APPENDIX 10.3-1

Bridges – Cabanatuan Bypass
(Initial & Ultimate Stage)

BRIDGE NO. 1 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. RIVER CONDITION

- The riverbed is composed of silty clay with its riverbank in stable condition.
- The river course will unlikely meander but will tend to scour at the riverbed.
- The upstream and downstream conditions of riverbed & riverbanks are stable.
- No evidence of drifts/debris during flooding
- The river discharge at 50 year return period is 92.70 cum/sec
- The river velocity at 50 years return period is 1.578 m/sec.
- The top river width at design flood level is 43.40 m.

2. SOIL / GROUND CONDITION

- The site is covered by 1.00m to 3.00m grayish silty clay, followed by a very thick layer of very dense sand and gravel.
- N-value at the upper 1.00mm to 7.50m depth ranges from 4 to 40 and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

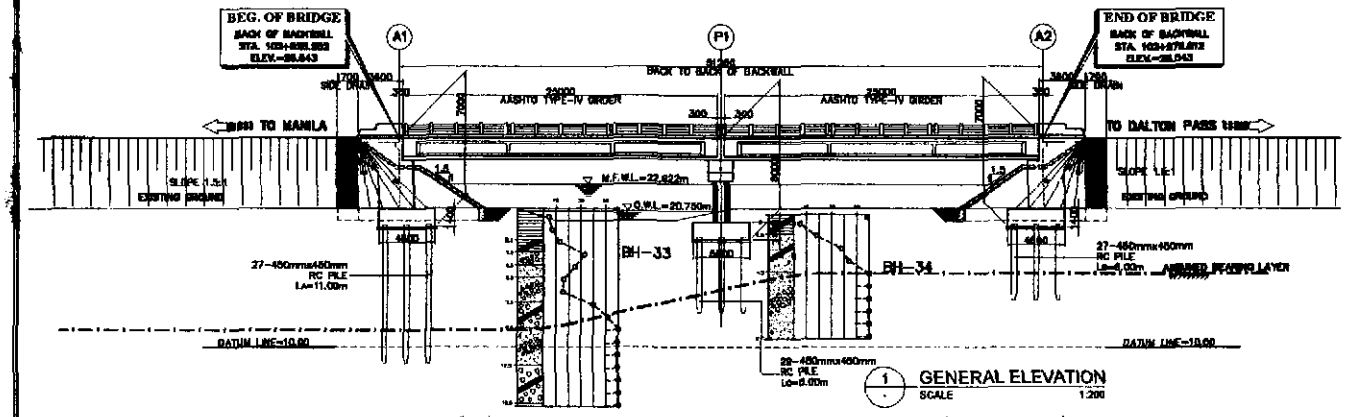
	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	51.26 m	51.26 m
CARRIAGEWAY WIDTH	(2 x 3.50m)	(2 x 3.50m)
SHOULDER WIDTH	1 x 2.50m	1 x 2.50m
SIDEWALK WIDTH	1 x 0.75m	1 x 0.75m
SUPERSTRUCTURE TYPE	2-span, PCDG Type IV (51.26 m)	2-span, PCDG Type IV (51.26 m)
SUBSTRUCTURE TYPE	Closed-type Abutment / 2-Column Pier	Closed-type Abutment /2-Column Pier
FOUNDATION TYPE	450 x 450 RC Pile	450 x 450 RC Pile

(2) DETERMINATION OF FINAL SCHEME

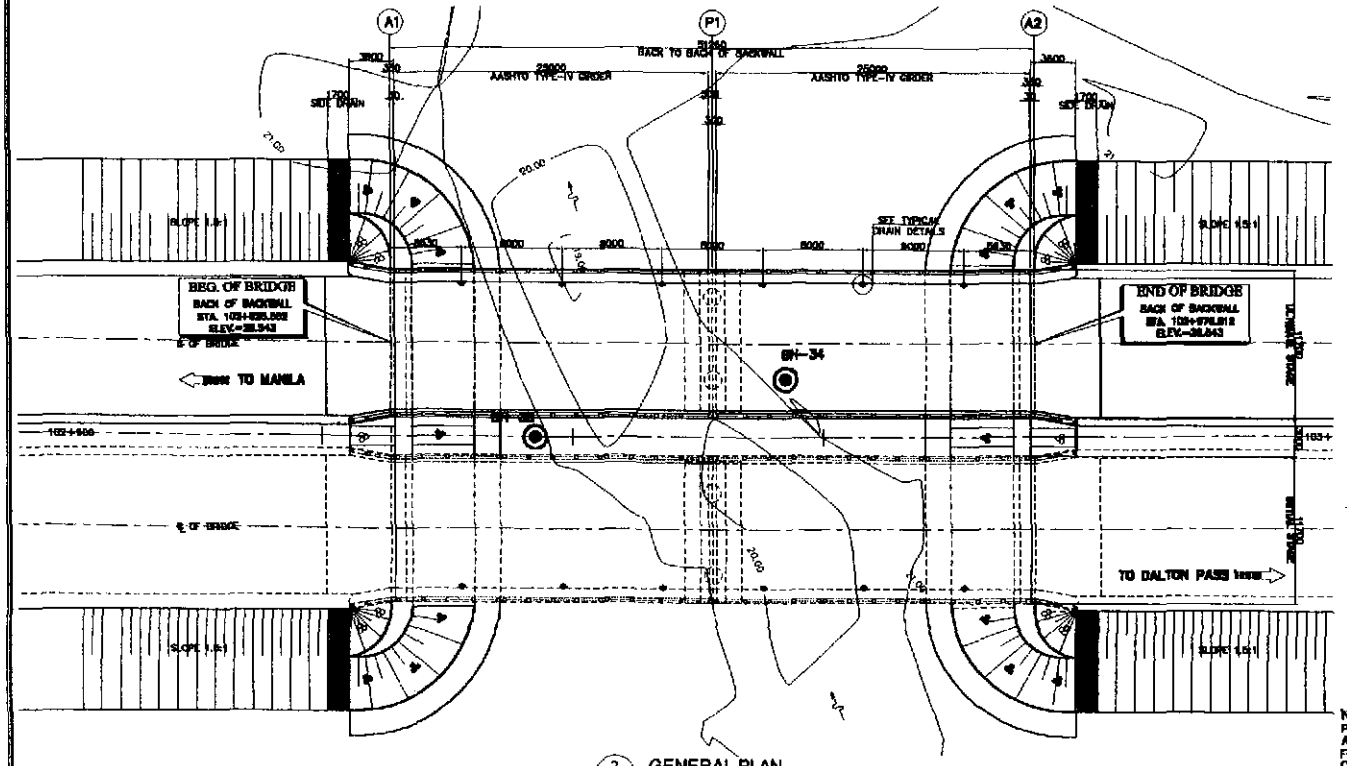
- A two-span bridge with pier located at the center span was proposed for economical reason.
- Pier located at center of river will not have a problem as in the case of debris collision to pier column and local scour at pier foundation since river flow is relatively slow.

(3) PROTECTION AGAINST SCOURING

- Since water velocity is slow (1.578 m/sec), the bridge utilizes Grouted Riprap Riverbank Protection with Loose Boulder Apron provided at toe.

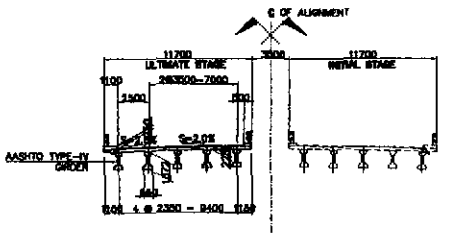


1 GENERAL ELEVATION
SCALE 1:200

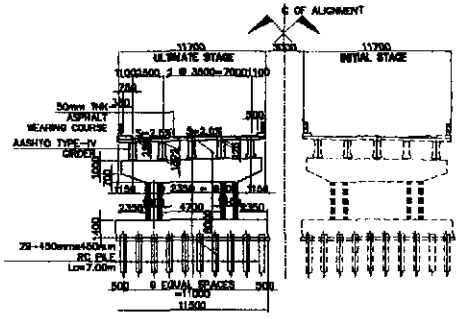


2 GENERAL PLAN
SCALE 1:200

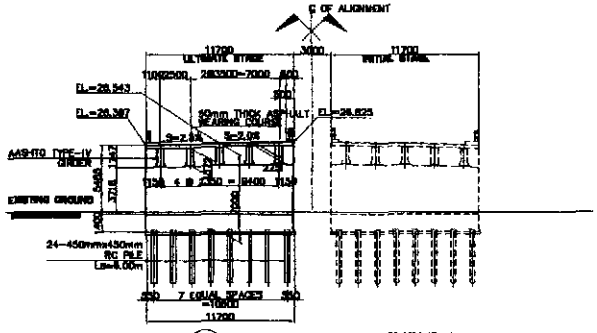
A CABANATUAN BRIDGE NO.1 (STA.102+925.552)
SCALE AS SHOWN



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ PIER P1
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

NOTE :
PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 AND A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	1.575 m/sec
DISCHARGE @ 50 YEARS, Qso	92.700 cu.m/sec
CATCHMENT AREA, CA	28.130 sq. km

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DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

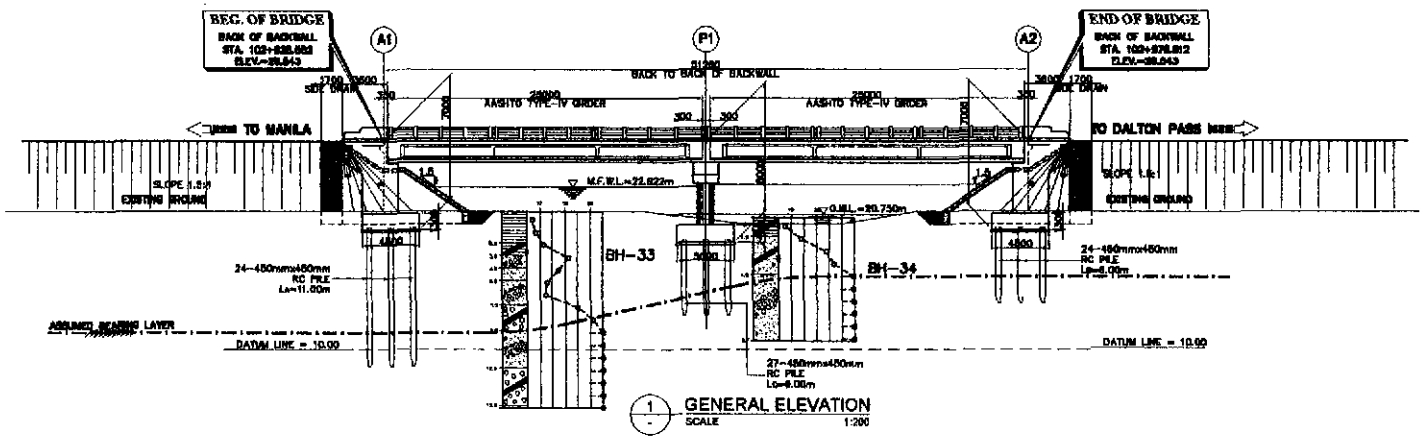
Submitted by	Reviewed by	Recommended by	Recommended by	Approved by
DANILO G. TRIJANO, Project Director	ADRIANA M. DORDY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	EDUARDO V. MA, Undersecretary	SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE I

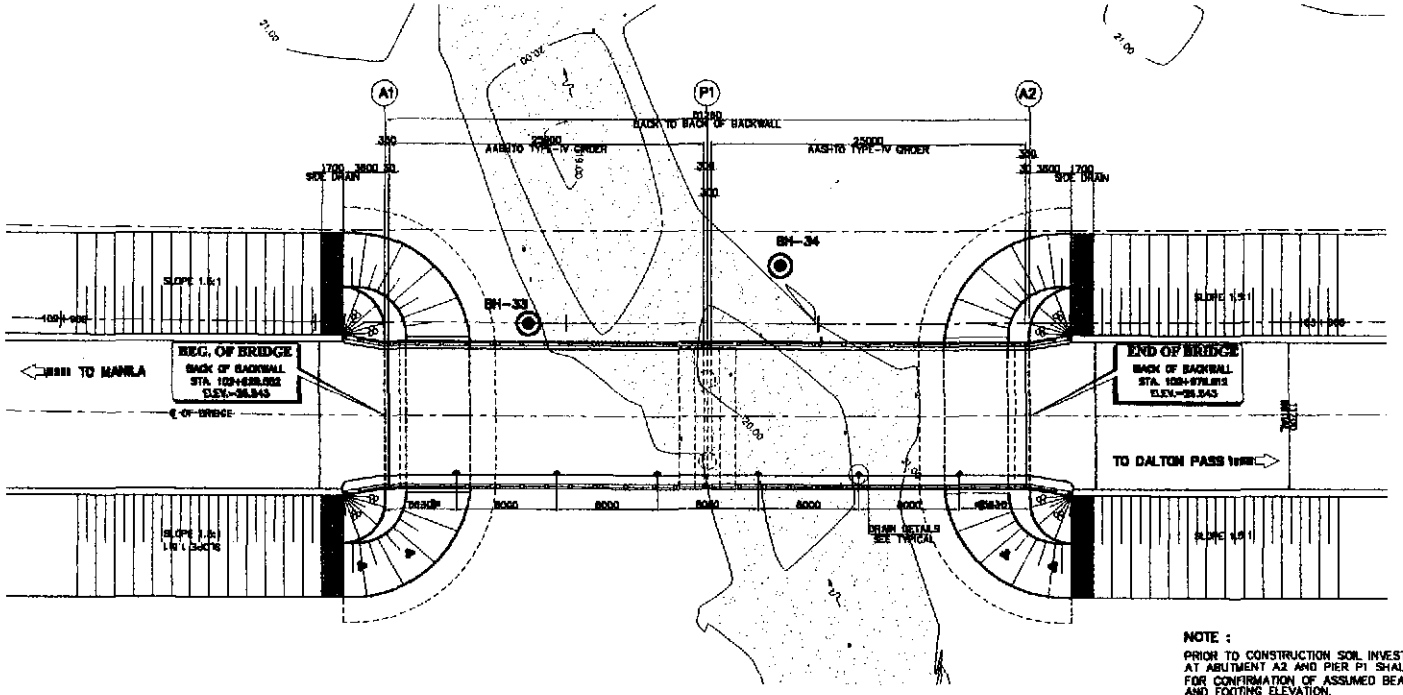
SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO.1
GENERAL PLAN, ELEVATION AND SECTIONS (ULTIMATE STAGE)

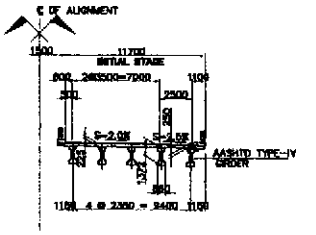
SHEET NO. : B-00



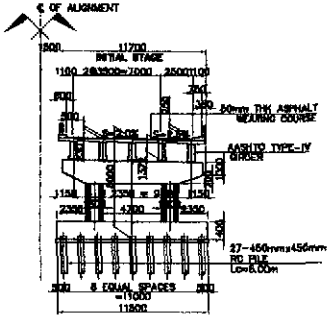
1 GENERAL ELEVATION
SCALE 1:200



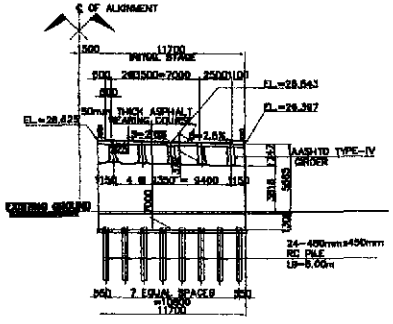
2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ PIER P1
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

A CABANATUAN BRIDGE NO.1 (STA.102+925.552)
SCALE AS SHOWN

NOTE :
PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A2 AND PIER P1 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	1.578 m/sec
DISCHARGE @ 50 YEARS, Qso	92.700 cu.m/sec
CATCHMENT AREA, CA	28.130 sq. km

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DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

Asst. – Pwd	Bureau of Design		Office of the Secretary	
Submitted By	Reviewed By	Recommended By	Recommended By (See cover sheet for signatures)	Approved By (See cover sheet for signatures/approval)
DANILO C. TRIJANO, Project Director	ADRIANO M. DONOY, Chief, Bridge Division	ARMANDO S. REYES, Director IV (OIC)	EDMUNDO V. JOB, Undersecretary	SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE I

SCALE : 1 : 200 FULL SIZE A1

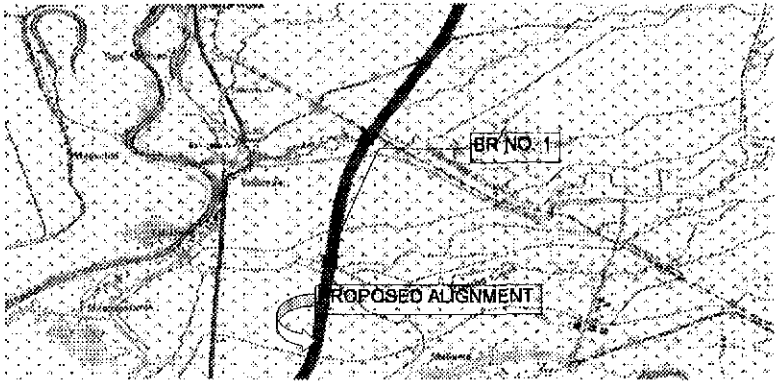
SHEET CONTENTS :
BRIDGE NO. 1
GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)

SHEET NO. : B-05

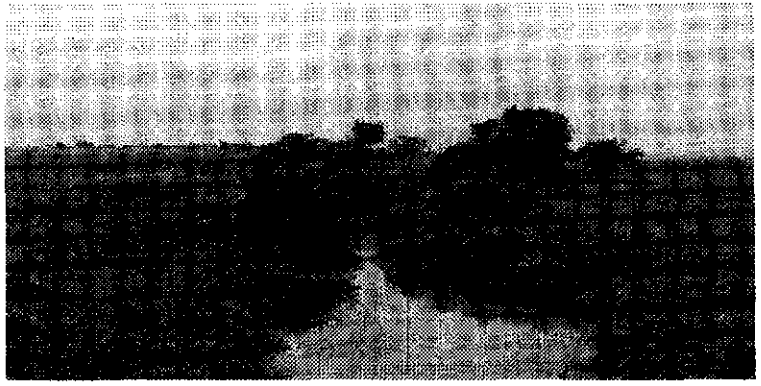
PROPOSED BRIDGE SITE SURVEY

Survey Date	19-Jun-01	Bridge No./Station	Bridge No.1 / STA.-1+303.100
Bypass Name	CABANATUAN	Prepared by	RML / ENS

Location River Name :



Photograph Upstream



Land Use	☐ Commercial ☐ Industrial ☑ Residential ☑ Agricultural ☐ Others	
Geographical Features / Terrain	☐ Mountenous area ☐ Alluvial ☑ Plain ☐ Others	
Stream / River Type	☐ Straight ☐ Braided ☑ Meandering	
Nearby Structures	Upstream / Downstream	
Environmental Condition	☑ Trees/Vegetation ☐ Fish & Fish Habitat	
Water Level (During survey)	☐ 0 - 0.50m ☑ 0.50m - 1.0m ☐ 1.0m - 1.5m ☐ Others	

River Condition

River Width (m) : 10.00

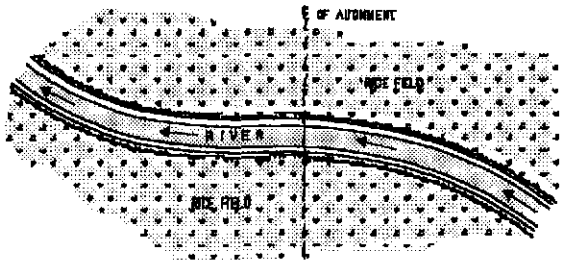
Stream Velocity (m/s) :
- Normal : 0.45
- During Flood : 1.40

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

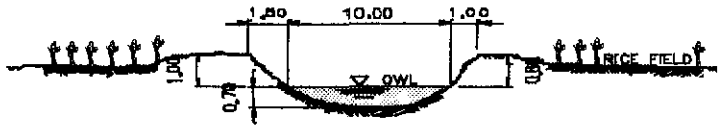
Site Access During Construction:
- ☐ Possible
- ☑ Difficult

Comments:

a. Plan



b. Section / Elevation



Meander Situation	Upstream	☑ Existing ☐ None
	Downstream	☑ Existing ☐ None
Riverbed Material	☐ Large Gravel ☐ Gravel ☐ Sand ☑ Soil ☐ Others	
Riverside/Bank Condition	Upstream	☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
	Downstream	☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
Tendency to River Course and Riverbed Change	☑ Stable ☑ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others	
Flood signs	☑ None ☐ Existing -	
Evidence of Drift & Debris	☑ None ☐ Existing	Driftwoods, Φ = Length = / Others :
Maximum Flood Water Level	Height above bank (m) 0.2	Comments :
☑ Interview ☐ Flood Data ☐ Flood Marks	Frequency (yrs) 10	
	Cause Typhoon	
Recommendation for Bridge	Verify maximum flood water level. Provide 1.50m clearance from MFWL.	
Recommendation for River Protection Works		
Comments / Others		

Table 3.4-16 Bridge No. 1 Site Condition

BRIDGE NO. 2 (CABANATUAN BYPASS-INITIAL AND ULTIMATE STAGE)

1. RIVER CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition.
- The river course will unlikely meander but will tend to scour at the riverbed.
- The upstream and downstream conditions of riverbed & river banks are stable.
- No evidence of drifts/debris during flooding
- The river discharge at 50 year return period is 512.80 cum/sec
- The river velocity at 50 years return period is 3.046 m/sec.
- The top river width at design flood level is 55.6 m.

2. SOIL / GROUND CONDITION

- Bridge site is underlain by thick gravel and sand deposits with alternating layer of silt and clay.
- Gravel and sand deposit is overlain uppermost plastic silt or clay with thickness ranging from 4.5 to 8.5 meters and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

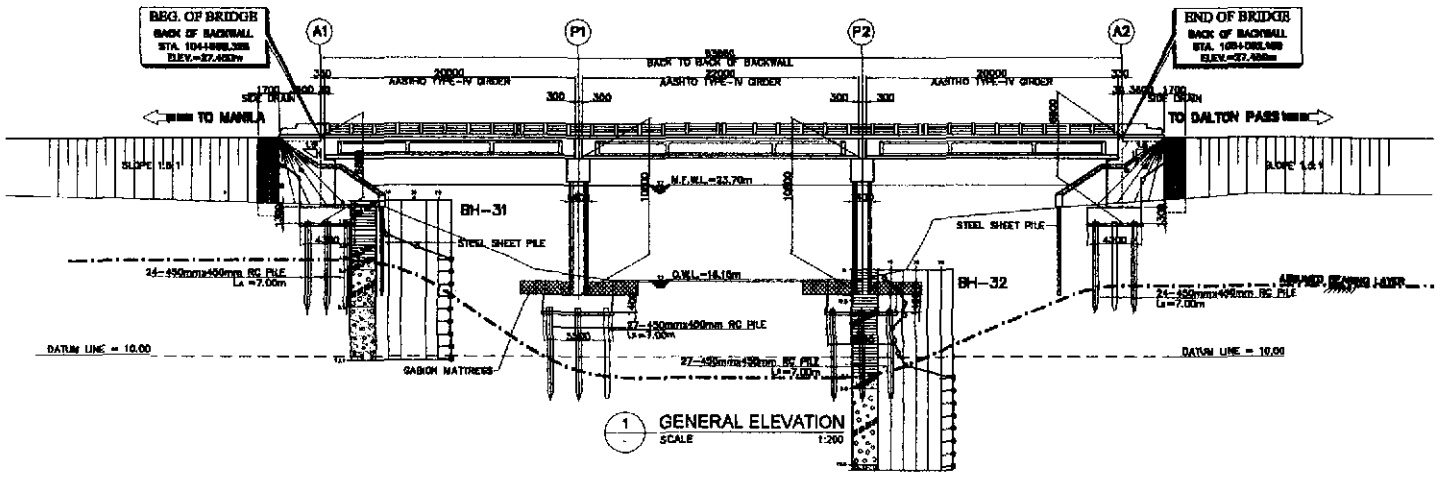
	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	63.86 m	63.86 m
CARRIAGEWAY WIDTH	(2 x 3.50m)	(2 x 3.50m)
SHOULDER WIDTH	1 x 2.50m	1 x 2.50m
SIDEWALK WIDTH	1 x 0.75m	1 x 0.75m
SUPERSTRUCTURE TYPE	3-span, PCDG Type IV (63.86 m)	3-span, PCDG Type IV (63.86 m)
SUBSTRUCTURE TYPE	Closed-type Abutment / 2-Column Pier	Closed-type Abutment /2-Column Pier
FOUNDATION TYPE	450 x 450 RC Pile	450 x 450 RC Pile

(2) DETERMINATION OF FINAL SCHEME

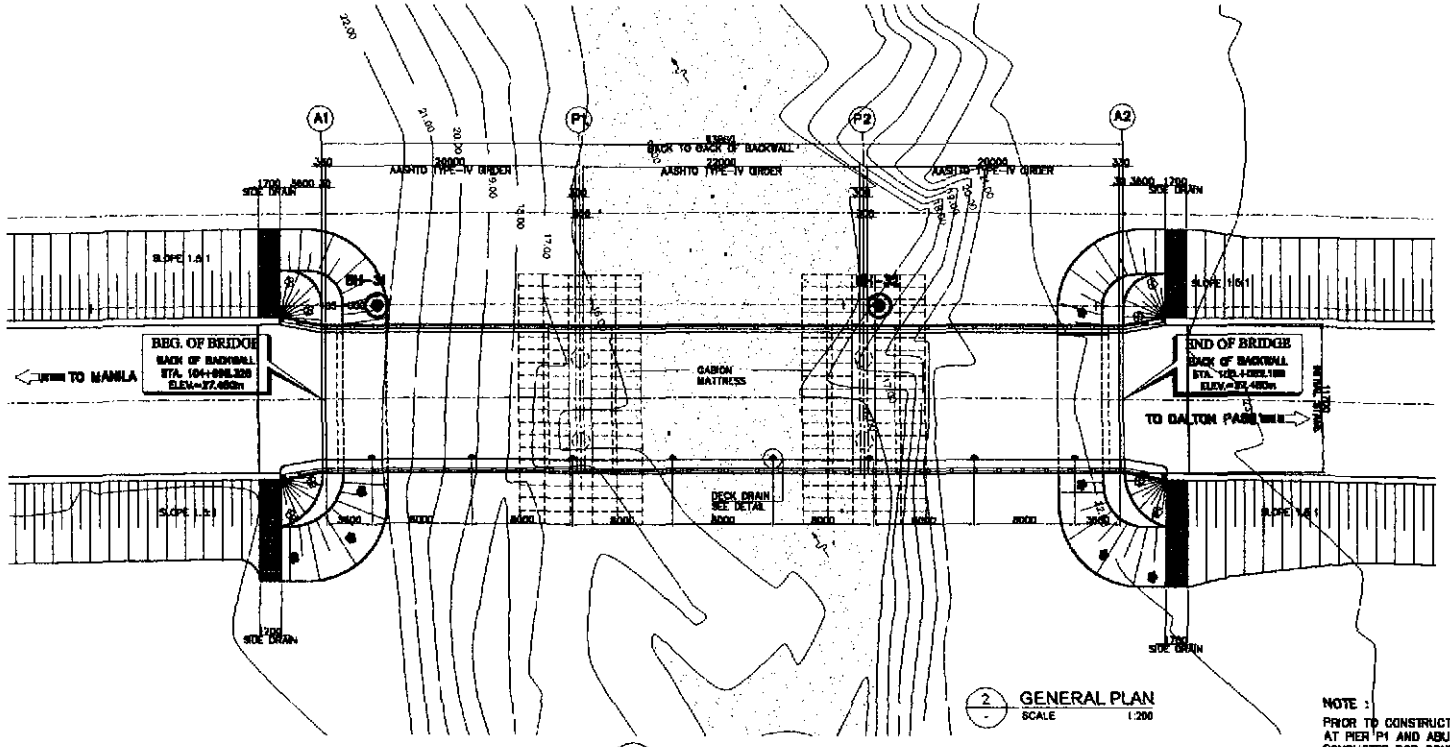
- A three span bridge was proposed being more economical than a 4-span bridge and more hydraulically advantageous than a 2-span bridge.
- Although a 2-span bridge is economical, a pier located at center of river will be a problem in case of debris collision to pier column and local scour at pier foundation.

(3) PROTECTION AGAINST SCOURING

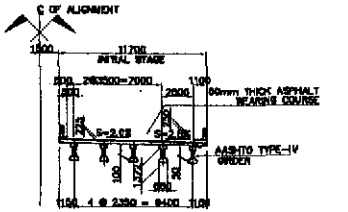
- Since water velocity is relatively fast (3.046 m/sec), DPWH criteria requires the use of Rubble Concrete River Bank Protection.
- River Bank Protection will be supported by steel sheet piles penetrating thru 5 to 8 meters of silty clay layer.
- Gabion mattress will be used to protect piers from local scouring.



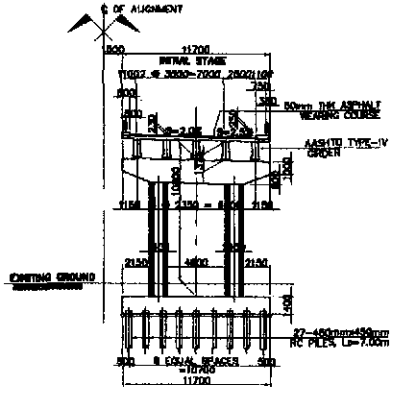
1 GENERAL ELEVATION
SCALE 1:200



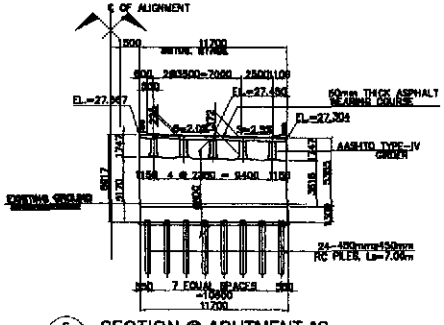
2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ PIER P1
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	3.048 m/sec
DISCHARGE @ 50 YEARS, Qso	512.800 cu.m/sec
CATCHMENT AREA, CA	107.760 sq. km

A CABANATUAN BYPASS BRIDGE NO.2 (STA. 104+998.328)
SCALE AS SHOWN

NOTE :
PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT PIER P1 AND ABUTMENT A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

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KEI KATAHIRA & ENGINEERS INTERNATIONAL
YEO YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

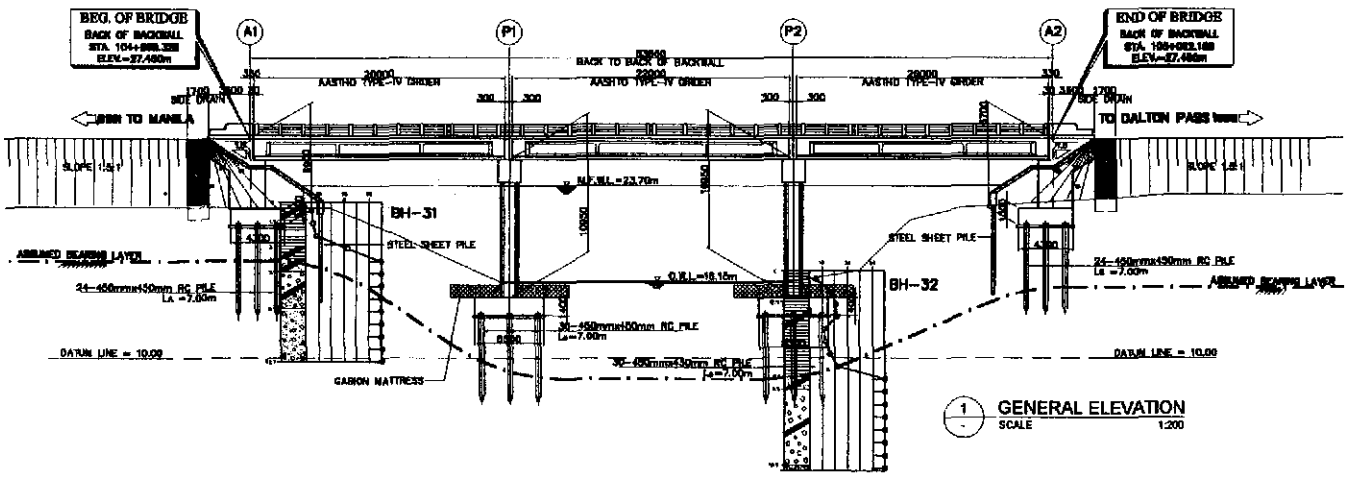
BUREAU OF DESIGN			OFFICE OF THE SECRETARY	
Recommended by: DANILO C. TRIANO, Project Director	Reviewed by: ADRIANO M. DOROY, Chief, Bridges Division	Recommended by: GILBERTO S. REYES, Director IV (OIC)	Recommended by: EDUARDO V. MAS, Undersecretary	Approved by: SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE I

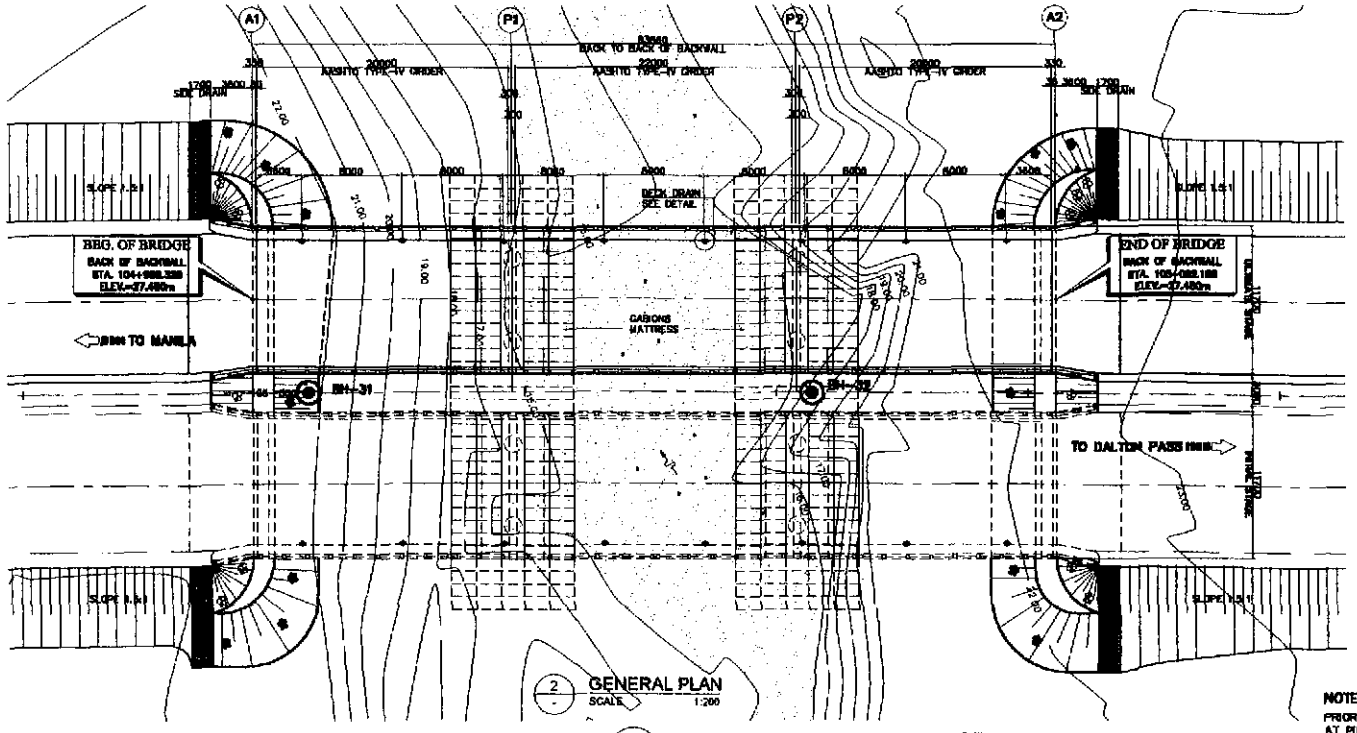
SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 2
GENERAL PLAN, ELEVATION AND SECTIONS
(INITIAL STAGE)

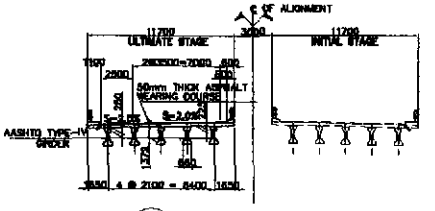
SHEET NO. : B-20



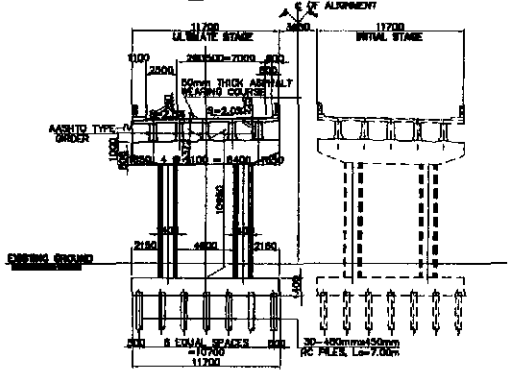
1 GENERAL ELEVATION
SCALE 1:200



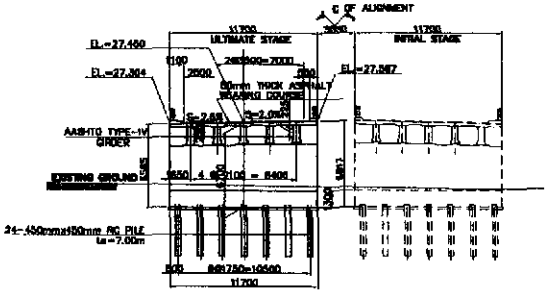
2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ PIER P1
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vss	3.046 m/sec
DISCHARGE @ 50 YEARS, Qss	512.800 cu.m/sec
CATCHMENT AREA, CA	107.760 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT PIER P1 AND ABUTMENT A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BYPASS BRIDGE NO.2 (STA.104+998.328)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY

KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

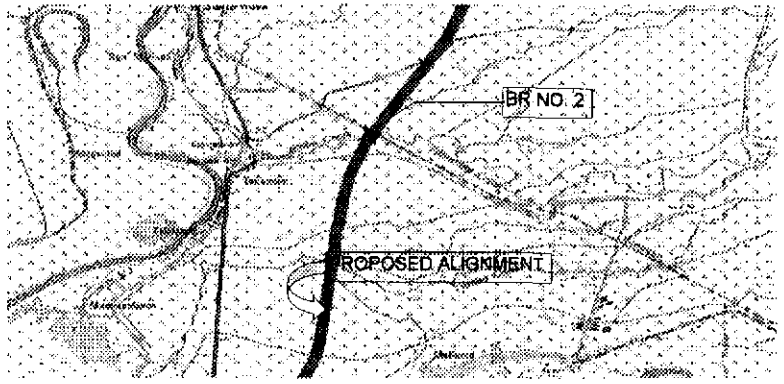
RAS - PMO	BUREAU OF WORKS		OFFICE OF THE SECRETARY	
Submitted By	Reviewed By	Recommended By	Recommended By (See cover sheet for Signature)	Approved By (See cover sheet for Signature/Approval)
DANILO C. TRIJANO, Project Director	ARMANDO M. QUROY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	EDMUNDO U. HIR, Undersecretary	SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY CABANATUAN BYPASS - CONTRACT PACKAGE I	1 : 200 FULL SIZE A1	BRIDGE NO. 2 GENERAL PLAN, ELEVATION AND SECTIONS (ULTIMATE STAGE)	B-00

PROPOSED BRIDGE SITE SURVEY

Survey Date	19-Jun-01	Bridge No./Station	Bridge No.2 / STA.0+762.370
Bypass Name	CABANATUAN	Prepared by	RML / ENS

1 Location — River Name :



2 Photograph

Upstream

3 River Condition

River Width (m) : 30.00

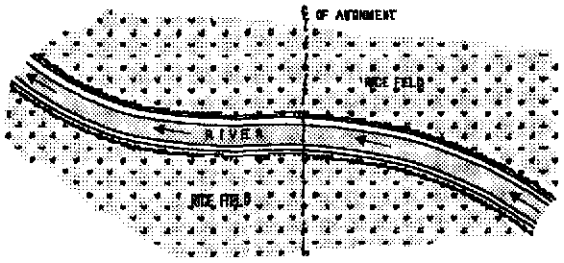
Stream Velocity (m/s) :
- Normal : 0.75
- During Flood : 1.70

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

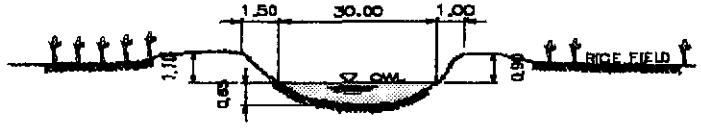
Site Access During Construction:
- ☐ Possible
- ☑ Difficult

Comments:

a. Plan



b. Section / Elevation



4	Land Use	☐ Commercial ☐ Industrial ☑ Residential ☑ Agricultural ☐ Others	
5	Geographical Features / Terrain	☐ Mountenous area ☐ Alluvial ☑ Plain ☐ Others	
6	Stream / River Type	☐ Straight ☐ Braided ☑ Meandering	
7	Nearby Structures	Upstream / Downstream	
8	Environmental Condition	☑ Trees/Vegetation ☐ Fish & Fish Habitat	
9	Water Level (During survey)	☐ 0 - 0.50m ☑ 0.50m - 1.0m ☐ 1.0m - 1.5m ☐ Others	
10	Meander Situation	Upstream: ☑ Existing ☐ None / Downstream: ☑ Existing ☐ None	
11	Riverbed Material	☐ Large Gravel ☐ Gravel ☐ Sand ☑ Soil ☐ Others	
12	Riverside/Bank Condition	Upstream: ☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R / Downstream: ☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R	
13	Tendency to River Course and Riverbed Change	☑ Stable ☑ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others	
14	Flood signs	☑ None ☐ Existing -	
15	Evidence of Drift & Debris	☑ None ☐ Existing — Driftwoods, Φ = — Length = / Others :	
16	Maximum Flood Water Level	☑ Interview ☐ Flood Data ☐ Flood Marks — Height above bank (m) 0.4 / Frequency (yrs) 10 / Cause Typhoon — Comments :	
17	Recommendation for Bridge	Verify maximum flood water level. Provide 1.50m clearance from MFWL.	
18	Recommendation for River Protection Works		
19	Comments / Others		

Table 3.4-17 Bridge No. 2 Site Condition

BRIDGE NO. 3 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. CANAL CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition
- The river courses will not meander.
- The upstream and downstream condition of riverbed & river banks are stable
- No evidence of drifts/debris during flooding.
- The river discharge at 50 year return period is 40.60 cum/sec
- The river velocity at 50 years return period is 2.235 m/sec.
- The top river width at design flood level is 28.20 m.

2. SOIL CONDITION

- Bridge site is underlain by thick gravel and sand deposits with alternating layer of silt and clay.
- Gravel and sand deposit is overlain uppermost plastic silt or clay with thickness ranging from 14.5 to 16.5 meters and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	35.86 m	35.86 m
CARRIAGEWAY WIDTH	(2 x 3.50m)	(2 x 3.50m)
SHOULDER WIDTH	1 x 2.50m	1 x 2.50m
SIDEWALK WIDTH	1 x 0.75m	1 x 0.75m
SUPERSTRUCTURE TYPE	One-span, PCDG Type VI (35.86 m)	One-span, PCDG Type VI (35.86 m)
SUBSTRUCTURE TYPE	Closed-type Abutment	Closed-type Abutment
FOUNDATION TYPE	450 x 450 RC Pile	450 x 450 RC Pile

(2) DETERMINATION OF FINAL SCHEME

- The top width of river during the design flood is 28.20 m. To minimize river encroachment considering abutment slope protection, the bridge length becomes 35.0m for a single-span bridge.

- A single Span bridge is proposed due to :

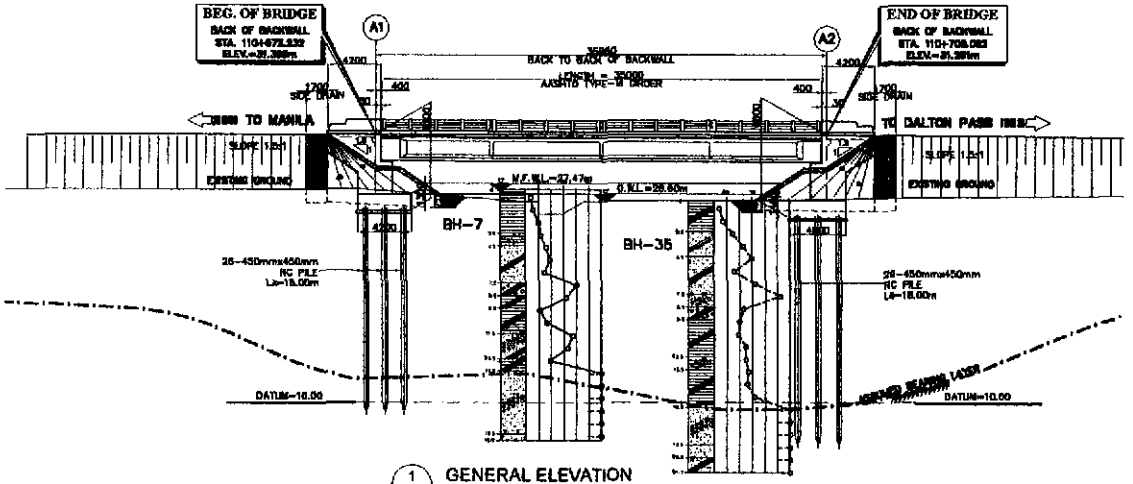
    - Two-span bridge is not recommended since one pier will have to be located at the center of the river and may cause problems on river hydraulics.

    - A three span bridge tends to be more expensive because of additional substructure cost.

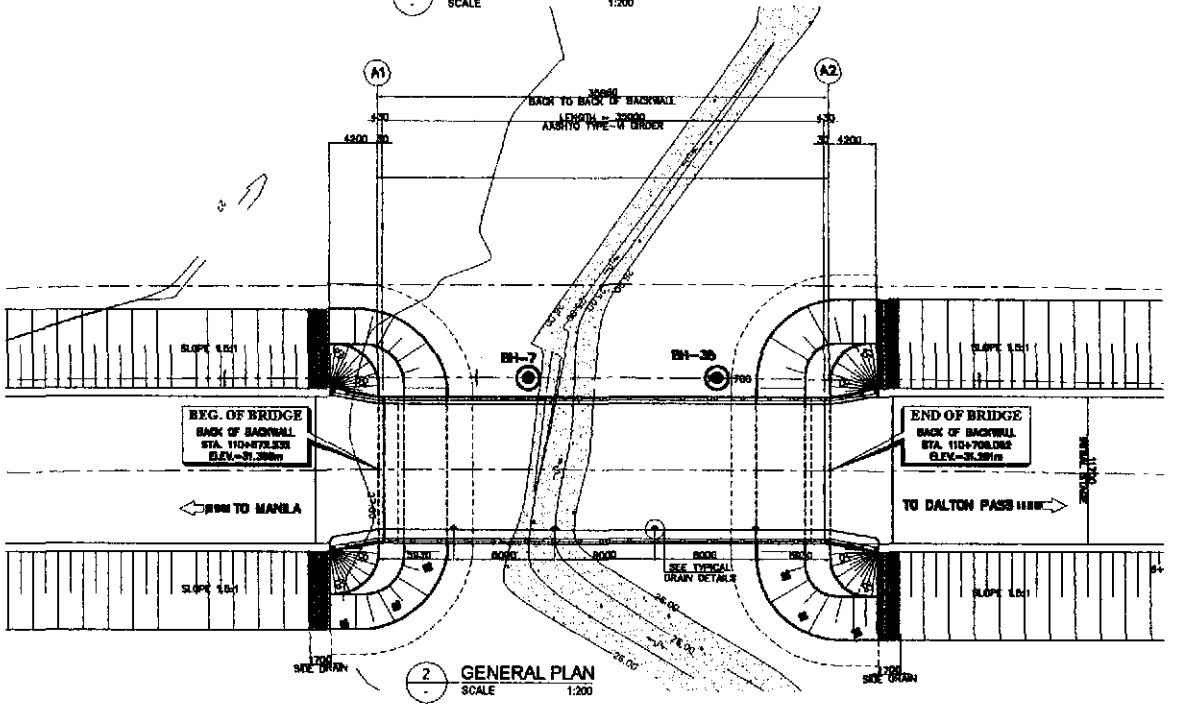
- Pile foundation is proposed due to presence of soft soil layer.

(3) PROTECTION AGAINST SCOURING

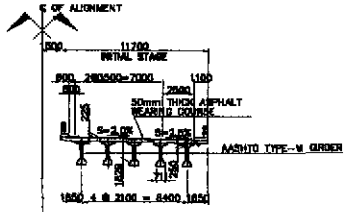
- Since river velocity during worst flooding is relatively slow (2.235 m/sec), the bridge utilizes Grouted Riprap Riverbank Protection with Loose Boulder Apron provided at toe.



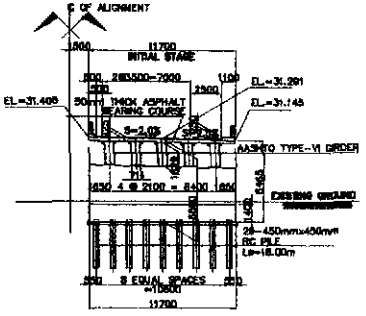
1 GENERAL ELEVATION
SCALE 1:200



2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	2.235 m/sec
DISCHARGE @ 50 YEARS, Qso	40.800 cu.m/sec
CATCHMENT AREA, CA	11.175 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM, SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BYPASS BRIDGE NO.3 (STA.110+672.236)
SCALE A5 SHOWN

JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

DESIGNED | CHECKED | SUBMITTED | DATE | SIGNATURE | TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

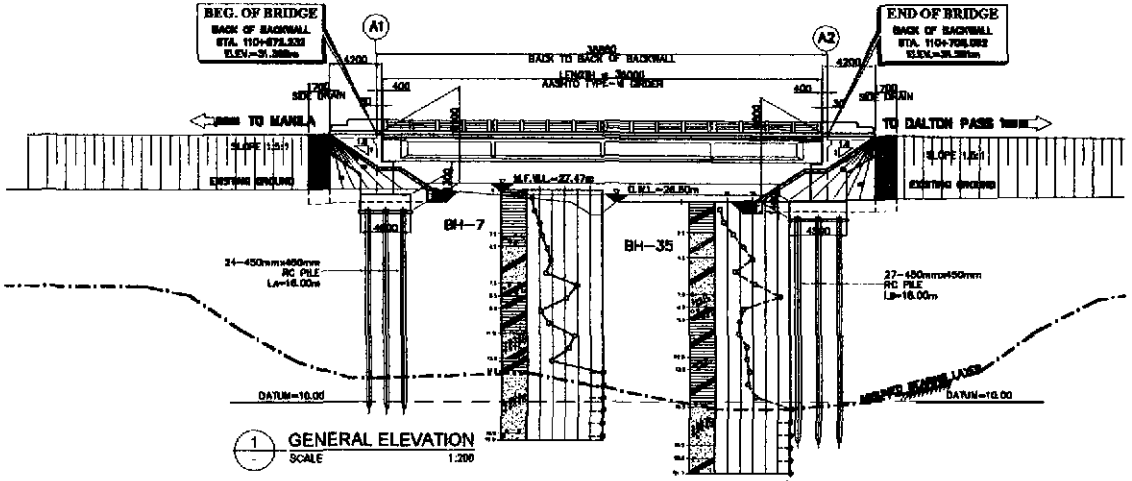
FUNC. – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By	Reviewed By	Recommended By	Recommended By (See cover sheet for signature)	Approved By (See cover sheet for signature/approval)
DANILO C. YBAÑEZ, Project Director	ARMANDO M. ORDAY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	EDMUNDO V. MIR, Undersecretary	RAMON A. BATUMBAKEL, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE II

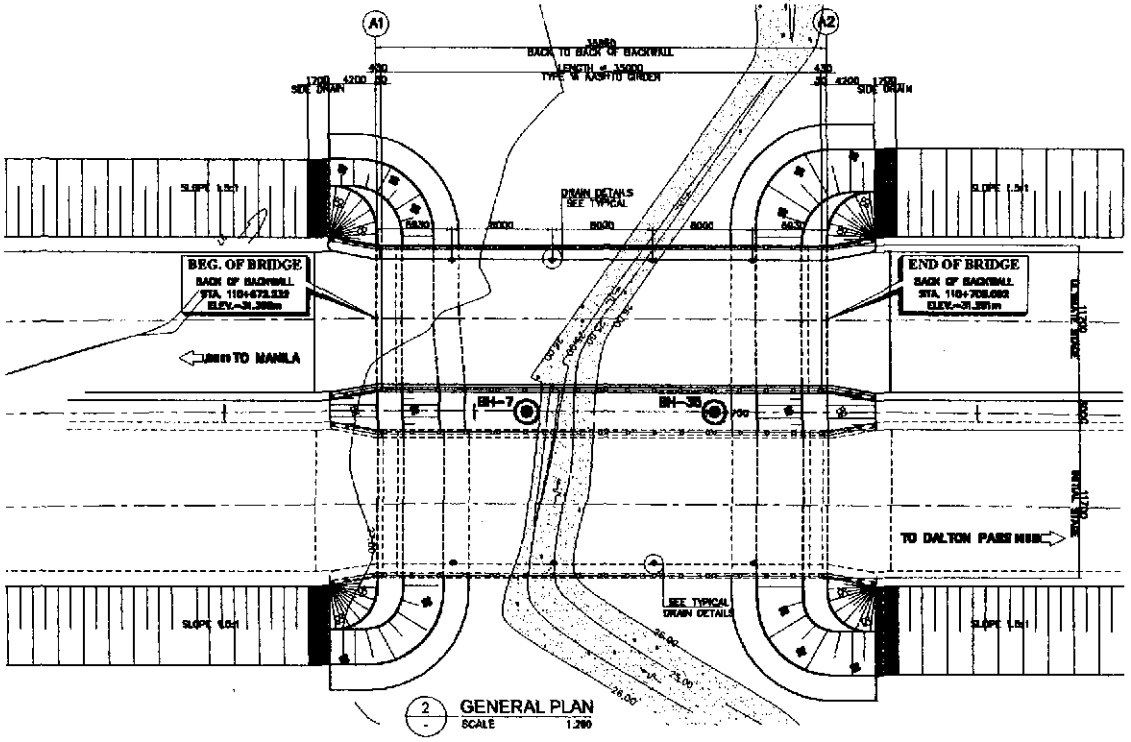
SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 3
GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)

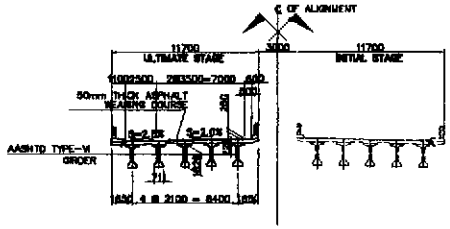
SHEET NO. : B-36



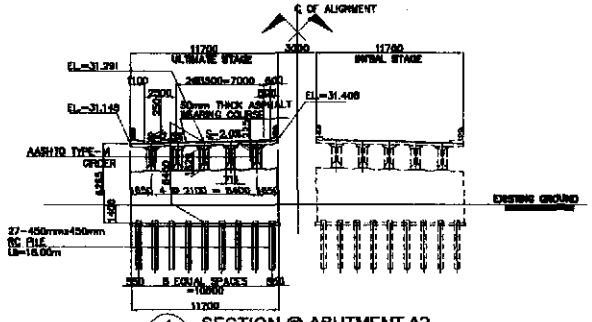
1 GENERAL ELEVATION
SCALE 1:200



2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	2.235 m/sec
DISCHARGE @ 50 YEARS, Qso	40.600 cu.m/sec
CATCHMENT AREA, CA	11.175 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BYPASS BRIDGE NO.3 (STA.110+672.232)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
NATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

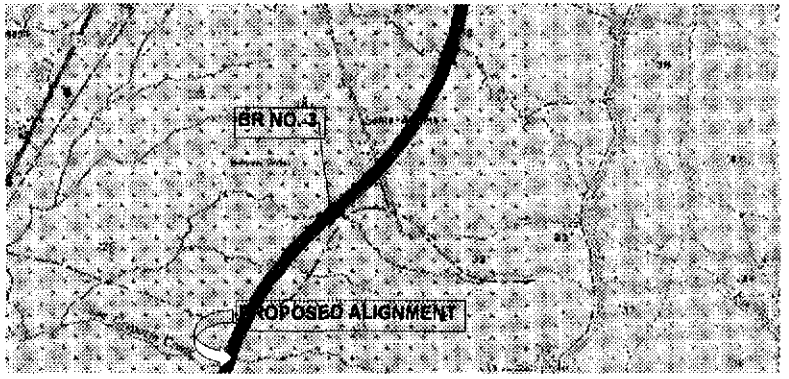
FUEL – FMS	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By	Reviewed By	Recommended By	Recommended By (See cover sheet for Signature)	Approved By (See cover sheet for Signature/Approval)
DIEGO C. TRIANO, Project Director	ADRIAN M. CORPUZ, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	EDMUNDO V. MIR, Undersecretary	SIMEON A. DATAMANSIN, Secretary

PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY CABANATUAN BYPASS - CONTRACT PACKAGE II	1: 200 FULL SIZE A1	BRIDGE NO.3 GENERAL PLAN, ELEVATION AND SECTIONS (ULTIMATE STAGE)	B-00

PROPOSED BRIDGE SITE SURVEY

Survey Date	19-Jun-01	Bridge No./Station	Bridge No.3 / STA.6+486.000
Bypass Name	CABANATUAN	Prepared by	RML / ENS

1 Location — River Name :



2 Photograph

Downstream

Upstream

3	Land Use	☐ Commercial ☐ Industrial ☑ Residential ☑ Agricultural ☐ Others
4	Geographical Features / Terrain	☐ Mountenous area ☐ Alluvial ☑ Plain ☐ Others
5	Stream / River Type	☐ Straight ☐ Braided ☑ Meandering
6	Nearby Structures	Upstream ; Downstream
7	Environmental Condition	☑ Trees/Vegetation ☐ Fish & Fish Habitat
8	Water Level (During survey)	☐ 0 - 0.50m ☑ 0.50m - 1.0m ☐ 1.0m - 1.5m ☐ Others

9 River Condition

River Width (m) : 25

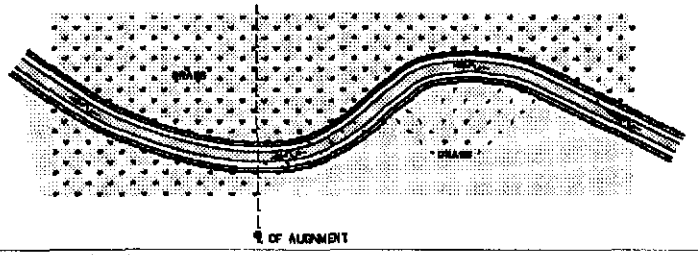
Stream Velocity (m/s) :
- Normal : 0.20
- During Flood : 1.20

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

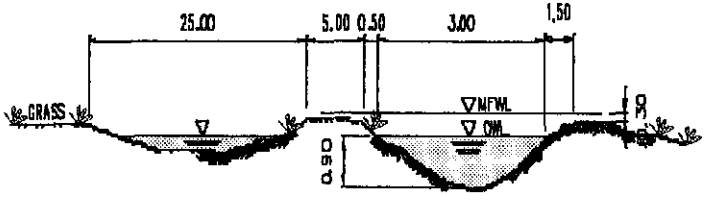
Site Access During Construction:
- ☑ Possible
- ☑ Difficult

Comments:

a. Plan



b. Section / Elevation



10	Meander Situation	Upstream	☑ Existing ☐ None
		Downstream	☐ Existing ☐ None
11	Riverbed Material	☐ Large Gravel ☑ Gravel ☐ Sand ☑ Soil ☐ Others	
12	Riverside/Bank Condition	Upstream	☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
		Downstream	☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
13	Tendency to River Course and Riverbed Change	☑ Stable ☐ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others	
14	Flood signs	☑ None ☐ Existing -	
15	Evidence of Drift & Debris	☑ None ☐ Existing	Driftwoods, Φ = ; Length = ; Others :
16	Maximum Flood Water Level ☑ Interview ☐ Flood Data ☐ Flood Marks	Height above bank (m)	0.3
		Frequency (yrs)	10
		Cause	Typhoon
		Comments :	
17	Recommendation for Bridge	Verify maximum flood water level. Provide 1.50m clearance from MFWL.	
18	Recommendation for River Protection Works	Provide river bank slope protection works.	
19	Comments / Others	River re-channeling within the bridge site is required.	

Table 3.4-18 Bridge No. 3 Site Condition

BRIDGE NO. 4 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. RIVER/CANAL CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition.
- The river course will unlikely meander.
- The upstream and downstream conditions of riverbed & river banks are stable.
- No evidence of drifts/debris during flooding.
- The river discharge at 50 year return period is 99.70 cum/sec
- The river velocity at 50 years return period is 2.726 m/sec.
- The top river width at design flood level is 16.00 m.
- The bridge is skewed 15° LF.

2. SOIL CONDITION

- Bridge site is underlain by thick gravel & sand deposits with alternating layer of silt & clay.
- Gravel and sand deposit is overlain uppermost plastic silt or clay with thickness ranging from 2.5 to 4.5 meters and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	24.66 m	24.66 m
CARRIAGEWAY WIDTH	2 x 3.50m	(2 x 3.50m) + (4 x 3.25m)
SHOULDER WIDTH	1 x 2.50m	(1 x 2.50m) + (2 x 1.50m)
SIDEWALK WIDTH	-	2 x 1.50m
SUPERSTRUCTURE TYPE	One-span, PCDG Type IV (24.66 m)	One-span, PCDG Type IV (24.66 m)
SUBSTRUCTURE TYPE	Closed-type Abutment	Closed-type Abutment
FOUNDATION TYPE	450 x 450 RC Pile	450 x 450 RC Pile

(2) DETERMINATION OF FINAL SCHEME

- The top width of river during the design flood is 16.0 m. To minimize river encroachment considering abutment slope protection, the bridge length becomes 24.0m for a single-span bridge.

- A single Span bridge is proposed due to :

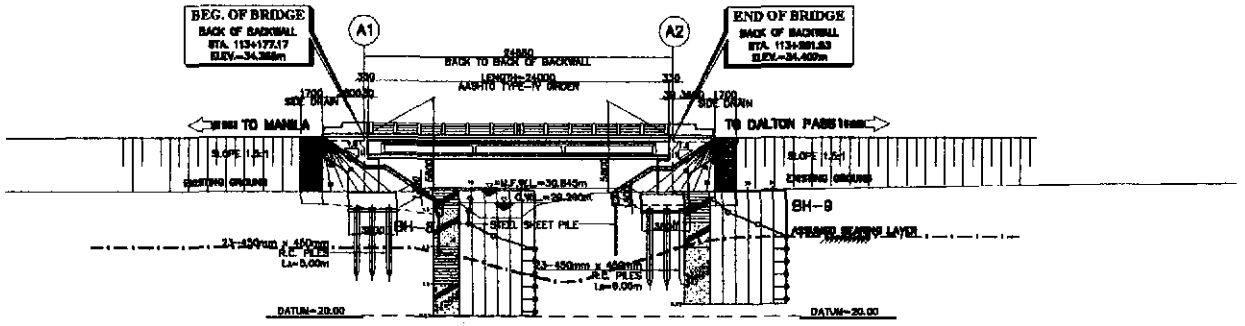
    - Two-span bridge is not recommended since one pier will have to be located at the center of the river and may cause problems on river hydraulics.

    - A three span bridge tends to be more expensive because of additional substructure cost.

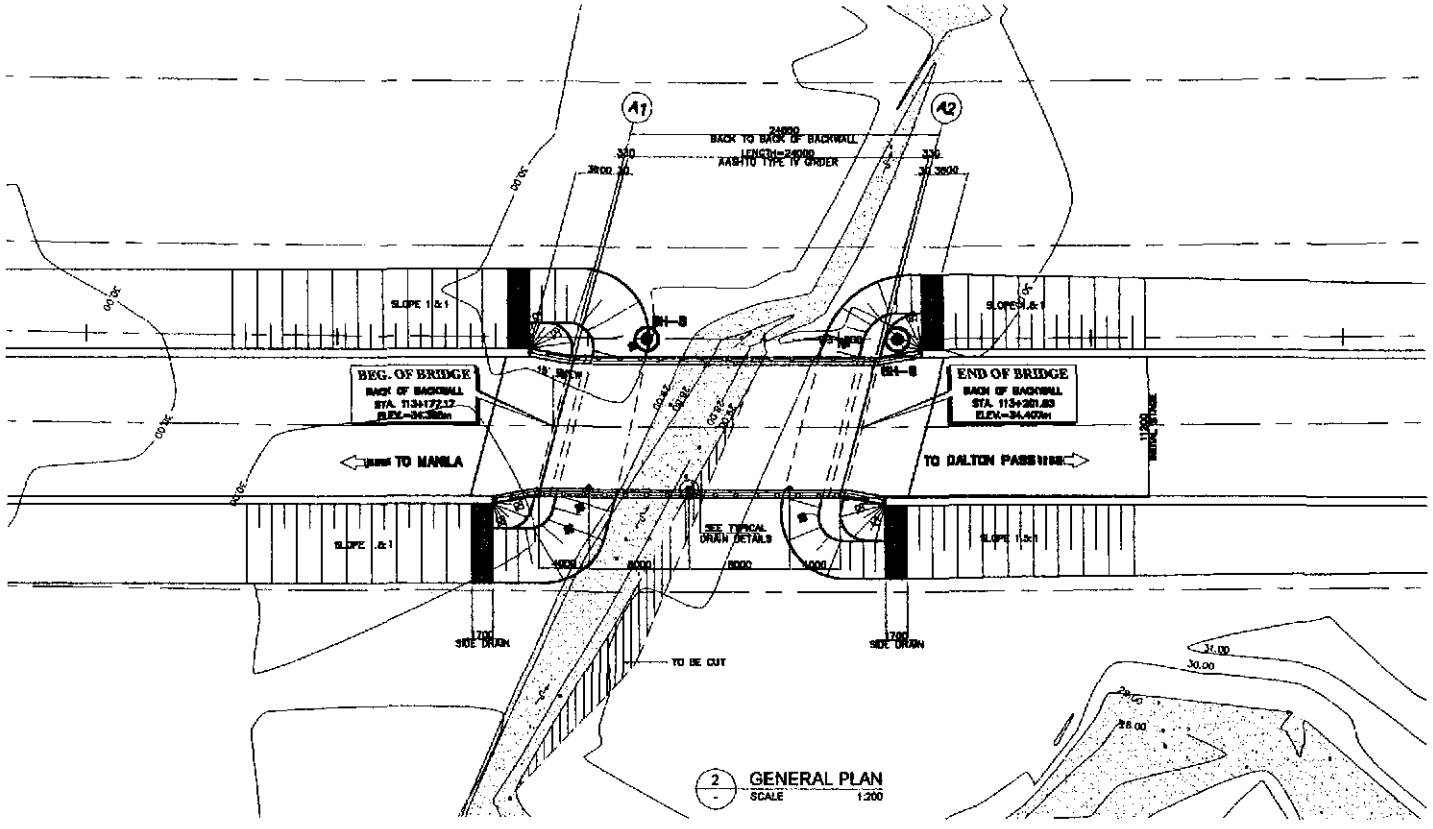
- Pile foundation is proposed due to presence of soft soil layer.

(3) PROTECTION AGAINST SCOURING

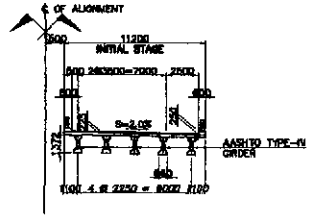
- Since river velocity during worst flooding is relatively slow (2.726 m/sec), the bridge utilizes Grouted Riprap Riverbank Protection.
- River Bank Protection will be supported by Steel Sheet Piles penetrating thru 3 to 4 meters of sandy clay layer.



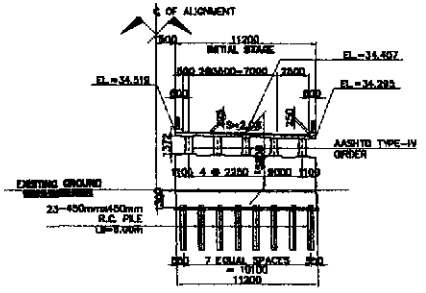
1 GENERAL ELEVATION
SCALE 1:200



2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vss	2.726 m/sec.
DISCHARGE @ 50 YEARS, Qss	99.700 cu. m/sec.
CATCHMENT AREA, CA	22.225 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BYPASS BRIDGE NO.4 (STA.113+177.17)
SCALE AS SHOWN

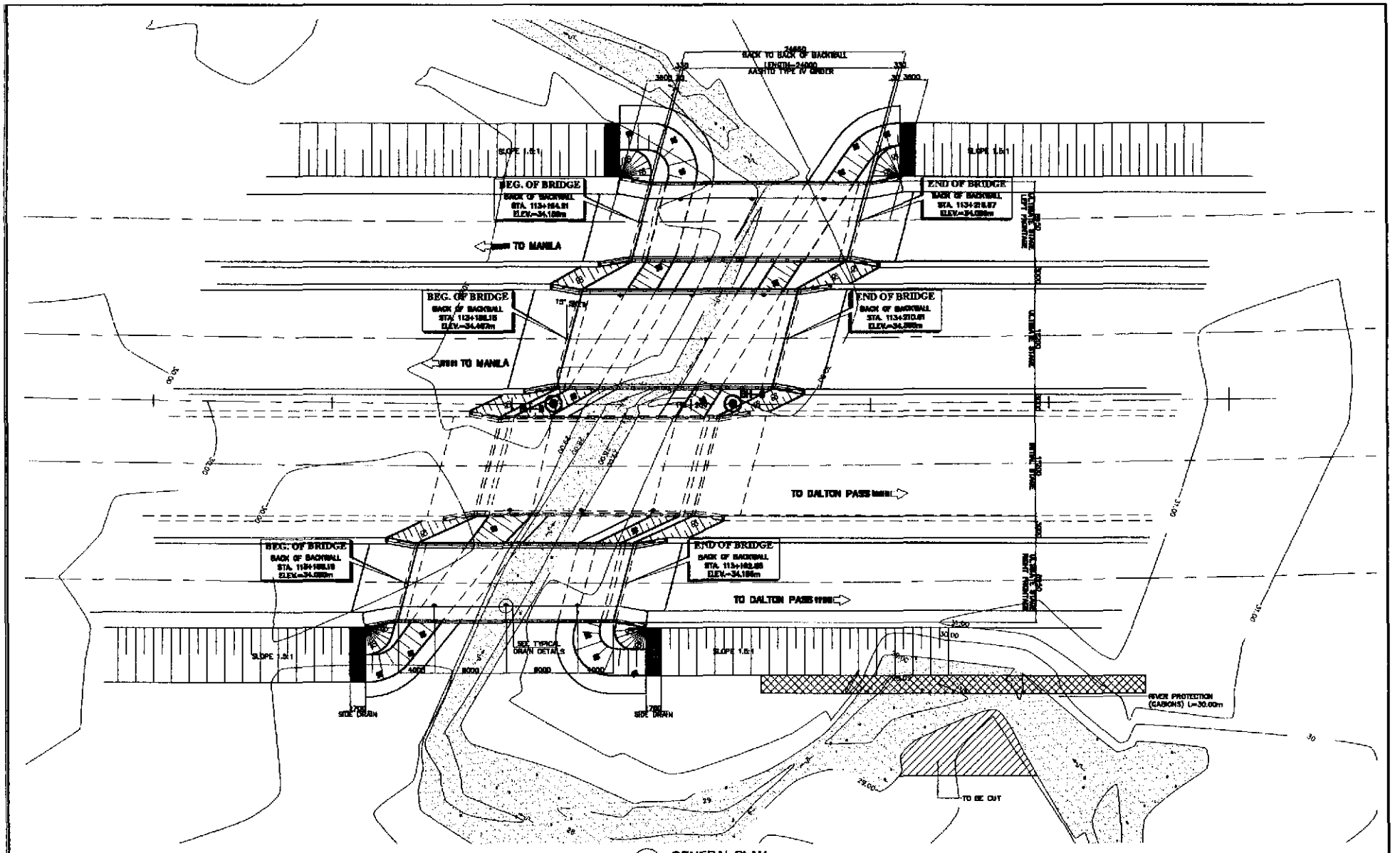
JICA JAPAN INTERNATIONAL COOPERATION AGENCY
KEI KATAHIRA & ENGINEERS INTERNATIONAL
YEO YACHIYO ENGINEERING CO., LTD.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

RAS – 7000	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By	Reviewed By	Recommended By	Recommended By (See cover sheet for Signature)	Approved By (See cover sheet for Signature/Approval)
DANILO O. TRIANO, Project Director	ADRIANO M. DOROY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	EDUARDO V. MA, Undersecretary	SIMEON A. SARMIENTO, Secretary

PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY CABANATUAN BYPASS - CONTRACT PACKAGE II	1 : 200 FULL SIZE A1	BRIDGE NO. 4 GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)	B-51



1 GENERAL PLAN
SCALE 1:200

A CABANATUAN BYPASS BRIDGE NO.4 (STA.113+186.15)
SCALE AS SHOWN

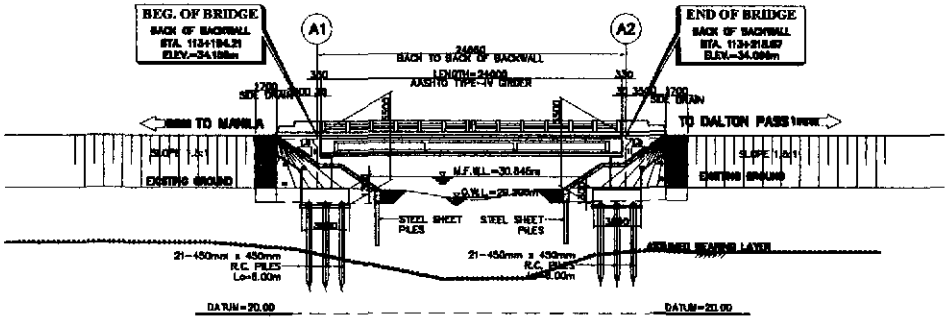
JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

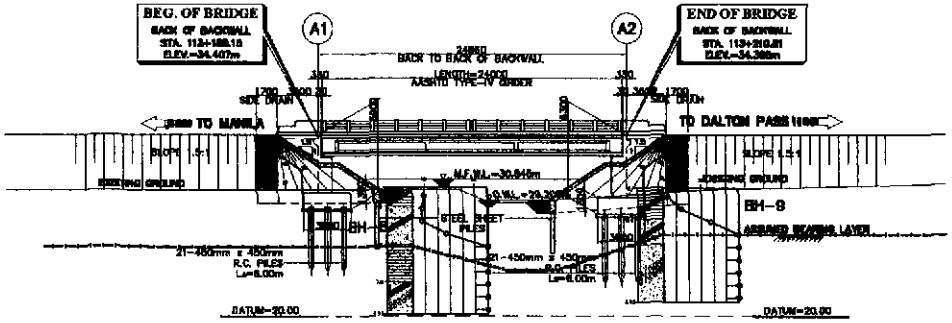
	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

PMO – PMD	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By: DANILO O. VENANCIO, Project Director	Reviewed By: ADVENTO M. DARDY, Chief, Bridges Division	Recommended By: GILBERTO B. REYES, Director IV (OIC)	Recommended By: (See cover sheet for Signature) EDMUNDO V. MIR, Undersecretary	Approved By: (See cover sheet for Signature/Approval) RAMON A. DATUMANONG, Secretary

PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY	1 : 200	BRIDGE NO.4 GENERAL PLAN (ULTIMATE STAGE)	B-00
CABANATUAN BYPASS - CONTRACT PACKAGE II	FULL SIZE A1		



1 GENERAL ELEVATION @ LEFT FRONTAGE
SCALE 1:200



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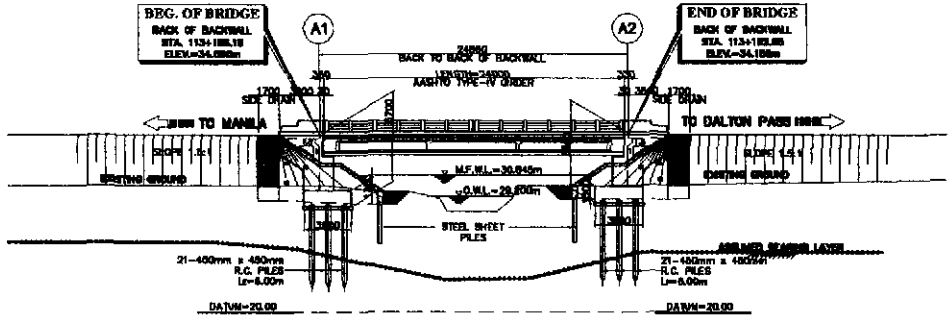
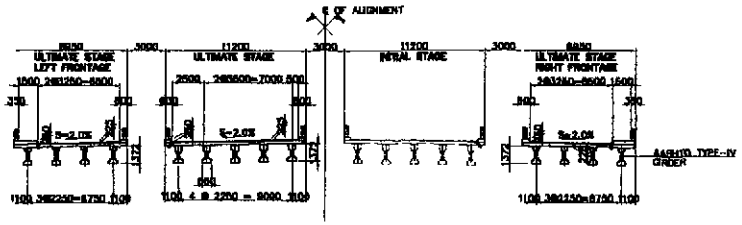
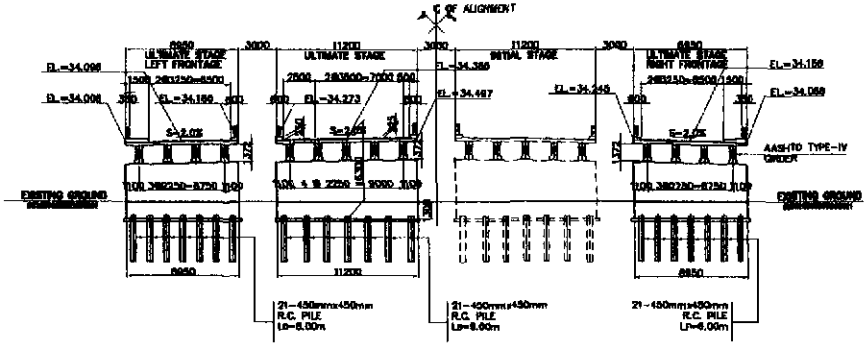
SCALE 1:200



3 GENERAL ELEVATION @ RIGHT FRONTAGE
SCALE 1:200



4 SECTION @ MIDSPAN
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, V50	2.728 m/sec.
DISCHARGE @ 50 YEARS, Q50	99.700 cu./sec.
CATCHMENT AREA, CA	22.225 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 AND A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.
THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BYPASS BRIDGE NO.4 (STA. 113+186.15)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

REG. – PMO	BUREAU OF WORKS		OFFICE OF THE SECRETARY	
Validated By	Reviewed By	Recommended By	Recommended By (See cover sheet for Signature)	Approved By (See cover sheet for Signature/Approval)
DANILO C. TRIANO Project Director	ADRIANO M. DORIT OIC, Bridge Division	GILBERTO S. REYES Director IV (OIC)	EDUARDO V. MA Undersecretary	SIMEON A. DATUMANONG Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE II

SCALE : 1 : 200 FULL SIZE A1

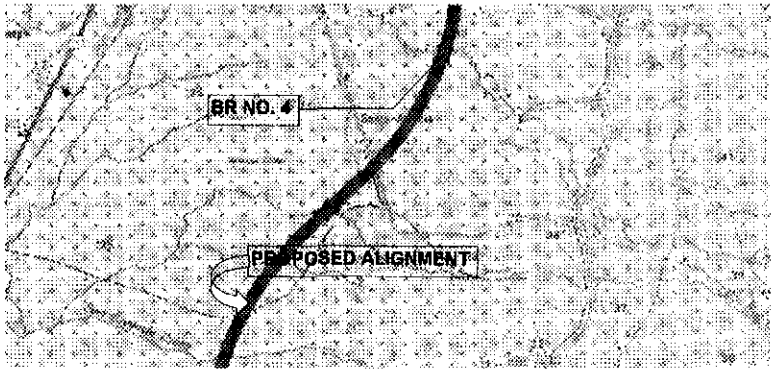
SHEET CONTENTS :
BRIDGE NO. 4
GENERAL ELEVATION AND SECTIONS (ULTIMATE STAGE)

SHEET NO. : B-00

PROPOSED BRIDGE SITE SURVEY

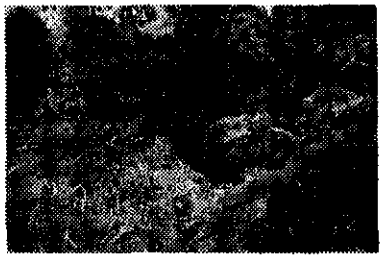
Survey Date	14-Jun-01	Bridge No./Station	Bridge No.4 / STA.8+947.200
Bypass Name	CABANATUAN	Prepared by	RML / ENS

1 Location — River Name :

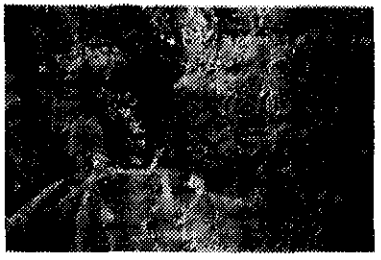


2 Photograph

Downstream



Upsteam



3	Land Use	☑ Commercial ☐ Industrial ☐ Residential ☑ Agricultural ☐ Others
4	Geographical Features / Terrain	☐ Mountenous area ☐ Alluvial ☑ Plain ☐ Others
5	Stream / River Type	☐ Straight ☐ Braided ☑ Meandering
6	Nearby Structures	Upstream / Downstream
7	Environmental Condition	☑ Trees/vegetation ☐ Fish & Fish Habitat
8	Water Level (During survey)	☐ 0 - 0.50m ☑ 0.50m - 1.0m ☐ 1.0m - 1.5m ☐ Others

8 River Condition

River Width (m) : 11.00

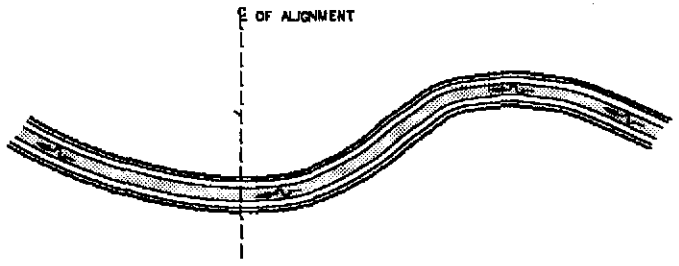
Stream Velocity (m/s) :
- Normal : 0.20
- During Flood : 1.20

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

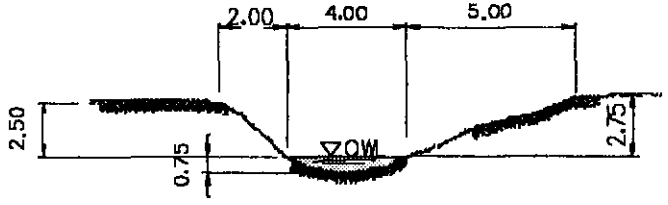
Site Access During Construction:
- ☑ Possible
- ☐ Difficult

Comments:

a. Plan



b. Section / Elevation



10	Meander Situation	Upstream: ☑ Existing ☐ None / Downstream: ☑ Existing ☐ None
11	Riverbed Material	☐ Large Gravel ☐ Gravel ☐ Sand ☑ Soil ☐ Others
12	Riverside/Bank Condition	Upstream: ☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R / Downstream: ☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
13	Tendency to River Course and Riverbed Change	☑ Stable ☐ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others
14	Flood signs	☑ None ☐ Existing -
15	Evidence of Drift & Debris	☑ None ☐ Existing — Driftwoods, Φ = — Length = — Others :
16	Maximum Flood Water Level	☑ Interview ☐ Flood Data ☐ Flood Marks — Height above bank (m): 0.0 — Frequency (yrs): 10 — Cause: Typhoon — Comments :
17	Recommendation for Bridge	Verify maximum flood water level. Provide 1.50m clearance from MFWL.
18	Recommendation for River Protection Works	Provide river bank slope protection works.
19	Comments / Others	

Table 3.4-19 Bridge No. 4 Site Condition

BRIDGE NO. 5 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. RIVER/CANAL CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition.
- The river course will unlikely meander but will tend to scour at the riverbed.
- The upstream and downstream conditions of riverbed & river banks are stable.
- No evidence of drifts/debris during flooding.
- The river discharge at 50 year return period is 63.40 cum/sec
- The river velocity at 50 years return period is 1.937 m/sec.
- The top river width at design flood level is 16.82 m.
- The bridge is skewed 15° LF

2. SOIL CONDITION

- Bridge site is underlain by thick gravel and sand deposits with alternating layer of silt and clay.
- Gravel and sand deposit is overlain uppermost plastic silt or clay with 3.5 meters thickness and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	24.66 m	24.66 m
CARRIAGEWAY WIDTH	2 x 3.50m	(2 x 3.50m) + (4 x 3.25m)
SHOULDER WIDTH	1 x 2.50m	(1 x 2.50m) + (2 x 1.50m)
SIDEWALK WIDTH	-	2 x 1.50m
SUPERSTRUCTURE TYPE	One-span, PCDG Type IV (2 4.66 m)	One-span, PCDG Type IV (24.66 m)
SUBSTRUCTURE TYPE	Closed-type Abutment	Closed-type Abutment
FOUNDATION TYPE	450 x 450 RC Pile	450 x 450 RC Pile

(2) DETERMINATION OF FINAL SCHEME

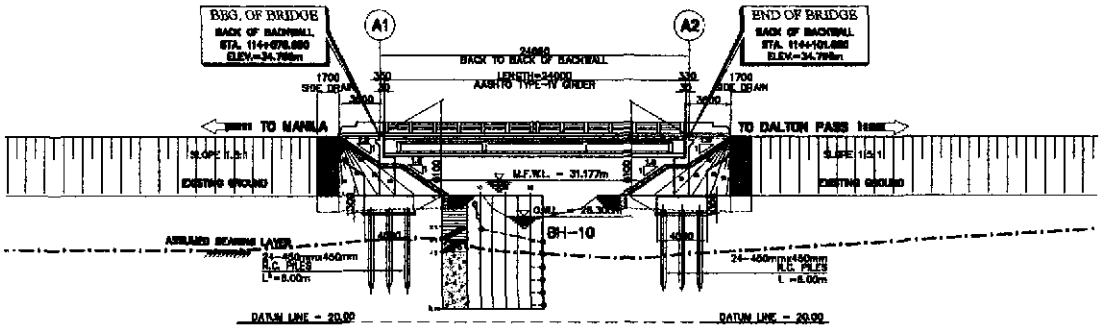
- The top width of river during the design flood is 16.82 m. To minimize river encroachment considering abutment slope protection, the bridge length becomes 24.0m for a single-span bridge.

- A single Span bridge is proposed due to :
  - Two-span bridge is not recommended since one pier will have to be located at the center of the river and may cause problems on river hydraulics.
  - A three span bridge tends to be more expensive because of additional substructure cost.

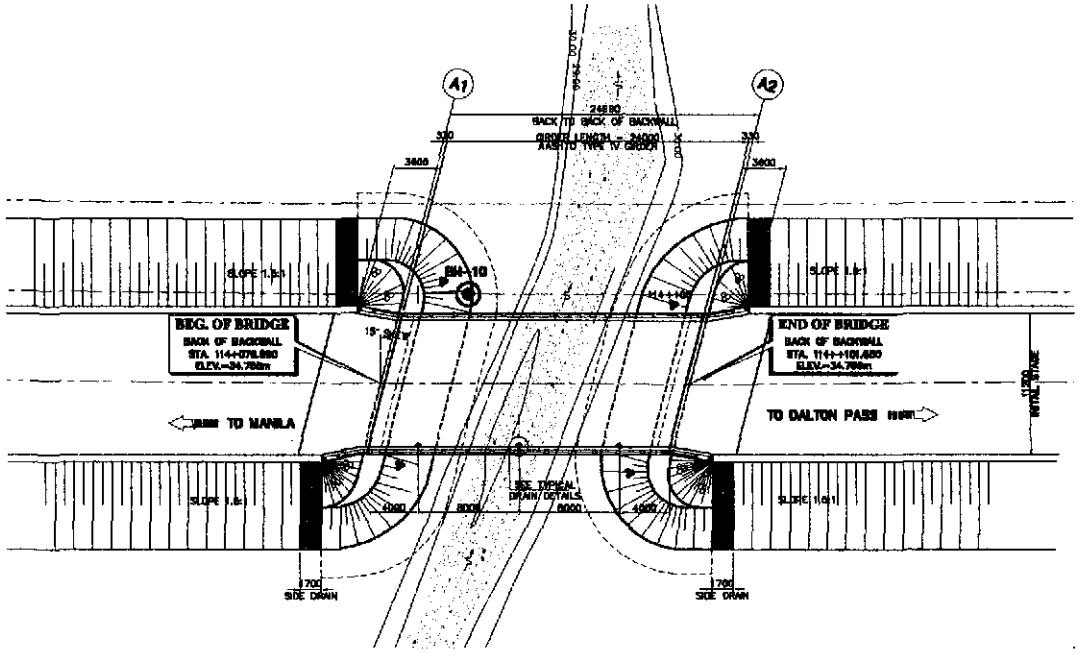
- Pile foundation is proposed due to presence of soft soil layer.

(3) PROTECTION AGAINST SCOURING

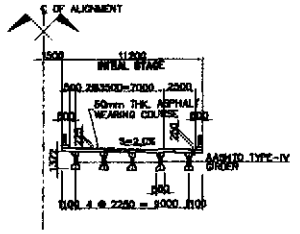
- Grouted Riprap River Bank Protection will be used in conjunction with DPWH Criteria for river with velocity < 3.0 m/sec.
- Scour protection of Loose Boulder Apron at toe of Riverbank Protection shall be provided.



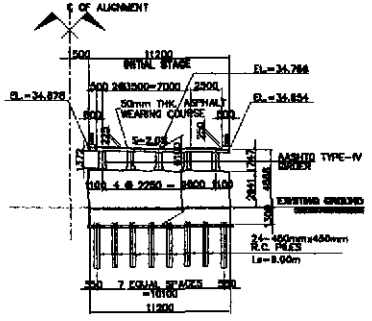
1 GENERAL ELEVATION
SCALE 1:200



2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	1.937 m/sec
DISCHARGE @ 50 YEARS, Qso	63.400 cu.m/sec
CATCHMENT AREA, CA	17.650 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A2 SHALL BE CONDUCTED FOR *CONFIRMATION OF ASSUMED BEARING CAPACITY* AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BYPASS BRIDGE NO.5 (STA.114+076.990)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

DESIGNED / CHECKED / SUBMITTED — DATE — SIGNATURE — TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
PMO - PMO | BUREAU OF DESIGN | OFFICE OF THE SECRETARY

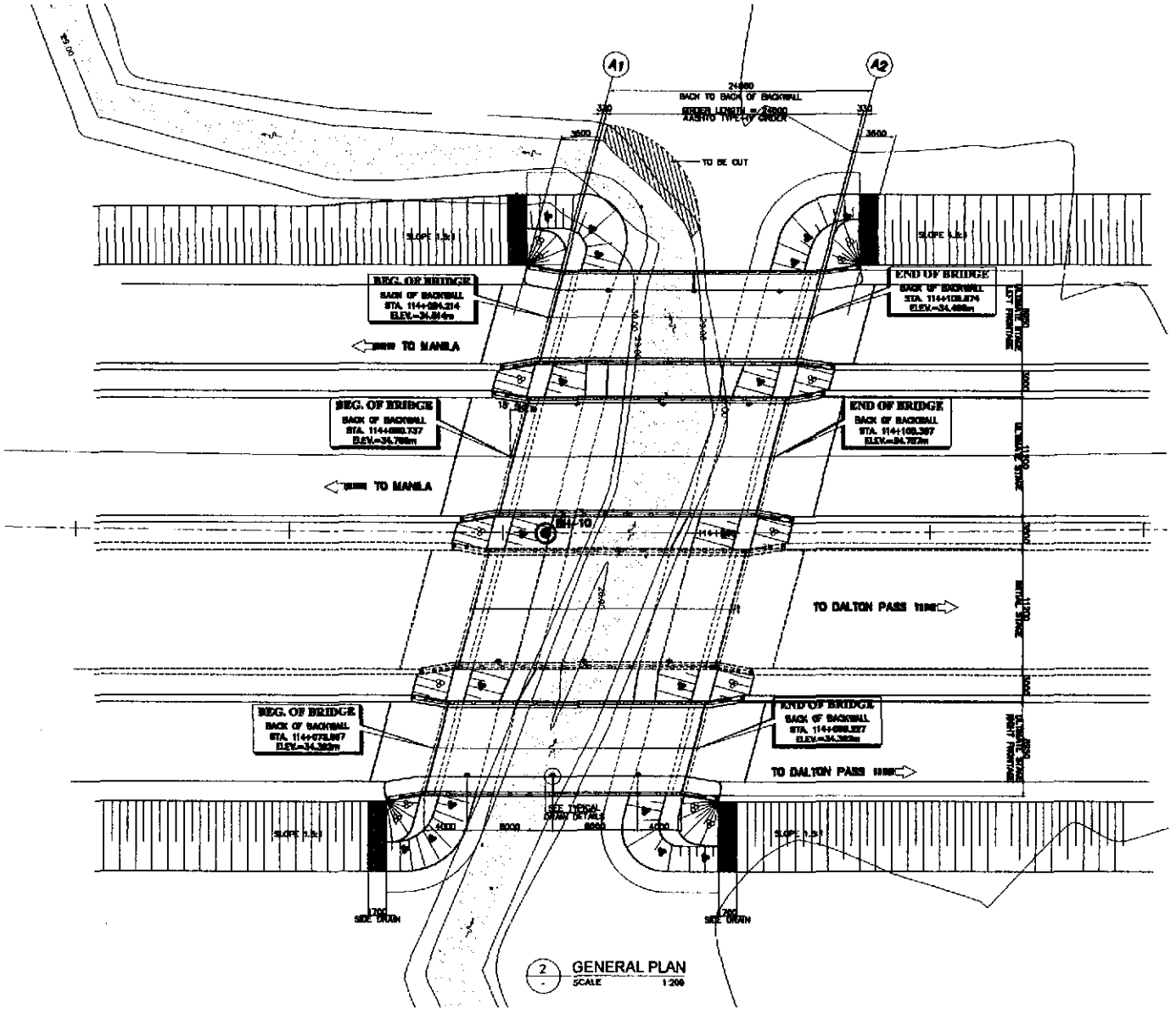
Submitted By	Reviewed By	Recommended By	Recommended By (See cover sheet for Signature)	Approved By (See cover sheet for Signature/Approval)
DIEGO C. TRIANO, Project Director	ADONIS M. CRUZ, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	EDMUNDO V. MR, Undersecretary	RHEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE II

SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 5
GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)

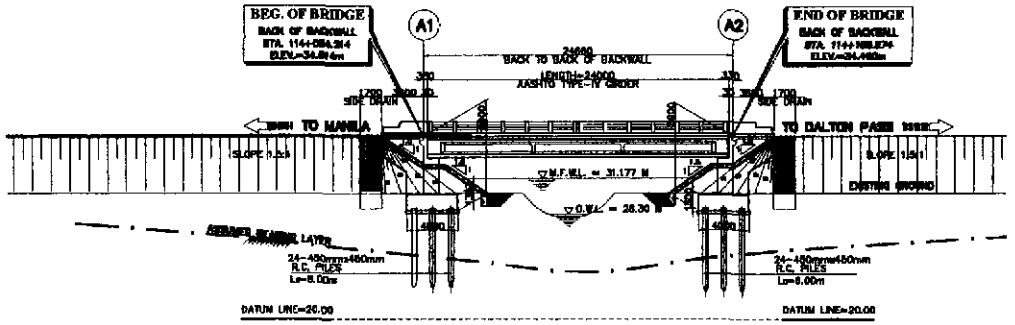
SHEET NO. : B-64



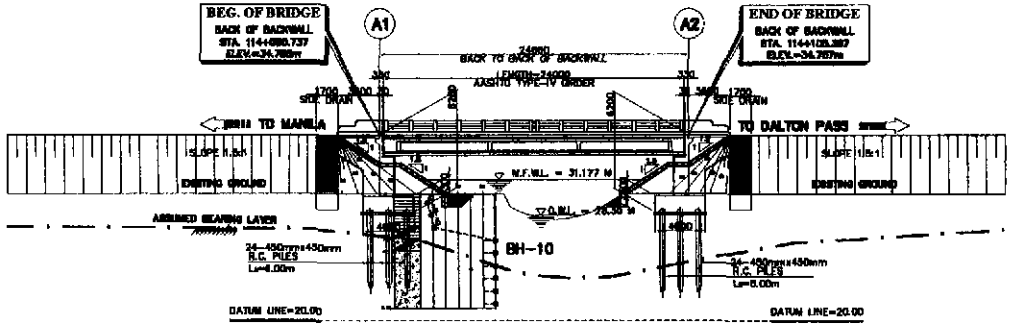
2 GENERAL PLAN
SCALE 1:200

A CABANATUAN BYPASS BRIDGE NO.5 (STA.114+080.737)
SCALE AS SHOWN

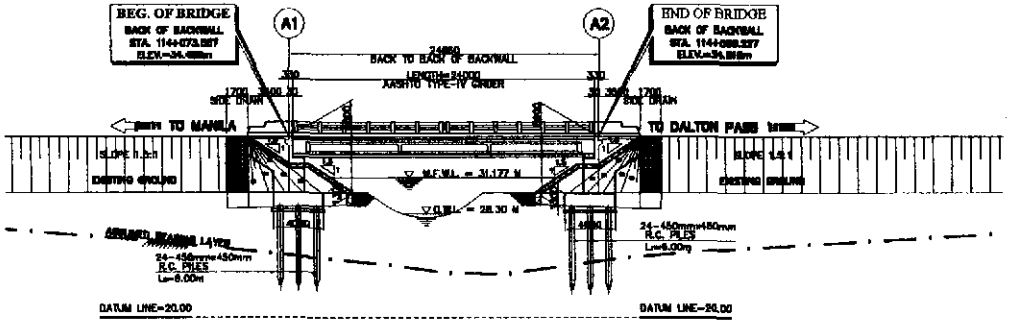
JICA JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL / YACHIYO ENGINEERING CO., LTD.		DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
	DESIGNED			PUNL – HED	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY	1 : 200	BRIDGE NO. 5 GENERAL PLAN (ULTIMATE STAGE)	B-00
	CHECKED			Submitted By	Reviewed By	Recommended By	Recommended By (See cover sheet for Signatory)	Approved By (See cover sheet for Signatory/Approval)			
	SUBMITTED		TEAM LEADER	DANILO C. TRIJANO Project Director	ADRIANO M. DORIO Chief, Bridges Division	GILBERTO S. REYES Director IV (OIC)	FERNANDO V. MR Undersecretary	SIMEON A. MATUNAHONG Secretary	CABANATUAN BYPASS - CONTRACT PACKAGE II	FULL SIZE A1	



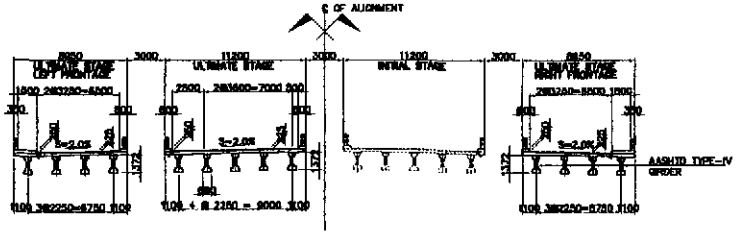
1 GENERAL ELEVATION @ LEFT FRONTAGE
SCALE 1:200



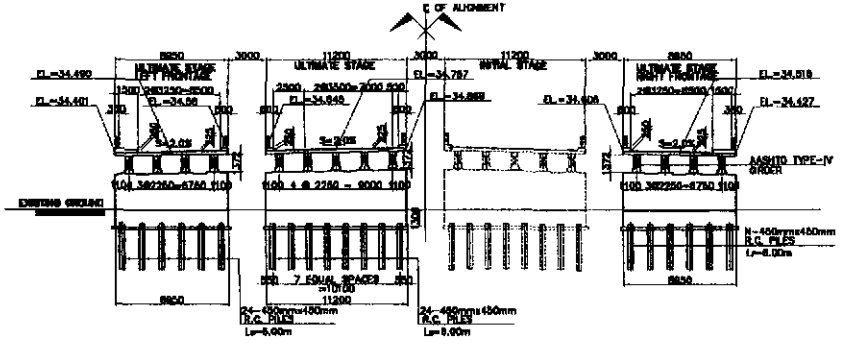
2 GENERAL ELEVATION (ULTIMATE)
SCALE 1:200



3 GENERAL ELEVATION @ RIGHT FRONTAGE
SCALE 1:200



4 SECTION @ MID-SPAN
SCALE 1:200



5 SECTION@ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	1.937 m/sec
DISCHARGE @ 50 YEARS, Qso	63.400 cu.m/sec
CATCHMENT AREA, CA	17.650 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BYPASS BRIDGE NO.5 (STA. 114+080.737)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

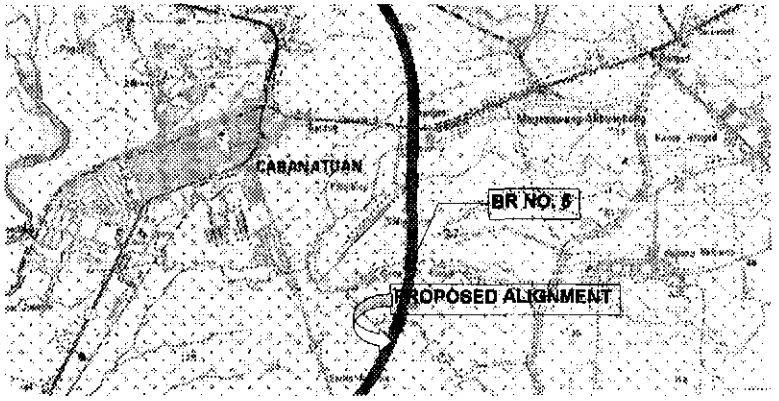
PURE – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Recommended By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Authority)
DANILO C. TRIJANO, Project Director	ADRIANO M. DOROY, Chief, Bridges Division	GILBERTO S. REYES, Director of BOD	EDMUNDO V. MIR, Undersecretary	EMILIO A. DATUMANONG, Secretary

PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY CABANATUAN BYPASS - CONTRACT PACKAGE II	1 : 200 FULL SIZE A1	BRIDGE NO. 5 GENERAL ELEVATION AND SECTIONS (ULTIMATE STAGE)	B-00

PROPOSED BRIDGE SITE SURVEY

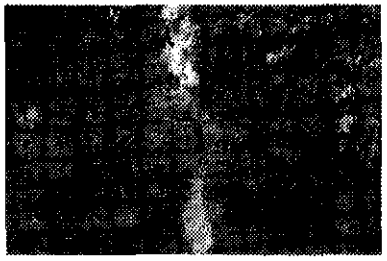
Survey Date	19-Jun-01	Bridge No./Station	Bridge No. 5 / STA.9+841.500
Bypass Name	CABANATUAN	Prepared by	RML / ENS

Location River Name :



Photograph

Upstream



Downstream

1	Land Use	☐ Commercial ☐ Industrial ☐ Residential ☑ Agricultural ☐ Others
2	Geographical Features / Terrain	☐ Mountenous area ☐ Alluvial ☑ Plain ☐ Others
3	Stream / River Type	☐ Straight ☐ Braided ☑ Meandering
4	Nearby Structures	Upstream / Downstream
5	Environmental Condition	☑ Trees/Vegetation ☐ Fish & Fish Habitat
6	Water Level (During survey)	☐ 0 - 0.50m ☑ 0.50m - 1.0m ☐ 1.0m - 1.5m ☐ Others

River Condition

River Width (m) : 9.50

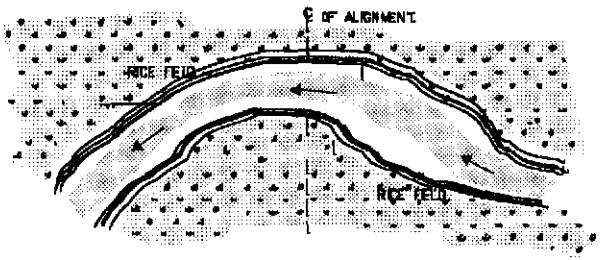
Stream Velocity (m/s) :
- Normal : 0.75
- During Flood : 1.45

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

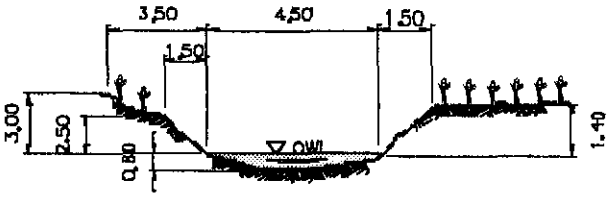
Site Access During Construction:
- ☑ Possible
- ☐ Difficult

Comments:

a. Plan



b. Section / Elevation



10	Meander Situation	Upstream	☑ Existing ☐ None
		Downstream	☑ Existing ☐ None
11	Riverbed Material	☐ Large Gravel ☐ Gravel ☐ Sand ☑ Soil ☐ Others	
12	Riverside/Bank Condition	Upstream	☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
		Downstream	☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
13	Tendency to River Course and Riverbed Change	☑ Stable ☑ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others	
14	Flood signs	☑ None ☐ Existing -	
15	Evidence of Drift & Debris	☑ None ☐ Existing	Driftwoods, Φ = / Length = / Others : Weeds
16	Maximum Flood Water Level ☐ Interview ☐ Flood Data ☐ Flood Marks	Height above bank (m)	0.0
		Frequency (yrs)	10
		Cause	Typhoon
		Comments :	
17	Recommendation for Bridge	Verify maximum flood water level. Provide 1.0m clearance from MFWL and/or top of bank.	
18	Recommendation for River Protection Works	Provide river bank slope protection works.	
19	Comments / Others		

Table 3.4-20 Bridge No. 5 Site Condition

BRIDGE NO. 6 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. RIVER/CANAL CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition.
- The river course will unlikely meander and will cut thru the road alignment at an angle of 30°.
- The upstream and downstream conditions of riverbed & river banks are stable.
- No evidence of drifts/debris during flooding.
- The river discharge at 50 year return period is 69.00 cum/sec
- The river velocity at 50 years return period is 2.90 m/sec.
- The top river width at design flood level is 23.20 m.
- The bridge is skewed 10° LF

2. SOIL CONDITION

- Bridge site is underlain by thick gravel and sand deposits with alternating layer of silt and clay.
- Gravel and sand deposit is overlain uppermost plastic silt or clay with thickness ranging from 4.5 to 6.5 meters and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	31.86 m	31.86 m
CARRIAGEWAY WIDTH	2 x 3.50m	(2 x 3.50m) + (4 x 3.25m)
SHOULDER WIDTH	1 x 2.50m	(1 x 2.50m) + (2 x 1.50m)
SIDEWALK WIDTH	-	2 x 1.50m
SUPERSTRUCTURE TYPE	One-span, PCDG Type IV-B (24.66 m)	One-span, PCDG Type IV-B (24.66 m)
SUBSTRUCTURE TYPE	Closed-type Abutment	Closed-type Abutment
FOUNDATION TYPE	450 x 450 RC Pile	450 x 450 RC Pile

(2) DETERMINATION OF FINAL SCHEME

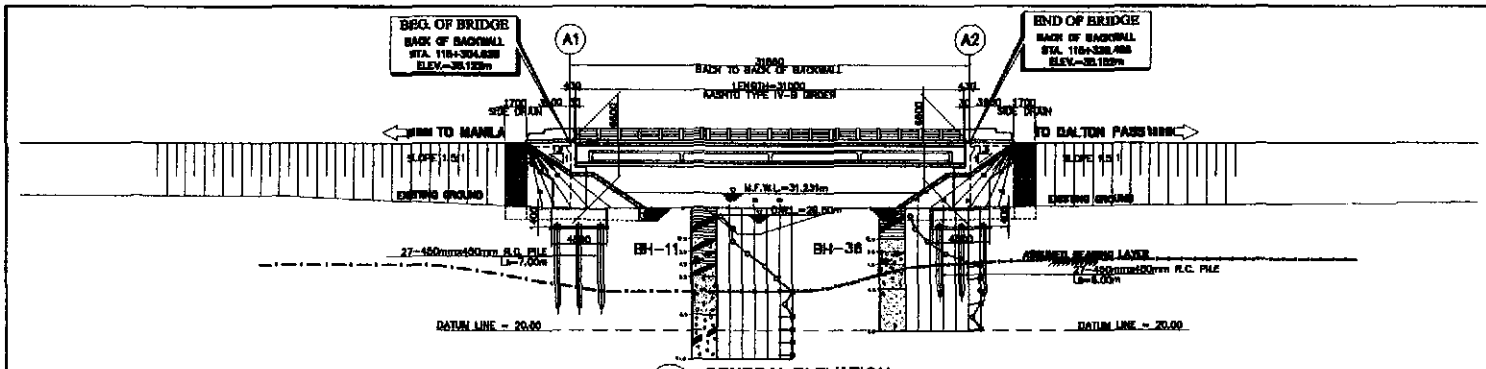
- The top width of river during the design flood is 23.2 m. To minimize river encroachment considering abutment slope protection, the bridge length becomes 31.0m for a single-span bridge.

- A single Span bridge is proposed due to :
  - Two-span bridge is not recommended since one pier will have to be located at the center of the river and may cause problems on river hydraulics.
  - A three span bridge tends to be more expensive because of additional substructure cost.

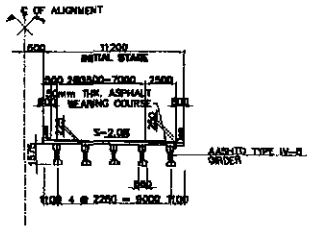
- Pile foundation is proposed due to presence of soft soil layer.

(3) PROTECTION AGAINST SCOURING

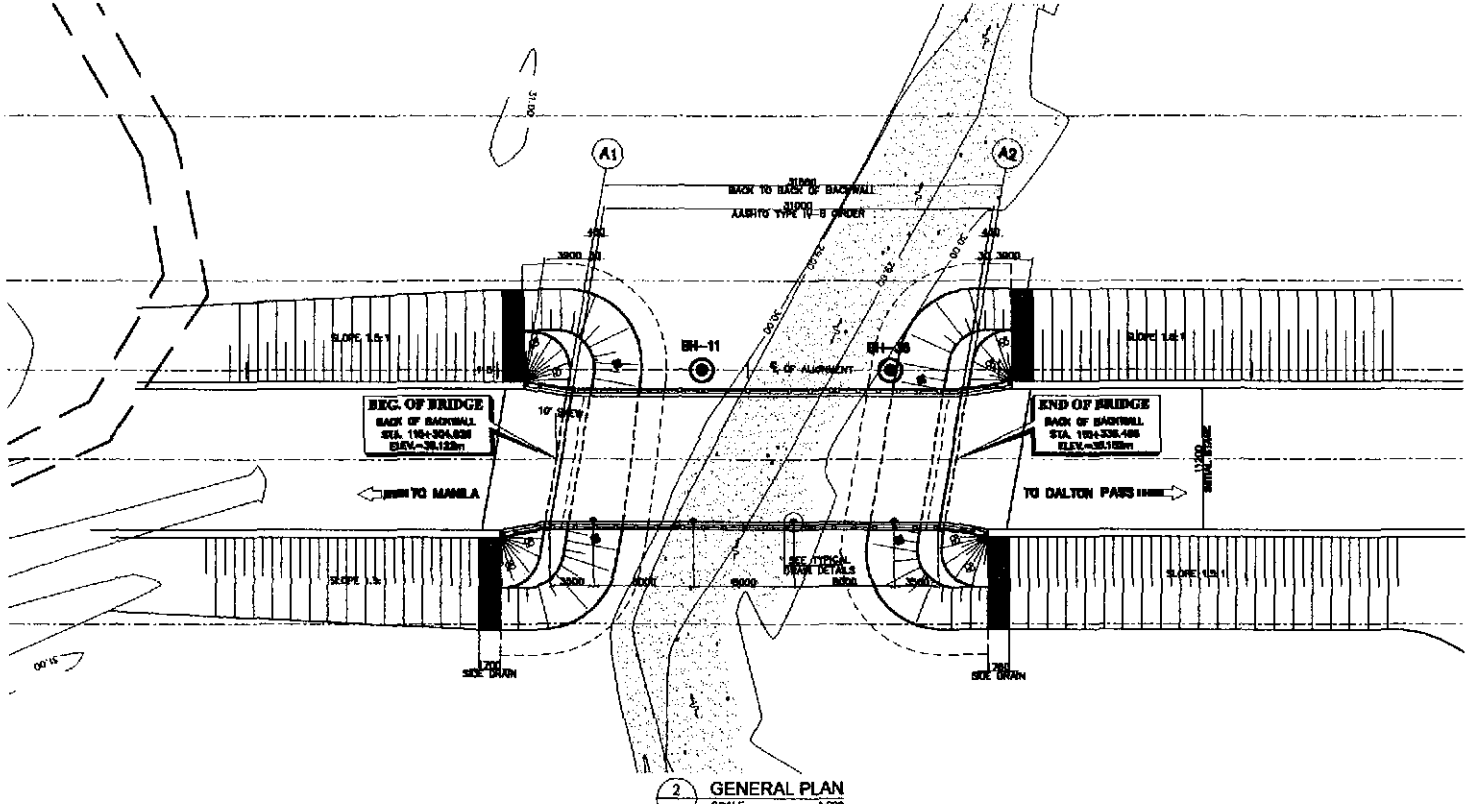
- Grouted Riprap River Bank Protection will be used in conjunction with DPWH Criteria for river with velocity < 3.0 m/sec.
- Scour protection of Loose Boulder Apron at toe of Riverbank Protection shall be provided.



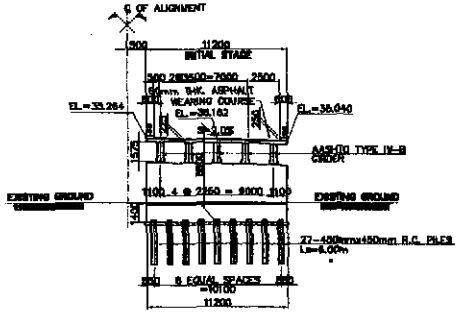
1 GENERAL ELEVATION
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



2 GENERAL PLAN
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	2.900 m/sec.
DISCHARGE @ 50 YEARS, Qso	68.000 cu./sec.
CATCHMENT AREA, CA	10.425 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 AND A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

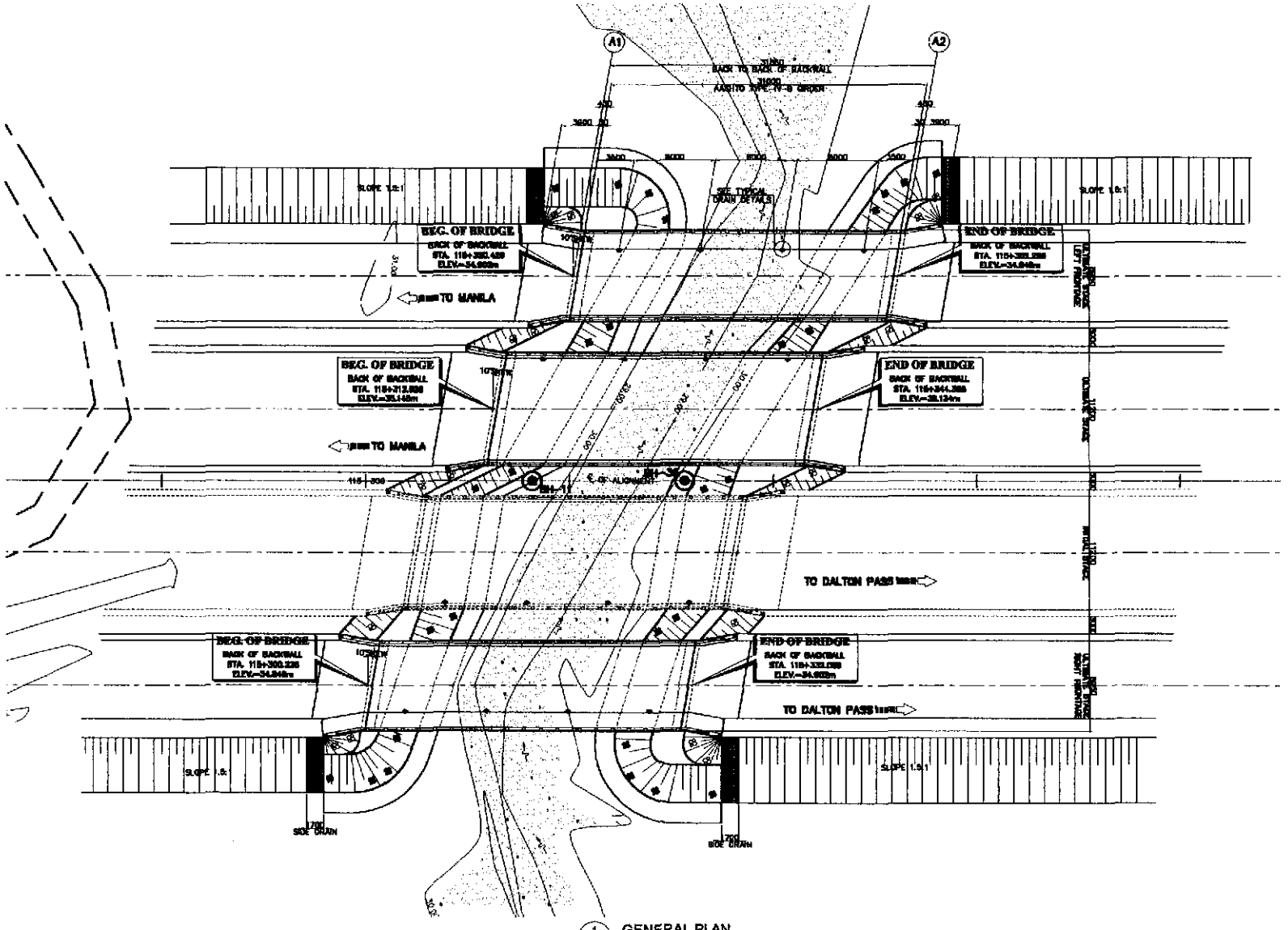
A CABANATUAN BYPASS BRIDGE NO.6 (STA.115+304.626)
SCALE A3 SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

	Submitted By	Endorsed By	Recommended By	Recommended By	Approved By
	DANILO C. TRIANO, Project Director	ADRIANO M. DORDY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	EDMUNDO V. MIR, Undersecretary	SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY CABANATUAN BYPASS - CONTRACT PACKAGE II	1:200 FULL SIZE A1	BRIDGE NO. 6 GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)	B-77



1 / - GENERAL PLAN
SCALE 1:200

A / - CABANATUAN BYPASS BRIDGE NO.6 (STA.115+312.526)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

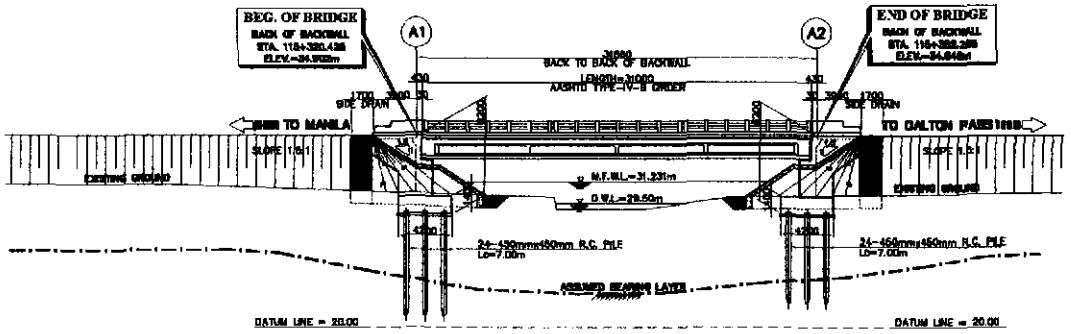
PMS – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By	Reviewed By	Recommended By	Recommended By (See cover sheet for Signature)	Approved By (See cover sheet for Signature/Approval)
DANILO O. TRIJANO, Project Director	ADRIANO M. DONNY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	EDMUNDO Y. UR, Undersecretary	RINDON A. BATUHONOS, Secretary

PROJECT AND LOCATION :
DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)

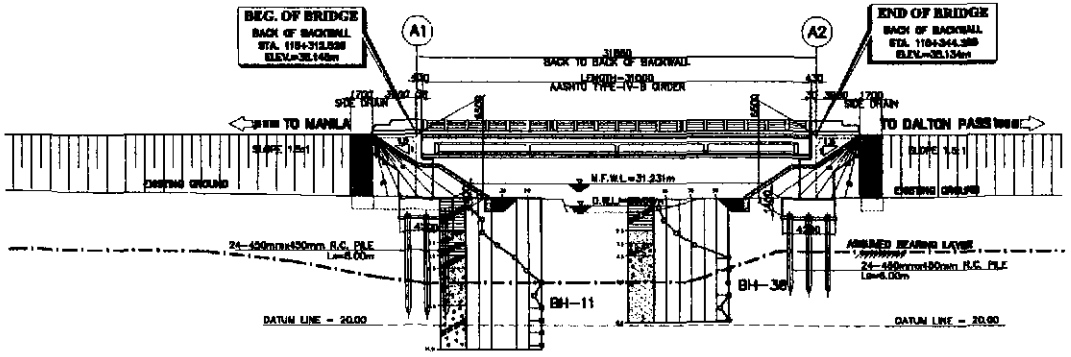
SCALE : FULL SIZE A1

SHEET CONTENTS :
CABANATUAN BYPASS
BRIDGE NO.6 (ULTIMATE STAGE)
GENERAL PLAN

SHEET NO. : CB*



1 GENERAL ELEVATION @ LEFT FRONTAGE
SCALE 1:200



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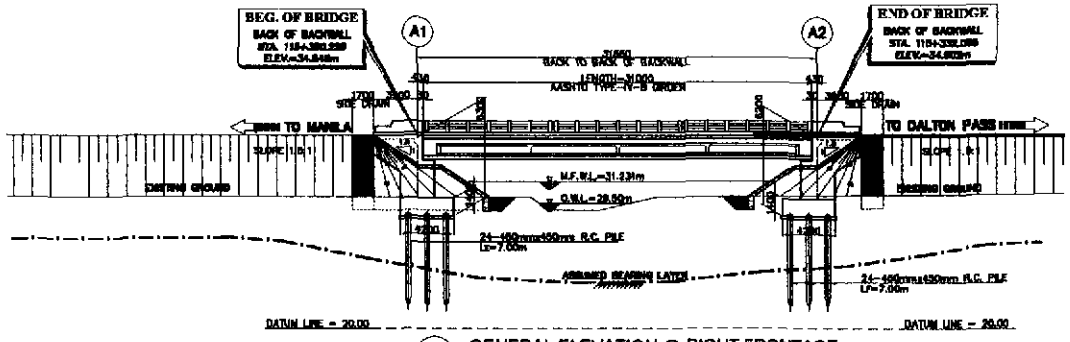

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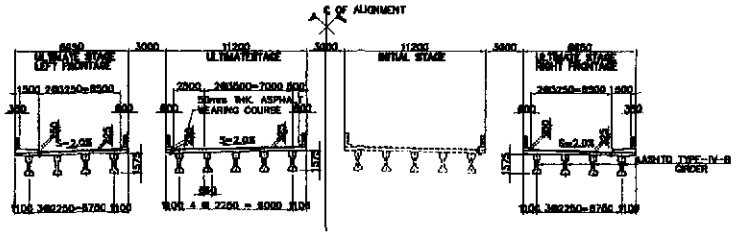
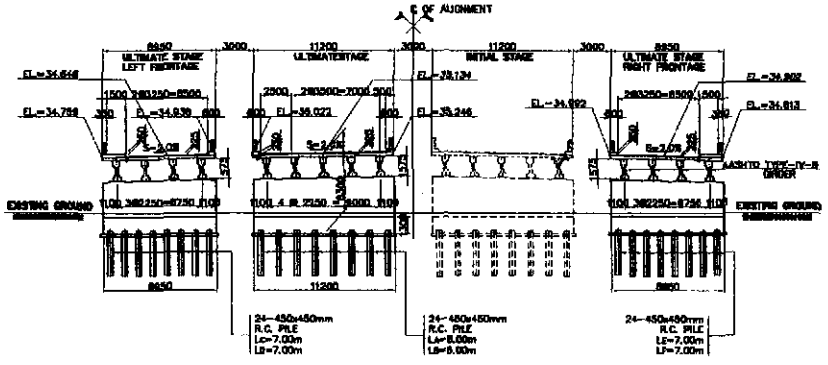
SCALE 1:200



4 SECTION @ MIDSPAN
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	2.900 m/sec.
DISCHARGE @ 50 YEARS, Qso	69.000 cu./sec.
CATCHMENT AREA, CA	10.425 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 AND A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.
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A CABANATUAN BYPASS BRIDGE NO.6 (STA.115+312.526)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

DESIGNED | CHECKED | SUBMITTED — DATE — SIGNATURE — TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

FUNC. – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By: OSMILO O. TINAWIG, Project Director	Reviewed By: ADRIANO M. OCHOY, Chief, Bridges Division	Recommended By: ALBERTO S. REYES, Director IV (OIC)	Recommended By: (See cover sheet for Signatures) FERNANDO V. MIR, Undersecretary	Approved By: (See cover sheet for Signatures/Approval) RHODA A. BATUMBAKAL, Secretary

PROJECT AND LOCATION :
DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Pleridel, Cabanatuan and San Jose Bypasses)

SCALE : FULL SIZE A1

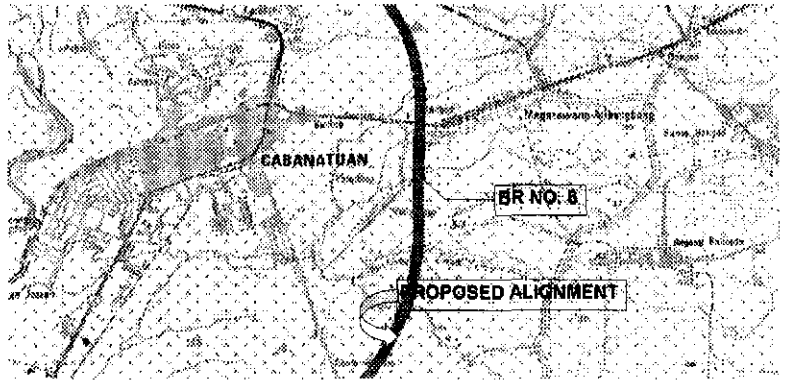
SHEET CONTENTS :
CABANATUAN BYPASS
BRIDGE NO.6 (ULTIMATE STAGE)
GENERAL ELEVATIONS AND SECTIONS

SHEET NO. : CB*

PROPOSED BRIDGE SITE SURVEY

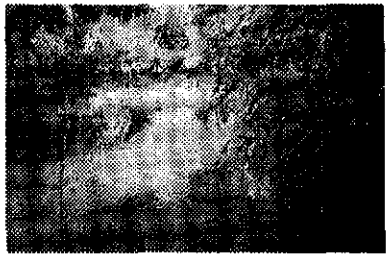
Survey Date	19-Jun-01	Bridge No./Station	Bridge No.6 / STA.11+074.400
Bypass Name	CABANATUAN	Prepared by	RML / ENS

Location — River Name :



Photograph

Upstream



Downstream

1	Land Use	☐ Commercial ☐ Industrial ☐ Residential ☑ Agricultural ☐ Others
2	Geographical Features / Terrain	☐ Mountainous area ☐ Alluvial ☑ Plain ☐ Others
3	Stream / River Type	☐ Straight ☐ Braided ☑ Meandering
4	Nearby Structures	Upstream: ; Downstream: 7.0m long bridge at 300m from site
5	Environmental Condition	☑ Trees/vegetation ☐ Fish & Fish Habitat
6	Water Level (During survey)	☐ 0 - 0.50m ☑ 0.50m - 1.0m ☐ 1.0m - 1.5m ☐ Others

River Condition

River Width (m) : 15.00

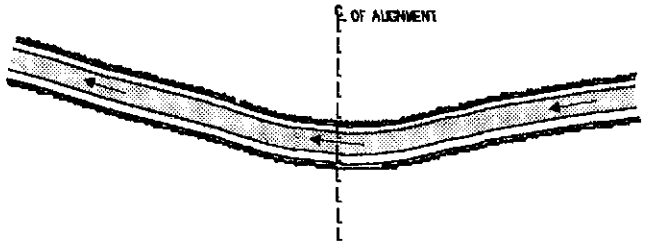
Stream Velocity (m/s) :
- Normal : 0.30
- During Flood : 0.90

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

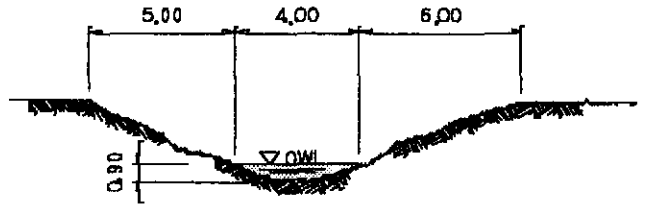
Site Access During Construction:
- ☐ Possible
- ☑ Difficult

Comments:

a. Plan



b. Section / Elevation



10	Meander Situation	Upstream: ☑ Existing ☐ None ; Downstream: ☑ Existing ☐ None
11	Riverbed Material	☑ Large Gravel ☐ Gravel ☐ Sand ☑ Soil ☐ Others
12	Riverside/Bank Condition	Upstream: ☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R ; Downstream: ☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
13	Tendency to River Course and Riverbed Change	☑ Stable ☑ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others
14	Flood signs	☑ None ☐ Existing -
15	Evidence of Drift & Debris	☑ None ☐ Existing — Driftwoods, Φ = — Length = — Others : Weeds
16	Maximum Flood Water Level	☑ Interview ☐ Flood Data ☐ Flood Marks — Height above bank (m): 0.3 — Frequency (yrs): 10 — Cause: Typhoon — Comments :
17	Recommendation for Bridge	Verify maximum flood water level. Provide 1.50m clearance from MFWL.
18	Recommendation for River Protection Works	
19	Comments / Others	

Table 3.4-21 Bridge No. 6 Site Condition

BRIDGE NO. 7 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. RIVER CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition.
- The river course will unlikely meander but will tend to scour at the riverbed.
- The upstream and downstream conditions of riverbed & river banks are stable.
- No evidence of drifts/debris during flooding.
- This bridge crosses over an existing irrigation Canal.
- The river discharge is controlled by irrigation.
- The river velocity is controlled by irrigation.
- The top river width at design flood level is 27.20 m.
- The bridge is skewed 10° RF

2. SOIL CONDITION

- Bridge site is underlain by thick gravel and sand deposits with alternating layer of silt and clay.
- Gravel and sand deposit is overlain uppermost *plastic silt or clay with 7.5 meters* thickness and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

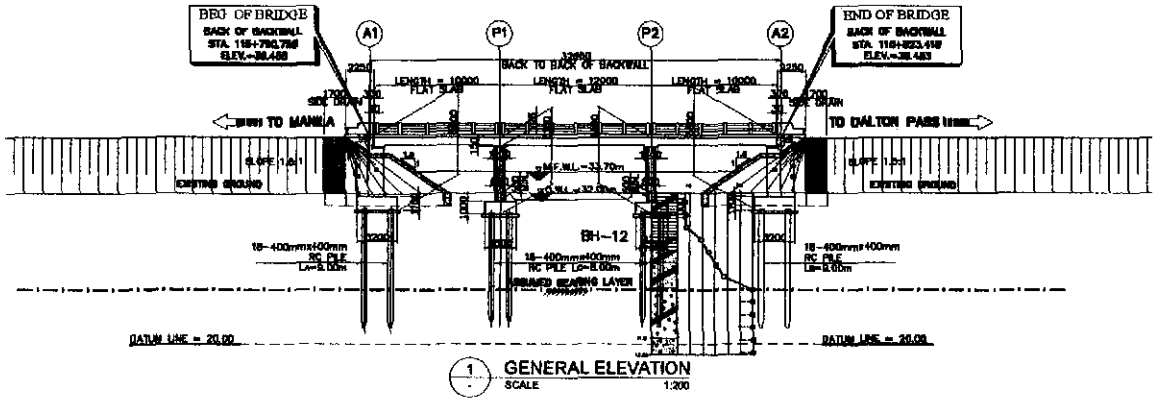
	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	32.66 m	32.66 m
CARRIAGEWAY WIDTH	2 x 3.50m	(2 x 3.50m) + (4 x 3.00m)
SHOULDER WIDTH	1 x 2.50m	(1 x 2.50m) + (2 x 1.50m)
SIDEWALK WIDTH	-	2 x 1.50m
SUPERSTRUCTURE TYPE	Three-span, RCS (10.0+12.0+10.0m)	Three-span, RCS (10.0+12.0+10.0m)
SUBSTRUCTURE TYPE	Closed-type Abutment 2-Column Pier	Closed-type Abutment 2-Column Pier (Main Road) 1-Column Pier (Frontage Roads)
FOUNDATION TYPE	450 x 450 RC Pile	450 x 450 RC Pile

(2) DETERMINATION OF FINAL SCHEME

- A three-span bridge was proposed being more economical than 2-span or 4-span bridge.
- Pier located at center of canal could disrupt the irrigational canal function during construction.

(3) PROTECTION AGAINST SCOURING

- Grouted Riprap River Bank Protection will be used in conjunction with DPWH Criteria for river with velocity < 3.0 m/sec.



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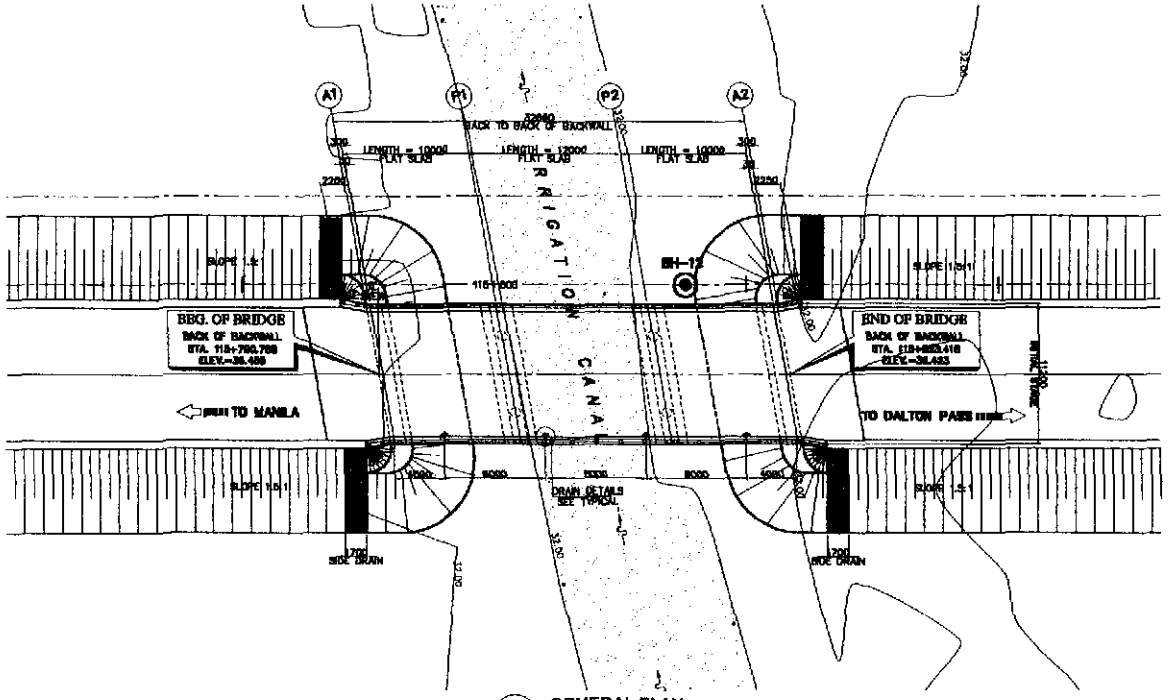
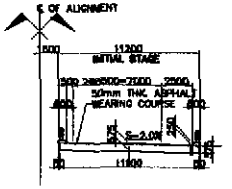
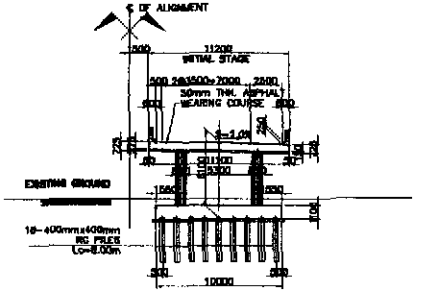
SCALE 1:200



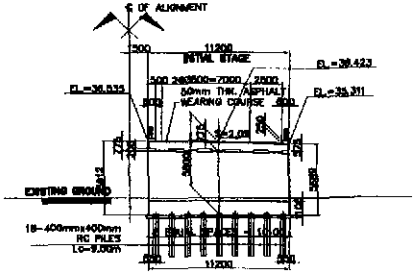
2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ PIER P2
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
IRRIGATION CANAL	-

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A2 AND PIER P1 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

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A CABANATUAN BYPASS BRIDGE NO.7 (STA.115+790.758)
SCALE AS SHOWN

JICA JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

REVISED | DATE | SIGNATURE
CHECKED
SUBMITTED
TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

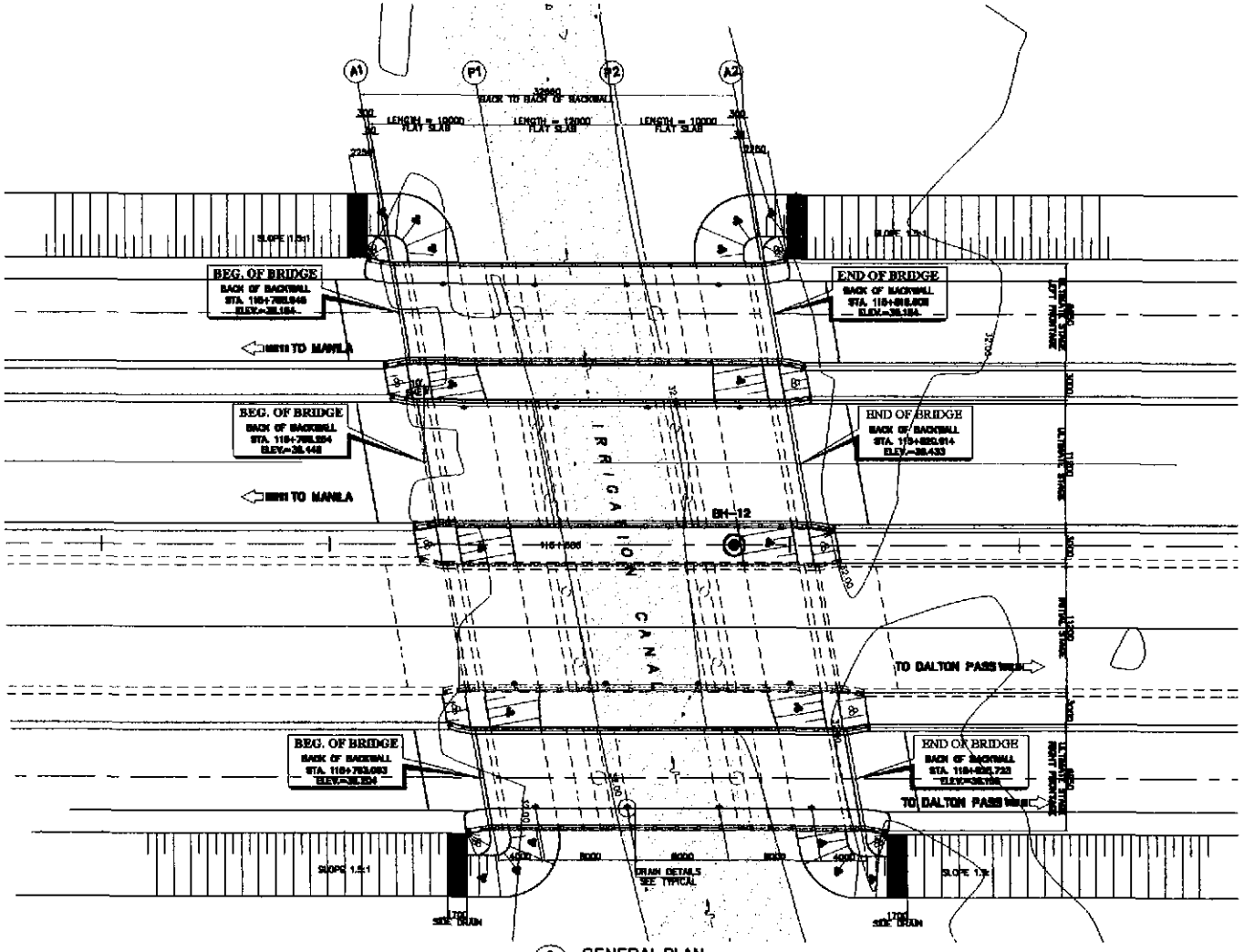
BUREAU OF DESIGN			OFFICE OF THE SECRETARY	
Submitted By	Reviewed By	Recommended By	Recommended By (See cover sheet for Signatures)	Approved By (See cover sheet for Signatures)
DANILO O. TRAMBO, Project Director	ADRIANO M. DORDY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	EDMUNDO V. MIR, Undersecretary	BRIGIDO A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE II

SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 7
GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)

SHEET NO. : B-90



2 GENERAL PLAN
SCALE 1:200

A CABANATUAN BYPASS BRIDGE NO.7 (STA.115+788.254)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		
TEAM LEADER		

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

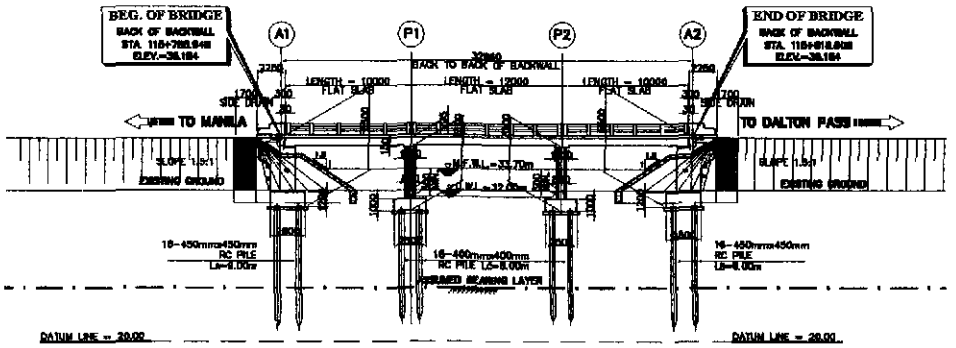
BUR. – Plan	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Recommended By: DANILO O. TRIVIÑO, Project Director	Reviewed By: ADRIANO M. OGRAY, Chief, Bridges Division	Recommended By: GILBERTO S. RIVERA, Director IV (OIC)	Recommended By: (See cover sheet for Signatory) ERNESTO V. MIR, Undersecretary	Approved By: (See cover sheet for Signature/Approval) SIMEON A. MITUMAWONG, Secretary

PROJECT AND LOCATION :
DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)

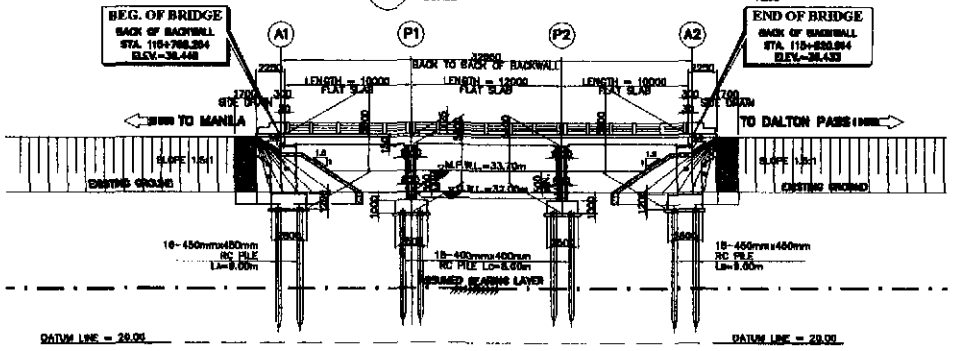
SCALE : FULL SIZE A1

SHEET CONTENTS :
CABANATUAN BYPASS
BRIDGE NO.7 (ULTIMATE STAGE)
GENERAL PLAN

SHEET NO. : CB*



1 - GENERAL ELEVATION @ LEFT FRONTAGE
SCALE 1:200



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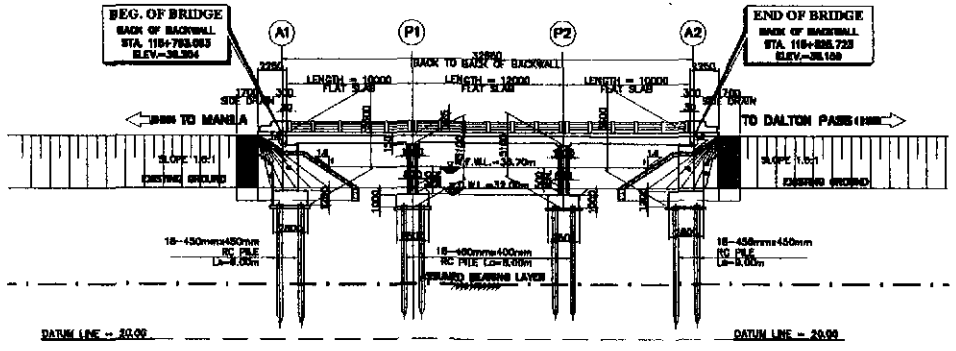
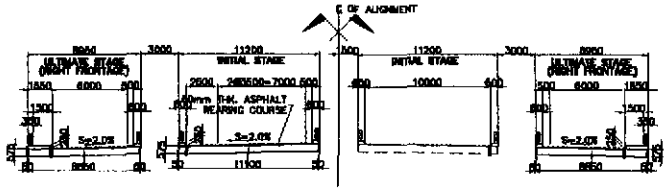
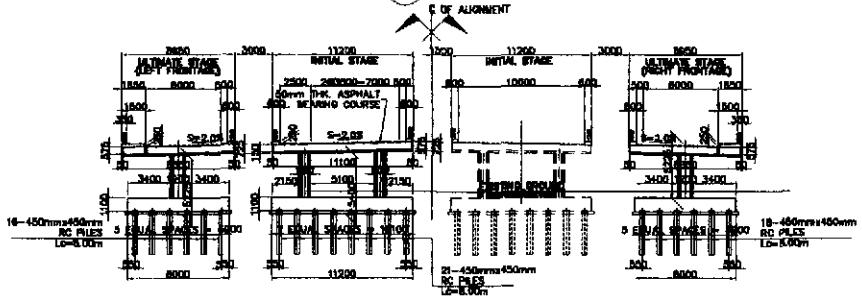


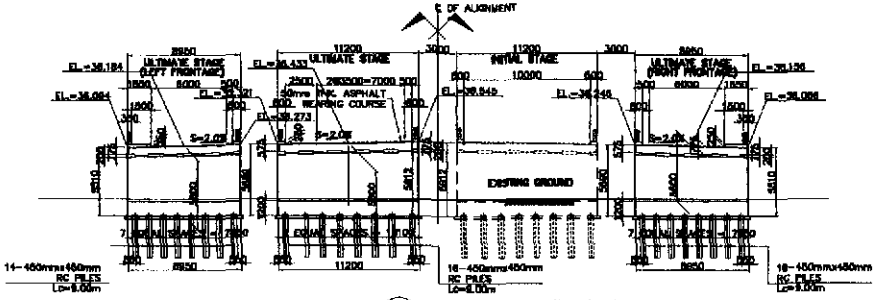
3 - GENERAL ELEVATION @ RIGHTT FRONTAGE
SCALE 1:200



4 - SECTION @ MIDSPAN
SCALE 1:200



5 - SECTION @ PIER P2
SCALE 1:200



6 - SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
IRRIGATION CANAL	-

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

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A - CABANATUAN BYPASS BRIDGE NO.7 (STA.115+788.254)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
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YACHIYO ENGINEERING CO., LTD.

		DATE	SIGNATURE
DESIGNED			
CHECKED			
SUBMITTED			TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

REG. - NCR	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted by: DANILO C. TAJANLANGIT, Project Director	Reviewed by: ADOLFO M. DORIA, Chief, Bridges Division	Recommended by: GILBERTO S. REYES, Director IV (OIC)	Recommended by: (See cover sheet for Signature) EDMUNDO Y. MIR, Undersecretary	Approved by: (See cover sheet for Signature/Approval) RAMON A. SUGUITAN, Secretary

PROJECT AND LOCATION :
DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)

SCALE : FULL SIZE A1

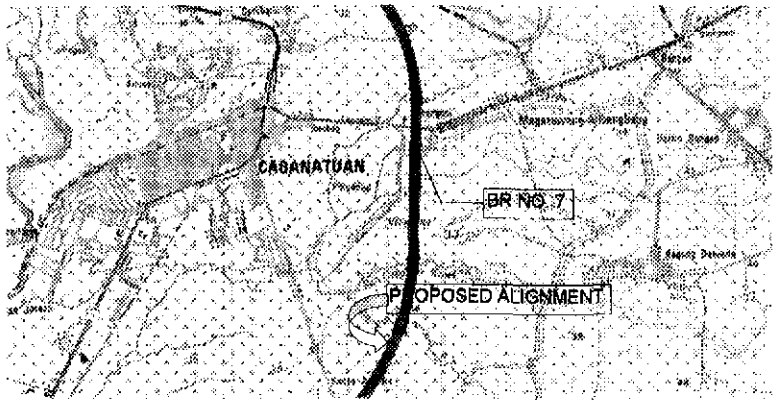
SHEET CONTENTS :
CABANATUAN BYPASS
BRIDGE NO.7 (ULTIMATE STAGE)
GENERAL ELEVATION AND SECTIONS

SHEET NO. : CB*

PROPOSED BRIDGE SITE SURVEY

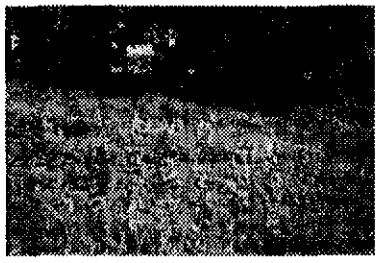
Survey Date	19-Jun-01	Bridge No./Station	Bridge No.7 / STA.11+562.300
Bypass Name	CABANATUAN	Prepared by	RML / ENS

1 Location — River Name :

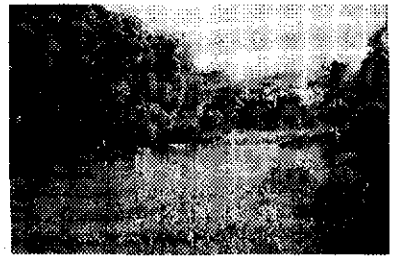


2 Photograph

Upstream



Downstream



3	Land Use	☐ Commercial ☐ Industrial ☐ Residential ☑ Agricultural ☐ Others
4	Geographical Features / Terrain	☐ Mountenous area ☐ Alluvial ☑ Plain ☐ Others
5	Stream / River Type	☐ Straight ☐ Braided ☑ Meandering
6	Nearby Structures	Upstream ; Downstream: Bridge at 300m from site.
7	Environmental Condition	☑ Trees/vegetation ☐ Fish & Fish Habitat
8	Water Level (During survey)	☐ 0 - 0.50m ☐ 0.50m - 1.0m ☑ 1.0m - 1.5m ☐ Others

9 River Condition

River Width (m) : 15.00

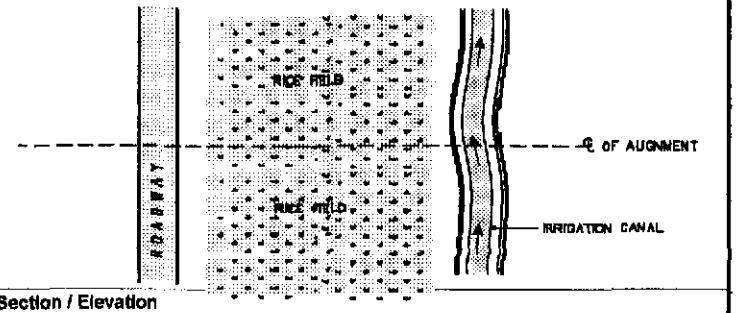
Stream Velocity (m/s) :
- Normal : 0.70
- During Flood : 1.30

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

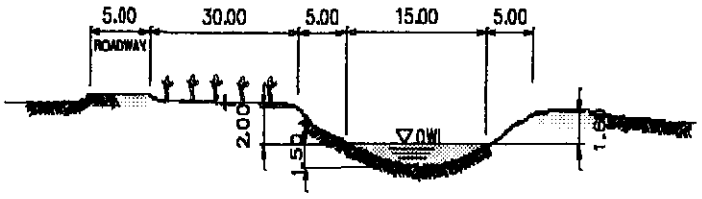
Site Access During Construction:
- ☑ Possible
- ☐ Difficult

Comments:

a. Plan



b. Section / Elevation



10	Meander Situation	Upstream	☑ Existing ☐ None
		Downstream	☑ Existing ☐ None
11	Riverbed Material	☐ Large Gravel ☐ Gravel ☐ Sand ☑ Soil ☐ Others	
12	Riverside/Bank Condition	Upstream	☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
		Downstream	☑ Stable ○L ○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
13	Tendency to River Course and Riverbed Change	☑ Stable ☑ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others	
14	Flood signs	☑ None ☐ Existing -	
15	Evidence of Drift & Debris	☑ None ☐ Existing	Driftwoods, Φ = ; Length = ; Others : Weeds.
16	Maximum Flood Water Level ☐ Interview ☐ Flood Data ☐ Flood Marks	Height above bank (m)	Comments :
		Frequency (yrs)	
		Cause	
17	Recommendation for Bridge	*Verify maximum flood water level. Provide 1.0m clearance from MFWL and/or top of bank.*	
18	Recommendation for River Protection Works		
19	Comments / Others		

Table 3.4-22 Bridge No. 7 Site Condition

BRIDGE NO. 8 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. RIVER CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition.
- The river course will unlikely meander but will tend to scour at the riverbed.
- The river course will cut thru the road alignment at an angle of 30°.
- The upstream and downstream conditions of riverbed & river banks are stable.
- No evidence of drifts/debris during flooding.
- The river discharge at 50 year return period is 32.30 cum/sec
- The river velocity at 50 years return period is 2.677 m/sec.
- The top river width at design flood level is 23.75 m.
- The bridge is skewed 15° LF

2. SOIL CONDITION

- Bridge site is underlain by thick gravel and sand deposits with alternating layer of silt and clay.
- Gravel and sand deposit is overlain uppermost plastic silt or clay with thickness ranging from 4.5 to 5.5 meters and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	31.86 m	31.86 m
CARRIAGEWAY WIDTH	2 x 3.50m	(2 x 3.50m) + (4 x 3.25m)
SHOULDER WIDTH	1 x 2.50m	(1 x 2.50m) + (2 x 1.50m)
SIDEWALK WIDTH	-	2 x 1.50m
SUPERSTRUCTURE TYPE	One-span, PCDG Type IV-B (31.86m)	One-span, PCDG Type IV-B (31.86m)
SUBSTRUCTURE TYPE	Closed-type Abutment	Closed-type Abutment
FOUNDATION TYPE	450 x 450 RC Pile	450 x 450 RC Pile

(2) DETERMINATION OF FINAL SCHEME

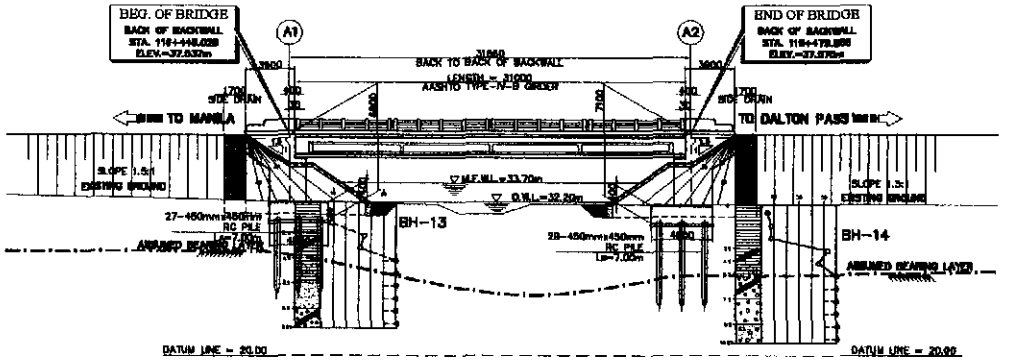
- The top width of river during the design flood is 23.75 m. To minimize river encroachment considering abutment slope protection, the bridge length becomes 31.0m for a single-span bridge.

- A single Span bridge is proposed due to :
  - Two-span bridge is not recommended since one pier will have to be located at the center of the river and may cause problems on river hydraulics.
  - A three span bridge tends to be more expensive because of additional substructure cost.

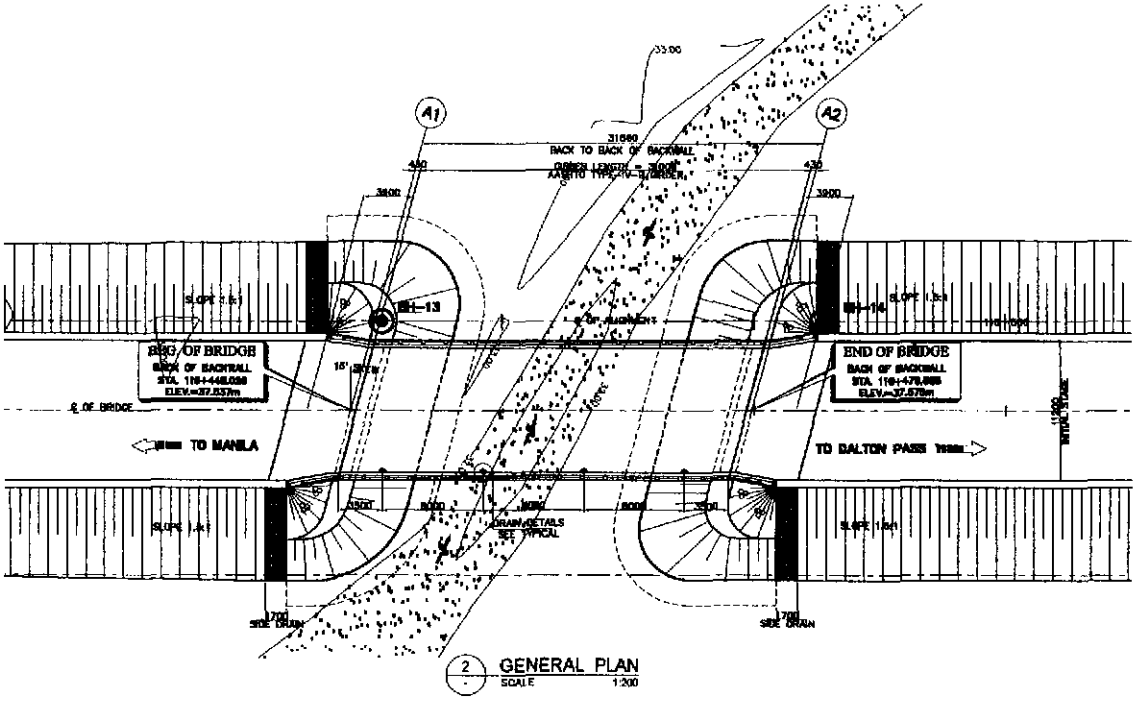
- Pile foundation is proposed due to presence of soft soil layer.

(3) PROTECTION AGAINST SCOURING

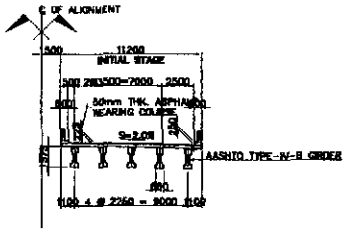
- Grouted Riprap River Bank Protection will be used in conjunction with DPWH Criteria for river with velocity < 3.0 m/sec.
- Scour protection of Loose Boulder Apron at toe of River Bank Protection shall be provided.



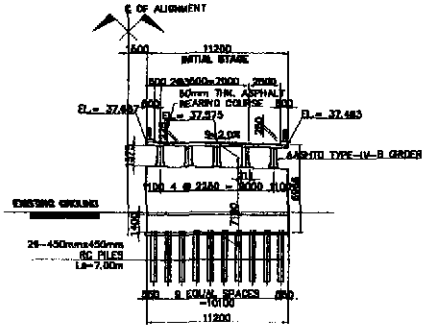
1 GENERAL ELEVATION
SCALE 1:200



2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	2.677 m/sec
DISCHARGE @ 50 YEARS, Qso	32.300 cu.m/sec
CATCHMENT AREA, CA	2.050 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BYPASS BRIDGE NO. 8 (STA. 116+448.026)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

DESIGNED | DATE | SIGNATURE
CHECKED
SUBMITTED
TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

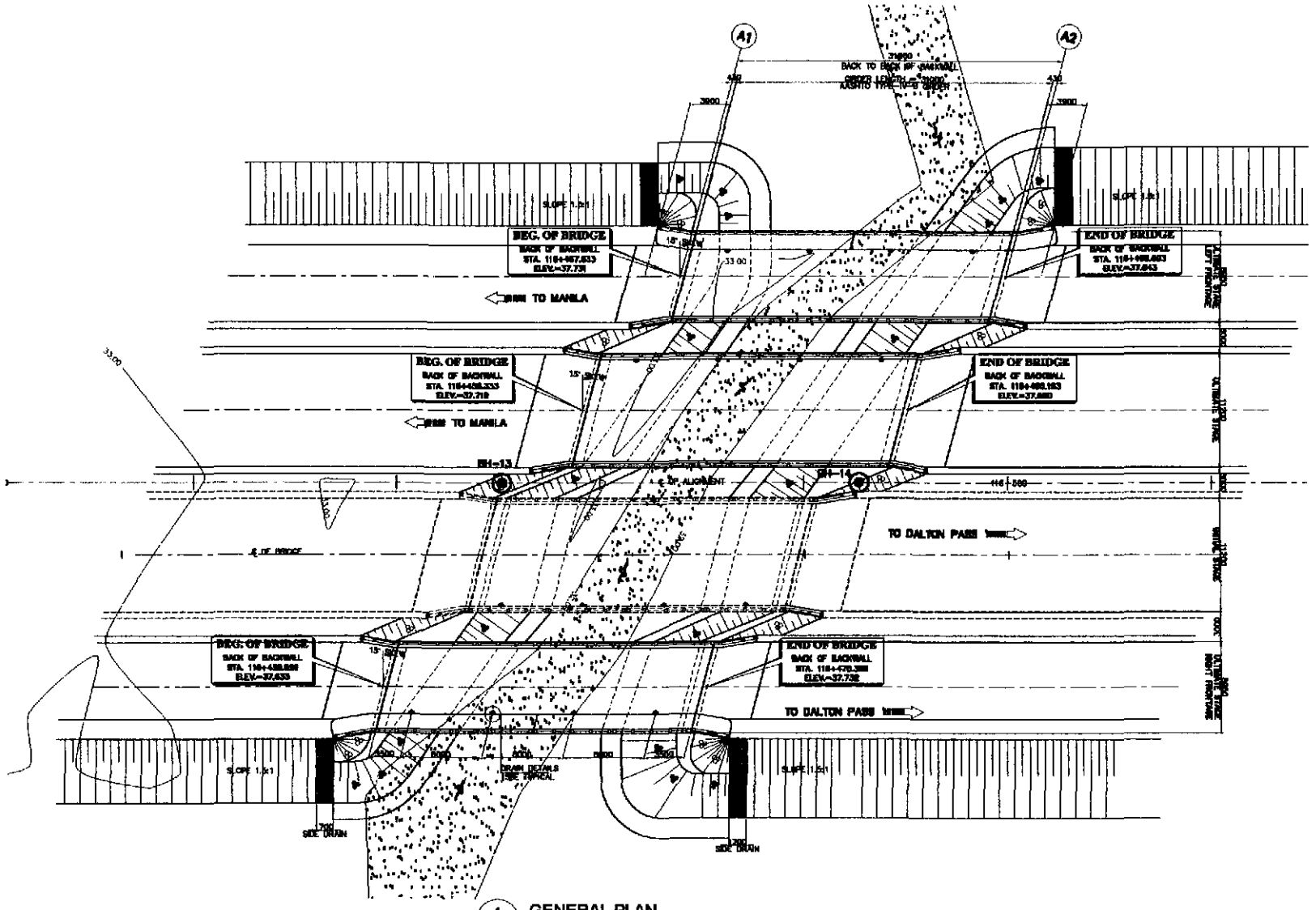
FUND — FMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By: DANILO C. TRIVIÑO, Project Director	Reviewed By: ADRIANO M. DORDY, Chief, Bridges Division	Recommended By: GILBERTO S. REYES, Director II (OIC)	Recommended By: EDMUNDO V. MIR, Undersecretary	Approved By: RAMON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE II

SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8
GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)

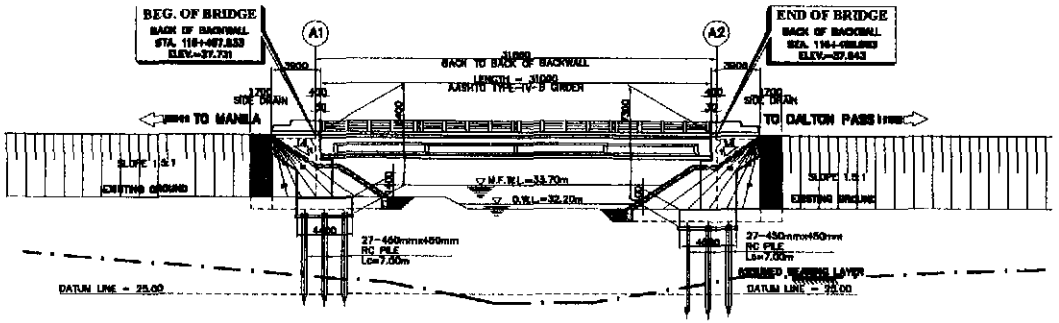
SHEET NO. : B-102



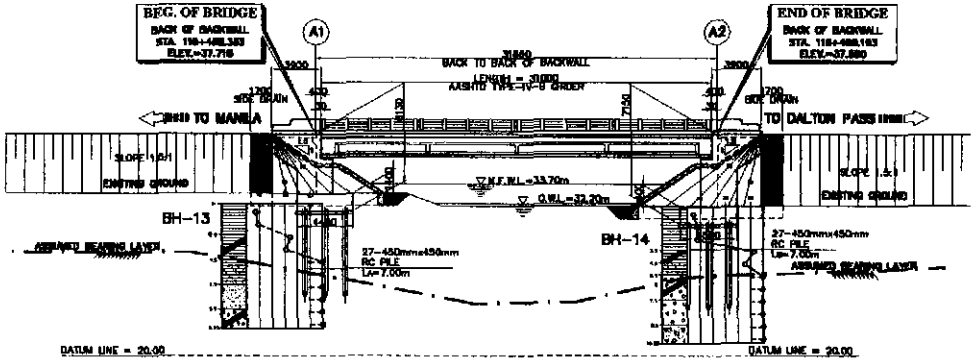
1 / - GENERAL PLAN
SCALE 1 : 200

A / - CABANATUAN BYPASS BRIDGE NO. 8 (STA. 116+458.333)
SCALE AS SHOWN

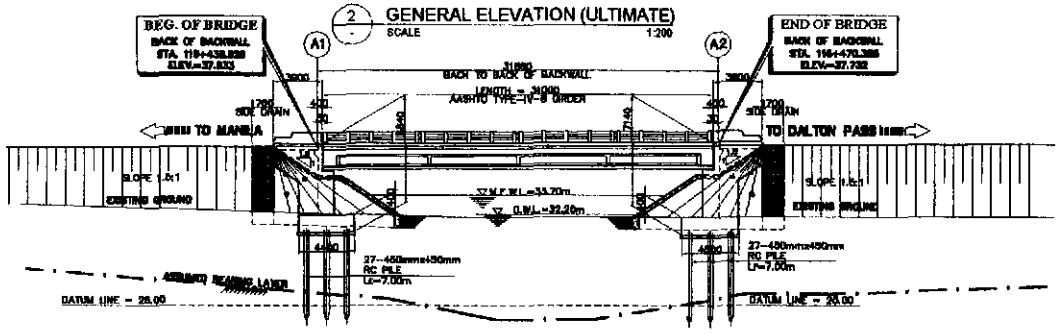
JICA JAPAN INTERNATIONAL COOPERATION AGENCY KEI KATAHIRA & ENGINEERS INTERNATIONAL YBO YACHIYO ENGINEERING CO., LTD.	DESIGNED CHECKED SUBMITTED TEAM LEADER	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS Submitted by: DOMINADOR T. BAYONA, Project Director Bureau of Design — Reviewed by: ADRIANO M. GARAY, Chief, Bridges Division; Recommended by: REDENTOR G. LEUTERIO, Director Office of the Secretary — Recommended by: EDMUNDO V. MIR, Undersecretary; Approved by: SIMEON A. DATUMANONG, Secretary	PROJECT AND LOCATION : DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	SCALE : FULL SIZE A1	SHEET CONTENTS : CABANATUAN BYPASS BRIDGE NO. 8 (ULTIMATE STAGE) GENERAL PLAN	SHEET NO. : CB*



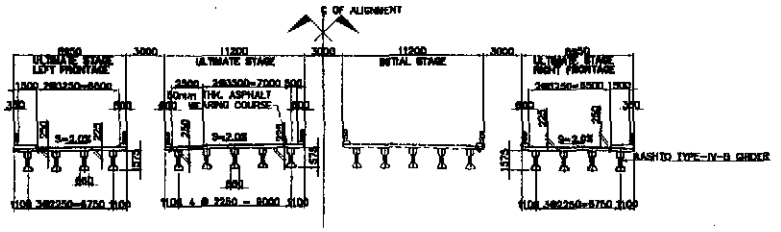
1 GENERAL ELEVATION @ LEFT FRONTAGE
SCALE 1:200



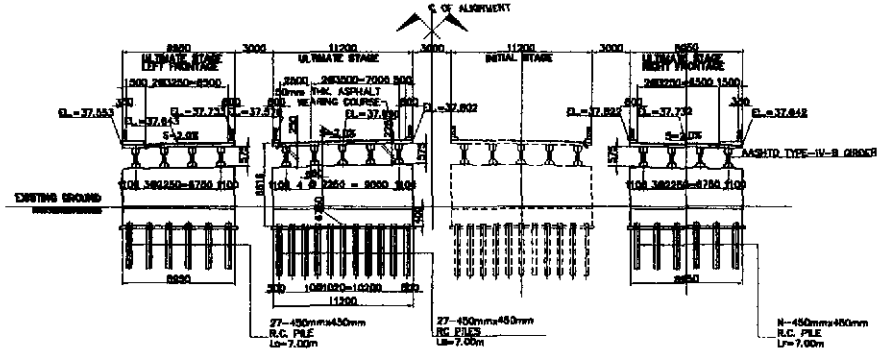
2 GENERAL ELEVATION (ULTIMATE)
SCALE 1:200



3 GENERAL ELEVATION @ RIGHT FRONTAGE
SCALE 1:200



4 SECTION @ MIDSPAN
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	2.877 m/sec
DISCHARGE @ 50 YEARS, Qso	32.300 cu.m/sec
CATCHMENT AREA, CA	2.050 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 AND A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BYPASS BRIDGE NO. 8 (STA. 116+458.333
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

DESIGNED | CHECKED | SUBMITTED | DATE | SIGNATURE | TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

FUEL – FMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted by: DOMINADOR T. SANTOS, Project Director	Reviewed by: ADRIANO M. DORDY, Chief, Bridges Division	Recommended by: EDUARDO G. LEUTERIO, Director	Recommended by: (See next sheet for Signature) EDUARDO V. MAS, Undersecretary	Approved by: (See cover sheet for Signature/Approval) RAMON A. ORTAÑOSA, Secretary

PROJECT AND LOCATION :
DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)

SCALE : FULL SIZE A1

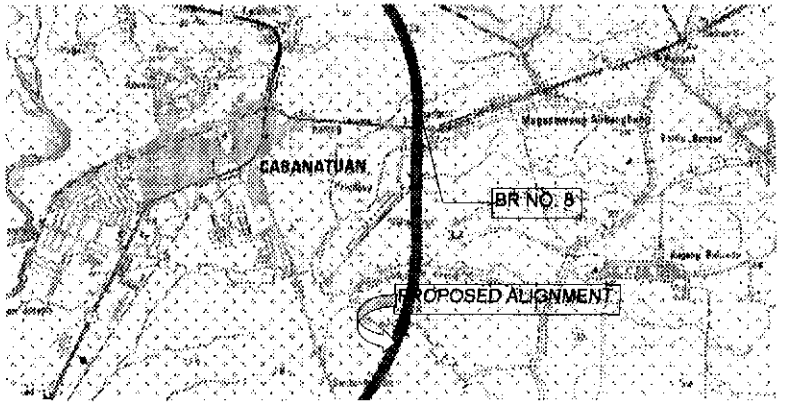
SHEET CONTENTS :
CABANATUAN BYPASS
BRIDGE NO. 8 (ULTIMATE STAGE)
GENERAL ELEVATION AND SECTIONS

SHEET NO. : CB*

PROPOSED BRIDGE SITE SURVEY

Survey Date	20-Jun-01	Bridge No./Station	Bridge No.8 / STA.12+225.370
Bypass Name	CABANATUAN	Prepared by	RML / ENS

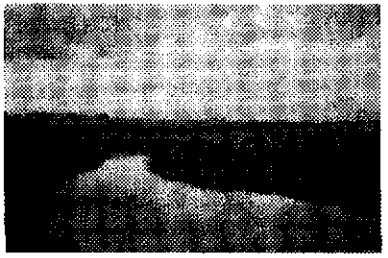
1 Location — River Name :



2 Photograph

Upstream

Downstream



5 River Condition

River Width (m) : 35.00

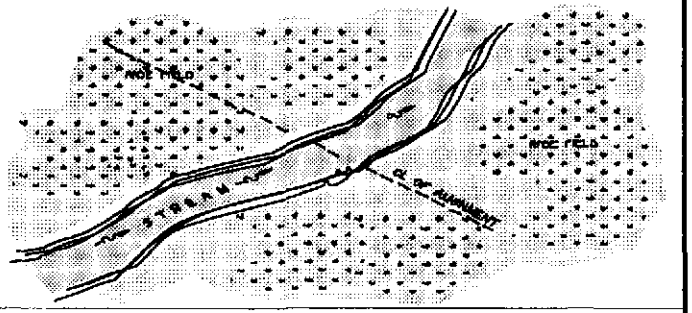
Stream Velocity (m/s) :
- Normal : 0.70
- During Flood : 1.20

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

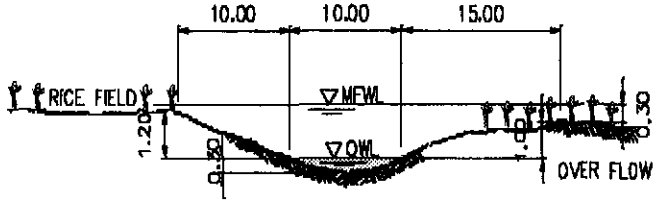
Site Access During Construction:
- [x] Possible
- [ ] Difficult

Comments:

a. Plan



b. Section / Elevation



3 Land Use	[ ] Commercial [ ] Industrial [ ] Residential [x] Agricultural [ ] Others	10 Meander Situation	Upstream [x] Existing [ ] None; Downstream [x] Existing [ ] None
4 Geographical Features / Terrain	[ ] Mountainous area [ ] Alluvial [x] Plain [ ] Others	11 Riverbed Material	[ ] Large Gravel [ ] Gravel [ ] Sand [x] Soil [ ] Others
6 Stream / River Type	[ ] Straight [ ] Braided [x] Meandering	12 Riverside/Bank Condition	Upstream [x] Stable [ ] L [ ] R [ ] Scouring/Eroding - L R [ ] With Protection/Revetment - L R; Downstream [x] Stable [ ] L [ ] R [ ] Scouring/Eroding - L R [ ] With Protection/Revetment - L R
16 Nearby Structures	Upstream; Downstream: 1-2.7mx2.8m RCBC at 400m from site.	13 Tendency to River Course and Riverbed Change	[x] Stable [x] Scouring [ ] Aggradation [ ] Degradation [ ] Sediment Transport [ ] Others
7 Environmental Condition	[x] Trees/Vegetation [ ] Fish & Fish Habitat	14 Flood signs	[x] None [ ] Existing -
8 Water Level (During survey)	[x] 0 - 0.50m [ ] 0.50m - 1.0m [ ] 1.0m - 1.5m [ ] Others	15 Evidence of Drift & Debris	[x] None [ ] Existing; Driftwoods, Φ = ; Length = ; Others : Weeds
		16 Maximum Flood Water Level [x] Interview [ ] Flood Data [ ] Flood Marks	Height above bank (m) 0.3; Frequency (yrs) 10; Cause Typhoon; Comments :
		17 Recommendation for Bridge	Verify maximum flood water level. Provide 1.50m clearance from MFWL.
		18 Recommendation for River Protection Works	Provide river bank slope protection works.
		19 Comments / Others	

Table 3.4-23 Bridge No. 8 Site Condition

BRIDGE NO. 9 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. RIVER CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition.
- The river course will unlikely meander but will tend to scour at the riverbed.
- The upstream and downstream conditions of riverbed & river banks are stable.
- No evidence of drifts/debris during flooding.
- The river discharge at 50 year return period is 65.00 cum/sec
- The river velocity at 50 years return period is 2.097 m/sec.
- The top river width at design flood level is 55.00 m.

2. SOIL CONDITION

- Bridge site is underlain by thick gravel and sand deposits with alternating layer of silt and clay.
- Gravel and sand deposit is overlain uppermost plastic silt or clay with thickness ranging from 6.5 to 10.5 meters and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

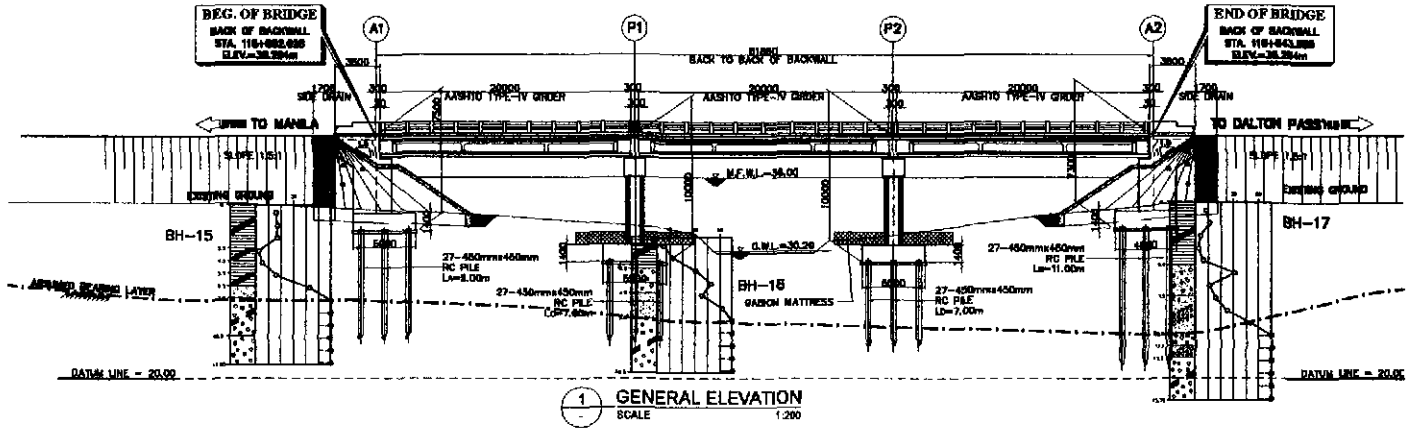
	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	61.86 m	61.86 m
CARRIAGEWAY WIDTH	2 x 3.50m	2 x 3.50m
SHOULDER WIDTH	1 x 2.50m	1 x 2.50m
SIDEWALK WIDTH	1 x 0.75m	1 x 0.75 m
SUPERSTRUCTURE TYPE	Three-span, PCDG Type IV (61.86m)	One-span, PCDG Type IV (61.86m)
SUBSTRUCTURE TYPE	Closed-type Abutment/2-Column Pier	Closed-type Abutment/2-Column Pier
FOUNDATION TYPE	450 x 450 RC Pile	450 x 450 RC Pile

(2) DETERMINATION OF FINAL SCHEME

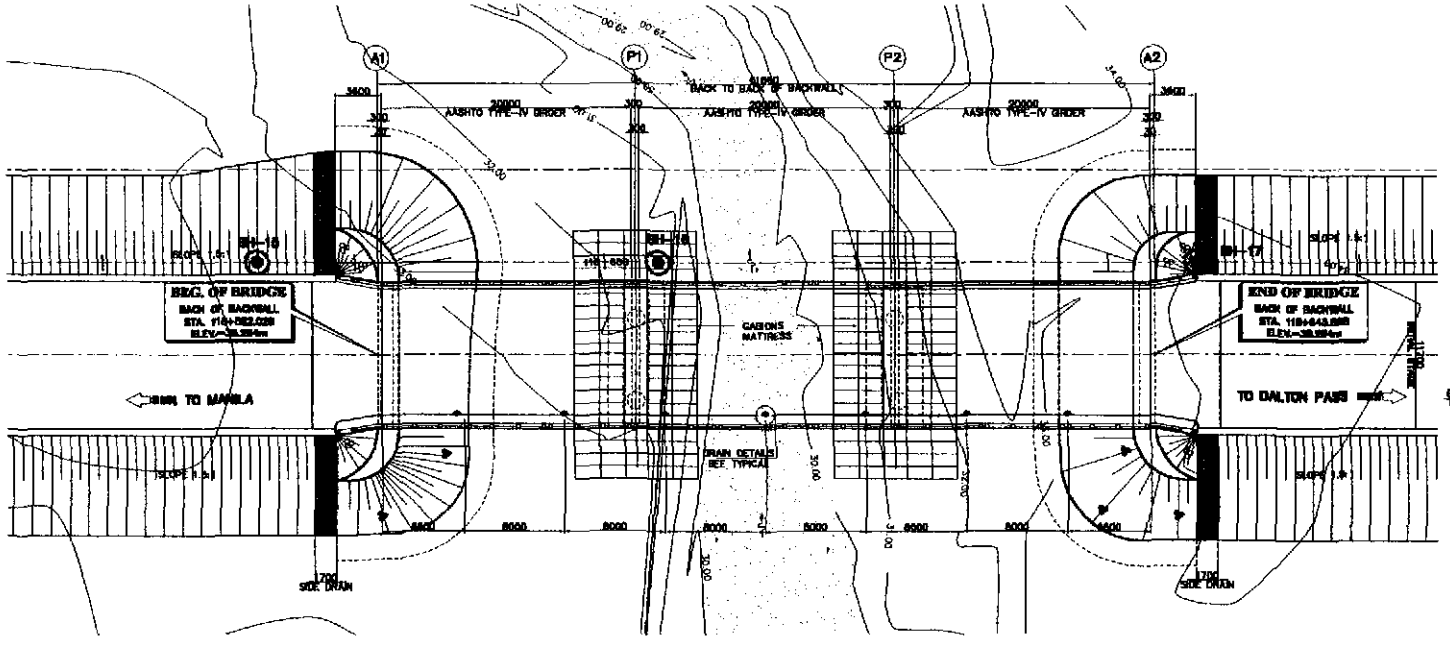
- A three span bridge was proposed being more economical than a 4-span bridge and more hydraulically advantageous than a 2-span bridge.
- Also, for a 2-span bridge, a pier located at center of river will be a problem in case of debris collision to pier column and local scour at pier foundation.

(3) PROTECTION AGAINST SCOURING

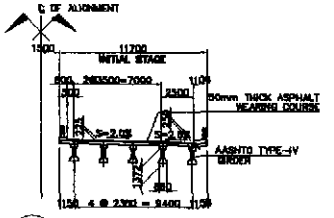
- Grouted Riprap River Bank Protection will be used in conjunction with DPWH Criteria for river with velocity < 3.0 m/sec.
- Scour protection of Loose Boulder Apron at toe of River Bank Protection shall be provided.



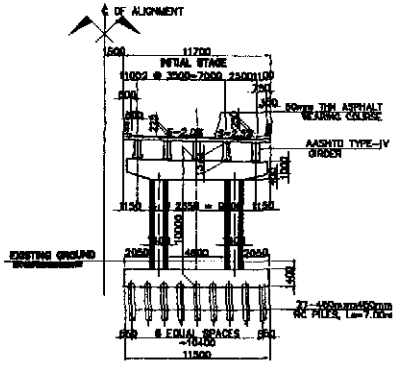
1 GENERAL ELEVATION
SCALE 1:200



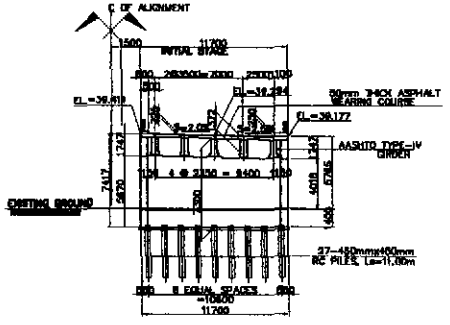
2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ PIER P2
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vss	2.087 m/sec
DISCHARGE @ 50 YEARS, Qss	85.000 cu.m/sec
CATCHMENT AREA, CA	11.95 sq. km

A CABANATUAN BRIDGE NO. 9 (STA.118+582.028)
SCALE AS SHOWN

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 AND PIER P2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

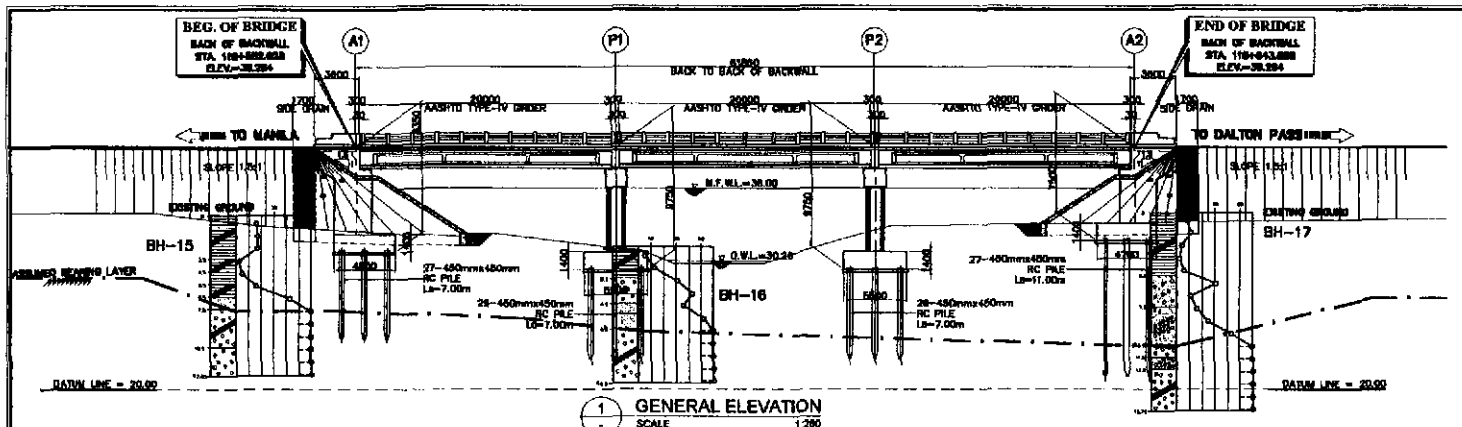
PCPE - PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By	Reviewed By	Recommended By	Recommended By (See cover sheet for Signature)	Approved By (See cover sheet for Signature/Approval)
DIEGO C. ITAWANG, Project Director	ARSENIO M. DAYOT, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	EDMUNDO V. MIR, Undersecretary	SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE II

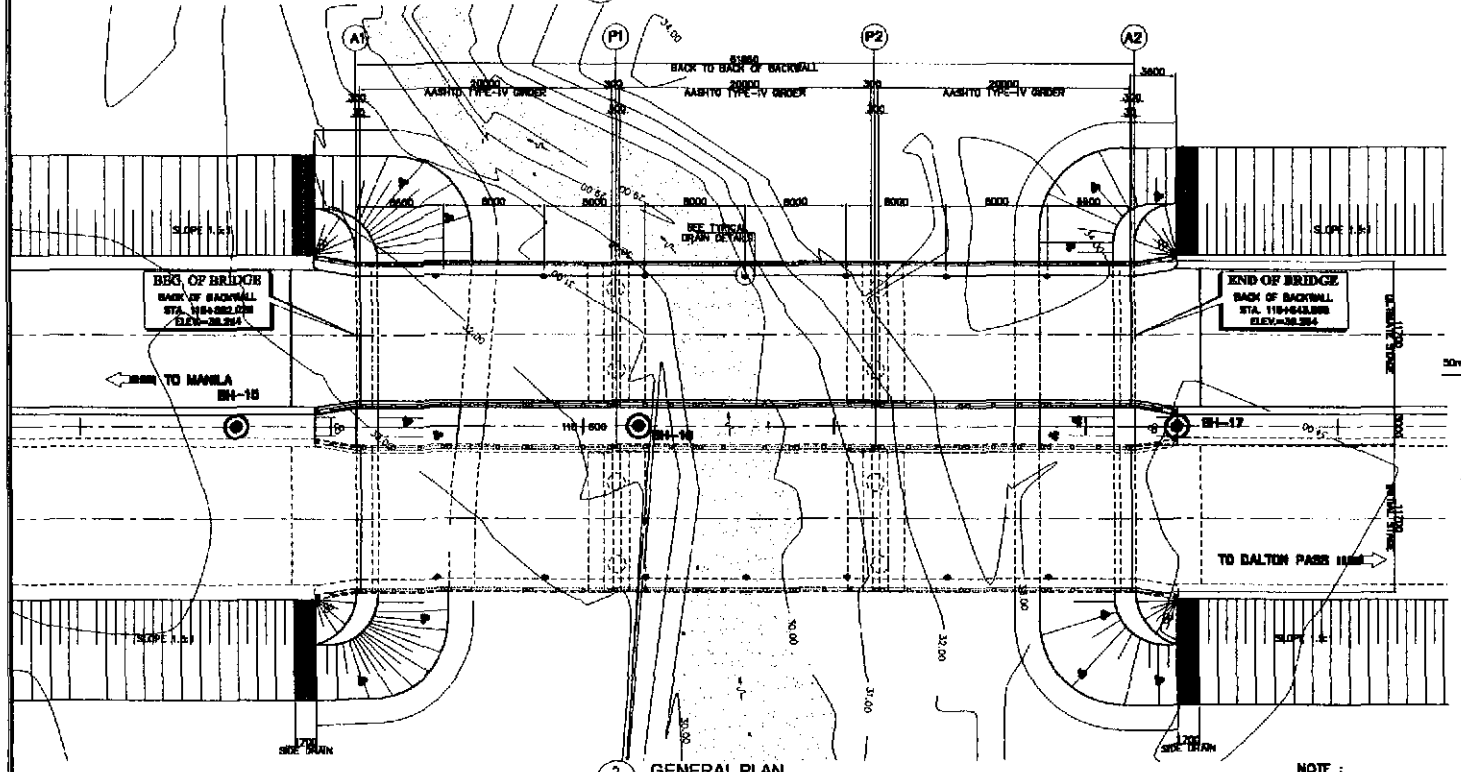
SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 9
GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)

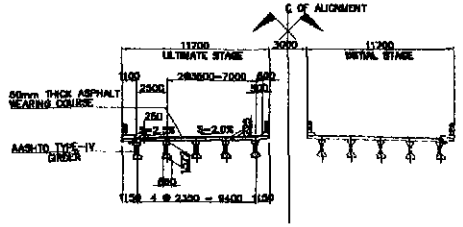
SHEET NO. : B-117



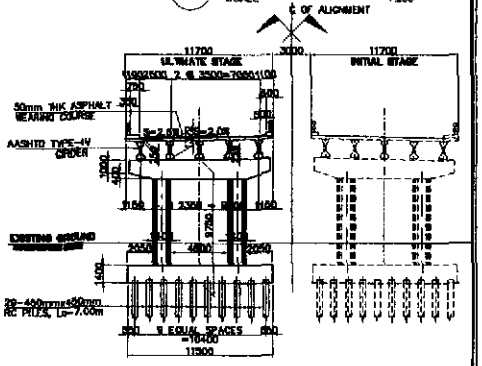
1 GENERAL ELEVATION
SCALE 1:200



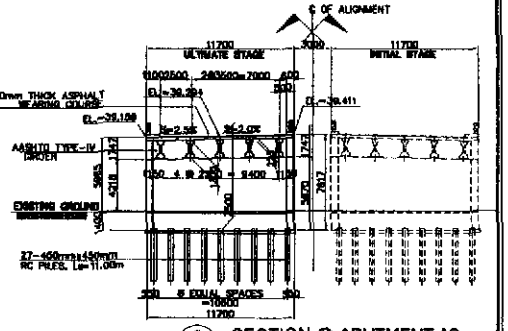
2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ PIER P2
SCALE 1:200



5 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vss	2.097 m/sec
DISCHARGE @ 50 YEARS, Qss	65.000 cu.m/sec
CATCHMENT AREA, CA	11.95 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 AND PIER P2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM, SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BRIDGE NO.9 (STA.118+582.028)
SCALE AS SHOWN

JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

	Submitted By	Reviewed By	Recommended By	Approved By
FMR – PMO	ANGELO C. TRIANO, Project Director			
BUREAU OF DESIGN		ARNOLD M. CRUZ, Chief, Bridges Division		
OFFICE OF THE SECRETARY			ELISEO B. REYES, Director IV (OIC)	EDWARD V. MR, Undersecretary
				MANUEL A. BAUTISTA, Secretary

CHECKED
SUBMITTED
TEAM LEADER

PROJECT AND LOCATION :
DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)

SCALE : FULL SIZE A1

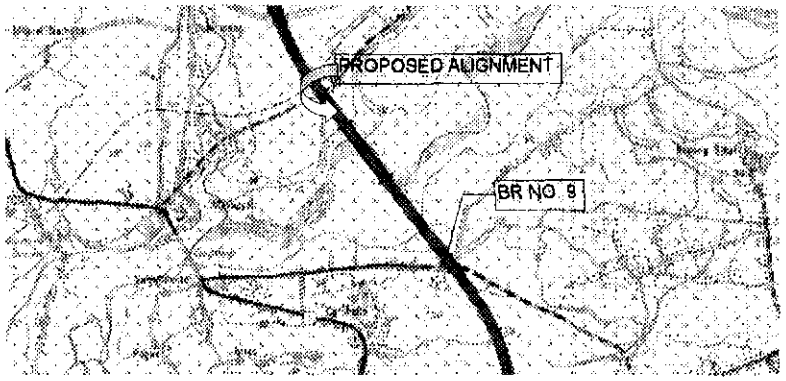
SHEET CONTENTS :
CABANATUAN BYPASS
BRIDGE NO.9 (ULTIMATE STAGE)
GENERAL PLAN, ELEVATION AND SECTIONS

SHEET NO. : CB*

PROPOSED BRIDGE SITE SURVEY

Survey Date	20-Jun-01	Bridge No./Station	Bridge No.9 / STA.14+346.870
Bypass Name	CABANATUAN	Prepared by	RML / ENS

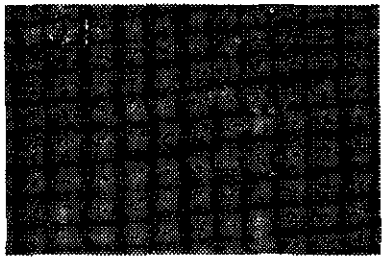
1 Location — River Name :



Photograph

Upstream

Downstream



2	Land Use	☐ Commercial ☐ Industrial ☐ Residential ☑ Agricultural ☐ Others
3	Geographical Features / Terrain	☐ Mountainous area ☐ Alluvial ☑ Plain ☐ Others
4	Stream / River Type	☑ Straight ☐ Braided ☑ Meandering
5	Nearby Structures	Upstream ; Downstream: 12m long bridge at 2.8km from site.
6	Environmental Condition	☑ Trees/Vegetation ☐ Fish & Fish Habitat
7	Water Level (During survey)	☐ 0 - 0.60m ☑ 0.60m - 1.0m ☐ 1.0m - 1.5m ☐ Others

8 River Condition

River Width (m) : 10.70

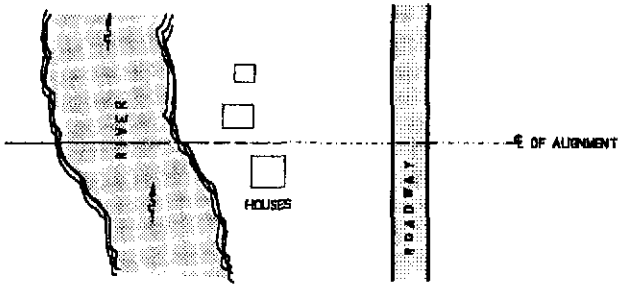
Stream Velocity (m/s) :
Normal : 0.60
During Flood : 0.90

Channel Slope (%) :
Upstream : 2
Downstream : 2

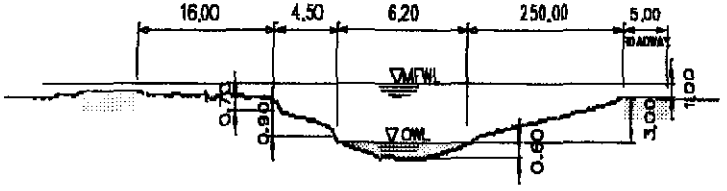
Site Access During Construction:
☑ Possible
☐ Difficult

Comments:

a. Plan



b. Section / Elevation



10	Meander Situation	Upstream	☑ Existing ☐ None
		Downstream	☐ Existing ☑ None
11	Riverbed Material	☐ Large Gravel ☐ Gravel ☐ Sand ☑ Soil ☐ Others	
12	Riverside/Bank Condition	Upstream	☑ Stable ◯L◯R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
		Downstream	☑ Stable ◯L◯R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
13	Tendency to River Course and *Riverbed Change*	☑ Stable ☑ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others	
14	Flood signs	☑ None ☐ Existing -	
15	Evidence of Drift & Debris	☑ None ☐ Existing	Driftwoods, Φ = ; Length = ; Others : Weeds and bamboos
16	Maximum Flood Water Level ☑ Interview ☐ Flood Data ☐ Flood Marks	Height above bank (r	1.0
		Frequency (yrs)	10
		Cause	Typhoon
		Comments :	
17	Recommendation for Bridge	Verify maximum flood water level. Provide 1.50m clearance from MFWL.	
18	Recommendation for River Protection Works	Provide river bank slope protection works.	
19	Comments / Others		

Table 3.4-24 Bridge No. 9 Site Condition

BRIDGE NO. 11 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. RIVER CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition.
- The river course will unlikely meander but will tend to scour at the riverbed.
- The upstream and downstream conditions of riverbed & river banks are stable.
- Drifts and debris during flooding are not evident.
- The river discharge is controlled by irrigation.
- The river velocity is controlled by irrigation.
- The top river width at design flood level is 30.00 m.
- This bridge crosses over an existing irrigation Canal.

2. SOIL CONDITION

- Site is underlain by thick gravel & sand deposits with alternating layer of silt & clay.
- Gravel and sand deposit is overlain uppermost plastic silt or clay with thickness ranging from 6.5 to 10.5 meters and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

- Two-lane, Single-span PCDG on Closed type abutment on RC piles.

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

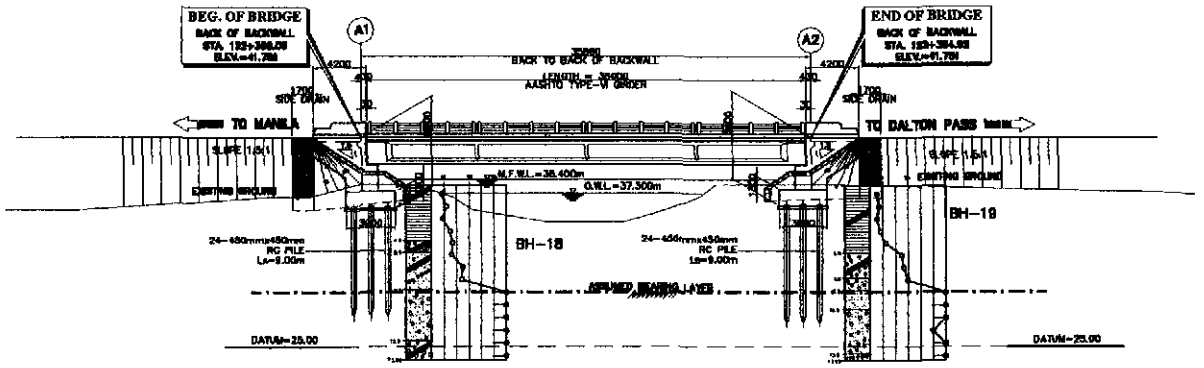
	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	35.86 m	35.86 m
CARRIAGEWAY WIDTH	2 x 3.50m	2 x 3.50m
SHOULDER WIDTH	1 x 2.50m	1 x 2.50m
SIDEWALK WIDTH	1 x 0.75m	1 x 0.75 m
SUPERSTRUCTURE TYPE	Three-span, PCDG Type VI (35.86m)	Three-span, PCDG Type Vi (35.86m)
SUBSTRUCTURE TYPE	Closed-type Abutment	Closed-type Abutment
FOUNDATION TYPE	450 x 450 RC Pile	450 x 450 RC Pile

(2) DETERMINATION OF FINAL SCHEME

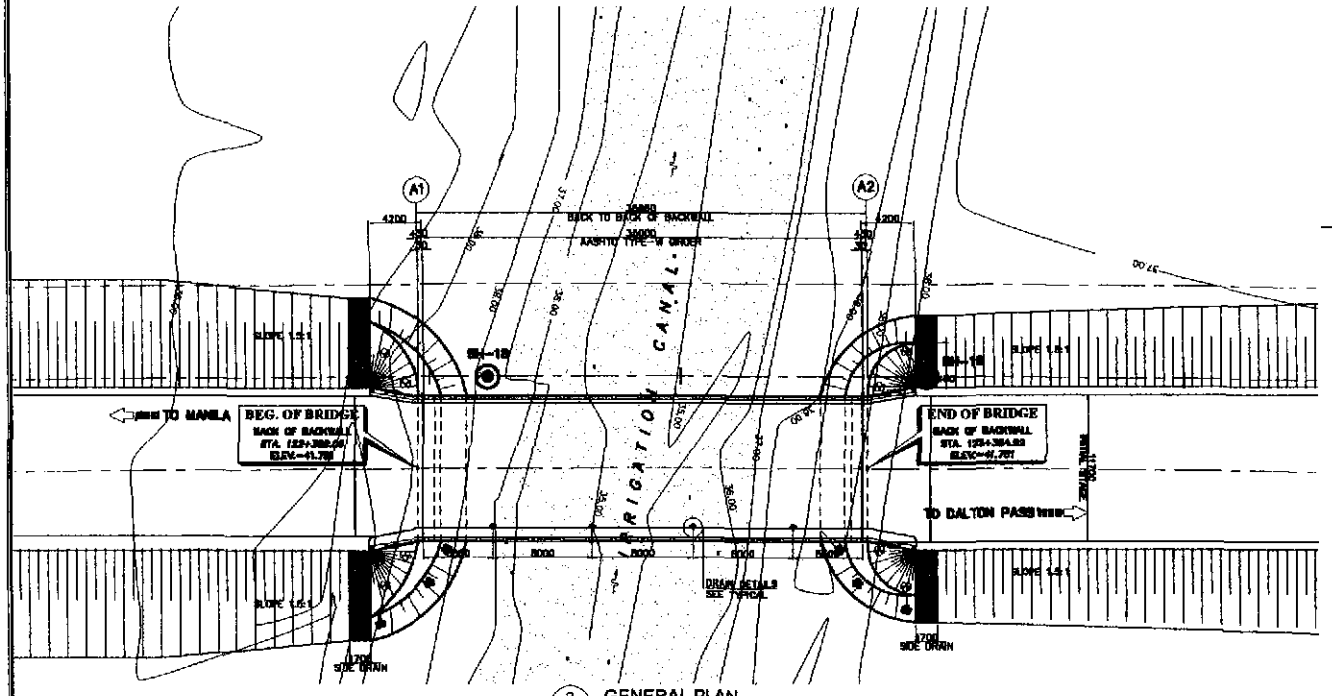
- Bridge spanning was determined by hydraulic consideration. Alternately 2-span bridge would be uneconomical and may present problems such as debris collision to its columns and local scour at its piers foundation.

(3) PROTECTION AGAINST SCOURING

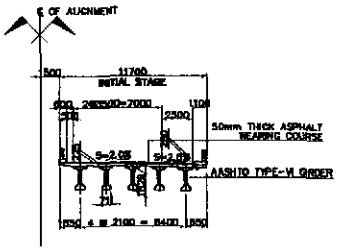
- Grouted Riprap River Bank Protection will be used in conjunction with DPWH Criteria for river with velocity < 3.0 m/sec.



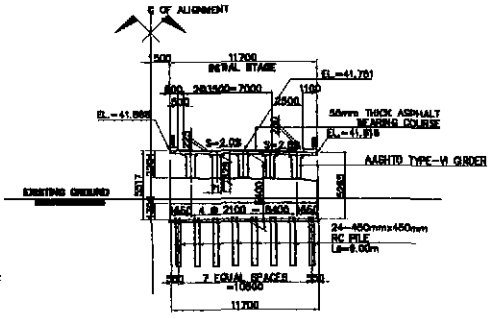
1 GENERAL ELEVATION
SCALE 1:200



2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

A CABANATUAN BRIDGE NO.11 (STA. 122+359.06)
SCALE AS SHOWN

HYDRAULIC DATA	
IRRIGATION CANAL	-

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KEI HATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO YACHIYO ENGINEERING CO., LTD.

DESIGNED | CHECKED | SUBMITTED | DATE | SIGNATURE | TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

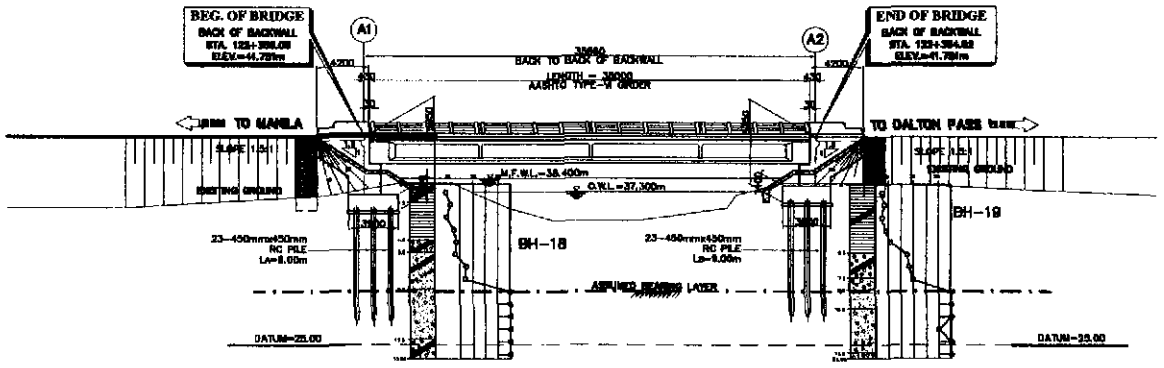
PMS. - PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By: DANILO O. TRAJANO, Project Director	Reviewed By: ADRIANO M. DORAY, Chief, Bridge Division	Recommended By: GILBERTO S. REYES, Director IV (OIC)	Recommended By: (Two cover sheet for Secretary) EDMUNDO V. ARR, Undersecretary	Approved By: (Two cover sheet for Secretary/Approval) SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE IV

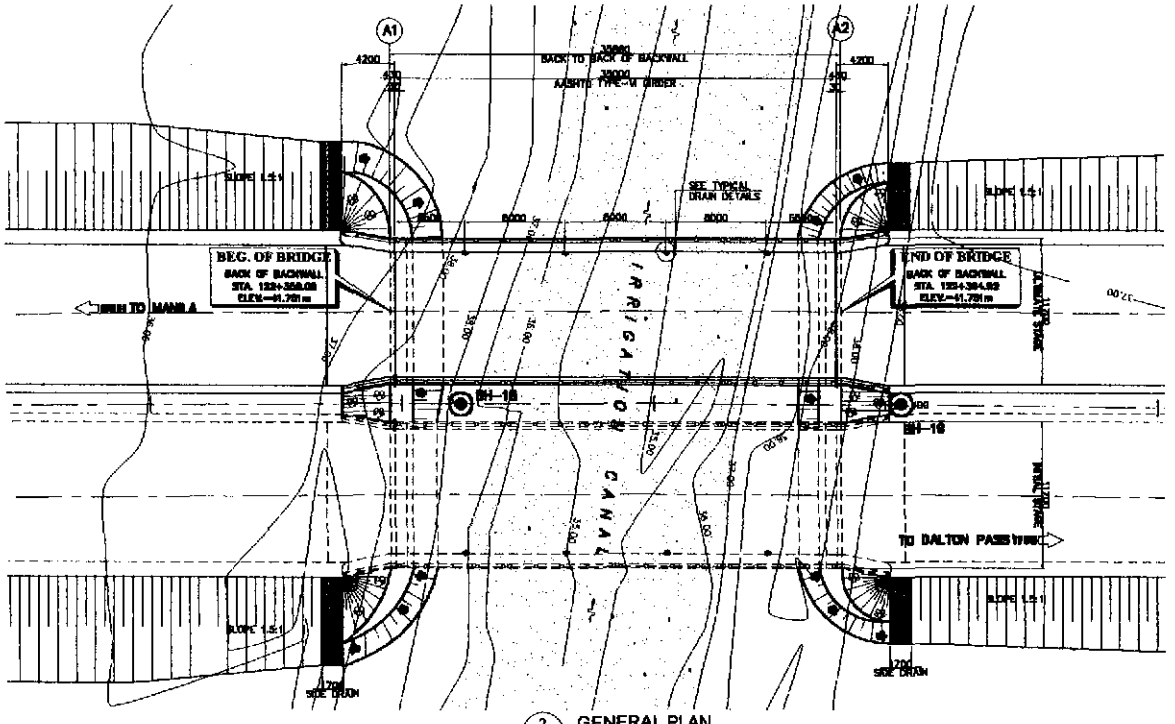
SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 11
GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)

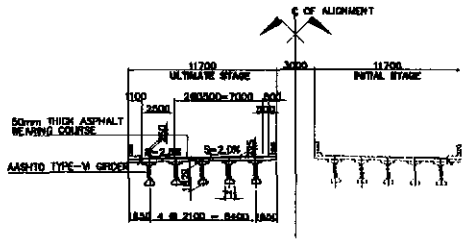
SHEET NO. : B-135



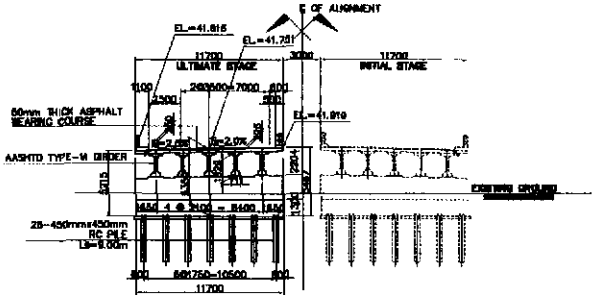
1 GENERAL ELEVATION
SCALE 1:200



2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
IRRIGATION CANAL	-

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT AT SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BRIDGE NO.11 (STA. 122+359.06)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

DESIGNED	CHECKED	SUBMITTED
		TEAM LEADER

CHIEF - PMD	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By: DANILO C. TRIANO, Project Director	Endorsed By: ADRIANO M. CORDY, Chief, Bridges Division	Recommended By: FILIBERTO S. REYES, Director IV (OIC)	Recommended By: EDMUNDO V. MR, Undersecretary	Approved By: SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)

SCALE : FULL SIZE A1

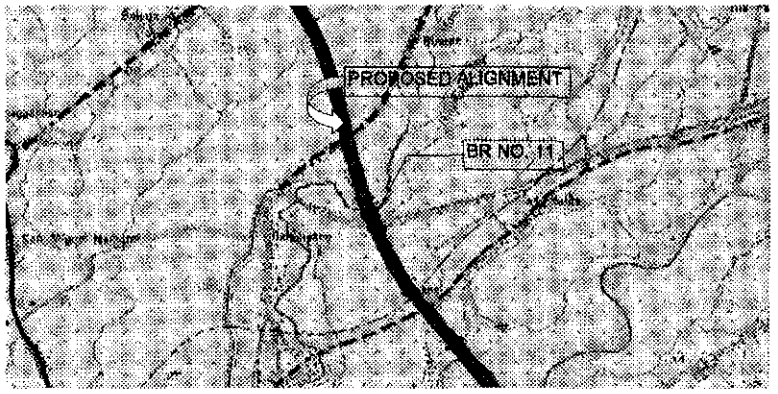
SHEET CONTENTS :
CABANATUAN BYPASS
BRIDGE NO.11(ULTIMATE STAGE)
GENERAL PLAN, ELEVATION AND SECTIONS

SHEET NO. : CB*

PROPOSED BRIDGE SITE SURVEY

Survey Date	20-Jun-01	Bridge No./Station	Bridge No.11 / STA.18+123.670
Bypass Name	CABANATUAN	Prepared by	RML / ENS

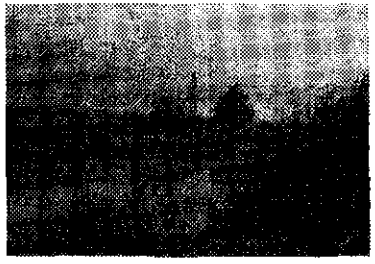
1 Location — River Name :



2 Photograph

Upstream

Downstream



3 Land Use	☐ Commercial ☐ Industrial ☐ Residential ☑ Agricultural ☐ Others	
4 Geographical Features / Terrain	☐ Mountenous area ☐ Alluvial ☑ Plain ☐ Others	
5 Stream / River Type	☑ Straight ☐ Braided ☐ Meandering	
6 Nearby Structures	Upstream	Control gate at 200m from site.
	Downstream	
7 Environmental Condition	☑ Trees/Vegetation	☐ Fish & Fish Habitat
8 Water Level (During survey)	☐ 0 - 0.60m ☐ 0.60m - 1.0m ☑ 1.0m - 1.5m ☐ Others	

9 River Condition

River Width (m) : 30.00

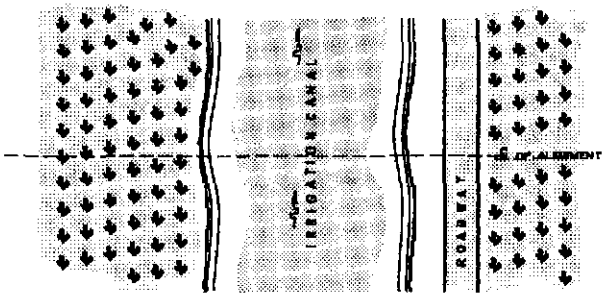
Stream Velocity (m/s) :
- Normal : 0.75
- During Flood : 1.30

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

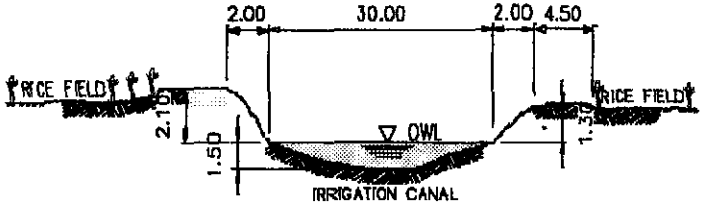
Site Access During Construction:
- ☑ Possible
- ☑ Difficult

Comments:

a. Plan



b. Section / Elevation



10 Meander Situation	Upstream	☐ Existing ☑ None
	Downstream	☐ Existing ☑ None
11 Riverbed Material	☐ Large Gravel ☐ Gravel ☐ Sand ☑ Soil ☐ Others	
12 Riverside/Bank Condition	Upstream	☑ Stable ○L○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
	Downstream	☑ Stable ○L○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
13 Tendency to River Course and Riverbed Change	☑ Stable ☐ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others	
14 Flood signs	☑ None ☐ Existing -	
15 Evidence of Drift & Debris	☑ None ☐ Existing	Driftwoods, Φ = / Length = / Others :
16 Maximum Flood Water Level	☑ Interview ☐ Flood Data ☐ Flood Marks	Height above bank (m): 0.2 / Frequency (yrs): 10 / Cause: Typhoon / Comments:
17 Recommendation for Bridge	Verify maximum flood water level. Provide 1.0m clearance from MFWL and/or top of bank.	
18 Recommendation for River Protection Works		
19 Comments / Others		

Cabanatuan Bypass Road

Table 3.4-26 Bridge No. 11 Site Condition

BRIDGE NO. 12 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. RIVER CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition.
- The river course will unlikely meander but will tend to scour at the riverbed.
- The upstream and downstream conditions of riverbed & river banks are stable.
- Drifts and debris during flooding are not evident.
- The river discharge at 50 year return period is 735.50 cum/sec
- The river velocity at 50 years return period is 3.00 m/sec.
- The top river width at design flood level is 90.88 m.
- The bridge is skewed 15° RF

2. SOIL CONDITION

- Site is underlain by thick gravel & sand deposits with alternating layer of silt & clay.
- Gravel and sand deposit is overlain uppermost plastic silt or clay with thickness ranging from 3.5 to 10.5 meters and after which N-values > 50 is consistent towards the end of borehole.

3. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

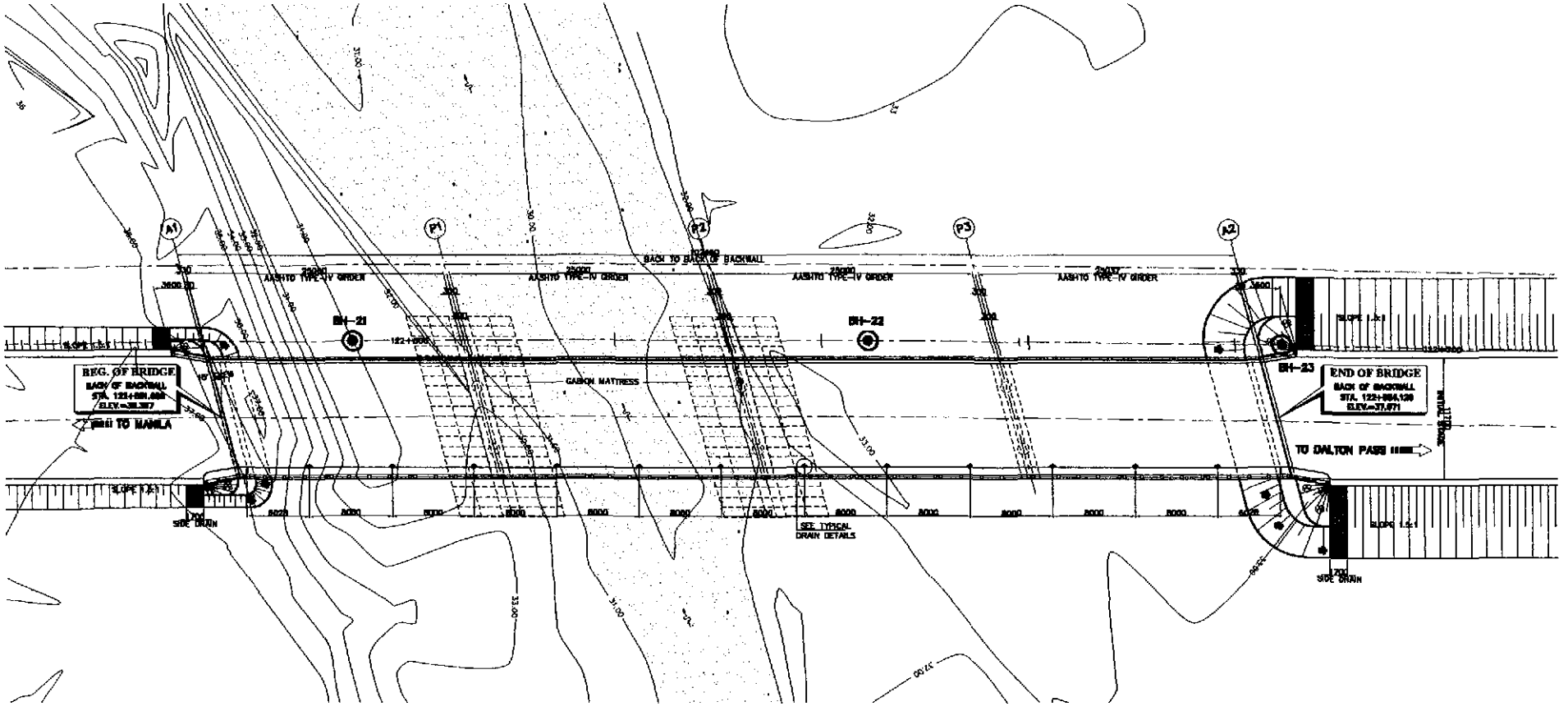
	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	102.48 m	102.48 m
CARRIAGEWAY WIDTH	2 x 3.50m	2 x 3.50m
SHOULDER WIDTH	1 x 2.50m	1 x 2.50m
SIDEWALK WIDTH	1 x 0.75m	1 x 0.75 m
SUPERSTRUCTURE TYPE	Three-span, PCDG Type IV (102.46m)	Three-span, PCDG Type IV (102.46m)
SUBSTRUCTURE TYPE	Closed-type Abutment/2-Column Pier	Closed-type Abutment/2-Column Pier
FOUNDATION TYPE	BH-Piles (450 x 260)	BH-Piles (450 x 260)

(2) DETERMINATION OF FINAL SCHEME

- A 4-span bridge was proposed to meet the required hydraulic opening.
- The 4-span bridge is more economical than 3-span bridge which requires a more expensive PCDG Type VI comparing to reduced number of pier.
- The 4-span bridge is more economical than 5-span bridge which will required additional Pier (including pile, etc.) as compared to the added cost of PCDG Type IV.

(3) PROTECTION AGAINST SCOURING

- Since water velocity is relatively fast (4.35 m/sec), DPWH criteria requires Rubble Concrete Riverbank Protection.
- Riverbank Protection will be supported by Steel Sheet Piles penetrating thru 3.5 to 6.0 meters of silty clay layer.
- Gabion Mattress will be used to protect piers from local scouring.



1 GENERAL PLAN
SCALE 1:200

A CABANATUAN BYPASS BRIDGE NO. 12 (STA. 122+581.666)
SCALE AS SHOWN

JICA JAPAN INTERNATIONAL COOPERATION AGENCY
KEI KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO YACHIYO ENGINEERING CO., LTD.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

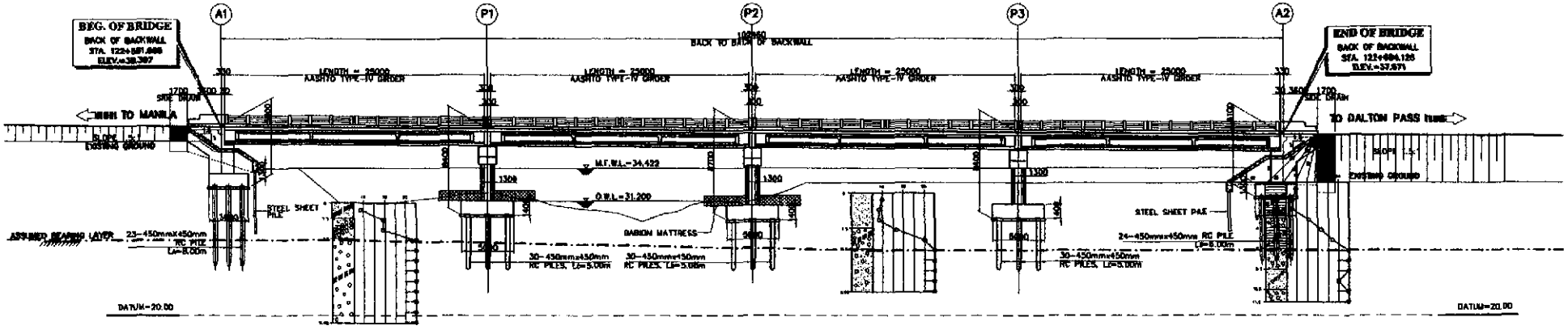
Prepared By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signatory)	Approved By: (See cover sheet for Signature/Approval)
Asst. – Field	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
DANILO G. TRAJANO, Project Director	ADRIANO M. DORDY, Chief, Bridges Division	GILBERTO B. REYES, Director IV (OIC)	EDUARDO V. MA, Undersecretary	BIENVEN A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE IV

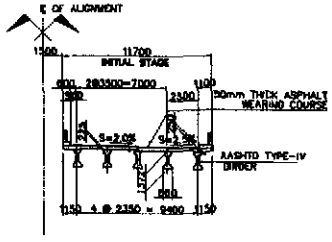
SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 12
GENERAL PLAN
(INITIAL STAGE)

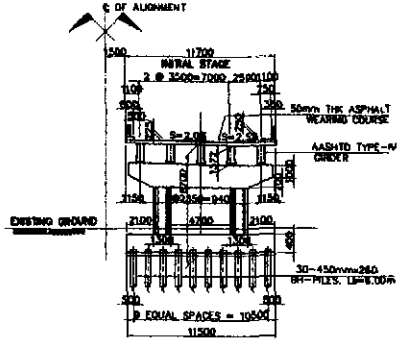
SHEET NO. : B-150



1 GENERAL ELEVATION
SCALE 1:200



2 SECTION @ MIDSPAN
SCALE 1:200



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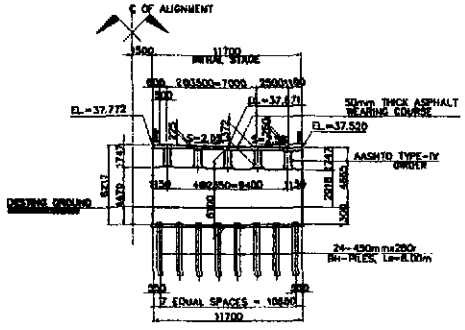
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	m/sec
DISCHARGE @ 50 YEARS, Qso	cu.m/sec
CATCHMENT AREA, CA	129.925 sq. km

NOTE :
PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A1, PIER P2 AND P3 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUME BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BYPASS BRIDGE NO. 12 (STA. 122+581.666)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BUREAU OF DESIGN
OFFICE OF THE SECRETARY

Prep. – Prjct. Engr.	Submitted By:	Reviewed By:	Recommended By:	Recommended By: (For conf. sheet for Signature)	Approved By: (For conf. sheet / or Signature/approval)
	RAMON C. TRAJANO Project Director	ARSENIO M. BORJA Chief, B Div.	GILBERTO S. REYES Director IV	EDUARDO V. MAR Undersecretary	SIMEON A. DATUMANONG Secretary

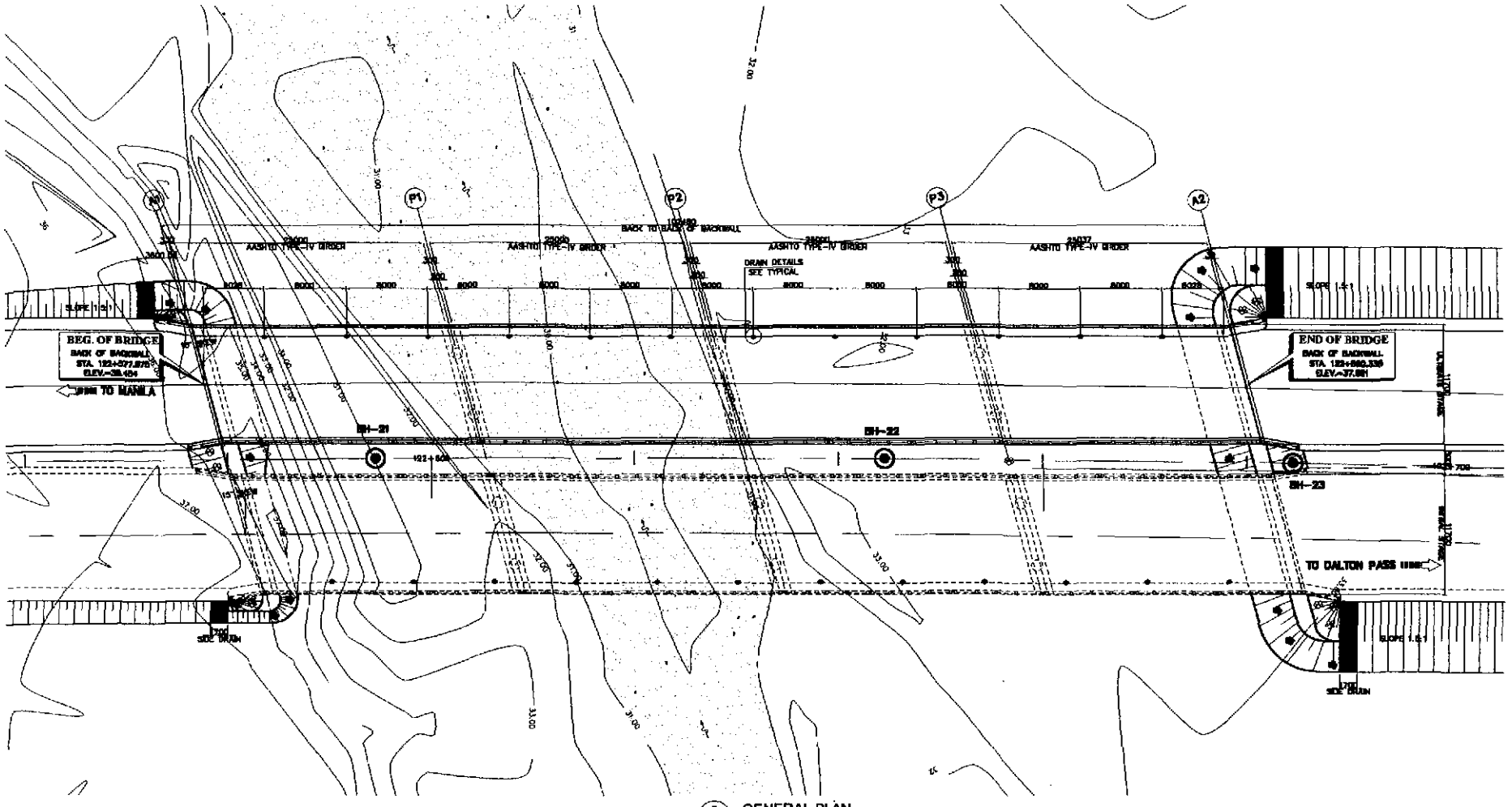
	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING(INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE IV

SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 12
GENERAL ELEVATION AND SECTIONS (INITIAL STAGE)

SHEET NO. : B-151



2 GENERAL PLAN
SCALE 1:200

A CABANATUAN BYPASS BRIDGE NO. 12 (STA. 122+577.875)
SCALE AS SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KEI KATAHIRA & ENGINEERS INTERNATIONAL
YEC YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DRAWN		
CHECKED		
SUBMITTED		TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

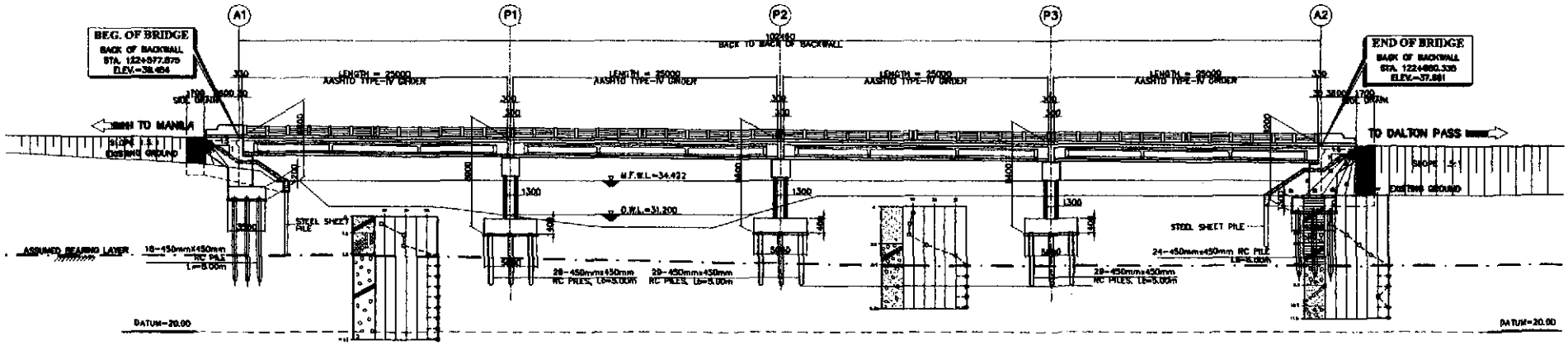
ASEC. – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DAVID G. TRIANO, Project Director	ADRIANO M. DORIY, Chief, Bridge Division	GILBERTO S. REYES, Director IV (OIC)	EDMUNDO V. MR, Undersecretary	SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)

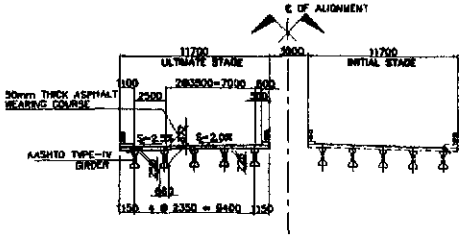
SCALE : FULL SIZE A1

SHEET CONTENTS :
CABANATUAN BYPASS
BRIDGE NO.12 (ULTIMATE STAGE)
GENERAL PLAN, ELEVATION AND SECTIONS

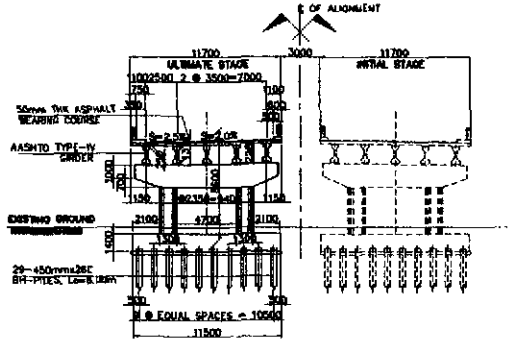
SHEET NO. : CB*



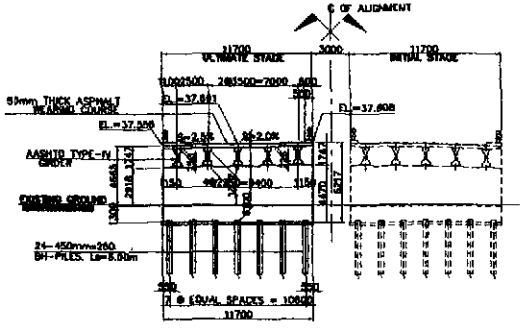
1 GENERAL ELEVATION
SCALE 1:200



2 SECTION @ MIDSPAN
SCALE 1:200



3 SECTION @ PIER P2
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
VELOCITY @ 50 YEARS, Vso	3.000 m/sec
DISCHARGE @ 50 YEARS, Qso	735.509 cu.m/sec
CATCHMENT AREA, CA	129.925 sq. km

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT PIER P1 AND P2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

THE PILE LENGTH RECOMMENDED ARE MINIMUM. SHOULD THE SOIL AT THE RECOMMENDED LENGTH BE INADEQUATE BEARING MATERIAL, LENGTH SHALL BE INCREASED. THE MINIMUM SOCKET LENGTH INTO ADEQUATE SOIL FOR 400 x 400 R. C. PILE IS 1000mm WHILE FOR 450 x 450 R. C. PILE IS 1200mm.

A CABANATUAN BRIDGE NO. 12 (STA. 122+577.875)
SCALE A0 SHOWN

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

DESIGNED | DATE | SIGNATURE
CHECKED
SUBMITTED
TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BUREAU OF DESIGN | OFFICE OF THE SECRETARY
Prep. : Prof.
Submitted By: DANILO C. TRIJANO, Project Director
Reviewed By: ADRIANO M. DOROY, Chief, Br. Span Division
Recommended For: GILBERTO G. REYES, Director IV (OIC)
Recommended By: (See cover sheet for Signature) EDMUNDO V. MER, Undersecretary
Approved By: (See cover sheet for Signature) SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)

SCALE : FULL SIZE A1

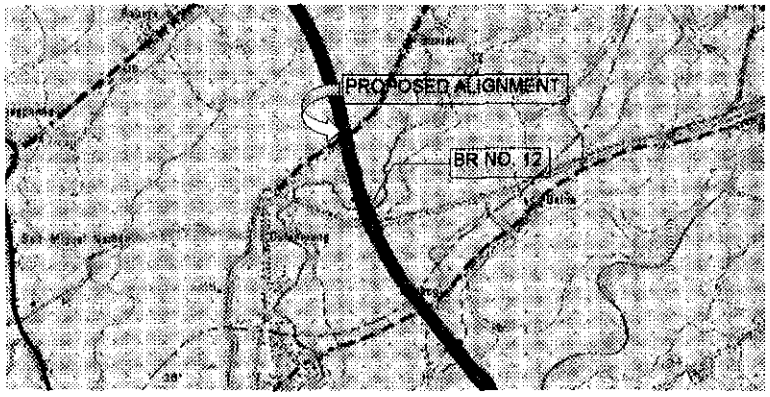
SHEET CONTENTS :
CABANATUAN BYPASS
BRIDGE NO.12 (ULTIMATE STAGE)
GENERAL ELEVATION AND SECTIONS

SHEET NO. : CB*

PROPOSED BRIDGE SITE SURVEY

Survey Date	20-Jun-01	Bridge No./Station	Bridge No.12 / STA.18+339.670
Bypass Name	CABANATUAN	Prepared by	RML / ENS

1 Location — River Name :



2 Photograph

Downstream

Upstream

3 Land Use — ☐ Commercial ☐ Industrial ☐ Residential ☑ Agricultural ☐ Others

4 Geographical Features / Terrain — ☐ Mountenous area ☐ Alluvial ☑ Plain ☐ Others

5 Stream / River Type — ☑ Straight ☐ Braided ☑ Meandering

6 Nearby Structures — Upstream: — Downstream: 80m long bridge at 900m from site.

7 Environmental Condition — ☑ Trees/Vegetation ☑ Fish & Fish Habitat

8 Water Level (During survey) — ☐ 0 - 0.60m ☑ 0.50m - 1.0m ☐ 1.0m - 1.5m ☐ Others

9 River Condition

River Width (m) : 55.00

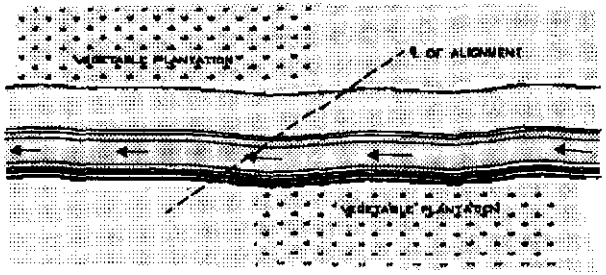
Stream Velocity (m/s) :
- Normal : 0.65
- During Flood : 1.50

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

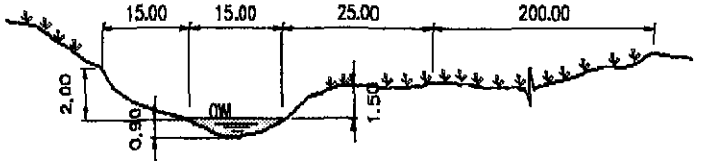
Site Access During Construction:
☑ Possible
☐ Difficult

Comments:

a. Plan



b. Section / Elevation



10 Meander Situation
- Upstream: ☑ Existing ☐ None
- Downstream: ☐ Existing ☑ None

11 Riverbed Material — ☐ Large Gravel ☑ Gravel ☑ Sand ☑ Soil ☐ Others

12 Riverside/Bank Condition
- Upstream: ☑ Stable ○L○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R
- Downstream: ☑ Stable ○L○R ☐ Scouring/Eroding - L R ☐ With Protection/Revetment - L R

13 Tendency to River Course and *Riverbed Change* — ☑ Stable ☑ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others

14 Flood signs — ☑ None ☐ Existing -

15 Evidence of Drift & Debris — ☑ None ☐ Existing — Driftwoods, Φ = — Length = — Others : Weeds and bamboos.

16 Maximum Flood Water Level — ☑ Interview ☐ Flood Data ☐ Flood Marks
- Height above bank (m): 0.3
- Frequency (yrs): 10
- Cause: Typhoon
- Comments : South side, water wiythin bank but north side water overflow during flood.

17 Recommendation for Bridge — Verity maximum flood water level. Provide 1.50m clearance from MFWL.

18 Recommendation for River Protection Works

19 Comments / Others

Table 3.4-27 Bridge No. 12 Site Condition

BRIDGE NO. 13 (CABANATUAN BYPASS–INITIAL AND ULTIMATE STAGE)

1. RIVER CONDITION

- The riverbed is composed of silty clay with its river bank in stable condition.
- The river courses will unlikely meander.
- The upstream and downstream conditions of riverbed & river banks are stable.
- Drifts and debris during flooding are not evident.
- This bridge crosses over an existing irrigation Canal.
- The river discharge is controlled by irrigation canal.
- The river velocity is controlled by irrigation canal.
- The top river width at design flood level is 15.40 m.
- The bridge is skewed 10° LF

2. SOIL CONDITION

- Bridge site is underlain by thick gravel and sand deposits with alternating layer of silt and clay.
- Gravel and sand deposit is overlain uppermost plastic silt or clay with 19.5 meters thickness and after which N-values > 50 is consistent towards the end of borehole.

4. DESCRIPTION OF BRIDGE

(1) SELECTION OF SPAN COMPOSITION AND BRIDGE TYPE

	INITIAL STAGE	ULTIMATE STAGE
BRIDGE LENGTH	20.66 m	20.66m
CARRIAGEWAY WIDTH	2 x 3.50m	2 x 3.50m
SHOULDER WIDTH	1 x 2.50m	1 x 2.50m
SIDEWALK WIDTH	1 x 0.75m	1 x 0.75 m
SUPERSTRUCTURE TYPE	One-span, PCDG Type IV (20.66m)	Three-span, PCDG Type IV (20.66m)
SUBSTRUCTURE TYPE	Closed-type Abutment	Closed-type Abutment
FOUNDATION TYPE	RC Piles (450 x 450)	RC Piles (450 x 450)

(2) DETERMINATION OF FINAL SCHEME

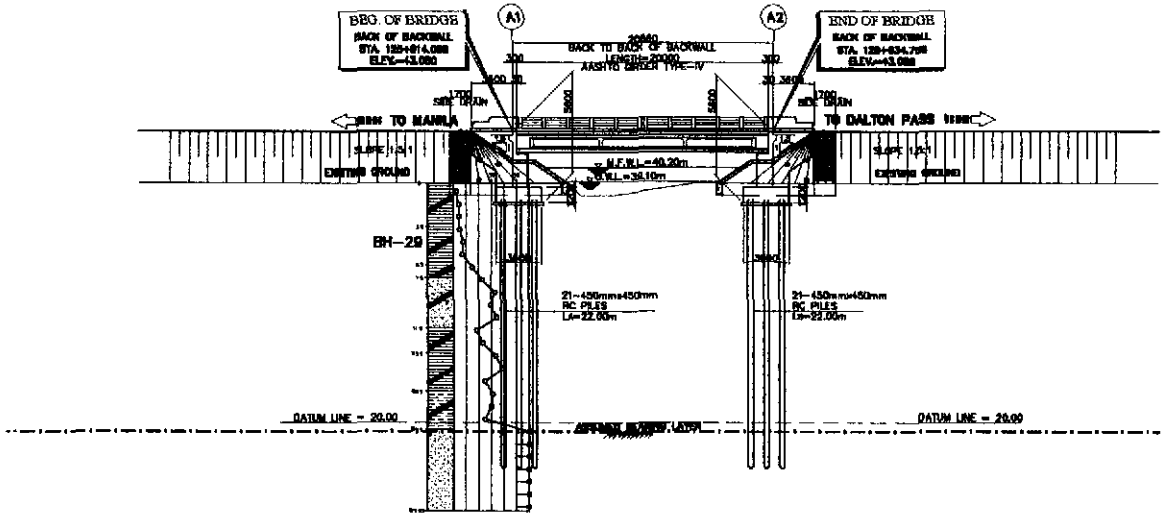
- The top width of river during the design flood is 15.4 m. To minimize river encroachment considering abutment slope protection, the bridge length becomes 20.0m for a single-span bridge.

- A single Span bridge is proposed due to :
  - Two-span bridge is not recommended since one pier will have to be located at the center of the river and may cause problems on river hydraulics.
  - A three span bridge tends to be more expensive because of additional substructure cost.

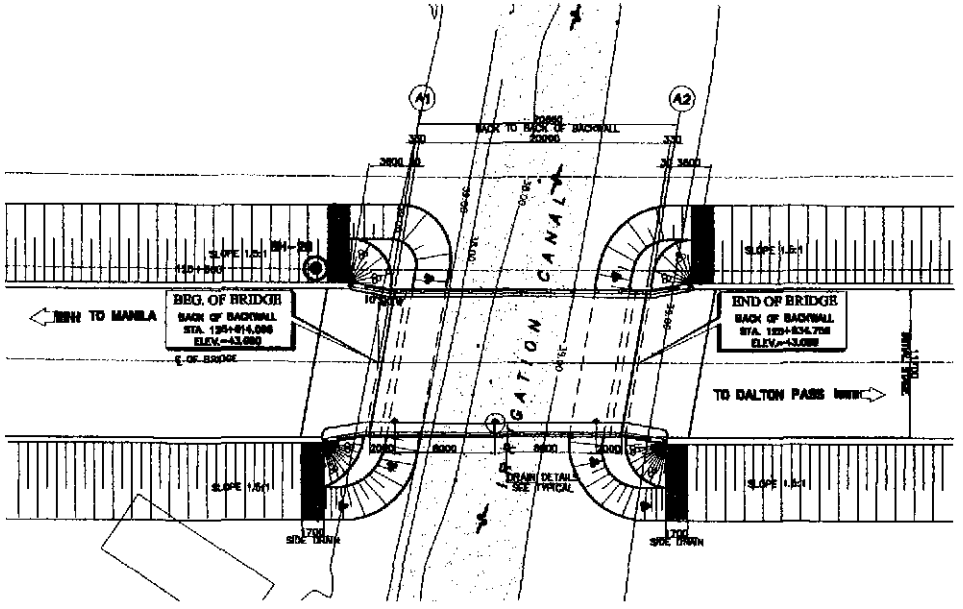
- Pile foundation is proposed due to presence of soft soil layer.

(3) PROTECTION AGAINST SCOURING

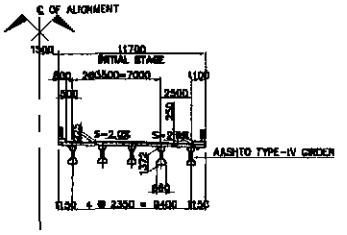
- Grouted Riprap River Bank Protection will be used in conjunction with DPWH Criteria for river with velocity < 3.0 m/sec.



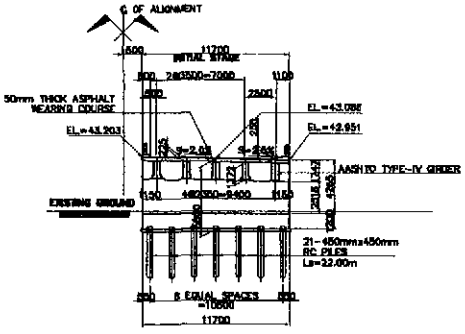
1 - SCALE 1:200 GENERAL ELEVATION



2 - SCALE 1:200 GENERAL PLAN



3 - SCALE 1:200 SECTION @ MIDSPAN



4 - SCALE 1:200 SECTION @ ABUTMENT A2

HYDRAULIC DATA	
IRRIGATION CANAL	-

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

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A - SCALE AS SHOWN CABANATUAN BRIDGE NO.13 (STA.125+614.096)

JICA JAPAN INTERNATIONAL COOPERATION AGENCY

KATAHIRA & ENGINEERS INTERNATIONAL — YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED		
CHECKED		
SUBMITTED		TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

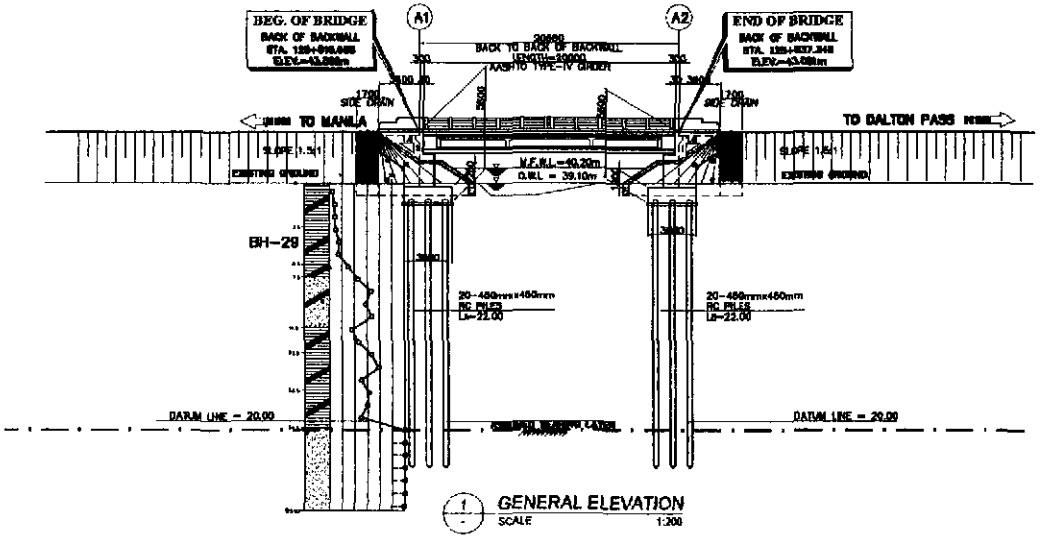
PURE - PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By	Reviewed By	Recommended By	Recommended By (Not later than for Signature)	Approved By (Not later than for Signature/Approval)
DIVILO C. TAVARIO, Project Director	ADRIANO M. DONOY, Chief, Bridges Division	GILBERTO S. BOYES, Director IV (OIC)	EDUARDO V. MA, Undersecretary	RAMON A. BAUTISTA, Secretary

PROJECT AND LOCATION :
DETAILED DESIGN ENGINEERING ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY
CABANATUAN BYPASS - CONTRACT PACKAGE IV

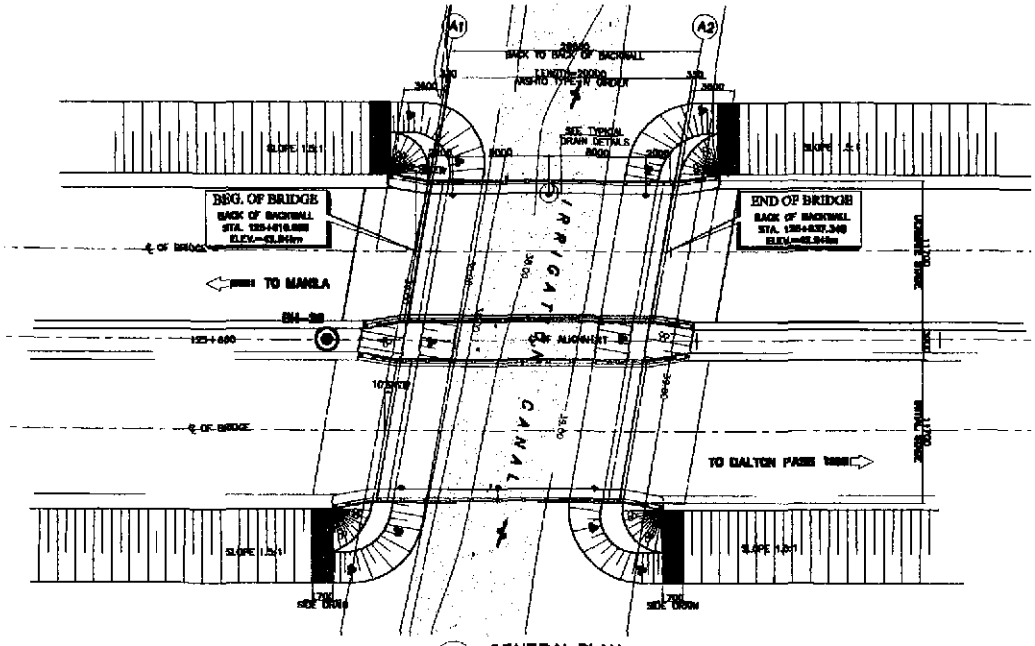
SCALE : 1 : 200 FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 13
GENERAL PLAN, ELEVATION AND SECTIONS (INITIAL STAGE)

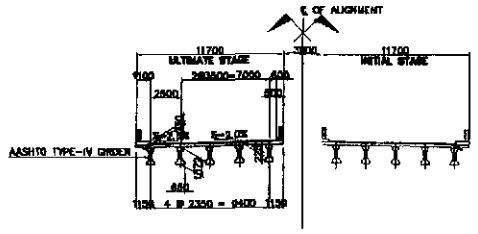
SHEET NO. : B-170



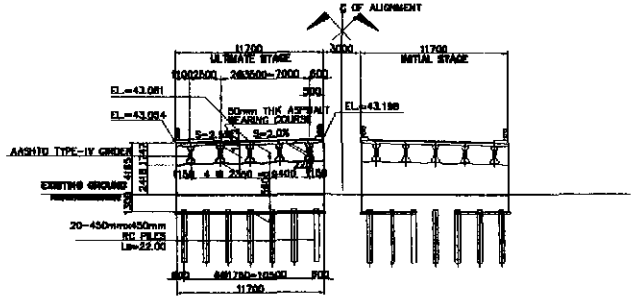
1 GENERAL ELEVATION
SCALE 1:200



2 GENERAL PLAN
SCALE 1:200



3 SECTION @ MIDSPAN
SCALE 1:200



4 SECTION @ ABUTMENT A2
SCALE 1:200

HYDRAULIC DATA	
IRRIGATION CANAL	-

NOTE :

PRIOR TO CONSTRUCTION SOIL INVESTIGATION AT ABUTMENT A2 SHALL BE CONDUCTED FOR CONFIRMATION OF ASSUMED BEARING CAPACITY AND FOOTING ELEVATION.

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A PLARIDEL BRIDGE NO.13 (STA. 125+637.548)
SCALE AS SHOWN

JICA JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

DESIGNED | CHECKED | SUBMITTED — DATE — SIGNATURE — TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

BUREAU OF DESIGN			OFFICE OF THE SECRETARY	
Submitted By	Reviewed By	Recommended By	Recommended By (Use cover sheet for Signature)	Approved By (Use cover sheet for Signature/Approval)
DANILO C. ITALIANO Project Director	ANTONIO M. DORDY Chief, Bridges Division	GILBERTO S. REYES Director IV (OIC)	EDMUNDO V. MIR Undersecretary	RUBEN A. DATAMONGAN Secretary

PROJECT AND LOCATION :
DETAILED ENGINEERING DESIGN ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)

SCALE : FULL SIZE A1

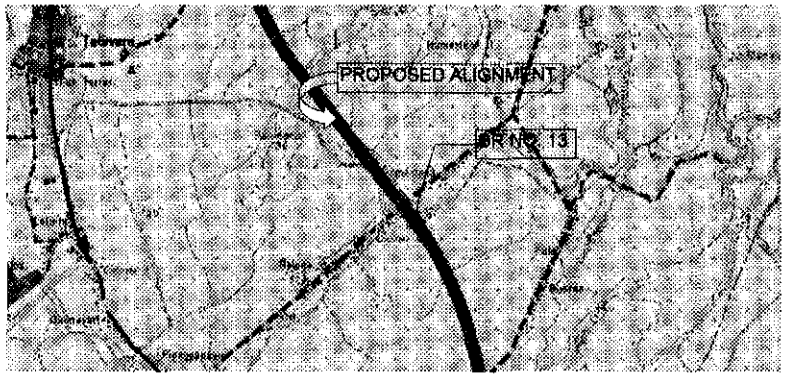
SHEET CONTENTS :
CABANATUAN BYPASS
BRIDGE NO.13 (ULTIMATE STAGE)
GENERAL PLAN, ELEVATION AND SECTIONS

SHEET NO. : CB*

PROPOSED BRIDGE SITE SURVEY

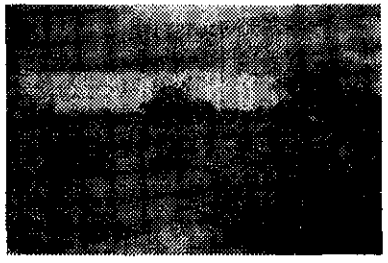
Survey Date	20-Jun-01	Bridge No./Station	Bridge No.13 / STA.21+382.900
Bypass Name	CABANATUAN	Prepared by	RML / ENS

Location — River Name :



Photograph

Downstream



Upstream

River Condition

River Width (m) : 13.00

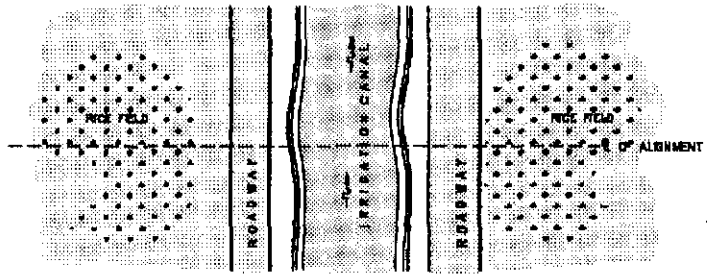
Stream Velocity (m/s) :
- Normal : 0.20
- During Flood : 1.20

Channel Slope (%) :
- Upstream : 2
- Downstream : 2

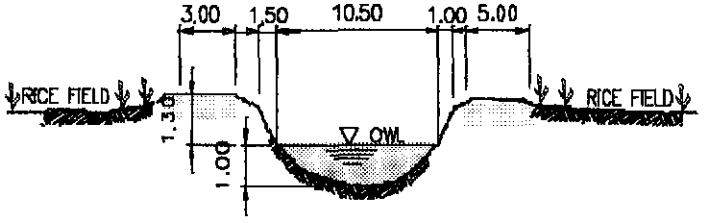
Site Access During Construction:
- [x] Possible
- [ ] Difficult

Comments:

a. Plan



b. Section / Elevation



10 Meander Situation	Upstream	☐ Existing ☐ None	
	Downstream	☐ Existing ☐ None	
11 Riverbed Material	☐ Large Gravel ☐ Gravel ☐ Sand ☑ Soil ☐ Others		
12 Riverside/Bank Condition	Upstream	☑ Stable ○L ○R ☐ Scouring/Eroding - L R	☐ With Protection/Revetment - L R
	Downstream	☑ Stable ○L ○R ☐ Scouring/Eroding - L R	☐ With Protection/Revetment - L R
13 Tendency to River Course and Riverbed Change	☑ Stable ☐ Scouring ☐ Aggradation ☐ Degradation ☐ Sediment Transport ☐ Others		
14 Flood signs	☑ None ☐ Existing -		
15 Evidence of Drift & Debris	☑ None ☐ Existing	Driftwoods, Φ =	Length =
		Others :	
16 Maximum Flood Water Level ☑ Interview ☐ Flood Data ☐ Flood Marks	Height above bank (m)	0.4	Comments
	Frequency (yrs)	10	
	Cause	Typhoon	
17 Recommendation for Bridge	Verify maximum flood water level. Provide 1.0m clearance from MFWL and/or top of bank.		
18 Recommendation for River Protection Works			
19 Comments / Others			

3 Land Use	☐ Commercial ☐ Industrial ☐ Residential ☑ Agricultural ☐ Others	
4 Geographical Features / Terrain	☐ Mountainous area ☐ Alluvial ☑ Plain ☐ Others	
5 Stream / River Type	☑ Straight ☐ Braided ☐ Meandering	
6 Nearby Structures	Upstream	Three-celled RCBC at 129m from site.
	Downstream	
7 Environmental Condition	☑ Trees/vegetation	☑ Fish & Fish Habitat
8 Water Level (During survey)	☐ 0 - 0.50m ☑ 0.50m - 1.0m ☐ 1.0m - 1.5m ☐ Others	

Table 3.4-28 Bridge No. 13 Site Condition

Cabanatuan Bypass Road