



JAPAN INTERNATIONAL COOPERATION AGENCY



DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS - ARMM
REPUBLIC OF THE PHILIPPINES

**THE STUDY
ON
INFRASTRUCTURE (ROAD NETWORK)
DEVELOPMENT PLAN
FOR
THE AUTONOMOUS REGION IN MUSLIM MINDANAO
(ARMM)
IN
THE REPUBLIC OF THE PHILIPPINES**

**FINAL REPORT
VOLUME-IV : DRAWINGS**

MARCH 2010

**CTI ENGINEERING INTERNATIONAL CO., LTD.
YACHIYO ENGINEERING CO., LTD.**

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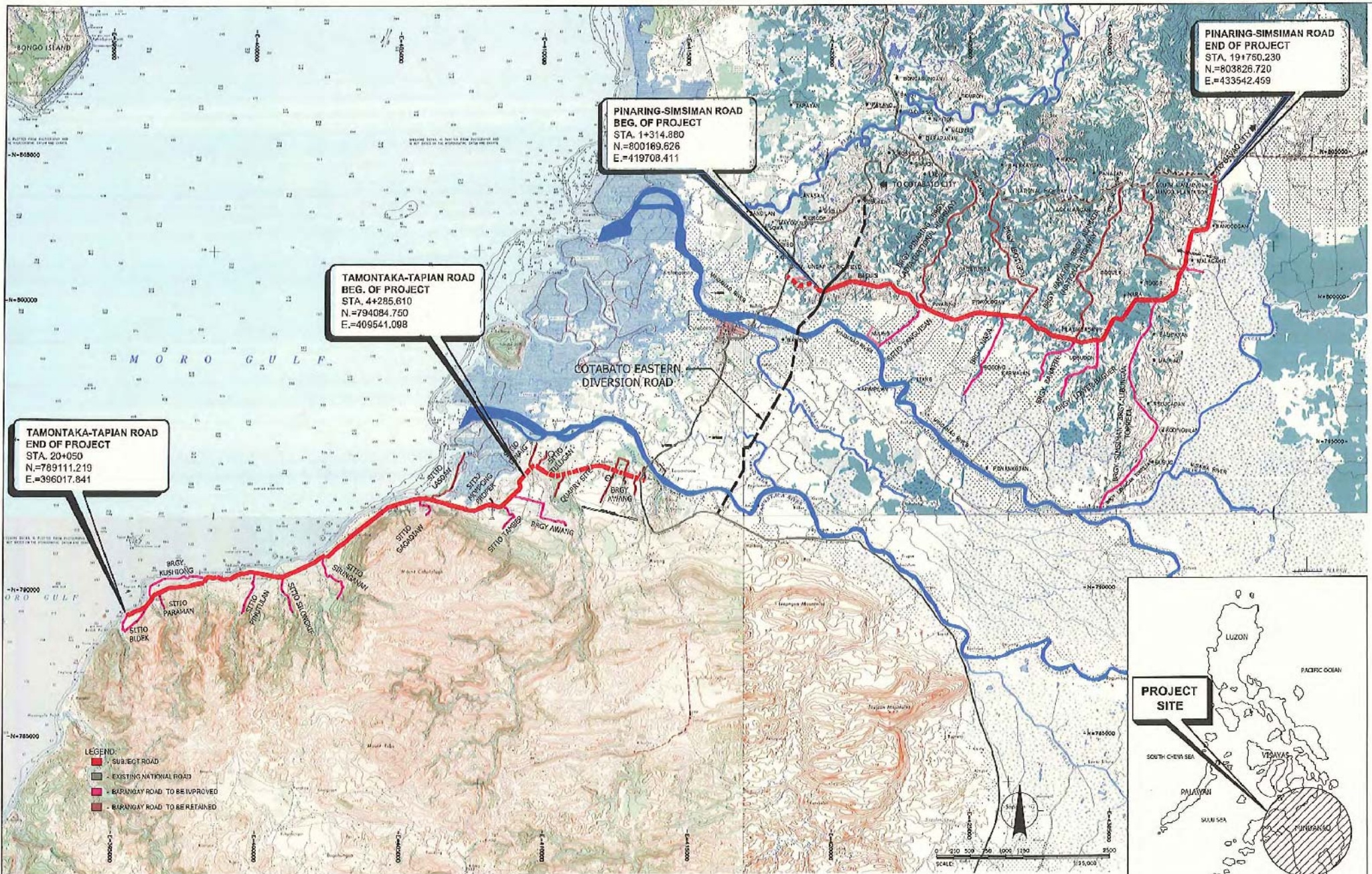
Yachiyo Engineering International Co., Ltd

THE STUDY ON INFRASTRUCTURE (ROAD NETWORK) DEVELOPMENT PLAN FOR
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DRAFT FINAL REPORT PART IV

DRAWING LIST

DWG. NO.	TITLE	DWG. NO.	TITLE	DWG. NO.	TITLE
A. GENERAL					
6-01	TABLE OF CONTENTS				
6-02	KEY MAP AND LOCATION PLAN				
6-03	LEGEND AND ABBREVIATIONS				
6-04	GEOMETRIC DESIGN STANDARDS				
6-05	GENERAL NOTES (PAGE 1 OF 2)				
6-06	GENERAL NOTES (PAGE 2 OF 2)				
B. PINARING-SIMSIMAN		C. TAMONTAKA-TAPIAN		D. COMMON DRAWINGS	
PS-01	PINARING-SIMSIMAN TYPICAL CROSS SECTION	TT-01	PINARING-SIMSIMAN TYPICAL CROSS SECTION (SOFT GROUND SECTION)	CM-01	TYPICAL SIDEWALK RAILING AND DRAIN DETAILS
PS-02	PINARING-SIMSIMAN TYPICAL CROSS SECTION (SOFT GROUND SECTION)	TT-02	PINARING-SIMSIMAN TYPICAL CROSS SECTION	CM-02	TYPICAL PRECAST CONCRETE PILE DETAILS
PS-03	PLAN & LONGITUDINAL PROFILE, STA. 0+000 - STA 0+750	TT-03	PLAN & LONGITUDINAL PROFILE, STA. 0+000 - STA 0+750	CM-03	APPROACH SLAB DETAILS
PS-04	PLAN & LONGITUDINAL PROFILE, STA. 0+750 - STA 1+500	TT-04	PLAN & LONGITUDINAL PROFILE, STA. 0+750 - STA 1+500	CM-04	ABUTMENT SLOPE PROTECTION (GABIONS AND ABUTMENT DRAINAGE DETAILS)
PS-05	PLAN & LONGITUDINAL PROFILE, STA. 1+500 - STA 2+250	TT-05	PLAN & LONGITUDINAL PROFILE, STA. 1+500 - STA 2+250	CM-05	TYPICAL STONE MASONRY RETAINING WALL
PS-06	PLAN & LONGITUDINAL PROFILE, STA. 2+250 - STA 3+000	TT-06	PLAN & LONGITUDINAL PROFILE, STA. 2+250 - STA 3+000	CM-06	BAILEY BRIDGE DETAILS
PS-07	PLAN & LONGITUDINAL PROFILE, STA. 3+000 - STA 3+750	TT-07	PLAN & LONGITUDINAL PROFILE, STA. 3+000 - STA 3+750	CM-07	STANDARDS FOR PAVEMENT MARKINGS
PS-08	PLAN & LONGITUDINAL PROFILE, STA. 3+750 - STA 4+500	TT-08	PLAN & LONGITUDINAL PROFILE, STA. 3+750 - STA 4+500	CM-08	STANDARD REINFORCED CONCRETE PIPE CULVERTS
PS-09	PLAN & LONGITUDINAL PROFILE, STA. 4+500 - STA 5+250	TT-09	PLAN & LONGITUDINAL PROFILE, STA. 4+500 - STA 5+250	CM-09	STANDARD HEADWALL / WINGWALL, TYPE F (NORMAL) STANDARD HEADWALL "S"
PS-10	PLAN & LONGITUDINAL PROFILE, STA. 5+250 - STA 6+000	TT-10	PLAN & LONGITUDINAL PROFILE, STA. 5+250 - STA 6+000	CM-10	REINFORCED CONCRETE HEADWALL "L"-TYPE
PS-11	PLAN & LONGITUDINAL PROFILE, STA. 6+000 - STA 6+750	TT-11	PLAN & LONGITUDINAL PROFILE, STA. 6+000 - STA 6+750	CM-11	STANDARD CONCRETE CATCH BASIN
PS-12	PLAN & LONGITUDINAL PROFILE, STA. 6+750 - STA 7+500	TT-12	PLAN & LONGITUDINAL PROFILE, STA. 6+750 - STA 7+500		
PS-13	PLAN & LONGITUDINAL PROFILE, STA. 7+500 - STA 8+250	TT-13	PLAN & LONGITUDINAL PROFILE, STA. 7+500 - STA 8+250		
PS-14	PLAN & LONGITUDINAL PROFILE, STA. 8+250 - STA 9+000	TT-14	PLAN & LONGITUDINAL PROFILE, STA. 8+250 - STA 9+000		
PS-15	PLAN & LONGITUDINAL PROFILE, STA. 9+000 - STA 9+750	TT-15	PLAN & LONGITUDINAL PROFILE, STA. 9+000 - STA 9+750		
PS-16	PLAN & LONGITUDINAL PROFILE, STA. 9+750 - STA 10+500	TT-16	PLAN & LONGITUDINAL PROFILE, STA. 9+750 - STA 10+500		
PS-17	PLAN & LONGITUDINAL PROFILE, STA. 10+500 - STA 11+250	TT-17	PLAN & LONGITUDINAL PROFILE, STA. 10+500 - STA 11+250		
PS-18	PLAN & LONGITUDINAL PROFILE, STA. 11+250 - STA 12+000	TT-18	PLAN & LONGITUDINAL PROFILE, STA. 11+250 - STA 12+000		
PS-19	PLAN & LONGITUDINAL PROFILE, STA. 12+000 - STA 12+750	TT-19	PLAN & LONGITUDINAL PROFILE, STA. 12+000 - STA 12+750		
PS-20	PLAN & LONGITUDINAL PROFILE, STA. 12+750 - STA 13+500	TT-20	PLAN & LONGITUDINAL PROFILE, STA. 12+750 - STA 13+500		
PS-21	PLAN & LONGITUDINAL PROFILE, STA. 13+500 - STA 14+250	TT-21	PLAN & LONGITUDINAL PROFILE, STA. 13+500 - STA 14+250		
PS-22	PLAN & LONGITUDINAL PROFILE, STA. 14+250 - STA 15+000	TT-22	PLAN & LONGITUDINAL PROFILE, STA. 14+250 - STA 15+000		
PS-23	PLAN & LONGITUDINAL PROFILE, STA. 15+000 - STA 15+750	TT-23	PLAN & LONGITUDINAL PROFILE, STA. 15+000 - STA 15+750		
PS-24	PLAN & LONGITUDINAL PROFILE, STA. 15+750 - STA 16+500	TT-24	PLAN & LONGITUDINAL PROFILE, STA. 15+750 - STA 16+500		
PS-25	PLAN & LONGITUDINAL PROFILE, STA. 16+500 - STA 17+250	TT-25	PLAN & LONGITUDINAL PROFILE, STA. 16+500 - STA 17+250		
PS-26	PLAN & LONGITUDINAL PROFILE, STA. 17+250 - STA 18+000	TT-26	PLAN & LONGITUDINAL PROFILE, STA. 17+250 - STA 18+000		
PS-27	PLAN & LONGITUDINAL PROFILE, STA. 18+000 - STA 18+750	TT-27	PLAN & LONGITUDINAL PROFILE, STA. 18+000 - STA 18+750		
PS-28	PLAN & LONGITUDINAL PROFILE, STA. 18+750 - STA 19+500	TT-28	PLAN & LONGITUDINAL PROFILE, STA. 18+750 - STA 19+500		
PS-29	PLAN & LONGITUDINAL PROFILE, STA. 19+500 - STA 20+434.777	TT-29	PLAN & LONGITUDINAL PROFILE, STA. 19+500 - STA 20+350		
PS-30	SALAM BRIDGE 1, STA. 5+088.80 - STA. 5+091.30	TT-30	PLAN & LONGITUDINAL PROFILE, STA. 20+250 - STA 20+435.768		
PS-31	SALAM BRIDGE 2, STA. 7+802.00 - STA. 7+828.812	TT-31	SALAM BRIDGE 1, STA. 8+089.80 - STA. 8+123.812		
PS-32	SALAM BRIDGE 3, STA. 8+182.00 - STA. 8+184.812	TT-32	SALAM BRIDGE 2, STA. 14+754.47 - STA. 14+806.58		
PS-33	SALAM BRIDGE 4, STA. 11+474.00 - STA. 11+496.812	TT-33	SALAM BRIDGE 3, STA. 17+126.70 - STA. 17+142.20		
PS-34	SCHEDULE OF PIPE CULVERTS - PINARING-SIMSIMAN ROAD	TT-34	SALAM BRIDGE 4, STA. 19+354.87 - STA. 19+388.48		
PS-35	SCHEDULE AND DETAILS OF SIDE DITCHES - PINARING-SIMSIMAN ROAD	TT-35	SCHEDULE OF PIPE CULVERTS - TAMONTAKA-TAPIAN ROAD		
		TT-36	SCHEDULE AND DETAILS OF SIDE DITCHES - TAMONTAKA-TAPIAN ROAD		



RECOMMENDING APPROVAL:				APPROVED:	
PROJECT DIRECTOR	REGIONAL DIRECTOR	DIRECTOR BOB	UNDERSECRETARY	SECRETARY	
DATE:	DATE:	DATE:	DATE:	DATE:	

PROJECT & LOCATION :
 THE STUDY ON INFRASTRUCTURE (ROAD NETWORK) DEVELOPMENT PLAN FOR THE AUTONOMOUS REGION IN MUSLIM MINDANAO (ARMM) IN THE REPUBLIC OF THE PHILIPPINES PROVINCE OF MAGUINDANAO

SHEET CONTENTS :	SHEET NO.	SHEET NO.
LOCATION MAP		G-02

LEGENDS AND ABBREVIATIONS

1. LEGENDS

1.1 EXISTING TOPOGRAPHICAL FEATURES				1.3 NEW DESIGN FEATURES			
STRUCTURE: BUILDING, HOUSES		TREES, COCONUT, BANANAS		(A) PLAN			
PAVED ROAD		VEGETATION BOUNDARY		ROADS		BRIDGE	
UNPAVED ROAD OR TRACK		SWAMP		EDGE OF SHOULDER		WATER FLOW	
TRAIL		POND		CENTER LINE		CULVERT	
FENCE		RIVER/CREEK		EDGE OF SHOULDER		CATCH BASIN	
WALL		STREAM		CENTERLINE OF ROADS		EMBANKMENT	
DEPRESSION		HORIZONTAL/VERTICAL CONTROL POINT		DITCH		EXCAVATION	
INDEX CONTOUR				NORTH ARROW		STONE MASONRY RETAINING WALL	
INTERMEDIATE CONTOUR				REFERENCE TO NOTE		BENCHMARK	
1.2 EXISTING UTILITIES NETWORK				(B) LONGITUDINAL PROFILE			
STEEL ELECTRIC POLE		FIRE HYDRANT		CULVERT		WATER LEVEL	
CONCRETE ELECTRIC POST		TELEPHONE CIRCUIT BOX		BRIDGE		EXISTING GROUND LINE	
WOODEN ELECTRIC POST		DISTRIBUTION LINE		PVI STATION		FINISHED GRADE LINE	
CONCRETE TELEPHONE POST (ICC)		CULVERT		STONE MASONRY RETAINING WALL, RIGHT SIDE			
				STONE MASONRY RETAINING WALL, LEFT SIDE			
2. ABBREVIATIONS							
MAX = MAXIMUM	CU = CULVERT	N.O. = NUMBER	APPR. = APPROXIMATE				
MIN = MINIMUM	RCPC = REINFORCED CONCRETE PIPE CULVERT	H = HORIZONTAL	CL = CENTER LINE				
FIN = FINISH	RCBC = REINFORCED CONCRETE BOX CULVERT	Y = VERTICAL	BVCS = BEGINNING OF VERTICAL CURVE STATION				
DIA = DIAMETER	TS = TANGENT TO SPIRAL	R.O.W. = RIGHT OF WAY	BVCE = BEGINNING OF VERTICAL CURVE ELEVATION				
DWG = DRAWING	SC = SPIRAL TO CURVE	VC = VERTICAL CURVE	EVCS = END OF VERTICAL CURVE STATION				
ELEV = ELEVATION	CS = CURVE TO SPIRAL	SHLDR = SHOULDER	EVCE = END OF VERTICAL CURVE ELEVATION				
L = LENGTH	ST = SPIRAL TO TANGENT	C&G = CURB & GUTTER	N = COORDINATES NORTH				
PI = POINT OF INTERSECTION	PM = POINT OF VERTICAL INTERSECTION	A.D. = ALGEBRAIC DIFFERENCE	E = COORDINATES EAST				
% = PERCENT	DFL = DESIGN FLOOD LEVEL	K = RATE OF VERTICAL CURVATURE	N = NORTH				
M = METER	EXPWY = EXPRESSWAY	STA = STATION	KM = KILOMETER				
MN = MILLIMETER	MC = MEDIAN CLEARANCE	FGL = FINISHED GRADE LEVEL	NC = NORMAL CROSSFALL				
CB = CONCRETE BARRIER	PCCP = PORTLAND CEMENT CONCRETE PAVEMENT	CABC = CRUSHED AGGREGATE BASE COURSE	ASB = AGGREGATE SUB BASE COURSE				
BCSC = BITUMINOUS CONCRETE SURFACE COURSE	CTBC = CEMENT TREATED BASE COURSE						



JAPAN INTERNATIONAL COOPERATION AGENCY



CTI Engineering International Co., Ltd.



DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS-AARM
REPUBLIC OF THE PHILIPPINES



YEC Yachiyo Engineering Co., Ltd.

RECOMMENDING APPROVAL:

PROJECT DIRECTOR

REGIONAL DIRECTOR

DIRECTOR BUD

UNDERSECRETARY

SECRETARY

APPROVED:

SECRETARY

PROJECT & LOCATION :

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SHEET CONTENTS :

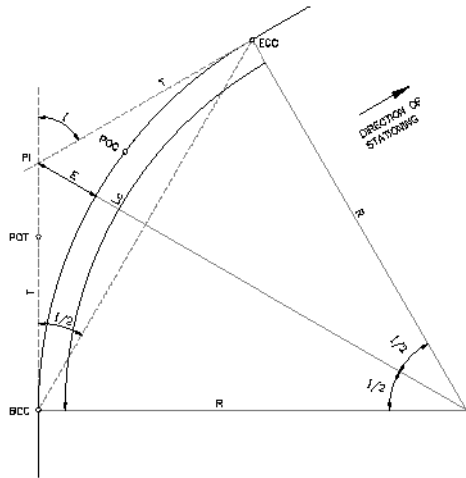
LEGENDS AND ABBREVIATIONS

SET NO.



SHEET NO.





HORIZONTAL CURVE (CIRCULAR)

LEGEND :

- I = CENTRAL ANGLE
- R = CURVE RADIUS
- T = TANGENT DISTANCE
- E = EXTERNAL DISTANCE
- Lc = LENGTH OF CURVE
- D = DEGREE OF CURVE
- PI = POINT OF INTERSECTION
- BCC = BEGINNING OF CIRCULAR CURVE
- ECC = END CIRCULAR CURVE
- STA = STATION, POINT OF CENTER LINE
- POT = POINT ON TANGENT
- POC = POINT ON CURVE

IN ANY HORIZONTAL CIRCULAR CURVE

- $L_c = 20 I/D$
- $T = R \tan I/2$
- $E = R \sec I/2$
- $RH = 1145.916/D$

NOTES:

1. THE DEGREE OF CURVE IS DEFINED AS THE CENTRAL ANGLE (I) SUBTENDED BY A 20 - METER ARC.

LEGEND :

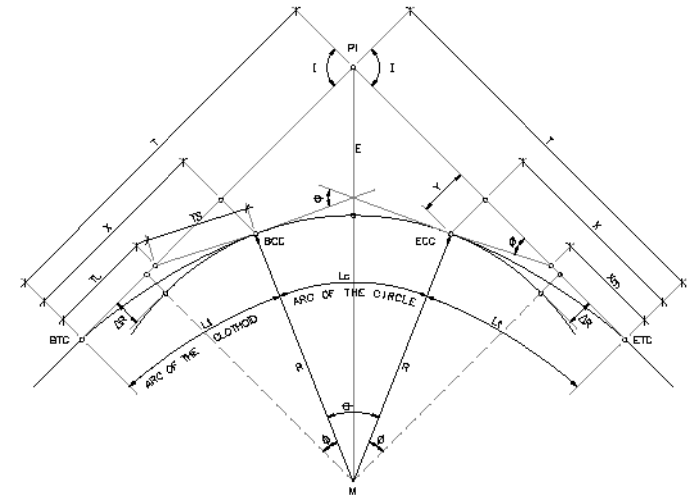
- LVC = LENGTH OF VERTICAL CURVE
- PVC = POINT OF VERTICAL CURVATURE
- PVT = POINT OF VERTICAL TANGENCY
- PM = POINT OF VERTICAL INTERSECTION
- Mo = MIDDLE ORDINATE
- Rv = APPROXIMATE RADIUS OF VERTICAL CURVE
- Lo = DISTANCE TO LOWEST OR HIGHEST POINT
- g1, g2 = GRADES IN PERCENT
- x = DISTANCE FROM PVC OR PVT TO ANY POINT ON CURVE.
- y = VERTICAL OFFSET AT DISTANCE X.

IN ANY VERTICAL PARABOLIC CURVE

- $M_o = - (g_1 - g_2) LVC/8 \text{ OR } (g_1 - g_2) LVC/8$
- $y = 4 M_o (x/LVC)^2$
- $Lo = q LVC/g_1 - g_2$
- $R_v = 100 LVC / (g_1 - g_2)$

NOTES:

1. GRADES ASCENDING FORWARD ARE POSITIVE. GRADES DESCENDING FORWARD ARE NEGATIVE.
2. RADIUS OF VERTICAL CURVE Rv IS APPROXIMATE AND IS USED ONLY FOR CHECKING SIGHT DISTANCE REQUIREMENTS.
3. NO VERTICAL CURVE IS REQUIRED WHERE THE GRADE ALGEBRAIC DIFFERENCE IS 0.20 % OR LESS.



CLOTHOID (EULER SPIRAL)

LEGEND :

- PI = POINT OF INTERSECTION
- A = PARAMETER OF THE CLOTHOID
- ΔR = RADIUS OF CIRCULAR CURVE
- Lt = LENGTH OF TRANSITION
- X_m = ABSISSA OF THE TRANSITION END
- Y = ORDINATE OF THE TRANSITION END
- R = OFFSET OF THE CIRCULAR CURVE
- X = SHIFT OF THE POINT TANGENCY
- TL = LONG TANGENT OF THE TRANSITION
- TS = SHORT TANGENT OF THE TRANSITION
- I = DEFLECTION ANGLE
- ϕ = ANGLE OF CLOTHOID AT R
- ϕ_c = ANGLE AT THE CENTER OF THE CIRCULAR CURVE
- Lc = LENGTH OF CIRCULAR CURVE
- L = TOTAL LENGTH OF CURVE
- T = TANGENT LENGTH OF THE CURVE
- E = EXTERNAL DISTANCE BETWEEN MIDDLE OF CURVE AND PI
- BTC/ETC = TANGENT TO SPIRAL/ SPIRAL TO TANGENT
- BCC/ECC = SPIRAL TO CIRCLE/ CIRCLE TO SPIRAL

CLOTHOID 'S FORMULAS :

- $A^2 = L_t \times R$
- $\phi = L_t / 2R$ (RADIUS)
- $X = (1 - \phi^2 / 24 + \phi^4 / 40 - \phi^6 / 81 + 11 \phi^8 / 17 - \dots) \times L_t$
- $Y = (\phi / 11 + 3 - \phi^2 / 2 + 7 - \phi^4 / 2 + 11 - \phi^6 / 2 + 15 + \dots) \times L_t$
- $\Delta R = (R \times \cos \phi + Y) - R$
- $X_m = X - (R \times \sin \phi)$
- $TL = X - T / \tan \phi$
- $TS = Y / \sin \phi$
- $\phi_c = I - 2\phi$
- $L_c = \phi R \sin \phi$
- $L = L_c + 2L_t$
- $T = (R + R\Delta) \times \tan (I/2) + X_m$
- $E = (R + R\Delta) / \cos (I/2) - R$

GENERAL NOTES FOR STRUCTURE

GENERAL

- UNLESS INDICATED OTHERWISE, ALL DIMENSIONS, DISTANCES AND SIZES (MEMBERS AND REINFORCING STEEL) ARE IN MILLIMETERS EXCEPT STATIONING WHICH ARE IN KILOMETERS + METERS AND ELEVATIONS WHICH ARE IN METERS.
- INDICATED DIMENSIONS SHALL GOVERN OVER SCALED DIMENSIONS. SCALED DIMENSIONS SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.
- ALL DIMENSIONS OF EXISTING STRUCTURE SHALL BE VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION STARTS.

DESIGN SPECIFICATION

- STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 17TH EDITION, 2002, BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, INC., (AASHTO) AND NATIONAL STRUCTURAL CODE OF THE PHILIPPINES (NSCP) 1987.

LOADING

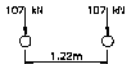
- DEAD LOAD : WEIGHT OF THE STRUCTURE AND AN ALLOWANCE OF 1.05kN/m² FOR FUTURE WEARING COURSE.

2. LIVELOAD :

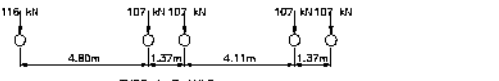
- AASHTO HS20 (WB16) TRUCK AND EQUIVALENT LANE LOADING

- SIDEWALK : 4.07 kPa

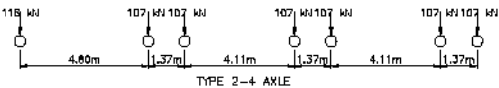
- ALTERNATE MILITARY LOADING :



- PERMIT DESIGN LIVELOAD (SPECIAL PERMIT REQUIRED BEFORE PASSING THE BRIDGE):



TYPE 1-3 AXLE



TYPE 2-4 AXLE

- IMPACT : IN ACCORDANCE WITH DIVISION 1 OF AASHTO SPECS AND NSCP CHAPTER 21.

- SEISMIC LOAD : IN ACCORDANCE WITH DIVISION 1-A AND NSCP CHAPTER 21 OF AASHTO SPECS USING ACCELERATION COEFFICIENT OF 0.4 AND SEISMIC PERFORMANCE CATEGORY D.

- STREAMFLOW : SEE BRIDGE DETAILS

- LOAD COMBINATION :

- GROUP I = 1.3[1.00 + 1.67(L+I)n + 1.00SF]
- GROUP IB = 1.3[1.00 + 1.00(L+I)p + 1.00SF]
- GROUP VII = 1.0[1.00 + 1.00SF + 1.00EQ]

MATERIALS

1. CONCRETE

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

STRUCTURAL COMPONENT	CLASS	28-DAY CYLINDER STRENGTH		MAX SIZE OF COARSE AGGREGATE (mm)	REMARK
		MPa	psi		
CAST IN PLACE GIRDERS, SLABS, DIAPHRAGMS, WINGWALLS, BACKWALLS, COPINGS, COLUMNS, FOOTING	A (MOD)	21	3045	20	
THIN REINFORCED SECTIONS SUCH AS RAILINGS AND RAILPOSTS	C	21	3045	12.50	
BORED PILES	AA	28	4000	20	
LEAN CONCRETE		15	2175	38	

2. REINFORCING STEEL

- UNLESS INDICATED OTHERWISE, REINFORCING STEEL SHALL CONFORM TO AASHTO M31 (ASTM A615), GRADE 43, DEFORMED, WITH MINIMUM YIELD STRENGTH, $f_y=276$ MPa (40,000 psi).
- REINFORCING STEEL SHALL BE FREE OF EXCESSIVE RUST, OIL OR ANY SUBSTANCES WHICH WILL WEAKEN THE BOND WITH CONCRETE.

3. PRESTRESSING STEEL AND WIRE ROPE

- UNLESS INDICATED OTHERWISE, PRESTRESSING STEEL SHALL BE SEVEN WIRE UNCOATED STRESS-RELIEVED STRANDS CONFORMING TO AASHTO M203 (ASTM A416), GRADE 270, WITH MINIMUM ULTIMATE STRENGTH OF 1880 MPa (270,000 psi)
- WIRE ROPE SHALL CONFORM TO AASHTO M277 SPEC.

4. STRUCTURAL STEEL, BOLTS AND WELDS

TYPE	SPECIFICATION
STEEL PLATES AND ROLLED SHAPES	AISC 3114 SMA 490W ($f_y = 355$ MPa) AISC 3114 SMA 490W ($f_y = 235$ MPa)
BOLTS	AISC 1188 (S107W)
WELDS	AWA II 17.4 SERIES (2002)
STEEL H-PILES	AISC 5626 SHH 400M ($f_y = 235$ MPa)

5. ELASTOMERIC BEARING PADS (FOR CONCRETE STRUCTURES)

UNLESS INDICATED OTHERWISE, ELASTOMERIC BEARING PADS SHALL BE 100% VIRGIN CHLOROPRENE (NEOPRENE) PADS WITH DURETOMETER HARDNESS 80 AND SHALL BE PLAN/LAMINATED WITH NOT-CORROSIVE MILD STEEL SHEETS. ELASTOMERIC PADS SHALL CONFORM TO THE REQUIREMENTS AS PRESCRIBED IN DPMW D.O. No. 20 SERIES OF 1997 "REVISED DPMW STANDARD SPECIFICATION FOR ELASTOMERIC BEARING PADS."

SPECIFICATIONS :

- DURO HARDNESS, SHORE A (ASTM D-2240) _____ 80
- TENSILE STRENGTH ASTM D412-128 Kg/m²(min)
- ULTIMATE ELONGATION % _____ 350% (min)
- MATERIAL _____ NEOPRENE

CONSTRUCTION

1. CONSTRUCTION SPECIFICATIONS

ALL CONSTRUCTION SHALL CONFORM TO:

- CONDITIONS OF CONTRACT
- THE SPECIAL PROVISIONS
- THE DPMW STANDARD SPECIFICATIONS FOR HIGHWAY, BRIDGES AND AIRPORTS, VOLUME II 1985 EDITION, AS MODIFIED ON THE DRAWINGS.

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. CONSTRUCTION LIMITS

THE CONTRACTOR SHALL VERIFY AND WORK WITHIN THE CONSTRUCTION LIMITS OR EASEMENTS OF THE BRIDGE STRUCTURE. HE SHALL HOWEVER PROVIDE FOR AREAS HE MAY REQUIRE FOR HIS OWN USE. IT IS THE INTENT OF THE PLANS TO LEAVE TO UNDISTURBED EVERYTHING WHICH DOES NOT ADVERSELY AFFECT THE FINISHED WORK. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO ITS ORIGINAL CONDITION AS DIRECTED BY THE ENGINEER.

4. SITE PREPARATION

ALL EXISTING PERMANENT WORKS (SUCH AS PAVEMENT, CURBS, GUTTERS, RIPRAP, SLOPE PROTECTION WORKS, AND ALL OTHER SIMILAR WORKS) WHICH WILL INTERFERE WITH THE WORK SHALL BE COMPLETELY REMOVED AND DISPOSED OFF FROM THE SITE BY THE CONTRACTOR. ALL SALVAGEABLE MATERIALS SHALL BE PROPERLY AND CAREFULLY DISMANTLED AND DEPOSITED ON A CONVENIENT SITE AS INSTRUCTED BY THE ENGINEER. HOWEVER, IF SUCH PERMANENT WORKS ARE DESIGNATED TO REMAIN BUT WILL BE DEMOLISHED BY THE CONTRACTOR FOR THE NECESSARY PROSECUTION OF THE WORKS,

THESE DEMOLISHED PERMANENT WORKS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION.

5. PUBLIC UTILITIES/FACILITIES

REFER TO SPECIAL PROVISIONS

6. DETOUR

WHERE REQUIRED BY THE CONTRACT PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL PREPARE THE DESIGN DRAWINGS OF, CONSTRUCT AND MAINTAIN A DETOUR DURING CONSTRUCTION PERIOD IN ACCORDANCE WITH THE SPECIFICATIONS AND AS APPROVED BY THE ENGINEER.

7. TRAFFIC MANAGEMENT

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING AND MAINTAINING AN EFFECTIVE TRAFFIC CONTROL PLAN IN ACCORDANCE WITH THE SPECIAL PROVISIONS SUBJECT TO THE APPROVAL OF THE ENGINEER AND THE CORRESPONDING LOCAL AUTHORITIES.

8. MATERIAL SOURCES

WHERE COMMON BORROW IS REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING HIS OWN SOURCES OF COMMON BORROW AS OUTLINED IN THE SPECIFICATIONS.

9. EXCAVATION

EXCAVATION FOR STRUCTURES SHALL BE NEAT LINES AS SHOWN ON THE PLANS AND THE SOIL UNDERNEATH STRUCTURE FOUNDATIONS SHALL NOT BE DISTURBED.

10. BACKFILLING

BACKFILLING FOR STRUCTURES SHALL BE DONE WITH GRANULAR MATERIALS COMPACTED ACCORDING TO SPECIFICATIONS.

11. REINFORCED CONCRETE

a. 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 SPECIFICATIONS.

(3) FOR CONCRETE DEPOSITED AGAINST THE GROUND, LEAN CONCRETE WITH A MINIMUM THICKNESS OF 50mm SHALL BE LAID FIRST BEFORE INSTALLING THE REINFORCEMENT. THE LEAN CONCRETE SHALL NOT BE CONSIDERED IN MEASURING THE STRUCTURAL DEPTH OF CONCRETE SECTION.

(4) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL THE POURING SEQUENCES FOR ALL CONCRETING WORKS.

b. 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.

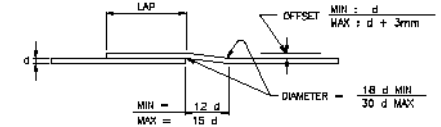
(3) BAR SPLICING NOT INDICATED ON DRAWINGS SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

(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, UNLESS SPECIFICALLY INDICATED.

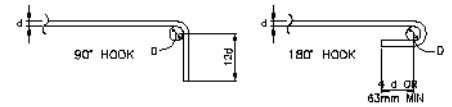
(6) UNLESS OTHERWISE SHOWN ON DRAWINGS, THE CLEAR DISTANCE BETWEEN PARALLEL BARS IN A LAYER SHALL NOT BE LESS THAN 1.5 TIMES THE NOMINAL DIAMETER OF THE BAR NOR LESS THAN 1.5 TIMES THE MAXIMUM SIZE OF COARSE AGGREGATE. THE CLEAR DISTANCE BETWEEN LAYERS SHALL NOT BE LESS THAN 25mm NOR ONE BAR DIAMETER.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

(7) CRANKED SPLICES



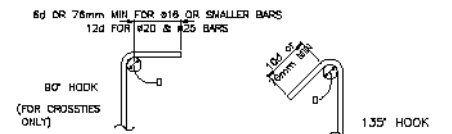
(8) HOOKS AND BENDS

a. DIMENSIONS OF 90-DEGREE AND 180-DEGREE HOOKS



PIN DIAMETER = $D - 6d$ FOR #10 THRU #25
 $D - 6d$ FOR #28, #32 AND #38

b. DIMENSIONS FOR STIRRUPS AND CROSS-TIE HOOKS



PIN DIAMETER = $D - 6d$ FOR #10 THRU #25
 $D - 6d$ FOR #28, #32 AND #38

c. CONCRETE COVER TO REINFORCEMENT

CONCRETE COVER TO REINFORCEMENT SHALL BE 50mm UNLESS SHOWN OTHERWISE ON DRAWINGS.

d. 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 CONCRETES AND BETWEEN EXISTING AND NEW CONCRETE SHALL BE ROUGHENED WITH AN AMPLITUDE OF 6mm MINIMUM.

e. CHIPPING OF EXISTING CONCRETE

(1) REFER TO SPECIAL PROVISIONS.

(2) JACKHAMMER OR SIMILAR DESTRUCTIVE TOOLS SHALL NOT BE USED IN BREAKING EXISTING CONCRETE SLAB ON TOP OF GIRDERS, DIAPHRAGMS AND WEB OF CHANNELS. EXTREME CARE SHALL BE TAKEN TO AVOID CAUSING INJURY OR DAMAGE TO SAID MEMBERS.

f. FALSEWORK

ALL FALSEWORK SHALL BE DESIGNED BY THE CONTRACTOR SUBJECT TO THE APPROVAL BY THE ENGINEER.

THE DESIGN CONSULTANT SHALL BE HELD FULLY RESPONSIBLE FOR THE FAILURE OF THE FACILITY DUE TO FACILITY DESIGN EXCEPT FOR THE CHANGES MADE WITHOUT THE CONFORMITY OF THE CONSULTANTS

RECOMMENDING APPROVAL:

PROJECT DIRECTOR
DATE: _____

REGIONAL DIRECTOR
DATE: _____

DIRECTOR BDD
DATE: _____

UNDERSECRETARY
DATE: _____

APPROVED:

SECRETARY
DATE: _____

PROJECT & LOCATION :

THE STUDY ON INFRASTRUCTURE (ROAD NETWORK) DEVELOPMENT PLAN FOR THE AUTONOMOUS REGION TO MUSLIM MINDANAO (ARMM) IN THE REPUBLIC OF THE PHILIPPINES PROVINCE OF MAGUINDANAO

SHEET CONTENTS :

GENERAL NOTES

SHEET NO.

1

SHEET NO.

G-05

GENERAL NOTES FOR STRUCTURE, CONT.

g. FORMWORK

FORMWORKS SHALL BE CONSTRUCTED SUCH THAT IT WILL NOT YIELD UNDER THE LOAD AND SHALL BE SUCH AS TO AVOID THE FORMATION OF FIVES. ALL CORNERS OF CONCRETE MEMBERS SHALL BE CHAMFERED TO 20mm UNLESS NOTED OTHERWISE ON DRAWINGS. STRIPPING OF FORMS AND SHORES SHALL BE AS DESIGNATED BY THE ENGINEER. THE FOLLOWING MAY BE 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

h. 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.

12. 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.

13. PRESTRESSED CONCRETE : SEE PRESTRESSED DESIGN GUIDE ON DRAWINGS.

14. BORED PILES

d) SUBMITTALS

AT LEAST TWO WEEKS BEFORE WORK ON SHAFTS BEGINS, THE CONTRACTOR

SHALL SUBMIT THE FOLLOWING TO THE ENGINEER FOR REVIEW AND APPROVAL.

(1) LIST OF PROPOSED EQUIPMENT TO BE USED INCLUDING CRANES, DRILLS, AUGERS, BAILING BUCKETS, FINAL CLEANING EQUIPMENT, DESANDING EQUIPMENT, SLURRY PUMPS, CASING, ETC.

(2) DETAILS OF OVERALL CONSTRUCTION OPERATION SEQUENCE AND THE SEQUENCE OF SHAFT CONSTRUCTION IN BENTS OR GROUPS.

(3) DETAILS OF SHAFT EXCAVATION METHOD.

(4) WHEN SLURRY IS REQUIRED, DETAILS OF THE METHOD PROPOSED FOR MIXING, CIRCULATING AND DESANDING SLURRY.

(5) DETAILS OF METHOD TO CLEAN THE SHAFT EXCAVATION.

(6) DETAILS OF REINFORCEMENT PLACEMENT INCLUDING SPICES, SUPPORT AND CENTRALIZATION METHODS.

(7) DETAILS OF CONCRETE PLACEMENT, CURING AND PROTECTION.

(8) DETAILS OF ANY REQUIRED LOAD TEST, AND;

(9) OTHER INFORMATION SHOWN ON THE PLANS OR REQUESTED BY THE ENGINEER.

THE CONTRACTOR SHALL NOT START THE CONSTRUCTION OF DRILLED SHAFTS UNTIL SUCH DRAWINGS HAVE BEEN APPROVED BY THE ENGINEER. SUCH APPROVAL WILL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR RESULTS OBTAINED BY USE OF THESE DRAWINGS OR ANY OF HIS OTHER RESPONSIBILITIES UNDER THE CONTRACT.

b) CONCRETE

CONCRETE SHALL BE CLASS "P" UNLESS OTHERWISE SPECIFIED. MINIMUM CEMENT CONTENT SHALL BE NOT LESS THAN 380 kg/cu.m.

MAXIMUM SIZE AGGREGATE—25mm; SPECIFIED COMP. STRENGTH (28 DAYS) 28 MPa.

c) REINFORCING STEEL

UNLESS INDICATED OTHERWISE, REINFORCING STEEL SHALL CONFORM TO AASHTO M31 (ASTM A615) GRADE 40, DEFORMED.

d) CASINGS

CASINGS REQUIRED TO BE INCORPORATED AS PART OF THE PERMANENT WORK SHALL BE AASHTO M170 (ASTM A706) GRADE 36 UNLESS OTHERWISE SPECIFIED.

e) PROTECTION OF EXISTING STRUCTURES

ALL REASONABLE PRECAUTIONS SHALL BE TAKEN TO PREVENT DAMAGE TO EXISTING STRUCTURES AND UTILITIES. THESE MEASURES SHALL INCLUDE, BUT ARE NOT LIMITED TO, SELECTING CONSTRUCTION METHODS AND PROCEDURES THAT WILL PREVENT EXCESSIVE CAVING OF THE SHAFT EXCAVATION, MONITORING AND CONTROLLING THE VIBRATIONS FROM THE DRIVING OF CASING OR SHEETING, DRILLING OF THE SHAFT OR FROM BLASTING, IF PERMITTED.

15. SHORING

a) CAMBER FOR REINFORCED CONCRETE SUPERSTRUCTURE SHALL BE DETERMINED BASED ON THE USE OF SHORING DURING CONSTRUCTION.

b) CAMBER FOR COMPOSITE SUPERSTRUCTURE WITH PRESTRESSED GIRDERS SHALL BE DETERMINED BASED ON UNSHORED CONDITION.

16. EMBANKMENT CONSTRUCTION SEQUENCE

APPROACH EMBANKMENT SHALL BE CONSTRUCTED PRIOR TO DRIVING OF ABUTMENT PILES. EMBANKMENT SHALL BE PLACED IN SUCH A MANNER THAT WOULD AVOID UNBALANCED PRESSURES ON BRIDGES.

17. TEST PILES

TEST PILES SHALL BE DRIVEN AT ABUTMENT A & B AND AT EACH PIER.

18. SPREAD FOOTINGS

FOOTING SHALL BE EMBEDDED AT LEAST 700mm INTO HARD STRATA. EXCAVATION IN ROCK SHALL BE TO THE TRIM LINES OF FOOTINGS. IF THE CONDITIONS OF THE FOUNDATION SOIL AT FOOTING ELEVATION IS SUCH THAT THE INDICATED BEARING CAPACITY CAN NOT BE ATTAINED CONSULTANT SHOULD BE NOTIFIED.

SYMBOLS	
	MAIN DETAIL TARGET
	SUB DETAIL TARGET
	SECTION TARGET
	ELEVATION TARGET
	DETAIL REFERENCE TARGET
	NORTH ARROW
	BUNDLED BARS
	LINE OF SYMMETRY
	SYMMETRY
	INDICATION OF ELEVATION
	SECTION IN WATER
	RIVER FLOW
	LIMITS OF DIMENSION
	CENTER LINE
	SECTION IN EARTH
	SECTION IN STRUCTURAL STEEL
	SECTION IN CONCRETE
	SECTION IN EXISTING CONCRETE STRUCTURE
	ELASTOMERIC BEARING PAD
	SECTION IN BITUMINOUS WEARING SURFACE
	PLAN VIEW & ELEVATION OF CUT & FILL SLOPES
	PLAN VIEW OF SLOPE PROTECTION
	PLAN VIEW OF GROUDED RIPRAP ON SLOPE
	ROUND
	SQUARE
	AT
	AND
	PLATE
	CENTERLINE
	ANGLE SHAPE
	C/C, C TO C, CENTER TO CENTER
	BENCH MARK
	BOREHOLE LOCATION

ABBREVIATIONS

ABT	ABOUT	FTG	FOOTING
ABUT	ABUTMENT	KPa	KILOPASCAL
BEG	BEGINNING	m	METER
BET	BETWEEN	mm	MILLIMETER
BOTT	BOTTOM	MAX	MAXIMUM
BR	BRIDGE	M.F.W.L.	MAX. FLOOD WATER LEVEL
BRG	BEARING	MIN	MINIMUM
C	CENTERLINE	MO	MIDDLE ORDNATE
CLR	CLEAR	MPa	MEGAPASCAL
cm	CENTIMETER	N	NEWTON
COL	COLUMN	NF	NEAR FACE
CONC	CONCRETE	No.	NUMBER
CONST	CONSTRUCTION	O.C.	ON CENTERS
CONT	CONTINUOUS	OWL	ORDINARY WATER LEVEL
CTR	CENTER	PEJF	PREMOULDED EXPANSION JOINT FILLER
DET	DETAIL	PVC	POLYVINYL CHLORIDE
D.F.L.	DESIGN FLOOD LEVEL	PVI	POINT OF VERTICAL INTERSECTION
DIAM	DIAMETER	QTY	QUANTITY
DIAPH	DIAPHRAGM	R	RADIUS
DWG	DRAWING	RC	REINFORCED CONCRETE
EA	EACH	RDWY	ROADWAY
EF	EACH FACE	TYP	TYPICAL
EL/ELEV	ELEVATION	VER	VERIFY

THE DESIGN CONSULTANT SHALL BE HELD FULLY RESPONSIBLE FOR THE FAILURE OF THE FACILITY DUE TO FAULTY DESIGN EXCEPT FOR THE CHANGES MADE WITHOUT THE CONFORMITY OF THE CONSULTANTS

RECOMMENDING APPROVAL:

PROJECT DIRECTOR

REGIONAL DIRECTOR

DIRECTOR DOO

UNDERSECRETARY

APPROVAL:

SECRETARY

PROJECT & LOCATION :

THE STUDY ON INFRASTRUCTURE (ROAD NETWORK) DEVELOPMENT PLAN FOR THE AUTONOMOUS REGION IN MUSLIM MINDANAO (ARMM) IN THE REPUBLIC OF THE PHILIPPINES PROVINCE OF MISORINDANAO

SHEET CONTENTS :

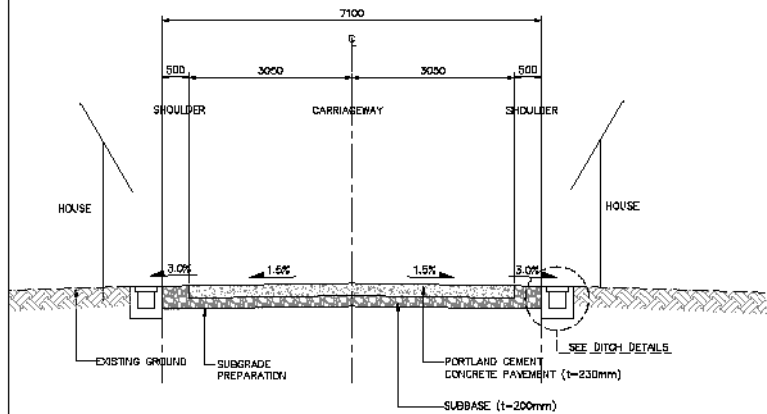
GENERAL NOTES, SYMBOLS & ABBREVIATIONS

SET NO.

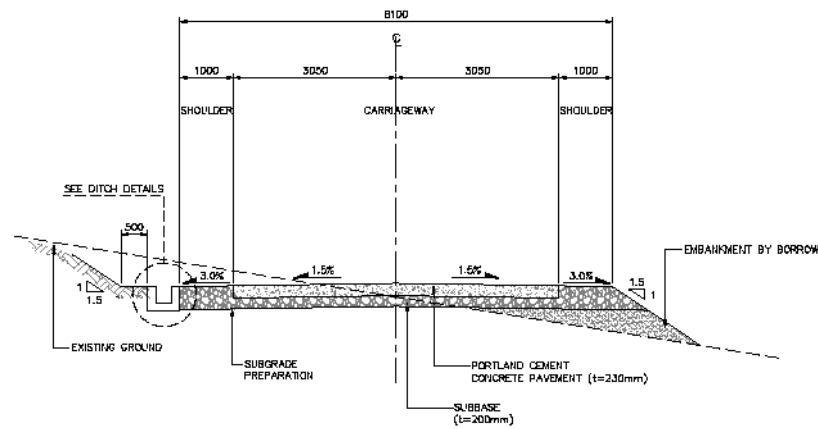


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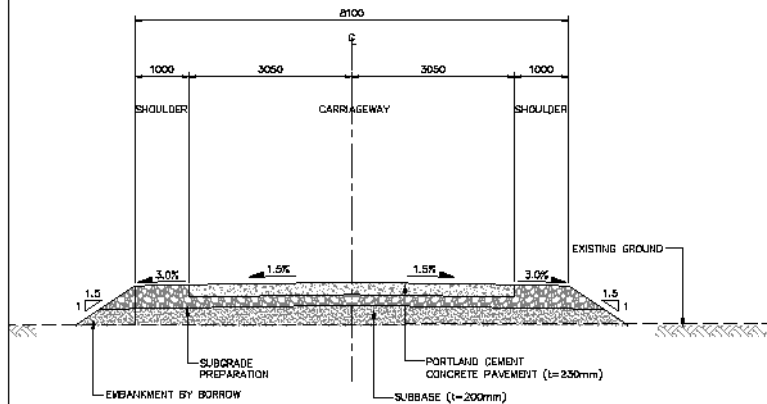


TYPICAL CROSS SECTION WHERE PROPOSED ROAD ELEVATION IS ALMOST AS SAME AS THE EXISTING ELEVATION (CLOSE TO ROADSIDE DEVELOPMENT)

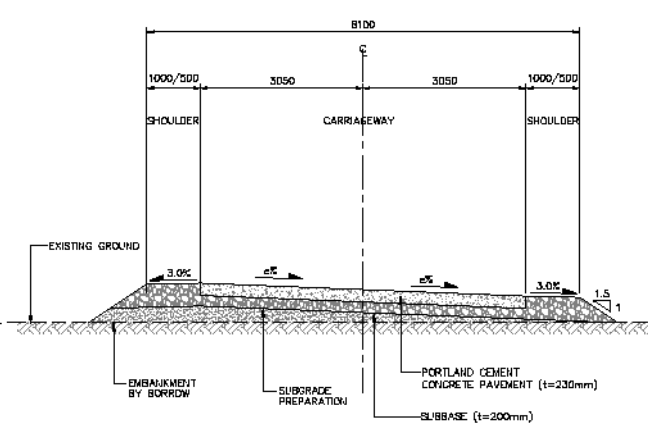


CUT SECTION

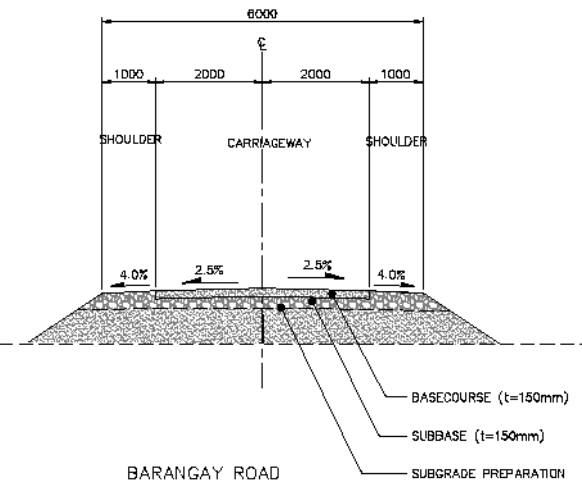
EMBANKMENT SECTION



EMBANKMENT SECTION



SUPER ELEVATION SECTION



BARANGAY ROAD

1
RC-01/RC-01 SCALE 1:50

PINARING-SIMSIMAN ROAD
TYPICAL CROSS SECTIONS

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS



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DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS-ARMM
REPUBLIC OF THE PHILIPPINES

CTI Engineering International Co., Ltd.
Yeo Yachiyo Engineering Co., Ltd.

RECOMMENDING APPROVAL:

PROJECT DIRECTOR
DATE

REGIONAL DIRECTOR
DATE

DIRECTOR BUD
DATE

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SECRETARY
DATE

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SHEET COMMENTS :

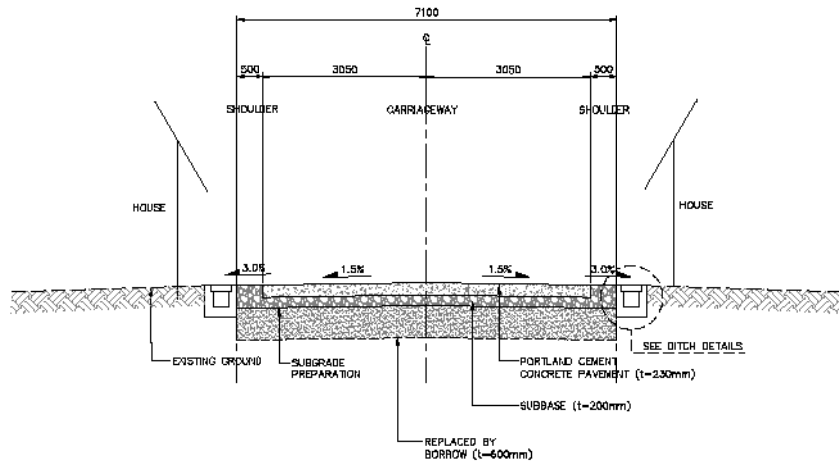
TYPICAL CROSS SECTION
(SOFT GROUND SECTION)

SET NO.

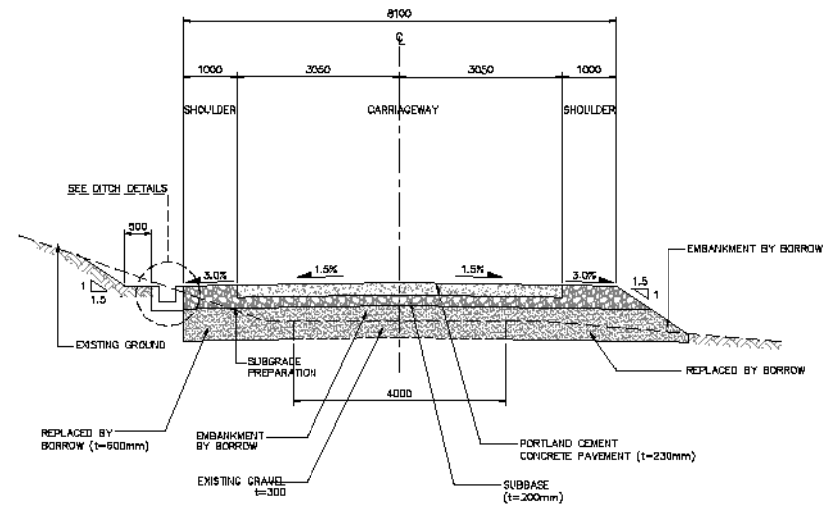


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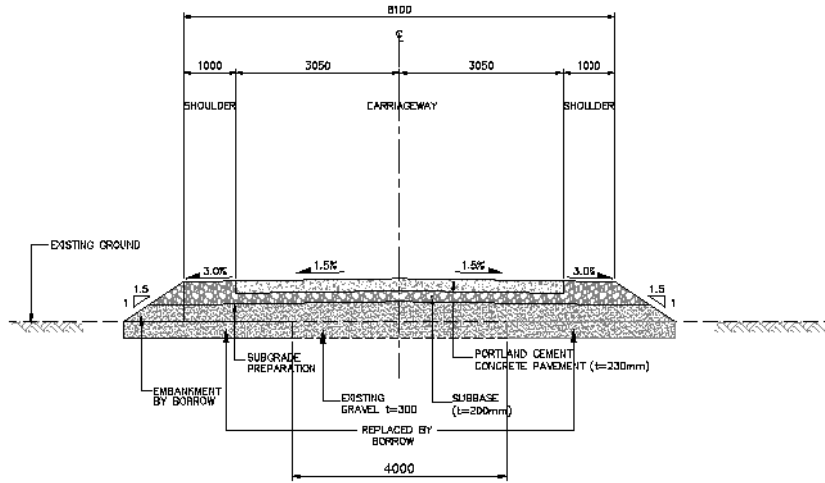


TYPICAL CROSS SECTION WHERE PROPOSED ROAD ELEVATION IS ALMOST AS SAME AS THE EXISTING ELEVATION (CLOSE TO ROADSIDE DEVELOPMENT)

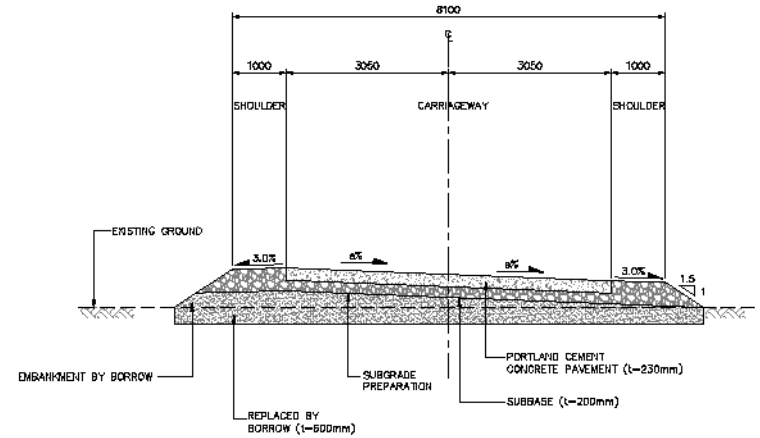


CUT SECTION

EMBANKMENT SECTION



EMBANKMENT SECTION



SUPER ELEVATION SECTION

PINARING-SIMSIMAN ROAD
TYPICAL CROSS SECTIONS (SOFT GROUND SECTION)
STATION 1+315 - 1+800, 2+700 - 4+200

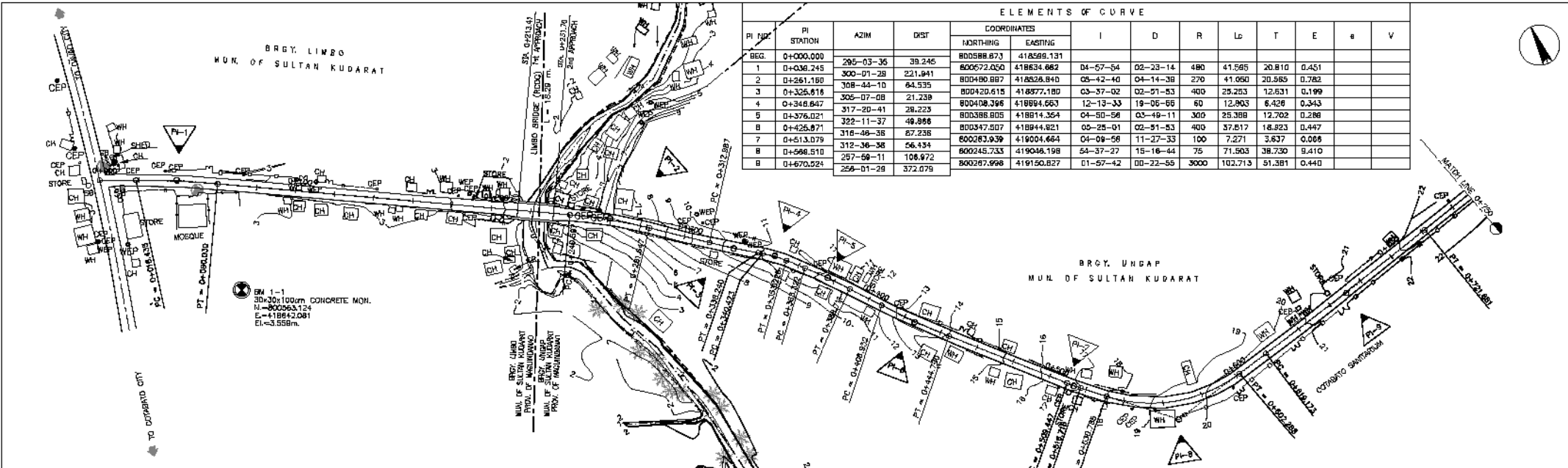
5+800 - 9+800, 10+200 - 16+500, 17+500 - 20+113

1
RC-02 RC-02 SCALE

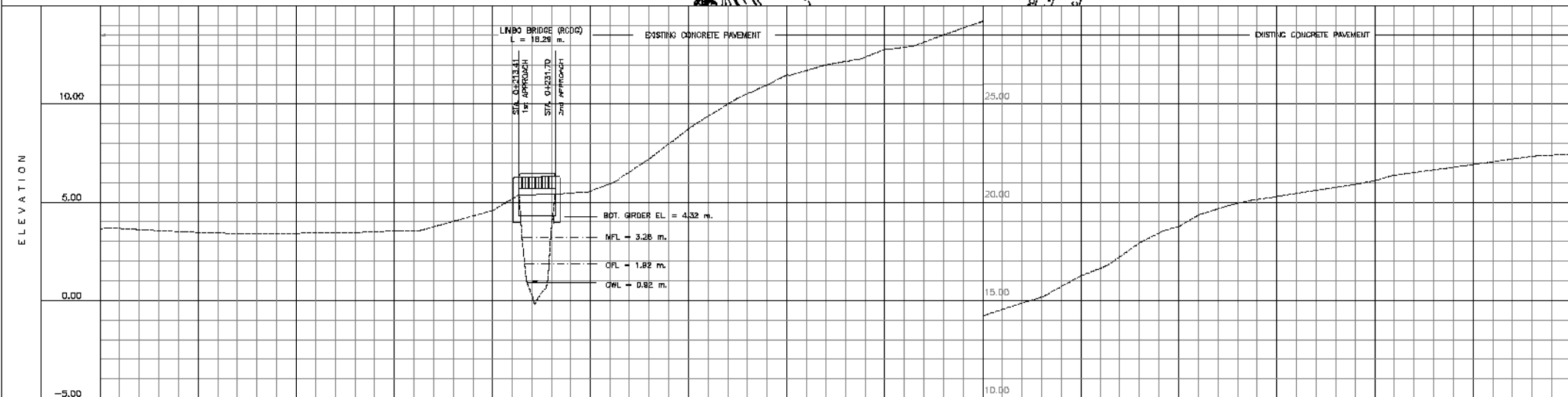
1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. PROVIDE REPLACEMENT OF GRAVEL, 1=500mm WHEN EXISTING GROUND CBR ≤ 3.0%



PI NO.	PI STATION	AZIM	DIST	ELEMENTS OF CURVE												
				COORDINATES		I	D	R	L _s	T	E	e	V			
				NORTHING	EASTING											
BEG.	0+000.000			800588.873	418299.131											
1	0+036.245	295-03-36	39.245	800672.050	418834.882	04-57-04	02-23-14	480	41.595	20.810	0.451					
2	0+261.160	300-01-28	231.941	800480.887	418926.840	05-42-40	04-14-38	270	41.050	20.585	0.782					
3	0+326.616	308-44-10	64.535	800420.615	418977.180	03-57-02	02-21-53	400	25.253	12.631	0.199					
4	0+348.847	305-07-08	21.238	800408.396	418994.653	12-13-33	19-06-66	60	12.803	6.428	0.343					
5	0+376.021	317-20-41	28.233	800388.805	418814.354	04-50-56	03-49-11	300	25.388	12.702	0.288					
6	0+426.871	322-11-37	49.866	800347.507	418844.821	05-25-01	02-51-53	400	37.817	18.823	0.447					
7	0+513.079	312-38-36	56.434	800267.939	419004.684	04-09-58	11-27-33	100	7.271	3.637	0.068					
8	0+598.510	287-58-11	108.972	800245.733	419048.198	04-37-27	15-18-44	75	71.503	38.730	0.410					
9	0+670.524	259-01-28	372.079	800267.696	419150.827	01-57-42	00-22-55	3000	102.713	51.381	0.440					



STATION	0+000	0+100	0+200	0+300	0+400	0+500	0+600	0+700
FINISHED GRADE								
EXISTING GROUND	3.820	3.810	3.508	3.437	3.408	3.420	3.448	3.397
VERTICAL CURVATURE								
HORIZONTAL CURVATURE								
SUPERELEVATION								

RECOMMENDING APPROVAL:

PROJECT DIRECTOR: _____ DATE: _____

REGIONAL DIRECTOR: _____ DATE: _____

DIRECTOR BUD: _____ DATE: _____

UNDERSECRETARY: _____ DATE: _____

APPROVED:

SECRETARY: _____ DATE: _____

PROJECT & LOCATION:

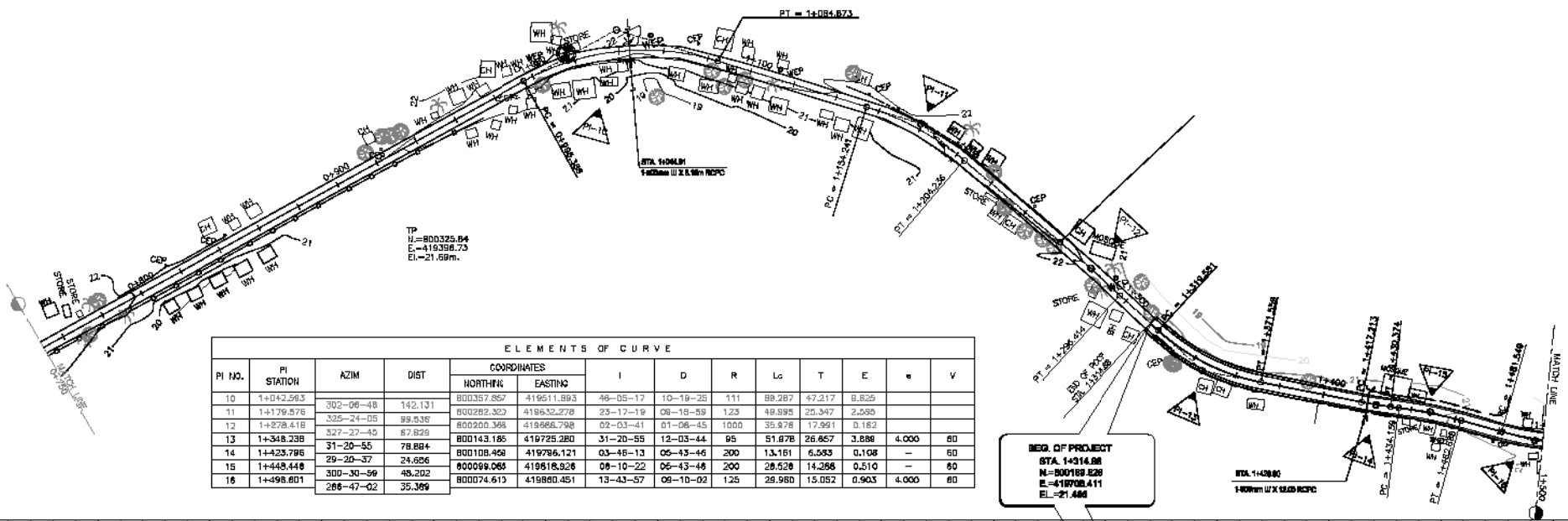
THE STUDY ON INFRASTRUCTURE (ROAD NETWORK) DEVELOPMENT PLAN FOR THE AUTONOMOUS REGION IN MUSLIM MINDANAO (ARMM) IN THE REPUBLIC OF THE PHILIPPINES PROVINCE OF MAGUIPINDANAO

SHEET CONTENTS:

PIHARRING-SIMSIMAN PLAN AND PROFILE STA. 0+000 TO STA. 0+750

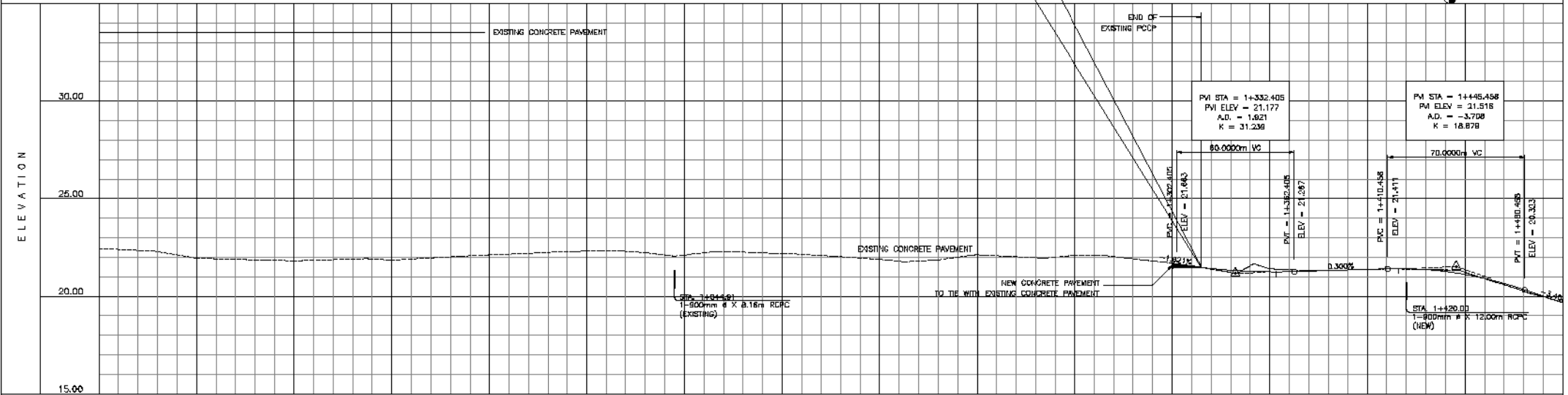
SHEET NO.

SHEET NO. PS-03



ELEMENTS OF CURVE

PI NO.	PI STATION	AZIM	DIST	COORDINATES		I	D	R	Lc	T	E	e	V
				NORTHING	EASTING								
10	1+042.563	302-06-48	142.131	800357.857	419511.893	46-05-17	10-19-25	111	88.287	47.217	8.825		
11	1+179.576	325-24-05	89.538	800282.320	419632.278	25-17-19	08-18-59	123	48.895	25.347	2.590		
12	1+278.418	327-27-40	87.828	800200.368	419666.798	02-03-41	01-06-45	1000	35.978	17.961	0.162		
13	1+348.238	31-20-55	78.884	800143.185	419725.280	31-20-55	12-03-44	95	51.878	26.657	3.888	4.000	80
14	1+425.796	29-20-37	24.686	800108.458	419796.121	03-46-13	06-43-46	200	13.161	6.583	0.108	-	60
15	1+448.448	300-30-59	48.202	800099.068	419818.926	08-10-22	06-43-46	200	28.528	14.286	0.510	-	60
16	1+498.801	286-47-02	35.389	800074.613	419860.451	13-43-57	08-10-02	125	28.980	15.052	0.903	4.000	80



STATION	0+800	0+900	1+000	1+100	1+200	1+300	1+400	1+500
FINISHED GRADE	22.400	22.281	21.850	21.853	21.642	21.649	21.508	21.648
EXISTING GROUND	22.400	22.281	21.850	21.853	21.642	21.649	21.508	21.648
VERTICAL CURVATURE	EXISTING							
HORIZONTAL CURVATURE	EXISTING							
SUPERELEVATION	EXISTING							

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UNDERSECRETARY: _____ DATE: _____

APPROVED:

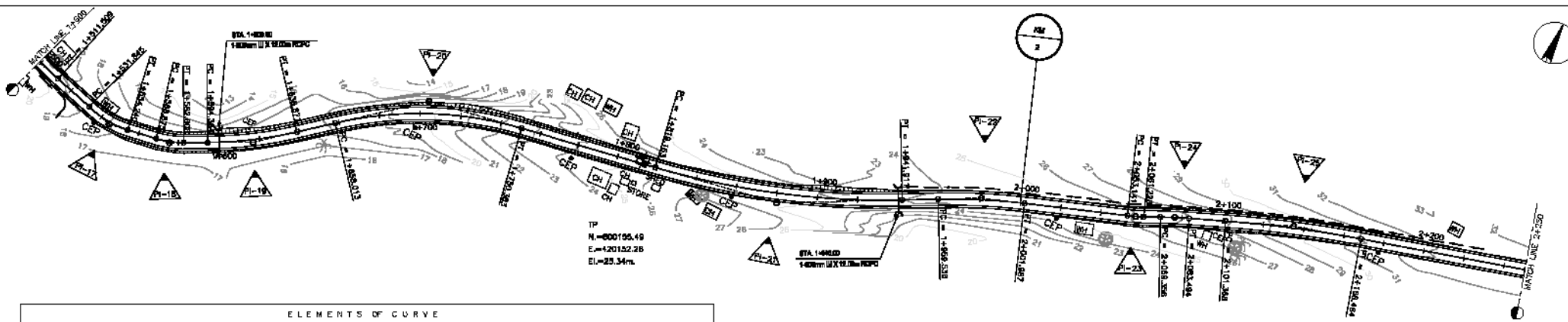
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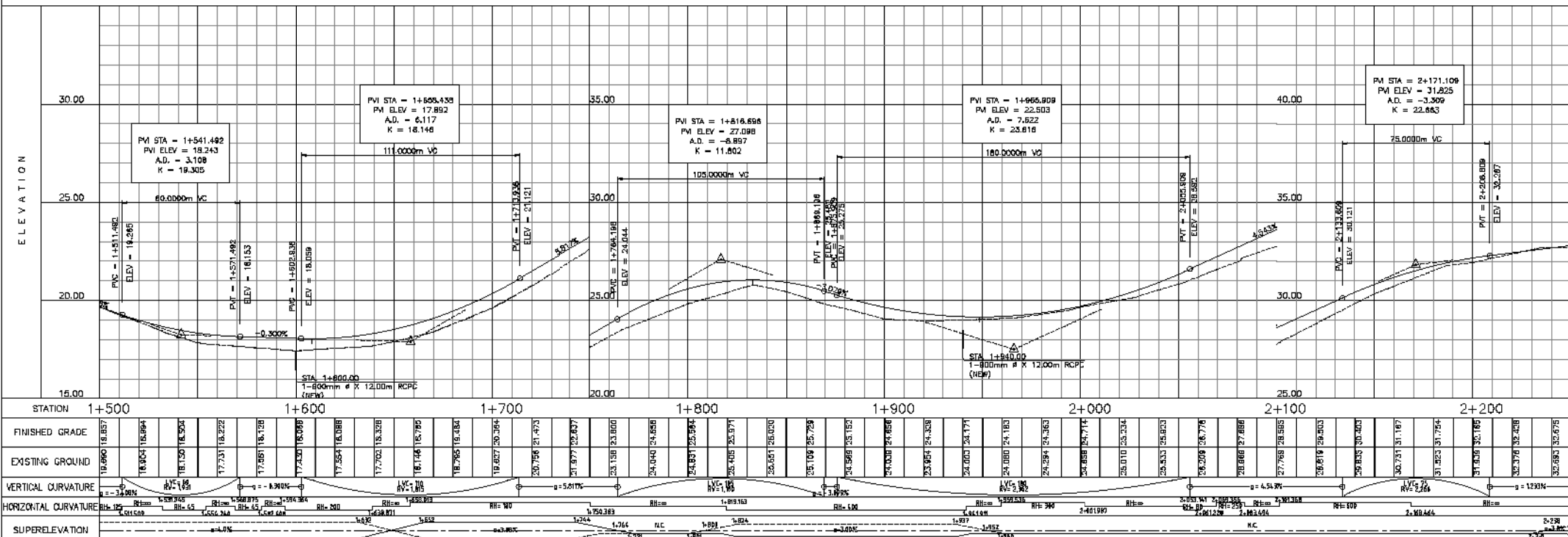
SHEET COMMENTS: PHARRING-SIMSIMAN PLAN AND PROFILE STA. 0+750 TO STA. 1+500

SET NO. 1

SHEET NO. PS-D4



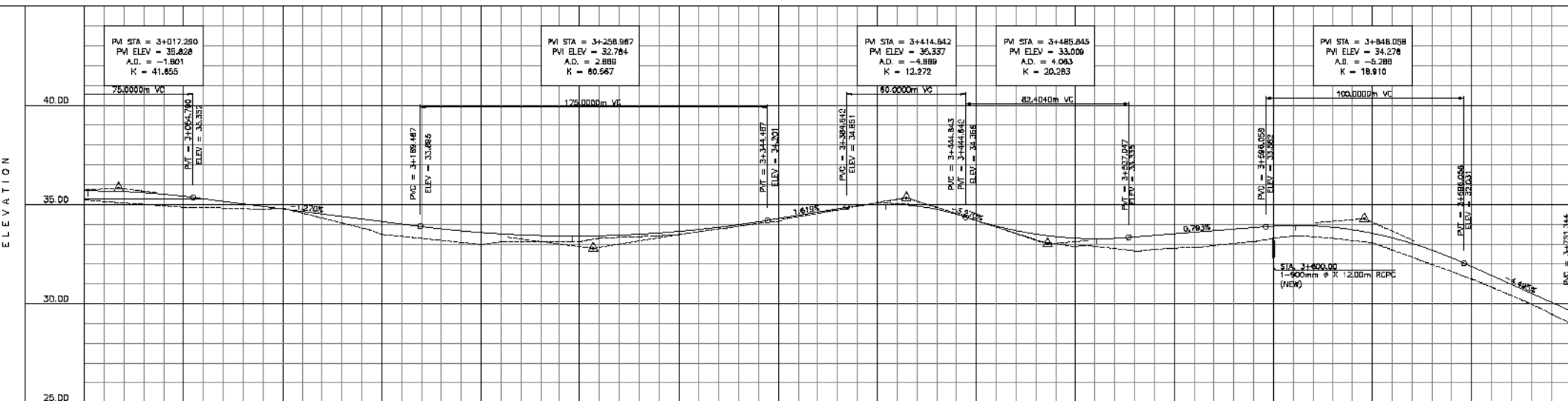
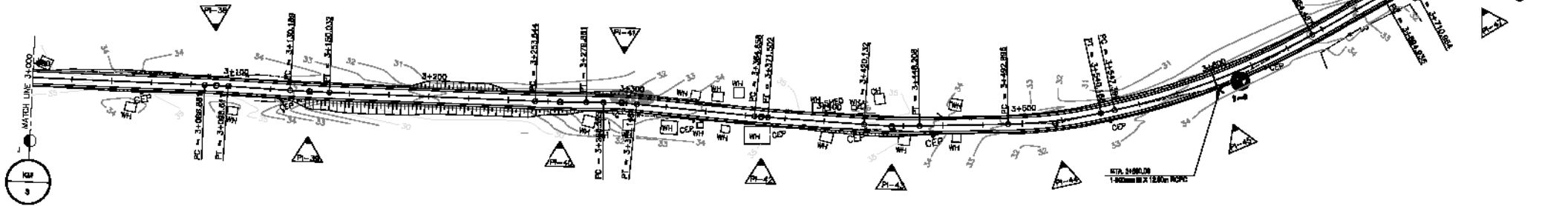
PI NO.	PI STATION	AZIM	DST	COORDINATES		I	D	R	Lg	T	E	a	V
				NORTHING	EASTING								
17	1+543.279	282-07-45	32.990	800060.380	418805.032	28-30-47	25-27-53	45	22.384	11.434	1.430	4.000	80
18	1+076.735	244-38-38	41.022	800054.878	419837.711	17-29-08	28-27-03	45	13.733	8.920	0.528	4.000	80
19	1+816.709	231-53-36	88.714	800082.445	419974.781	12-45-01	05-43-46	200	44.507	72.346	1.344	3.800	80
20	1+705.239	281-17-46	117.868	800137.182	420044.587	28-24-08	09-21-58	180	92.370	47.226	6.092	3.800	80
21	1+681.023	243-42-48	100.746	800154.108	420220.405	17-34-87	03-01-83	400	122.748	87.861	4.725	3.600	80
22	1+980.797	251-49-16	76.462	800208.725	420316.733	08-08-27	03-49-11	300	42.451	21.281	0.752	-	80
23	2+057.188	248-01-44	19.246	800232.580	420383.378	05-47-32	14-18-28	80	8.087	4.047	0.102	-	80
24	2+076.427	248-18-09	58.528	800240.396	420400.954	03-14-25	04-35-01	250	14.138	7.071	0.100	-	80
25	2+134.851	255-40-35	143.213	800281.116	420455.703	06-24-26	01-54-35	600	67.086	33.563	0.939	-	80



STATION	1+500	1+600	1+700	1+800	1+900	2+000	2+100	2+200
FINISHED GRADE	19.990	19.857	18.222	16.433	17.892	22.088	22.503	31.825
EXISTING GROUND	18.304	16.894	16.504	16.222	16.133	16.059	16.153	16.257
VERTICAL CURVATURE	g = -3.48%							
HORIZONTAL CURVATURE	R1000, R1500, R2000, R3000, R4000, R5000, R6000, R7000, R8000, R9000, R10000, R12000, R15000, R20000, R30000, R40000, R50000, R60000, R70000, R80000, R90000, R100000, R120000, R150000, R200000, R300000, R400000, R500000, R600000, R700000, R800000, R900000, R1000000, R1200000, R1500000, R2000000, R3000000, R4000000, R5000000, R6000000, R7000000, R8000000, R9000000, R10000000, R12000000, R15000000, R20000000, R30000000, R40000000, R50000000, R60000000, R70000000, R80000000, R90000000, R100000000, R120000000, R150000000, R200000000, R300000000, R400000000, R500000000, R600000000, R700000000, R800000000, R900000000, R1000000000, R1200000000, R1500000000, R2000000000, R3000000000, R4000000000, R5000000000, R6000000000, R7000000000, R8000000000, R9000000000, R10000000000, R12000000000, R15000000000, R20000000000, R30000000000, R40000000000, R50000000000, R60000000000, R70000000000, R80000000000, R90000000000, R100000000000, R120000000000, R150000000000, R200000000000, 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R2000000000000000000000000000000000000000, R3000000000000000000000000000000000000000, R4000000000000000000000000000000000000000, R5000000000000000000000000000000000000000, R6000000000000000000000000000000000000000, R7000000000000000000000000000000000000000, R8000000000000000000000000000000000000000, R9000000000000000000000000000000000000000, R100, R12000000000000000000000000000000000000000, R1500000000							

PI NO.	PI STATION	AZIM	DIST	COORDINATES		I	D	R	Lc	T	E	φ	V
				NORTHING	EASTING								
				38	3+092.746								
39	3+140.111	280-24-07	126.594	800326.451	421419.832	01-25-18	01-25-57	800	19.842	9.922	0.082	-	80
40	3+286.704	280-31-02	30.145	800299.263	421543.472	01-53-05	01-25-57	800	26.316	13.158	0.108	-	90
41	3+296.646	285-16-35	8.311	800293.760	421673.111	04-45-33	05-43-46	200	16.613	8.311	0.173	-	80
42	3+388.060	284-14-06	66.101	800274.432	421841.882	01-34-07	04-35-01	250	6.844	3.422	0.023	-	80
43	3+434.180	278-52-21	82.459	800258.178	421705.763	05-21-44	03-48-11	300	28.077	14.049	0.328	-	80
44	3+516.618	267-34-57	84.876	800246.490	421787.225	11-17-24	04-46-28	240	47.291	23.723	1.170	3.640	90
45	3+601.341	250-32-20	102.407	800249.040	421872.026	17-02-37	03-10-59	360	107.069	53.942	4.018	3.120	80
46	3+702.651	252-22-32	31.128	800283.158	421968.581	01-50-12	02-12-31	500	18.028	8.015	0.084	-	80
47	3+734.076	247-11-23	26.224	800282.553	421998.248	05-11-09	05-43-46	200	18.102	8.057	0.205	-	90

BM 1-4
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E.=421882.618
Ei.=33.822m.

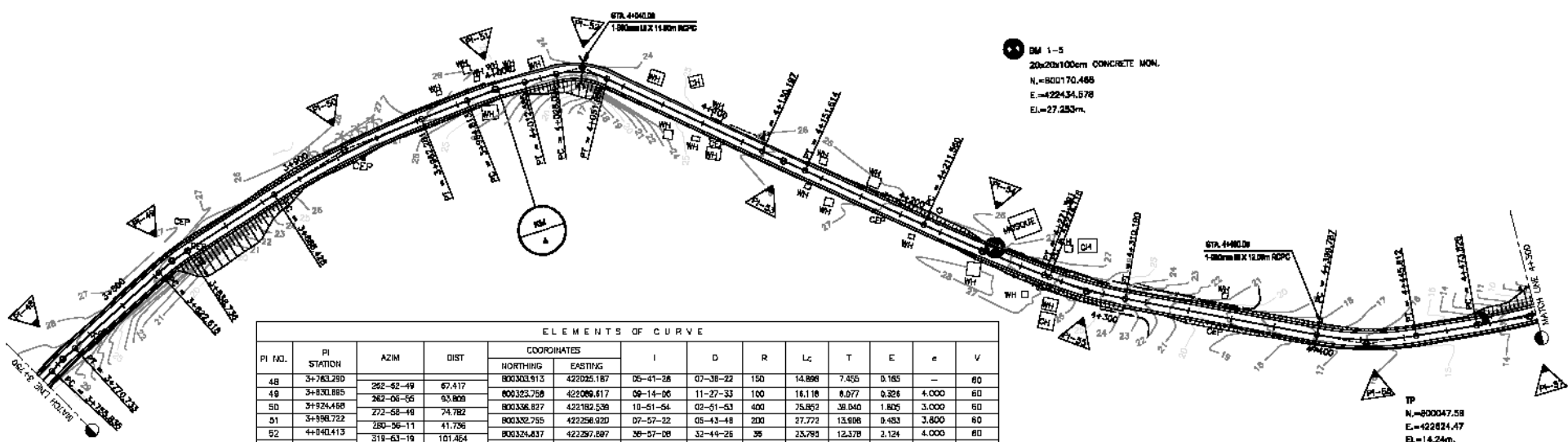


STATION	3+000	3+100	3+200	3+300	3+400	3+500	3+600	3+700
FINISHED GRADE	35.020	35.087	35.078	35.646	35.350	35.513	35.208	35.954
EXISTING GROUND	35.078	35.646	35.350	35.513	35.208	35.954	35.020	35.087
VERTICAL CURVATURE	<p>VC=75m RVC=1.84 VC=178m RVC=1.85 VC=80m RVC=1.27 VC=82m RVC=1.27 VC=100m RVC=1.89</p>							
HORIZONTAL CURVATURE	<p>R11=∞ R12=∞ R13=∞ R14=∞ R15=∞ R16=∞ R17=∞ R18=∞ R19=∞ R20=∞ R21=∞ R22=∞ R23=∞ R24=∞ R25=∞ R26=∞ R27=∞ R28=∞ R29=∞ R30=∞</p>							
SUPERELEVATION	<p>0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00%</p>							

JAPAN INTERNATIONAL COOPERATION AGENCY
 CTI Engineering International Co., Ltd.
 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS-ARMM
 Yeco Yachiyo Engineering Co., Ltd.

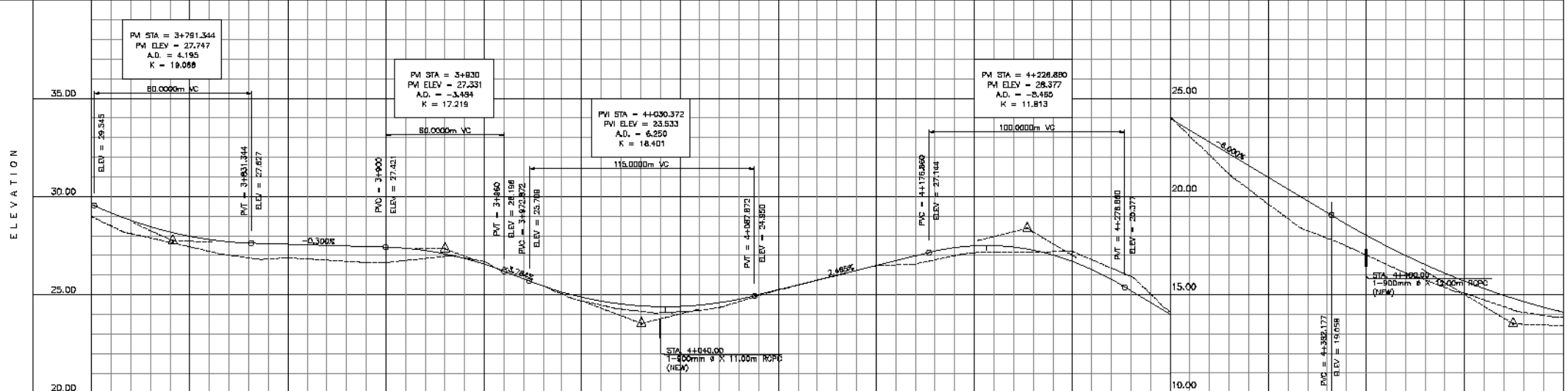
RECOMMENDED APPROVAL:
 PROJECT DIRECTOR: _____ DATE: _____
 REGIONAL DIRECTOR: _____ DATE: _____
 DIRECTOR BDO: _____ DATE: _____
 UNDERSECRETARY: _____ DATE: _____

APPROVED: _____ DATE: _____
 SECRETARY: _____ DATE: _____
 PROJECT & LOCATION :
 THE STUDY ON INFRASTRUCTURE (ROAD NETWORK DEVELOPMENT PLAN FOR THE AUTONOMOUS REGION IN MUSLIM MINDANAO (ARMM) IN THE REPUBLIC OF THE PHILIPPINES PROVINCE OF MAQUINDANAO
 SHEET CONTENTS :
 PINARING-SIMSIMAN PLAN AND PROFILE STA. 3+000 TO STA. 3+700
 SET NO. SHEET NO. P5-07



ELEMENTS OF CURVE

PI NO.	PI STATION	AZIM	DIST	COORDINATES		I	D	R	Lc	T	E	e	V
				NORTHING	EASTING								
48	3+763.280	262-62-49	67.917	800303.913	422025.187	05-41-26	07-38-22	150	14.896	7.455	0.185	-	60
49	3+800.885	262-06-55	63.809	800323.758	422069.617	09-14-06	11-27-33	100	16.116	8.077	0.328	4.000	60
50	3+924.458	272-08-48	74.782	800332.827	422182.539	10-51-54	02-51-53	400	75.852	36.040	1.805	3.000	60
51	3+998.722	280-06-11	41.796	800332.755	422256.920	07-57-22	05-43-48	200	37.772	13.698	0.483	3.000	60
52	4+040.413	319-63-19	101.464	800324.817	422297.897	26-57-08	32-44-26	35	23.789	12.379	2.124	4.000	60
53	4+140.690	319-16-30	100.379	800247.246	422363.282	00-36-49	00-34-23	9000	21.419	10.710	0.029	-	60
54	4+241.484	315-09-48	56.736	800171.022	422426.882	03-25-41	01-08-45	1000	58.831	28.824	0.448	1.500	60
55	4+292.283	303-30-46	130.835	800134.820	422494.224	10-29-02	05-43-45	200	35.072	15.880	0.815	3.000	60
58	4+322.640	283-18-56	75.889	800058.619	422570.722	20-11-49	08-48-53	130	45.825	23.153	2.048	4.000	60
57	4+466.329	277-18-24	66.063	800038.579	422843.897	08-00-33	03-18-27	350	48.525	24.503	0.857	-	60



STATION	3+800	3+900	4+000	4+100	4+200	4+300	4+400	4+500
FINISHED GRADE	28.665	28.373	27.931	27.685	26.924	27.601	27.511	27.481
EXISTING GROUND	28.665	28.373	27.931	27.685	26.924	27.601	27.511	27.481
VERTICAL CURVATURE	<p>VC=60 RV=1.00 VC=60 RV=1.00 VC=60 RV=1.00 VC=60 RV=1.00 VC=60 RV=1.00 VC=60 RV=1.00 VC=60 RV=1.00 VC=60 RV=1.00 VC=60 RV=1.00</p>							
HORIZONTAL CURVATURE	<p>R=100 R=100 R=100 R=100 R=100 R=100 R=100 R=100 R=100</p>							
SUPERELEVATION	<p>0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00%</p>							

JICA JAPAN INTERNATIONAL COOPERATION AGENCY
CTI CTI Engineering International Co., Ltd.
YECO Yachiyo Engineering Co., Ltd.

RECOMMENDING APPROVAL:

PROJECT DIRECTOR: _____ DATE: _____

NATIONAL DIRECTOR: _____ DATE: _____

DIRECTOR BOB: _____ DATE: _____

UNDERSECRETARY: _____ DATE: _____

APPROVED:

SECRETARY: _____ DATE: _____

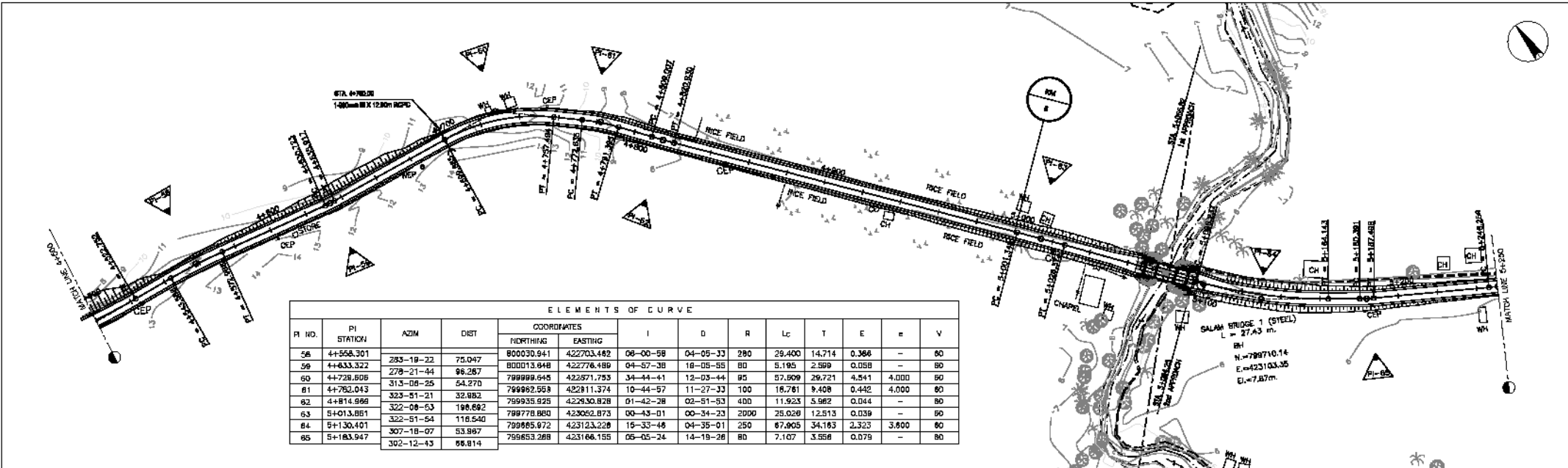
PROJECT & LOCATION:

THE STUDY ON INFRASTRUCTURE (ROAD NETWORK DEVELOPMENT PLAN FOR THE AUTONOMOUS REGION IN MUSLIM MINDANAO (ARMM) IN THE REPUBLIC OF THE PHILIPPINES PROVINCE OF MAQUINDANAO

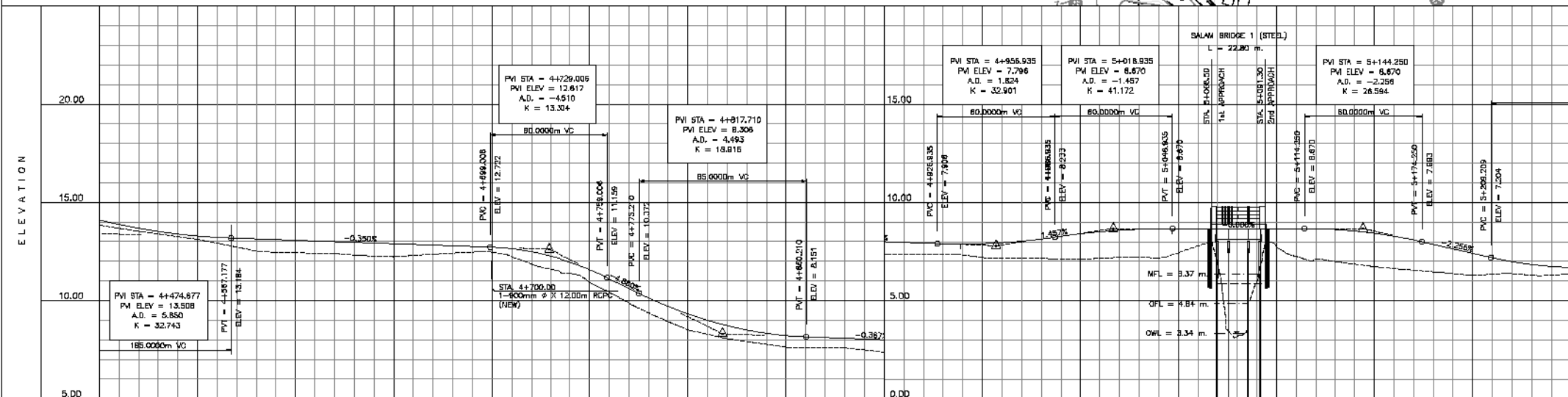
SHEET CONTENTS:

PLAN AND PROFILE STA. 3+750 TO STA. 4+500

SHEET NO. (PS-08)



P. NO.	PI STATION	AZIM	DIST	COORDINATES		I	D	R	Lc	T	E	e	V
				NORTHING	EASTING								
56	4+558.301	283-19-22	75.047	800030.941	422703.482	08-00-58	04-05-33	280	29.400	14.714	0.366	-	50
59	4+833.322	278-21-44	96.267	800013.948	422776.489	04-57-38	18-05-55	80	5.195	2.599	0.058	-	50
60	4+728.506	313-06-25	54.270	799989.645	422871.753	34-44-41	12-03-44	95	57.609	29.721	4.541	4.000	50
61	4+762.043	323-51-21	32.982	799982.559	422811.374	10-44-57	11-27-33	100	18.761	8.408	0.442	4.000	50
62	4+814.996	322-08-53	196.682	799935.925	422930.828	01-42-28	02-51-53	400	11.923	5.982	0.044	-	50
63	5+013.881	322-51-54	116.540	799778.950	423092.873	00-43-01	00-34-23	2000	25.029	12.513	0.039	-	50
64	5+130.401	307-18-07	53.987	799895.972	423123.229	19-33-48	04-35-01	250	67.905	34.163	2.323	3.800	50
65	5+183.947	302-12-43	66.814	799853.288	423166.158	09-05-24	14-19-28	80	7.107	3.556	0.079	-	50



STATION	4+500	4+600	4+700	4+800	4+900	5+000	5+100	5+200
FINISHED GRADE	13.431	14.109	13.327	13.659	13.392	13.217	13.139	13.069
EXISTING GROUND	12.831	13.519	12.587	13.009	12.832	12.657	12.579	12.509
VERTICAL CURVATURE	-0.350%							
HORIZONTAL CURVATURE	-0.362%							
SUPERELEVATION	NE, NC							

JICA JAPAN INTERNATIONAL COOPERATION AGENCY

CTI CTI Engineering International Co., Ltd.

YECO Yachiyo Engineering Co., Ltd.

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS-ARMM
REPUBLIC OF THE PHILIPPINES

RECOMMENDED APPROVAL:

PROJECT DIRECTOR: _____ DATE: _____

REGIONAL DIRECTOR: _____ DATE: _____

DIRECTOR BOB: _____ DATE: _____

UNDERSECRETARY: _____ DATE: _____

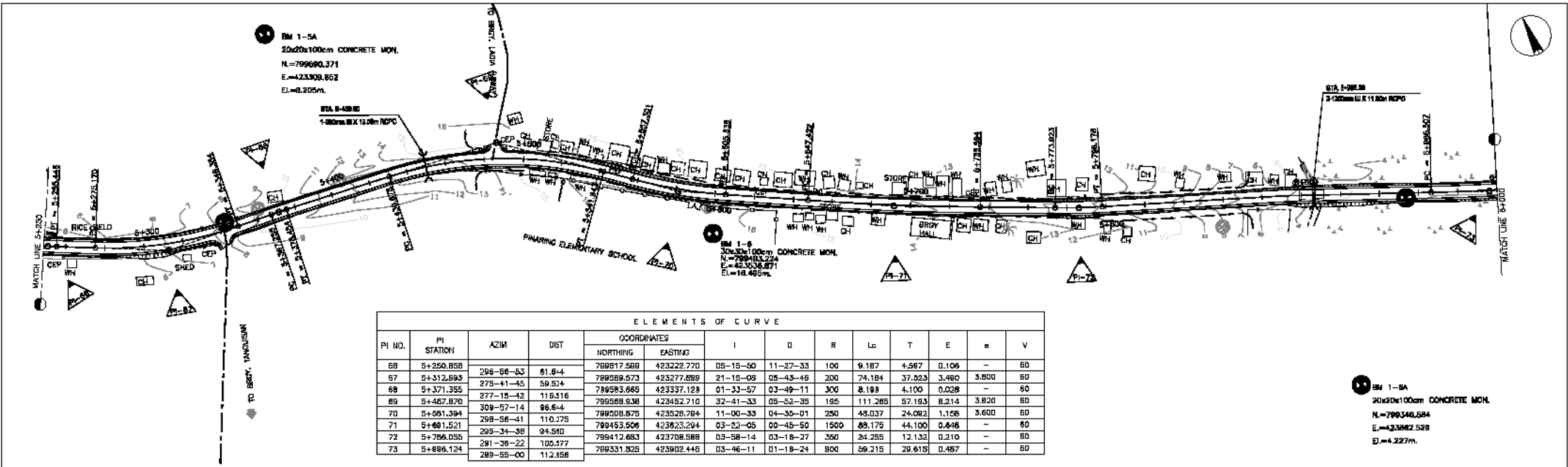
APPROVED:

PROJECT & LOCATION: THE STUDY ON INFRASTRUCTURE (ROAD NETWORK) DEVELOPMENT PLAN FOR THE AUTONOMOUS REGION IN MUSLIM MINDANAO (ARMM) IN THE REPUBLIC OF THE PHILIPPINES PROVINCE OF MAQUINDANAO

SHEET CONTENTS: PPIAIRING-SIMSIMAI PLAN AND PROFILE STA. 4+600 TO STA. 5+200

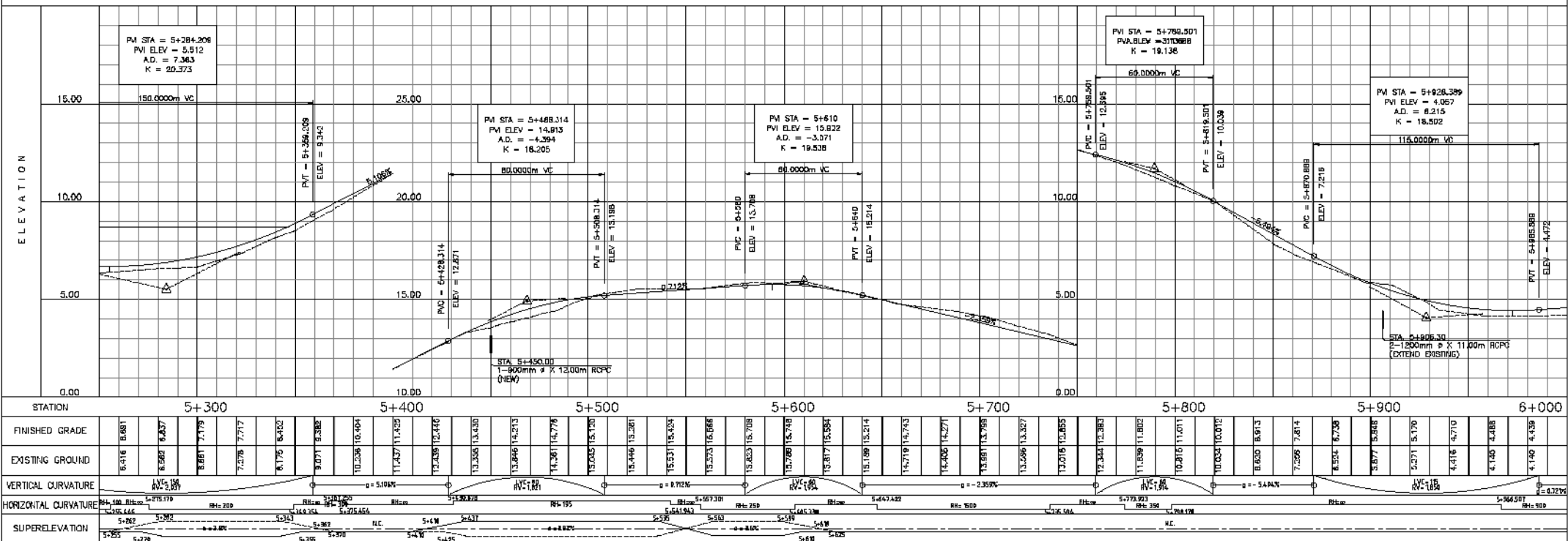
SET NO. PS-09

SHEET NO. PS-09



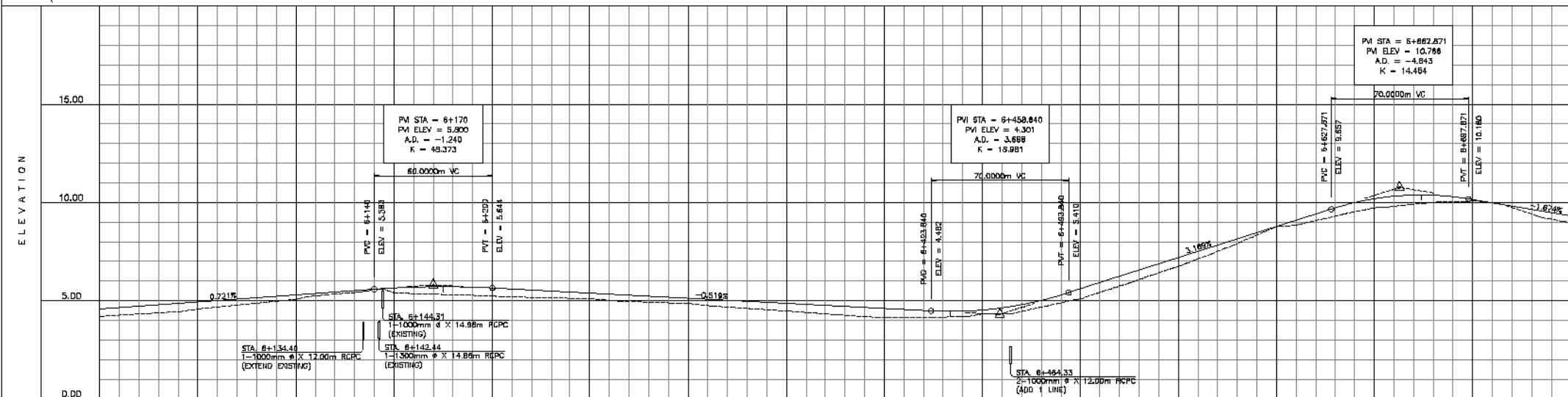
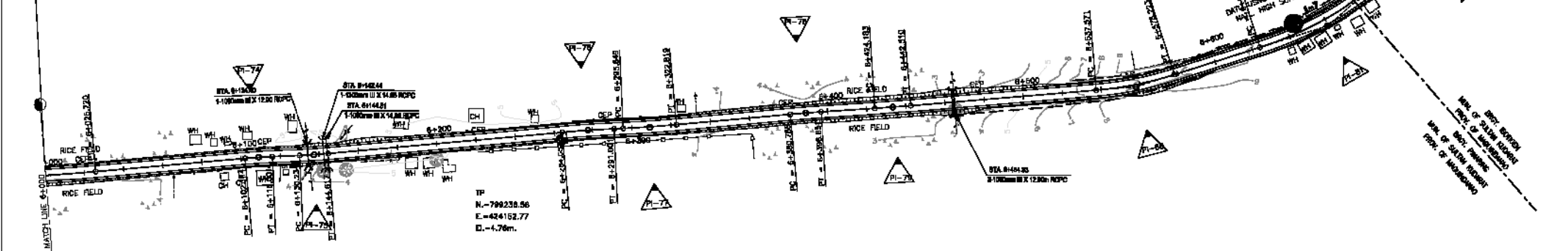
ELEMENTS OF CURVE

PI NO.	PI STATION	AZIM	DIST	COORDINATES		I	O	R	Lg	T	E	a	V
				NORTHING	EASTING								
66	5+250.858			789817.588	423222.720	05-15-50	11-27-33	100	9.187	4.587	0.108	-	60
67	5+312.693	298-56-53	61.844	789898.673	423277.898	21-15-08	05-43-48	200	74.184	37.923	3.480	3.800	60
68	5+371.355	275-41-45	59.524	789983.665	423337.128	01-33-57	03-49-11	300	8.199	4.100	0.028	-	60
69	5+427.870	277-15-42	115.516	789958.938	423452.710	32-41-33	05-52-35	195	111.265	57.193	8.214	3.820	60
70	5+491.394	309-57-14	96.644	789908.875	423528.784	11-00-33	04-35-01	250	48.037	24.082	1.128	3.600	60
71	5+460.1521	298-56-41	110.275	789453.508	423623.294	03-22-05	00-45-50	1500	88.175	44.100	0.448	-	60
72	5+786.055	289-34-58	84.560	789842.683	423708.588	03-58-14	03-18-27	350	24.255	12.132	0.210	-	60
73	5+888.124	289-55-00	112.958	789831.925	423902.445	03-46-11	01-18-24	800	59.215	29.618	0.487	-	60



<p>JICA JAPAN INTERNATIONAL COOPERATION AGENCY CTI CTI Engineering International Co., Ltd. Yeo Yachiyo Engineering Co., Ltd.</p>	<p>RECOMMENDED APPROVAL:</p> <p>PROJECT DIRECTOR: _____ DATE: _____</p> <p>REGIONAL DIRECTOR: _____ DATE: _____</p> <p>DIRECTOR BOB: _____ DATE: _____</p> <p>UNDERSECRETARY: _____ DATE: _____</p>	<p>APPROVED:</p> <p>SECRETARY: _____ DATE: _____</p>	<p>PROJECT & LOCATION :</p> <p>THE STUDY ON INFRASTRUCTURE (ROAD NETWORK) DEVELOPMENT PLAN FOR THE AUTONOMOUS REGION IN MUSLIM MINDANAO (ARMM) IN THE REPUBLIC OF THE PHILIPPINES PROVINCE OF MAQUINDANAO</p>	<p>SHEET CONTENTS :</p> <p>PIHARING-SMSIMAN PLAN AND PROFILE STA. 5+250 TO STA. 6+000</p>	<p>SET NO.</p> <p>1</p>	<p>SHEET NO.</p> <p>PS-10</p>
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PI NO.	PI STATION	AZIM	DIST	ELEMENTS OF CURVE									
				COORDINATES		I	D	R	Lc	T	E	e	V
				NORTHING	EASTING								
74	6+109.058	292-34-06	29.371	799293.346	424008.646	02-39-08	03-49-11	300	13.987	6.946	0.090	-	80
75	6+137.427	289-49-18	140.395	799288.458	424034.843	02-44-48	03-48-11	300	14.383	7.183	0.088	-	80
76	6+277.729	292-20-52	31.461	799234.863	424186.882	02-31-31	01-54-35	600	26.448	13.224	0.146	-	80
77	6+309.238	288-45-11	79.489	799222.901	424195.980	02-35-41	01-54-35	600	27.172	13.586	0.154	-	80
78	6+389.720	291-16-04	44.628	799198.036	424270.792	01-30-53	01-54-35	600	15.882	7.932	0.062	-	80
78	6+433.347	290-13-04	124.637	799178.848	424312.380	01-03-00	01-08-45	1000	18.328	9.165	0.042	-	80
80	6+557.983	277-16-40	102.189	799136.776	424426.328	12-06-24	06-21-08	180	40.682	20.413	1.194	3.880	80
81	6+659.879	294-28-32	66.082	799123.833	424530.684	22-38-08	08-21-58	180	71.112	36.026	3.570	3.880	80
82	6+725.121	250-35-28	80.680	799141.334	424594.408	04-03-08	03-49-11	300	21.214	10.612	0.188	-	80



STATION	6+000	6+100	6+200	6+300	6+400	6+500	6+600	6+700
FINISHED GRADE	4.574	4.719	4.857	4.997	5.139	5.282	5.427	5.574
EXISTING GROUND	4.208	4.301	4.392	4.481	4.568	4.653	4.737	4.819
VERTICAL CURVATURE	q = 0.121%		q = 0.181%		q = 0.169%		q = 0.147%	
HORIZONTAL CURVATURE	R1=100	R1=100	R1=100	R1=100	R1=100	R1=100	R1=100	R1=100
SUPERELEVATION	N.C.							

0.00
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS-ARMM
REPUBLIC OF THE PHILIPPINES

RECOMMENDED APPROVAL:

PROJECT DIRECTOR	REGIONAL DIRECTOR	DIRECTOR BOB	UNDERSECRETARY
DATE:	DATE:	DATE:	DATE:

APPROVED:

PROJECT & LOCATION :	SHEET CONTENTS :	SHEET NO.	SHEET NO.
THE STUDY ON INFRASTRUCTURE (ROAD NETWORK) DEVELOPMENT PLAN FOR THE AUTONOMOUS REGION IN MUSLIM MINDANAO (ARMM) IN THE REPUBLIC OF THE PHILIPPINES PROVINCE OF MAQUINDANAO	PIHARRING-SIMSHAW PLAN AND PROFILE STA. 6+000 TO STA. 6+750	11	PS-11