REPUBLIC OF THE PHILIPPINES

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

CEBU 2ND DISTRICT ENGINEERING OFFICE

POBLACION DALAGUETE, CEBU, REGION VII

C.Y. 2025 PROJECT

DETAILED ENGINEERING DESIGN PLAN FOR

CONVERGENCE AND SPECIAL SUPPORT PROGRAM: BASIC INFRASTRUCTURE PROGRAM (BIP), FLOOD MITIGATION STRUCTURES PROTECTING PUBLIC INFRASTRUCTURES/FACILITIES, CONSTRUCTION OF DRAINAGE STRUCTURE, BARANGAY LANGTAD, ARGAO, CEBU

ARGAO, CEBU

LINED CANAL 1 = 217.69 M.

LINED CANAL 2 = 63.00 M.

SUBMITTED:

LENARD A. PANUGALINOG
CHIEF, PLANNING AND DESIGN SECTION

DATE:

RECOMMENDED:

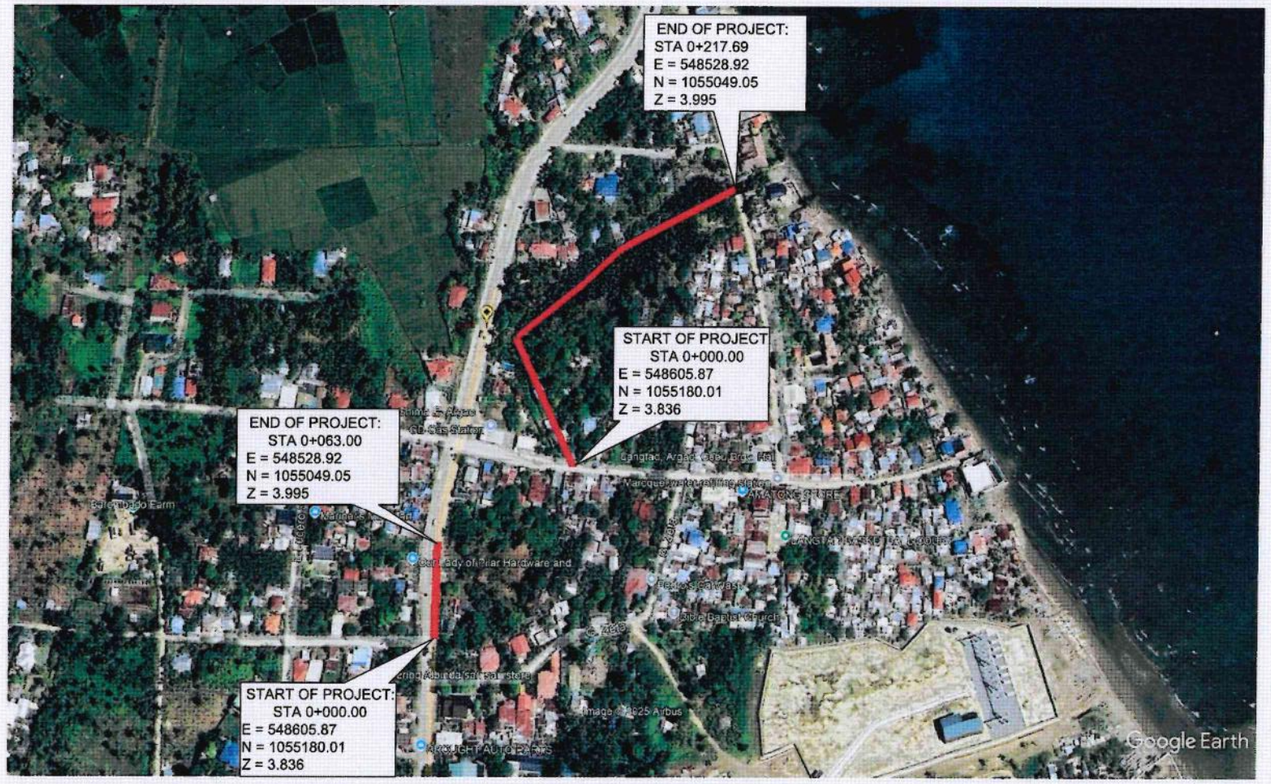
ROSALIND R. VASQUEZ
OIC - ASSISTANT DISTRICT ENGINEER

DATE:

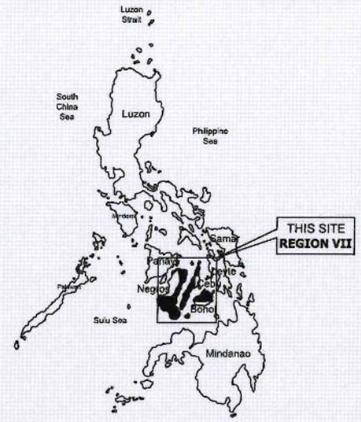
SUBMITTED:

SUSAN L. ORNOPIA-AROA
OIC - DISTRICT ENGINEER

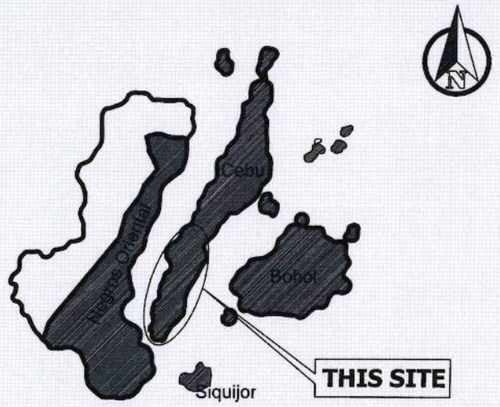
DATE:



1 / A-2 2 **VICINITY MAP**
SCALE: NTS



KEY MAP



REGION VII MAP

LOCATION MAP

VICINITY MAP

INDEX OF SHEETS

SET	SHEET NO.	SHEET CONTENTS
A	1	COVER SHEET
	2	LOCATION PLAN, PROJECT LENGTH DATA, INDEX OF SHEET, KEY MAP, LOCATION MAP AND VICINITY MAP
	3	SUMMARY OF QUANTITIES
B	4-5	GENERAL NOTES (SPECIFICATION, DESIGN CRITERIA, SYMBOLS, ABBREVIATIONS & LEGENDS)
	6	ITEM SPECIFICATION
	7-8	GEOTECHNICAL INVESTIGATION REPORT
	9	BACK - UP COMPUTATION AND VOLUME REPORT
	10	DPWH STANDARD PROJECT BILLBOARD
	11	TYPICAL ROAD WITH SEAWALL STRUCTURE SECTION
	12	TYPICAL ROAD WITH RCPC SECTION
	13	TYPICAL FLOOD CONTROL STRUCTURE DETAIL
	14	SHEET PILE DETAILS
C	15	TOPOGRAPHIC SURVEY
	16	PROJECT ALIGNMENT
	17	PLAN AND PROFILE
	18-26	CROSS - SECTION

PROJECT LENGTH DATA

TYPE	STATION (LIMITS)	LENGTH
LINED CANAL 1	SEC 1: STA 0+000.00 TO STA 0+217.69	217.69M
LINED CANAL 2	SEC 2: STA 0+000.00 TO STA 0+063.00	63.00M
BOX CULVERT	SEC 2: STA 0+000.00	15.05M

TYPE	STATION (LIMITS)	QUANTITY
CATCH BASIN	SEC 2: STA 0+000.00, STA 0+063.00	2

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU, REGION VII

PROJECT NAME AND LOCATION:
C.Y. 2025 PROJECT
DETAILED ENGINEERING DESIGN PLAN FOR CONVERGENCE AND SPECIAL SUPPORT PROGRAM: SUSTAINABLE INFRASTRUCTURE PROJECTS ALLEVIATING GAPS (SIPAG), FLOOD MITIGATION STRUCTURES PROTECTING MAJOR/ STRATEGIC PUBLIC BUILDINGS/ FACILITIES, CONSTRUCTION OF SEAWALL, BARANGAY LOOC, OSLOB, CEBU
OSLOB, CEBU
SEAWALL LENGTH = 151.90 M.

SHEET CONTENTS:
INDEX OF DRAWINGS
PROJECT INFORMATION SHEET
LOCATION PLAN
KEY MAP, LOCATION MAP, VICINITY MAP

PREPARED AND DESIGNED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
CHARIE Z. BAHENA	**KEVIN JOSHUA A. TAMANAHA**	**LENARD A. PANUGALINOG**	**SUSAN L. ORNOPIA-AROA**	**MA. CHYMBELIN D. IBAL**	A 02 03	02 26
ENGINEER II	ENGINEER II	CHIEF, PLANNING AND DESIGN SECTION	ASSISTANT DISTRICT ENGINEER	DISTRICT ENGINEER		
DATE :	DATE :	DATE :	DATE :	DATE :		

SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	QTY.	UNIT
B.4(10)	Miscellaneous Survey and Staking	1.00	L.S.
B.5(1)	Project Billboard/Sign Board	3.00	each
B.7(1)	Occupational Safety and Health Program	1.00	L.S.
B.8 (1)	Traffic Management	0.59	month
B.9(1)	Mobilization/Demobilization	1.00	L.S.
101(3)b6	Removal of Actual Structures/Obstruction, 0.30m thick, PCCP (Unreinforced)	1.00	L.S.
900(1)c	Clearing and Grubbing	20.59	cu.m.
902(1)a1	Reinforcing Steel (Deformed), Grade 40	2,248.42	kg
1700 (1)	Reinforcing Steel (Deformed), Grade 40	1.00	L.S.
1701 (2)	Surplus Common Excavation	1,403.71	cu.m.
1704 (1) a	Embankment, From roadway/structure excavation	110.36	cu.m.
1718 (21) b1	Lined Canal, Concrete, Rectangular	280.69	l.m.
1718 (22)	Bedding	139.74	cu.m

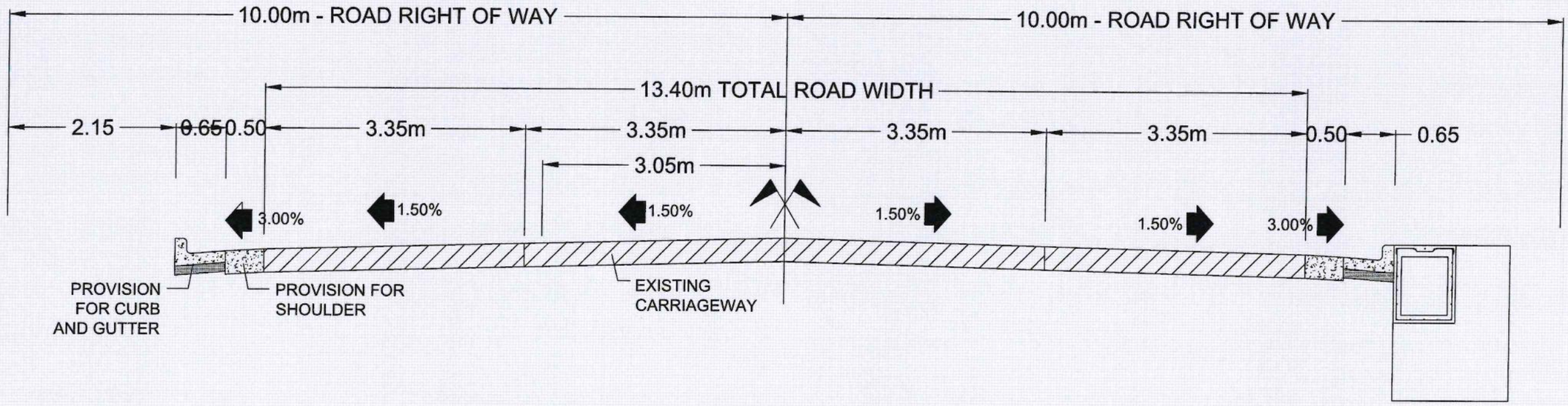
REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU, REGION VII

PROJECT NAME AND LOCATION:
C.Y. 2025 PROJECT
DETAILED ENGINEERING DESIGN PLAN FOR CONVERGENCE AND SPECIAL SUPPORT PROGRAM: SUSTAINABLE INFRASTRUCTURE PROJECTS ALLEVIATING GAPS (SIPAG), FLOOD MITIGATION STRUCTURES PROTECTING MAJOR/ STRATEGIC PUBLIC BUILDINGS/ FACILITIES, CONSTRUCTION OF SEAWALL, BARANGAY LOOC, OSLOB, CEBU
OSLOB, CEBU
SEAWALL LENGTH = 151.90 M.

SHEET CONTENTS: SUMMARY OF QUANTITIES

PREPARED AND DESIGNED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
CHARIE Z. BAHENA	KEVIN JOSHUA A. TAMANAHA	LENARD A. PANUGALINOG	SUSAN L. ORNOPIA-AROA	MA. CHYMBELIN D. IBAL	A 03 03	03 26
ENGINEER II	ENGINEER II	CHIEF, PLANNING AND DESIGN SECTION	ASSISTANT DISTRICT ENGINEER	DISTRICT ENGINEER		
DATE :	DATE :	DATE :	DATE :	DATE :		



1
B-5 08

NORMAL ROAD SECTION

SCALE: 1:25

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU, REGION VII

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	PREPARED AND DESIGNED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
C.Y. 2025 PROJECT DETAILED ENGINEERING DESIGN PLAN FOR CONVERGENCE AND SPECIAL SUPPORT PROGRAM: SUSTAINABLE INFRASTRUCTURE PROJECTS ALLEVIATING GAPS (SIPAG), FLOOD MITIGATION STRUCTURES PROTECTING MAJOR/ STRATEGIC PUBLIC BUILDINGS/ FACILITIES, CONSTRUCTION OF SEAWALL, BARANGAY LODC, OSLOB, CEBU OSLOB, CEBU SEAWALL LENGTH = 151.90 M.	TYPICAL ROAD WITH FLOOD CONTROL STRUCTURE CROSS SECTION	**CHARIE Z. BAHENA** ENGINEER II DATE :	**KEVIN JOSHUA A. TAMANAHA** ENGINEER II DATE :	**LENARD A. PANUGALINOG** CHIEF, PLANNING AND DESIGN SECTION DATE :	**SUSAN L. ORNOPIA-AROA** ASSISTANT DISTRICT ENGINEER DATE :	**MA. CHYMBELIN D. IBAL** DISTRICT ENGINEER DATE :	B 06 10	09 26

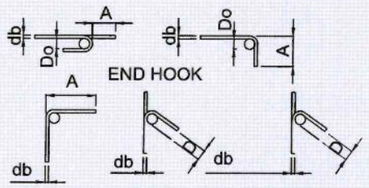
NOTES

MISCELLANEOUS STRUCTURES - REINFORCED CONCRETE LINE CANAL

1. REINFORCING STEEL SHALL CONFORM TO AASHTO M31 (ASTM A615), GRADE 40 FOR BARS 16mm AND SMALLER (40 000psi) fy=275.80 MPa.
2. SLOPE TOP OF LINED CANAL SHALL BE 2.00% GOING TO THE GUTTER.
3. COVERING SHALL BE LOCATED AT EVERY 15m AND/OR AT EVERY CORNER OF THE JUNCTION FOR MAINTENANCE PURPOSES.
4. HOOKS AND BENDS

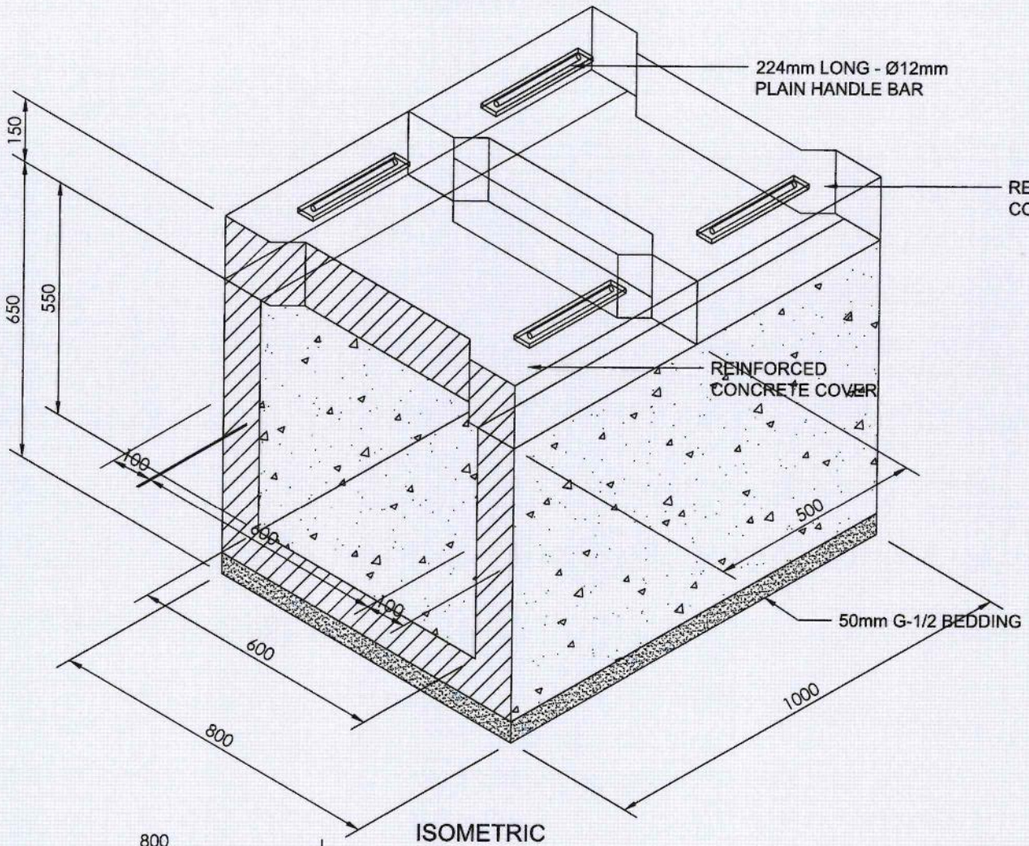
   HOOKS AND BENDS SHALL BE AS SHOWN IN THE FOLLOWING TABLE

BAR DIA, dbØ mm	END HOOKS		STIRRUP & TIE		STIRRUP TIE
	180°	90°	90°	135°	135°
10	125	150	100	100	125
12	150	200	113	113	163
16	175	250	150	138	200

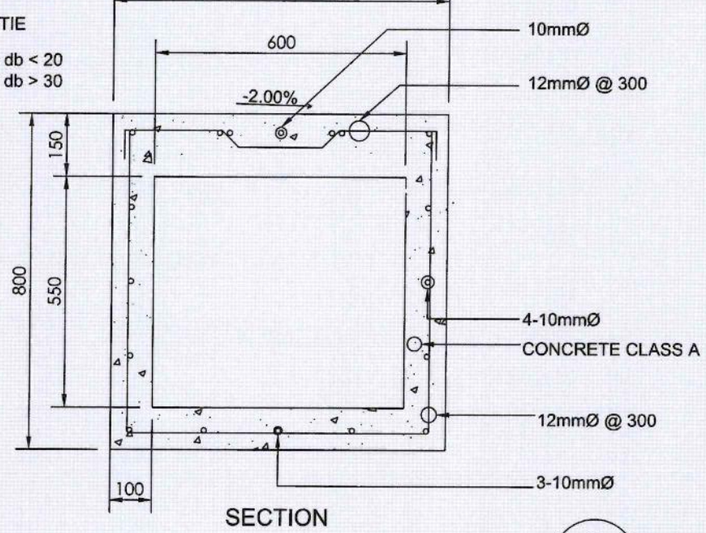


Do = 6 db for db < 30
Do = 8.7 db for db > 30

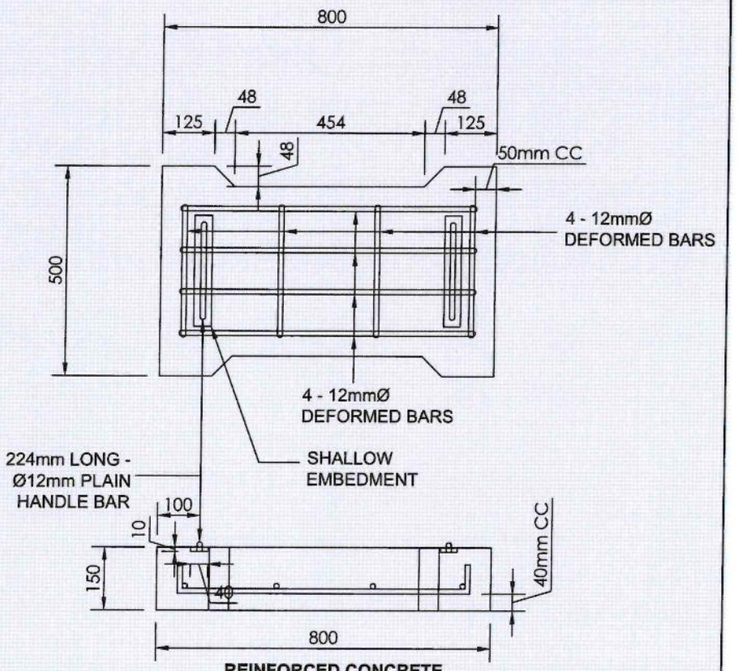
D = 4 db for db < 20
D = 6 db for db > 30



ISOMETRIC



SECTION



REINFORCED CONCRETE COVER DETAIL

TYPE	DESCRIPTION	UNIT PER METER	QTY
CONCRETE	LINED CANAL W/ COVER	m^3/meter	0.31
REIFORCEMENT	LINED CANAL W/ COVER AND METAL GRATING	kg/meter	33.17

1 / B-15 18

REINFORCED CONCRETE LINED CANAL DETAIL

SCALE: NTS

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU, REGION VII

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	PREPARED AND DESIGNED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
C.Y. 2025 PROJECT DETAILED ENGINEERING DESIGN PLAN FOR CONVERGENCE AND SPECIAL SUPPORT PROGRAM: SUSTAINABLE INFRASTRUCTURE PROJECTS ALLEVIATING GAPS (SIPAG), FLOOD MITIGATION STRUCTURES PROTECTING MAJOR/ STRATEGIC PUBLIC BUILDINGS/ FACILITIES, CONSTRUCTION OF SEAWALL, BARANGAY LOOC, OSLOB, CEBU OSLOB, CEBU SEAWALL LENGTH = 151.90 M.	REINFORCED CONCRETE LINED CANAL DETAIL	CHARIE Z. BAHENA ENGINEER II DATE :	KEVIN JOSHUA A. TAMANAHA ENGINEER II DATE :	LENARD A. PANUGALINOG CHIEF. PLANNING AND DESIGN SECTION DATE :	SUSAN L. ORNOPIA-AROA ASSISTANT DISTRICT ENGINEER DATE :	MA. CHYMBELIN D. IBAL DISTRICT ENGINEER DATE :	B 08 10	11 26

NOTES

BOX CULVERT (SINGLE AND DOUBLE BARREL), WING WALL

SPECIFICATIONS
DESIGN 1994 AASHTO STANDARD, SPECIFICATIONS FOR HIGH BRIDGES, 12TH EDITION

DESIGN LOAD
LIVE LOAD MS-18 (HS20-44)

CONCRETE
ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF f'c=20.7MPa (3000psi) ALL EXPOSED CORNERS CHAMFER EDGE 20mm. NO CONSTRUCTION JOINT ARE TO BE MADE EXCEPT AS SHOWN WHEN BOTTOM SLAB IS SUBJECTED TO ABRASION, ADD 25mm TO BOTTOM SLAB TO INCREASE COVERAGE ON STEEL.

STEEL REINFORCEMENT
ALL REINFORCING STEEL SHALL BE INTERMEDIATE (GRADE 40) ASTM A-615 WITH DEFORMATIONS CONFORMING TO ASTM A-305.

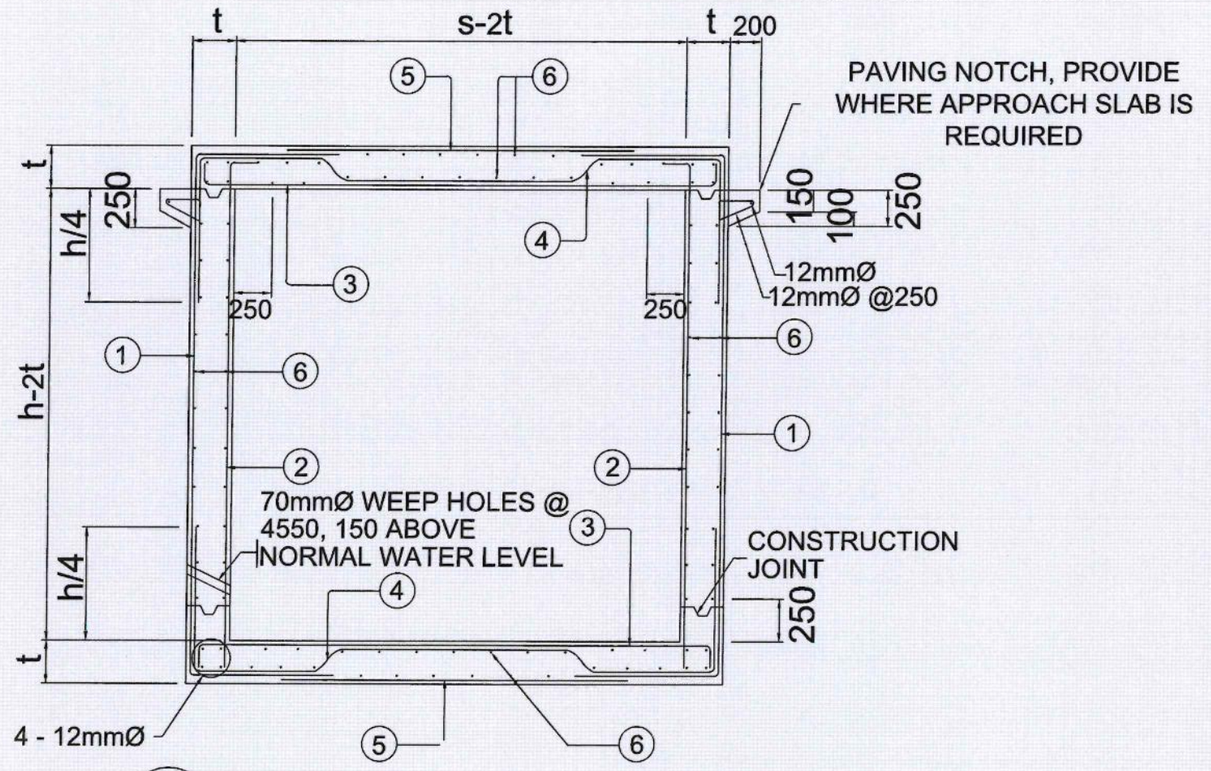
GENERAL
IN STATING CULVERT SIZE, GIVE WIDTH BY HEIGHT (WIDTH FIRST). WHEN HEIGHT OF FILL, H = 0, THE TOP OF SURFACE OF THE UPPER SLAB SHALL FOLLOW THE CROWN OF THE FINISHED ROADWAY. THE BOX CULVERT SHALL BE CONSTRUCTED ON A LAYER OF LEAN CONCRETE OF 50mm MINIMUM THICKNESS.

LIVE LOAD DISTRIBUTION REINFORCEMENT
WHEN THERE IS LESS THAN 600mm OF FILL ABOVE TOP SLAB OF CULVERT, ADDITIONAL REINFORCEMENT TRANSVERSE TO THE MAIN REINFORCEMENT IS ADDED TO THE BOTTOM OF THE TOP SLAB IN ACCORDANCE WITH AASHTO 1.3.2.E

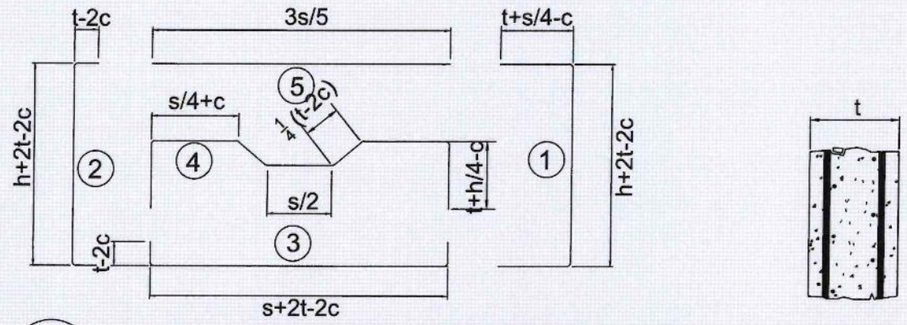
HEIGHT OF FILL
MAXIMUM HEIGHT OF FILL IS 300mm ABOVE TOP SLAB, FOR HEIGHT OF FILL GREATER THAN 3000mm, SPECIAL DESIGN OF BOX CULVER SHOULD BE DONE.

DIMENSIONS
ALL UNITS ARE IN mm UNLESS OTHERWISE SPECIFIED

NOTE :
FOR ALL THICKNESS LESS THAN 240, STAGGER HORIZONTAL REINFORCEMENT BARS AS SHOWN:



1 / B-14 17 SECTION - SINGLE BARREL
SCALE: NTS



2 / B-14 17 BAR BENDING DIAGRAM - SINGLE BARREL
SCALE: NTS

CLEAR	SINGLE BARREL BOX CULVERT												
h	t	BAR 1		BAR 2		BAR 3		BAR 4		BAR 5		BAR 6	
		Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING	Ø	SPACING
1500	180	16	240	16	280	16	240	16	240	12	300	12	250

CLEAR	QUANTITY PER METER OF BARREL					
h	SINGLE		DOUBLE		TRIPLE	
	CONCRETE	REINFORCEMENT	CONCRETE	REINFORCEMENT	CONCRETE	REINFORCEMENT
1500	1.21	189.60	2.34	279.60	3.32	387.10

STATIONING OF BOX CULVERT

NO.	STATIONING	LENGTH	BOX CULVERT TYPE	REMARKS
1	K 107+718.00	9.50m	SINGLE BARREL	SECTION 1

PLEASE BE NOTED THAT THE STATIONING ARE SUBJECT TO CHANGES AS PER ACTUAL CONDITION

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
CEBU 2ND DISTRICT ENGINEERING OFFICE
POBLACION DALAGUETE, CEBU, REGION VII

PROJECT NAME AND LOCATION:
C.Y. 2025 PROJECT
DETAILED ENGINEERING DESIGN PLAN FOR CONVERGENCE AND SPECIAL SUPPORT PROGRAM: SUSTAINABLE INFRASTRUCTURE PROJECTS ALLEVIATING GAPS (SIPAG), FLOOD MITIGATION STRUCTURES PROTECTING MAJOR/ STRATEGIC PUBLIC BUILDINGS/ FACILITIES, CONSTRUCTION OF SEAWALL, BARANGAY LOOC, OSLOB, CEBU
OSLOB, CEBU
SEAWALL LENGTH = 151.90 M.

SHEET CONTENTS:
BOX CULVERT (SINGLE) DETAILS

PREPARED AND DESIGNED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
CHARIE Z. BAHENA	KEVIN JOSHUA A. TAMANAHA	LENARD A. PANUGALINOG	SUSAN L. ORNOPIA-AROA	MA. CHYMBELIN D. IBAL	B 10 10	13 26
ENGINEER II	ENGINEER II	CHIEF, PLANNING AND DESIGN SECTION	ASSISTANT DISTRICT ENGINEER	DISTRICT ENGINEER		
DATE :	DATE :	DATE :	DATE :	DATE :		