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REPUBLIC OF THE PHILIPPINES  
**DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS**  
CARAGA REGION - XII  
BUTUAN CITY DISTRICT ENGINEERING OFFICE  
R. PALMA ST., BRGY. DAGOHOY, BUTUAN CITY

C.Y. 2025 PROJECT

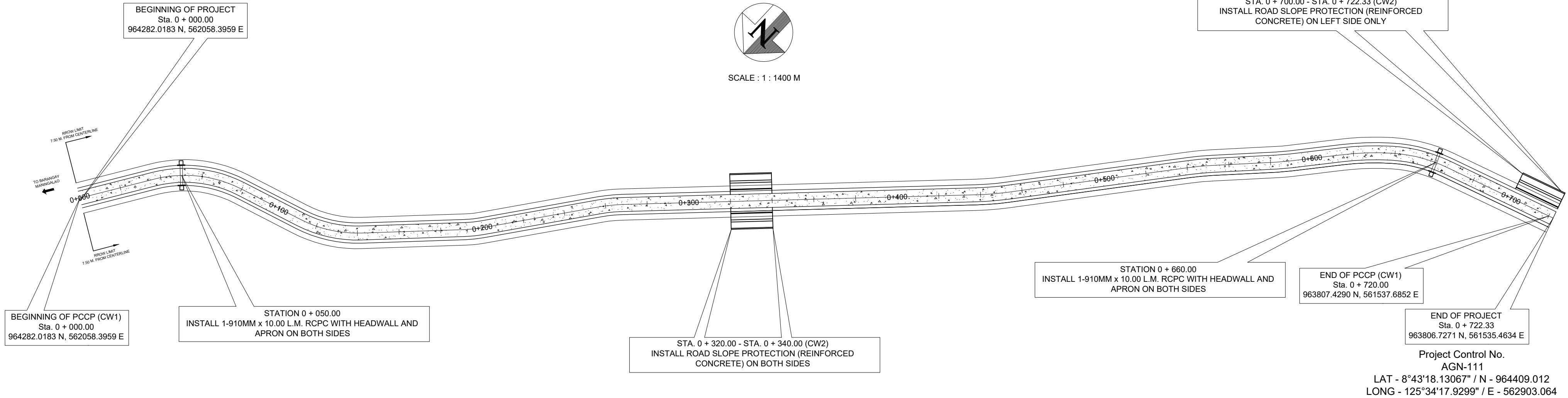
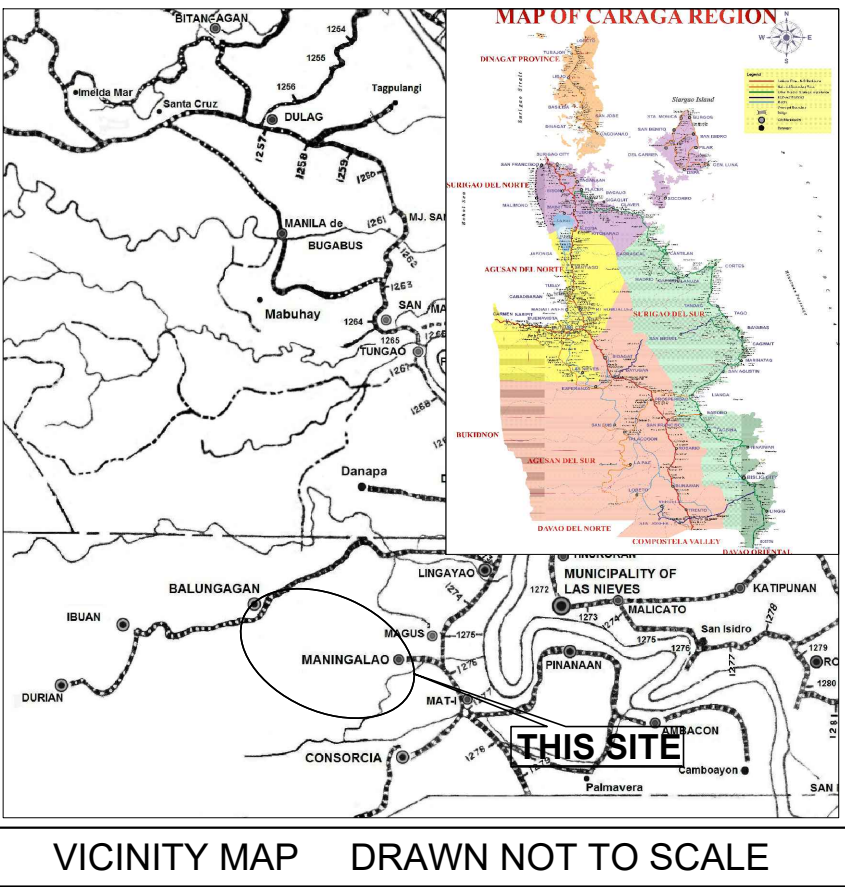
DETAILED ENGINEERING DESIGN PLAN FOR  
**CONSTRUCTION OF ROAD, PHASE 1, BARANGAY MANINGALAO  
AND BARANGAY DURIAN, LAS NIEVES, AGUSAN DEL NORTE**

LOCATION : BARANGAY MANINGALAO, LAS NIEVES, AGUSAN DEL NORTE

STATION LIMIT : 0 + 000.00 - 0 + 722.33

NET LENGTH : 1.44 LANE KM. (CW1 - CONSTRUCTION OF CONCRETE ROAD)

NET AREA : 2,910.19 SQ.M. (CW2 - CONSTRUCTION OF ROAD SLOPE PROTECTION)



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PROJECT NAME AND LOCATION :  
CONSTRUCTION OF ROAD, PHASE 1, BARANGAY  
MANINGALAO AND BARANGAY DURIAN, LAS NIEVES,  
AGUSAN DEL NORTE

SHEET CONTENTS :  
PLAN  
VICINITY MAP

DRAFTED :  
**IVAN RAY S. ARANAS**  
ENGINEER II  
PREPARED :  
**EBONY KIRSTIE C. ABOGADO**  
ENGINEER II

REVIEWED :  
**RYAN JOY L. BASCO**  
ENGINEER II  
DATE:

SUBMITTED :  
**GRACE T. CURAYAG**  
CHIEF, PLANNING AND DESIGN SECTION  
IN CONCURRENCE CAPACITY  
DATE:

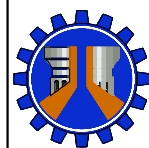
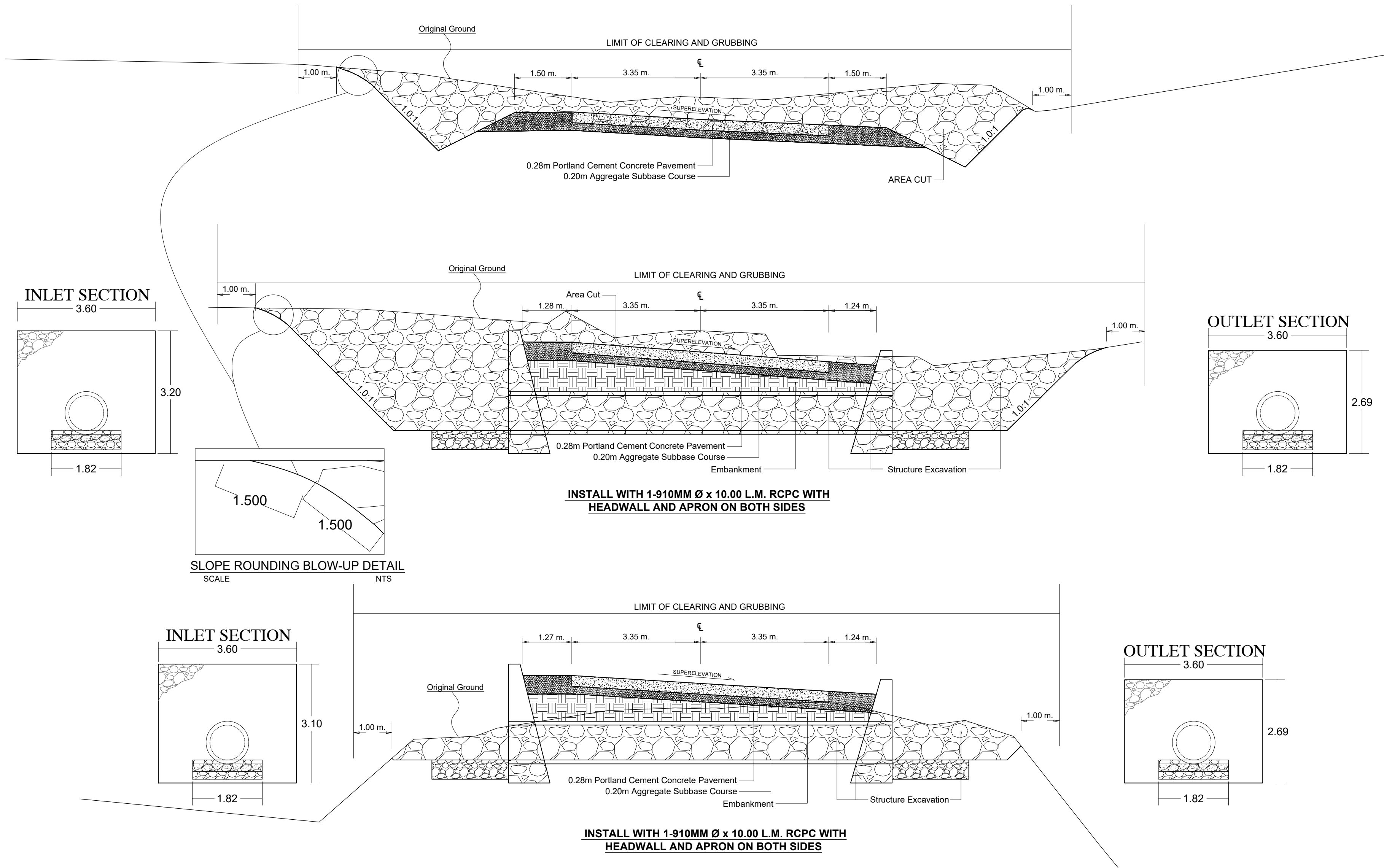
RECOMMENDED :  
**GRACE T. CURAYAG**  
OIC - ASSISTANT DISTRICT ENGINEER  
DATE:

APPROVED :  
**JOSE CAESAR A. RADAZA**  
DISTRICT ENGINEER  
DATE:

SET NO. SHEET NO.  
G 1  
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TYPICAL ROADWAY CROSS SECTION

SCALE 1 : 75 m.



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SHEET CONTENTS :  
TYPICAL ROADWAY CROSS SECTIONS

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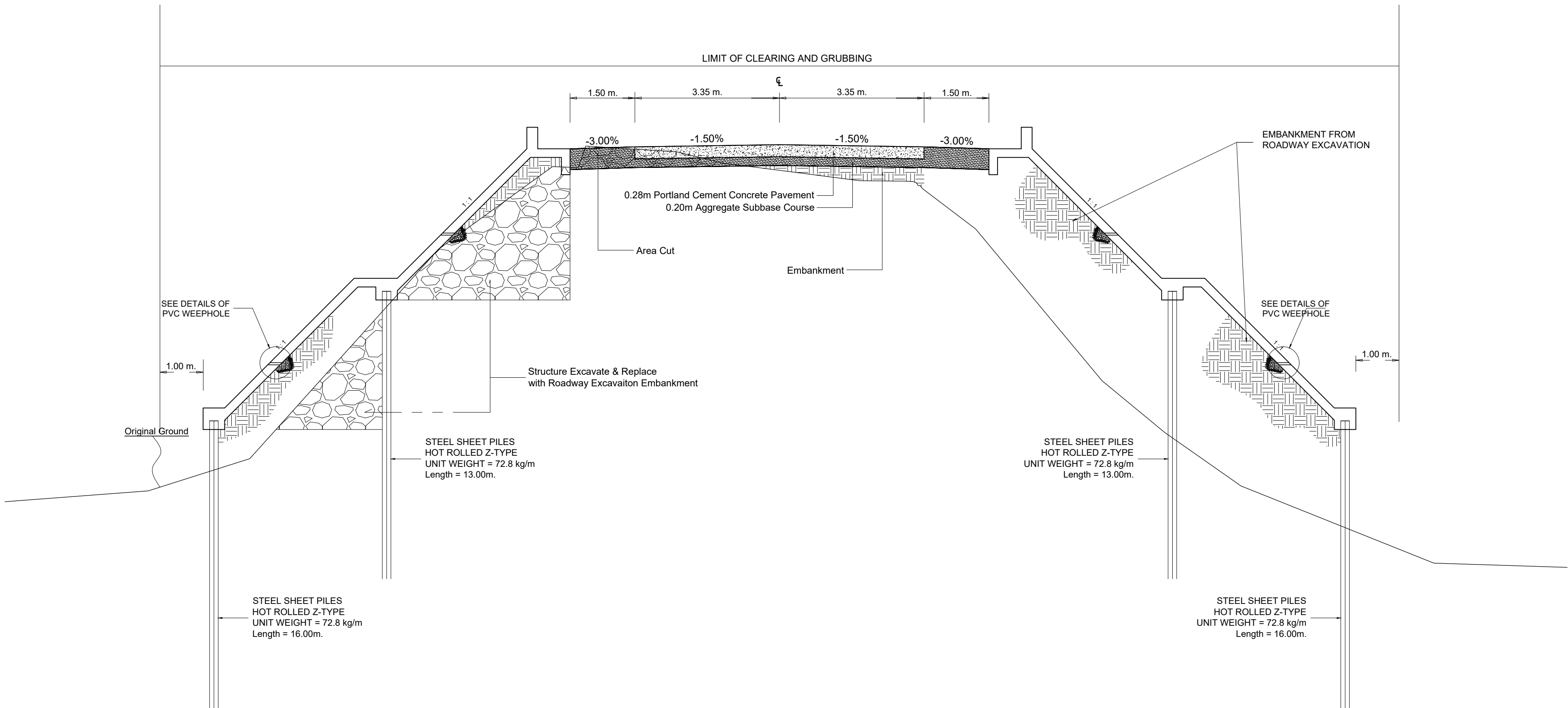
APPROVED :  
JOSE CAESAR A. RADAZA  
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DATE:

SET NO. SHEET NO.  
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TYPICAL ROADWAY CROSS SECTION

SCALE 1 : 75 m.



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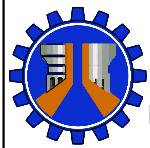
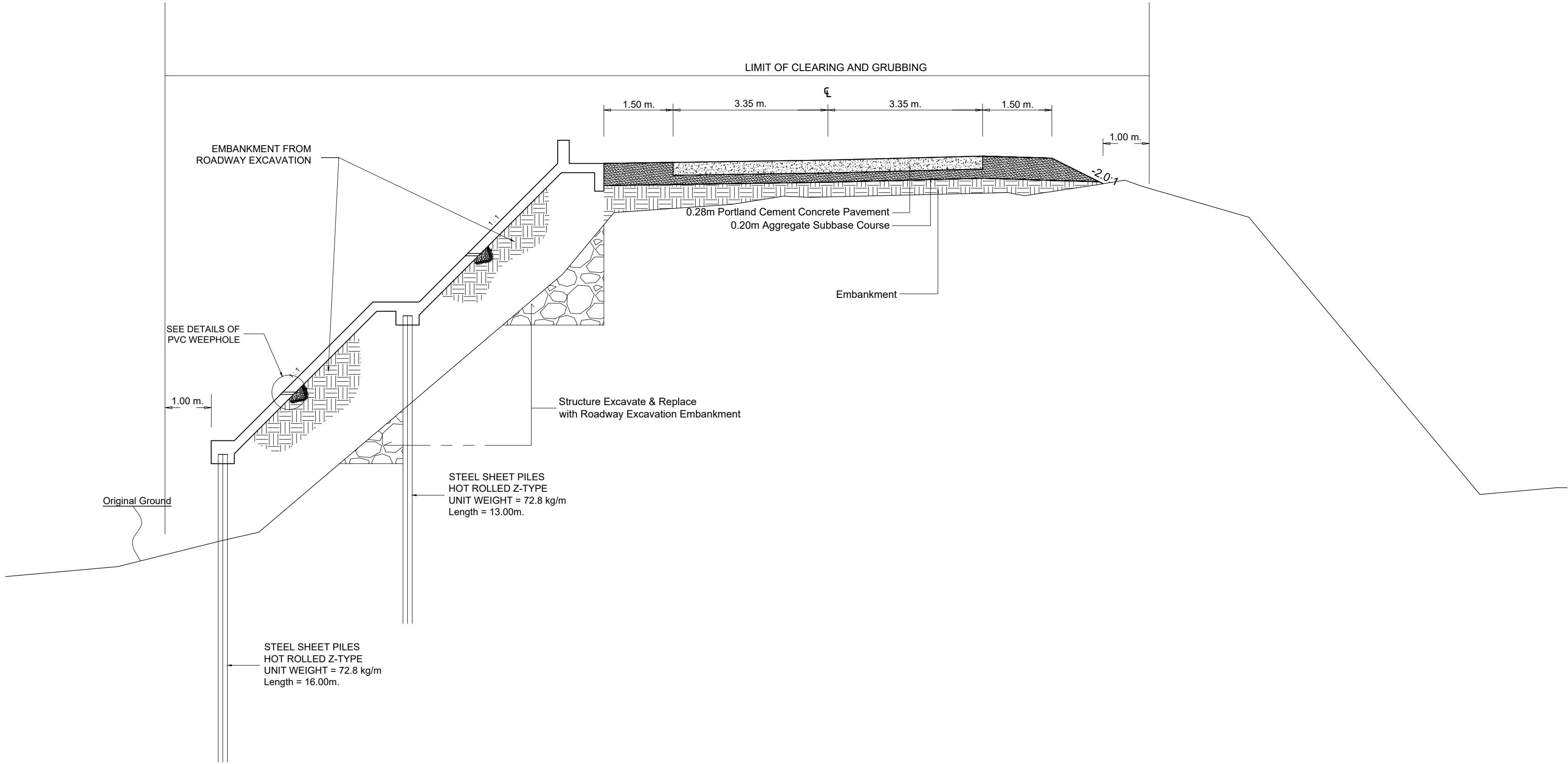
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TYPICAL ROADWAY CROSS SECTION



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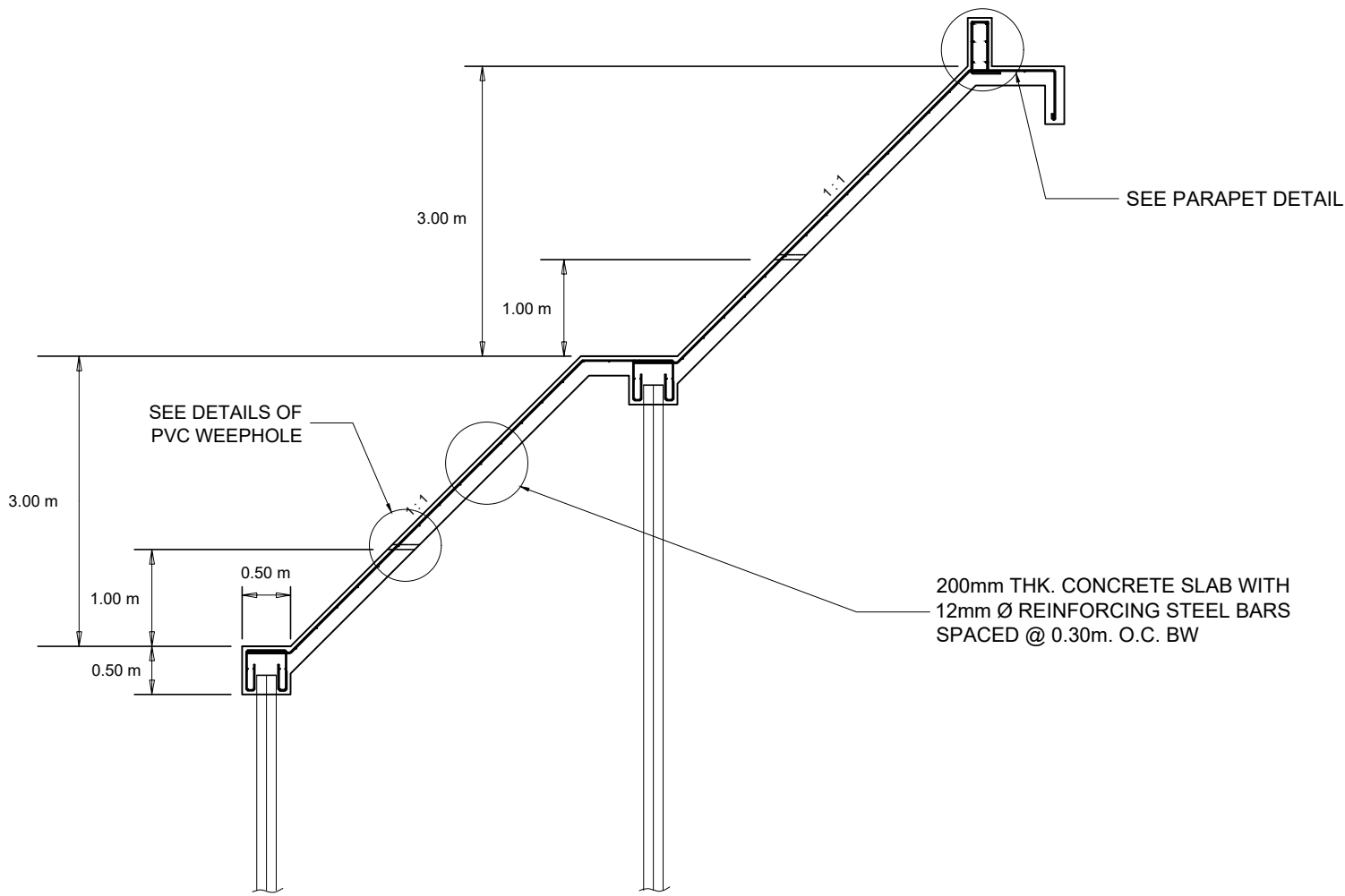
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DATE:

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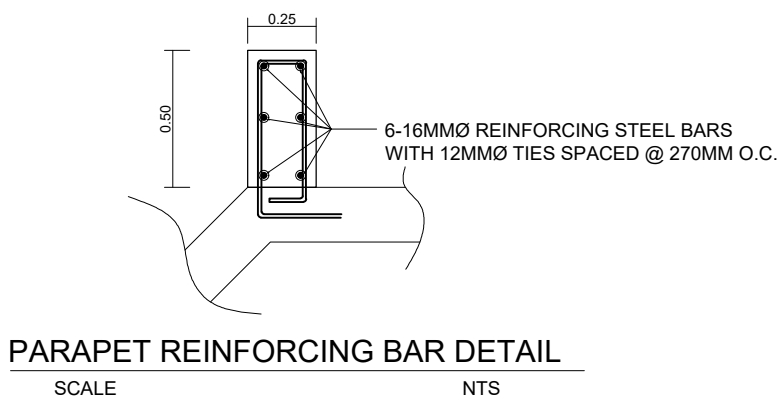
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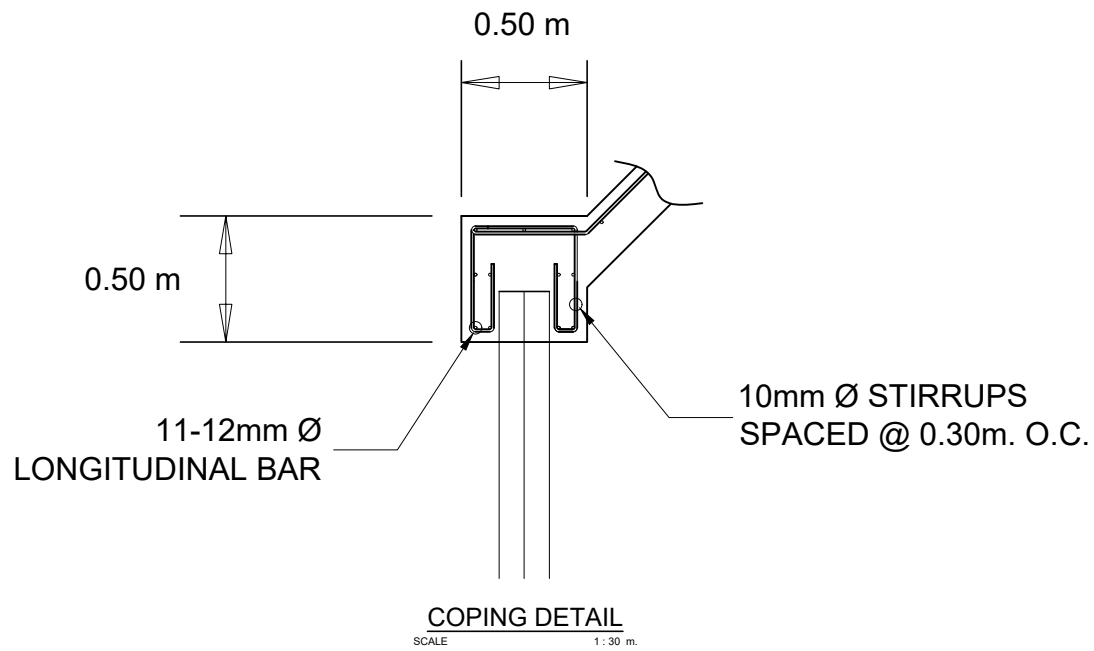
SET NO.	SHEET NO.
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TYPICAL SLOPE PROTECTION SECTION  
SCALE 1:70 m.



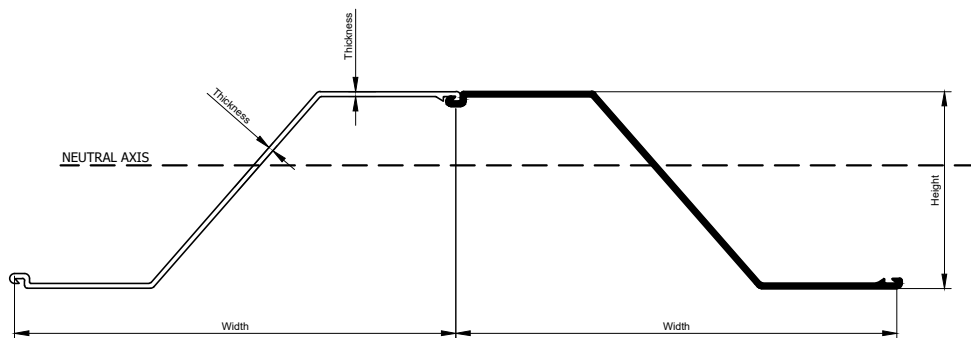
PARAPET REINFORCING BAR DETAIL  
SCALE NTS



COPING DETAIL  
SCALE 1:30 m.

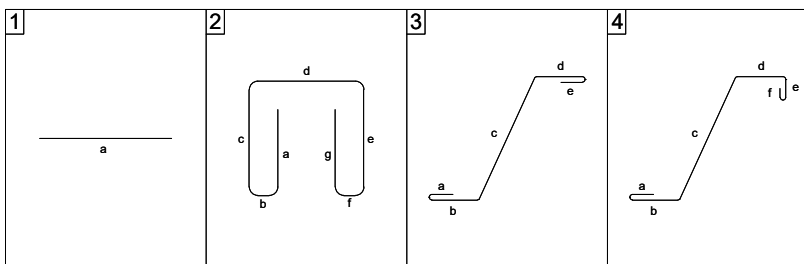
#### HOT ROLLED Z-TYPE SHEET PILES PROPERTIES

Width mm	Height mm	Thickness mm	section Area cm <sup>2</sup> /m	Mass		Combined Moment of Inertia cm <sup>4</sup> /m	Section Modulus cm <sup>3</sup> /m
				kg/m	kg/m <sup>2</sup>		
770	343.5	8.6/8.5	120.8	72.8	94.5	21,496	1,252



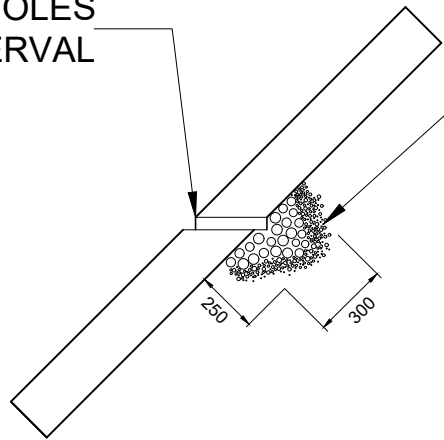
HOT ROLLED Z-TYPE TYPICAL SECTION  
SCALE NTS

#### BAR BENDING DIAGRAM - SLOPE PROTECTION



50mm PVC WEEPHOLES  
STAGGERED @ 2.00m INTERVAL

GRADED GRAVEL WITH THE LARGER  
ONES PLACED ADJACENT TO  
WEEPHOLES AS SHOWN



WEEPHOLE DETAIL  
SCALE 1:30 m.

#### SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	REMARKS
CW1				
Part A	FACILITIES FOR THE ENGINEER			
A.1.1(8)	PROVISION OF FIELD OFFICE FOR THE ENGINEERS (RENTAL BASIS)	MO.	6.60	
Part B	OTHER GENERAL REQUIREMENTS			
B.5	PROJECT BILLBOARD	EA.	3.00	PLACED AT BEGINNING & END OF PROJECT
B.7(1)	OCCUPATIONAL SAFETY AND HEALTH PROGRAM	MO.	6.60	D.O. 13 SERIES OF 2018
B.8 (1)	ROAD WORKS SAFETY AND TRAFFIC MANAGEMENT	MO.	6.60	PROVIDE STANDARD WARNING SIGNS AND BARRICADES
B.9	MOBILIZATION/DEMOBILIZATION	L.S.	1.00	
Part C	EARTHWORKS			
100(1)	CLEARING AND GRUBBING (WITH STRIPPING)	HA.	1.51	
102(2)	SURPLUS COMMON EXCAVATION	CU.M.	7,243.25	
103(1)a	STRUCTURE EXCAVATION (COMMON SOIL)	CU.M.	154.23	
104(1)a	EMBANKMENT FROM ROADWAY EXCAVATION	CU.M.	1,862.64	
105(1)a	SUBGRADE PREPARATION, COMMON MATERIAL	SQ.M.	6,588.75	
Part D	SUBBASE AND BASE COURSE			
200(1)	AGGREGATE SUBBASE COURSE	CU.M.	713.25	THICKNESS = 0.20 M.
Part E	SURFACE COURSE			
311(1)e1	PCC PAVEMENT (PLAIN)-CONVENTIONAL METHOD, 280MM THK.	SQ.M.	4,824.00	
Part G	DRAINAGE AND SLOPE PROTECTION STRUCTURES			
500(1)a3	PIPE CULVERTS, 910MM DIA. (36")	L.M.	20.00	
506(1)	STONE MASONRY	CU.M.	33.21	

#### SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	REMARKS
CW2				
Part C	EARTHWORKS			
103(1)a	STRUCTURE EXCAVATION (COMMON SOIL)	CU.M.	340.44	
Part G	DRAINAGE AND SLOPE PROTECTION STRUCTURES			
400(6)	STRUCTURAL STEEL SHEET PILES, FURNISHED	M.	2,349.00	
400(12)	STRUCTURAL STEEL SHEET PILES, DRIVEN	M.	1,969.16	
404(1)a	REINFORCING STEEL BAR, GRADE 40	KG.	3,484.05	
404(1)b	REINFORCING STEEL BAR, GRADE 60	KG.	419.98	
405	STRUCTURAL CONCRETE CLASS A	CU.M.	151.03	



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AGUSAN DEL NORTE

SHEET CONTENTS :

TYPICAL SLOPE PROTECTION SECTION  
HOT ROLLED Z-TYPE TYPICAL SECTION  
HOT ROLLED Z-TYPE SHEET PILE PROPERTIES  
BAR BENDING DIAGRAM  
COPING DETAIL  
PARAPET REINFORCING DETAIL  
WEEPHOLE DETAIL  
SUMMARY OF QUANTITIES

DRAFTED :

**IVAN RAY S. ARANAS**  
ENGINEER II

PREPARED :

**EBONY KIRSTIE C. ABOGADO**  
ENGINEER II

REVIEWED :

**RYAN JOY L. BASCO**  
ENGINEER II

DATE:

SUBMITTED :

**GRACE T. CURAYAG**  
CHIEF, PLANNING AND DESIGN SECTION  
IN CONCURRENCE CAPACITY

DATE:

RECOMMENDED :

**GRACE T. CURAYAG**  
OIC - ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED :

**JOSE CAESAR A. RADAZA**  
DISTRICT ENGINEER

DATE:

SET NO.

G  
6 16

SHEET NO.

6  
26



Sta. 320.00 - Sta. 340.00									
NUMBER STEEL SHEET PILE		FOR	20.00 meters (each side/bank)						
USE Z-TYPE			72.8 KG/m						
	FURNISHED (left side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		26 PCS	13 meters	338.00 meters		24606.4 KGS			
					TOTAL	24,606.40 KGS			
	DRIVEN (left side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		26 PCS	10.895 meters	283.27 meters		20,622.06 KGS			
		26 PCS	13 meters	338.00 meters		24,606.40 KGS			
				54.73 meters	TOTAL	45,228.46 KGS			
				54.73 meters					
NUMBER STEEL SHEET PILE									
USE Z-TYPE		FOR	20.00 meters (each side/bank)						
			72.8 KG/m						
	FURNISHED (left side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		26 PCS	16 meters	416.00 meters		30,284.80 KGS			
					TOTAL	30,284.80 KGS			
	DRIVEN (left side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		26 PCS	13.65 meters	354.90 meters		25,836.72 KGS			
		26 PCS	16 meters	416.00 meters		30,284.80 KGS			
				61.10 meters	TOTAL	56,121.52 KGS			
				61.10 meters					

Sta. 320.00 - Sta. 340.00									
NUMBER STEEL SHEET PILE		FOR	20.00 meters (each side/bank)						
USE Z-TYPE			72.8 KG/m						
	FURNISHED (right side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		26 PCS	13 meters	338.00 meters		24606.4 KGS			
					TOTAL	24,606.40 KGS			
	DRIVEN (right side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		26 PCS	10.415 meters	270.79 meters		19,713.51 KGS			
		26 PCS	13 meters	338.00 meters		24,606.40 KGS			
				67.21 meters	TOTAL	44,319.91 KGS			
				67.21 meters					
NUMBER STEEL SHEET PILE									
USE Z-TYPE		FOR	20.00 meters (each side/bank)						
			72.8 KG/m						
	FURNISHED (right side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		26 PCS	16 meters	416.00 meters		30284.8 KGS			
					TOTAL	30,284.80 KGS			
	DRIVEN (right side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		26 PCS	13.305 meters	345.93 meters		25,183.70 KGS			
		26 PCS	16 meters	416.00 meters		30,284.80 KGS			
				70.07 meters	TOTAL	55,468.50 KGS			
				70.07 meters					

Sta. 700.00 - Sta. 722.33									
NUMBER STEEL SHEET PILE		FOR	22.33 meters (each side/bank)						
USE Z-TYPE			72.8 KG/m						
	FURNISHED (left side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		29 PCS	13 meters	377.00 meters		27445.6 KGS			
					TOTAL	27,445.60 KGS			
	DRIVEN (left side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		29 PCS	10.826667 meters	313.97 meters		22,857.26 KGS			
		29 PCS	13 meters	377.00 meters		27,445.60 KGS			
				63.03 meters	TOTAL	50,302.86 KGS			
				63.03 meters					
NUMBER STEEL SHEET PILE									
USE Z-TYPE		FOR	22.33 meters (each side/bank)						
			72.8 KG/m						
	FURNISHED (left side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		29 PCS	16 meters	464.00 meters		33779.2 KGS			
					TOTAL	33,779.20 KGS			
	DRIVEN (left side)	NUM. OF PCS	LENGTH	TOTAL LENGTH		TOTAL KGS			
		29 PCS	13.803333 meters	400.30 meters		29,141.60 KGS			
		29 PCS	16 meters	464.00 meters		33,779.20 KGS			
				63.70 meters	TOTAL	62,920.80 KGS			
				63.70 meters					

## GRADING QUANTITIES

STATION	LENGTH	EXCAVATION (cu.m.)	EMBANKMENT (cu.m.)	ITEM 102(2) SURPLUS COMMON EXCAVATION (CU.M.)	ITEM 104(1)a EMBANKMENT FROM EXCAVATION (CU.M.)	ITEM 200 AGGREGATE SUBBASE COURSE (CU.M.)	REMARKS
Sta. 0 + 000.00 - Sta. 0 + 720.00	720.000	9,571.550	1,862.640	7,243.250	1,862.640	713.250	ROAD CONCRETING
TOTAL	720.000	9,571.550	1,862.640	7,243.250	1,862.640	713.250	

## ESTIMATED QUANTITIES

SECTION 1 (Both Sides) L =										20.00 M										
MEMBER	BAR	MARK	BAR	TYPE	BAR	SIZE	D E S C R I P T I O N						SPLICE	BAR LENGTH m	QUANTITY	TOTAL	UNIT	TOTAL	VOLUME OF CONCRETE	
							a m	b m	c m	d m	e m	f m				LENGTH m	WEIGHT kg/m	WEIGHT KGS		C.U.M.
CONCRETE SLOPE	1a				12		0.400	0.800	3.900	0.800			0.000	5.900	67	395.30	0.888	351.03	96.92	
	1b				12		20.000						1.000	21.000	24	504.00	0.888	447.55		
	1a				12		0.800	3.900	0.300				0.000	5.000	67	335.00	0.888	297.48		
	1b				12		20.000						1.000	21.000	14	294.00	0.888	261.07		
COPIN G																				
	CS1				12		20.000						1.000	21.000	11	231.00	0.888	205.13		
	CS2				10		0.150	0.300	0.300	0.300	0.150		0.000	1.200	67	80.40	0.616	49.53		
PARAPET	1a				12		0.200	0.400	0.150	0.400			0.000	1.150	75	86.25	0.888	76.59		
	1b				16		20.000						1.000	21.000	6	126.00	1.579	198.95		
																	TOTAL	3,774.66	96.92	

SECTION 2 (Left Side) L =											22.33 M								
MEMBER	BAR	MARK	BAR	TYPE	BAR SIZE	D E S C R I P T I O N						SPLICE	BAR LENGTH m	QUANTITY	TOTAL	UNIT	TOTAL	VOLUME OF CONCRETE	
						a m	b m	c m	d m	e m	f m				LENGTH m	WEIGHT kg/m	WEIGHT KGS		
CONCRETE SLOPE	1a				12	0.400	0.800	3.900	0.800			0.000	5.900	67	395.30	0.888	351.03	54.11	
	1b				12	22.330						1.000	23.330	24	559.92	0.888	497.21		
	1a				12	0.800	3.900	0.300				0.000	5.000	67	335.00	0.888	297.48		
	1b				12	22.330						1.000	23.330	14	326.62	0.888	290.04		
COPIN G	CS1				12	22.330						1.000	23.330	11	256.63	0.888	227.89		
	CS2				10	0.150	0.300	0.300	0.300	0.150		0.000	1.200	75	90.00	0.616	55.44		
PARAPET	1a				12	0.200	0.400	0.150	0.400			0.000	1.150	75	86.25	0.888	76.59		
	1b				16	22.330						1.000	23.330	6	139.98	1.579	221.03		
																TOTAL	2,016.70	54.11	
																GRAND TOTAL	5,791.36	151.03	
																RSB Grade 40	3,484.05		
																RSB Grade 60	419.98		

STEEL SHEET PILE CONCRETE SLAB										AREA (SQ.M.)	LENGTH (M.)				NO. OF UNIT			
	VOLUME									2.423	X	62.33 =		151.02559 CU.M.	1	151.02559 CU.M.		
															SUB-TOTAL	151.02559 CU.M.		
															TOTAL	151.02559 CU.M.		

## PAVING QUANTITIES

ITEM 311(1)e1 - PORTLAND CEMENT CONCRETE PAVEMENT, 0.28m THK.

### CONCRETING

Sta. 0 + 000.00 - Sta. 0 + 720.00

Length = 720.000 m  
Width = 6.700 m  
Area = 720.00 x 6.70m  
= 4,824.000 m²

Total Area =4,824.000 m²

## DRAINAGE SCHEDULE

STATION	DESCRIPTION	ITEM 103(1)a STRUCTURE EXCAVATION (CU.M.)	ITEM 500(1)a3 PIPE CULVERTS, 910MM Ø (36" Ø) (L.M.)	ITEM 506(1) STONE MASONRY (CU.M.)
0 + 050.00	INSTALL 1-910MM x 10.00 L.M. RCPC WITH HEADWALL AND APRON ON BOTH SIDES	109.57	10.00	16.72
0 + 660.00	INSTALL 1-910MM x 10.00 L.M. RCPC WITH HEADWALL AND APRON ON BOTH SIDES	44.66	10.00	16.49
TOTAL		154.23	20.00	33.21



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**BUTUAN CITY DISTRICT ENGINEERING OFFICE**  
R.PALMA ST. BRGY. DAGOHAY, BUTUAN CITY

PROJECT NAME AND LOCATION :

CONSTRUCTION OF ROAD, PHASE 1, BARANGAY  
MANINGALAO AND BARANGAY DURIAN, LAS NIEVES,  
AGUSAN DEL NORTE

SHEET CONTENTS :

GRADING QUANTITIES  
PAVING QUANTITIES  
DRAINAGE SCHEDULE  
ESTIMATED QUANTITIES  
DRAINAGE SCHEDULE

DRAFTED :

**IVAN RAY S. ARANAS**  
ENGINEER II

PREPARED :

**EBONY KIRSTIE C. ABOGADO**  
ENGINEER II

REVIEWED :

**RYAN JOY L. BASCO**  
ENGINEER II

DATE:

SUBMITTED :

**GRACE T. CURAYAG**  
CHIEF, PLANNING AND DESIGN SECTION  
IN CONCURRENCE CAPACITY

DATE:

RECOMMENDED :

**GRACE T. CURAYAG**  
OIC - ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED :