

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE VII SIQUIJOR DISTRICT ENGINEERING OFFICE Larena, Siquijor

C.Y. 2024 PROJECT DETAILED ENGINEERING DESIGN PLAN FOR **MOOE - MAINTENANCE, REPAIR AND REHABILITATION OF INFRASTRUCTURE FACILITIES AND OTHER RELATED ACTIVITIES -**MAINTENANCE, REPAIR AND REHABILITATION OF INFRASTRUCTURE **FACILITIES - FLOOD CONTROL AND DRAINAGE SYSTEMS, STRUCTURES** AND RELATED FACILITIES, REPAIR/MAINTENANCE OF SEÑORA RIVER **REVETMENT 1, TIGBAWAN, LAZI, SIQUIJOR**

LAZI, SIQUIJOR STA. 0+085.00 - STA. 0+095.00 (LEFT-SIDE) NET LENGTH = 10.00 METERS

SUBMITTED:

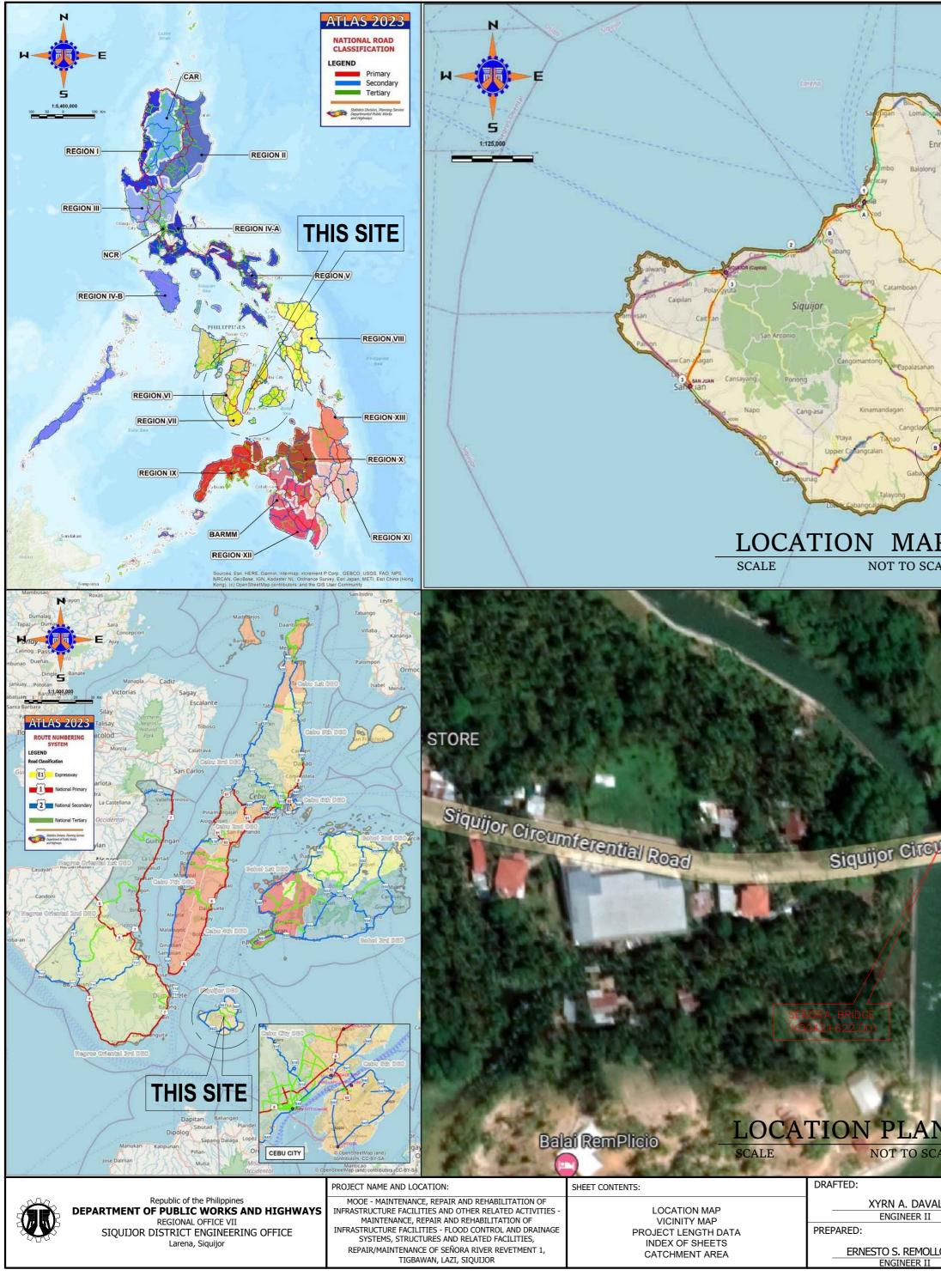
RECOMMENDED:

RAKIL-ALI S. RAK-IN, AER ASSISTANT DISTRICT ENGINEER DATE:

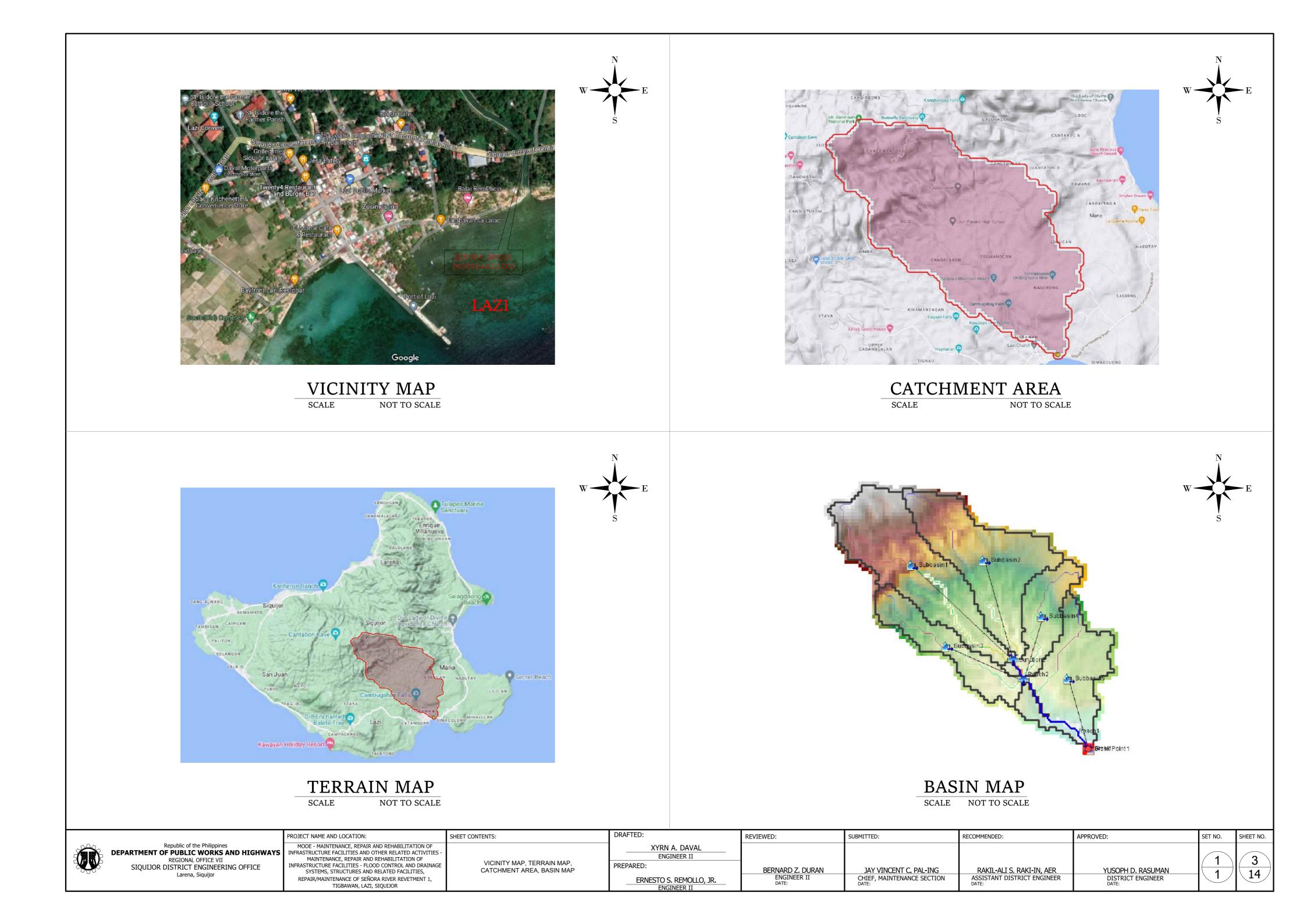
JAY VINCENT C. PAL-ING CHIEF, MAINTENANCE SECTION DATE:

APPROVED:

YUSOPH D. RASUMAN DISTRICT ENGINEER DATE:



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Lico-an of 2			SHEET NO.	SHEET NO. SHEET CONTENTS				
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<u>, jr.</u>	BERNARD Z. DURAN ENGINEER II DATE:	JAY VINCENT C. CHIEF, MAINTENAN DATE:	PAL-ING RAK	IL-ALI S. RAKI-IN, A FANT DISTRICT ENGI	NEER Y	USOPH D. RASUMAN DISTRICT ENGINEER DATE:		





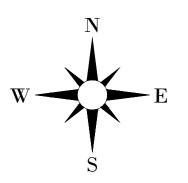


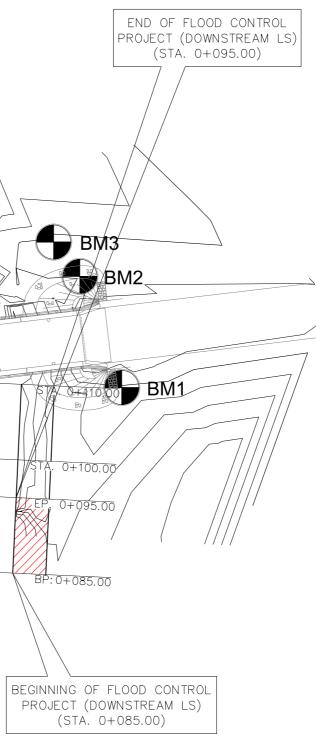
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 PROJECT NAME AND LOCATION:
 MOOE - MAINTENANCE, REPAIR AND REHABILITATION OF
 ENGINEER II
 MOOE - MAINTENANCE, REPAIR AND REHABILITATION OF
 ENGINEER II
 ENGINEER II
 ENGINEER II

 NIFRASTRUCTURE FACILITIES - FLOOD CONTROL AND DRAINAGE
 SYSTEMS, STRUCTURE FACILITIES - FLOOD CONTROL AND DRAINAGE
 GENERAL PLAN
 PREPARED:

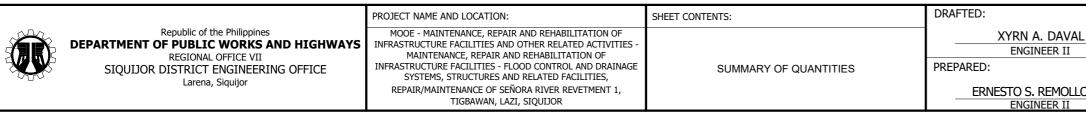
 REPAIR/MAINTENANCE OF SEÑORA RIVER REVETMENT 1, TIGBAWAN, LAZI, SIQUIDOR
 TIGBAWAN, LAZI, SIQUIDOR
 ERNESTO S. REMOLILIER II





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OLLO, JR.	BERNARD Z. DURAN ENGINEER II DATE:	JAY VINCENT C. PAL-ING CHIEF, MAINTENANCE SECTION DATE:	RAKIL-ALI S. RAKI-IN, AER ASSISTANT DISTRICT ENGINEER DATE:	YUSOPH D. RASUMAN DISTRICT ENGINEER DATE:		14

SUMMARY OF QUANTITIES								
ITEM NO.	DESCRIPTION	ORIGINAL QUANTITY	UNIT	REMARKS				
A.1.1(8)	PROVISION OF FIELD OFFICE FOR THE ENGINEER (RENTAL BASIS)	2.00	MONTH					
A.1.1(16)	OPERATION & MAINTENANCE OF FIELD OFFICE FOR THE ENGINEER	2.00	MONTH					
B.5(1)	PROJECT BILLBOARD / SIGNBOARD	2.00	EACH					
B.7(1)	OCCUPATIONAL SAFETY AND HEALTH	1.00	LUMP SUM					
B.9(1)	MOBILIZATION / DEMOBILIZATION	1.00	LUMP SUM					
1700(2)	CLEARING AND GRUBBING	1.00	LUMP SUM					
1710(1)a	RIPRAP (CLASS A)	12.73	CUBIC METER					
1711(1)	STONE MASONRY	1.80	CUBIC METER					
1712(1)	CONCRETE SLOPE PROTECTION	14.05	CUBIC METER					
1717(3)b	FURNISHING OF STEEL SHEET PILE (Z-TYPE, GRADE 50)	8,201.70	KILOGRAM	STEEL SHEET PILES HOT ROLLED Z TYPE FY50 MHZ13-820 820mm x 380mm x 7.8/7.7mm (w = 70.10 kg/m)				
1717(8)b	STEEL SHEET PILE, DRIVEN (Z-TYPE, GRADE 50)	78.00	METER					



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DLLO, JR I	BERNARD Z. DURAN ENGINEER II DATE:	JAY VINCENT C. PAL-ING CHIEF, MAINTENANCE SECTION DATE:	RAKIL-ALI S. RAKI-IN, AER ASSISTANT DISTRICT ENGINEER DATE:	YUSOPH D. RASUMAN DISTRICT ENGINEER DATE:		14	

1.0 GENERAL NOTES

- 1.1 SURVEY CONTROLS AND REFERENCES
 - 1.1.1 SURVEY CONTROLS AND REFERENCES ARE PROVIDED IN THE TOPOGRAPHIC REPORT AND IN THE DRAWINGS. SEE TOPOGRAPHIC PLAN.
- 1.2 STATIONINGS
 - 1.2.1 CENTERLINE STATIONING OF THE PROJECT WERE BASED FROM THE BRIDGE OF THE RIVER.
 - 1.2.2 ALIGNMENT AND GRADE ARE SUBJECT TO ADJUSTMENT TO SUIT EXISTING FIELD CONDITIONS.
- 1.3 ELEVATION AND GRADE
 - 1.3.1 ELEVATIONS AND GRADES AS DESCRIBED IN THE PROFILE ARE CENTER OF THE EXISTING RIVER BED, BANK ELEVATION, BOTTOM OF PILE CAP, ORDINARY WATER LEVEL, MAXIMUM EXPERIENCE FLOOD LEVEL, DESIGN FLOOD LEVEL, DESIGN RIVER BED AND TOP ELEVATION OF FLOOD CONTROL STRUCTURES.
- 1.4 HORIZONTAL CONTROL
 - 1.4.1 BASIC TRAVERSE STATIONS WERE ESTABLISHED BASED ON STATIONS OF EXISTING KM. POSTS AND EXISTING PERMANENT STRUCTURES AT THE PROJECT SITE.
- 1.5 VERTICAL CONTROL
 - 1.5.1 ELEVATIONS WERE ASSUMED AT THE FIRST BENCH MARK AT THE BEGINING OF EACH SECTION OF THE PROJECT.
 - 1.5.2 BENCH MARKS WERE ESTABLISHED AT EXISTING UNDISTURBED STRUCTURES AT DIFFERENT INTERVALS ALONG THE PROJECT.
- 1.6 DIMENSIONS
 - 1.6.1 DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
 - 1.6.2 STATIONING ARE GIVEN IN KILOMETERS AND METERS.
 - 1.6.3 RADI TRANSITION CURVES ELEVATIONS AND FLOOR LEVELS ARE GIVEN IN METERS.

2.0 DESIGN CRITERIA

- 2.1 DESIGN STRESSES
 - 2.1.1 CONCRETE FOR SLOPE PROTECTION, CLASS "A" COMPRESSIVE STRENGTH @28 DAYS, fc' = 20.70 MPa
 - 2.1.2 STRUCTURAL STEEL, ASTM-A36 STEEL SHEET PILES, fy = 248.30 MPa
 - 2.1.3 REINFORCING STEEL GRADE 40 STRUCTURAL GRADE DEFORMED BARS, fy =275.00 MPa
 - 2.1.4 WELDS USED E-60XX ELECTRODE
- 2.2 DESIGN LOADINGS

2.2.1 REINFORCED CONCRETE	δc' = 23.56 kN/m ³

 $\delta c' = 13.00 \text{ kN/m}^3$

2.2.2 RIPRAP, LIMESTONE

3.0 HYDRAULIC DESIGN DATA

HYDROLOGIC ANALYSIS									
25 YEAR RETURN PERIOD			50 YEAR RETURN PERIOD			100 YEAR RETURN PERIOD			
	QTY	UNIT		QTY	UNIT		QTY	UNIT	
CATCHMENT AREA	28.174	SQ.KM.	CATCHMENT AREA	28.174	SQ.KM.	CATCHMENT AREA	28.174	SQ.KM.	
DISCHARGE (D)	182.60	M ³ /SEC	DISCHARGE (D)	208.70	M ³ /SEC	DISCHARGE (D)	234.50	M ³ /SEC	
VELOCITY (V)		M/SEC	VELOCITY (V)		M/SEC	VELOCITY (V)		M/SEC	

4.0 MATERIALS

4.1 RIPRAP AND GROUTED RIPRAP

4.1.1 STONES

STONES FOR RIPRAP SHALL CONSIST OF ROCK AS NEARLY AS RECTANGULAR IN SECTION AS IS PRACTICAL, EXCEPT THAT RIPRAP OF CLASS A MAY CONSIST OF ROUND NATURAL STONES. THE STONES

STONES FOR RIPRAP SHALL CONSIST OF ROCK AS NEARLY AS RECTANGULAR IN SECTION AS IS PRACTICAL, EXCEPT THAT RIPRAP OF CLASS A MAY CONSIST OF ROUND NATURAL STONES. THE STONES SHALL BE SOUND, TOUGH, DURABLE, DENSE, RESISTANT TO THE ACTION OF AIR AND WATER, AND SUITABLE IN ALL RESPECTS FOR THE PURPOSE INTENDED.

STONES FOR RIPRAP SHALL BE ONE OF THE FOLLOWING CLASSES AS SHOWN ON THE PLANS OR DETERMINED BY THE ENGINEER.

CLASS A - STONES RANGING FROM A MINIMUM OF 15KG TO A MAXIMUM OF 25KG WITH AT LEAST 50 PERCENT OF THE STONES WEIGHING MORE THAN 20KG

CLASS B - STONES RANGING FROM MINIMUM OF 30KG TO A MAXIMUM OF 70KG WITH AT LEAST 50 PERCENT OF THE STONES WEIGHING MORE THAN 50KG

CLASS C - STONES RANGING FROM MINIMUM OF 60KG TO A MAXIMUM OF 100KG WITH AT LEAST 50 PERCENT OF THE STONES WEIGHING MORE THAN 80KG

CLASS D - STONES RANGING FROM MINIMUM OF 100KG TO A MAXIMUM OF 200KG WITH AT LEAST 50 PERCENT OF THE STONES WEIGHING MORE THAN 150KG

SOUND PIECES OF BROKEN CONCRETE OBTAINED FROM THE REMOVAL OF BRIDGES. CULVERTS AND OTHER STRUCTURES MAY BE SUBSTITUTED FOR STONE WITH THE APPROVAL OF THE ENGINEER.

4.1.2 FILTER MATERIALS

WHEN REQUIRED, THE RIPRAP SHALL BE PLACED ON A FILTER LAYER TO PREVENT FINE EMBANKMENT MATERIALS TO BE WASHED OUT THROUGH THE VOIDS OF THE FACE STONES. THE GRADING OF THE FILTER MATERIAL SHALL BE AS SPECIFIED ON THE PLANS, OR IN THE SPECIAL PROVISIONS. IF NOT SO SPECIFIED, IT WILL BE REQUIRED THAT D15 OF THE FILTER IS AT LEAST 4 TIMES THE SIZE D85 FOR THE EMBANKMENT MATERIAL, WHERE D15 PERCENT AND 85 PERCENT, RESPECTIVELY, PASSING (BY MASS) IN A GRAIN SIZE ANALYSIS. FINE AGGREGATE PASSING GRADING REQUIREMENTS FOR ITEM 405, STRUCTURAL CONCRETE, WILL SATISFY FOREGOING REQUIREMENTS.

4.1.3 MORTAR

MORTAR FOR GROUTED RIPRAP SHALL CONSIST OF SAND, CEMENT AND WATER CONFORMING TO THE REQUIREMENTS GIVEN UNDER ITEM 405, STRUCTURAL CONCRETE, MIXED IN THE PROPORTION OF ONE PART CEMENT TO THREE PARTS SAND BY VOLUME, AND SUFFICIENT WATER TO OBTAIN THE REQUIRED CONSISTENCY.

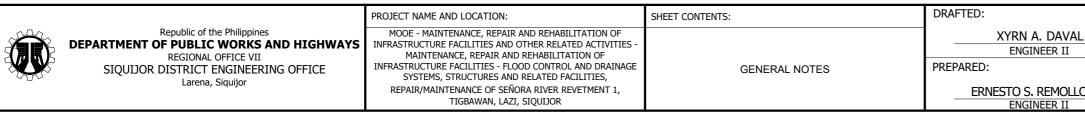
THE HORIZONTAL AND VERTICAL CONTACT SURFACE BETWEEN STONES SHALL BE EMBEDDED BY CEMENT MORTAR HAVING A MINIMUM THICKNESS OF 20 MM. SUFFICIENT MORTAR SHALL BE USED TO COMPLETELY FILL ALL VOIDS LEAVING THE FACE OF THE STONES EXPOSED

4.2 STONE MASONRY

4.2.1 STONE

THE STONE SHALL BE CLEAN, HARD, AND DURABLE AND SHALL BE SUBJECT TO THE ENGINEER'S APPROVAL. ADOBE STONE SHALL NOT BE USED UNLESS OTHERWISE SPECIFIED.

SIZES AND SHAPES - UNLESS OTHER SIZES ARE SHOWN ON THE PLANS.



CEMENT, FINE AGGREGATE, AND WATER SHALL CONFORM TO THE RESPECTIVE REQUIREMENTS FOR THOSE MATERIALS AS SPECIFIED UNDER ITEM 405, STRUCTURAL CONCRETE, EXCEPT AS TO THE GRADING OF FINE AGGREGATE WHICH SHALL ALL PASS THE 2.36 MM (NO. 8) SIEVE, NOT LESS THAN 15 NOR MORE THAN 40 PERCENT SHALL PASS THE 0.3 MM (NO. 50) SIEVE, AND NOT MORE THAN 10 PERCENT SHALL PASS THE 0.15 MM (NO.100) SIEVE.

THE MORTAR FOR THE MASONRY SHALL BE COMPOSED OF ONE PART OF PORTLAND CEMENT AND TWO PARTS OF FINE AGGREGATE BY VOLUME AND SUFFICIENT WATER TO MAKE THE MORTAR OF SUCH CONSISTENCY THAT IT CAN BE HANDLED EASILY AND SPREAD WITH A TROWEL. MORTAR SHALL BE MIXED ONLY IN THOSE QUANTITIES REQUIRED FOR IMMEDIATE USE. UNLESS AN APPROVED MORTAR MIXING MACHINE IS USED, THE FINE AGGREGATE AND CEMENT SHALL BE MIXED DRY IN A TIGHT BOX UNTIL THE MIXTURE ASSUMES A UNIFORM COLOR, AFTER WHICH, WATER SHALL BE ADDED AS THE MIXING CONTINUES UNTIL THE MORTAR ATTAINS THE PROPER CONSISTENCY. MORTAR THAT IS NOT USED WITHIN 90 MINUTES AFTER THE WATER HAS BEEN ADDED SHALL BE DISCARDED. RETEMPERING OF MORTAR WILL NOT BE PERMITTED.

A BED COURSE, WHERE REQUIRED, SHALL BE GRANULAR MATERIAL WHICH SATISFIES THE REQUIREMENTS FOR ITEM 200, AGGREGATE SUB-BASE, GRADING A.

STEEL SHEET PILES SHALL BE OF THE TYPE. WEIGHT AND SECTION MODULUS INDICATED ON THE PLANS OR SPECIAL PROVISIONS, AND SHALL MEET THE REQUIREMENTS OF AASHTO M202 (ASTM A-328), OR AASHTO M223. ALL OTHER SHEET PILES SHALL MEET THE REQUIREMENTS PRESCRIBED ABOVE THE PARTICULAR MATERIAL SPECIFIED. THE JOINTS SHALL BE PRACTICALLY WATER-TIGHT WHEN THE PILES ARE IN PLACE. PILE SHOES SHALL BE CALLED FOR ON THE PLANS. MATERIAL FOR PILE SPLICES, WHEN SPLICING IS ALLOWED, SHALL BE OF THE SAME QUALITY AS THE MATERIAL USED FOR THE PILE ITSELF AND SHALL FOLLOW THE REQUIREMENTS GIVEN ON THE PLANS.

STONES HAVE A THICKNESS OF NOT LESS THAN 150 MM, AND WIDTHS OF NOT LESS THAN ONE AND ONE-HALF TIMES THEIR RESPECTIVE THICKNESS, AND LENGTHS OF NOT LESS THAN ONE AND ONE HALF TIMES THEIR RESPECTIVE WIDTHS. EACH STONE SHALL BE OF GOOD SHAPE AND BE FREE OF DEPRESSIONS AND PROJECTIONS THAT MIGHT WEAKEN OR PREVENT IT FROM BEING PROPERLY BEDDED.

DRESSING - THE STONE SHALL BE DRESSED TO REMOVE ANY THIN OR WEAK PORTIONS. FACE STONES SHALL BE DRESSED TO PROVIDE BED AND JOINT LINES THAT DO NOT VARY MORE THAN 20 MM FROM THE TRUE LINES AND TO ENSURE THE MEETING OF BED AND JOINT LINES WITHOUT THE ROUNDING OF CORNERS OF THE STONES IN EXCESS OF 30 MM IN RADIUS. BED SURFACES OF THE FACE STONES SHALL BE APPROXIMATELY NORMAL TO THE FACE OF THE STONES FOR ABOUT 80 MM AND FROM THIS POINT MAY DEPART FROM A NORMAL PLANE NOT TO EXCEED 50 MM IN 300 MM.

FINISH FOR EXPOSED FACES - FACE STONES SHALL BE PITCHED TO THE LINE ALONG THE BEDS AND JOINTS. THE MAXIMUM PROJECTION OF ROCK FACES BEYOND PITCH LINES SHALL NOT BE MORE THAN 50 MM.

2.2 MORTAR

4.3 CONCRETE SLOPE PROTECTION

4.3.1 BED COURSE

4.3.2 FORMWORK

FORMWORK, WHERE NECESSARY, SHALL BE AS SPECIFIED IN ITEM 407, CONCRETE STRUCTURES.

4.3.3 STEEL REINFORCEMENT

STEEL REINFORCEMENT SHALL BE AS SPECIFIED IN ITEM 404, REINFORCING STEEL.

4.3.4 CONCRETE

CONCRETE SHALL BE CLASS B AS SPECIFIED IN ITEM 405, STRUCTURAL CONCRETE, UNLESS OTHERWISE SPECIFIED OR REQUIRED BY THE ENGINEER.

4.4 SHEET PILES

5.0 CONSTRUCTION REQUIREMENTS

5.1 CLEARING AND GRUBBING

5.1.1 GENERAL

THE ENGINEER WILL ESTABLISH THE LIMITS OF WORK AND DESIGNATE ALL TREES, SHRUBS, PLANTS AND OTHER THINGS TO REMAIN. THE CONTRACTOR SHALL PRESERVE ALL OBJECTS DESIGNATED TO REMAIN. PAINT REQUIRED FOR CUT OR SCARRED SURFACE OF TREES OR SHRUBS SELECTED FOR RETENTION SHALL BE AN APPROVED ASPHALTUM BASE PAINT PREPARED ESPECIALLY FOR TREE SURGERY.

CLEARING SHALL EXTEND ONE (1) METER BEYOND THE TOE OF THE FILL SLOPES OR BEYOND ROUNDING OF CUT SLOPES AS THE CASE MAYBE FOR THE ENTIRE LENGTH OF THE PROJECT UNLESS OTHERWISE SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER AND PROVIDED IT IS WITHIN THE RIGHT OF WAY LIMITS OF THE PROJECT, WITH THE EXCEPTION OF TREES UNDER THE JURISDICTION OF THE FOREST MANAGEMENT BUREAU (FMB).

5.1.2 CLEARING AND GRUBBING

ALL SURFACE OBJECTS AND ALL TREES, STUMPS, ROOTS AND OTHER PROTRUDING OBSTRUCTIONS, NOT DESIGNATED TO REMAIN, SHALL BE CLEARED AND/OR GRUBBED, INCLUDING MOWING AS REQUIRED, EXCEPT AS PROVIDED BELOW: (1) REMOVAL OF UNDISTURBED STUMPS AND ROOTS AND NONPERISHABLE SOLID OBJECTS WITH A MINIMUM DEPTH OF ONE

- (1) METER BELOW SUBGRADE OR SLOPE OF EMBANKMENT WILL NOT BE REQUIRED.
- (2) IN AREAS OUTSIDE OF THE GRADING LIMITS OF CUT AND EMBANKMENT AREAS, STUMPS AND NONPERISHABLE SOLID OBJECTS SHALL BE CUT OFF NOT MORE THAN 150 MM (6 INCHES) ABOVE THE GROUND LINE OR LOW WATER LEVEL.
- (3) IN AREAS TO BE ROUNDED AT THE TOP OF CUT SLOPES, STUMPS SHALL BE CUT OFF FLUSH WITH OR BELOW THE SURFACE OF THE FINAL SLOPE LINE.
- (4) GRUBBING OF PITS, CHANNEL CHANGES AND DITCHES WILL BE REQUIRED ONLY TO THE DEPTH NECESSITATED BY THE PROPOSED EXCAVATION WITHIN SUCH AREAS.
- (5) IN AREAS COVERED BY COGON/TALAHIB, WILD GRASS AND OTHER VEGETATIONS. TOP SOIL SHALL BE CUT TO A MAXIMUM DEPTH OF 150 MM BELOW THE ORIGINAL GROUND SURFACE OR AS DESIGNATED BY THE ENGINEER, AND DISPOSED OUTSIDE THE CLEARING AND GRUBBING LIMITS AS INDICATED IN THE TYPICAL ROADWAY SECTION.

EXCEPT IN AREAS TO BE EXCAVATED, STUMP HOLES AND OTHER HOLES FROM WHICH OBSTRUCTIONS ARE REMOVED SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO THE REQUIRED DENSITY.

IF PERISHABLE MATERIAL IS BURNED, IT SHALL BE BURNED UNDER THE CONSTANT CARE OF COMPONENT WATCHMEN AT SUCH TIMES AND IN SUCH A MANNER THAT THE SURROUNDING VEGETATION, OTHER ADJACENT PROPERTY, OR ANYTHING DESIGNATED TO REMAIN ON THE RIGHT OF WAY WILL NOT BE JEOPARDIZED. IF PERMITTED, BURNING SHALL BE DONE IN ACCORDANCE WITH APPLICABLE LAWS. ORDINANCES, AND REGULATION.

THE CONTRACTOR SHALL USE HIGH INTENSITY BURNING PROCEDURES, (I.E., INCINERATORS, HIGH STACKING OR PIT AND DITCH BURNING WITH FORCED AIR SUPPLEMENTS) THAT PRODUCE INTENSE BURNING WITH LITTLE OR NO VISIBLE SMOKE EMISSION DURING THE BURNING PROCESS. AT THE CONCLUSION OF EACH BURNING SESSION. THE FIRE SHALL BE COMPLETELY EXTINGUISHED SO THAT NO SMOLDERING DEBRIS REMAINS.

IN THE EVENT THAT THE CONTRACTOR IS DIRECTED BY THE ENGINEER NOT TO START BURNING OPERATIONS OR TO SUSPEND SUCH OPERATIONS BECAUSE OF HAZARDOUS WEATHER CONDITIONS.

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LLO, JR.	BERNARD Z. DURAN ENGINEER II DATE:	JAY VINCENT C. PAL-ING CHIEF, MAINTENANCE SECTION DATE:	RAKIL-ALI S. RAKI-IN, AER ASSISTANT DISTRICT ENGINEER DATE:	YUSOPH D. RASUMAN DISTRICT ENGINEER DATE:	3	14

MATERIAL TO BE BURNED WHICH INTERFERES WITH SUBSEQUENT CONSTRUCTION OPERATIONS SHALL BE MOVED BY THE CONTRACTOR TO TEMPORARY LOCATIONS CLEAR OF CONSTRUCTION OPERATIONS AND LATER, IF DIRECTED BY THE ENGINEER, SHALL BE PLACED ON A DESIGNATED SPOT AND BURNED.

MATERIALS AND DEBRIS WHICH CANNOT BE BURNED AND PERISHABLE MATERIALS MAY BE DISPOSED OFF BY METHODS AND AT LOCATIONS APPROVED BY THE ENGINEER, ON OR OFF THE PROJECT. IF DISPOSAL IS BY BURYING, THE DEBRIS SHALL BE PLACED IN LAYERS WITH THE MATERIAL SO DISTURBED TO AVOID NESTING. EACH LAYER SHALL BE COVERED OR MIXED WITH EARTH MATERIAL BY THE LAND-FILL METHOD TO FILL ALL VOIDS. THE TOP LAYER OF MATERIAL BURIED SHALL BE COVERED WITH AT LEAST 300 MM (12 INCHES) OF EARTH OR OTHER APPROVED MATERIAL AND SHALL BE GRADED, SHAPED AND COMPACTED TO PRESENT A PLEASING APPEARANCE. IF THE DISPOSAL LOCATION IS OFF THE PROJECT, THE CONTRACTOR SHALL MAKE ALL NECESSARY ARRANGEMENTS WITH PROPERTY OWNERS IN WRITING FOR OBTAINING SUITABLE DISPOSAL LOCATIONS WHICH ARE OUTSIDE THE LIMITS OF VIEW FROM THE PROJECT. THE COST INVOLVED SHALL BE INCLUDED IN THE UNIT BID PRICE. A COPY OF SUCH AGREEMENT SHALL BE FURNISHED TO THE ENGINEER. THE DISPOSAL AREAS SHALL BE SEEDED, FERTILIZED AND MULCHED AT THE CONTRACTOR'S EXPENSE.

WOODY MATERIAL MAY BE DISPOSED OFF BY CHIPPING. THE WOOD CHIPS MAY BE USED FOR MULCH, SLOPE EROSION CONTROL OR MAY BE UNIFORMLY SPREAD OVER SELECTED AREAS AS DIRECTED BY THE ENGINEER. WOOD CHIPS USED AS MULCH FOR SLOPE EROSION CONTROL SHALL HAVE A MAXIMUM THICKNESS OF 12 MM (1/2 INCH) AND FACES NOT EXCEEDING 3900 MM2 (6 SQUARE INCHES) ON ANY INDIVIDUAL SURFACE AREA. WOOD CHIPS NOT DESIGNATED FOR USE UNDER OTHER SECTIONS SHALL BE SPREAD OVER THE DESIGNATED AREAS IN LAYERS NOT TO EXCEED 75 MM (3 INCHES) LOOSE THICKNESS. DISEASED TREES SHALL BE BURIED OR DISPOSED OFF AS DIRECTED BY THE ENGINEER.

ALL MERCHANTABLE TIMBER IN THE CLEARING AREA WHICH HAS NOT BEEN REMOVED FROM THE RIGHT OF WAY PRIOR TO THE BEGINNING OF CONSTRUCTION, SHALL BECOME THE PROPERTY OF THE CONTRACTOR, UNLESS OTHERWISE PROVIDED.

LOW HANGING BRANCHES AND UNSOUND OR UNSIGHTLY BRANCHES ON TREES OR SHRUBS DESIGNATED TO REMAIN SHALL BE TRIMMED AS DIRECTED. BRANCHES OF TREES EXTENDING OVER THE ROADBED SHALL BE TRIMMED TO GIVE A CLEAR HEIGHT OF 6 M (20 FEET) ABOVE THE ROADBED SURFACE. ALL TRIMMING SHALL BE DONE BY SKILLED WORKMEN AND IN ACCORDANCE WITH GOOD TREE SURGERY PRACTICES.

TIMBER CUT INSIDE THE AREA STAKED FOR CLEARING SHALL BE FELLED WITHIN THE AREA TO BE CLEARED.

5.1.3 INDIVIDUAL REMOVAL OF TREES OR STUMPS

INDIVIDUAL TREES OR STUMPS DESIGNATED BY THE ENGINEER FOR REMOVAL AND LOCATED IN AREAS OTHER THAN THOSE ESTABLISHED FOR CLEARING AND GRUBBING AND ROADSIDE CLEANUP SHALL BE REMOVED AND DISPOSED OFF AS SPECIFIED UNDER SUBSECTION 100.2.2 EXCEPT TREES REMOVED SHALL BE CUT AS NEARLY FLUSH WITH THE GROUND AS PRACTICABLE WITHOUT REMOVING STUMPS.

5.2 STRUCTURE EXCAVATION

PRIOR TO STARTING EXCAVATION OPERATIONS IN ANY AREA, ALL NECESSARY CLEARING AND GRUBBING IN THAT AREA SHALL HAVE BEEN PERFORMED IN ACCORDANCE WITH ITEM 100, CLEARING AND GRUBBING

5.2.1 EXCAVATION

5.2.1.1 GENERAL, ALL STRUCTURES

THE CONTRACTOR SHALL NOTIFY THE ENGINEER SUFFICIENTLY IN ADVANCE OF THE BEGINNING OF ANY EXCAVATION SO THAT CROSS-SECTIONAL ELEVATIONS AND MEASUREMENTS MAY BE TAKEN ON THE UNDISTURBED GROUND. THE NATURAL GROUND ADJACENT TO THE STRUCTURE SHALL NOT BE DISTURBED WITHOUT PERMISSION OF THE ENGINEER.

TRENCHES OR FOUNDATION PITS FOR STRUCTURES OR STRUCTURE FOOTINGS SHALL BE EXCAVATED TO THE LINES AND GRADES OR ELEVATIONS SHOWN ON THE PLANS OR AS STAKED BY THE ENGINEER. THEY SHALL BE OF SUFFICIENT SIZE TO PERMIT THE PLACING OF STRUCTURES OR STRUCTURE FOOTINGS OF THE FULL WIDTH AND LENGTH SHOWN. THE ELEVATIONS OF THE BOTTOMS OF FOOTINGS, AS SHOWN ON THE PLANS. SHALL BE CONSIDERED AS APPROXIMATE ONLY AND THE ENGINEER MAY ORDER, IN WRITING, SUCH CHANGES IN DIMENSIONS OR ELEVATIONS OF FOOTINGS AS MAY BE DEEMED NECESSARY, TO SECURE A SATISFACTORY FOUNDATION.

BOULDERS, LOGS, AND OTHER OBJECTIONABLE MATERIALS ENCOUNTERED IN EXCAVATION SHALL BE REMOVED.

AFTER EACH EXCAVATION IS COMPLETED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO THAT EFFECT AND NO FOOTING, BEDDING MATERIAL OR PIPE CULVERT SHALL BE PLACED UNTIL THE ENGINEER HAS APPROVED THE DEPTH OF EXCAVATION AND THE CHARACTER OF THE FOUNDATION MATERIAL.

5.2.1.2 STRUCTURES OTHER THAN PIPE CULVERTS.

ALL ROCK OR OTHER HARD FOUNDATION MATERIALS SHALL BE CLEANED ALL LOOSE MATERIALS, AND CUT TO A FIRM SURFACE, EITHER LEVEL, STEPPED, OR SERRATED AS DIRECTED BY THE ENGINEER. ALL SEAMS OR CREVICES SHALL BE CLEANED AND GROUTED. ALL LOOSE AND DISINTEGRATED ROCKS AND THIN STRATA SHALL BE REMOVED.

5.2.1.3 WHEN THE FOOTING IS TO REST ON MATERIAL OTHER THAN ROCK.

EXCAVATION TO FINAL GRADE SHALL NOT BE MADE UNTIL JUST BEFORE THE FOOTING IS TO BE PLACED. WHEN THE FOUNDATION MATERIAL IS SOFT OR MUCKY OR OTHERWISE UNSUITABLE, AS DETERMINED BY THE ENGINEER, THE CONTRACTOR SHALL REMOVE THE UNSUITABLE MATERIAL AND BACKFILL WITH APPROVED GRANULAR MATERIAL. THIS FOUNDATION FILL SHALL BE PLACED AND COMPACTED IN 150 MM (6 INCHES) LAYERS UP TO THE FOUNDATION ELEVATION.

WHEN FOUNDATION PILES ARE USED, THE EXCAVATION OF EACH PIT SHALL BE COMPLETED BEFORE THE PILES ARE DRIVEN AND ANY PLACING OF FOUNDATION FILL SHALL BE DONE AFTER THE PILES ARE DRIVEN. AFTER THE DRIVING IS COMPLETED, ALL LOOSE AND DISPLACED MATERIALS SHALL BE REMOVED, LEAVING A SMOOTH, SOLID BED TO RECEIVE THE FOOTING.

5.3 RIPRAP AND GROUTED RIPRAP

5.3.1 EXCAVATION

THE BED FOR RIPRAP SHALL BE EXCAVATED TO THE REQUIRED DEPTHS AND PROPERLY COMPACTED, TRIMMED AND SHAPED.

THE RIPRAP SHALL BE FOUNDED IN A TOE TRENCH DUG BELOW THE DEPTH OF SCOUR AS SHOWN ON THE 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.

5.3.2 PLACING

STONES PLACED BELOW THE WATER LINE SHALL BE DISTRIBUTED SO THAT THE MINIMUM THICKNESS OF THE RIPRAP IS NOT LESS THAN THAT SPECIFIED. STONES ABOVE THE WATER LINE 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. EACH STONE SHALL BE LAID WITH ITS LONGEST AXIS PERPENDICULAR TO THE SLOPE IN CLOSE CONTACT WITH EACH ADJACENT STONE. 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.

UNLESS OTHERWISE PROVIDED, RIPRAP SHALL HAVE THE FOLLOWING MINIMUM THICKNESS, MEASURED PERPENDICULAR TO THE SLOPE:

		CROS
CLASS A - 300 MM	CLASS C - 600 MM	BATTE
CLASS B - 500 MM	CLASS D - 800 MM	LINE C

	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
Republic of the Philippines DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGIONAL OFFICE VII SIQUIJOR DISTRICT ENGINEERING OFFICE Larena, Siquijor	MOOE - MAINTENANCE, REPAIR AND REHABILITATION OF INFRASTRUCTURE FACILITIES AND OTHER RELATED ACTIVITIES - MAINTENANCE, REPAIR AND REHABILITATION OF INFRASTRUCTURE FACILITIES - FLOOD CONTROL AND DRAINAGE SYSTEMS, STRUCTURES AND RELATED FACILITIES, REPAIR/MAINTENANCE OF SEÑORA RIVER REVETMENT 1, TIGBAWAN, LAZI, SIQUIJOR		XYRN A. DAVAL ENGINEER II PREPARED: ERNESTO S. REMOLLO, JR. ENGINEER II	BERNARD Z. DURAN ENGINEER II DATE:	JAY VINCENT C. PAL-ING CHIEF, MAINTENANCE SECTION DATE:	RAKIL-ALI S. RAKI-IN, AER ASSISTANT DISTRICT ENGINEER DATE:	YUSOPH D. RASUMAN DISTRICT ENGINEER DATE:	23	7 14

CARE SHALL BE TAKEN TO PREVENT THE BUNCHING OF SMALL STONE OR STONES OF THE SAME SIZE. LARGE STONES SHALL BE USED IN THE CORNERS.

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.

THE STONES SHALL BE SO HANDLED AS NOT TO JAR 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.

BEDS FOR FACE STONES MAY VARY FROM 20 MM TO 50 MM IN THICKNESS. THEY SHALL NOT EXTEND AN UNBROKEN LINE THROUGH MORE THAN 5 STONES. JOINTS MAY VARY FROM 20 MM TO 50 MM IN THICKNESS. THEY SHALL NOT EXTEND IN AN UNBROKEN LINE THROUGH MORE THAN TWO STONES. THEY MAY BE AT ANGLES WITH THE VERTICAL FROM 00 TO 450 . FACE STONE SHALL BOND AT LEAST 150 MM LONGITUDINALLY AND 50 MM VERTICALLY. AT NO PLACE SHALL CORNERS OF FOUR STONES BE ADJACENT TO EACH OTHER.

THE SURFACE OF RIPRAP SHALL NOT VARY FROM THE THEORETICAL SURFACE BY MORE THAN 100 MM AT ANY POINT.

5.3.3 GROUTING

WHEN GROUTED RIPRAP IS SPECIFIED, STONES SHALL BE PLACED BY HAND, OR INDIVIDUALLY BY MACHINE AS SPECIFIED FOR RIPRAP PLACED ABOVE THE WATER LINE. THE SPACES BETWEEN THE STONES SHALL THEN BE FILLED WITH CEMENT MORTAR THROUGHOUT THE THICKNESS OF THE RIPRAP AS SPECIFIED IN SUBSECTION 504.2.3, MORTAR. SUFFICIENT MORTAR SHALL BE USED TO COMPLETELY FILL ALL VOIDS. EXCEPT THAT THE FACE SURFACE OF THE STONES SHALL BE LEFT EXPOSED.

GROUT SHALL BE PLACED FROM BOTTOM TO TOP OF THE SURFACE SWEPT 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.

THE STONES SHALL ALSO BE LAID IN A MANNER THAT THE VERTICAL AND HORIZONTAL ALIGNMENTS OF THE EXPOSED FACE SHALL, AS POSSIBLE BE MAINTAINED IN A STRAIGHT LINE.

5.3.4 WEEPHOLES

ALL WALLS AND ABUTMENTS SHALL BE PROVIDED WITH WEEPHOLES. UNLESS OTHERWISE SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER, THE WEEPHOLES SHALL BE PLACED HORIZONTALLY AT THE LOWEST POINTS WHERE FREE OUTLETS FOR WATER CAN BE OBTAINED AND SHALL BE SPACED AT NOT MORE THAN 2 M CENTER TO CENTER IN A STAGGERED MANNER . THE LENGTH OF THE WEEPHOLES SHALL NOT BE LESS THAN THE THICKNESS OF THE WALLS OF THE ABUTMENT AND SHALL BE AT LEAST 50 MM DIAMETER PVC OR OTHER PIPE MATERIALS ACCEPTED BY THE ENGINEER. WEEPHOLES MUST BE PROVIDED WITH FILTER BAGS AS SPECIFIED IN SPECIAL PROVISION OR AS DIRECTED BY THE ENGINEER, AND SHALL BE INCIDENTAL TO PAY ITEM 505.

5.4 STONE MASONRY

5.4.1 SELECTION AND PLACING

WHEN THE MASONRY IS TO BE PLACED ON A PREPARED FOUNDATION BED, THE BED SHALL BE FIRM AND NORMAL TO, OR IN STEPS NORMAL TO, THE FACE OF THE WALL, AND SHALL HAVE BEEN APPROVED BY THE ENGINEER BEFORE ANY STONE IS PLACED.

THE EXPOSED FACES OF INDIVIDUAL STONES SHALL BE PARALLEL TO THE FACES OF THE WALLS IN WHICH THE STONES ARE SET.

5.4.2 BED AND JOINTS

CROSS BEDS FOR VERTICAL FACED WALLS SHALL BE LEVEL, AND FOR FERED WALLS MAY VARY FROM LEVEL TO NORMAL TO THE BATTER OF THE FACE OF THE WALL.

5.4.3 HEADERS

HEADERS SHALL BE DISTRIBUTED UNIFORMLY THROUGHOUT THE WALLS OF THE STRUCTURES SO AS TO FORM AT LEAST ONE-FIFTH OF THE EXPOSED FACES. THEY SHALL BE OF SUCH LENGTHS AS TO EXTEND FROM THE FRONT FACE OF THE WALL INTO THE BACKING OF AT LEAST 300 MM. WHEN A WALL IS 450 MM OR LESS IN THICKNESS, THE HEADERS SHALL EXTEND ENTIRELY FROM FRONT TO BACK FACE.

5.4.4 BACKING

BACKING SHALL BE BUILT MOSTLY OF LARGE STONES AS SHOWN IN THE APPROVED PLANS OR AS DIRECTED BY THE ENGINEER. THE INDIVIDUAL STONES COMPOSING THE BACKING AND HEARTING SHALL BE WELL BONDED WITH THE STONES IN THE FACE WALL AND WITH EACH OTHER. ALL OPENINGS AND INTERSTICES IN THE BACKING SHALL BE FILLED COMPLETELY WITH MORTAR OR WITH SPALLS SURROUNDED COMPLETELY BY MORTAR.

5.4.5 POINTING

BOTH BED AND VERTICAL JOINTS SHALL BE FINISHED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THE MORTAR IN JOINTS ON TOP OF SURFACE OF MASONRY SHALL BE CROWNED SLIGHTLY AT THE CENTER OF THE MASONRY TO PROVIDE DRAINAGE.

5.4.6 COPING

COPINGS, IF CALLED FOR, SHALL BE FINISHED AS SHOWN ON THE PLANS. WHERE COPINGS ARE NOT CALLED FOR, THE TOP OF THE WALL SHALL BE FINISHED WITH STONES WIDE ENOUGH TO COVER THE TOP OF THE WALL FROM 450 MM TO 1000 MM IN LENGTH, AND OF RANDOM HEIGHTS, WITH A MINIMUM HEIGHT OF 150 MM. STONE SHALL BE LAID IN SUCH A MANNER THAT THE TOP COURSE IS AN INTEGRAL PART OF THE WALL. THE TOPS OF TOP COURSE OF STONE SHALL BE PITCHED TO LINE, IN BOTH VERTICAL AND HORIZONTAL PLANES.

5.4.7 WEEPHOLES

IT SHALL CONFORM TO THE REQUIREMENTS OF ITEM 504, RIPRAP AND GROUTED RIPRAP UNDER SUBSECTION 504.3.4, WEEPHOLES.

5.4.8 CLEANING EXPOSED FACES

IMMEDIATELY AFTER BEING LAID, AND WHILE THE MORTAR IS FRESH, ALL FACE STONES SHALL BE THOROUGHLY CLEANED OF MORTAR STAINS AND SHALL BE KEPT CLEAN UNTIL THE WORK IS COMPLETED.

5.4.9 CURING

IN HOT OR DRY WEATHER, THE MASONRY SHALL BE SATISFACTORY PROTECTED FROM THE SUN AND SHALL BE KEPT WET FOR A PERIOD OF AT LEAST THREE DAYS AFTER COMPLETION.

5.5 CONCRETE SLOPE PROTECTION

5.5.1 EXCAVATION

THE GROUND SHALL BE EXCAVATED WHERE NECESSARY IN ACCORDANCE WITH THE DIMENSIONS, LINES AND GRADES SHOWN ON THE PLANS.

5.5.2 BED COURSE

WHERE SHOWN ON THE PLANS OR ORDERED BY THE ENGINEER, THE CONTRACTOR SHALL PROVIDE AND LAY A BED COURSE, TO THE DEPTH REQUIRED, AND AS SPECIFIED IN ITEM 200, AGGREGATE SUBBASE COURSE, COMPACTED AT LEAST 100 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T 180, METHOD D.

5.5.3 CONCRETE

THE CONTRACTOR SHALL PROVIDE AND PLACE CONCRETE IN ACCORDANCE WITH THE REQUIREMENTS OF ITEM 405, STRUCTURAL CONCRETE, TO THE REQUIRED DEPTHS IN THE POSITIONS AND TO THE GRADES AND ELEVATIONS SHOWN ON THE PLANS. UNLESS OTHERWISE SPECIFIED, THE CONCRETE SLABS SHALL NOT BE GREATER THAN 4M BY 4M AND SHALL HAVE BETWEEN SLABS, PLAIN VERTICAL STRAIGHT JOINTS WITH NO JOINT FILLER OR SEALER. THE TOE OF THE CONCRETE SLOPE PROTECTION SHALL BE CONSTRUCTED AND PROTECTED A SHOWN ON THE PLANS.