2-3 Obligation of Recipient Country

In the implementation of the Project under Japan's Grant Aid Assistance, PAGASA is responsible for the following tasks.

1) General requirements
   a) To undertake all necessary institutional and juridical procedures in the Philippines.
   b) To handle duty exemption procedures and to take necessary measures for customs clearance at the port of disembarkation for the materials and equipment imported for the Project.
   c) To accord Japanese nationals, whose services may be required in connection with the supply of products and services under verified contracts, such facilities as may be necessary for their entry into the Philippines and stay therein for the performance of their work.
   d) To provide necessary space at the PAGASA Head Office for the Consultant and the Contractor for the implementation of the Project, if required.
   e) To allocate necessary personnel for meteorological observation and forecasting work.

2) Requirements for Construction of Radar Tower Buildings
   a) To ensure the security and to secure and clear the land necessary for the Project prior to commencement of the construction.
   b) To obtain necessary permissions for construction of the radar tower buildings.
   c) To secure land necessary for the Project and to clear, level and reclaim the land prior to commencement of the construction.
   d) To renovate the existing buildings for establishing a new Staff Quarter
   e) To provide the commercial power supply and other incidental facilities for the radar tower buildings.
   f) To provide temporary facilities for distribution of electricity, water and other incidental facilities for the construction work.
   g) To install the required step-down transformers for the commercial power supply at the sites.
   h) To undertake incidental outdoor works such as gardening, fencing, gates, boundary walls and exterior lighting in and around the sites, if necessary.
   i) To procure furniture for a new Staff Quarter
   j) To secure sufficient spaces at the Project sites for temporary facilities such as a contractor's office, workshop, building materials storage, etc. for the construction work.
   k) To implement expansion and concrete pavement of the remaining unpaved portion of the existing access road.
   l) To provide adequate maintenance of the buildings constructed under the Grant Aid Project, so as they can function effectively.

3) Requirements for the Equipment

a) To remove and relocate the existing facilities for installation of the equipment at the expense of PAGASA.

b) To secure the existing frequencies for the meteorological radar systems to be installed.

c) To obtain the required space segment and the VSAT user license from the National Telecommunications Commission (NTC)) for the use of satellite communication for the meteorological data satellite communication system (VSAT) to be installed.

d) To secure effective space at the existing facilities for installation of the equipment to be supplied.

e) To maintain, and properly and effectively utilize, the equipment purchased under the Grant Aid.

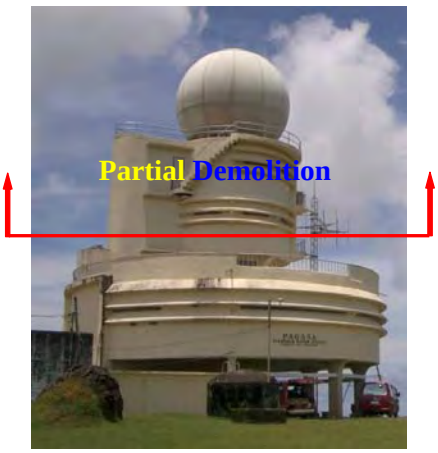
The detailed obligations required for construction of Radar Tower Building to be taken by PAGASA are indicated hereunder and according to these, the capital cost to be born by PAGASA is as per attached “2-5 Project Cost Estimate”.

<Virac Meteorological Radar Station>

(1) Partial demolition of the existing radar tower building in order to prevent it from collapsing due to an earthquake and/or strong wind associated with typhoons because;

1) the existing building is obsolete,
2) the upper part of the existing building is not appropriately connected to the main columns of the bottom part and,
3) the upper parts of each column is out of the column's center line of the bottom part.

These are why the existing building swings due to strong winds.



(2) Shift of the existing observation field and instruments.

(3) Re-wiring the existing power cable for the mobile communication facilities located in the site.

(4) Renovation of the existing buildings circled in the picture for establishment of the staff quarter.

(5) Replacement of the existing step down transformers since the existing transformers are rapidly becoming obsolete and not enough capacity required for a new radar tower building.

Table 42: Requirements of the step down transformers for Virac

Number	3 sets
Capacity	50 kVA x 3 sets = 150kVA
Input/Output	13.2 kV/240V 60Hz

<Aparri Meteorological Radar Station>

(1) In order to secure enough space for construction of a new radar tower building in the Project, demolition for the existing building circled in the picture is required.

(2) Repair of the column on the ground floor of the existing radar tower building which has already lost more than 50% of the designed concrete strength and removal of all the existing radar system are indispensable since subsidence of the existing building was caused by several earthquakes especially the earthquake that occurred during the existing building construction period on June 19, 1992. The existing building is in extremely hazardous condition and may be leveled by an earthquake.

(3) Renovation of the existing buildings circled in the picture for establishment of the staff quarter.

(4) Shift of the existing observation field and instruments.

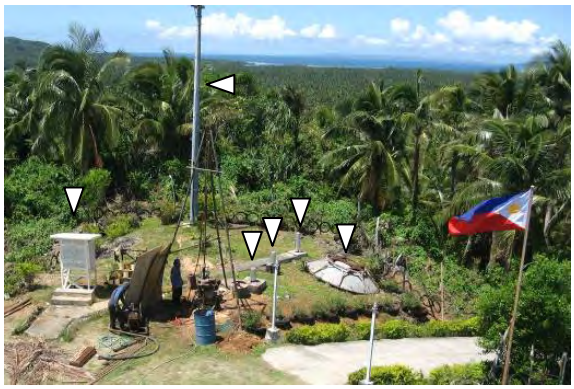
(5) Replacement of the existing step down transformers since the existing transformers are rapidly becoming obsolete and not enough capacity required for a new radar tower building.

Table 43: Requirements of the step down transformers for Aparri

Number	3 sets
Capacity	50 kVA x 3 sets = 150kVA
Input/Output	13.2 kV/240V 60Hz

<Guiuan Meteorological Radar Station>

(1) Shift of the existing observation field and instruments.



(2) Removal of the existing radar system

(3) Renovation of the existing buildings circled in the picture for establishment of the staff quarter.

(4) Expansion (required width: 3.8m (existing: 3.2 m)) and concrete pavement of the remaining unpaved portion of the existing access road from the main road to the site.

(5) Supply of the commercial power (240V, 3 phases, 3 wires, 60Hz) and the step down transformers specified as follows for a new radar tower building.

Table 44: Requirements of the step down transformers for Guiuan

Number	3 sets
Capacity	50 kVA x 3 sets = 150kVA
Input/Output	13.2 kV/240V 60Hz

Drawing of expansion and concrete pavement of the remaining unpaved portion of the existing access road from the main road to the site is attached hereunder.

NOTES:

1. SCALE : METERS

LEGENDS:

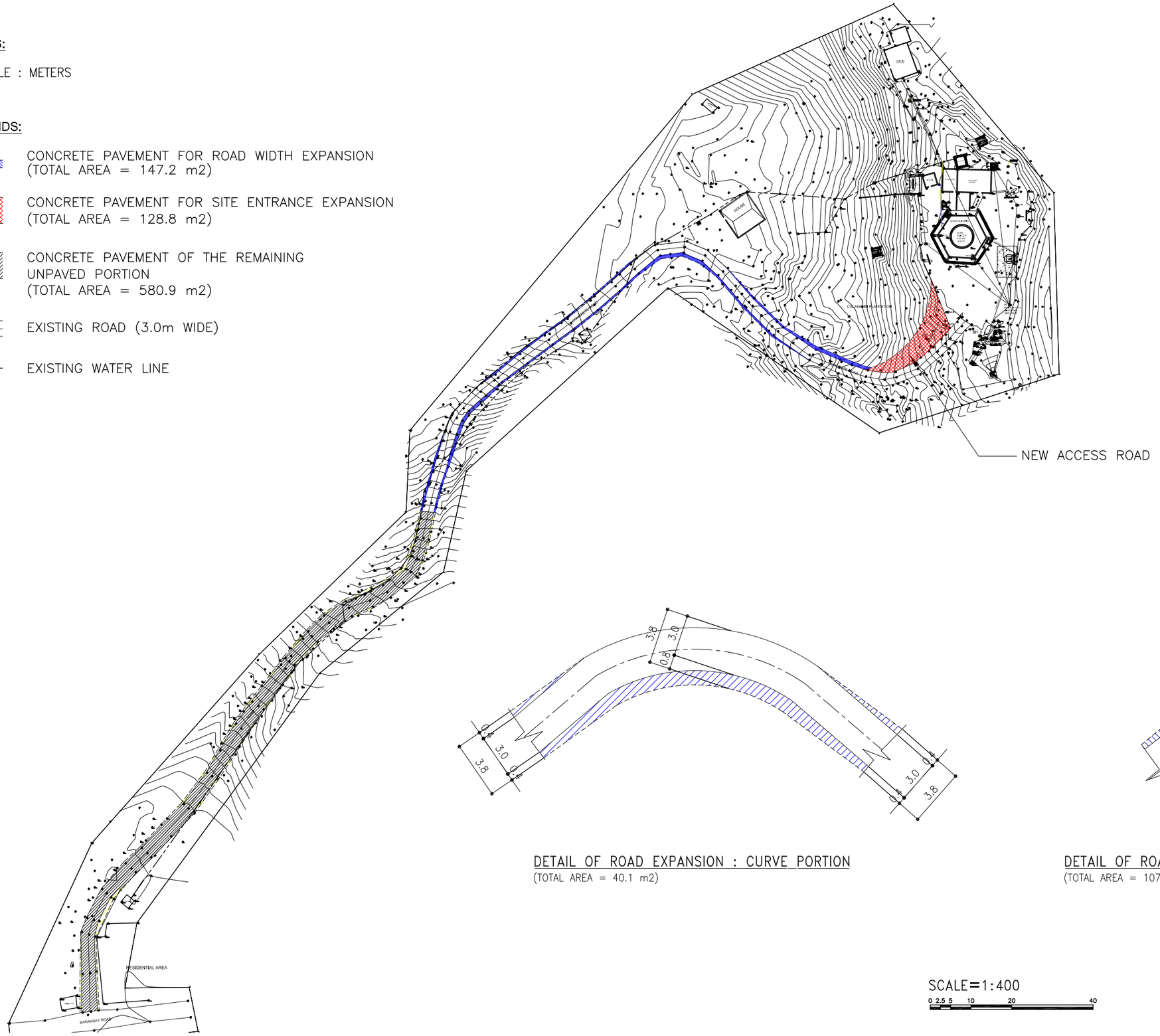
CONCRETE PAVEMENT FOR ROAD WIDTH EXPANSION
(TOTAL AREA = 147.2 m2)

CONCRETE PAVEMENT FOR SITE ENTRANCE EXPANSION
(TOTAL AREA = 128.8 m2)

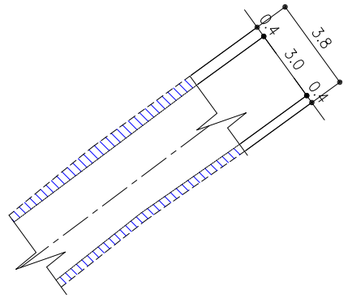
CONCRETE PAVEMENT OF THE REMAINING
UNPAVED PORTION
(TOTAL AREA = 580.9 m2)

EXISTING ROAD (3.0m WIDE)

EXISTING WATER LINE



DETAIL OF ROAD EXPANSION : CURVE PORTION
(TOTAL AREA = 40.1 m2)



DETAIL OF ROAD EXPANSION : STRAIGHT ROAD PORTION
(TOTAL AREA = 107.1 m2)

SCALE=1:400

0 2.5 5 10 20 40

Japan Weather Association
Sunshine 60 Bldg., 55F, 3-1-1, Higashi Ikebukuro, Toshima-ku, Tokyo,
170-6055 Japan Tel. +81-3-5958-8161 Fax. +81-3-5958-8162

GUIUAN METEOROLOGICAL
RADAR OBSERVATION STATION

DRAWING TITLE
EXPANSION AND CONCRETE PAVEMENT OF THE REMAINING UNPAVED PORTION OF THE EXISTING ACCESS ROAD

SCALE
1:400

DRAWING No.
G - G - 02

2-4 Project Operation Plan

(1) Operation and Maintenance Plan for the Equipment

1) Operational Plan of Meteorological Radar System

Upon completion of the Project, the hours of operation of each meteorological radar systems have been planned in accordance with annual transition of the climate in the Philippines. PAGASA has agreed to meet the following operational plan.

Table 45: Estimated Annual Radar Operation Hours
(Calculated based on daily rainfall data 2002-2007 (for 5 years) recorded by PAGASA)

Estimated Annual Radar Operation Hours of Virac Meteorological Doppler Radar System					
Annually	Number of Tropical Cyclone/year	Number of Observation/day	Observation Hours (h/day)	Observation Days	Observation Hours
When no rainfall is observed	0	2	2	142	284
When rainfall is observed	0	8	8	178	1,424
Tropical Cyclone	9	Continuously	24	45 (1 Tropical Cyclone/5 Day)	1,080
				365	2,788
				Annual Observation Hour: 2,800 hours	

Estimated Annual Radar Operation Hours of Aparri Meteorological Doppler Radar System					
Annually	Number of Tropical Cyclone/year	Number of Observation/day	Observation Hours (h/day)	Observation Days	Observation Hours
When no rainfall is observed	0	2	2	252	504
When rainfall is observed	0	8	8	68	544
Tropical Cyclone	9	Continuously	24	45 (1 Tropical Cyclone/5 Day)	1,080
				365	2,128
				Annual Observation Hour: 2,200 hours	

Estimated Annual Radar Operation Hours of Guiuan Meteorological Doppler Radar System					
Annually	Number of Tropical Cyclone/year	Number of Observation/day	Observation Hours (h/day)	Observation Days	Observation Hours
When no rainfall is observed	0	2	2	154	308
When rainfall is observed	0	8	8	166	1,328
Tropical Cyclone	9	Continuously	24	45 (1 Tropical Cyclone/5 Day)	1,080
				365	2,716
				Annual Observation Hour: 2,800 hours	

2) Operation and Maintenance Plan for the Equipment

For appropriate operation of the meteorological radar systems, the following number of staff is required.

Table 46: Required Staff at each Meteorological Radar Station

Position	Virac Meteorological Radar Station	Aparri Meteorological Radar Station	Guiuan Meteorological Radar Station
Chief Meteorological Officer	1	1	1
Assistant Meteorological Officer	1	1	1
Observer/Radar Operator	1	1	1
Electronic Engineer/Technician	1	1	1
Electrical Engineer/Technician	1	1	1
Mechanical Technician	1	1	1

3) Quick Response Team for Operation and Maintenance of the Equipment

In order to assist each Meteorological Radar Station and make prompt action required for recovering failure of the meteorological radar system, the meteorological radar display system and the meteorological data satellite communication system (VSAT), the following member of the quick response team at PAGASA Head Office is required.

Table 47: Required Staff of Quick Response Team of Radar System

Position	PAGASA Head Office
Chief of Meteorological Equipment and Maintenance Section	1
Officer-in-charge of Radar Maintenance Unit	1
Meteorological Radar Engineer	1
Meteorological Radar Technician	1
Meteorological Radar Technician	1

Table 48: Required Staff of Quick Response Team of Communication/ICT

Position	PAGASA Head Office
Electronic Engineer (Communication, VSAT, GPRS/EDGE Equipment)	1
Electronic Technician (Communication, VSAT, GPRS/EDGE Equipment)	1
ICT/Software Engineer (Network & Computer Equipment + Software Maintenance)	1
ICT/Software Technician (Network & Computer Equipment + Software Maintenance)	1

4) Operation and Maintenance Plan for the Equipment

In connection with equipment maintenance, consideration must be given to the followings.

- Technical training for the PAGASA staff
- Establishment of appropriate measures against system failure
- A fully documented maintenance system, with proper document control
- Scheduled replacement of parts and overhauls
- Strengthening of the operation and maintenance structure of PAGASA
- Establishment of technical and financial self-reliance of PAGASA

<Recruitment of Engineer/Staff >

Operation and maintenance of the meteorological radar systems are carried out mainly by PAGASA electronic and communications engineers and technical staff. However, the number of engineers and

technical staff is not adequate. Therefore, it is crucial that the existing vacant positions be filled. PAGASA fully recognizes the need to fill the existing vacant positions. For the staff recruitment, the Department of Science and Technology (DOST) as the supervising department of PAGASA should lend its strong support and special attention on this matter.

In order for PAGASA to become self-reliant in technical areas such as the operation and maintenance of radar systems, it is requisite of PAGASA to make continuing efforts to fill vacancies and promote technology transfer for all staff levels, from senior engineers to entry level technicians.

(2) Operation and Maintenance Plan for the Radar Tower Buildings

There are three key issues for the maintenance of the radar tower building to be implemented by PAGASA: (i) daily cleaning; (ii) maintenance to cover wear and tear; damage and aging; and (iii) security measures to ensure safety and to prevent crimes.

The implementation of daily cleaning of the building gives a good impression to visitors/users and encourages people to respect the building and the equipment. Cleaning is also important to ensure the equipment continues to operate correctly, it helps in the rapid detection and repair damaged equipment and prolongs the life of the building equipment. The main repair work will be refurbishing or replacement of exterior and interior materials protecting the building structure. The required inspections are outlined below.

Table 49: Outline of Regular Inspection for the building

	Items of Maintenance Work	Frequency
Exterior	Repair and repainting of external walls	Repair: every 5 years, Repaint: every 15 years
	Inspection and repair of roofs	Inspection: every year Repair: as required
	Regular cleaning of drain pipes and drainage systems	Monthly
	Inspection and repair of sealing of external windows and doors	Every year
	Regular inspection and cleaning of ditches and manholes	Every year
Interior	Renewal of interior finishing	As required
	Repair and repainting of partition walls	As required
	Adjustment of window and door fitting	Every year

It is important that regular preventive maintenance of the building equipment is carried out before the equipment fails, or requires repair or replacement of part(s). The life of the building equipment can be significantly extended by proper operation and regular inspection, lubrication, adjustment and cleaning. These regular inspections can prevent equipment failure and accidents. Regular inspection, replacement of consumables and cleaning/replacement of filters for ventilation and air-conditioning units should be carried out in accordance with the maintenance manual.

It is essential to establish a proper maintenance structure in PAGASA, involving the rigorous

implementation of regular inspection and maintenance procedures. This work may be assigned to the private sector (local agents), if required. The general life expectancy of the major building equipment is shown below.

Table 50: Life Expectancy of Building Equipment

System	Building Equipment	Life Expectancy
Electrical System	• Distribution panels • Fluorescent lamps • Incandescent lamps	20 – 30 years 5,000 – 10,000 hours 1,000 – 1,500 hours
Water Supply and Drainage Systems	• Pipes and valves • Sanitary fixture	15 years 25 – 30 years
Air-Conditioning System	• Pipes • Exhaust fans • Air-conditioning units	15 years 20 years 15 years

2-5 Project Cost Estimate

2-5-1 Estimate of Project Cost and Capital Cost to be borne by PAGASA-DOST

The estimated project cost to be financed by the Japan's Grant Aid Assistance is provisional and would be further examined by the Government of Japan for the approval of the Grant.

The estimated project cost to be borne by PAGASA-DOST has been estimated and is shown in the following tables.

Estimated Project Cost to be borne by the Philippines

Table 51: Project Cost Estimate

Estimated Capital Cost	21,721,000 Peso x 1.12 (VAT) = 24,328,000 Peso (approx. 63 Million JP Yen)
Estimated VAT for Construction Works	65,452,000 Peso (approx. 170 Million JP Yen)
Estimated VAT & Import Tax for Equipment	122,600,000 Peso (approx. 319 Million JP Yen)
Estimated Bank Commissions	1,310,000 Peso (approx. 3.4 Million JP Yen)
Total (Estimated Project Cost)	**213,690,000 Peso (approx.555 Million JP Yen)**

Estimated Capital Cost to be borne by PAGASA-DOST

Table 52: Estimated Capital Cost to be borne by PAGASA

Estimated Capital Cost of PAGASA for Virac Radar Observation Station (Philippine Peso)

Items	Capital Cost
Partial demolition of the existing building including disposal of debris material 4,800 Peso/m^2 x (3.3 x 3.3 x 3.14 x 3) x 1.2 =	590,000
Renovation of the existing buildings for establishing a new Staff Quarter 8,000 Peso/m^2 x (8.7 x 8.7 x 3.14 x 2 + 288) x 1.1 =	6,717,000
Removal of the existing radar system Heavy Equipment: 360,000 Peso + Scaffolding: 65,000 Peso + Wooden Box: 30,000 Peso + Manpower: 179,000 Peso + Accommodation & Transportation for Manpower: 53,000 Peso=	687,000
Shift of the existing observation field and instruments	20,000
Repair of the existing boundary wall or fence and gate	140,000
Repair of the existing concrete pavement	50,000
Furniture for the Staff Quarter	120,000
Installation of step-down transformer(s) for 150kVA power supply for the Radar Tower Building	420,000
Procurement of a 25kVA engine generator for the Staff Quarter	550,000
Total	9,294,000

Estimated Capital Cost of PAGASA for Aparri Radar Observation Station (Philippine Peso)

Items	Capital Cost
Demolition of the existing facilities which may obstruct during construction of the new Radar Tower Building 3,500 Peso/m^2 x (60 + 5.5 + 2) x 1.2 =	284,000
Renovation of the existing building for the Staff Quarter 8,000 Peso/m^2 x (49 x 4 + 10) x 1.1 =	1,813,000
Removal of the existing radar system Heavy Equipment: 360,000 Peso + Scaffolding: 65,000 Peso + Wooden Box: 30,000 Peso + Manpower: 179,000 Peso + Accommodation & Transportation for Manpower: 53,000 Peso=	687,000
Shift of the existing observation field and instruments	20,000
Repair of the existing boundary wall or fence and gate	350,000
Repair of the existing concrete pavement	40,000
Furniture for the Staff Quarter	120,000
Installation of step-down transformer(s) for 150kVA power supply for the Radar Tower Building	420,000
Procurement of a 25kVA engine generator for the Staff Quarter	550,000
Total	4,284,000

Estimated Capital Cost of PAGASA for Guiuan Radar Observation Station (Philippine Peso)

Items	Capital Cost
Renovation of the existing building for the Staff Quarter 8,000 Peso/m^2 x (65 x 2) x 1.1 =	1,144,000
Removal of the existing radar system Heavy Equipment: 360,000 Peso + Scaffolding: 65,000 Peso + Wooden Box: 30,000 Peso + Manpower: 179,000 Peso + Accommodation & Transportation for Manpower: 53,000 Peso=	687,000
Shift of the existing observation field and instruments (steel pole for anemometer)	50,000
Repair of the existing boundary wall or fence and gate	70,000
Construction of an access road 2,900 Peso/m^2 x 856.9 m^2 x 1.2 =	2,982,000
Repair of the existing concrete pavement	20,000
Furniture for the Staff Quarter	120,000
Installation of step-down transformer(s) for 150kVA power supply for the Radar Tower Building	420,000
Cabling for 3 Phase Commercial Power Supply for the Radar Tower Building	2,100,000
Procurement of a 25kVA engine generator for the Staff Quarter	550,000
Total	8,143,000
Ground Total *VAT is excluded in the Capital Costs indicated in the above table	21,721,000

Banking Arrangement (Philippine Peso)

Bank Commissions (0.1% of the Project Cost to be granted)	1,310,000

Table53: Estimated VAT for Construction Works to be paid by PAGASA (Philippine Peso)

Construction Work	VAT (12%)
Construction of Virac Meteorological Radar Tower Building	22,618,000
Construction of Aparri Meteorological Radar Tower Building	22,064,000
Construction of Guiuan Meteorological Radar Tower Building	20,770,000
VAT Total	65,452,000

Table54: Estimated VAT & Import Tax for Equipment to be paid by PAGASA (Philippine Peso)

Equipment	Import Tax (10%)	VAT (12%)
Virac Meteorological Radar Observation Station	17,377,000	20,852,000
Aparri Meteorological Radar Observation Station	17,377,000	20,852,000
Guiuan Meteorological Radar Observation Station	17,377,000	20,852,000
PAGASA Head Office, WFFC	3,597,000	4,316,000
VAT & Import Tax Total	55,728,000	66,872,000

Applied Exchange Rate: US$ 1 = 105.80 JP Yen, 1 Peso = 2.60 JP Yen

The Project Cost Disbursement Schedule of PAGASA is attached hereunder.

Table 55: The Project Cost Disbursement Schedule of PAGASA

		2009									
		1	2	3	4	5	6	7	8	9	10
Detailed Design											
Tendering Procedures											
Banking Arrangement	**Peso**										
Banking Arrangement for Detailed Design	10,000										
Banking Arrangement Term 1 (Term extended as per below)											

Total: 9.0 months

		2009		2010											2011												2012												2013		
		11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
Virac Meteorological Observation Station and PAGASA WFFC																																									
Construction Work at Virac Radar Tower Building																**Total: 20.0 months**																										
Preparation Work																																										
Temporary/Piling/Earth Works																																										
Structure Work																																										
Finishing Works																																										
Building Equipment																																										
External Work																																										
Equipment Manufacturing for Virac and PAGASA WFFC																																										
Equipment Transportation for Virac and PAGASA WFFC																																										
Equipment Installation/Adjustment for Virac																																										
Equipment Installation/Adjustment for PAGASA WFFC																																										
Project Cost to be borne by PAGASA	**Peso**																																									
Partial demolition of the existing building including disposal of debris material	590,000																																									
Renovation of the existing buildings for establishing a new Staff Quarter	6,717,000																																									
Removal of the existing radar system	687,000																																									
Shift of the existing observation field and instruments	20,000																																									
Repair of the existing boundary wall or fence and gate	140,000																																									
Repair of the existing concrete pavement	50,000																																									
Furniture for the Staff Quarter	120,000																																									
Installation of step-down transformer(s) for 150kVA power supply for the Radar Tower Building	420,000																																									
Procurement of a 25kVA engine generator for the Staff Quarter	550,000																																									
VAT (12%) for 40% of Construction Work	9,047,000																																									
VAT (12%) for 30% of Construction Work	6,785,000																																									
VAT (12%) for 20% of Construction Work	4,524,000																																									
VAT (12%) for 10% of Construction Work	2,262,000																																									
VAT (12%) and Duties & Other Taxies (10%) for the Equipment (First Shipment)	2,307,000																																									
VAT (12%) and Duties & Other Taxies (10%) for the Equipment (Second Shipment)	43,835,000																																									

Aparri Meteorological Observation Station

Construction Work at Aparri Radar Tower Building		**Total: 18.0 months**
Preparation Work		
Temporary/Piling/Earth Works		
Structure Work		
Finishing Works		
Building Equipment		
External Work		
Equipment Manufacturing for Aparri		
Equipment Transportation for Aparri		
Equipment Installation/Adjustment for Aparri		
Project Cost to be borne by PAGASA	**Peso**	
Demolition of existing facilities which obstruct the construction of a new Radar Tower Building	284,000	
Renovation of the existing building for the Staff Quarter	1,813,000	
Removal of the existing radar system	687,000	
Shift of the existing observation field and instruments	20,000	
Repair of the existing boundary wall or fence and gate	350,000	
Repair of the existing concrete pavement	40,000	
Furniture for the Staff Quarter	120,000	
Installation of step-down transformer(s) for 150kVA power supply for the Radar Tower Building	420,000	
Procurement of a 25kVA engine generator for the Staff Quarter	550,000	
VAT (12%) for 40% of Construction Work	8,825,000	
VAT (12%) for 30% of Construction Work	6,619,000	
VAT (12%) for 20% of Construction Work	4,413,000	
VAT (12%) for 10% of Construction Work	2,207,000	
VAT (12%) and Duties & Other Taxies (10%) for the Equipment (First Shipment)	1,911,000	
VAT (12%) and Duties & Other Taxies (10%) for the Equipment (Second Shipment)	36,318,000	

Guiuan Meteorological Observation Station

Construction Work at Guiuan Radar Tower Building		**Total: 17.3 months**
Preparation Work		
Temporary/Earth Works		
Structure Work		
Finishing Works		
Building Equipment		
External Work		
Equipment Manufacturing for Guiuan		
Equipment Transportation for Guiuan		
Equipment Installation/Adjustment for Guiuan		
Project Cost to be borne by PAGASA	**Peso**	
Renovation of the existing building for the Staff Quarter	1,144,000	
Removal of the existing radar system	687,000	
Shift of the existing observation field and instruments (steel pole for anemometer)	50,000	
Repair of the existing boundary wall or fence and gate	70,000	
Construction of an access road	2,982,000	
Repair of the existing concrete pavement	20,000	
Furniture for the Staff Quarter	120,000	
Installation of step-down transformer(s) for 150kVA power supply for the Radar Tower Building	420,000	
Cabling for 3 Phase Commercial Power Supply for the Radar Tower Building	2,100,000	
Procurement of a 25kVA engine generator for the Staff Quarter	550,000	
VAT (12%) for 40% of Construction Work	8,308,000	
VAT (12%) for 30% of Construction Work	6,231,000	
VAT (12%) for 20% of Construction Work	4,154,000	
VAT (12%) for 10% of Construction Work	2,077,000	
VAT (12%) and Duties & Other Taxies (10%) for the Equipment (First Shipment)	1,911,000	
VAT (12%) and Duties & Other Taxies (10%) for the Equipment (Second Shipment)	36,318,000	
Banking Arrangement	**Peso**	
Banking Arrangement Term 1	81,000	
Banking Arrangement Term 2	440,000	
Banking Arrangement Term 3	444,000	
Banking Arrangement Term 4	335,000	

2-5-2 Estimate of Recurrent Cost for the Project to be borne by the Philippine side

(1) Recurrent Cost to be borne by PAGASA-DOST

The annual recurrent costs to be borne by PAGASA for the first decade after the completion of the Project are attached hereunder. The recurrent costs have been calculated in accordance with the following fundamental conditions.

- Operation and maintenance to be carried out by PAGASA
- Appropriate operation in accordance with the operations manuals
- Regular and proper maintenance according to the maintenance manuals

The recurrent costs of all the project sites (WFFC, Virac Meteorological Observation Station, Aparri Meteorological Observation Station and Guiuan Meteorological Observation Station), which mainly consist of operation and maintenance costs of the equipment and the radar tower buildings to be borne by PAGASA have been calculated as shown in the following tables.

Table 56: Recurrent Cost of WFFC

Estimated Recurrent Cost

	Equipment	Item	Q'ty	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	Remarks
1	Product Monitor	Hard disk	7	0	0	0	91,000	0	0	0	91,000	0	0	Every 4 years
	(7sets)	CD for archiving product data (20sheets/1set)	3	2,460	2,460	2,460	2,460	2,460	2,460	2,460	2,460	2,460	2,460	
2	Printer	Printer ink cartridge	4	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	7,600	
		Paper (500sheets/1set)	2	400	400	400	400	400	400	400	400	400	400	
3	Compact UPS	Battery	7	0	0	26,600	0	0	26,600	0	0	26,600	0	Every 3 years
4	1kVA UPS	Battery	1	0	0	5,300	0	0	5,300	0	0	5,300	0	Every 3 years
		Subtotal (Peso)		10,460	10,460	42,360	101,460	10,460	42,360	10,460	101,460	42,360	10,460	382,300

Others

	Cost Item	Details	Q'ty	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	Remarks
1	Electricity Charge		1	321,302	321,302	321,302	321,302	321,302	321,302	321,302	321,302	321,302	321,302	※1
2	Communication Cost (VSAT)			200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	
3	Radio Station License Fee (VSAT)	WFFC, Virac, Apari and Guiuan (4 sets)		8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	
4	Special maintenance	System brush-up by manufacture's engineer	1	0	0	300,000	0	0	300,000	0	0	0	300,000	For 5 days at site
		Subtotal (Peso)		529,302	529,302	829,302	529,302	529,302	829,302	529,302	529,302	529,302	829,302	6,193,023
		Total (Peso)		**539,762**	**539,762**	**871,662**	**630,762**	**539,762**	**871,662**	**539,762**	**630,762**	**571,662**	**839,762**	**6,575,323**
		Total (JPY)		**¥1,295,430**	**¥1,295,430**	**¥2,091,990**	**¥1,513,830**	**¥1,295,430**	**¥2,091,990**	**¥1,295,430**	**¥1,513,830**	**¥1,371,990**	**¥2,015,430**	**¥15,780,776**

Table 57: Recurrent Cost of Virac Meteorological Observation Station

Estimated Recurrent Cost

	Equipment	Item	Q'ty	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	Remarks
1	Antenna	Grease (For AZ/EL)	1	0	0	0	0	10,000	0	0	0	0	14,000	16kg/can,Every 5 years
		Timing belt (For AZ/EL)	2	0	0	0	0	0	0	0	8,000	0	0	Every 8 years
2	Antenna controller	AC fan (3sets)	3	0	0	0	0	0	0	0	0	0	18,000	Every 10 years
3	Transmitter/Receiver	AC fan (24sets)	24	0	0	0	0	0	0	0	0	0	144,000	Every 10 years
4	Receiver	AC fan (3sets)	3	0	0	0	0	0	0	0	0	0	18,000	Every 10 years
5	Product Monitor(5sets)	Hard disk	5	0	0	0	65,000	0	0	0	65,000	0	0	Every 4 years
		CD for data storage (20sheets/1set)	1	820	820	820	820	820	820	820	820	820	820	
6	Printer	Printer ink cartridge	2	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	
		Paper (500sheets/1set)	1	200	200	200	200	200	200	200	200	200	200	
7	Compact UPS	Battery	5	0	0	19,000	0	0	19,000	0	0	19,000	0	Every 3 years
8	1kVA UPS	Battery	1	0	0	5,300	0	0	5,300	0	0	5,300	0	Every 3 years
9	Emergency Power Back-up Unit	Battery	1	0	0	0	0	0	0	400,000	0	0	0	Every 7 years
10	Electic Double Layer Capacitor typed UPS	AC fan (3sets)	3	0	0	0	0	0	0	0	0	0	18,000	Every 10 years
		Arrester (6sets)	1	0	0	0	0	0	0	0	0	0	8,000	Every 10 years
11	Diesel Engine Generator	Oil seal and filter	2	0	1,560	8,600	1,560	8,600	1,560	8,600	1,560	8,600	1,560	Every 1and 2 years
		Battery for Engine start	2	0	0	0	0	0	3,000	0	0	0	3,000	Every 7 years
		Subtotal (Peso)		4,820	6,380	37,720	71,380	23,420	33,680	413,420	79,380	37,720	229,380	937,300

Others

	Cost Item	Details	Q'ty	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	Remarks
1	Electricity Charge		1	211,545	211,545	211,545	211,545	211,545	211,545	211,545	211,545	211,545	211,545	? 1
2	Fuel cost	Fuel consumption of DEG	1	343,449	343,449	343,449	343,449	343,449	343,449	343,449	343,449	343,449	343,449	? 2
3	Special maintenance	System brush-up by manufacture's engineer	1	0	0	300,000	0	0	300,000	0	0	0	300,000	For 5 days at site
4	Radome	Caulking repair	1	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
5	Pest-control	Exterminating vermination	1	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	
6	PC communication charge	Internet communication for Windows PC	1	1,000	1,000	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	
		Subtotal (Peso)		568,994	568,994	869,494	569,494	569,494	869,494	569,494	569,494	569,494	869,494	6,593,944
		Total (Peso)		**573,814**	**575,374**	**907,214**	**640,874**	**592,914**	**903,174**	**982,914**	**648,874**	**607,214**	**1,098,874**	**7,531,244**
		Total (JPY)		**¥1,377,154**	**¥1,380,898**	**¥2,177,314**	**¥1,538,098**	**¥1,422,994**	**¥2,167,618**	**¥2,358,994**	**¥1,557,298**	**¥1,457,314**	**¥2,637,298**	**¥18,074,984**

Estimated Recurrent Cost

Table 58: Recurrent Cost of Aparri Meteorological Observation Station

	Equipment	Item	Q'ty	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	Remarks
1	Antenna	Grease (For AZ/EL)	1	0	0	0	0	10,000	0	0	0	0	14,000	16kg/can,Every 5 years
		Timing belt (For AZ/EL)	2	0	0	0	0	0	0	0	8,000	0	0	Every 8 years
2	Antenna controller	AC fan (3sets)	3	0	0	0	0	0	0	0	0	0	18,000	Every 10 years
3	Transmitter/Receiver	AC fan (24sets)	24	0	0	0	0	0	0	0	0	0	144,000	Every 10 years
4	Receiver	AC fan (3sets)	3	0	0	0	0	0	0	0	0	0	18,000	Every 10 years
5	Product Monitor(5sets)	Hard disk	5	0	0	0	65,000	0	0	0	65,000	0	0	Every 4 years
		CD for data storage (20sheets/1set)	1	820	820	820	820	820	820	820	820	820	820	
6	Printer	Printer ink cartridge	2	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	
		Paper(500sheets/1set)	1	200	200	200	200	200	200	200	200	200	200	
7	Compact UPS	Battery	5	0	0	19,000	0	0	19,000	0	0	19,000	0	Every 3 years
8	1kVA UPS	Battery	1	0	0	5,300	0	0	5,300	0	0	5,300	0	Every 3 years
9	Emergency Power Back-up Unit	Battery	1	0	0	0	0	0	0	400,000	0	0	0	Every 7 years
10	Electic Double Layer Capacitor typed UPS	AC fan (3sets)	3	0	0	0	0	0	0	0	0	0	18,000	Every 10 years
		Arrester (6sets)	1	0	0	0	0	0	0	0	0	0	8,000	Every 10 years
11	Diesel Engine Generator	Oil seal and filter	2	0	0	1,560	0	8,600	1,560	0	0	1,560	8,600	Every 3 and 5 years
		Battery for Engine start	2	0	0	0	0	0	0	3,000	0	0	0	Every 7 years
		Subtotal(Peso)		4,820	4,820	30,680	69,820	23,420	30,680	407,820	77,820	30,680	233,420	913,980

Others

	Cost Item	Details	Q'ty	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	Remarks
1	Electricity Charge		1	332,428	332,428	332,428	332,428	332,428	332,428	332,428	332,428	332,428	332,428	? 1
2	Fuel cost	Fuel consumption of DEG	1	89,951	89,951	89,951	89,951	89,951	89,951	89,951	89,951	89,951	89,951	? 2
3	Special maintenance	System brush-up by manufacture's engineer	1	0	0	300,000	0	0	300,000	0	0	0	300,000	For 5 days at site
4	Radome	Caulking repair	1	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
5	Pest-control	Exterminating vermination	1	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	
6	PC communication charge	Internet communication for Windows PC	1	1,000	1,000	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	
		Subtotal(Peso)		436,379	436,379	736,879	436,879	436,879	736,879	436,879	436,879	436,879	736,879	5,267,793
		Total (Peso)		**441,199**	**441,199**	**767,559**	**506,699**	**460,299**	**767,559**	**844,699**	**514,699**	**467,559**	**970,299**	**6,181,773**
		Total(JPY)		**¥1,058,878**	**¥1,058,878**	**¥1,842,142**	**¥1,216,078**	**¥1,104,718**	**¥1,842,142**	**¥2,027,278**	**¥1,235,278**	**¥1,122,142**	**¥2,328,718**	**¥14,836,255**

Estimated Recurrent Cost

Table 59: Recurrent Cost of Guiuan Meteorological Observation

	Equipment	Item	Q'ty	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	Remarks
1	Antenna	Grease (For AZ/EL)	1	0	0	0	0	10,000	0	0	0	0	14,000	16kg/can,Every 5 years
		Timing belt (For AZ/EL)	2	0	0	0	0	0	0	0	8,000	0	0	Every 8 years
2	Antenna controller	AC fan (3sets)	3	0	0	0	0	0	0	0	0	0	18,000	Every 10 years
3	Transmitter/Receiver	AC fan (24sets)	24	0	0	0	0	0	0	0	0	0	144,000	Every 10 years
4	Receiver	AC fan (3sets)	3	0	0	0	0	0	0	0	0	0	18,000	Every 10 years
5	Product Monitor(5sets)	Hard disk	5	0	0	0	65,000	0	0	0	65,000	0	0	Every 4 years
		CD for data storage (20sheets/1set)	1	820	820	820	820	820	820	820	820	820	820	
6	Printer	Printer ink cartridge	2	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	
		Paper(500sheets/1set)	1	200	200	200	200	200	200	200	200	200	200	
7	Compact UPS	Battery	5	0	0	19,000	0	0	19,000	0	0	19,000	0	Every 3 years
8	1kVA UPS	Battery	1	0	0	5,300	0	0	5,300	0	0	5,300	0	Every 3 years
9	Emergency Power Back-up Unit	Battery	1	0	0	0	0	0	0	400,000	0	0	0	Every 7 years
10	Electic Double Layer Capacitor typed UPS	AC fan (3sets)	3	0	0	0	0	0	0	0	0	0	18,000	Every 10 years
		Arrester (6sets)	1	0	0	0	0	0	0	0	0	0	8,000	Every 10 years
11	Diesel Engine Generator	Oil seal and filter	2	8,600	8,600	8,600	8,600	8,600	8,600	8,600	8,600	8,600	8,600	Every 1 year
		Battery for Engine start	2	0	0	3,000	0	0	3,000	0	0	3,000	0	Every 3 years
		Subtotal(Peso)		13,420	13,420	40,720	78,420	23,420	40,720	413,420	86,420	40,720	233,420	984,100

Others

	Cost Item	Details	Q'ty	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	Remarks
1	Electricity Charge		1	0	0	0	0	0	0	0	0	0	0	? 1
2	Fuel cost	Fuel consumption of DEG	1	572,415	572,415	572,415	572,415	572,415	572,415	572,415	572,415	572,415	572,415	? 2
3	Special maintenance	System brush-up by manufacture's engineer	1	0	0	300,000	0	0	300,000	0	0	0	300,000	For 5 days at site
4	Radome	Caulking repair	1	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	
5	Pest-control	Exterminating vermination	1	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	
6	PC communication charge	Internet communication for Windows PC	1	1,000	1,000	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	
		Subtotal(Peso)		586,415	586,415	886,915	586,915	586,915	886,915	586,915	586,915	586,915	886,915	6,768,151
		Total (Peso)		**599,835**	**599,835**	**927,635**	**665,335**	**610,335**	**927,635**	**1,000,335**	**673,335**	**627,635**	**1,120,335**	**7,752,251**
		Total(JPY)		**¥1,439,604**	**¥1,439,604**	**¥2,226,324**	**¥1,596,804**	**¥1,464,804**	**¥2,226,324**	**¥2,400,804**	**¥1,616,004**	**¥1,506,324**	**¥2,688,804**	**¥18,605,401**

(2) Annual Budget Trends

< PAGASA Head Office, WFFC>

The estimated recurrent cost for PAGASA Head Office is only 0.1% of the total amount of PAGASA budget excluding the budget for all the existing meteorological radar observation stations. Therefore, it has been assessed that there is no problem in this regard.

Table 60: Movement of PAGASA Budget (In Thousand Pesos)

Item	2005	2006	2007	2008	2009
Personnel Expenses	235,280	230,801	241,216	242,703	242,703
Consumable Cost	31,767	30,550	30,550	61,361	61,361
Electricity and Water Utilization Cost	11,627	11,627	11,627	14,057	14,057
Cost of Spare Parts	4,435	5,652	5,652	6,942	6,942
Telecommunication Cost/ VSAT Communication	9,468	9,468	9,468	11,456	11,456
Others	30,258	30,258	51,458	121,523	121,523
Total	322,835	318,356	349,971	458,042	458,042

< Virac, Aparri and Guiuan Meteorological Radar Observation Stations >

The estimated recurrent cost for the Meteorological Radar Observation Stations is less than the present budget indicated in the below table. Hence, it is assessed that there is no problem in its sustainability.

Table 61: Operation and Maintenance of Meteorological Radar Observation Stations

(In Thousand Pesos)

Year	Item	Virac Meteorological Radar Observation Station	Aparri Meteorological Radar Observation Station	Guiuan Meteorological Radar Observation Station
2005	Personnel Expenses	1,232	799	827
	Consumable Cost	1,074	1,074	1,074
	Electricity and Water Utilization Cost	138	138	138
	Radar Maintenance Cost	47	47	47
	Total	2,491	2,058	2,086
2006	Personnel Expenses	1,236	803	830
	Consumable Cost	1,074	1,074	1,074
	Electricity and Water Utilization Cost	138	138	138
	Radar Maintenance Cost	47	47	47
	Total	2,495	2,062	2,089
2007	Personnel Expenses	1,327	966	892
	Consumable Cost	1,046	1,046	1,046
	Electricity and Water Utilization Cost	176	177	177
	Radar Maintenance Cost	37	36	36
	Total	2,586	2,225	2,151
2008	Personnel Expenses	1,434	1,073	998
	Consumable Cost	1,104	1,104	1,104
	Electricity and Water Utilization Cost	167	168	169
	Radar Maintenance Cost	47	47	47
	Total	2,752	2,392	2,318
2009	Personnel Expenses	1,552	1,190	1,115
	Consumable Cost	1,104	1,104	1,104
	Electricity and Water Utilization Cost	167	168	169
	Radar Maintenance Cost	47	47	47
	Total	2,870	2,509	2,435

2-6 Other Relevant Issues

(1) Approval by the Executive Committee of the National Economic Development Council

According to the national regulation of the Philippines, since the total cost of the Project has exceeded 500 Hundred Million Pesos, obtaining an approval from the Investment Coordinating Council (ICC) is indispensable. If the project is not approved by the ICC, allocation of the required budget, conclusion of consultant agreement and contract, tax exemption, import permit, etc. cannot be consummated. Therefore, in the interest of smooth Project implementation, the following required documents including the ICC PE Form must be prepared by PAGASA and promptly submitted to the National Economic and Development Authority (NEDA) for approval by the ICC prior to commencement of the Project.

Table 62: Required Items for Investment Coordinating Council (ICC) Approval Process

	Required Items	Detail
1	Feasibility Study Report	Instead of the Feasibility Study Report, the Draft Basic Design Study Report is acceptable. The Report must highlight the followings; 1) Historical Background 2) Sectoral Program Context 3) Regional Spatial Context 4) Objectives 5) Description 6) Cost and Financing 7) Institutional Arrangement 8) Implementation Schedule 9) Technical/Market/Environmental Analysis 10) Financial Analysis 11) Economic Analysis 12) Social Analysis 13) Issues 14) Recommendations
2	Accomplished ICC PE Forms	The Form must be prepared according to NEDA's instructions/format.
3	Regional Development Council (RDC) endorsements for regional, municipal and local projects	Virac, Aparri and Guiuan
4	Endorsement from other concerned agencies	Endorsement of the Department of Science and Technology (DOST) for submission of the ICC PE Form
5	Local map	-
6	DBM certification of budget cover availability for the project	DBM certification of budget strategy covering the whole project implementation period
7	EIS/ECC/CNC	Certificate of Non-Coverage (CNC) issued on May 26, 2008

(2) Value Added Tax (VAT)

Value added tax incorporated in payments for construction work and installation of equipment under the Project as well as procurement of instruments, construction materials, etc. by a Japanese contractor(s) in the Philippines is not automatically exempted. In order to refund the value added tax to the contractor, the required procedures agreed between the Embassy of Japan and the Bureau of Internal Revenue (BIR) are as follows.

- The project implementing agency in the Philippines must take budgetary steps.
- Supplementary Agreement on VAT Payment shall be signed between the project implementing agency and the contractor.
- Refund of VAT must be in Philippine Peso and the reimbursement amount shall be 12% of the remaining amount of the contract price after deduction of the equipment procurement cost.
- The contractor shall pay the required VAT in accordance with the Philippine law.
- According to the Supplementary Agreement on VAT Payment, the contractor shall claim the VAT refund to the project implementing agency.
- The project implementing agency shall directly refund the same amount of the VAT paid by the contractor to the contractor's bank account.
- The contractor shall have a corporate status as a branch office in the Philippines with TIN Number and VAT Registration Number.
- The progress of the VAT refund shall be reported to relevant organizations such as the Embassy of Japan, JICA, etc.

(3) Requisite Permits/Documentations for the Project

Table 63: Requisite Permits/Documentations for the Project

Requirements	Concerned Agencies	Weather and Flood Forecasting Center (WFFC)	Virac Meteorological Radar Observation Station	Aparri Meteorological Radar Observation Station	Guiuan Meteorological Radar Observation Station
Certificate of Non-Coverage (CNC)	Environmental Management Bureau (EMB)	-	Certificate issued on May 26, 2008	Certificate issued on May 26, 2008	Certificate issued on May 26, 2008
VSAT User License	National Telecommunications Commission (NTC)	○	○	○	○
Transponder Lease Agreement with the Satellite Operator	MEASAT III	○	○	○	○
Certificate of the Meteorological Radar Frequency (2,850MHz ±10Mhz)	National Telecommunications Commission (NTC)	–	○	○	○
Radiation Influence Permit	Department of Health (DOH)	–	○	○	○
Height Clearance Permit	Civil Aviation Authority of the Philippines (CAAP)	–	○ (Virac Airport)	○ (Tuguegarao Airport)	○ (Guiuan Airport)
Building Permit (for Construction of a new Radar Tower Building)	Municipality (Municipal Planning and Development Office)	–	○ (Bato Municipality)	○ (Aparri Municipality)	○ (Guiuan Municipality)

(4) Building Permit for Construction of the Radar Tower Buildings

For construction of the Radar Tower Buildings at Virac, Aparri and Guiuan Meteorological Radar Observation Stations, building permit to be issued by the concerned Municipality is needed prior to commencement of the construction work. The following documents enumerated in the table below are required in securing the said permit, which normally takes a month.

Table 64: Required Documents for Building Permit

	Required Documents	Required Number
1	Accomplished Prescribed Application Form	Original: 1
2	Building Drawings(Architectural and External Work, Structural Work, Electrical Installations, Air-Conditioning and Ventilation, Plumbing)	Copy: 5
3	Contract	Copy: 1
4	Structural Design & Composition	Copy: 5
5	Bill of Material & Cost Estimate	Copy: 1
6	PAGASA Forward Letter	Original: 1

Chapter 3
Project Evaluation and Recommendations

Chapter 3 Project Evaluation and Recommendations

3 - 1 Project Effect

(1) Project Effect

Table 65: Project Effect

Present Situation and Existing Issue	Remedial Measures under the Project	Direct Effects and Degree of Improvement	Indirect Effects and Degree of Improvement
The existing Virac, Aparri and Guiuan radar systems were completed in 1994, and are now more than 15 years old. Due to the age of the existing radar systems, it is difficult to conduct radar monitoring for a number of reasons such as the transmitted power is down, each circuit in the system is obsolete, and radar pictures in the display are unreadable. Therefore, currently PAGASA is not able to appropriately monitor the tropical cyclones in the Pacific Ocean, and cannot accurately detect the centers or intensities. Consequently, the Meteorological Radar Stations cannot provide the required information to the Weather and Flood Forecasting Center (WFFC) as an input for the preparation of the public storm signal warning and tropical cyclone information. As such, presently the overall Philippine tropical cyclone mitigation system is substantially impaired.	• Construction of modern Meteorological Radar Tower Buildings at Virac, Aparri and Guiuan Radar Observation Stations • Installation of Meteorological Doppler Radar Systems at Virac, Aparri and Guiuan Radar Observation Stations • Installation of Meteorological Radar Data Display System at Virac, Aparri and Guiuan Radar Observation Stations and PAGASA Head Office, WFFC • Installation of Meteorological Data Satellite Communication System (VSAT) at Virac, Aparri and Guiuan Radar Observation Stations and PAGASA Head Office, WFFC	In case of occurrence of a tropical cyclone in the radar detection range, hourly issuance of the public storm signal warning and tropical cyclone information (intensity, location and track) will be made to the Office of the President, the Office of the Civil Defense (OCD), the Disaster Coordinating Council (DCC), the Department of Education, Culture and Sports (DECS), the Department of Health (DOH), the Armed Forces of the Philippines, as well as to other agencies concerned with disaster management, especially to the directly affected local government units, and also to the International Organizations, the Red Cross, NGOs, and the mass media.	Timely dissemination of evacuation order will be made. Timely commencement of disaster preparedness and evacuation assistance will be made by agencies concerned with disaster management. Damage caused by tropical cyclones will be reduced. Accuracy of weather forecasts will be higher. Accuracy of flood forecasts will be higher.
Since the existing radar systems have no Doppler function, in real time, PAGASA is unable to; 1) monitor stormy wind generated by tropical cyclone in the Pacific Ocean and the coastal area, including direction of rainfall motion, 2) detect local severe storm associated with tornados that briefly occur in the Pacific Ocean and the coastal areas which can create serious damage, and 3) detect heavy rainfall area due to no wind convergence area data in the radar observed data.		PAGASA will be able to monitor stormy wind generated by tropical cyclone, direction of rainfall motion and local severe storm associated with tornados in the Pacific Ocean and the coastal area in real time basis. The information of stormy wind and direction of rainfall motion will be contained in the hourly tropical cyclone information issued by PAGASA. PAGASA will be able to detect heavy rainfall area in the radar detection range and promptly issue weather, flood and landslide warnings.	
There is no data communication system to transmit the meteorological radar data such as rainfall intensity, wind speed/direction, etc. from the proposed Meteorological Radar Systems to the WFFC.		The public storm signal warning and tropical cyclone information will be promptly issued by PAGASA since the rainfall intensity and wind speed/direction, etc. of tropical cyclone observed by Virac, Aparri and Guiuan Doppler	

There is no system to display the radar pictures of the proposed Meteorological Radar Systems at the WFFC.		radar systems can be received at the WFFC in real time.	

(2) Achievement Indicators for the Project

As a result of extensive discussions with PAGASA, the following Achievement Indicators for the Project have been set as follows.

Table 66: Achievement Indicator

Indicator	Present (Base Line)	Target	Expected Achievement Time
Enhancement of Cyclone Monitoring Capability of PAGASA	Detection range of precipitation intensity 1mm/h or more: 300km radius	Detection range of precipitation intensity 1mm/h or more: 450km radius	At the completion of the Project
	No capability to monitor tropical cyclonic wind velocity	Monitoring capability of tropical cyclonic wind velocity maximum 75m/s in 200km radius	At the completion of the Project
	Inability to detect the direction of rainfall motion	Capability to detect the direction of rainfall motion in 200km radius	At the completion of the Project
Enhancement of Capability of PAGASA for the issuance of public storm signal warning	Tropical cyclone expected to come to the Philippines within the next 36hrs: 4 times a day	Tropical cyclone in the radar detection range: hourly issuance of the public storm signal warning and tropical cyclone information (intensity, location and track)	1 year from the completion of the Project

(3) Population to directly benefit from the Implementation of the Project

The overall objective of the Project is to reduce devastation caused by tropical cyclones. This will be achieved by improving tropical cyclone monitoring and forecasting capability in the Philippines through the replacement of the existing Virac, Aparri and Guiuan ordinary radar systems to meteorological Doppler radar systems (S-band). The Philippines is particularly affected by tropical cyclones that come from the Pacific Ocean. Tropical cyclones are the extreme manifestations of nature that lead to immense distress and deprivation for immeasurable lives. The extensive losses from tropical cyclones are a significant set-back to the national economy and for the development of the Philippines. Meanwhile, there is real concern that the number of victims by tropical cyclone will proportionally increase due to the fact that the estimated population of the Philippines by 2020 will reach more than 100 million as indicated by the National Statistics Office. Anyhow, the number of population to be benefited by the implementation of the Project is the whole nation of the Republic of the Philippines (the population of the Philippines in 2007: 88,574,614 as published by the National Statistics Office).

To estimate how the Project will benefit the people of the Philippines, the number of the potentially affected population has been calculated using "Climatology of Tropical Cyclone Occurrence and Tracks (1948-2005)" attached hereunder, based on the 2007 Census of Population published by the National Statistics Office of the Philippines. The results are as follows;

The population in the areas affected by flood that will directly benefit from the Project is estimated to be 72,729,150, which is 81% of the total population of the Philippines.

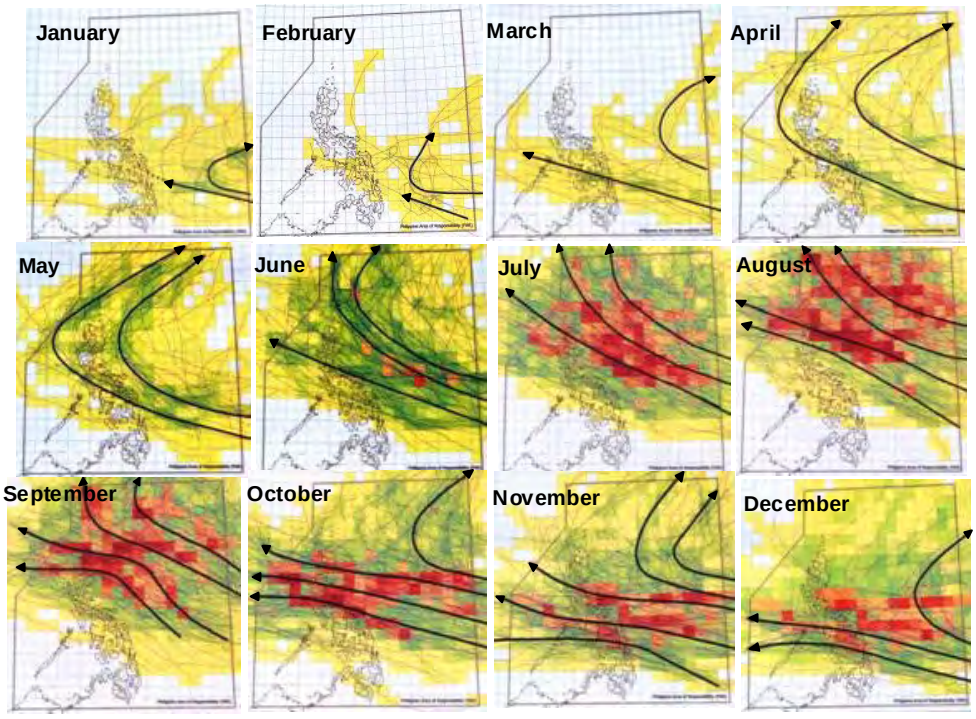


Figure 19: Climatology of Tropical Cyclone Occurrence and Tracks (1948-2005)
By PAGASA

3 - 2 Recommendations

In order to further enhance the benefits of the Project, the following recommendations should be implemented, namely;

1) Manpower Development

a) The development of more qualified technical personnel through continuous training and other related manpower development programs;
b) The conduct of timely research to increase the level of understanding/knowledge about meteorological disasters, and its impact on socio-economic activities;

2) Natural Disaster Prevention and Management

a) The creation of effective communication and collaboration with the various government agencies, NGOs, and international institutions for better coordination of natural disaster prevention and management;
b) The formulation of effective and consistent disaster prevention schemes through different stages from Weather Forecasting, Warning Announcement, Disaster Occurrence, Information Dissemination, all the way to Evacuation Stage;
c) Implement and ensure wider dissemination of knowledge and information on disaster-prevention activities to all sectors including government disaster management agencies, the private sector, and the population at risk;
d) Setting up of redundancies in the announcement of warnings and other information dissemination to ensure reaching out to the general populace;
e) Continuing education to the general public, especially the population at risk, through the Local Government Units (LGUs) in coordination with various related disaster management agencies on effective natural disaster prevention and management;

3) Longer Life Span of Project Equipment and Facilities

a) Regularly secure the necessary budget for the efficient operation and maintenance of the systems, and the procurement of requisite spare parts and consumables for all the equipment to be supplied under the Project;
b) Ensure protection of the equipment and facilities against theft and vandalism;

4) Cost Recovery Schemes

a) Develop ways and means to systematically recover at least the operation and maintenance cost by catering to the needs and requirements of private business sectors vis-à-vis meteorological products including observed data of the meteorological radar systems and services.

Upon materialization of this Project, PAGASA will be able to implement the fundamental routine works such as meteorological observation and forecasting using the meteorological Doppler radar systems, as well as its operation and maintenance. However, for further improvement of PAGASA's technical skill and capability, coupled with effectively longer utilization of the meteorological radar systems, technical training and technology transfer are vital and indispensable for PAGASA staff. The knowledge, technical skills and ability of PAGASA personnel can be enhanced by specialized training in Japan in radar meteorology, and the operation and maintenance of the meteorological Doppler radar systems. This can also be augmented by PAGASA's own training.

Appendices

Appendix 1. Member List of the Survey Team

(1) Basic Design Survey Team

Mr. Toshiyuki IWAMA	Team Leader	Director, Project Study Division I, Grant Aid and Loan Support Department Japan International Cooperation Agency (JICA)
Mr. Kazuhiko IIDA	Technical Advisor	Senior Scientific Officer, Observations Department, Observations Division, Office of Observing Systems Operations, Japan Meteorological Agency (JMA)
Ms. Rieko KUBOTA	Project Coordinator	Project Administration Officer, Project Study Division I, Grant Aid and Loan Support Department, Japan International Cooperation Agency (JICA)
Mr. Yoshihisa UCHIDA	Project Manager / Meteorological Radar System Planning / Operation and Maintenance Planning	Japan Weather Association (JWA)
Mr. Takehiro YOSHIDA	System Planning /Equipment Cost Estimate	Japan Weather Association (JWA)
Mr. Makoto YONEDA	Facility Planning / Natural Conditions Survey	Japan Weather Association (JWA) (Commonwealth Engineers Co., Ltd.)
Mr. Kazumasa MITA	Procurement＆Construction Planning / Construction Cost Estimate	Japan Weather Association (JWA) (Commonwealth Engineers Co., Ltd.)
Mr. Takayuki MOTOYA	Economic, Financial and Social Impact Analysis	Japan Weather Association (JWA)
Mr. Felipe Fiel A. Sarigumba	Local Consultant (Information/Data Collection and Analysis)	Japan Weather Association (JWA)

(2) Draft Report Explanation Team

Mr. Satoru MIMURA	Team Leader	Director, Disaster Management Division Ⅰ Water Resources and Disaster Management Group Global Environment Department Japan International Cooperation Agency (JICA)
Mr. Chiaki KOBAYASHI	Project Coordinator	Disaster Management Division Ⅰ Water Resources and Disaster Management Group Global Environment Department Japan International Cooperation Agency (JICA)
Mr. Yoshihisa UCHIDA	Project Manager / Meteorological Radar System Planning / Operation and Maintenance Planning	Japan Weather Association (JWA)
Mr. Takehiro YOSHIDA	System Planning /Equipment Cost Estimate	Japan Weather Association (JWA)
Mr. Kazumasa MITA	Procurement＆Construction Planning / Construction Cost Estimate	Japan Weather Association (JWA) (Commonwealth Engineers Co., Ltd.)
Mr. Takayuki MOTOYA	Economic, Financial and Social Impact Analysis	Japan Weather Association (JWA)
Mr. Felipe Fiel A. Sarigumba	Local Consultant (Information/Data Collection and Analysis)	Japan Weather Association (JWA)

Appendix 2. Study Schedule

(1) Basic Design Study

Schedule			Govermental Member			Consultant Member					
			Mr. Toshiyuki IWAMA	Mr. Kazuhiko IIDA	Ms. Rieko KUBOTA	Mr. Yoshihisa UCHIDA	Mr. Takehiro YOSHIDA	Mr. Makoto YONEDA	Mr. Kazumasa MITA	Mr. Takayuki MOTOYA	Mr. Felipe Fiel A. Sarigumba
			Team Leader	Technical Advisor	Project Coordinator	Project Manager/ Meteorological Radar System Planning/Operation and Maintenance Planning	System Planning /Equipment Cost Estimate	Facility Planning / Natural Conditions Survey	Procurement& Construction Planning /Construction Cost Estimate	Economic, Financial and Social Impact Analysis	Local Consultant (Information/Data Collection and Analysis)
	2008										
1	26Jun.	Tue				Tokyo→Manila JL741 (09:35-13:05) Preliminary Discussion with JICA Philippine Office		Tokyo→Manila JL741 (09:35-13:05) Preliminary Discussion with JICA Philippine Office			
2	27Jun.	Fri				Preliminary Discussion with PAGASA, Visit to local contractors for Topographic and Geotechnical Survey, Data Collection		Preliminary Discussion with PAGASA, Visit to local contractors for Topographic and Geotechnical Survey, Data Collection			
3	28 Jun.	Sat				Visit to local contractors for Topographic and Geotechnical Survey, Data Collection, Study for Unit Price of Construction Materials		Visit to local contractors for Topographic and Geotechnical Survey, Data Collection, Study for Unit Price of Construction Materials			
4	29 Jun.	Sun				Visit to local contractors for Topographic and Geotechnical Survey, Data Collection	Tokyo→Manila JL741 (09:35-13:05)	Visit to local contractors for Topographic and Geotechnical Survey, Data Collection	Tokyo→Manila JL741 (09:35-13:05)		
5	30 Jun.	Mon		Tokyo→Manila JL741 (09:35-13:05)		Preliminary Discussion with PAGASA, Site Survey at Weather and Flood Forecasting Center (WFFC), Internal Meeting					
6	1 Jul.	Tue		Courtesy call on Embassy of Japan, Discussion with JICA Philippine Office, Courtesy call on PAGASA, Discussion with PAGASA, Study for VSAT systems transferd from Department of Agriculture (DA)							
7	2 Jul.	Wed		Manila→(By Air) Virac, Site Survey at Virac Radar Observation Station		Manila→(By Air) Virac, Site Survey at Virac Radar Observation Station					
8	3 Jul.	Thu		Site Survey at Virac Radar Observation Station		Site Survey at Virac Radar Observation Station, Discussion with Municipality on Building Permit and Occupancy Permit, Discussion with ATO, Discussion with Material Quality Control & Hydrology Division of DPWH, Discussion with Ferry Company, Discussion with Electricity Company					
9	4 Jul.	Fri		Virac→(By Air) Manila							
10	5 Jul.	Sat		Internal Meeting, Data Collection		Virac→(By Ferry) Legaspi→(By Air) Manila Discussion with Material Quality Control & Hydrology Section of DPWH Legaspi Regional Office					
11	6 Jul.	Sun		Internal Meeting, Data Collection		Internal Meeting, Data Collection					
12	7 Jul.	Mon	Tokyo→Manila JL741 (09:35-13:05)	Discussion with PAGASA				Discussion with Associtin of Structure Engineer of the Philippines	Data Collection ,Quantity Survey		
13	8 Jul.	Tue	Discussion with PAGASA, Discussion with Philippine Customs			Discussion with PAGASA		Study for Construction Materials and Methods	Data Collection, Quantity Survey		
14	9 Jul.	Wed	Signing on Minutes of Discussions, Report to Embassy of Japan and JICA Philippine Office, Discussion with DOST and PAGASA					Study for Construction Materials and Methods	Data Collection, Quantity Survey		
15	10 Jul.	Thu	Manila→Tokyo JL746 (09:00-14:25)		Follow-up Study for Customs Clearance	Manila→(By Air) Tacloban→(By Road) Guiuan, Site Survey at Guiuan Radar Observation Station					
16	11 Jul.	Fri			Follow-up Study for Customs Clearance	Site Survey at Guiuan Radar Observation Station, Discussion with Municipality on Building Permit and Occupancy Permit, Discussion with ATO, Discussion with Material Quality Control & Hydrology Division of DPWH Tacloban Regional Office, Discussion with Ferry Company, Discussion with Electricity Company					
17	12 Jul.	Sat			Manila→Tokyo JL746 (09:00-14:25)						
18	13 Jul.	Sun				Guiuan→(By Road) Tacloban→(By Air) Manila					
19	14 Jul.	Mon				Discussion with Air Transportation Office (ATO)	Discussion with Air Transportation Office (ATO)	Data Collection, Quantity Survey	Data Collection, Quantity Survey, Study for Shipping Company		
20	15 Jul.	Tue				Site Survey at WFFC	Site Survey at WFFC	Study for Construction Materials and Methods	Data Collection, Quantity Survey, Study for Shipping Company		

21	**16 Jul.**	**Wed**				Manila→(By Road) Tuguegarao					
22	**17 Jul.**	**Thu**				Study for VSAT systems transferd from Department of Agriculture (DA) at Tuguegarao DA Office, Tuguegarao→(By Road) Aparri, Site Survey at Aparri Radar Observation Station, Discussion with Municipality on Building Permit and Occupancy					Data Collection at Statistics Office
23	**18 Jul.**	**Fri**				Site Survey at Aparri Radar Observation Station, Discussion with Material Quality Control & Hydrology Division of DPWH Tuguegarao Regional Office, Aparri→(By Road) Tuguegarao				Tokyo→Manila JL754 (18:25-21:55)	Data Collection at Statistics Office
24	**19 Jul.**	**Sat**				Tuguegarao→(By Air)Manila				Statisticcal Data Collection and Analysis	
25	**20 Jul.**	**Sun**				Internal Meeting, Data Collection				Statisticcal Data Collection and Analysis	
26	**21 Jul.**	**Mon**				Discussion with PAGASA and National Economic and Development Authority (NEDA), Discussion with National Telecommunication Committee (NTC)	Site Survey at WFFC, Discussion with National Telecommunication Committee (NTC)	Discussion with PAGASA, Site Survey at WFFC, Study for Construction Materials and Methods		Discussion with PAGASA and National Economic and Development Authority (NEDA)	Analysis of Statistical Data
27	**22 Jul.**	**Tue**				Discussion with PAGASA, Study for VSAT systems transferd from Department of Agriculture		Study for Construction Materials and Methods	Study for Shipping Company	Data Collection at Map Center	
28	**23 Jul.**	**Wed**				Discussion with National Disaster Coordinating Council (NDCC), Discussion with Satelliet Space Segment Provider		Study for Construction Materials and Methods	Data Collection, Quantity Survey	Analysis of Statistical Data	
29	**24 Jul.**	**Thu**				Discussion with Department of Health (DOH) on Radiation Influence Permit		Study for Construction Materials and Methods, Collection of Questionnaires	Data Collection, Quantity Survey, Study for Transportation Planning	Analysis of Statistical Data	Study for Areas to directly benefit from the implementation of the Project
30	**25 Jul.**	**Fri**				Discussion with PAGASA, Site Survey at WFFC, Data Collection		Data Collection, Quantity Survey, Study for Unit Price of Construction Materials, Collection of Questionnaires		Discussion with PAGASA	
31	**26 Jul.**	**Sat**				Internal Meeting, Data Collection		Topographic and Geotechnical Survey Follow-up	Internal Meeting, Data Collection, Study for Unit Price	Analysis of Statistical Data	
32	**27 Jul.**	**Sun**				Internal Meeting, Data Collection		Internal Meeting, Data Collection, Study for Unit Price	Internal Meeting, Data Collection, Study for Unit Price	Internal Meeting, Data Collection	
33	**28 Jul.**	**Mon**				Discussion with PAGASA, Data Collection		Topographic and Geotechnical Survey Follow-up	Data Collection, Quantity Survey, Study for Unit Price of Construction Materials, Collection of Questionnaires	Study for PAGASA Budjet, Study for Achievement Indicators for the Project	Study for Areas to directly benefit from the implementation of the Project
34	**29 Jul.**	**Tue**				Discussion with Mobile Telecommunication Company and PAGASA		Study for Construction Materials and Methods, Collection of Questionnaires	Data Collection, Quantity Survey, Study for Transportation Planning	Study for Operation and Maintenance Cost of the Project	Study for mumber of the Population to directly benefit from the implementation of the Project
35	**30 Jul.**	**Wed**				Discussion with PAGASA, Data Collection		Study for Construction Materials and Methods	Data Collection, Quantity Survey, Study for Transportation Planning	Analysis of Project Effect	Study for mumber of the Population to directly benefit from the implementation of the Project
36	**31 Jul.**	**Thu**				Report to PAGASA, Submission of the Technical Notes of the Study to PAGASA					
37	**1 Aug.**	**Fri**				Report to Embassy of Japan and JICA Philippine Office, Data Collection		Study for Construction Materials and Methods	Report to Embassy of Japan and JICA Philippine Office, Data Collection	Analysis of Statistical Data	Study for mumber of the Population to directly benefit from the implementation of the Project
38	**2 Aug.**	**Sat**				Internal Meeting, Data Collection					
39	**3 Aug.**	**Sun**				Manila→Tokyo JL746 (09:00-14:25)					

(2) Explanation of Draft Report

Study Schedule			Governmental Member		Consultant Member				
			Mr. Satoru MIMURA	Mr. Chiaki KOBAYASHI	Mr. Yoshihisa UCHIDA	Mr. Takehiro YOSHIDA	Mr. Kazumasa MITA	Mr. Takayuki MOTOYA	Mr. Felipe Fiel A. Sarigumba
2008			Team Leader	Project Coordinator	Project Manager/ Meteorological Radar System Planning/Operation and Maintenance Planning	System Planning /Equipment Cost Estimate	Procurement&Construction Planning /Construction Cost Estimate	Economic, Financial and Social Impact Analysis	Local Consultant (Information/Data Collection and Analysis)
1	20 Oct.	Mon				Tokyo→Manila JL741 (09:35-13:05)			
2	21 Oct.	Tue				Discussion with PAGASA, Explanation of Draft Report to PAGASA			
3	22 Oct.	Wed				Discussion with PAGASA, Explanation of Draft Report to PAGASA			
4	23 Oct.	Thu				Discussion with PAGASA, Explanation of Draft Report to PAGASA			
5	24 Oct.	Fri				Discussion with PAGASA, Explanation of Draft Report to PAGASA			
6	25 Oct.	Sat				Data Collection			
7	26 Oct.	Sun				Data Collection			
8	27 Oct.	Mon				Discussion with PAGASA, Explanation of Draft Report to PAGASA			
9	28 Oct.	Tue	Tokyo→Manila JL741 (09:35-13:30) Discussion with JICA Philippine Office			Manila→Tokyo JL746 (09:10-14:10)	Tokyo→Manila JL741 (09:35-13:30) Discussion with JICA Philippine Office		
10	29 Oct.	Wed	Courtesy call on Embassy of Japan, Courtesy call on PAGASA, Discussion with PAGASA, Explanation of Draft Report to PAGASA				Courtesy call on Embassy of Japan, Courtesy call on PAGASA, Discussion with PAGASA, Explanation of Draft Report to PAGASA		Discussion with PAGASA, Explanation of Draft Report to PAGASA
11	30 Oct.	Thu	Courtesy call on DOST, Discussion with PAGASA and National Economic and Development Authority (NEDA), Discussion with PAGASA, Explanation of Draft Report to PAGASA				Courtesy call on DOST, Discussion with PAGASA and National Economic and Development Authority (NEDA), Discussion with PAGASA, Explanation of Draft Report to PAGASA		
12	31 Oct.	Fri	Discussion with PAGASA, Explanation of Draft Report to PAGASA				Discussion with PAGASA, Explanation of Draft Report to PAGASA		
13	1 Nov.	Sat	Manila→(By Air) Virac				Manila→(By Air) Virac	Assistance for Preparation of ICCPE Form	Manila→(By Air) Virac
14	2 Nov.	Sun	Virac→(By Air) Manila Internal Meeting, Data Collection				Virac→(By Air) Manila Internal Meeting, Data Collection	Assistance for Preparation of ICCPE Form	Virac→(By Air) Manila
15	3 Nov.	Mon	Discussion with PAGASA, Explanation of Draft Report to PAGASA				Discussion with PAGASA, Explanation of Draft Report to PAGASA		
16	4 Nov.	Tue	Signing on Minutes of Discussions, Report to JICA Philippine Office				Signing on Minutes of Discussions, Report to JICA Philippine Office		Signing on Minutes of Discussions
17	5 Nov.	Wed	Manila→Tokyo JL746 (09:10-14:10)				Manila→Tokyo JL746 (09:10-14:10)		

Appendix 3. List of Party Concerned in the Recipient Country

- **Department of Science and Technology (DOST)**

Dr. Estrella F. Alabastro	Secretary
Dr. Graciano P. Yumul, Jr	Undersecretary

- **National Economic and Development Authority (NEDA)**

Mr. Kenneth V. Tanate	Chief Economic Development Specialist
Ms. Ameta B. Benjamin	Supervising Economic Development Specialist
Ms. Wanda Casten	Senior Economic Development Specialist
Mr. Reno Joseph N. Cantre	Economic Development Specialist

- **Department of Agriculture (DOA)**

Mr. Teddy Casucog	Network Administrator
Mr. Artemio Manuel Vergara	Agriculturist II
Mr. Policarpio Ignacio	Network Administrator

- **Department of Health (DOH), Bureau of Health Devices and Technology**

Ms. Agnette P. Peralta	Director
Ms. Maria Hadys R, Cabrera	Health Physicist
Mr. Arnold I. Eleazar	Health Physicist

- **Department of Transportation and Communications (DTC), Civil Aviation Authority**

Mr. Daniel A. Dimagiba	Executive Director
Mr. Roberto P. Tolentino, Pece	Telecommunications Spectrum Manager

Aerodrome Development Management Service (ADMS)

Ms. Corazon D. Doctolero	Engineer II

Air Transportation Office (ATO), Virac Airport

Ms. Cynthia M. Tumanut	Airport Manager

- **National Telecommunications Commission (NTC)**

Mr. Roberto P. Tolentino	Telecommunications Spectrum Manager

- **Department of National Defense, Office of Civil Defense**

Mr. Glenn J Rabonza	Administrator, Camp Aguinaldo

- **Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)**

PAGASA Head Office and Weather and Flood Forecasting Center (WFFC)

Dr. Prisco D.Nilo	Director
Dr. Nathaniel T. Servando	Deputy Director for Research and Development,

	Program Manager
Mr. Catalino L.Davis	Chief, PAGASA Engineering and Maintenance Division, Assistant Program Manager
Dr. Vicente B. Malano	Supervising Weather Specialist, Officer-in-charge of Field Operations Center
Ms. Fredolina D. Baldonado	Supervising Weather Specialist
Mr. Edwin F. Manresa	Supervising Weather Specialist, Chief, Meteorological Equipment Maintenance Section
Mr. Silvestre L. Selpa	Supervising Weather Specialist
Mr. Arnel R. Manoos	Weather Facilities Specialist III, Electronics and Communication Engineering Section, Engineering Maintenance Division
Ms. Lillibeth B. Gonzales	Officer-in-charge of Finance and Management Division
Mr. Erie Estrella	Weather Facilities Specialist, Engineering, Maintenance Division
Ms. Nancy T. Lance	Weather Specialist II, Officer-in-charge of Plans and Program Development Staff
Mr. Romeo M. Cadag	Civil Engineer, Engineering, Maintenance Division
Mr. Conrado P. Aldovino	Civil Engineer, Engineering, Maintenance Division
Mr. Gaspar B. Salaguste	Civil Engineer, Engineering, Maintenance Division
Mr. Lourclcs V. Tibig	Chief of Climate Data Section
Virac Radar Observation Station	
Mr. Ely P. Rodulfo	Chief Meteorological Officer, Weather Specialist
Mr. Eufronio H. Garcia	Weather Facilities Specialist II
Mr. Juan T. Pantion, Jr	Weather Observer II
Virac Pagasa Complex	
Mr. Ely P. Rodulfo	Chief Meteorological Officer, Weather Specialist
Appri Radar Observation Station	
Mr. Jose Rico G. Mercado	Chief Meteorological Officer, Weather Specialist
Guiuan Radar Observation Station	
Mr. Marianito A. Macasa	Chief Meteorological Officer, Weather Specialist
Tuguegarao Synoptic Station	
Mr. Leo L. Bunag	Chief Meteorological Officer, Weather Specialist

- **Municipality of Aparri**

Dr. Ismael V. Tumaru,	Municipal Mayor

- **Department of Public Works and Highways**

  Virac Office

Mr.Arnulfo T. Almojuela	Engineer III

  Legazpi Office

Mr. Fermin E. Pefeza	Engineer V

  Tuguegarao Office

Mr. Bdilberto B. Bttung	Officer-in-charge, Engineer

- **First Catanduanes Electric Cooperative Inc. (Virac)**

Mr. Carlos T. Gitntn	Engineering Division

- **Cagayan Electric Cooperative Inc. (Aparri)**

Mr. Felipe R. Tumacoer, Jr.	Engineering Division

- **Eastern Samar Electric Company (Guiuan)**

Mr. Parcho Afable	Technical Services Dept. Manager

- **Measat Satellite Systems SDN BHD**

Mr. Rob Marabut	Senior Sales/Business Development Manager

- **Municipal Engineering Office (Virac)**

Mr. Domingo Bernal	Municipal Engineer
Mr. Franklin Toledana	Engineer I

- **Municipal Engineering Office (Aparri)**

Mr. Rolando A. Liberato	Municipal Engineer

- **Municipal Engineering Office (Guiuan)**

Mr. Gilberto N. Labicane	Municipal Engineer
Mr. Arsenio V. Salanida	Municipal Engineer

- **SMART**

Mr. Rogelio L. Flores	Senior Manager, NSD-NSA4 South Luzon

Appendix 4. Minutes of Discussions

Minutes of Discussions
on the Basic Design Study
on the Project for Improvement of the Meteorological Radar System
in the Philippines

Referring to the results of Preparatory Study conducted in December 2007, the Government of Japan (hereinafter referred to as "the GOJ") decided to conduct a Basic Design Study on the Project for Improvement of the Meteorological Radar System (hereinafter referred to as "the Project") in the Philippines (hereinafter referred to as "the Philippines") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Philippines the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Toshiyuki IWAMA, Director, Project Study Division I, Grant Aid and Loan Support Department, JICA and is scheduled to stay in the country from June 26 to August 03, 2008.

The Team held discussions with the officials concerned of the Government of the Philippines (hereinafter referred to as "GOP"). As a result of discussions, both parties confirmed the main items described in the attached sheets.

Quezon City, July 09, 2008

Toshiyuki IWAMA
Leader
Basic Design Study Team
Japan International Cooperation Agency

Dr. Graciano P. YUMUL, Jr.
Undersecretary for Research and Development
Department of Science and Technology (DOST)

Dr. Prisco D. ,NILO
Director
Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA-DOST)

ATTACHMENT

1. Objective of the Project

The objective of the Project is to protect lives and properties of the people and mitigate the devastation caused by tropical cyclones and other severe weather phenomena through the continuous and timely dissemination of accurate forecasts, warnings and advisories to the public, disaster management agencies and mass media by enhancing the tropical cyclone monitoring capability of PAGASA-DOST.

2. Responsible and Implementing organization

2-1) The responsible organization

The responsible organization is Department of Science and Technology (DOST).

2-2) The implementing organization

The implementing organization is the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA-DOST).

2-3) Organization charts of organization

The respective organization charts are shown in **Annex-1.**

3. Project title

Both sides agreed to rename the Project into the "Project for Improvement of the Meteorological Radar System in the Philippines" from the previous title "Project for Enabling Communities for the Adoption of Disaster Prevention and Preparedness Measures in Areas Prone to Floods and Rain-induced Landslides through Improvement of the Meteorological Radar System in the Philippines"

4. Project sites

The proposed project sites are Virac in Catanduanes Province, Aparri in Cagayan Province, Guiuan in Eastern Samar Province and Weather and Flood Forecasting Center (WFFC) in Quezon City. Location of the Project sites and present detection range of the existing radar systems are shown in **Annex-2.**

5. Items requested by the Philippines side

After discussions with the Team, the items described in **Annex-3** were confirmed as the final requests by the Philippines side. JICA will assess the appropriateness of the request and will report the findings to the Government of Japan.

6. Japan's Grant Aid Scheme

6-1. The Philippines side understand the Japan's Grant Aid scheme explained by the Team, as described in **Annex 4-1.**

6-2. The Philippines side will take the necessary measures and allocate the necessary budget properly, as described in **Annex 4-2,** for the smooth implementation of the Project, as a condition for the Japan's Grant Aid to be implemented.

7. Schedule of the Study

7-1. The Consultant members of the Team will proceed to further studies in the Philippines until August 03, 2008.

7-2. JICA will prepare the draft report in English and dispatch a mission in order to explain its contents in October 2008.

7-3. In case that the contents of the report are accepted in principle by the GOP, JICA will complete the final report and send it to the Philippines by the end of December, 2008.

8. Other Relevant Issues

8-1 Priority of the Project sites

Both sides agreed that the priority may be changed in accordance with the following conditions.

1) Climate condition of each proposed site (especially precipitation) for construction and installation works
2) Operation of at least 2 existing/new radar systems for tropical cyclone monitoring, during the Project implementation

However, the Team indicated that the priority of the Project sites (1. Virac in Catanduanes Province, 2. Aparri in Cagayan Province and 3. Guiuan in Eastern Samar Province) indicated in the Minutes of Discussion of the Preparatory Study signed in December 2007 would be given maximum consideration for preparation of the Project implementation schedule.

The order of Project implementation will be informed to the PAGASA-DOST in the Explanation of draft of Basic Design Study in October 2008.

8-2 Selection of the Doppler radar transmitter

As a consequence of comparison between Klystron and Solid State Power Amplifier (SSPA) raised by PAGASA-DOST during the Preparatory Study, the Team recommended SSPA due to the following advantages; cost effectiveness, easy replacement of amplifier unit, low power consumption, long estimate of life time, narrow transmitting spectrum (band width), stable transmitting output power, none preheating time, etc. The Philippines side agreed with the recommendation of the Team.

8-3 Technical confirmation of the VSAT system

The Japanese side requested the Philippines side that, in order to maximize the effect of installing the radar systems, it is crucial that the observed data from each radar station be able to be transmitted and analyzed at the Weather and Flood Forecasting Center (WFFC). However, the Philippines side explained that the existing VSAT system to be transferred from the Department of Agriculture may have problems in future usage.

Therefore, for assurance of establishment of national radar observation network, the Philippines side requested the inclusion of a new VSAT system due to several factors and conditions.

The Philippines side shall technically confirm the following items of the VSAT system transferred from the Department of Agriculture to be appropriately operational for the Project and officially inform of the result of the confirmation supported by the letter of availability of spare parts from the manufacturer to JICA

Philippines office during the stay of the Team in the Philippines.

- All units (Indoor Unit, Outdoor Unit, frame relay, modem, router, etc.) operational between the Hub system in Quezon City and the remote site(s) of Department of Agriculture.
- Availability of the manufacturer of the VSAT system
- Availability of spare parts

The Team will assess the appropriateness of the request of VSAT system.

8-4 VSAT User License for the VSAT system

The Philippines side shall obtain the VSAT User License from the National Telecommunications Commission (NTC) prior to commencement of the Project.

8-5 Space segment for the VSAT system

The Philippines side shall secure the required annual budget for the required space segment (bandwidth of transponder) fee and obtain the space segment enough for communication between the PAGASA Head Office (WFFC) and 3 meteorological radar observation stations (Virac, Aparri and Guiuan) prior to commencement of the Project.

8-6 Major undertakings by the Philippines side

The Philippines side agreed to undertake the following measures at their own cost prior to the commencement of the Project:

1) Partial demolition/renovation of the existing radar tower building

In order to utilize the existing facilities in the proposed project sites and minimize the initial cost to be borne by PAGASA-DOST, the Team made the following proposals and the Philippines side agreed with the detailed proposals from the Team indicated in the attached tables in **Annex-6.**

- Complete separation of a radar operation & maintenance facility and a staff living facility from the perspective of good hygiene and pest control
- Partial demolition/renovation of the existing building for improving the staff quarter by PAGASA-DOST instead of complete demolition of the existing radar tower building

2) Construction of access road(s) for Guiuan radar station prior to commencement of the Project implementation

3) Confirmation of non interference between radar system and the mobile phone communication at Virac radar station

The Philippines side agreed to technically confirm non interference between the radar system to be procured and the mobile phone communication at Virac.

4) Securement of the required budget for refunding Value Added Tax (VAT) and Custom duties, and

5) Security of the equipment at the proposed project sites

8-7 Utilization of the existing radar systems (Virac, Aparri and Guiuan)

The PAGASA-DOST expressed to continuously utilize 1 of 3 existing radar systems at Daet in Camarines Norte Province and the other 2 as spares procured under the Japanese Loan Scheme in order to reinforce the plan for establishment of the national radar observation network.

8-8 Approval by the Investment Coordination Committee (ICC)

The Philippines side shall obtain ICC approval for the implementation of the Project. The Philippines side is fully aware that the Approval of ICC is a pre-requisite for the Exchange of Notes. The intended schedule explained by the Philippines side is as shown in **Annex-7.**

8-9 Acquisition of the required permit(s)/certificate(s) for ICC approval

The Philippines side shall acquire the necessary permit/certificate such as Height Clearance Permit, Radiation Influence Permit, Certificate of Non-Coverage, etc. The Philippines side agreed to obtain the required permit(s)/certificate(s) by the end of October 2008.

8-10 Operation and Maintenance

The Philippines side agreed to allocate sufficient budget and qualified staff for proper and effective operation/maintenance of the equipment procured under the Project.

8-11 Technical Training

1) The Philippines side requested a technical training on the operation and maintenance of the Doppler radar systems provided by the equipment suppliers. The Team will study the necessity of the training.
2) The Philippines side also requested the technical training on the analysis and utilization of the Doppler radar products. The Philippines side is aware that preparation and submission of the application form to the NEDA is necessary.

END

Annex-1 Organization Charts
Annex-2 Present Detection Range of the Meteorological Radar Network in the Philippines
Annex-3 Final Items requested by Philippines
Annex-4-1 Japan's Grant Aid Scheme
Annex-4-2 Major undertakings by each government
Annex-5 Check List of VSAT System transferred from the Department of Agriculture (DOA)
Annex-6 Responsibility Classification for Implementation of the Project
Annex-7 Schedule for obtaining ICC approval