BRIDGES

GENERAL

GENERAL NOTES FOR BRIDGES - 1

A. DESIGN CRITERIA

1. DESIGN SPECIFICATION

   A. DPWH DESIGN GUIDELINES CRITERIA AND STANDARDS FOR PUBLIC WORKS AND HIGHWAYS, VOL.II .

   B. NATIONAL STRUCTURAL CODE OF THE PHILIPPINES, VOL.II, BRIDGES, 2nd ED. 1997

   C. THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 16TH EDITION, 1996.

   D. JAPAN ROAD ASSOCIATION SPECIFICATIONS FOR HIGHWAY BRIDGES

2. DESIGN METHODOLOGY

   ALLOWABLE STRESS DESIGN (ASD) &
   LOAD FACTOR DESIGN (ULTIMATE STRENGTH DESIGN)

3. LOADING

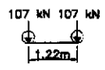
   3.1 DEAD LOADS — WEIGHT

   A. CONCRETE — 24.50 kN/m^3
   B. STEEL — 77.00 kN/m^3
   C. EARTH — 19.00 kN/m^3
   D. WEARING SURFACE (50mm THK.) — 1.10 kN/m^2

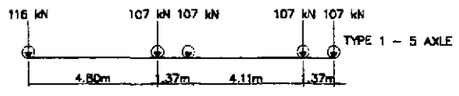
   3.2 LIVE LOADS

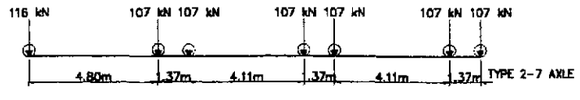
   A. AASHTO MS18 (HS20) TRUCK AND EQUIVALENT LANE LOADING.
   B. SIDEWALK LOAD
   SPAN $\leq$ 30.5m ; 4.07 kN/m^2
   SPAN > 30.5m ; $\left(1.437 + \frac{43.798}{L}\right)\left(\frac{16.76-W}{15.24}\right)$ $kN/m^2 < 2.874$ kN/m^2
   L : LOADED LENGTH W : SIDEWALK WIDTH

   C. ALTERNATE MILITARY LOADING.



   D. PERMIT DESIGN LOAD (SPECIAL PERMIT REQUIRED BEFORE PASSING BRIDGE)





   3.3 IMPACT

   IN ACCORDANCE WITH DIVISION 1 OF AASHTO STANDARD SPECIFICATIONS,1996.

   3.4 SEISMIC LOAD

   IN ACCORDANCE WITH DIVISION 1A OF THE 1996 AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES USING ACCELERATIONS COEFFICIENT OF 0.40 AND SEISMIC PERFORMANCE CATEGORY D.

   3.5 HYDRAULIC DESIGN DATA

   50-YEAR DESIGN DISCHARGE, Q_{50} = 5,020 m^3/sec.
   DESIGN FLOW VELOCITY, V_{50} = 0.79 m/sec.
   DESIGN FLOOD WATER LEVEL, DFWL = EL + 15.30 m
   CATCHMENT AREA, CA = 889.10 km^2

   3.6 TEMPERATURE RANGES

   ASSUMED BASE TEMPERATURE : +28C°
   MINIMUM AMBIENT AIR TEMPERATURE : +18C°
   MAXIMUM AMBIENT AIR TEMPERATURE : +38C°
   TEMPERATURE DIFFERENCE BETWEEN TOP OF SLAB AND OTHER PARTS OF STRUCTURE : +10C°

   3.7 CONSTRUCTION LOADS

   CONSTRUCTION LOADS SHALL BE AS STIPULATED IN THE AASHTO GUIDE SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THESE LOADS ARE NOT EXCEEDED AND THAT THE MEMBER STRESSES ARE WITHIN ALLOWABLE DURING CONSTRUCTION.

   3.8 OTHER LOADS

   IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS, 1996.

   3.9 LOAD COMBINATION (LOAD FACTOR DESIGN)

   A. GROUP 1 = 1.3 [1.0 D + 1.67(L+1)n + 1.0 SF]
   B. GROUP 1B = 1.3 [1.0 D + 1.0(L+1)p + 1.0 SF]
   C. GROUP VII = 1.3 [1.0 D + 1.0 SF + EQ]
   D. OTHER LOAD COMBINATIONS SHALL BE IN ACCORDANCE WITH AASHTO GUIDE SPECIFICATIONS.

B. MATERIALS

1. CONCRETE

   UNLESS INDICATED OTHERWISE ON PLANS, THE CONCRETE CLASS AND STRENGTH SHALL BE AS FOLLOWS:

STRUCTURAL MEMBER	CLASS	28 – DAY CYLINDER STRENGTH		MAX. SIZE OF COARSE AGGREGATE mm (in.)	REMARKS
		MPa	PSI		
CAST – IN PLACE GIRDERS, SLABS, DIAPHRAGMS, WINGWALLS BACKWALLS, ABUTMENT COPINGS, COLUMNS, SLABS, SHEAR KEYS	AA2	28	4060	20	
FOOTINGS, PILE CAP, BORED PILES, APPROACH SLAB	AA1	28	4060	25	*SEE NOTE BELOW
THIN REINFORCED SECTIONS, PARAPET, RAILINGS & RAILPOST, CURB AND SIDEWALK	C	21	3000	12	
PRESTRESSED CONCRETE MEMBERS : AASHTO GIRDERS, PRECAST DECK SLAB PANELS, C.I.P. POST-TENSIONED SLAB	PP	35 41	5075 5946	20 20	⊕ TRANSFER ⊕ SERVICE
STEEL SHEET PILE CAP	A	21	3000	38	
RUBBLE CONC., CONC. BLOCK FOR PIER PROTECTION	B	16.5	2400	50	–
LEAN CONCRETE	–	17	1450	38	

   * NOTE :
   THE CEMENT CONTENT OF THE DESIGN MIX SHALL BE ADJUSTED IN ACCORDANCE WITH THE AASHTO PROVISIONS WHEN CONCRETING UNDER WATER TO COMPENSATE FOR THE LOSS OF STRENGTH DUE TO WATER INFILTRATION.

2. REINFORCING STEEL

   (a) REINFORCING STEEL SHALL CONFORM TO AASHTO M31 (ASTM A615), GRADES 40 & 60 DEFORMED WITH MINIMUM YIELD STRENGTH AS DESCRIBED BELOW.

REBAR GRADE	YIELD STRENGTH fy (MPa)	SIZE (mm)
40	276 (40 ksi)	16mmø & BELOW, UNLESS OTHERWISE NOTED
60	415 (60 ksi)	20mmø & ABOVE

   (b) REINFORCING STEEL SHALL BE FREE OF MILL SCALES, OIL OR ANY SUBSTANCES WHICH WILL WEAKEN THE BOND WITH CONCRETE.
   (c) REINFORCING STEEL SHALL BE WELDABLE TYPE.
   WELDING REINFORCING STEEL SHALL CONFORM TO ANSI/AWS D1.4.

3. PRESTRESSING STEEL

   PRESTRESSING STEEL SHALL BE SEVEN-WIRE UNCOATED LOW RELXATION STRANDS AND SHALL CONFORM TO AASHTO M203 (ASTM A416) WITH MINIMUM ULTIMATE STRENGTH OF Fy = 1860 MPa (270,000psi).

   PC STRESS BAR SHALL BE HIGH TENSILE COLD WORKED STRESS BAR CONFORMING TO ASTM-A722/ISO 6934 (SBPR 930/1180) WITH NOMINAL TENSILE STRENGTH OF 1176 MPa.

4. STRUCTURAL STEEL AND WELDS

MATERIALS	YIELD STRENGTH fy (MPa)	REFERENCE SPECIFICATIONS
STRUCTURAL STEEL	250 (GRADE 36)	AASHTO M270, (ASTM A709)
WELDS	AS PER BASE METAL REQUIREMENT	LATEST ANSI /AASHTO/AWS D1.5 BRIDGE WELDING CODE

5. ELASTOMERIC BEARING PADS

   ELASTOMERIC BEARING PADS SHALL BE 100% VIRGIN CHLOROPRENE (NEOPRENE) PADS WITH DUROMETER HARDNESS 60 AND SHALL BE LAMINATED WITH NON-CORROSIVE MILD STEEL SHEETS (ASTM A570). ELASTOMERIC PADS SHALL CONFORM TO THE REQUIREMENTS AS PRESCRIBED IN DPWH D.O. NO. 25 SERIES OF 1977 "REVISED DPWH STANDARD SPECIFICATION FOR ELASTOMERIC BEARING PAD."

SPECIFICATIONS	
DURO HARDNESS, SHORE A (ASTM D-2240)---60 ±5	
TENSILE STRENGTH ASTM	D 412-175 Kg/cm^2 (min)
ULTIMATE ELONGATION %	350 % (min)
MATERIAL	NEOPRENE

C. CONSTRUCTION

THESE NOTES ARE PROVIDED FOR QUICK REFERENCE ONLY AND SHALL BE READ IN CONJUNCTION WITH THE TECHNICAL SPECIFICATIONS FOR THE PROJECT.

THE DESIGN OF BRIDGES IS BASED ON THE CONSTRUCTION SEQUENCE SHOWN IN THE DRAWINGS. ANY VARIATION FROM THE SEQUENCE MUST BE APPROVED BY THE ENGINEER.

CONSTRUCTION SHALL COMPLY WITH 1995 DPWH STANDARD SPECIFICATION FOR HIGHWAYS, BRIDGES AND AIRPORTS OR MODIFIED BY SPECIAL PROVISIONS.

1. DIMENSIONS

   1.1 SECTION, DIMENSIONS AND DISTANCES SHALL NOT BE SCALED FOR CONSTRUCTION PURPOSES. THE INDICATED DIMENSION SHALL GOVERN UNLESS OTHERWISE SPECIFIED.

   1.2 ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

   1.3 ALL STATIONING ARE IN KILOMETER PLUS METER AND ELEVATION IN METER.

GENERAL NOTES FOR BRIDGES - 2

2. SETTING OUT

THE SETTING OUT AND THE ELEVATIONS OF THE DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE APPROVED BY THE ENGINEER PRIOR TO THE START OF ANY CONSTRUCTION WORK.

3. REINFORCED CONCRETE

3.1 CAST IN PLACE CONCRETE SHALL BE CLASS "AA1" OR "AA2" EXCEPT RAILINGS WHICH SHALL BE CLASS "C". UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED EDGES SHALL BE CHAMFERED 20mm EXCEPT RAILINGS AND RE-ENTRANT ANGLES WHICH SHALL BE CHAMFERED AND FILLETED 13mm RESPECTIVELY.

3.2 CONCRETE MIX AND PLACING

(1) DESIGN OF CONCRETE MIX SHALL MEET THE DESIGN CONCRETE STRENGTH GIVEN UNDER ITEM 1 OF MATERIALS.

(2) CONCRETE SHALL BE DEPOSITED, VIBRATED AND CURED IN ACCORDANCE WITH THE SPECIFICATION.

(3) FOR CONCRETE DEPOSITED AGAINST THE GROUND, LEAN CONCRETE WITH A MINIMUM THICKNESS OF 100mm SHALL BE LAID FIRST BEFORE INSTALLING THE REINFORCEMENT. THIS LEAN CONCRETE SHALL NOT BE CONSIDERED IN MEASURING THE STRUCTURAL DEPTH OF CONCRETE SECTION.

(4) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL PLACING SEQUENCES FOR ALL CONCRETING WORK.

3.3 BAR BENDING, SPLICING AND PLACING

(1) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER, FOR APPROVAL, SHOP DRAWINGS INDICATING THE BENDING, CUTTING, SPLICING AND INSTALLATION OF ALL REINFORCING BARS.

(2) BARS SHALL BE BENT COLD. BARS PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT UNLESS PERMITTED BY THE ENGINEER.

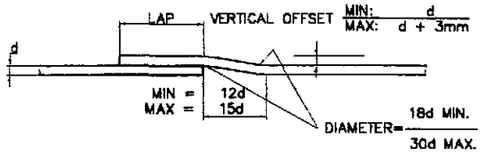
(3) BAR SPLICING NOT INDICATED ON DRAWINGS SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

(4) WELDED SPLICES, IF APPROVED BY THE ENGINEER, SHALL DEVELOP IN TENSION AT LEAST 125% OF THE SPECIFIED YIELD STRENGTH OF THE BARS.

(5) NOT MORE THAN 50% OF THE BARS AT ANY ONE SECTION SHALL BE SPLICED.

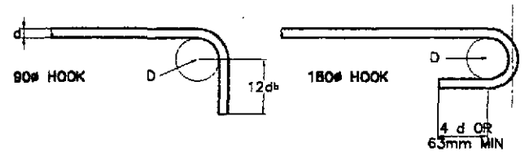
(6) UNLESS OTHERWISE SHOWN ON DRAWINGS, THE CLEAR DISTANCE BETWEEN PARALLEL BARS IN A LAYER SHALL NOT BE LESS THAN 1.5 TIMES THE NOMINAL DIAMETER OF THE BAR NOR LESS THAN 1.5 TIMES THE MAXIMUM SIZE OF COARSE AGGREGATE. THE CLEAR DISTANCE BETWEEN LAYERS SHALL NOT BE LESS THAN 25mm NOR ONE BAR DIAMETER. THE BARS IN THE UPPER LAYER SHALL BE PLACED DIRECTLY ABOVE THOSE IN THE BOTTOM LAYER.

(7) CRANKED SPLICES



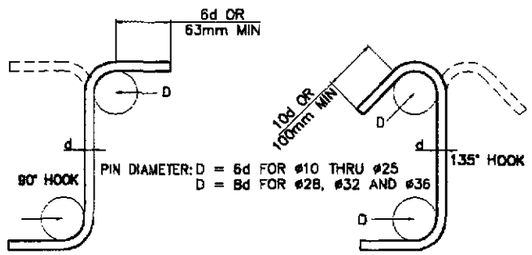
(8) HOOKS AND BENDS

DIMENSIONS OF 90-DEGREE AND 180-DEGREE HOOKS



PIN DIAMETER: D = 6d FOR ø10 THRU ø25
D = 8d FOR ø28, ø32 AND ø36

DIMENSIONS FOR STIRRUPS AND TIE HOOKS



PIN DIAMETER: D = 6d FOR ø10 THRU ø25
D = 8d FOR ø28, ø32 AND ø36

3.4 CONCRETE COVER TO REINFORCEMENT

UNLESS OTHERWISE NOTED, ALL BAR DIMENSIONS ARE REFERRED TO THE CENTER OF BARS AND THE MINIMUM COVERING MEASURED FROM THE SURFACE OF THE CONCRETE TO THE FACE OF ANY BAR SHALL BE 40mm. FOR SUBSTRUCTURE PERMANENTLY EXPOSED TO EARTH, COVERING SHALL BE 75mm. FOR COLUMNS, COVERING SHALL BE 75mm.

3.5 CONSTRUCTION JOINT

(1) THE POSITION AND FORM OF ANY CONSTRUCTION JOINT SHALL BE AS SHOWN ON DRAWINGS OR AS AGREED WITH THE ENGINEER.

(2) THE INTERFACE BETWEEN THE FIRST AND SECOND POUR CONCRETE SHALL BE ROUGHENED WITH AN AMPLITUDE OF 6MM MINIMUM.

3.6 FALSEWORK

ALL FALSEWORK SHALL BE DESIGNED BY THE CONTRACTOR SUBJECT TO THE APPROVAL BY THE ENGINEER. FALSEWORKS SHOWN IN THE DRAWINGS SHALL SERVE AS REFERENCE ONLY.

3.7 FORMWORK

FORMWORKS SHALL BE CONSTRUCTED SUCH THAT IT WILL NOT YIELD UNDER THE LOAD AND SHALL BE SUCH AS TO AVOID THE FORMATION OF FINE. ALL CORNERS OF CONCRETE MEMBERS SHALL BE CHAMFERED TO 25mm UNLESS NOTED OTHERWISE ON DRAWINGS. STRIPPING OF FORMS AND SHORES SHALL BE AS DESIGNATED BY THE ENGINEER. THE FOLLOWING MAYBE USED AS A GUIDE.

	MIN. TIME
SHORING UNDER GIRDERS, BEAMS, FRAMES. . . .	14 DAYS
DECK SLABS	14 DAYS
WALLS.	7 DAYS
COLUMNS.	7 DAYS
SIDES OF BEAMS AND ALL OTHER VERTICAL SURFACES	2 DAYS

3.8 PROTECTION AND CURING OF CONCRETE

CONCRETE SURFACES SHALL BE PROTECTED FROM HARMFUL EFFECTS OF SUN, WIND AND RUNNING WATER AND SHALL BE KEPT DAMP FOR AT LEAST 7 DAYS.

4. EMBANKMENT CONSTRUCTION SEQUENCE

APPROACH EMBANKMENT SHALL BE CONSTRUCTED PRIOR TO CONSTRUCTION OF ABUTMENT PILES.

5. REINFORCED CONCRETE CAST-IN-PLACE BORED PILES

5.1 THE REQUIRED ALLOWABLE BEARING CAPACITY FOR EACH PILE DIAMETER IS AS FOLLOWS:

PILE DIA.	NORMAL (KN)		ULTIMATE (KN)	
	COMPRESSION	TENSION	COMPRESSION	TENSION
ø1000	3000	1200	9000	3600
ø1200	4000	1500	12000	8000
ø1500	6500	2000	19500	11000

5.2 BOTTOM OF BORED PILES SHALL BE EMBEDDED AT LEAST TWO TIMES PILE DIAMETER (2D) INTO HARD STRATA CAPABLE OF DEVELOPING ALLOWABLE BEARING CAPACITY AS SPECIFIED. IF THE ABOVE CONDITION IS NOT MET DURING CONSTRUCTION, THE PILE SHALL BE INCREASED AND THE DESIGNER/CONSULTANT SHALL BE NOTIFIED FOR CONFIRMATION. AN ON-SITE SUBSURFACE INVESTIGATION SHALL ALSO BE UNDERTAKEN DURING CONSTRUCTION FOR CONFIRMATION/VERIFICATION OF DATA USED IN THE DESIGN.

5.3 PILE LENGTHS SHOWN ARE ESTIMATED LENGTHS DURING DESIGN. DETERMINATION OF REQUIRED PILE LENGTHS SHALL BE DETERMINED BY THE CONTRACTOR BASED ON THE RESULTS OF FIELD INVESTIGATIONS CARRIED OUT BY THE CONTRACTOR. SEE THE SPECIAL PROVISIONS OF THE TECHNICAL SPECIFICATIONS.

5.4 ULTRASONIC INTEGRITY TESTING (AS PER SPECIFICATIONS) SHALL BE CONDUCTED FOR ALL PILES TO VERIFY/CHECK THE CONCRETE HOMOGENEITY AND TO LOCATE/EVALUATE ANY POSSIBLE IRREGULARITY IN THE COMPLETED BORED PILES AS DESCRIBED IN THE SPECIAL PROVISIONS.

5.5 STATIC LOAD TEST AND HIGH STRAIN DYNAMIC LOAD TEST SHALL BE CONDUCTED AS INDICATED IN THE SCHEDULE OF PILE LOAD TEST OF THE COMPLETED BORED PILES. THE RESULT SHALL BE SUBMITTED FOR EVALUATION AND REFERENCE.

6. ADDITIONAL SOIL INVESTIGATION

ADDITIONAL SUBSURFACE INVESTIGATION (BORE HOLES) SHALL BE CONDUCTED FOR EACH PIER OF MAIN BRIDGE AND ABUTMENT LOCATION AND HALF THE NUMBER OF PIERS FOR THE APPROACH SPANS TO CONFIRM/VERIFY THE DESIGN SOIL PROFILE AND CAPACITIES. IF THE RESULTS OF THE SOIL INVESTIGATION DIFFERS FROM THE SOIL DATA USED IN DESIGN, THE CONTRACTOR SHALL NOTIFY THE ENGINEER/ CONSULTANT TO MAKE THE NECESSARY ADJUSTMENTS IN THE FOUNDATION.

7. CAMBER

7.1 STEEL AND PRECAST CONCRETE GIRDERS SHALL BE CONSTRUCTED WITH CAMBER INDICATED IN THE DRAWINGS.

7.2 AFTER ERECTION IS COMPLETE, THE FLANGE ELEVATION OF THE GIRDERS SHALL BE SURVEYED. BASED ON THIS INFORMATION, THE CONTRACTOR SHALL DETERMINE THE HAUNCH HEIGHTS REQUIRED ALONG THE STRUCTURE IN ORDER THAT THE FINISHED GRADE SHOWN IN THE DRAWINGS WILL BE ACHIEVED, TAKING DUE ACCOUNT OF FURTHER DEFLECTIONS TO BE INCURRED WHEN THE DECK AND SIDEWALKS ARE ADDED AND THE ORDER IN ERECTION OF DECK PANEL IS TO TAKE PLACE.

7.3 THE CONTRACTOR SHOULD PREPARE & SUBMIT A GEOMETRY CONTROL REPORT TO THE ENGINEER INDICATING THE ASSUMPTIONS AND CALCULATION PROCEDURES THAT HAVE BEEN FOLLOWED IN DETERMINING HAUNCH HEIGHTS. THE CONTRACTOR SHOULD MONITOR AND UPDATE THIS REPORT AS NECESSARY AS ERECTION PROCEEDS.

7.4 FOR NOTES ON MAIN BRIDGE BALANCED CANTILEVER CONSTRUCTION CAMBER, SEE SHEET NO. BBM-75

GENERAL NOTES FOR BRIDGES - 3

8. STRUCTURAL STEEL

THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS FOR ALL STRUCTURAL STEEL WORK. THESE SHOP DRAWINGS SHALL BE APPROVED BY THE ENGINEER BEFORE ANY FABRICATION COMMENCES.

9. SHORING

9.1 CAMBER FOR REINFOCED CONCRETE SUPERSTRUCTURES WERE DETERMINED BASED ON THE USE OF SHORINGS DURING CONSTRUCTION.

9.2 CAMBER FOR COMPOSITE SUPERSTRUCTURES WITH PRECAST PRESTRESSED GIRDERS WERE DETERMINED BASED ON UNSHORED CONDITIONS.

10. EXCAVATION

EXCAVATION FOR STRUCTURES SHALL BE TO THE NEAT LINES OF FOOTING OR AS SPECIFIED IN THE STANDARD SPECIFICATIONS.

11. WATER ELEVATION

WATER ELEVATIONS SHOWN ON PLANS ARE APPROXIMATE ONLY ANY VARIATION FOUND DURING CONSTRUCTION SHALL NOT BE CONSIDERED AS A BASIS FOR EXTRA COMPENSATION.

12. DETOUR

THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN DETOUR BRIDGES, AND/OR ROADS DURING CONSTRUCTION TO ALLOW CONTINUOUS FLOW OF TRAFFIC. THEY SHALL BE CONSTRUCTED ON LOCATION AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. NO ADDITIONAL COST SHALL BE ALLOWED FOR ANY RELOCATION OF DETOUR.

13. PRESTRESSED CONCRETE (AASHTO GIRDERS)

GIRDER DESIGN GUIDE

13.1 POST-TENSIONING ; THE PROPOSED TYPE OF TENDONS WHICH WILL BE USED IN THE POST-TENSIONED DESIGNS AND ALL NECESSARY ADDITIONAL DETAILS INCLUDING THOSE FOR END ANCHORAGES, METHODS TO BE EMPLOYED AND PROCEDURES TO BE FOLLOWED, SHALL BE AS APPROVED BY THE ENGINEER. PORTION OF THE TENDONS SHALL BE DRAPED LONGITUDINAL IN PARABOLIC PORTIONS. ALL TENDONS SHALL BE PLACED SO THAT THEIR CENTER OF GRAVITY WILL BE AT THE POSITION SHOWN ON PLANS. THE TOTAL POST-TENSION FORCE AFTER LOSSES REQUIRED AT MIDSPAN SHALL BE PROVIDED AS CALLED FOR IN THE VARIOUS DESIGNS. THE REQUIRED FORCES AFTER LOSSES SHALL BE OBTAINED BY APPLYING INITIAL TENSILE FORCES OF SUFFICIENT MAGNITUDE TO ALLOW FOR ALL SUBSEQUENT LOSSES, INCLUDING THOSE FOR ELASTIC SHORTENING, SHRINKAGE, CREEP, RELAXATION, FRICTION, AND EFFICIENCY OF END ANCHORAGES. AFTER SECURING THE END ANCHORAGES ALL TENDONS SHALL BE PRESSURE GROUTED IN THEIR CONDUITS IN ACCORDANCE WITH THE "SPECIFICATIONS".

13.2 CONCRETE FOR GIRDERS SHALL BE A MINIMUM STRENGTH OF 41 N/mm^2 (5,945 PSI) AT THE AGE OF 28 DAYS.

13.3 CONCRETE FOR CAST-IN-PLACE SLAB HAVE A MINIMUM STRENGTH OF 28 N/mm2 (4,060 PSI) AT THE AGE OF 28 DAYS.

13.4 THE CONTRACTOR MAY PROPOSE ANY ALTERNATIVE TENDON SIZE AND LAYOUT WHICH SHALL MEET THE APPROVAL OF THE ENGINEER.

13.5 THE REQUIRED STRENGTH OF CONCRETE AT TIME OF TENSIONING SHALL BE 35 MPa (5,075 PSI). A GRID CONSISTING OF #12 BARS AT 100 CENTERS IN BOTH DIRECTIONS SHALL BE PLACED NEAR EACH ANCHORAGE OF THE POST-TENSIONING SYSTEM.

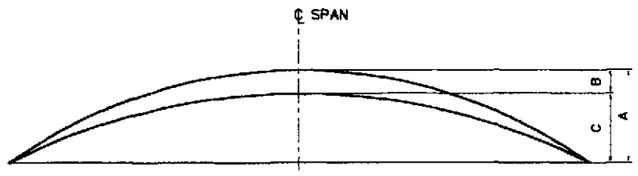
13.6 HANDLING PRESTRESSED CONCRETE BEAMS : THE BEAMS SHALL BE MAINTAINED IN AN UPRIGHT POSITION AND SHALL BE LIFTED BY SUITABLE DEVICES PROVIDED AT THE ENDS OF THE BEAMS. ATTENTION IS DIRECTED TO THE INCREASED DIFFICULTY OF LIFTING BEAMS WITHOUT END BLOCKS. THE CONTRACTOR'S PROPOSED LIFTING DETAILS SHOULD BE GIVEN CAREFUL CONSIDERATION BEFORE BEING SUBMITTED ON SHOP DRAWING FOR APPROVAL. THE USE OF HOLES FOR LIFTING PURPOSES WILL NOT BE PERMITTED.

13.7 CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE ENGINEER THE CALCULATED ELONGATION OF THE PRESTRESSING TENDONS CORRESPONDING TO THE REQUIRED JACKING FORCES.

13.8 PRECAST GIRDERS SHALL MEET THE TOLERANCES SPECIFIED IN THE AASHTO GUIDE SPECIFICATIONS FOR DESIGN AND CONSTRUCTION OF SEGMENTAL CONCRETE BRIDGES.

13.9 TRANSVERSE DEFLECTION OF PRECAST GIRDERS SHALL NOT EXCEED $1/500_{TH}$ OF THE GIRDER LENGTH. WHERE DEFLECTION EXCEED THIS VALUE, PROCEDURES FOR CORRECTION SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW, IF CORRECTION BY APPROVED PROCEDURE IS NOT POSSIBLE, THE GIRDER SHALL BE REJECTED.

13.10 THE CONTRACTOR SHALL SUBMIT, FOR APPROVAL OF THE ENGINEER, ALL NECESSARY SHOP DRAWINGS AND DETAILS PRIOR TO FABRICATION AND ERECTION.



DEAD LOAD CAMBER DIAGRAM FOR PRECAST/PRESTRESSED AASHTO GIRDERS

A = INITIAL CAMBER – ESTIMATED PRESTRESS CAMBER LESS DEFLECTION DUE TO GIRDER DEAD LOAD

B = DEFLECTION DUE TO SLAB, DIAPHRAGM, SIDEWALKS, RAILING AND RAILPOST

C = FINAL CAMBER

NOTE; A AND B ARE THEORETICAL VALUES AND MAY VARY WITH ACTUAL (AGE) CONCRETE STRENGTH, VARIOUS PRESTRESSING CONDITIONS, CREEP FACTOR, AND PRESTRESS LOSSES. CONTRACTOR SHALL SURVEY TOP OF GIRDERS TO OBTAIN ACTUAL VALUE OF A AND ADJUST PROFILE ACCORDINGLY.

GENERAL NOTES FOR BRIDGES - 4

14. WELDING ON REINFORCEMENT BARS

14.1 WELDING ON REINFORCEMENT BARS SHALL NOT BE ALLOWED EXCEPT ON AREAS/LOCATIONS INDICATED IN THE PLANS.

14.2 WELDING SHALL CONFORM TO THE STRUCTURAL WELDING CODE, REINFORCING STEEL, ANSI/AWS D1.4 OF THE AMERICAN WELDING SOCIETY AND JAPAN INDUSTRIAL STANDARD (JIS). ALL WELDING SHALL CONFORM TO THE REQUIREMENTS OF QUALIFICATION, TESTING, QUALITY AND WORKMANSHIP.

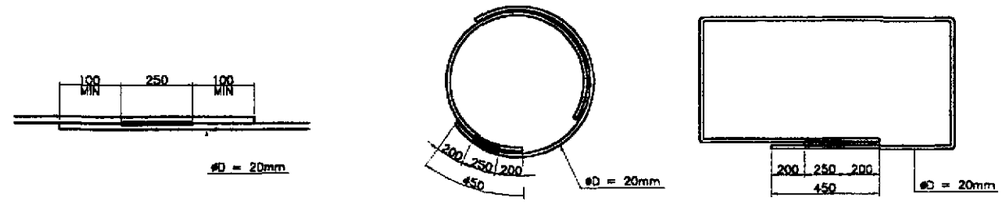
14.3 REINFORCING STEEL SUBJECT TO LAP WELDING (AS SHOWN IN THE DRAWINGS) SHALL BE WELDABLE TYPE. WHEN A REINFORCING STEEL NOT LISTED IN AWS D1.4 ART. 1.3.1 IS APPROVED BY THE CONSULTANT, ITS CHEMICAL COMPOSITION AND CARBON EQUIVALENT SHALL BE PROVIDED AND ITS WELDABILITY ESTABLISHED BY QUALIFICATION IN ACCORDANCE WITH THE REQUIREMENTS OF ART. 6.2 OF AWS D1.4 AND ALL OTHER REQUIREMENTS PRESCRIBED BY THE CONSULTANT.

14.4 WELDED LAP JOINTS SHALL BE LIMITED TO BAR 20mmø AND SMALLER.

14.5 THE CONTRACTOR SHALL BE RESPONSIBLE FOR VISUAL INSPECTION AND NECESSARY CORRECTION OF ALL DEFICIENCIES IN MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF SECT. 3.4 AND 4.4 OR OTHER PARTS OF AWS D1.4, AS APPLICABLE.

14.6 THE CONTRACTOR SHALL COMPLY WITH ALL REQUESTS OF THE CONSULTANT TO CORRECT DEFICIENCIES IN MATERIALS AND WORKMANSHIP AS PROVIDED IN THE CONTRACT DOCUMENTS.

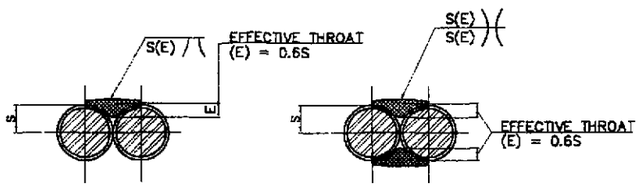
14.7 IN THE EVENT THAT FAULTY WELDING OR ITS REMOVAL FOR REWELDING DAMAGES THE BASE METAL SO THAT IN THE JUDGEMENT OF THE CONSULTANT ITS RETENSION IS NOT IN ACCORDANCE WITH THE INTENT OF THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL REMOVE AND REPLACE THE DAMAGED BASE METAL OR SHALL COMPENSATE FOR THE DEFICIENCY IN A MANNER APPROVED BY THE CONSULTANT.



SINGLE FLARED-V-GROOVE SPIRAL COLUMN TIES

15. MECHANICAL CONNECTION ON REINFORCEMENT BARS

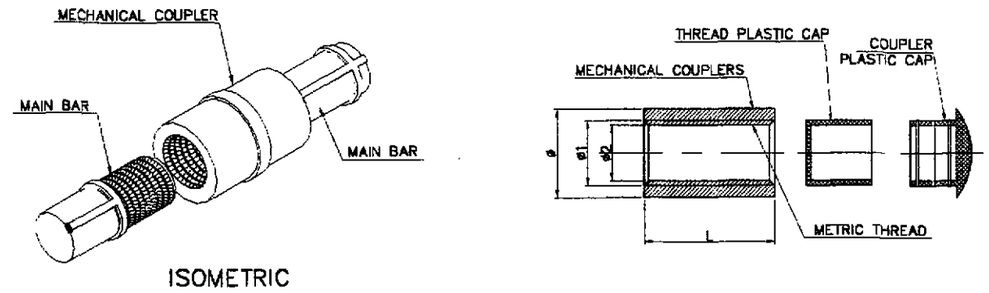
A FULL MECHANICAL CONNECTION ON REINFORCEMENT BARS USING PROPRIETARY MECHANICAL COUPLERS SHALL DEVELOP IN TENSION OR COMPRESSION, AS REQUIRED, AT LEAST 125 PERCENT OF THE SPECIFIED YIELD STRENGTH OF THE BAR.



A. SINGLE B. DOUBLE

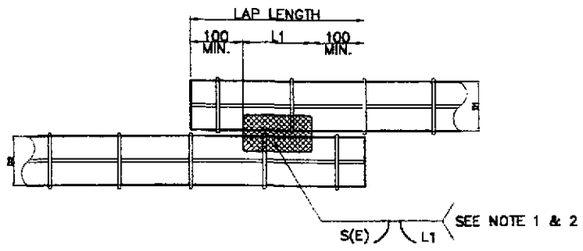
WHERE: S = RADIUS OF REINFORCING BAR
E = EFFECTIVE THROAT

FLARED-V- GROOVE WELD

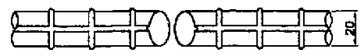


ISOMETRIC

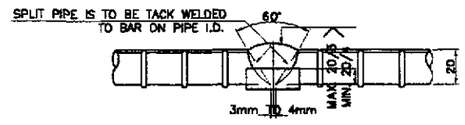
MECHANICAL COUPLER DETAIL



DIRECT LAP JOINT WITH BARS IN CONTACT



PLAN (BARS BEFORE WELDING)



DETAILS OF SINGLE-V-GROOVE BUTT WELD

NOTES: 1. THE EFFECTS OF ECCENTRICITY SHALL BE CONSIDERED OR RESTRAINT PROVIDED IN THE DESIGN OF THE JOINT.
2. L1 = 2 D1 (MIN.); D1 ≤ D2

JICA JAPAN INTERNATIONAL COOPERATION AGENCY; KEI KATAHIRA & ENGINEERS INTERNATIONAL; YEC YACHIYO ENGINEERING CO., LTD.		DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			
	DESIGNED	9/21/02	M. S. NIBAL	PJHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY
	CHECKED	9/23/02	J. C. SANTOS	Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature) / Approved By: (See cover sheet for Signature/Approval)
	SUBMITTED	10/14/02	TEAM LEADER	DANILO C. TRAJANO, Project Director	ADRIANO M. DOROY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	MANUEL M. BONDAN, Undersecretary / SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE III	AS SHOWN FULL SIZE A1	BRIDGE NO. 8 ANGAT RIVER BRIDGE GENERAL NOTES FOR BRIDGES (4 OF 4) (INITIAL STAGE)	B8G-04

SPECIAL NOTES FOR MAIN BRIDGE SUPERSTRUCTURES

PRESTRESSED REINFORCEMENT AND PRESTRESSING

1.) PRESTRESSING TENDONS SHALL CONSIST OF HIGH TENSILE STEEL WIRE OR STRAND IN CONTINUOUS LENGTHS WITHOUT SPLICES OR COUPLINGS, OR HIGH TENSILE STEEL BARS AND SHALL FULFILL ALL APPLICABLE REQUIREMENTS PRESCRIBED IN THE SPECIFICATIONS.

2.) THE PRESTRESSING SYSTEM TO BE USED SHALL FULFILL ALL APPLICABLE REQUIREMENTS PRESCRIBED IN THE SPECIFICATION AND SHALL BE APPROVED BY THE CONSULTANT OR HIS REPRESENTATIVE.

3.) THE REQUIRED PRESTRESSING FOR EACH MEMBER OR STRUCTURE IS DEFINED ON THE DRAWINGS BY THE FOLLOWING DATA:

a) CENTROID OF PRESTRESSING FORCE OVER THE LENGTH OF THE MEMBER

b) INITIAL PRESTRESSING FORCES P1, BEFORE ANY LOSSES DUE TO CREEP AND SHRINKAGE HAVE OCCURED FOR CRITICAL SECTIONS

c) FINAL EFFECTIVE PRESTRESSING FORCES P_F, AFTER ALL LOSSES HAVE OCCURRED, FOR CRITICAL SECTIONS.

4.) THE INITIAL PRESTRESSING FORCES INDICATED ON THE DRAWINGS ARE BASED ON ASSUMED VALUES FOR STEEL QUALITY, FRICTION COEFFICIENT, WOBBLE COEFFICIENT, TYPE OF CEMENT, IN CERTAIN CASES TIME SPAN BETWEEN STAGES OF PRESTRESSING, ALL VALUES AS STATED IN THE STRUCTURAL ANALYSIS FOR THE STRUCTURE CONCERNED.

SHOULD THE CORRESPONDING VALUES FOR THE PRESTRESSING SYSTEM,CEMENT AND CONSTRUCTION SCHEDULE CHOSEN BY THE CONTRACTOR DIFFER FROM THOSE ASSUMED IN THE DESIGN, THE INITIAL PRESTRESSING FORCES SHALL BE ADJUSTED SUCH THAT THE FINAL PRESTRESSING FORCES AGREE WITH THE VALUE INDICATED ON DRAWINGS, WITHIN THE ALLOWABLE TOLERANCES OF +5% AND −0%

5.) SUITABLE CALCULATIONS FOR ADJUSTMENT OF INITIAL PRESTRESSING FORCES, BURSTING REINFORCEMENT, ELONGATIONS, JACKING FORCES BASED ON THE ALLOWABLE VALUES FOR MAXIMUM STEEL AND CONCRETE STRESSES AND THE COEFFICENTS FOR CREEP AND SHRINKAGE ASSUMED IN THE STRUCTURAL ANALYSIS, AS WELL AS SUITABLE WORKING DRAWINGS SHOWING TENDON AND ANCHORAGE ARRANGEMENT, TENDON SUPPORTS, BURSTING AND ALL OTHER ADDITIONAL REINFORCEMENT REQUIRED FOR THE PRESTRESSING SYSTEM CHOSEN SHALL BE SUBMITTED TO THE ENGINEER'S REPRESENTATIVE FOR APPROVAL BEFORE WORK CONCERNED BEGINS.

6.) TENDONS SHALL BE ENCLOSED IN MORTAR−TIGHT FLEXIBLE METAL DUCTS. ANCHORAGES SHALL PROVIDE FOR GROUT PASSAGE THROUGH THE DUCT.

IN CAST−IN−PLACE CONTINUOUS STRUCTURES, EACH DUCT SHALL BE PROVIDED WITH INTERMEDIATE VENTS TO THE TOP OF THE GIRDERS LOCATED AS NECESSARY OR DIRECTED BY THE ENGINEER. VENTS SHALL BE USED PRIMARILY FOR CONTROL PURPOSES AND SHALL BE CLOSED UNDER PRESSURE OF ISSUING GROUT. GROUT SHALL BE INJECTED AT VENTS ONLY IN CASE OF CLOGGING.

7.) THE MINIMUM REQUIRED COMPRESSIVE STRENGTH (fci'), OF CONCRETE AT THE TIME OF FULL PRESTRESSING OF ANY SINGLE TENDON SHALL BE AS INDICATED IN THE DRAWINGS.

8.) TENDONS FOR CAST−IN−PLACE STRUCTURES SHALL BE TENSIONED AS SPECIFIED ON THE DRAWINGS AND IN THE STRUCTURAL ANALYSIS.

9.) PRESTRESSING IN STAGES, IF REQUIRED, SHALL BE CARRIED OUT AS SPECIFIED ON THE DRAWINGS AND IN THE STRUCTURAL ANALYSIS. *THE CENTROID OF THE GROUP OF TENDONS* STRESSED DURING FIRST STAGE PRESTRESSING SHALL COINCIDE WITH THE CENTROID OF THE TOTAL PRESTRESSING FORCE.

DURING FIRST STAGE PRESTRESSING OF CAST−IN−PLACE STRUCTURES THE FALSEWORK SHALL BE CONTINUOUSLY ADJUSTED TO COMPENSATE FOR PIER SETTLEMENTS.

UPON COMPLETION OF THE FINAL STAGE PRESTRESSING, FALSEWORK SHALL BE FULLY RELEASED.

10.) ANCHORAGES SHALL BE SUITABLY PROTECTED AGAINST CORROSION. RECESSES FOR ANCHORAGES SHALL BE FILLED WITH CONCRETE OF AT LEAST SAME CLASS OF MEMBER.

POST TENSIONED REINFORCEMENT SHOULD DEVELOP THE REQUIRED ULTIMATE CAPACITY OF PRESTRESSING STEEL WITHOUT EXCEEDING ANTICIPATED SET. THE ANCHORAGE SHOULD DEVELOP AT LEAST 95 PERCENT OF THE SPECIFIED ULTIMATE CAPACITY OF PRESTRESSING STEEL WHEN TESTED IN AN UNBONDED CONDITION WITHOUT EXCEEDING ANTICIPATED SET OR DAMAGE.

11.) DRAIN HOLES SHOULD BE PLACED IN THE BOTTOM SLAB AT THE LOW POINT OF EACH CELL TO DRAIN CURING WATER DURING CONSTRUCTION OR ANY RAIN WATER THAT LEAKS THROUGH THE DECK SLAB.
IN SOME INSTANCES, WHEN DRAINAGE THROUGH THE BOTTOM SLAB IS DIFFICULT. OTHER MEANS SHALL BE PROVIDED (i.e., CELLS OVER LARGE PIERS AND WHERE A SLOPING EXTERIOR WEB INTERSECTS A VERTICAL WEB).
IN THIS CASE, A HORIZONTAL DRAIN SHOULD BE PROVIDED THROUGH THE VERTICAL WEB (SEE DETAIL SHOWING DRAINAGE DETAILS FOR THE BOTTOM SLAB OF CONCRETE BOX GIRDER BRIDGES).

UTILITY OPENINGS

1.) ACCESS HOLES AND AIR VENT HOLES
ACCESS HOLES WITH DOORS SHALL BE PLACED IN THE BOTTOM SLAB FOR MAINTENANCE AND TO INSPECT UTILITIES, INSIDE CELLS (WATERLINE, CONDUITS, E.Q. RESTRAINER, ETC.) FIGURE BELOW SHOWS ACCESS HOLE AND AIR VENT HOLE DETAILS. SEE FIGURE FOR AIR VENT HOLE DETAILS AND MISCELLANEOUS DRAWINGS FOR LOCATION.

2.) DRAIN HOLES
DRAIN HOLES SHOULD BE PLACED IN THE BOTTOM SLAB AT THE LOW POINT TO DRAIN WATER DURING CONSTRUCTION AND ANY RAIN WATER THAT LEAKS THROUGH THE DECK SLAB. SEE MISCELLANEOUS DRAWINGS FOR DRAIN LOCATION & DETAILS.

FORMWORK AND PLACING CONCRETE

1.) ALL EXPOSED CONCRETE SURFACES SHALL BE IN ACCORD−ANCE WITH THE SPECIFICATION TO PROVIDE A SMOOTH FINISH, UNIFORM TEXT AND COLOR.

2.) ALL EXPOSED CORNERS OF THE CONCRETE SHALL BE CHAMFERED 20mm UNLESS OTHERWISE NOTED.

3.) CONSTRUCTION JOINTS IN SUBSTRUCTURE IF REQUIRED, SHALL BE STRAIGHT, HORIZONTAL, UNIFORM IN APPEARANCE, SPACED AT REGULAR INTERVALS FROM THE TOP OF THE PIER AND SUBJECT TO THE APPROVAL OF THE ENGINEER'S REPRESENTATIVE.

4.) THE ACTUAL CAMBER USED SHALL BE CHOSEN SUCH THAT THE ALLOW−ABLE TOLERANCE FOR DECK SLAB AND PAVEMENT THICKNESS AS WELL AS FOR THE FINAL GRADE ARE NOT EXCEEDED.

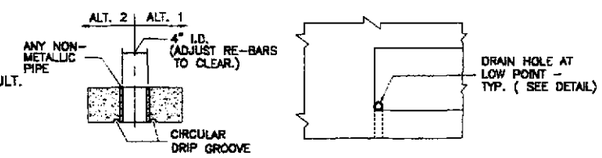
5.) THE ALLOWABLE TOLERANCE FOR THE THICKNESS OF CAST−IN−PLACE DECK SLABS PLACED ON PREFABRICATED GIRDERS SHALL BE +10mm.

6.) DEVIATION IN THE TOP SURFACE OF DECK SLABS SHALL NOT EXCEED 10mm. WHEN TESTED WITH A 4 METER STRAIGHT EDGE.

7.) ACCESS OPENINGS FOR CONSTRUCTION PURPOSES IN TOP OR BOTTOM SLABS OF BOX GIRDERS ARE THE RESPONSIBILITY OF THE CONTRACTOR. SUCH OPENINGS SHALL NO WAY IMPAIR THE STRENGTH OR SERVICEABILITY OF THE COMPLETED STRUCTURE AND SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

8.) WITH THE EXCEPTION OF LONG CONTINUOUS STRUCTURES, WHERE CONSTRUCTION STAGES ARE SHOWN IN THE DRAWINGS, CONCRETE FOR ALL CAST−IN−PLACE SUPERSTRUCTURES SHALL BE PLACED IN ONE CONTINUOUS POUR. THE USE OF A RETARDING AGENT IS RECOMMENDED SUBJECT TO THE APPROVAL OF THE ENGINEER.

9.) THE CONTRACTOR SHALL SUBMIT FOR APPROVAL OF THR ENGINEER THE CONCRETE PLACING/POURING SEQUENCE PRIOR TO CONCRETING ACTIVITIES.



DRAIN HOLE
SHOWN ON FRAMING PLAN

FALSEWORK

1.) ALL FALSEWORK SHALL BE SUITABLY DESIGNED TO PREVENT LARGE OR IRREGULAR DIFFERENCES IN SETTLEMENT BETWEEN INDIVIDUAL SUPPORTS WHICH COULD CAUSE CRACKING OF THE CONCRETE. FALSEWORK SHOWN IN THE DRAWINGS ARE FOR THE CONSTRACTOR'S REFERENCE ONLY. FORMWORK DESIGN SHALL BE THE CONTRACTOR'S RESPONSIBILITY SUBJECT TO THE ENGINEER'S APPROVAL.

2.) ALL FALSEWORK SHALL BE MOUNTED ON SUITABLE JACKS TO ALLOW GRADUAL ADJUSTMENT IN BOTH VERTICAL DIRECTIONS UNDER FULL LOAD.

3.) FALSEWORK SHALL BE SUFFICIENTLY BRACED TO GUARANTEE STABILITY UNDER ALL LOADS INCIDENT TO THE CONSTRUCTION OPERATION.

4.) THE SECTIONS OF THE FALSEWORK ADJACENT TO THE PIER OR ABUTMENTS SHALL BE DESIGNED TO TRANSMIT THE FULL VERTICAL LOADS DIRECTLY TO THESE MEMBERS OR THEIR FOUNDATIONS.

5.) FALSEWORK DISPLACEMENTS RELATIVE TO STRAIGHT LINES THROUGH FIXED POINTS MARKED ON THE PIERS AND ABUTMENTS SHALL BE PRE−VENTED DURING THE CURING PERIOD AND DURING FIRST STAGE PRE−STRESSING, FALSEWORK SETTLEMENTS SHALL BE MEASURED AT SUITABLE INTERVALS DURING THE CURING PERIOD AND COMPENSATED FOR BY RAISING JACKS IF NECSSARY. PIER AND ABUTMENT SETTLEMENTS SHALL BE MEASURED CONTINUOUSLY DURING FIRST STAGE PRESTRESSING AND COMPENSATED FOR BY LOWERING JACKS ACCORDINGLY.

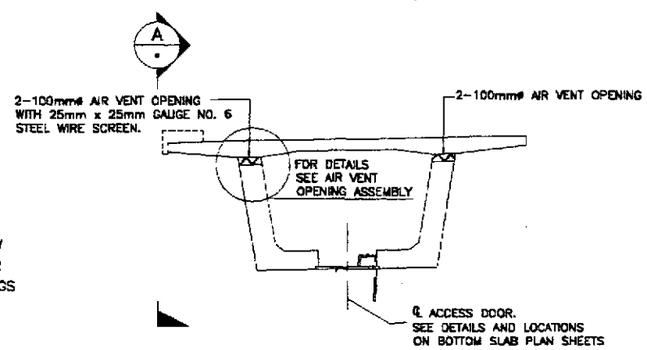
6.) UPON COMPLETION OF FIRST STAGE PRESTRESSING THE CORRESPONDING FALSEWORK SHALL BE FULLY RELEASED, GRADUALLY AND UNIFORMLY WORKING IN SEQUENCE ACCORDING TO DRAWINGS.

CONSTRUCTION METHOD

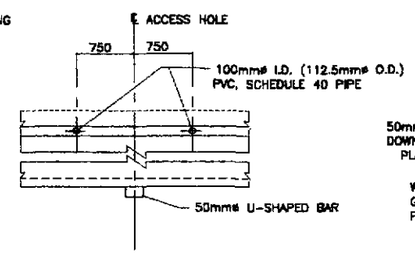
1.) THE SUPERSTRUCTURES WILL BE CONSTRUCTED USING THE BALANCED CANTILEVER METHOD. SPECIALIZED CONSTRUCTION EQUIPMENT OR FORM TRAVELLER WEIGHT ASSUMED IN THE DESIGN IS 600 KN.

2.) THE CONTRACTOR SHOULD PREPARE & SUBMIT SCHEDULE AND DETAILS OF THE SPECIALIZED CONSTRUCTION EQUIPMENT FOR APPROVAL OF CONSULTANT/ENGINEER.

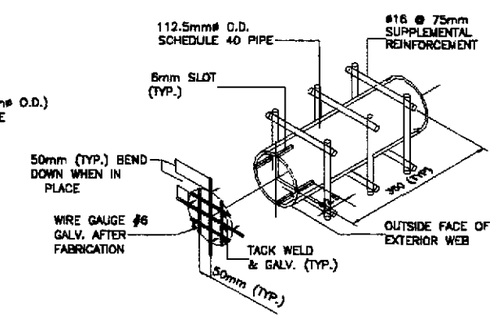
3.) THE CONTRACTOR SHOULD PREPARE & SUBMIT A GEOMETRY CONTROL TO THE ENGINEER CONSIDERING THE ACTUAL EQUIPMENT BE USED AND ALL OTHER ANTICIPATED CONSTRUCTION LOADS. SUCH REPORT SHOULD BE MONITORED AND UPDATED BY THE CONTRACTOR AS THE CONSTRUCTION PROCEEDS.



ELEVATION-AIR VENT HOLE IN WEB



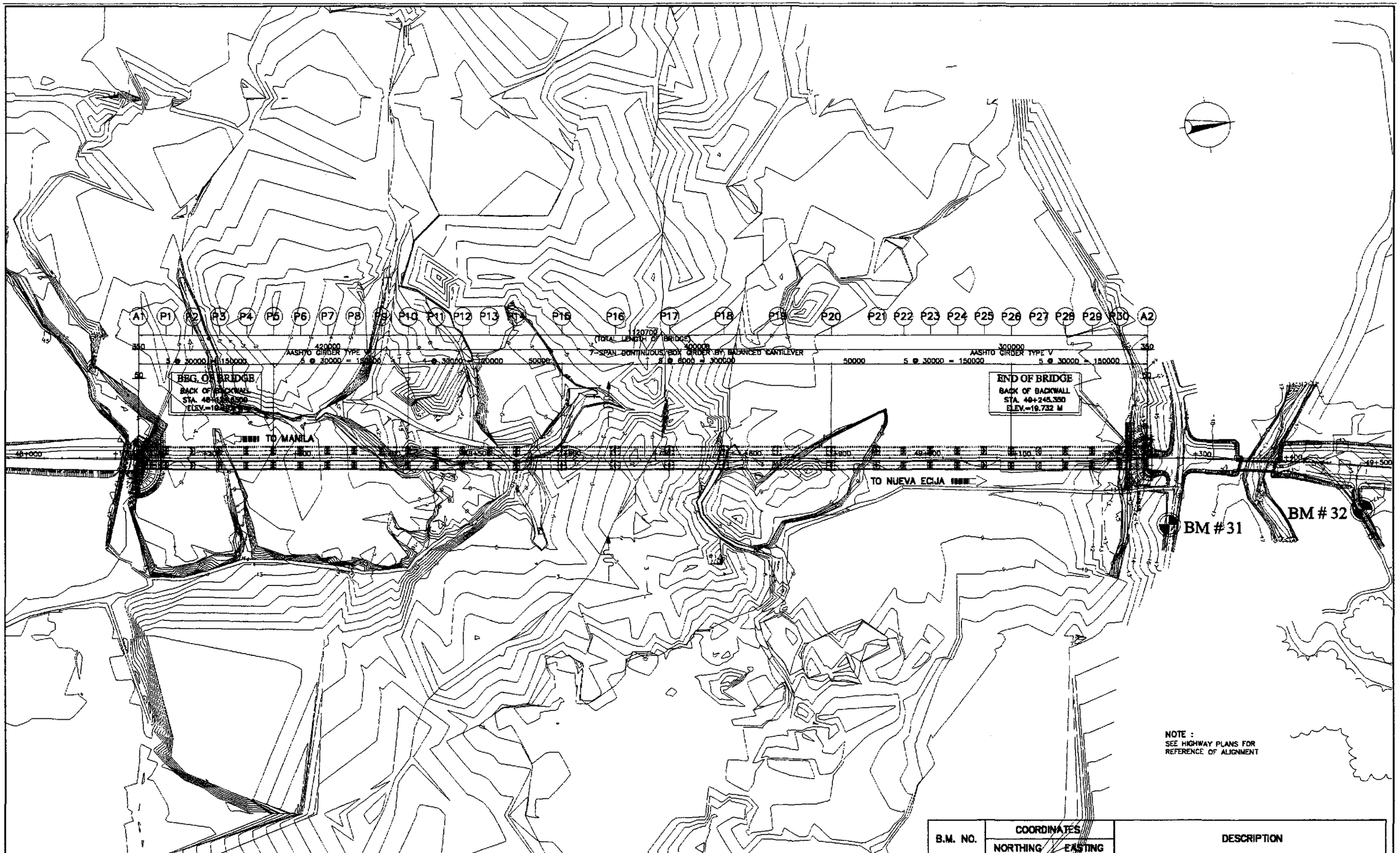
SECTION - A



AIR VENT OPENING ASSEMBLY TYPICAL

JICA JAPAN INTERNATIONAL COOPERATION AGENCY		DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				
KEI KATAHIRA & ENGINEERS INTERNATIONAL / YEO YACHIYO ENGINEERING CO., LTD.	DESIGNED	9/21/02		PUHC − PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
	CHECKED	9/23/02	J. C. SANTOS	Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
	SUBMITTED	10/14/02	TEAM LEADER	DANILO C. TRAJANO Project Director	ADRIANO M. DOROY Chief, Bridges Division	GILBERTO S. REYES Director IV (OIC)	MANUEL M. BONDAN Undersecretary	SIMEON A. DATUMANONG Secretary

PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO. 8 ANGAT RIVER BRIDGE SPECIAL NOTES FOR MAIN BRIDGE SUPERSTRUCTURES (INITIAL STAGE)	B8G-05
PLARIDEL BYPASS - CONTRACT PACKAGE III	FULL SIZE A1		



NOTE :
SEE HIGHWAY PLANS FOR REFERENCE OF ALIGNMENT

B.M. NO.	COORDINATES		DESCRIPTION
	NORTHING	EASTING	
31	1,655,556.301	492,461.715	IT IS LOCATED ON THE SIDE OF THE PROVINCIAL ROAD UNDER AN ACACIA TREE ON THE RIGHT SIDE OF THE ALIGNMENT IN BARANGAY TABONGBONG.
32	1,655,771.206	492,471.812	IT IS LOCATED ON THE SIDE OF A DIRT ROAD NEAR AN ELECTRICAL POST ON THE RIGHT SIDE OF THE ALIGNMENT IN BARANGAY TABONGBONG, SAN RAFAEL.

A HORIZONTAL AND VERTICAL CONTROL MONUMENT
SCALE 1 : 2000

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

	DATE	SIGNATURE
DESIGNED	9/21/02	J. S. NAGA
CHECKED	9/23/02	J. E. SANTOS
SUBMITTED	10/14/02	M. KUDA TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

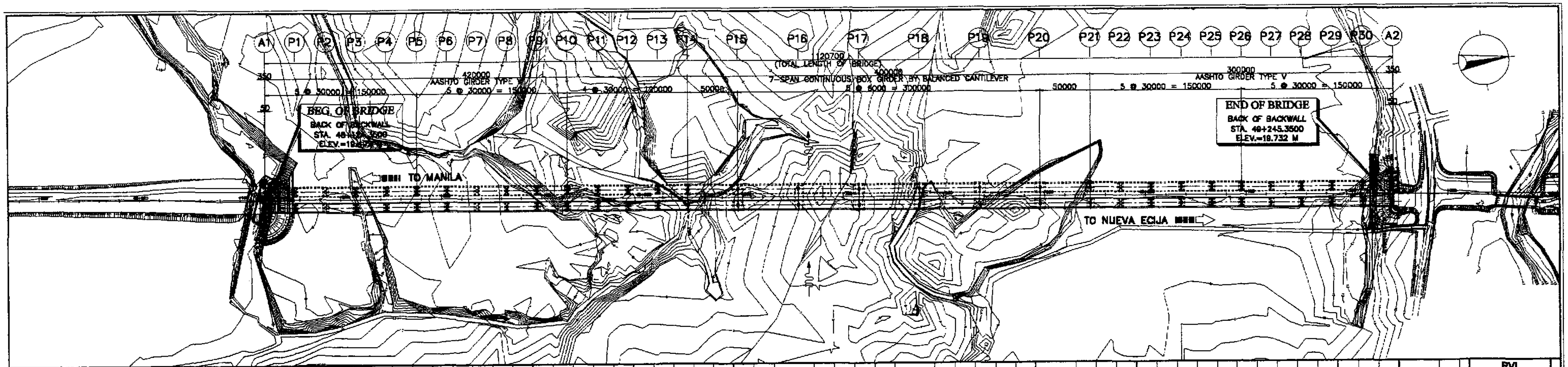
PJHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DANILO C. TRAJANO	ADRIANO M. DOROY	GILBERTO S. REYES	MANUEL M. BONDAN	SIMEON A. DATUMANONG
Project Director	Chief, Bridges Division	Director IV (OIC)	Undersecretary	Secretary

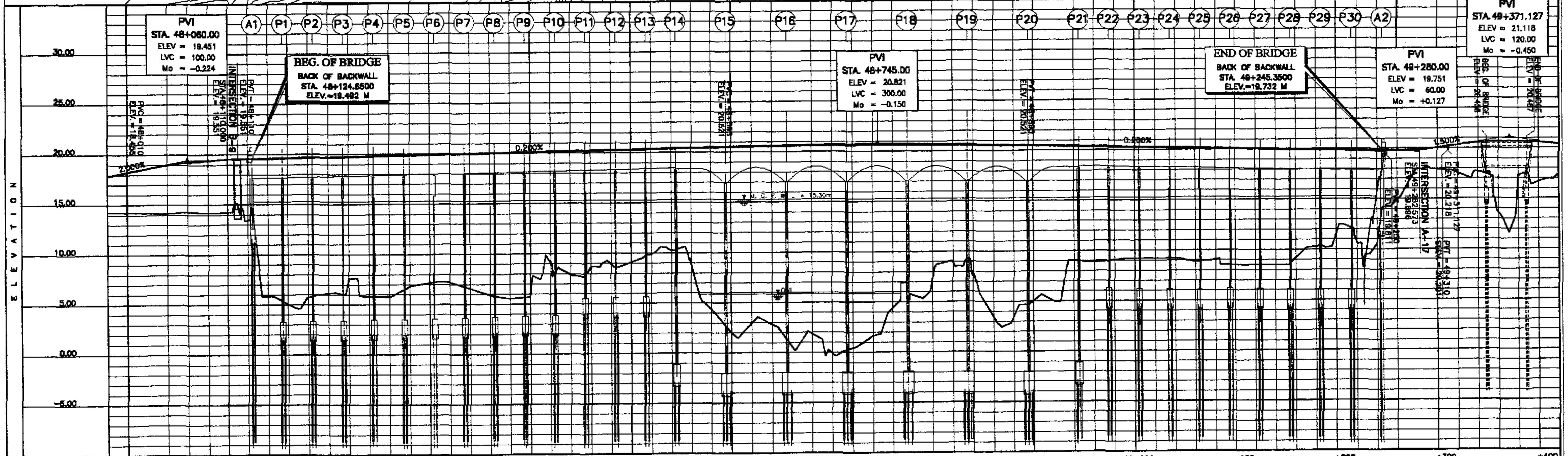
PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

SCALE : AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
HORIZONTAL AND VERTICAL CONTROL MONUMENT
(INITIAL STAGE)

SHEET NO. : B8G-06





STATION	48+000						+100					+200
FINISHED GRADE @ BYPASS ALIGNMENT	18.258	18.645	18.972	19.227	19.410	19.522	19.571	19.611	19.651	19.691	19.731	19.771
FINISHED GRADE @ BRIDGE CENTERLINE	18.169	18.558	18.885	19.140	19.323	19.435	19.484	19.524	19.564	19.604	19.644	19.684
FINISHED ELEV./STATION @ BRIDGE PIER CENTERLINE							+124.650 19.493		+155.000 19.555	+185.000 19.615		+215.000 19.675
ORIGINAL GROUND ELEVATION	14.252	14.220	14.187	14.304	14.235	14.260	13.456	5.880	5.022	5.682	6.111	7.208

STATION					+300					+400		
FINISHED GRADE @ BYPASS ALIGNMENT	19.811	19.851	19.891	19.931	19.971	20.011	20.051	20.091	20.131	20.171	20.211	20.251
FINISHED GRADE @ BRIDGE CENTERLINE	19.724	19.764	19.804	19.844	19.884	19.924	19.964	20.004	20.044	20.084	20.124	20.164
FINISHED ELEV./STATION @ BRIDGE PIER CENTERLINE	+245.000 19.735		+275.000 19.795	+305.000 19.855		+335.000 19.915	+365.000 19.975		+395.000 20.035	+425.000 20.095		+455.000 20.155
ORIGINAL GROUND ELEVATION	5.847	5.788	6.853	7.167	7.218	6.582	5.948	5.572	5.726	8.474	7.868	8.701

STATION			+500				+600					+700
FINISHED GRADE @ BYPASS ALIGNMENT	20.291	20.331	20.371	20.411	20.451	20.491	20.531	20.567	20.597	20.623	20.643	20.657
FINISHED GRADE @ BRIDGE CENTERLINE	20.204	20.244	20.284	20.324	20.364	20.404	20.444	20.480	20.510	20.536	20.556	20.570
FINISHED ELEV./STATION @ BRIDGE PIER CENTERLINE	+485.000 20.215		+515.000 20.275	+545.000 20.335			+595.000 20.395			+655.000 20.530		
ORIGINAL GROUND ELEVATION	8.438	9.163	9.791	10.303	8.673	4.384	2.053	3.094	2.803	0.652	1.831	-0.254

STATION					+800					+900		
FINISHED GRADE @ BYPASS ALIGNMENT	20.667	20.671	20.670	20.663	20.651	20.634	20.611	20.583	20.549	20.511	20.471	20.431
FINISHED GRADE @ BRIDGE CENTERLINE	20.580	20.584	20.583	20.576	20.564	20.547	20.524	20.496	20.482	20.424	20.384	20.344
FINISHED ELEV./STATION @ BRIDGE PIER CENTERLINE	+715.000 20.578			+775.000 20.578			+835.000 20.530			+895.000 20.433		+945.000 20.333
ORIGINAL GROUND ELEVATION	0.411	1.688	4.324	5.490	7.585	8.990	7.418	3.254	3.291	4.990	5.020	9.081

STATION			49+000					+100				
FINISHED GRADE @ BYPASS ALIGNMENT	20.391	20.351	20.311	20.271	20.231	20.191	20.151	20.111	20.071	20.031	19.991	19.951
FINISHED GRADE @ BRIDGE CENTERLINE	20.304	20.264	20.224	20.184	20.144	20.104	20.064	20.024	19.984	19.944	19.904	19.864
FINISHED ELEV./STATION @ BRIDGE PIER CENTERLINE		+975.000 20.273	+005.000 20.213		+035.000 20.153	+065.000 20.093		+095.000 20.033	+125.000 19.973		+155.000 19.913	+185.000 19.853
ORIGINAL GROUND ELEVATION	8.914	9.111	9.243	9.246	9.203	8.919	9.134	8.560	8.564	8.565	9.272	10.553

STATION	+200					+300						+400
FINISHED GRADE @ BYPASS ALIGNMENT	19.911	19.871	19.831	19.805	19.878	20.065	20.341	20.547	20.652	20.658	20.564	20.369
FINISHED GRADE @ BRIDGE CENTERLINE	19.824	19.784	19.744	19.718	19.791	19.978	20.254	20.480	20.585	20.571	20.477	20.282
FINISHED ELEV./STATION @ BRIDGE PIER CENTERLINE		+215.000 19.793	+245.350 19.732									
ORIGINAL GROUND ELEVATION	11.910	10.607	10.818	14.865	17.975	17.902	17.537	17.670	13.578	17.251	16.804	17.304

HORIZONTAL CURVATURE: R=∞ — 49+235.179 — R = 3500

VERTICAL CURVATURE: 2.000% — L = 100, Mo = -0.224 — g = -0.200% — g = +0.200% — L = 300, Mo = -0.150 — g = -0.200% — L = 60, Mo = +0.127 — g = 1.500% — L = 120, Mo = -0.450

SUPERELEVATION: NC

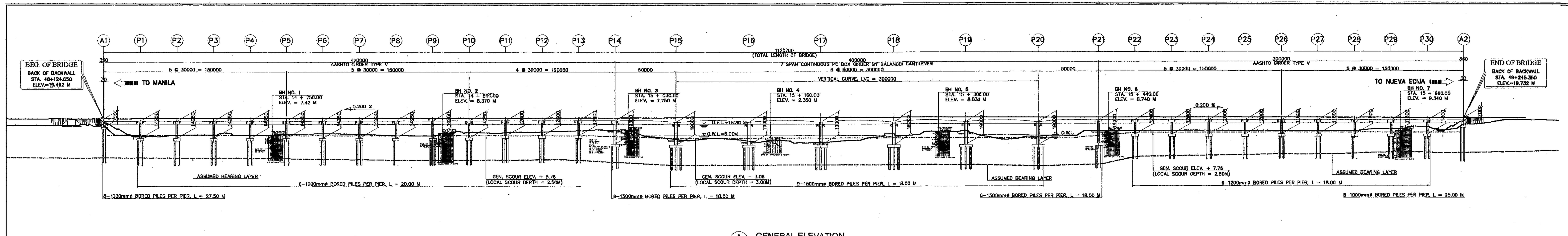
JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED	9/21/02	N. S. NAZAL
CHECKED	9/23/02	J. C. SANTOS
SUBMITTED	10/14/02	TEAM LEADER

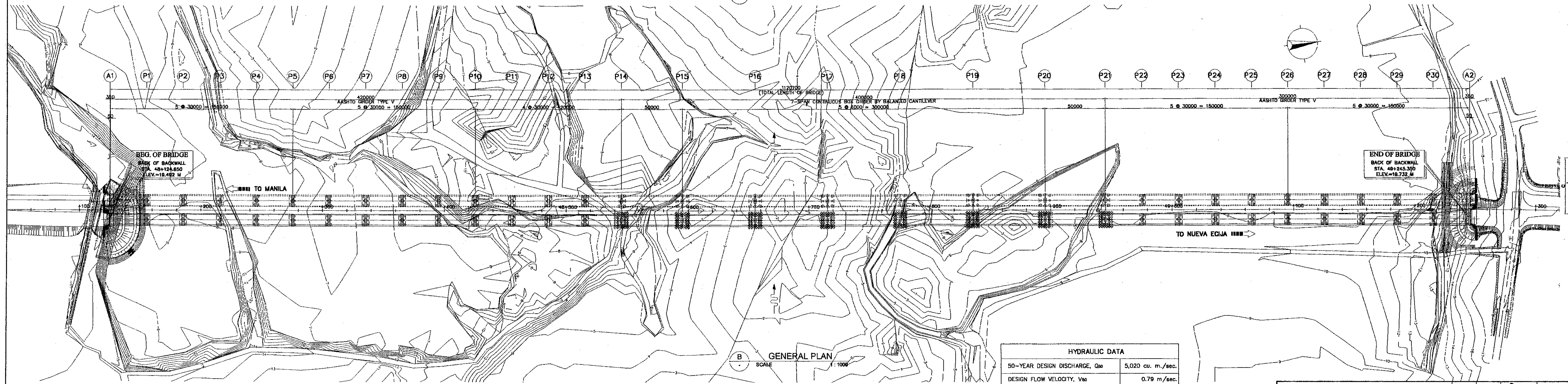
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

PJHL - 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. TRAJANO	ADRIANO M. DOROY	GILBERTO S. REYES	MANUEL M. BONOAN	SIMEON A. DATUMANONG
Project Director	Chief, Bridges Division	Director IV (OIC)	Undersecretary	Secretary

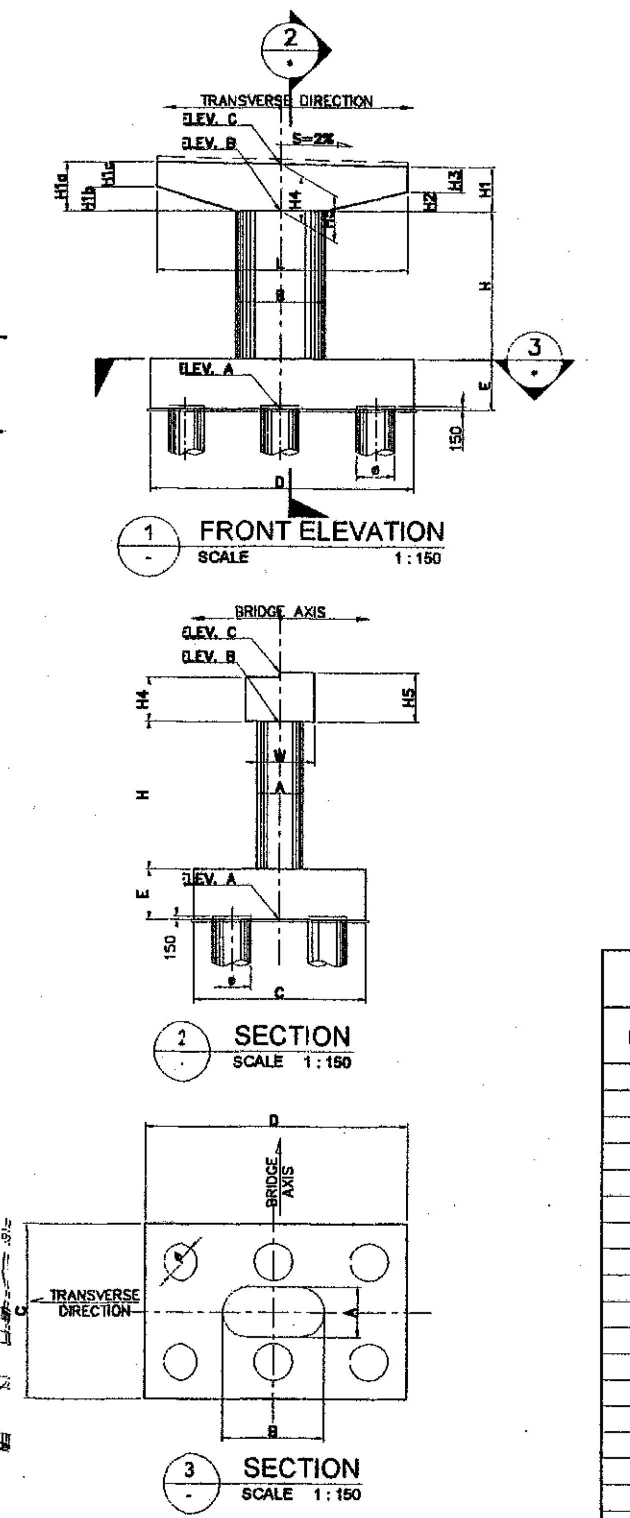
PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO. 8 ANGAT RIVER BRIDGE PLAN AND PROFILE (INITIAL STAGE)	B8G-07
PLARIDEL BYPASS - CONTRACT PACKAGE III	FULL SIZE A1		



(A) GENERAL ELEVATION
SCALE 1 : 1000



(B) GENERAL PLAN
SCALE 1 : 1000



(1) FRONT ELEVATION
SCALE 1 : 150

(2) SECTION
SCALE 1 : 150

(3) SECTION
SCALE 1 : 150

TABLE OF COORDINATES

PIER NO.	STATION	INITIAL STAGE – COLUMN NORTHINGS	INITIAL STAGE – COLUMN EASTINGS	INITIAL STAGE – PILE CAP NORTHINGS	INITIAL STAGE – PILE CAP EASTINGS	ULTIMATE STAGE – COLUMN NORTHINGS	ULTIMATE STAGE – COLUMN EASTINGS	ULTIMATE STAGE – PILE CAP NORTHINGS	ULTIMATE STAGE – PILE CAP EASTINGS
ABUT. 1	48 + 124.650	–	–	–	–	–	–	–	–
PIER 1	48 + 155.000	1654458.843	492254.996	1654458.843	492254.996	1654430.760	492235.287	1654430.760	492235.287
PIER 2	48 + 185.000	1654488.603	492258.789	1654488.603	492258.789	1654490.626	492242.918	1654490.626	492242.918
PIER 3	48 + 215.000	1654518.362	492262.583	1654518.362	492262.583	1654520.385	492246.711	1654520.385	492246.711
PIER 4	48 + 245.000	1654548.121	492266.376	1654548.121	492266.376	1654550.144	492250.504	1654550.144	492250.504
PIER 5	48 + 275.000	1654577.880	492270.169	1654577.880	492270.169	1654579.903	492254.298	1654579.903	492254.298
PIER 6	48 + 305.000	1654607.639	492273.963	1654607.639	492273.963	1654609.663	492258.091	1654609.663	492258.091
PIER 7	48 + 335.000	1654637.399	492277.756	1654637.399	492277.756	1654639.422	492261.884	1654639.422	492261.884
PIER 8	48 + 365.000	1654677.158	492281.549	1654677.158	492281.549	1654669.181	492265.678	1654669.181	492265.678
PIER 9	48 + 395.000	1654696.917	492285.342	1654696.917	492285.342	1654698.940	492269.471	1654698.940	492269.471
PIER 10	48 + 425.000	1654726.676	492289.136	1654726.676	492289.136	1654728.699	492273.264	1654728.699	492273.264
PIER 11	48 + 455.000	1654756.436	492292.929	1654756.436	492292.929	1654758.459	492277.057	1654758.459	492277.057
PIER 12	48 + 485.000	1654786.195	492296.722	1654786.195	492296.722	1654788.218	492280.851	1654788.218	492280.851
PIER 13	48 + 515.000	1654815.954	492300.516	1654815.954	492300.516	1654817.977	492284.644	1654817.977	492284.644
PIER 14	48 + 545.000	1654845.713	492304.309	1654845.713	492304.309	1654847.736	492288.437	1654847.736	492288.437
PIER 15	48 + 595.000	1654895.312	492310.631	1654895.312	492310.631	1654897.335	492294.759	1654897.335	492294.759
PIER 16	48 + 655.000	1654954.830	492318.218	1654954.830	492318.218	1654956.853	492302.346	1654956.853	492302.346
PIER 17	48 + 715.000	1655014.349	492325.804	1655014.349	492325.804	1655017.162	492303.733	1655017.162	492303.733
PIER 18	48 + 775.000	1655073.867	492333.391	1655073.867	492333.391	1655075.890	492317.519	1655075.890	492317.519
PIER 19	48 + 835.000	1655133.386	492340.977	1655133.386	492340.977	1655135.409	492325.106	1655135.409	492325.106
PIER 20	48 + 895.000	1655192.904	492348.564	1655192.904	492348.564	1655194.927	492332.692	1655194.927	492332.692
PIER 21	48 + 945.000	1655242.503	492354.886	1655242.503	492354.886	1655244.526	492339.014	1655244.526	492339.014
PIER 22	48 + 975.000	1655272.262	492358.679	1655272.262	492358.679	1655274.285	492342.808	1655274.285	492342.808
PIER 23	49 + 005.000	1655302.021	492362.473	1655302.021	492362.473	1655304.044	492346.601	1655304.044	492346.601
PIER 24	49 + 035.000	1655331.780	492366.266	1655331.780	492366.266	1655333.803	492350.394	1655333.803	492350.394
PIER 25	49 + 065.000	1655361.540	492370.059	1655361.540	492370.059	1655363.563	492354.188	1655363.563	492354.188
PIER 26	49 + 095.000	1655391.299	492373.852	1655391.299	492373.852	1655393.322	492357.981	1655393.322	492357.981
PIER 27	49 + 125.000	1655421.058	492377.646	1655421.058	492377.646	1655423.081	492361.774	1655423.081	492361.774
PIER 28	49 + 155.000	1655450.817	492381.439	1655450.817	492381.439	1655452.840	492365.567	1655452.840	492365.567
PIER 29	49 + 185.000	1655480.516	492385.232	1655480.516	492385.232	1655482.600	492369.361	1655482.600	492369.361
PIER 30	49 + 215.000	1655510.431	492388.282	1655510.431	492388.282	1655512.359	492373.154	1655512.359	492373.154
ABUT. 2	49 + 245.350	–	–	–	–	–	–		

TABLE OF DIMENSIONS FOR INITIAL STAGE

PIER NO.	COLUMN A (mm)	COLUMN B (mm)	COLUMN H (mm)	COLUMN ELEV.B (m)	PILE CAP C (mm)	PILE CAP D (mm)	PILE CAP E (mm)	PILE CAP ELEV.A (m)	COPING L (mm)	COPING W (mm)	COPING H1 (mm)	COPING H2 (mm)	COPING H3 (mm)	COPING H4 (mm)	COPING H5 (mm)	COPING H1a (mm)	COPING H1b (mm)	COPING H1c (mm)	COPING ELEV.C (m)	PILES DIA. (mm)	PILES LENGTH (mm)	PILES NUMBER (pcs)
ABUT. 1	1500	9950	–	–	5000	9950	1500	10.992	–	–	–	–	–	–	–	–	–	–	–	1000	27500	8
PIER 1	1500	3500	12500	15.680	5650	8900	2000	1.180	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.530	1200	20000	6
PIER 2	1500	3500	12500	15.740	5650	8900	2000	1.240	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.590	1200	20000	6
PIER 3	1500	3500	12500	15.800	5650	8900	2000	1.300	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.650	1200	20000	6
PIER 4	1500	3500	12500	15.860	5650	8900	2000	1.360	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.710	1200	20000	6
PIER 5	1500	3500	12500	15.920	5650	8900	2000	1.420	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.770	1200	20000	6
PIER 6	1500	3500	12500	15.980	5650	8900	2000	1.480	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.830	1200	20000	6
PIER 7	1500	3500	12500	16.040	5650	8900	2000	1.540	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.890	1200	20000	6
PIER 8	1500	3500	12500	16.100	5650	8900	2000	1.600	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.950	1200	20000	6
PIER 9	1500	3500	12500	16.160	5650	8900	2000	1.660	9950	2500	1750	750	1000	1850	1850	1949	949	1000	18.010	1200	20000	6
PIER 10	1500	3500	12500	16.220	5650	8900	2000	1.720	9950	2500	1750	750	1000	1850	1850	1949	949	1000	18.070	1200	20000	6
PIER 11	1500	3500	10850	16.280	5650	8900	2000	3.430	9950	2500	1750	750	1000	1850	1850	1949	949	1000	18.130	1200	20000	6
PIER 12	1500	3500	10850	16.340	5650	8900	2000	3.490	9950	2500	1750	750	1000	1850	1850	1949	949	1000	18.190	1200	20000	6
PIER 13	1500	3500	10850	16.400	5650	8900	2000	3.550	9950	2500	1750	750	1000	1850	1850	1949	949	1000	18.250	1200	20000	6
PIER 14	2000	4000	17050	17.790	6700	10500	2250	−1.51	9950	2500	2250	1000	1250	2250	2424	2449	1199	1250	20.140	1500	18000	6
PIER 15	2500	4500	19000	16.850	10500	10500	2500	−4.66	–	–	–	–	–	3500	3500	–	–	–	20.350	1500	18000	9
PIER 16	2500	4500	19000	16.980	10500	10500	2500	−4.52	–	–	–	–	–	3500	3500	–	–	–	20.480	1500	18000	9
PIER 17	2500	4500	19000	17.030	10500	10500	2500	−4.47	–	–	–	–	–	3500	3500	–	–	–	20.530	1500	18000	9
PIER 18	2500	4500	19000	17.030	10500	10500	2500	−4.47	–	–	–	–	–	3500	3500	–	–	–	20.530	1500	18000	9
PIER 19	2500	4500	19000	16.980	10500	10500	2500	−4.52	–	–	–	–	–	3500	3500	–	–	–	20.480	1500	18000	9
PIER 20	2500	4500	19000	16.880	10500	10500	2500	−4.62	–	–	–	–	–	3500	3500	–	–	–	20.360	1500	18000	9
PIER 21	2000	4000	17050	17.780	6700	10500	2250	−1.52	9950	2500	2250	1000	1250	2250	2424	2449	1199	1250	20.130	1500	18000	6
PIER 22	1500	3500	10250	16.400	5650	8900	2000	4.150	9950	2500	1750	750	1000	1850	1850	1949	949	1000	18.250	1200	18000	6
PIER 23	1500	3500	10250	16.340	5650	8900	2000	4.090	9950	2500	1750	750	1000	1850	1850	1949	949	1000	18.190	1200	18000	6
PIER 24	1500	3500	10250	16.280	5650	8900	2000	4.030	9950	2500	1750	750	1000	1850	1850	1949	949	1000	18.130	1200	18000	6
PIER 25	1500	3500	10250	16.220	5650	8900	2000	3.970	9950	2500	1750	750	1000	1850	1850	1949	949	1000	18.070	1200	18000	6
PIER 26	1500	3500	10050	16.160	5650	8900	2000	3.910	9950	2500	1750	750	1000	1850	1850	1949	949	1000	18.010	1200	18000	6
PIER 27	1500	3500	10050	16.100	5650	8900	2000	4.050	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.950	1200	18000	6
PIER 28	1500	3500	10050	16.040	5650	8900	2000	3.990	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.890	1200	18000	6
PIER 29	1500	3500	10050	15.980	5650	8900	2000	3.930	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.830	1200	18000	6
PIER 30	1500	3500	10050	15.920	5650	8900	2000	3.870	9950	2500	1750	750	1000	1850	1850	1949	949	1000	17.770	1200	18000	6
ABUT. 2	1500	9950	–	–	5000	9950	1500	10.872	–	–	–	–	–	–	–	–	–	–	–	1000	25000	8

HYDRAULIC DATA	
50-YEAR DESIGN DISCHARGE, Q_{50}	5,020 cu. m./sec.
DESIGN FLOW VELOCITY, V_{50}	0.79 m/sec.
CATCHMENT AREA, CA	889.10 km²
DESIGN FLOOD WATER LEVEL, DFWL	EL. + 15.30 m

PERFECTO L. ZAPLAN JR.
OIC Chief, Hydraulics Division, BOD

(1) GENERAL PLAN, ELEVATION AND SECTIONS
SCALE AS SHOWN

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

	DATE	SIGNATURE
DESIGNED	9/21/02	M. S. NAVAL
CHECKED	9/28/02	J. C. SANTOS
SUBMITTED	10/14/02	TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

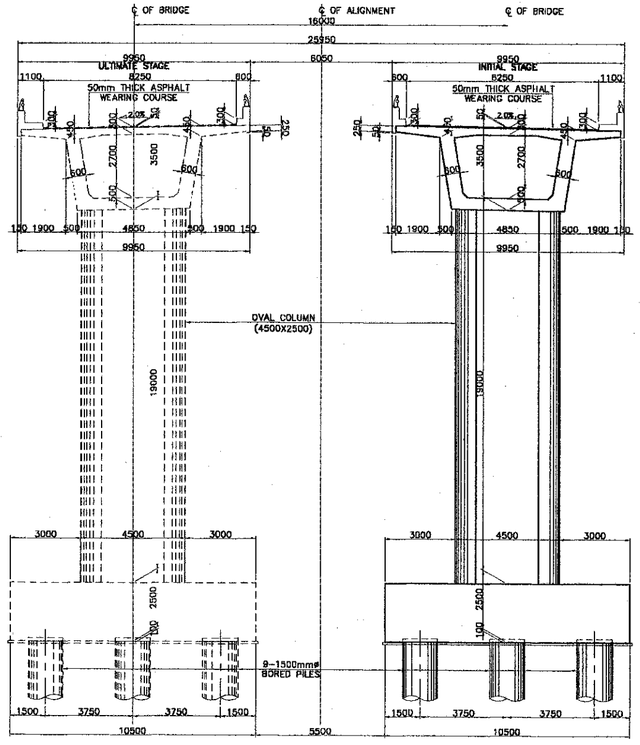
PJHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DANILO C. TRAJANO, Project Director	ADRIANO M. DOROY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	MANUEL M. BONOAN, Undersecretary	SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

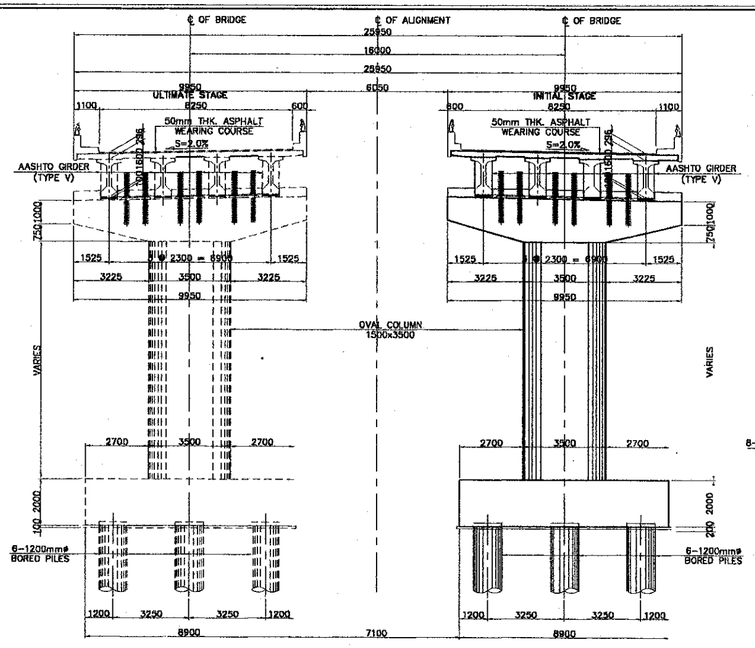
SCALE : AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
GENERAL PLAN, ELEVATION AND SECTIONS (1 OF 2)
(INITIAL STAGE)

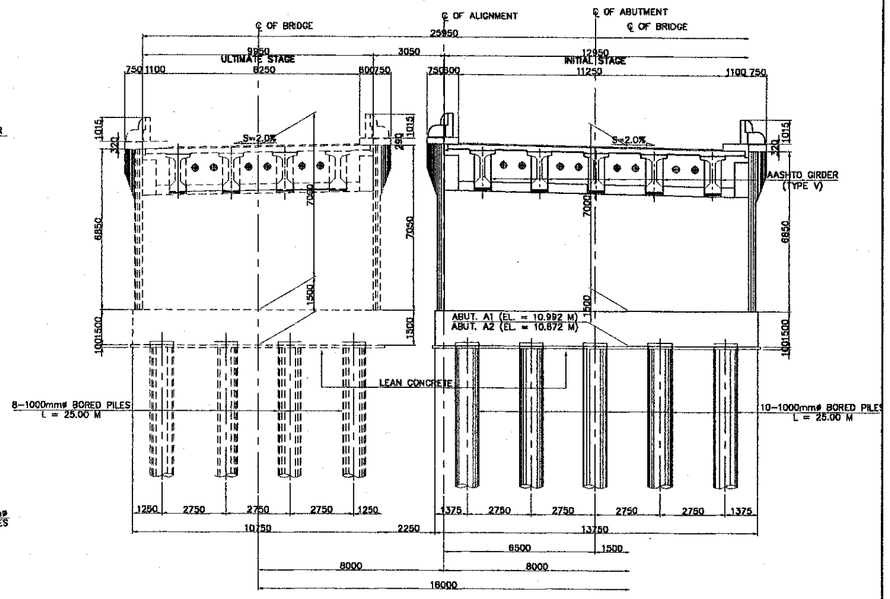
SHEET NO. : B8G-08



A SECTION @ MAIN BRIDGE
SCALE 1:100



D SECTION @ APPROACH BRIDGE
SCALE 1:100



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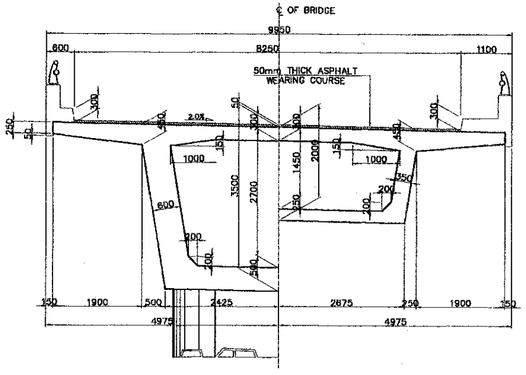

F SECTION OF SUPERSTRUCTURE (MAIN BRIDGE)
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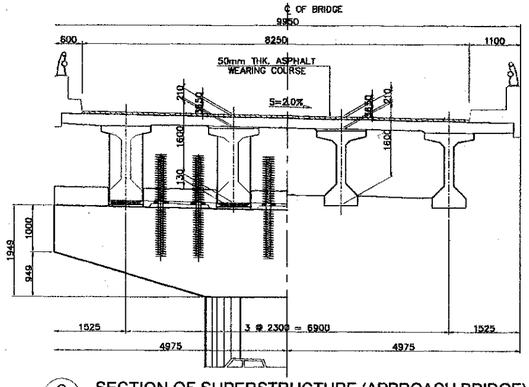
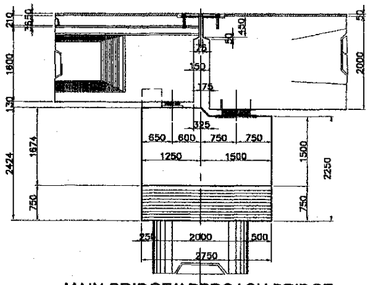
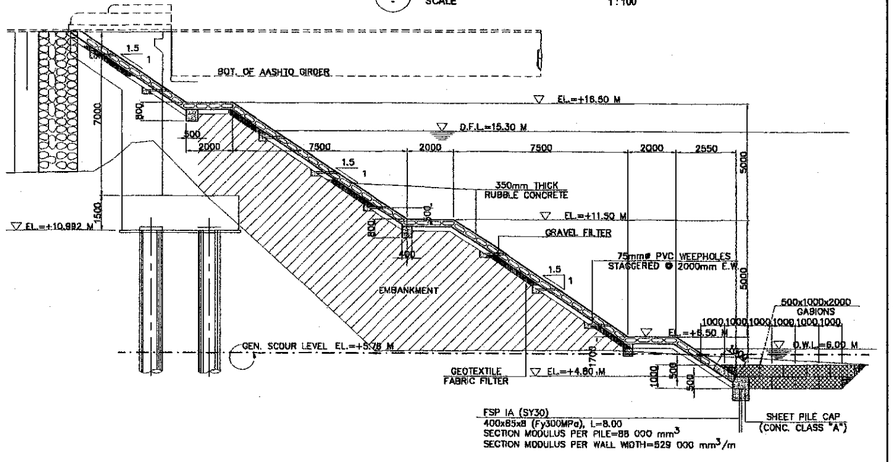


G SECTION OF SUPERSTRUCTURE (APPROACH BRIDGE)
SCALE 1:100



H MAIN BRIDGE/APPROACH BRIDGE CONNECTION DETAILS
SCALE 1:50



I ABUTMENT SLOPE PROTECTION DETAILS (ABUT. A1)
SCALE 1:100

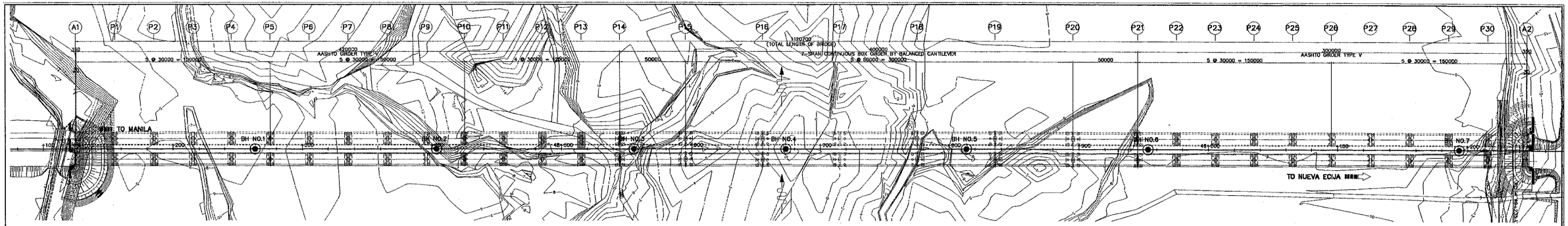
JICA
JAPAN INTERNATIONAL COOPERATION AGENCY
KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD.

	DATE	SIGNATURE
DESIGNED	9/21/02	
CHECKED	9/28/02	J.C. SANTOS
SUBMITTED	10/14/02	TEAM LEADER

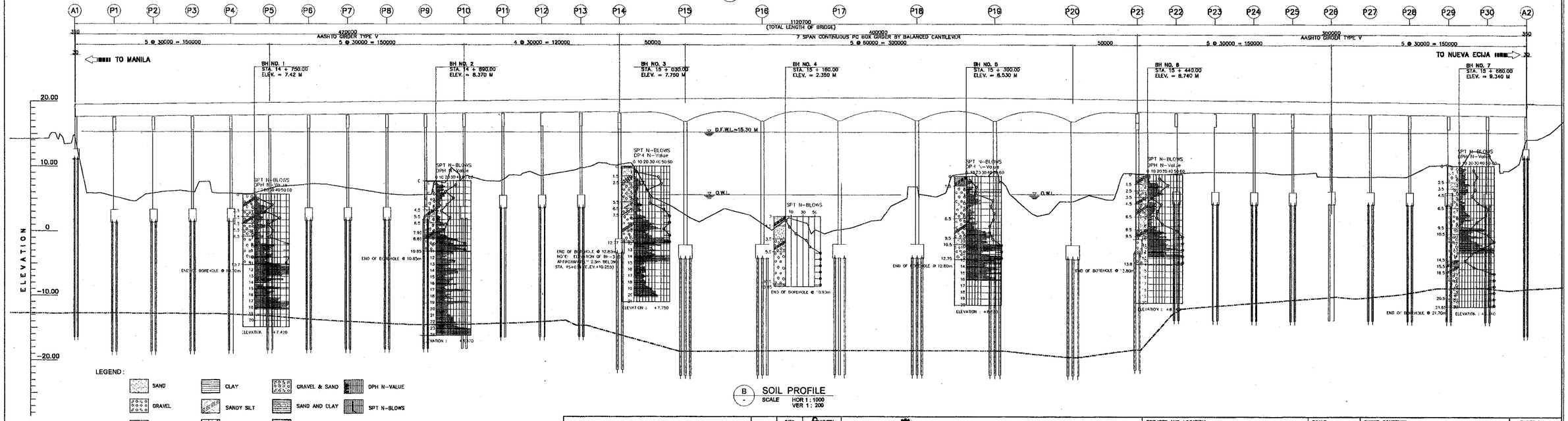
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

FUND. – PNG	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. TRAJANO, Project Director	ADRIANO M. DOROY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	MANUEL M. BONGAN, Undersecretary	SIMEON A. DATUWANONG, Secretary

PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO. 8 ANGAT RIVER BRIDGE GENERAL PLAN, ELEVATION AND SECTIONS (2 OF 2) (INITIAL STAGE)	B8G-09
PLARIDEL BYPASS - CONTRACT PACKAGE III	FULL SIZE A1		



A BOREHOLE LOCATION PLAN
SCALE 1 : 1000



B SOIL PROFILE
SCALE HOR 1 : 1000
VER 1 : 200

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

	DATE	NAME
DESIGNED	9/6/02	
CHECKED	9/23/02	
SUBMITTED	10/11/02	TEAM LEADER

REPUBLIC OF THE PHILIPPINES
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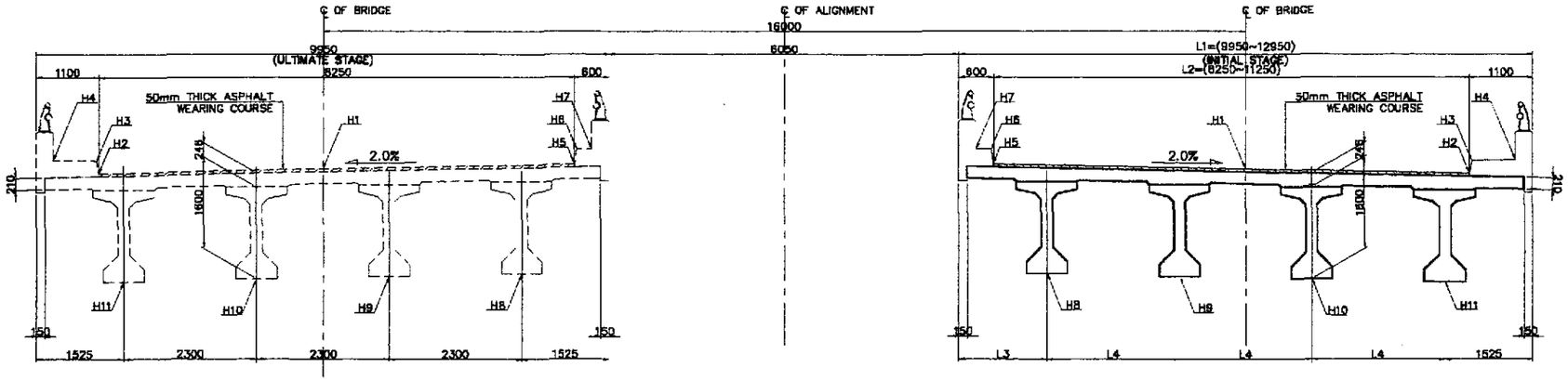
DANILO C. TRAJANO, Project Director	ADRIANO M. DOROY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	MANUEL M. BONGAN, Undersecretary	SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

SCALE : AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
BOREHOLE LOCATION PLAN AND SOIL PROFILE
(INITIAL STAGE)

SHEET NO. : B8G-10



A TYPICAL SECTION @ APPROACH BRIDGE

SCALE 1 : 50

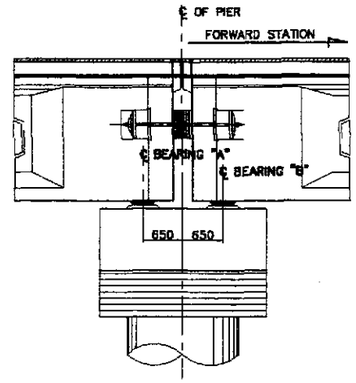
TABLE OF ELEVATIONS

STATION	H1	H2	H3	H4	H5	H6	H7	L1	L2	L3	L4
48+140.00	19.524	19.446	19.898	19.831	19.811	19.851	19.917	9.950	8.250	1.525	2.300
48+160.00	19.564	19.486	19.738	19.671	19.651	19.901	19.957	9.950	8.250	1.525	2.300
48+180.00	19.604	19.526	19.776	19.711	19.691	19.941	19.997	9.950	8.250	1.525	2.300
48+200.00	19.644	19.566	19.816	19.751	19.731	19.981	20.037	9.950	8.250	1.525	2.300
48+220.00	19.684	19.606	19.856	19.791	19.771	20.021	20.077	9.950	8.250	1.525	2.300
48+240.00	19.724	19.646	19.896	19.831	19.811	20.061	20.117	9.950	8.250	1.525	2.300
48+260.00	19.764	19.686	19.936	19.871	19.851	20.101	20.157	9.950	8.250	1.525	2.300
48+280.00	19.804	19.726	19.976	19.911	19.891	20.141	20.197	9.950	8.250	1.525	2.300
48+300.00	19.844	19.766	20.016	19.951	19.931	20.181	20.237	9.950	8.250	1.525	2.300
48+320.00	19.884	19.806	20.056	19.991	19.971	20.221	20.277	9.950	8.250	1.525	2.300
48+340.00	19.924	19.846	20.096	20.031	20.011	20.261	20.317	9.950	8.250	1.525	2.300
48+360.00	19.964	19.886	20.136	20.071	20.051	20.301	20.357	9.950	8.250	1.525	2.300
48+380.00	20.004	19.926	20.176	20.111	20.091	20.341	20.397	9.950	8.250	1.525	2.300
48+400.00	20.044	19.966	20.216	20.151	20.131	20.381	20.437	9.950	8.250	1.525	2.300
48+420.00	20.084	20.006	20.256	20.191	20.171	20.421	20.477	9.950	8.250	1.525	2.300
48+440.00	20.124	20.046	20.296	20.231	20.211	20.461	20.517	9.950	8.250	1.525	2.300
48+460.00	20.164	20.086	20.336	20.271	20.251	20.501	20.557	9.950	8.250	1.525	2.300
48+480.00	20.204	20.126	20.376	20.311	20.291	20.541	20.597	9.950	8.250	1.525	2.300
48+500.00	20.244	20.166	20.416	20.351	20.331	20.581	20.637	9.950	8.250	1.525	2.300
48+520.00	20.284	20.206	20.456	20.391	20.371	20.621	20.677	9.950	8.250	1.525	2.300
48+540.00	20.324	20.246	20.496	20.431	20.411	20.661	20.717	9.950	8.250	1.525	2.300
48+960.00	20.304	20.226	20.476	20.411	20.391	20.641	20.697	9.950	8.250	1.525	2.300
48+980.00	20.264	20.186	20.436	20.371	20.351	20.601	20.657	9.950	8.250	1.525	2.300
49+000.00	20.224	20.146	20.396	20.331	20.311	20.561	20.617	9.950	8.250	1.525	2.300
49+020.00	20.184	20.106	20.356	20.291	20.271	20.521	20.577	9.950	8.250	1.525	2.300
49+040.00	20.144	20.066	20.316	20.251	20.231	20.481	20.537	9.950	8.250	1.525	2.300
49+060.00	20.104	20.026	20.276	20.211	20.191	20.441	20.497	9.950	8.250	1.525	2.300
49+080.00	20.064	19.986	20.236	20.171	20.151	20.401	20.457	9.950	8.250	1.525	2.300
49+100.00	20.024	19.946	20.196	20.131	20.111	20.361	20.417	9.950	8.250	1.525	2.300
49+120.00	19.984	19.906	20.156	20.091	20.071	20.321	20.377	9.950	8.250	1.525	2.300
49+140.00	19.944	19.866	20.116	20.051	20.031	20.281	20.337	9.950	8.250	1.525	2.300
49+160.00	19.904	19.826	20.076	20.011	19.991	20.241	20.297	9.950	8.250	1.525	2.300
49+180.00	19.864	19.786	20.036	19.971	19.951	20.201	20.257	9.950	8.250	1.525	2.300
49+200.00	19.824	19.746	19.996	19.931	19.911	20.161	20.217	9.950	8.250	1.525	2.300
49+220.00	19.784	19.706	19.956	19.891	19.871	20.121	20.177	9.950	8.250	1.525	2.300
49+240.00	19.744	19.666	19.916	19.851	19.831	20.081	20.137	9.950	8.250	1.525	2.300

TABLE OF ELEVATIONS

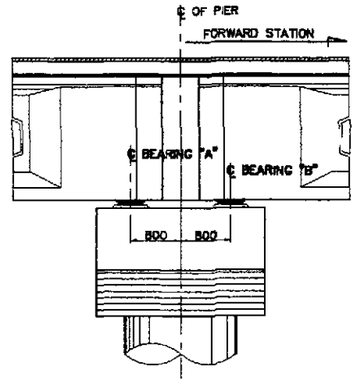
LOCATION		STATION	H8	H9	H10	H11
ABUT. A1	AFTER	48+123.170	17.668	17.622	17.576	17.530
PIER 1	BEFORE	48+154.250	17.725	17.679	17.633	17.587
	AFTER	48+155.750	17.728	17.682	17.636	17.590
PIER 2	BEFORE	48+184.250	17.785	17.739	17.693	17.647
	AFTER	48+185.750	17.788	17.742	17.696	17.650
PIER 3	BEFORE	48+214.250	17.845	17.799	17.753	17.707
	AFTER	48+215.750	17.848	17.802	17.756	17.710
PIER 4	BEFORE	48+244.250	17.905	17.859	17.813	17.767
	AFTER	48+245.750	17.908	17.862	17.816	17.770
PIER 5	BEFORE	48+274.250	17.965	17.919	17.873	17.827
	AFTER	48+275.750	17.968	17.922	17.876	17.830
PIER 6	BEFORE	48+304.375	18.026	17.980	17.934	17.888
	AFTER	48+305.825	18.028	17.982	17.936	17.890
PIER 7	BEFORE	48+334.250	18.085	18.039	17.993	17.947
	AFTER	48+335.750	18.088	18.042	17.996	17.950
PIER 8	BEFORE	48+364.250	18.145	18.099	18.053	18.007
	AFTER	48+365.750	18.148	18.102	18.056	18.010
PIER 9	BEFORE	48+394.250	18.205	18.159	18.113	18.067
	AFTER	48+395.750	18.208	18.162	18.116	18.070
PIER 10	BEFORE	48+424.375	18.266	18.220	18.174	18.128
	AFTER	48+425.825	18.268	18.222	18.176	18.130
PIER 11	BEFORE	48+454.250	18.325	18.279	18.233	18.187
	AFTER	48+455.750	18.328	18.282	18.236	18.190
PIER 12	BEFORE	48+484.250	18.385	18.339	18.293	18.247
	AFTER	48+485.750	18.388	18.342	18.296	18.250
PIER 13	BEFORE	48+514.250	18.445	18.399	18.353	18.307
	AFTER	48+515.750	18.448	18.402	18.356	18.310
PIER 14	BEFORE	48+544.250	18.505	18.459	18.413	18.367
	AFTER	48+545.750	18.508	18.462	18.416	18.370
PIER 15	BEFORE	48+574.500	18.567	18.521	18.475	18.429
	AFTER	48+575.850	18.570	18.524	18.478	18.432
PIER 21	BEFORE	48+944.150	18.570	18.524	18.478	18.432
	AFTER	48+945.500	18.567	18.521	18.475	18.429
PIER 22	BEFORE	48+974.250	18.448	18.402	18.356	18.310
	AFTER	48+975.750	18.445	18.399	18.353	18.307
PIER 23	BEFORE	49+004.250	18.388	18.342	18.296	18.250
	AFTER	49+005.750	18.385	18.339	18.293	18.247
PIER 24	BEFORE	49+034.250	18.328	18.282	18.236	18.190
	AFTER	49+035.750	18.325	18.279	18.233	18.187
PIER 25	BEFORE	49+064.250	18.268	18.222	18.176	18.130
	AFTER	49+065.750	18.265	18.219	18.173	18.127

LOCATION		STATION	H8	H9	H10	H11
PIER 26	BEFORE	49+094.375	18.208	18.162	18.116	18.070
	AFTER	49+095.825	18.206	18.160	18.114	18.068
PIER 27	BEFORE	49+124.250	18.148	18.102	18.056	18.010
	AFTER	49+125.750	18.145	18.099	18.053	18.007
PIER 28	BEFORE	49+154.250	18.088	18.042	17.996	17.950
	AFTER	49+155.750	18.085	18.039	17.993	17.947
PIER 29	BEFORE	49+184.250	18.028	17.982	17.936	17.890
	AFTER	49+185.750	18.025	17.979	17.933	17.887
PIER 30	BEFORE	49+214.250	17.968	17.922	17.876	17.830
	AFTER	49+215.750	17.965	17.919	17.873	17.827
ABUT. A2	BEFORE	49+244.830	17.894	17.848	17.796	17.747



1 AT EXPANSION

SCALE 1 : 50



2 AT FIXED

SCALE 1 : 50

NOTE : THE CONTRACTOR SHOULD VERIFY ALL ELEVATIONS. ELEVATIONS TO MATCH HIGHWAY DESIGN PROFILE TO BE APPROVED BY THE ENGINEER BEFORE SETTING-OUT.

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

	DATE	SIGNATURE
DESIGNED	9/21/02	M. S. BAYAL
CHECKED	9/23/02	J. C. SANTOS
SUBMITTED	10/14/02	E. ALANGA TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

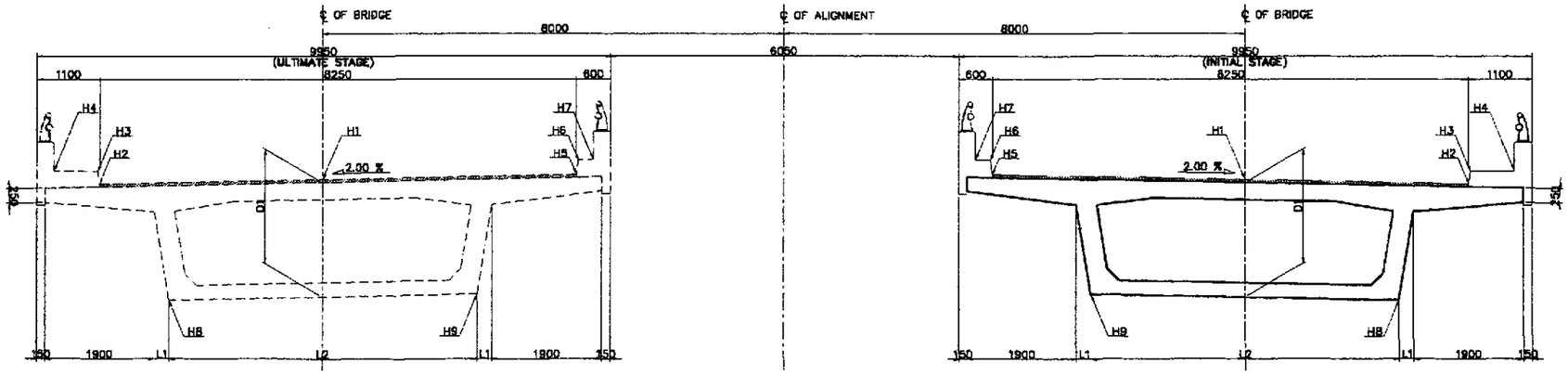
PUHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DANILO C. TRAJANO	ADRIANO M. DOROY	GILBERTO S. REYES	MANUEL M. BONGAN	SIMEON A. DATUMANONG
Project Director	Chief, Bridges Division	Director IV (OIC)	Undersecretary	Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

SCALE : AS SHOWN FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
TABLE OF ELEVATIONS (APPROACH BRIDGE)
(INITIAL STAGE)

SHEET NO. : B8G-11



A TYPICAL BOX GIRDER SECTION

SCALE 1 : 60

TABLE OF ELEVATIONS

STATION	H1	H2	H3	H4	H5	H6	H7	H8	H9	D1	L1	L2
48+560.00	20.364	20.274	20.524	20.258	20.451	20.701	20.707	18.310	18.417	2.000	0.254	5.342
48+580.00	20.404	20.314	20.584	20.298	20.491	20.741	20.747	17.980	18.085	2.371	0.315	5.220
48+600.00	20.444	20.354	20.804	20.338	20.531	20.781	20.787	17.270	17.369	3.124	0.438	4.973
48+620.00	20.480	20.390	20.640	20.374	20.567	20.817	20.823	18.399	18.506	2.027	0.259	5.333
48+640.00	20.510	20.420	20.670	20.404	20.597	20.847	20.853	18.086	18.191	2.371	0.315	5.220
48+660.00	20.536	20.446	20.696	20.430	20.623	20.873	20.879	17.362	17.461	3.124	0.438	4.973
48+680.00	20.556	20.466	20.716	20.450	20.643	20.893	20.899	18.475	18.582	2.027	0.259	5.333
48+700.00	20.570	20.480	20.730	20.464	20.657	20.907	20.913	18.146	18.251	2.371	0.315	5.220
48+720.00	20.580	20.490	20.740	20.474	20.667	20.917	20.923	17.406	17.505	3.124	0.438	4.973
48+740.00	20.584	20.494	20.744	20.478	20.671	20.921	20.927	18.503	18.610	2.027	0.259	5.333
48+760.00	20.583	20.493	20.743	20.477	20.670	20.920	20.926	18.159	18.264	2.371	0.315	5.220
48+780.00	20.576	20.486	20.736	20.470	20.663	20.913	20.919	17.402	17.501	3.124	0.438	4.973
48+800.00	20.564	20.474	20.724	20.458	20.651	20.901	20.907	18.483	18.590	2.027	0.259	5.333
48+820.00	20.547	20.457	20.707	20.441	20.634	20.884	20.890	18.123	18.228	2.371	0.315	5.220
48+840.00	20.524	20.434	20.684	20.418	20.611	20.861	20.867	17.350	17.449	3.124	0.438	4.973
48+860.00	20.496	20.406	20.656	20.390	20.583	20.833	20.839	18.415	18.522	2.027	0.259	5.333
48+880.00	20.462	20.372	20.622	20.356	20.549	20.799	20.805	18.038	18.143	2.371	0.315	5.220
48+900.00	20.424	20.334	20.584	20.318	20.511	20.761	20.767	17.250	17.349	3.124	0.438	4.973
48+920.00	20.384	20.294	20.544	20.278	20.471	20.721	20.727	18.303	18.410	2.027	0.259	5.333
48+940.00	20.344	20.254	20.504	20.238	20.431	20.681	20.687	17.266	17.367	3.027	0.422	5.005

NOTE : THE CONTRACTOR SHOULD VERIFY ALL ELEVATIONS. ELEVATIONS TO MATCH HIGHWAY DESIGN PROFILE TO BE APPROVED BY THE ENGINEER BEFORE SETTING-OUT.

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

	DATE	SIGNATURE
DESIGNED	9/21/02	J. S. [illegible]
CHECKED	9/23/02	J. P. SANTOS
SUBMITTED	10/4/02	[illegible] TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

PJHL – 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. TRAJANO	ADRIANO M. DOROY	GILBERTO S. REYES	MANUEL M. BONOAN	SIMEON A. DATUMANONG
Project Director	Chief, Bridges Division	Director IV (OBC)	Undersecretary	Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

SCALE : AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
TABLE OF ELEVATIONS
(MAIN BRIDGE)
(INITIAL STAGE)

SHEET NO. : B8G-12

SUMMARY OF QUANTITIES
ANGAT RIVER BRIDGE CROSSING (BRIDGE NO. 8)

ITEM NO.	DESCRIPTION	UNIT	QUANTITIES			REMARKS
			APPROACH	MAIN	TOTAL	
PART F	BRIDGE CONSTRUCTION					
I	**SUPERSTRUCTURE**					
310(2)	Asphalt Mixture Wearing Course (t=50mm) incl. Tack Coat	m^2	6,034.65	3,300.00	9,334.65	
401(2)a	Steel Railing Type A for (Angat, Talavera and approach of Pampanga Bridge)	m	1,440.15	800.00	2,240.15	
SPL 401(3)a	Bridge Name Plate, 1000 x 600 for Angat Bridge	ea.	2	–	2	
404(1)	Reinforcing Steel (Grade 40)	kg.	436,856.97	437,307.78	874,164.75	
404(2)	Reinforcing Steel (Grade 60)	kg.	185,036.98	280,129.41	465,166.39	
405(1)f	Structural Concrete Class AA2 (f'c=28 Mpa, max. aggregate 20mm) for Long Bridge Superstructures	m^3	2,138.00	7.60	2,145.60	
405(3)	Structural Concrete Class C (f'c=21 MPa, max. aggregate 12mm) for Thin Reinforced Members	m^3	629.69	355.20	984.89	
405(4)b	Structural Concrete Class PP (f'c=41 MPa max. aggregate 20mm) for Prestressed Box Girders in Angat Bridge	m^3	–	3,066.95	3,066.95	
406(1)g	Precast Prestressed Structural Concrete Member (AASHTO Girder Type V, L=29.4m)	ea.	56	–	56	
406(1)h	Precast Prestressed Structural Concrete Member (AASHTO Girder Type V, L=29.55m)	ea.	41	–	41	
406(3)a	Prestressing Steel 12–T12.7 Grade 270 for PC Box Girders of Angat Bridge, Longitudinal	kg.	–	147,712.41	147,712.41	
406(3)b	Prestressing Steel 5–T12.7 Grade 270 for PC Box Girders of Angat Bridge, Transversal in Top Slab	kg.	–	29,029.58	29,029.58	
406(3)c	Prestressing Bar Ø32mm for PC Box Girders of Angat Bridge, Transversal in Diaphragms	kg.	–	4,874.44	4,874.44	
406(3)d	Prestressing Bar Ø32mm for PC Box Girders of Angat Bridge, Vertical in Webs	kg.	–	5,713.69	5,713.69	
407(1)b	Elastomeric Bearing Pad (600x300x50mm)	ea.	186	8	194	
407(1)d	Elastomeric Bearing Pad (600x700x89mm)	ea.	–	4	4	
407(2)b	Expansion Joint, Multiflex M100 (Elastomeric) ±50mm movement	m	23.40	–	23.40	
407(2)c	Expansion Joint, Multiflex M140 (Elastomeric) ±70mm movement	m	30.60	–	30.60	
407(2)e	Expansion Joint Multiflex M200 (Elastomeric) ±100mm movement	m	–	20.40	20.40	
407(4)	G.I Drain Pipe Ø150mm for Bridge Drainage	m	265.20	204.60	469.80	
SPL 407(3)a	Restraining Bar Ø32mm x 1495mm	ea.	14	–	14	
SPL 407(3)b	Restraining Bar Ø32mm x 1900mm	ea.	18	–	18	
SPL 420(3)	False Works Required for Cantilever Construction for PC Box Girder (Angat Bridge)	l.s.	–	1	1	
II	**SUBSTRUCTURE**					
103(2)a	Bridge Excavation above OWL (Common Soil)	m^3	4,035.48	1,366.91	5,402.39	
103(2)c	Bridge Excavation below OWL (Common Soil)	m^3	3,661.53	7,054.89	10,716.42	
104(4)	Embankment from Borrow (Selected Granular Material) for Bridge	m^3	1,263.85	–	1,263.85	
200(1)	Aggregate Subbase Course	m^3	26.72	–	26.72	
400(15)a	Cast-in-place Concrete Bored Piles Ø 1000mm	m	470.00	–	470.00	
400(15)b	Cast-in-place Concrete Bored Piles Ø 1200mm	m	2,568.00	–	2,568.00	
400(15)c	Cast-in-place Concrete Bored Piles Ø 1500mm	m	–	1,188.00	1,188.00	
400(21)	Static Pile Load Test for Ø1500mm Bored Piles	ea.	–	2	2	
404(1)	Reinforcing Steel (Grade 40)	kg.	50,215.58	1,004.61	51,220.19	
404(2)	Reinforcing Steel (Grade 60)	kg.	1,178,579.68	772,264.94	1,950,844.62	
405(1)e	Structural Concrete Class AA1 (f'c=28 Mpa, max. aggregate 20mm) for Long Bridge Substructures	m^3	4,852.26	3,317.31	8,169.57	
405(6)	Lean Concrete (f'c=17 MPa max. aggregate 38mm)	m^3	132.10	84.10	216.20	
SPL 311(2)	PCC Pavement (Reinforced) t=300mm Approach Slab	m^2	106.03	–	106.03	
SPL 400(23)a	High Strain Dynamic Pile Test for Ø1000mm Bored Piles	ea.	1	–	1	
SPL 400(23)b	High Strain Dynamic Pile Test for Ø1200mm Bored Piles	ea.	3	–	3	
SPL 400(24)	Pile Integrity Test for Bored Piles of Various Diameter	ea.	51	22	73	
SPL 900(3)	Provisional Sum for Geotechnical Investigation	l.s.	–	–	1	
III	**REVETMENT (RIVERBANK PROTECTION)**					
103(1)	Structure Excavation	m^3	1,769.50	–	1,769.50	
104(3)	Embankment from borrow pit	m^3	8,496.45	–	8,496.45	
405(1)a	Structural Concrete Class A (f'c=21 Mpa, max. aggregate 38mm) for Heavily Reinf. Structures	m^3	105.74	–	105.74	
405(2)	Structural Concrete Class B (f'c=17 MPa, max. aggregate 50mm) for Plain or Lightly Reinf. Structures	m^3	50.75	–	50.75	
504(5)	Grouted Riprap Class A	m^3	26.19	–	26.19	
506(1)	Hand Laid Rock Apron (Loose Boulder Apron)	m^3	118.98	–	118.98	
507(2)b	Steel Sheet Piles (400mmx85mm), furnish & driven	m	2,632.00	–	2,632.00	
509(1)	Gabions, (2.0 x 1.0 x 0.50)	m^3	1,094.63	–	1,094.63	
510(1)	Rubble Concrete Slope Protection	m^3	1,062.26	–	1,062.26	
SPL 407(5)a	Pier Protection Concrete Blocks for Angat Bridge	m^2	–	1,344.00	1,344.00	
IV	**TEMPORARY WORKS**					
SPL 420(2)a	Realignment of River/Stream	l.s.	1	–	1	
SPL 420(4)a	Temporary Craneway for Angat Bridge Construction	m	–	416.00	416.00	
SPL 420(5)a	Temporary Access Road (Causeway) for Angat Bridge Construction	m	710.00	–	710.00	
SPL 420(6)a	Temporary Cofferdam for Pier Construction (Angat Bridge Type 1)	ea.	–	2	2	
SPL 420(6)b	Temporary Cofferdam for Pier Construction (Angat Bridge Type 2)	ea.	–	6	6	
V	**ELECTRICAL WORKS**					
SPL 620(4)c	Bridge Lighting Poles (Single Lamp)	ea.	24	14	38	
SPL 620(4)d	Street Lighting Service Pole with Panel	ea.	–	–	2	

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

	DATE	SIGNATURE
DESIGNED	9/21/02	M. S. SAVIL
CHECKED	9/25/02	J. C. SANTOS
SUBMITTED	10/4/02	TEAM LEADER

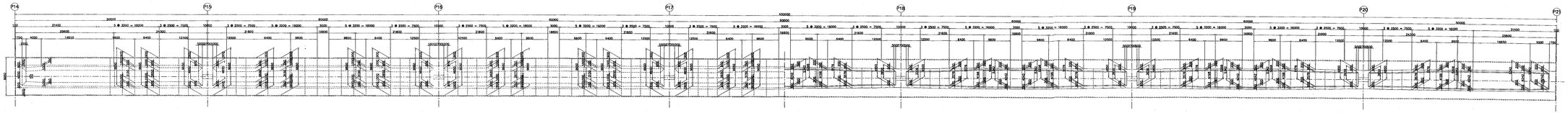
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

PUHL – 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. TRAJANO	ADRIANO M. DOROY	GILBERTO S. REYES	MANUEL M. BONGAN	SIMEON A. DATUMANONG
Project Director	Chief, Bridges Division	Director IV (OIC)	Undersecretary	Secretary

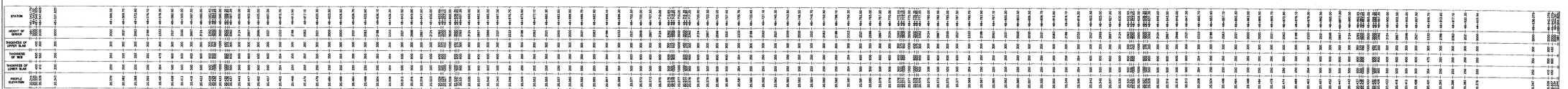
PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE III	AS SHOWN FULL SIZE A1	BRIDGE NO. 8 ANGAT RIVER BRIDGE SUMMARY OF QUANTITIES (INITIAL STAGE)	B8G-13

MAIN BRIDGE

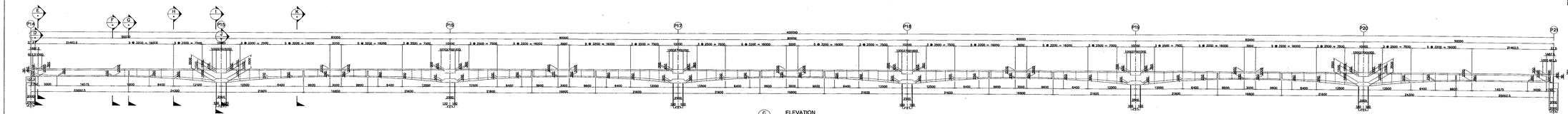
LAYOUT AND DIMENSIONS



A HALF SHOWING TOP SLAB
SCALE 1 : 200

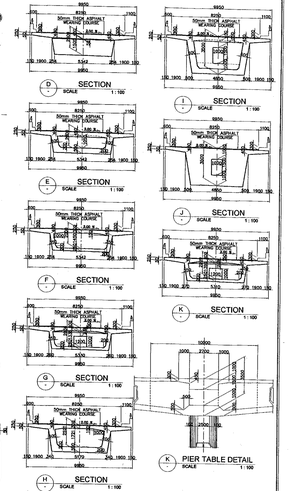


B HALF SHOWING BOT. SLAB
SCALE 1 : 200



C ELEVATION
SCALE 1 : 200

LAYOUT OF SUPERSTRUCTURE (MAIN BRIDGE)
SCALE AS SHOWN



D SECTION
SCALE 1 : 100

I SECTION
SCALE 1 : 100

E SECTION
SCALE 1 : 100

J SECTION
SCALE 1 : 100

F SECTION
SCALE 1 : 100

K SECTION
SCALE 1 : 100

G SECTION
SCALE 1 : 100

H SECTION
SCALE 1 : 100

K PIER TABLE DETAIL
SCALE 1 : 100

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY

KATAHIRA & ENGINEERS INTERNATIONAL

YEC YACHIYO ENGINEERING CO., LTD.

	DATE	
DESIGNED	03/04/	
CHECKED	03/04/	
SUBMITTED	03/04/	

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

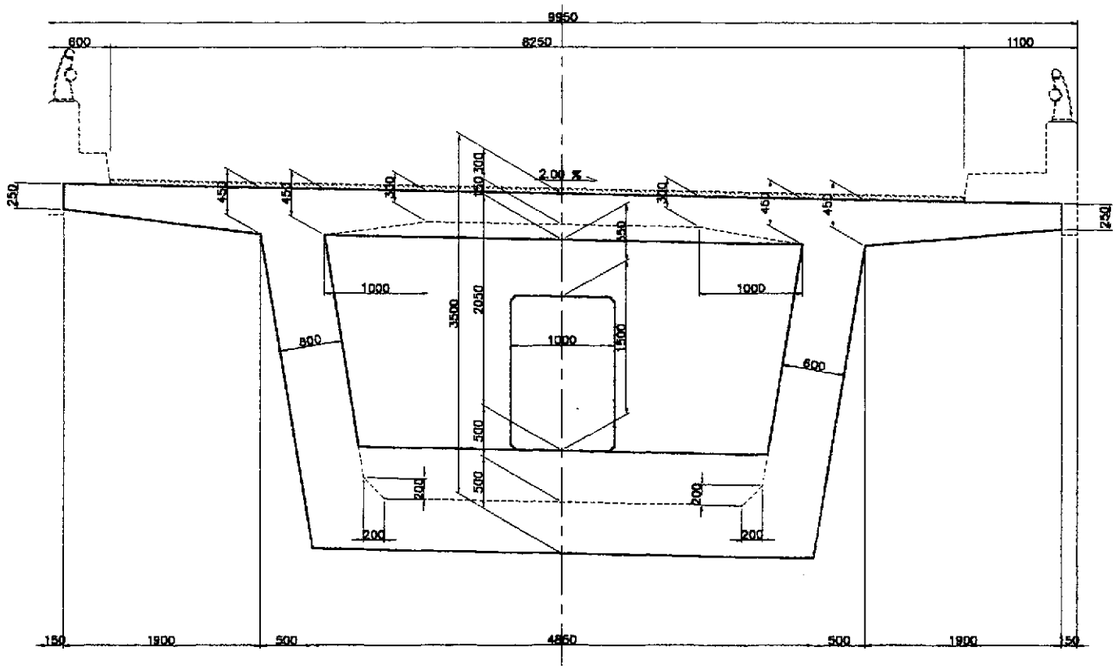
DATE OF ISSUE	BUREAU OF WORKS		OFFICE OF THE SECRETARY
JUL. 1, 2002	Submitted by:	Recommended by:	Recommended for approval:
	DANILO C. TRIJICO Project Engineer	CORNELIO G. GONZAL Chief, Bridge Division	GLICERIO S. RIVES Director III, DPWH
			Approved By: Secretary of Public Works & Highways
			ANGELO G. MAGNO Undersecretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Pan-Iloil, Cebanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE II

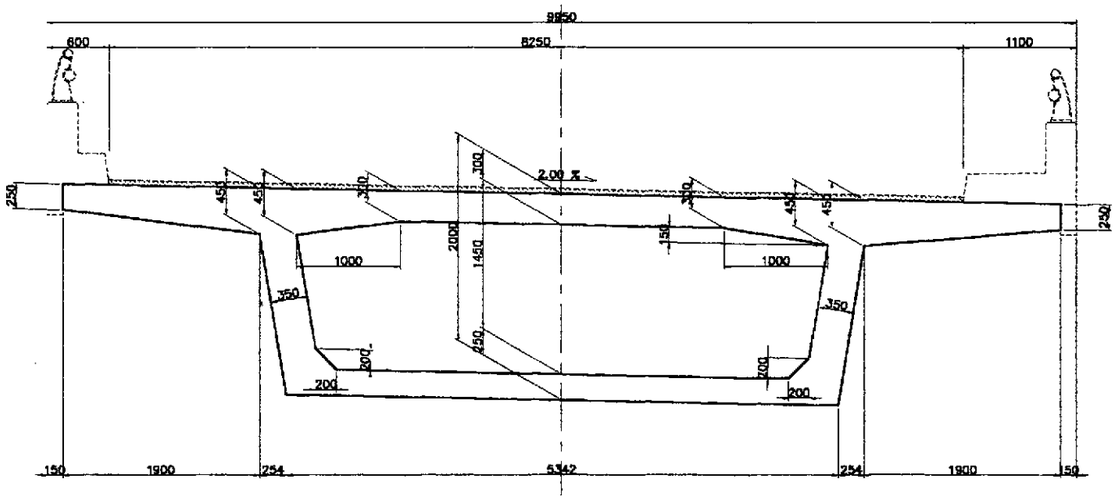
SCALE :
AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 AMGAT RIVER BRIDGE
LAYOUT OF STRUCTURE
(PIER 14 - P21)
(INITIAL STAGE)

SHEET NO. :
B8M-01



A - TYPICAL SECTION @ SUPPORT
SCALE 1 : 30



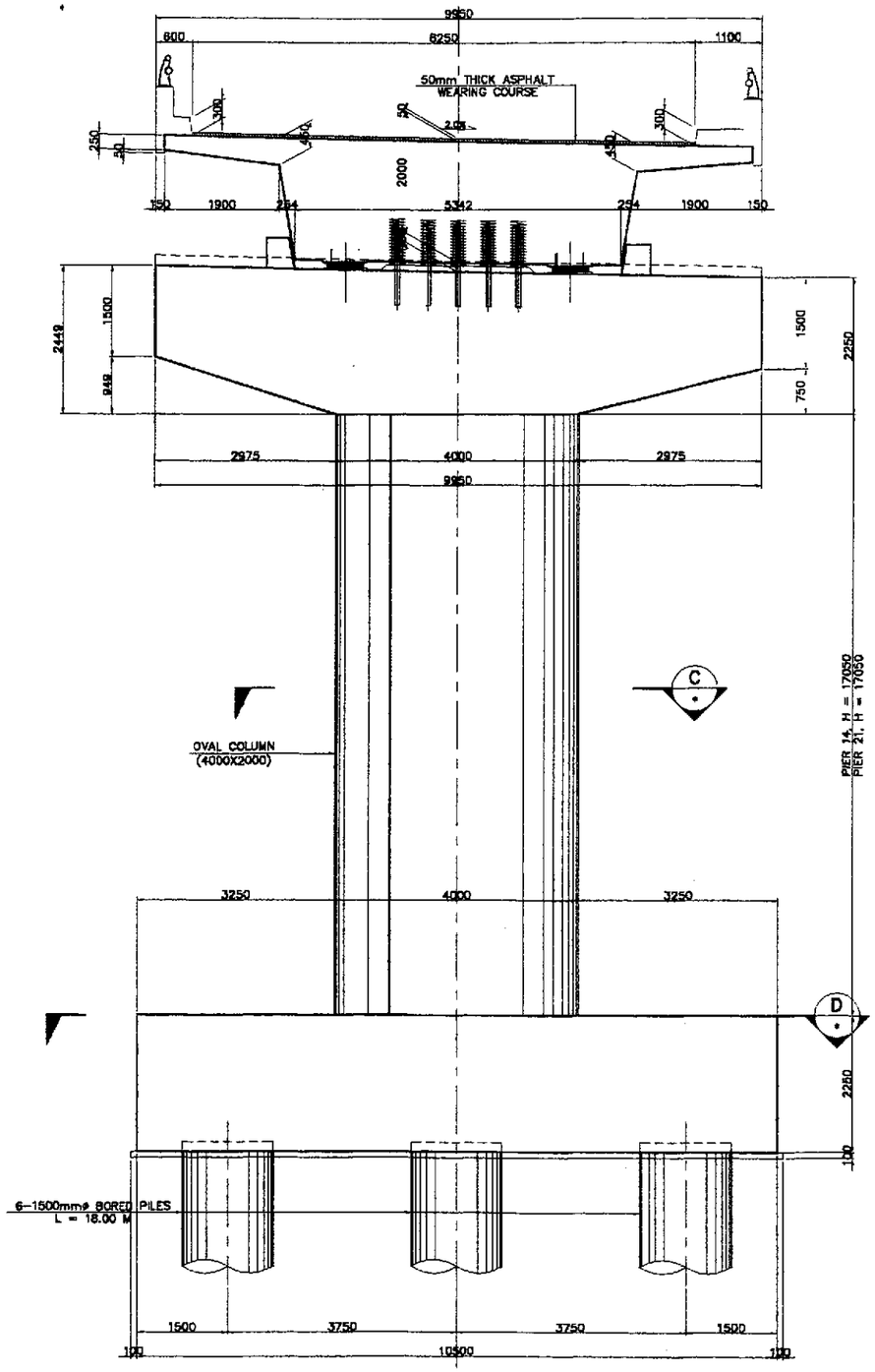
B - TYPICAL SECTION @ MID-SPAN
SCALE 1 : 30

1 - TYPICAL SECTIONS FOR SUPERSTRUCTURE (SHOWING DIMENSIONS)
SCALE AS SHOWN

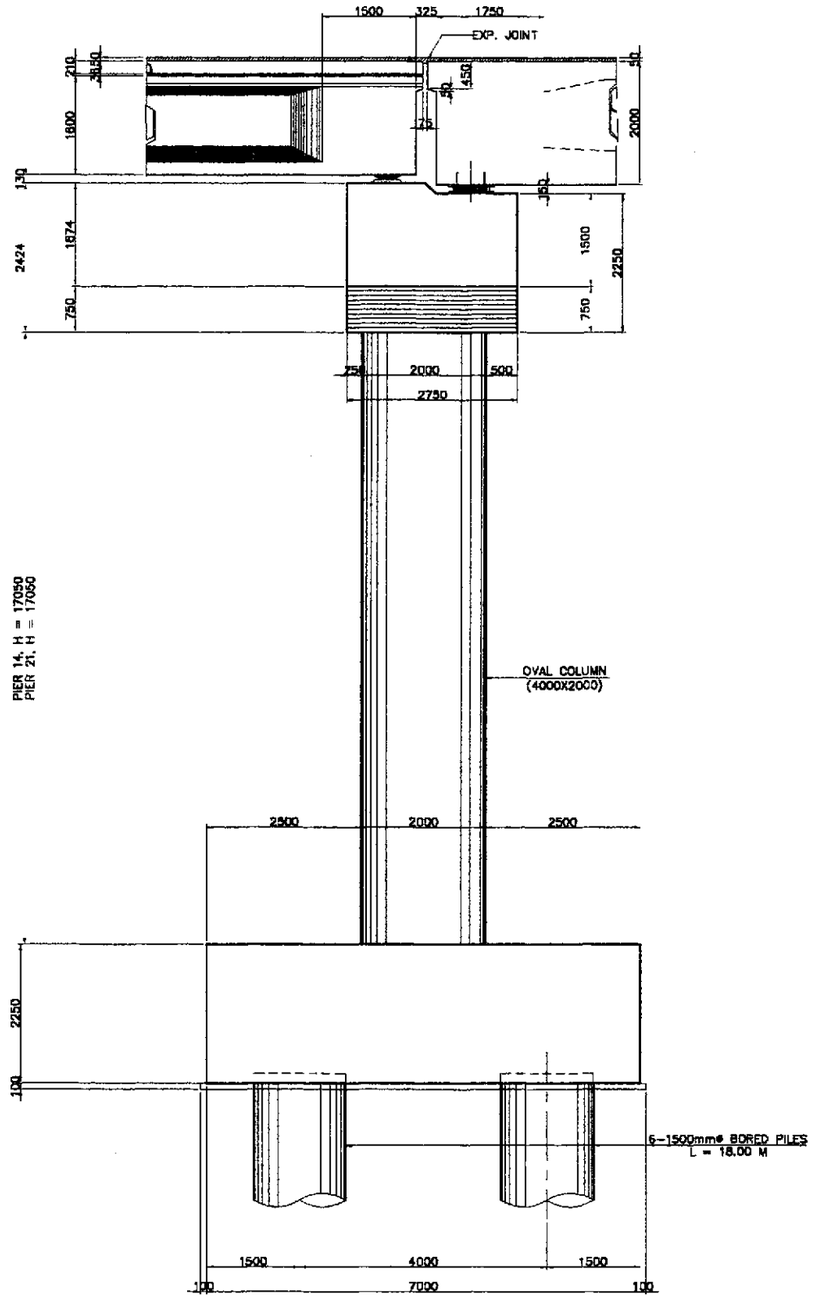
JICA JAPAN INTERNATIONAL COOPERATION AGENCY KEI KATAHIRA & ENGINEERS INTERNATIONAL YEC YACHIYO ENGINEERING CO., LTD.	DATE / SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS				PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
DESIGNED	9/21/02	PJHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)	AS SHOWN	BRIDGE NO. 8 ANGAT RIVER BRIDGE TYPICAL SECTIONS FOR SUPERSTRUCTURE (INITIAL STAGE)	B8M-02
CHECKED	9/23/02	Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature) / Approved By: (See cover sheet for Signature/Approval)				
SUBMITTED	10/14/02 TEAM LEADER	DANILO C. TRAJANO Project Director	ADRIANO M. DOROY Chief, Bridges Division	GILBERTO S. REYES Director IV (OIC)	MANUEL M. BONGAN Undersecretary	SIMEON A. DATUMANONG Secretary			

PLARIDEL BYPASS - CONTRACT PACKAGE III

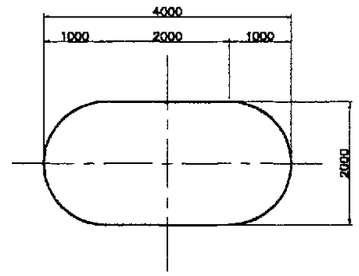
FULL SIZE A1



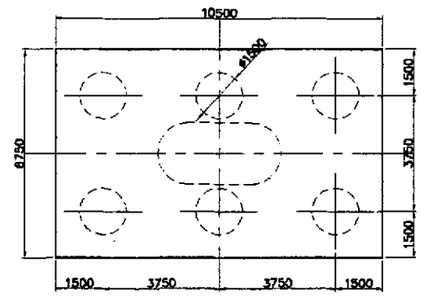
A SCALE 1:50 FRONT ELEVATION



B SCALE 1:50 SIDE ELEVATION



C SCALE 1:50 SECTION



D SCALE 1:100 SECTION

1 SCALE AS SHOWN PIER LAYOUT AND DIMENSIONS (PIER 14 & PIER 21)

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

	DATE	SIGNATURE
DESIGNED	9/21/02	
CHECKED	9/23/02	J. C. SANTOS
SUBMITTED	10/14/02	TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

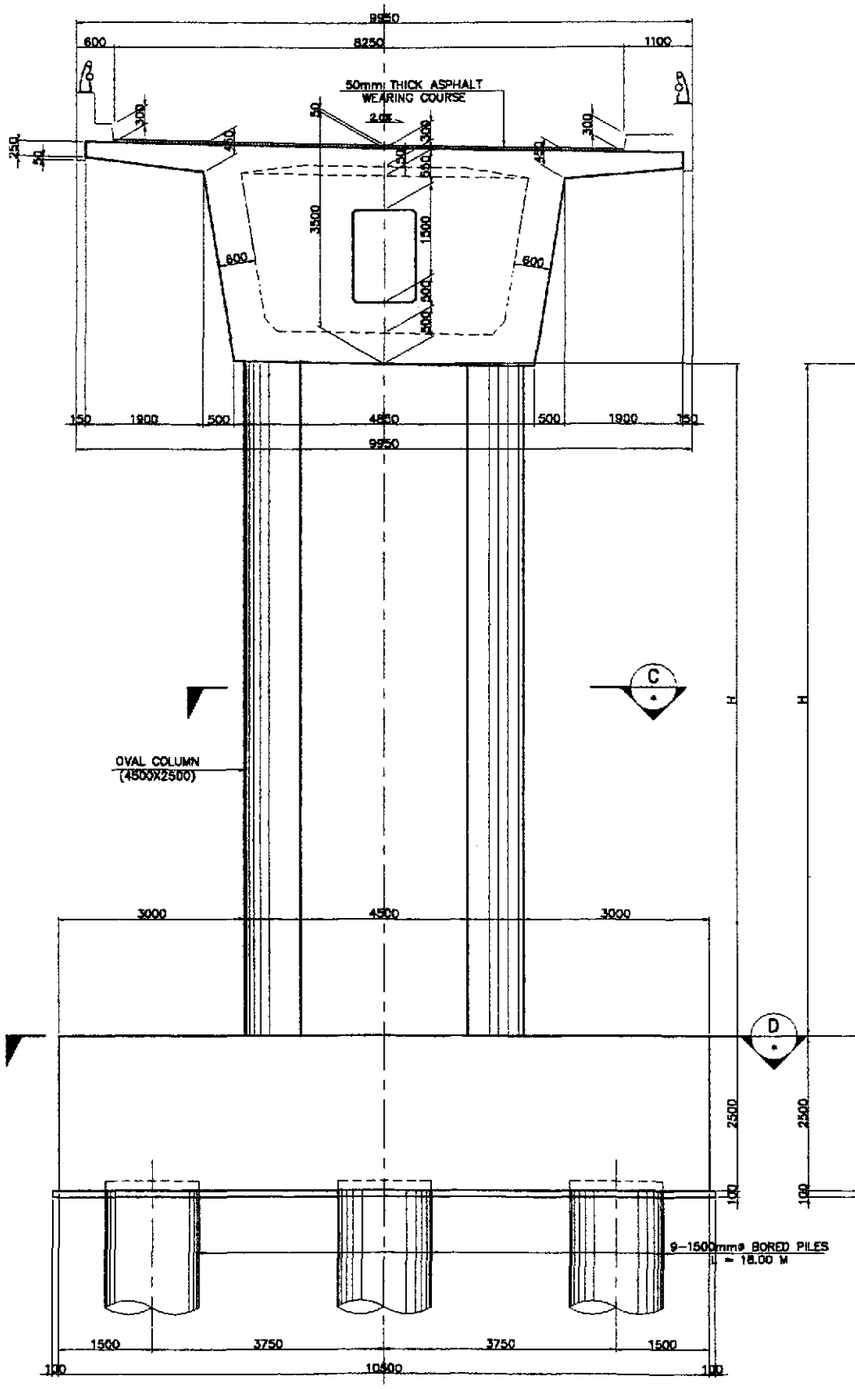
PJHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DANILO C. TRAJANO	ADRIANO M. DOROY	GILBERTO S. REYES	MANUEL M. BONGAN	SIMEON A. DATUMANONG
Project Director	Chief, Bridges Division	Director IV (OIC)	Undersecretary	Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

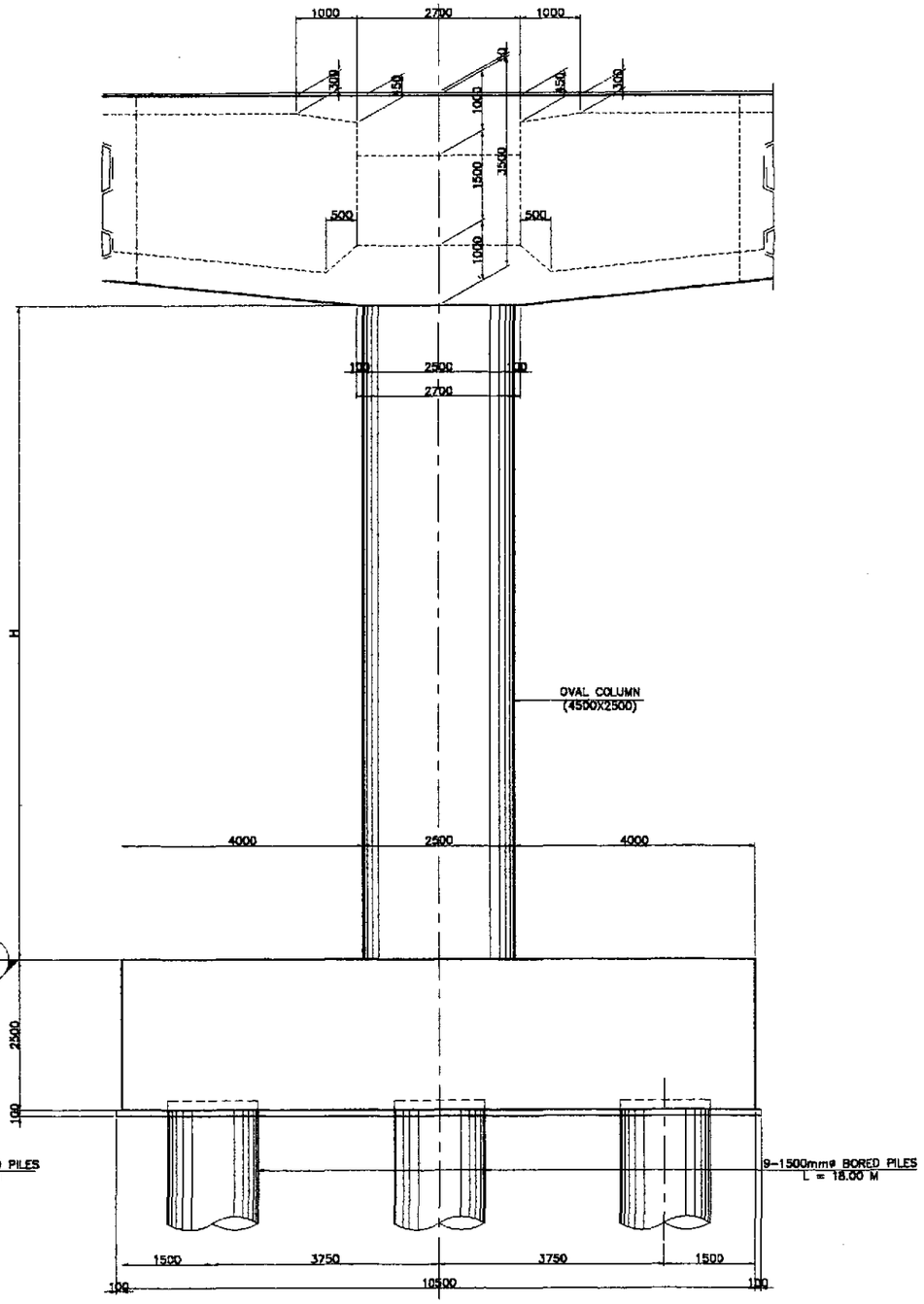
SCALE : AS SHOWN FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
PIER LAYOUT AND DIMENSIONS (PIER 14 & PIER 21)
(INITIAL STAGE)

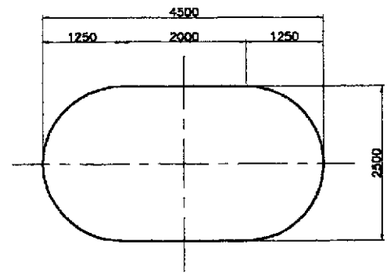
SHEET NO. : B8M-03



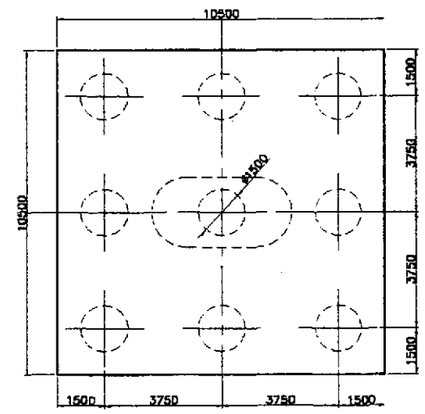
A FRONT ELEVATION
SCALE 1:50



B SIDE ELEVATION
SCALE 1:50



C SECTION
SCALE 1:50



D SECTION
SCALE 1:100

SCHEDULE OF DIMENSIONS	
LOCATION	H
PIER 15	19000
PIER 16	19000
PIER 17	19000
PIER 18	19000
PIER 19	19000
PIER 20	19000

1 PIER LAYOUT AND DIMENSIONS (PIER 15 to PIER 20)
SCALE AS SHOWN

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

	DATE	SIGNATURE
DESIGNED	9/21/02	L. S. Wang
CHECKED	9/23/02	J. C. SANTOS
SUBMITTED	10/14/02	TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

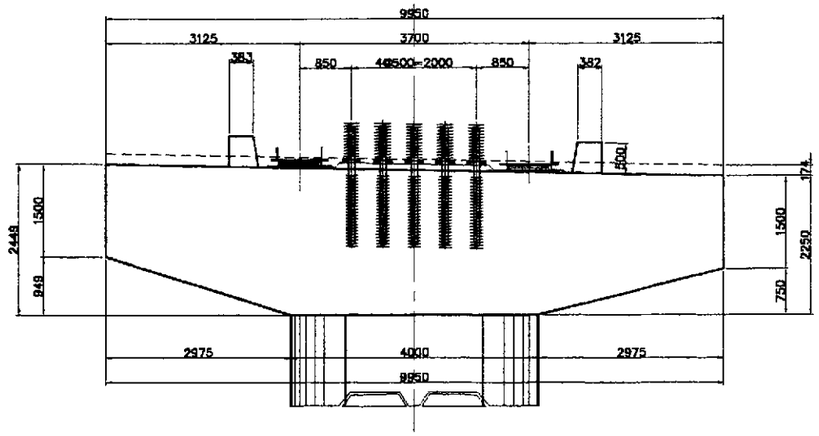
PUHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DANILO C. TRAJANO, Project Director	ADRIANO M. DOROY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	MANUEL M. BONGOAN, Undersecretary	SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

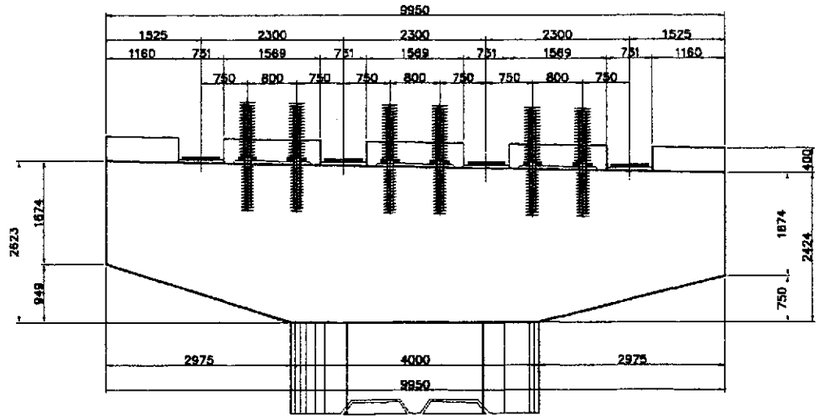
SCALE : AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
PIER LAYOUT AND DIMENSIONS (PIER 15 to PIER 20)
(INITIAL STAGE)

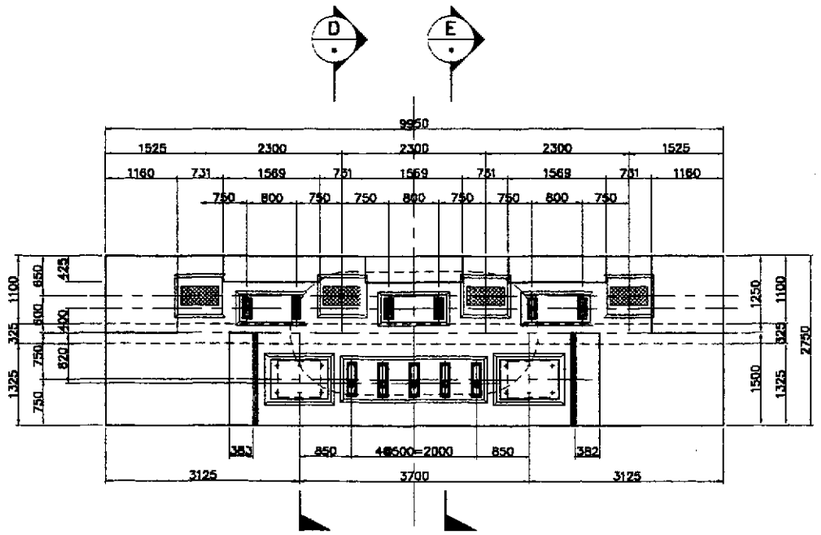
SHEET NO. : B8M-04



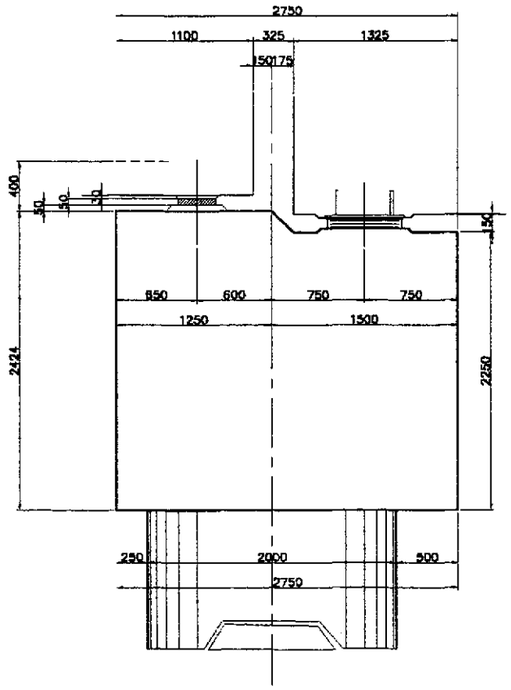
B ELEVATION @ BOX GIRDER SIDE
SCALE 1 : 50



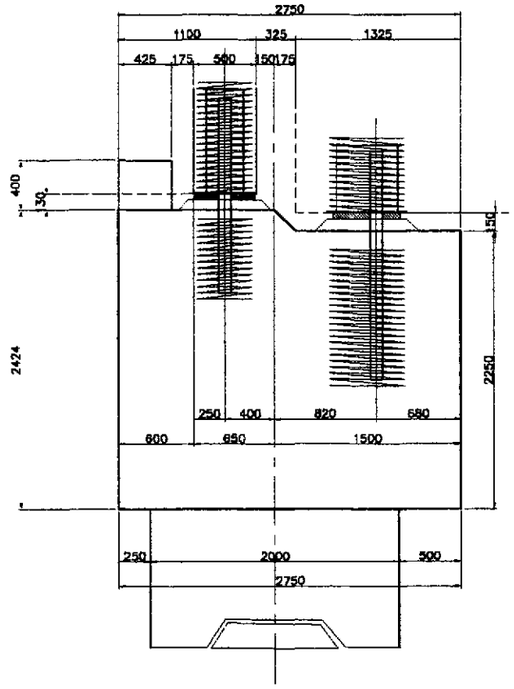
C ELEVATION @ AASHTO GIRDER SIDE
SCALE 1 : 50



A COOPING PLAN
SCALE 1 : 50



D SECTION
SCALE 1 : 25



E SECTION
SCALE 1 : 25

1 COPING LAYOUT AND DIMENSIONS (PIER 14 & PIER 21)
SCALE AS SHOWN

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

	DATE	SIGNATURE
DESIGNED	9/21/02	M. SUNAMI
CHECKED	9/23/02	J. C. SANTOS, TEAM LEADER
SUBMITTED	10/14/02	

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

PJHL – 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. TRAJANO, Project Director	ADRIANO M. DOROY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	MANUEL M. BONOAN, Undersecretary	SIMEON A. DATUMANONG, Secretary

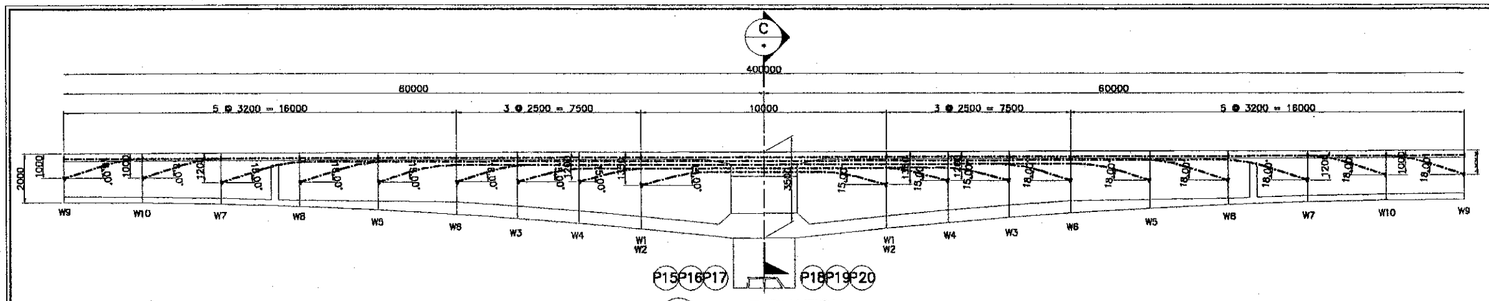
PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

SCALE : AS SHOWN
FULL SIZE A1

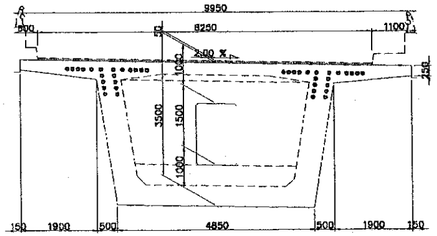
SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
COPING LAYOUT AND DIMENSIONS (PIER 14 & PIER 21)
(INITIAL STAGE)

SHEET NO. : B8M-05

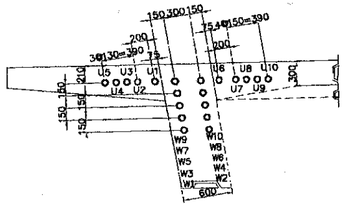
SUPERSTRUCTURE PRESTRESSING CABLES



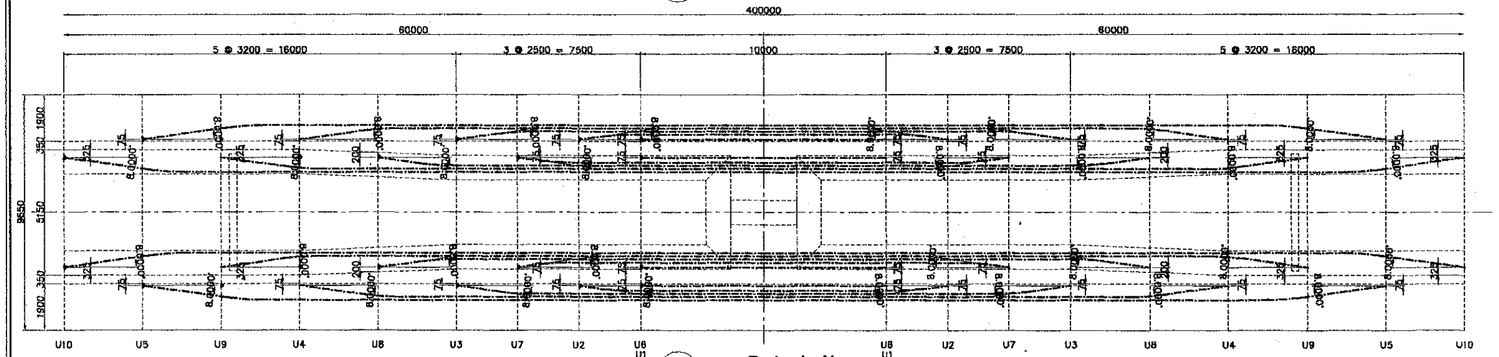
A ELEVATION
SCALE 1:100



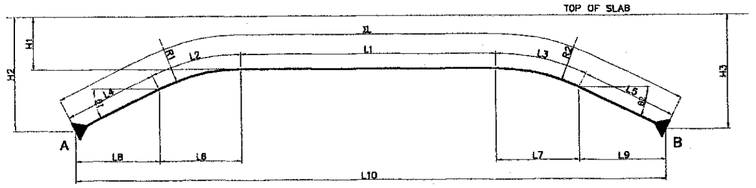
C SECTION
SCALE 1:50



D DETAIL
SCALE 1:30



A PLAN
SCALE 1:100



NOTE :

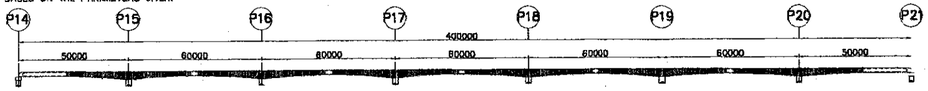
- LIVE END
- DEAD END

TENDON DESIGNATION	NO. OF TENDON	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	ΣL (mm)	L6 (mm)	L7 (mm)	L8 (mm)	L9 (mm)	L10 (mm)	H1 (mm)	H2 (mm)	H3 (mm)	R1 (mm)	R2 (mm)	θ1 (degree)	θ2 (degree)	FORCE IN TENDON @ JACK BEFORE LOCK OFF (KN)	ELONGATION OF TENDON (mm) END A	ELONGATION OF TENDON (mm) END B	ANCHORAGE SLIP (mm)	TYPE – SIZE	TENDON LENGTH (mm)	TOTAL LENGTH (mm)	TOTAL WEIGHT OF TENDON (mm)
W1	2	4390	1571	1571	1298	1298	10124	1553	1553	1252	1252	10000	810	1350	1350	6000	6000	15.000°	15.000°	1545	30.44	30.44	6	12–dia. 12.7	12824	1846656	1431.16
W2	2	4390	1571	1571	1298	1298	10124	1553	1553	1252	1252	10000	810	1350	1350	6000	6000	15.000°	15.000°	1545	30.44	30.44	6	12–dia. 12.7	12824	1846656	1431.16
W3	2	14390	1571	1571	1298	1298	20124	1553	1553	1252	1252	20000	860	1200	1200	6000	6000	15.000°	15.000°	1545	58.58	58.58	6	12–dia. 12.7	21474	3092256	2396.50
W4	2	9390	1571	1571	1298	1298	15124	1553	1553	1252	1252	15000	860	1200	1200	6000	6000	15.000°	15.000°	1545	44.71	44.71	6	12–dia. 12.7	16474	2372256	1838.50
W5	2	25252	1885	1885	1283	1283	31587	1854	1854	1220	1220	31400	510	1200	1200	6000	6000	18.000°	18.000°	1545	87.92	87.92	6	12–dia. 12.7	32938	4743072	3675.88
W6	2	18852	1885	1885	1283	1283	25187	1854	1854	1220	1220	25000	510	1200	1200	6000	6000	18.000°	18.000°	1545	71.40	71.40	6	12–dia. 12.7	26538	3821472	2961.64
W7	2	37129	1885	1885	1768	1768	44435	1854	1854	1681	1681	44200	360	1200	1200	6000	6000	18.000°	18.000°	1545	119.85	119.85	6	12–dia. 12.7	45785	6593040	5109.61
W8	2	30729	1885	1885	1768	1768	38035	1854	1854	1681	1681	37800	360	1200	1200	6000	6000	18.000°	18.000°	1545	104.26	104.26	6	12–dia. 12.7	39385	5671440	4395.37
W9	2	50237	1885	1885	1608	1608	57219	1854	1854	1528	1528	57000	210	1000	1000	6000	6000	18.000°	18.000°	1545	149.92	149.92	6	12–dia. 12.7	58569	8433936	6536.30
W10	2	43837	1885	1885	1608	1608	50819	1854	1854	1528	1528	50600	210	1000	1000	6000	6000	18.000°	18.000°	1545	134.99	134.99	6	12–dia. 12.7	53519	7706736	5972.72
U1	2	10000	–	–	–	–	10000	–	–	–	–	10000	210	–	–	–	–	–	–	1545	31.45	31.45	6	12–dia. 12.7	12700	1828800	1417.32
U2	2	11315	838	838	1017	1017	15025	835	835	1008	1008	15000	210	210	210	0.000	0.000	0.000	0.000	1545	46.97	46.97	6	12–dia. 12.7	17725	2552400	1978.11
U3	2	18905	1396	1396	1672	1672	25042	1392	1392	1656	1656	25000	210	210	210	0.000	0.000	0.000	0.000	1545	76.84	76.84	6	12–dia. 12.7	26392	3800448	2945.35
U4	2	29845	1396	1396	2606	2611	37860	1392	1392	2581	2581	37800	210	210	210	0.000	0.000	0.000	0.000	1545	113.15	113.15	6	12–dia. 12.7	40560	5840640	4526.50
U5	2	40805	1396	1396	3540	3540	50678	1392	1392	3506	3508	50600	210	210	210	0.000	0.000	0.000	0.000	1545	147.80	147.80	6	12–dia. 12.7	53378	7686432	5956.98
U6	2	10000	–	–	–	–	10000	–	–	–	–	10000	210	–	–	–	–	–	–	1545	31.45	31.45	6	12–dia. 12.7	12700	1828800	1417.32
U7	2	16315	838	838	1017	1017	20025	835	835	1008	1008	20000	210	210	210	0.000	0.000	0.000	0.000	1545	62.09	62.09	6	12–dia. 12.7	22725	3272400	2536.11
U8	2	23305	1396	1396	1672	1672	31442	1392	1392	1656	1658	31400	210	210	210	0.000	0.000	0.000	0.000	1545	95.23	95.23	6	12–dia. 12.7	34142	4918448	3810.25
U9	2	36255	1396	1396	2606	2608	44260	1392	1392	2581	2581	44200	210	210	210	0.000	0.000	0.000	0.000	1545	130.66	130.66	6	12–dia. 12.7	46960	6762240	5240.74
U10	2	47205	1396	1396	3540	3540	57078	1392	1392	3506	3508	57000	210	210	210	0.000	0.000	0.000	0.000	1545	164.64	164.64	6	12–dia. 12.7	59778	8608032	6671.22
																									TOTAL	93224160	72248.72

NOTE:

1. ALL PRESTRESSING STEEL SHALL COMFORM TO ASTM M16 FOR HIGH TENSILE STRENGTH, SEVEN WIRE STRANDS, GRADE 270 AND LOW RELAXATION WITH AN ULTIMATE STRENGTH Fpu=1862 MPa.
2. FORCES IN TENDONS AND ELONGATIONS SHALL BE CALCULATED ASSUMING THE FOLLOWING CHARACTERISTICS :
   ANCHORAGE DRAW-IN = 6mm (AFTER LOCK-OFF)
   WOBBLE COEFFICIENT = 0.006 RAD/METER (GALVANIZED STEEL SHEATING)
   CURVATURE COEFFICIENT = 0.30 PER RADIAN
3. AN ADDITIONAL 1.35m IS ADDED AT BOTH ENDS OF JACKING FOR TENDON LENGTH.
4. THE ELONGATION SHOWN IN THE TABLE IS FOR REFERENCE ONLY. THE CONTRACTOR SHOULD SUBMIT CALCULATION OF ELONGATION BASED ON THE PARAMETERS GIVEN.

	fpu	fci @ TIME OF STRESSING	fc' @ 28 DAYS	PC CABLE
MAIN PC CABLE	1862 MPa (270,000 psi)	34.47 MPa (5000 psi)	41.38 MPa (6000 psi)	12 – 12.7 (SWPR7B)



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

	DATE	SIGNATURE
DESIGNED	9/21/02	M. S. NAVA
CHECKED	9/23/02	J. C. SANTOS
SUBMITTED	10/14/02	TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

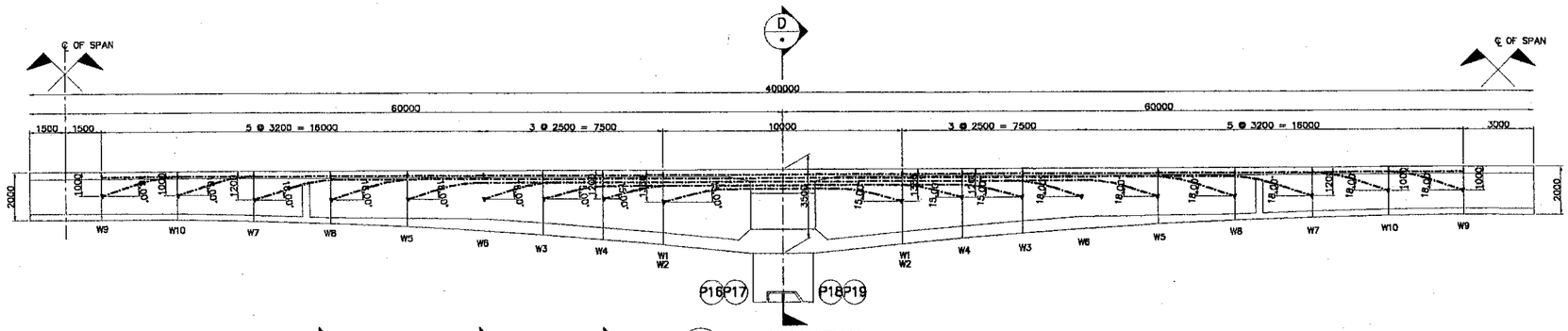
PJHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DANILO C. TRAJANO, Project Director	ADRIANO M. DOROY, Chief, Bridges Division	GILBERTO S. REYES, Director IV (OIC)	MANUEL M. BONGAN, Undersecretary	SIMEON A. DATUMANONG, Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

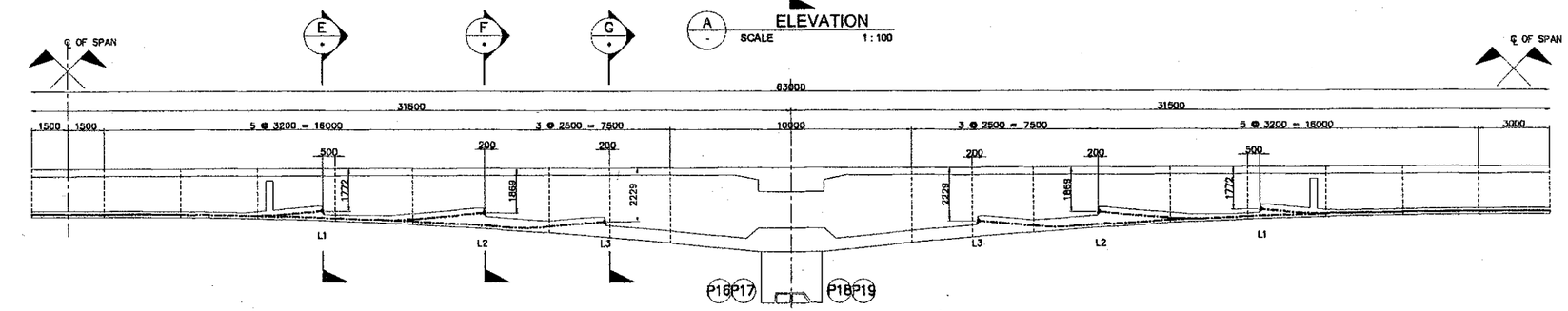
SCALE : AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
ARRANGEMENT OF LONGITUDINAL MAIN PC CABLES (1 OF 4)
(INITIAL STAGE)

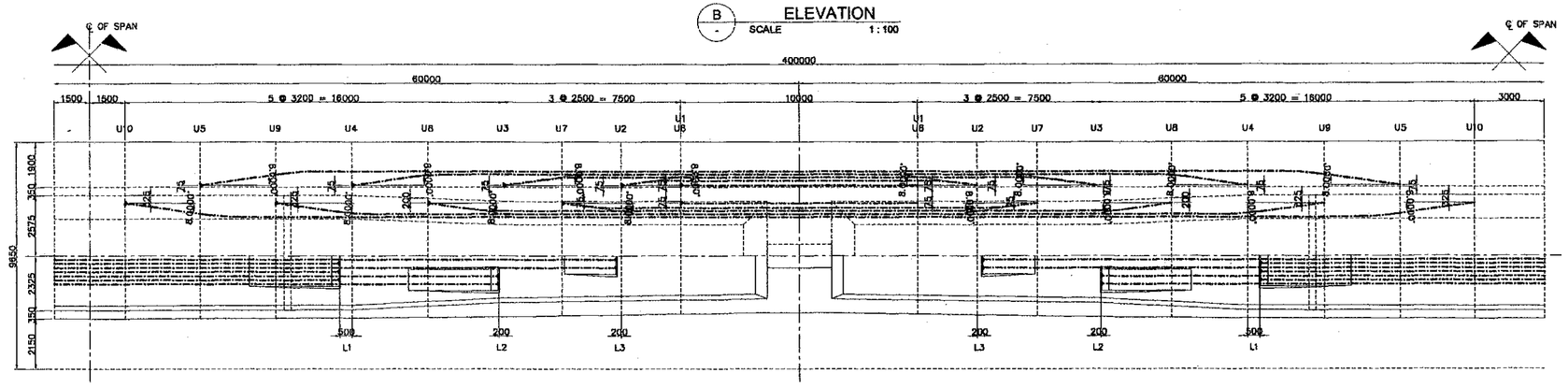
SHEET NO. : B8M-11



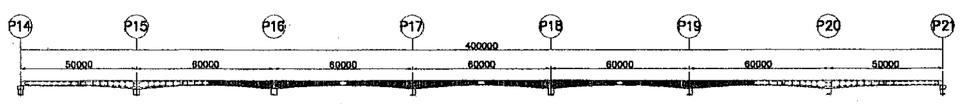
A ELEVATION
SCALE 1 : 100

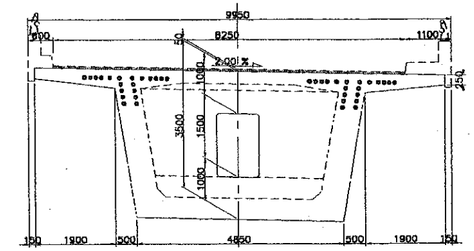


B ELEVATION
SCALE 1 : 100

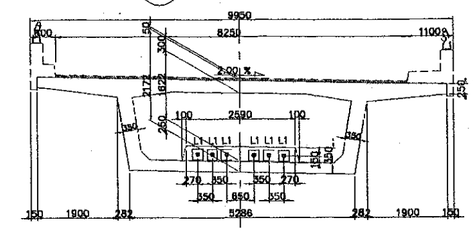


C PLAN
SCALE 1 : 100

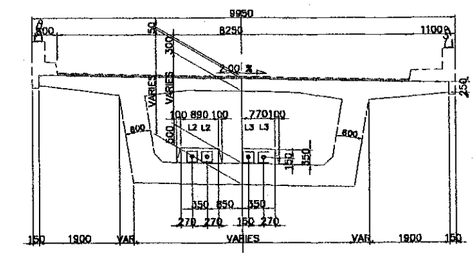




D SECTION
SCALE 1 : 60

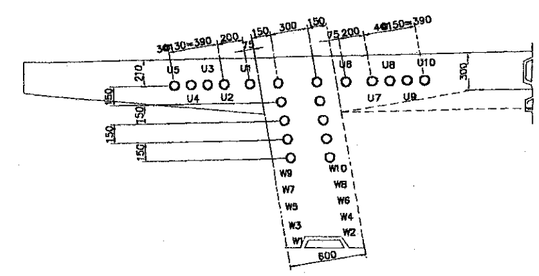


E SECTION
SCALE 1 : 60



F SECTION
SCALE 1 : 60

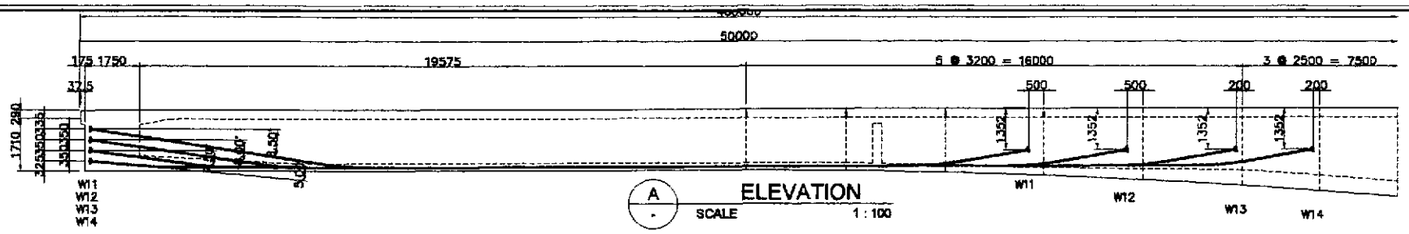
G SECTION
SCALE 1 : 60



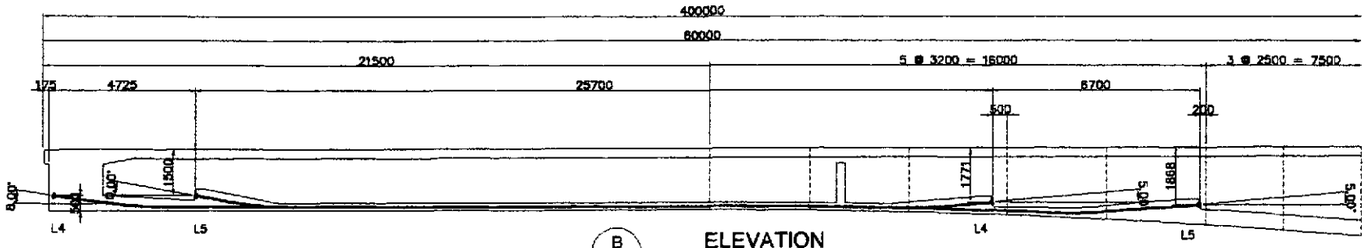
G DETAIL
SCALE 1 : 20

JICA JAPAN INTERNATIONAL COOPERATION AGENCY KEI KATAHIRA & ENGINEERS INTERNATIONAL yeo YACHIYO ENGINEERING CO., LTD.	DATE	SIGNATURE	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS			
	DESIGNED	9/2/02	FUHL – PMO	BUREAU OF DESIGN	OFFICE OF THE SECRETARY	
	CHECKED	9/23/02	Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature) / Approved By: (See cover sheet for Signature/Approval)
	SUBMITTED	10/14/02	DANILO C. TRAJANO Project Director	ADRIANO M. DOROY Chief, Bridges Division	GILBERTO S. REYES Director IV (OIC)	MANUEL M. BONGAN Undersecretary / SIMEON A. DATUMANONG Secretary

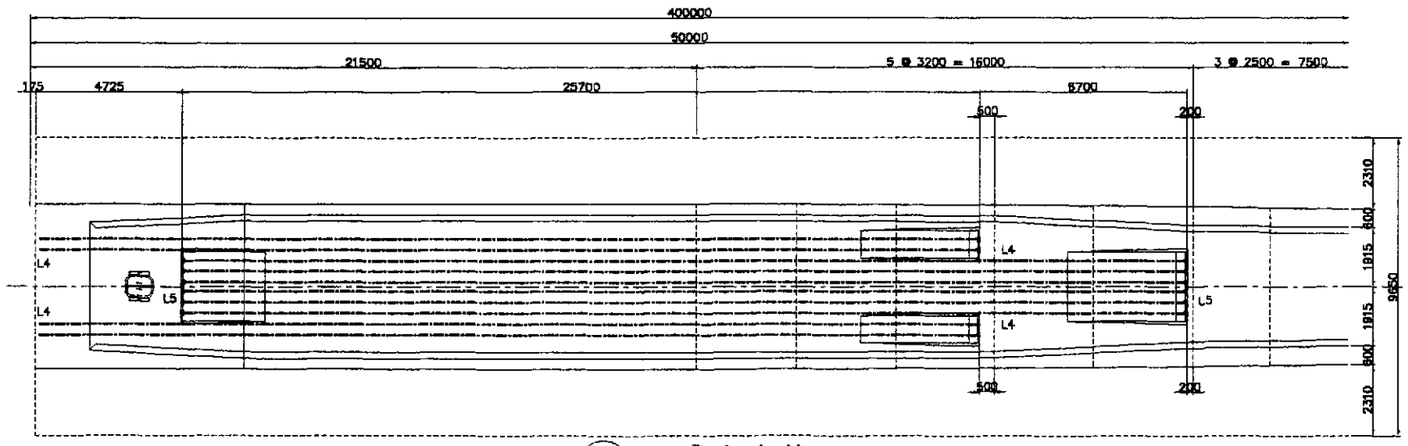
PROJECT AND LOCATION :	SCALE :	SHEET CONTENTS :	SHEET NO. :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses) PLARIDEL BYPASS - CONTRACT PACKAGE III	AS SHOWN FULL SIZE A1	BRIDGE NO. 8 ANGAT RIVER BRIDGE ARRANGEMENT OF LONGITUDINAL MAIN PC CABLES (2 OF 4) (INITIAL STAGE)	B8M-12



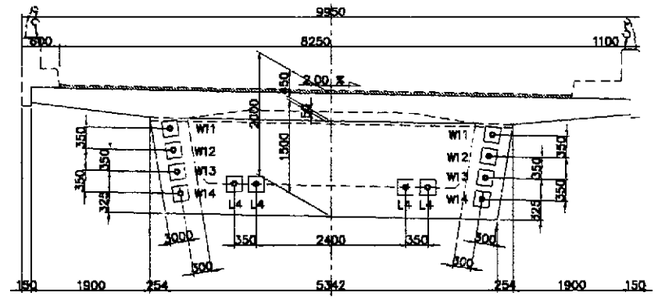
A ELEVATION
SCALE 1 : 100



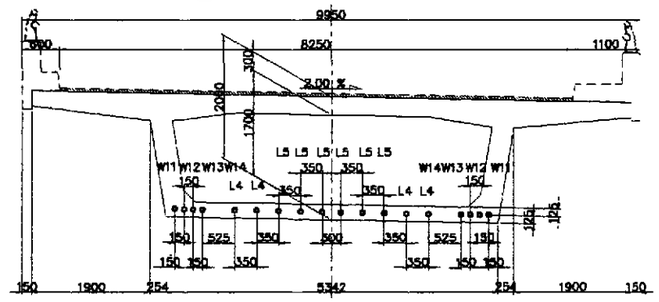
B ELEVATION
SCALE 1 : 100



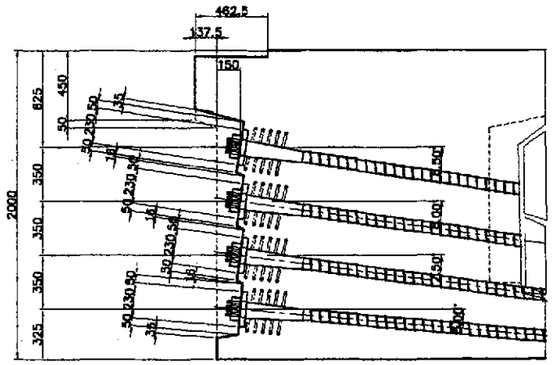
C PLAN
SCALE 1 : 100



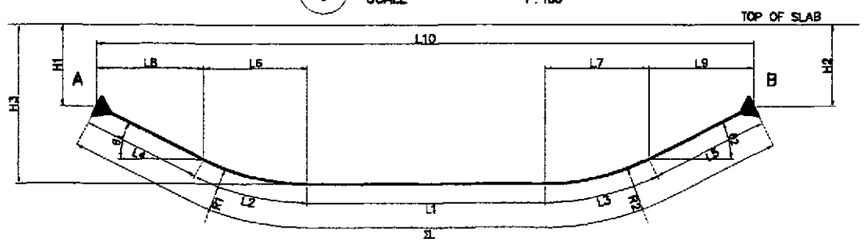
D SECTION
SCALE 1 : 100



E SECTION
SCALE 1 : 100



F DETAIL OF ANCHORAGE
SCALE 1 : 100



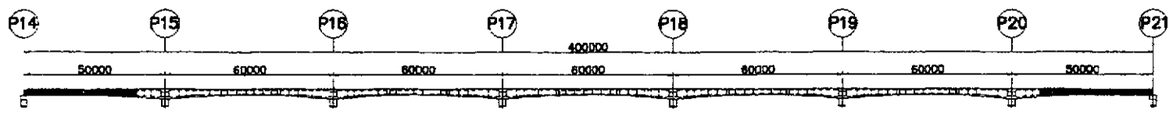
NOTE :

- LIVE END
- DEAD END

P14 P15 P20 P21

TENDON DESIGNATION	NO. OF TENDON	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	ℓL (mm)	L6 (mm)	L7 (mm)	L8 (mm)	L9 (mm)	L10 (mm)	H1 (mm)	H2 (mm)	H3 (mm)	R1 (mm)	R2 (mm)	θ1 (degree)	θ2 (degree)	FORCE IN TENDON @ JACK BEFORE LOCK OFF (KN)	ELONGATION OF TENDON (mm) END A	ELONGATION OF TENDON (mm) END B	ANCHORAGE SLIP (mm)	TYPE – SIZE	TENDON LENGTH (mm)	TOTAL LENGTH (mm)	TOTAL WEIGHT OF TENDON (mm)
W11	2	17327	1483	1745	7714	2137	30408	1478	1736	7629	2104	30275	625	1352	1875	10000	10000	8.500°	10.000°	1545	92.58	87.88	6	12–dia. 12.7	33106	1589088	1231.54
W12	2	22531	1396	1745	5767	2137	33577	1392	1736	5711	2104	33475	975	1352	1875	10000	10000	8.000°	10.000°	1545	101.11	95.56	6	12–dia. 12.7	36277	1741296	1349.50
W13	2	28301	1306	1745	3558	2137	37050	1305	1736	3528	2104	36975	1325	1352	1875	10000	10000	7.500°	10.000°	1545	110.29	103.87	6	12–dia. 12.7	39750	1908000	1478.50
W14	2	32911	873	1745	1858	2137	39524	872	1736	1851	2104	39475	1675	1352	1875	10000	10000	5.000°	10.000°	1545	120.56	107.89	6	12–dia. 12.7	42224	2026752	1570.73
L4	4	23350	1396	873	1995	2698	30310	1392	872	1976	2685	30275	1500	1771	1875	10000	10000	8.000°	5.000°	1545	88.84	90.50	6	12–dia. 12.7	33010	3188960	2455.94
L5	6	23075	1745	873	1285	5472	32450	1736	873	1265	5452	32400	1500	1868	1875	10000	10000	10.000°	5.000°	1545	93.79	94.16	6	12–dia. 12.7	35150	5061600	3922.74
																									TOTAL	15495696	12009.15

	fpu	fci @ TIME OF STRESSING	fc' @ 28 DAYS	PC CABLE
MAIN PC CABLE	1862 MPa (240,000 psi)	34.47 MPa (5000 psi)	41.38 MPa (6000 psi)	12 –ø12.7 (SWPR7B)



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

	DATE	SIGNATURE
DESIGNED	9/21/02	M. S. NAVA
CHECKED	9/23/02	J. C. SANTOS
SUBMITTED	10/14/02	M. SODA TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

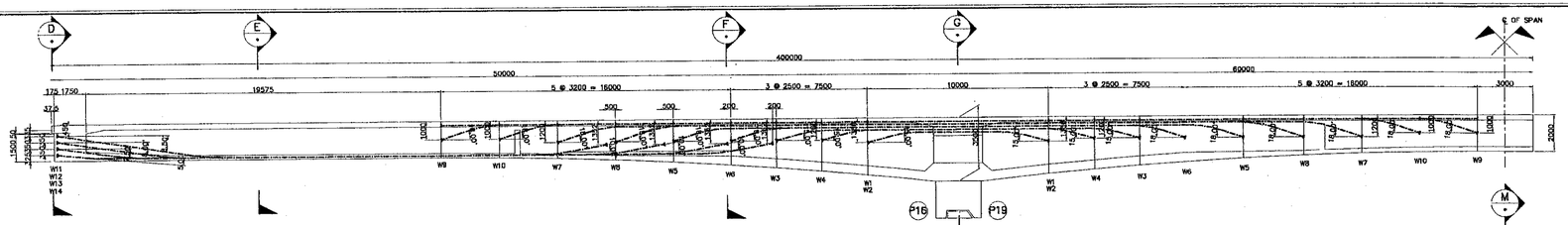
PJHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DANILO C. TRAJANO	ADRIANO M. DORDY	GILBERTO S. REYES	MANUEL M. BONOAN	SIMEON A. DATUMANONG
Project Director	Chief, Bridges Division	Director IV (OIC)	Undersecretary	Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

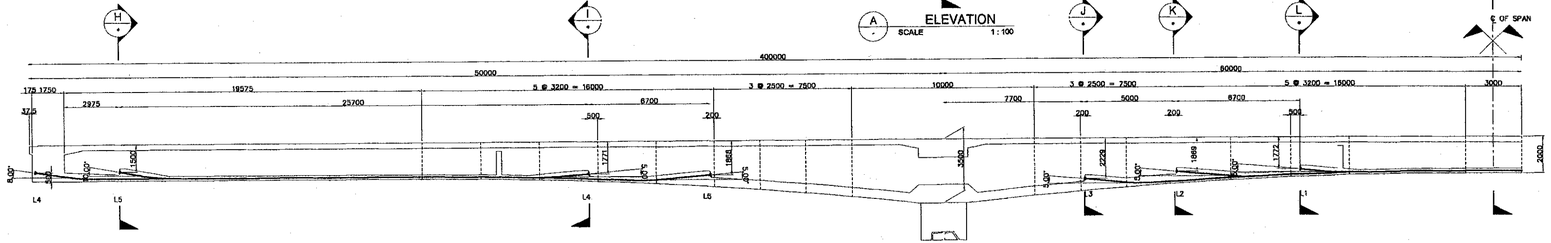
SCALE :
AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
ARRANGEMENT OF LONGITUDINAL MAIN PC CABLES (3 OF 4)
(INITIAL STAGE)

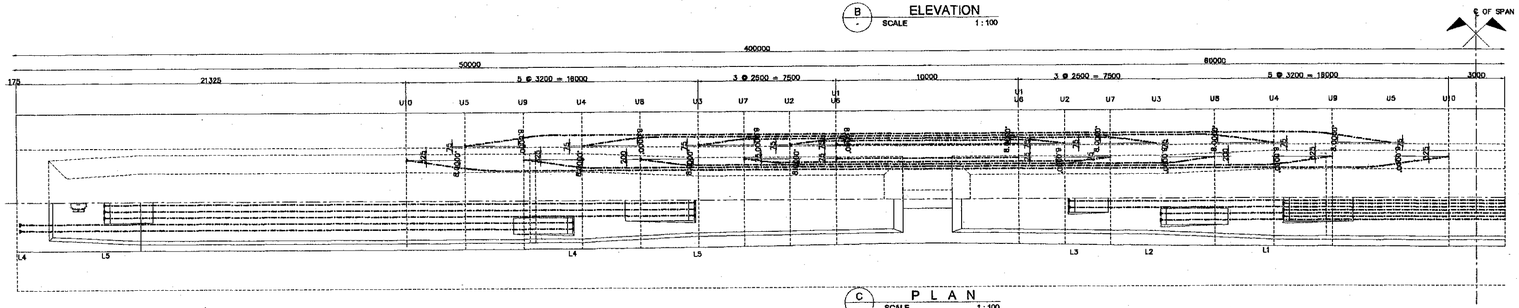
SHEET NO. :
B8M-13



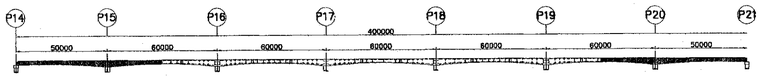
A SCALE 1:100 ELEVATION

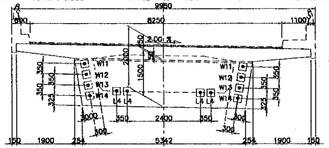


B SCALE 1:100 ELEVATION

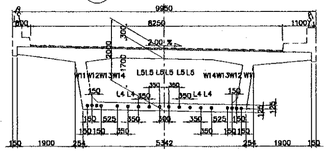


C SCALE 1:100 PLAN

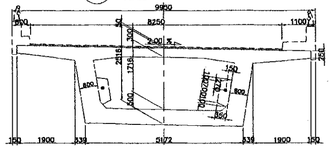




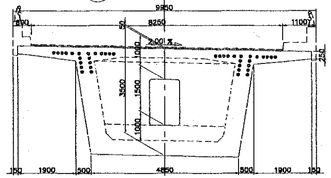
D SCALE 1:60 SECTION



E SCALE 1:60 SECTION



F SCALE 1:60 SECTION



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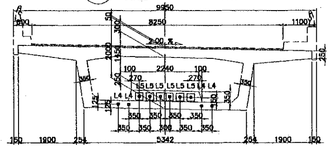

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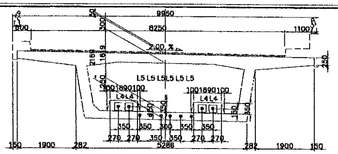
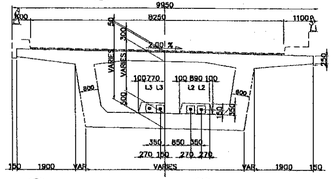
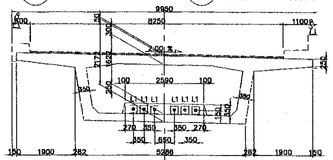


I SCALE 1:60 SECTION

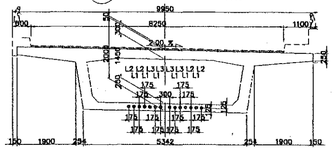


J SCALE 1:60 SECTION

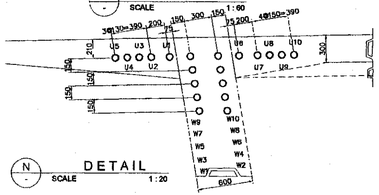
K SCALE 1:60 SECTION



L SCALE 1:60 SECTION



M SCALE 1:60 SECTION



N SCALE 1:20 DETAIL

JICA JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL / YACHIYO ENGINEERING CO., LTD.	DESIGNED	9/21/02	
	CHECKED	9/23/02	
	SUBMITTED	10/1/02	

SIGNATURES: DESIGNER, CHECKER, SUBMITTER, TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

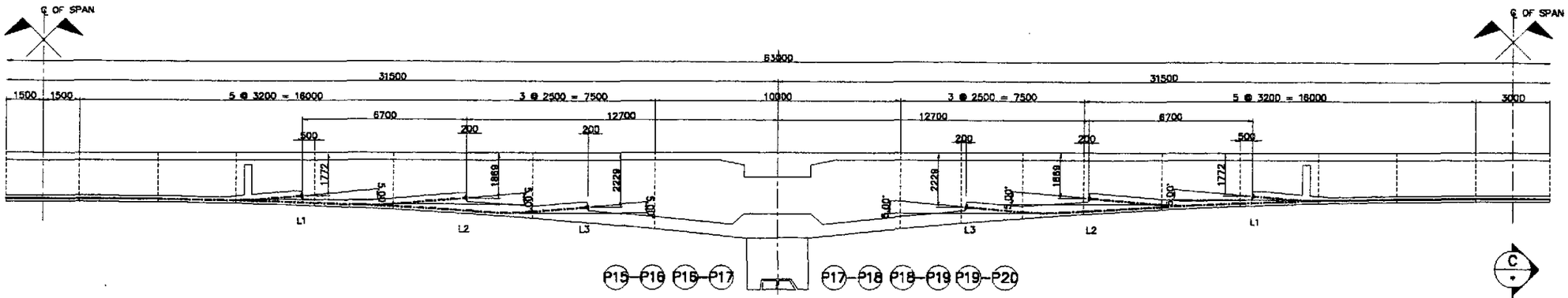
PUHL – PWO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DANILO C. TRIAANO Project Director	ADRIANO M. DOROY Chief, Bridges Division	GILBERTO S. REYES Director IV (OIC)	MANUEL M. BONGAN Undersecretary	SIMEON A. DATUMANONG Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

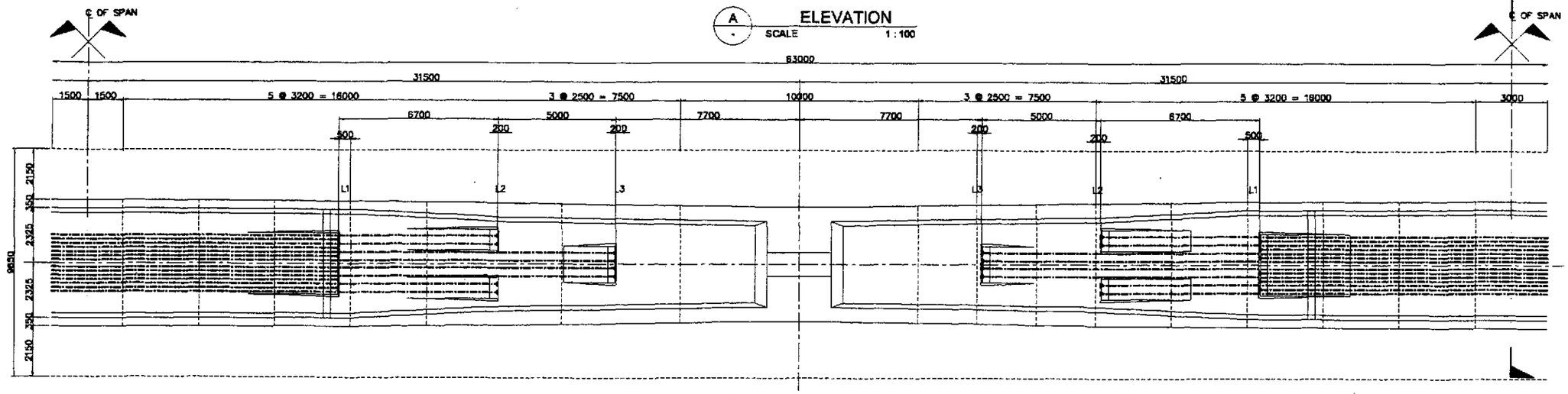
SCALE : AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
ARRANGEMENT OF LONGITUDINAL MAIN PC CABLE (4 OF 4)
(INITIAL STAGE)

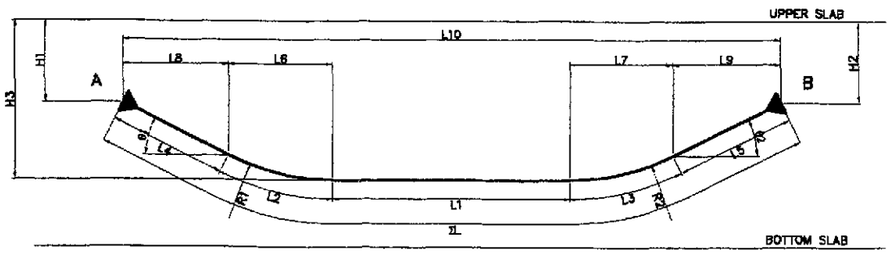
SHEET NO. : B8M-14



A ELEVATION
SCALE 1 : 100

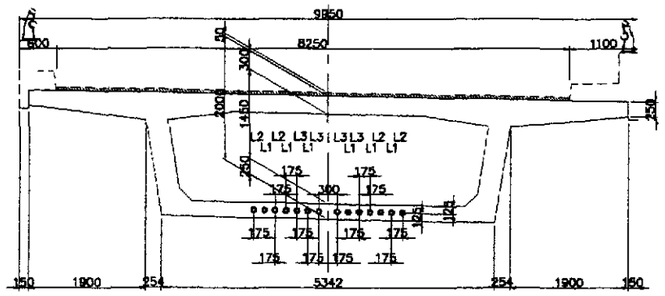


B PLAN
SCALE 1 : 100



NOTE :

- LIVE END
- DEAD END

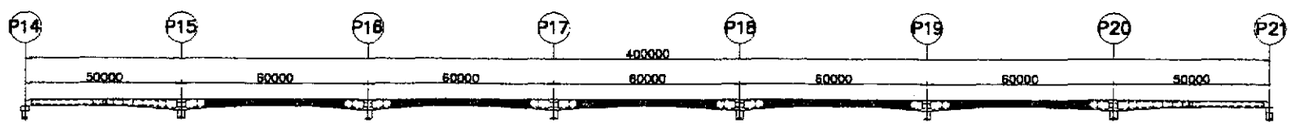


C SECTION
SCALE 1 : 50

P15 – P16 P16 – P17 P17 – P18 P18 – P19 P19 – P20

TENDON DESIGNATION	NO. OF TENDON	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L5 (mm)	ΣL (mm)	L8 (mm)	L7 (mm)	L8 (mm)	L9 (mm)	L10 (mm)	H1 (mm)	H2 (mm)	H3 (mm)	R1 (mm)	R2 (mm)	α1 (degree)	α2 (degree)	FORCE IN TENDON @ JACK BEFORE LOCK OFF (KN)	ELONGATION OF TENDON (mm) END A	ELONGATION OF TENDON (mm) END B	ANCHORAGE SLIP (mm)	TYPE – SIZE	TENDON LENGTH (mm)	TOTAL LENGTH (mm)	TOTAL WEIGHT OF TENDON (mm)
L1	6	17556	898	898	1127	1127	21206	898	898	1125	1125	21200	1772	1772	1875	10000	10000	5.000°	5.000°	1545	64.47	64.47	6	12–dia. 12.7	23906	8606160	8889.77
L2	4	26770	873	873	3055	3055	34626	872	872	3043	3043	34600	1869	1869	1875	10000	10000	5.000°	5.000°	1545	99.92	99.92	6	12–dia. 12.7	37326	8958240	6942.64
L3	4	35730	873	873	3577	3577	44630	872	872	3564	3564	44600	2229	2229	1875	10000	10000	5.000°	5.000°	1545	123.89	123.89	6	12–dia. 12.7	47330	11359200	8803.38
																									TOTAL	28923600	22415.79

	fpu	fci @ TIME OF STRESSING	fc' @ 28 DAYS	PC CABLE
MAIN PC CABLE	1862 MPa (270,000 psi)	34.47 MPa (5000 psi)	41.38 MPa (6000 psi)	12 –ø12.7 (SWPR7B)



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

	DATE	SIGNATURE
DESIGNED	9/21/02	
CHECKED	9/23/02	J. C. SANTOS
SUBMITTED	10/11/02	TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

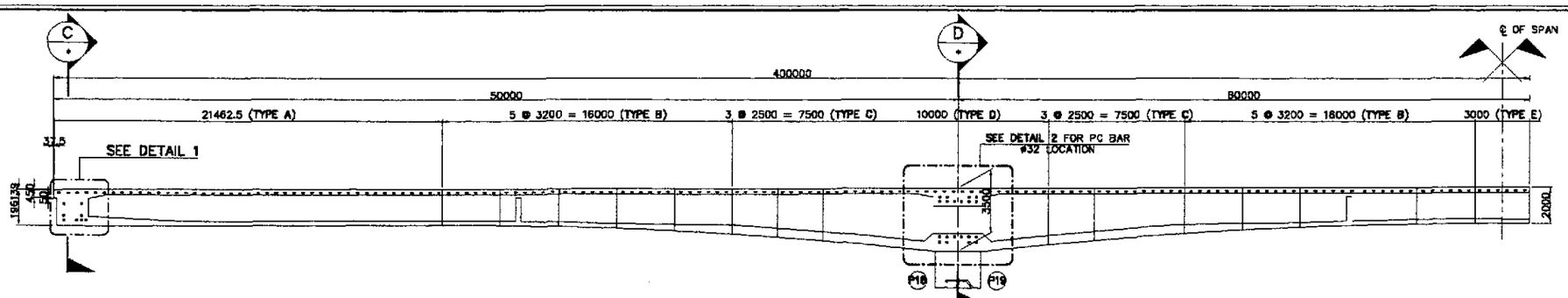
FUHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DANILO C. TRAJANO	ADRIANO M. DOROY	GILBERTO S. REYES	MANUEL M. BONGAN	SIMEON A. DATUMANONG
Project Director	Chief, Bridges Division	Director IV (OIC)	Undersecretary	Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

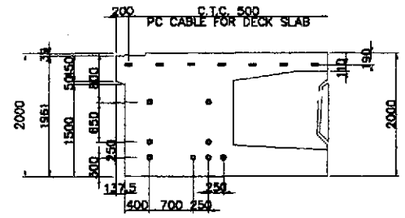
SCALE : AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANAGT RIVER BRIDGE
ARRANGEMENT OF LOWER SLAB
PC CABLE
(INITIAL STAGE)

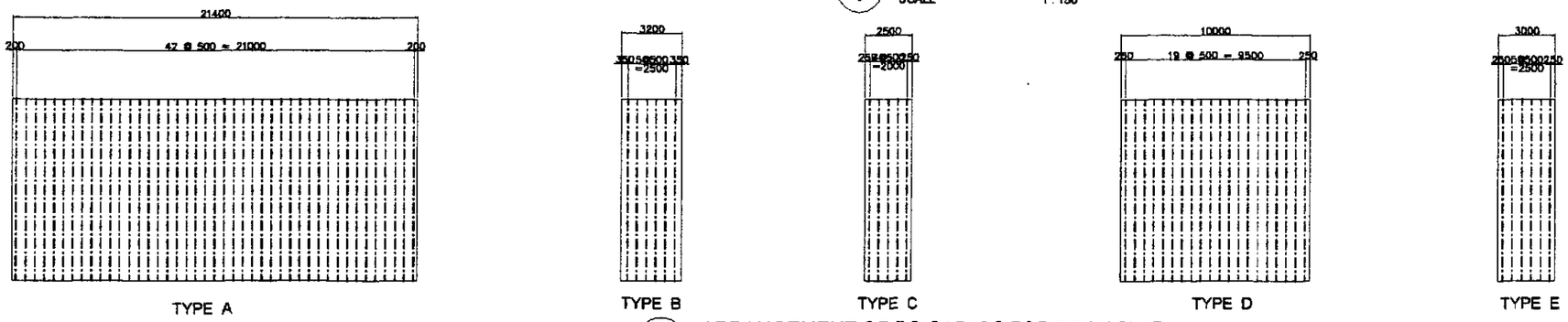
SHEET NO. : B8M-15



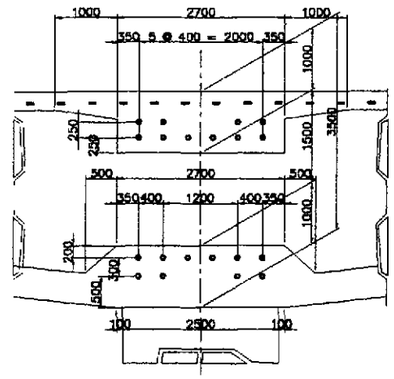
A ELEVATION
SCALE 1 : 150



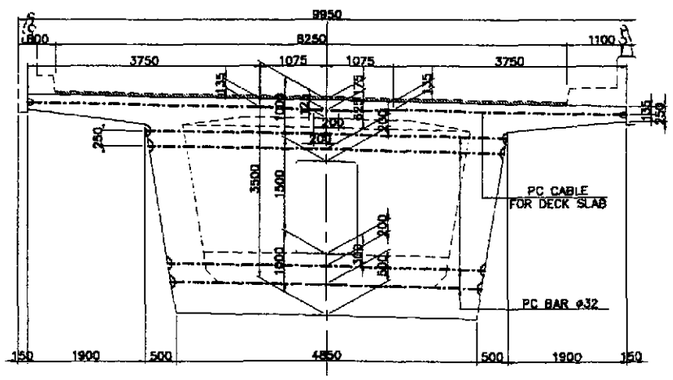
1 DETAIL
SCALE 1 : 50



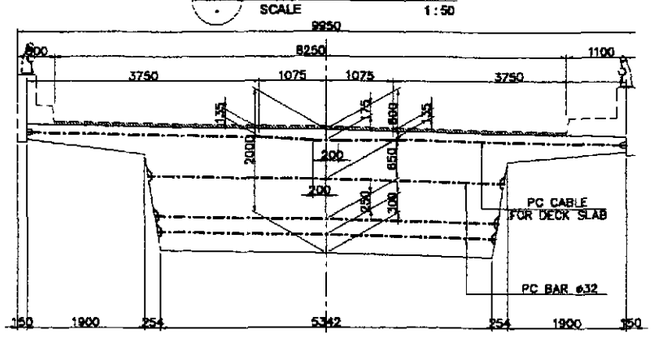
A ARRANGEMENT OF PC CABLES FOR DECK SLAB
SCALE 1 : 150



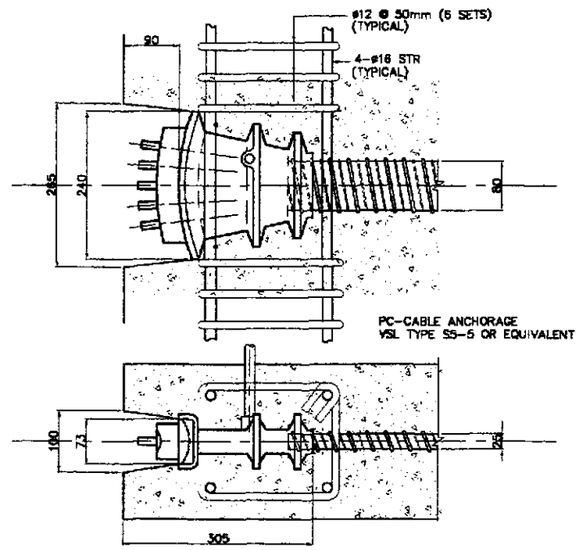
2 DETAIL
SCALE 1 : 50



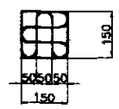
C SECTION
SCALE 1 : 50



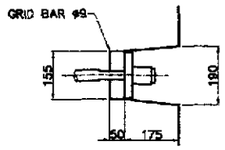
D SECTION
SCALE 1 : 50



DETAIL OF PC CABLE
ANCHORAGE VSL TYPE S5-5 FOR DECK SLAB
SCALE NTS



GRID BAR Ø9



DETAIL OF PC CABLE
ANCHORAGE FOR CROSS BEAM
SCALE 1 : 10

	fpu	fci @ TIME OF STRESSING	fs @ 28 DAYS	JACKING FORCE	PC TENDON	LENGTH (mm)	QUANTITY	TOTAL LENGTH (mm)	TOTAL WEIGHT (Kgs.)
PC CABLES FOR DECK SLAB	1860 MPa (270000 psi)	34.47 MPa (5000 psi)	41.38 MPa (6000 psi)	644 KN	5 – ø12.7	9654	776	37457520	29029.58
PC BAR FOR END DIAPHRAGM	1080 MPa (156650 psi)	34.47 MPa (5000 psi)	41.38 MPa (6000 psi)	607 KN	ø32	5572(ave.)	16	89152	587.51
PC BAR FOR PIER HEAD	1080 MPa (156650 psi)	34.47 MPa (5000 psi)	41.38 MPa (6000 psi)	607 KN	ø32	5421(ave.)	120	650520	4286.93

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

	DATE	SIGNATURE
DESIGNED	9/21/02	M. S. TAMAI
CHECKED	9/28/02	J. C. SANTOS
SUBMITTED	10/14/02	TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

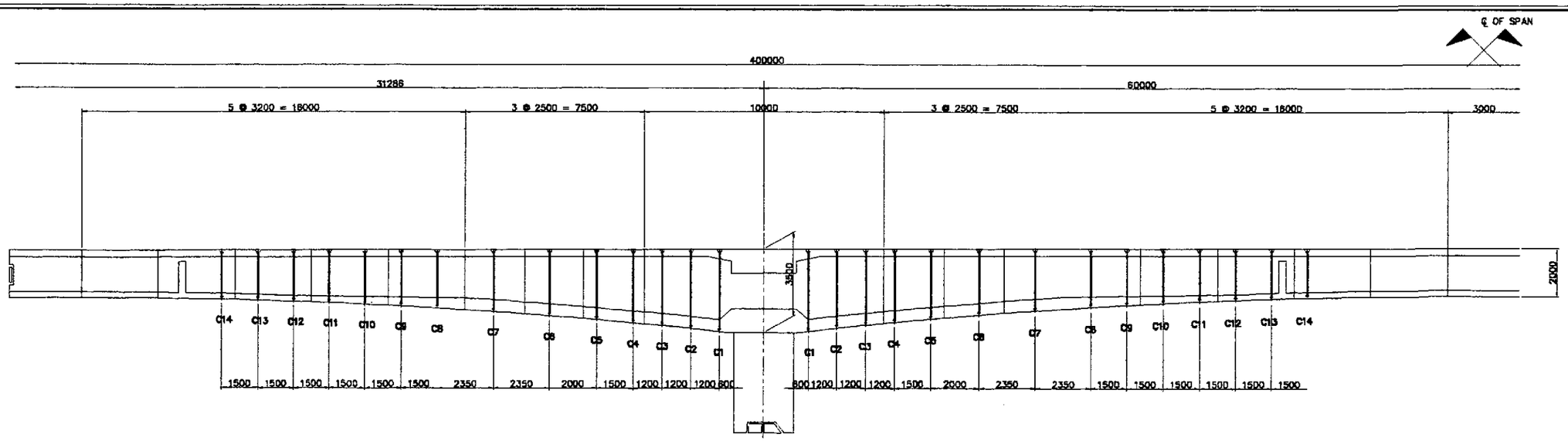
FPHL – PMO	BUREAU OF DESIGN		OFFICE OF THE SECRETARY	
Submitted By:	Reviewed By:	Recommended By:	Recommended By: (See cover sheet for Signature)	Approved By: (See cover sheet for Signature/Approval)
DANILO C. TRAJANO	ADRIANO M. DOROY	GILBERTO S. REYES	MANUEL M. BONOAN	SIMEON A. DATUMANONG
Project Director	Chief, Bridges Division	Director IV (OIC)	Undersecretary	Secretary

PROJECT AND LOCATION :
THE DETAILED DESIGN STUDY ON UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY (Plaridel, Cabanatuan and San Jose Bypasses)
PLARIDEL BYPASS - CONTRACT PACKAGE III

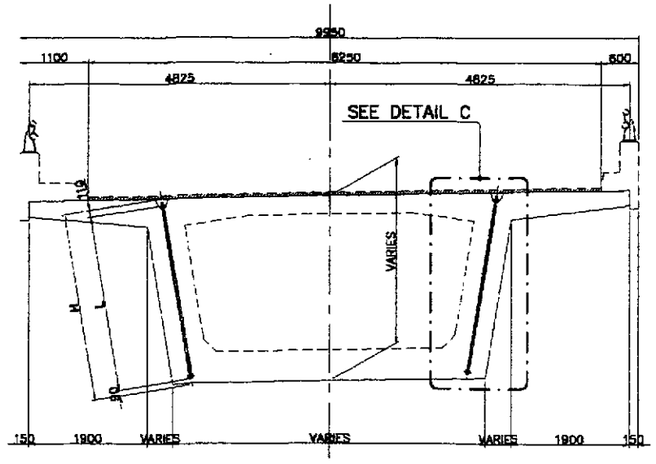
SCALE : AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
ARRANGEMENT OF TRANSVERSE PC BARS
(INITIAL STAGE)

SHEET NO. : B8M-16



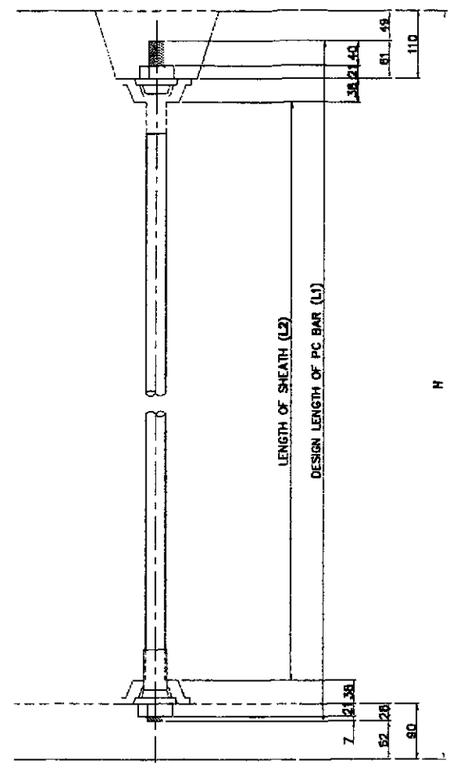
A — ELEVATION (TYPICAL ARRANGEMENT)
SCALE 1 : 100



B — ARRANGEMENT OF VERTICAL PC BARS
SCALE 1 : 50

	fpu	fci @ TIME OF STRESSING	fs @ 28 DAYS	JACKING FORCE (kN)	PC TENDON
VERTICAL PC BAR	1080 (156650) psi	34.47 Mpa (5000) psi	34.47 Mpa (5000) psi	607	ø32

LOCATION	H (m)	L1 (m)	L2 (m)	L (m)	NO. OF BARS	LENGTH (m)	WEIGHT (kgs.)	TOTAL WEIGHT (kgs.)
C1	3.52	3.409	3.244	3.32	24	81.82	22.47	539.17
C2	3.38	3.269	3.104	3.18	24	78.46	21.54	517.03
C3	3.25	3.139	2.974	3.05	24	75.34	20.69	496.46
C4	3.13	3.019	2.854	2.93	24	72.46	19.90	477.49
C5	3.00	2.889	2.724	2.80	24	69.34	19.04	456.92
C6	2.83	2.719	2.554	2.83	24	65.26	17.92	430.04
C7	2.64	2.529	2.364	2.44	24	60.70	16.67	399.99
C8	2.49	2.379	2.214	2.29	24	57.10	15.68	376.26
C9	2.40	2.289	2.124	2.20	24	54.94	15.08	362.03
C10	2.33	2.219	2.054	2.13	24	53.26	14.62	350.96
C11	2.26	2.149	1.984	2.06	24	51.58	14.16	339.89
C12	2.20	2.089	1.924	2.00	24	50.14	13.77	330.40
C13	2.15	2.039	1.874	1.95	24	48.94	13.44	322.49
C14	2.10	1.989	1.824	1.90	24	47.74	13.11	314.58
				TOTAL LENGTH =		667.02		
							TOTAL WEIGHT =	5713.69



C — PC BAR DETAIL
SCALE 1 : 5

1 — ARRANGEMENT OF VERTICAL PC BARS
SCALE AS SHOWN

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

	DATE	SIGNATURE
DESIGNED	9/21/02	V. S. NUNEZ
CHECKED	9/23/02	J. E. SANTOS
SUBMITTED	10/14/02	TEAM LEADER

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

PJHL – 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. TRAJANO	ADRIANO M. DOROY	GILBERTO S. REYES	MANUEL M. BONOAN	SIMEON A. DATUMANONG
Project Director	Chief, Bridges Division	Director IV (OIC)	Undersecretary	Secretary

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PLARIDEL BYPASS - CONTRACT PACKAGE III

SCALE : AS SHOWN
FULL SIZE A1

SHEET CONTENTS :
BRIDGE NO. 8 ANGAT RIVER BRIDGE
ARRANGEMENT OF VERTICAL PC BARS
(INITIAL STAGE)

SHEET NO. : B8M-17