The types of superstructures for various span lengths shown in Table 4.15 were categorized as follows:

1)	Span length less than 24 m	H-beam girder
2)	Span length more than 25 m	Plate girder
3)	Subject to criteria	PC girder

This categorization of superstructure type is based on the study described below.

1) Case 1 : H-beam girder for less than 24 m span length

For bridges with span lengths of less than 24 m, the experience in Japan indicates that the following three types will be economical for steel bridges.

- H-beam girder
- Plate girder (non-composite build-up girder)
- Composite plate girder (composite build-up girder)

Composite plate girder, in which slab concrete takes part of the resistant capacity of the girder through the structural synthesis of slab concrete and plate girder, is unsuitable superstructure type in the Philippines because of problems in concrete quality, handling manner and maintenance. On the other hand, H-beam girder has some allowance in its sectional stress and less deflection. Therefore H-beam girder was adopted after the comparison between H-beam girder and plate girder (non-composite), as shown in Table 4.16.

Table 4.16 COMPARISON OF H-BEAM GIRDER AND PLATE GIRDER (for less than 24 m span length)

Evaluation Item	H-Beam Girder	Plate Girder	Evaluation (advantage)
Adoptable Span	Less than 24 m	Less than 40 m	--
Girder Height	Approx. 90 cm	Approx. 130 m	H-beam
Difficulty of Transportation, Erection	Easy	A little difficult	H-beam
Cost	Lower (more material, lower fabrication cost)	Higher (less material, higher fabrication cost)	H-beam

Figure 4-3 shows relation of span length and steel weight except for accessories such as shoes, expansion joints, handrails and drainage boxes, by the types of superstructure.

2) Case 2 : Plate girder (non-composite) for more than 25 m span length

For bridges with span length of more than 25 m, the experience in Japan indicates that the following two types will be economical.

- Plate girder (non-composite build-up plate girder)
- Composite plate girder (composite build-up plate girder)

Since the composite type is an unsuitable structure in the Philippines as explained in 1) case 1, the plate girder type was adopted although it is relatively uneconomical. A comparison between plate girder and composite plate girder is presented in Table 4.17.

Table 4.17 COMPARISON OF PLATE GIRDER AND COMPOSITE PLATE GIRDER

Evaluation Item	Plate Girder	Composite Plate Girder	Evaluation (advantage)
Slab Concrete	Required quality $k = 270\ kg/cm^2$	Required quality $k = 300\ kg/cm^2$	Plate girder $k = 270\ kg/cm^2$ is common in R.P.
Girder Height	Over 180 cm	Approx. 180 cm	Composite pl. girder
Deflection	More	Less	Composite pl. girder
Maintenance	Easy to repair	Difficult to repair	Plate girder
Cost	High	Low	Composite pl. girder

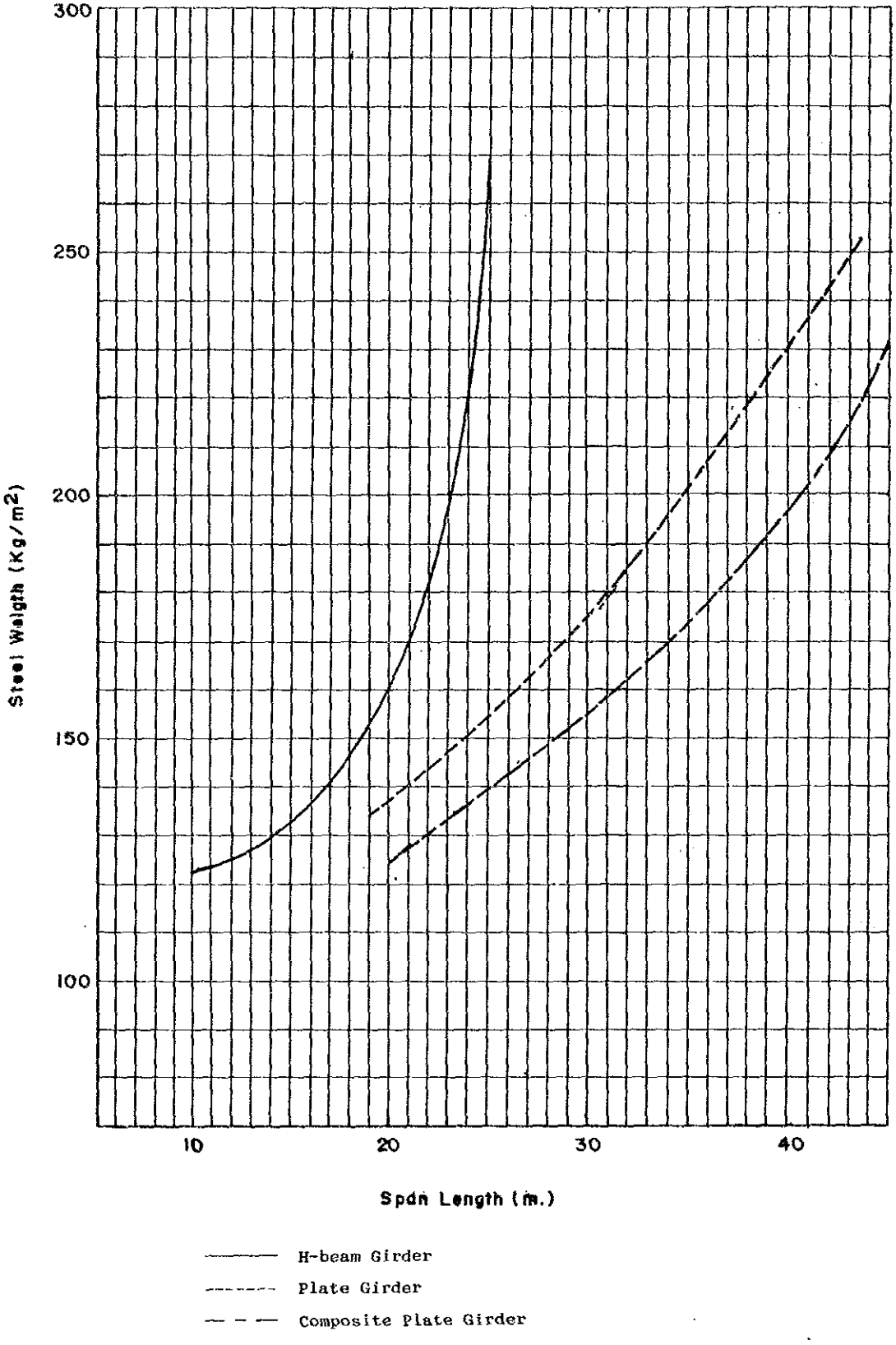


Figure 4.3 STEEL WEIGHT (EXCEPT INCIDENTAL FACILITIES)

The girder height was designed to be as lower as possible within the stress limit, because of that higher girder would result to higher approach road embankment and longer approach road.

The maximum length of the girder members was decided to be less than 8.5 m, considering convenience of transportation and fabrication of them in the Philippines.

3) Case 3 : PC girder

Structural type of bridges complying with the following conditions can be PC girder:

- Where the conditions of transportation route and access roads are unsuitable for steel girder bridge construction. The fabrication yard at construction site shall be required for PC girder.

- Where the timbering for steel girder erection is difficult due to river condition.

- Where it is desirable to construct PC girder bridge Procurement of construction material will contribute to the economic activities in the area.

- Where PC girder bridge is suitable for the area from the environmental and esthetic view.

The following 3 bridges of Group-2, whose locations and construction conditions would comply with above criteria, were adopted to be PC girder type.

05.03.01	Hitoma Br.	3 x 27m = 81m
07.05.05	Tambongon Br.	3 x 27m = 81m
07.06.07	Mojon Br.	5 x 32m = 160m

4.3.4 Types of Substructures

T-shape abutments and column piers were adopted for the substructures. Column pier can avoid disturbance to the stream lines, when the bridge line crosses the river at oblique angle (refer to Table 4.18).

T-shape abutment is required to have at least two lines of piles in order to avoid tilting of the abutment when scouring of the embankment will occur. R.C. rectangular pile of 400 x 400 was adopted for this pile foundations.

Table 4.18 STREAM ANGLE

Bridge Number	Name of Bridge	Stream Angle*	Remarks
05.02.04	Banquerohan Br.	90°	3@25
05.03.01	Hitoma Br.	90°	3@27 PC girder
05.06.04	Lanang Br.	54°	3@27
05.06.05	Potot Br.	90°	3@20
06.06.04	Lawigan Br.	90°	3@32
07.05.01	Apalan Br.	90°	2@27
07.05.05	Tambongon Br.	90°	3@27 PC girder
07.06.05	Mojon Br.	90°	5@32 PC girder
07.15.06A	Alimango Br.	90°	1@35
08.01.01	Anas Br.	90°	3@20
08.03.04	Elizabeth Br.	90°	3@20

Note: * Oblique angle between stream line and bridge

4.3.5 Determination of Other Items

1. Bridge Width

The bridge width of 8.32 m, which was proposed by the DPWH, was adopted after the technical verification and based on the following reasons:

1) According to the highway specification of the DPWH, the minimum width of 2-lane carriageway and shoulder are 6.1 m and 0.3 m respectively. The clear zone of 0.46 m and handrail section of 0.35 m also are required for each side of bridge. Thus, the total bridge width is 8.32 m.

2) Providing 2-lane road and bridge is one of principal targets of transport sector investment in the Medium-Term Philippine Development Plan.

3) All bridges constructed under international assistance and planned to be constructed by local fund have 2-lane or more.

2. Road Surface Height

According to the specification of the DPWH, the lower surface of girder shall be heighten with minimum 1.0 m from High Flood Water Level (H.F.L). Road surface height was estimated as a sum in thickness of girder, slab, pavement, etc. to height of the lower surface of girder.

3. Weathering Steel

Depending on the mountainous location of bridge, weathering steel which has atmospheric corrosion resistance is used for Alimango bridge of Group-2.

4.4 Design of Superstructure

4.4.1 Design Criteria

The design criteria for superstructures are as follows:

(1) H-beam, Plate Girder

- Design Specification : AASHTO Standard Specifications for Highway Bridges (13rd Edition, 1983)
  : Specification for Highway Bridges, Japan Road Association, 1989
- Live Load : AASHTO HS-20-44 (MS18) for Roadways
  : 2.873 KN/M2 for Sidewalks
- Temperature Change : rise + 10°, fall - 10°
- Concrete Slab : (3L + 11) x 1.05,
  L = span Length
- Max. Length of Member : 8.5 m

- Concrete Strength : Slab fc = 300 kg/cm²
  Railing fc = 130 kg/cm²
- Reinforcing Bar : fy = 2,100 kg/cm²

(2) PC Girder

- Design Specification : AASHTO Standard Specifications for Highway Bridges (13rd Edition, 1983)
  : Specification for Highway Bridges, Japan Road Association, 1989
- Live Load : AASHTO HS-20-44 (MS18) for Roadways
  : 2.873 KN/M2 for Sidewalks
- Temperature Change : rise + 10°, fall - 10°
- Concrete Slab : (3L + 11) x 1.05,
  L = span Length
- PC Wire : 12 - T12.4
- Main Girder : AASHTO Type IV
- Concrete Strength : Main Girder fc = 350 kg/cm²
  Slab fc = 280 kg/cm²
  Railing fc = 210 kg/cm²
- Reinforcing Bar : fy = 3,000 kg/cm²

4.4.2 Design Results

The result of the analysis are given in the following tables:

(1) Size and Stress Intensity of Girders for Group-2 Bridges ... Appendix 9 Table 9-2.
(2) Size of Slabs, Girders and Shoes for Groups-1 and Group-2 Bridges ... Appendix 9 Table 9-3.
(3) Reaction for Abutments and Pier Beams ... Appendix 9 Table 9-4.

(4) Standard Sketch of Superstructure (H-beam) ...
Appendix 9 Figure 9-1.
(5) Standard Sketch of Superstructure (Plate girder) ...
Appendix 9 Figure 9-2.
(6) Standard Sketch of Superstructure (PC girder) ...
Appendix 9 Figure 9-3.

4.5 Design of Substructures

4.5.1 Design Criteria

The design criteria for substructures are as follows:

- Design Specification : AASHTO Standard Specifications for Highway Bridges (13rd Edition, 1983)
- Earthquake Load : C = 0.12 with Reference to Relevant AASHTO Provisions
- Concrete Strength at 28 days: fc = 210 kg/cm^2
- Reinforcing Bar: fy = 2,100 kg/cm^2
- Steel Pile : fy = 2,400 kg/cm^2

4.5.2 Design Results

Design results are shown in the following table and figures:

(1) Substructure Types and Reaction of Pile ...
Appendix 9 Table 9-5.
(2) Standard Sketch of Abutment ... Appendix 9 Figure 9-4.
(3) Standard Sketch of Pier (span 15m ~ 24m) ...
Appendix 9 Figure 9-5.
(4) Standard Sketch of Pier (span 25m ~ 32m) ...
Appendix 9 Figure 9-6.
(5) Standard Sketch of Pier (PC girder) ...
Appendix 9 Figure 9-7.

4.6 Design of Approach Roads

4.6.1 Design Criteria

The design standard for secondary class national roads specified in the Highway Design Guideline of the Philippines was adopted for the design of the approach roads. Its geometric standard is shown in Table 4.19.

Table 4.19 MINIMUM GEOMETRIC STANDARD

	Flat	Rolling	Mountainous
1. Design Seed (km/hr)	60	50	40
2. Pavement Width (m)	6.70	6.70	6.70
3. Shoulder Width (m)	1.00	1.00	1.00
4. Minimum Radius (m)	120	80	50
5. Maximum Superelevation (%)	8	8	8
6. Maximum Grade (%)	3	5	10
7. Minimum Length of Vertical Curve (m)	60	60	60
8. Minimum Radius for Crest Vertical Curve (m)	1500	1200	1000
9. Minimum Radius for Sag Vertical Curve (m)	1500	1000	800

4.6.2 Typical Roadway Sections

Figure 9-8 in Appendix 9 shows typical roadway sections of the approach roads.

4.6.3 Analysis of Soft Ground

As a result of the geotechnical survey, it is ascertained that the subsoil of the Banquerohan Br., Apalan Br. and Tambongon Br. sites are soft.

The problems caused by soft subsoil for the construction of bridges are insufficient bearing capacity of the subsoil, settlement of embankments due to consolidation and slope failure of embankments. As a countermeasure for insufficient bearing capacity, reinforced concrete piles which are made in the

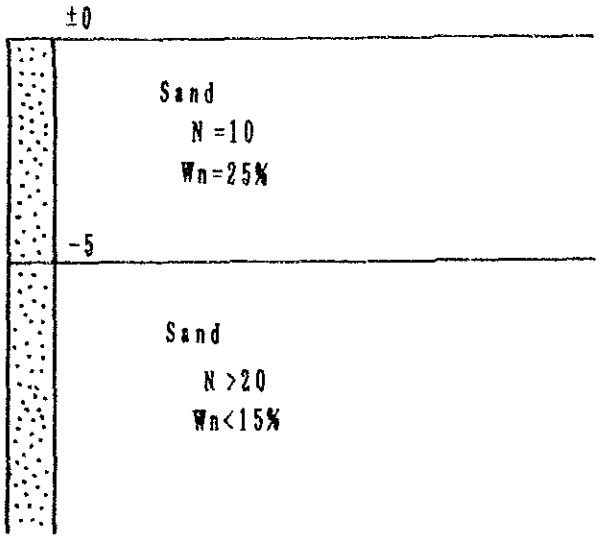
Philippines are used for the foundations of abutments and piers. To stabilize the embankment, the following special countermeasures are planned because of the short construction period.

(1) Soil Property and Section Model

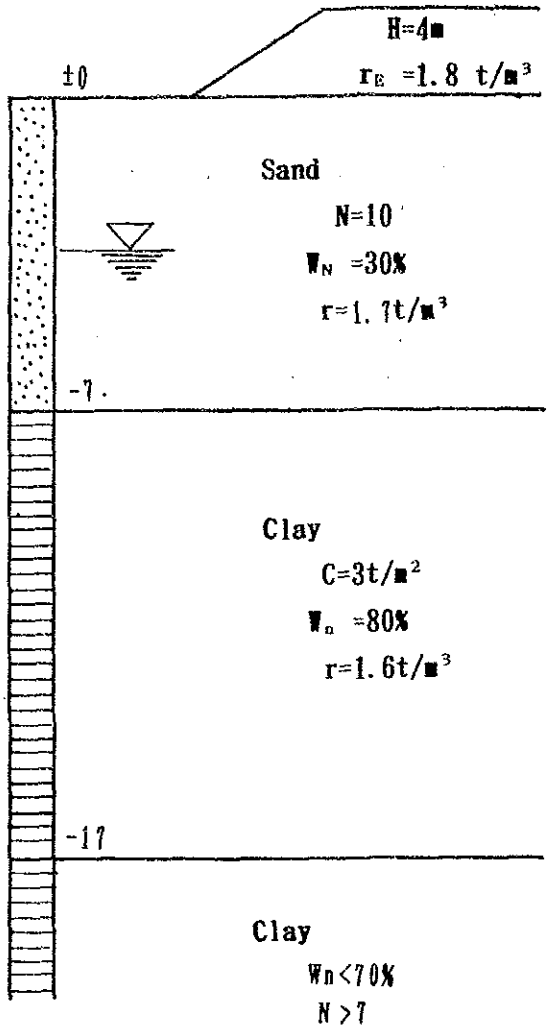
The section model and soil properties of layer for the analysis are shown in Figure 4.4.

Cohesion of clayey soil are assumed from the relationship between water content (Wn) and unconfined compressive strength (qu = 2 x cohesion) shown in Appendix 8.

05. 02. 04 BANQUEROHAN Br.



07. 05. 01 APALAN Br.



07. 05. 05 TAMBONGON Br.

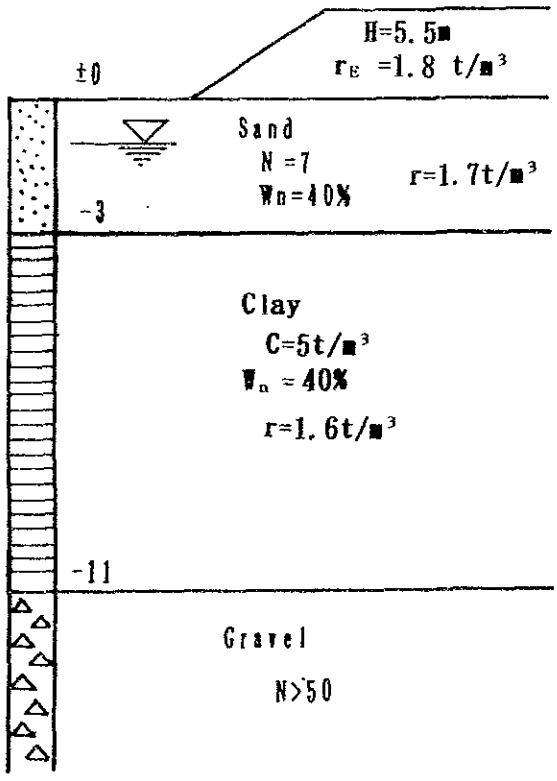


Figure 4.4 EMBANKMENT SECTION MODEL

(2) Settlement Analysis (Apalan Br., Tambongon Br.)

Settlements were estimated by using e-logp curve and Cu curve shown in Appendix 8.

The results are follow:

Apalan Br.
Ultimate settlement : app. 50 cm
Days for 80 % consolidation : app. 3,000 days (8.5 yrs)

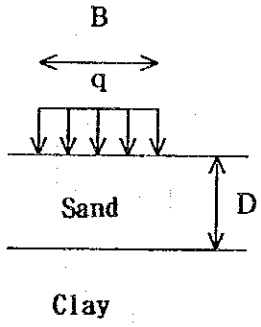
Tambongon Br.
Ultimate settlement : app. 40 cm
Days for 80 % consolidation : app. 500 days (1.4 yrs)

(3) Bearing Capacity for Embankment

Safety factors for bearing capacity of clayer soil below sand layer are estimated by using the following equation:

$$q = \frac{5C}{Fs}\left(1 + \frac{D}{B}\right)\left(1 + 0.2\,\frac{D}{B}\right)$$

The results are follow:



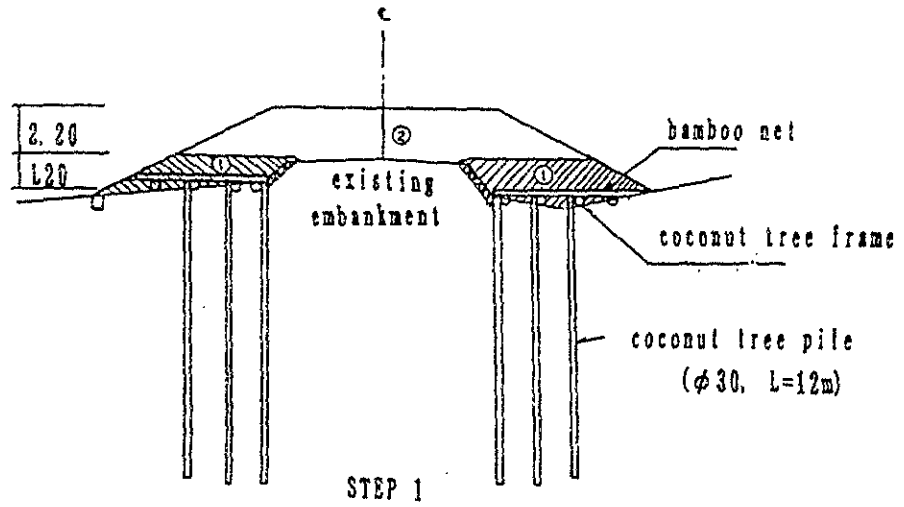
Apalan Br.
Fs = 3.5

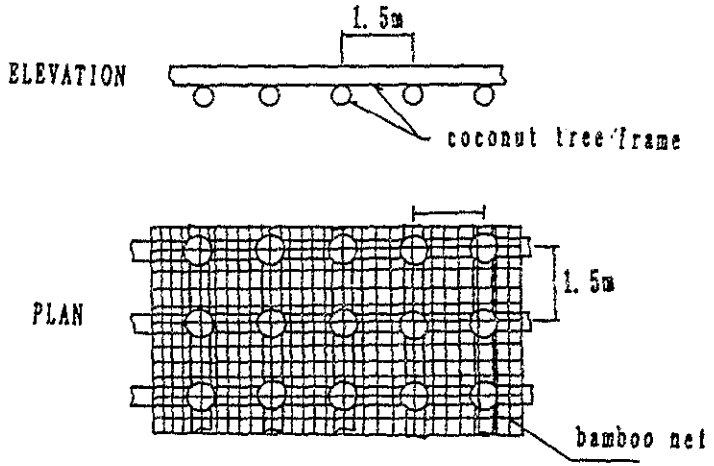
Tambongon Br.
Fs = 3.0

(4) Countermeasure

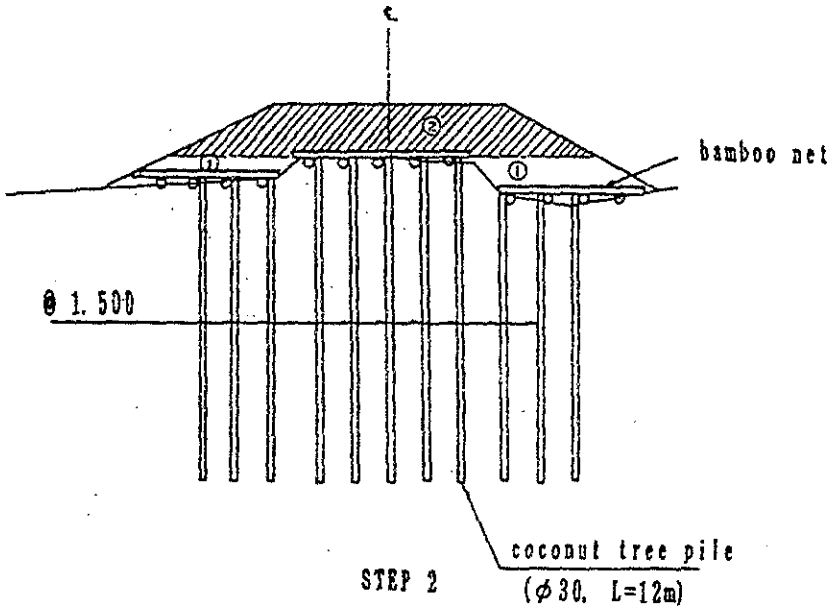
The results saying that bearing capacity is sufficient but ultimate settlement being 10 % of embankment height in long period indicate that some countermeasures are necessary to reduce ultimate settlement and to prevent lateral flow.

As a countermeasure, the preloading, sheet and pile-net methods were proposed. The pile-net method was adopted because of the necessity of speedy execution, procurement of local material and concrete pavement on the embankment. Bamboo nets and coconut trees will be used for the pile-net method which is illustrated in Figure 4.5.





PILE - NET



Procedure of Execution

i) Drive coconut tree piles and stall wooden frames and bamboo nets on both side of existing embankment.
Execute Embankment on the bamboo nets up tp existing embankment. (Riprap shpould be removed prior to embankment is executed where riprap is existing.)

ii) Drive coconut tree piles and stall wooden frames and bamboo nets on top of existing embankment. Execute embankment up to porposed grade.

Figure 4.5 COUNTERMEASURE ON SOFT GROUND (PILE-NET METHOD)

4.7 Design of Pavement Structures

4.7.1 Design Criteria

- Design Specification: AASHTO Guide for Design of Pavement Structure 1986, AASHTO

- Serviceability of PCC Pavement: initial 4.5
  terminal 2.5

- Pavement Layer Characteristics:
  modulus of subbase: 8000 psi
  modulus of elasticity of PCC:
  328×10^6 psi

- PCC Modulus of Rupture: 580 psi

- Drainage Coefficient: 0.9

- Load Transfer Coefficient: 4

- Loss of Support: 1

4.7.2 Types of Pavement

Portland Cement Concrete (PCC) pavement is recommended, as shown in Figure 4.6.

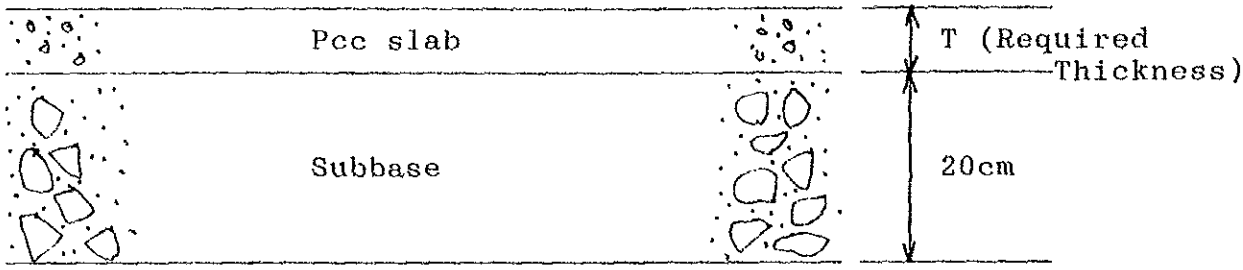


Figure 4.6 TYPICAL CROSS SECTION OF PCC PAVEMENT

The required thickness of PCC slab will be estimated so as to bear the expected number of traffic volume and loads. Table 4.20 shows the recommendations based on the outcomes of the Feasibility Study of the Road Improvement on the Pan-Philippine Highway conducted by JICA on September 1987.

Table 4.20 RECOMMENDED THICKNESS BY PCC SLAB

PCC Thickness

Traffic loading class (x 10^6)	CBR	2	3	4	5	6	8	10	15	20	Performance Period
Light traffic Loading	L-1 (0.005)	Apply min. 20 cm									More than 25 Years
	L-2 (0.01)										
	L-3 (0.03)										
Heavy traffic Loading	A (0.1)	23cm									15 Years
	B (0.2)	25cm									
	C (0.4)	28cm			25cm						
	D (0.7)	28cm									
	E (1.0)	30cm									
Extra Heavy traffic	F-d (1.5-3.5)	30 or 33 or 35									5-12 Years

Note: Traffic loading class is express in number of ESAL (18- kip equivalent single axle loads)

4.8 Design of River Protection

4.8.1 Required Area of Water Opening

The required water opening for run-off flood discharge is presented in Appendix 8.

4.8.2 Type of River Bank Protection

As planned for the Phase I, II, and III Bridge Projects, riverbank protection at the front of abutments is constructed when the velocity of river water is over 3 m per second or when erosion and scouring are expected.

Considering the availability of local materials, grouted riprap protection is adopted for the Project. The slope gradient of grouted riprap of 1.5 : 1 was adopted so as to prevent the slope failure of back-filling embankment. It was also proposed that grouted riprap foundation would be extended into the bedrock or to below the scour depth. Figure 4-7 shows a typical cross section of grouted riprap.

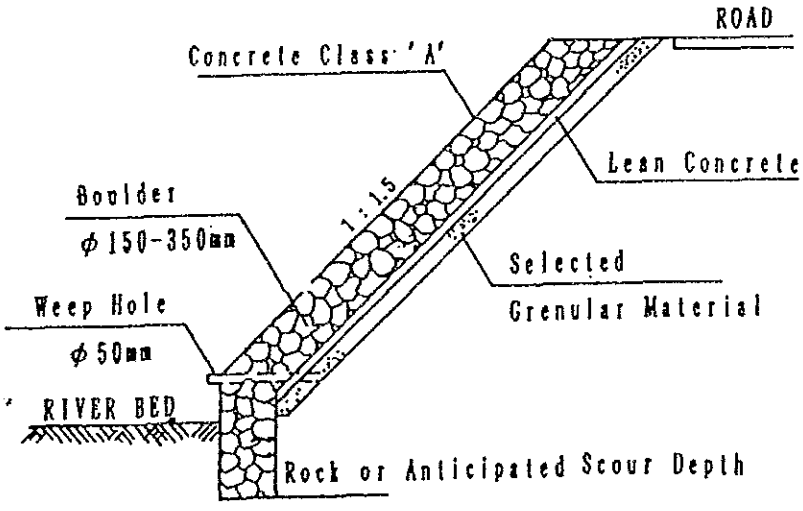


Figure 4.7 RIVERBANK PROTECTION

4.9 Summary of Design Results

The results of design after engineering considerations on the various conditions of each bridge are summarized in Table 4.21. The quantities of construction are shown in Table 4.22 and 4.23.

Table 4.21 SUMMARY OF GROUP-2 BRIDGES

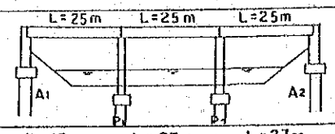
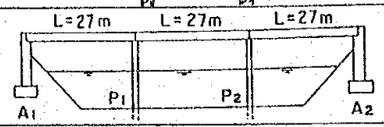
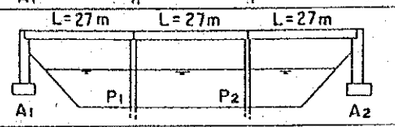
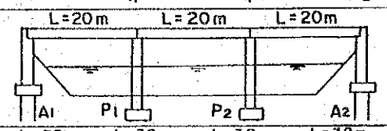
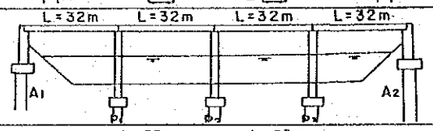
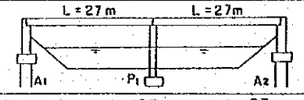
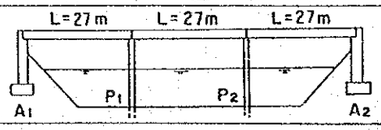
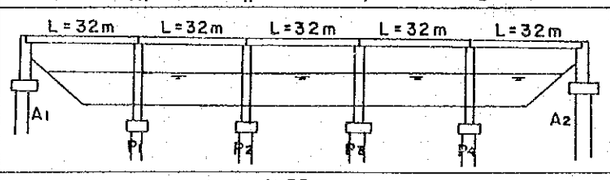
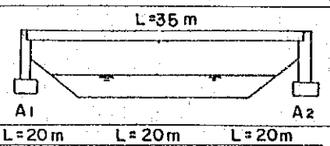
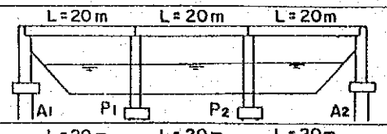
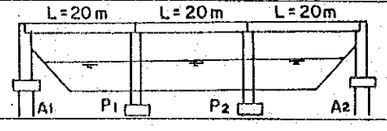
Bridge No.	Name of Bridge	Type of Bridge	Superstructure	Substructure	Remarks
05.02.04	Banquerohan Br.		Build-up Beam L; 25+25+25=75m	A Abut - RC Pile (400mmx400mmx16.0mx12 piles) P_1 Pier - RC Pile (400mmx400mmx14.0mx 8 piles) P_2 Pier - RC Pile (400mmx400mmx14.0mx 8 piles) B Abut - RC Pile (400mmx400mmx13.0mx10 piles)	--
05.03.01	Hitoma Br.		Pre-stressed Girder L; 27+27+27=81m	A Abut - Spread foundation P_1 Pier - Spread foundation P_2 Pier - Spread foundation B Abut - Spread foundation	--
05.06.04	Lanang Br.		Build-up Beam L; 27+27+27=81m	A Abut - Spread foundation P_1 Pier - Spread foundation P_2 Pier - Spread foundation B Abut - Spread foundation	--
05.06.05	Potot Br.		H-Beam L; 20+20+20=60m	A Abut - RC Pile (400mmx400mmx 7.0mx 8 piles) P_1 Pier - RC Pile (400mmx400mmx 6.0mx 8 piles) P_2 Pier - RC Pile (400mmx400mmx 6.0mx 8 piles) B Abut - RC Pile (400mmx400mmx 7.0mx 8 piles)	--
06.06.04	Lawigan Br.		Build-up Beam L; 32+32+32=96m	A Abut - RC Pile (400mmx400mmx 7.0mx10 piles) P_1 Pier - RC Pile (400mmx400mmx 7.0mx 8 piles) P_2 Pier - RC Pile (400mmx400mmx 7.0mx 8 piles) B Abut - RC Pile (400mmx400mmx 7.0mx10 piles)	--
07.05.01	Apalan Br.		Build-up Beam L; 27+27=54m	A Abut - RC Pile (400mmx400mmx 8.0mx12 piles) P Pier - RC Pile (400mmx400mmx26.0mx 8 piles) B Abut - RC Pile (400mmx400mmx32.0mx12 piles)	--
07.05.05	Tambongon Br.		Pre-stressed Girder L; 27+27+27=81m	A Abut - RC Pile (400mmx400mmx12.0mx18 piles) P_1 Pier - RC Pile (400mmx400mmx10.0mx 8 piles) P_2 Pier - RC Pile (400mmx400mmx10.0mx 8 piles) B Abut - RC Pile (400mmx400mmx19.0mx18 piles)	--
07.06.05	Mojon Br.		Pre-stressed Girder L; 32+32+32+32+32 =160m	A Abut - RC Pile (400mmx400mmx20.0mx18 piles) P_1 Pier - RC Pile (400mmx400mmx20.0mx12 piles) P_2 Pier - RC Pile (400mmx400mmx17.0mx16 piles) P_3 Pier - RC Pile (400mmx400mmx17.0mx16 piles) P_4 Pier - RC Pile (400mmx400mmx17.0mx12 piles) B Abut - RC Pile (400mmx400mmx17.0mx16 piles)	--
07.15.06A	Alimango Br.		Build-up Beam L; 35m	A Abut - Spread foundation B Abut - RC Pile (400mmx400mmx18.0mx10 piles)	Weathering Steel Bridge
08.01.01	Anas Br.		H-Beam L; 20+20+20=60m	A Abut - RC Pile (400mmx400mmx 6.0mx10 piles) P_1 Pier - RC Pile (400mmx400mmx 5.0mx 8 piles) P_2 Pier - RC Pile (400mmx400mmx 5.0mx 8 piles) B Abut - RC Pile (400mmx400mmx 6.0mx10 piles)	--
08.03.04	Elizabeth Br.		H-Beam L; 20+20+20=60m	A Abut - RC Pile (400mmx400mmx16.0mx10 piles) P_1 Pier - RC Pile (400mmx400mmx13.0mx10 piles) P_2 Pier - RC Pile (400mmx400mmx16.0mx 8 piles) B Abut - RC Pile (400mmx400mmx20.0mx18 piles)	--

Table 4.22 SUMMARY OF QUANTITIES FOR GROUP-2 BRIDGES (1/3)

Bridge No.	Name of Bridge	Bridge Length Span Length (m) + Number of Spans (m) Bridge Length (m)	Superstructure		Substructure						
					Abutment : A		Pier	RC Pile	Replaced Concrete	Sheet Piles (III)	
			Steel Weight Total Girder Length	Concrete Deck Slab (m^2)	A1 (m)	A2 (m)	Height (m)	Length (m) x Number = Length (m)	(m^3)	Piers (t)	Abuts (t)
05.02.04	Banquerohan Br.	Built-up Beam 25 + 25 + 25 = 75m	Steel Weight 98.085 t	624.0	H=5.50	H=4.50	P1 : H = 5.50 P2 : H = 5.50	A1 : 16.00 x 12 = 192.00 A2 : 13.00 x 10 = 130.00 P1 : 14.00 x 8 = 112.00 P2 : 14.00 x 8 = 112.00	- - - -	P1 : 35.4 t P2 : Re-use	A : 28.8 t
05.03.01	Hitoma Br.	PC Girder 27 + 27 + 27 = 81m	Total Girder Length 81m x 4 = 324m	673.9	H=5.00	H=5.00	P1 : H = 5.50 P2 : H = 5.50	A1 : - A2 : - P1 : - P2 : -	A1 : 126 m^3 A2 : 126 m^3 P1 : 81 m^3 P2 : 95 m^3	P1 : 18.15 t (Light weight) P2 : 18.15 t (Light weight)	
05.06.04	Lanang Br.	Built-up Beam 27 + 27 + 27 = 81m	Steel Weight 110.109 t	673.9	H=6.00	H=6.00	P1 : H = 5.50 P2 : H = 5.50	A1 : - A2 : - P1 : - P2 : -	A1 : 58 m^3 A2 : 51 m^3 P1 : - P2 : -		
05.06.05	Potot Br.	H-Beam 20 + 20 + 20 = 60m	Steel Weight 71.687 t	449.2	H=4.00	H=4.00	P1 : H = 5.50 P2 : H = 5.50	A1 : 7.00 x 8 = 56.00 A2 : 7.00 x 8 = 56.00 P1 : 6.00 x 8 = 48.00 P2 : 6.00 x 8 = 48.00	- - - -	P1 : 38.16 t P2 : Re-use	
06.06.04	Lawigan Br.	Built-up Beam 32 + 32 + 32 = 96m	Steel Weight 144.722 t	798.7	H=5.00	H=5.50	P1 : H = 5.50 P2 : H = 5.50	A1 : 7.00 x 10 = 70.00 A2 : 7.00 x 10 = 70.00 P1 : 7.00 x 8 = 56.00 P2 : 7.00 x 8 = 56.00	- - - -	P1 : 31.44 t P2 : Re-use	
07.05.01	Apalan Br.	Built-up-Beam 27 + 27 = 54m	Steel Weight 73.406 t	449.3	H=6.00	H=6.00	P1 : H = 5.50 P2 : H = 5.50	A1 : 8.00 x 12 = 96.00 A2 : 32.00 x 12 = 384.00 P1 : 26.00 x 8 = 208.00	- - -	P1 : 34.32 t	A1, A2...Co-use of River Protection
07.05.05	Tambongon Br.	PC Girder 27 + 27 + 27 = 81m	Total Girder Length 81m x 4 = 324m	673.9	H=7.00	H=7.00	P1 : H = 5.50 P2 : H = 5.50	A1 : 12.00 x 18 = 216.00 A2 : 19.00 x 18 = 342.00 P1 : 10.00 x 8 = 80.00 P2 : 10.00 x 8 = 80.00	- - - -	P1 : 39.36 t P2 :	A1, A2...Co-use of River Protection
07.06.05	Mojon Br.	PC Girder 32 + 32 + 32 + 32 + 32 = 160m	Total Girder Length 160m x 4 = 640m	1,331.2	H=6.50	H=5.50	P1 : H = 5.50 P2 : H = 5.50	A1 : 20.00 x 18 = 360.00 A2 : 17.00 x 15 = 255.00 P1 : 20.00 x 12 = 240.00 P2 : 17.00 x 16 = 272.00 P3 : 17.00 x 16 = 272.00 P4 : 17.00 x 12 = 204.00	- - - - - -		
07.15.06A	Alimango Br.	Built-up-Beam (Weathering) 35m	Steel Weight 58.759 t	291.2	H=4.50	H=4.50	P1 : H = 5.50 P2 : H = 5.50	A1 : - A2 : 10.00 x 10 = 100.00	A1 : 66 m^3 A2 : -		
08.01.01	Anas Br.	H-Beam 20 + 20 + 20 = 60m	Steel Weight 71.687 t	499.2	H=4.50	H=4.50	P1 : H = 5.50 P2 : H = 5.50	A1 : 6.00 x 10 = 60.00 A2 : 6.00 x 10 = 60.00 P1 : 5.00 x 8 = 40.00 P2 : 5.00 x 8 = 40.00	- - - -		
08.03.04	Elizabeth Br.	H-Beam 20 + 20 + 20 = 60m	Steel Weight 71.687 t	499.2	H=5.00	H=7.00	P1 : H = 5.50 P2 : H = 5.50	A1 : 16.00 x 10 = 160.00 A2 : 20.00 x 18 = 360.00 P1 : 13.00 x 10 = 130.00 P2 : 16.00 x 8 = 128.00	- - - -	P1 : 27.48 t	
Total	11 Brs.	Built-up Beam : 341 m H-Beam : 180 m PC Girder : 322 m	Built-up Beam: 485.081 t H-Beam : 215.061 t PC Girder : 1,288m	7,013.7	12 Abuts	12 Abuts	21 Abuts	371 piles 5,093 m	- 603 m^3 -	Sheet Pile (III) 206.16 t Light weight 36.30 t Total 242.46 t	Sheet Pile (III) 28.8 t

Table 4.22 SUMMARY OF QUANTITIES FOR GROUP-2 BRIDGES (2/3)

Bridge No.	Name of Bridge	Approach Road										River Bank Protection					
		Road Length		Concrete Pavement		Slope Protection				Concrete Retaining Wall		Riprap River Bank Protection				Concrete Retaining Wall	
						Riprap		Steel Sheet Pile Foundation				Riprap		Steel Sheet Pile Foundation			
		Left (m)	Right (m)	Left (m^2)	Right (m^2)	Left (m^2)	Right (m^2)	Left (t)	Right (t)	Left (m^3)	Right (m^3)	Left (m^2)	Right (m^2)	Left (t)	Right (t)	Left (m^3)	Right (m^3)
05.02.04	Banquerohan Br.	126.5	125.8	843.9	839.1	386	20	-	-	-	-	78	52	-	-	-	-
05.03.01	Hitoma Br.	138.2	133.1	963.3	927.7	26	250	-	-	-	-	118	92	-	-	-	-
05.06.04	Lanang Br.	127.0	155.5	926.4	1,134.6	126	138	-	-	-	-	-	-	-	-	208	190
05.06.05	Potot Br.	102.5	125.6	662.9	812.1	0	30	-	-	-	-	110	138	-	-	-	-
06.06.04	Lawigan Br.	128.0	111.3	889.1	772.9	0	102	-	-	-	-	132	100	-	-	-	-
07.05.01	Apalan Br.	141.0	127.9	957.0	868.0	938	44	-	-	-	-	16	20	Type II :23.040	Type II :23.040	-	-
07.05.05	Tambongon Br.	144.6	131.7	969.3	882.7	622	636	Type III: 73.500 Type II : 42.000	Type III:125.160 Type II : 48.000	-	-	104	106	Type III:26.460	Type III:27.300	-	-
07.06.05	Mojon Br.	127.3	138.7	804.8	877.2	202	558	-	-	-	-	234	164	-	-	-	-
07.15.06A	Alimango Br.	124.5	129.0	862.3	893.7	302	0	-	-	812	0	-	-	-	-	379	323
08.01.01	Anas Br.	129.2	128.9	866.1	863.9	78	80	-	-	-	-	160	190	-	-	-	-
08.03.04	Elizabeth Br.	143.5	129.6	972.2	877.8	638	142	-	-	-	-	148	204	-	-	-	-
Total	11 Brs.	1,432.3	1,437.1	9,717.3	9,749.7	3,318	2,000	Type III: 73.500 Type II : 42.000 Total :115.000	Type III:125.160 Type II : 48.000 Total :173.160	812	0	1,100	1,066	Type III:26.460 Type II :23.040 Total :49.500	Type III:27.300 Type II :23.040 Total :50.340	587	513

Table 4.22 SUMMARY OF QUANTITIES FOR GROUP-2 BRIDGES (3/3)

Bridge No.	Name of Bridge	Demolish				Temporary Work	
		Timber Slab (m^2)	Timber Pier (No.)	Concrete Structure (m^3)	Bailey Br. Steel Materials (kg)	Temporary Bridge for Work (m^2)	Timber Detour Bridges (m^2)
05.02.04	Banquerohan Br.	-	-	-	-	290.4	-
05.03.01	Hitona Br.	-	-	-	-	-	-
05.06.04	Lanang Br.	-	-	-	-	-	-
05.06.05	Potot Br.	-	-	-	-	198.0	-
06.06.04	Lawigan Br.	368	0	77	17,300	355.3	189.4
07.05.01	Apalan Br.	-	-	-	-	154.0	-
07.05.05	Tambongon Br.	-	-	-	-	451.0	-
07.06.05	Mojon Br.	-	-	-	-	-	-
07.15.06A	Alimango Br.	74	0	270	2,200	99.0	-
08.01.01	Anas Br.	195	3	19	17,900	165.0	144.0
08.03.04	Elizabeth Br.	-	-	-	-	198.0	-
Total	11 Bridges	637	3	366	37,400	1,910.7	333.4

Table 4.23 LAND ACQUISITION, HOUSE DEMOLITION AND TEMPORARY LAND FOR CONSTRUCTION WORKS (UNDERTAKEN BY THE PHILIPPINE GOVERNMENT)

Bridge No.	Bridge Name	Land Acquisition (m^2)	Demolition	Temporary Land for Works (m^2)
05.02.04	Banquerohan Br.	2,520	-	2,062
05.03.01	Hitoma Br.	2,710	Wooden House : 1	2,432
05.06.04	Lanang Br.	2,830	-	1,530
05.06.05	Potot Br.	2,280	-	1,754
06.06.04	Lawigan Br.	2,390	Concrete House : 2 Wooden House : 1	1,782
07.05.01	Apalan Br.	2,690	-	2,118
07.05.05	Tambongon Br.	2,760	-	2,432
07.06.07	Mojon Br.	2,660	Wooden House : 1	3,234
07.15.06A	Alimango Br.	2,540	-	1,670
08.01.01	Anas Br.	2,580	-	1,782
08.03.04	Elizabeth Br.	2,730	-	2,300

4.10 Construction Plan

4.10.1 Transportation Plan

Steel materials of superstructure will be shipped by sea from Japan to ports of entry in the Philippines, and then delivered to bridge construction sites by land. The transportation routes and existing conditions of them are presented in Table 4.24.

As described in the Minutes of Discussions (Appendix 2), the Philippine Government will keep the inland transportation routes to be passable for transporting materials and equipment.

According to the 2nd Site Investigation, number of bridges to be reinforced for the smooth transportation of materials and equipment were as follows:

- 05.02.04 Banquerohan Br. : None
- 05.03.01 Hitoma Br. : To reinforce 2 bailey brs.
- 05.06.04 Lanang Br. : To reinforce 2 bailey brs.
  To reinforce 2 wooden brs.
  To reinforce and grade 4 spillways
- 05.06.05 Potot Br. : To reinforce 1 bailey br.
  To reinforce 3 wooden brs.
- 06.06.04 Lawigan Br. : To reinforce 4 bailey brs.
- 07.05.01 Apalan Br. : To reinforce 6 bailey brs.
- 07.05.05 Tambongon Br. : To reinforce 3 wooden brs.
- 07.06.07 Mojon Br. : None
- 07.15.06A Alimango Br. : None
- 08.01.01 Anas Br. : To reinforce 3 bailey brs.
  To reinforce 1 wooden br.
- 08.03.04 Elizabeth Br. : None

Several measures to reinforce these bridges can be proposed. Appendix 9 Figures 9 - 13 illustrate proposed measures to reinforce the bridges.

Table 4.24 INLAND ROUTE AND ITS CONDITION (1/2)

Bridge No.	Bridge Name	Unloading Port	Inland Route		Existing Condition
			On Sea	On Land	
05.02.04	Banquerohan Br.	Manila	None	Manila → Site 607km	· Good paved road
05.03.01	Hitoma Br.	Manila	· Tabaco → Virac	Manila → Tabaco 542km Virac → Site 54km	· Manila → Tabaco Good paved road · Virac → 17.5km Good paved road · 17.5km → Site Good unpaved road 2 bailey brs.
05.06.04	Lanang Br.	Manila	· Manila → Masbate	Masbate → Site 56km	· Masbate → 5km Good paved road · 5km → 25.6km Unpaved road under construction · 25.6km → Site Unpaved road with a mud pond 2 bailey brs. 2 wooden brs. 4 spillways
05.06.05	Potot Br.	Manila	· Manila → Masbate	Masbate → Site 37km	· Masbate → 5km Good paved road · 5km → 25.6km Unpaved road under construction · 25.6km → Site Poor unpaved road 1 bailey br. 3 wooden brs.
06.06.04	Lawigan Br.	Iloilo	None	Iloilo → Site 75km	· Iloilo → 62km Good paved road · 62km → Site 4 bailey brs.

Table 4.24 INLAND ROUTE AND ITS CONDITION (2/2)

Bridge No.	Bridge Name	Unloading Port	Inland Route		Existing Condition
			On Sea	On Land	
07.05.01	Apalan Br.	Cebu	None	Cebu → Site 95km	· Cebu → 65.3km Good paved road · 65.3km → Site Good unpaved road 6 bailey brs.
07.05.05	Tambongon Br.	Cebu	None	Cebu → Site 117km	· Cebu → 108.2km Good paved road · 108.2km → Site Good unpaved road 3 bailey brs.
07.06.07	Mojon Br.	Cebu	None	Cebu → Site 21km	· Cebu → Site Good paved road
07.15.06A	Alimango Br.	Cebu	None	Cebu → Site 43km	· Cebu → Site Good paved road
08.01.01	Anas Br.	Tacloban	None	Tacloban → Site 124km	· Tacloban → 69.7km Good paved road · 69.7km → 83.7km Under construction · 83.7km → Site Good unpaved road 4 bailey brs. 1 wooden br.
08.03.04	Elizabeth Br.	Tacloban	None	Tacloban → Site 81km	· Tacloban → 69.7km Good paved road · 69.7km → 80.1km Under construction · 80.1km → Site Good unpaved road

4.10.2 Erection Method for Girder

1. Steel Girder

The direct erection method is adopted in the study after studying the construction scale and site conditions. The crawler crane(s) which can be used for the direct erection method is (are) sitting on the riverbed or approach road. The island in the river or temporary bridge will be required for erecting the steel girder from the riverbed or from the approach road respectively. The level of the island or temporary bridge should be 1.0 m higher than ordinary water level.

Both cases also require bent supports which can be made by coconut tree. It will be the best way to construct the temporary bridge with coconut bent at dry season and to erect the steel girder at rainy season.

The plan of erection method and fablication yard for the steel girder are shown in Table 4.25. Temporary timber bridge and standard drawing of timber bents are shown in Appendix 9 Figures 9-14 and 9-15, respectively.

2. PC girder

There are several erection method for PC girder, i.e. direct erection method by using self-driving crane in riverside land, method by using erection girder, direct erection method by using setting or movable portal crane, etc. Among of them, direct erection method by using self-driving crane was recommended for the Project from the engineering view on construction scale and site conditions. Appendix 9 Figure 9-16 shows an illustration of erection method.

3. Summary

The erection method of each Group-2 bridge is summarized in Table 4.25.

Table 4.25 PROPOSED ERECTION METHOD AND FABRICATION YARD FOR GIRDER

Bridge No.	Bridge Name	Steel Girder		Erection Method	Bent Type	Yard Type	Remarks
		Type	No. of Joint				
05.02.04	Banquerohan Br.	Built-Up Beam L = 3@25m = 75m	15	Bent by Truck Crane	Wooden	Temp. Timber Platform + Approach Road	
05.03.01	Hitoma Br.	PC Girder L = 3@27m = 81m	0	Bi-lifting by Truck Crane	None	Existing Reinforced Bridge + Temp. Timber Platform	
05.06.04	Lanang Br.	Built-Up Beam L = 3@27m = 81m	6	Bent by Truck Crane	Wooden	Crane Pontoon	
05.06.05	Potot Br.	H-Beam L = 3@20m = 60m	4	Bent by Truck Crane	Wooden	Island	
06.06.04	Lawigan Br.	H-Beam L = 3@32m = 96m	8	Bent by Truck Crane	Wooden	Graded River Bed	
07.05.01	Apalan Br.	H-Beam L = 2@27m = 54m	6	Bent by Truck Crane	Wooden	Temp. Timber Platform + Approach Road	
07.05.05	Tambongon Br.	PC Girder L = 3@27m = 81m	0	Bi-lifting of Truck Crane	None	Island	
07.06.07	Mojon Br.	PC Girder L = 5@32m =160m	0	Bi-lifting of Truck Crane	None	Approach Road + Spillway	
07.15.06A	Alimango Br.	Built-Up Beam L = 1@35m = 35m	4	Bent by Truck Crane	Wooden	Temp. Timber Platform + Approach Road	
08.01.01	Anas Br.	H-Beam L = 3@20m = 60m	4	Bent by Truck Crane	Wooden	Temp. Timber Platform + Approach Road	
08.03.04	Elizabeth Br.	H-Beam L = 3@20m = 60m	4	Bent by Truck Crane	Wooden	Temp. Timber Platform + Approach Road	

4.10.3 Construction of Cofferdams

Construction of substructures and river protection should be implemented in the dry season so as not only to reduce the construction costs but also to assure the safety and quality of construction. A temporary cofferdam will be required at any time during construction of substructures and river protection.

The fill type cofferdam is basically recommended while sheet pile cofferdam is proposed where the ordinary water level is relatively high or the river is wide. The typical cross sections of sheet pile and fill type cofferdam are shown in Appendix 9 Figure 9-17 and 9-18, respectively.

The bridges whose substructures and river protection require cofferdams during construction are listed below and in Table 4.26.

Island:	05.02.04	Banquerohan Br.	for 2 abutments, 2 river protections
	05.06.04	Lanang Br.	for 2 piers
	06.06.04	Lawigan Br.	for 1 abutment, 2 river protections
	07.05.01	Apalan Br.	for 2 abutments, 1 river protection
	07.06.07	Mojon Br.	for 2 piers
	07.15.06A	Alimango Br.	for 1 river protection
	08.01.01	Anas Br.	for 1 pier
	08.03.04	Elizabeth Br.	for 1 pier
Sheet Pile:	05.02.04	Banquerohan Br.	for 2 piers
	05.06.04	Lanang Br.	for 1 abutment, 2 piers
	06.06.04	Lawigan Br.	for 2 abutments
	07.05.01	Apalan Br.	for 1 pier, 1 river protection
	07.05.05	Tambongon Br.	for 2 abutments, 2 piers
	08.03.04	Elizabeth Br.	for 1 pier
Forepoling:			
	05.03.01	Hitoma Br.	for 2 piers

Table 4.26 COFFERDAM PLANNING

Bridge No.	Bridge Name	Abutment A_1	Abutment A_2	Pier P_1	Pier P_2	Pier P_3	Pier P_4	River Protc. A_1	River Protc. A_2
05.02.04	Banquerohan Br.	Island	Island	Island	Sheet Pile	Sheet Pile	Sheet Pile	Island	Island
05.03.01	Hitoma Br.	Not Necces.	Not Necces.	Forepoling	Forepoling	-	-	Not Necces.	Not Necces.
05.06.04	Lanang Br.	Not Necces.	Not Necces.	Not Necces.	Not Necces.	-	-	Not Necces.	Not Necces.
05.06.05	Potot Br.	Sheet Pile (For protection of existing bridge)	Not Necces.	Sheet Pile	Sheet Pile	-	-	Not Necces.	Not Necces.
06.06.04	Lawigan Br.	Not Necces.	Not Necces.	Sheet Pile	Sheet Pile	Not Necces.	-	Island	Island
07.05.01	Apalan Br.	Island	Island	Sheet Pile	-	-	-	Sheet Pile	Island
07.05.05	Tambongon Br.	Sheet Pile	Sheet Pile	Sheet Pile	Sheet Pile	-	-	Island	Island
07.06.07	Mojon Br.	Not Necces.	Not Necces.	Not Necces.	Island	Island	-	Not Necces.	Not Necces.
07.15.06A	Alimango Br.	Not Necces.	Not Necces.	-	-	-	-	Island	Not Necces.
08.01.01	Anas Br.	Not Necces.	Not Necces.	Not Necces.	Island	-	-	Not Necces.	Not Necces.
08.03.04	Elizabeth Br.	Not Necces.	Sheet Pile	Island	-	-	-	Not Necces.	Not Necces.

4.10.4 Traffic Control During Construction

Detour roads shall be planned to provide for traffic during construction. The detour roads should keep the present service level for traffic.

Table 4.27 shows the existing conditions of the bridges and their detour roads. According to this table, the detour roads can be categorized as follows:

1) Existing bridges/spillways possible to be utilized

- 05.02.04 Banquerohan Br.
- 05.03.01 Hitoma Br.
- 05.06.04 Lanang Br.
- 05.06.05 Potot Br.
- 07.05.01 Apalan Br.
- 07.05.05 Tambongon Br.
- 07.06.07 Mojon Br.
- 08.03.04 Elizabeth Br.

2) Temporary wooden bridges to be constructed

- 06.06.04 Lawigan Br.
- 08.01.01 Anas Br.

The typical cross sections of temporary wooden bridge are illustrated in Appendix 9 Figure 9-19.

Table 4.27 DETOUR PLANNING

Bridge No.	Bridge Name	Existing Condition	D e t o u r
05.02.04	Banquerohan Br.	RC girder	To use existing bridge
05.03.01	Hitoma Br.	Bailey	- do -
05.06.04	Lanang Br.	Spillway	To use existing spillway
05.06.05	Potot Br.	Bailey	To use existing bridge
06.06.04	Lawigan Br.	Bailey	To construct detour and temp. wooden bridge in downstream
07.05.01	Apalan Br.	Bailey	To use existing bridge
07.05.05	Tambongon Br.	Wooden	- do -
07.06.07	Mojon Br.	Spillway	To use existing spillway
07.15.06A	Alimango Br.	RC Arch	To stop traffic during construction
08.01.01	Anas Br.	Bailey	To construct detour and temp. wooden bridge in downstream
08.03.04	Elizabeth Br.	Bailey	To use existing bridge

4.10.5 Demolition of Existing Bridges and Facilities

The time of demolishing the existing bridges depends on detour plan of Section 4.10.4, as follows:

1) Bridges to be demolished before commencement of the construction works
(within the scope of Japan's Grant Aid)

- 06.06.04 Lawigan Br.
- 07.15.06A Alimango Br.
- 08.01.01 Anas Br.

2) Bridges to be demolished after completion of the construction works
(to be undertaken by the Government of the Philippine)

- 05.02.04 Banquerohan Br.
- 05.03.01 Hitoma Br.
- 05.06.04 Lanang Br.
- 05.06.05 Potot Br.
- 07.05.01 Apalan Br.
- 07.05.05 Tambongon Br.
- 07.06.07 Mojon Br.
- 08.03.04 Elizabeth Br.

3) Facilities to be relocated
(to be undertaken by the Government of the Philippine)

Table 4.28 shows the facilities to be relocated.

Other facilities which will be the obstacles to bridge construction, i.e. water pipe, electric power line, etc., also shall be relocated without loosing of their function.

Table 4.28 FACILITIES TO BE RELOCATED
(UNDERTAKEN BY THE PHILIPPINE GOVERNMENT)

Bridge No.	Bridge Name	Electric Power Line (m)	Electric Pole (Nos.)	Water Pipe (m)
05.02.04	Banquerohan Br.	280	4	-
05.03.01	Hitoma Br.	-	-	-
05.06.04	Lanang Br.	-	-	-
05.06.05	Potot Br.	-	-	-
06.06.04	Lawigan Br.	250	4	ø50 : 338
07.05.01	Apalan Br.	200	4	-
07.05.05	Tambongon Br.	100	2	-
07.06.07	Mojon Br.	300	4	-
07.15.06A	Alimango Br.	-	-	-
08.01.01	Anas Br.	220	4	ø100 : 220
08.03.04	Elizabeth Br.	180	3	-

4.11 Project Implementation Plan

4.11.1 Basic Concept

The followings are the basic concept for implementing the Japan's Grant Aid Project after Exchange of Notes (E/N) between both countries:

- Japanese Consultant shall implement the Project under the consultant Agreement between the DPWH.
- The consultant will carry out Detail Design, Tendering Works and Construction Supervision after the Agreement.
- Tenderers for bridge construction shall be qualified Japanese contractors.
- Group-2 bridges will be constructed by a successful Japanese contractor under the contract between the DPWH.
- The Agreement and the Contract shall come into effect after Verification of Japanese Government.
- DPWH shall execute smoothly and successfully the articles defined in Minutes of Meeting signed on July 1st, 1992 and October 1st, 1992.

Project contents and undertakings of both governments are described below.

1. Project Contents

The main features of Group-2 Project are shown in following Table:

PROJECT CONTENTS

	Group-2 Bridge
Total No. of Bridges	11
Total Length of Bridges (m)	843
Length of Span (m)	20,25,27,32,35
Number of Spans	·One span - 1 Br. ·Two spans - 1 Br. ·Three spans - 8 Br. ·Five spans - 1 Br. 32 spans 11 Br.
Width of Bridges (m)	·Total Width 8.32 ·Roadway 3.35 m x 2 Lanes ·Sidewalk 0.42 m x 2 Lanes
Type of Superstructures	·H-Beam composite Girder - 3 Br. ·Built-up Steel Girder - 5 Br. ·PC Girder - 3 Br.
Type of Superstructures	Abutments: T-Type Abutments (Spread or Pile) Piers: Column-Type Piers (Spread or Pile)
Cofferdams	Island, Steel Sheet Pile, Forepoling
Approach roads (m)	Roadways 3.35 m x 2 Lanes Shoulders 1.0 x 2 Lanes Portland Cement Concrete Pavement
River Bank Protection	Grouted Riprap, Gravity Type

2. Undertakings of Both Governments

Scope of Grant Aid by the Government of Japan

The scope of Grant Aid by the Government of Japan covers construction of bridges, access roads and related structures, including the supply of steel materials. The major construction works are as follows:

a) Construction of Superstructures

- Supply, delivery and erection of steel materials, construction of concrete slabs and handrails

b) Construction of Substructures

- Construction of abutments and piers (including piles)
- Temporary works (sheet pile cofferdams)

c) Construction of Approach Roads

(Scope is limited to connecting new bridges to existing roads with smooth alignment.)

- Earth works and construction of pavement structures
  - Installation of drainage facilities
  - Supply, delivery and installation of steel railings

d) Construction of River Bank Protection
(Scope is limited to abutments.)

Undertakings of the Government of the Philippines

The scope of undertaking of the Philippines for the Group-2 Bridges is as follows:

(1) Scope of Major Undertakings

a) Demolishing existing bridges after completion of the construction works.

b) Acquiring the right-of-way and providing necessary land area before commencement of the construction works.

c) Removing obstacles including houses within the right-of-way that affect the implementation of the Project before commencement of the construction works.

d) Making passable all roads and bridges leading to the project sites for the transportation of materials

and equipment provided under the Japan's Grant Aid before the start of the inland transportation.

4.11.2 Design and Construction Supervision Plan

The implementation of the Project shall be carried out by the Japanese Consultant under Consultant Agreement between DPWH. Main scope of consultant's works are detail design, tendering and construction supervising. Some important points to be taken into consideration during the implementation of the Project are as below.

1. Detail Design Stage

The followings are contents of consultant's works in detail design stage:

- Discussion and confirmation on the implementation with DPWH
- Geographical surveys for Hitoma Br. and Apalan Br.
- Detail design
- Drawing and documentation of construction
- Construction scheming and estimating construction cost
- Confirmation on appropriateness of detail design to contents of E/N
- Obtaining DPWH's approval on detail design

1) Geographical Surveys

(1) Hitoma Br.

Three geographical borings, two for abutments and one for P1 (pier 1), were carried out during the Basin Design stage. However, one additional boring (depth : 15 m) to be located at P2 (pier 2) is necessary since P2 foundation will be possibly suffered from scoring due to its deep and central location of Hitoma River.

(2) Apalan Br.

Two geographical borings, one for each abutment, were carried out during the Basic Design stage when Apalan Br. would have one span of 30 m long.

However, it has been re-planned that Apalan Br. will have 54 m length and 2 spans, due to lack of opening area estimated by hydrological analysis. Hence one additional boring (depth : 35 m) to be located at proposed abutment is necessary.

2) Confirmation on appropriateness of detail design to contents of E/N

Appropriateness of detail design to contents of E/N shall be confirmed and approved by the Governments before tendering.

3) Period for detail design stage

6 months are required.

2. Tendering

All works from public announcement of tendering to contract of construction are carried out by the Japanese Consultant.

3. Construction Supervision

The Consultant will carry out construction supervision including progress inspection of the Philippines works as well as stage control, quality control, work done inspection, etc for bridge construction.

The main work items are:

- discussions between DPWH and relevant governmental agencies
- inspection of site survey
- inspection of construction progress
- quality control
- inspection of work done

In order to successfully complete the Consultant's works mentioned above, one senior engineer stationing by spots and two junior engineers stationing during construction period will be required.

4.11.3 Procurement Plan

Procurement plan by origin of the materials and equipment for Group-2 bridge construction are shown in Table 4.29 and 4.30.

Table 4.29 LOCAL MATERIALS AND EQUIPMENT

1. Materials

- Crashed stone
- Cement
- Stone
- Sand
- Reinforce bar

2. Materials for Temporary Works

- Timber for form work
- Timber for timbering and platform
- Sand bag
- Oil and fuel

3. Machines

· Bulldozer	(15 t)
· Backhoe	(0.6 m^3)
· Diesel hummer	(2.5 t)
· ditto	(3.5 t)
· Vibro hummer	(40 kW)
· Dump truck	(8 t)
· Trailer truck	(15 t ~ 40 t)
· Truck crane	(15 t ~ 30 t)
· Truck crane	(120 t)
· Tier roller	(9 t)
· Tamper	(60 kg)
· Concrete mixer	(0.1 m^3)
· Agitater truck	(3 m^3)
· Electric welder	(300 A)
· Water pump	(150 mm ~ 250 mm)
· Generator	(35 KVA ~ 125 KVA)

Table 4.30 MATERIALS AND EQUIPMENT FROM JAPAN

- H-Beam
- Built-Up Beam
- Equipment for steel girder erection
- Equipment for PC girder erection
- Sheath
- Fixer
- Grouting material
- Support
- Guard rail for access road
- Sheet pile
- Supporter
- Painting material

4.11.4 Implementation Schedule

Table 4.31 shows the implementation schedule.

Table 4.31 IMPLEMENTATION SCHEDULE

	1	2	3	4	5	6	7	8	9	10	11	12
Detail Design and Tendering			(6 months)									
Steel Material Procurement and Supervision	(Preparatory Work)											
		(Substructure)										
	(Steel Material Procurement)											
										(Superstructure)		
				(Sea Protection)								
						(Access Road)						
									(Orderliners)			

4.11.5 Construction Cost

The cost borne by the Government of the Philippines is roughly estimated at 7.2 million pesos, as shown in Table 4.32 and Appendix 11.

Table 4.32 COST BORNE BY THE GOVERNMENT OF THE PHILIPPINES

unit : million pesos

1. Land acquisition and Temporary land		
(1) Land acquisition		1.9
(2) Temporary land		0.4
	Sub-total	2.3
2. Demolition and removing of facilities		
(1) Demolition		0.4
(2) Removing		2.6
	Sub-total	3.0
3. Improvement of transport route		
(1) Bridges		0.3
(2) Roads		0.5
	Sub-total	0.8
4. Demolition of existing bridge post-construction		
	Sub-total	1.1
	Total	7.2

CHAPTER 5

PROJECT ELEVATION AND CONCLUSION

CHAPTER 5

PROJECT EVALUATION AND CONCLUSION

The direct and indirect effects and extents of improving present situation by the execution of the Project (Phase IV) is as follows.

Table 5-1 EFFECT AND EXTENT OF IMPROVING PRESENT SITUATION BY IMPLEMENTING THE PROJECT

Present Condition and Problems	Proposed Measures	Effect and Improvement Level by the Project
1. The road along the proposed bridge is important for living and transportation of agriculture product. But these bridges are made by timber bailey bridges, which affect traffic.	. To construct permanent bridges	. It is possible to secure safe and reliable traffic measures, and to transport the agricultural product and necessities of life, anytime, safely and rapidly.
2. Existing bridge has a danger to be washed out and damaged.	. To construct permanent bridges and execute the design of pier and abutment in consideration of flood countermeasures and to set up riprap.	. It is possible to provide a safe and strong structure for ordinal flooding. . River control will be improved pertially so as to prevent the damages to bridges.
3. The improvement of residential living standard and activation of regional industry are not achieved due to undeveloped road network.	. To accelate the development of neighboring road network by the Government of the Philippines, due to reconstruct new permanent bridges.	. Contribution to upgrade the life standard and to promote agriculture and socio-economical activities. . The number of the beneficiary is 5,360,000 people. The areas of beneficiary is 53,800 square kilometers.

As described above, this project will contribute the rise of living standard, and promote the productivity of agriculture. As a result, it is judged proper to execute this project under Japan Grant Aid. Further, it is considerable that the Government of the Philippines can cope with the maintenance and management for the bridges based on the experience from Phase I, Phase II and Phase III.

Consultant Proposal on Engineering Guidance

The DPWH has experienced to implement two Group-1 type projects, i.e. Phase I (24 bridges) and Phase III Group-1 (27 bridges) as described in Sections 2.2.3 and 2.3.1, in which the DPWH has constructed 51 bridges by the steel materials supplied under Japan's Grant Aid. The well improvement in the field of engineering and project management of the DPWH has been welcomed through the above implementations.

This Project includes several Group-1 bridges with more than 3 (three) short spans and require the detailed geological survey instead of rough estimation of ground conditions in order to expedite construction schedule.

For early completion and more successful improvement of technique and quality of the Project, a series of engineering guidance on the geological survey and detail design of substructure considering the characteristics of ground conditions and superstructure system can be proposed in the implementation stage.

APPENDIX 1

MISSION FOR BASIC DESIGN STUDY

- MEMBERS, ITINERARY AND LIST OF PERSONS MET

I. 1st Site Study

II. Second Survey

III. Explanation and Discussion for Draft Final Report

I. 1ST SITE STUDY

I-1. Members of the Site Survey Team

MINORU MIURA

Leader/Bridge Planner
Katahira & Engineers International

HIROMI KAWABE

Transportation Planner
Katahira & Engineers International

I-2. Itinerary of the Basic Design Study Team

1st site study schedule of the study team from March 29th 1992 to May 2nd 1992 is as follows.

No.	Date	Activities	Site Survey
1.	March 29, 1992 (Sun.)	• MINORU MIURA (Leader/Bridge Planner) HIROMI KAWABE (Transportation Planner) Arrival to Metro Manila	
2.	March 30, 1992 (Mon.)	• Meeting with Mr. MACHIDA of JICA • Courtesy call to JICA • Courtesy call to Embassy of Japan • Meeting with DPWH - Explanation of Inception Report, - Collection of basic data of proposed bridges - Receipt the list of additional proposed bridges	
3.	March 31, 1992 (Tue.)	• Review/analysis of the basic data of proposed bridges	
4.	April 1, 1992 (Wed.)	• Review/analysis of the basic data of proposed bridges • Basic planning of the bridges	
5.	April 2, 1992 (Thu.)	• Review/analysis of the basic data of proposed bridges • Basic planning of the bridges • Meeting at DPWH - Review of the basic data of the proposed bridges discussion for the result of the analysis - Meeting for the site survey	• Commencement of site survey by local consultant
6.	April 3, 1992 (Fri.)	• Review/analysis of the basic data of the proposed bridges • Basic planning of the bridges	
7.	April 4, 1992 (Sat.)	• Messrs. MIURA and KAWABE to CEBU Island • Waiting at Cebu city due to strike of the Airport personnel	• Site survey of the proposed bridges - 07-06-06 - 07-06-07 - 07-05-01 - 07-05-02 - 07-05-03

No.	Date	Activities	Site Survey
8.	April 5, 1992 (Sun.)	• Waiting at Cebu city due to strike • Meeting with the region V Director - Explanation of Inception Report - Discussion for peace and order in Region V areas	
9.	April 6, 1992 (Mon.)	• Messrs. MIURA and KAWABE returned to Manila • Meeting at JICA office - Information/Discussion of site survey - Schedule of Mr. MIURA (changed April 7 to April 8)	
10.	April 7, 1992 (Tue.)	• Meeting at the planning section section of DPWH - Discussion of site survey schedule and survey method - Explanation/Discussion about selection method of subjective candidate bridges • Meeting at JICA • Meeting at Embassy of Japan • Selection of survey bridges • Review of basic planning of the bridges	
11.	April 8, 1992 (Wed.)	• Selection of subjective bridges surveyed • Review of the basic planning of the bridges • Mr. MIURA returned to Japan	
12.	April 9, 1992 (Thu.)	• Selection of subjective bridges surveyed • Review of the basic planning of the bridges	
13.	April 10, 1992 (Fri.)	• Collection of basic data of proposed bridges • Selection of subjective bridges surveyed • Review of the basic planning of the bridges • Selection of high priority bridges	

No.	Date	Activities	Site Survey
14.	April 11, 1992 (Sat.)	· Analysis/Review of the basic data of the proposed bridges · Selection of subjective bridges surveyed · Review of the basic planning of the bridges · Selection of high priority bridges	
15.	April 12, 1992 (Sun.)	· Analysis/Review of the basic data of the proposed bridges · Selection of subjective bridges surveyed · Review of the basic planning of the bridges · Selection of high priority bridges	
16.	April 13, 1992 (Mon.)	· Analysis/Review of the basic data of the proposed bridges · Selection of subjective bridges surveyed · Review of the basic planning of the bridges · Selection of high priority bridges	
17.	April 14, 1992 (Tue.)	· Analysis/Review of the basic data of the proposed bridges · Selection of subjective bridges surveyed · Review of the basic planning of the bridges · Selection of high priority bridges	
18.	April 15, 1992 (Wed.)	· Analysis/Review of the basic data of the proposed bridges · Collection/Review of the basic data of the proposed bridges	
19.	April 16, 1992 (Thu.)	· Analysis/Review of the basic data of the proposed bridges · Selection of subjective bridges surveyed · Review of the basic planning of the bridges · Selection of high priority bridges	

No.	Date	Activities	Site Survey
20.	April 17, 1992 (Fri.)	• Analysis/Review of the basic data of the proposed bridges • Selection of subjective bridges surveyed	
21.	April 18, 1992 (Sat.)	• Analysis/Review of the basic data of the proposed bridges • Selection of subjective bridges surveyed	
22.	April 19, 1992 (Sun.)	• Analysis/Review of the basic data of the proposed bridges • Selection of subjective bridges surveyed	
23.	April 20, 1992 (Mon.)	• Selection of subjective bridges surveyed • Review of the basic planning of the bridges • Selection of high priority bridges	
24.	April 21, 1992 (Tue.)	• Review of the basic planning of the bridges • Selection of high priority bridges	
25.	April 22, 1992 (Wed.)	• Meeting at DPWH - Discussion about the result of selection of subjective bridges surveyed - Meeting/Discussion for survey schedule and survey methodology • Review of the basic planning of the bridges • Selection of high priority bridges	
26.	April 23, 1992 (Thu.)	• Review of the basic planning of the bridges	
27.	April 24, 1992 (Fri.)	• Meeting at JICA office - Explanation/Discussion about site survey schedule - Discussion about peace and order • Review of the basic planning of the bridges	

No.	Date	Activities	Site Survey
28.	April 25, 1992 (Sat.)	· Selection of high priority bridges · Grouping of substitute candidate bridges (Group-1/Group-2)	
29.	April 26, 1992 (Sun.)	· Grouping of substitute candidate bridges (Group-1/Group-2)	
30.	April 27, 1992 (Mon.)	· Mr. KAWABE arrival to Tacloban for site survey	08-03-04 08-03-08A 08-03-07A 08-03-03 08-03-02 08-03-01 08-03-06A
31.	April 28, 1992 (Tue.)	· Mr. KAWABE returned to Manila · Meeting at JICA office - Explanation/Discussion about site survey schedule - Discussion about peace and order · Grouping of substitute candidate bridges (Group-1/Group-2)	
32.	April 29, 1992 (Wed.)	· Mr. KAWABE investigated existing bridges in Legaspi	05-01-02 05-05-03 05-08-01 05-02-01 05-09-01
33.	April 30, 1992 (Thu.)	· Mr. KAWABE returned to Manila · Grouping of substitute candidate bridges (Group-1/Group-2)	Conclusion of the site survey for general condition in project sites by local consultant
34.	May 1, 1992 (Fri.)	· Analysis/Collection of data	
35.	May 2, 1992 (Sun.)	· Mr. KAWABE returned to Japan	

I-3 LIST OF PERSONS MET

Name and Organization	Position
DPWH Central Office in Manila	
Mr. Teodoro T. Encarnacion	Undersecretary
Mr. Manuel M. Bonoan	Assistant Secretary for Planning
Ms. Linda M. Templo	Chief Civil Engineer, Planning Service
Mr. Carlos V. Rodriguez	Chief Civil Engineer, Bureau of Design
Mr. Antonio T. Naguit, Jr.	O.I.C. Chief Civil Engineer Bureau of Construction
Mr. Norman J. Orlina	Head Civil Engineer, Bureau of Construction
Mr. Jaime S. Magnaye	Head Civil Engineer, D.P.D. Planning Service
Mr. Danilo A. Madamba	Supervising Civil Engineer, Bureau of Design
Mr. Ryogi Hagiwara	JICA/DPWH Engineering Consultant
DPWH Regional Office, Region V	
Mr. Conrado Ajero	Regional Director
Mr. Domingo R. Villasenor	Asst. Regional Director for Services
Miss Soledad Uy-Boco	Engr. V, Chief, Planning and Design Section
Mr. Talastas	Engr. IV, Head Civil Engr., Planning and Design Section
Mr. Vicente Miraballes	Engr. II, Planning and Design Section
District Engineering Office, Albay	
Mr. Orlando B. Roces	Assistant District Engineer
District Engineering Office, Camarines Sur II	
Mr. Manuel Azurin	District Engineer
District Engineering Office, Camarines Norte	
Mr. Conrado Barcelona	OIC Chief, Maintenance Section
Mr. Enrico A. Velas	Engr. III, OIC Chief, Planning and Design Section
Mrs. Flordeliza B. Aler	Engr. II, Construction Section

District Engineering Office, Sorsogon

Mr. Boanerges A. Relativo	District Engineer
Mr. Jose D. Gigantone	Assistant District Engineer
Mr. Francisco G. Magnaye	Engr. III, Chief, Planning and Design Section
Mr. Larry B. Reyes	Engr. I, Planning and Design Section

District Engineering Office, Masbate

Mr. Gilbert C. Olfindo	OIC District Engineer
Mr. Alejandro E. Villahermoso	OIC Assistant District Engineer
Mr. Salcedo A. Legaspi	Engr. III, Chief, Construction Section
Mr. Roger S. Ricarte	OIC Chief, Construction Section
Mrs. Amalia S. Merioles	Admi. Off. III, Chief, Administrative Section

District Engineering Office, Catanduanes

Mr. Mariano Saret	District Engineer
Mr. Monico T. Genogaling	Engr. III, Planning and Design Section

DPWH Regional Office, Region VI

Mr. Ernesto A. Silvela	Regional Director
Mr. Manolito S. Saldivia	OIC, Asst. Regional Director for Operations
Mr. Clemenceau Villanueva	Asst. Regional Director for Services
Mr. Claro Cesario T. Moscoso	OIC, Planning and Design Division
Mr. Cecil C. Caligan	Engr. III, Structural Design Section
Mr. Leo P. Bionat	Engr. II, Highway Design Section

District Engineering Office, Negros Occidental II

Mr. Rogelio Q. Tongson	District Engineer
Mrs. Emma M. Guimbal	Engr. III, Planning and Design Section

District Engineering Office, Aklan

Mr. Modesto D. Intoy	District Engineer
Mr. Ely O. Tungala	Engr. III, Planning and Design Section

City Engineering Office, Roxas City

Mr. Ardielli A. Ambrosio	OIC, City Engineer

District Engineering Office, Capiz

Mr. Leovegildo Goco	District Engineer

District Engineering Office, Iloilo 1st

Mr. Jose C. Sabio	OIC, Assistant District Engineer

City Engineering Office, Cadiz City

Mr. Fernando O. Daliva	OIC, City DPWH Engineer
Mr. Braullo A. Cacanog	City Engineer

DPWH Regional Office, Region VII

Mr. Bashir Rasuman	Regional Director
Mr. Simplicio Berdon	Asst. Regional Director for Services (OIC)
Mrs. Gloria Dindin	Engr. IV, Chief Planning and Design Section
Mr. Danny Pasicaran	Engr. II, Planning and Design Section

Cebu 1st District Engineering Office, Region VII

Mrs. Perla Angcahas	Assistant District Engineer
Mrs. Monica Rabaya	Engr. III, Chief Planning and Design Section

Cebu 2nd District Engineering Office, Region VII

Mr. Wilfredo Ordesta Sr.	District Engineer
Mrs. Marlina Alvizo	Assistant District Engineer
Mrs. Estela Abellana	Engr. II, Chief Planning and Design Section (OIC)

Dumaguete City Engineering Office

Mr. Jose Quiambao	City Engineer
Mr. Rodrigo Catapusan	Engr. III, Asst. City Engineer
Mr. Renier Enario	Engr. II, Planning and Design Section

Bohol 1st District Engineering Office

Mr. Ernesto Roldan	District Engineer
Mrs. Yolanda Requierme	Assistant District Engineer
Mr. Wilfredo Husain	Engr. III, Asst. Chief, Planning and Design Section

Bohol 2nd District Engineering Office

Mr. Feliciano Arboleda	District Engineer (OIC)
Mr. Hilario Cabalit	Engr. III, Chief Planning and Design Section
Miss Teresita Mejos	Foreman, Construction and Maintenance Section
Mr. Cerry Geazonia	Engr. I, Planning and Design Section

Provincial Engineering District, Bohol

Atty. Clemencia Sarmiento	Assistant Provincial Engineer

Tagbilaran City Engineering Office

Mr. Adelaida Paylado	City Engineer
Mrs. Wilfreda Bolotaulo	Engr. II, Construction

DPWH Regional Office, Region VIII, Palo, Leyte

Mr. Luis V. Mallari, Jr.	Chief Planning and Design Division
Mr. Celso E. Lumaniog	Asst. Chief Planning and Design Division

District Engineering Office, Catbalogan City, Western Samar

Mr. Romualdo M. Baltazar	District Engineer
Mr. Nestor I. Mate	Chief Maintenance Section

Leyte I District Engineering Office, Palo, Leyte

Mr. Tereso P. Makabenta, Jr.	Assistant District Engineer
Mr. Ignacio B. Petilos, Jr.	Chief Maintenance Section

Leyte II District Engineering Office, Ormoc City, Leyte

Mr. Ramon C. Omega	District Engineer
Mr. Nataniel B. Santiago	Chief, Planning and Design Section

Leyte III District Engineering Office, Baybay, Leyte

Mr. Vicente A. Yulo, Jr.	District Engineer (OIC)
Mr. Jose Aguilar, Jr.	Assistant District Engineer
Mr. Fernando V. Duavis	Chief, Planning and Design Section
Mr. Gil Matizano	Chief, Construction Section

District Engineering Office, Naval, Biliran

Mr. Remus P. Mejia	Assistant District Engineer
Mr. Benefredo P. Elatico	Chief Planning and Design Section

Embassy of Japan in the Philippines

Mr. Takuya Ikeda	First Secretary

JICA Office in the Philippines

Mr. Kenji Matsumoto	Assistant Resident Representative

(SITE INSPECTION/VALIDATION OF BRIDGES IN REGION V)

No.	Date	Study Team	Bridge Inspected	Location
1.	13th Apr. Mon 1992		. 05-09-01 Cagbacong Br. . 05-02-01 San Rafael Br.	. Legaspi City, Albay . Castilla, Sorsogon
2.	14th Apr. Tues. 1992		. 05-01-02 San Vicente Br. . 05-05-03 Kigatos Bridge . 05-05-02 Pugay Bridge . 05-08-01 Barit Bridge	. Libon, Albay . Nabua, Camarines Sur . San Jose, Camarines Sur . Iriga City Camarines Sur
3.	15th Apr. Wed. 1992		. 05-02-04 Banquerohan Br. . 05-02-05 San Fernando Br. . 05-02-06 Matnog Bridge	. Barcelona, Sorsogon . Bulusan, Sorsogon . Sta. Magdalena, Sorsogon
4.	18th Apr. Sat. 1992		. 05-05-04 Tariric Bridge . 05-05-09 Baras Bridge . 05-05-10 Malitbog Bridge . 05-05-05 Sarimao Bridge . 05-05-08 Odicon Bridge	. Minalabac, Camarines Sur . Minalabac, Camarines Sur . Minalabac, Camarines Sur . Pasacao, Camarines Sur . Pasacao, Camarines Sur
5.	19th Apr. Sun. 1992		. 05-04-03 Pinaglapaan Br. . 05-04-02 Calimoog Br. . 05-04-01 Mataque Bridge . 05-04-04 Talagpucao Br.	. Capalonga Cam. Norte . Capalonga Cam. Norte . Capalonga Cam. Norte . Capalonga Cam. Norte

6.	20th Apr. Mon. 1992	. 05-06-02 Manolib Bridge	. Milagros, Masbate
		. 05-06-04 Lanang Bridge	. Aroroy, Masbate
		. 05-06-05 Potot Bridge	. Milagros, Masbate
7.	21st Apr. Tues. 1992	. 05-06-03 Baldosa Bridge	. Cawayan, Masbate
8.	22nd Apr. Wed. 1992	. 05-06-01 Daplian Bridge	. San Fernando, Masbate
9.	23rd Apr. Thurs. 1992	. 05-02-03 Bacalon Bridge	. Magallanes, Sorsogon
		. 05-02-02 Beriran Bridge	. Juban, Sorsogon
10.	24th Apr. Fri. 1992	. 05-03-02 Kampawikan Br.	. Panganiban, Catanduanes
11.	25th Apr. Sat. 1992	. 05-03-01 Hitoma Bridge	. Caramoran, Catanduanes
12.	29th Apr. Wed. 1992	. 05-01-02 San Vicente Br.	. Libon, Albay
		. 05-08-01 Barit Bridge	. Iriga City Cam. Sur
		. 05-05-03 Kigatos Bridge	. Nabua, Cam. Sur
		. 05-02-01 San Rafael Bridge	. Castilla, Sorsogon
		. 05-09-01 Cagbacong Bridge	. Legazpi City Albay

(SITE INSPECTION/VALIDATION OF BRIDGES IN REGION VI)

No.	Date	Study Team	Bridge Inspected	Location
1.	13th Apr. Mon. 1992			
2.	14th Apr. Tues. 1992		. 06-04-07A Caliban Bridge	. Murcia, Negros Occidental
			. 06-04-08A Poncian Bridge	. Murcia, Negros Occidental
			. 06-04-09A Tayum-an Bridge	. Murcia, Negros Occidental
			. 06-04-10A Pandanon Bridge	. Murcia/D.S. Benedicto Bdry., Negros Occ.
			. 06-04-11A Talus Bridge	. D.S. Benedicto Negros Occ.
			. 06-04-12A Bago Bridge	. D.S. Benedicto/ San Carlos City Bdry. Negros Occidental
3.	15th Apr. Wed. 1992		. 06-04-03 Lambunao Bridge	. Cadiz City Negros Occ.
			. 06-04-01 Camao-o Bridge	. Cadiz City Negros Occ.
			. 06-04-02 Sunglay Bridge	. Cadiz City Negros Occ.
4.	20th Apr. Mon. 1992		. 06-06-03 Seguidan Bridge	. Tubungan, Iloilo
			. 06-06-05 Alameda Bridge	. Igbaras, Iloilo
			. 06-06-04 Lawigan Bridge	. San Joaquin, Iloilo
5.	21st Apr. Tues. 1992		. 06-06-06A Cabilawan Bridge	. New Lucena, Iloilo
			. 06-03-10A Codingle Bridge	. Dumarao, Capiz
			. 06-03-03 Tamalalud Bridge	. Dumarao, Capiz
			. 06-03-11A Bungsuay-Lawa-an Bridge	. Dumarao, Capiz
			. 06-03-12A Lawa-an Bridge	. Dumarao, Capiz

		. 06-03-01 Mambusao Bridge	. Mambusao, Capiz
		. 06-03-07 Majanlud Bridge	. Sapian, Capiz
		. 06-03-06 Sayoyan Bridge	. Ivisan, Capiz
		. 06-03-10A Banica Bridge	. Roxas City, Capiz
6.	22nd Apr. Wed. 1992	. 06-01-01 Tambac Bridge	. New Washington, Aklan
		. 06-01-12 Poblacion-Malaydayon	. Malinao, Aklan
		. 06-01-11 Liloan-San Roque Bridge	. Malinao, Aklan
		. 06-01-16 Tigao Bridge	. Makato, Aklan
7.	23rd Apr. Thurs. 1992	. 06-01-17 Kabulihan Br.	. Malay, Aklan
		. 06-01-05 Agbalogo Br.	. Agbalago, Aklan
		. 06-01-21A Pob.-Liboton Bridge	. Makato, Aklan
		. 06-01-05 Pangawasan Br.	. Makato, Aklan
		. 06-01-14 Calangcang-Carugdog Bridge	. Makato, Aklan
8.	24th Apr. Fri. 1992		

(SITE INSPECTION/VALIDATION OF BRIDGES IN REGION VII)

No.	Date	Study Team	Bridge Inspected	Location
1.	4th Apr. Sat. 1992		. 07-06-06 Dumlog-Biasong Bridge	. Talisay, Cebu
			. 07-06-07 Mohon Bridge	. Talisay, Cebu
			. 07-05-01 Apalan Bridge	. Tuburan, Cebu
			. 07-05-02 Bagasawe Br.	. Tubuelan, Cebu
			. 07-05-03 Putat I Bridge	. Tabuelan, Cebu
2.	13th Apr. Mon. 1992		. 07-12-01 Camboga-ong Br.	. Mandaue City Cebu
			. 07-06-07 Mohon Bridge	. Talisay, Cebu
			. 07-06-06 Dumlog Bridge	. Talisay, Cebu
			. 07-06-04 Camp 4	. Talisay, Cebu
			. 07-15-06 Alimango Bridge	. Toledo City Cebu
			. 07-15-07A Cabitoonan Br.	. Toledo City Cebu
			. 07-06-05 Mantalongon Br.	. Barili, Cebu
			. 07-06-09A Ylaya II Bridge	. Barili, Cebu
3.	14th Apr. Tues. 1992		. 07-05-01 Apalan Bridge	. Tuburan, Cebu
			. 07-05-02 Bagasawe Bridge	. Tabuelan, Cebu
			. 07-05-03 Putat I Bridge	. Tabuelan, Cebu
			. 07-05-04 Tacup Bridge	. San Remigio, Cebu
			. 07-05-05 Tambongon Bridge	. San Remigio, Cebu
			. 07-05-07A Behang (Dakit) Bridge	. Borbon, Cebu
			. 07-05-06A Graje Bridge	. Borbon, Cebu

4.	15th Apr. Wed. 1992	. 07-06-10A Lingigon Bridge	. Argao, Cebu
		. 07-06-08A Mag-ambac Bridge	. Dalaguete, Cebu
		. 07-06-01 Lusapan Bridge	. Boljoon, Cebu
5.	20th Apr. Mon. 1992	. 07-08-06A Tinago-Calindagan Bridge	. Dumaguete City Negros Or.
		. 07-08-01 Boy's Town Br.	. Dumaguete City Negros Or.
		. 07-08-05 Candau-ay-Balugo Bridge	. Dumaguete City Negros Or.
		. 07-08-07A City Pound Bridge	. Dumaguete City Negros Or.
6.	21st Apr. Tues. 1992	. 07-08-08A Dumaguete-Balugo Bridge	. Dumaguete City Negros Or.
		. 07-08-04 Dumaguete-Palinpinon Br.	. Dumaguete City Negros. Or.
		. 07-08-09A Camanjac Bridge	. Dumaguete City Negros Or.
7.	22nd Apr. Wed. 1992	. 07-04-07A Canjulao Bridge	. Jagna, Bohol
		. 07-04-09A Lubcanan Br.	. Jagna, Bohol
		. 07-04-08A Matin-ao Bridge	. Sierra Bullones Bohol
		. 07-04-06A Calunasan Bridge	. Pilar, Bohol
		. 07-04-03 Malitbog Bridge	. Alicia, Bohol
		. 07-04-12A Tipolo Bridge	. Ubay, Bohol
		. 07-04-11A Carood Bridge	. Candijay, Bohol
8.	23rd Apr. Thurs. 1992	. 07-03-05 Malid Bridge	. Carmen, Bohol
		. 07-03-06 Hinabuyan Br.	. Carmen, Bohol
		. 07-03-01 Tohogon Bridge	. Carmen, Bohol
		. 07-03-02 Craneway Br.	. Carmen, Bohol

		. 07-03-03 Cantaongon Br.	. Antequera, Bohol
9.	24th Apr. Fri. 1992	. 07-03-08A Inambacan Bridge	. San Isidro, Bohol
		. 07-03-07A Sinsin Bridge	. Batuan, Bohol
10.	25th Apr. Sat. 1992	. 07-14-01 Cabawan Bridge	. Tagbilaran City, Bohol

(SITE INSPECTION/VALIDATION OF BRIDGES IN REGION VIII)

NO.	DATE	STUDY TEAM	BRIDGE INSPECTED	LOCATION
1.	13th Apr. Mon. 1992		. 08-07-18A Bagacay Bridge . 08-07-16A Calicoan Bridge	. Hinabangan Western Samar - d o -
2.	14th Apr. Tues. 1992		. 08-07-17A Parasanon Br. . 08-07-08A Waclit Bridge . 08-07-09A Bangon Bridge . 08-07-11A Sawa Bridge . 08-07-10A Iba Bridge	. Villareal, W. Samar . Basey, West Samar . Basey, West Samar . Basey, West Samar . Basey, West Samar
3.	15th Apr. Wed. 1992		. 08-02-04A Canomantag Br. . 08-02-05A Himanglos Br. . 08-02-06A Sapiniton Br. . 08-02-07A Bagacay Bridge	. Barugo, Leyte . Barugo, Leyte . San Miguel, Leyte . San Miguel, Leyte
4.	20th Apr. Mon. 1992		. 08-04-11A Bagumbayan Br.	. Hilongos, Leyte
5.	21th Apr. Tues. 1992		. 08-01-01 Anas Bridge . 08-01-02A Masagongsong Br. . 08-01-03A Masagongsong Br. . 08-01-04A Mapuyo Bridge	. Naval, Biliran . Kawayan, Biliran . Kawayan, Biliran . Kawayan, Biliran
6.	22th Apr. Wed. 1992		. 08-01-07A Dispo Bridge . 08-01-08A Gueron Bridge . 08-01-09A Macopa Bridge . 08-01-06A Lawaan Bridge	. Naval, Biliran . Naval, Biliran . Caibiran, Biliran . Cabucgayan, Biliran

7.	23th Apr. Thurs. 1992	. 08-03-04 Elizabeth Bridge	. Leyte, Leyte
		. 08-03-08A Calunasan Bridge	. San Isidro, Leyte
		. 08-03-07A Natuhuran Bridge	. San Isidro, Leyte
		. 08-03-03 Basud Bridge	. Tabango, Leyte
		. 08-03-02 Tabango Bridge	. Tabango, Leyte
8.	24th Apr. Fri. 1992	. 08-03-01 Campocpoc Bridge	. Tabango, Leyte
		. 08-03-06A Matag-ob Bridge	. Matag-ob, Leyte
9.	25th Apr. Sat 1992	. 08-04-01A Matagnao Bridge	. Abuyog, Leyte
		. 08-04-03A Cagbolo Bridge	. Abuyog, Leyte
11.	27th Apr. Mon.	. 08-03-04 Elizabeth Bridge	. Leyte, Leyte
		. 08-03-08A Calunasan Bridge	. San Isidro, Leyte
		. 08-03-07A Natuhuran Bridge	. San Isidro, Leyte
		. 08-03-03 Basud Bridge	. San Isidro, Leyte
		. 08-03-02 Tabango Bridge	. Tabango, Leyte
		. 08-03-01 Campocpoc Bridge	. Tabango, Leyte
		. 08-03-06A Matag-ob Bridge	. Matag-ob, Leyte

II. SECOND SURVEY

II-1. Member of the Study Team

Dr. Michio Okahara	Leader Chief, Foundation Engineering Division, Structure and Bridge Department, Public Works Research Institute, Ministry of Construction.
Mr. Hajime Ohiro	Bridge Planner Deputy Manager First Engineering Division, Engineering Department, Honshu-Shikoku Bridge Authority.
Mr. Minoru Miura	Bridge Planner Katahira & Engineers International
Mr. Koichi Kadoya	Bridge Designer Katahira & Engineers International
Mr. Hiromi Kawabe	Bridge Designer/Transportation Planner Katahira & Engineers International
Mr. Masao Aizawa	Geotechnical Surveyor Katahira & Engineers International
Mr. Kenji Sugawara	Topographic Surveyor Katahira & Engineers International
Mr. Hidetomo Akutsu	Construction Planning/Estimator Katahira & Engineers International

II-2. ITINERARY

2nd site survey schedule of the study team from June 24, 1992 to August 3, 1992, is as follows.

No.	Date	Study Team	Geological Survey	Topographic Survey
1.	June 24th 1992 (Wed.)	• Michio Okahara, Hajime Ohiro, Minoru Miura and Hidetomo Akutsu arrival to Manila • Courtesy call to Embassy of Japan • Meeting at JICA - Explanation of the Interim Report, and Survey Schedule - Discussion about peace and order		
2.	June 25th 1992 (Thu.)	• Meeting with DPWH Explanation of the Interim Report, and Survey Schedule • Masao Aizawa and Kenji Sugawara arrival to Manila • Discussion among Study Team		
3.	June 26th 1992 (Fri.)	• Inspection of disaster in related with Mt. Pinatubo Eruption • Review/collection of data from DPWH		
4.	June 27th 1992 (Sat.)	• Discussion among Study Team - preparation of "Minute of Discussion" - scheduling of site survey • Review/collection of data		

No.	Date	Study Team	Geological Survey	Topographic Survey
5.	June 28th 1992 (Sun.)	• Discussion among Study Team - Review/analysis of the basic data of the proposed bridges - Preparation of site survey		
6.	June 29th 1992 (Mon.)	• OKAHARA, OHIRO, MIURA and AKUTSU arrival to Cebu - Site survey 07-06-07 07-06-06 07-15-06A • AIZAWA/SUGAWARA - Meeting with survey companies		
7.	June 30th 1992 (Tue.)	• OKAHARA, OHIRO, MIURA and AKUTSU site survey 07-06-05 07-06-09A • OKAHARA, OHIRO, MIURA and AKUTSU returned to Manila • Review/collection of data		
8.	July 1st 1992 (Wed.)	• Minutes signed • Meeting at JICA office - Report about Minute of Meetings		
9.	July 2nd 1992 (Thu.)	• Discussion among Study Team • AIZAWA and SUGAWARA site survey (Cebu) - Instruction of Geological and Topographical survey for Group 2 07-05-01 07-05-05		

No.	Date	Study Team	Geological Survey	Topographic Survey
10.	July 3rd 1992 (Fri.)	· Meeting at Embassy of Japan and JICA · Michio Okahara, and Hajime Ohiro return to Japan · Discussion among Study Team · Review/Collection of Data · Site survey (Cebu) 07-06-07 07-15-06A		
11.	July 4th 1992 (Sat.)	· Review/Collection of Data · Site survey (Panay) - Confirmation/ instruction of survey location with survey companies · Meeting among Study Team		· Commencement of Bridge No. 07-05-01 and 07-05-05
12.	July 5th 1992 (Sun.)	· Hiromi Kawabe, and Koichi Kadoya arrival to Manila · Discussion among Study Team · Review/Collection of Data · AIZAWA and SUGAWARA site survey (Leyte) 08-03-04		· Commencement of Bridge No. 07-05-01 07-05-05 · Commencement of Bridge No. 08-03-04
13.	July 6th 1992 (Mon.)	· Basic planning of Group-1, Bridge · Review/Analysis of Collection Data · AIZAWA/SUGAWARA Instruction of Geological and Topographic survey for 06-01-01 Bridge in Leyte		· Commencement of Bridge No. 07-05-01 07-05-05 08-03-04

No.	Date	Study Team	Geological Survey	Topographic Survey
14.	July 7th 1992 (Tue.)	• MIURA, AKUTSU, AIZAWA and SUGAWARA arrival to Legaspi - Site survey (Legaspi) 05-02-04 (Group-2) 05-02-03 (Group-1) 05-02-02 (Group-1) • KADOYA/KAWABE - Basic planning of Group-1	• Commencement of Bridge No. 06-06-04	• Commencement of Survey Bridge No. 05-02-04 • Conclusion of Bridge No. 07-05-01 and 07-05-05
15.	July 8th 1992 (Wed.)	• MIURA/AKUTSU - Site survey 05-01-02 • MIURA/AKUTSU return to Manila • KADOYA/KAWABE - Basic planning of Group-1		• Commencement of Bridge No. 07-06-07 07-15-06A • Conclusion of Bridge No. 08-03-04
16.	July 9th 1992 (Thu.)	• Basic planning of Group-1 bridges • Collection of Hydrological data for Group-2 bridges • Site survey (Katanduanes) 05-03-01 • Review of Execution of planning	• Commencement of Bridge No. 07-05-05	• Commencement of Bridge No. 05-06-05 07-01-01 • Conclusion of Bridge No. 05-02-04
17.	July 10th 1992 (Fri.)	• Basic planning of Group-1 bridges • Collection of Hydraulic data for Group-2 bridges • Meeting at JICA - Peace and order • Site survey (Masbate) - Confirmation/ instruction of Geological and Topographical survey for Group-2 bridges • Review of Execution planning	• Commencement of Bridge No. 05-02-04	• Commencement of Bridge No. 05-03-01 • Conclusion of Bridge No. 07-06-07 07-15-06A

No.	Date	Study Team	Geological Survey	Topographic Survey
18.	July 11th 1992 (Sat.)	• Basic planning of Group-1 • Collection of Hydraulic analysis data for Group-2 bridges • Site survey (Masbate) - Instruction/ confirmation of Geological and Topographic survey for Group-2 bridges 05-06-05	• Commencement of Bridge No. 05-06-04 • Commencement of Bridge No. 05-06-05	• Commencement of Bridge No. 06-06-04 • Conclusion of Bridge No. 08-01-01
19.	July 12th 1992 (Sun.)	• Discussion among Study Team • Review/Collection of data	• Commencement of Bridge No. 07-15-06A	• Conclusion of Bridge No. 05-03-01 05-06-05
20.	July 13th 1992 (Mon.)	• Explanation of progress condition at DPWH and JICA • MIURA returned to Japan		• Commencement of Bridge No. 05-06-04 • Conclusion of Bridge No. 06-06-04
21.	July 14th 1992 (Tue.)	• Basic planning of Group-1 • Check of Topographic Maps for Group-2 • Discussion among Study Team • Review of Execution Planning • Site survey (Legaspi)	• Commencement of Bridge No. 07-06-07	
22.	July 15th 1992 (Wed.)	• Basic planning of Group-1 and -2 • Site survey (Legaspi) - Instruction and Supervision of Geological survey for 05-02-04 bridge • Review of Execution Planning • Hydrological Analysis	• Conclusion of Bridge No. 05-06-04 • Conclusion of Bridge No. 05-06-05	• Conclusion of Bridge No. 05-06-04

No.	Date	Study Team	Geological Survey	Topographic Survey
23.	July 16th 1992 (Thu.)	• Basic planning of Group-1, -2 bridges • Site survey (Cebu) - Instruction and Supervision of Geological survey for Group-2 bridges 07-05-01 07-05-05 - Confirmation of Topo map. • Review of Execution Planning	• Conclusion of Bridge No. 05-03-01 • Conclusion of Bridge No. 06-06-04	
24.	July 17th 1992 (Fri.)	• Basic planning of Group-1, -2 bridges • Site survey (Cebu) - Instruction and Supervision of Geological survey for Group-2 bridges 07-15-06A 07-06-07 - Confirmation of Topo map. • Review of Execution Planning	• Conclusion of Bridge No. 07-15-06A	
25.	July 18th 1992 (Sat.)	• Basic planning of Group-1 and -2 • Discussion among Study Team • Review/Analysis of Geological Survey and Topographic Survey Results • Review of Execution Planning • Hydrological Analysis	• Conclusion of Bridge No. 05-02-04 • Conclusion of Bridge No. 07-05-05	

No.	Date	Study Team	Geological Survey	Topographic Survey
26.	July 19th 1992 (Sun.)	• Basic Planning of Group-1 and -2 • Review/Analysis of Geological Survey and Topographic Survey Results • Review of Execution Planning • Hydrological Analysis	• Commencement of Bridge No. 07-05-01 • Conclusion of Bridge No. 07-06-07	
27.	July 20th 1992 (Mon.)	• Basic Planning of Group-1 and -2 • Review/Analysis of Geological Survey and Topographic Survey Results • Review of Execution Planning • Hydrological Analysis		
28.	July 21st 1992 (Tue.)	• Basic Planning of Group-1 and -2 • Review/Analysis of Geological Survey and Topographic Survey Results • Review of Execution Planning • Hydrological Analysis		
29.	July 22nd 1992 (Wed.)	• Basic Planning of Group-1 and -2 • Site survey (Leyte) Collection of Data • Review of Execution Planning • Hydrological Analysis • Meeting among Study Team		

No.	Date	Study Team	Geological Survey	Topographic Survey
30.	July 23rd 1992 (Thu.)	• AKUTSU returned to Japan • Basic Planning of Group-1 and -2 • Review/Analysis of Geological Survey and Topographic Survey Results • Review of Execution Planning		
31.	July 24th 1992 (Fri.)	• Basic Planning of Group-1 and -2 • Review/Analysis of Geological Survey and Topographic Survey Results • Hydrological Analysis		
32.	July 25th 1992 (Sat.)	• Basic Planning of Group-1 and -2 • Review/Analysis of Geological Survey and Topographic Survey Results • Hydrological Analysis	• Conclusion of Bridge No. 07-05-01 • Commencement of Bridge No. 08-03-04	
33.	July 26th 1992 (Sun.)	• Discussion among Study Team • Basic Planning of Group-1 and -2 • Review/Analysis of Geological Survey and Topographic Survey Results • Hydrological Analysis		
34.	July 27th 1992 (Mon.)	• Discussion among Study Team • Basic Planning of Group-1 and -2 • Review/Analysis of Geological Survey and Topographic Survey Results • Hydrological Analysis	• Commencement of Bridge No. 08-01-01	

No.	Date	Study Team	Geological Survey	Topographic Survey
35.	July 28th 1992 (Tue.)	· Discussion among Study Team · Basic Planning of Group-1 and -2 · Review/Analysis of Geological Survey and Topographic Survey Results · Hydrological Analysis	· Conclusion of Bridge No. 08-03-04	
36.	July 29th 1992 (Wed.)	· Basic Planning of Group-1 and -2 · Review/Analysis of Geological Survey and Topographic Survey Results · Hydrological Analysis · Site Survey Changed plan 07-05-05		
37.	July 30th 1992 (Thu.)	· Basic Planning of Group-1 and -2 · Review/Analysis of Geological Survey and Topographic Survey Results · Hydrological Analysis · Site Survey Changed plan 07-05-05	· Conclusion of Bridge No. 08-01-01	
38.	July 31st 1992 (Fri.)	· Basic Planning of Group-1 and -2 · Review/Analysis of Geological Survey and Topographic Survey Results · Hydrological Analysis		

No.	Date	Study Team	Geological Survey	Topographic Survey
39.	Aug. 1st 1992 (Sat.)	• Basic Planning of Group-1 and -2 • Review/Analysis of Geological Survey and Topographic Survey Results • Hydrological Analysis		
40.	Aug. 2nd 1992 (Sun.)	• Basic Planning of Group-1 and -2 • Review/Analysis of Geological Survey and Topographic Survey Results • Hydrological Analysis		
41.	Aug. 3rd 1992 (Mon.)	• KAWABE, KADOYA, AIZAWA and SUGAWARA return to Japan		

II-3. List of Persons Met

Department of Public Works and Highways

1.	Mr. Teodoro T. Encarnacion	- Undersecretary
2.	Mr. Romulo M. del Rosario	- Undersecretary
3.	Mr. Manuel M. Bonoan	- Assistant Secretary
4.	Mr. Ryogi Hagiwara	- JICA/DPWH Expert

D.P.W.H Bureau of Construction/Bureau of Design/Planning Office

1.	Mr. Manuel V. Mapa	- Director, B.O.C.
2.	Mr. Gregorio O. Carillo	- Asst. Director, B.O.D.
3.	Mr. Carlos Rodriquez	- Chief Engineer, B.O.D.
4.	Ms. Linda M. Templo	- Chief Engineer, Planning
5.	Ms. Josefina Alagar	- Chief Engineer, B.O.D.
6.	Mr. Jaime S. Magnaye	- Head Civil Engineer, Planning
7.	Mr. Paciano Tubal	- Head Civil Engineer, B.O.C
8.	Mr. Edwin Fortes	- Engineer III, Planning Service
9.	Mr. Edwin C Matanguihan	- Engineer IV, Bridge Design Division
10	Mr. Adriano Doroy	- Engineer IV, Bridge Design Division

D.P.W.H.

Regional Office, Legazpi (South Luzon), Region V

1.	Mr. Conrado L Ajero	- Regional Director
2.	Mr. Domingo R Villasenor	- Asst. Director for Services
3.	Ms. Soledad L Uy-Boco	- Chief, Planning and Design Division
4.	Mr. Roberto M.Mitra	- Engineer III, Regional Project Management Office
5.	Mr. Jesus L.Monreal	- Civil Engineer

District Engineer Office, Sorsogon (South Luzon), Region V

1.	Mr. Boanerges Relativo	- District Engineer

District Engineer Office, Catanduanes (South Luzon), Region V

1.	Mr. Manano S Saret	- District Engineer
2.	Mr. Monoco Genogaling	- Engineer III, Planning and Design Division

District Engineer Office, Masbate (South Luzon), Region V

1.	Mr. Salcedo A. Legaspi	- Engineer III, Planning and Design Section
2.	Mr. Vicente A. Lubaton	- Engineer II, Planning and Design Section

D.P.W.H.

Regional Office, Iloilo (Iloilo), Region VI

1.	Mr. Ernesto A Silveo	- Regional Director
2.	Mr. Cecil Cahgan	- Engineer III, Regional Office

District Engineer Office, Iloilo 1st. (Panay), Region VI

1.	Mr. Rudy G.Camashllo	- District Engineer, Iloilo 1st.
2.	Mr. Elmar S.Silveo	- Engineer III, Const. Section

D.P.W.H.

Regional Office, Cebu 1st. (Cebu), Region VII

1.	Mr. Bashir D.Rasuman	- Regional Director
2.	Ms. Gloria Dindin	- Engineer IV, Planning and Design Section
3.	Ms. Estella Abellana	- Planning and Design Office

District Engineer Office, Cebu 1st. (Cebu), Region VII

1.	Mr. Antonio Basalo	- District Engineer, Cebu 1st.
2.	Mrs. Monica Rabaya	- Engineer III, Planning and Design Section

District Engineer Office, Cebu 2nd. (Cebu), Region VII

1.	Mr. Wilfedo A. Ordesta	- District Engineer, Cebu 2nd.
2.	Ms. Estela Abellana	- Engineer III, Planning and Design Section

D.P.W.H.

Regional Office, Tacloban (Leyte, Samar), Region VIII

1.	Mr. Celso Z. Lumaniog	- Asst. Div. Chief for Planning and Design Division
2.	Mr. Luis Mallari	- Engineer V, Chief for Planning and Design Division

Embassy of Japan

1.	Mr. Takuya Ikeda	- First Secretary

Japan International Cooperation Agency (JICA)

1.	Mr. Masataka Iijima	- Resident Representative
2.	Mr. Satoshi Machida	- Deputy Resident Representative
3.	Mr. Hirofumi Yoshikawa	- Deputy Resident Representative
4.	Mr. Makoto Kashiwaya	- Assistant Resident Representative
5.	Mr. Naoya Shimizu	- Assistant Resident Representative

III. Explanation and Discussion for Draft Final Report

III-1. Member of the Study Team

Mr. Hajime Ohiro	Leader Deputy Manager First Engineering Division, Engineering Department, Honshu-Shikoku Bridge Authority.
Mr. Toshiyuki Iwama	Project Coordinator Second Basic Design Study Division, Grant Aid Study & Design Department, JICA.
Mr. Minoru Miura	Bridge Planner Katahira & Engineers International.
Mr. Koichi Kadoya	Bridge Designer Katahira & Engineers International.
Mr. Hiromi Kawabe	Bridge Designer/Transportation Planner Katahira & Engineers International.

III-2. Itinerary of Mission for explanation of Draft Final Report

The mission schedule from September 27th, 1992 to October 3rd, 1992 is bellow.

No.	Date	Activities	Site Survey
1.	Sept. 27, 1992 (Sun.)	Mr. Minoru Miura Mr. Koichi Kadoya Mr. Hiromi Kawabe Arrival to Manila	
2.	Sept. 28, 1992 (Mon.)	· Meeting at DPWH - Explanation and Discussion on Draft Final Report/ Site Survey Schedule · Discussion and Preparation on Minutes of Discussion · Meeting at JICA - Explanation and Discussion on Draft Final Report/ Site Survey Schedule	
3.	Sept. 29, 1992 (Tue.)	Mr. Hajime Ohiro Mr. Toshiyuki Iwama Arrival to Manila · Meeting at DPWH - Explanation and Discussion on Draft Final Report to representatives of Regional office - Collection of data related in other countries aids · Meeting at Embassy of Japan - Explanation of Draft Final Report/Site Survey Schedule - I.C.C. - Peace and order · Meeting at JICA office - I.C.C. - Peace and order	
4.	Sept. 30, 1992 (Wed.)	· Meeting at DPWH - Check of Draft Final Report - Approval of I.C.C. - Peace and order - Reconfirmation of Scope of works shouldered by Republic of the Philippines · Discussion and preparation on Minutes of Discussion	

No.	Date	Activities	Site Survey
5.	Oct. 1, 1992 (Thu.)	· Discussion and Preparation on Minutes of Discussion · Signing Minutes · Reporting to JICA, Embassy of Japan	
6.	Oct. 2, 1992 (Fri.)	Site survey	
7.	Oct. 3, 1992	Mr. Hajime Ohiro Mr. Minoru Miura Mr. Koichi Kadoya Mr. Hiromi Kawabe Metro Manila to Tokyo	

III-3. List of Persons Met

Department of Public Works and Highways

1.	Mr. Romulo M. del Rosario	-	Undersecretary
2.	Mr. Teodoro T. Encarnacion	-	Undersecretary
3.	Mr. Edmundo V. Mir	-	Undersecretary
4.	Mr. Gregorio Alvarez	-	Undersecretary
5.	Mr. Manuel M. Bonoan	-	Assistant Secretary for Planning

D.P.W.H. Bureau of Construction/Bureau of Design/Planning Office

1.	Mr. Manuel V. Mapa	-	Director, Bureau of Construction
2.	Mr. Edelio Montemayor	-	Asst. Director, B.O.C.
3.	Mr. Antonio Naguit	-	Chief Engineer, B.O.C.
4.	Mr. Norman Orlina	-	Engineer IV, B.O.C.
5.	Mr. Romy Espanto	-	Engineer III, B.O.C.
6.	Mr. Bienvenido Leuterio	-	Director, Bureau of Design
7.	Mr. Gregorio Carilio	-	Asst. Director, Bureau of Design
8.	Mr. Carlos Rodriguez	-	Chief Engineer, Bureau of Design
9.	Ms. Josie Alagar	-	Chief Engineer, Bureau of Design
10.	Ms. Linda M. Tempo	-	Chief Engineer, Planning Office
11.	Mr. Jaime Magnave	-	Engineer IV, Planning Office
12.	Mr. Yukihiro Tsukada	-	D.P.W.H. Expert/Consultant

D.P.W.H. Regional Office (Region V, VI, VII and VIII)

1.	Ms. Soledad L. Uy Boco	-	Engineer V, P.D.D., Region V
2.	Mr. Cecile C. Caligan	-	Engineer III, P.D.D., Region VI
3.	Ms. Gloria R. Dindin	-	Engineer IV, P.D.D., Region VII
4.	Mr. Celso Z. Lumanog	-	Engineer IV, P.D.D., Region VIII

Embassy of Japan

1.	Mr. Takuya Ikeda	-	First Secretary

Japan International Cooperation Agency

1.	Mr. Satoshi Machida	-	Deputy Resident Representative
2.	Mr. Kenji Matsumoto	-	Assistant Resident Representative

APPENDIX 2

MINUTES OF DISCUSSIONS AND OTHER DOCUMENTS

I. 1st Site Study
(Explanation and Discussion for Interim Report)

II. Explanation and Discussion for Draft Final Report

III. Document on Peace and Order

I. 1st Site Study
(Explanation and Discussion for Interim Report)

MINUTES OF DISCUSSIONS

OF

BASIC DESIGN STUDY ON THE PROJECT FOR

CONSTRUCTING BRIDGES ALONG RURAL ROADS (PHASE IV)

ON

THE REPUBLIC OF THE PHILIPPINES

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a Basic Design Study on the Project for Constructing Bridges Along Rural Roads (Phase IV) in the Philippines (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a study team, which is headed by Dr. Michio Okahara, Chief of Foundation Engineering Division, Structure and Bridge Department, Public Works Research Institute, Ministry of Construction, and is scheduled to stay in the country from June 24 to July 3, 1992.

The team held discussions with the officials concerned of the Government of the Philippines and conducted a field survey at the study area.

In the course of the discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study report.

Manila, July 01, 1992

Michio Okahara

DR. MICHIO OKAHARA
Leader
Basic Design Study Team
JICA

Teodoro T. Encarnacion

MR. TEODORO T. ENCARNACION
Undersecretary
Department of Public Works
and Highways
The Republic of the Philippines

A T T A C H M E N T

1. **Objectives**

The objectives of the Project in line with the Highway Development Program and Five Year Bridge Reconstruction Program along Secondary Roads are as follows:

1) To provide basic transport facilities in rural areas, and

2) To enhance development and facilitate the effective delivery of socio-economic extension services to the communities served.

2. **Project sites**

The project sites of the bridges are as shown in the map of Annexes I and II.

3. **Executing agency**

The Department of Public Works and Highways of the Philippines is responsible for the administration and execution of the Project.

4. **Items requested by the Government of the Philippines**

After dicussions with the Basic Design Study Team, the following items were finally requested by the Philippine side.

1) To provide steel materials necessary for constructing bridges (Group 1) listed in Annex III.

2) To construct bridges (Group 2) listed in Annex IV.

3) To consider more concrete bridges under Group 2.

4) To consider additional number of bridges in Annex V.

However, the final components of the Project will be decided after further studies.

5. **Japan's Grant Aid system**

1) The Government of the Philippines has understood the system of Japan's Grant Aid explained by the team.

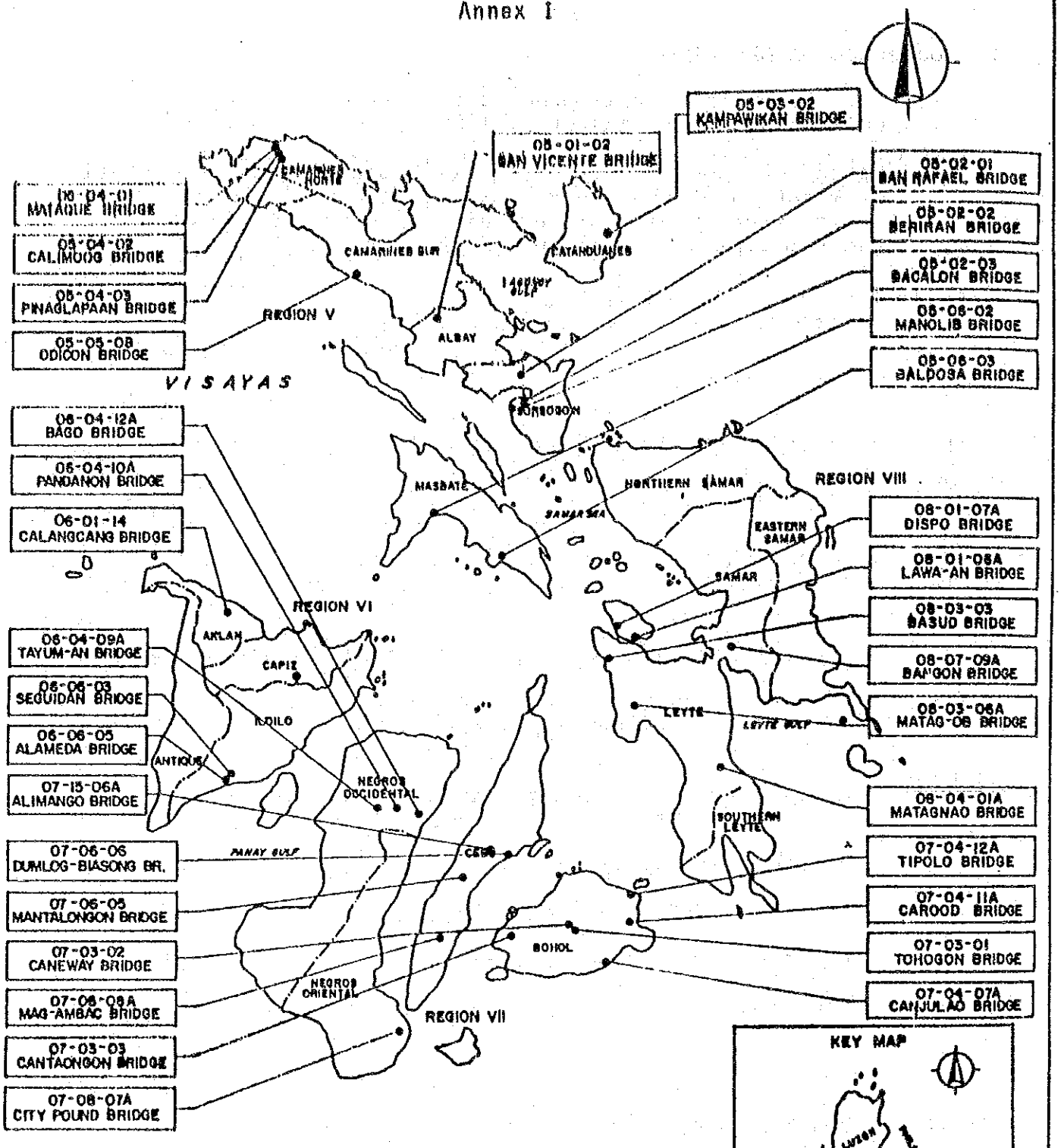
2) The Government of the Philippines will take necessary measures, described in Annex VI for smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

6. Schedule of the Study

1) The Consultant will proceed to further studies in the Philippines until August 3, 1992.

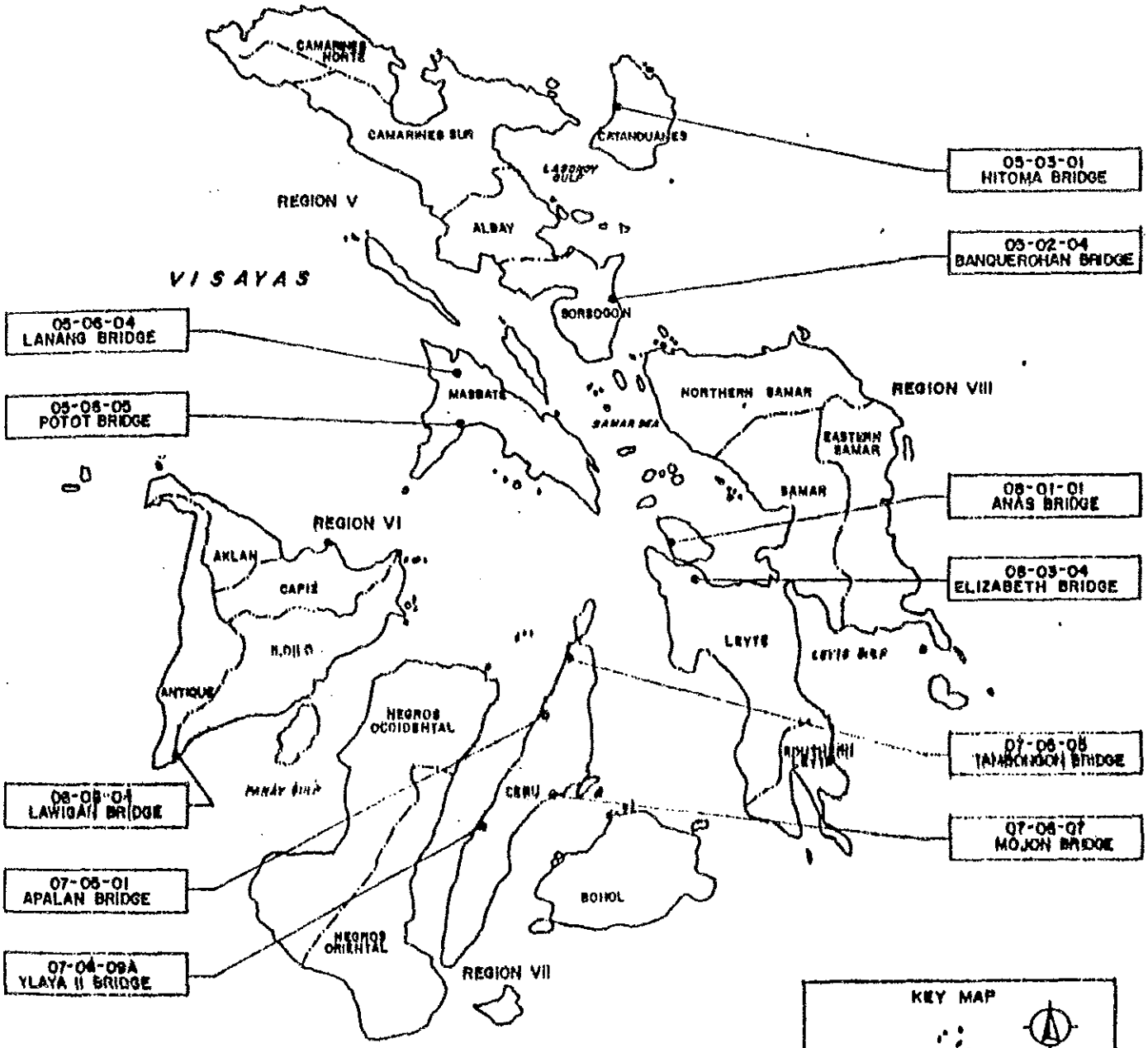
2) Based on the Minutes of Discussions and technical examination of the study results, JICA will complete the draft final report and explain it to the Government of the Philippines by the end of September, 1992.

Annex I



LOCATION MAP
(GROUP I)

Annex II



LOCATION MAP
(GROUP II)

ANNEX III - LIST OF BRIDGES FOR GROUP-1

No.	Bridge No.	Name of Bridge	Location
1	05.02.01	San Rafael Bridge	Km. 556 + 886 San Rafael-Monte-Carmelo-Libtong-Miluya-Amomontiog-Oras-B. Sirang Castilla Sorsogon
2	05.02.02	Beriran Bridge	Km 608 + 897 Juban-Beriran-Caruhayon Road Juban, Sorsogon
3	05.02.03	Bacalon Bridge	Km. 623 + 620 Juban-Magallanes Road Magallanes, Sorsogon
4	05.04.01	Mataque Bridge	Km. 325 + 601 Bagong Silang-Capalonga Camarines Norte
5	05.04.02	Calimoog Bridge	Km. 318 + 036.50 Bagong Silang-Capalonga Road Capalonga, Camarines Norte
6	05.04.03	Pinaglapaan Bridge	Km. 315 + 349.30 Bagong Silang-Capalonga Road Capalonga, Camarines Norte
7	05.05.08	Odicon Bridge	Km. 2 + 100 From Pasacao-Odicon-Tagbag Road Pasacao, Camarines Sur
8	05.06.02	Manolib Bridge	Km 26 + 946.50 From Masbate Port Masbate-Aroroy Road, Masbate
9	05.06.03	Baldosa Bridge	Km. 51 + 860 From Masbate Port Buenavista-Cawayan Road, Cawayan, Masbate
10	06.01.14	Calangcang Bridge	Km. 189 + 881.63 Calangcang-Carugdog Road Makato, Aklan
11	06.04.09A	Tayum-an Bridge	Km. 24 + 850 Bacolod-Murcia-D.S.Benedicto -San Carlos Boundary, Negros Occidental

ANNEX III - LIST OF BRIDGES FOR GROUP-1

No.	Bridge No.	Name of Bridge	L o c a t i o n
12	06.04.10A	Pandanon Bridge	Km. 35 + 500 Bacolod-Murcia-D.S.Benedicto -San Carlos Boundary, Negros Occidental
13	06.04.12A	Bago Bridge	Km. 68 + 100 Bacolod-Murcia-D.S.Benedicto -San Carlos Boundary, Negros Occidental
14	06.06.03	Seguidan Bridge	Km. 57 + 100 Guimbal-Igbaras-Tubungan Road Tubungan, Iloilo
15	06.06.05	Alameda Bridge	Km. 47 + 300 Guimbal-Igbaras Road Igbaras, Iloilo
16	07.03.01	Tohogon Bridge	Km. 62 + 260 From Port of Tagbilaran City Carmen-Bacani Road, Bohol I
17	07.03.02	Caneway Bridge	Km. 63 + 400 From Port of Tagbilaran City Carmen-Bacani Road, Bohol I
18	07.03.03	Cantaongon Bridge	Km. 27 + 590 From Port of Tagbilaran City Catagbacan-Antequera Road Antequera, Bohol I
19	07.04.07A	Canjulao Bridge	Km. 63 + 410 Jagna-Sierra Bullones Road Bohol II
20	07.04.11A	Carood Bridge	Km. 98 + 238 Candijay-Mabini Road Candijay, Bohol II
21	07.04.12A	Tipolo Bridge	Km. 132 + 326 Ubay-Tapal Wharf Road Ubay, Bohol II
22	07.06.05	Mantalongon Bridge	Km. 50 + 800 Barili-Aloguinsan Road Barili, Cebu II
23	07.06.06	Dumlog-Biasong Bridge	Km. 12 + 059 Tabunok-Talisay Road Talisay, Cebu II

ANNEX III - LIST OF BRIDGES FOR GROUP-1

No.	Bridge No.	Name of Bridge	L o c a t i o n
24	07.06.08A	Mag-Ambac Bridge	Km. 95 + 600 Jct. Barili-Aloguinsan Road Mantalongon, Dalaguete Cebu II
25	07.08.07A	City Pound Bridge	Km. 6 + 246 Balugo-Vicinal Road Dumaguete City
26	07.15.06A	Alimango Bridge	Km. 28 + 502 Cebu-Toledo Wharf Road Cantabaco, Toledo City
27	08.01.06A	Lawa-an Bridge	Km. 1110 + 620 Cabucgayan-Biliran Biliran Sub-Province
28	08.01.07A	Dispo Bridge	Km. 1026 + 270 Naval-Caibiran-Cross Country Road Biliran Sub-Province
29	08.03.03	Basud Bridge	Km. 1022 + 900 San Isidro-Tabango-Villaba Road Leyte II
30	08.03.06A	Matag-ob Bridge	Km. 1003 + 810 Libangao-Matag-ob-Palompon Road Leyte II
31	08.04.01A	Matagnao Bridge	Km. 75 + 102 Abuyog-Silago Road Leyte III
32	08.07.09A	Bangon Bridge	Km. 895 + 176 Dolongan-Basey Road Samar

ANNEX IV-LIST OF BRIDGES FOR GROUP-2

No.	Bridge No.	Name of Bridge	L o c a t i o n
1	05.02.04	Banquerohan Bridge	Km. 607 + 023.60 Guibat-Barcelona-Bulusan Road Barcelona, Sorsogon
2	05.03.01	Hitoma Bridge	Km. 151 + 600 Virac-San Andres-Caramoran Pandan Road, Catanduanes
3	05.06.04	Lanang Bridge	Km. 56 + 129.33 From Masbate Port, Masbate-Aroroy Road Masbate
4	05.06.05	Potot Bridge	Km. 37 + 739.78 From Masbate Port Masbate-Balud Road, Masbate
5	06.06.04	Lawigan Bridge	Km. 70 + 900 Tiolas-Sinogbuhan Road San Joaquin, Iloilo
6	07.05.01	Apalan Bridge	Km. 97 + 803 Toledo-Tabuelan Road Cebu I
7	07.05.05	Tambongon Bridge	Km. 131 + 248 Antonio de Pio Highway Cebu I
8	07.06.07	Mojon Bridge	Km. 0 + 200 From Tabunok Tabunok-Talisay Road, Cebu II
9	07.06.09A	Ylaya-II Bridge	Km. 63 + 000 Barili-Mantayupan Road Barili, Cebu II
10	08.01.01	Anas Bridge	Km. 102 + 820 From Port of Ormoc City to Naval-Almeria and Circumferential Road Biliran Sub-Province
11	08.03.04	Elizabeth Bridge	Km. 984 + 820 Lemon-Sambolawan-Calaguise-Calubian Road Leyte II

ANNEX V - LIST OF REQUESTED ADDITIONAL BRIDGES

No.	Bridge No.	Name of Bridge	L o c a t i o n
1	05.01.02	San Vicente Bridge	Km. 483 + 050 Libon-Bacolod-San Vicente- Burabod-Buga Road, Albay
2	05.03.02	Kampawikan Bridge	Km. 56 + 649 Jct. Pang.-Sabloyon Road Panganiban, Catanduanes

Annex VI

UNDERTAKINGS BY THE GOVERNMENT OF THE PHILIPPINES

1. To provide necessary data and information for basic design study and for implementation of the Project.

2. To ensure the exemption from customs duties, internal tax and other fiscal levies and prompt unloading and customs clearance at the port of entry in the Philippines of the materials and equipment provided under Japan's Grant Aid.

3. To exempt Japanese nationals engaged in the Project from customs duties, internal tax, other fiscal levies and other administrative requirements which may be imposed in the Philippines with respect to the supply of materials and services under verified contracts.

4. To accord Japanese nationals whose services may be required in connection with the supply of the materials and the services under verified contracts such facilities as may be necessary for their entry into the Philippines and stay therein for the execution of the Project.

5. Bridges under Group 1

   5.1 To construct the bridges listed in Annex III within the period of one year after delivery of steel materials at designated ports of entry provided under the Japan's Grant Aid.

   5.2 To ensure all the expenses necessary for the construction of the bridges as well as for inland transportation of the bridge steel materials provided under the Japan's Grant Aid from the ports of entry to each bridge site.

6. Bridges under Group 2

   6.1 To acquire the right-of-way and to provide necessary land area for the construction works.

   6.2 To remove obstacles including houses within the right-of-way that affects the implementation of the Project.

   6.3 To make passable all roads and bridges leading to the project sites for the transportation of materials and equipment provided under Japan's Grant Aid.

7. To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.

   - Advising commission of Authorization to Pay
   - Payment commission

II. Explanation and Discussion for Draft Final Report

MINUTES OF DISCUSSIONS
OF
BASIC DESIGN STUDY ON THE PROJECT FOR
CONSTRUCTING BRIDGES ALONG RURAL ROADS (PHASE IV)
IN
THE REPUBLIC OF THE PHILIPPINES
(CONSULTATION ON DRAFT REPORT)

In June 1992, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for Constructing Bridges along Rural Roads (Phase IV) in the Republic of the Philippines (hereinafter referred to as "the Project"), and through discussions, field survey, and technical examination of the results in Japan, has prepared the draft report of the Basic Design Study.

In order to explain and to consult with the Government of the Philippines on the components of the draft report, JICA sent to the Philippines a study team, which is headed by Mr. Hajime Ohiro, Deputy Manager, First Engineering Division, Engineering Department, Honshu-Shikoku Bridge Authority from September 27 to October 03, 1992. As a result of the discussions, both parties confirmed the main items described on the attached sheet.

Manila, October 01, 1992

HAJIME OHIRO
Leader
Draft Report Explanation Team
JICA

TEODORO T. ENCARNACION
Undersecretary
Department of Public Works
and Highways

ATTACHMENT

1. The Government of the Philippines has agreed and accepted in principle the components of the draft report proposed by the Team.

2. The Government of the Philippines has understood the system of Japan's Grant Aid explained by the Team. The appraisal of the Project by the Government of Japan will be based on the result of the Basic Design report and other related information.

3. The Government of the Philippines will take the necessary measures, agreed in the Minutes of Discussions of the Project signed on July 01, 1992, on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

4. The Government of the Philippines has reconfirmed the names and locations of bridges to be included in the Project, as shown in Annex I.

5. The Government of the Philippines has confirmed the following items:

   5.1. Group-1 Bridges

      (1) Materials and equipment to be supplied by the Government of Japan

         - Steel girder material
           H-beam, steel plate, miscellaneous steel
         - Equipment for steel girder erection
         - Field paint material
         - Guard rail material

      (2) Designated international ports

         - Manila South Harbor
         - Port of Iloilo
         - Port of Cebu
         - Port of Tacloban

   5.2. Group-2 Bridges

      (1) Bridges to be constructed by the Government of Japan

         - Three (3) PC girder bridges
         - Eight (8) steel girder bridges

(2) Main works to be undertaken by the Government of the Philippines

- Demolishing existing bridges after completion of the construction works.
- Acquiring the right-of-way and providing necessary land area before commencement of the construction works.
- Removing obstacles including houses within the right-of-way that affect the implementation of the Project before commencement of the construction works.
- Making passable all roads and bridges leading to the project sites for the transportation of materials and equipment provided under the Japan's Grant Aid before the start of the inland transportation.

6. The Government of the Philippines has confirmed that the Phase III Group-1 Project for Constructing Bridges along Rural Roads shall be completed by the end of December 1992.

7. The Government of the Philippines requested engineering assistance on Geotechnical Surveys, Detailed Design of Sub-structures and Construction Planning for several bridges of the Group-1 to the Government of Japan.

8. The Department of Public Works and Highways of the Government of the Philippines will take the necessary steps to obtain the early clearance from the Investment Coordination Committee (ICC) to facilitate the implementation of the Project.

9. The Team will make the final report in accordance with the confirmed items, and send it to the Government of Philippines by December 1992.

Annex I

LIST OF BRIDGES FOR GROUP-1 (1/3) (1/6)

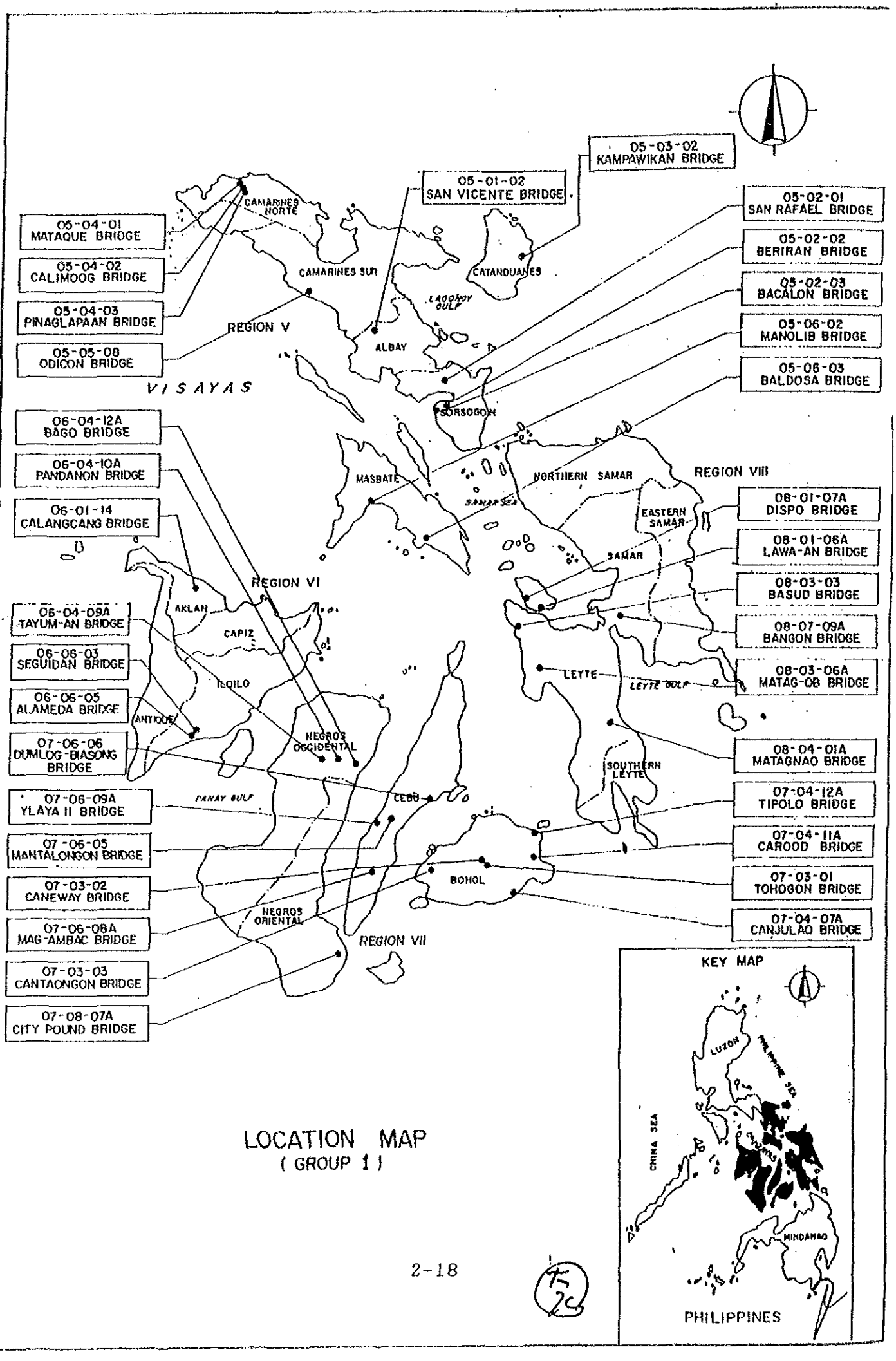
No.	Bridge No.	Name of Bridge	Location
1	05.01.02	San Vicente Bridge	Km. 483 + 050 Libon-Bacolod-San Vicente-Burabod-Buga Rd. Albay (Provincial Road)
2	05.02.01	San Rafael Bridge	Km. 556 + 886 San Rafael-Monte-Carmelo-Libtong-Miluya- Amomontiog-Oras-B.Sirang Castilla, Sorsogon (Barangay Road)
3	05.02.02	Beriran Bridge	Km. 608 + 897 Juban-Beriran-Caruhayon Road Juban, Sorsogon (Barangay Road)
4	05.02.03	Bacalon Bridge	Km. 623 + 620 Juban-Magallanes Road Magallanes, Sorsogon (National Road)
5	05.03.02	Kampawikan Bridge	Km. 56 + 649 Jct. Panganiban-Sabloyon Road Panganiban, Catanduanes (National Road)
6	05.04.01	Mataque Bridge	Km. 325 + 601 Bagong Silang-Capalonga Camarines Norte (National Road)
7	05.04.02	Calimoog Bridge	Km. 318 + 036.50 Bagong Silang-Capalonga Road Capalonga, Camarines Norte (National Road)
8	05.04.03	Pinaglapaan Bridge	Km. 315 + 349.30 Bagong Silang-Capalonga Road Capalonga, Camarines Norte (National Road)
9	05.05.08	Odicon Bridge	Km. 2 + 100 From Pasacao-Odicon-Tagbag Road Pasacao, Camarines Sur (Barangay Road)
10	05.06.02	Manolib Bridge	Km. 26 + 946.50 From Masbate Port Masbate-Aroroy Road, Masbate (National Road)
11	05.06.03	Baldosa Bridge	Km. 51 + 860 From Masbate Port Buenavista-Cawayan Road, Cawayan, Masbate (National Road)
12	06.01.14	Calangcang Bridge	Km. 189 + 881.63 Calangcang-Carugdog Road Makato, Aklan (Provincial Road)
13	06.04.09A	Tayum-an Bridge	Km. 24 + 850 Bacolod-Murcia-D.S. Benedicto-San Carlos Bdry., Negros Occidental (National Road)
14	06.04.10A	Pandanon Bridge	Km. 35 + 500 Bacolod-Murcia-D.S. Benedicto-San Carlos Bdry., Negros Occidental (National Road)

LIST OF BRIDGES FOR GROUP-1 (2/3)

No.	Bridge No.	Name of Bridge	Location
15	06.04.12A	Bago Bridge	Km, 68 + 100 Bacolod-Murcia-D.S. Benedicto-San Carlos Bdry., Negros Occidental (National Road)
16	06.06.03	Seguidan Bridge	Km. 57 + 100 Guimbal-Igbaras-Tubungan Road Tubungan, Iloilo (National Road)
17	06.06.05	Alameda Bridge	Km. 47 + 300 Guimbal-Igbaras Road Igbaras, Iloilo (National Road)
18	07.03.01	Tohogon Bridge	Km. 62 + 260 From Port of Tagbilaran City Carmen-Bacani Road, Bohol I (National Road)
19	07.03.02	Caneway Bridge	Km. 63 + 400 From Port of Tagbilaran City Carmen-Bacani Road, Bohol I (National Road)
20	07.03.03	Cantaongon Bridge	Km. 27 + 590 From Port of Tagbilaran City Catagbacan-Antequera Road (National Road) Antequera, Bohol I
21	07.04.07A	Canjulao Bridge	Km. 63 + 410 Jagna-Sierra Bullones Road Bohol I (National Road)
22	07.04.11A	Carood Bridge	Km. 98 + 238 Candijay-Mabini Road Candijay, Bohol II (Provincial Road)
23	07.04.12A	Tipolo Bridge	Km. 132 + 326 Ubay-Tapal Wharf Road Ubay, Bohol II (Provincial Road)
24	07.06.05	Mantalongon Bridge	Km. 50 + 800 Barili-Aloguinsan Road Barili, Cebu II (National Road)
25	07.06.06	Dumlog-Biasong Bridge	Km. 12 + 059 Tabunok-Talisay Road Talisay, Cebu II (Provincial Road)
26	07.06.08A	Mag-Ambac Bridge	Km. 95 + 600 Jct. Barili-Aloguinsan Road Mantalongon, Dalaguete Cebu II (National Road)
27	07.06.09A	Ylaya-II Bridge	Km. 63 + 000 Barili-Mantayupan Road Barili, Cebu II (National Road)
28	07.08.07A	City Pound Bridge	Km. 6 + 246 Balugo-Vicinal Road Dumaguete City (Barangay Road)

LIST OF BRIDGES FOR GROUP-1 (3/3) (3/6)

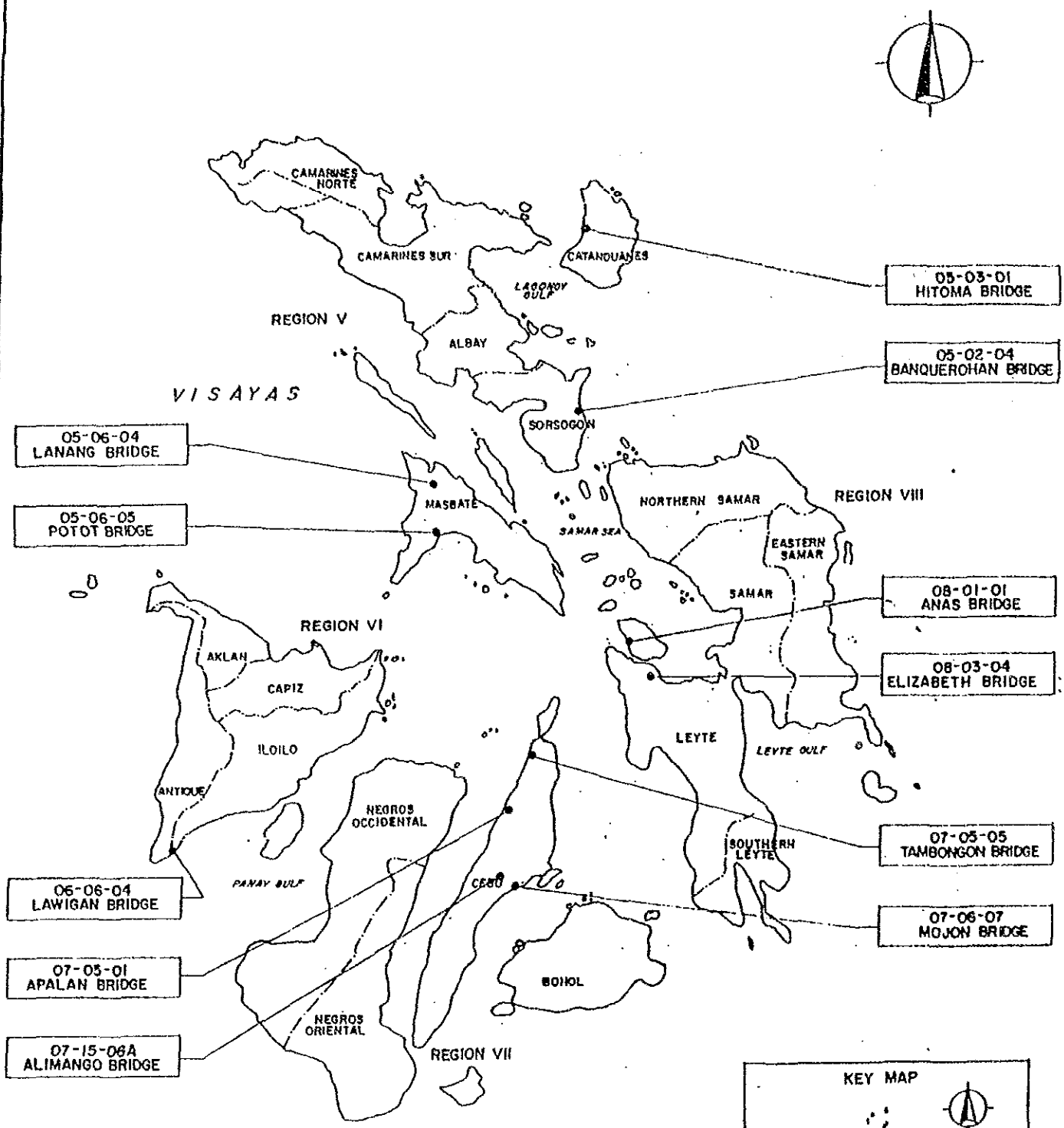
No.	Bridge No.	Name of Bridge	Location
29	08.01.06A	Lawa-an Bridge	Km. 1110 + 620 Cabucgayan-Biliran Biliran Sub-Province (National Road)
30	08.01.07A	Dispo Bridge	Km. 1026 + 270 Naval-Caibiran-Cross Country Road Biliran Sub-Province (National Road)
31	08.03.03	Basud Bridge	Km. 1022 + 900 San Isidro-Tabango-Villaba Road Leyte III (National Road)
32	08.03.06A	Matag-ob Bridge	Km. 1003 + 100 Libangao-Matag-ob-Palompon Road Leyte II (National Road)
33	08.04.01A	Matagnao Bridge	Km. 75 + 102 Abuyog-Silago Road Leyte III (Provincial Road)
34	08.07.09A	Bangon Bridge	Km. 895 + 176 Dolongan-Basey Road Samar (National Road)

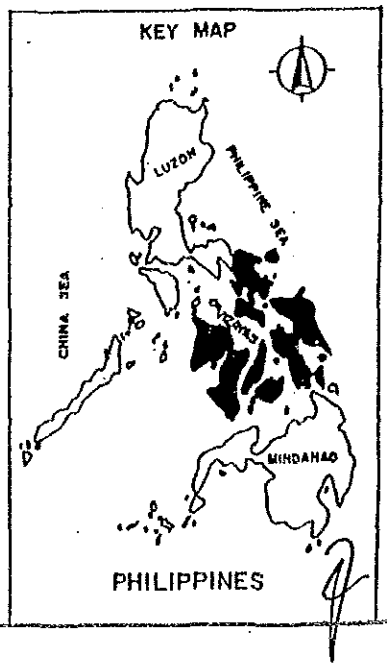


LOCATION MAP
(GROUP 1)

LIST OF BRIDGES FOR GROUP-2 (5/6)

No.	Bridge No.	Name of Bridge	Location
1	05.02.04	Banquerohan Bridge	Km. 607 + 023.60 Gubat-Barcelona-Bulusan Road Barcelona, Sorsogon (National Road)
2	05.03.01	Hitoma Bridge	Km. 151 + 600 Virac-San Andres-Caramoran Pandan Road, Catanduanes (National Road)
3	05.06.05	Lanang Bridge	Km. 56 + 129.33 From Masbate Port, Masbate-Aroroy Road Masbate (National Road)
4	05.06.05	Potot Bridge	Km. 37 + 739.78 From Masbate Port Masbate-Balud Road, Masbate (National Road)
5	06.06.04	Lawigan Bridge	Km. 70 + 900 Tiolas-Sinogbuhan Road San Joaquin, Iloilo (National Road)
6	07.05.01	Apalan Bridge	Km. 97 + 803 Toledo-Tabuelan Road Cebu I (National Road)
7	07.05.05	Tambongon Bridge	Km. 131 + 248 Antonio de Pio Highway Cebu I (National Road)
8	07.06.07	Mojon Bridge	Km. 0 + 200 From Tabunok Tabunok-Talisay Road, Cebu II (Provincial Road)
9	07.15.06A	Alimango Bridge	Km. 28 + 502 Cebu-Toledo Wharf Road Cantabaco, Toledo City (National Road)
10	08.01.01	Anas Bridge	Km. 102 + 820 From Port of Ormoc City to Naval-Almeria and Circumferential Road Biliran Sub-Province (National Road)
11	08.03.04	Elizabeth Bridge	Km. 984+ 820 Lemon-Sambolawan-Calaguise-Calubian Road Leyte II (National Road)





LOCATION MAP
(GROUP 2)

III. Document on Peace and Order

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

13 July 1992

Dr. MICHIO OKAHARA
Basic Design Study Team Leader
Foundation Engineering Division
Structure & Bridge Engineering Department
Public Works Research Intitute
Ministry of Construction
1 Asahi Tsukuba-shi, 305
Tokyo, Japan

Thru : Mr. MINORU MIURA
Project Manager/Bridge Planner
Katahira and Engineers International
4th Floor, P & L Building
116 Legaspi Street, Legaspi Village
Makati, Metro Manila

S i r :

Please be informed that we are formally advised by the Superintendent of the PNP, Regional Command 6, thru our Regional Director in Region VI that the criminality and insurgency situation in areas covered by the Project on the Bridge Reconstruction Along Rural Roads, Phase IV in Region VI, particularly the vicinity of Lawigan Bridge, in San Joaquin, Iloilo will not pose any serious threat in the activity to be undertaken relative thereto.

We hope that the above information will be sufficient as we look forward to your continued support to our development efforts.

Very truly yours,

MANUEL M. BONOAN
Assistant Secretary for Planning

Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Bonifacio Drive, Port Area, Manila

28 July 1992

Dr. MICHIO OKAHARA
Basic Design Study Team Leader
Foundation Engineering Division
Structure & Bridge Engineering Department
Public Works Research Institute
Ministry of Construction
1 Asahi Tsukuba-shi, 305
Tokyo, Japan

T H R U : Mr. MINORU MIURA
Project Manager/Bridge Planner
Katahira and Engineers International
4th Floor, P & L Building
116 Legaspi Street, Legaspi Village
Makati, Metro Manila

S i r :

This has reference to the implementation of the 15 proposed bridge projects in Region V under the JICA Grant Aid Project on the Bridge Reconstruction Along Rural Roads, Phase IV in the Philippines.

In this regard, we wish to assure you that on the basis of the reports and confirmation obtained from the Philippine National Police by our DPWH Regional Director who is based in Legaspi City (Albay) and the respective DPWH District Engineers in the provinces of Camarines Sur, Camarines Norte, Albay, Sorsogon, Catanduanes and Masbate, we expect no problem to implement the projects relative to peace and order situation in the specific project sites. May we also inform you that the DPWH is currently undertaking several foreign-assisted projects in Region V funded by the OECF, IBRD and ADB, and we have never encountered any peace and order related problem in the implementation of these projects.

We trust that this information will be sufficient as we look forward to your continued support to our developments efforts.

Very truly yours,

MANUEL M. BONOAN
Asst. Secretary for Planning

APPENDIX 3

COUNTRY DATA

Table 1 (1) EXISTING ROAD LENGTH, 1988

(km)

	National					City				
	Concrete	Asphalt	Gravel	Earth	Total	Concrete	Asphalt	Gravel	Earth	Total
Philippines	6,179.7	5,829.3	13,400.3	743.4	26,143.7	649.4	2,006.0	1,164.5	164.7	3,984.6
NCR	446.8	421.3	14.0	0.0	882.1	281.9	832.8	159.1	0.0	1,273.8
I	449.3	919.7	952.9	93.2	2,415.1	8.3	183.4	118.1	0.0	309.8
II	599.1	108.8	1,532.0	61.9	2,301.8	0.0	0.0	0.0	0.0	0.0
III	796.5	504.0	391.8	0.0	1,692.3	56.5	115.9	41.0	45.2	258.6
IV	556.9	1,191.7	2,180.6	89.3	4,028.5	37.9	127.7	102.1	25.0	292.7
V	648.0	337.2	909.4	47.0	1,941.6	20.3	81.1	125.8	18.1	245.3
VI	307.0	789.2	1,533.7	0.0	2,629.9	91.7	152.4	48.8	4.6	297.5
VII	164.6	676.5	821.2	4.4	1,666.7	32.4	236.7	24.1	22.0	315.2
VIII	662.0	57.1	1,152.4	92.1	1,963.6	39.1	2.8	20.0	8.7	70.6
IX	52.6	312.6	653.9	0.0	1,019.1	8.2	76.9	36.3	0.1	121.5
X	634.6	352.8	1,200.0	0.0	2,187.4	36.2	71.2	99.0	11.0	217.4
XI	455.2	129.9	1,224.4	144.7	1,954.2	15.2	92.5	319.1	26.9	453.7
XII	397.1	28.5	834.0	201.8	1,461.4	21.7	32.6	17.1	3.1	128.5

Table 1 (2) EXISTING ROAD LENGTH, 1988

(km)

	Municipal					Provincial				
	Concrete	Asphalt	Gravel	Earth	Total	Concrete	Asphalt	Gravel	Earth	Total
Philippines	1,712.4	1,574.5	6,383.0	3,224.8	12,858.7	714.1	2,584.4	20,477.9	5,215.0	28,991.4
NCR	351.2	162.0	29.4	11.8	518.4	0.0	0.0	0.0	0.0	0.0
I	40.4	286.5	667.4	409.6	1,403.9	49.0	470.4	1,677.9	659.8	2,857.1
II	21.0	56.4	827.9	236.3	1,141.6	8.5	159.0	1,416.8	338.2	1,972.5
III	202.1	213.6	465.9	155.2	1,036.8	302.0	332.4	1,543.9	185.7	2,364.0
IV	330.1	239.3	594.1	217.3	1,380.8	151.6	488.8	2,824.5	401.7	3,866.6
V	107.1	192.3	361.0	121.2	781.6	35.1	318.2	1,082.3	361.0	1,796.6
VI	204.3	75.8	359.3	57.1	696.5	62.0	94.2	2,190.7	106.2	2,453.1
VII	97.6	144.6	457.6	229.4	929.2	13.7	170.0	1,918.6	261.5	2,363.8
VIII	246.9	18.2	310.8	138.0	713.9	60.6	327.4	830.6	185.2	1,403.8
IX	3.3	25.5	547.7	260.1	836.6	1.7	130.7	1,730.7	231.9	2,095.0
X	38.4	91.9	556.4	523.9	1,210.6	14.1	88.1	2,022.1	663.3	2,787.6
XI	39.5	33.5	758.7	429.5	1,261.2	10.7	4.5	2,210.5	783.7	3,009.4
XII	30.5	34.9	446.8	435.4	947.6	5.1	0.7	1,029.3	986.8	2,021.9

Table 1 (3) EXISTING ROAD LENGTH, 1988

(km)

	Municipal					Provincial				
	Concrete	Asphalt	Gravel	Earth	Total	Concrete	Asphalt	Gravel	Earth	Total
Philippines	299.1	557.7	84,826.6	0.0	85,685.7	9,554.7	12,551.9	126,254.3	9,338.9	157,664.1
NCR	0.0	0.0	234.7	0.0	234.7	1,079.9	1,416.1	437.2	11.8	2,909.0
I	18.5	72.4	9,898.6	0.0	9,989.8	565.5	1,932.4	13,314.9	1,162.6	16,975.7
II	1.2	0.0	7,453.1	0.0	7,454.3	629.8	324.2	11,229.8	686.4	12,870.2
III	83.9	19.1	7,619.9	0.0	7,722.9	1,441.0	1,185.0	10,062.5	386.1	13,074.6
IV	122.8	204.5	8,460.1	0.0	8,787.4	1,209.3	2,252.0	14,161.4	733.3	18,356.0
V	12.3	70.8	3,768.2	0.0	3,852.3	822.8	999.6	6,246.7	547.3	8,616.4
VI	49.3	99.8	7,753.0	0.0	7,902.1	714.3	1,211.4	11,885.5	167.9	13,979.1
VII	5.3	68.9	5,411.3	0.0	5,485.5	313.6	1,296.7	8,632.8	517.3	10,760.4
VIII	0.0	0.0	4,284.4	0.0	4,284.4	1,008.6	405.5	6,598.2	424.0	8,436.3
IX	0.0	6.1	5,432.0	0.0	5,438.1	65.8	551.8	8,400.6	492.1	9,510.3
X	4.5	13.4	8,379.5	0.0	8,397.4	727.8	617.4	12,257.0	1,198.2	14,800.4
XI	0.0	0.0	8,769.4	0.0	8,769.4	520.6	260.4	13,282.1	1,384.8	15,447.9
XII	1.3	2.7	7,364.4	0.0	7,368.4	455.7	99.4	9,745.6	1,627.1	11,927.8

Table 2 Main Economic Index (1/2)

General Outline of the Republic of the Philippines

Capital: Metro Manila
Language: Pilipino, English
GPN per Capita: 730 dollars
Population: 5,736,000
Area: 300,000 km²
Currency: Philippine Peso

item / unit / year	GNP	Agri-culture	Mining & Industry	Manufac-turing	GNP Deflator	Financial Balance	Against GNP	Lending Rate	Exchange Rate
	Billion Peso	Composition Rate by Economic Activity (%)			1980 = 100	Million Pesos	%	%	Peso = 1$
1970	41.5	37.1	20.8	18.6	12.3	59.0	0.14	-	5.9044
1980	264.6	23.3	27.5	24.4	42.0	-3,385.0	-1.28	14.00	7.511
1985	609.4	26.7	26.6	24.7	100.0	-11,538.0	-1.89	28.612	18.607
1987	708.5	24.1	26.4	24.5	109.2	-18,447.0	-2.60	13.338	20.568
1988	825.7	23.0	27.1	25.1	119.7	-25,019.0	-3.03	15.921	21.095
1989	963.0	25.3	26.7	25.0	132.3	-19,044.0	-1.98	19.270	21.737
1990	1066.3	-	-	-	142.0	-37,194.0	-3.49	24.118	24.311

Table 2 Main Economic Index (2/2)

item / unit / year	Exports	Imports	Current Balance	Trade Balance	Balance	Total Balance	Foreign Money Reserve	Consumer Price Index
	Million US dollar							1980=100
1970	1,142	1.286	-48	-26	271	83	251	10.0
1980	5,788	8,295	-1,928	-1,939	2,683	891	3,140	39.4
1985	4,630	5,395	-35	-482	353	978	1,116	100.0
1987	5,720	6,737	-444	-1,017	355	-298	2,014	104.6
1988	7,074	8,731	-390	-1,085	571	660	2,111	113.7
1989	7,747	10,732	-1,465	-2,598	139.1	300	2,376	125.8
1990	8,186	12,206	-2,695	-4,020	205.7	-1,876.3	2,048	141.7

Source: Handbook of Overseas Economic Cooperation 1992

Table 3 FUNCTIONAL CLASSIFICATION OF NATIONAL GOVERNMENT EXPENDITURES, 1987 - 1992

(Unit: %)

	Actual Annual average 1976-85	Estimate 1986	Projections						Annual Average 1987-92
			1987	1988	1989	1990	1991	1992	
Economic Services	33.0	17.3	19.9	21.6	23.9	26.3	28.4	30.3	25.1
Agriculture	7.3	3.2	3.9	5.7	6.5	7.4	8.2	9.1	6.8
Industry, trade and tourism	3.1	0.7	1.4	1.9	2.4	2.8	3.0	3.3	2.5
Utilities and infrastructure	23.5	13.4	14.6	14.0	15.0	16.1	17.2	17.9	15.8
Social Services	20.2	18.3	21.5	24.5	28.4	31.4	35.7	39.2	30.1
Education	12.3	10.2	11.5	13.2	14.1	14.9	17.1	18.7	15.0
Health	3.9	3.0	3.4	4.2	5.9	6.6	8.2	9.6	6.3
Social security and welfare	2.1	4.7	6.2	6.2	6.2	6.3	6.4	6.4	6.2
Housing and community development	1.9	0.4	0.4	0.9	2.2	3.6	4.0	4.5	2.7
Defense	14.0	8.9	7.3	7.4	8.0	8.4	8.5	8.9	8.1
General Public Services	20.0	10.0	11.3	15.7	14.7	13.7	12.3	9.6	12.9
Debt Service Fund and Net Landing*	11.9	47.5	40.0	30.8	25.0	20.2	15.1	12.0	23.9
T o t a l	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: * For 1987 onwards, this item includes a portion of the external liabilities of government financial institutions to be assumed by the national government. Exclusion debt service on liabilities of the Philippines Nuclear Power Plant.

Services of Basic Data: MBM and NEDA.

Table 4 Land and Population

(1990)

Region/Province	Land (km^2)	Population (100 psns.)	Density (psns./km^2)
Metro Manila	636.0	7,929	12,467.0
CAR	18,293.6	1,146	62.6
Region 1	12,840.2	3,551	276.6
Region 2	26,837.6	2,341	87.2
Region 3	18,230.8	6,199	340.0
Region 4	46,924.2	8,266	176.2
Region 5	17,632.5	3,910	221.7
Region 6	20.223.2	5,392	266.6
Region 7	14,951.4	4,593	307.2
Region 8	21,432.7	3,055	142.5
Region 9	18,730.1	3,159	168.7
Region 10	28,327.7	3,510	123.9
Region 11	31,692.8	4,457	140.6
Region 12	23,323.2	3,171	136.0
Total	300,000.0	60,685	202.3

Source: 1991 Philippine Statistical Yearbook

Table 5 Persons By Industry

(1990)

Industry	Employed Persons (%)	
Agriculture, Forestry, and Fishery	10,185	(45.2)
Mining and Quarrying	138	(0.6)
Manufacturing	2,188	(9.7)
Construction	974	(4.3)
Electricity, Gas, Water and Sanitary Services	91	(0.4)
Transport, Storage and Communication	1,137	(5.0)
Trading	3,145	(14.0)
Finance	444	(2.0)
Services	4,220	(18.7)
Total	22,532	(100%)

Source: 1991 Philippine Statistical Yearbook

Table 6 Persons of Major Industries by Region (1990)

(unit: 1000 psns.)

Item \ Region	Region V	Region VI	Region VII	Region VIII	Total
Agriculture, Forestry, and Fishery	916	1,139	834	825	10,185
Mining and Quarrying	8	11	12	-	138
Manufacturing	13	110	200	69	2,188
Electricity, Gas, Water and Sanitary Services	8	3	6	3	91
Construction	56	44	84	41	974
Trading	186	28	223	183	3,145
Transport	56	5	81	41	1,137
Finance	13	24	11	12	444
Services	271	367	276	173	4,220
Others	1	-	6	-	15
Total	1,652	2,045	1,734	1,349	22,532

Source: National Statistic Office

Table 7 Telecommunication Facilities and Broadcasting Stations

Region	Telephone		Telephone Station	Telex	Facsimile	Radio	Radio Stations
	Line	Exchange					
Metro Manila	462,776	44	0	0	0	0	23,422
Car	7,000	5	56	1	0	3	0
Region I	18,704	55	116	4	1	6	2,358
II	5,840	25	92	3	0	0	1,109
III	35,889	56	111	9	0	5	2,797
IV	38,329	55	222	6	0	32	2,172
V	7,490	17	125	6	0	15	1,707
VI	22,543	16	137	7	2	1	3,720
VII	23,905	11	128	5	1	0	5,689
VIII	8,000	11	147	4	0	6	679
IX	5,937	7	90	3	1	0	1,437
X	8,367	14	112	8	1	8	3,554
XI	19,581	17	98	3	1	0	3,935
XII	3,950	7	105	6	0	2	1,146
Total	688,311	340	1,539	65	7	78	53,725

Table 8 External Assistance

(unit: million US dollars)

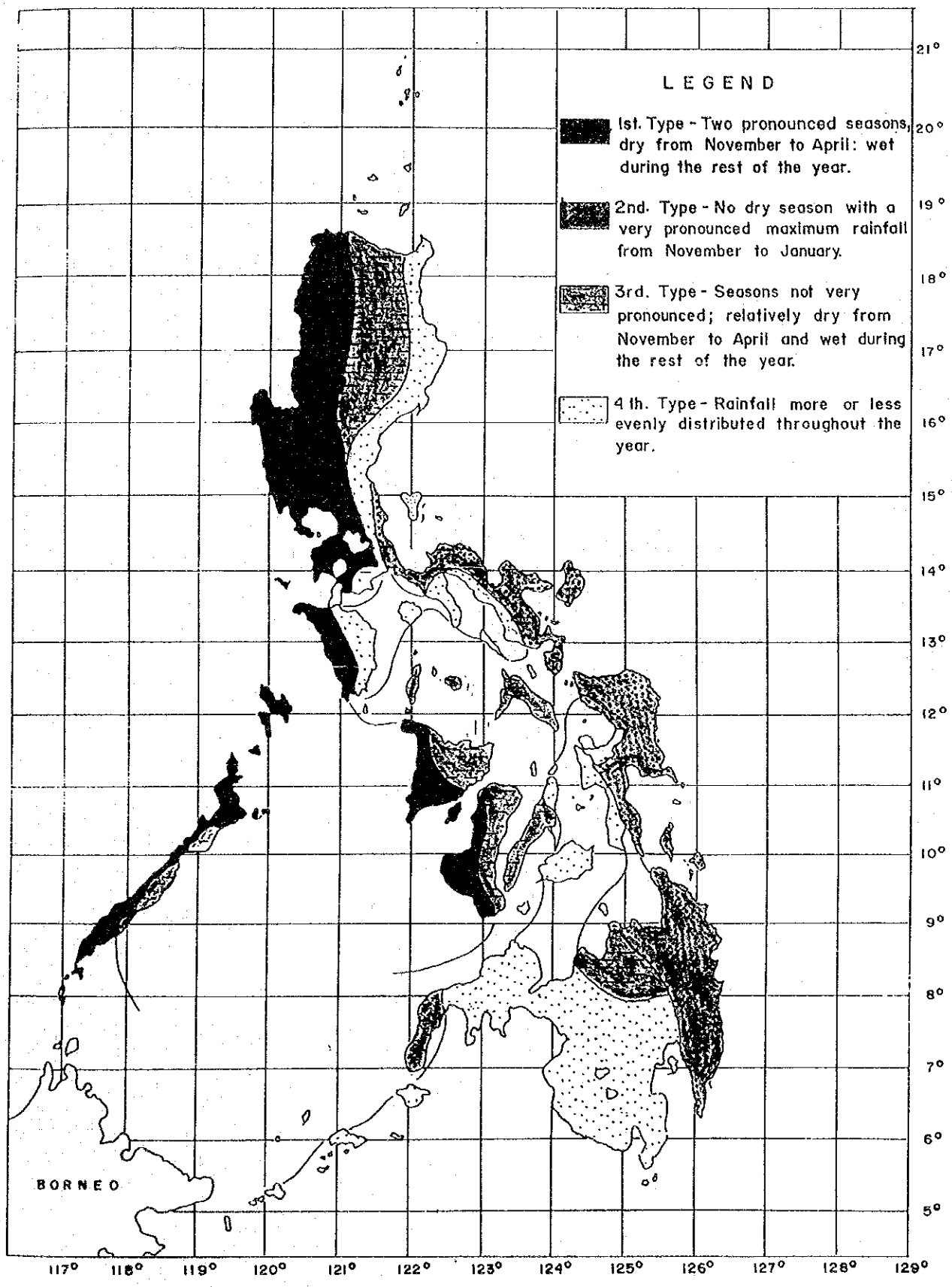
Item \ Year	1987	1988	1989	1990
Bilateral Aid	702.7	789.2	757.0	1,100.3
(Highest Country)	(JPN 379.4)	(JPN 534.7)	(JPN 403.8)	(JPN 647.5)
Multilateral Aid	67.5	65.1	86.9	176.4
Total (Including Private Sector)	848.0	1,310.5	1,215.8	2,098.2

Table 9 Japan's Economic Cooperation and Trade

(unit: million US dollars)

Item \ Year		1986	1987	1988	1989	1990
Bilateral ODA (Net)	Grant	80.37	117.79	131.10	176.06	153.14
	(Technical cooperation)	(39.30)	(44.90)	(60.70)	(60.74)	(61.98)
	Loan	357.58	267.59	403.62	227.69	494.31
	Total	437.96	379.38	534.72	403.75	647.45
Others	(Net)	24.46	-15.76	-40.88	297.57	-
Total (Net)		462.42	363.62	493.84	701.32	-
Export from Japan		1,088.14	1,414.70	1,739.81	2,380.53	2,503.89
Import from Japan		1,200.66	1,352.86	2,044.14	2,059.47	2,157.04

Source: Handbook of Overseas Economic Cooperation 1992



☒ 1 CLIMATE MAP OF THE PHILIPPINES