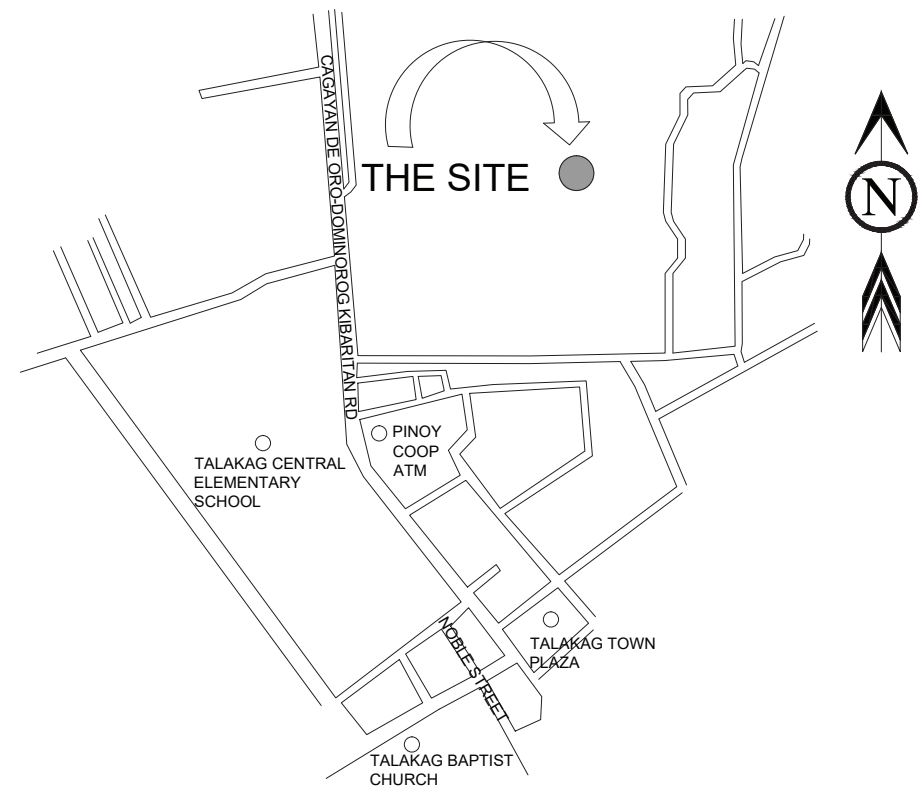
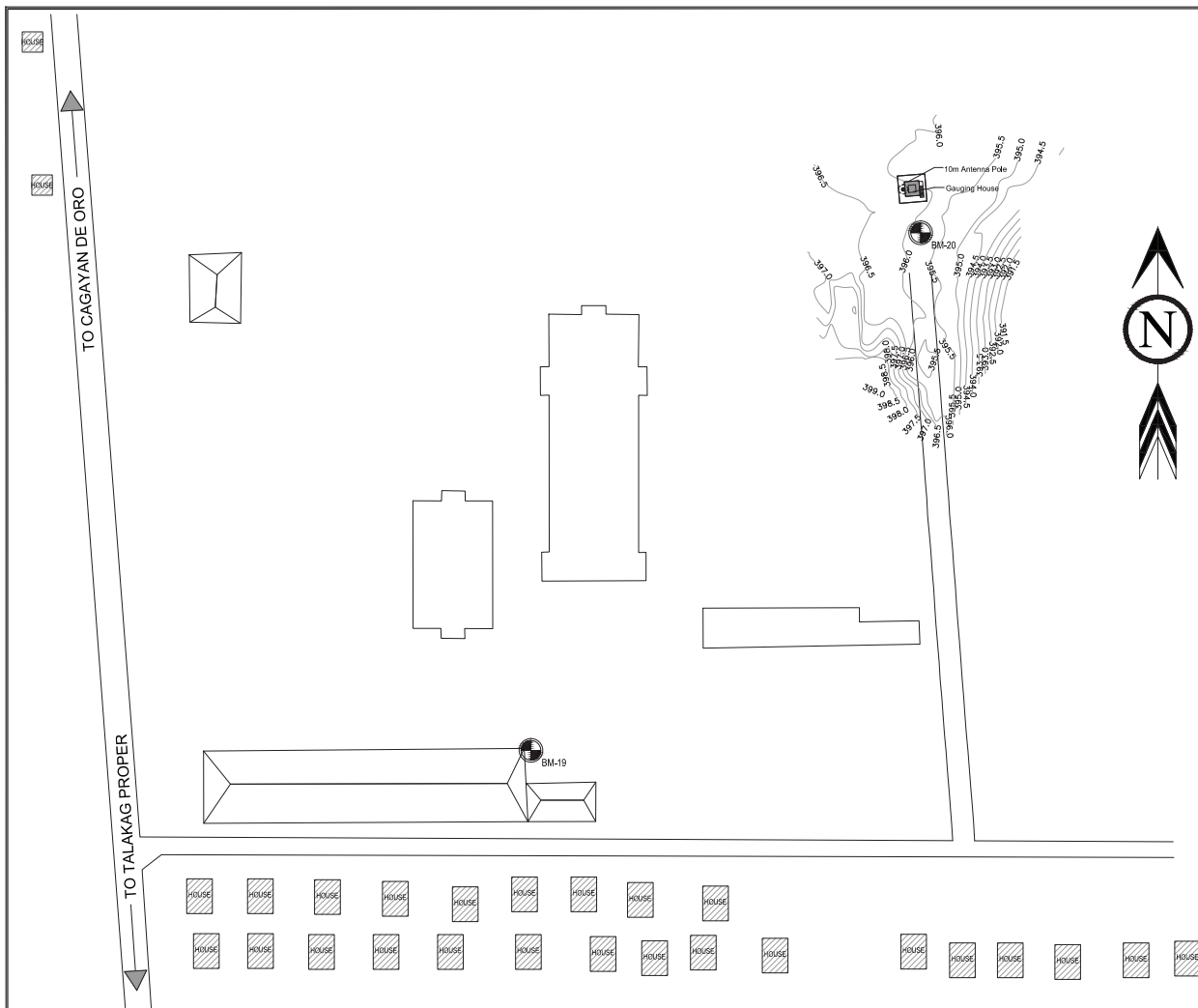
GENERAL SITE ELEVATION
SCALE 1:100



Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-27	917602.8450	471029.0880	601.001 M.	RIGHT SIDE OF GATE
BM-28	917526.2020	470979.2930	600.938 M.	BACK OF COVERED STAGE

PROJECT NAME AND LOCATION: PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN			PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION		NIPPON KOEI CO., LTD. TOKYO, JAPAN		SHEET CONTENTS : R-9 NANGKA ELEMENTARY SCHOOL GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION		DATE : -
MARK	DETAILS	DATE	RECOMMENDED BY: Vicente B. Malano, Ph.D., MNSA Administrator MINDANAO PRSD	APPROVED BY: Vicente B. Malano, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: Civil Engineer	CHECKED BY: Yasushi Azuma JICA Study Team Leader	DATE :		SCALE : -
REVISIONS			DATE :	DATE :	DATE :	DATE :	DRAWING NO : CVL-SI-1		UNIT : -

Fig.10 Rainfall Gauge Station (R-9)



Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-19	910639.6450	456104.1150	395.913 M.	-
BM-20	910781.5220	456210.9040	391.904 M.	-

MARK	DETAILS	DATE
REVISIONS		

PROJECT NAME AND LOCATION:
 PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN

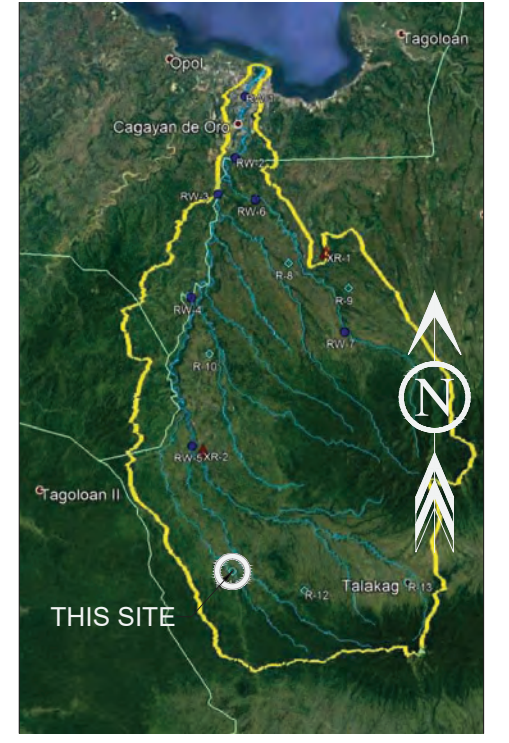
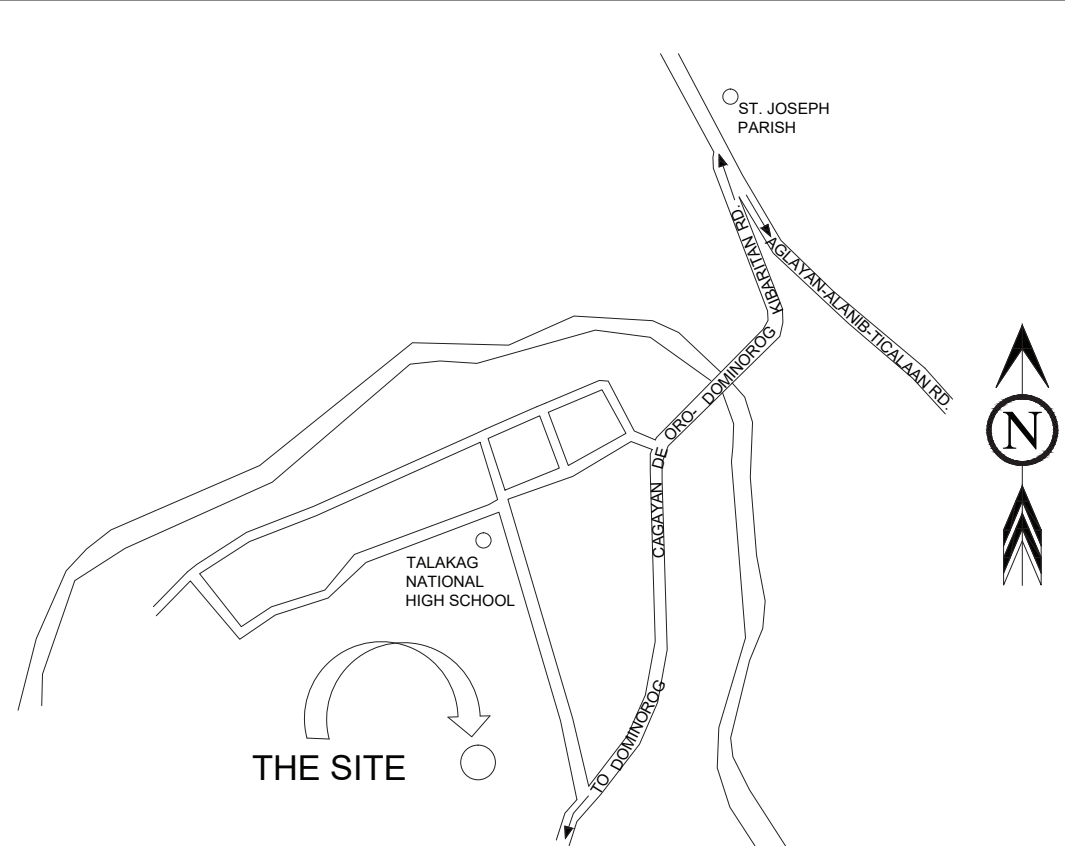
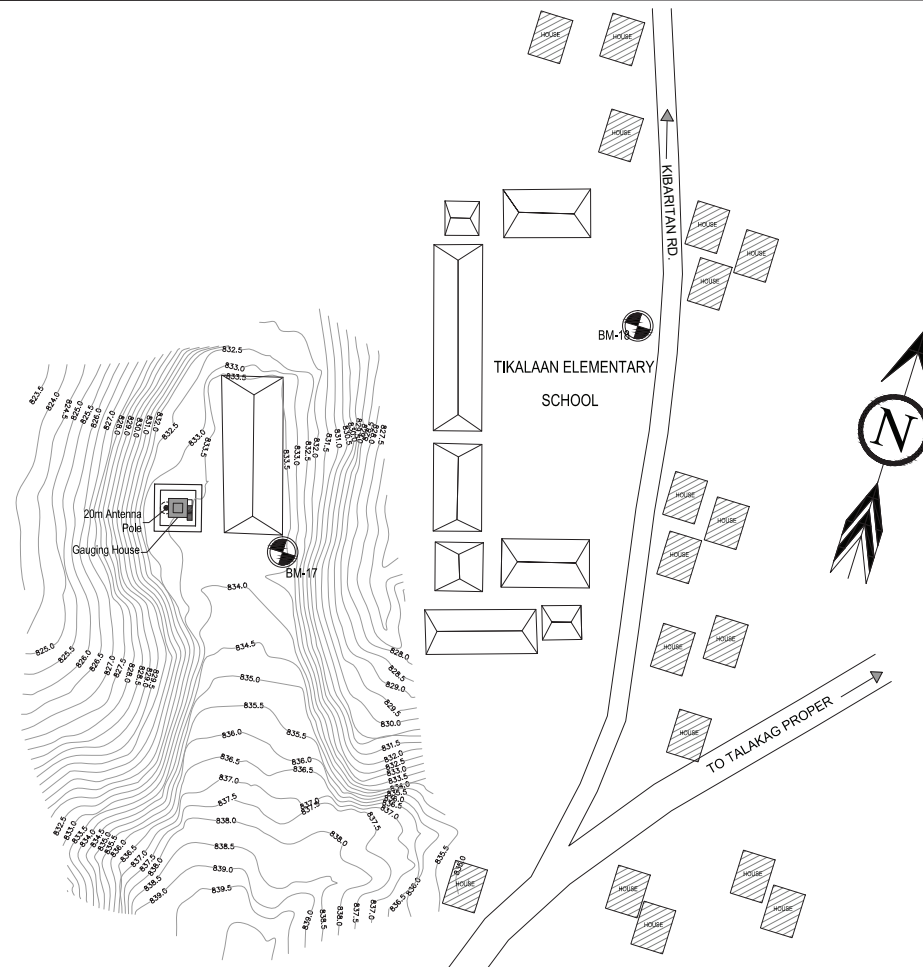
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION

NIPPON KOEI CO., LTD. TOKYO, JAPAN

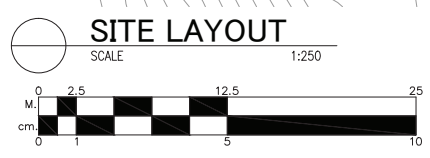
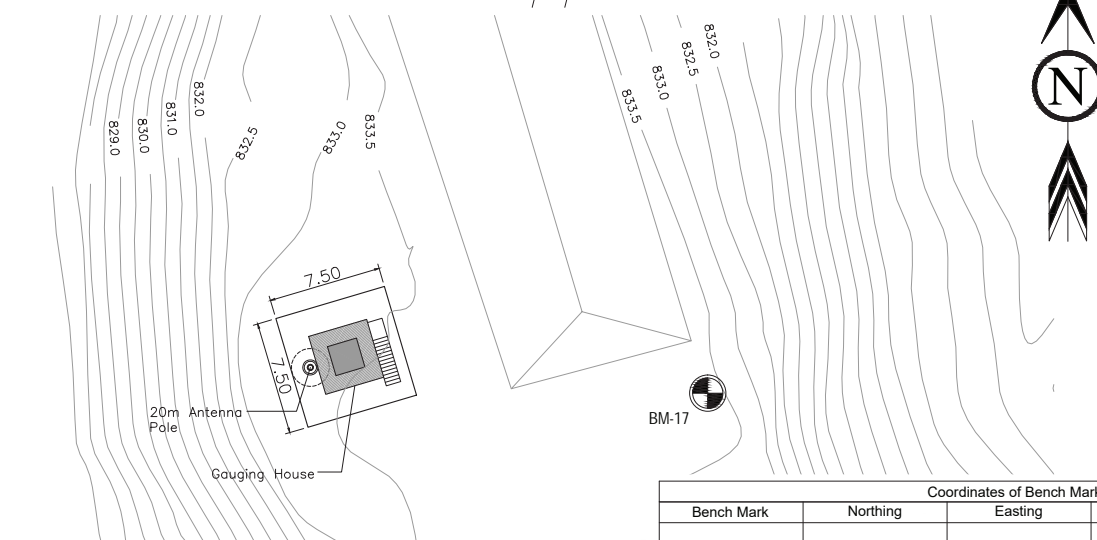
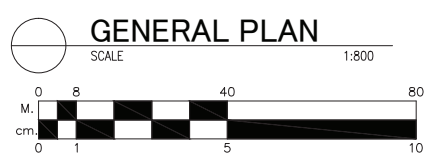
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DATE:	DATE:	DATE:	DATE:

SHEET CONTENTS :	DATE :	-
R-10 TALAKAG BUREAU OF FIRE GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION	SCALE :	-
	UNIT :	-
	DRAWING NO :	CVL-SJ-1

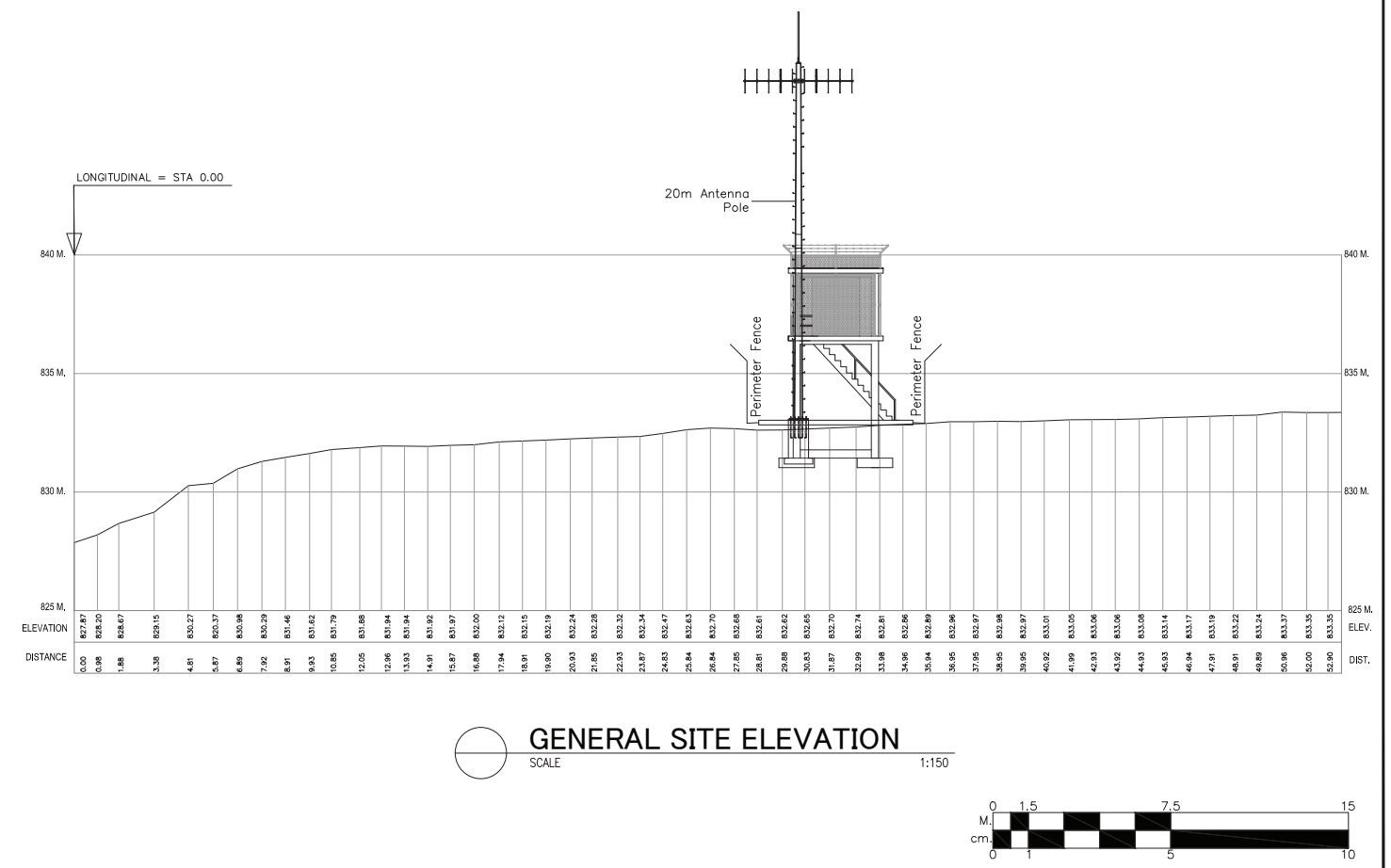
Fig.11 Rainfall Gauge Station (R-10)



KEY MAP
SCALE NTS



Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-17	888016.9650	458454.3450	823.235 M.	-
BM-18	888084.8390	458512.2210	823.4228 M.	-



GENERAL SITE ELEVATION
SCALE 1:150

MARK	DETAILS	DATE
REVISIONS		

PROJECT NAME AND LOCATION:
PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN

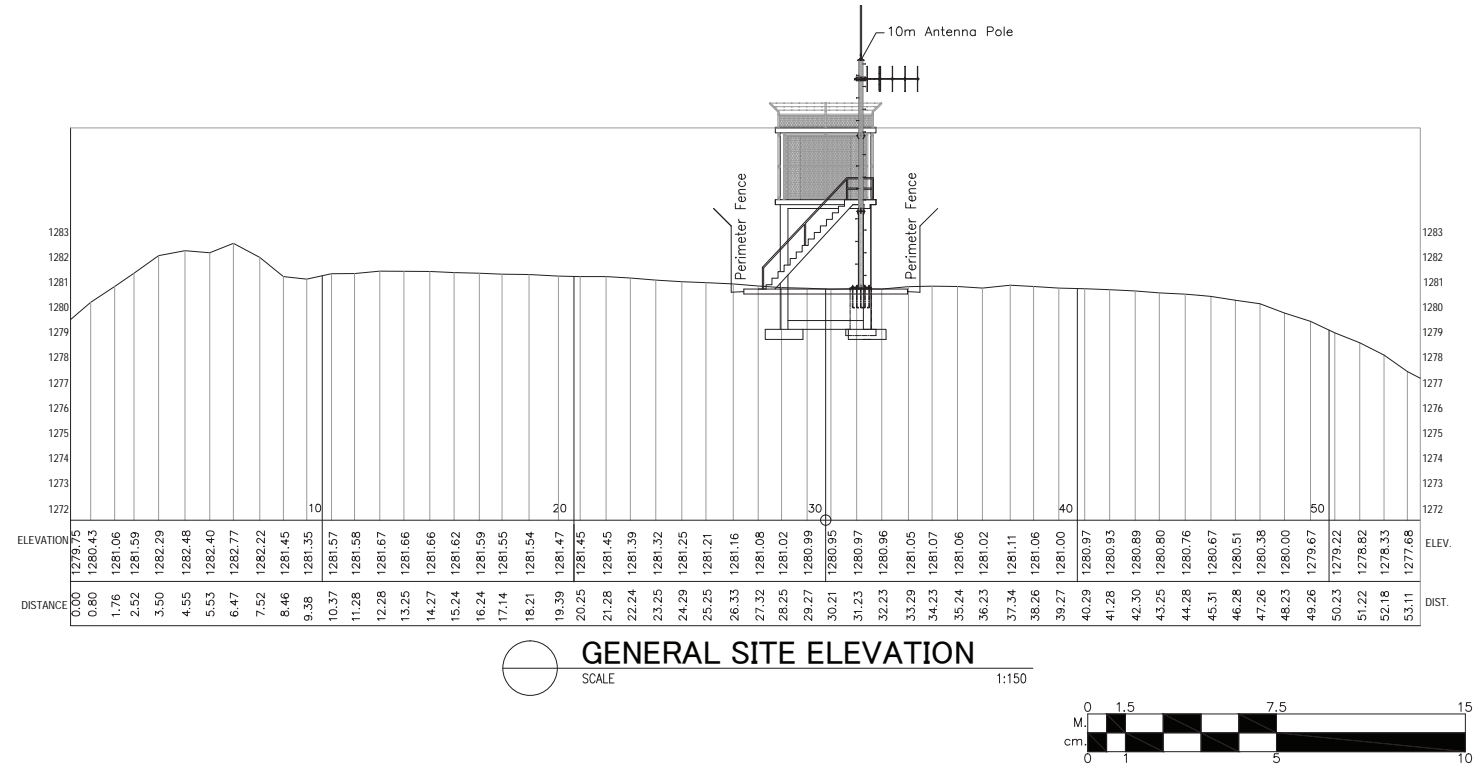
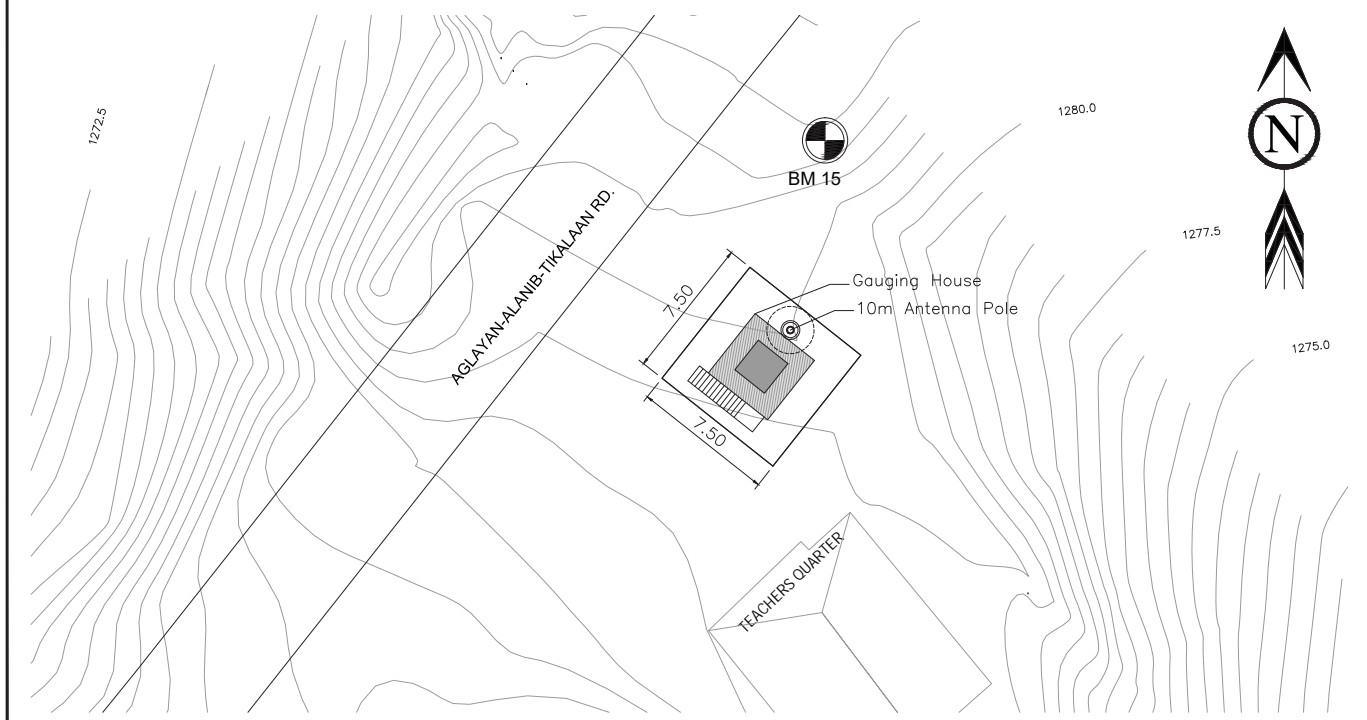
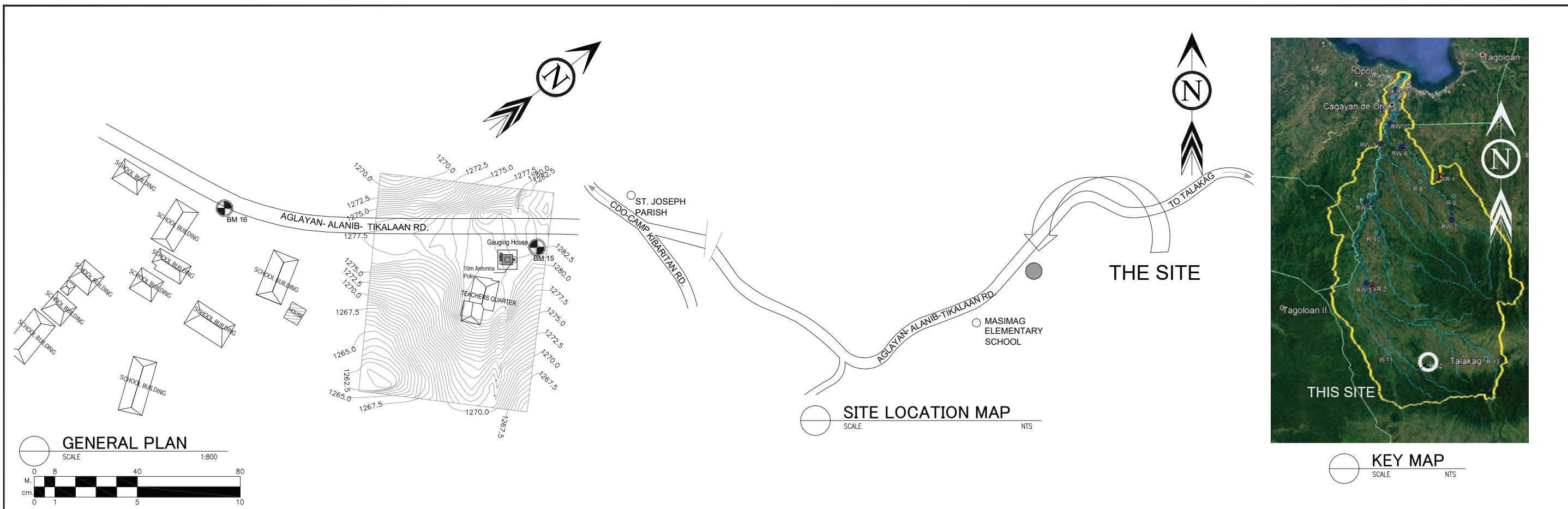
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION

NIPPON KOEI CO., LTD. TOKYO, JAPAN

RECOMMENDED BY: Office-in-Charge Mindanao PRSD	APPROVED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: CIVIL ENGINEER	CHECKED BY: YASUSHI AZUMA JICA Study Team Leader
DATE:	DATE:	DATE:	DATE:

SHEET CONTENTS :	DATE :	-
R-11 TIKALAN NATIONAL HIGH SCHOOL	SCALE :	-
GENERAL PLAN, SITE LOCATION MAP, KEY MAP	UNIT :	-
SITE LAYOUT & GENERAL SITE ELEVATION	DRAWING NO :	CVL-SK-1

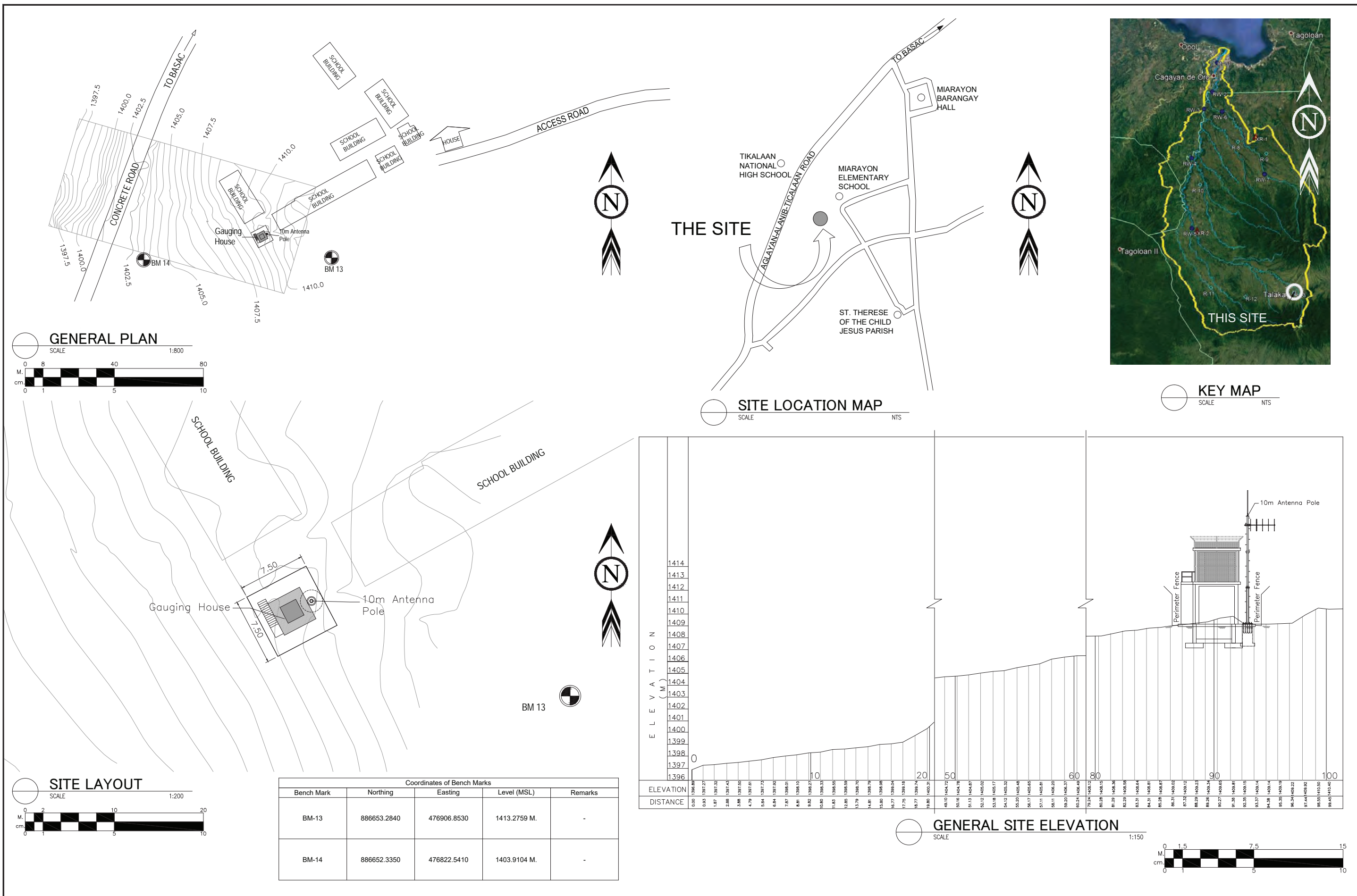
Fig.12 Rainfall Gauge Station (R-11)



Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-15	885963.8070	466015.0910	1282.4636 M.	-
BM-16	885878.0190	465927.8250	1278.1257 M.	-

PROJECT NAME AND LOCATION: PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN			PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION		NIPPON KOEI CO., LTD. TOKYO, JAPAN		SHEET CONTENTS : R-12 MASIMAG ELEMENTARY SCHOOL GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION		DATE : -
MARK	DETAILS	DATE	RECOMMENDED BY: Office-in-Charge Mindanao PRSD	APPROVED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: CIVIL ENGINEER	CHECKED BY: YASUSHI AZUMA JICA Study Team Leader			SCALE : -
REVISIONS			DATE:	DATE:	DATE:	DATE:			UNIT : -
							DRAWING NO : CVL-SL-1		

Fig.13 Rainfall Gauge Station (R-12)



Coordinates of Bench Marks			
Bench Mark	Northing	Easting	Level (MSL)
BM-13	886653.2840	476906.8530	1413.2759 M.
BM-14	886652.3350	476822.5410	1403.9104 M.

MARK	DETAILS	DATE
REVISIONS		

PROJECT NAME AND LOCATION:
 PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN

PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION

RECOMMENDED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA
 OFFICE-IN-CHARGE MINDANAO PRSD

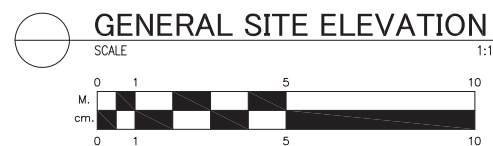
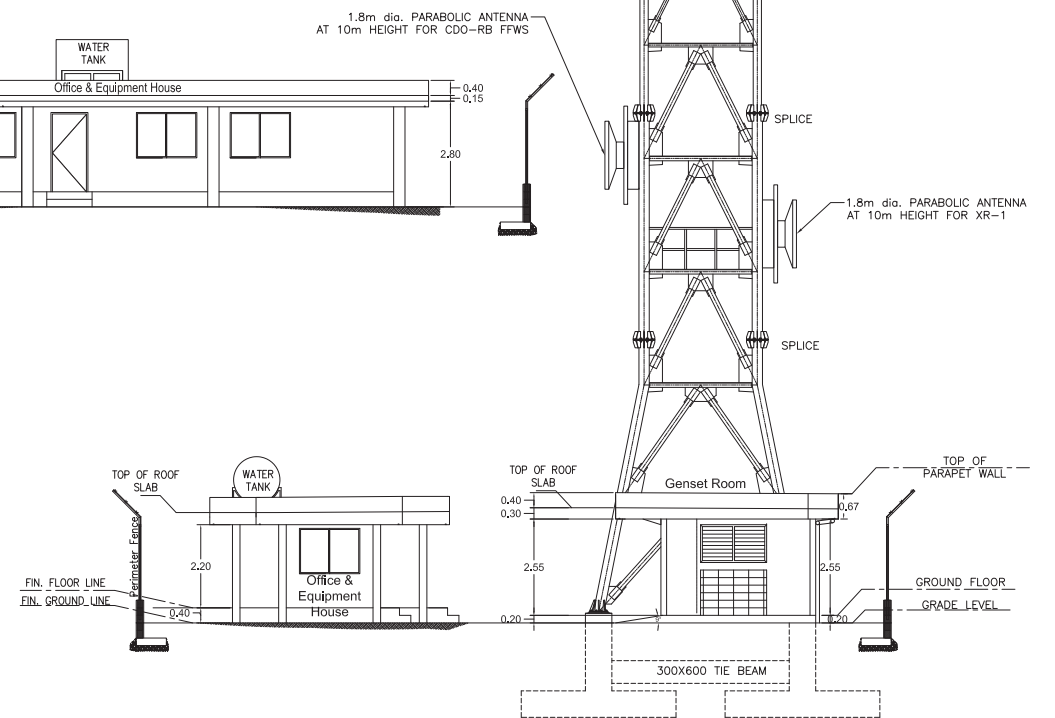
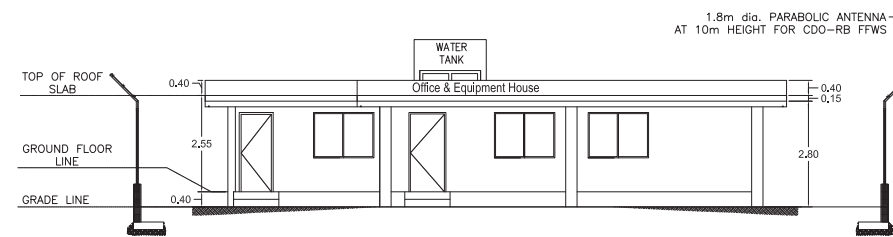
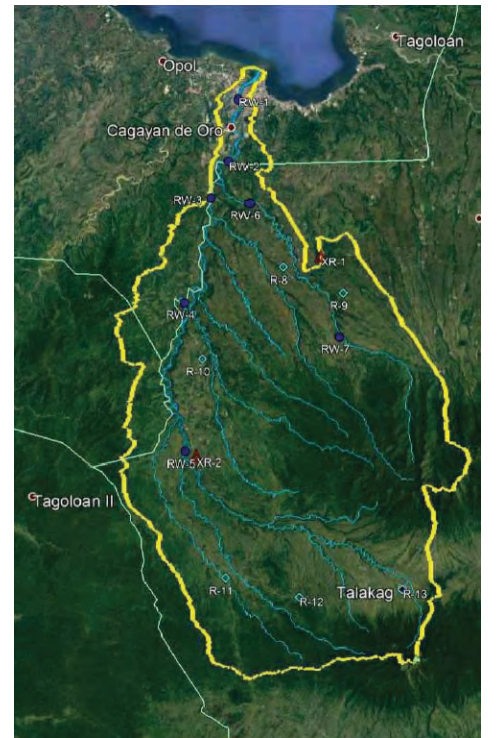
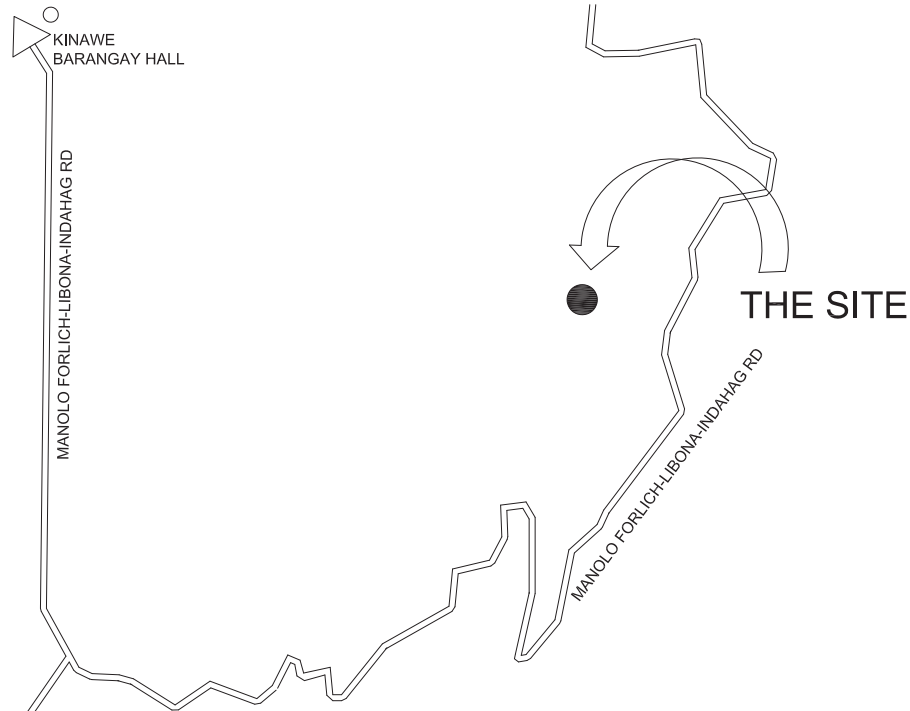
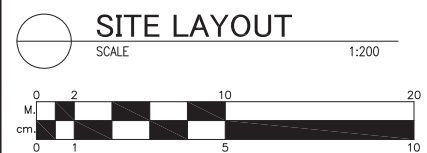
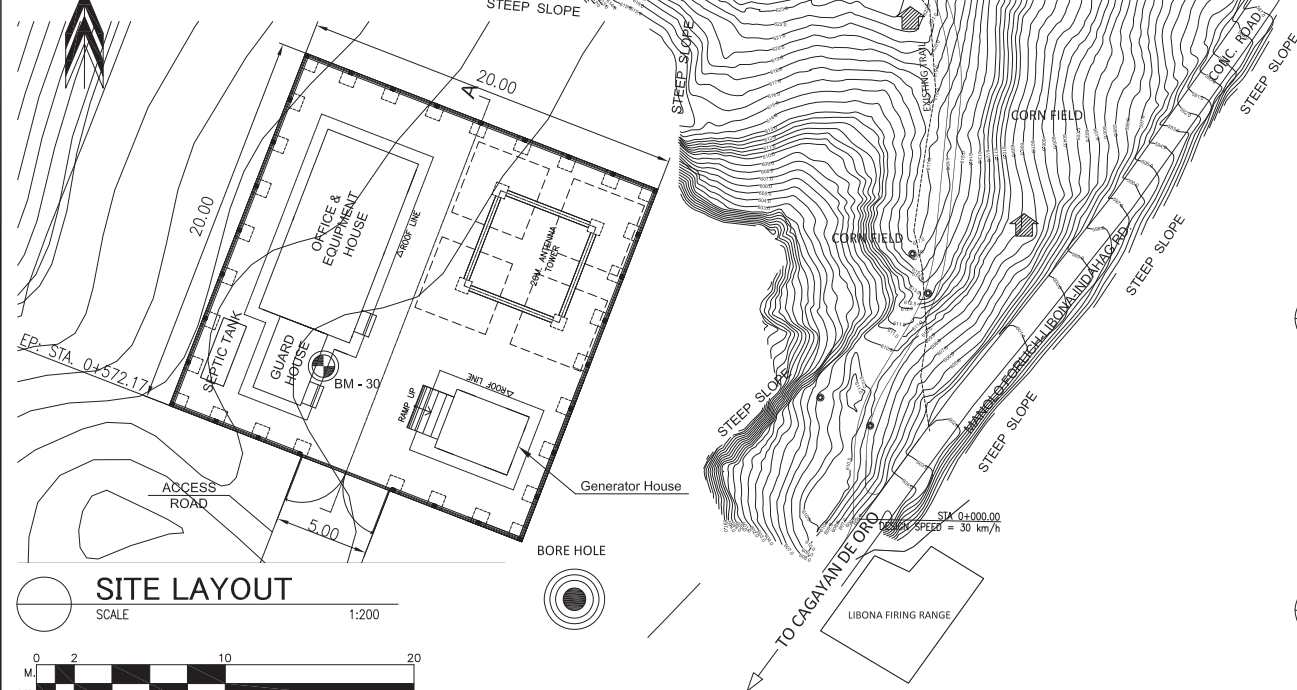
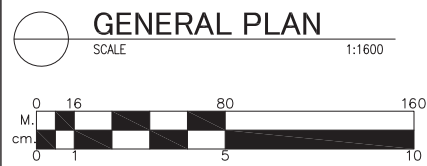
NIPPON KOEI CO., LTD.
 TOKYO, JAPAN

DESIGNED BY: CIVIL ENGINEER
 CHECKED BY: YASUSHI AZUMA JICA Study Team Leader

SHEET CONTENTS :	DATE :	-
R-13 MIARAYON ELEMENTARY SCHOOL	SCALE :	-
GENERAL PLAN, SITE LOCATION MAP, KEY MAP	UNIT :	-
SITE LAYOUT & GENERAL SITE ELEVATION	DRAWING NO :	CVL-SM-1

Fig.14 Rainfall Gauge Station (R-13)

Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-29	921219.9170	468630.0720	642.600 M.	BESIDE BOULDER
BM-30	921313.6710	468637.5050	645.717 M.	BESIDE TEAK TREE



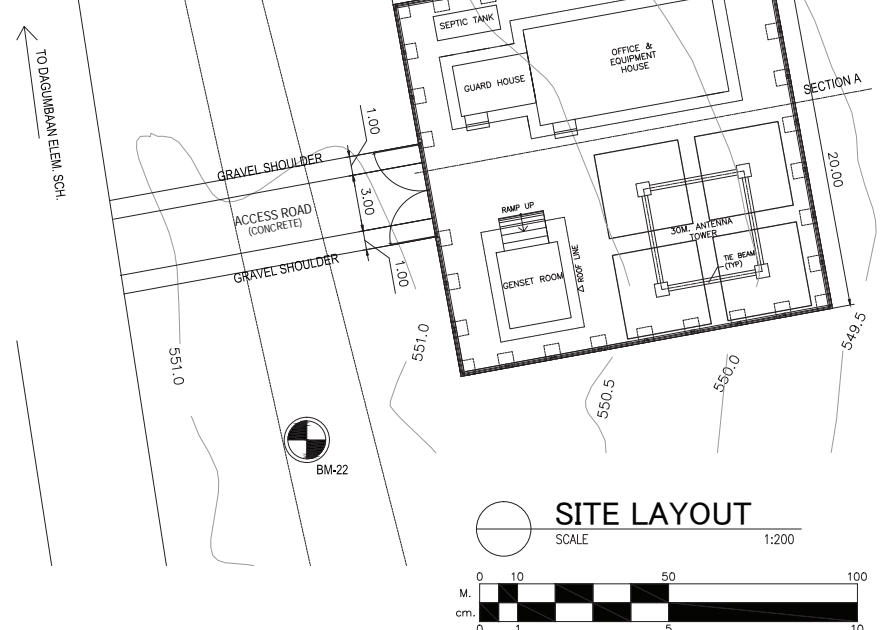
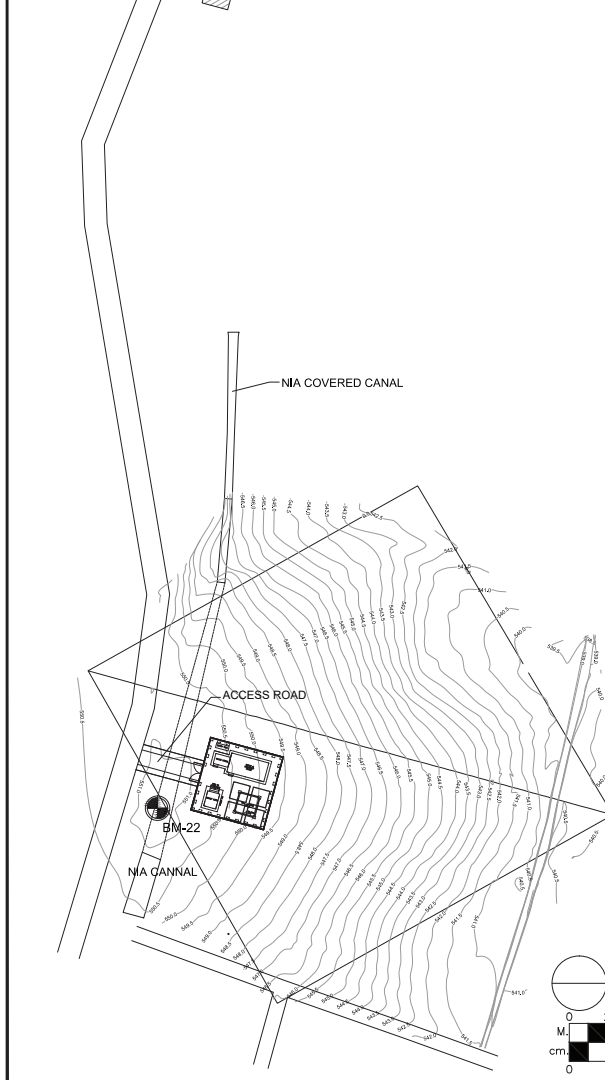
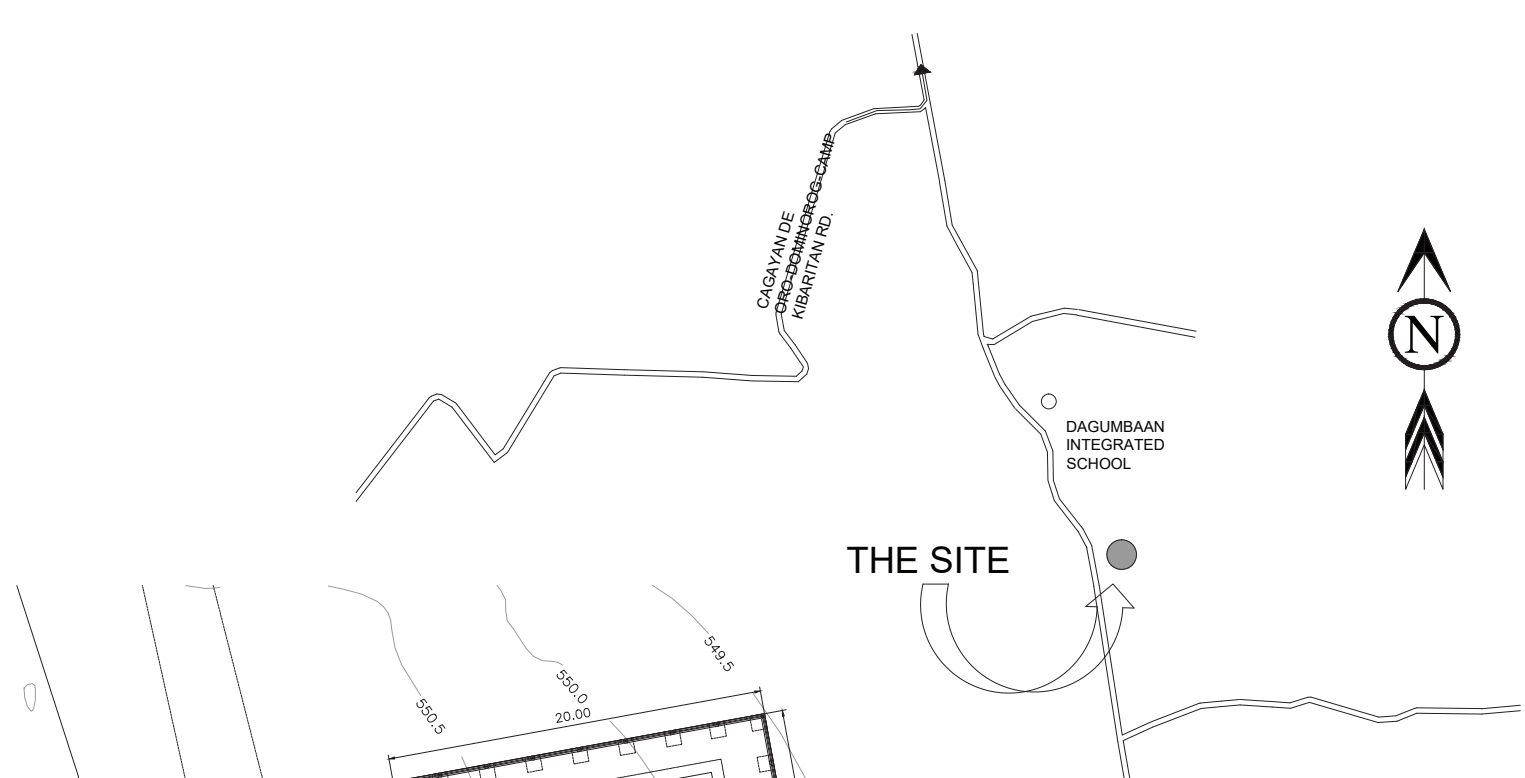
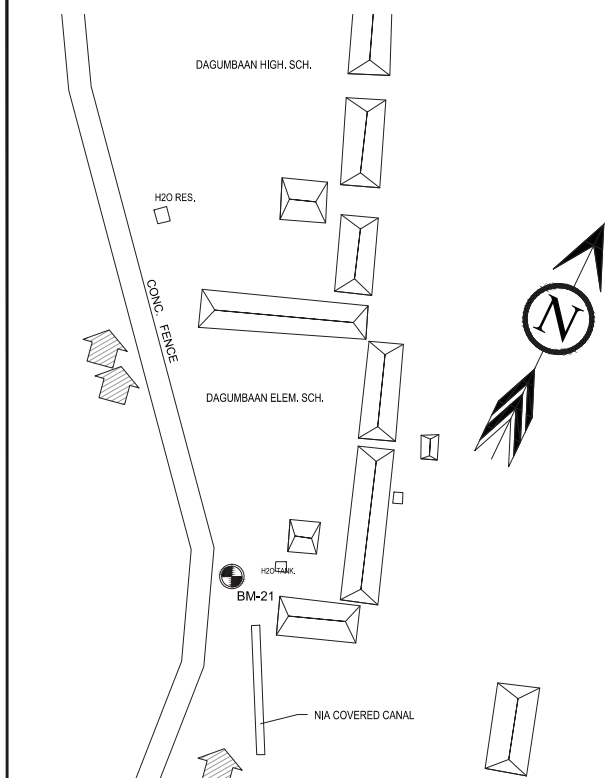
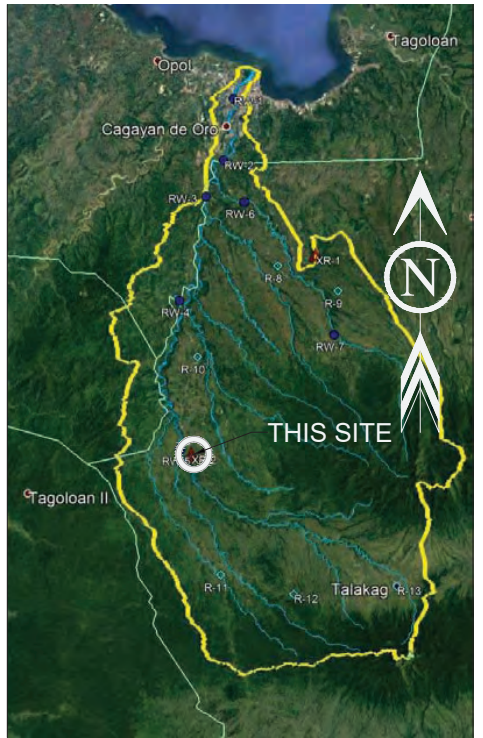
MARK	DETAILS	DATE
REVISIONS		

PROJECT NAME AND LOCATION:
 PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN

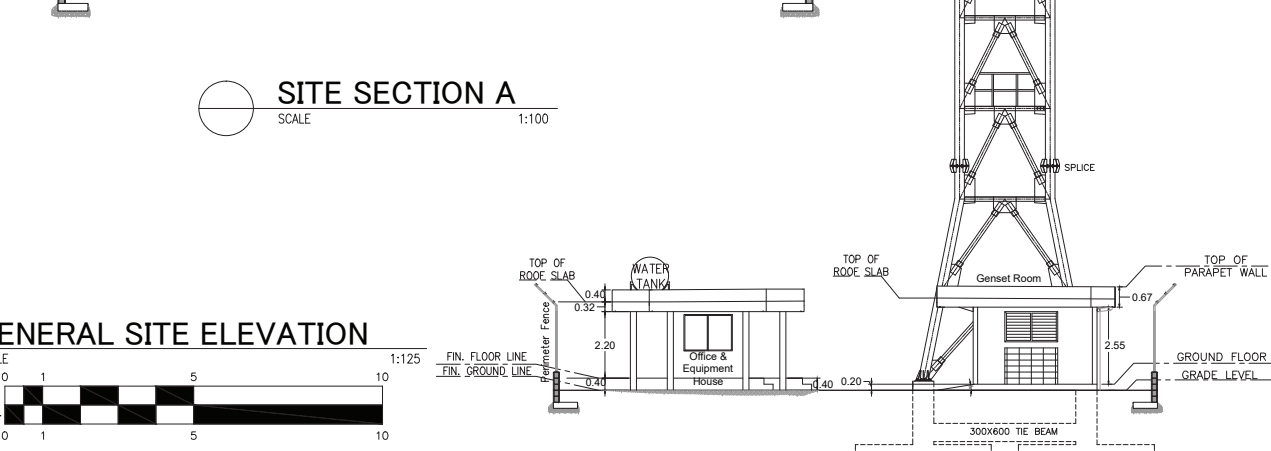
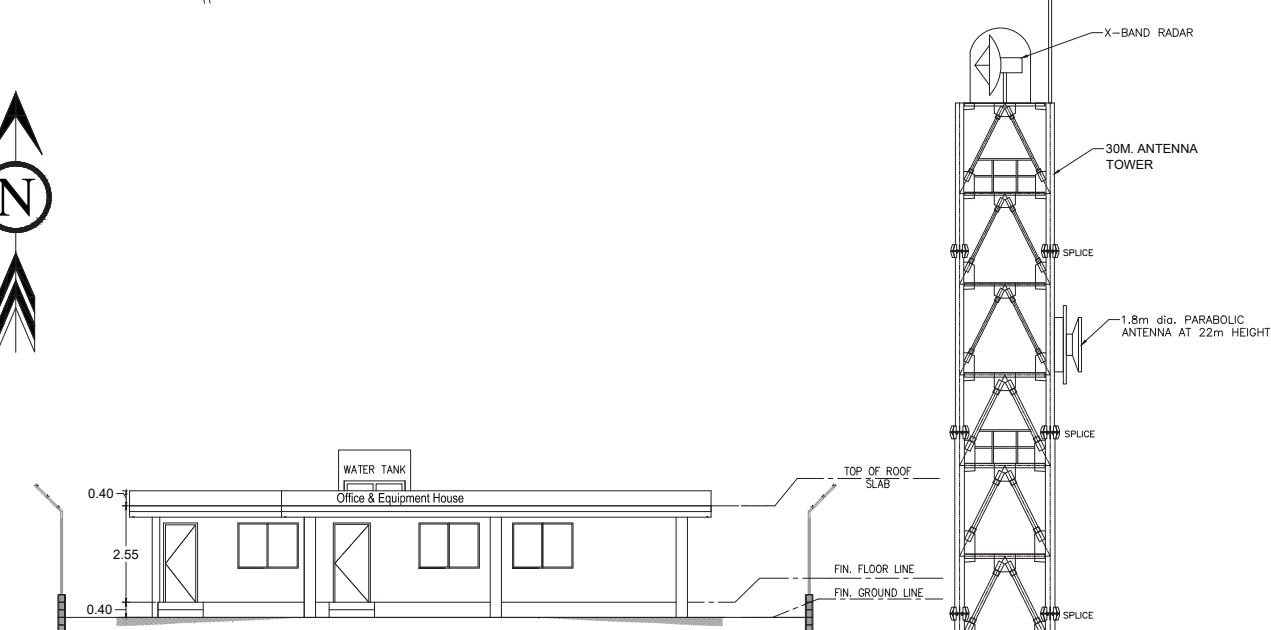
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION		NIPPON KOEI CO., LTD. TOKYO, JAPAN	
RECOMMENDED BY: -- Office-in-Charge Mindanao PRSD	APPROVED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: -- CIVIL ENGINEER	CHECKED BY: YASUSHI AZUMA JICA Study Team Leader
DATE:	DATE:	DATE:	DATE:

SHEET CONTENTS :	DATE :	-
GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION	SCALE :	-
	UNIT :	-
	DRAWING NO :	CVL-SN-1

Fig.15 X-band Radar Rain Gauge Station (XR-1)



Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-21	900833.6970	455291.7780	549.904 M.	BACK OF COVERED STAGE
BM-22	900584.3160	455389.3020	551.338 M.	BACK OF COVERED STAGE



MARK	DETAILS	DATE
	REVISIONS	

PROJECT NAME AND LOCATION:
 PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN

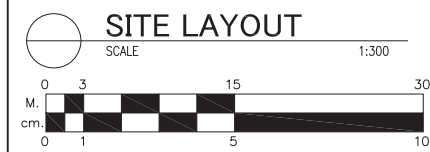
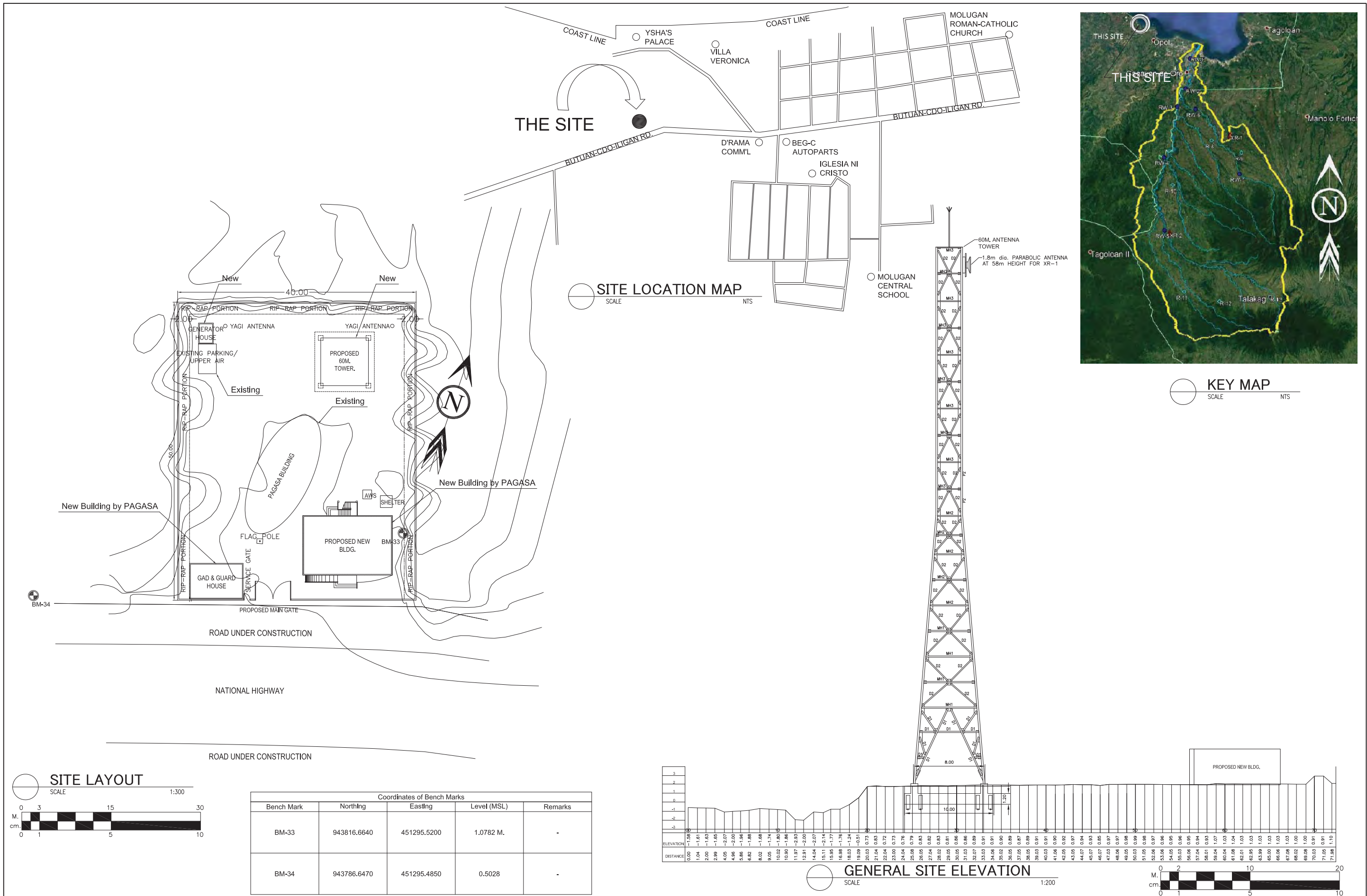
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NIPPON KOEI CO., LTD. TOKYO, JAPAN

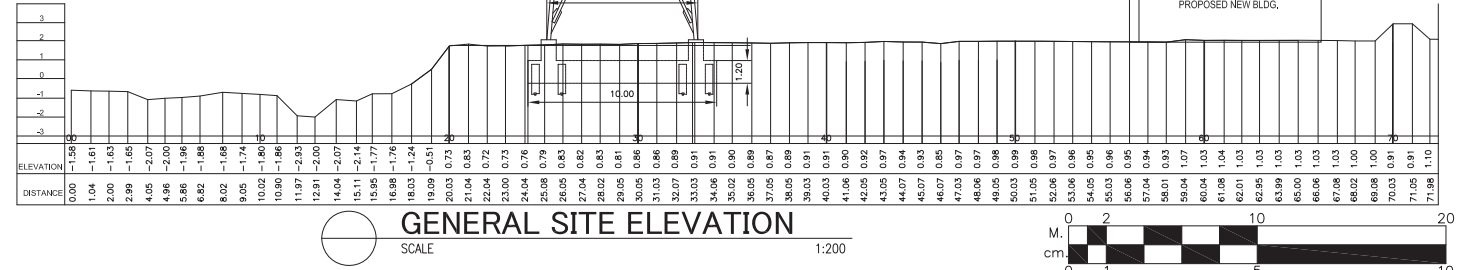
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DATE:	DATE:	DATE:	DATE:

SHEET CONTENTS :	DATE :	-
XR-2 DAGUMBAAN GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION	SCALE :	-
	UNIT :	-
	DRAWING NO :	CVL-SO-1

Fig.16 X-band Radar Rain Gauge Station (XR-2)

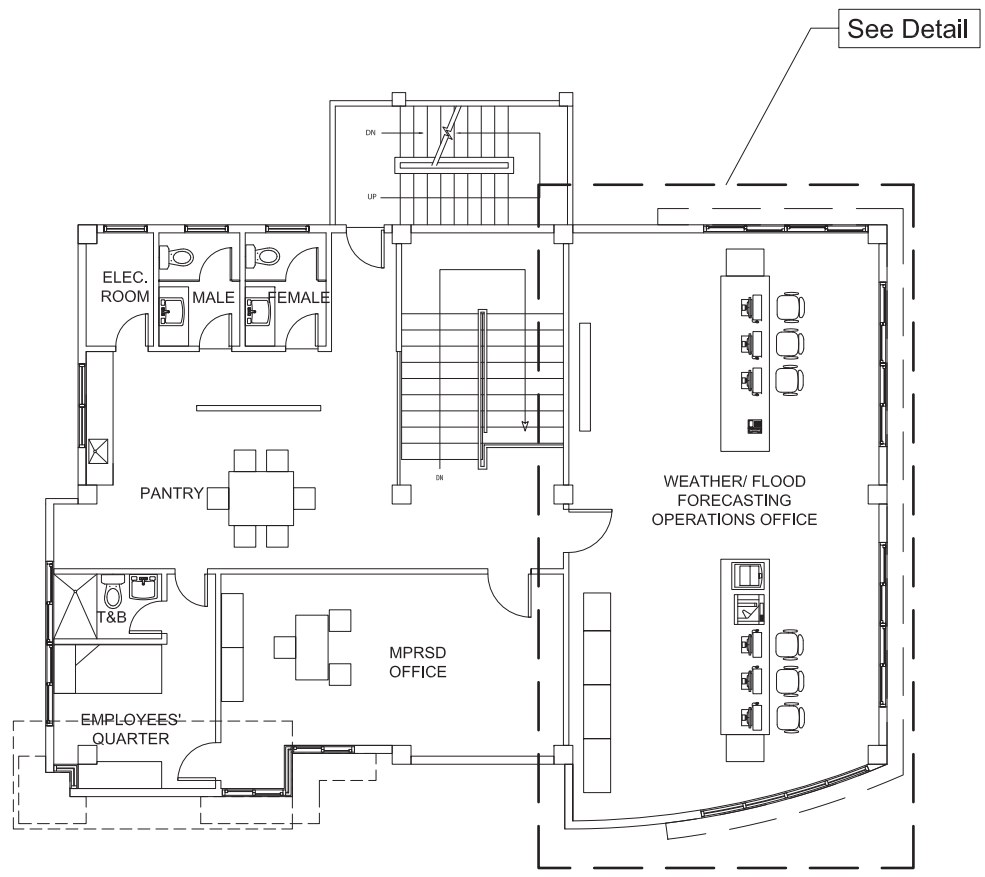


Coordinates of Bench Marks				
Bench Mark	Northing	Easting	Level (MSL)	Remarks
BM-33	943816.6640	451295.5200	1.0782 M.	-
BM-34	943786.6470	451295.4850	0.5028	-



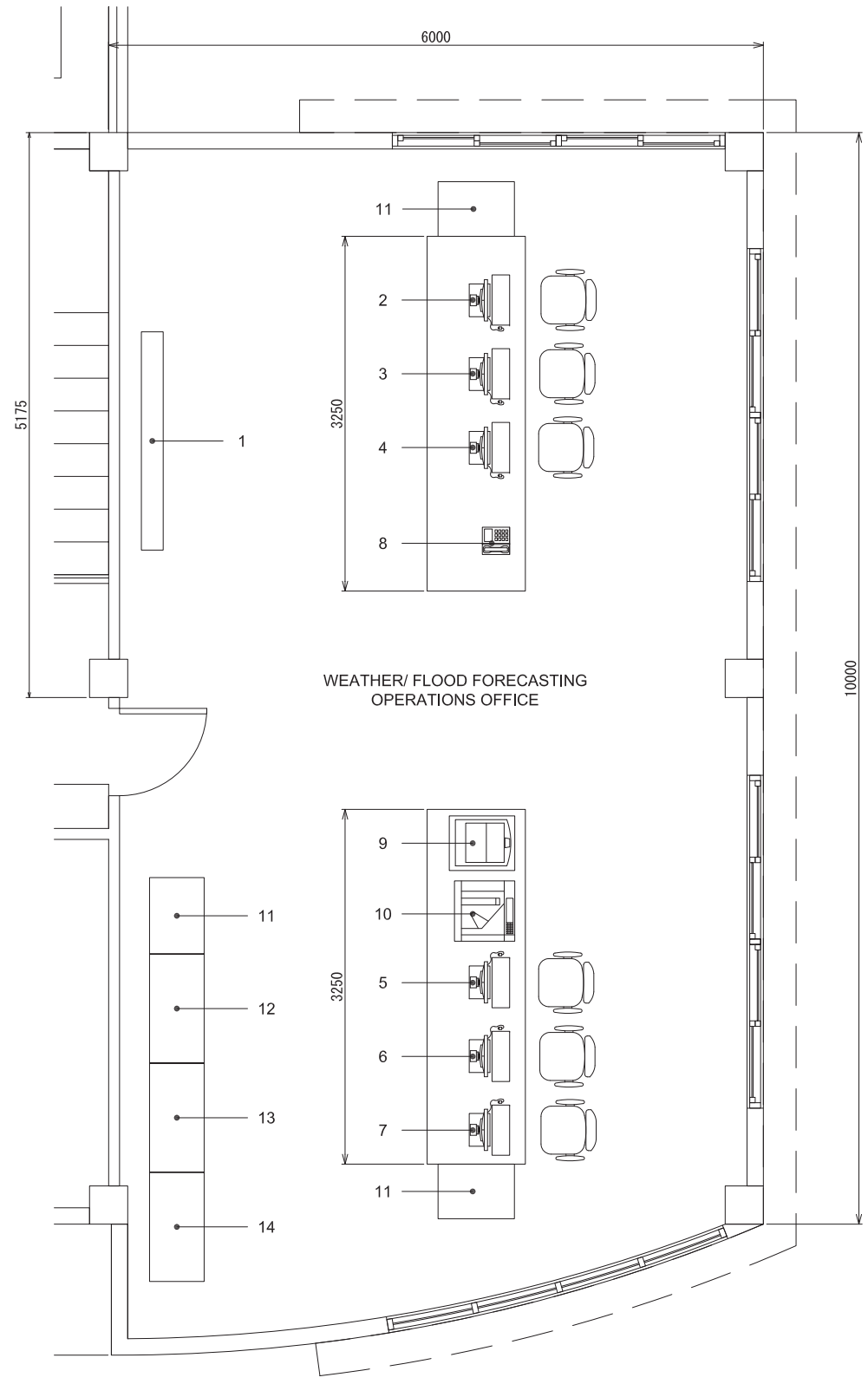
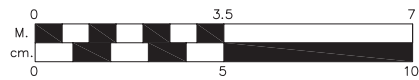
PROJECT NAME AND LOCATION: PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN			PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION		NIPPON KOEI CO., LTD. TOKYO, JAPAN		SHEET CONTENTS : CAGAYAN DE ORO RIVER BASIN FLOOD FORECASTING & WARNING CENTER (CDO-RB FFWC) GENERAL PLAN, SITE LOCATION MAP, KEY MAP SITE LAYOUT & GENERAL SITE ELEVATION		DATE : -
MARK	DETAILS	DATE	RECOMMENDED BY: -- Office-in-Charge Mindanao PRSD	APPROVED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: -- CIVIL ENGINEER	CHECKED BY: YASUSHI AZUMA JICA Study Team Leader			SCALE : -
REVISIONS			DATE:	DATE:	DATE:	DATE:			UNIT : -
									DRAWING NO : CVL-SP-1

Fig.17 Master Station



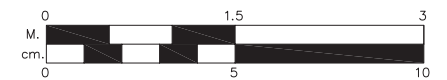
SECOND FLOOR PLAN

SCALE 1:70



EQUIPMENT LAYOUT

SCALE 1:30

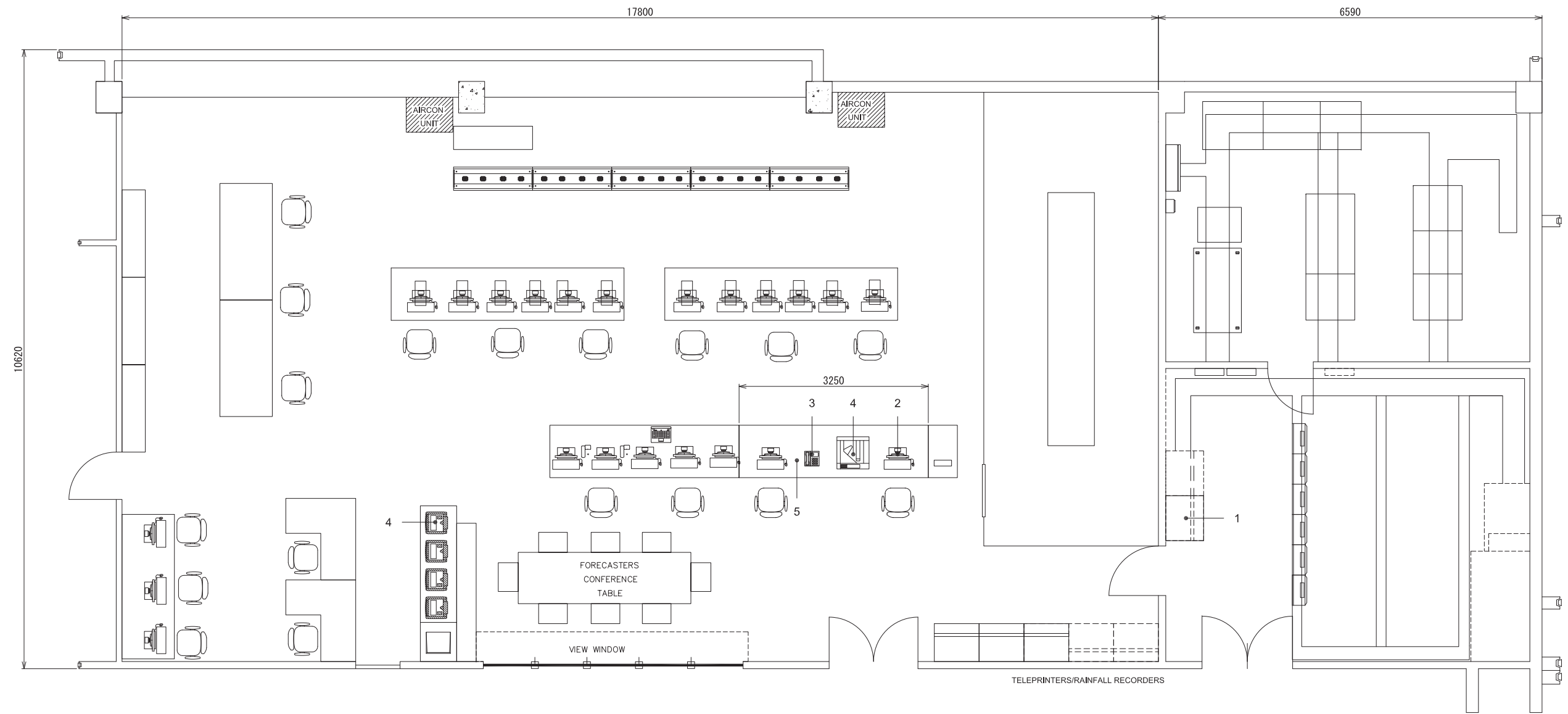


LEGEND:

- 1 Display (50 in. Monitor x4)
- 2 FFWS Display Terminal
- 3 X-Band Radar Terminal
- 4 Operating Console
- 5 Network Monitor Terminal
- 6 Data Logger Memory Card Reader
- 7 File Converter
- 8 VoIP TEL
- 9 Network Printer
- 10 FAX / TEL
- 11 AC UPS
- 12 Server Rack
- 13 Telemetry Controller
- 14 7.5GHz IP Radio

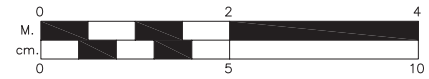
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			PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN		RECOMMENDED BY: <small>Office-in-Charge Mindanao PRSD</small>		APPROVED BY: <small>VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA</small>		DESIGNED BY: <small>CIVIL ENGINEER</small>		CHECKED BY: <small>PROJECT MANAGER</small>		SCALE : -	
MARK			DETAILS			DATE			CDO-RFFWC EQUIPMENT LAYOUT		UNIT : -			
REVISIONS											DRAWING NO : -			

Fig.18 Equipment Layout at Master Station



EQUIPMENT LAYOUT

SCALE 1 : 40

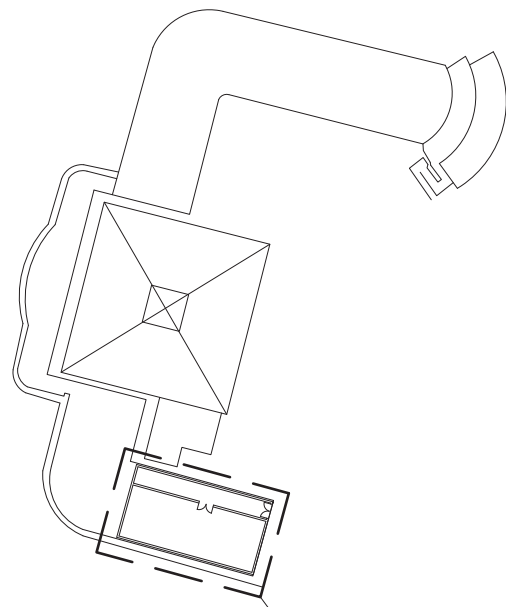


LEGEND:

- 1 RAW Data Processing Server
- 2 X-Band Radar Terminal
- 3 VoIP TEL
- 4 FAX / TEL
- 5 AC UPS (Under Table)

			PROJECT NAME AND LOCATION: PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN		PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION		NIPPON KOEI CO., LTD. TOKYO, JAPAN		SHEET CONTENTS : PAGASA HMD EQUIPMENT LAYOUT		DATE : -
MARK	DETAILS	DATE	RECOMMENDED BY: Office-in-Charge Mindanao PRSD	APPROVED BY: VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA	DESIGNED BY: CIVIL ENGINEER	CHECKED BY: PROJECT MANAGER			SCALE : -	UNIT : -	DATE :
REVISIONS			DATE:	DATE:	DATE:	DATE:			DRAWING NO : -		

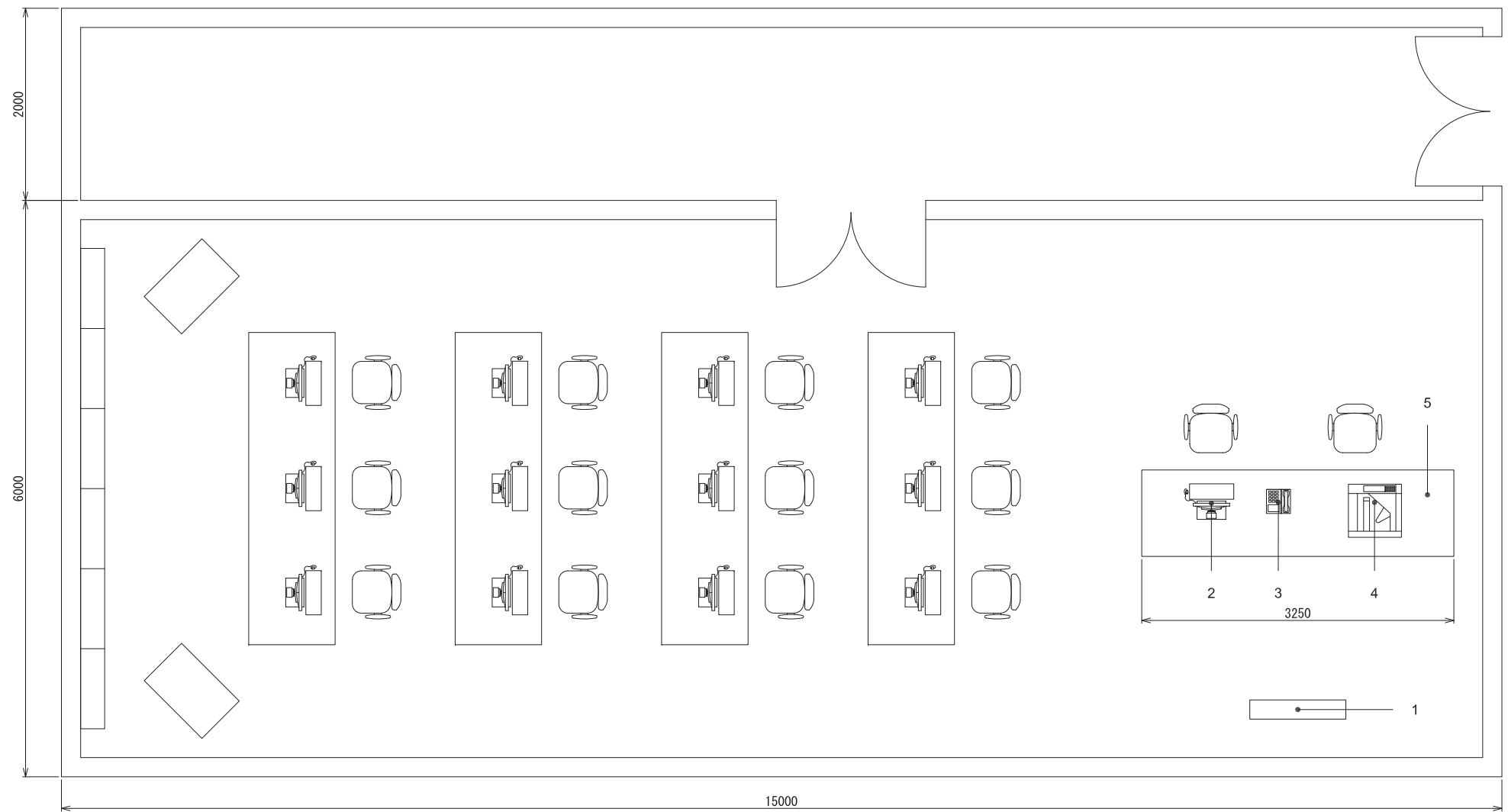
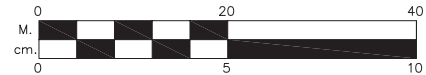
Fig.19 Equipment Layout of Monitoring Station at PAGASA HMD



Position of Room

CDO-CDRRMD BUILDING

SCALE 1 : 400

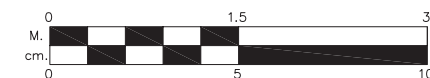


EQUIPMENT LAYOUT

SCALE 1 : 30

LEGEND:

- 1 LCD Display
- 2 Display Terminal
- 3 VoIP TEL
- 4 FAX / TEL
- 5 AC UPS (Under Table)





PROJECT NAME AND LOCATION:			 PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION		 NIPPON KOEI CO., LTD. <small>TOKYO, JAPAN</small>		SHEET CONTENTS :		DATE :	-
PREPARATORY SURVEY FOR THE PROJECT FOR IMPROVEMENT OF FLOOD FORECASTING AND WARNING SYSTEM (FFWS) FOR CAGAYAN DE ORO RIVER BASIN			RECOMMENDED BY:		DESIGNED BY:		CDO-CDRRMD EQUIPMENT LAYOUT		SCALE :	-
MARK	DETAILS	DATE	APPROVED BY:		CHECKED BY:				UNIT :	-
REVISIONS			<small>Office-in-Charge Mindanao PRSD</small>		<small>VICENTE B. MALANO, Ph.D., MNSA Administrator PAGASA</small>		<small>CIVIL ENGINEER</small>		DRAWING NO :	-
			DATE:		DATE:					

Fig.20 Equipment Layout of Monitoring Station at CDO-CDRRMD