



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

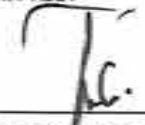
REGIONAL OFFICE No. XI
GOV. CHAVEZ COR. R. MAGSAYSAY ST. DAVAO CITY

C.Y. 2025 PROJECT
DETAILED ENGINEERING DESIGN PLAN FOR

**CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE -
JCT. CABANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG -
CALLAWA ROAD (MANDUG SECTION), DAVAO CITY**

SECTION	:	BRGY. MANDUG, BRGY. TIGATTO, & BRGY. NEW VALENCIA
LOCATION	:	DAVAO CITY
STATION LIMITS	:	SECTION 1: STA. 1514+950.000 - STA. 1515+250.000 SECTION 2: STA. 0+210.500 - STA. 0+250.500
SLOPE PROTECTION	:	340.00 LN M / 1,330.00 SQ M
ROAD SECTION ID	:	(LOCAL ROAD)

SUBMITTED:


JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION

DATE:

RECOMMENDED:


JOSELITO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR

DATE:

APPROVED:

JUBY B. CORDON
REGIONAL DIRECTOR

DATE:

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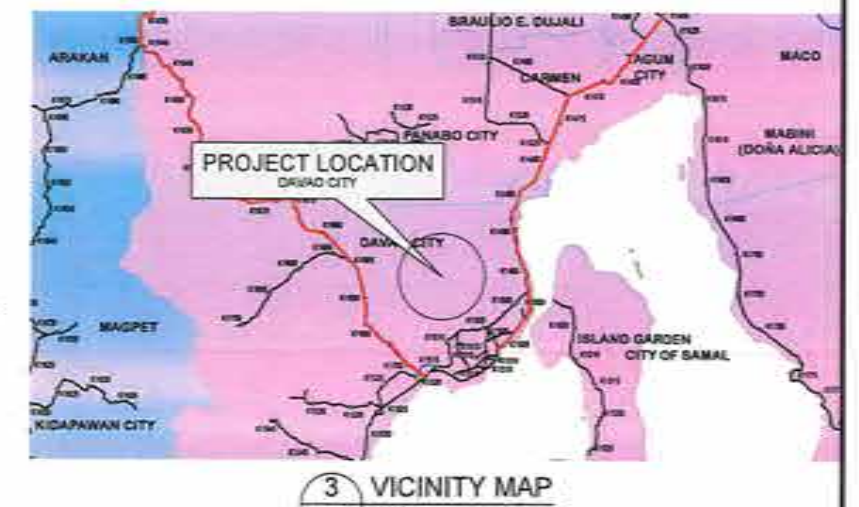
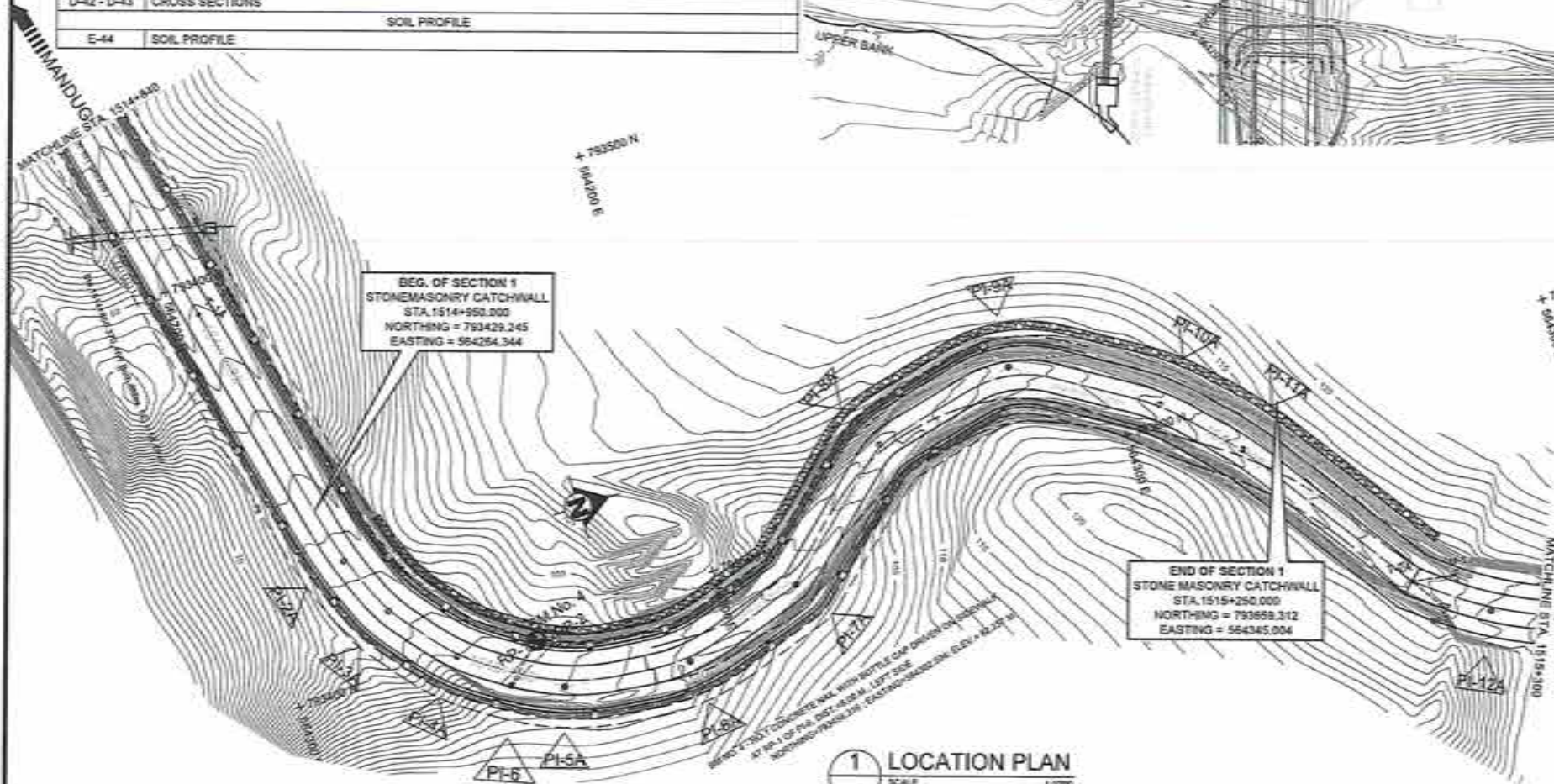
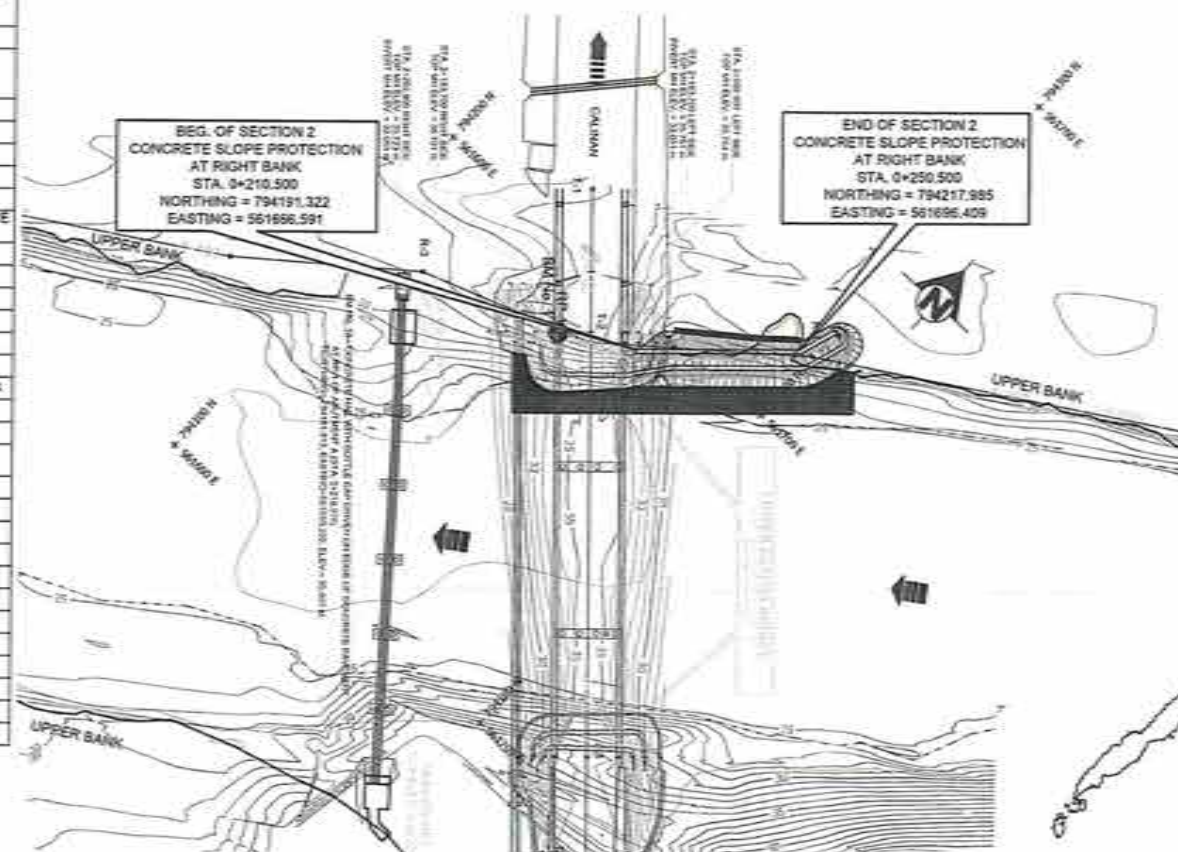
PROJECT LIMITS

SECTION 1: STONEMASONRY CATCHWALL

BEGINNING OF PROJECT: STA. 1514+550.000
END OF PROJECT: STA. 1515+250.000
NET LENGTH = 300.000 L.N.M.

SECTION 2: CONCRETE SLOPE PROTECTION

BEGINNING OF PROJECT: STA. 0+210.500
END OF PROJECT: STA. 0+250.500
NET LENGTH = 40.000 L.N.M.



	PROJECT NAME AND LOCATION CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) - JCT. NINDUG - CALABAN ROAD (NINDUG SECTION), DAVAO CITY	SHEET CONTENTS INDEX OF SHEETS, VICINITY MAP, KEY MAP, AND PROJECT LIMITS	DRAFTED AND PREPARED LESTER C. PADILLA ENGINEER II	REVIEWED ALGIN A. GINGALAN ENGINEER II, SEC. 1	CHECKED JUDY ANN T. BERNARDO CHIEF PLANNING AND DESIGN DIVISION	RECOMMENDED JOSELO B. CABALLERO ASSISTANT REGIONAL DIRECTOR	APPROVED JUDY B. GORDON REGIONAL DIRECTOR	SET NO. A	SHEET NO. 01

SUMMARY & QUANTITIES

ITEM No.	DESCRIPTION OF WORK	UNIT	SECTION 1	SECTION 2	TOTAL QUANTITY	REMARKS
PART A. FACILITIES FOR THE ENGINEER						
A.1.1(3)	CONSTRUCTION OF FIELD OFFICE FOR THE ENGINEER	LS	-	-	1.00	BAHAY KUBO
A.1.1(16)	OPERATION AND MAINTENANCE OF FIELD OFFICE FOR THE ENGINEER	MONTH	-	-	7.00	
PART B. OTHER GENERAL REQUIREMENTS						
B.4(1)	CONSTRUCTION SURVEY AND STAKING	KM	-	-	0.34	
B.5	PROJECT BILLBOARD / SIGNBOARD (2 DPWH)	EACH	-	-	2.00	
B.5	PROJECT BILLBOARD / SIGNBOARD (2 DENR-EMB)	EACH	-	-	2.00	
B.5	PROJECT BILLBOARD / SIGNBOARD (2 COA)	EACH	-	-	2.00	
B.7(2)	OCCUPATIONAL SAFETY AND HEALTH PROGRAM	LS	-	-	1.00	
B.8(1)	TRAFFIC MANAGEMENT	MONTH	-	-	7.00	
B.9	MOBILIZATION / DEMOBILIZATION	LS	-	-	1.00	
PART C. EARTHWORKS						
100(1)	CLEARING AND GRUBBING	HA	0.74	0.18	0.92	
101(1)	REMOVAL OF STRUCTURES AND OBSTRUCTION	LS	-	-	1.00	REMOVAL OF EXISTING RUBBLE CONCRETE = 37.44 CU.M
102(1)	UNSUITABLE EXCAVATION	CU.M	-	1,175.12	1,175.12	FOR CONCRETE BLOCKS
102(2)	SURPLUS COMMON EXCAVATION	CU.M	7,600.40	-	7,600.40	
103(1)a	STRUCTURE EXCAVATION, COMMON SOIL	CU.M	1,518.00	503.65	2,021.65	FOR SLOPE PROTECTION, PILE CAP, FLARED TYPE HEADWALL, AND LINED CANAL
103(3)	FOUNDATION FILL	CU.M	-	3.94	3.94	FOR FLARED TYPE HEADWALL AND LINED CANAL
103(5)a	PIPE CULVERTS AND DRAIN EXCAVATION, COMMON SOIL	CU.M	-	16.40	16.40	FOR RCPC
104(2)a	EMBANKMENT FROM BORROW, COMMON SOIL	CU.M	-	1,085.94	1,085.94	
105(1)a	SUBGRADE PREPARATION, COMMON MATERIAL	SQ.M	-	850.00	850.00	
PART D. SUBBASE AND BASE COURSE						
200(1)	AGGREGATE SUBBASE COURSE	CU.M	-	254.17	254.17	FOR BED COURSE
PART E. DRAINAGE AND SLOPE PROTECTION CONSTRUCTION						
404(1)a	REINFORCING STEEL, GRADE 40	KG	2,528.00	5,960.05	8,488.05	FOR CATCHWALL, SLOPE PROTECTION, PILE CAP, AND FLARED TYPE HEADWALL
404(1)b	REINFORCING STEEL, GRADE 60	KG	37,498.00	-	37,498.00	FOR CATCHWALL
405(1)a2	STRUCTURAL CONCRETE, 20.68 MPa, CLASS A, 14 DAYS	CU.M	-	676.46	676.46	FOR CONCRETE BLOCKS, NO OF PCS = 620
405(1)a3	STRUCTURAL CONCRETE, 20.68 MPa, CLASS A, 28 DAYS	CU.M	-	206.05	206.05	FOR SLOPE PROTECTION, PILE CAP, AND FLARED TYPE HEADWALL
405(1)b2	STRUCTURAL CONCRETE, 27.58 MPa, CLASS P, 14 DAYS	CU.M	300.00	-	300.00	FOR CATCHWALL
407(8)	LEAN CONCRETE, CLASS B (16.50 MPa)	CU.M	49.50	-	49.50	FOR CATCHWALL
PART F. DRAINAGE AND SLOPE PROTECTION STRUCTURES						
500(3)b1	LINED CANAL, RECTANGULAR, CONCRETE, 0.60m x 0.50m	LN.M	-	30.50	30.50	
500(1)b3	PIPE CULVERTS, 910MM DIA., CLASS IV, RCPC	LN.M	-	11.00	11.00	WITH PROVISION OF SAND BEDDING
505(2)a	GROUTED RIPRAP, CLASS "A"	CU.M	-	71.82	71.82	
506(1)	STONE MASONRY	CU.M	1,465.17	-	1,465.17	FOR CATCHWALL
1719(5)a5	RECTANGULAR ALUMINUM FLAP GATE, 1200mm x 1200mm	EACH	-	1.00	1.00	
1717(4)b	FURNISHED AND DRIVEN OF STEEL SHEET PILE, Z-TYPE, GRADE 50 (HOT-ROLLED)	M	-	792.00	792.00	SECTION MODULUS = 1311 cm ³ /m; WIDTH = 820mm
715(1)	GEOTEXTILE	SQ.M	1,050.00	-	1,050.00	BASAL REINFORCEMENT; FM 2000
715(3)	DRAINAGE GEOTEXTILE	SQ.M	-	828.00	828.00	FILTER MATERIAL FOR CONCRETE BLOCKS
PART G. MISCELLANEOUS STRUCTURES						
622(2)c	COCO-LOG / FASCINE	LN.M	1,800.00	-	1,800.00	
622(3)b	VEGETATION, VETIVER GRASS SYSTEM	SQ.M	7,965.00	-	7,965.00	

NOTE: QUANTITIES ARE SUBJECT TO INCREASE/DECREASE DEPENDING ON THE ACTUAL FIELD CONDITIONS.

DISPOSAL @ 00KM

QUARRY SITE: DAVAO RIVER - TIGATTO

A. ROADWORK AHEAD (T1-1)	EACH	2.00
B. END ROADWORK (T2-16)	EACH	2.00
C. WORKMEN AHEAD (SYMBOLIC) (T1-5)	EACH	2.00
D. PREPARE TO STOP (T1-18)	EACH	2.00
E. TEMPORARY HAZARD MARKER (T5-5)	EACH	4.00
F. TEMPORARY BOLLARDS (AT 5m APART)	EACH	138.00
G. BARRICADE FLASHER LIGHT (EVERY AFTER 3 BOLLARDS)	EACH	18.00



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REGIONAL OFFICE NO. XI
GOV. CHRISTOPHER R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION

CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) -
JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS

SUMMARY OF QUANTITIES

PREPARED

ESTER G. PADILLA
ENGINEER II
DATE
JESSICA APOSTOL
ENGINEER I

REVIEWED

ALGIN A. GINGO
ENGINEER II
DATE

QUANTIFIED

JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL

JOSEPH B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED

JURY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO.

A
02/18

SHEET NO.

02
44

GENERAL NOTES

1. STONE MASONRY

- (a) STONE MASONRY CAN BE USED IN HEADWALLS FOR CULVERTS, IN RETAINING WALLS AT THE TOES OF SLOPES, AND AT OTHER PLACES CALLED FOR ON THE PLANS, CONSTRUCTED ON THE FOUNDATION BED, IN ACCORDANCE WITH THIS SPECIFICATION AND IN CONFORMITY WITH THE LINES, GRADES, SECTIONS, AND DIMENSIONS SHOWN ON THE PLANS.

2. CONSTRUCTION REQUIREMENTS

- (a) ALL STONES SHALL BE CLEANED THOROUGHLY AND WETTED IMMEDIATELY BEFORE BEING SET, AND THE BED WHICH IS TO RECEIVE THEM SHALL BE CLEANED AND MOISTENED BEFORE THE MORTAR IS SPREAD. THEY SHALL BE LAID WITH THEIR LONGEST FACES HORIZONTAL IN FULL BEDS OF MORTAR, AND THE JOINTS SHALL BE FLUSHED WITH MORTAR.
- (b) THE EXPOSED FACES OF INDIVIDUAL STONES SHALL BE PARALLEL TO THE FACES OF THE WALLS IN WHICH THE STONES ARE SET.
- (c) THE STONES SHALL BE HANDLED AS NOT TO JAR OR DISPLACE THE STONES ALREADY SET. SUITABLE EQUIPMENT SHALL BE PROVIDED FOR SETTING STONES LARGER THAN THOSE THAT CAN BE HANDLED BY TWO MEN. THE ROLLING OR TURNING OF STONES ON THE WALLS WILL NOT BE PERMITTED. IF A STONE IS LOOSENED AFTER THE MORTAR HAS TAKEN INITIAL SET, IT SHALL BE REMOVED, THE MORTAR CLEANED OFF, AND THE STONE RELAID WITH FRESH MORTAR.

3. METHOD OF MEASUREMENT

- (a) STONE MASONRY SHALL BE MEASURED BY THE NUMBER OF CUBIC METERS OF COMPLETE IN PLACE AND ACCEPTED, PROJECTIONS EXTENDING BEYOND THE FACES OF THE WALLS SHALL NOT BE INCLUDED. IN COMPUTING THE QUANTITY, THE DIMENSIONS USED SHALL BE THOSE SHOWN ON THE PLANS OR AS ORDERED IN WRITING BY THE ENGINEER. NO DEDUCTIONS SHALL BE MADE FOR WEEPHOLES, DRAIN PIPES OR OTHER OPENINGS OF LESS THAN ONE SQUARE METER IN AREA.

4. CONCRETE

(a) CONCRETE STRENGTH BY CLASS.

STRUCTURAL MEMBER	CLASS	14-DAY CYLINDER STRENGTH		MAX SIZE OF COARSE AGGREGATE, mm (in.)
		MPa	PSI	
FOUNDATION	A	27.58	4000	20

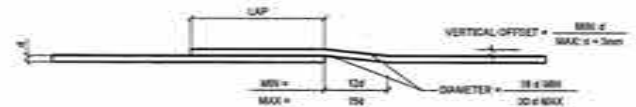
- (b) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL THE PLACING SEQUENCES FOR ALL TYPES OF CONCRETING WORK.
- (c) DESIGN FOR CONCRETE STRENGTH SHALL BE AS SET FORTH UNDER ITEM NO. 1 OF MATERIALS.
- (d) CONCRETE SHALL BE DEPOSITED, VIBRATED AND CURED IN ACCORDANCE WITH THE GENERAL SPECIFICATIONS.

5. REINFORCING STEEL

- (a) REINFORCING STEEL SHALL CONFORM TO AASHTO M31 (ASTM A615), GRADE 45, DEFORMED WITH MINIMUM YIELD STRENGTH, $f_y=276$ MPa (40,000 PSI) FOR BARS 19mm Ø OR SMALLER AND GRADE 60 WITH MINIMUM YIELD STRENGTH, $f_y=414$ MPa (60,000 PSI) FOR LARGER THAN 19mm Ø.
- (b) REINFORCING STEEL SHALL BE FREE OF MILL SCALE, OIL OR ANY SUBSTANCES WHICH WILL WEAKEN THE BOND WITH CONCRETE.

6. BAR BENDING, SPlicing AND PLACING

- (1) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL OF 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 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 NOT 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



6. GEOTEXTILE (BASAL REINFORCEMENT)

WOVEN OR NONWOVEN GEOTEXTILES SHALL CONSIST ONLY OF LONG CHAIN POLYMERIC FILAMENTS OR YARNS FORMED INTO A STABLE NETWORK SUCH THAT THE FILAMENTS OR YARNS RETAIN THEIR POSITION RELATIVE TO EACH OTHER DURING HANDLING, PLACEMENT, AND DESIGN SERVICE LIFE. AT LEAST 95 PERCENT BY WEIGHT OF THE LONG CHAIN POLYMER SHALL BE A POLYOLEFIN OR POLYESTER. THE MATERIAL SHALL BE FREE OF DEFECTS AND TEARS. THE GEOTEXTILE SHALL CONFORM AS A MINIMUM TO THE PROPERTIES INDICATED FOR CLASS 1 UNDER AASHTO M-288, GEOTEXTILE SPECIFICATION FOR HIGHWAY APPLICATIONS.

THE CONTRACTOR SHALL SUBMIT TO THIS OFFICE A MANUFACTURER'S CERTIFICATION THAT THE GEOSYNTHETICS SUPPLIED MEET THE RESPECTIVE INDEX CRITERIA SET WHEN THE GEOSYNTHETIC WAS APPROVED BY THIS OFFICE, MEASURED IN FULL ACCORDANCE WITH ALL TEST METHODS AND STANDARDS SPECIFIED AND AS SET FORTH IN THE SPECIFICATIONS. IN CASE OF DISPUTE OVER VALIDITY OF VALUES, THIS OFFICE CAN REQUIRE THE CONTRACTOR TO SUPPLY TEST DATA FROM AN AGENCY APPROVED LABORATORY TO SUPPORT THE CERTIFIED VALUES SUBMITTED AT THE CONTRACTOR'S COST.

GEOTEXTILES USUALLY REQUIRE PRETENSIONING TO REMOVE ANY SLACK IN THE REINFORCEMENT OR IN THE PANEL. THE TENSION IS THEN MAINTAINED BY STAKING OR BY PLACING FILL DURING TENSIONING. TENSIONING AND STAKING WILL REDUCE SUBSEQUENT HORIZONTAL MOVEMENTS OF THE PANEL AS THE WALL FILL IS PLACED.

PROPERTIES OF FM GEOTEXTILES		TEST STANDARD	UNIT	FM 2000
<u>INITIAL MECHANICAL PROPERTIES</u>				
WIDE WIDTH TENSILE STRENGTH	MD	ISO 10319	N/m	125
WIDE WIDTH TENSILE STRENGTH	CD	ISO 10319	N/m	125
STRAIN AT NOMINAL TENSILE STRENGTH	MD	ISO 10319	%	15
STRAIN AT NOMINAL TENSILE STRENGTH	CD	ISO 10319	%	15
CBR PUNCTURE STRENGTH		ISO 12236	kN	14
DROP CONE PERFORATION DIAMETER		ISO 13433	mm	12
ABRASION RESISTANCE		ASTM D4986	% retained	70
UV RESISTANCE (AT 500 HOURS)		ASTM D4255	% retained	90
<u>HYDRAULIC</u>				
PORE SIZE Q ₁		ISO 12958	mm	0.15
WATER PERMEABILITY Q ₂		ISO 11058	cm/s	15
<u>NONWOVEN LOOP PROPERTIES</u>				
LOOP SPACING	MD		m	0.25
LOOP SPACING	CD		m	1.0
LOOP TENSILE STRENGTH	MD		N	2.8
<u>FORM OF SUPPLY</u>				
WIDTH			m	3.2
LENGTH			m	100

THE GEOTEXTILES SHALL BE UNROLLED AS SMOOTHLY AS POSSIBLE ON THE PREPARED SUBGRADE IN THE DIRECTION OF CONSTRUCTION TRAFFIC. ADJACENT GEOTEXTILE ROLLS SHALL BE OVERLAPPED IN THE DIRECTION OF SUBBASE PLACEMENT USING THE GUIDELINES TABLE 3. SEWING IS RECOMMENDED WHERE SUBGRADE SOILS HAVE A C.B.R. VALUES LESS THAN 1. THE GEOTEXTILE MAY BE HELD IN PLACE PRIOR TO SUBBASE PLACEMENT BY PINS, STAPLES, OR PILES OF FILL OR ROCK ON CURVES. THE GEOTEXTILE MAY BE FOLDED OR CUT TO CONFORM TO THE CURVE. THE FOLD OR OVERLAP SHALL BE IN THE DIRECTION OF CONSTRUCTION AND HELD IN PLACE AS PRESCRIBED ABOVE.

TABLE 3 RECOMMENDED OVERLAPS

SOIL STRENGTH (CBR)	UNSEWN OVERLAP (mm)	OVERLAP (mm)
LESS THAN 1	-	228
1 - 2	965	203
2 - 3	762	76
3 AND ABOVE	610	-

SURVEY SPECIFICATION

SECTION	SURVEY INSTRUMENT USED		DATE SURVEYED	PROJECT CONTROL POINTS	REMARKS
SECTION 1	TOTAL STATION	SN 2807396	GEONIKA (ZOOM 50)	REFER TO PLAN AND PROFILE	ALL PROJECT CONTROL POINTS ARE PROJECTED IN PRS 10 GRID COORDINATE SYSTEM (ZONE 5)
	RTK (BASE)	1549127	07m		
SECTION 2	RTK (ROVER)	1049128	07m	MARCH 18, 2024	
	ROVER - CHC (77)	SN1049128, BASE CHC (77)			

BENCHMARK AND DESCRIPTION

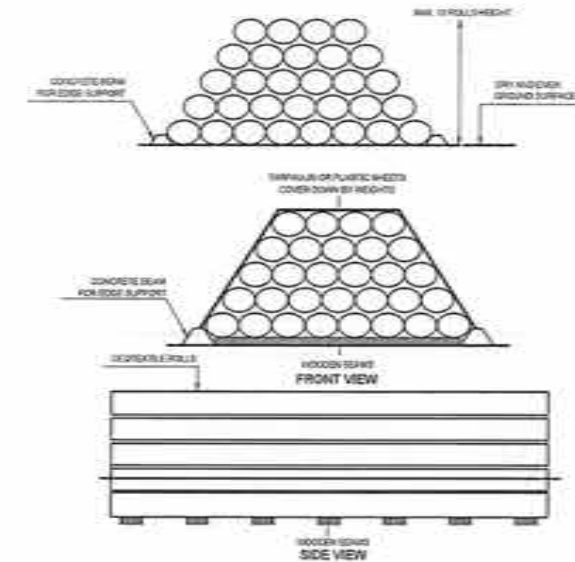
SECTION	BENCHMARK	NORTHING	EASTING	ELEVATION (METERS)	DESCRIPTION
SECTION 1	BM NO. 4	716435.316	564332.594	KL 237	NO.1 CONCRETE NAIL WITH BOTTLE CAP DRIVEN ON SIDEWALK AT RP-1 OF P-46, DIST. 48.00 M., LEFT SIDE
SECTION 2	BM NO. 1	714181.913	514550.292	31.907	CONCRETE NAIL WITH BOTTLE CAP DRIVEN ON EDGE OF CONCRETE PAVEMENT AT RP-1 OF ABUTMENT A (STA. 2+216.976)

METHODS OF STORAGE

THE GEOTEXTILES DELIVERED TO SITE SHALL BE STORED IN COVERED AREA ON A FIRM AND LEVEL FOUNDATION. THE GEOTEXTILE SHALL BE PREFERABLY PLACED ON WOODEN BEAM SUPPORT (ELEVATED SAY 100mm ABOVE GROUND LEVEL) TO AVOID DIRECT CONTACT WITH THE GROUND LEVEL. THIS IS TO PREVENT THE GEOTEXTILE FROM GETTING SOAL OR WET DURING RAIN FLOODING.

THE GEOTEXTILE SHALL BE STACKED IN TRIANGULAR MANNER NOT MORE THAN 10 ROLLS IN HEIGHT AND SUFFICIENT LATERAL RESTRAINT MUST BE PROVIDED TO PREVENT COLLAPSE OF THE STACKED ROLLS. LATERAL RESTRAINT CAN BE PROVIDED THROUGH HEAVY CONCRETE BLOCKS PLACED ON BOTH ENDS OF THE STACK.

WHERE PROPER COVERED STORAGE AREA IS NOT AVAILABLE THE ENTIRE STACKED ROLLS OF GEOTEXTILES SHALL BE COVERED WITH TARPULIN OR PLASTIC SHEET AND FIRMLY WEIGHTED DOWN.



FILL PLACEMENT

FILL SHALL BE COMPACTED AS SPECIFIED BY PROJECT SPECIFICATIONS OR TO 100 PERCENT OF THE MAXIMUM DRY DENSITY.

DENSITY TESTING SHALL BE MADE EVERY 500 CU M. SOIL PLACEMENT OR AS OTHERWISE SPECIFIED BY THE ENGINEER FROM THIS OFFICE OR CONTRACT DOCUMENTS.

BACKFILL SHALL BE PLACED, SPREAD, AND COMPACTED IN SUCH A MANNER TO MINIMIZE THE DEVELOPMENT OF WRINKLES AND/OR DISPLACEMENT OF THE GEOSYNTHETIC REINFORCEMENT.

FILL SHALL BE PLACED IN 200 MM MAXIMUM LIFT THICKNESS WHERE HEAVY COMPACTION EQUIPMENT IS TO BE USED, AND 150 MM MAXIMUM UNCOMPACTIONED LIFT THICKNESS WHERE HAND OPERATED EQUIPMENT IS USED.

BACKFILL SHALL BE GRADED AWAY FROM THE SLOPE CREST AND ROLLED AT THE END OF EACH WORK DAY TO PREVENT PONDING OF WATER ON SURFACE OF THE REINFORCED SOIL MASS.

TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY UPON THE GEOSYNTHETIC REINFORCEMENT. A MINIMUM FILL THICKNESS OF 150 MM IS REQUIRED PRIOR TO OPERATION OF TRACKED VEHICLES OVER THE GEOSYNTHETIC REINFORCEMENT. TURNING OF TRACKED VEHICLES SHOULD BE KEPT TO A MINIMUM TO PREVENT TRACKS FROM DISPLACING THE FILL AND THE GEOSYNTHETIC REINFORCEMENT.

IF APPROVED BY THE ENGINEER, RUBBER-TIRED EQUIPMENT MAY PASS OVER THE GEOSYNTHETIC REINFORCEMENT AT SPEEDS OF LESS THAN 16 KM/H. SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.



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GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION)
- JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS
GENERAL NOTES

DRAFTED AND PREPARED
LESTER G. PADILLA
ENGINEER II
DATE

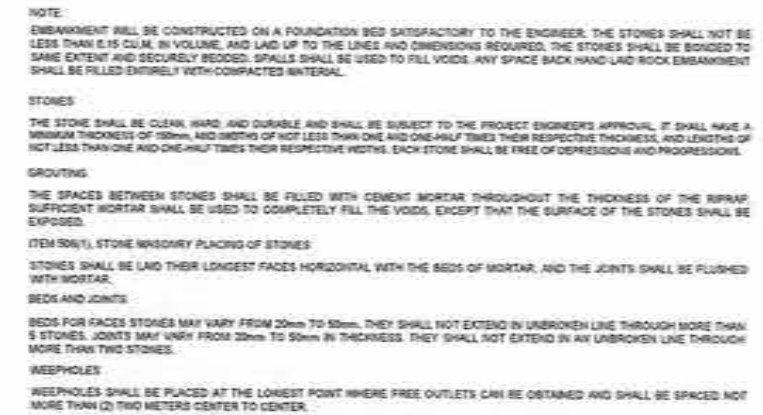
REVIEWED
ALGIN A. GONZALEZ
ENGINEER III, SECTION CHIEF
DATE

SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF, TRAINING AND DESIGN DIVISION
DATE

RECOMMENDED
JOSE LITO B. CABALLERO
ASST. DIR. REGIONAL DIRECTOR
DATE

APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO.
A
03/18
SHEET NO.
03
44



Section		E												
Rebar Length		1.2 m												
Net Length		300 mm												
BAR BENDING DIAGRAM	MARK	SIZE (mmφ)	QTY	SHAPE	SPACING	DEVELOPMENT (mm)		CUT LENGTH			UNIT WEIGHT (kg/m)	TOTAL WT. (ALLOTTED)		
						a	b	LENGTH PER BAR (m)	LAP LENGTH	TOTAL LENGTH PER BAR (m)			TOTAL LENGTH (m)	
	1	20	20	B	AS SHOWN	200, 100	2,50	300, 400	32, 40	332, 800	4,556.95	2.456	98414	
	2	20	3000	B		300	2,50	2,650	0.70	2,650	8,553.00	2.456	21094	
	3	16	667	A		450	300	2,400	-2,50	2,400	1,600.80	1.579	3538	
TOTAL											46,026.556			
GRADE 40											3,538.000			
GRADE 60											37,488.556			

1 TYPICAL ROADWAY CROSS SECTION FOR SECTION 1
SCALE 1:150

2 STONE MASONRY CATCHWALL DETAIL
SCALE 1:30

MINIMUM REQUIRED FREEBOARD	
DESIGN FLOOD DISCHARGE (m ³ /s)	FREEBOARD (m)
LESS THAN 200	0.60
200 AND UP TO 500	0.60
500 AND UP TO 2,000	1.00
2,000 AND UP TO 5,000	1.20
5,000 AND UP TO 10,000	1.50

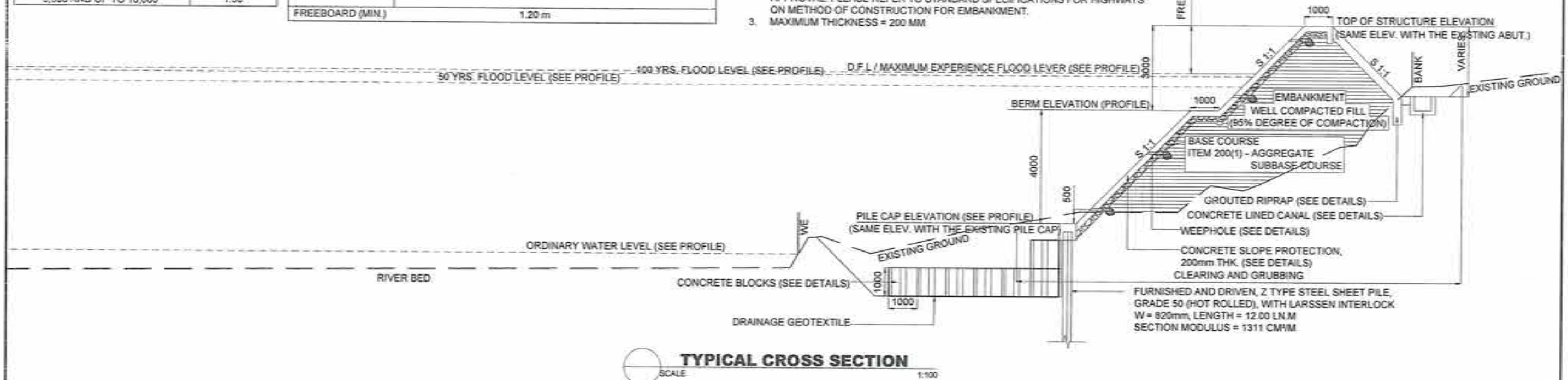
HYDRAULIC PARAMETERS			
	RETURN PERIOD		MAXIMUM EXPERIENCE FLOOD LEVEL
	50 YEARS	100 YEARS	
DRAINAGE AREA	1,681.908 km ²		
DISCHARGE	2,439.184 m ³ /sec	2,690.607 m ³ /sec	2,767.000 m ³ /sec
FLOOD LEVEL	28.60 m - 31.62 m	28.85 m - 32.02 m	28.91 m - 32.14 m
FREEBOARD (MIN.)	1.20 m		

NOTES:

1. EMBANKMENT OF EARTH MATERIALS SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 200MM, LOOSE MEASUREMENT, AND SHALL BE COMPACTED AS SPECIFIED BEFORE THE NEXT LAYER IS PLACED. AS COMPACTION OF EACH LAYER PROGRESSES, CONTINUOUS LEVELING AND MANIPULATING WILL BE REQUIRED TO ASSURE UNIFORM DENSITY.
2. EMBANKMENT PLACED ON EXISTING SLOPES THAT ARE STEEPER THAN 3:1 WHEN MEASURED AT RIGHT ANGLES TO THE ROADWAY SHALL BE CONTINUOUSLY BENCHED IN LAYERS SUBJECT TO THE ENGINEER'S APPROVAL. PLEASE REFER TO STANDARD SPECIFICATIONS FOR HIGHWAYS ON METHOD OF CONSTRUCTION FOR EMBANKMENT.
3. MAXIMUM THICKNESS = 200 MM

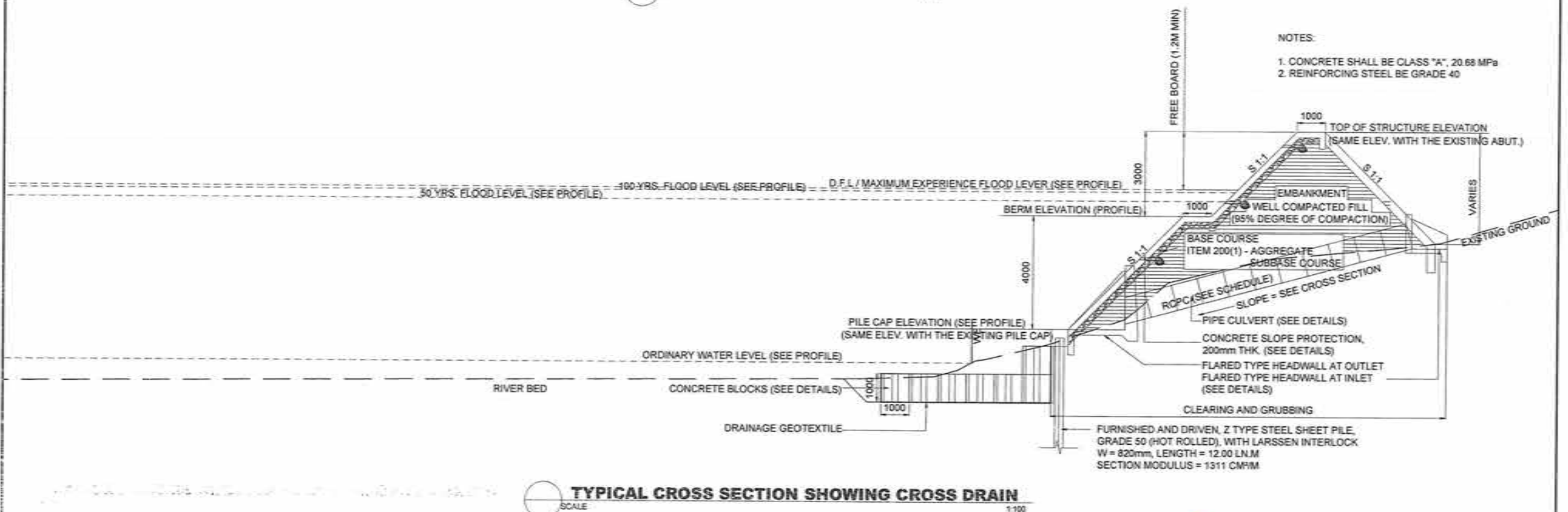
NOTES:

1. CONCRETE SHALL BE CLASS "A", 20.68 MPa
2. REINFORCING STEEL BE GRADE 40



TYPICAL CROSS SECTION

SCALE 1:100



TYPICAL CROSS SECTION SHOWING CROSS DRAIN

SCALE 1:100

 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI 80V CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	DRAFTED AND PREPARED	REVIEWED	SUBMITTED	RECOMMENDING APPROVAL	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION), DAVAO CITY	TYPICAL CROSS SECTION TYPICAL CROSS SECTION SHOWING CROSS DRAIN	JAMALICA A. MANOKING ENGINEER 3	JUAN JOHN R. SOTTO ENGINEER 3, SECTION CHIEF	JUDY ANN T. BERNARDINO CHIEF PLANNING AND DESIGN DIVISION	JOSEPH B. CABALLERO ASSISTANT REGIONAL DIRECTOR	JURY B. CORON REGIONAL DIRECTOR	A 06/18	06 44

1. CONCRETE SHALL BE CLASS "A" 20.68 MPa
2. REINFORCING STEEL BE GRADE 40



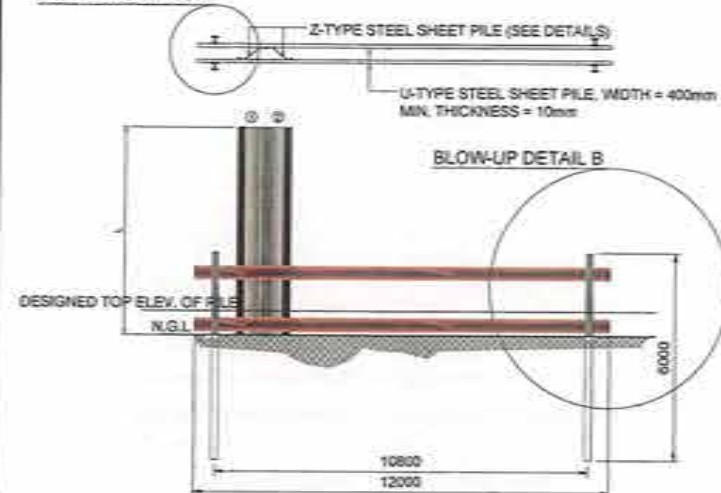
SHEET PILE DETAILS



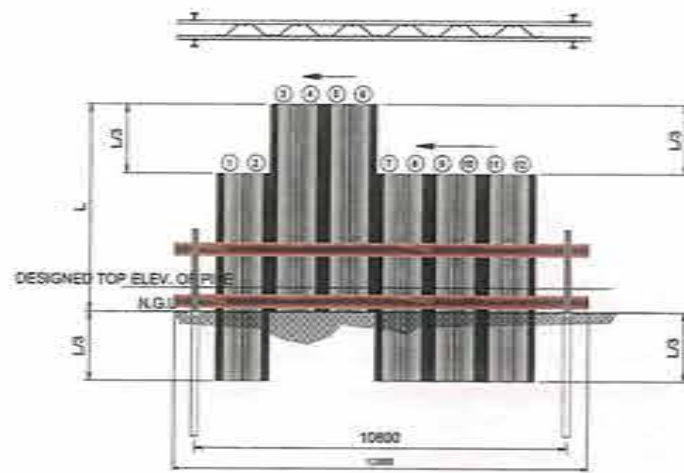
A. GROUTED RIPRAP:

1. THE BED FOR RIPRAP SHALL BE EXCAVATED TO THE REQUIRED DEPTH AND PROPERLY COMPACTED, TRIMMED AND SHAPED.
2. THE RIPRAP SHALL BE FOUNDED IN A TOE TRENCH DUG BELOW THE DEPTH OF SCOUR AS SHOWN ON PLANS OR AS ORDERED BY THE ENGINEER. THE TOE TRENCH SHALL BE FILLED WITH STONE OF THE SAME CLASS AS THAT SPECIFIED FOR THE RIPRAP, UNLESS OTHERWISE SPECIFIED.
3. THE STONES SHALL BE CLEAN AND DURABLE AND SUBJECT TO ENGINEERS APPROVAL. STONES SHALL BE PLACED BY HAND OR INDIVIDUALLY BY MACHINES. THEY SHALL BE LAID WITH CLOSE, BROKEN JOINTS AND SHALL BE FIRMLY BEDDED INTO THE SLOPE AND AGAINST THE ADJOINING STONES. THE RIPRAP SHALL BE THOROUGHLY RAMMED INTO PLACE AS CONSTRUCTION PROGRESSES AND THE FINISHED SURFACE SHALL PRESENT AN EVEN, TIGHT SURFACE. INTERSTICES BETWEEN STONES SHALL BE FILLED WITH SMALL BROKEN FRAGMENTS FIRMLY RAMMED INTO PLACE.
4. THE SPACES BETWEEN THE STONES SHALL THEN BE FILLED WITH CEMENT MORTAR AS SPECIFIED IN SUBSECTION 504.2.3, MORTAR (DPWH STANDARDS SPECS. REV. 2012). SUFFICIENT MORTAR SHALL BE USED TO COMPLETELY FILL ALL VOIDS, EXCEPT THAT THE FACE SURFACE OF THE STONES SHALL BE LEFT EXPOSED.
5. GROUT SHALL BE PLACED FROM BOTTOM TO TOP OF THE SURFACE AND SWEEPED WITH A STIFF BROOM. AFTER GROUTING IS COMPLETED, THE SURFACE SHALL BE CURED AS SPECIFIED IN ITEM 405, STRUCTURAL CONCRETE FOR A PERIOD OF AT LEAST THREE DAYS.
6. 250-300mmØ SHALL BE USED FOR THE FACING AND SHALL BE HANDLAID WITH THE LONGEST DIMENSIONS PERPENDICULAR TO THE SLOPE AND FIRMLY BEDDED INTO THE SLOPE AND AGAINST THE ADJOINING BOULDER SPACES BETWEEN THE BOULDERS SHALL BE COMPLETELY FILLED WITH 1:3 MORTAR, THE OUTSIDE SURFACE OF THE BOULDERS SHALL BE LEFT EXPOSED AND THE SURFACE OF THE MORTAR SHALL BE SWEEPED WITH A STIFF BROOM.

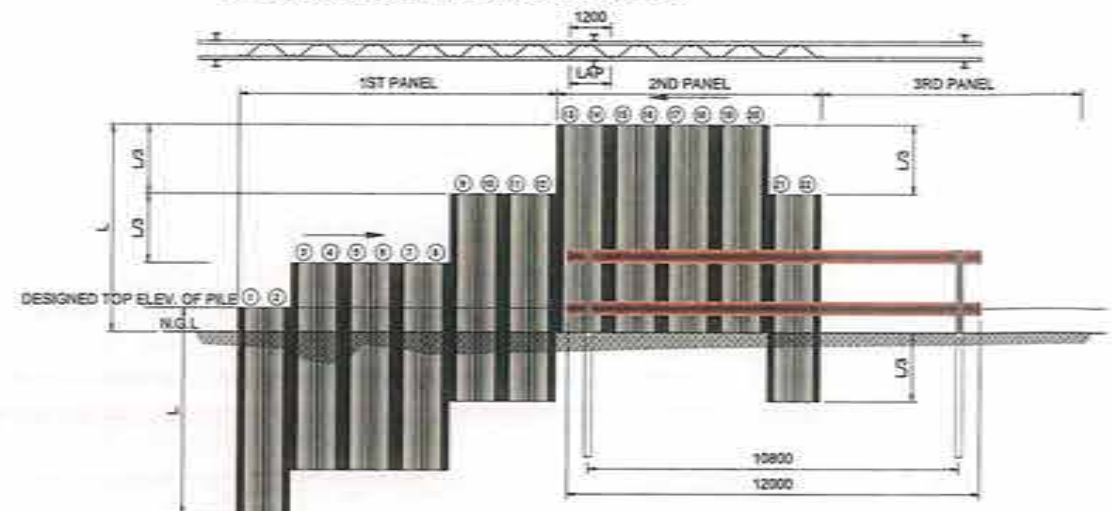
1.) PITCH, ALIGN AND PLUMB THE FIRST PAIR
BLOW-UP DETAIL A



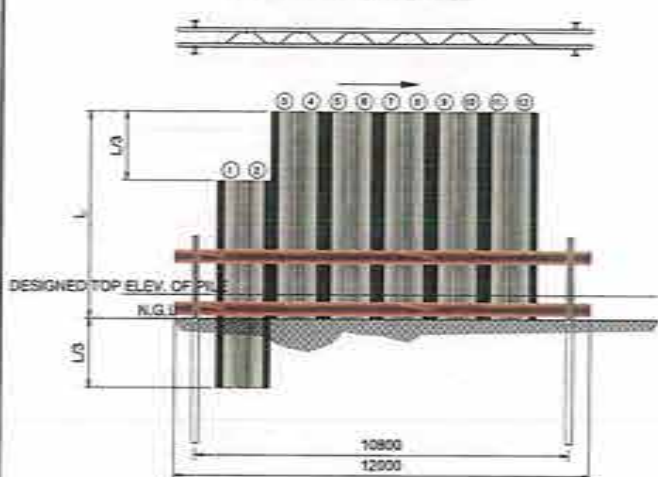
4.) DRIVE REMAINDER OF THE PANEL, WORKING BACKWARDS TOWARDS THE FIRST PAIR.



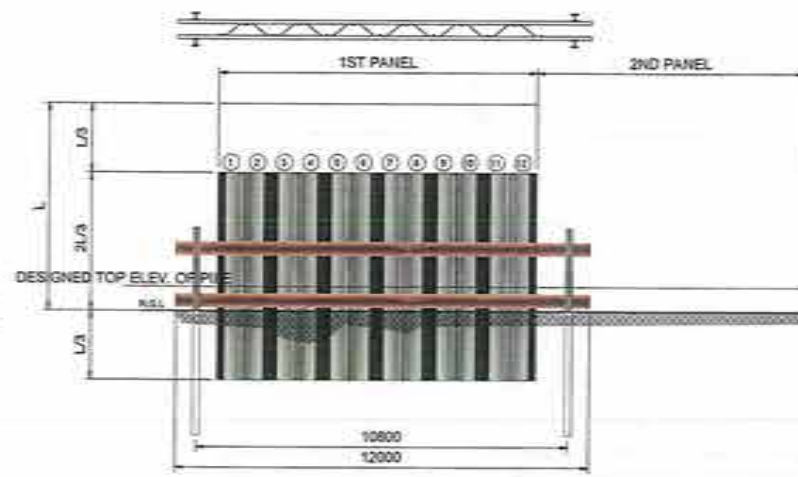
7.) FIRST PANEL DRIVEN TO FINAL LEVEL IN STAGES. THE LAST PAIR OF THE SECOND PANEL PLUMBED AND DRIVEN ACCURATELY.



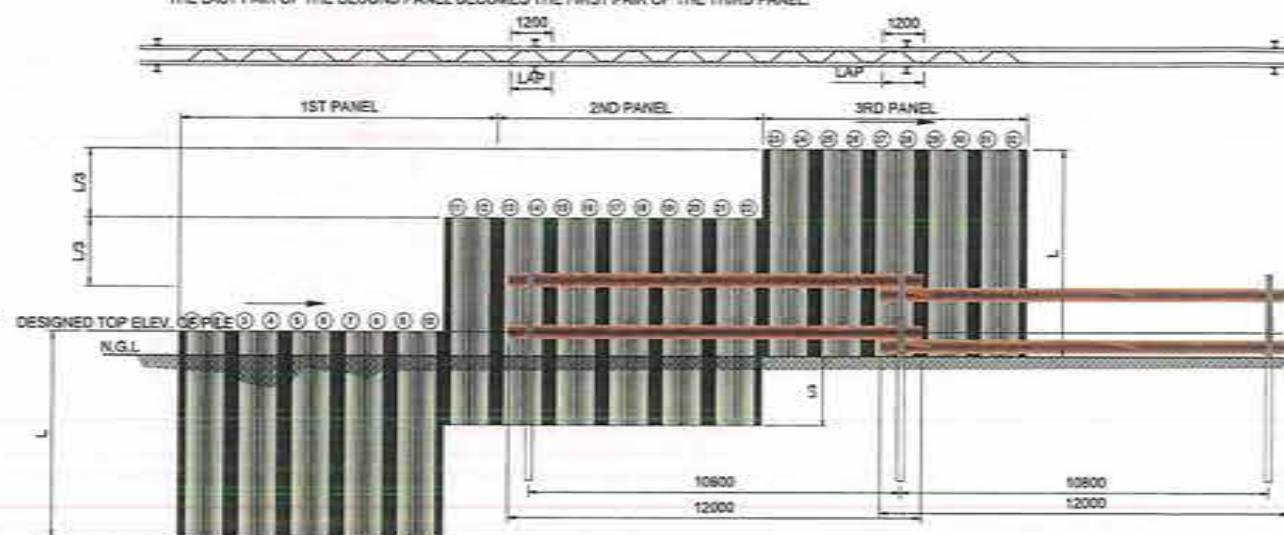
2.) DRIVE THE FIRST PAIR CAREFULLY AND ACCURATELY. PITCH THE REST OF THE PANEL.



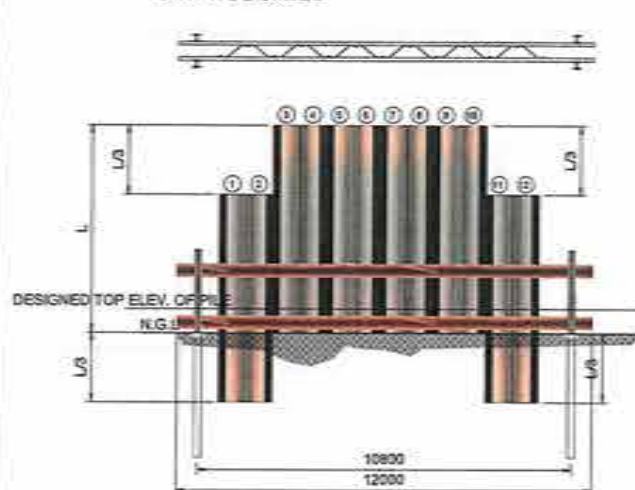
5.) FIRST PANEL PART DRIVEN



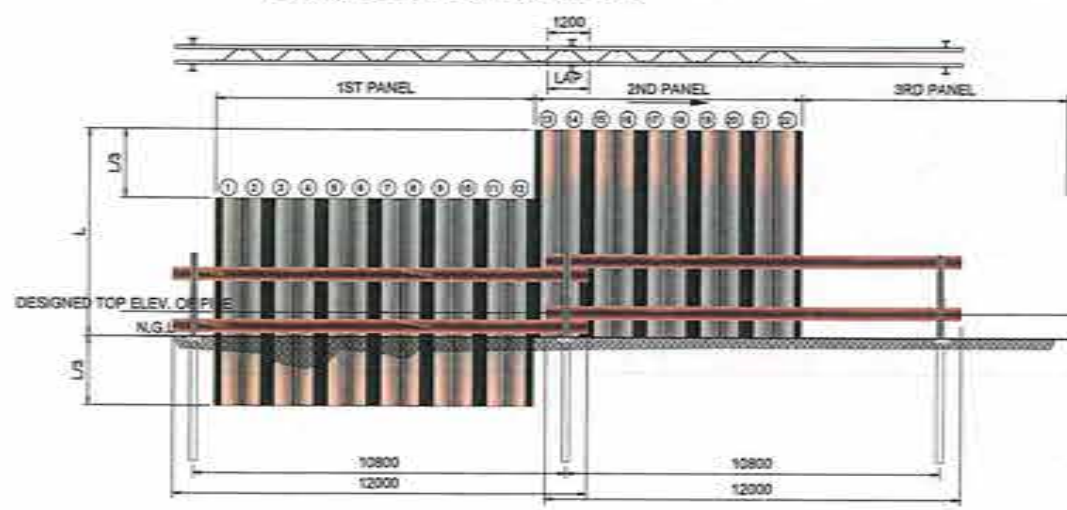
8.) FIRST PANEL COMPLETED, SECOND PANEL PART DRIVEN, THIRD PANEL PITCHED. THE LAST PAIR OF THE SECOND PANEL BECOMES THE FIRST PAIR OF THE THIRD PANEL.



3.) ENSURE LAST PAIR IS ACCURATELY POSITION AND PLUMBER. DRIVE THE LAST PAIR.



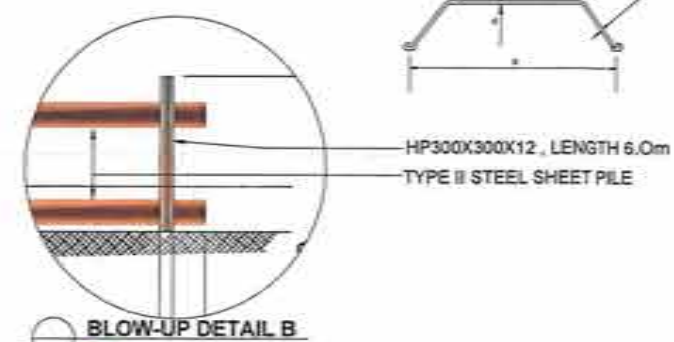
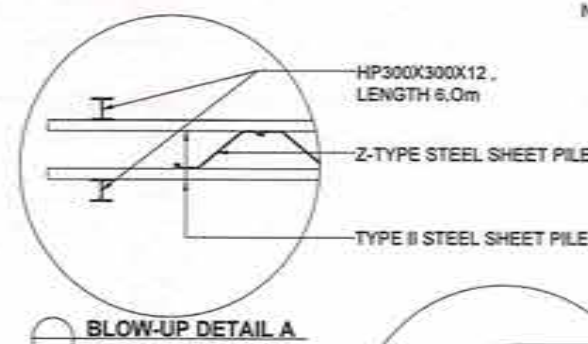
6.) SECOND PANEL PITCHED. LAST PAIR OF THE FIRST PANEL BECOMES THE FIRST PAIR OF THE SECOND PANEL.



NOTES:

1.) 1 PAIR IS 2 Z-TYPE SHEET PILE

PROPERTIES OF TYPE II STEEL SHEET PILES		
WIDTH (mm)	SECTION MODULUS cm^2/m	LENGTH (m)
400	874	12.00



SHEET PILE PANEL DRIVING METHOD

NTS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MASSARAY AVENUE, DAUOG CITY

PROJECT NAME AND LOCATION

CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) -
JCT. MANDUG - DALLAWA ROAD (MANDUG SECTION),
DAUOG CITY

SHEET CONTENTS

SHEET PILE PANEL DRIVING METHOD

DRAFTED AND PREPARED

JAMAICA A. MANDUG
ENGINEER I

DATE

REVIEWED

ALAIN JOHN R. SOTTO
ENGINEER II, SECTION CHIEF

DATE

SUBMITTED

JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION

DATE

RECOMMENDING APPROVAL

JOSELO S. CABALLERO
ASSISTANT REGIONAL DIRECTOR

DATE

APPROVED

JUDY S. CORDON
REGIONAL DIRECTOR

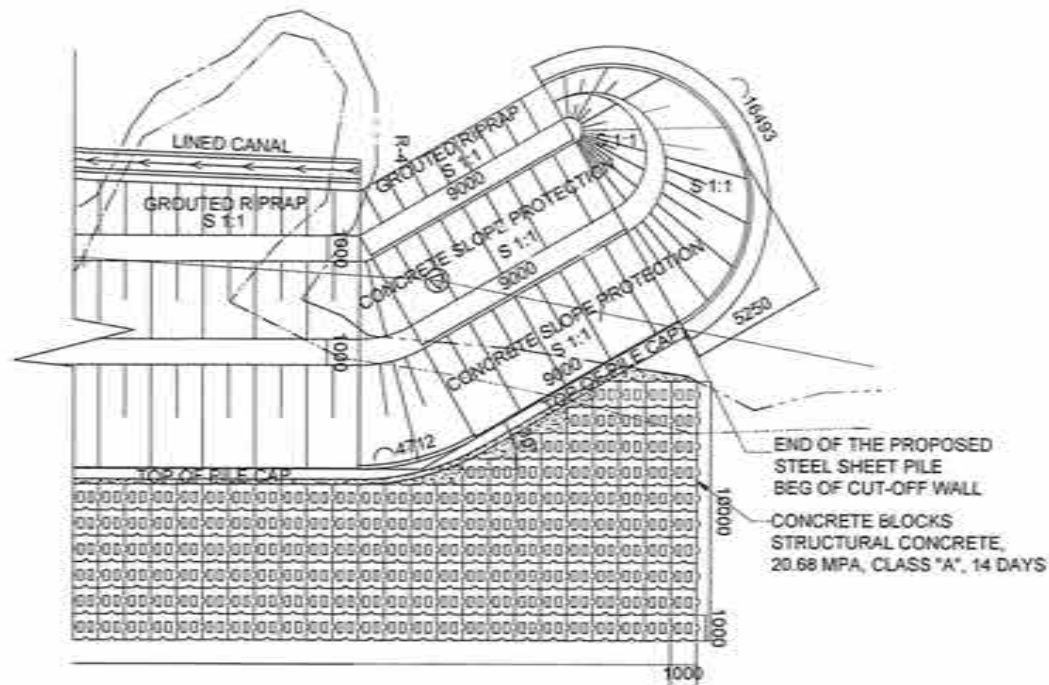
DATE

SHEET NO.

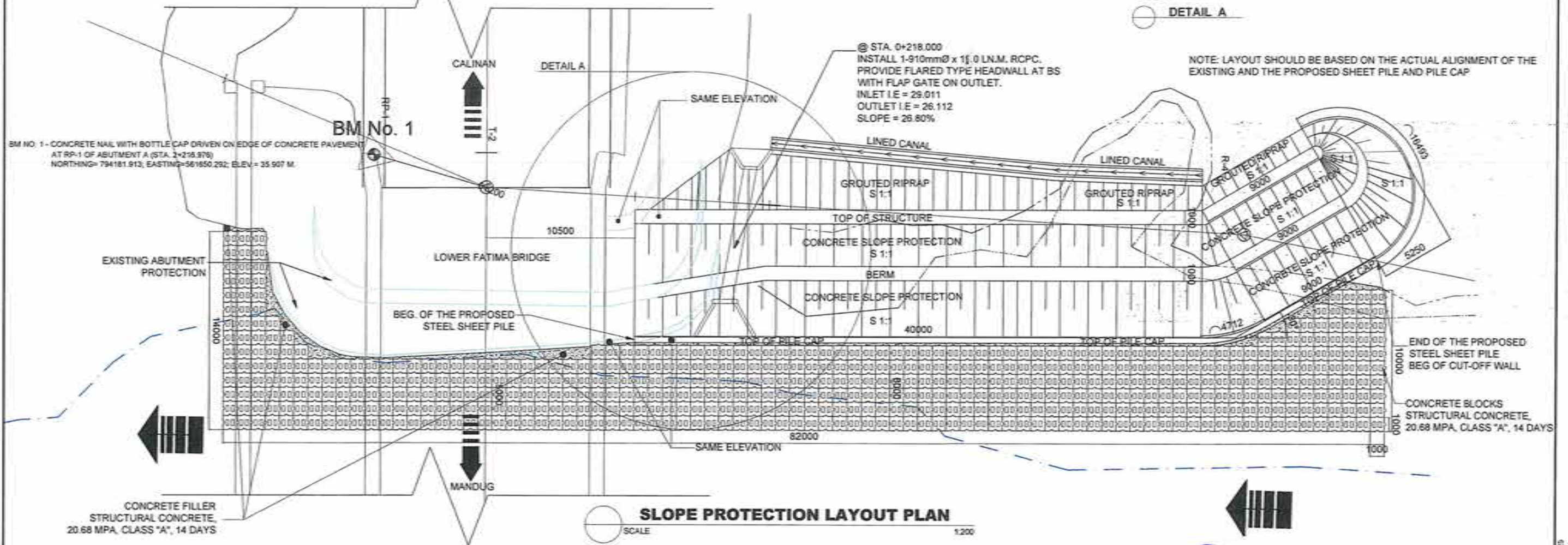
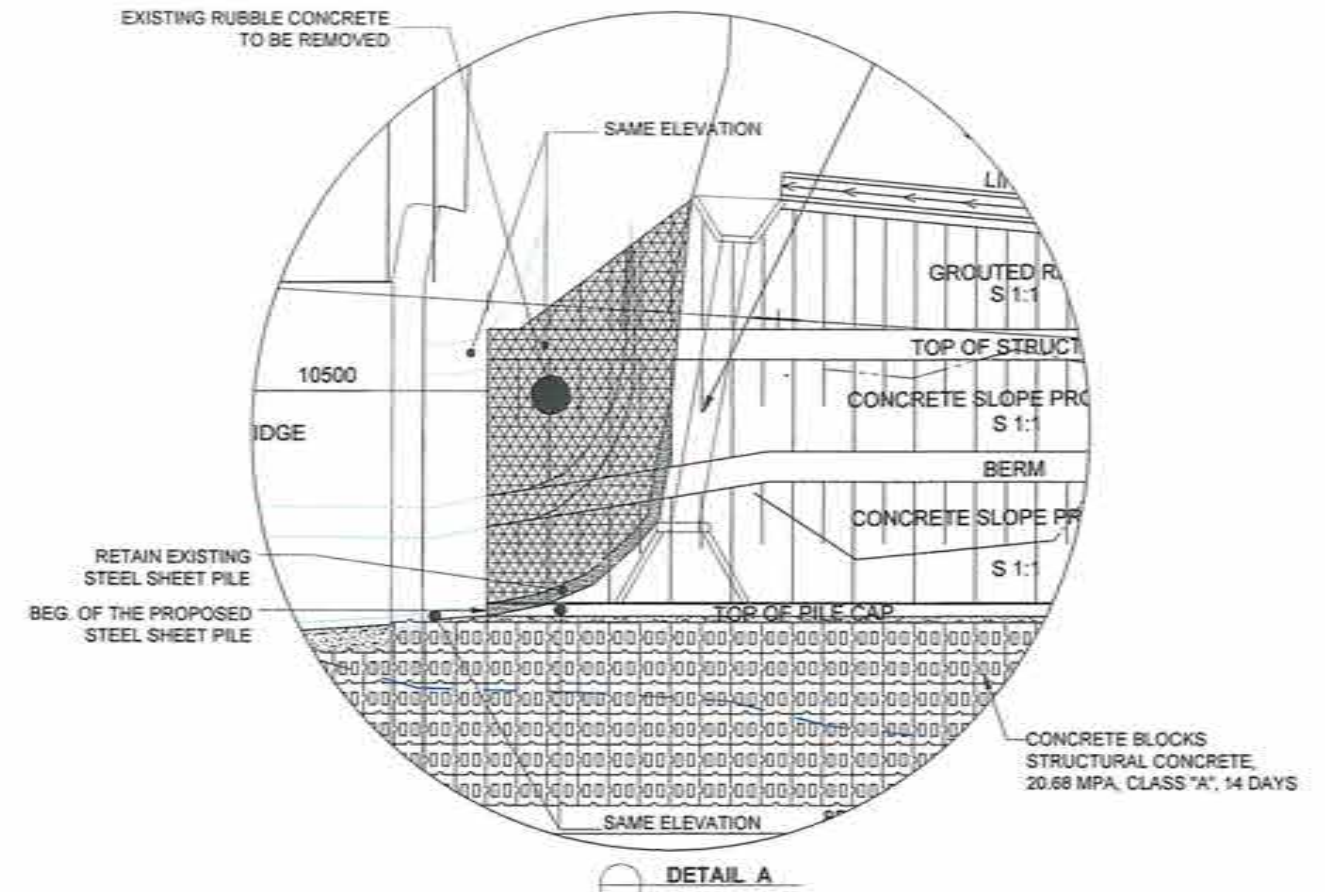
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08/18

SHEET NO.

08
44



CLOSURE DETAILS
SCALE 1:200



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. INGAYSA AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) -
JCT. MANDUG - CALLARUA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS
SLOPE PROTECTION LAYOUT PLAN
CLOSURE DETAILS

DRAFTED AND PREPARED
JAMAICA A. MARCOS
ENGINEER 2
DATE

REVIEWED
ALAN JOHN R. SOTTO
ENGINEER IN-CHARGE
DATE

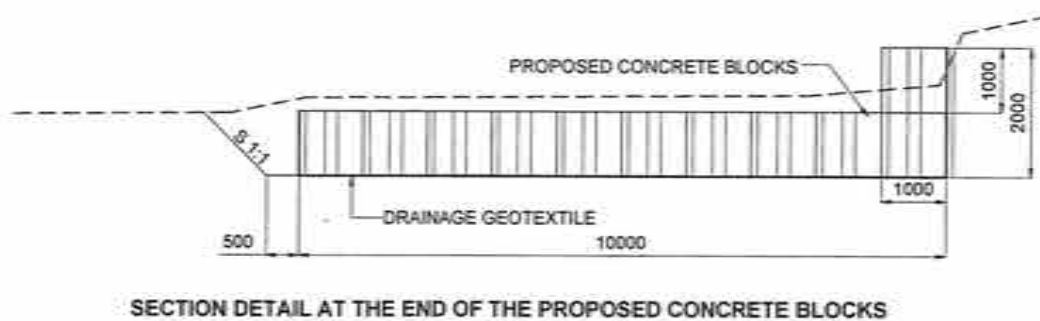
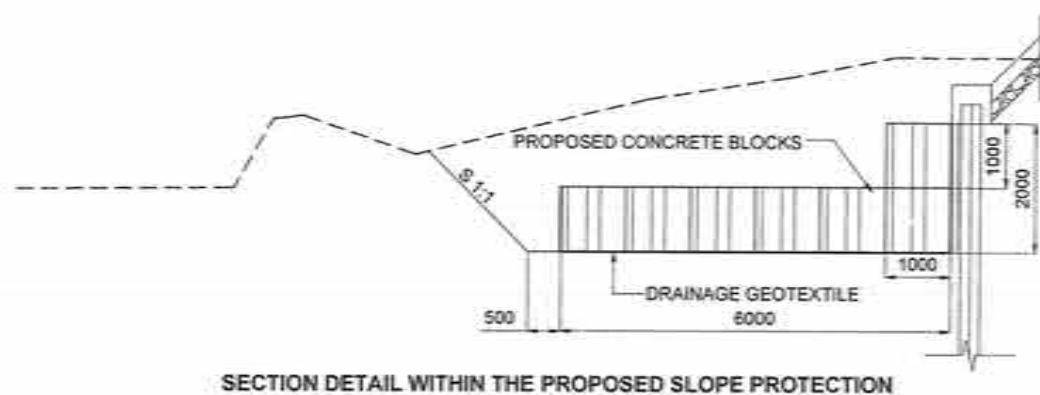
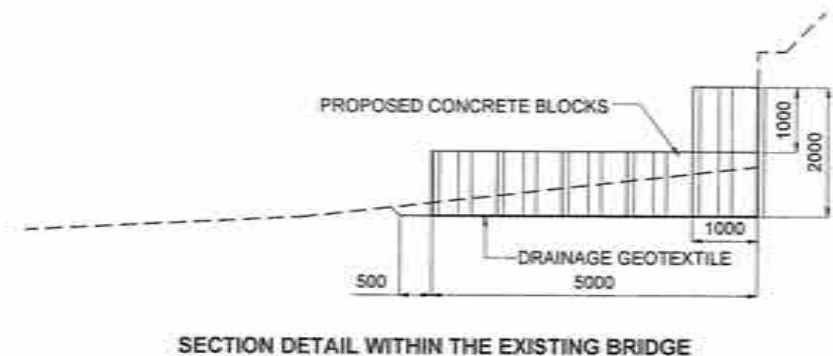
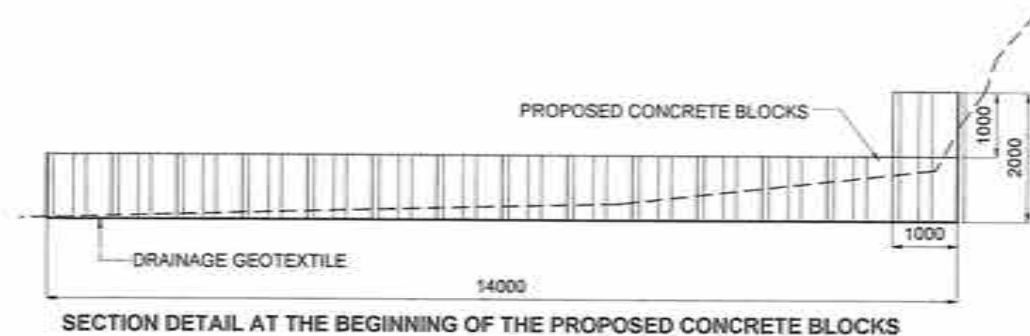
SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
GILBERT B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

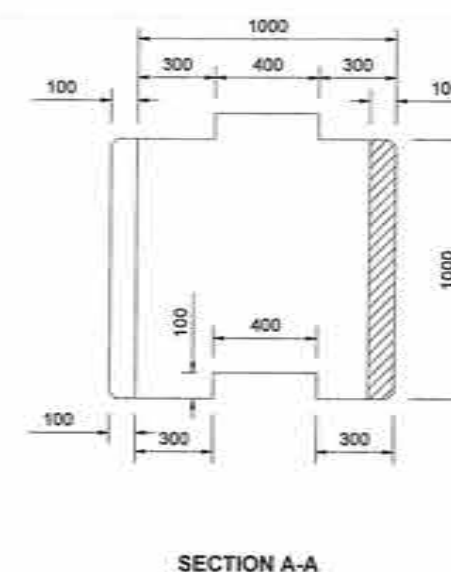
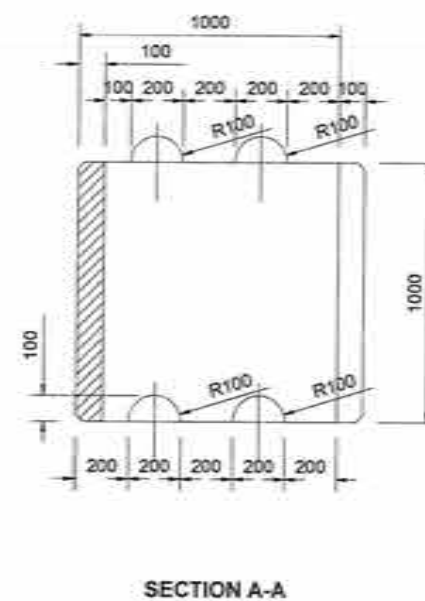
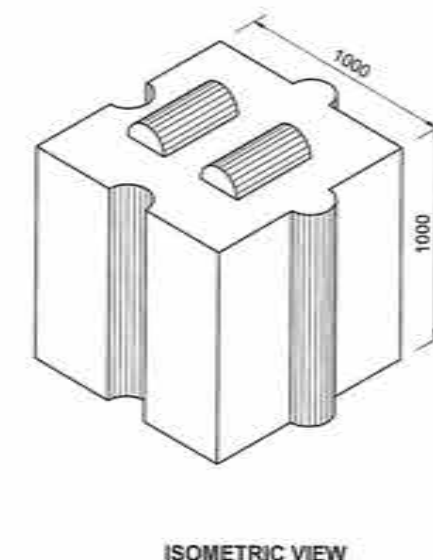
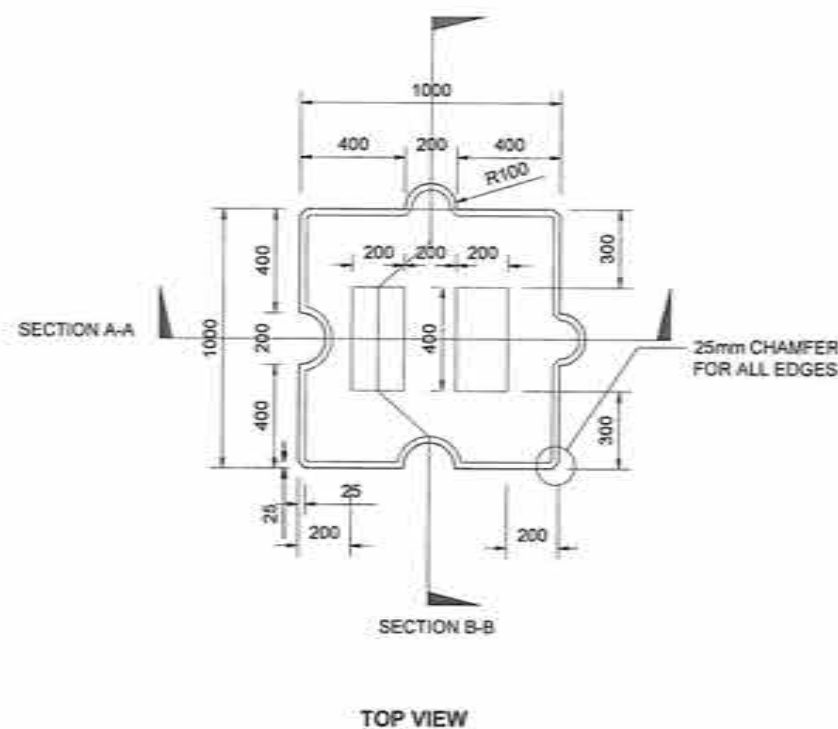
APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO. 09
SHEET NO. 44
A
09/18

- NOTES:
1. ALL CORNER EDGES SHOULD BE CHAMFERED BY 25mm
 2. CONCRETE, STRUCTURAL CONCRETE, 20.68 Mpa, CLASS 'A', 14 DAYS



SECTION DETAILS
SCALE 1:80



CONCRETE BLOCKS DETAILS
SCALE 1:20

 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION: CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION), DAVAO CITY	SHEET CONTENTS: SECTION DETAILS CONCRETE BLOCKS DETAILS	DRAFTED AND PREPARED:  JAMAICA A. MANDUG ENGINEER II	REVIEWED:  KLAIN JOHN R. SOTTO ENGINEER II, SECTION CHIEF	SUBMITTED:  JUDY ANN T. BERNARDINO CHIEF, PLANNING AND DESIGN DIVISION	RECOMMENDING APPROVAL:  JOSE LUIS B. CABALLERO ASSISTANT REGIONAL DIRECTOR	APPROVED:  JUBY B. CORDON REGIONAL DIRECTOR	SHEET NO. A 10/18 SHEET NO. 10 44
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3. DRAINAGE GEOTEXTILE (ITEM 715.7.1)

MECHANICAL PROPERTIES	TEST METHOD	UNIT	MINIMUM AVERAGE VALUES	
			MACHINE DIRECTION	CROSS DIRECTION
PROPERTY	TWO LAYER COMPOSITE GEOTEXTILE MECHANICALLY BONDED 100% CONTINUOUS POLYPROPYLENE, (BLUE COLOR) PROTECTION GEOTEXTILE WHILE (GRAY COLOR) IS THE FILTER GEOTEXTILE			
NUMBER OF FILTER CONSTRUCTIONS	acc. GIROUD		25-40	
OPENING SIZE	ISO 12956	l/m2s	0.08	
PERMEABILITY NORMAL TO THE PLANE 50mm HEAD	ISO 11058	kN	35	
TENSILE STRENGTH	ISO 10319	kN/m	30 (min.)	30 (min.)
ELONGATION AT BREAK	ISO 10319	%	90 (max)	40 (max)
DYNAMIC DROP CONE	ISO 13433	mm	40 (max)	
CBR PUNCTURE STRENGTH	ISO 12236		4.50 (min)	
THICKNESS 2 kPa	ISO 9863	mm	4.50 (min)	
MASS	ISO 9864	g.m2	600 (min)	
UV RESISTANCE STRAIN STRENGTH (3 MONTHS OUTDOOR ASEAN CONDITION)	ASTM D4355	% retained	75 (min)	

GEOTEXTILE

THE GEOTEXTILE SHALL BE UNROLLED AS SMOOTHLY AS POSSIBLE ON THE PREPARED SUBGRADE IN THE DIRECTION OF CONSTRUCTION TRAFFIC. ADJACENT GEOTEXTILE ROLLS SHALL BE OVERLAPPED IN THE DIRECTION OF SUBBASE PLACEMENT USING THE GUIDELINES TABLE 3. SEWING IS RECOMMENDED WHERE SUBGRADE SOILS HAVE A C.B.R. VALUES LESS THAN 1. THE GEOTEXTILE MAY BE HELD IN PLACE PRIOR TO SUBBASE PLACEMENT BY PINS, STAPLES, OR PILES OF FILL OR ROCK. ON CURVES, THE GEOTEXTILE MAYBE FOLDED OR CUT TO CONFORM TO THE CURVE. THE FOLD OR OVERLAP SHALL BE IN THE DIRECTION OF CONSTRUCTION AND HELD IN PLACE AS PRESCRIBED ABOVE.

TABLE 3 RECOMMENDED OVERLAPS

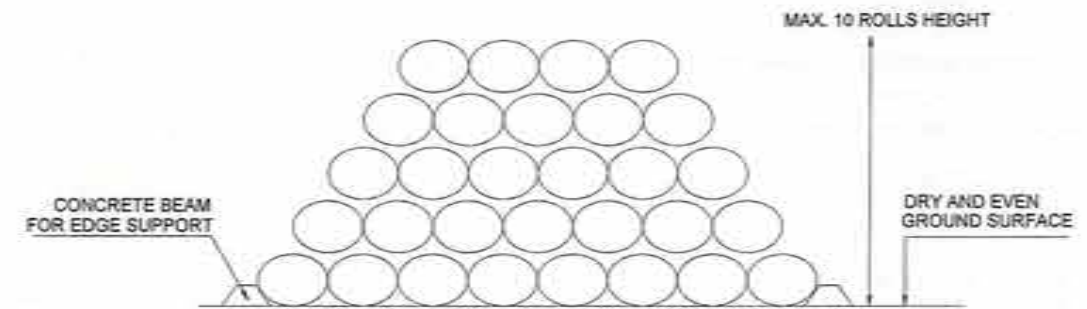
SOIL STRENGTH (CBR)	UNSEWN OVERLAP (mm)	OVERLAP (mm)
LESS THAN 1	-	229
1 - 2	965	203
2 - 3	762	76
3 AND ABOVE	610	-

METHODS OF STORAGE

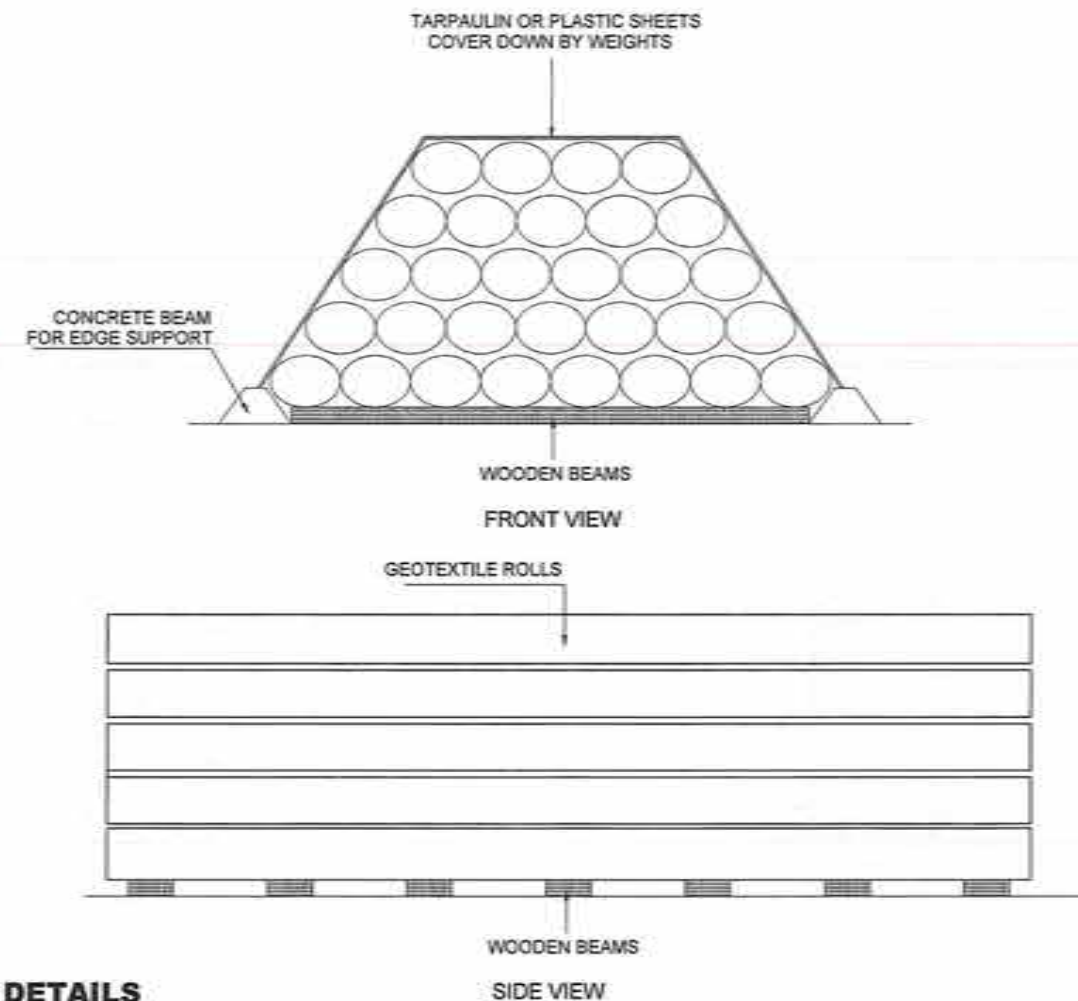
THE GEOTEXTILES DELIVERED TO SITE SHALL BE STORED IN COVERED AREA ON A FIRM AND LEVEL FOUNDATION. THE GEOTEXTILE SHALL BE PREFERABLY BE PLACED ON WOODEN BEAM SUPPORT (ELEVATED SAY 100mm ABOVE GROUND LEVEL) TO AVOID DIRECT CONTACT WITH THE GROUND LEVEL. THIS IS TO PREVENT THE GEOTEXTILE FROM GETTING SOAK OR WET DURING RAIN FLOODING.

THE GEOTEXTILE SHALL BE STACKED IN TRIANGULAR MANNER NOT MORE THAN 10 ROLLS IN HEIGHT AND SUFFICIENT LATERAL RESTRAINT MUST BE PROVIDED TO PREVENT COLLAPSE OF THE STACKED ROLLS. LATERAL RESTRAINT CAN BE PROVIDED THROUGH HEAVY CONCRETE BLOCKS PLACED ON BOTH ENDS OF THE STACK.

WHERE PROPER COVERED STORAGE AREA IS NOT AVAILABLE THE ENTIRE STACKED ROLLS OF GEOTEXTILES SHALL BE COVERED WITH TARPAULIN OR PLASTIC SHEET AND FIRMLY WEIGHTED DOWN.



STORAGE OF GEOTEXTILE ROLLS IN DRY AREA AND METHOD OF STACKING THE ROLLS IN DRY AREA



DRAINAGE GEOTEXTILE DETAILS

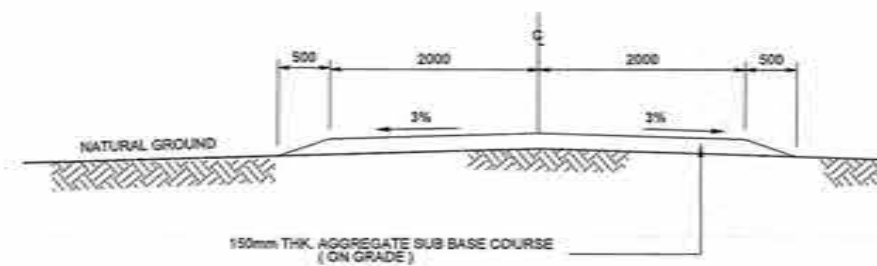
SCALE

NTS

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAUO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	DRAFTED AND PREPARED	REVIEWED	SUBMITTED	RECOMMENDING APPROVAL	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALAWA ROAD (MANDUG SECTION), DAUO CITY	DRAINAGE GEOTEXTILE DETAILS	JAMAICA A. MANDUG ENGINEER II	ALAN JOHN R. SOTTO ENGINEER II, SENIOR CHIEF	JUDY M. T. BERNARDINO CHIEF PLANNING AND DESIGN DIVISION	JOSEITO B. CABALLERO ASSISTANT REGIONAL DIRECTOR	JUBY B. CORDON REGIONAL DIRECTOR	A 11/18	11 44



SERVICE ROAD LOCATION PLAN
SCALE NTS

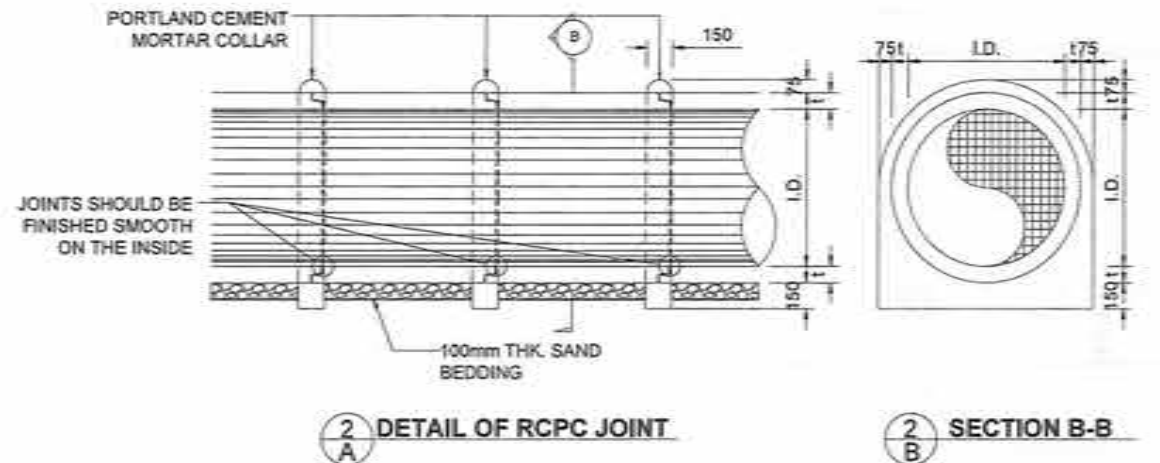


SERVICE ROAD TYPICAL SECTION
SCALE NTS

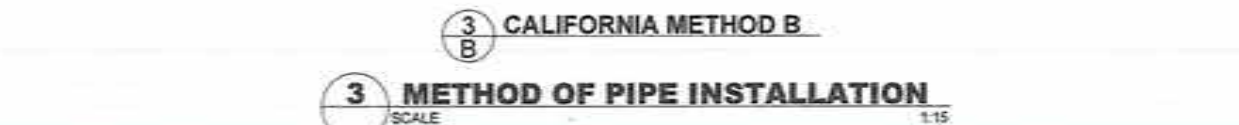
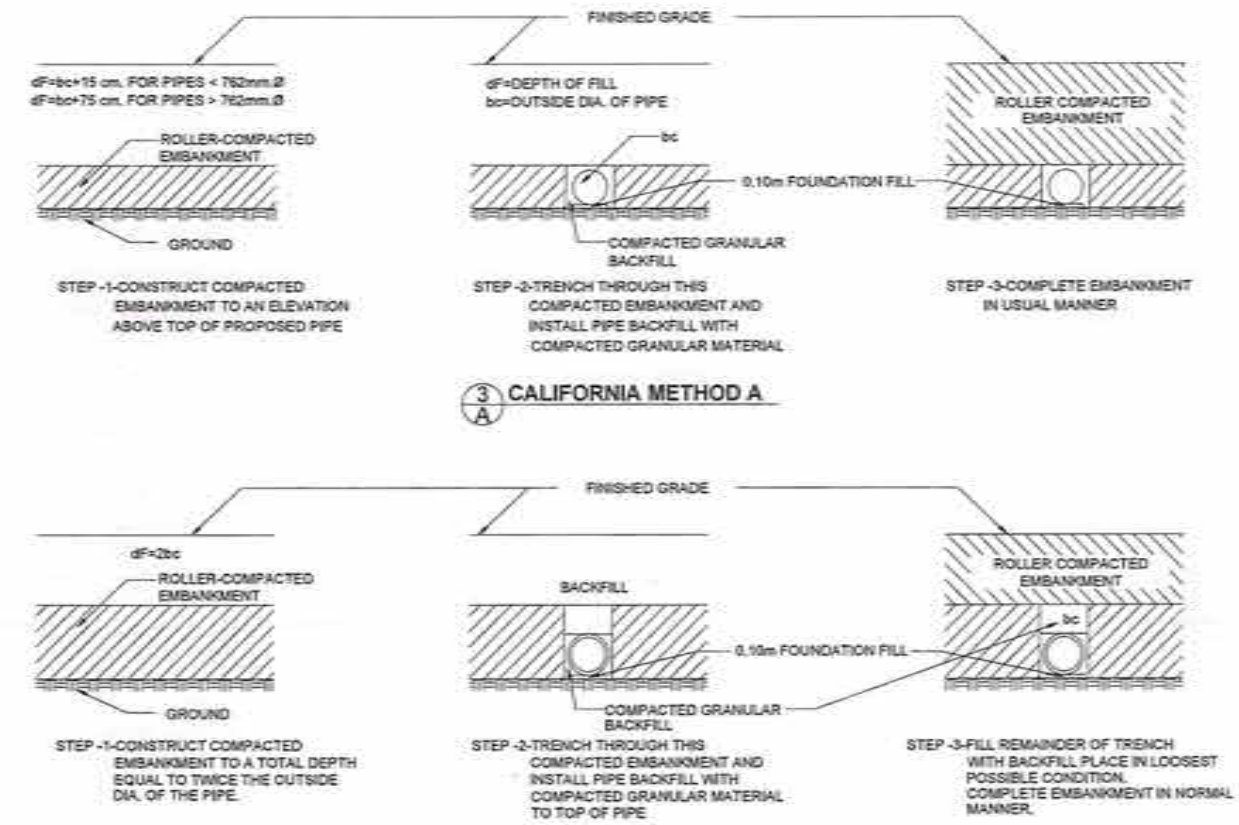
 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. 8, MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION), DAVAO CITY	SHEET CONTENTS SERVICE ROAD LOCATION PLAN SERVICE ROAD TYPICAL SECTION	DRAFTED AND PREPARED:  JAMAICA A. MANDUG ENGINEER II DATE: _____	REVIEWED:  ALAIN JOHN R. SORIA ENGINEER III, SECTION CHIEF DATE: _____	SUBMITTED:  JUDY ANN BERNARDINO CHIEF, PLANNING AND DESIGN DIVISION DATE: _____	RECOMMENDING APPROVAL:  ROSELITO B. CABALLERO ASSISTANT REGIONAL DIRECTOR DATE: _____	APPROVED:  JUBY S. CORDON REGIONAL DIRECTOR DATE: _____	SET NO. SHEET NO. A 12 12/18 44
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NOTES:

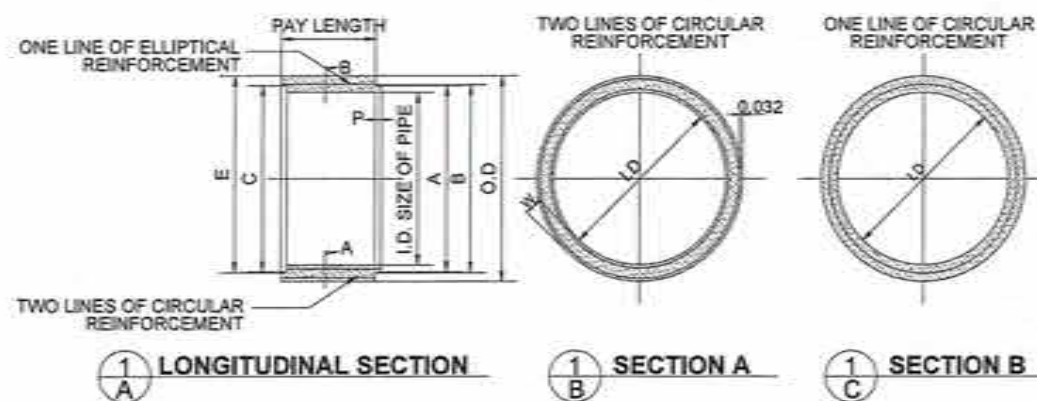
JOINTS SHALL BE MADE WITH (A) PORTLAND CEMENT MORTAR, AS MAY BE SPECIFIED. MORTAR JOINTS SHALL BE MADE WITH AN EXCESS OF MORTAR TO FORM A CONTINUOUS BEAD AROUND THE OUTSIDE OF THE CONDUIT AND FINISHED SMOOTH ON THE INSIDE. FOR GROUTED JOINTS, MOLDS AND RUNNERS SHALL BE USED TO RETAIN THE POURED GROUT.



2 REINFORCED CONCRETE PIPE CULVERT DETAILS
SCALE 1:30



3 METHOD OF PIPE INSTALLATION
SCALE 1:15

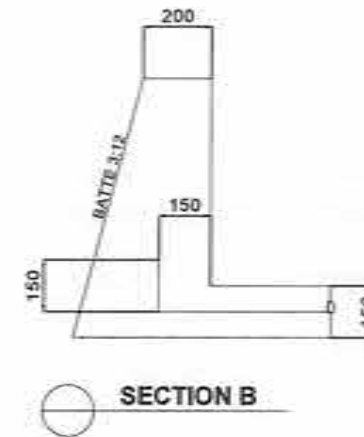
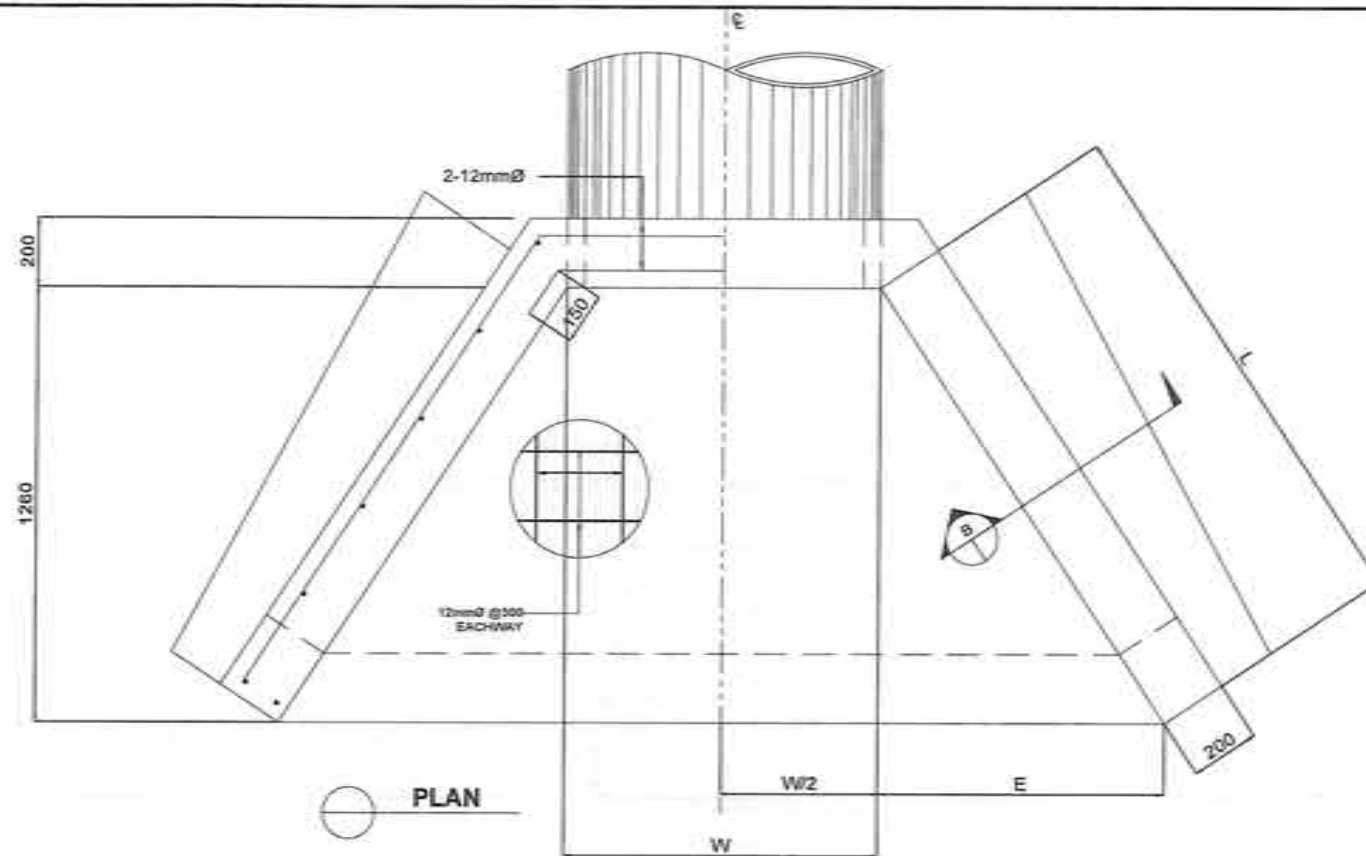


1 DESIGN REQUIREMENTS OF REINFORCED OF CONCRETE PIPE CULVERT
SCALE 1:15

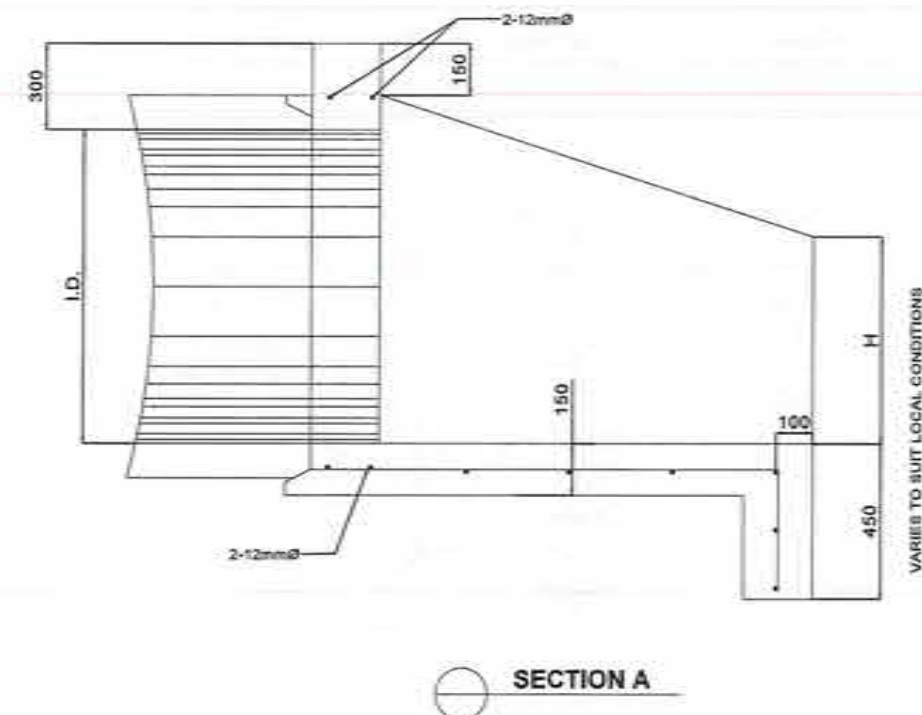
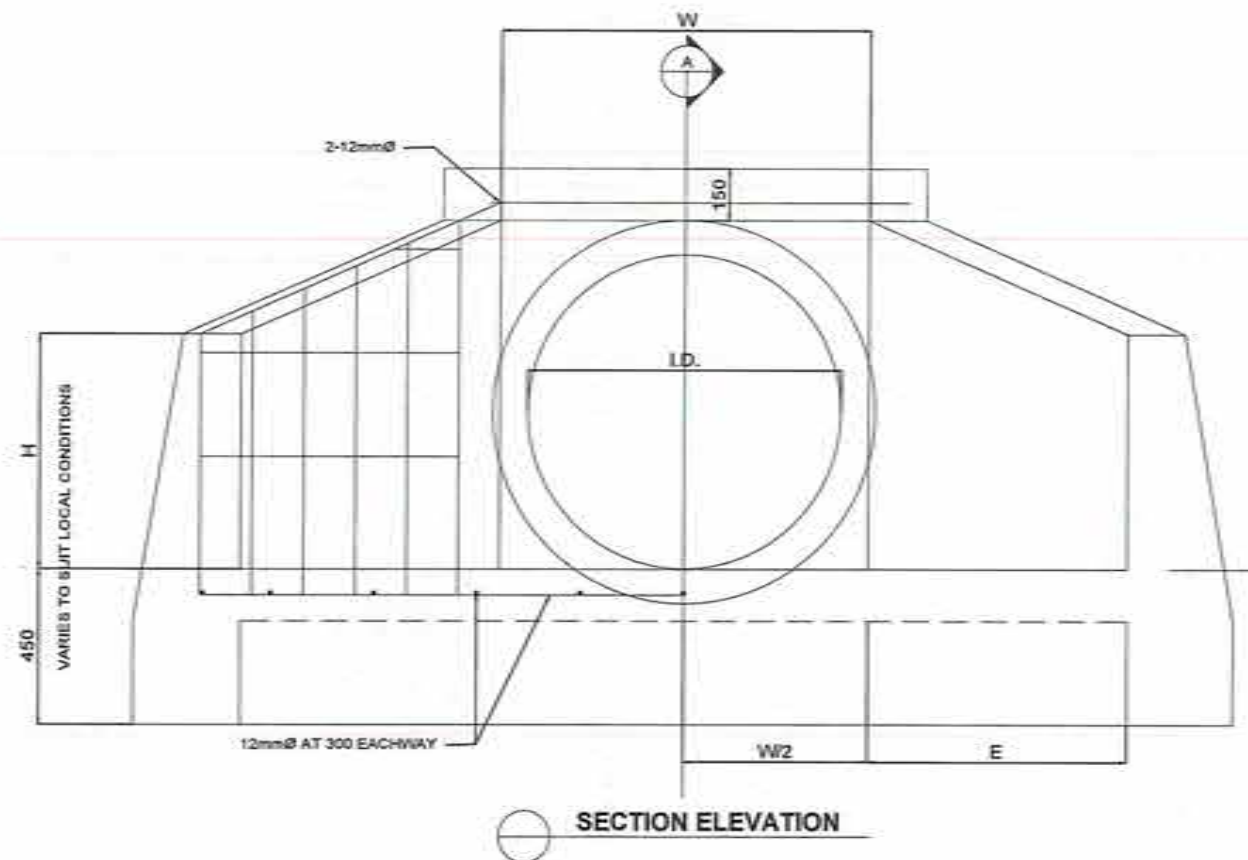
SIZE OF PIPE		CONCRETE 317 KG./SQ. CM. (4,500 LB./SQ.IN.)						
IN.	M.	WALL THICKNESS (M)	TONGUE (M)		GROOVE (M)		DEPTH (M)	MINIMUM REINFORCEMENT SQ.CM./M. OF PIPE *
		W	A	B	C	E	P	CIRCULAR REINFORCEMENT
36"	0.91	0.086	0.988	1.007	1.994	1.013	0.064	2 LINE EACH 4.66

* - THE DISTANCE FROM CENTERLINE OF THE REINFORCEMENT TO THE NEAREST SURFACE OF THE CONCRETE HAS BEEN ASSUMED AS 0.032 M. FOR PIPES WITH A SHELL THICKNESS OF 0.064 M. OR MORE.

NOTE: DESIGN REQUIREMENTS ARE BASED ON THE SPECIFICATIONS FOR MATERIALS OF AASHTO M-170



FLARED F TYPE HEADWALLS				
DIAMETER	DIMENSIONS			
	L	E	F	W
910	1510	840	1260	1070



FLARED TYPE HEADWALL DETAILS AT INLET OF THE RCPC
SCALE NTS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) -
JCT. MANDUG - CALLAMA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS
FLARED TYPE HEADWALL DETAILS
AT INLET OF THE RCPC

DRAFTED AND PREPARED
Jamaica A. Wandong
JAMAICA A. WANDONG
ENGINEER II
DATE

REVIEWED
Alain John R. Sotro
ALAIN JOHN R. SOTRO
ENGINEERING SECTION CHIEF
DATE

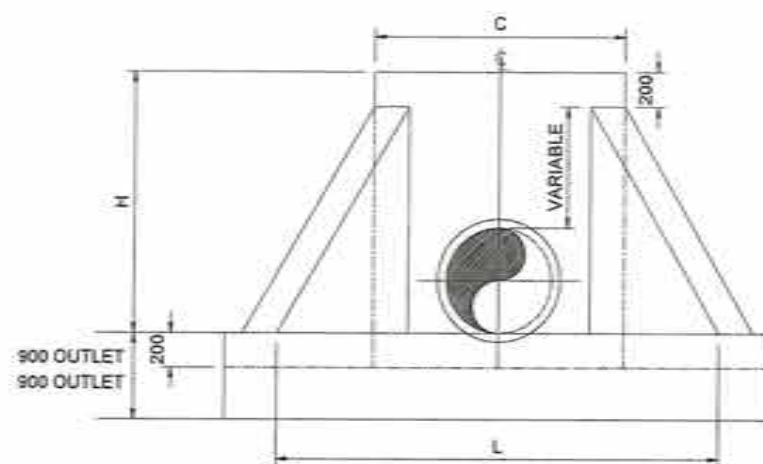
SUBMITTED
Judy Ann T. Bernardino
JUDY ANN T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
Jose Luis B. Caballero
JOSE LUIS B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
Jury S. Cordon
JURY S. CORDON
REGIONAL DIRECTOR
DATE

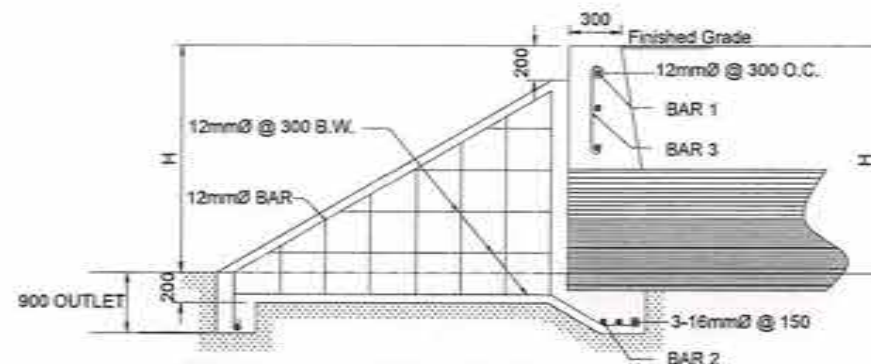
SET NO.
A
14/18

SHEET NO.
14
44

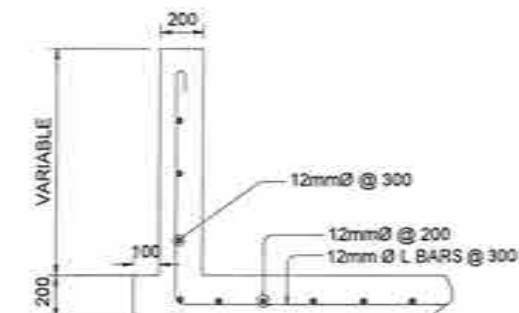


2A ELEVATION

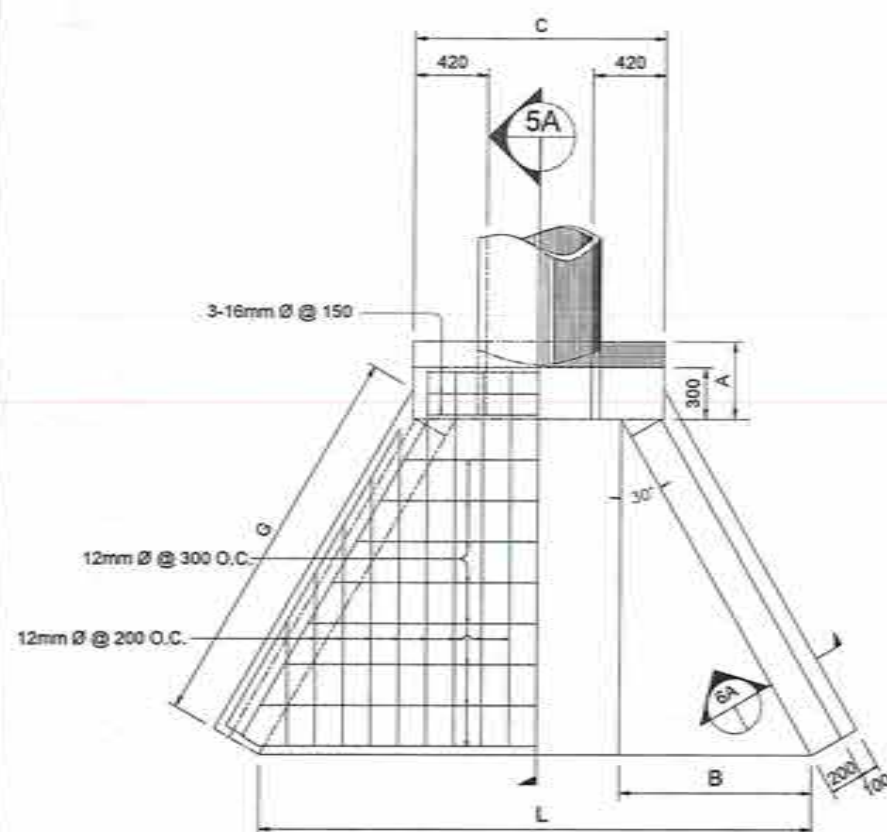
HEADWALL FOR SINGLE BARREL PIPE CULVERTS
TYPE B₁ (SQUARE)



5A SECTION A



6A SECTION B



1A PLAN

HEADWALL FOR SINGLE BARREL PIPE CULVERTS
TYPE B₁ (SQUARE)

INLET OR OUTLET CONCRETE HEADWALL DIMENSIONS
FOR SINGLE AND MULTI BARREL RCPC
DIMENSIONS IN CENTIMETERS

PIPE DIAMETER Ø (mm)		610	760	910	1070	1220	1520
COMMON TO ALL NUMBER OF BARRELS	H	151	168	181	197	212	242
	A	45	45	45	60	60	60
	d	20	25	30	25	30	35
	h	131	146	161	177	192	222
SINGLE BARREL	c	145	160	175	191	206	236
DOUBLE BARREL	c	267	312	357	405	450	540
TRIPLE BARREL	c	389	464	539	619	694	844
B FOR VARIOUS EMBANKMENT SLOPE	3/2	119.5	132.5	145.5	159.5	172.5	198.5
	2/1	157.5	174.5	192	210.5	227.5	262.5
	3/1	233	259	285	312.5	338.5	390.5
	4/1	308.5	343	378	415	450	518.5
G FOR VARIOUS EMBANKMENT SLOPE	3/2	227	253	279	307	333	385
	2/1	303	337	372	409	443	513
	3/1	454	506	558	613	665	769
	4/1	605	674	744	818	888	1025

FLARED TYPE HEADWALL DETAILS AT OUTLET OF THE RCPC

SCALE

NTS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. N. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) -
JCT. MANDUG - CALLANA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS
FLARED TYPE HEADWALL DETAILS
AT OUTLET OF THE RCPC

DRAFTED AND PREPARED
JEMALCA A. MANDUG
ENGINEER I
DATE

REVIEWED
ALAN JOHN R. SOTTO
ENGINEER II, SECTION CHIEF
DATE

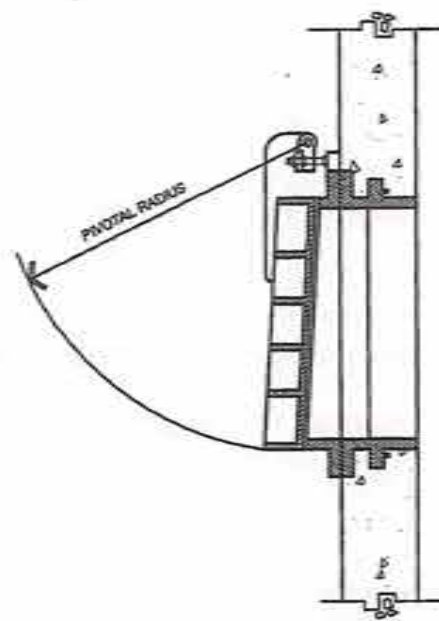
SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
ROBERTO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

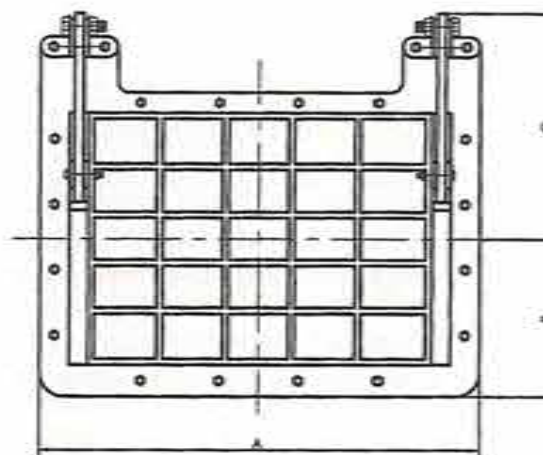
APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR
DATE

SHEET NO.
A
15/18

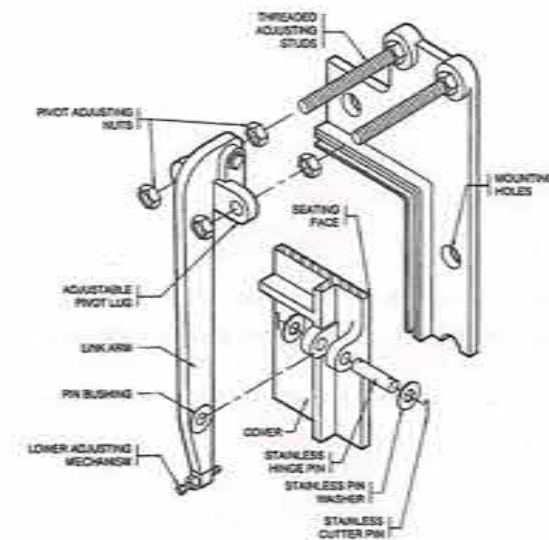
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15
44



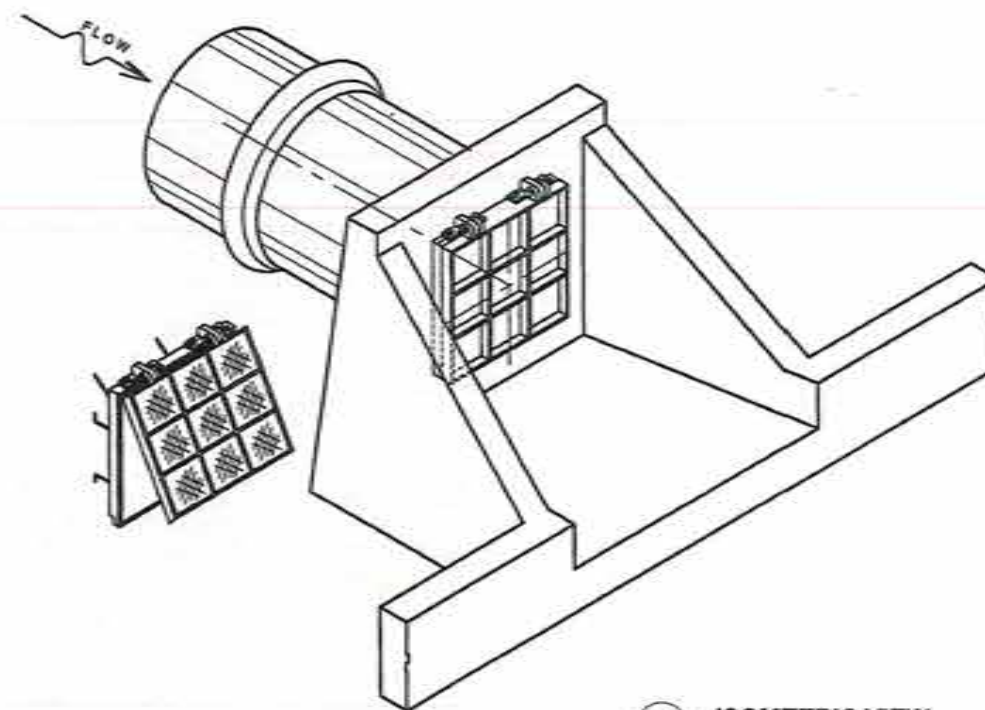
○ SIDE VIEW



○ FRONT VIEW



○ DETAILS OF ADJUSTABLE TOP PIVOT AND LINK ASSEMBLY



○ ISOMETRIC VIEW

RECTANGULAR FLAP GATE				
WIDTH (mm) X HEIGHT (mm)	DIMENSION (mm)			PIVOT RADIUS (mm)
	A	B	C	
1200 X 1200	1450	725	943.75	1543.75

1 TYPICAL DETAILS FOR RECTANGULAR FLAP GATE



REPUBLIC OF THE PHILIPPINES
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REGIONAL OFFICE NO. XI
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PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) -
JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS
TYPICAL DETAILS FOR RECTANGULAR FLAP GATE

DRAFTED AND PREPARED
JAMAICA A. MANDING
ENGINEER II
DATE

REVIEWED
ALAIN JOHN R. SOTTO
ENGINEER II, SECTION CHIEF
DATE

SUBMITTED
JUDY ANN T. BERNARDO
CHIEF, PLANNING AND DESIGN DIVISION
DATE

RECOMMENDING APPROVAL
JOSEPH B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO. SHEET NO.
A 16
16/18 44

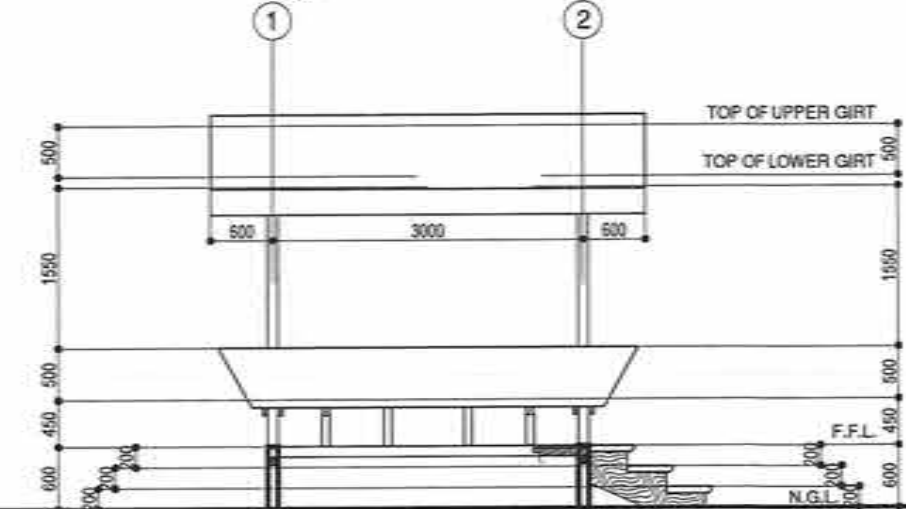
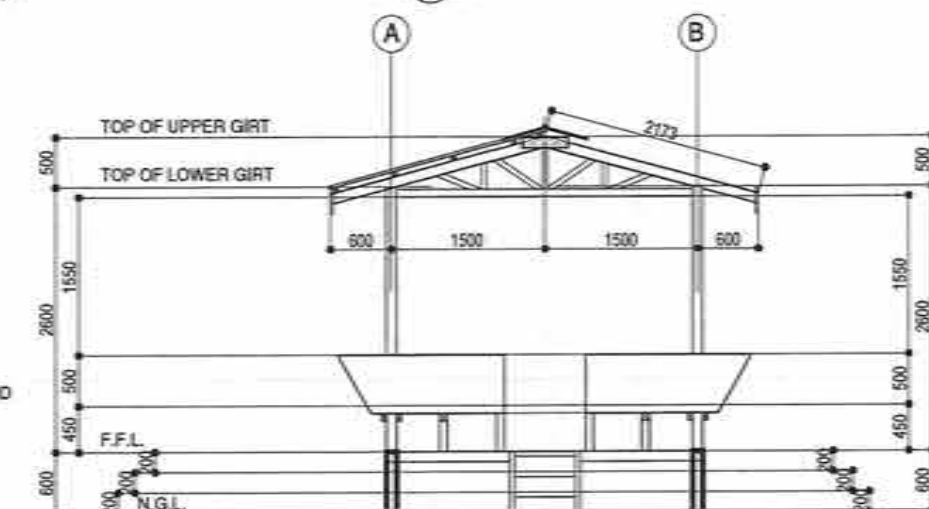
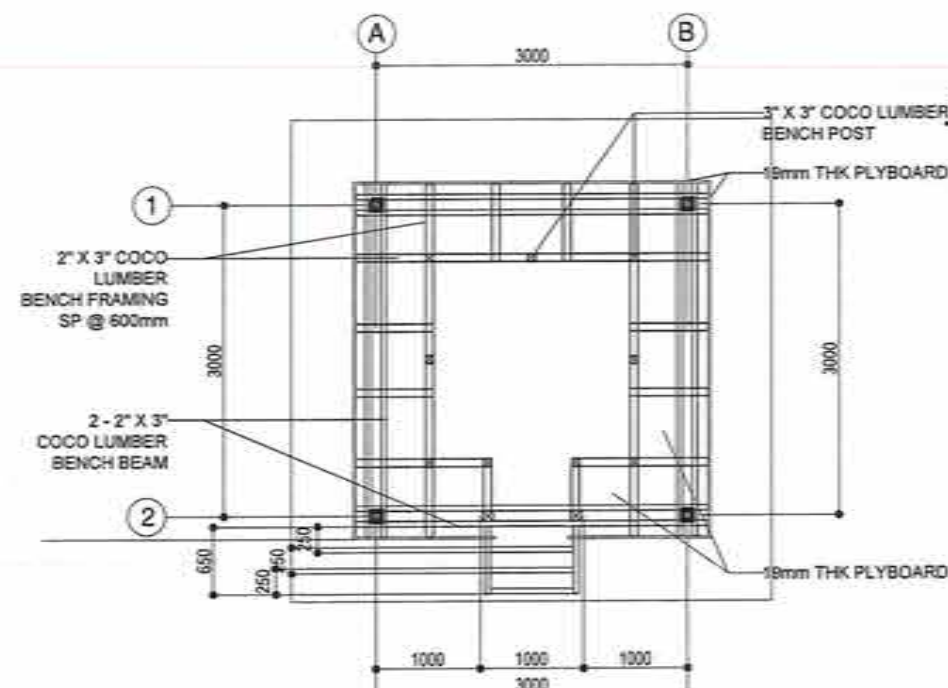
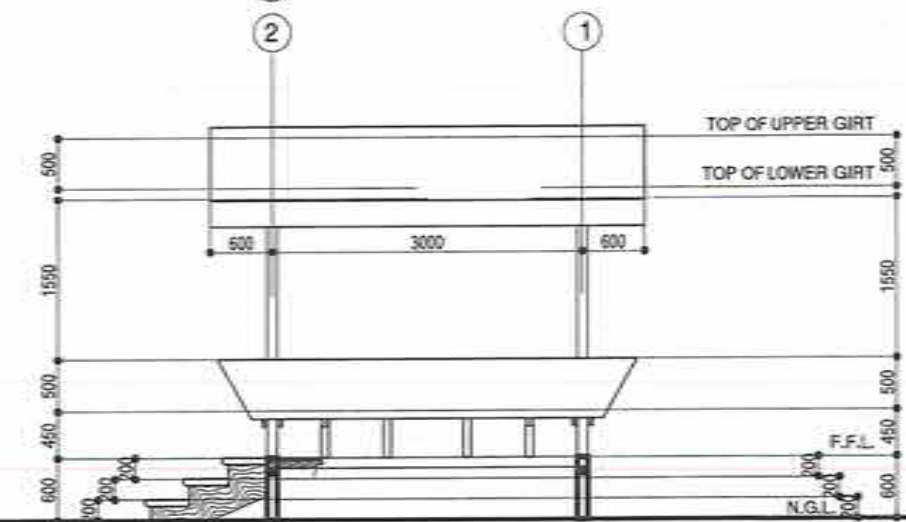
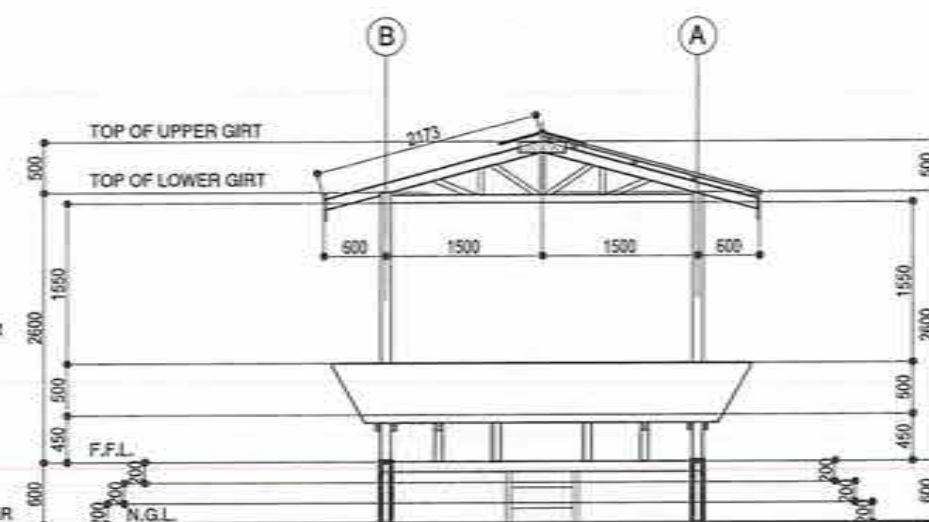
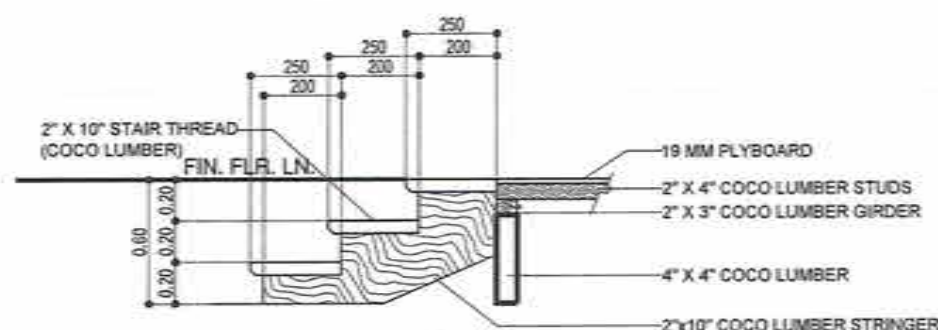
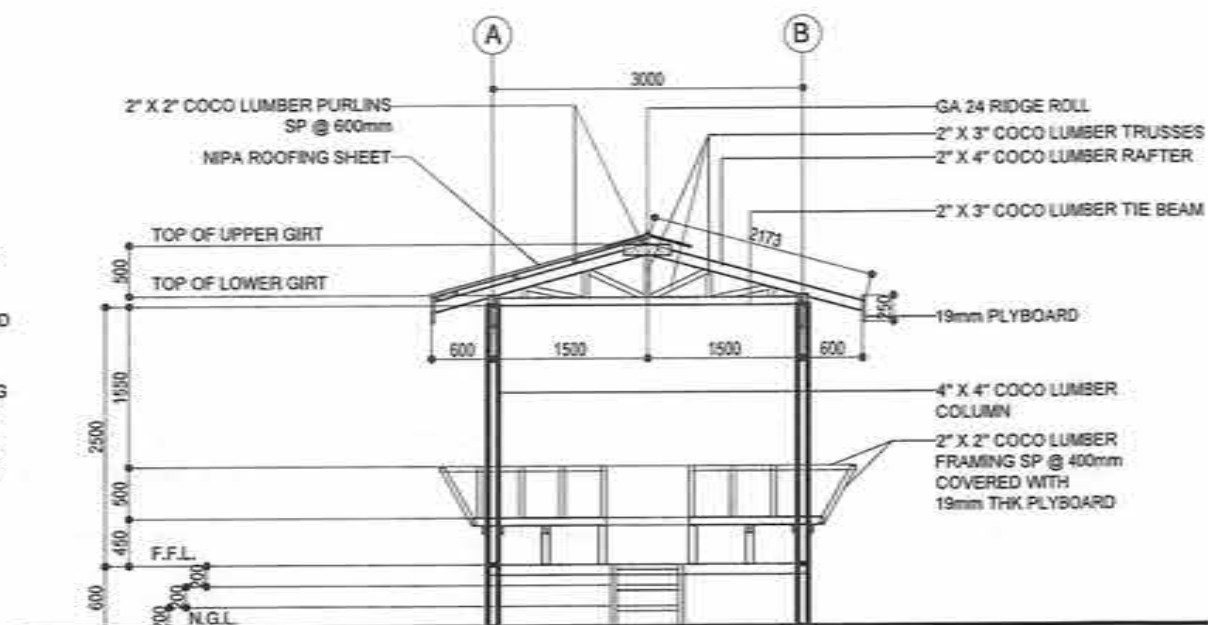
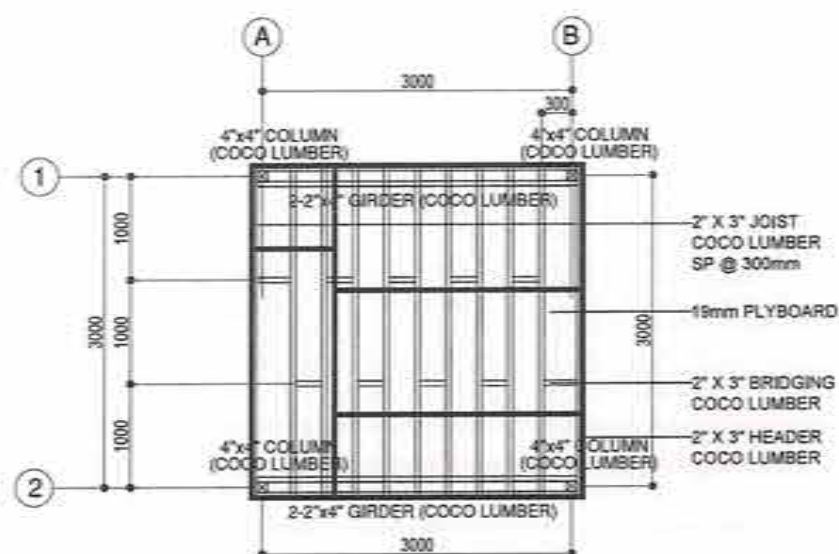
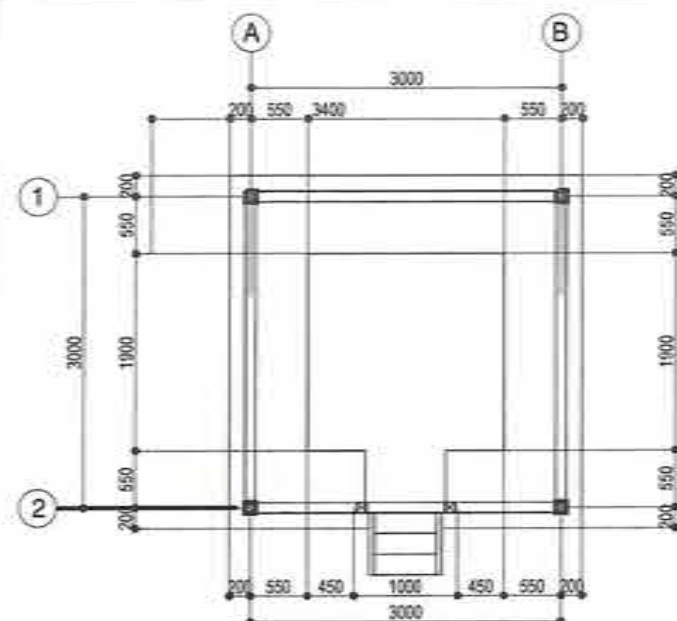
DRAINAGE SCHEDULE

STATION	DESCRIPTION	103(1)a	103(3)	103(6)a	404(1)a	405(1)a3	500(1)b3	500(3)b1	1719(6)a5	REMARKS
		cu.m.	cu.m.	cu.m.	kgs.	cu.m.	ln.m.	ln.m.	each	
0+218.000	@ STA. 0+218.000 INSTALL 1-910mmØ x 11.0 LN.M. RCPC. PROVIDE FLARED TYPE HEADWALL AT BS WITH FLAP GATE ON OUTLET. INLET IE = 29.011 OUTLET IE = 26.112 SLOPE = 26.80%	6.95	1.20	16.40	102.05	3.12	11.00		1.00	CROSSDRAIN
0+220.000 TO 0+250.500	30.50 Ln.m. CONCRETE LINED CANAL	46.97	2.75					30.50		RIGHT BANK
TOTAL		53.92	3.94	16.40	102.05	3.12	11.00	30.50	1.00	

SUMMARY OF QUANTITIES

ITEM #	DESCRIPTION	UNIT	QUANTITY	REMARKS
103(1)a	STRUCTURE EXCAVATION (COMMON SOIL)	cu.m.	53.92	FOR FLARED HEADWALL
103(3)	FOUNDATION FILL	cu.m.	3.94	FOR FLARED HEADWALL
103(6)a	PIPE CULVERTS AND DRAIN EXCAVATION (COMMON SOIL)	cu.m.	16.40	FOR RCPC
404(1)a	REINFORCING STEEL, GRADE 40	kgs.	102.05	FOR FLARED HEADWALL
405(1)a3	STRUCTURAL CONCRETE, CLASS "A"	cu.m.	3.12	FOR FLARED HEADWALL
500(1)b3	PIPE CULVERTS, 910mmØ CLASS IV	ln.m.	11.00	WITH PROVISION OF SAND BEDDING
500(3)b1	LINED CANAL, RECTANGULAR, CONCRETE, 0.6m x 0.5m	ln.m.	30.50	
1719(6)a5	RECTANGULAR ALUMINUM FLAP GATE, 1200mm x 1200mm	each	1.00	

 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	DRAFTED AND PREPARED	REVIEWED	SUBMITTED	RECOMMENDING APPROVAL	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTAN ROAD (JACARIA SECTION) - JCT. MANDUG - CALLARUA ROAD (MANDUG SECTION), DAVAO CITY	DRAINAGE SCHEDULE SUMMARY OF QUANTITIES (SECTION 2)	 JAMAICA A. MANDUG ENGINEER II DATE:	 ALAIN JOHN R. SDRFO ENGINEER II, SECTION CHIEF DATE:	 JUDY ANN T. BERNARDINO CHIEF, PLANNING AND DESIGN DIVISION DATE:	 JOSEITO B. CABALLERO ASSISTANT REGIONAL DIRECTOR DATE:	 JUBY B. COROON REGIONAL DIRECTOR DATE:	A 17/18	17 44



USE OF TRAFFIC CONTROLLERS (FLAGMEN)

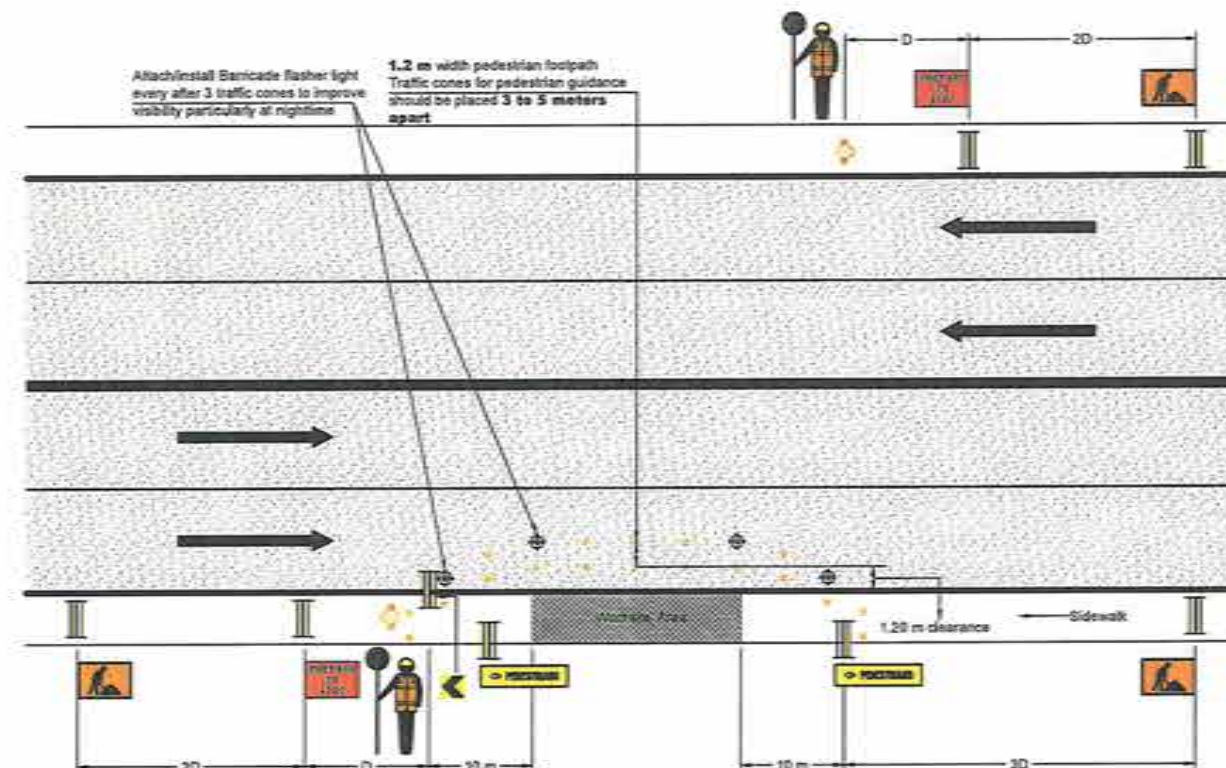
1. THE TRAFFIC CONTROLLER USES A PORTABLE STOP/SLOW HAND HELD SIGN OR RED AND GREEN STOP/GO FLAG TO CONTROL THE TRAFFIC.
2. WHEN CONTROLLING TRAFFIC, A TRAFFIC CONTROLLER SHOULD ENSURE THAT A SYMBOLIC WORKMAN SIGN AND PREPARE TO STOP SIGN AND ADDITIONAL SIGNS AND DEVICES REQUIRED FOR THE OVERALL WORKSITE TRAFFIC MANAGEMENT SCHEME ARE IN PLACE TO PROVIDE ADVANCE WARNING AND INFORMATION TO ROAD USERS.
3. THE TRAFFIC CONTROLLER SHOULD STAND APPROXIMATELY 30 METERS IN ADVANCE OF WORK AREA.
4. THE TRAFFIC CONTROLLER SHOULD BE VISIBLE TO THE APPROACHING ROAD USER AND STAND ON THE CURB SIDE OR SHOULDER CLEAR OF THE TRAVELLED PATH TO VIEW BOTH THE WORKSITE AND ONCOMING TRAFFIC.
5. TRAFFIC CONTROLLER WILL NEED TO USE TWO-WAY RADIOS TO ENSURE ADEQUATE COMMUNICATION OVER LONG DISTANCE OR WHERE THERE IS LIMITED VISIBILITY.

NOTE:

1. ROADWORK AHEAD - THE FIRST ADVANCE WARNING SIGN SEEN BY DRIVERS, SHOULD BE LOCATED AT MINIMUM DISTANCE "20" METERS (D IS THE APPROACHED SPEED OF TRAFFIC) BEFORE THE START OF THE WORKS, OR IF THERE IS A TRANSITION AREA, THE START OF THE TAPER.
2. OTHER SIGN IN ADVANCE WARNING AREA SHOULD BE SPACE "D" METERS APART.
3. LONGITUDINAL BUFFER SPACE SHOULD BE 20 TO 30 METERS LONG BUT CAN BE EXTENDED IF THE WORK AREA IS HIDDEN FROM APPROACHING ROAD USER, e.g. BY A CURVE OR CREST.
4. LATERAL BUFFER SPACE SHOULD BE A MINIMUM OF 1.2 METERS IN SLOW SPEED AREAS, OR IN HIGH SPEED AND HIGH VOLUME AREAS, A LARGE ADJACENT CLEARANCE IN DESIRABLE WITH SAFETY BARRIERS ADJACENT TO THE WORK AREA.
5. LOCATION OF TRAFFIC CONTROLLER SHOULD BE 30 METERS IN ADVANCE OF WORK AREA, WITH GOOD SITE DISTANCE OF ONCOMING TRAFFIC, WITH AN ESCAPE PATH IN AN EMERGENCY, WHERE THE OTHER TRAFFIC CONTROLLER IS VISIBLE, AND CAN BE SEEN BY THE ROAD USER.

REFERENCES:

- D.O. NO.13, SERIES 2018 - GUIDELINE FOR THE PREPARATION OF COST ESTIMATES FOR THE TRAFFIC MANAGEMENT AND SAFETY AND HEALTH REQUIREMENTS FOR THE CONSTRUCTION AND MAINTENANCE OF ROADS, BRIDGES AND SAFETY AND HEALTH.
- ROAD SAFETY MANUAL 2004
- PART 2: ROAD SAFETY AND PAVEMENT DESIGN MANUAL 2012.



	COMMENTS
1. ROAD LAYOUT	THE PROJECT IS LOCATED AT BRGY. MANDUG & BRGY. TIGATTO. THE PROJECT HAS AN EXISTING FOUR-LANE PCOP ROAD.
2. ROAD GEOMETRY	THE PROPOSED PROJECT FOR THIS SECTION IS THE CONSTRUCTION OF STONEMASONRY CATCHWALL.
3. SIGHT DISTANCE	THE PROJECT IS SITUATED IN FLAT TO ROLLING TERRAIN. SIGHT DISTANCE IS VERY ADEQUATE FOR THE WHOLE STRETCH OF THE PROJECT.
4. VULNERABLE ROAD USER FACILITIES	MOTORCYCLES, TUKTUKS, TRICYCLES, PRIVATE CARS, A FEW CARGO VANSTUCKS, AND PEDESTRIANS ESPECIALLY SINCE THE PROJECT TRAVERSES THRU BRGY. MANDUG & BRGY. TIGATTO WHERE STORES ARE PRESENT ON BOTH SIDES AND FOOT TRAFFIC IS CONSIDERABLE.
5. PAVEMENT CONDITION	EXISTING ROADWAY CONSISTS OF PCOP.
6. EXISTING SIGNS	THERE ARE EXISTING SIGNS ALONG THE PROJECT.
7. LIGHTING FACILITIES	THERE ARE NO EXISTING LIGHTING FACILITIES THAT WILL BE AFFECTED BY THE PROJECT.
8. ABUTTING ACCESSES	NONE.
9. ADJOINING ROAD NETWORKS	NONE.
10. OTHER POSSIBLE CONSTRAINTS	NONE.

SCHEME 1 CONSTRUCTION OF PAVED SHOULDER AND SLOPE PROTECTION STRUCTURES

TERMINATION AREA			
SPEED OF TRAFFIC (KPH)	LENGTH OF DIVERGENCE LATERAL SHIFT TAPER (m)	LENGTH OF MERGE TAPER (m)	LENGTH OF STRAIGHT SECTION BETWEEN MULTI-LANE CLOSURES (m)
≤ 40	40	80	% OF LEAD TAPER LENGTH
50	50	100	
60	60	120	
70	70	140	
80	80	160	
90	90	180	
100	100	200	
110	110	220	

APPROACH CLEARANCE AREA	
SPEED OF TRAFFIC (KPH)	BUFFER LENGTH (m)
≤ 40	0
50	0
60	20 - 30
70	20 - 30
80	20 - 30
90	20 - 30
100	20 - 30
110	20 - 30

ADVANCE WARNING AREA	
SPEED OF TRAFFIC (KPH)	SIGNAGE SPACING (10' VALUE) (m)
≤ 40	0 - 5
50	15
60	45
70	70
80	80
90	90
100	100
110	110

TRANSITION AREA			
SPEED OF TRAFFIC (KPH)	LENGTH OF DIVERGENCE LATERAL SHIFT TAPER (m)	LENGTH OF MERGE TAPER (m)	LENGTH OF STRAIGHT SECTION BETWEEN MULTI-LANE CLOSURES (m)
≤ 40	40	80	80
50	50	100	75
60	60	120	90
70	70	140	105
80	80	160	120
90	90	180	135
100	100	200	150
110	110	220	165

1 TRAFFIC MANAGEMENT LAYOUT



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GEN. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALLAWA ROAD (MANNUG SECTION), DAVAO CITY

SHEET CONTENTS:
TRAFFIC MANAGEMENT LAYOUT

DRAFTED AND PREPARED:
LESTER G. PADILLA
ENGINEER II
DATE: 01/06/2025

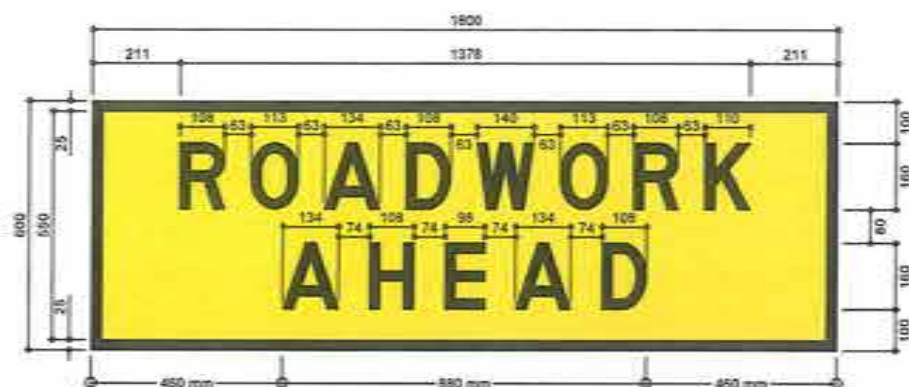
REVIEWED:
ALVIN A. GINGGAY
ENGINEER II
DATE: 01/06/2025

SUBMITTED:
JUDY B. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION
DATE: 01/06/2025

RECOMMENDED:
JOSE LUIS B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE: 01/06/2025

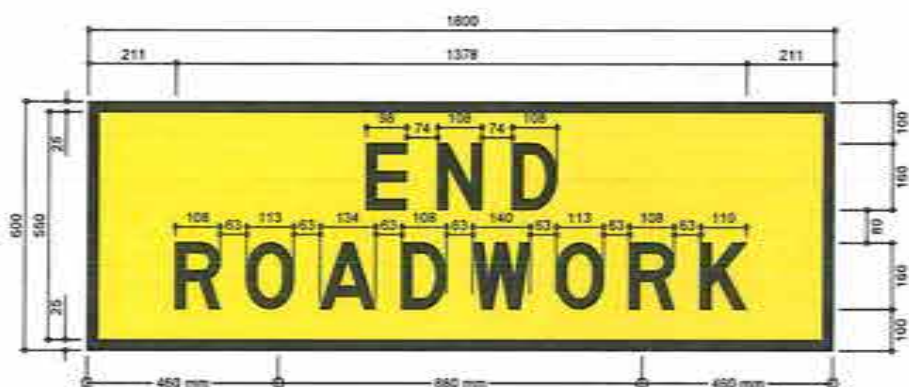
APPROVED:
JUDY B. CORDON
REGIONAL DIRECTOR
DATE: 01/06/2025

SET NO. B
SHEET NO. 19
01/06 44



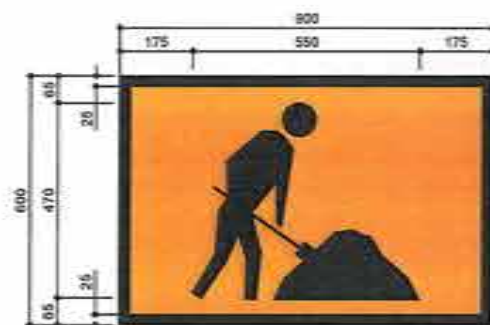
ROADWORK AHEAD DETAILS

SIGN NO.	SIZE (mm)	LETTERS/SYMBOLS	BACKGROUND	TYPE OF SIGNS
T1-1	1800 X 600	LINE 1 - BLACK 200 DM LINE 2 - BLACK 160 DM	YELLOW REFLECTORIZED	ADVANCE WARNING SIGNS



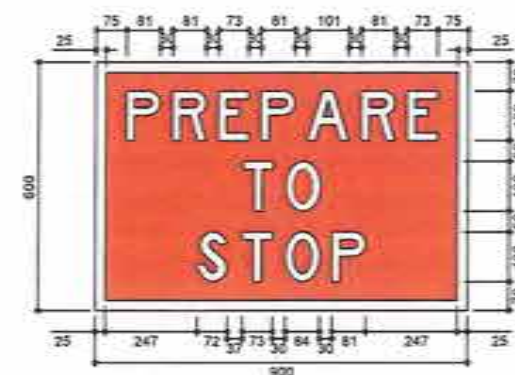
END ROADWORK DETAILS

SIGN NO.	SIZE (mm)	LETTERS/SYMBOLS	BACKGROUND	TYPE OF SIGNS
T2-18	1800 X 600	LINE 1 - BLACK 200 DM LINE 2 - BLACK 160 DM	YELLOW REFLECTORIZED	ADVANCE WARNING SIGNS



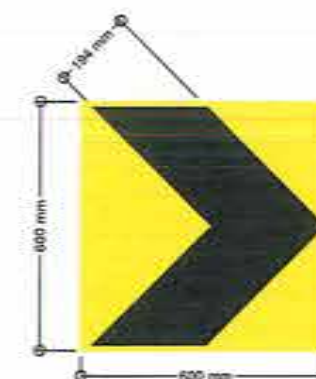
WORKMEN AHEAD (SYMBOLIC) DETAILS

SIGN NO.	SIZE (mm)	LETTERS/SYMBOLS	BACKGROUND	TYPE OF SIGNS
T1-5	900 X 600	BLACK	RED/ORANGE - FLUORESCENT FOR DAY USE - REFLECTORIZED FOR NIGHT	ADVANCE WARNING SIGNS



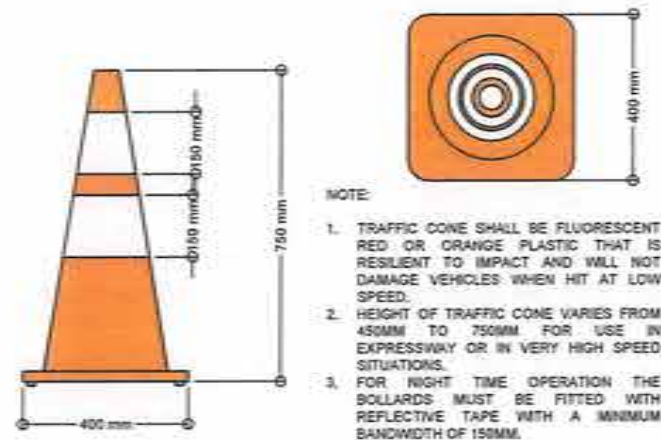
PREPARED TO STOP DETAILS

SIGN NO.	SIZE (mm)	LETTERS/SYMBOLS	BACKGROUND	TYPE OF SIGNS
T1-18	900 X 600	LINE 1 - WHITE 120 DM LINE 2 - WHITE 120 DM LINE 3 - WHITE 120 DM REFLECTORIZED	RED REFLECTORIZED	REGULATORY SIGNS



SPEED RESTRICTION DETAILS

SIGN NO.	SIZE (mm)	LETTERS/SYMBOLS	BACKGROUND	TYPE OF SIGNS
TS-5	600 X 600 TYPE B-1	BLACK 154 WIDE AT 45°	YELLOW REFLECTORIZED	TEMPORARY HAZARD MARKER

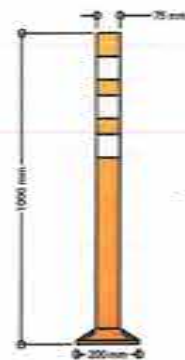


NOTE:

1. TRAFFIC CONE SHALL BE FLUORESCENT RED OR ORANGE PLASTIC THAT IS RESILIENT TO IMPACT AND WILL NOT DAMAGE VEHICLES WHEN HIT AT LOW SPEED.
2. HEIGHT OF TRAFFIC CONE VARIES FROM 450MM TO 750MM FOR USE IN EXPRESSWAY OR IN VERY HIGH SPEED SITUATIONS.
3. FOR NIGHT TIME OPERATION THE BOLLARDS MUST BE FITTED WITH REFLECTIVE TAPE WITH A MINIMUM BANDWIDTH OF 150MM.

SPACING	CONDITION
5 - 10 METERS	ON TAPER WHEN USED AROUND SMALL WORK SITES (MAY BE REDUCED TO 3m TO GUIDE PEDESTRIANS OR TO PREVENT TRAFFIC TAKING A WRONG TURN THROUGH A GAP IN THE LINE OF BOLLARDS)
10 - 20 METERS	WHEN USED AS LONGITUDINAL SEPARATION BETWEEN OPPOSING TRAFFIC FLOWS WHEN USED AS LONGITUDINAL SEPARATION OF TRAFFIC FROM THE WORKSITE OR CLOSED LANE (MAY BE INCREASED TO 50m WHERE THE LENGTH OF BOLLARDS EXCEEDS 1KM)

1 TRAFFIC CONE
SCALE
MTS



PLAN



SPECIFICATION	
REFLECTIVE:	ROAD SAFETY POLE
COLOR:	ORANGE
MATERIAL:	PU MATERIAL ELASTIC, FLEXIBLE
REFLECTIVE FILM:	CRYSTAL LATTICE

NOTE:

1. BOLLARDS SHALL BE FLUORESCENT RED OR ORANGE PLASTIC THAT IS RESILIENT TO IMPACT AND WILL NOT DAMAGE VEHICLES WHEN HIT AT LOW SPEED.
2. HEIGHT OF BOLLARDS MUST BE UP TO 1 METER.
3. FOR NIGHT TIME OPERATION THE BOLLARDS MUST BE FITTED WITH REFLECTIVE TAPE WITH A MINIMUM BANDWIDTH OF 250MM.
4. SPACING @ 0.60 M. O.C.

2 SECTION
SCALE
b

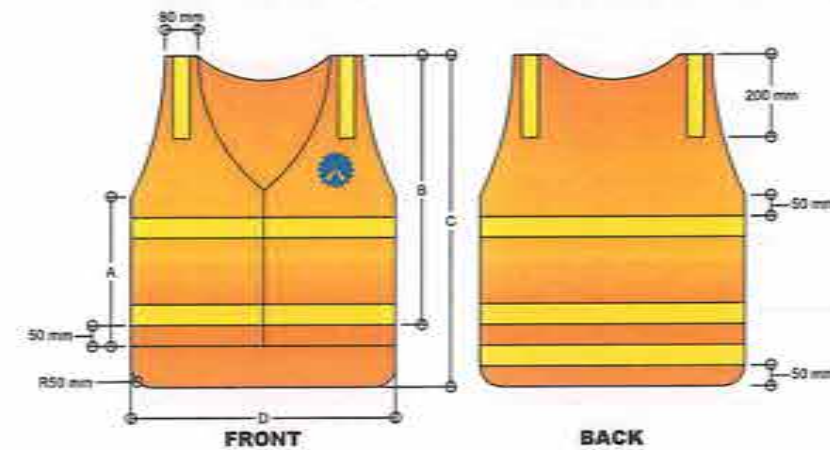
2 ISOMETRIC VIEW
SCALE
c

SPACING	CONDITION
5 - 10 METERS	ON TAPER WHEN USED AROUND SMALL WORK SITES (MAY BE REDUCED TO 3m TO GUIDE PEDESTRIANS OR TO PREVENT TRAFFIC TAKING A WRONG TURN THROUGH A GAP IN THE LINE OF BOLLARDS)
10 - 20 METERS	WHEN USED AS LONGITUDINAL SEPARATION BETWEEN OPPOSING TRAFFIC FLOWS WHEN USED AS LONGITUDINAL SEPARATION OF TRAFFIC FROM THE WORKSITE OR CLOSED LANE (MAY BE INCREASED TO 50m WHERE THE LENGTH OF BOLLARDS EXCEEDS 1KM)

2 FLEXIBLE BOLLARD DETAIL
SCALE
MTS

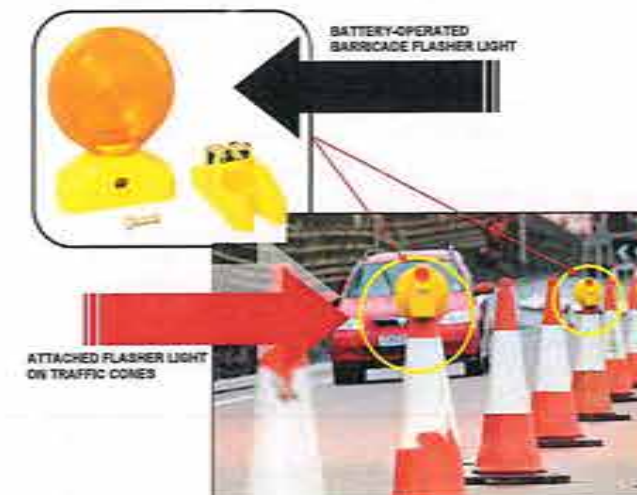
NOTE:

1. ALL PERSONNEL WORKING ON OR ADJACENT TO A ROADWORK SITE SHALL WEAR APPROPRIATE ROAD SAFETY MATERIALS SUCH AS HIGH VISIBILITY VEST (MADE FROM FLUORESCENT RED/ORANGE MATERIAL), HARD HAT AND SAFETY SHOES.
2. THE VEST SHALL BE WORN OVER NORMAL CLOTHING AND PROPERLY FASTENED SO THAT THE ENTIRE AVAILABLE AREA OF HIGH VISIBILITY MATERIAL CAN BE SEEN IN ANY DIRECTION. TO MAXIMIZE EFFECTIVENESS THE VEST SHOULD BE KEPT CLEAN AND IN GOOD CONDITION.
3. THE TRAFFIC SAFETY VEST SHALL BE MADE FROM FLUORESCENT RED OR ORANGE MATERIAL. THE VEST SHALL ALSO HAVE TWO (2) STRIPS OF YELLOW RETRO-REFLECTIVE MATERIAL AT THE FRONT AND THREE (3) STRIPS AT THE BACK. REFLECTIVE MATERIALS SHALL BE 50mm WIDE. DPHW LOGO SHALL BE 80mm DIAMETER. THE SAFETY VEST SHOULD HAVE A SECURE FASTENING PREFERABLY A ZIP.
4. THE JACKET MAY BE WORN OVER WET WEATHER CLOTHING. ALTERNATIVELY, WET WEATHER HIGH VISIBILITY CLOTHING SHALL BE MADE FROM WATER PROOF MATERIAL MATCHING THOSE PROPERTIES ABOVE FOR COLOR AND RETRO REFLECTIVITY.



SIZE	A (mm)	B (mm)	C (mm)	D (mm)
MEDIUM	280	600	750	580
LARGE	295	625	775	610
EXTRA LARGE	310	650	800	640

3 TRAFFIC SAFETY VEST DETAILS
SCALE
MTS



4 BARRICADE FLASHER LIGHT
SCALE
MTS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) -
JCT. MANDUG - CALLAGUA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS
TRAFFIC CONE
FLEXIBLE BOLLARD DETAIL
TRAFFIC SAFETY VEST DETAILS
BARRICADE FLASHER LIGHT

DRAFTED AND PREPARED
LESTER G. PADILLA
ENGINEER II
DATE

REVIEWED
ALGIN A. GINGRAN
ENGINEER II
DATE

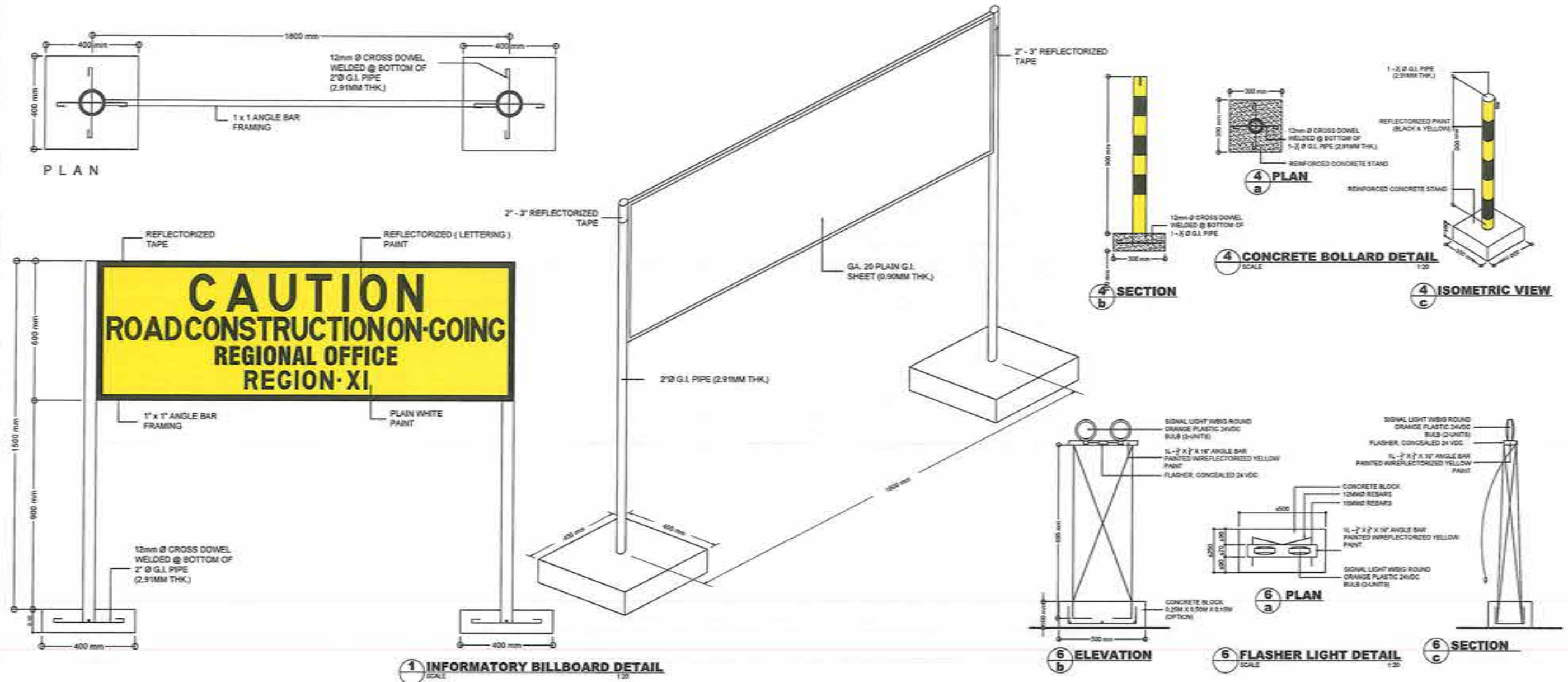
SUBMITTED
JUDY ANN BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION
DATE

RECOMMENDED
JOSEPH B. CABALLERO
ASST. REGIONAL DIRECTOR
DATE

APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO.
B
03/06

SHEET NO.
21
44

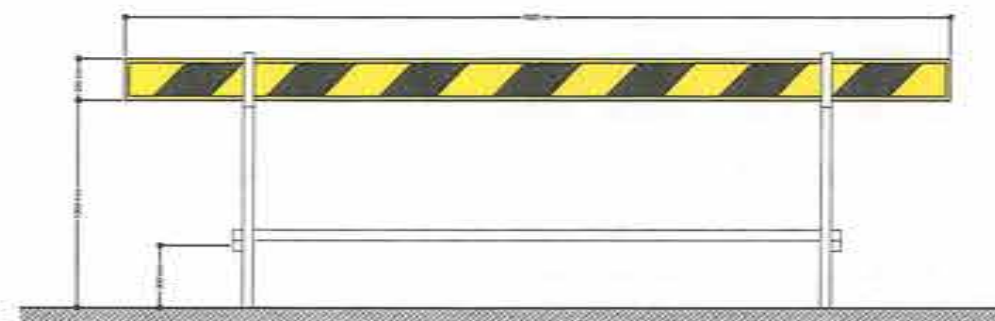


NOTE:

1. THE TAPE (CAUTION) SHALL BE TIED OR SUPPORT APPROXIMATELY 1 METER HIGH.
2. THE TAPE SHALL BE 100MM WIDE WITH ALTERNATING BLACK AND YELLOW STRIPES.

2 CONSTRUCTION OF SAFETY FENCE

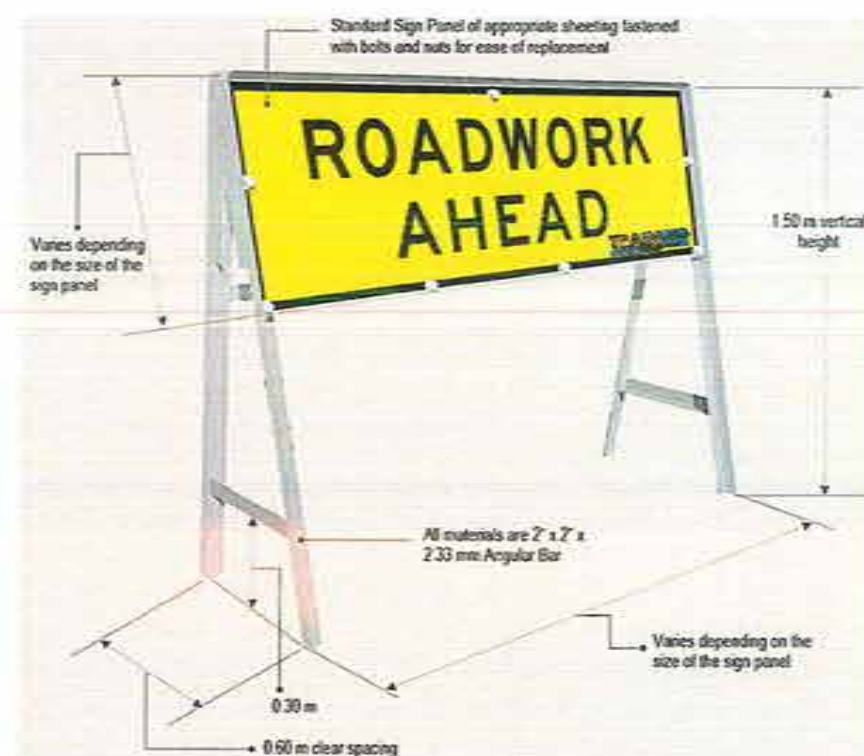
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHARIZ COR. R. MASSAVAL AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION: CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CASANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALAWAN ROAD (MANDUG SECTION), DAVAO CITY	SHEET CONTENTS: INFORMATORY BILLBOARD DETAIL CONSTRUCTION OF SAFETY FENCE CONCRETE BOLLARD DETAILS FLASHER LIGHT DETAIL	DRAFTED AND PREPARED: LESTER C. PADILLA ENGINEER II	REVIEWED: ALGIN A. GINGATAN ENGINEER III, SECTION CHIEF	SUBMITTED: JUDY ANN T. BERNARDINO CHIEF, PLANNING AND DESIGN DIVISION	RECOMMENDED: JOSEPH B. CABALLERO ASSISTANT REGIONAL DIRECTOR	APPROVED: JUDY B. CORDON REGIONAL DIRECTOR	SET NO. B SHEET NO. 22
---	---	---	---	---	---	--	--	--



NOTE:

1. BOARD DIMENSIONS: (4M X 0.15M X 0.20M) WITH DIAGONAL BLACK AND REFLECTIVE YELLOW STRIPES PREFERABLY TERMINATING IN YELLOW AT EACH END.
2. MOUNTING HEIGHT: APPROXIMATELY 1 METER USING TRESTLES (SHOULD BE ERECTED PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW).
3. BARRIER BOARD SHALL NOT BE USED FOR DELINEATION PURPOSES OR INSTALLED PARALLEL TO VEHICULAR TRAFFIC UNLESS THERE IS AN OFFSET OF AT LEAST FOUR (4) METERS FROM THE TRAVELLED PATH.

1 BARRIER BOARD DETAIL



2 ROAD SIGN DETAILS



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION:

CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CASANTIAN ROAD (ACACIA SECTION) -
JCT. MANDUG - CALUKA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS:

ROAD SIGN DETAIL
BARRIER BOARD DETAIL

DRAFTED AND PREPARED:

LESTER G. PROULLA
ENGINEER III

DATE:

REVIEWED:

ALGIN A. GINGATAN
ENGINEER III

DATE:

SUBMITTED:

JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION

DATE:

RECOMMENDED:

JOSEITO S. CABALLERO
ASSISTANT REGIONAL DIRECTOR

DATE:

APPROVED:

JUDY B. CORDON
REGIONAL DIRECTOR

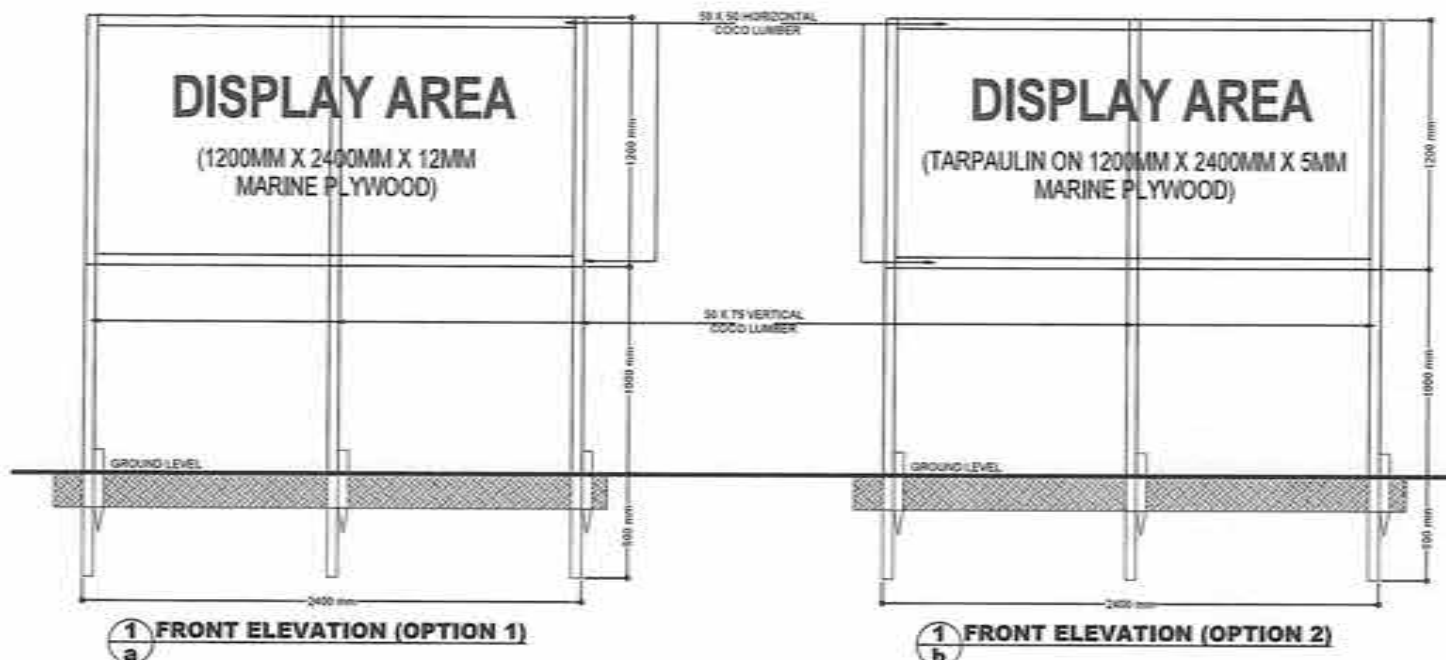
DATE:

SET NO.

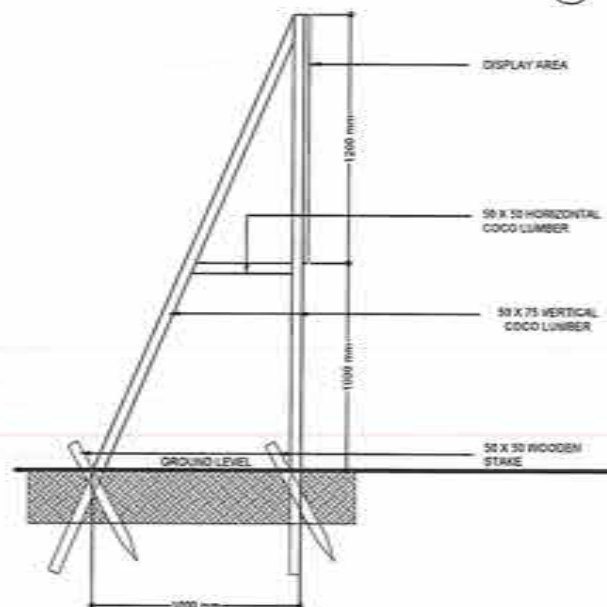
B
05/06

SHEET NO.

23
44



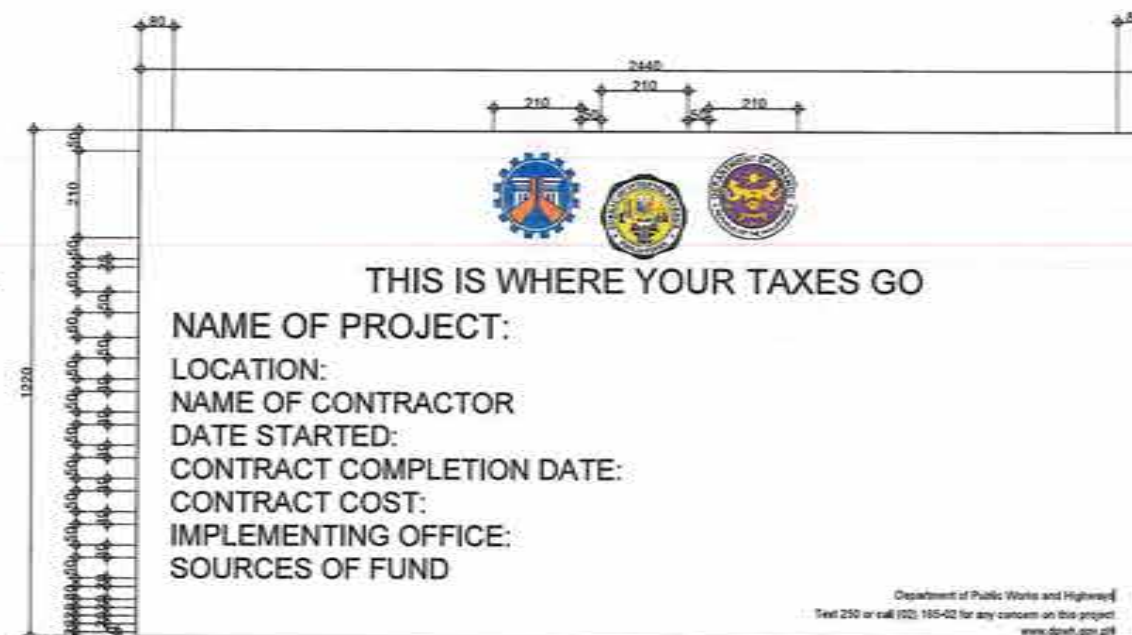
1 BILLBOARD DETAILS
SCALE: 1/40



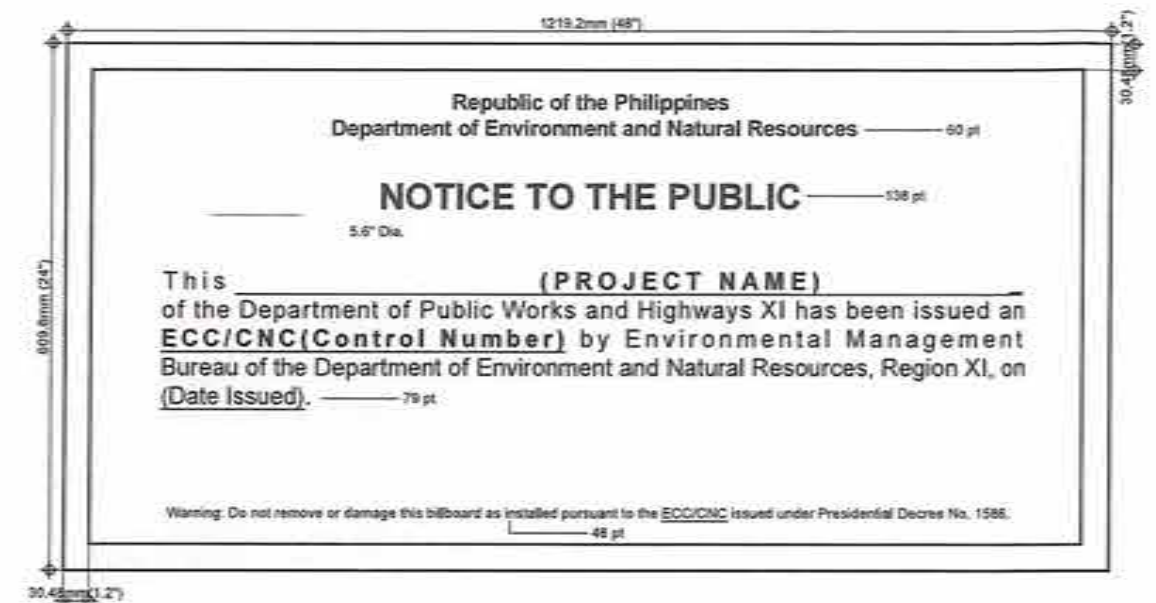
1 ELEVATION



1 ORIENTATION



NOTE:
For source of Fund, state if DPWH Regular Budget, Priority Development Assistance Fund, DepEd/DA/DAR Budget, Calamity Fund, MVUC Fund etc.



Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
Regional Office No. XI
Gov. Chavez Cor. R. Magsaysay Avenue, Davao City

Project: _____ Cost: _____
Location: _____ Fund Sources: _____

Implementing Agencies: _____
Development Partner's: _____
Contractor/Supplier: _____
Brief Description of Project: _____

Project Details:

Project Date			Project Status				Remarks
Duration	Started	Target Date of Completion	Percentage of Completion	As of (Date)	Cost Incurred to Date	Date Completed	

For Particular of complaints about this project, please contact the Regional Office or Cluster which has audit jurisdiction on this project.

COA Regional Office No./Cluster : XI
Address : Buhangin, Davao City
Contact No. : (082) 241-2941 or Text COA Citizens Desk (0915-5391-957)

NOTES FOR COA BILLBOARD:

- TARPULIN, WHITE, 8FT x 8 FT
- RESOLUTION: 70DPI
- FONT: HELVETICA
- FONT SIZE : MAIN INFORMATION - 3"
- SUB-INFORMATION - 1"
- FONT COLOR: BLACK



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTAN ROAD (ACACIA SECTION) -
JCT. MINOUG - CALLAWA ROAD (MANEUG SECTION),
DAVAO CITY

SHEET CONTENTS
BILLBOARD DETAIL

DRAFTED AND PREPARED
LESTER Q. PADILLA
ENGINEER
DATE

REVIEWED
ALGIN A. GINGO
ENGINEER II, SECTION CHIEF
DATE

SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION
DATE

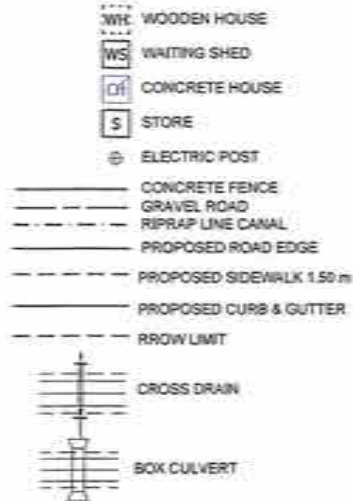
RECOMMENDED
JOSE LITO B. CABALLERO
ASST. REGIONAL DIRECTOR
DATE

APPROVED
JULY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO. 24
SHEET NO. 44

SECTION 1
(STONE MASONRY CATCHWALL)

LEGEND:



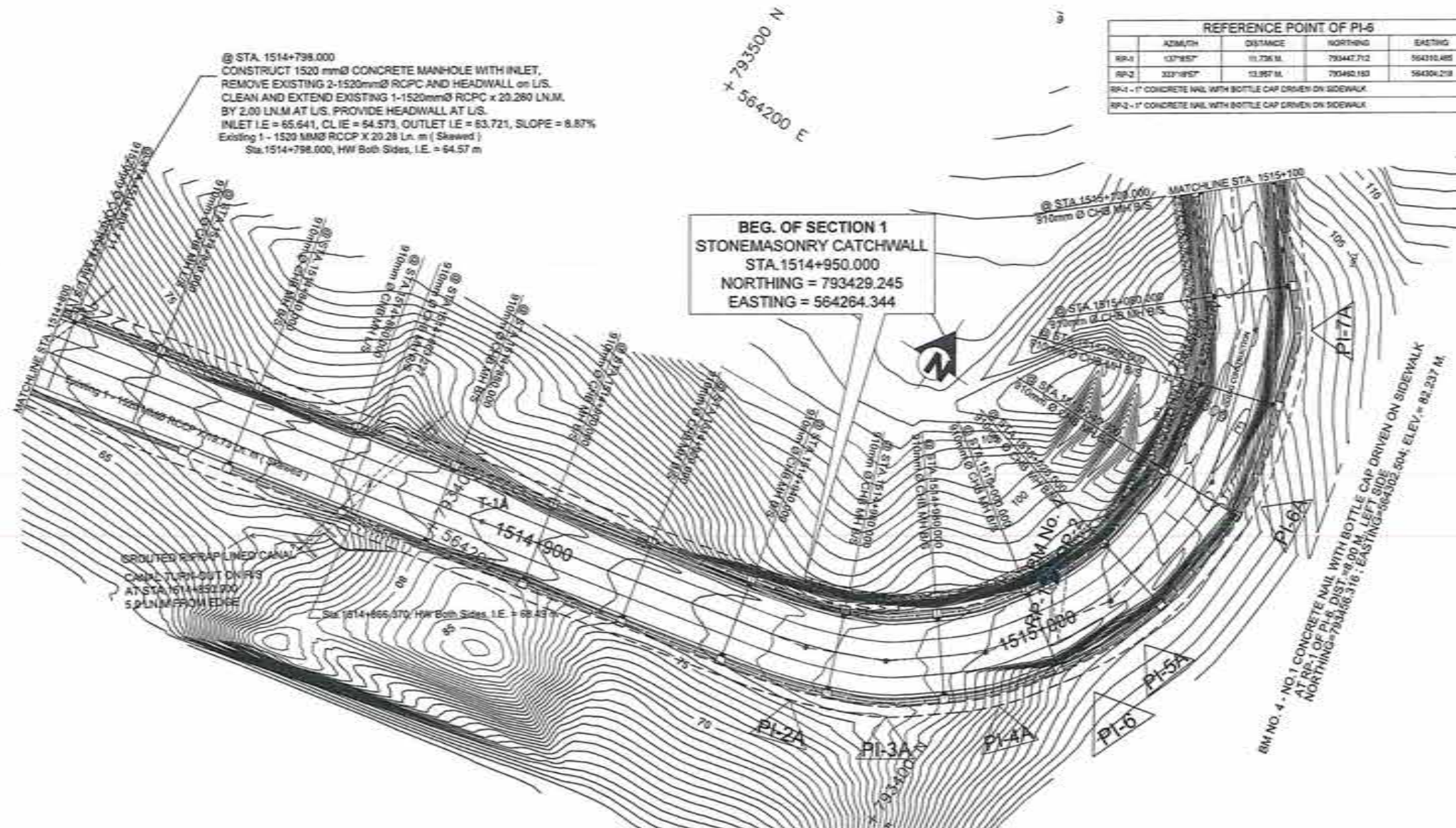
ELEMENTS OF CURVE														
PI-#	PI STATION	NORTHING	EASTING	I	D	R	T	E	Lc	Pc	PI	s	w	V (gph)
PI-2A	1514+954.257	793419.969	564271.376	11°32'13"	11°27'33"	100.000	10.102	0.939	20.136	1514+944.155	1514+964.291			
PI-3A	1514+969.608	793426.231	564285.468	14°35'03"	38°11'50"	30.000	3.939	0.245	7.636	1514+965.789	1514+972.406			
PI-4A	1514+988.451	793438.503	564300.236	17°22'05"	28°28'52"	40.000	6.189	0.464	12.125	1514+982.341	1514+994.468			
PI-5A	1515+013.984	793455.229	564314.595	27°20'21"	22°02'13"	52.000	12.647	1.516	24.812	1515+001.337	1515+026.149			
PI-6A	1515+042.995	793488.517	564318.057	24°30'49"	28°28'52"	40.000	8.690	0.933	17.114	1515+034.325	1515+051.418			
PI-7A	1515+072.688	793517.545	564306.911	23°27'50"	341°58'19"	3.000	0.623	0.084	1.229	1515+072.065	1515+073.290			

STATION COORDINATES			
POINT	STATION	NORTHING	EASTING
T-1A	1514+888.651	793405.845	564297.311

TRAVERSE LINE		
PI-#	AZMUTH	DISTANCE
PI-1A TO T-1A	257°37'22"	14.872 M.
T-1A TO PI-1A	257°39'23"	234.521 M.
PI-1A TO PI-2A	257°34'05"	55.806 M.
PI-2A TO PI-3A	246°01'52"	15.425 M.
PI-3A TO PI-4A	231°25'48"	18.884 M.
PI-4A TO PI-5A	214°04'43"	25.627 M.
PI-5A TO PI-6A	185°44'22"	28.482 M.
PI-6A TO PI-7A	162°13'23"	28.359 M.
PI-7A TO PI-8A	138°45'43"	37.323 M.

REFERENCE POINT OF PI-5			
RP-#	AZMUTH	DISTANCE	NORTHING
RP-1	137°05'27"	11.736 M.	793447.712
RP-2	323°18'57"	13.957 M.	793462.183

RP-1 - 1" CONCRETE NAIL WITH BOTTLE CAP DRIVEN ON SIDEWALK.
RP-2 - 1" CONCRETE NAIL WITH BOTTLE CAP DRIVEN ON SIDEWALK.



PLAN
SCALE 1:700 m



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTAN ROAD (ACACIA SECTION)
- JCT. WANDUG - CULLAWA ROAD (MANDUG SECTION),
DARAO CITY

SHEET CONTENTS
PLAN FOR SECTION 1

SURVEYED:
RUEL M. BACAY
ENGINEER I
DATE
CHECKED:
DANIEL M. CARRERA
ENGINEER II
DATE

PREPARED:
LESTER G. PADILLA
ENGINEER I
DATE
CHECKED:
ALVIN A. GINGATAN
ENGINEER II
DATE

SUBMITTED:
JUDY ANN W. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION
DATE

RECOMMENDED:
JOSEFINO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED:
JUDY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO. C
SHEET NO. 25
0115 44

LEGEND:

- WH WOODEN HOUSE
- WS WAITING SHED
- CH CONCRETE HOUSE
- S STORE
- ⊕ ELECTRIC POST
- CONCRETE FENCE
- GRAVEL ROAD
- RIPRAP LINE CANAL
- PROPOSED ROAD EDGE
- PROPOSED SIDEWALK 1.50 m
- PROPOSED CURB & GUTTER
- ROW LIMIT
- CROSS DRAIN
- BOX CULVERT

ELEMENTS OF CURVE

PI-No.	PI STATION	NORTHING	EASTING	I	D	R	T	E	Lc	Pc	PI	a	w	V (kph)
PI-8A	1515+109.994	793565.112	564284.308	28°15'35"	76°23'40"	15.000	3.776	0.468	7.396	1515+106.218	1515+113.816			
PI-9A	1515+144.308	793578.718	564278.585	44°57'54"	45°50'12"	25.000	10.348	2.056	19.629	1515+133.871	1515+153.591			
PI-10A	1515+179.316	793609.304	564295.873	14°46'17"	22°59'56"	50.000	6.481	0.418	12.990	1515+172.854	1515+185.725			
PI-11A	1515+200.562	793623.909	564311.203	09°12'22"	11°27'32"	100.000	8.051	0.324	16.068	1515+192.511	1515+208.579			
PI-12A	1515+269.252	793666.867	564364.187	15°54'45"	12°43'51"	90.000	12.579	0.875	24.995	1515+256.674	1515+281.669			
PI-13A	1515+309.006	793701.517	564378.552	26°12'48"	11°41'25"	98.000	22.832	2.625	44.864	1515+306.183	1515+331.048			
PI-14A	1515+343.408	793736.841	564377.345	11°13'05"	22°59'56"	50.000	4.911	0.241	9.790	1515+338.498	1515+348.284			
PI-15A	1515+368.993	793763.406	564378.796	16°12'33"	14°19'26"	80.000	11.382	0.807	22.632	1515+357.601	1515+389.230			
PI-16A	1515+400.050	793790.151	564354.711	17°17'23"	11°27'31"	100.000	15.204	1.149	30.176	1515+384.847	1515+415.023			

TRAVERSE LINE

PI-#	AZIMUTH	DISTANCE
T-1A TO PI-12A	218°32'43"	15.352 M.
PI-12A TO PI-13A	202°38'55"	29.828 M.
PI-13A TO PI-14A	178°24'17"	35.183 M.
PI-14A TO PI-15A	185°11'11"	25.616 M.
PI-15A TO PI-16A	148°58'38"	31.289 M.
PI-16A TO PI-17A	121°41'19"	44.816 M.

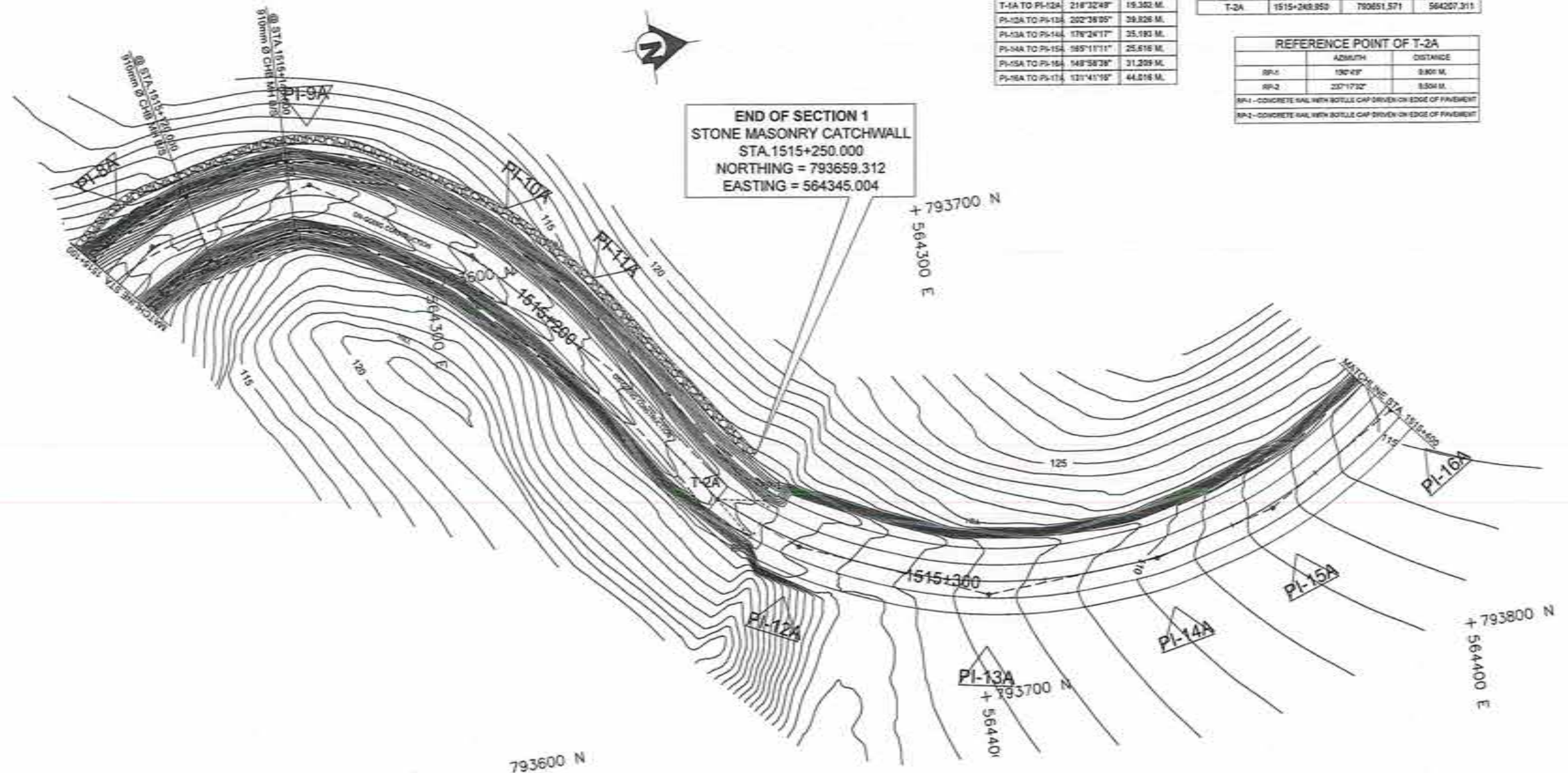
STATION COORDINATES

POINT	STATION	NORTHING	EASTING
T-2A	1515+248.950	793651.571	564207.311

REFERENCE POINT OF T-2A

	AZIMUTH	DISTANCE
RP-1	192°43"	9.801 M.
RP-2	237°17'32"	9.504 M.

RP-1 - CONCRETE RAIL WITH BOTTLE CAP DRIVEN ON EDGE OF PAVEMENT
 RP-2 - CONCRETE RAIL WITH BOTTLE CAP DRIVEN ON EDGE OF PAVEMENT

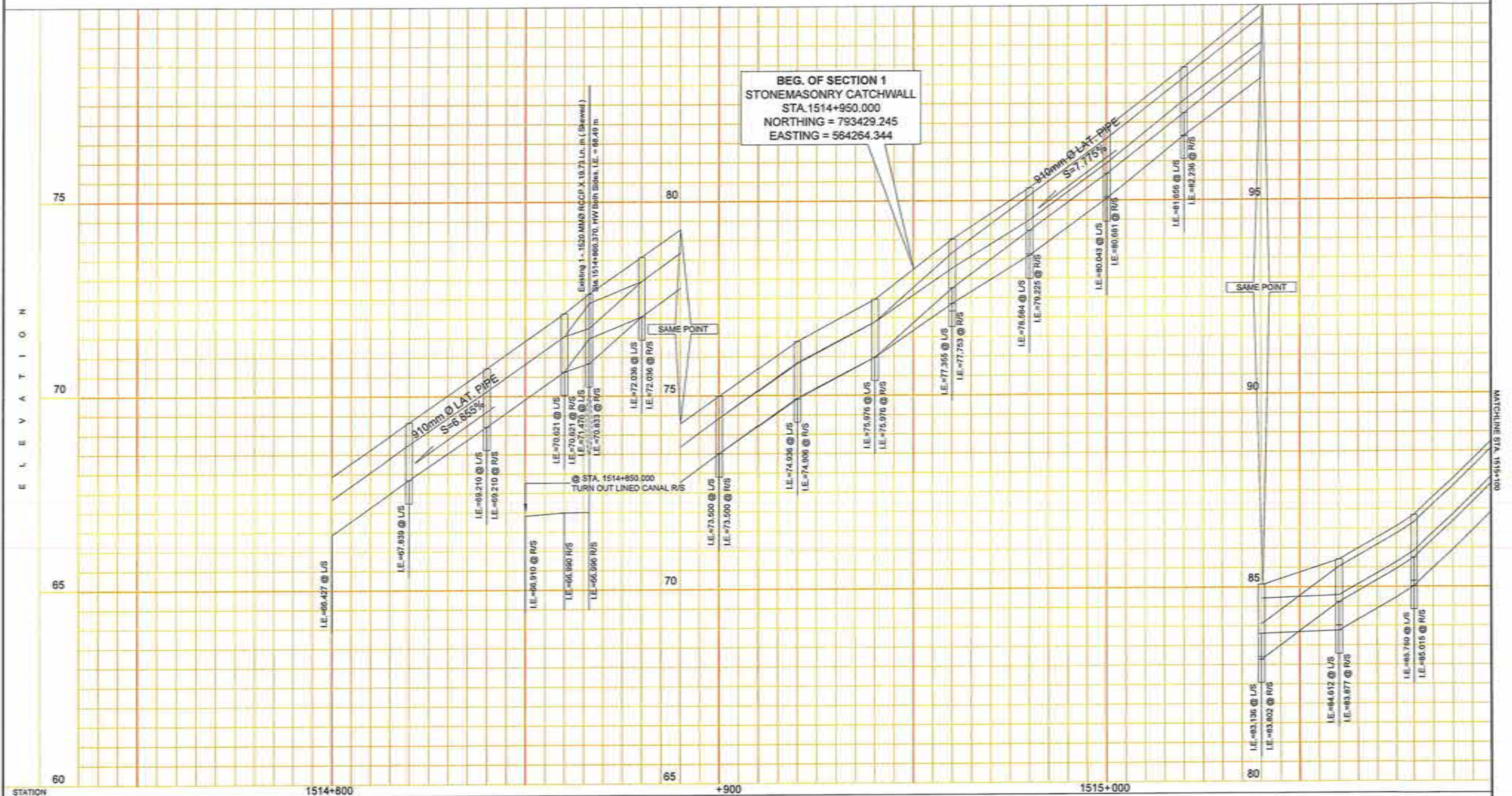


PLAN
 SCALE 1:700 m.

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI 506, CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	SURVEYED:	PREPARED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.	
	CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALLAMIA ROAD (MANDUG SECTION), DAVAO CITY	PLAN FOR SECTION 1	DATE: CHECKED: DATE:	DATE: CHECKED: DATE:	DATE: CHECKED: DATE:	DATE: CHECKED: DATE:	DATE: CHECKED: DATE:	JUDY B. CORDON REGIONAL DIRECTOR	C 02/15	26 44
			DATE: CHECKED: DATE:	DATE: CHECKED: DATE:	DATE: CHECKED: DATE:	DATE: CHECKED: DATE:	DATE: CHECKED: DATE:	DATE: CHECKED: DATE:	DATE: CHECKED: DATE:	JUDY B. CORDON REGIONAL DIRECTOR

PROFILE

SCALE 1:700 m. HOR.
SCALE 1:70 m. VERT.



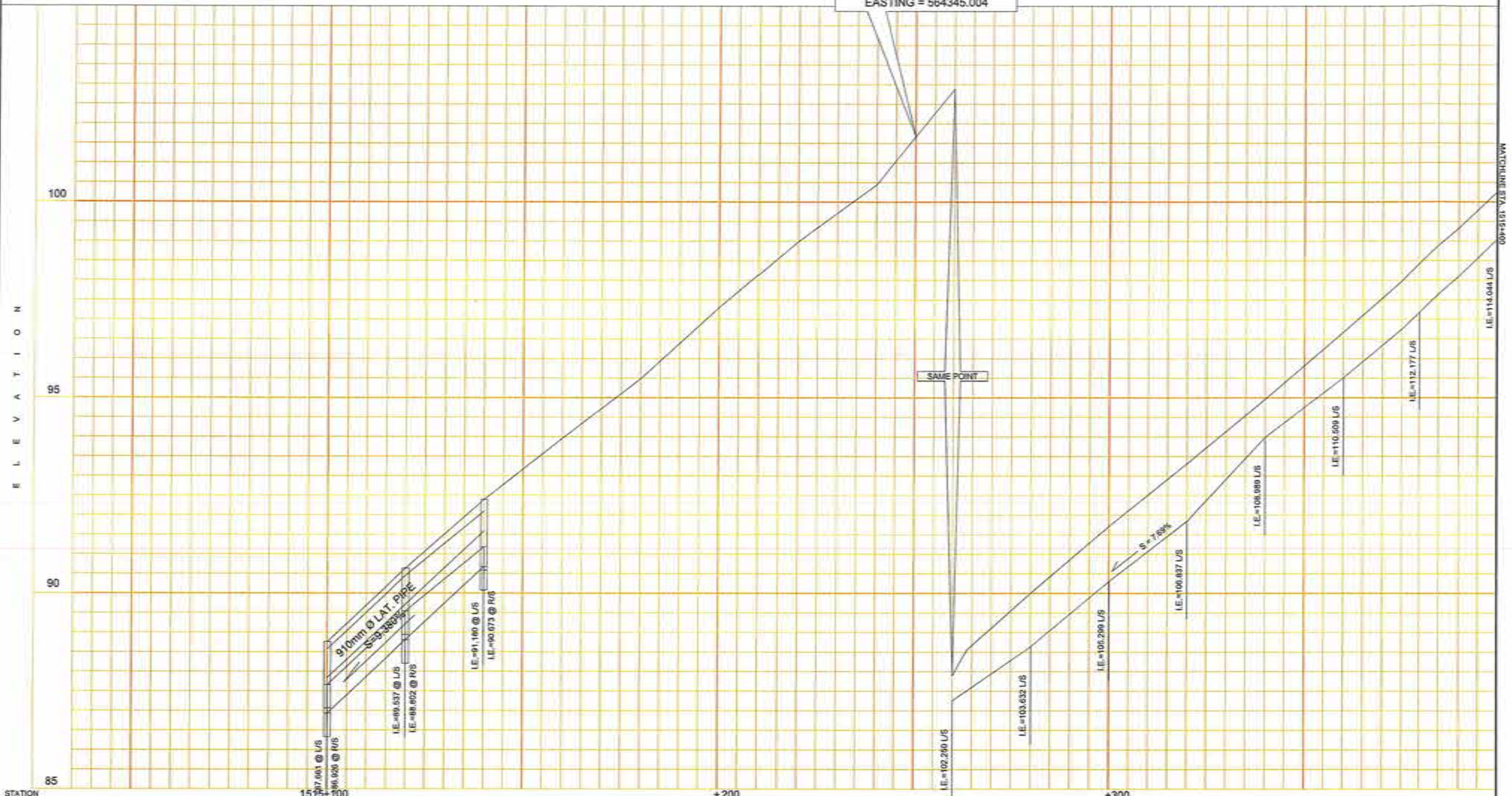
FINISHED GRADE ELEVATION	F O L L O W E X I S T I N G E L E V A T I O N																		
EXISTING ROAD ELEVATION		67.788 67.931	69.323	70.714	72.125	72.627	73.674	74.984	76.392	77.470	79.011	80.329	81.859	83.418	85.068	86.709	88.847	90.758	
WIDENING	L																		
	R																		
SUPER ELEVATION	F O L L O W E X I S T I N G S U P E R E L E V A T I O N																		

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. B. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALLARUA ROAD (MANDUG SECTION), DAVAO CITY	SHEET CONTENTS PROFILE FOR SECTION 1	SURVEYED DATE: _____ CHECKED: _____ DATE: _____	PREPARED DATE: _____ CHECKED: _____ DATE: _____	SUBMITTED DATE: _____ CHECKED: _____ DATE: _____	RECOMMENDED DATE: _____ CHECKED: _____ DATE: _____	APPROVED DATE: _____ CHECKED: _____ DATE: _____	SET NO. C 03/15	SHEET NO. 27/44
			ENGINEER I _____	ENGINEER I _____	ENGINEER I _____	ENGINEER I _____	ENGINEER I _____	ENGINEER I _____	
			ENGINEER II _____	ENGINEER II _____	ENGINEER II _____	ENGINEER II _____	ENGINEER II _____	ENGINEER II _____	
			ENGINEER III _____	ENGINEER III _____	ENGINEER III _____	ENGINEER III _____	ENGINEER III _____	ENGINEER III _____	

PROFILE

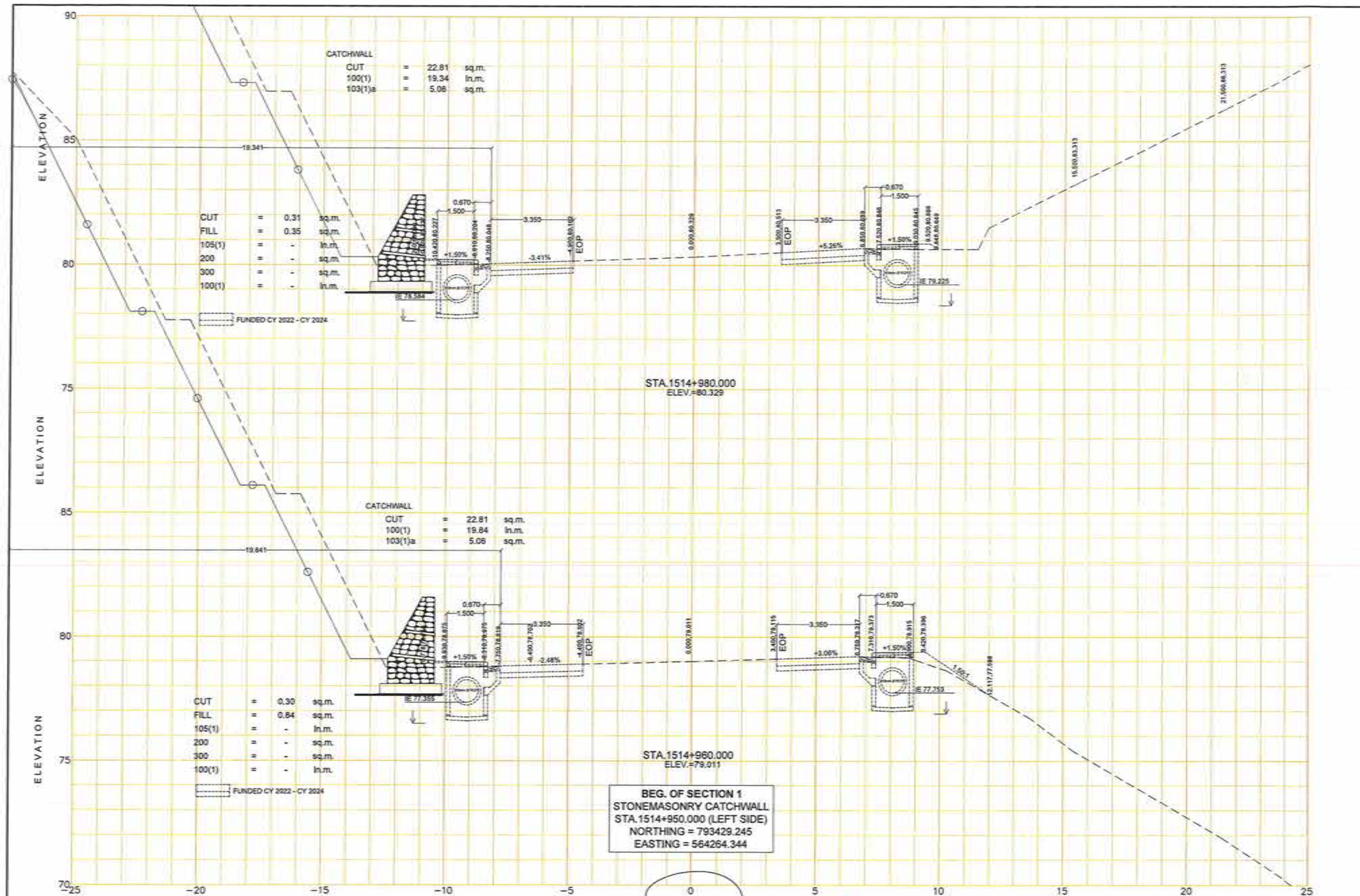
SCALE 1:700 m. HOR.
SCALE 1:70 m. VERT.

END OF SECTION 1
STONE MASONRY CATCHWALL
STA. 1515+250.000
NORTHING = 793659.312
EASTING = 564345.004



STATION	1515+000	1515+100	1515+200	1515+300	1515+400
FINISHED GRADE ELEVATION	88.758	90.634	92.368	93.958	95.484
EXISTING ROAD ELEVATION	88.758	90.634	92.368	93.958	95.484
WIDENING	L	R			
SUPER ELEVATION	FOLLOW EXISTING SUPER ELEVATION				

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. ORVILLE DOR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	SURVEYED	PREPARED	SUBMITTED	RECOMMENDED	APPROVED	SET NO.	SHEET NO.	
	CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALLANIA ROAD (MANDUG SECTION), DAVAO CITY	PROFILE FOR SECTION 1	DATE: <u>04/15/2015</u> CHECKED: <u>[Signature]</u> DATE: <u>04/15/2015</u> CHECKED: <u>[Signature]</u>	DATE: <u>04/15/2015</u> CHECKED: <u>[Signature]</u> DATE: <u>04/15/2015</u> CHECKED: <u>[Signature]</u>	DATE: <u>04/15/2015</u> CHECKED: <u>[Signature]</u> DATE: <u>04/15/2015</u> CHECKED: <u>[Signature]</u>	DATE: <u>04/15/2015</u> CHECKED: <u>[Signature]</u> DATE: <u>04/15/2015</u> CHECKED: <u>[Signature]</u>	DATE: <u>04/15/2015</u> CHECKED: <u>[Signature]</u> DATE: <u>04/15/2015</u> CHECKED: <u>[Signature]</u>	C	28	
									04/15	44



REPUBLIC OF THE PHILIPPINES
 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
 REGIONAL OFFICE NO. XI
 GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION:
 CONSTRUCTION OF ROAD SLOPE PROTECTION
 STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION)
 - JCT. MANDUG - DALLANIA ROAD (MANDUG SECTION),
 DAVAO CITY

SHEET CONTENTS:
 CROSS SECTIONS

SURVEYED:
 RUEL MEBACAY
 ENGINEER II
 DATE: 05/15/2023
 CHECKED:
 DANLO M. CARIAGA
 ENGINEER II
 DATE: 05/15/2023

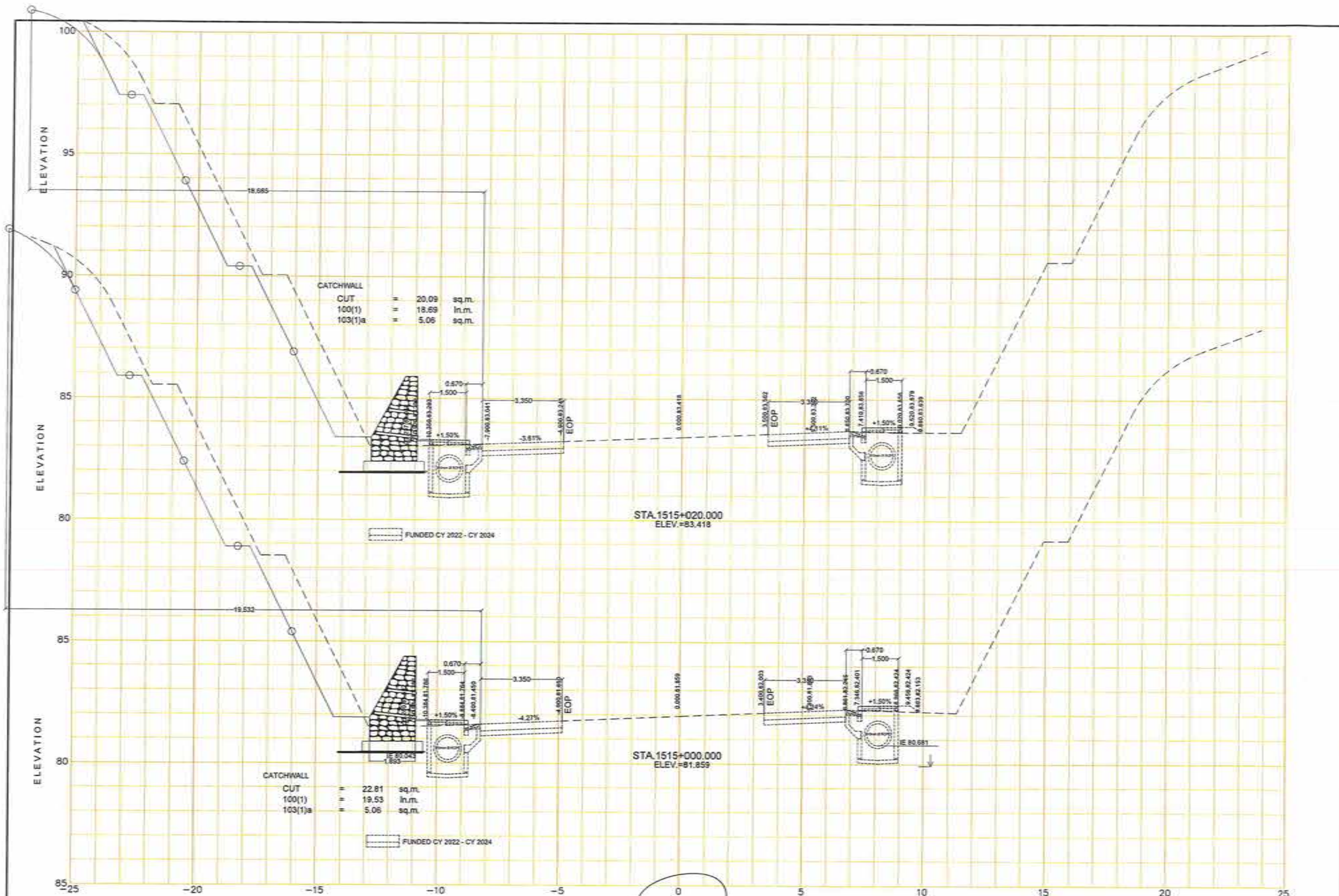
PREPARED:
 LESTER G. PADILLA
 ENGINEER II
 DATE: 05/15/2023
 CHECKED:
 ALGIN A. GIVONATAN
 ENGINEER II
 DATE: 05/15/2023

SUBMITTED:
 JUDY ANN T. BERNARDINO
 CHIEF, PLANNING AND DESIGN DIVISION
 DATE: 05/15/2023

RECOMMENDED:
 JOSELYN B. CABALLERO
 ASSISTANT REGIONAL DIRECTOR
 DATE: 05/15/2023

APPROVED:
 JUDY B. CORDON
 REGIONAL DIRECTOR
 DATE: 05/15/2023

SET NO. C
 SHEET NO. 29/44



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CIBANTAN ROAD (ACACIA SECTION)
- JCT. MANDUG - CALLAMIA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS
CROSS SECTIONS

SURVEYED
DATE
CHECKED
DATE
DANLO M. CARRAGA
ENGINEER II

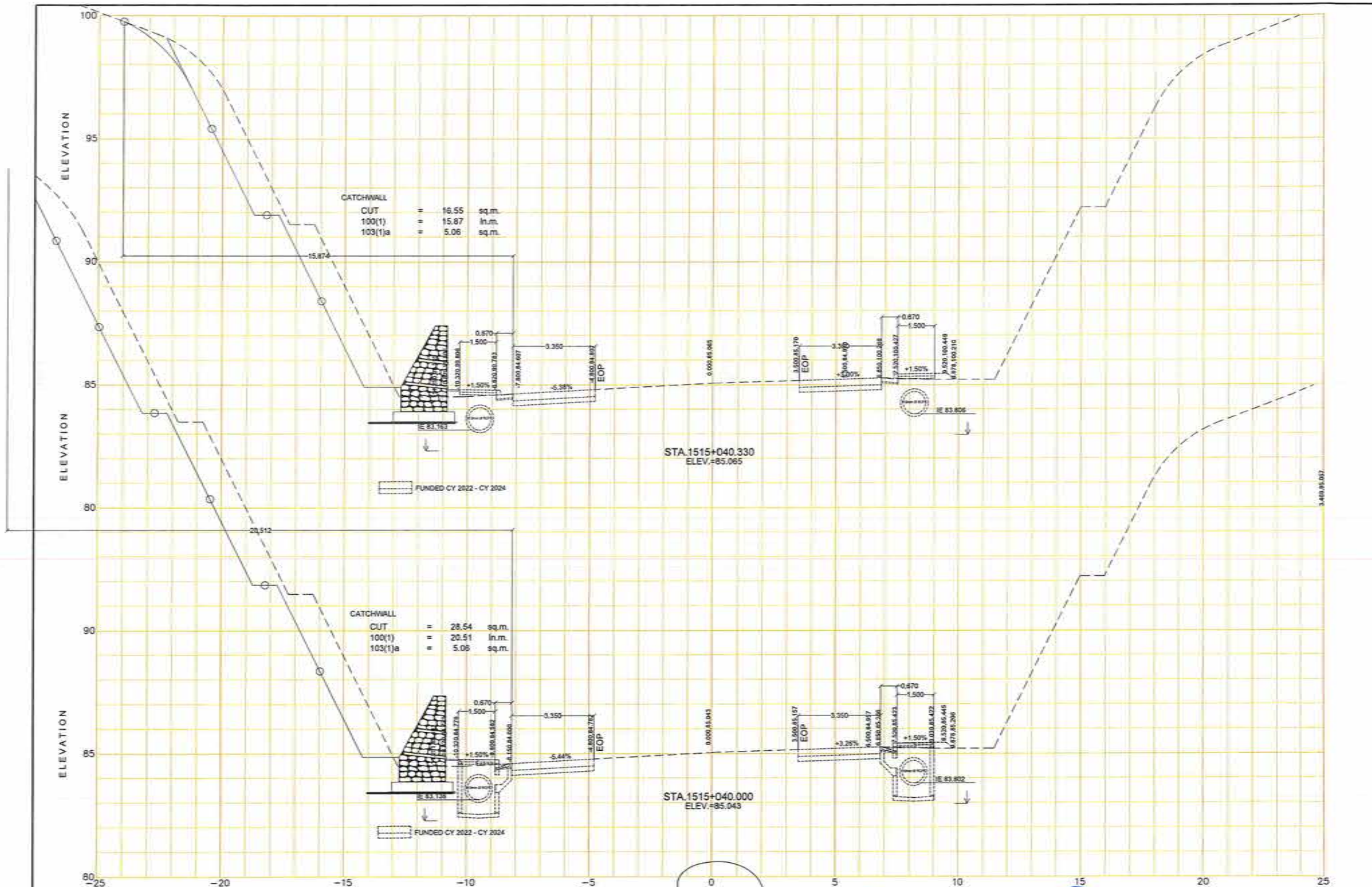
PREPARED
DATE
CHECKED
DATE
ALGIN A. GINGGA
ENGINEER II

SUBMITTED
DATE
JUDY M. T. BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION

RECOMMENDED
DATE
JOSEPH B. CABALLERO
ASSISTANT REGIONAL DIRECTOR

APPROVED
DATE
JUDY B. CORDON
REGIONAL DIRECTOR

SET NO.
C
06/15
SHEET NO.
30
44



REPUBLIC OF THE PHILIPPINES
 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
 REGIONAL OFFICE NO. XI
 GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION:
 CONSTRUCTION OF ROAD SLOPE PROTECTION
 STRUCTURE - JCT. OMBANTAN ROAD (ACACIA SECTION)
 - JCT. MANDUIS - CALLANUA ROAD (MANDUIS SECTION),
 DAVAO CITY

SHEET CONTENTS:
 CROSS SECTIONS

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 CHECKED:
 DATE:
 ENGINEER:
 ENGINEER II:
 ENGINEER III:

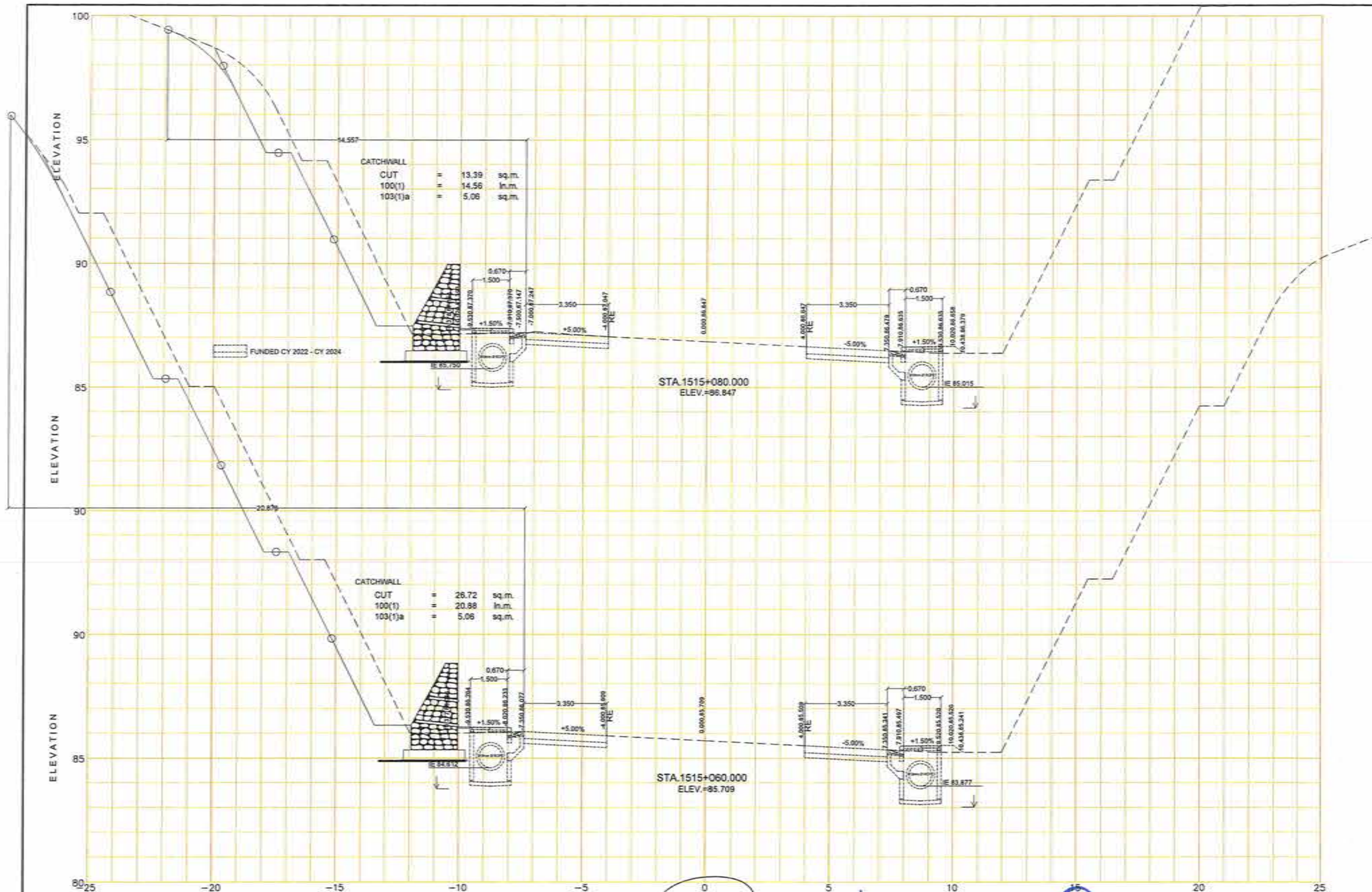
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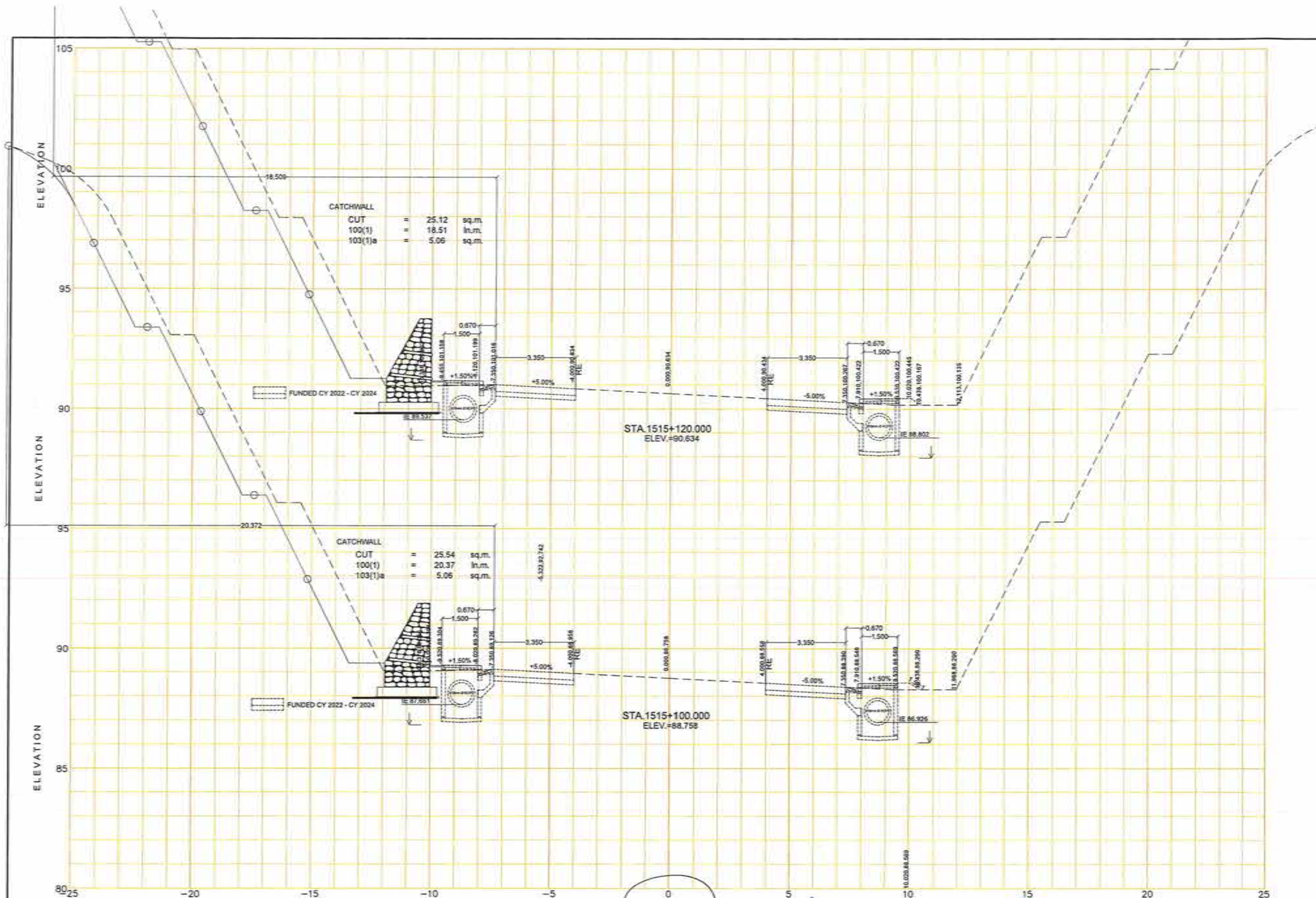
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 ENGINEER:
 ENGINEER II:
 ENGINEER III:

SET NO.
 SHEET NO.
 C 31
 07/15 44



REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	SURVEYED	PREPARED	SUBMITTED	RECOMMENDED	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. OBANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALLANBA ROAD (MANDUG SECTION), DAVAO CITY	CROSS SECTIONS	DATE: _____ CHECKED: _____ DATE: _____	DATE: _____ CHECKED: _____ DATE: _____	DATE: _____ CHECKED: _____ DATE: _____	DATE: _____ CHECKED: _____ DATE: _____	DATE: _____ CHECKED: _____ DATE: _____	DATE: _____ CHECKED: _____ DATE: _____	C 08/15



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, ORAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACADA SECTION)
- JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS
CROSS SECTIONS

SURVEYED
RICHARD RASOY
ENGINEER II
DATE
CHECKED
DAVID M. CERVANTES
ENGINEER II
DATE

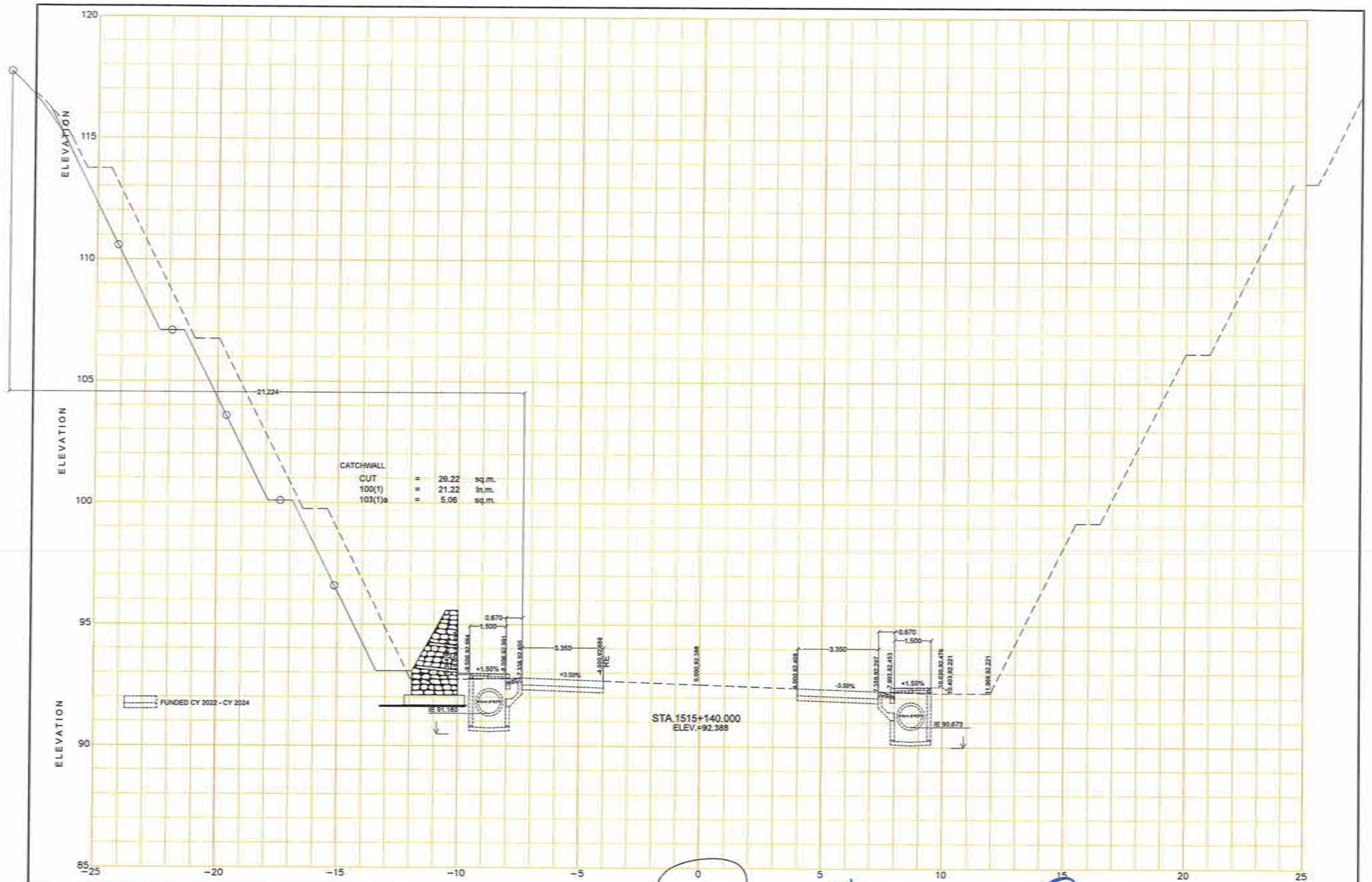
PREPARED
LESSER G. PALLA
ENGINEER II
DATE
CHECKED
ALGIN A. GINGGAL
ENGINEER II
DATE

SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION
DATE

RECOMMENDED
JOSEPH B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO.
C
09/15
SHEET NO.
33
44



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACADA SECTION)
- JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS
CROSS SECTIONS

SURVEYED
RUEL M. BARRERA
ENGINEER II
DATE: 10/15/2023
CHECKED: DAVIDO M. BARRERA
ENGINEER II
DATE: 10/15/2023

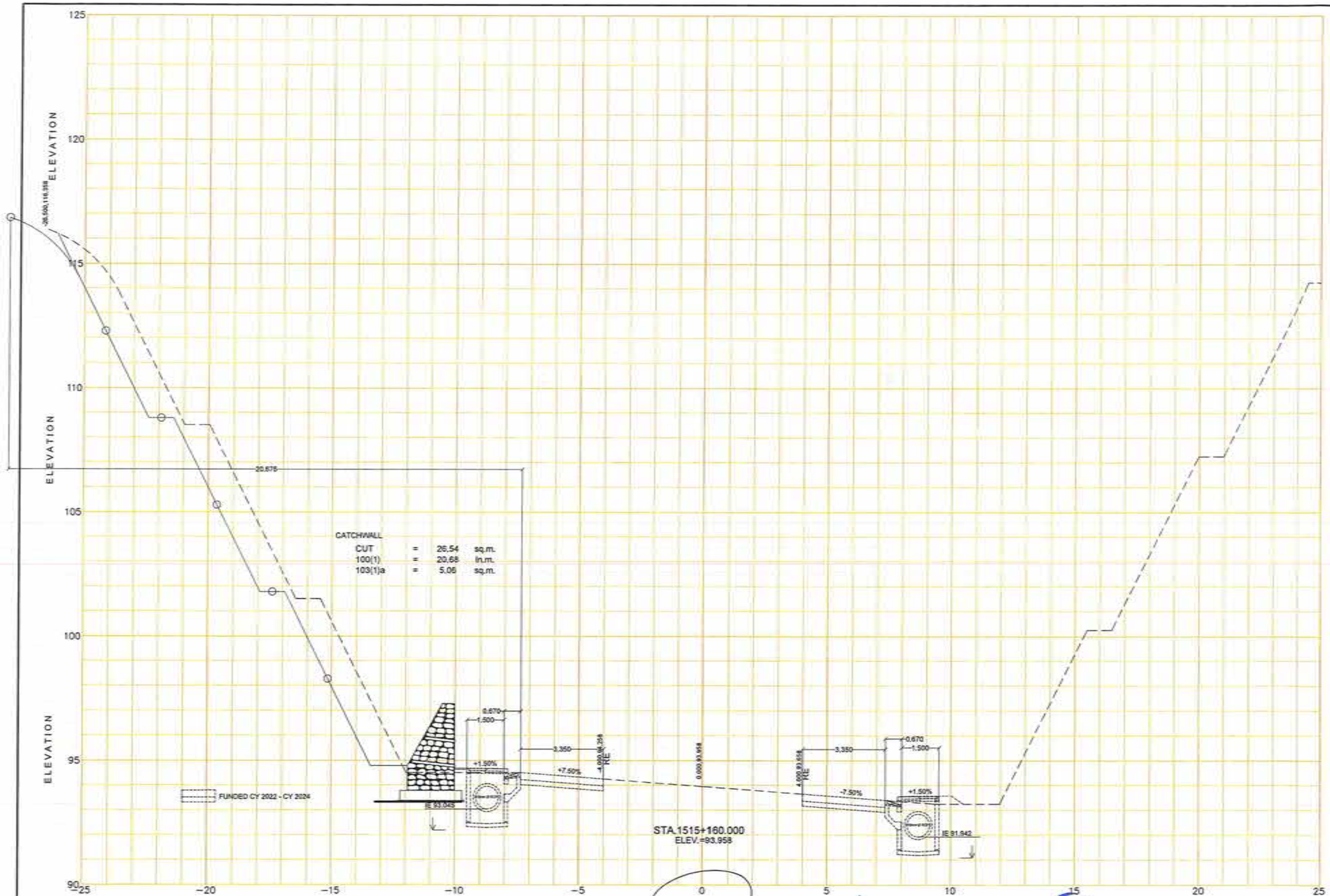
PREPARED
LESTER G. PAULLA
ENGINEER II
DATE: 10/15/2023
CHECKED: ALGIN A. GINGOYAN
ENGINEER II
DATE: 10/15/2023

SUBMITTED
JUDY ANN BERNARDINO
CHIEF PLANNING AND DESIGN DIVISION
DATE: 10/15/2023

RECOMMENDED
JOSELUIS B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE: 10/15/2023

APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR
DATE: 10/15/2023

SET NO. C
10/15
SHEET NO. 34
44



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (MOAGA SECTION)
- JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS
CROSS SECTIONS

SURVEYED
RUEL M. BACAY
ENGINEER II
DATE
CHECKED
DAVID M. CARRAGA
ENGINEER II
DATE

PREPARED
LESTER G. PADILLA
ENGINEER I
DATE
CHECKED
ALVIN A. GINGGON
ENGINEER I
DATE

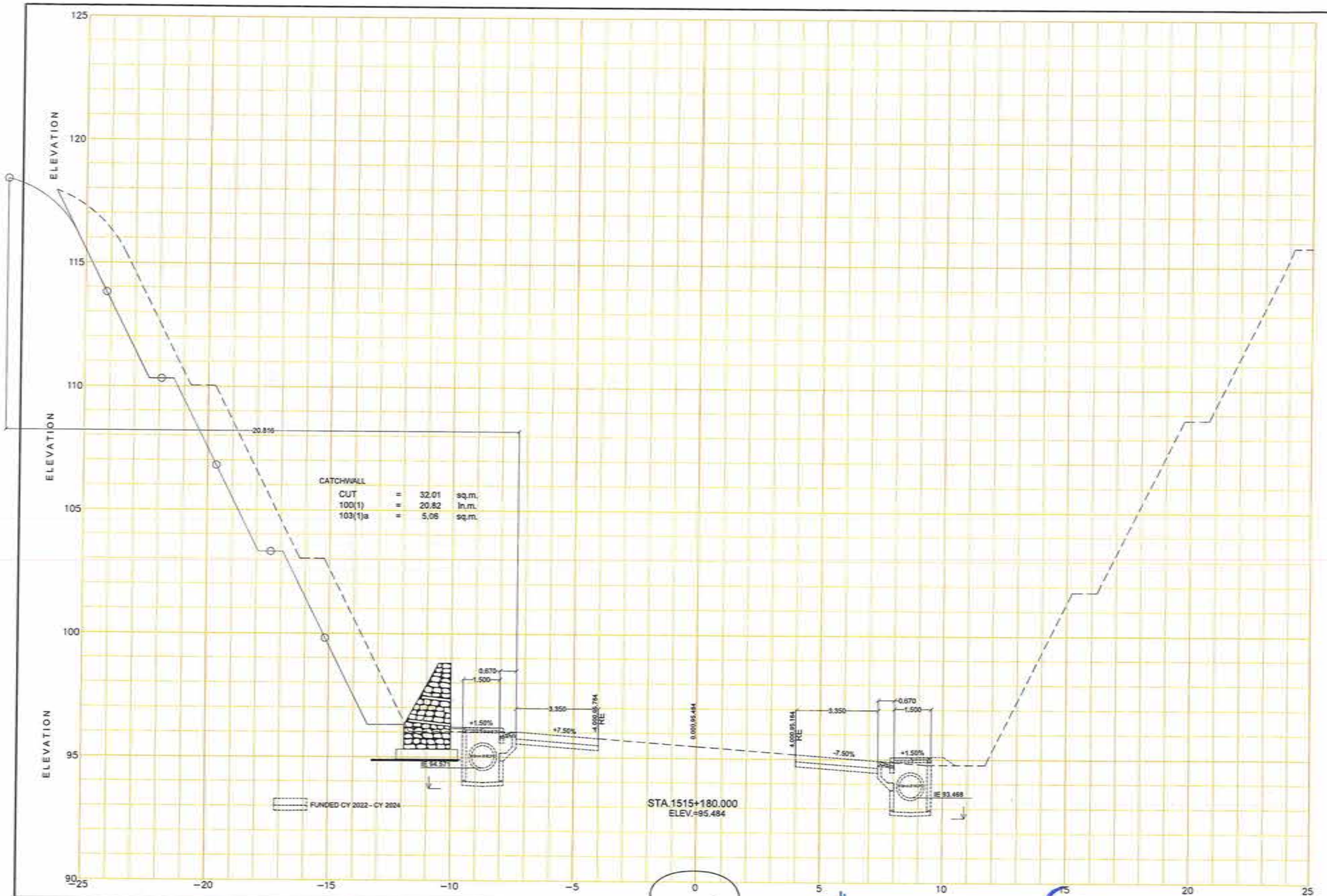
SUBMITTED
JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION
DATE

RECOMMENDED
JOSEPH B. CABALLERO
ASSISTANT REGIONAL DIRECTOR
DATE

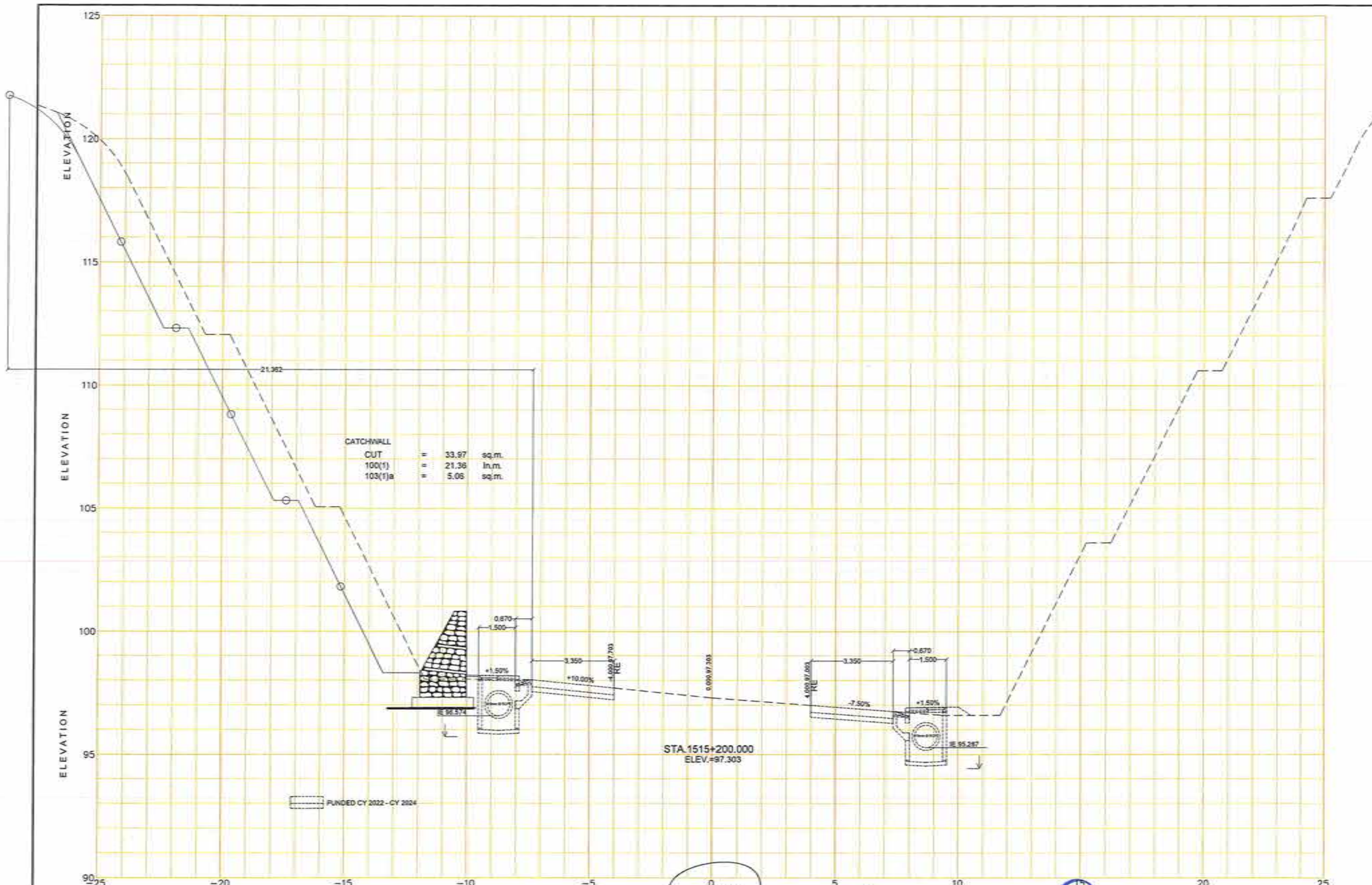
APPROVED
JUDY B. CORDON
REGIONAL DIRECTOR
DATE

SET NO.
C
11/15

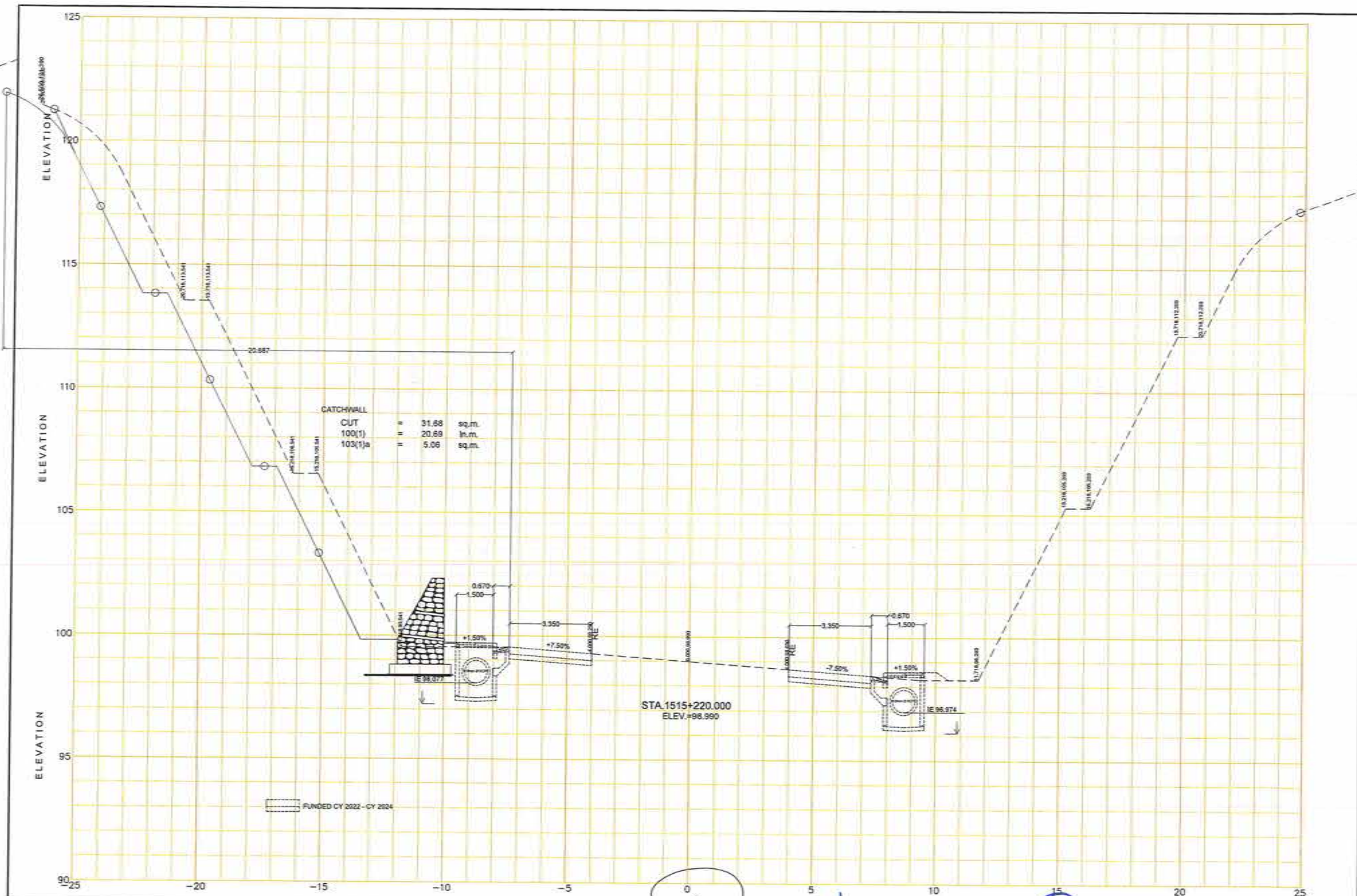
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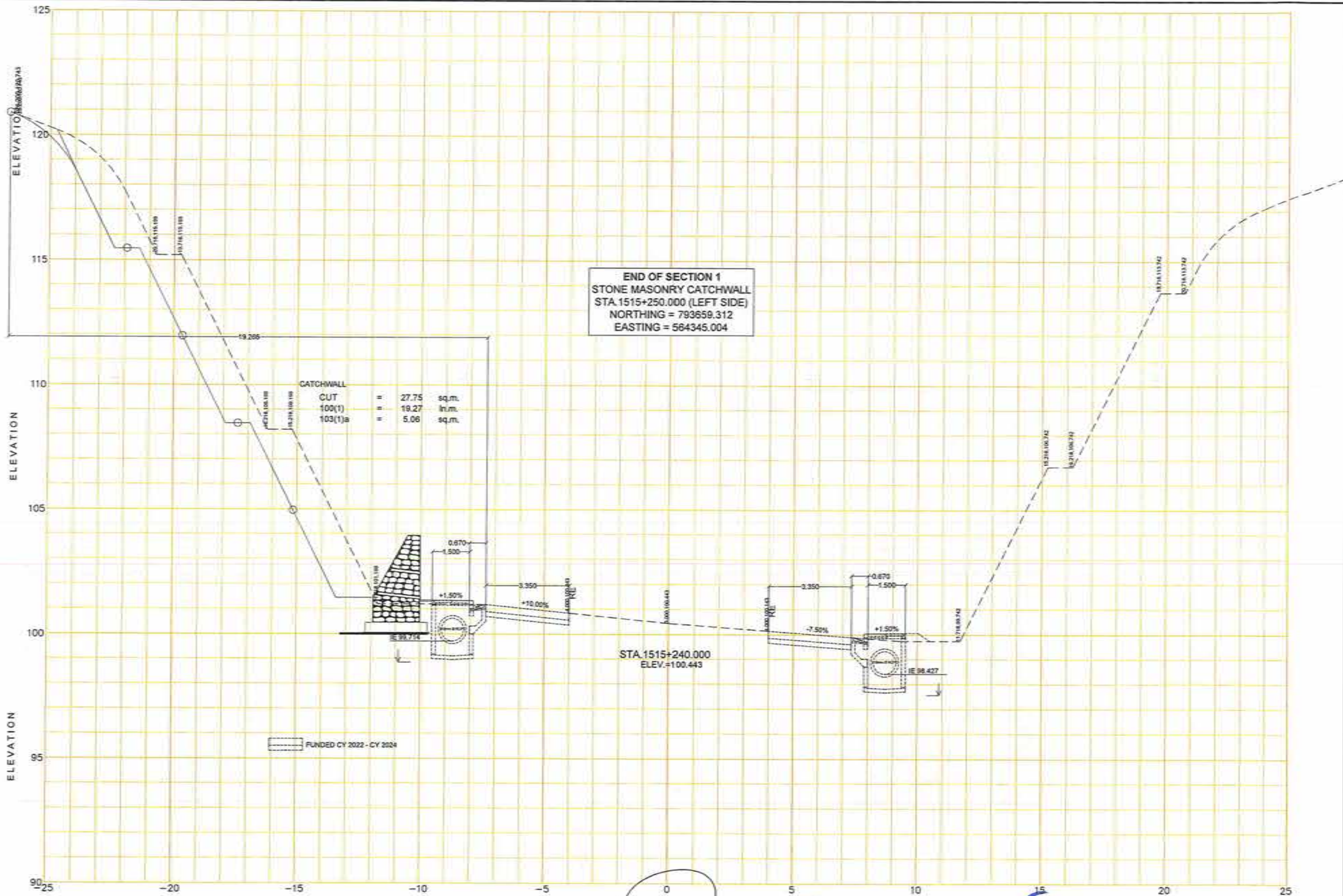
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	SURVEYED	PREPARED	SUBMITTED	RECOMMENDED	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALLANIA ROAD (MANDUG SECTION), DAVAO CITY	CROSS SECTIONS	DATE CHECKED DATE	DATE CHECKED DATE	DATE CHECKED DATE	DATE CHECKED DATE	DATE CHECKED DATE	C	36
			DATE CHECKED DATE	DATE CHECKED DATE	DATE CHECKED DATE	DATE CHECKED DATE	DATE CHECKED DATE	12/15	44
			DATE CHECKED DATE	DATE CHECKED DATE	DATE CHECKED DATE	DATE CHECKED DATE	DATE CHECKED DATE		



REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	SURVEYED	PREPARED	SUBMITTED	RECOMMENDED	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) - JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION), DAVAO CITY	CROSS-SECTIONS	SURVEYED: RUEL M. SACAY ENGINEER I DATE: 10/10/2023 CHECKED: DANLO M. CAMAGA ENGINEER II DATE: 10/10/2023	PREPARED: LESTER S. PABILA ENGINEER I DATE: 10/10/2023 CHECKED: ALGIN A. GINGATAN ENGINEER II DATE: 10/10/2023	SUBMITTED: JUDY ANN M. BERNARDO CHIEF, PLANNING AND DESIGN DIVISION DATE: 10/10/2023	RECOMMENDED: JOSELO B. CABALLERO ASSISTANT REGIONAL DIRECTOR DATE: 10/10/2023	APPROVED: JUDY B. CORDON REGIONAL DIRECTOR DATE: 10/10/2023	SET NO. C 13/15	SHEET NO. 37/44



REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE NO. XI GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY	PROJECT NAME AND LOCATION	SHEET CONTENTS	SURVEYED	PREPARED	SUBMITTED	RECOMMENDED	APPROVED	SET NO.	SHEET NO.
	CONSTRUCTION OF ROAD SLOPE PROTECTION STRUCTURE - JCT. CASANTIAN ROAD (AOKIA SECTION) - JCT. MANDUG - CALLANIA ROAD (MANDUG SECTION), DAVAO CITY	CROSS SECTIONS	SURVEYED: <u>RIUEL M. BACAY</u> ENGINEER I DATE: <u>10/10/2023</u> CHECKED: <u>DAVID M. CARAGA</u> ENGINEER II DATE: <u>10/10/2023</u>	PREPARED: <u>LESTER P. PADILLA</u> ENGINEER I DATE: <u>10/10/2023</u> CHECKED: <u>ALGIN A. GINGO</u> ENGINEER II DATE: <u>10/10/2023</u>	SUBMITTED: <u>JUDY ANN L. BERNARDINO</u> CHIEF, PLANNING AND DESIGN DIVISION DATE: <u>10/10/2023</u>	RECOMMENDED: <u>JOSEPH B. CABALLERO</u> ASSISTANT REGIONAL DIRECTOR DATE: <u>10/10/2023</u>	APPROVED: <u>JUDY B. CORDON</u> REGIONAL DIRECTOR DATE: <u>10/10/2023</u>	SET NO.: <u>C</u> SHEET NO.: <u>38</u>	SHEET NO.: <u>44</u>



REPUBLIC OF THE PHILIPPINES
 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
 REGIONAL OFFICE NO. XI
 GOV. CHARVIE CROSAS, R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION:
 CONSTRUCTION OF ROAD SLOPE PROTECTION
 STRUCTURE - JCT. CABANTARAN ROAD (ACACIA SECTION)
 - JCT. MANDUG - CALLAWA ROAD (MANDUG SECTION),
 DAVAO CITY

SHEET CONTENTS:
 CROSS SECTIONS

SURVEYED
 DATE: 10/10/2023
 CHECKED: DANIEL M. CARABIA
 DATE: 10/10/2023

PREPARED
 DATE: 10/10/2023
 CHECKED: ALGIN A. GINGALAN
 DATE: 10/10/2023

SUBMITTED
 DATE: 10/10/2023
 CHECKED: JUDY ANN V. BERNARDINO
 DATE: 10/10/2023

RECOMMENDED
 DATE: 10/10/2023
 CHECKED: JOSEPH B. CABALLERO
 DATE: 10/10/2023

APPROVED
 DATE: 10/10/2023
 CHECKED: JUDY B. CORDON
 DATE: 10/10/2023

SET NO.
 C
 15/15

SHEET NO.
 39
 44

SECTION 2
(CONCRETE SLOPE PROTECTION)

LEGEND:

- WATER LINE
- UPPER - BANK
- LOWER - BANK
- TREES
- EXISTING BRIDGE
- PROPOSED CONCRETE SLOPE PROTECTION
- PROPOSED CONCRETE BLOCKS
- PROPOSED CROSS DRAIN WITH FLARED HEADWALL BS

TRAVERSE LINE		
P-I#	AZIMUTH	DISTANCE
R-1 TO R-2	318°12'43"	20.000 M.
R-2 TO R-3	318°12'43"	89.863 M.
T-4 TO T-5	318°12'43"	19.950 M.

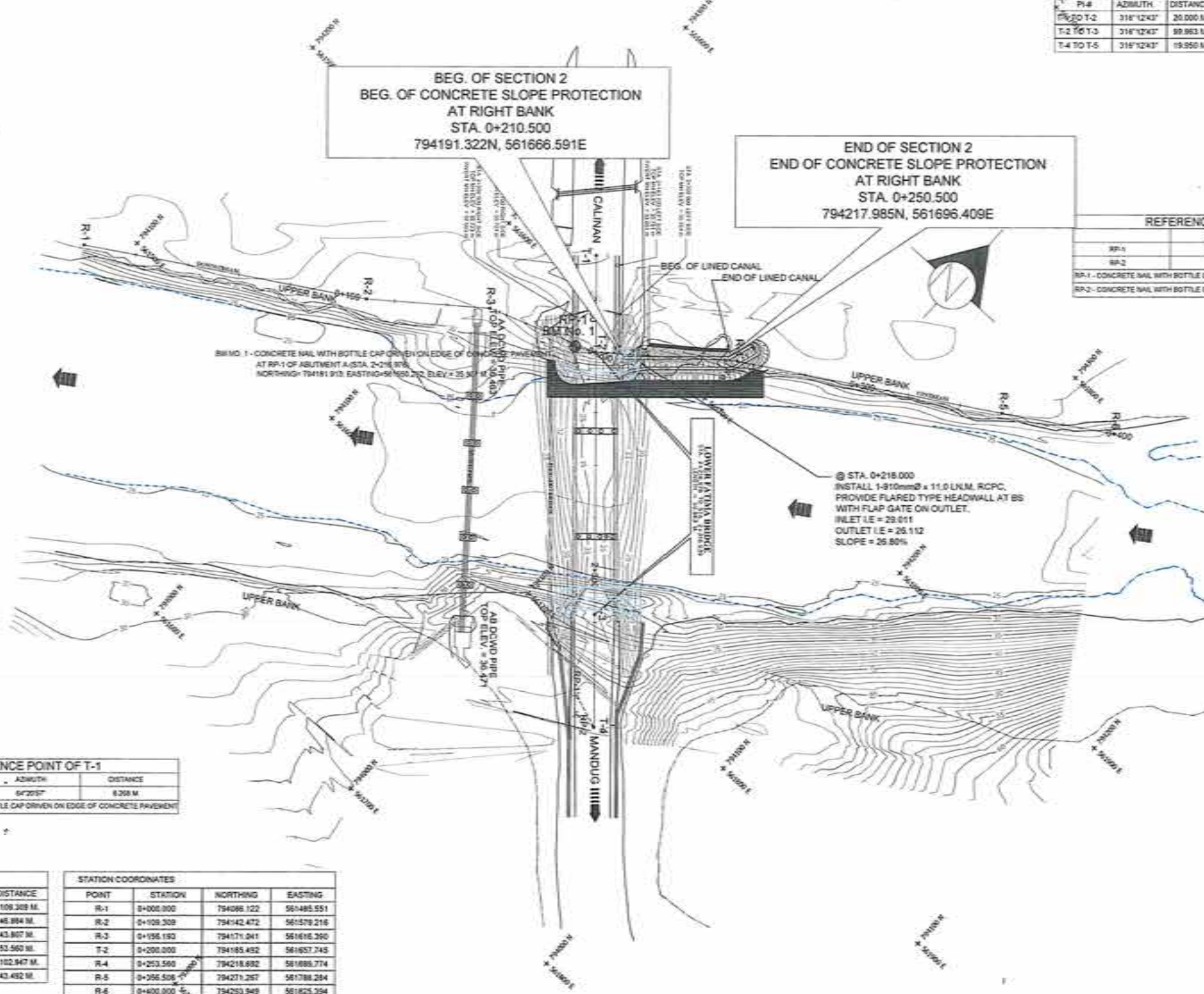
STATION COORDINATES			
POINT	STATION	NORTHING	EASTING
T-1	2+180.300	794213.962	561633.105
T-2	2+216.876	794185.492	561657.745
T-3	2+316.839	794110.958	561724.258
T-4	2+358.999	794079.852	561753.052

REFERENCE POINT OF T-4		
RP-1	ADIMUTH	DISTANCE
RP-1	109°31'12"	13.760 M.
RP-2	87°54'22"	6.118 M.
RP-1 - CONCRETE NAIL WITH BOTTLE CAP DRIVEN ON EDGE OF CONCRETE PAVEMENT		
RP-2 - CONCRETE NAIL WITH BOTTLE CAP DRIVEN ON EDGE OF CONCRETE PAVEMENT		

REFERENCE POINT OF T-1		
RP-1	ADIMUTH	DISTANCE
RP-1	64°22'57"	6.208 M.
RP-1 - CONCRETE NAIL WITH BOTTLE CAP DRIVEN ON EDGE OF CONCRETE PAVEMENT		

TRAVERSE LINE		
P-I#	ADIMUTH	DISTANCE
R-1 TO R-2	238°58'05"	109.309 M.
R-2 TO R-3	232°27'27"	45.884 M.
R-3 TO R-4	250°44'19"	43.807 M.
R-4 TO R-5	231°41'38"	53.560 M.
R-5 TO R-6	239°17'23"	102.847 M.
R-6 TO R-7	238°33'55"	43.492 M.

STATION COORDINATES			
POINT	STATION	NORTHING	EASTING
R-1	0+000.000	794086.122	561485.551
R-2	0+108.309	794142.472	561579.216
R-3	0+158.193	794171.041	561616.360
T-2	0+200.000	794185.492	561657.745
R-4	0+253.560	794218.692	561686.774
R-5	0+356.508	794271.267	561784.284
R-6	0+400.000	794293.949	561825.394



PLAN
SCALE 1:1250



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION:
CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) -
JCT. MANDUG - CALLARUA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS:
PLAN

SURVEYED BY:
REVIEWED BY:
JAMES T. BERNARDINO
JAMES T. BERNARDINO
JAMES T. BERNARDINO
JAMES T. BERNARDINO

PREPARED BY:
REVIEWED BY:
JAMES T. BERNARDINO
JAMES T. BERNARDINO
JAMES T. BERNARDINO
JAMES T. BERNARDINO

APPROVED BY:
JAMES T. BERNARDINO
JAMES T. BERNARDINO
JAMES T. BERNARDINO
JAMES T. BERNARDINO

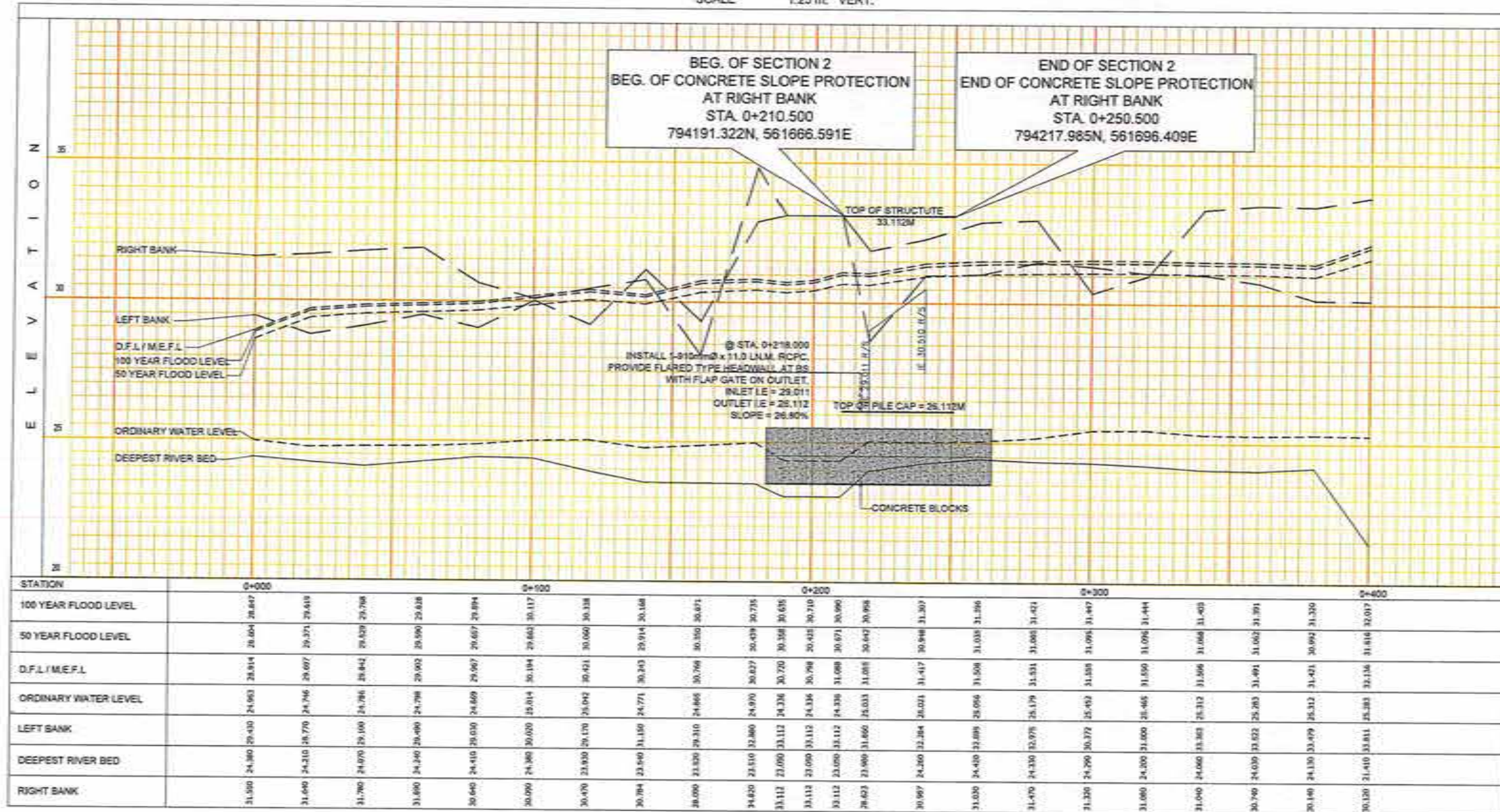
RECOMMENDING APPROVAL:
JAMES T. BERNARDINO
JAMES T. BERNARDINO
JAMES T. BERNARDINO
JAMES T. BERNARDINO

APPROVED BY:
JAMES T. BERNARDINO
JAMES T. BERNARDINO
JAMES T. BERNARDINO
JAMES T. BERNARDINO

SET NO. 01/04
SHEET NO. 40/44

PROFILE

SCALE 1:125 m. HOR.
SCALE 1:25 m. VERT.



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGIONAL OFFICE NO. XI
GOV. CHAVEZ COR. R. MAGSAYSAY AVENUE, DAVAO CITY

PROJECT NAME AND LOCATION

CONSTRUCTION OF ROAD SLOPE PROTECTION
STRUCTURE - JCT. CABANTIAN ROAD (ACACIA SECTION) -
JCT. MANDUG - CALLAMBA ROAD (MANDUG SECTION),
DAVAO CITY

SHEET CONTENTS

PROFILE

SURVEYED

REVIEWED
DAVID M. CORTUGA
ENGINEER II, SECTION CHIEF

PREPARED

REVIEWED
JUAN JOSE R. SOTTO
ENGINEER II, SECTION CHIEF

DESIGNED

DATE
JUDY ANN T. BERNARDINO
CHIEF, PLANNING AND DESIGN DIVISION

RECOMMENDING APPROVAL

DATE
ROBERTO B. CABALLERO
ASSISTANT REGIONAL DIRECTOR

APPROVED

DATE
JURY S. CORDON
REGIONAL DIRECTOR

SET NO.

D
02/04

SHEET NO.

41
44

