

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS CORDILLERA ADMINISTRATIVE REGION BENGUET 1ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET

C.Y. 2025 PROJECT DETAILED ENGINEERING DESIGN PLAN FOR **CONSTRUCTION OF ROAD, PAYACPAC - PALAKPAK - LUMES - APNE, BARANGAY SAN PASCUAL, TUBA, BENGUET**

LOCATION: TUBA, BENGUET STATION LIMITS: STA. 0+000.00 - STA.4+859.50 NET LENGTH: 1.100 KM/ 2.200 LANE KM OF ROAD CONCRETING 3.760 LANE KM OF GRAVEL ROAD NET AREA: 1,529.00 SQ.M. (SLOPE PROTECTION)

RECOMMENDED:

SUBMITTED:

ROMUALDO T. APALIAS

OIC-CHIEF PLANNING AND DESIGN SECTION

DATE:

EDGARDO G. ENRIQUEZ

ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED:



ISAGANI C. CAYME, CESE

DISTRICT ENGINEER

DATE:



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QUANTITY COMPUTATION

	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
ERRER	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER	ISAGANI C. CAYME, CESE DISTRICT ENGINEER	GENERAL 01 16	02 120



MATERIALS SOURCE MAP

NOT TO SCALE

Gen-02



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I. STANDARD SPECIFICATIONS

- A. ALL WORKS SHALL COMPLY WITH
- DPWH STANDARD SPECIFICATIONS FOR HIGHWAY, BRIDGES, AND AIRPORTS, XI. DRAINAGE STRUCTURES REVISED 2013, SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS PERTAINING TO THE PROJECT
- 2. DPWH DESIGN GUIDELINES, CRITERIA AND STANDARDS (DGCS) 2015 ED. 2.1 VOLUME 2A - GEOHAZARD ASSESSMENT 2.2 VOLUME 2B - ENGINEERING SURVEYS
- 2.3 VOLUME 2C GEOLOGICAL AND GEOTECHNICAL INVESTIGATION 2 4 VOLUME 4 - HIGHWAY DESIGN
- 3. AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, 2018, 7TH EDITIONS
- AASHTO GUIDE FOR DESIGN OF PAVEMENT STRUCTURES, 1993 EDITION

SHOULD THERE BE MAJOR DEVIATIONS FROM THE ORIGINAL/CONSTRUCTION PLAN WITH THAT OF THE ACTUAL SITE CONDITION, AS DETERMINED THROUGH A JOINT STAKE-OUT SURVEY BETWEEN THE CONTRACTOR, IMPLEMENTING SECTION AND PLANNING SECTION AN "AS-STAKED" PLAN IN ACCORDANCE TO D.O. No. 15 SERIES OFXII. STRUCTURAL CONCRETE STRUCTURES 2016. SHOULD BE SUBMITTED TO THE IMPLEMENTING DISTRICT OFFICE IN ORDER THAT IMMEDIATE STEPS MAY BE TAKEN TO CORRECT OR ADJUST WHATEVER APPRECIABLE XII.1 CONCRETE DEVIATION THERE MAY BE FROM THE ORIGINAL PLAN.

II. DIMENSIONS

NOTE:

A. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS WHICH INCLUDE STATIONING DISTANCE BETWEEN CONTROL POINTS AND DIMENSIONS OF PIPES AND BOX CULVERTS AS SHOWN IN THE PLAN, PROFILE, AND CROSS-SECTION ARE IN METERS; AND THE UNIT OF MEASURE AS SHOWN IN THE DETAILS OF STRUCTURES ARE IN MILLIMETERS

III. STATIONING

- A. THE ROAD STATIONING AND ELEMENTS OF CURVES ARE RELATIVE TO THE ULTIMATE CENTERLINE OF THE ROAD.
- B. EQUATION OF STATIONS WHEN USED (BACK STATION/AHEAD STATION) ARE PROVIDED AT THE BEGINNING OR END OF THE CURVE AND/OR AT FULL STATION.

IV. HORIZONTAL CONTROL

- A. PRIMARY HORIZONTAL CONTROL POINTS WERE ESTABLISHED THROUGH GLOBAL POSITIONING SYSTEM (GPS) OBSERVATION USING THE NAMRIA CONTROL DESCRIBED AS
 - A.1 PRS-92 (ZONE III) CONTROL POINT
 - STATION NAME: BLLM NO. 11
 - NORTHING: 1814988.1630m EASTING: 442692.2260m
 - ELEVATION: 440.284m
- B. AZIMUTH AND DISTANCES BETWEEN CONTROL POINTS WERE MEASURED WITH THE USE OF TOTAL STATION AND GNSS.
- C. INDICATED AZIMUTH OF LINES ARE GRID AZIMUTH BASED FROM GPS STATIONS, ESTABLISHED ALONG THE ROAD
- D. THE GRID COORDINATES OF CONTROL POINTS ARE IN PRS-92 COORDINATE SYSTEM AND WERE ESTABLISHED BASED ON GRID COORDINATE OF NAMRIA CONTROL STATION

V. VERTICAL CONTROL

- A. ELEVATIONS WERE ASSUMED AT THE FIRST BENCH MARK AT THE BEGINNING OF EACH SECTION OF THE PROJECT.
- B. BENCH MARKS WERE ESTABLISHED AT EXISTING UNDISTURBED STRUCTURES AT DIFFERENT INTERVALS ALONG THE PROJECT.
- C. VERTICAL DATUM WERE RECKONED FROM CONTROL STATION POINT BM-1 WITH AN ESTABLISHED ELEVATION OF 1637.447 MASL FOR THE FIRST SECTION.

VI. INSTRUMENT USED

INSTRUMENT	MODEL	DATE OF CALIBRATION
LEICA TS16 TOTAL STATION	TS16 I 15", R1000 IMAGING	JUNE 13, 2025

VII. DATE OF SURVEY

FEBRUARY 4-7, 2025

VIII. HORIZONTAL ALIGNMENT

THE HORIZONTAL ALIGNMENT SHOWN IN THESE DRAWINGS FOLLOWS THE LONGITUDINAL JOINT OF THE PCC PAVEMENT (WHICH IS DEFINED AS THE EXISTING CENTERLINE) WITH MINOR DEVIATION DUE MAINLY TO SOME CONSTRUCTION ERRORS DURING ORIGINAL CONSTRUCTION STAGE. MINOR ADJUSTMENT OF THE HORIZONTAL ALIGNMENT MAY BE MADE AS DIRECTED BY THE ENGINEER TO SUIT THE ACTUAL FIELD CONDITION

IX. REMOVAL OF EXISTING STRUCTURES & OBSTRUCTIONS

- VII. ALL WORKS SHALL COMPLY WITH CLAUSE 39, "REQUIREMENTS AND CONDITIONS OF CONTRACT" VOLUME 1 OF THE STANDARD SPECIFICATION FOR PUBLIC WORKS AND HIGHWAYS, 2013.
- VIJ. PORTIONS OF EXISTING UTILITIES. SUCH AS WATER MAINS. IRRIGATION CHANNELS, TELEPHONE POST AND TRUNK LINES, ETC. THAT MAY CAUSE OBSTRUCTION TO THE CONSTRUCTION OF THIS PROJECT SHALL BE RELOCATED BY THE ENTITY OR OWNER CONCERNED. EXTREME PRECAUTION SHALL BE EXERCISED BY THE CONTRACTOR NOT TO DAMAGE ANY SECTION OF THE**XV. BATAS PAMBANSA BLG. 344 (ACCESSIBILITY LAW)** EXISTING PUBLIC UTILITIES DURING CONSTRUCTION. ANY REPAIR OF DAMAGE THEREOF SHALL BE ON THE ACCOUNT OF THE CONTRACTOR. ANY REMOVAL OF MISCELLANEOUS STRUCTURES THAT MAY BE REQUIRED SHALL BE CONSIDERED SUBSIDIARY WORK PERTAINING TO OTHER CONTRACT ITEM. NO DIRECT PAYMENT SHALL BE MADE FOR THIS WORK EXCEPT FOR SPECIFIC ITEMS EXPLICITLY IDENTIFIED FOR PAYMENT IN THE BID SCHEDULE.

X. ROAD CONNECTIONS AND PRIVATE ENTRANCES

A. APPROACHES AND ROAD ENTRANCES SHALL BE CONSTRUCTED BY THE CONTRACTOR AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER IN SUCH A MANNER TO ENSURE

SMOOTH CONNECTIONS AND RIDING QUALITY. B. NO OPENING FOR DRIVEWAYS OR PRIVATE ENTRANCES SHALL BE ALLOWED EXCEPT WITH THE PRIOR APPROVAL FROM THE PROPER AUTHORITIES.

- A. EXACT LOCATIONS, SLOPES, OUTFALLS, AND INVERT ELEVATIONS OF DRAINAGE STRUCTURES SHALL BE CHECKED IN THE FIELD BY THE ENGINEER. MINOR ADJUSTMENT MAY BE MADE WITH THE APPROVAL OF THE ENGINEER TO SUIT ACTUAL FIELD CONDITIONS B. ANY REVISIONS, REMOVAL AND/OR RELAYING OF DRAINAGE STRUCTURES AS DIRECTED BY
- THE ENGINEER TO SUIT EXISTING FIELD CONDITIONS SHALL BE CONSIDERED AS SUBSIDIARY WORK PERTAINING TO OTHER CONTRACT ITEMS. NO DIRECT PAYMENT SHALL BE MADE FOR THIS WORK UNLESS OTHERWISE SPECIFICALLY IDENTIFIED FOR PAYMENT IN THE BID SCHEDULE C. EXISTING DRAINAGE STRUCTURES OR PART THEREOF REMOVED BY THE CONTRACTOR
- THAT ARE STILL SERVICEABLE SHALL BE TURNED OVER TO THE GOVERNMENT AND SHALL BE DEPOSITED AT A PLACE WITHIN THE PROJECT SITE DESIGNATED BY THE ENGINEER WITHOUT ANY EXTRA COMPENSATION. EXTREME PRECAUTION SHALL BE EXERCISED BY THE CONTRACTOR NOT TO DAMAGE THESE MATERIALS DURING THE REMOVAL AND HANDLING.

END HOOK

- A. UNLESS OTHERWISE INDICATED ON THE PLANS, THE MINIMUM CYLINDER STRENGTH OF STRUCTURAL CONCRETE @ 28 DAYS SHALL BE 21.00 MPa.
- B. THE MINIMUM COVERING FROM SURFACE OF CONCRETE TO THE FACE OF THE NEAREST BAR SHALL BE 50mm. ALL CONCRETE SHALL BE POURED WHERE THERE IS A PERMISSIBLI WEATHER CONDITION AND NO OTHER ENVIRONMENTAL HAZARD WILL AFFECT THE POURING.

XII.2 REINFORCING STEEL

A. REINFORCING BARS FOR ALL STRUCTURES SHALL BE GRADE 60 (Fy=414 MPa) FOR BARS LARGER THAN 16 mm DIAMETER. GRADE 40 (Fv= 275.8 MPa) FOR BARS 16 mm DIAMETER OR SMALLER. ALL REBARS SHALL BE FREE OF MILL SCALES, OIL OR ANY SUBSTANCE THAT MAY IMPAIR/WEAKEN BOND WITH CONCRETE.

B. REINFORCING BAR SPLICING

- WHERE SPLICING IS PERMITTED, THE MINIMUM LAP LENGTH OF BARS SHALL BE AS PER AASHTO ARTICLE 8.32; ALL SPLICES SHALL BE STAGGERED AT LEAST 40 BAR DIAMETER WHERE BUTT WELD IS USED IN LIEU OF LAPPED CONNECTIONS, THIS SHALL DEVELOP AT LEAST 125% OF THE SPECIFIED YIELD STRENGTH OF THE REINFORCING STEEL BAR. REINFORCING BARS SHALL BE ACCURATELY FORMED TO THE SHAPES AND
- DIMENSIONS INDICATED ON THE PLAN UNLESS OTHERWISE PERMITTED. ALL REINFORCING BARS REQUIRING BENDING SHALL BE BENT COLD, WHEN REINFORCING BARS ARE BENT BY HEATING . THE ENTIRE OPERATION SHALL BE APPROVED BY THE ENGINEER.
- C. HOOKS AND BENDS

HOOKS AND BENDS SHALL BE AS SHOWN IN THE FOLLOWING TABLE

TABLE 1: TABLE FOR VALUES OF A OR G





STIRRUP & TIE HOOK

STIRRUP - TIF

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

XIV. SLOPE/EMBANKMENTOPROTECTION WORKS (GROUTED RIPRAP / STONE MASONRY)

- A FOUNDATION OF EMBANKMENT PROTECTION WORKS SHALL SIT ON A FIRM AND STABLE FOUNDATION. SOIL BORING TEST SHALL BE CONDUCTED DURING CONSTRUCTION TO VERIFY THE ACTUAL SOIL BEARING CAPACITY OF SOIL. SOFT SPOTS UNDER THE FOUNDATION SHALL BE REMOVED AND REPLACED WITH SUITABLE BEDDING MATERIALS OR CONCRETE CLASS "B".
- B. SOFT SPOTS BETWEEN THE CUT FACE AND SLOPE/EMBANKMENT PROTECTION WALLS MUST BE FILLED WITH ROCKS OR SUITABLE MATERIALS. SUCH BACKFILL MATERIALS PLACED BEHIND THE WALL SHALL BE FREE DRAINING, NON EXPANSIVE AND WATER SHALL BE DRAINED BY WEEPHOLES PLACED AT SUITABLE INTERVALS AND ELEVATIONS.
- C. THE DEPTH OF PENETRATION SHALL BE MEASURED FROM THE LEVEL OF THE ORIGINAL GROUND SURFACE AND SHALL NOT INCLUDE EXCAVATED MATERIALS.
- D. THE THICKNESS OR DIAMETER OF STONES FOR STONE MASONRY SHALL NOT BE LESS THAN 150MM.

SHEET CONTENTS

A. IN ACCORDANCE TO BATAS PAMBANSA BLG. 344, ACCESSIBILITY FOR THE DISABLED PERSON SHALL BE PROVIDED AT THE DESIGNATED PLACE IN BUILT-UP AREAS ALONG THE PROJECT ROAD, THE IMPLEMENTING OFFICE SHALL IDENTIFY THE LOCATIONS OF AND PROVIDE ACCESSIBILITY FACILITIES FOR PERSONS WITH DISABILITY AND ACCORDANCE WITH D.O. 37 SERIES OF 2009.

-GENERAL CONSTRUCTION NOTES



PREPARED:



REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS CORDILLERA ADMINISTRATIVE REGION BENGUET 1ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET

PASCUAL, TUBA, BENGUET
TUBA, BENGUET

CONSTRUCTION OF ROAD, PAYACPAC -

PALAKPAK - LUMES - APNE, BARANGAY SAN

PROJECT NAME AND LOCATION:



3.

2.

6. CRANKED SPLICE IS SHOWN BELOW

DESIGN CRITERIA

1. CODES AND SPECIFICATIONS

- ALL WORKS SHALL COMPLY WITH THE DPWH STANDARD 1.1. SPECIFICATIONS FOR HIGHWAYS, BRIDGES, AND AIRPORTS (REVISED 2013).
- ALL WORKS SHALL COMPLY WITH THE DPWH DESIGN 1.2. GUIDELINES, CRITERIA AND STANDARDS (DGCS) 2015 EDITION.
- ALL WORKS SHALL COMPLY WITH THE NATIONAL 1.3. STRUCTURAL CODE OF THE PHILIPPINES (2010)
- ALL WORKS SHALL COMPLY WITH AASHTO STANDARD 1.4. SPECIFICATIONS FOR HIGHWAYS & BRIDGES (2012).

2. HYDRAULIC DATA

ONE-HUNDRED (100)-YEAR RETURN PERIOD AT MAIN 2.1. RIVERS AND FIFTY (50)-YEAR RETURN PERIOD AT TRIBUTARY RIVERS

DESIGN STRESSES

CONCRETE COMPRESSIVE STRENGTH 3.1.

- fc' CLASS A = 21.00 MPa 3.1.1.
- fc' CLASS B = 16.50 MPa 3.1.2.
- fc' CLASS C = 21.00 MPa 3.1.3.
- 3.1.4. fc' LEAN = 13.80 MPa

3.2. REINFORCEMENT YIELD STRENGTH

- 3.2.1. fy (GRADE 40) = 276.00 MPa
- fy (GRADE 60) = 414.00 MPa 3.2.2.
- UNIT WEIGHTS 3.3.
- 3.3.1. PLAIN / REINFORCED CONCRETE = 24.00 KN/m³
- 3.3.2. STONE MASONRY = 26.75 KN/m
- 3.3.3. COMPACTED SOIL EMBANKMENT = 18.00 KN/m³

BAR BENDING, SPLICING AND PLACING

THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL OF SHOP DRAWINGS INDICATING THE BENDING, CUTTING, SPLICING AND INSTALLATION OF ALL REINFORCING BARS.

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. NOT MORE THAN 50% OF THE BARS AT ANY ONE SECTION SHALL BE SPLICED.

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



7. UNLESS OTHERWISE SHOWN ON THE PLANS, BARS SHALL BE LAPPED AT A MINIMUM DISTANCE AS SHOWN BELOW

SPLICE TYPE	GRADE 40 MIN. LAP	GRADE 60 MIN. LAP	BUT NOT LESS THAN
TENSION	24 BAR DIAMETER	36 BAR DIAMETER	300.00 mm
COMPRESSION	20 BAR DIAMETER	24 BAR DIAMETER	300.00 mm

DIMENSIONS OF HOOKS AND BENDS ARE SHOWN BELOW 8.



DIMENSIONS OF HOOKS AND BENDS ARE SHOWN BELOW



PIN DIAMETER: D = 6db FOR 10mmØ THRU 25mmØ PIN DIAMETER: D = 8db FOR 28mmØ THRU 36mmØ

ED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
MARK ANTHONY L. FERRER ENGINEER II	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER DATE:	ISAGANI C. CAYME, CESE DISTRICT ENGINEER DATE:	GENERAL 03 16	04

ITEM 100 - CLEARING AND GRUBBING

100.1 : DESCRIPTION

THIS ITEM SHALL CONSIST OF CLEARING, GRUBBING, REMOVING AND DISPOSING ALL SURGERY PRACTICES. VEGETATION AND DEBRIS AS DESIGNATED IN THE CONTRACT, EXCEPT THOSE OBJECTS THAT ARE DESIGNATED TO REMAIN IN PLACE OR ARE TO BE REMOVED IN CONSONANCE WITH OTHER PROVISIONS OF THIS SPECIFICATION. THE WORK SHALL ALSO INCLUDE THE PRESERVATION FROM BE CLEARED. INJURY OR DEFACEMENT OF ALL OBJECTS DESIGNATED TO REMAIN.

100.2 : CONSTRUCTION REQUIREMENTS

100.2.1 : GENERAL

DESIGNATED TO REMAIN. PAINT REQUIRED FOR CUT OR SCARRED SURFACE OF TREES OR SHRUBS GROUND AS PRACTICABLE WITHOUT REMOVING STUMPS. 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).

100.2.2 : 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 MOWED AS REQUIRED. EXCEPT AS PROVIDED BELOW:

(1) REMOVAL OF UNDISTURBED STUMPS AND ROOTS AND NON-PERISHABLE 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 NON-PERISHABLE SOLID OBJECTS SHALL BE CUT OFF NOT MORE THAN 150 MM ABOVE THE GROUND LINE OR LOW WATER LEVEL

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 VEGETATION, TOP SOIL SHALL BE CUT TO A MAXIMUM DEPTH OF 150MM 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 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 SMOULDERING 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, 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 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 LINES, GRADES AND DIMENSIONS SHOWN ON THE PLANS OR ESTABLISHED BY THE ENGINEER. OUTSIDE THE LIMITS OF VIEW FROM 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 102.1.1 ROADWAY EXCAVATION AREAS SHALL BE SEEDED, FERTILIZED AND MULCHED AT THE CONTRACTOR'S EXPENSE.

MULCH, SLOPE EROSION CONTROL OR MAY BE UNIFORMLY SPREAD OVER SELECTED AREAS AS REMOVAL OF UNSUITABLE MATERIAL FROM THE ROADBED AND BENEATH EMBANKMENT AREAS; AND DIRECTED BY THE ENGINEER. WOOD CHIPS USED AS MULCH FOR SLOPE EROSION CONTROL SHALL HAVE A MAXIMUM THICKNESS OF 12 MM AND FACES NOT EXCEEDING 3900 MM2/ ON ANY INDIVIDUAL SPECIFIC USE IN THE IMPROVEMENT. ROADWAY EXCAVATION WILL BE CLASSIFIED AS "UNCLASSIFIED SURFACE AREA. WOOD CHIPS NOT DESIGNATED FOR USE UNDER OTHER SECTIONS SHALL BE SPREAD EXCAVATION", "ROCK EXCAVATION", "COMMON EXCAVATION", OR "MUCK EXCAVATION" AS INDICATED OVER THE DESIGNATED AREAS IN LAYERS NOT TO EXCEED 75 MM LOOSE THICKNESS. DISEASED IN THE BILL OF QUANTITIES AND HEREINAFTER DESCRIBED. 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 ABOVE THE ROADBED SURFACE. ALL TRIMMING SHALL BE DONE BY SKILLED WORKMEN AND IN ACCORDANCE WITH GOOD TREE

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

100.2.3 : 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, GRUBBING AND THE ENGINEER WILL ESTABLISH THE LIMITS OF WORK AND DESIGNATE ALL TREES, SHRUBS, ROADSIDE CLEAN-UP SHALL BE REMOVED AND DISPOSED OFF AS SPECIFIED UNDER PLANTS AND OTHER THINGS TO REMAIN. THE CONTRACTOR SHALL PRESERVE ALL OBJECTS SUBSECTION 100.2.2 EXCEPT TREES REMOVED SHALL BE CUT AS NEARLY FLUSH WITH THE

100.3 : METHOD OF MEASUREMENT

MEASUREMENT WILL BE BY ONE OR MORE OF THE FOLLOWING ALTERNATE METHODS:

- 1. AREA BASIS. THE WORK TO BE PAID FOR SHALL BE THE NUMBER OF HECTARES AND FRACTIONS THEREOF ACCEPTABLY CLEARED AND GRUBBED WITHIN THE LIMITS INDICATED ON THE PLANS OR AS MAY BE ADJUSTED IN FIELD STAKING BY THE ENGINEER. AREAS NOT WITHIN THE CLEARING AND GRUBBING LIMITS SHOWN ON THE PLANS OR NOT STAKED FOR CLEARING AND GRUBBING WILL NOT BE MEASURED FOR PAYMENT
- 2. LUMP-SUM BASIS. WHEN THE BILL OF QUANTITIES CONTAINS A CLEARING AND GRUBBING LUMP-SUM ITEM, NO MEASUREMENT OF AREA WILL BE MADE FOR SUCH ITEM.
- 3. INDIVIDUAL UNIT BASIS (SELECTIVE CLEARING). THE DIAMETER OF TREES WILL BE MEASURED AT A HEIGHT OF 1.4 M ABOVE THE GROUND. TREES LESS THAN 150 MM IN DIAMETER WILL NOT BE MEASURED FOR PAYMENT.

WHEN BILL OF QUANTITIES INDICATES MEASUREMENT OF TREES BY INDIVIDUAL UNIT BASIS, IN AREAS TO BE ROUNDED AT THE TOP OF CUT SLOPES, STUMPS SHALL BE CUT OFF FLUSH SCHEDULE OF SIZES:

DIAMETER AT HEIGHT OF 1.4 METERS	PAY ITEM DESIGNATION
OVER 150mm TO 900mm	SMALL
OVER 900mm	LARGE

100.4 : BASIS OF PAYMENT

THE ACCEPTED QUANTITIES, MEASURED AS PRESCRIBED SECTION 100.3, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR EACH OF THE PAY ITEMS LISTED BELOW THAT IS INCLUDED IN THE BILL OF QUANTITIES, WHICH PRICE AND PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL LABOR, EQUIPMENT TOOLS AND NECESSARY TO COMPLETE THE WORK PRESCRIBED IN THIS ITEM.

PAYMENT WILL BE MADE UNDER:

PAY ITEM NUMBER	DESCRIPTION	UNIT OF MEASUREMENT
100(1)	CLEARING AND GRUBBING	HECTARE
100(2)	CLEARING AND GRUBBING	LUMPSUM
100(3)	INDIVIDUAL REMOVAL OF TREES, SMALL	EACH
100(4)	INDIVIDUAL REMOVAL OF TREES LARGE	EACH

ITEM 102 - EXCAVATION

102.1 DESCRIPTION

THIS ITEM SHALL CONSIST OF ROADWAY DRAINAGE AND BORROW EXCAVATION, AND THE DISPOSAL OF MATERIAL IN ACCORDANCE WITH THIS SPECIFICATION AND IN CONFORMITY WITH THE

ROADWAY EXCAVATION WILL INCLUDE EXCAVATION AND GRADING FOR ROADWAYS, PARKING WOODY MATERIAL MAY BE DISPOSED OFF BY CHIPPING. THE WOOD CHIPS MAY BE USED FOR AREAS, INTERSECTIONS, APPROACHES, SLOPE ROUNDING, BENCHING, WATERWAYS AND DITCHES:

> UNCLASSIFIED EXCAVATION. UNCLASSIFIED EXCAVATION SHALL CONSIST OF THE EXCAVATION AND DISPOSAL OF ALL MATERIALS REGARDLESS OF ITS NATURE, NOT CLASSIFIED AND INCLUDED IN THE BILL OF QUANTITIES UNDER OTHER PAY ITEMS

COMPACTION

2 SPECIFICATION AND CONSTRUCTION REQUIREMENTS

		Gen-04	NOT TO SCALE						
	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	PREPARED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS CORDILLERA ADMINISTRATIVE REGION BENGUET 1 ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET	CONSTRUCTION OF ROAD, PAYACPAC - PALAKPAK - LUMES - APNE, BARANGAY SAN PASCUAL,TUBA, BENGUET TUBA, BENGUET	-GENERAL CONSTRUCTION NOTES -SPECIFICATION AND CONSTRUCTION REQUIREMENTS	MARK ANTHONY L. FERRER ENGINEER II	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER DATE:	ISAGANI C. CAYME, CESE DISTRICT ENGINEER	GENERAL 04 16	05

WHERE PROVIDED FOR ON THE PLANS OR IN THE SPECIAL PROVISIONS, SUITABLE TOPSOIL REMOVED TO SUCH EXTANT AND TO SUCH DEPTH AS THE ENGINEER MAY DIRECT. THE REMOVED TOPSOIL SHALL BE TRANSPORTED AND DEPOSITED IN STORAGE PILES AT LOCATIONS APPROVED BY THE ENGINEER. THE TOPSOIL SHALL BE COMPLETELY REMOVED TO THE REQUIRED DEPTH FROM ANY THE AREA AND SHALL BE KEPT SEPARATE FROM OTHER EXCAVATED MATERIALS FOR LATER USE.

ENCOUNTERED IN EXCAVATION AND ON AREAS WHERE EMBANKMENT IS TO BE PLACED SHALL BE DESIGNATED AREA PRIOR TO THE BEGINNING OF REGULAR EXCAVATION OR EMBANKMENT WORK IN

THE ENGINEER WILL DESIGNATE AS UNSUITABLE THOSE SOILS THAT CANNOT BE PROPERLY WHEN EXCAVATION METHODS EMPLOYED BY THE CONTRACTOR LEAVE UNDRAINED POCKETS IN COMPACTED IN EMBANKMENTS. ALL UNSUITABLE MATERIALS SHALL BE DISPOSED OFF AS SHOWN ON THE ROCK SURFACE, THE CONTRACTOR SHALL AT HIS OWN EXPENSE, PROPERLY DRAIN SUCH THE PLANS OR AS DIRECTED WITHOUT DELAY TO THE CONTRACTOR. DEPRESSIONS OR WHEN PERMITTED BY THE ENGINEER FILL THE DEPRESSIONS WITH APPROVED IMPERMEABLE MATERIAL.

ONLY APPROVED MATERIALS SHALL BE USED IN THE CONSTRUCTION OF EMBANKMENTS AND BACKFILLS.

BORROW MATERIALS SHALL NOT BE PLACED UNTIL AFTER THE READILY ACCESSIBLE MATERIALS FROM ROADWAY EXCAVATION HAS BEEN PLACED IN THE FILL, UNLESS OTHERWISE PERMITTED OR DIRECTED BY THE ENGINEER. IF THE CONTRACTOR PLACES MORE BORROW THAN IS REQUIRED AND THEREBY CAUSES A WASTE OF EXCAVATION, THE AMOUNT OF SUCH WASTE WILL BE DEDUCTED FROM THE BORROW VOLUME

(1) ROCK EXCAVATION. ROCK EXCAVATION SHALL CONSIST OF EXCAVATION OF IGNEOUS, SEDIMENTARY AND METAMORPHIC ROCKS WHICH CANNOT BE EXCAVATED WITHOUT BLASTING OR THE USE OF RIPPERS, AND ALL BOULDERS OR OTHER DETACHED STONES EACH HAVING A VOLUME OF 1 CUBIC METER OR MORE AS DETERMINED BY PHYSICAL MEASUREMENTS OR VISUALLY BY THE ENGINEER.

(2) COMMON EXCAVATION. COMMON EXCAVATIONS SHALL CONSIST OF ALL EXCAVATION NOT INCLUDED IN THE BILL OF QUANTITIES UNDER "ROCK EXCAVATION" OR OTHER PAY ITEMS.

(3) MUCK EXCAVATION. MUCK EXCAVATION SHALL CONSIST OF THE REMOVAL AND DISPOSAL OF DEPOSITS OF SATURATED OR UNSATURATED MIXTURES OF SOILS AND ORGANIC MATTER NOT SUITABLE FOR FOUNDATION MATERIALS REGARDLESS OF MOISTURE CONTENT.

102.1.2 BORROW EXCAVATION

BORROW EXCAVATION SHALL CONSIST OF THE EXCAVATION AND UTILIZATION OF APPROVED MATERIALS REQUIRED FOR THE CONSTRUCTION OF EMBANKMENTS OR FOR OTHER PORTIONS OF THE WORK, AND SHALL BE OBTAINED FROM APPROVED SOURCES, IN ACCORDANCE WITH CLAUSE 61, STANDARD SPECIFICATIONS FOR PUBLIC WORKS AND HIGHWAYS, VOLUME I AND THE FOLLOWING:

(1) BORROW, CASE 1 BORROW CASE 1 WILL CONSIST OF MATERIAL OBTAINED FROM SOURCES DESIGNATED ON THE PLANS OR IN THE SPECIAL PROVISIONS.

(2) BORROW, CASE 2

BORROW CASE 2 WILL CONSIST OF MATERIAL OBTAINED FROM SOURCES PROVIDED BY THE CONTRACTOR

THE MATERIAL SHALL MEET THE QUALITY REQUIREMENTS DETERMINED BY THE ENGINEER UNLESS OTHERWISE PROVIDED IN THE CONTRACT.

102.2 CONSTRUCTION REQUIREMENTS

102.2.1 GENERAL

WHEN THERE IS EVIDENCE OF DISCREPANCIES ON THE ACTUAL ELEVATIONS AND THAT SHOWN ON THE PLANS, A PRE-CONSTRUCTION SURVEY REFERRED TO THE DATUM PLANE USED IN THE APPROVED PLAN SHALL BE UNDERTAKEN BY THE CONTRACTOR UNDER THE CONTROL OF THE ENGINEER TO SERVE AS BASIS FOR THE COMPUTATION OF THE ACTUAL VOLUME OF THE EXCAVATED MATERIALS.

ALL EXCAVATIONS SHALL BE FINISHED TO REASONABLY SMOOTH AND UNIFORM SURFACES. NO MATERIALS SHALL BE WASTED WITHOUT AUTHORITY OF THE ENGINEER. EXCAVATION OPERATIONS SHALL BE CONDUCTED SO THAT MATERIAL OUTSIDE OF THE LIMITS OF SLOPES WILL NOT BE DISTURBED. PRIOR TO EXCAVATION, ALL NECESSARY CLEARING AND GRUBBING IN THAT AREA SHALL HAVE BEEN PERFORMED IN ACCORDANCE WITH ITEM 100, CLEARING AND GRUBBING.

102.2.2 : CONSERVATION OF TOPSOIL

102.2.3 : UTILIZATION OF EXCAVATED MATERIALS

ALL SUITABLE MATERIALS REMOVED FROM THE EXCAVATION SHALL BE USED IN THE FORMATION OF THE EMBANKMENT. SUBGRADE. SHOULDERS, SLOPES, BEDDING, AND BACKFILL FOR STRUCTURES, AND FOR OTHER PURPOSES SHOWN ON THE PLANS OR AS DIRECTED.

ALL EXCESS MATERIALS, INCLUDING ROCK AND BOULDERS THAT CANNOT BE USED IN EMBANKMENTS SHALL BE DISPOSED OFF AS DIRECTED.

MATERIALS ENCOUNTERED IN THE EXCAVATION AND DETERMINED BY THE ENGINEER AS 102.2.8 : BORROW AREAS SUITABLE FOR TOPPING, ROAD FINISHING, SLOPE PROTECTION, OR OTHER PURPOSES SHALL BE CONSERVED AND UTILIZED AS DIRECTED BY THE ENGINEER

102.2.4 : PREWATERING

EXCAVATION AREAS AND BORROW PITS MAY BE PRE-WATERED BEFORE EXCAVATING THE MATERIAL. WHEN PRE-WATERING IS USED, THE AREAS TO BE EXCAVATED SHALL BE MOISTENED TO THE FULL DEPTH. FROM THE SURFACE TO THE BOTTOM OF THE EXCAVATION. THE WATER SHALL BE CONTROLLED SO THAT THE EXCAVATED MATERIAL WILL CONTAIN THE PROPER MOISTURE TO PERMIT COMPACTION TO THE SPECIFIED DENSITY WITH THE USE OF STANDARD COMPACTING EQUIPMENT PRE-WATERING SHALL BE SUPPLEMENTED WHERE NECESSARY, BY TRUCK WATERING UNITS, TO ENSURE THAT THE EMBANKMENT MATERIAL CONTAINS THE PROPER MOISTURE AT THE TIME OF

THE CONTRACTOR SHALL PROVIDE DRILLING EQUIPMENT CAPABLE OF SUITABLY CHECKING THE MOISTURE PENETRATION TO THE FULL DEPTH OF THE EXCAVATION.

102.2.5 PRESPLITTING

UNLESS OTHERWISE PROVIDED IN THE CONTRACT, ROCK EXCAVATION WHICH REQUIRES DRILLING AND SHOOTING SHALL BE PRESPLIT.

PRESPLITTING TO OBTAIN FACES IN THE ROCK AND SHALE FORMATIONS SHALL BE PERFORMED BY: (1) DRILLING HOLES AT UNIFORM INTERVALS ALONG THE SLOPE LINES, (2) LOADING AND STEMMING THE HOLES WITH APPROPRIATE EXPLOSIVES AND STEMMING MATERIAL, AND (3) DETONATING THE HOLES SIMULTANEOUSLY.

PRIOR TO STARTING DRILLING OPERATIONS FOR PRESPLITTING, THE CONTRACTOR SHALL FURNISH THE ENGINEER A PLAN OUTLINING THE POSITION OF ALL DRILL HOLES, DEPTH OF DRILLING, TYPE OF EXPLOSIVES TO HE USED. LOADING PATTERN AND SEQUENCE OF FIRING. THE DRILLING AND BLASTING PLAN ARE FOR RECORD PURPOSES ONLY AND WILL NOT ABSOLVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR USING PROPER DRILLING AND BLASTING PROCEDURES. CONTROLLED BLASTING SHALL BEGIN WITH A SHORT TEST SECTION OF A LENGTH APPROVED BY THE ENGINEER THE TEST SECTION SHALL BE PRESPLIT, PRODUCTION DRILLED AND BLASTED AND SUFFICIENT MATERIAL EXCAVATED WHEREBY THE ENGINEER CAN DETERMINE IF THE CONTRACTOR'S METHODS ARE SATISFACTORY. THE ENGINEER MAY ORDER DISCONTINUANCE OF THE PRESPLITTING WHEN HE DETERMINES THAT THE MATERIALS ENCOUNTERED HAVE BECOME UNSUITABLE FOR BEING PRESPLIT.

THE HOLES SHALL BE CHARGED WITH EXPLOSIVES OF THE SIZE, KIND, STRENGTH, AND AT THE SPACING SUITABLE FAR THE FORMATIONS BEING PRESPLIT, AND WITH STEMMING MATERIAL WHICH PASSES A 9.5 MM STANDARD SIEVE AND WHICH HAS THE QUALITIES FOR PROPER CONFINEMENT OF THE EXPLOSIVES.

THE FINISHED PRESPLIT SLOPE SHALL BE REASONABLY UNIFORM AND FREE OF LOOSE ROCK. VARIANCE FROM THE TRUE PLANE OF THE EXCAVATED BACKSLOPE SHALL NOT EXCEED 300 MM: HOWEVER, LOCALIZED IRREGULARITIES OR SURFACE VARIATIONS THAT DO NOT CONSTITUTE A SAFETY HAZARD OR AN IMPAIRMENT TO DRAINAGE COURSES OR FACILITIES WILL BE PERMITTED.

A MAXIMUM OFFSET OF 600 MM WILL BE PERMITTED FOR A CONSTRUCTION WORKING BENCH AT THE BOTTOM OF EACH LIFT FOR USE IN DRILLING THE NEXT LOWER PRESPLITTING PATTERN.

102.2.6 EXCAVATION OF DITCHES, GUTTERS, ETC.

ALL MATERIALS EXCAVATED FROM SIDE DITCHES AND GUTTERS, CHANNEL CHANGES, IRRIGATION DITCHES, INLET AND OUTLET DITCHES, TOE DITCHES, FURROW DITCHES, AND SUCH OTHER DITCHES AS MAY BE DESIGNATED ON THE PLANS OR STAKED BY THE ENGINEER. SHALL BE UTILIZED AS PROVIDED IN SUBSECTION 102.2.3

DITCHES SHALL CONFORM TO THE SLOPE, GRADE, AND SHAPE OF THE REQUIRED CROSS-SECTION, WITH NO PROJECTIONS OF ROOTS, STUMPS, ROCK, OR SIMILAR MATTER. THE CONTRACTOR SHALL MAINTAIN AND KEEP OPEN AND FREE FROM LEAVES, STICKS, AND OTHER DEBRIS ALL DITCHES DUG BY HIM UNTIL FINAL ACCEPTANCE OF THE WORK.

FURROW DITCHES SHALL BE FORMED BY PLOWING A CONTINUOUS FURROW ALONG THE LINE STAKED BY THE ENGINEER. METHODS OTHER THAN PLOWING MAY BE USED IF ACCEPTABLE TO THE ENGINEER. THE DITCHES SHALL BE CLEANED OUT BY HAND SHOVEL WORK, BY DITCHER, OR BY SOME OTHER SUITABLE METHOD, THROWING ALL LOOSE MATERIALS ON THE DOWNHILL SIDE SO THAT THE BOTTOM OF THE FINISHED DITCH SHALL BE APPROXIMATELY 450 MM BELOW THE CREST OF THE LOOSE MATERIAL PILED ON THE DOWNHILL SIDE. HAND FINISH WILL NOT BE REQUIRED, BUT THE FLOW LINES SHALL BE IN SATISFACTORY SHAPE TO PROVIDE DRAINAGE WITHOUT OVERFLOW.

102.2.7 : EXCAVATION OF ROADBED LEVEL

ROCK SHALL BE EXCAVATED TO A DEPTH OF 150 MM BELOW SUBGRADE WITHIN THE LIMITS OF THE ROADBED, AND THE EXCAVATION BACKFILLED WITH MATERIAL DESIGNATED ON THE PLANS OR APPROVED BY THE ENGINEER AND COMPACTED TO THE REQUIRED DENSITY.

MATERIAL BELOW SUBGRADE. OTHER THAN SOLID ROCK BE THOROUGHLY SCARIFIED TO A DEPTH OF 150 MM AND THE MOISTURE CONTENT INCREASED OR REDUCED, AS NECESSARY, TO BRING THE MATERIAL THROUGHOUT THIS 150 MM LAYER TO THE MOISTURE CONTENT SUITABLE FOR MAXIMUM COMPACTION. THIS LAYER SHALL THEN BE COMPACTED IN ACCORDANCE WITH SUBSECTION 104.3.3.

THE CONTRACTOR SHALL NOTIFY THE ENGINEER SUFFICIENTLY IN ADVANCE OF OPENING ANY BORROW AREAS SO THAT CROSS-SECTION ELEVATIONS AND MEASUREMENTS OF THE GROUND SURFACE AFTER STRIPPING MAY BE TAKEN, AND THE BORROW MATERIAL CAN BE TESTED BEFORE BEING USED. SUFFICIENT TIME FOR TESTING THE BORROW MATERIAL SHALL BE ALLOWED.

ALL BORROW AREAS SHALL BE BLADED AND LEFT IN SLICH SHAPE AS TO PERMIT ACCURATE MEASUREMENTS AFTER EXCAVATION HAS BEEN COMPLETED. THE CONTRACTOR SHALL NOT EXCAVATE BEYOND THE DIMENSIONS AND ELEVATIONS ESTABLISHED, AND NO MATERIAL SHALL BE REMOVED PRIOR TO THE STAKING OUT AND CROSS-SECTIONING OF THE SITE. THE FINISHED BORROW AREAS SHALL BE APPROXIMATELY TRUE TO LINE AND GRADE ESTABLISHED AND SPECIFIED AND SHALL BE FINISHED, AS PRESCRIBED IN CLAUSE 61, STANDARD SPECIFICATIONS FOR PUBLIC WORKS AND HIGHWAYS, VOLUME 1. WHEN NECESSARY TO REMOVE FENCING, THE FENCING SHALL BE REPLACED IN AT LEAST AS GOOD CONDITION AS IT WAS ORIGINALLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONFINEMENT OF LIVESTOCK WHEN A PORTION OF THE FENCE IS REMOVED.

102.2.9 : REMOVAL OF UNSUITABLE MATERIAL

WHERE THE PLANS SHOW THE TOP PORTION OF THE ROADBED TO BE SELECTED TOPPING, ALL UNSUITABLE MATERIALS SHALL BE EXCAVATED TO THE DEPTH NECESSARY FOR REPLACEMENT OF THE SELECTED TOPPING TO THE REQUIRED COMPACTED THICKNESS.

WHERE EXCAVATION TO THE FINISHED GRADED SECTION RESULTS IN A SUBGRADE OR SLOPES OF UNSUITABLE SOIL, THE ENGINEER MAY REQUIRE THE CONTRACTOR TO REMOVE THE UNSUITABLE MATERIAL AND BACKFILL TO THE FINISHED GRADED SECTION WITH APPROVED MATERIAL. THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS IN SUCH A WAY THAT THE ENGINEER CAN TAKE THE NECESSARY CROSS-SECTIONAL MEASUREMENTS BEFORE THE BACKFILL IS PLACED.

THE EXCAVATION OF MUCK SHALL BE HANDLED IN A MANNER THAT WILL NOT PERMIT THE ENTRAPMENT OF MUCK WITHIN THE BACKFILL. THE MATERIAL USED FOR BACKFILLING UP TO THE GROUND LINE OR WATER LEVEL, WHICHEVER IS HIGHER, SHALL BE ROCK OR OTHER SUITABLE GRANULAR MATERIAL SELECTED FROM THE ROADWAY EXCAVATION, IF AVAILABLE. IF NOT AVAILABLE, SUITABLE MATERIAL SHALL BE OBTAINED FROM OTHER APPROVED SOURCES. UNSUITABLE MATERIAL REMOVED SHALL BE DISPOSED OFF IN DESIGNATED AREAS SHOWN ON THE PLANS OR APPROVED BY THE ENGINEER.

102.3 : METHOD OF MEASUREMENT

THE COST OF EXCAVATION OF MATERIAL WHICH IS INCORPORATED IN THE WORKS OR IN OTHER AREAS OF FILL SHALL BE DEEMED TO BE INCLUDED IN THE ITEMS OF WORK WHERE THE MATERIAL IS USED. MEASUREMENT OF UNSUITABLE OR SURPLUS MATERIAL SHALL BE THE NET VOLUME IN ITS ORIGINAL POSITION.

FOR MEASUREMENT PURPOSES, SURPLUS SUITABLE MATERIAL SHALL BE CALCULATED AS THE DIFFERENCE BETWEEN THE NET VOLUME OF SUITABLE MATERIAL REQUIRED TO BE USED IN EMBANKMENT CORRECTED BY APPLYING A SHRINKAGE FACTOR OR A SWELL FACTOR IN CASE OF ROCK EXCAVATION, DETERMINED BY LABORATORY TESTS TO GET ITS ORIGINAL VOLUME MEASUREMENT, AND THE NET VOLUME OF SUITABLE MATERIAL FROM EXCAVATION IN THE ORIGINAL POSITION. SEPARATE PAY ITEMS SHALL BE PROVIDED FOR SURPLUS COMMON, UNCLASSIFIED AND ROCK MATERIAL

THE CONTRACTOR SHALL BE DEEMED TO HAVE INCLUDED IN THE CONTRACT UNIT PRICES ALL COSTS OF OBTAINING LAND FOR THE DISPOSAL OF UNSUITABLE OR SURPLUS MATERIAL.

102.4 : BASIS OF PAYMENT

THE ACCEPTED QUANTITIES. MEASURED AS PRESCRIBED IN SECTION 102.3 SHALL BE PAID FOR AT 103.2.3 : UTILIZATION OF EXCAVATED MATERIALS THE CONTRACT UNIT PRICE FOR EACH OF THE PAY ITEMS LISTED BELOW THAT IS INCLUDED IN THE BILL OF QUANTITIES WHICH PRICE AND PAYMENT SHALL BE FULL COMPENSATION FOR THE REMOVAL AND DISPOSAL OF EXCAVATED MATERIALS INCLUDING ALL LABOR, EQUIPMENT, TOOLS, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK PRESCRIBED IN THIS ITEM.

PAYMENT WILL BE MADE UNDER:

PAY ITEM NUMBER	DESCRIPTION	UNIT OF MEASUREMENT
102(1)	UNSUITABLE EXCAVATION	CUBIC METER
102(2)	SURPLUS COMMON EXCAVATION	CUBIC METER
102(3)	SURPLUS ROCK EXCAVATION	CUBIC METER
102(4)	SURPLUS UNCLASSIFIED EXCAVATION	CUBIC METER

ITEM 103 - STRUCTURE EXCAVATION

103.1 : DESCRIPTION

THIS ITEM SHALL CONSIST OF THE NECESSARY FOR FOUNDATION OF BRIDGES, CULVERTS, UNDER DRAINS, AND OTHER STRUCTURES NOT OTHERWISE PROVIDED FOR IN THE SPECIFICATIONS. EXCEPT AS OTHERWISE PROVIDED FOR PIPE CULVERTS, THE BACKFILLING OF COMPLETED STRUCTURES AND THE DISPOSAL OF ALL EXCAVATED SURPLUS MATERIALS. SHALL BE IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN REASONABLY CLOSE CONFORMITY WITH THE PLANS OR AS ESTABLISHED BY THE ENGINEER.

THIS ITEM SHALL INCLUDE NECESSARY DIVERTING OF LIVE STREAMS, BAILING, PUMPING, DRAINING, SHEETING, BRACING, AND THE NECESSARY CONSTRUCTION OF CRIBS AND COFFERDAMS, AND FURNISHING THE MATERIALS THEREFORE, AND THE SUBSEQUENT REMOVAL OF CRIBS AND COFFERDAMS AND THE PLACING OF ALL NECESSARY BACKFILL.

IT SHALL ALSO INCLUDE THE FURNISHING AND PLACING OF APPROVED FOUNDATION FILL MATERIAL TO REPLACE UNSUITABLE MATERIAL ENCOUNTERED BELOW THE FOUNDATION ELEVATION OF STRUCTURES

NO ALLOWANCE WILL BE MADE FOR CLASSIFICATION OF DIFFERENT TYPES OF MATERIAL ENCOUNTERED

103.2 : CONSTRUCTION REQUIREMENTS

103.2.1 : CLEARING AND GRUBBING

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.

103.2.2 : EXCAVATION

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 FNGINFFR

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

2. STRUCTURES OTHER THAN PIPE CULVERTS. ALL ROCK OR OTHER HARD FOUNDATION MATERIALS SHALL BE CLEANED OF 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. 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 150MM LAYERS UP TO THE FOUNDATION ELEVATION.

WHEN THE 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 ALL 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.

ALL EXCAVATED MATERIALS, SO FAT AS SUITABLE, SHALL BE UTILIZED AS BACKFILL OR EMBANKMENT. THE SURPLUS MATERIALS SHALL BE DISPOSED OFF IN SUCH MANNER AS NOT TO OBSTRUCT THE STREAM OR OTHERWISE IMPAIR THE EFFICIENCY OR APPEARANCE OF THE STRUCTURE. NO EXCAVATED MATERIALS SHALL BE DEPOSITED AT ANY TIME SO AS TO ENDANGER THE PARTLY FINISHED STRUCTURE

103.2.6 : BACKFILL AND EMBANKMENT FOR STRUCTURES OTHER THAN PIPE CULVERTS

EXCAVATED AREAS AROUND STRUCTURES SHALL BE BACKFILLED WITH FREE DRAINING GRANULAR MATERIAL APPROVED BY THE ENGINEER AND PLACED IN HORIZONTAL LAYERS NOT OVER 150MM IN THICKNESS, TO THE LEVEL OF THE ORIGINAL GROUND SURFACE. EACH LAYER SHALL BE MOISTENED OR DRIED AS REQUIRED AND THOROUGHLY COMPACTED WITH MECHANICAL TAMPERS.

IN PLACING BACKFILLS OR EMBANKMENT, THE MATERIAL SHALL BE PLACED SIMULTANEOUSLY IN SO FAR AS POSSIBLE TO APPROXIMATELY THE SAME ELEVATION ON BOTH SIDES OF AN ABUTMENT, PIER, OR WALL. IF CONDITIONS REQUIRE PLACING BACKFILL OR EMBANKMENT APPRECIABLY HIGHER ON ONE SIDE SHALL NOT BE PLACED UNTIL THE MASONRY HAS ATTAINED SUFFICIENT STRENGTH TO WITHSTAND ANY PRESSURE CREATED BY THE METHODS USED AND MATERIALS PLACED WITHOUT DAMAGE OR STRAIN BEYOND A SAFE FACTOR.

BACKFILL OR EMBANKMENT SHALL NOT BE PLACED BEHIND THE WALLS OF CONCRETE CULVERTS OR ABUTMENTS OR RIGID FRAME STRUCTURES UNTIL THE TOP SLAB IS PLACED AND CURED. BACKFILL AND EMBANKMENT BEHIND ABUTMENTS HELD AT THE TOP BY THE SUPERSTRUCTURE, AND BEHIND THE SIDEWALLS OF CULVERTS, SHALL BE CARRIED UP SIMULTANEOUSLY BEHIND OPPOSITE ABUTMENTS OR SIDEWALLS.

ALL EMBANKMENTS ADJACENT TO STRUCTURES SHALL BE CONSTRUCTED IN HORIZONTAL LAYERS AND COMPACTED AS PRESCRIBED IN SUBSECTION 104.3.3 EXCEPT THAT MECHANICAL TAMPERS MAY BE USED FOR THE REQUIRED COMPACTION. SPECIAL CARE SHALL BE TAKEN TO PREVENT ANY WEDGING ACTION AGAINST THE STRUCTURE, AND SLOPES BOUNDING OR WITHIN THE AREAS TO BE FILLED SHALL BE BENCHED OR SERRATED TO PREVENT WEDGE ACTION. THE PLACING OF EMBANKMENT AND THE BENCHING SLOPES SHALL CONTINUE IN SUCH A MANNER THAT ALL TIMES THERE WILL BE HORIZONTAL BERM OF THOROUGHLY COMPACTED MATERIAL FOR A DISTANCE AT LEAST EQUAL TO THE HEIGHT OF THE ABUTMENT OR WALL TO BE BACKFILLED AGAINST EXCEPT INSOFAR AS UNDISTURBED MATERIAL OBTRUDES UPON THE AREA.

BROKEN ROCK OR COARSE SAND AND GRAVEL SHALL BE PROVIDED FOR A DRAINAGE FILTER AT WEEPHOLES AS SHOWN ON THE PLANS

THE VOLUME OF EXCAVATION TO BE PAID FOR WILL BE THE NUMBER OF CUBIC METERS

MEASURED IN ORIGINAL POSITION OF MATERIAL ACCEPTABLY EXCAVATED IN CONFORMITY WITH THE

PLANS OR AS DIRECTED BY THE ENGINEER. BUT IN NO CASE, EXCEPT AS NOTED, WILL ANY OF THE

-SPECIFICATION AND CONSTRUCTION

FOLLOWING VOLUMES BE INCLUDED IN THE MEASUREMENT FOR PAYMENT

SHEET CONTENTS

REQUIREMENTS

103.3 : METHOD OF MEASUREMENT

103.3.1 : STRUCTURE EXCAVATION

SPECIFICATION AND CONSTRUCTION REQUIREMENTS

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DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS CORDILLERA ADMINISTRATIVE REGION BENGUET 1ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET

REPUBLIC OF THE PHILIPPINES

TUBA. BENGUET

CONSTRUCTION OF ROAD, PAYACPAC -

PALAKPAK - LUMES - APNE, BARANGAY SAN

PASCUAL, TUBA, BENGUET

PROJECT NAME AND LOCATION:

PREPARED:

NOT TO SCALE Gen-05

3. PAYMENT WILL BE MADE UNDER:

103.3.3 : FOUNDATION FILL PRIOR TO CONSTRUCTION OF EMBANKMENT, ALL NECESSARY CLEARING AND GRUBBING IN THAT AREA SHALL HAVE BEEN PERFORMED IN CONFORMITY WITH ITEM 100, CLEARING AND GRUBBING. THE VOLUME OF FOUNDATION FILL TO BE PAID FOR WILL BE THE NUMBER OF CUBIC METERS MEASURED IN FINAL POSITION OF THE SPECIAL GRANULAR MATERIAL ACTUALLY PROVIDED AND PLACED EMBANKMENT CONSTRUCTION SHALL CONSIST OF CONSTRUCTING ROADWAY EMBANKMENTS BELOW THE FOUNDATION ELEVATION OF STRUCTURES AS SPECIFIED, COMPLETED IN PLACE AND INCLUDING PREPARATION OF THE AREAS UPON WHICH THEY ARE TO BE PLACED; THE CONSTRUCTION ACCEPTED. OF DIKES WITHIN OR ADJACENT TO THE ROADWAY: THE PLACING AND COMPACTING OF APPROVED MATERIAL WITHIN ROADWAY AREAS WHERE UNSUITABLE MATERIAL HAS BEEN REMOVED, AND THE PLACING AND COMPACTING OF EMBANKMENT MATERIAL IN HOLES, PITS, AND OTHER DEPRESSIONS WITHIN THE ROADWAY AREA.

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THE VOLUME OUTSIDE OF VERTICAL PLANES **450MM** OUTSIDE OF AND PARALLEL TO THE NEAT LINES OF FOOTINGS AND THE INSIDE WALLS OF PIPE AND PIPE-ARCH CULVERTS AT THEIR WIDEST HORIZONTAL DIMENSIONS

2. THE VOLUME EXCAVATION FOR CULVERTS AND SECTIONS OUTSIDE THE VERTICAL PLANE FOR CULVERTS STIPULATED IN (1) ABOVE.

3. THE VOLUME OUTSIDE OF NEAT LINES OF UNDER DRAINS AS SHOWN ON THE PLANS, AND OUTSIDE THE LIMITS OF FOUNDATION FILL AS ORDERED BY THE ENGINEER.

THE VOLUME INCLUDED WITHIN THE STAKED LIMITS OF THE ROADWAY EXCAVATION, CONTIGUOUS CHANNEL CHANGES, DITCHES, ETC., FOR WHICH PAYMENT IS OTHERWISE PROVIDED IN THE SPECIFICATION.

5. VOLUME OF WATER OR OTHER LIQUID RESULTING FROM CONSTRUCTION OPERATIONS AND WHICH CAN BE PUMPED OR DRAINED AWAY.

6. THE VOLUME OF ANY EXCAVATION PERFORMED PRIOR TO THE TAKING OF ELEVATIONS AND MEASUREMENTS OF THE UNDISTURBED GROUND.

THE VOLUME OF ANY MATERIAL REHANDLED, EXCEPT THAT WHERE THE PLANS INDICATE OR THE ENGINEER DIRECTS THE EXCAVATION AFTER EMBANKMENT HAS BEEN PLACED AND EXCEPT THAT WHEN INSTALLATION OF PIPE CULVERTS BY THE IMPERFECT TRENCH METHOD SPECIFIED IN ITEM 500 IS REQUIRED, THE VOLUME OF MATERIAL RE-EXCAVATED AS DIRECTED WILL BE INCLUDED.

THE VOLUME OF EXCAVATION FOR FOOTINGS ORDERED AT A DEPTH MORE THAN 1.5M BELOW THE LOWEST ELEVATION FOR SUCH FOOTINGS SHOWN ON THE ORIGINAL CONTRACT PLANS, UNLESS THE BILL OF QUANTITIES CONTAINS A PAY ITEM FOR EXCAVATION ORDERED BELOW THE ELEVATIONS SHOWN ON THE PLANS FOR INDIVIDUAL FOOTINGS.

103.3.5 : BASIS OF PAYMENT

THE ACCEPTED QUANTITIES, MEASURED AS PRESCRIBED IN SECTION 103.3, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR EACH OF THE PARTICULAR PAY ITEMS LISTED BELOW THAT IS INCLUDED IN THE BILL OF QUANTITIES. THE PAYMENT SHALL CONSTITUTE FULL COMPENSATION FOR THE REMOVAL AND DISPOSAL OF EXCAVATED MATERIALS INCLUDING ALL LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THE WORK PRESCRIBED IN THIS ITEM, EXCEPT AS FOLLOWS:

1. ANY EXCAVATION FOR FOOTINGS ORDERED AT A DEPTH MORE THAN 1.5 M BELOW THE LOWEST ELEVATION SHOWN ON THE ORIGINAL CONTRACT PLANS WILL BE PAID FOR AS PROVIDED IN PART K, MEASUREMENT AND PAYMENT, UNLESS A PAY ITEM FOR EXCAVATION ORDERED BELOW PLAN ELEVATION APPEARS IN THE BILL OF QUANTITIES.

2. CONCRETE WILL BE MEASURED AND PAID FOR AS PROVIDED UNDER ITEM 405, STRUCTURAL CONCRETE.

ANY ROADWAY OR BORROW EXCAVATION REQUIRED IN EXCESS OF THE QUANTITY EXCAVATED FOR STRUCTURES WILL BE MEASURED AND PAID FOR AS PROVIDED UNDER ITEM 102.

4. SHORING, CRIBBING, AND RELATED WORK REQUIRED FOR EXCAVATION ORDERED MORE THAN 1.5 M BELOW PLAN ELEVATION WILL BE PAID FOR IN ACCORDANCE WITH PART K.

PAY ITEM NUMBER	DESCRIPTION	UNIT OF MEASUREMENT
103(1)	STRUCTURE EXCAVATION	CUBIC METER
103(2)	BRIDGE EXCAVATION	CUBIC METER
103(3)	FOUNDATION FILL	CUBIC METER
103(4)	EXCAVATION ORDERED PLAN ELEVATION	CUBIC METER
103(5)	SHORING, CRIBBING, AND RELATED WORK	LUMPSUM
103(6)	PIPE CULVERTS AND DRAIN EXCAVATION	CUBIC METER

ITEM 104 - EMBANKMENT

104. I DESCRIPTION

THIS ITEM SHALL CONSIST OF THE CONSTRUCTION OF EMBANKMENT IN ACCORDANCE WITH THIS SPECIFICATION AND IN CONFORMITY WITH THE LINES, GRADES AND DIMENSIONS SHOWN ON THE PLANS OR ESTABLISHED BY THE ENGINEER.

104.2 MATERIAL REQUIREMENTS

EMBANKMENTS SHALL BE CONSTRUCTED OF SUITABLE MATERIALS, IN CONSONANCE WITH THE FOLLOWING DEFINITIONS:

1. SUITABLE MATERIAL -- MATERIAL WHICH IS ACCEPTABLE IN

ACCORDANCE WITH THE CONTRACT AND WHICH CAN BE COMPACTED IN THE MANNER SPECIFIED IN THIS ITEM. IT CAN BE COMMON MATERIAL OR ROCK.

SELECTED BORROW, FOR TOPPING - SOIL OF SUCH GRADATION THAT ALL PARTICLES WILL PASS A SIEVE WITH 75 MM SQUARE OPENINGS AND NOT MORE THAN 15 MASS PERCENT WILL PASS THE 0.075

MM (NO. 200) SIEVE, AS DETERMINED BY AASHTO T 11. THE MATERIAL SHALL HAVE A PLASTICITY INDEX OF NOT MORE THAN 6 AS DETERMINED BY AASHTO T 90 AND A LIQUID LIMIT OF NOT MORE THAN 30 AS DETERMINED BY AASHTO T 89.

2. UNSUITABLE MATERIAL -- MATERIAL OTHER THAN SUITABLE MATERIALS SUCH AS:

- a. MATERIALS CONTAINING DETRIMENTAL QUANTITIES OF ORGANIC MATERIALS, SUCH AS GRASS, ROOTS AND SEWERAGE
- b. ORGANIC SOILS SUCH AS PEAT AND MUCK.

c. SOILS WITH LIQUID LIMIT EXCEEDING 80 AND/OR PLASTICITY INDEX EXCEEDING 55.

d. SOILS WITH A NATURAL WATER CONTENT EXCEEDING 100%

e. SOILS WITH VERY LOW NATURAL DENSITY. 800 KG/M3 OR LOWER.

f. SOILS THAT CANNOT BE PROPERLY COMPACTED AS DETERMINED BY THE ENGINEER

104.3 CONSTRUCTION REQUIREMENTS

104.3.1 GENERAL

EMBANKMENTS AND BACKFILLS SHALL CONTAIN NO MUCK, PEAT, SOD, ROOTS OR OTHER DELETERIOUS MATTER. ROCKS, BROKEN CONCRETE OR OTHER SOLID, BULKY MATERIALS SHALL NOT BE PLACED IN EMBANKMENT AREAS WHERE PILING IS TO BE PLACED OR DRIVEN.

WHERE SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER. THE SURFACE OF THE EXISTING GROUND SHALL BE COMPACTED TO A DEPTH OF 150 MM AND TO THE SPECIFIED REQUIREMENTS OF THIS ITEM.

WHERE PROVIDED ON THE PLANS AND BILL OF QUANTITIES THE TOP PORTIONS OF THE ROADBED IN BOTH CUTS AND EMBANKMENTS, AS INDICATED, SHALL CONSIST OF SELECTED BORROW FOR TOPPING FROM EXCAVATIONS.

104.3.2 METHODS OF CONSTRUCTION

WHERE THERE IS EVIDENCE OF DISCREPANCIES ON THE ACTUAL ELEVATIONS AND THAT SHOWN ON THE PLANS, A PRECONSTRUCTION SURVEY REFERRED TO THE DATUM PLANE USED IN THE APPROVED PLAN SHALL BE UNDERTAKEN BY THE CONTRACTOR UNDER THE CONTROL OF THE ENGINEER TO SERVE AS BASIS FOR THE COMPUTATION OF THE ACTUAL VOLUME OF THE EMBANKMENT MATERIALS.

WHEN EMBANKMENT IS TO BE PLACED AND COMPACTED ON HILLSIDES, OR WHEN NEW EMBANKMENT IS TO BE COMPACTED AGAINST EXISTING EMBANKMENTS, OR WHEN EMBANKMENT IS BUILT ONE-HALF WIDTH AT A TIME, THE EXISTING SLOPES THAT ARE STEEPER THAN 3:1 WHEN MEASURED AT RIGHT ANGLES TO THE ROADWAY SHALL BE CONTINUOUSLY BENCHED OVER THOSE AREAS AS THE WORK IS BROUGHT UP IN LAYERS. BENCHING WILL BE SUBJECT TO THE ENGINEER'S APPROVAL AND SHALL BE OF SUFFICIENT WIDTH TO PERMIT OPERATION OF PLACEMENT AND COMPACTION EQUIPMENT. EACH HORIZONTAL CUT SHALL BEGIN AT THE INTERSECTION OF THE ORIGINAL GROUND AND THE VERTICAL SIDES OF THE PREVIOUS CUTS. MATERIAL THUS EXCAVATED SHALL BE PLACED AND COMPACTED ALONG WITH THE EMBANKMENT MATERIAL IN ACCORDANCE WITH THE PROCEDURE DESCRIBED IN THIS SECTION.

UNLESS SHOWN OTHERWISE ON THE PLANS OR SPECIAL PROVISIONS, WHERE AN EMBANKMENT OF LESS THAN 1.2 M BELOW SUBGRADE IS TO BE MADE, ALL SOD AND VEGETABLE MATTER SHALL BE REMOVED FROM THE SURFACE UPON WHICH THE EMBANKMENT IS TO BE PLACED, AND THE CLEARED SURFACED SHALL BE COMPLETELY BROKEN UP BY PLOWING, SCARIFYING, OR STEEPING TO A MINIMUM DEPTH OF 150 MM EXCEPT AS PROVIDED IN SUBSECTION 102.2.2. THIS AREA SHALL THEN BE COMPACTED AS PROVIDED IN SUBSECTION 104.3.3. SOD NOT REQUIRED TO BE REMOVED SHALL BE THOROUGHLY DISC HARROWED OR SCARIFIED BEFORE CONSTRUCTION OF EMBANKMENT. WHEREVER A COMPACTED ROAD SURFACE CONTAINING GRANULAR MATERIALS LIES WITHIN 900 MM OF THE SUBGRADE, SUCH OLD ROAD SURFACE SHALL BE SCARIFIED TO A DEPTH OF AT LEAST 150 MM WHENEVER DIRECTED BY THE ENGINEER. THESE SCARIFIED MATERIALS SHALL THAN BE COMPACTED AS PROVIDED IN SUBSECTION 104.3.3.

WHEN SHOULDER EXCAVATION IS SPECIFIED, THE ROADWAY SHOULDERS SHALL BE EXCAVATED TO THE DEPTH AND WIDTH SHOWN ON THE PLANS. THE SHOULDER MATERIAL SHALL BE REMOVED WITHOUT DISTURBING THE ADJACENT EXISTING BASE COURSE MATERIAL, AND ALL EXCESS EXCAVATED MATERIALS SHALL BE DISPOSED OFF AS PROVIDED IN SUBSECTION 102.2.3. IF NECESSARY, THE AREAS SHALL BE COMPACTED BEFORE BEING BACKFILLED.

ROADWAY EMBANKMENT OF EARTH MATERIAL SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 200 MM, LOOSE MEASUREMENT, AND SHALL BE COMPACTED AS SPECIFIED BEFORE THE NEXT LAYER IS PLACED. HOWEVER, THICKER LAYER MAYBE PLACED IF VIBRATORY ROLLER WITH HIGH COMPACTIVE EFFORT IS USED PROVIDED THAT DENSITY REQUIREMENT IS ATTAINED AND AS APPROVED BY THE ENGINEER. TRIAL SECTION TO THIS EFFECT MUST BE CONDUCTED AND APPROVED BY THE ENGINEER. EFFECTIVE SPREADING EQUIPMENT SHALL BE USED ON EACH LIFT TO OBTAIN UNIFORM THICKNESS AS DETERMINED IN THE TRIAL SECTION PRIOR TO COMPACTION. AS THE COMPACTION OF EACH LAYER PROGRESSES, CONTINUOUS LEVELLING AND MANIPULATING WILL BE REQUIRED TO

D:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
MARK ANTHONY L. FERRER ENGINEER II	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER DATE:	ISAGANI C. CAYME, CESE DISTRICT ENGINEER DATE:	GENERAL 05 16	06 120

ASSURE UNIFORM DENSITY. WATER SHALL BE ADDED OR REMOVED, IF NECESSARY, IN ORDER TO OBTAIN THE REQUIRED DENSITY. REMOVAL OF WATER SHALL BE ACCOMPLISHED THROUGH AERATION BY PLOWING, BLADING, DISCING, OR OTHER METHODS SATISFACTORY TO THE ENGINEER, WHERE EMBANKMENT IS TO BE CONSTRUCTED ACROSS LOW SWAMPY GROUND THAT WILL NOT SUPPORT THE MASS OF TRUCKS OR OTHER HAULING EQUIPMENT, THE LOWER PART OF THE FILL MAY BE CONSTRUCTED BY DUMPING SUCCESSIVE LOADS IN A UNIFORMLY DISTRIBUTED LAYER OF A THICKNESS NOT GREATER THAN NECESSARY TO SUPPORT THE HAULING EQUIPMENT WHILE PLACING SUBSEQUENT LAYERS.

WHEN EXCAVATED MATERIAL CONTAINS MORE THAN 25 MASS PERCENT OF ROCK LARGER THAN 150 MM IN GREATEST DIAMETER AND CANNOT BE PLACED IN LAYERS OF THE THICKNESS PRESCRIBED WITHOUT CRUSHING, PULVERIZING OR FURTHER BREAKING DOWN THE PIECES RESULTING FROM EXCAVATION METHODS, SUCH MATERIALS MAY BE PLACED ON THE EMBANKMENT IN LAYERS NOT EXCEEDING IN THICKNESS THE APPROXIMATE AVERAGE SIZE OF THE LARGER ROCKS, BUT NOT GREATER THAN 600 MM.

EVEN THOUGH THE THICKNESS OF LAYERS IS LIMITED AS PROVIDED ABOVE, THE PLACING OF INDIVIDUAL ROCKS AND BOULDERS GREATER THAN 600 MM IN DIAMETER WILL BE PERMITTED PROVIDED THAT WHEN PLACED, THEY DO NOT EXCEED 1200 MM IN HEIGHT AND PROVIDED THEY ARE CAREFULLY DISTRIBUTED, WITH THE INTERSTICES FILLED WITH FINER MATERIAL TO FORM A DENSE AND COMPACT MASS

EACH LAYER SHALL BE LEVELLED AND SMOOTHED WITH SUITABLE LEVELLING EQUIPMENT AND BY DISTRIBUTION OF SPALLS AND FINER FRAGMENTS OF EARTH. LIFTS OF MATERIAL CONTAINING MORE THAN 25 MASS PERCENT OF ROCK LARGERTHAN 150 MM IN GREATEST DIMENSIONS SHALL NOT BE CONSTRUCTED ABOVE AN ELEVATION 300 MM BELOW THE FINISHED SUBGRADE. THE BALANCE OF THE EMBANKMENT SHALL BE COMPOSED OF SUITABLE MATERIAL SMOOTHED AND PLACED IN LAYERS NOT EXCEEDING 200 MM IN LOOSE THICKNESS AND COMPACTED AS SPECIFIED FOR EMBANKMENTS.

DUMPING AND ROLLING AREAS SHALL BE KEPT SEPARATE, AND NO LIFT SHALL BE COVERED BY ANOTHER UNTIL COMPACTION COMPLIES WITH THE REQUIREMENTS OF SUBSECTION 104.3.3.

HAULING AND LEVELLING EQUIPMENT SHALL BE SO ROUTED AND DISTRIBUTED OVER EACH LAYER OF THE FILL IN SUCH A MANNER AS TO MAKE USE OF COMPACTION EFFORT AFFORDED THEREBY AND TO MINIMIZE RUTTING AND UNEVEN COMPACTION.

104.3.3 COMPACTION

COMPACTION TRIALS

BEFORE COMMENCING THE FORMATION OF EMBANKMENTS, THE CONTRACTOR SHALL SUBMIT IN WRITING TO THE ENGINEER FOR APPROVAL HIS PROPOSALS FOR THE COMPACTION OF EACH TYPE OF FILL MATERIAL TO BE USED IN THE WORKS. THE PROPOSALS SHALL INCLUDE THE RELATIONSHIP BETWEEN THE TYPES OF COMPACTION EQUIPMENT, THE NUMBER OF PASSES REQUIRED AND THE METHOD OF ADJUSTING MOISTURE CONTENT. THE CONTRACTOR SHALL CARRY OUT FULL SCALE COMPACTION TRIALS ON AREAS NOT LESS THAN 10 M WIDE AND 50 M LONG AS REQUIRED BY THE ENGINEER AND USING HIS PROPOSED PROCEDURES OR SUCH AMENDMENTS THERETO AS MAY BE FOUND NECESSARY TO SATISFY THE ENGINEER THAT ALL THE SPECIFIED REQUIREMENTS REGARDING COMPACTION CAN BE CONSISTENTLY ACHIEVED. COMPACTION TRIALS WITH THE MAIN TYPES OF FILL MATERIAL TO BE USED IN THE WORKS SHALL BE COMPLETED BEFORE WORK WITH THE CORRESPONDING MATERIALS WILL BE ALLOWED TO COMMENCE.

THROUGHOUT THE PERIODS WHEN COMPACTION OF EARTHWORK IS IN PROGRESS, THE CONTRACTOR SHALL ADHERE TO THE COMPACTION PROCEDURES FOUND FROM COMPACTION TRIALS FOR EACH TYPE OR MATERIAL BEING COMPACTED, EACH TYPE OF COMPACTION EQUIPMENT EMPLOYED AND EACH DEGREE OF COMPACTION SPECIFIED.

EARTH

THE CONTRACTOR SHALL COMPACT THE MATERIAL PLACED IN ALL EMBANKMENT LAYERS AND THE MATERIAL SCARIFIED TO THE DESIGNATED DEPTH BELOW SUBGRADE IN CUT SECTIONS, UNTIL A UNIFORM DENSITY OF NOT LESS THAN 95 MASS PERCENT OF THE MAXIMUM DRY DENSITY DETERMINED BY AASHTO T 99 METHOD C. IS ATTAINED. AT A MOISTURE CONTENT DETERMINED BY ENGINEER TO BE SUITABLE FOR SUCH DENSITY. ACCEPTANCE OF COMPACTION MAY BE BASED ON ADHERENCE TO AN APPROVED ROLLER PATTERN DEVELOPED AS SET FORTH IN ITEM 106, COMPACTION EQUIPMENT AND DENSITY CONTROL STRIPS.

THE ENGINEER SHALL DURING PROGRESS OF THE WORK, MAKE DENSITY TESTS OF COMPACTED MATERIAL IN ACCORDANCE WITH AASHTO T 191, T 205, OR OTHER APPROVED FIELLD DENSITY TESTS, INCLUDING THE USE OF PROPERLY CALIBRATED NUCLEAR TESTING DEVICES. A CORRECTION FOR COARSE PARTICLES MAY BE MADE IN ACCORDANCE WITH AASHTO T 224. IF, BY SUCH TESTS, THE ENGINEER DETERMINES THAT THE SPECIFIED DENSITY AND MOISTURE CONDITIONS HAVE NOT BEEN ATTAINED, THE CONTRACTOR SHALL PERFORM ADDITIONAL WORK AS MAY BE NECESSARY TO ATTAIN THE SPECIFIED CONDITIONS.

AT LEAST ONE GROUP OF THREE IN-SITU DENSITY TESTS SHALL BE CARRIED OUT FOR EACH 500 M2 OF EACH LAYER OF COMPACTED FILL.

ROCK

DENSITY REQUIREMENTS WILL NOT APPLY TO PORTIONS OF EMBANKMENTS CONSTRUCTED OF MATERIALS WHICH CANNOT BE TESTED IN ACCORDANCE WITH APPROVED METHODS.

EMBANKMENT MATERIALS CLASSIFIED AS ROCK SHALL BE DEPOSITED, SPREAD AND LEVELLED THE FULL WIDTH OF THE FILL WITH SUFFICIENT EARTH OR OTHER FINE MATERIAL SO DEPOSITED TO FILL THE INTERSTICES TO PRODUCE A DENSE COMPACT EMBANKMENT. IN ADDITION, ONE OF THE ROLLERS, VIBRATORS, OR COMPACTORS MEETING THE REQUIREMENTS SET FORTH IN SUBSECTION 106.2.1, COMPACTION EQUIPMENT. SHALL COMPACT THE EMBANKMENT FULL WIDTH WITH A MINIMUM OF THREE-COMPLETE PASSES FOR EACH LAYER OF EMBANKMENT.

104.3.4 PROTECTION OF ROADBED DURING CONSTRUCTION

DURING THE CONSTRUCTION OF THE ROADWAY, THE ROADBED SHALL BE MAINTAINED IN SUCH

CONDITION THAT IT WILL BE WELL DRAINED AT ALL TIMES. SIDE DITCHES OR GUTTERS EMPTYING FROM CUTS TO EMBANKMENTS OR OTHERWISE SHALL BE SO CONSTRUCTED AS TO AVOID DAMAGE TO EMBANKMENTS BY EROSION.

1043.5 PROTECTION OF STRUCTURE

IF EMBANKMENT CAN BE DEPOSITED ON ONE-SIDE ONLY OF ABUTMENTS, WING WALLS, PIERS OR CULVERT HEADWALLS, CARE SHALL BE TAKEN THAT THE AREA IMMEDIATELY ADJACENT TO THE STRUCTURE IS NOT COMPACTED TO THE EXTENT THAT IT WILL CAUSE OVERTURNING OF, OR EXCESSIVE PRESSURE AGAINST THE STRUCTURE. WHEN NOTED ON THE PLANS, THE FILL ADJACENT TO THE END BENT OF A BRIDGE SHALL NOT BE PLACED HIGHER THAN THE BOTTOM OF THE BACKFILL OF THE BENT UNTIL THE SUPERSTRUCTURE IS IN PLACE. WHEN EMBANKMENT IS TO BE PLACED ON BOTH SIDES OF A CONCRETE WALL OR BOX TYPE STRUCTURE, OPERATIONS SHALL BE SO CONDUCTED THAT THE EMBANKMENT IS ALWAYS AT APPROXIMATELY THE SAME ELEVATION ON BOTH SIDES OF THE STRUCTURE.

104.3.6 ROUNDING AND WARPING SLOPES

ROUNDING-EXCEPT IN SOLID ROCK, THE TOPS AND BOTTOMS OF ALL SLOPES, INCLUDING THE SLOPES OF DRAINAGE DITCHES, SHALL BE ROUNDED AS INDICATED ON THE PLANS. A LAYER OF EARTH OVERLAYING ROCK SHALL BE ROUNDED ABOVE THE ROCK AS DONE IN EARTH SLOPES.

WARPING-ADJUSTMENTS IN SLOPES SHALL BE MADE TO AVOID INJURY IN STANDING TREES OR MARRING OF WEATHERED ROCK. OR TO HARMONIZE WITH EXISTING LANDSCAPE FEATURES. AND THE TRANSITION TO SUCH ADJUSTED SLOPES SHALL BE GRADUAL. AT INTERSECTIONS OF CUTS AND FILLS, SLOPES SHALL BE ADJUSTED ART WARPED TO FLOW INTO EACH OTHER OR INTO THE NATURAL GROUND SURFACES WITHOUT NOTICEABLE BREAK.

104.3.7 FINISHING ROADBED AND SLOPES

AFTER THE ROADBED HAS BEEN SUBSTANTIALLY COMPLETED, THE FULL WIDTH SHALL BE CONDITIONED BY REMOVING ANY SOFT OR OTHER UNSUITABLE MATERIAL THAT WILL NOT COMPACT PROPERLY OR SERVE THE INTENDED PURPOSE. THE RESULTING AREAS AND ALL OTHER LOW SECTIONS, HOLES OR DEPRESSIONS SHALL BE BROUGHT TO GRADE WITH SUITABLE SELECTED MATERIAL. SCARIFYING, BLADING, DRAGGING, ROLLING, OR OTHER METHODS OF WORK SHALL BE PERFORMED OR USED AS NECESSARY TO PROVIDE A THOROUGHLY COMPACTED ROADBED SHAPED TO THE GRADES AND CROSS-SECTIONS SHOWN ON THE PLANS OR AS STAKED BY THE ENGINEER.

ALL EARTH SLOPES SHALL BE LEFT WITH ROUGHENED SURFACES BUT SHALL BE REASONABLY UNIFORM, WITHOUT ANY NOTICEABLE BREAK, AND IN REASONABLY CLOSE CONFORMITY WITH THE PLANS OR OTHER SURFACES INDICATED ON THE PLANS OR AS STAKED BY THE ENGINEER, WITH NO VARIATIONS THEREFROM READILY DISCERNIBLE AS VIEWED FROM THE ROAD.

104.3.8 SERRATED SLOPES

CUT SLOPES IN RIPPABLE MATERIAL (SOFT ROCK) HAVING SLOPE RATIOS BETWEEN 0.75:1 AND 2:1 SHALL BE CONSTRUCTED SO THAT THE FINAL SLOPE LINE SHALL CONSIST OF A SERIES OF SMALL HORIZONTAL STEPS. THE STEP RISE AND TREAD DIMENSIONS SHALL BE SHOWN ON THE PLANS. NO SCALING SHALL BE PERFORMED ON THE STEPPED SLOPES EXCEPT FOR REMOVAL OF LARGE ROCKS WHICH WILL OBVIOUSLY BE A SAFETY HAZARD IF THEY FALL INTO THE DITCH LINE OR ROADWAY. 104.3.9 EARTH BERMS

WHEN CALLED FOR IN THE CONTRACT, PERMANENT EARTH BERMS SHALL BE CONSTRUCTED OF WELL GRADED MATERIALS WITH NO ROCKS HAVING A DIAMETER GREATER THAN 0.25 THE HEIGHT OF THE BERM. WHEN LOCAL MATERIAL IS NOT ACCEPTABLE, ACCEPTABLE MATERIAL SHALL BE IMPORTED. AS DIRECTED BY THE ENGINEER.

COMPACTED BERM

COMPACTED BERM CONSTRUCTION SHALL CONSIST OF MOISTENING OR DRYING AND PLACING MATERIAL AS NECESSARY IN LOCATIONS SHOWN ON THE DRAWINGS OR AS ESTABLISHED BY THE ENGINEER. MATERIAL SHALL CONTAIN NO FROZEN MATERIAL, ROOTS, SOD OR OTHER DELETERIOUS MATERIALS. CONTRACTOR SHALL TAKE PRECAUTION TO PREVENT MATERIAL FROM ESCAPING OVER THE EMBANKMENT SLOPE. SHOULDER SURFACE BENEATH BERM WILL BE ROUGHENED TO PROVIDE A BOND BETWEEN THE BERM AND SHOULDER WHEN COMPLETED. THE CONTRACTOR SHALL COMPACT THE MATERIAL PLACED UNTIL AT LEAST 90 MASS PERCENT OF THE MAXIMUM DENSITY IS OBTAINED AS DETERMINED BY AASHTO T 99, METHOD C. THE CROSS-SECTION OF THE FINISHED COMPACTED BERM SHALL REASONABLY CONFORM TO TYPICAL CROSS-SECTION AS SHOWN ON THE PLANS.

UNCOMPACTED BERM

UNCOMPACTED BERM CONSTRUCTION SHALL CONSIST OF DRYING, IF NECESSARY AND PLACING MATERIAL IN LOCATIONS SHOWN ON THE PLANS OR AS ESTABLISHED BY THE ENGINEER. MATERIAL SHALL CONTAIN NO FROZEN MATERIAL, ROOTS, SOD OR OTHER DELETERIOUS MATERIALS. CONTRACTOR SHALL TAKE PRECAUTIONS TO PREVENT MATERIAL FROM ESCAPING OVER THE EMBANKMENT SLOPE.

104.4 METHOD OF MEASUREMENT

THE QUANTITY OF EMBANKMENT TO BE PAID FOR SHALL BE THE VOLUME OF MATERIAL COMPACTED IN PLACE, ACCEPTED BY THE ENGINEER AND FORMED WITH MATERIAL OBTAINED FROM ANY SOURCE.

MATERIAL FROM EXCAVATION PER ITEM 102 WHICH IS USED IN EMBANKMENT AND ACCEPTED BY THE ENGINEER WILL BE PAID UNDER EMBANKMENT AND SUCH PAYMENT WILL BE DEEMED TO INCLUDE THE COST OF EXCAVATING, HAULING, STOCKPILING AND ALL OTHER COSTS INCIDENTAL TO THE WORK.

MATERIAL FOR SELECTED BORROW TOPPING WIL BE MEASURED AND PAID FOR UNDER THE SAME CONDITIONS SPECIFIED IN THE PRECEDING PARAGRAPH.

Gen-06

SPECIFICATION AND CONSTRUCTION REQUIREMENTS NOT TO SCALE

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		PROJECT NAME AND LOCATION:	SHEET CONTENTS:	PREPARED:
	REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS CORDILLERA ADMINISTRATIVE REGION BENGUET 1 ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET	CONSTRUCTION OF ROAD, PAYACPAC - PALAKPAK - LUMES - APNE, BARANGAY SAN PASCUAL,TUBA, BENGUET	-SPECIFICATION AND CONSTRUCTION REQUIREMENTS	MARK ANTHONY L. FER
_		TUBA, BENGUET		

ENGINEER

UNLESS OTHERWISE SPECIFIED, ALL MATERIALS BELOW SUBGRADE LEVEL IN EARTH CUTS TO A DEPTH 150 MM OR OTHER DEPTH SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER SHALL BE EXCAVATED. THE MATERIAL, IF SUITABLE, SHALL BE SET SIDE FOR FUTURE USE OR, IF UNSUITABLE, SHALL BE DISPOSED OFF IN ACCORDANCE WITH THE REQUIREMENTS OF SUBSECTION 102.2.9.

WHERE MATERIAL HAS BEEN REMOVED FROM BELOW SUBGRADE LEVEL, THE RESULTING SURFACE SHALL BE COMPACTED TO A DEPTH OF 150 MM AND IN ACCORDANCE WITH OTHER REQUIREMENTS OF SUBSECTION 104.3.3.

ALL MATERIALS IMMEDIATELY BELOW SUBGRADE LEVEL IN EARTH CUTS TO A DEPTH OF 150 MM, OR TO SUCH GREATER DEPTH AS MAY BE SPECIFIED, SHALL BE COMPACTED IN ACCORDANCE WITH THE REQUIREMENTS OF SUBSECTION 104.3.3.

104.5 BASIS OF PAYMENT

THE ACCEPTED QUANTITIES MEASURED AS PRESCRIBED IN SECTION 104.4 SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR EACH OF THE PAY ITEMS LISTED BELOW THAT IS INCLUDED IN THE BILL OF QUANTITIES. THE PAYMENT SHALL CONTINUE FULL COMPENSATION FOR PLACING AND COMPACTING ALL MATERIALS INCLUDING ALL LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE WORK PRESCRIBED IN THIS ITEM.

PAY ITEM NUMBER	DESCRIPTION	UNIT OF MEASUREMENT
104(1)	EMBANKMENT	CUBIC METER
104(2)	SELECTED BORROW, FOR TOPPING CASE 1	CUBIC METER
104(3)	SELECTED BORROW, FOR TOPPING CASE 2	CUBIC METER
104(4)	EARTH BERM	CUBIC METER

ITEM 105 - SUBGRADE PREPARATION

105.1 : DESCRIPTION

THIS ITEM SHALL CONSIST OF THE PREPARATION OF THE SUBGRADE FOR THE SUPPORT OR OVERLYING STRUCTURAL LAYERS. IT SHALL EXTEND TO FULL WIDTH OF THE ROADWAY.UNLESS AUTHORIZED BY THE ENGINEER, SUB-GRADE PREPARATION SHALL NOT BE DONE UNLESS THE CONTRACTOR IS ABLE TO START IMMEDIATELY THE CONSTRUCTION OF THE PAVEMENT STRUCTURE.

105.2 : MATERIAL REQUIREMENTS

UNLESS OTHERWISE STATED IN THE CONTRACT AND EXCEPT WHEN THE SUBGRADE IS IN ROCK CUT, ALL MATERIALS BELOW SUB-GRADE LEVEL TO A DEPTH 150 MM OR TO SUCH GREATER DEPTH AS MAY BE SPECIFIED SHALL MEET THE REQUIREMENTS OR SECTION 104.2. MATERIAL REQUIREMENTS.

105.3 : CONSTRUCTION REQUIREMENTS

105.3.1 : PRIOR WORKS

PRIOR TO COMMENCING PREPARATION OF THE SUBGRADE. ALL CULVERTS, CROSS DRAINS. DUCTS AND THE LIKE (INCLUDING THEIR FULLY COMPACTED BACKFILL), DITCHES, DRAINS AND DRAINAGE OUTLETS SHALL COMPLETED. ANY WORK ON THE PREPARATION OF THE SUBGRADE SHALL NOT BE STARTED UNLESS PRIOR WORK HEREIN DESCRIBED SHALL HAVE BEEN APPROVED BY THE

105.3.2 : SUBGRADE LEVEL TOLERANCES

THE FINISHED COMPACTED SURFACE OF THE SUBGRADE SHALL CONFORM TO THE ALLOWABLE TOLERANCES AS SPECIFIED HEREUNDER:

PERMITTED VARIATION FROM	+20MM
DESIGN LEVEL OF SURFACE	-30MM
PERMITTED SURFACE IRREGULARITY	
MEASURED BY 3-M STRAIGHT EDGE	30MM
PERMITTED VARIATION FROM	
DESIGN CROSSFALL OR CAMBER	+/- 0.5%
PERMITTED VARIATION FROM	+/- 0.1%
DESIGN LONGITUDINAL GRADE	
OVER 25 M LENGTH	

105.3.3 : SUBGRADE IN COMMON EXCAVATION

105.3.6 SUBGRADE ON EXISTING PAVEMENT

WHERE THE NEW PAVEMENT IS TO BE CONSTRUCTED FMMEDIATELY OVER AN EXISTING PORTLAND CEMENT CONCRETE PAVEMENT AND IS SO SPECIFIED IN THE CONTRACT. THE SLAB SHALL BE BROKEN INTO PIECES WITH GREATEST DIMENSION OF NOT MORE THAN 500 MM AND THE EXISTING PAVEMENT MATERIAL COMPACTED AS SPECIFIED IN SUBSECTION 104.3.3, AS DIRECTED BY THE ENGINEER. THE RESULTING SUBGRADE LEVEL SHALL, AS PART OF PAVEMENT CONSTRUCTION BE SHAPED TO CONFORM TO THE ALLOWABLE TOLERANCES OF SUBSECTION 105.3.2 BY PLACING AND COMPACTING WHERE NECESSARY A LEVELING COURSE COMPRISING THE MATERIAL OF THE PAVEMENT COURSE TO BE PLACED IMMEDIATELY ABOVE.

WHERE THE NEW PAVEMENT IS TO BE CONSTRUCTED IMMEDIATELY OVER AN EXISTING ASPHALT CONCRETE PAVEMENT OR GRAVEL SURFACE PAVEMENT AND IF SO SPECIFIED IN THE CONTRACT. THE PAVEMENT SHALL BE SCARIFIED THOROUGHLY LOOSENED RESHAPED AND RECOMPACTED IN ACCORDANCE WITH SUBSECTION 104.3.3. THE RESULTING SUBGRADE LEVEL SHALL CONFORM TO THE ALLOWABLE TOLERANCES OF SUBSECTION 105.3.2.

105.3.7 PROTECTION OF COMPLETED WORK

THE CONTRACTOR SHALL BE REQUIRED TO PROTECT AND MAINTAIN AT HIS OWN EXPENSE THE ENTIRE WORK WITHIN THE LIMITS OF HIS CONTRACT IN GOOD CONDITION SATISFACTORY TO THE ENGINEER FROM THE TIME HE FIRST STARTED WORK UNTIL ALL WORK SHALL HAVE BEEN COMPLETED. MAINTENANCE SHALL INCLUDE REPAIRING AND RECOMPACTING RUTS, RIDGES, SOFT SPOTS AND DETERIORATED SECTIONS OF THE SUBGRADE CAUSED BY THE TRAFFIC OF THE CONTRACTOR'S VEHICLE/EQUIPMENT OR THAT OF THE PUBLIC.

105.3.8 TEMPLATES AND STRAIGHT-EDGES

THE CONTRACTOR SHALL PROVIDE FOR USE OF THE ENGINEER, APPROVED TEMPLATES AND STRAIGHT-EDGES IN SUFFICIENT NUMBER TO CHECK THE ACCURACY OF THE WORK, AS PROVIDED IN THIS SPECIFICATION.

105.4 METHOD OF MEASUREMENT

105.4.1 MEASUREMENT OF ITEMS FOR PAYMENT SHALL BE PROVIDED ONLY FOR:

- 1. THE COMPACTION OF EXISTING GROUND BELOW SUBGRADE LEVEL IN CUTS OF COMMON MATERIAL AS SPECIFIED IN SUBSECTION 105.3.3.
- 2. THE BREAKING UP OR SCARIFYING, LOOSENING, RESHAPING AND RECOMPACTING OF EXISTING PAVEMENT AS SPECIFIED IN SUBSECTION 105.3.3. THE QUANTITY TO BE PAID FOR SHALL BE THE AREA OF THE WORK SPECIFIED TO BE CARRIED OUT AND ACCEPTED BY THE ENGINEER.

105.4.2 PAYMENT FOR ALL WORK FOR THE PREPARATION OF THE SUBGRADE, INCLUDING SHAPING TO THE REQUIRED LEVELS AND TOLERANCES, OTHER THAN AS SPECIFIED ABOVE SHALL BE DEEMED TO BE INCLUDED IN THE PAY ITEM FOR EMBANKMENT.

105.5 BASIS OF PAYMENT

THE ACCEPTED QUANTITIES, MEASURED AS PRESCRIBED IN SECTION 105.4, SHALL BE PAID FOR AT THE APPROPRIATE CONTRACT UNIT PRICE FOR PAY ITEM LISTED BELOW THAT IS INCLUDED IN THE BILL OF QUANTITIES WHICH PRICE AND PAYMENT SHALL BE FULL COMPENSATION FOR THE PLACING OR REMOVAL AND DISPOSAL OF ALL MATERIALS INCLUDING ALL LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THE WORK PRESCRIBED IN THIS ITEM. PAYMENT WILL BE MADE UNDER:

PAY ITEM NUMBER	DESCRIPTION	UNIT OF MEASUREMENT
105(1)	SUBGRADE PREPARATION (COMMON MATERIAL)	SQUARE METER
105(2)	SUBGRADE PREPARATION (EXISTING PAVEMENT)	SQUARE METER
105(3)	SUBGRADE PREPARATION (UNSUITABLE MATERIAL)	SQUARE METER

ITEM 200 - AGGREGATE SUBBASE COURSE

200.1 DESCRIPTION

THIS ITEM SHALL CONSIST OF FURNISHING, PLACING AND COMPACTING AN AGGREGATE SUBBASE COURSE ON A PREPARED SUBGRADE I~ ACCORDANCE WITH THIS SPECIFICATION AND THE LINES, GRADES AND CROSS-SECTIONS SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.

200.2 MATERIAL REQUIREMENTS

AGGREGATE FOR SUBBASE SHALL CONSIST OF HARD, DURABLE PARTICLES OR FRAGMENTS OF CRUSHED STONE, CRUSHED SLAG, OR CRUSHED OR NATURAL GRAVEL AND FILLER OF NATURAL OR CRUSHED SAND OR OTHER FINELY DIVIDED MINERAL MATTER THE COMPOSITE MATERIAL SHALL BE FREE FROM VEGETABLE MATTER AND LUMPS OR BALLS OF CLAY, AND SHALL BE OF SUCH NATURE THAT IT CAN BE

COMPACTED READILY TO FORM A FIRM, STABLE SUBBASE.

THE SUBBASE MATERIAL SHALL CONFORM TO TABLE 200.1, GRADING REQUIREMENTS

TABLE 200.1 - GRADING REQUIREMENTS

SEIVE DES	MASS PERCENT	
STANDARD, MM	ALTERNATE US STANDARD	PASSING
50	2"	100
25	1"	55-85
9.5	<u>3</u> " 8	40-75
0.075	NO. 200	0-12

	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
RRER	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER	ISAGANI C. CAYME, CESE DISTRICT ENGINEER	GENERAL 06 16	07

THE FRACTION PASSING THE 0.075 MM (NO. 200) SIEVE SHALL NOT BE GREATER THAN 0.66 (TWO THIRDS) OF THE FRACTION PASSING THE 0.425 MM (NO. 40) SIEVE.

THE FRACTION PASSING THE 0.425 MM (NO. 40) SIEVE SHALL HAVE A LIQUID LIMIT NOT GREATER THAN 35 AND PLASTICITY INDEX NOT GREATER THAN 12 AS DETERMINED BY AASHTO T 89 AND T 90, RESPECTIVELY

THE COARSE PORTION, RETAINED ON A 2.00 MM (NO. 10) SIEVE, SHALL HAVE A MASS PERCENT OF WEAR NOT EXCEEDING 50 'BY THE LOS ANGELES ABRASION TESTS AS DETERMINED BY AASHTO T 96.

THE MATERIAL SHALL HAVE A SOAKED CBR VALUE OF NOT LESS THAN 30% AS DETERMINED BY AASHTO T 193. THE CBR VALUE SHALL BE OBTAINED AT THE MAXIMUM DRY DENSITY AND DETERMINED BY AASHTO T 180, METHOD D.

200.3 CONSTRUCTION REQUIREMENTS

200.3.1 PREPARATION OF EXISTING SURFACE

THE EXISTING SURFACE SHALL BE GRADED AND FINISHED AS PROVIDED UNDER ITEM 105, SUBGRADE PREPARATION, BEFORE PLACING THE SUBBASE MATERIAL

200.3.2 PLACING

THE AGGREGATE SUBBASE MATERIAL SHALL BE PLACED AT A UNIFORM MIXTURE ON A PREPARED SUBGRADE IN A QUANTITY WHICH WILL PROVIDE THE REQUIRED COMPACTED THICKNESS. WHEN MORE THAN ONE LAYER IS REQUIRED, EACH LAYER SHALL BE SHAPED AND COMPACTED BEFORE THE SUCCEEDING LAYER IS PLACED.

THE PLACING OF MATERIAL SHALL BEGIN AT THE POINT DESIGNATED BY THE ENGINEER. PLACING SHALL BE FROM VEHICLES ESPECIALLY EQUIPPED TO DISTRIBUTE THE MATERIAL IN A CONTINUOUS UNIFORM LAYER OR WINDROW. THE LAYER OR WINDROW SHALL BE OF SUCH SIZE THAT WHEN SPREAD AND COMPACTED, THE FINISHED LAYER SHALL BE IN REASONABLY CLOSE CONFORMITY TO THE NOMINAL THICKNESS SHOWN ON THE PLANS.

WHEN HAULING IS DONE OVER PREVIOUSLY PLACED MATERIAL, HAULING EQUIPMENT SHALL BE DISPERSED UNIFORMLY OVER THE ENTIRE SURFACE OF THE PREVIOUSLY CONSTRUCTED LAYER, TO MINIMIZE RUTTING OR UNEVEN COMPACTION.

200.3.3 SPREADING AND COMPACTING

WHEN UNIFORMLY MIXED, THE MIXTURE SHALL BE SPREAD TO THE PLAN THICKNESS, FOR COMPACTION.

WHERE THE REQUIRED THICKNESS IS 150 MM OR LESS, THE MATERIAL MAY BE SPREAD AND COMPACTED IN ONE LAYER. WHERE THE REQUIRED THICKNESS IS MORE THAN 150 MM. THE AGGREGATE SUBBASE SHALL BE SPREAD AND COMPACTED IN TWO OR MORE LAYERS OF APPROXIMATELY EQUAL THICKNESS, AND THE MAXIMUM COMPACTED THICKNESS OF ANY LAYER SHALL NOT EXCEED 150MM. ALL SUBSEQUENT LAYERS SHALL BE SPREAD AND COMPACTED IN A SIMILAR MANNER

THE MOISTURE CONTENT OF SUBBASE MATERIAL SHALL, IF NECESSARY, BE ADJUSTED PRIOR TO COMPACTION BY WATERING WITH APPROVED SPRINKLERS MOUNTED ON TRUCKS OR BY DRYING OUT. AS REQUIRED IN ORDER TO OBTAIN THE REQUIRED COMPACTION

IMMEDIATELY FOLLOWING FINAL SPREADING AND SMOOTHENING, EACH LAYER SHALL BE COMPACTED TO THE FULL WIDTH BY MEANS OF APPROVED COMPACTION EQUIPMENT. ROLLING SHALL PROGRESS GRADUALLY FROM THE SIDES TO THE CENTER, PARALLEL TO THE CENTERLINE OF THE ROAD AND SHALL CONTINUE UNTIL THE WHOLE SURFACE HAS BEEN ROLLED. ANY IRREGULARITIES OR DEPRESSIONS THAT DEVELOP SHALL BE CORRECTED BY LOOSENING THE MATERIAL AT THESE PLACES AND ADDING OR REMOVING MATERIAL UNTIL SURFACE IS SMOOTH AND UNIFORM. ALONG CURBS, HEADERS AND WALLS, AND AT ALL PLACES NOT ACCESSIBLE TO THE ROLLER, THE SUBBASE MATERIAL SHALL BE COMPACTED THOROUGHLY WITH APPROVED TAMPERS OR COMPACTORS.

IF THE LAYER OF SUBBASE MATERIAL, OR PART THEREOF, DOES NOT CONFORM TO THE REQUIRED FINISH, THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, MAKE THE NECESSARY CORRECTIONS.

COMPACTION OF EACH LAYER SHALL CONTINUE UNTIL A FIELD DENSITY OF AT LEAST 100 PERCENT OF THE MAXIMUM DRY DENSITY DETERMINED IN ACCORDANCE WITH AASHTO T 180, METHOD D HAS BEEN ACHIEVED. IN-PLACE DENSITY DETERMINATION SHALL BE MADE IN ACCORDANCE WITH AASHTO T 191

200.3.4 TRIAL SECTIONS

BEFORE SUBBASE CONSTRUCTION IS STARTED, THE CONTRACTOR SHALL SPREAD AND COMPACT TRIAL SECTIONS AS DIRECTED BY THE ENGINEER. THE PURPOSE OF THE TRIAL SECTIONS IS TO CHECK THE SUITABILITY OF THE MATERIALS, THE EFFICIENCY OF THE EQUIPMENT AND THE CONSTRUCTION METHOD WHICH IS PROPOSED TO BE USED BY THE CONTRACTOR THEREFORE THE CONTRACTOR MUST USE THE SAME MATERIAL EQUIPMENT AND PROCEDURES THAT HE PROPOSES TO USE FOR THE MAIN WORK. ONE TRIAL SECTION OF ABOUT 500 M2 SHALL BE MADE FOR EVERY TYPE OF MATERIAL AND/OR CONSTRUCTION EQUIPMENT/PROCEDURE PROPOSED FOR USE.

AFTER FINAL COMPACTION OF EACH TRIAL SECTION, THE CONTRACTOR SHALL CARRY OUT SUCH FIELD DENSITY TESTS AND OTHER TESTS REQUIRED AS DIRECTED BY THE ENGINEER.

IF A TRIAL SECTION SHOWS THAT THE PROPOSED MATERIALS EQUIPMENT OR PROCEDURES IN THE ENGINEER'S OPINION ARE NOT SUITABLE FOR SUBBASE, THE MATERIAL SHALL BE REMOVED AT THE CONTRACTOR'S EXPENSE, AND A NEW TRIAL SECTION SHALL BE CONSTRUCTED.

IF THE BASIC CONDITIONS REGARDING THE TYPE OF MATERIAL OR PROCEDURE CHANGE DURING THE EXECUTION OF THE WORK, NEW TRIAL SECTIONS SHALL BE CONSTRUCTED.

200.3.5 TOLERANCES

AGGREGATE SUBBASE SHALL BE SPREAD WITH EQUIPMENT THAT WILL PROVIDE A UNIFORM LAYER WHICH WHEN COMPACTED WILL CONFORM TO THE DESIGNED LEVEL AND TRANSVERSE SLOPES AS SHOWN ON THE PLANS. THE ALLOWABLE TOLERANCES SHALL BE AS SPECIFIED HEREUNDER:

PERMITTED VARIATION FROM DESIGN THICKNESS OF LAYER	+- 20MM	TAE
PERMITTED VARIATION FROM DESIGN LEVEL OF SURFACE	+ 10MM - 20MM	
PERMITTED SURFACE IRREGULARITY MEASURED BY 3-M STRAIGHT-EDGE	20MM	
PERMITTED VARIATION FROM DESIGN CROSSFALL OR CAMBER	+- 0.3%	
PERMITTED VARIATION FROM DESIGN LONGITUDINAL GRADE OVER	+- 0.1%	311
		APF COI

200.4 METHOD OF MEASUREME

AGGREGATE SUBBASE COURSE WILL BE MEASURED BY THE CUBIC METER (m³). THE QUANTITY TO BE PAID FOR SHALL BE THE DESIGN VOLUME COMPACTED IN-PLACE AS SHOWN ON THE PLANS AND ACCEPTED IN THE COMPLETED COURSE. NO ALLOWANCE WILL BE GIVEN FOR MATERIALS PLACED OUTSIDE THE DESIGN LIMITS SHOWN ON THE CROSS-SECTIONS. TRIAL SECTIONS SHALL NOT BE MEASURED SEPARATELY BUT SHALL BE INCLUDED IN THE QUANTITY OF SUBBASE HEREIN MEASURED.

200.5 BASIS OF PAYMENT

THE ACCEPTED QUANTITIES, MEASURED AS PRESCRIBED IN SECTION 200.4, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR AGGREGATE SUBBASE COURSE WHICH PRICE AND PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHINGS AND PLACING ALL MATERIALS, INCLUDING ALL LABOR. EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THE WORK PRESCRIBED IN THIS ITEM PAYMENT WILL BE MADE UNDER

ITEM 311 - PORTLAND CEMENT CONCRETE PAVEMENT (UNREINFORCED, 14 DAYS)

311.1 : DESCRIPTION

THIS ITEM SHALL CONSIST OF PAVEMENT OF PORTLAND CEMENT CONCRETE, WITH OR WITHOUT REINFORCEMENT, CONSTRUCTED ON THE PREPARED BASE IN ACCORDANCE WITH THIS SPECIFICATION AND IN CONFORMITY WITH LINES, GRADES, THICKNESS AND TYPICAL CROSS-SECTION SHOWN ON THE PLANS

311.2 : MATERIAL REQUIREMENTS

311.2.1 : PORTLAND CEMENT

IT SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF ITEM 700, HYDRAULIC CEMENT. ONLY TYPE I PORTLAND CEMENT SHALL BE USED UNLESS OTHERWISE PROVIDED FOR IN THE SPECIAL PROVISIONS. DIFFERENT BRANDS OR THE SAME BRANDS FROM DIFFERENT MILLS SHALL NOT BE MIXED NOR SHALL THEY BE USED ALTERNATELY UNLESS THE MIX IS APPROVED BY THE ENGINEER. HOWEVER, THE USE OF PORTLAND POZZOLAN CEMENT TYPE IP MEETING THE REQUIREMENTS OF AASHTO M 240/ASTM C 595, SPECIFICATIONS FOR BLENDED HYDRAULIC CEMENT SHALL BE ALLOWED, PROVIDED THAT TRIAL MIXES SHALL BE DONE AND THAT THE MIXES MEET THE CONCRETE STRENGTH REQUIREMENTS, THE AASHTO/ASTM PROVISIONS PERTINENT TO THE USE OF PORTLAND POZZOLAN CEMENT TYPE IP SHALL BE ADOPTED.

CEMENT WHICH FOR ANY REASON, HAS BECOME PARTIALLY SET OR WHICH CONTAINS LUMPS OF CAKED CEMENT SHALL BE REJECTED. CEMENT SALVAGED FROM DISCARDED OR USED BAGS SHALL NOT BE USED.

SAMPLES OF CEMENT SHALL BE OBTAINED IN ACCORDANCE WITH AASHTO T 127.

SHEET CONTENTS

REQUIREMENTS

311.2.2 : FINE AGGREGATE

IT SHALL CONSIST OF NATURAL SAND, STONE SCREENINGS OR OTHER INERT MATERIALS WITH SIMILAR CHARACTERISTICS, OR COMBINATIONS THEREOF, HAVING HARD, STRONG AND DURABLE PARTICLES. FINE AGGREGATE FROM DIFFERENT SOURCES OF SUPPLY SHALL NOT BE MIXED OR STORED IN THE SAME PILE NOR USED ALTERNATELY IN THE SAME CLASS OF CONCRETE WITHOUT THE APPROVAL OF THE ENGINEER.

IT SHALL NOT CONTAIN MORE THAN THREE (3) MASS PERCENT OF MATERIAL PASSING THE 0.075 MM (NO. 200) SIEVE BY WASHING NOT MORE THAN ONE (1) MASS PERCENT EACH OF CLAY LUMPS OR SHALE. THE USE OF BEACH SAND WILL NOT BE ALLOWED WITHOUT THE APPROVAL OF THE ENGINEER.

-SPECIFICATION AND CONSTRUCTION

IT SHALL CONFORM TO THE REQUIREMENTS OF ITEM 404, REINFORCING STEEL. DOWELS AND TIE BARS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 OR M 42, EXCEPT THAT RAIL STEEL SHALL NOT BE USED FOR TIE BARS THAT ARE TO BE BENT AND RE-STRAIGHTEN DURING CONSTRUCTION. TIE BARS SHALL BE DEFORMED BARS. DOWELS SHALL BE PLAIN ROUND BARS. BEFORE DELIVERY TO THE SITE OF WORK, ONE-HALF OF THE LENGTH OF EACH DOWEL SHALL BE PAINTED WITH ONE COAT OF APPROVED LEAD OR TAR PAINT.

SPECIFICATION AND CONSTRUCTION REQUIREMENTS Gen-07

NOT TO SCALE

MARK ANTHONY L. FE

ENGINEER II



REPUBLIC OF THE PHILIPPINES

CONSTRUCTION OF ROAD, PAYACPAC -

PALAKPAK - LUMES - APNE, BARANGAY SAN

PASCUAL, TUBA, BENGUET

PROJECT NAME AND LOCATION

PREPARED:

IF THE FINE AGGREGATE IS SUBJECTED TO FIVE (5) CYCLES OF THE SODIUM SULFATE SOUNDNESS TEST, THE WEIGHTED LOSS SHALL NOT EXCEED 10 MASS PERCENT.

THE FINE AGGREGATE SHALL BE FREE FROM INJURIOUS AMOUNTS OF ORGANIC IMPURITIES. IF SUBJECTED TO THE COLORIMETRIC TEST FOR ORGANIC IMPURITIES AND A COLOR DARKER THAN THE STANDARD IS PRODUCED, IT SHALL BE REJECTED. HOWEVER, WHEN TESTED FOR THE EFFECT OF ORGANIC IMPURITIES ON STRENGTH OF MORTAR BY AASHTO T 71, THE FINE AGGREGATE MAY BE USED IF THE RELATIVE STRENGTH AT 7 AND 28 DAYS IS NOT LESS THAN 95 PERCENT

THE FINE AGGREGATE SHALL BE WELL-GRADED FROM COARSE TO FINE AND SHALL CONFORM TO TABLE 311.1

BLE 311.1

SIEVE	MASS PERCENT
DESIGNATION	PASSING
9.5mm. (3/8 in.)	100%
4.75mm. (No.4)	95% - 100%
2.36mm. (No.8)	-
1.18mm. (No.16)	45% - 80%
0.600mm. (No.30)	-
0.300mm. (No.50)	5% - 30%
0.150mm (No.150)	0% - 10%

.2.3 : COARSE AGGREGATE

IT SHALL CONSIST OF CRUSHED STONE, GRAVEL, BLAST FURNACE SLAG, OR OTHER PROVED INERT MATERIALS (CORALLINE OR DOLOMITES) OF SIMILAR CHARACTERISTICS, OR MBINATIONS THEREOF, HAVING HARD, STRONG, DURABLE PIECES AND FREE FROM ANY ADHERENT COATINGS.

IT SHALL CONSIST OF CRUSHED STONE, GRAVEL, BLAST FURNACE SLAG, OR OTHER APPROVED INERT MATERIALS OF SIMILAR CHARACTERISTICS, OR COMBINATIONS THEREOF. HAVING HARD, STRONG, DURABLE PIECES AND FREE FROM ANY ADHERENT COATINGS.

IT SHALL CONTAIN NOT MORE THAN ONE (1) MASS PERCENT OF MATERIAL PASSING THE 0.075 MM (NO. 200) SIEVE, NOT MORE THAN 0.25 MASS PERCENT OF CLAY LUMPS, NOR MORE THAN 3.5 MASS PERCENT OF SOFT FRAGMENTS.

IF THE COARSE AGGREGATE IS SUBJECTED TO FIVE (5) CYCLES OF THE SODIUM SULFATE SOUNDNESS TEST, THE WEIGHTED LOSS SHALL NOT EXCEED 12 MASS PERCENT.

IT SHALL HAVE A MASS PERCENT OF WEAR NOT EXCEEDING 40 WHEN TESTED BY AASHTO T 96.

IF THE SLAG IS USED, ITS DENSITY SHALL NOT BE LESS THAN 1120 KG/M3. THE GRADATION OF THE COARSE AGGREGATE SHALL CONFORM TO TABLE 311.2.

TABLE 311.2

SIEVE DE	SIEVE DESIGNATION		MASS PERCENTAGE PASSING			
STANDARD, MM	ALTERNATE US STANDARD	GRADING A	GRADING B	GRADING C		
75.00	3 in.	100%	-	-		
63.00	2-1/2 in	90% - 100%	100%	100%		
50.00	2 in.	-	90% - 100%	90% - 100%		
37.50	1-1/2 in.	25% - 60%	35% - 70%	-		
25.00	1 in.	-	0% - 15%	35% - 70%		
19.00	3/4 in.	0% - 10%	-	-		
12.50	1/2 in.	0% - 5%	0% - 5%	10% - 30%		
4.75	No.4	-	-	0% - 5%		

311.2.4 : WATER

WATER USED IN MIXING, CURING OR OTHER DESIGNATED APPLICATION SHALL BE REASONABLY CLEAN AND FREE OF OIL, SALT, ACID, ALKALI, GRASS OR OTHER SUBSTANCES INJURIOUS TO THE FINISHED PRODUCT. WATER WILL BE TESTED ACCORDANCE WITH AND SHALL MEET THE REQUIREMENTS OF ITEM 714, WATER. WATER WHICH IS DRINKABLE MAY BE USED WITHOUT TEST. WHERE THE SOURCE OF WATER IS SHALLOW, THE INTAKE SHALL BE SO ENCLOSED AS TO EXCLUDE SILT, MUD, GRASS OR OTHER FOREIGN MATERIALS

311.2.5 : REINFORCING STEEL

THE SLEEVES FOR DOWEL BARS SHALL BE METAL OF APPROVED DESIGN TO COVER 50 MM, PLUS OR MINUS 5 MM OF THE DOWEL. WITH A CLOSED END, AND WITH A SUITABLE STOP TO HOLD THE END OF THE SLEEVE AT LEAST 25 MM FROM THE END OF THE DOWEL. SLEEVES SHALL BE OF SUCH DESIGN THAT THEY DO NOT COLLAPSE DURING CONSTRUCTION.

311.2.6 : WIRE MESH

THE DIAMETER OF WIRE FOR LATERAL AND LONGITUDINAL DIRECTIONS SHALL NOT BE LESS THAN 6 MM IN DIAMETER. TIE WIRE SHALL BE NO. 16 GAUGED ANNEALED WIRE.

311-2.6.1 : FABRICATION OF WIRE MESH

THE SPACING ON THE LATERAL DIRECTION IS TWICE WIDER THAN THAT OF THE LONGITUDINAL DIRECTION. THE WEIGHT OF WIRE MESH SHALL NOT BE LESS THAN 3 KG/M2. IT SHALL BE FABRICATED BY WELDING OR BINDING AT EACH CROSSING POINT AND SHALL MEET THE REQUIREMENTS OF ASTM A 185.

311.2.6.2 : INSTALLATION OF WIRE MESH

AFTER PLACEMENT OF SLIP BAR PLACED AT EVERY 9.0 M MAXIMUM INTERVAL FOR WEAKENED PLANE JOINT, WIRE MESH SHALL BE PLACED AT A DEPTH OF 5.0 CM TO 7.5 CM BELOW THE SURFACE OF THE SLAB OR AT 2/3 OF THICKNESS FROM THE BOTTOM OF THE PAVEMENT. IT SHALL BE SUPPORTED BY ANY APPROVED SUPPORT ASSEMBLIES OR SPACERS AGAINST DISPLACEMENT AND SHALL BE TIED TO IT USING TIE WIRES. THE SHEETS OF THE WELDED WIRE MESH SHALL BE FLAT, AND PROPER CARE SHALL BE OBSERVED IN HANDLING AND PLACING IT TO ENSURE ITS INSTALLATION IN THE PROPER POSITION.

WELDED WIRE MESH THAT HAVE BECOME BENT OR KINKED SHALL BE REJECTED.

311.2.7 : JOINT FILLERS

POURED JOINT FILLERS SHALL BE MIXED ASPHALT AND MINERAL OR RUBBER FILLER CONFORMING TO THE APPLICABLE REQUIREMENTS OF ITEM 705, JOINT MATERIALS.

PREFORMED JOINT FILLER SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF ITEM 705. IT SHALL BE PUNCHED TO ADMIT THE DOWELS WHERE CALLED FOR IN THE PLANS THE FILLER FOR EACH JOINT SHALL BE FURNISHED IN A SINGLE PIECE FOR THE FULL DEPTH AND WIDTH REQUIRED FOR THE JOINT.

311.2.8 : ADMIXTURES

AIR-ENTRAINING ADMIXTURE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 154.

CHEMICAL ADMIXTURES, IF SPECIFIED OR PERMITTED, SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 194.

FLY ASH, IF SPECIFIED OR PERMITTED AS A MINERAL ADMIXTURE AND NOT EXCEEDING 20% PARTIAL REPLACEMENT OF PORTLAND CEMENT IN CONCRETE MIX SHALL CONFORM TO THE REQUIREMENTS OF ASTM C 618.

ADMIXTURE/S MAYBE ADDED TO THE CONCRETE MIX TO PRODUCE DESIRED MODIFICATIONS TO THE PROPERTIES OF CONCRETE IF NECESSARY, BUT NOT AS PARTIAL REPLACEMENT OF CEMENT. IF SPECIFIED, MONOFILAMENT POLYPROPYLENE SYNTHETIC FIBRIN FIBERS, WHICH ARE USED AS ADMIXTURE TO PREVENT THE FORMATION OF TEMPERATURE/SHRINKAGE CRACKS AND INCREASE IMPACT RESISTANCE OF CONCRETE SLABS SHALL BE APPLIED IN THE DOSAGE RATE RECOMMENDED BY ITS MANUFACTURER.

311.2.9 : CURING MATERIALS

CURING MATERIALS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS AS SPECIFIED:

- AASHTO M 182 A. BURLAP CLOTH
- B. LIQUID MEMBRANE FORMING COMPOUNDS - AASHTO M 148
- C. SHEETING (FILM) MATERIALS AASHTO M 171

COTTON MATS AND WATER-PROOF PAPER CAN BE USED.

311.2.10 : CALCIUM CHLORIDE/CALCIUM NITRATE

IT SHALL CONFORM TO AASHTO M 144, IF SPECIFIED OR PERMITTED BY THE ENGINEER, AS ACCELERATOR

311.2.11 : STORAGE OF CEMENT AND AGGREGATE

ALL CEMENT SHALL BE STORED, IMMEDIATELY UPON DELIVERY AT THE SITE, IN WEATHERPROOF BUILDING WHICH WILL PROTECT THE CEMENT FROM DAMPNESS. THE FLOOR SHALL BE RAISED FROM THE GROUND. THE BUILDINGS SHALL BE PLACED IN LOCATIONS APPROVED BY THE ENGINEER. PROVISIONS FOR STORAGE SHALL BE AMPLE. AND THE SHIPMENTS OF CEMENT AS RECEIVED SHALL E SEPARATELY STORED IN SUCH A MANNER AS TO ALLOW THE EARLIEST DELIVERIES TO BE USED FIRST AND TO PROVIDE EASY ACCESS FOR IDENTIFICATION ANT INSPECTION OF EACH SHIPMENT. STORAGE BUILDINGS SHALL HAVE CAPACITY FOR STORAGE OF A SUFFICIENT QUANTITY OF CEMENT TO ALLOW SAMPLING AT LEAST TWELVE (12) DAYS BEFORE THE CEMENT IS TO BE USED. BULK CEMENT, IF USED, SHALL BE TRANSFERRED TO ELEVATED AIR TIGHT AND WEATHERPROOF BINS. STORED CEMENT SHALL MEET THE TEST REQUIREMENTS AT ANY TIME AFTER STORAGE WHEN RETEST IS ORDERED BY THE ENGINEER. AT THE TIME OF USE, ALL CEMENT SHALL BE FREE-FLOWING AND FREE OF LUMPS.

THE HANDLING AND STORING OF CONCRETE AGGREGATES SHALL BE SUCH AS TO PREVENT SEGREGATION OR THE INCLUSION OF FOREIGN MATERIALS. THE ENGINEER MAY REQUIRE THAT AGGREGATES BE STORED ON SEPARATE PLATFORMS AT SATISFACTORY LOCATIONS.

	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
RER	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER	ISAGANI C. CAYME, CESE DISTRICT ENGINEER	GENERAL 07 16	08

IN ORDER TO SECURE GREATER UNIFORMITY OF CONCRETE MIX, THE ENGINEER MAY REQUIRE THAT THE COARSE AGGREGATE BE SEPARATED INTO TWO OR MORE SIZES. DIFFERENT SIZES OF AGGREGATE SHALL BE STORED IN SEPARATE BINS OR IN SEPARATE STOCKPILES SUFFICIENTLY REMOVED FROM EACH OTHER TO PREVENT THE MATERIAL AT THE EDGES OF THE PILES FROM BECOMING INTERMIXED.

311.2.12 : PROPORTIONING, CONSISTENCY AND STRENGTH OF CONCRETE

THE CONTRACTOR SHALL PREPARE THE DESIGN MIX BASED ON THE ABSOLUTE VOLUME METHOD AS OUTLINED IN THE AMERICAN CONCRETE INSTITUTE (ACI) STANDARD 211.1, "RECOMMENDED PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE"

IT IS THE INTENT OF THIS SPECIFICATION TO REQUIRE AT LEAST 364 KG OF CEMENT PER CUBIC METER OF CONCRETE TO MEET THE MINIMUM STRENGTH REQUIREMENTS. THE ENGINEER SHALL DETERMINE FROM LABORATORY TESTS OF THE MATERIALS TO BE USED. THE CEMENT CONTENT AND THE PROPORTIONS OF AGGREGATE AND WATER THAT WILL PRODUCE WORKABLE CONCRETE HAVING A SLUMP OF BETWEEN 40 AND 75 MM IF NOT VIBRATED OR BETWEEN 10 AND 40 MM IF VIBRATED, AND A FLEXURAL STRENGTH OF NOT LESS THAN3.8 MPA WHEN TESTED BY THE THIRD-POINT METHOD OR 4.5 MPA WHEN TESTED BY THE MID-POINT METHOD AT FOURTEEN (14) DAYS IN ACCORDANCE WITH AASHTO T 97 AND T 177, RESPECTIVELY OR A COMPRESSIVE STRENGTH OF 24.1 MPA FOR CORES TAKEN AT FOURTEEN (14) DAYS AND TESTED IN ACCORDANCE WITH AASHTO T 24.

SLUMP SHALL BE DETERMINED USING AASHTO T 119.

THE DESIGNER SHALL CONSIDER THE USE OF LEAN CONCRETE (ECONOCRETE) MIXTURES USING LOCAL MATERIALS OR SPECIFICALLY MODIFIED CONVENTIONAL CONCRETE MIXES IN BASE COURSE AND IN THE LOWER COURSE COMPOSITE, MONOLITHIC CONCRETE PAVEMENTS USING A MINIMUM OF 75 MM OF CONVENTIONAL CONCRETE AS THE SURFACE COURSE.

THE MIX DESIGN SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL AND SHALL BE ACCOMPANIED WITH CERTIFIED TEST DATA FROM AN APPROVED LABORATORY DEMONSTRATING THE ADEQUACY OF THE MIX DESIGN. A CHANGE IN THE SOURCE OF MATERIALS DURING THE PROGRESS OF WORK MAY NECESSITATE A NEW DESIGN MIX.

311.3 : CONSTRUCTION REQUIREMENTS

311.3.1 QUALITY CONTROL OF CONCRETE

GENERAL

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE QUALITY CONTROL OF ALL MATERIALS DURING THE HANDLING, BLENDING, AND MIXING AND PLACEMENT OPERATIONS.

2. QUALITY CONTROL PLAN

THE CONTRACTOR SHALL FURNISH THE ENGINEER A QUALITY CONTROL PLAN DETAILING HIS PRODUCTION CONTROL PROCEDURES AND THE TYPE AND FREQUENCY OF SAMPLING AND TESTING TO INSURE THAT THE CONCRETE PRODUCED COMPLIES WITH THE SPECIFICATIONS. THE ENGINEER SHALL BE PROVIDED FREE ACCESS TO RECENT PLANT PRODUCTION RECORDS, AND IF REQUESTED, INFORMATIONAL COPIES OF MIX DESIGN, MATERIALS CERTIFICATIONS AND SAMPLING AND TESTING REPORTS.

QUALIFICATION OF WORKMEN

EXPERIENCED AND QUALIFIED PERSONNEL SHALL PERFORM ALL BATCHING OR MIXING OPERATION FOR THE CONCRETE MIX, AND SHALL BE PRESENT AT THE PLANT AND JOB SITE TO CONTROL THE CONCRETE PRODUCTIONS WHENEVER THE PLANT IS IN OPERATION. THEY SHALL BE IDENTIFIED AND DUTIES DEFINED AS FOLLOWS:

CONCRETE BATCHER. THE PERSON PERFORMING THE BATCHING OR MIXING OPERATION SHALL BE CAPABLE OF ACCURATELY CONDUCTING AGGREGATE SURFACE MOISTURE DETERMINATION AND ESTABLISHING CORRECT SCALE WEIGHTS FOR CONCRETE MATERIALS. HE SHALL BE CAPABLE OF ASSURING THAT THE PROPORTIONED BATCH WEIGHTS OF MATERIALS ARE IN ACCORDANCE WITH THE MIX DESIGN.

b. CONCRETE TECHNICIAN. THE PERSON RESPONSIBLE FOR CONCRETE PRODUCTION CONTROL AND SAMPLING AND TESTING FOR QUALITY CONTROL SHALL BE PROFICIENT IN CONCRETE TECHNOLOGY, AND SHALL HAVE A SOUND KNOWLEDGE OF THE SPECIFICATIONS AS THEY RELATE TO CONCRETE PRODUCTION. HE SHALL BE CAPABLE OF CONDUCTING TESTS ON CONCRETE AND CONCRETE MATERIALS IN ACCORDANCE WITH THESE SPECIFICATIONS. HE SHALL BE CAPABLE OF ADJUSTING CONCRETE MIX DESIGNS FOR IMPROVING WORKABILITY AND SPECIFICATION COMPLIANCE, AND PREPARING TRIAL MIX DESIGNS. HE SHALL BE QUALIFIED TO ACT AS THE CONCRETE BATCHER IN THE BATCHER'S ABSENCE.

QUALITY CONTROL TESTING

THE CONTRACTOR SHALL PERFORM ALL SAMPLING, TESTING AND INSPECTION NECESSARY TO ASSURE QUALITY CONTROL OF THE COMPONENT MATERIALS AND THE CONCRETE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE GRADATION OF FINE AND COARSE AGGREGATES AND FOR TESTING THE CONCRETE MIXTURE FOR SLUMP, AIR CONTENT, WATER-CEMENT RATIO AND TEMPERATURE. HE SHALL CONDUCT HIS OPERATIONS SO AS TO PRODUCE A MIX CONFORMING TO THE APPROVED MIX DESIGN.

5. DOCUMENTATION

THE CONTRACTOR SHALL MAINTAIN ADEQUATE RECORDS OF ALL INSPECTIONS AND TESTS. THE RECORDS SHALL INDICATE THE NATURE AND NUMBER OF OBSERVATIONS MADE, THE NUMBER AND TYPE OF DEFICIENCIES FOUND. THE QUANTITIES APPROVED AND REJECTED, AND NATURE OF ANY

CORRECTIVE ACTION TAKEN. THE ENGINEER MAY TAKE INDEPENDENT ASSURANCE SAMPLES AT RANDOM LOCATION FOR ACCEPTANCE PURPOSES AS HE DEEMS NECESSARY

311.3.2 EQUIPMENT

EQUIPMENT AND TOOLS NECESSARY FOR HANDLING MATERIALS AND PERFORMING ALL PARTS OF THE WORK SHALL BE APPROVED BY THE ENGINEER AS TO DESIGN, CAPACITY AND MECHANICAL CONDITION. THE EQUIPMENT SHALL BE AT THE JOBSITE SUFFICIENTLY AHEAD OF THE START OF CONSTRUCTION OPERATIONS TO BE EXAMINED THOROUGHLY AND APPROVED.

BATCHING PLANT AND EQUIPMENT

GENERAL. THE BATCHING SHALL INCLUDE BINS, WEIGHING HOPPERS, AND SCALES FOR THE FINE AGGREGATE AND FOR EACH SIZE OF COARSE AGGREGATE IF CEMENT IS USED IN BUILK A BIN, A HOPPER, AND SEPARATE SCALE FOR CEMENT SHALL BE INCLUDED. THE WEIGHING HOPPER SHALL BE PROPERLY SEALED AND VENTED TO PRECLUDE DUSTING OPERATION. THE BATCH PLANT SHALL BE EQUIPPED WITH A SUITABLE NON-RESETTABLE BATCH COUNTER WHICH WILL CORRECTLY INDICATE THE NUMBER OF BATCHES PROPORTIONED.

b. BINS AND HOPPERS. BINS WITH ADEQUATE SEPARATE COMPARTMENTS FOR FINE AGGREGATE AND FOR EACH SIZE OF COARSE AGGREGATE SHALL BE PROVIDED IN THE BATCHING PLANT

SCALES. SCALES FOR WEIGHING AGGREGATES AND CEMENT SHALL BE OF EITHER THE BEAM TYPE OR THE SPRINGLESS-DIAL TYPE. THEY SHALL BE ACCURATE WITHIN ONE-HALF PERCENT (0.5%) THROUGHOUT THE RANGE OF USE. POISES SHALL BE DESIGNED TO BE LOCKED IN ANY POSITION AND TO PREVENT UNAUTHORIZED CHANGE. SCALES SHALL BE INSPECTED AND SEALED AS OFTEN AS THE ENGINEER MAY DEEM NECESSARY

TO ASSURE THEIR CONTINUED ACCURACY.

d. AUTOMATIC WEIGHING DEVICES. UNLESS OTHERWISE ALLOWED ON THE CONTRACT, BATCHING PLANTS SHALL BE EQUIPPED WITH AUTOMATIC WEIGHING DEVICES OF AN APPROVED TYPE TO PROPORTION AGGREGATES AND BULK CEMENT.

2. MIXERS

GENERAL. CONCRETE MAY BE MIXED AT THE SITE OF CONSTRUCTION OR AT A CENTRAL PLANT, OR WHOLLY OR IN PART IN TRUCK MIXERS. EACH MIXER SHALL HAVE A MANUFACTURER'S PLATE ATTACHED IN A PROMINENT PLACE SHOWING THE CAPACITY OF THE DRUM IN TERMS OF VOLUME OF MIXED CONCRETE AND THE SPEED OF ROTATION OF THE MIXING DRUM OR BLADES.

b. MIXERS AT SITE OF CONSTRUCTION. MIXING SHALL BE DONE IN AN APPROVED MIXER CAPABLE OF COMBINING THE AGGREGATES, CEMENT AND WATER INTO A THOROUGHLY MIXED AND UNIFORM MASS WITHIN THE SPECIFIED MIXING PERIOD AND DISCHARGING AND DISTRIBUTING THE MIXTURE WITHOUT SEGREGATION ON THE PREPARED GRADE. THE MIXER SHALL BE EQUIPPED WITH AN APPROVED TIMING DEVICE WHICH WILL AUTOMATICALLY LOCK THE DISCHARGE LEVER WHEN THE DRUM HAS BEEN CHARGED AND RELEASED IT AT THE END OF THE MIXING PERIOD. IN CASE OF FAILURE OF THE TIMING DEVICE, THE MIXER MAY BE USED FOR THE BALANCE OF THE DAY WHILE IT IS BEING REPAIRED, PROVIDED THAT EACH BATCH IS MIXED 90 SECONDS. THE MIXER SHALL BE EQUIPPED WITH A SUITABLE NONRESETTABLE BATCH COUNTER WHICH SHALL CORRECTLY INDICATE THE NUMBER OF THE BATCHES MIXED.

TRUCK MIXER AND TRUCK AGITATORS. TRUCK MIXERS USED FOR MIXING AND HAULING CONCRETE, AND TRUCK AGITATORS USED FOR HAULING CENTRAL-MIXED CONCRETE, SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 157.

d. NON-AGITATOR TRUCK. BODIES OF NON-AGITATING HAULING EQUIPMENT FOR CONCRETE SHALL BE SMOOTH, MORTAR-TIGHT METAL CONTAINERS AND SHALL BE CAPABLE OF DISCHARGING THE CONCRETE AT A SATISFACTORY CONTROLLED RATE WITHOUT SEGREGATION.

PAVING AND FINISHING EQUIPMENT THE CONCRETE SHALL BE PLACED WITH AN APPROVED PAVER DESIGNED TO SPREAD, CONSOLIDATE, SCREED AND FLOAT FINISH THE FRESHLY PLACED CONCRETE IN ONE COMPLETE PASS OF THE MACHINE IN SUCH A MANNER THAT A MINIMUM OF HAND FINISHING WILL BE NECESSARY TO PROVIDE A DENSE AND HOMOGENEOUS PAVEMENT IN CONFORMANCE WITH THE PLANS AND SPECIFICATIONS.

THE FINISHING MACHINE SHALL BE EQUIPPED WITH AT LEAST TWO (2) OSCILLATING TYPE TRANSVERSE SCREED

VIBRATORS SHALL OPERATE AT A FREQUENCY OF 8,300 TO 9,600 IMPULSES PER MINUTE UNDER LOAD AT A MAXIMUM SPACING OF 60CM.

4. CONCRETE SAW

THE CONTRACTOR SHALL PROVIDE SAWING EQUIPMENT IN ADEQUATE NUMBER OF UNITS AND POWER TO COMPLETE THE SAWING WITH A WATER-COOLED DIAMOND EDGE SAW BLADE OR AN ABRASIVE WHEEL TO THE REQUIRED DIMENSIONS AND AT THE REQUIRED RATE. HE SHALL PROVIDE AT LEAST ONE (1) STAND-BY SAW IN GOOD WORKING CONDITION AND WITH AN AMPLE SUPPLY OF SAW BLADES.

5. FORMS

FORMS SHALL BE OF STEEL, OF AN APPROVED SECTION, AND OF DEPTH EQUAL TO THE THICKNESS OF THE PAVEMENT AT THE EDGE. THE BASE OF THE FORMS SHALL BE OF SUFFICIENT WIDTH TO PROVIDE NECESSARY STABILITY IN ALL DIRECTIONS. THE FLANGE BRACES MUST EXTEND OUTWARD ON THE BASE TO NOT LESS THAN 2/3 THE HEIGHT OF THE FORM.

-SPECIFICATION AND CONSTRUCTION

SHEET CONTENTS

REQUIREMENTS

THE MIXER SHALL BE OPERATED AT THE DRUM SPEED AS SHOWN ON THE MANUFACTURER'S NAME PLATE ATTACHED ON THE MIXER, ANY CONCRETE MIXED LESS THAN THE SPECIFIED TIME SHALL



DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS CORDILLERA ADMINISTRATIVE REGION BENGUET 1ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET

REPUBLIC OF THE PHILIPPINES

TUBA, BENGUET

CONSTRUCTION OF ROAD, PAYACPAC -

PALAKPAK - LUMES - APNE, BARANGAY SAN

PASCUAL, TUBA, BENGUET

PROJECT NAME AND LOCATION:

PREPARED:

WHEN MIXING IS DONE AT THE SIDE OF THE WORK. AGGREGATES SHALL BE TRANSPORTED FROM WORKABILITY OR FOR ACCELERATING THE SETTING OF THE CONCRETE WILL BE PERMITTED ONLY THE BATCHING PLANT TO THE MIXER IN BATCH BOXES, VEHICLE BODIES, OR OTHER CONTAINERS OF WHEN SPECIFICALLY APPROVED BY THE ENGINEER ADEQUATE CAPACITY AND CONSTRUCTION TO PROPERLY CARRY THE VOLUME REQUIRED. PARTITIONS SEPARATING BATCHES SHALL BE ADEQUATE AND EFFECTIVE TO PREVENT SPILLING FROM ONE 311.3.8 : LIMITATION OF MIXING COMPARTMENT TO ANOTHER WHILE IN TRANSIT OR BEING DUMPED. WHEN BULK CEMENT IS USED THE CONTRACTOR SHALL USE A SUITABLE METHOD OF HANDLING THE CEMENT FROM WEIGHING HOPPER TO TRANSPORTING CONTAINER OR INTO THE BATCH ITSELF FOR TRANSPORTATION TO THE MIXER, WITH NO CONCRETE SHALL BE MIXED, PLACED OR FINISHED WHEN NATURAL LIGHT IS INSUFFICIENT, CHUTE, BOOT OR OTHER APPROVED DEVICE, TO PREVENT LOSS OF CEMENT, AND TO PROVIDE POSITIVE UNLESS AN ADEQUATE AND APPROVED ARTIFICIAL LIGHTING SYSTEM IS OPERATED. ASSURANCE OF THE ACTUAL PRESENCE IN EACH BATCH OF THE ENTIRE CEMENT CONTENT SPECIFIED.

BULK CEMENT SHALL BE TRANSPORTED TO THE MIXER IN TIGHT COMPARTMENTS CARRYING THE TEMPERATURE OF MIXED CONCRETE FROM EXCEEDING A MAXIMUM TEMPERATURE OF 320/C. FULL AMOUNT OF CEMENT REQUIRED FOR THE BATCH. HOWEVER, IF ALLOWED IN THE SPECIAL PROVISIONS, IT MAY BE TRANSPORTED BETWEEN THE FINE AND COARSE AGGREGATE. WHEN CEMENT IS PLACED IN CONTACT WITH THE AGGREGATES, BATCHES MAY BE REJECTED UNLESS MIXED WITHIN CONCRETE NOT IN PLACE WITHIN NINETY (90) MINUTES FROM THE TIME THE INGREDIENTS WERE CHARGED INTO THE MIXING DRUM OR THAT HAS DEVELOPED INITIAL SET SHALL NOT BE USED. 1-1/2 HOURS OF SUCH CONTACT, CEMENT IN ORIGINAL SHIPPING PACKAGES MAY BE TRANSPORTED ON TOP OF THE AGGREGATES, EACH BATCH CONTAINING THE NUMBER OF SACKS REQUIRED BY THE JOB RETEMPERING OF CONCRETE OR MORTAR WHICH HAS PARTIALLY HARDENED, THAT IS MIX. REMIXING WITH OR WITHOUT ADDITIONAL CEMENT, AGGREGATE, OR WATER, SHALL NOT BE PERMITTED.

THE MIXER SHALL BE CHARGED WITHOUT LOSS OF CEMENT. BATCHING SHALL BE SO CONDUCTED IN ORDER THAT THE CONCRETE MAY BE PROPERLY PROTECTED AGAINST THE EFFECTS OF RAIN AS TO RESULT IN THE WEIGHT TO EACH MATERIAL REQUIRED WITHIN A TOLERANCE OF ONE (1) BEFORE THE CONCRETE IS SUFFICIENTLY HARDENED, THE CONTRACTOR WILL BE REQUIRED TO HAVE PERCENT FOR THE CEMENT AND TWO (2) PERCENT FOR AGGREGATES. AVAILABLE AT ALL TIMES MATERIALS FOR THE PROTECTION OF THE EDGES AND SURFACE OF THE UNHARDENED CONCRETE

WATER MAY BE MEASURED EITHER BY VOLUME OR BY WEIGHT. THE ACCURACY OF MEASURING THE WATER SHALL BE WITHIN A RANGE OF ERROR OF NOT MORE THAN ONE (1) PERCENT. UNLESS THE WATER IS TO BE WEIGHED, THE WATER-MEASURING EQUIPMENT SHALL INCLUDE AN AUXILIARY TANK FROM WHICH THE MEASURING TANK SHALL BE EQUIPPED WITH AN OUTSIDE TAP AND VALVE TO PROVIDE CHECKING THE SETTING, UNLESS OTHER MEANS ARE PROVIDED FOR READILY AND ACCURATELY DETERMINING THE AMOUNT OF WATER IN THE TANK. THE VOLUME OF THE AUXILIARY TANK SHALL BE AT LEAST EQUAL TO THAT OF THE MEASURING TANK.

THE CONCRETE MAY BE MIXED AT THE SITE OF THE WORK IN A CENTRAL-MIX PLANT, IN TRUCK MIXERS. THE MIXER SHALL BE OF AN APPROVED TYPE AND CAPACITY. MIXING TIME WILL BE MEASURED FROM THE TIME ALL MATERIALS, EXCEPT WATER, ARE THE DRUM. READY-MIXED CONCRETE SHALL BE WHEN CONCRETE IS TO BE PLACED ADJOINING A PREVIOUSLY CONSTRUCTED LANE AND MECHANICAL EQUIPMENT WILL BE OPERATED UPON THE EXISTING LANE, THAT PREVIOUSLY MIXED AND DELIVERED IN ACCORDANCE WITH REQUIREMENTS OF AASHTO M 157, EXCEPT THAT THE CONSTRUCTED LANE SHALL HAVE ATTAINED THE STRENGTH FOR FOURTEEN (14) DAY CONCRETE. IF MINIMUM REQUIRED REVOLUTIONS AT THE MIXING SPEED FOR TRANSIT-MIXED CONCRETE MAY BE REDUCED TO NOT LESS THAN THAT RECOMMENDED BY THE MIXER MANUFACTURER. THE NUMBER OF ONLY FINISHING EQUIPMENT IS CARRIED ON THE EXISTING LANE, PAVING IN ADJOINING LANES MAY BE REVOLUTIONS RECOMMENDED BY THE MIXER MANUFACTURER SHALL BE INDICATED ON THE PERMITTED AFTER THREE (3) DAYS. MANUFACTURER' S SERIAL PLATE ATTACHED TO THE MIXER. THE CONTRACTOR SHALL FURNISH TEST DATA ACCEPTABLE TO THE ENGINEER VERIFYING THAT THE MAKE AND MODEL OF THE MIXER WILL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED AGAINST AND ALONG THE FACES OF ALL PRODUCE UNIFORM CONCRETE CONFORMING TO PROVISION OF AASHTO M 157 AT THE REDUCED FORMS AND ALONG THE FULL LENGTH AND ON BOTH SIDES OF ALL JOINT ASSEMBLIES BY MEANS OF NUMBER OF REVOLUTIONS SHOWN ON THE SERIAL PLATE.

WHEN MIXED AT THE SITE OR IN A CENTRAL MIXING PLANT, THE MIXING TIME SHALL NOT BE LESS THAN FIFTY (50) SECONDS NOR MORE THAN NINETY (SECONDS FOR DRUM TYPE MIXERS, UNLESS MIXER PERFORMANCE TESTS PROVE ADEQUATE MIXING OF CONCRETE IN SHORTER TIME PERIOD.

CONCRETE SHALL BE DEPOSITED AS NEAR AS POSSIBLE TO THE EXPANSION AND CONTRACTION JOINTS WITHOUT DISTURBING THEM. BUT SHALL NOT BE DUMPED FROM THE DISCHARGE BUCKET OF THE OPERATION AND MIXING TIME FOR PAN, TWIN SHAFT AND OTHER TYPE OF CENTRAL MIXERS HOPPER INTO A JOINT ASSEMBLY UNLESS THE HOPPER IS WELL CENTERED ON THE JOINT ASSEMBLY. SHALL BE BASED ON THE MIXER MANUFACTURER'S INSTRUCTIONS. SHOULD ANY CONCRETE MATERIAL FALL ON OR BE WORKED INTO THE SURFACE OF A COMPLETED SLAB, IT SHALL BE REMOVED IMMEDIATELY.

FOUR (4) SECONDS SHALL BE ADDED TO THE SPECIFIED MIXING TIME IF TIMING STARTS AT THE INSTANT THE SKIP REACHES ITS MAXIMUM RAISED POSITIONS. MIXING TIME ENDS WHEN THE DISCHARGE CHUTE OPENS. TRANSFER TIME IN MULTIPLE DRUM MIXERS IS INCLUDED IN MIXING TIME. THE CONTENTS OF AN INDIVIDUAL MIXER DRUM SHALL BE REMOVED BEFORE A SUCCEEDING BATCH IS EMPTIED THEREIN

ALL FORMS SHALL BE RIGIDLY SUPPORTED ON BED OF THOROUGHLY COMPACTED MATERIAL DURING THE ENTIRE OPERATION OF PLACING AND FINISHING THE CONCRETE, FORMS SHALL BE PROVIDED WITH ADEQUATE DEVICES FOR SECURE SETTING SO THAT WHEN IN PLACE, THEY WILL WITHSTAND, WITHOUT VISIBLE SPRING OR SETTLEMENT, THE IMPACT AND VIBRATION OF THE CONSOLIDATION AND FINISHING OR PAVING EQUIPMENT.

311.3.3 : PREPARATION OF GRADE

AFTER THE SUBGRADE OR BASE HAS BEEN PLACED AND COMPACTED TO THE REQUIRED DENSITY, THE AREAS WHICH WILL SUPPORT THE PAVING MACHINE AND THE GRADE ON WHICH THE PAVEMENT IS TO BE CONSTRUCTED SHALL BE TRIMMED TO THE PROPER ELEVATION BY MEANS OF A PROPERLY DESIGNED MACHINE EXTENDING THE PREPARED WORK AREAS COMPACTED AT LEAST 60 CM BEYOND EACH EDGE OF THE PROPOSED CONCRETE PAVEMENT. IF LOSS OF DENSITY RESULTS FROM THE TRIMMING OPERATIONS, IT SHALL BE RESTORED BY ADDITIONAL COMPACTION BEFORE CONCRETE IS PLACED. IF ANY TRAFFIC IS ALLOWED TO USE THE PREPARED SUBGRADE OR BASE, THE SURFACE SHALL BE CHECKED AND CORRECTED IMMEDIATELY AHEAD OF THE PLACING CONCRETE.

THE SUBGRADE OR BASE SHALL BE UNIFORMLY MOIST WHEN THE CONCRETE IS PLACED.

311.3.6 HANDLING, MEASURING AND BATCHING MATERIALS

THE BATCH PLANT SITE, LAYOUT, EQUIPMENT AND PROVISIONS FOR TRANSPORTING MATERIAL SHALL BE SUCH AS TO ASSURE A CONTINUOUS SUPPLY OF MATERIAL TO THE WORK.

STOCKPILES SHALL BE BUILT UP IN LAYERS OF NOT MORE THAN ONE (1) METER IN THICKNESS. EACH LAYER SHALL BE COMPLETELY IN PLACE BEFORE BEGINNING THE NEXT WHICH SHALL NOT BE ALLOWED TO "CONE" DOWN OVER THE NEXT LOWER LAYER. AGGREGATES FROM DIFFERENT SOURCES AND OF DIFFERENT GRADING SHALL NOT BE STOCKPILED TOGETHER.

ALL WASHED AGGREGATES AND AGGREGATES PRODUCED OR HANDLED BY HYDRAULIC METHODS, SHALL BE STOCKPILED OR BINNED FOR DRAINING AT LEAST TWELVE (12) HOURS BEFORE BEING BATCHED

311.3.7 : MIXING CONCRETE

BE DISCARDED AND DISPOSED OFF BY THE CONTRACTOR AT HIS EXPENSE. THE VOLUME OF CONCRETE MIXED PER BATCH SHALL NOT EXCEED THE MIXER'S NOMINAL CAPACITY IN CUBIC METRE, AS SHOWN ON THE MANUFACTURER'S STANDARD RATING PLATE ON THE MIXER, EXCEPT THAT AN OVERLOAD UP TO TEN (10) PERCENT ABOVE THE MIXER'S NOMINAL CAPACITY MAY BE PERMITTED PROVIDED CONCRETE TEST DATA FOR STRENGTH, SEGREGATION, AND UNIFORM CONSISTENCY ARE SATISFACTORY, AND PROVIDED NO SPILLAGE OF CONCRETE TAKES PLACE.

THE BATCHES SHALL BE SO CHARGED INTO THE DRUM THAT A PORTION OF THE MIXING WATER SHALL BE ENTERED IN ADVANCE OF THE CEMENT AND AGGREGATES. THE FLOW OF WATER SHALL BE UNIFORM AND ALL WATER SHALL BE IN THE DRUM BY THE END OF THE FIRST FIFTEEN (15) SECONDS OF THE MIXING PERIOD. THE THROAT OF THE DRUM SHALL BE KEPT FREE OF SUCH ACCUMULATIONS AS MAY RESTRICT THE FREE FLOW OF MATERIALS INTO THE DRUM.

MIXED CONCRETE FROM THE CENTRAL MIXING PLANT SHALL BE TRANSPORTED IN TRUCK MIXERS, TRACK AGITATORS OR NON-AGITATING TRUCK SPECIFIED IN SUBSECTION 311.3.2, EQUIPMENT. THE TIME ELAPSED FROM THE TIME WATER IS ADDED TO THE MIX UNTIL THE CONCRETE IS DEPOSITED IN PLACE AT THE SITE SHALL NOT EXCEED FORTY FIVE (45) MINUTES WHEN THE CONCRETE IS HAULED IN NON-AGITATING TRUCKS, NOR NINETY (90) MINUTES WHEN HAULED ION TRUCK MIXERS OR TRUCK AGITATORS, EXCEPT THAT IN HOT WEATHER OR UNDER OTHER CONDITIONS CONTRIBUTING TO QUICK HARDENING OF THE CONCRETE, THE MAXIMUM ALLOWABLE TIME MAY BE REDUCED BY THE ENGINEER.

IN EXCEPTIONAL CASES AND WHEN VOLUMETRIC MEASUREMENTS ARE AUTHORIZED FOR SMALL PROJECT REQUIRING LESS THAN 75CU.M. OF CONCRETE PER DAY OF POURING, THE WEIGHT PROPORTIONS SHALL BE CONVERTED TO EQUIVALENT VOLUMETRIC PROPORTIONS. IN SUCH CASES. SUITABLE ALLOWANCE SHALL BE MADE FOR VARIATIONS IN THE MOISTURE CONDITION OF THE AGGREGATES, INCLUDING THE BULKING EFFECT IN THE FINE AGGREGATE. BATCHING AND MIXING SHALL BE IN ACCORDANCE WITH ASTMC685, SECTION 6 THROUGH 9.

CONCRETE MIXING BY CHUTE IS ALLOWED PROVIDED THAT WEIGHING SCALES FOR DETERMINING THE BATCH WEIGHT WILL BE USED.

RETEMPERING CONCRETE BY ADDING WATER OR BY OTHER MOANS SHALL NOT BE PERMITTED EXCEPT THAT WHEN CONCRETE IS DELIVERED IN TRUCK MIXERS, ADDITIONAL WATER MAY BE ADDED TO THE BATCH MATERIALS AND ADDITIONAL MIXING PERFORMED TO INCREASE THE SLUMP TO MEET THE SPECIFIED REQUIREMENTS, IF PERMITTED BY THE ENGINEER, PROVIDED ALL THESE OPERATIONS ARE PERFORMED WITHIN FORTY-FIVE (45) MINUTES AFTER THE INITIAL MIXING OPERATION AND THE WATER-CEMENT RATIO IS NOT EXCEEDED. CONCRETE THAT IS NOT WITHIN THE SPECIFIED SLUMP LIMITS AT THE TIME OF PLACEMENT SHALL NOT BE USED. ADMIXTURES FOR INCREASING THE

DURING HOT WEATHER, THE ENGINEER SHALL REQUIRE THAT STEPS BE TAKEN TO PREVENT THE

311.3.9 PLACING CONCRETE

CONCRETE SHALL BE DEPOSITED IN SUCH A MANNER TO REQUIRE MINIMAL REHANDLING. UNLESS TRUCK MIXERS OR NON-AGITATING HAULING EQUIPMENT ARE EQUIPPED WITH MEANS TO DISCHARGE CONCRETE WITHOUT SEGREGATION OF THE MATERIALS. THE CONCRETE SHALL BE UNLOADED INTO AN APPROVED SPREADING DEVICE AND MECHANICALLY SPREAD ON THE GRADE IN SUCH A MANNER AS TO PREVENT SEGREGATION. PLACING SHALL BE CONTINUOUS BETWEEN TRANSVERSE JOINTS WITHOUT THE USE OF INTERMEDIATE BULKHEADS. NECESSARY HAND SPREADING SHALL BE DONE WITH SHOVELS, NOT RAKES. WORKMEN SHALL NOT BE ALLOWED TO WALK IN THE FRESHLY MIXED CONCRETE WITH BOOTS OR SHOES COATED WITH EARTH OR FOREIGN SUBSTANCES.

VIBRATORS INSERTED IN THE CONCRETE. VIBRATORS SHALL NOT BE PERMITTED TO COME IN CONTACT WITH A JOINT ASSEMBLY, THE GRADE, OR A SIDE FORM. IN NO CASE SHALL THE VIBRATOR BE OPERATED LONGER THAN FIFTEEN (15) SECONDS IN ANYONE LOCATION

311.3.10 : TEST SPECIMENS

AS WORK PROGRESSES, AT LEAST ONE (1) SET CONSISTING OF THREE (3) CONCRETE BEAM TEST SPECIMENS, 150 MM X 150 MM X 525 MM SHALL BE TAKEN FROM EACH 330 M2 OF PAVEMENT, 230 MM DEPTH, OR FRACTION THEREOF PLACED EACH DAY. TEST SPECIMENS SHALL BE MADE UNDER THE SUPERVISION OF THE ENGINEER, AND THE CONTRACTOR SHALL PROVIDE ALL CONCRETE AND OTHER FACILITIES NECESSARY IN MAKING THE TEST SPECIMENS AND SHALL PROTECT THEM FROM DAMAGE BY TO NOT MORE THAN 14 M2 BY MECHANICAL SPRAYERS. THE SPRAYING EQUIPMENT SHALL BE EQUIPPED

ED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
MARK ANTHONY L. FERRER ENGINEER II	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER	ISAGANI C. CAYME, CESE DISTRICT ENGINEER	GENERAL 08 16	09 120

CONSTRUCTION OPERATIONS.

CYLINDER SAMPLES SHALL NOT BE USED AS SUBSTITUTE FOR DETERMINING THE ADEQUACY OF THE STRENGTH OF CONCRETE.

THE BEAMS SHALL BE MADE, CURED, AND TESTED IN ACCORDANCE WITH MSHTO T 23 AND T 97.

311.3.12 : JOINTS

JOINTS SHALL BE CONSTRUCTED OF THE TYPE AND DIMENSIONS, AND AT THE LOCATIONS REQUIRED BY THE PLANS OR SPECIAL PROVISIONS. ALL JOINTS SHALL BE PROTECTED FROM THE INTRUSION OF INJURIOUS FOREIGN MATERIAL UNTIL SEALED.

LONGITUDINAL JOINT

DEFORMED STEEL TIE BARS OF SPECIFIED LENGTH, SIZE, SPACING AND MATERIALS SHALL BE PLACED TO THE LONGITUDINAL JOINTS, THEY SHALL BE PLACED BY APPROVED MECHANICAL EQUIPMENT OR RIGIDLY SECURED BY CHAIR OR OTHER APPROVED SUPPORTS TO PREVENT DISPLACEMENT TIE BARS SHALL NOT BE PANTED OR COATED WITH ASPHALT OR OTHER MATERIALS OR ENCLOSED IN TUBES OR SLEEVES. WHEN SHOWN ON THE PLANS AND WHEN ADJACENT LANES OF PAVEMENT ARE CONSTRUCTED SEPARATELY, STEEL SIDE FORMS SHALL BE USED WHICH WILL FORM A KEYWAY ALONG THE CONSTRUCTION JOINT. TIE BARS, EXCEPT THOSE MADE OF RAIL STEEL. MAY BE BENT AT RIGHT ANGLES AGAINST THE FORM OF THE FIRST LANE CONSTRUCTED AND STRAIGHTENED INTO FINAL POSITION BEFORE THE CONCRETE OF THE ADJACENT LANE IS PLACED. IN LIEU OF BENT TIE BARS, APPROVED TWO-PIECE CONNECTORS MAY BE USED.

LONGITUDINAL FORMED JOINTS SHALL CONSIST OF A GROOVE OR CLEFT, EXTENDING DOWNWARD FROM AND NORMAL TO THE SURFACE OF THE PAVEMENT. THESE JOINTS SHALL BE EFFECTED OR FORMED BY AN APPROVED MECHANICALLY OR MANUALLY OPERATED DEVICE TO THE DIMENSIONS AND LINE INDICATED ON THE PLANS WHILE THE CONCRETE IS IN A PLASTIC STATE. THE GROOVE OR CLEFT SHALL BE FILLED WITH EITHER A PRE-MOLDED STRIP OR POURED MATERIAL AS REQUIRED

THE LONGITUDINAL JOINTS SHALL BE CONTINUOUS. THERE SHALL BE NO GAPS IN EITHER TRANSVERSE OR LONGITUDINAL JOINTS AT THE INTERSECTION OF THE JOINTS.

LONGITUDINAL SAWED JOINTS SHALL BE CUT BY MEANS OF APPROVED CONCRETE SAWS TO THE DEPTH, WIDTH AND LINE SHOWN ON THE PLANS. SUITABLE GUIDE LINES OR DEVICES SHALL BE USED TO ASSURE CUTTING THE LONGITUDINAL JOINT ON THE TRUE LINE. THE LONGITUDINAL JOINT SHALL BE SAWED BEFORE THE END OF THE CURING PERIOD OR SHORTLY THEREAFTER AND BEFORE ANY FOUIPMENT OR VEHICLES ARE ALLOWED ON THE PAVEMENT. THE SAWED AREA SHALL BE THOROUGHLY CLEANED AND, IF REQUIRED, THE JOINT SHALL IMMEDIATELY BE FILLED WITH SEALER.

LONGITUDINAL PAVEMENT INSERT TYPE JOINTS SHALL BE FORMED BY PLACING A CONTINUOUS STRIP OF PLASTIC MATERIALS WHICH WILL NOT REACT ADVERSELY WITH THE CHEMICAL CONSTITUENT OF THE CONCRETE.

2. TRANSVERSE EXPANSION JOINT

THE EXPANSION JOINT FILLER SHALL BE CONTINUOUS FROM FORM TO FORM, SHAPED TO SUBGRADE AND TO THE KEYWAY ALONG THE FORM. PREFORMED JOINT FILER SHALL BE FURNISHED IN LENGTHS EQUAL TO THE PAVEMENT WIDTH OR EQUAL TO THE WIDTH OF ONE LANE. DAMAGED OR REPAIRED JOINT FILLER SHALL NOT BE USED.

THE EXPANSION JOINT FILLER BE HELD IN A VERTICAL POSITION. AN APPROVED INSTALLING BAR, OR OTHER DEVICE, SHALL BE USED IF REQUIRED TO SECURE PREFORMED EXPANSION JOINT FILLER AT THE PROPER GRADE AND ALIGNMENT DURING PLACING AND FINISHING OF THE CONCRETE. FINISHED JOINT SHALL NOT DEVIATE MORE THAN 6 MM FROM A STRAIGHT LINE. IF JOINT FILLERS ARE ASSEMBLED IN SECTIONS, THERE SHALL BE NO OFFSETS BETWEEN ADJACENT UNITS. NO PLUGS OF SHALL BE PERMITTED ANYWHERE WITHIN THE EXPANSION SPACE.

TRANSVERSE CONTRACTION JOINT/WEAKENED JOINT

WHEN SHOWN ON THE PLANS, IT SHALL CONSIST OF PLANES OF WEAKNESS CREATED BY FORMING OR CUTTING GROOVES IN THE SURFACE OF THE PAVEMENT AND SHALL INCLUDE LOAD TRANSFER ASSEMBLIES. THE DEPTH OF THE WEAKENED PLANE JOINT SHOULD AT ALL TIMES NOT BE LESS THAN 50 MM, WHILE THE WIDTH SHOULD NOT BE MORE THAN 6 MM.

- TRANSVERSE STRIP CONTRACTION JOINT. IT SHALL BE FORMED BY INSTALLING A PARTING STRIP TO BE LEFT IN PLACE AS SHOWN ON THE PLANS.
- B. FORMED GROOVE. IT SHALL BE MADE BY DEPRESSING AN APPROVED TOOL OR DEVICE INTO THE PLASTIC CONCRETE. THE TOOL OR DEVICE SHALL REMAIN IN PLACE AT LEAST UNTIL THE

CONCRETE HAS ATTAINED ITS INITIAL SET AND SHALL THEN BE REMOVED WITHOUT DISTURBING THE ADJACENT CONCRETE, UNLESS THE DEVICE IS DESIGNED TO REMAIN IN THE JOINT

C. SAWED CONTRACTION JOINT. IT SHALL BE CREATED BY SAWING GROOVES IN THE SURFACE OF THE PAVEMENT OF THE WIDTH NOT MORE THAN 6 MM, DEPTH SHOULD AT ALL TIMES NOT BE LESS THAN 50 MM. AND AT THE SPACING AND LINES SHOWN ON THE PLANS. WITH AN APPROVED CONCRETE SAW. AFTER EACH JOINT IS SAWED, IT SHALL BE THOROUGHLY CLEANED INCLUDING THE ADJACENT CONCRETE SURFACE.

SAWING OF THE JOINT SHALL COMMENCE AS SOON AS THE CONCRETE HAS HARDENED SUFFICIENTLY TO PERMIT SAWING WITHOUT EXCESSIVE RAVELLING, USUALLY 4 TO 24 HOURS. ALL JOINTS SHALL BE SAWED BEFORE UNCONTROLLED SHRINKAGE CRACKING TAKES PLACE. IF NECESSARY, THE SAWING OPERATIONS SHALL BE CARRIED ON DURING THE DAY OR NIGHT.

REGARDLESS OF WEATHER CONDITIONS. THE SAWING OF ANY JOINT SHALL BE OMITTED IF CRACK OCCURS AT OR NEAR THE JOINT LOCATION PRIOR TO THE TIME OF SAWING. SAWING SHALL BE DISCOUNTED WHEN A DEVELOPS AHEAD OF THE SAW. IN GENERAL, ALL JOINTS SHOULD BE SAWED IN SEQUENCE. IF EXTREME CONDITION EXIST WHICH MAKE IT IMPRACTICAL TO PREVENT ERRATIC CRACKING BY EARLY SAWING, THE CONTRACTION JOINT GROOVE SHALL BE FORMED PRIOR TO INITIAL SET OF CONCRETE AS PROVIDED ABOVE

4. TRANSVERSE CONSTRUCTION JOINT

IT SHALL BE CONSTRUCTED WHEN THERE IS AN INTERRUPTION OF MORE THAN 30 MINUTES IN THE CONCRETING OPERATIONS. NO TRANSVERSE JOINT SHALL BE CONSTRUCTED WITHIN 1.50 M OF AN EXPANSION JOINT, CONTRACTION JOINT, OR PLANE OF WEAKNESS, IF SUFFICIENT CONCRETE HAS BEEN MIXED AT THE TIME OF INTERRUPTION TO FORM A SLAB OF AT LEAST 1.5 M LONG, THE EXCESS CONCRETE FROM THE LAST PRECEDING JOINT SHALL BE REMOVED AND DISPOSED OFF AS DIRECTED.

LOAD TRANSFER DEVICE 5.

DOWEL, WHEN USED, SHALL BE HELD IN POSITION PARALLEL TO THE SURFACE AND CENTER LINE OF THE SLAB BY A METAL DEVICE THAT IS LEFT IN THE PAVEMENT.

THE PORTION OF EACH DOWEL PAINTED WITH ONE COAT OF LEAD OR TAR INCONFORMANCE WITH THE REQUIREMENTS OF ITEM 404, REINFORCING STEEL SHALL BE THOROUGHLY COATED WITH APPROVED BITUMINOUS MATERIALS. E.G., MC-70, OR AN APPROVED LUBRICANT, TO PREVENT THE CONCRETE FROM BINDING TO THAT PORTION OF THE DOWEL. THE SLEEVES FOR DOWELS SHALL BE METAL DESIGNED TO COVER 50 MM PLUS OR MINUS 5 MM, OF THE DOWEL, WITH A WATERTIGHT CLOSED END AND WITH A SUITABLE STOP TO HOLD END OF THE SLEEVES AT LEAST 25 MM FROM THE END OF THE DOWEL.

IN LIEU OF USING DOWEL ASSEMBLIES AT CONTRACTION JOINTS, DOWEL MAY BE PLACED IN THE FULL THICKNESS OF PAVEMENT BY A MECHANICAL DEVICE APPROVED BY THE ENGINEER.

311.3.15 : CURING

IMMEDIATELY AFTER THE FINISHING OPERATIONS HAVE BEEN COMPLETED AND THE CONCRETE HAS SUFFICIENTLY SET, THE ENTIRE SURFACE OF THE NEWLY PLACED CONCRETE SHALL BE CURED IN ACCORDANCE WITH EITHER ONE OF THE METHODS DESCRIBED HEREIN. FAILURE TO PROVIDE SUFFICIENT COVER MATERIAL OF WHATEVER KIND THE CONTRACTOR MAY ELECT TO USE, OR THE LACK OF WATER TO ADEQUATELY TAKE CARE OF BOTH CURING AND OTHER REQUIREMENTS, SHALL BE A CAUSE FOR IMMEDIATE SUSPENSION OF CONCRETING OPERATIONS. THE CONCRETE SHALL NOT BE LEFT EXPOSED FOR MORE THAN 1/2 HOUR BETWEEN STAGES OF CURING OR DURING THE CURING PERIOD.

IN ALL CONGESTED PLACES, CONCRETE WORKS SHOULD BE DESIGNED SO THAT THE DESIGNED STRENGTH IS ATTAINED

COTTON OF BURLAP MATS 2.

THE SURFACE OF THE PAVEMENT SHALL BE ENTIRELY COVERED WITH MATS. THE MATS USED SHALL BE OF SUCH LENGTH (OR WIDTH) THAT AS LAID THEY WILL EXTEND AT LEAST TWICE THE THICKNESS OF THE PAVEMENT BEYOND THE EDGES OF THE SLAB.

THE MAT SHALL BE PLACED SO THAT THE ENTIRE SURFACE AND THE EDGES OF THE SLAB ARE COMPLETELY COVERED. PRIOR TO BEING PLACED, THE MATS SHALL BE SATURATED THOROUGHLY WITH WATER. THE MAT SHALL BE SO PLACED AND WEIGHTED DOWN SO AS TO CAUSE THEM TO REMAIN IN INTIMATE CONTACT WITH THE COVERED SURFACE. THE MAT SHALL BE MAINTAINED FULLY WETTED AND IN POSITION FOR 72 HOURS AFTER THE CONCRETE HAS BEEN PLACED UNLESS OTHERWISE SPECIFIED.

3. WATERPROOF PAPER

THE TOP SURFACE AND SIDES OF THE PAVEMENT SHALL BE ENTIRELY COVERED WITH WATERPROOF PAPER, THE UNITS SHALL BE LAPPED AT LEAST 45 CM. THE PAPER SHALL BE SO PLACED AND WEIGHTED DOWN SO AS TO CAUSE IT TO REMAIN IN INTIMATE CONTACT WITH THE SURFACE COVERED. THE PAPER SHALL HAVE SUCH DIMENSION BUT EACH UNIT AS LAID WILL EXTEND BEYOND THE EDGES OF THE SLAB AT LEAST TWICE THE THICKNESS OF THE PAVEMENT, OR AT PAVEMENT OR AT PAVEMENT WIDTH AND 60 CM STRIPS OF PAPER FOR THE EDGES. IF LAID LONGITUDINALLY, PAPER NOT MANUFACTURED IN SIZES WHICH WILL PROVIDE THIS WIDTH SHALL BE SECURELY SEWED OR CEMENTED TOGETHER, THE JOINTS BEING SECURELY SEALED IN SUCH A MANNER THAT THEY DO NOT OPEN UP OR SEPARATE DURING THE CURING PERIOD. UNLESS OTHERWISE SPECIFIED. THE COVERING SHALL BE MAINTAINED IN PLACE FOR 72 HOURS AFTER THE CONCRETE HAS BEEN PLACED. THE SURFACE OF THE PAVEMENT SHALL BE THOROUGHLY WETTED PRIOR TO THE PLACING OF THE PAPER.

STRAW CURING

WHEN THIS TYPE OF CURING IS USED, THE PAVEMENT SHALL BE CURED INITIALLY WITH BURLAP OR COTTON MATS. UNTIL AFTER FINAL SET OF THE CONCRETE OR. IN ANY CASE, FOR 12 HOURS AFTER PLACING THE CONCRETE AS SOON AS THE MATS ARE REMOVED. THE SURFACE AND SIDES OF THE PAVEMENT SHALL BE THOROUGHLY WETTED AND COVERED WITH AT LEAST 20 CM OF STRAW OR HAY. THICKNESS OF WHICH IS TO BE MEASURED AFTER WETTING. IF THE STRAW OR HAY COVERING BECOMES DISPLACED DURING THE CURING PERIOD IT SHALL BE REPLACED TO THE ORIGINAL DEPTH AND SATURATED. IT SHALL BE KEPT THOROUGHLY SATURATED WITH WATER FOR 72 HOURS AND THOROUGHLY WETTED DOWN DURING THE MORNING OF THE FOURTH DAY, AND THE COVER SHALL REMAIN IN PLACE UNTIL THE CONCRETE HAS ATTAINED THE REQUIRED STRENGTH.

IMPERVIOUS MEMBRANE METHOD

Gen-09

SHEET CONTENTS

REQUIREMENTS

THE ENTIRE SURFACE OF THE PAVEMENT SHALL BE SPRAYED UNIFORMLY WITH WHITE PIGMENTED CURING COMPOUND IMMEDIATELY AFTER THE FINISHING OF THE SURFACE AND BEFORE THE SET OF THE CONCRETE HAS TAKEN PLACE, OR IF THE PAVEMENT IS CURED INITIALLY WITH JUTE OR COTTON MATS, IT MAY BE APPLIED UPON REMOVAL OF THE MASS. THE CURING COMPOUND SHALL NOT BE APPLIED DURING RAIN. CURING COMPOUND SHALL BE APPLIED UNDER PRESSURE AT THE RATE 4 L TO NOT MORE THAN 14 M2 BY MECHANICAL SPRAYERS. THE

-SPECIFICATION AND CONSTRUCTION



DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS CORDILLERA ADMINISTRATIVE REGION BENGUET 1ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET

REPUBLIC OF THE PHILIPPINES

PASCUAL, TUBA, BENGUET

PROJECT NAME AND LOCATION:

TUBA. BENGUET

CONSTRUCTION OF ROAD, PAYACPAC -

PALAKPAK - LUMES - APNE, BARANGAY SAN

NOT TO SCALE

2		
	SPECIFICATION AND CO	NST
NIC	CAL SPRAYERS. THE SPRAYING EQUIPMENT SHALL BE EQUIPPED	THAN 75

PREPARED:

SPECIMENS CONCRETE DEEMED TO BE NOT ACCEPTABLE USING THE ABOVE CRITERIA MAY BE REJECTED UNLESS THE CONTRACTOR CAN PROVIDE EVIDENCE, BY MEANS OF CORE TESTS, THAT THE QUALITY OF CONCRETE REPRESENTED BY FAILED TEST RESULTS IS ACCEPTABLE IN PLACE AT LEAST THREE (3) REPRESENTATIVE CORES SHALL BE TAKEN FROM FACH MEMBER OR AREA OF CONCRETE IN PLACE THAT IS CONSIDERED DEFICIENT. THE LOCATION OF CORES SHALL BE DETERMINED BY THE ENGINEER SO THAT THERE WILL BE AT LEAST IMPAIRMENT OF STRENGTH OF THE STRUCTURE. THE OBTAINING AND TESTING OF DRILLED CORES SHALL BE IN ACCORDANCE WITH AASHTO T 24.

WITH A WIND GUARD. AT THE TIME OF USE, THE COMPOUND SHALL BE IN A THOROUGHLY MIXED CONDITION WITH THE PIGMENT UNIFORMLY DISPERSED THROUGHOUT THE VEHICLE. DURING APPLICATION. THE COMPOUND SHALL BE STIRRED CONTINUOUSLY BY EFFECTIVE MECHANICAL MEANS. HAND SPRAYING OF ODD WIDTHS OR SHAPES AND CONCRETE SURFACE EXPOSED BY THE REMOVAL OF FORMS WILL BE PERMITTED. CURING COMPOUND SHALL NOT BE APPLIED TO THE INSIDE FACES OF JOINTS TO BE SEALED, BUT APPROVED MEANS SHALL BE USED TO INSURE PROPER CURING AT LEAST 72 HOURS AND TO PREVENT THE INTRUSION OF FOREIGN MATERIAL INTO THE JOINT BEFORE SEALING HAS BEEN COMPLETED. THE CURING COMPOUND SHALL BE OF SUCH CHARACTER THAT THE FILM WILL HARDEN WITHIN 30 MINUTES AFTER APPLICATION. SHOULD THE FILM BE DAMAGED FROM ANY CAUSE WITHIN THE 72 HOUR CURING PERIOD, THE DAMAGED PORTIONS SHALL BE REPAIRED IMMEDIATELY WITH ADDITIONAL COMPOUND.

6. WHITE POLYETHYLENE SHEET

THE TOP SURFACE AND SIDES OF THE PAVEMENT SHALL BE ENTIRELY COVERED WITH POLYETHYLENE SHEETING. THE UNITS USED SHALL BE LAPPED AT LEAST 45 CM. THE SHEETING SHALL BE SO PLACED AND WEIGHTED DOWN SO AS TO CAUSE IT TO REMAIN INTIMATE CONTACT WITH THE SURFACE COVERED. THE SHEETING AS PREPARED FOR USE SHALL HAVE SUCH DIMENSION THAT EACH UNIT AS LAID WILL EXTEND BEYOND THE EDGES OF THE SLAB AT LEAST TWICE THE THICKNESS OF THE PAVEMENT. UNLESS OTHERWISE SPECIFIED, THE COVERING SHALL BE MAINTAINED IN PLACE FOR 72 HOURS AFTER THE CONCRETE HAS BEEN PLACED.

311.3.16 REMOVAL OF FORMS

FORMS FOR CONCRETE SHALL REMAIN IN PLACE UNDISTURBED FOR NOT LESS THAN TWENTY FOUR (24) HOURS AFTER CONCRETE POURING. IN THE REMOVAL OF FORMS CROWBARS SHOULD BE USED IN PULLING OUT NAILS AND PINS. CARE SHOULD BE TAKEN SO AS NOT TO BREAK THE EDGES OF THE PAVEMENT. IN CASE PORTIONS OF THE CONCRETE ARE SPALLED. THEY SHALL BE IMMEDIATELY REPAIRED WITH FRESH MORTAR MIXED IN THE PROPORTION OF ONE PART OF PORTLAND CEMENT AND TWO PARTS FINE AGGREGATES. MAJOR HONEYCOMB AREAS WILL BE CONSIDERED AS DEFECTIVE WORK, AND SHALL BE REMOVED AND REPLACED AT THE EXPENSE OF THE CONTRACTOR. ANY AREA OR SECTION SO REMOVED SHALL NOT BE LESS THAN THE DISTANCE BETWEEN WEAKENED PLANE JOINT NOR LESS THAN THE FULL WIDTH OF THE LANE INVOLVED.

311.3.17 : SEALING JOINTS

JOINTS SHALL BE SEALED WITH ASPHALT SEALANT SOON AFTER COMPLETION OF THE CURING PERIOD AND BEFORE THE PAVEMENT IS OPENED TO TRAFFIC, INCLUDING THE CONTRACTOR'S EQUIPMENT, JUST PRIOR TO SEALING, EACH JOINT SHALL BE THOROUGHLY CLEANED OF ALL FOREIGN MATERIALS INCLUDING MEMBRANE CURING COMPOUND AND THE JOINT FACES SHALL BE CLEAN AND SURFACE DRY WHEN THE SEAL IS APPLIED.

THE SEALING MATERIAL SHALL BE APPLIED TO EACH JOINT OPENING TO CONFORM TO THE DETAILS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. MATERIAL FOR SEAL APPLIED HOT SHALL BE STIRRED DURING HEATING SO THAT LOCALIZED OVERHEATING DOES NOT OCCUR.

THE POURING SHALL BE DONE IN SUCH A MANNER THAT THE MATERIAL WILL NOT BE SPILLED ON THE EXPOSED SURFACES OF THE CONCRETE. THE USE OF SAND OR SIMILAR MATERIAL AS A COVER FOR THE SEAL WILL NOT BE PERMITTED.

PREFORMED ELASTOMERIC GASKETS FOR SEALING JOINTS BE OF THE CROSS-SECTIONAL DIMENSIONS SHOWN ON THE PLANS. SEALS SHALL BE INSTALLED BY SUITABLE TOOLS, WITHOUT ELONGATION AND SECURED IN PLACED WITH AN APPROVED LUBRICANT ADHESIVE WHICH SHALL COVER. BOTH SIDES OF THE CONCRETE JOINTS. THE SEALS SHALL BE INSTALLED IN A COMPRESSIVE CONDITION AND SHALL AT TIME OF PLACEMENT BE BELOW THE LEVEL OF THE PAVEMENT SURFACE BY APPROXIMATELY 6 MM.

THE SEALS SHALL BE IN ONE PIECE FOR THE FULL WIDTH OF EACH TRANSVERSE JOINT.

311.3.18 : PROTECTION OF PAVEMENT

THE CONTRACTOR SHALL PROTECT THE PAVEMENT AND ITS APPURTENANCES AGAINST BOTH PUBLIC TRAFFIC, AND TRAFFIC CAUSED BY HIS OWN EMPLOYEES AND AGENTS. THIS SHALL INCLUDE WATCHMEN TO DIRECT TRAFFIC, AND THE ERECTION AND MAINTENANCE OF WARNING SIGNS, LIGHTS, PAVEMENT BRIDGES OR CROSS-OVERS, ETC. THE PLANS OR SPECIAL PROVISIONS WILL INDICATE THE LOCATION AND TYPE OF DEVICE OR FACILITY REQUIRED TO PROTECT THE WORK AND PROVIDE ADEQUATELY FOR TRAFFIC.

ALL BOREHOLES AFTER THICKNESS AND/OR STRENGTH DETERMINATIONS OF NEWLY CONSTRUCTED ASPHALT AND CONCRETE PAVEMENTS SHALL BE IMMEDIATELY FILLED/RESTORED WITH THE PRESCRIBED CONCRETE/ASPHALT MIX AFTER COMPLETION OF DRILLING WORKS.

ANY DAMAGE TO THE PAVEMENT, OCCURRING PRIOR TO FINAL ACCEPTANCE, SHALL BE REPAIRED OR THE PAVEMENT SHALL BE REPLACED.

311.3.20 : ACCEPTANCE OF CONCRETE

THE STRENGTH LEVEL OF THE CONCRETE WILL BE CONSIDERED SATISFACTORY IF THE AVERAGES OF ALL SETS OF THREE (3) CONSECUTIVE STRENGTH TEST RESULTS EQUAL OR EXCEED THE SPECIFIED STRENGTH. FC' AND NO INDIVIDUAL STRENGTH TEST RESULT DEFICIENT BY MORE THAN 15% OF THE SPECIFIED STRENGTH, FC'. A SET SHALL CONSIST OF A MINIMUM OF THREE (3) CONCRETE BEAM

CONCRETE THE AREA REPRESENTED BY THE CORES WILL BE CONSIDERED ADEQUATE IF THE AVERAGE STRENGTH OF THE CORES IS EQUAL TO AT LEAST 85% OF, AND IF NO SINGLE CORE IS LESS % OF THE SPECIFIED STRENGTH FC

RUCTION REQUIREMENTS

IF THE STRENGTH OF CONTROL SPECIMENS DOES NOT MEET THE REQUIREMENTS OF THIS SUBSECTION, AND IT IS NOT FEASIBLE OR NOT ADVISABLE TO OBTAIN CORES FROM THE STRUCTURE DUE TO STRUCTURAL CONSIDERATIONS, PAYMENT OF THE CONCRETE WILL BE MADE AT AN ADJUSTED PRICE DUE TO STRENGTH DEFICIENCY OF CONCRETE AS SPECIFIED HEREUNDER:

DEFICIENCY IN STRENGTH OF CONCRETE SPECIMENS, %	PERCENT (%) OF CONTRACT PRICE ALLOWED
LESS THAN 5	100%
5 TO LESS THAN 10	80%
10 TO LESS THAN 15	70%
15 TO LESS THAN 20	60%
20 TO LESS THAN 25	50%
25 TO MORE	0%

311.3.21 : OPENING TO TRAFFIC

THE ENGINEER WILL DECIDE WHEN THE PAVEMENT MAY BE OPENED TO TRAFFIC. THE ROAD WILL NOT BE OPENED TO TRAFFIC UNTIL TEST SPECIMENS MOLDED AND CURED IN ACCORDANCE WITH AASHTO T 23 HAVE ATTAINED THE MINIMUM STRENGTH REQUIREMENTS IN SUBSECTION 311.2.12. IF SUCH TESTS ARE NOT CONDUCTED PRIOR TO THE SPECIFIED AGE, THE PAVEMENT SHALL NOT BE OPERATED TO TRAFFIC UNTIL 14 DAYS AFTER THE CONCRETE WAS PLACED. BEFORE OPENING TO TRAFFIC, THE PAVEMENT SHALL BE CLEANED AND JOINT SEALING COMPLETED.

311.3.22 : TOLERANCE IN PAVEMENT THICKNESS

GENERAL

THE THICKNESS OF THE PAVEMENT WILL BE DETERMINED BY MEASUREMENT OF CORES FROM THE COMPLETED PAVEMENT IN ACCORDANCE WITH AASHTO T 148.

THE COMPLETED PAVEMENT SHALL BE ACCEPTED ON A LOT BASIS. A LOT SHALL BE CONSIDERED AS 1000 LINEAR METERS OF PAVEMENT WHEN A SINGLE TRAFFIC LANE IS POURED OR 500 LINEAR METERS WHEN TWO LANES ARE POURED CONCURRENTLY. THE LAST UNIT IN EACH SLAB CONSTITUTES A LOT IN ITSELF WHEN ITS LENGTH IS AT LEAST 1/2 OF THE NORMAL LOT LENGTH. IF THE LENGTH OF THE LAST UNIT IS SHORTER THAN 1/2 OF THE NORMAL LOT LENGTH, IT SHALL BE INCLUDED IN THE PREVIOUS

OTHER AREAS SUCH AS INTERSECTIONS, ENTRANCES, CROSSOVERS, RAMP, ETC., WILL BE GROUPED TOGETHER TO FORM A LOT. SMALL IRREGULAR AREAS MAY BE INCLUDED WITH OTHER UNIT AREAS TO FORM A LOT.

EACH LOT WILL BE DIVIDED INTO FIVE (5) EQUAL SEGMENTS AND ONE CORE WILL BE OBTAINED FROM EACH SEGMENT IN ACCORDANCE WITH AASHTO T 24.

PAVEMENT THICKNESS 2.

IT IS THE INTENT OF THIS SPECIFICATION THAT THE PAVEMENT HAS A UNIFORM THICKNESS AS CALLED FOR ON THE PLANS FOR THE AVERAGE OF EACH LOT AS DEFINED. AFTER THE PAVEMENT HAS MET ALL SURFACE SMOOTHNESS REQUIREMENTS, CORES FOR THICKNESS MEASUREMENTS WILL BE TAKEN

IN CALCULATING THE AVERAGE THICKNESS OF THE PAVEMENT, INDIVIDUAL MEASUREMENTS WHICH ARE IN EXCESS OF THE SPECIFIED THICKNESS BY MORE THAN 5 MM WILL BE CONSIDERED AS THE SPECIFIED THICKNESS PLUS 5 MM AND MEASUREMENT WHICH ARE LESS THAN THE SPECIFIED THICKNESS BY MORE THAN 25 MM SHALL NOT BE INCLUDED IN THE AVERAGE. WHEN THE AVERAGE THICKNESS FOR THE LOT IS DEFICIENT, THE CONTRACT UNIT PRICE WILL BE ADJUSTED FOR THICKNESS IN ACCORDANCE WITH PARAGRAPH (3 BELOW).

INDIVIDUAL AREAS WITHIN A SEGMENT FOUND DEFICIENT IN THICKNESS BY MORE THAN 25 MM SHALL BE EVALUATED BY THE ENGINEER, AND IF IN HIS JUDGMENT, THE DEFICIENT AREAS WARRANT REMOVAL THEY SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR WITH PAVEMENT OF THE SPECIFIED THICKNESS AT HIS ENTIRE EXPENSE. HOWEVER, IF THE EVALUATION OF THE ENGINEER IS THAT THE DEFICIENT AREA SHOULD NOT BE REMOVED AND REPLACED, SUCH AREA WILL NOT BE PAID.

WHEN THE MEASUREMENT OF ANY CORE IS LESS THAN THE SPECIFIED THICKNESS BY MORE THAN 25 MM, THE ACTUAL THICKNESS OF THE PAVEMENT IN THIS AREA WILL BE DETERMINED BY TAKING ADDITIONAL CORES AT NO LESS THAN 5 M INTERVALS PARALLEL TO THE CENTER LINE IN EACH DIRECTION FROM THE AFFECTED LOCATION UNTIL A CORE IS FOUND IN EACH DIRECTION. WHICH IS NOT DEFICIENT IN THICKNESS BY MORE THAN 25 MM. THE AREA OR SLAB FOR WHICH NO PAYMENT WII BE MADE SHALL BE THE PRODUCT OF THE PAVING WIDTH MULTIPLIED BY THE DISTANCE ALONG THE CENTER LINE OF THE ROAD BETWEEN TRANSVERSE SECTIONS FOUND NOT DEFICIENT IN THICKNESS BY MORE THAN 25 MM. THE THICKNESS OF THE REMAINDER OF THE SEGMENT TO BE USED TO GET THE AVERAGE THICKNESS OF EACH LOT SHALL BE DETERMINED BY TAKING THE AVERAGE THICKNESS OF ADDITIONAL CORES WHICH ARE NOT DEFICIENT BY MORE THAN 25 MM.

ADJUSTMENT FOR THICKNESS

WHEN THE AVERAGE THICKNESS OF PAVEMENT PER LOT IS DEFICIENT, PAYMENT FOR THE LOT SHALL BE ADJUSTED AS FOLLOWS:

DEFICIENCY IN THE AVERAGE THICKNESS PER LOT (mm)	PERCENT (%) OF CONTRACT PRICE PER LOT
0mm - 5mm	100% PAYMENT
6mm - 10mm	95% PAYMENT
11mm - 15mm	85% PAYMENT
16mm - 20mm	70% PAYMENT
21mm - 25mm	50% PAYMENT
MORE THAN 25mm	REMOVE AND REPLACE/ NO PAYMENT

D:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
MARK ANTHONY L. FERRER ENGINEER II	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER DATE:	ISAGANI C. CAYME, CESE DISTRICT ENGINEER DATE:	GENERAL 09 16	10 120

NO ACCEPTANCE AND FINAL PAYMENT SHALL BE MADE ON COMPLETED PAVEMENT UNLESS CORE TEST FOR THICKNESS DETERMINATION IS CONDUCTED, EXCEPT TOR BARANGAY ROADS WHERE THE IMPLEMENTING OFFICE IS ALLOWED TO WAIVE SUCH TEST.

311.4 : METHOD OF MEASUREMENT

THE AREA TO BE PAID FOR UNDER THIS ITEM SHALL BE THE NUMBER OF SQUARE METERS (M2) OF CONCRETE PLACED AND ACCEPTED IN THE COMPLETED PAVEMENT WITH OR WITHOUT RÉBAR OR WIRE MESH REINFORCEMENT. THE WIDTH FOR MEASUREMENTS WILL BE THE WIDTH FROM OUTSIDE EDGE TO OUTSIDE EDGE OF COMPLETED PAVEMENT AS PLACED IN ACCORDANCE WITH THE PLANS OR AS OTHERWISE REQUIRED BY THE ENGINEER IN WRITING. THE LENGTH WILL BE MEASURED HORIZONTALLY ALONG THE CENTER LINE OF EACH ROADWAY OR RAMP. ANY CURB AND GUTTER PLACED SHALL NOT BE INCLUDED THE AREA OF CONCRETE PAVEMENT MEASURED.

311.5 : BASIS OF PAYMENT

THE ACCEPTED QUANTITY, MEASURED AS PRESCRIBED IN SECTION 311 .4, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR PORTLAND CEMENT CONCRETE PAVEMENT AND PORTLAND CEMENT CONCRETE PAVEMENT (REINFORCED WITH WIRE MESH) WHICH PRICE AND PAYMENT SHALL BE FULL COMPENSATION FOR PREPARATION OF ROADBED AND FINISHING OF SHOULDERS. UNLESS OTHERWISE PROVIDED BY THE SPECIAL PROVISIONS, FURNISHING ALL MATERIALS, FOR MIXING, PLACING, FINISHING AND CURING ALL CONCRETE, FOR FURNISHING AND PLACING ALL JOINT MATERIALS, FOR SAWING WEAKENED PLANE JOINTS, FOR FITTING THE PREFABRICATED CENTER METAL JOINT, FOR FACILITATING AND CONTROLLING TRAFFIC, AND FOR FURNISHING ALL LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THE ITEM.

PAYMENT WILL BE MADE UNDER:

PAY ITEM NUMBER	DESCRIPTION	UNIT OF MEASUREMENT
311(1)	PCCP PAVEMENT (UNREINFORCED)	SQUARE METER
311(2)	PCCP PAVEMENT (REINFORCED)	SQUARE METER
311(3)	PCCP PAVEMENT (REINFORCED WITH WIRE MESH)	SQUARE METER
311(4)	PCCP PAVEMENT WITH CORALLINE MATERIALS AS COARSE AGGREGATES (UNREINFORCED)	SQUARE METER
311(5)	PCCP PAVEMENT WITH CORALLINE MATERIALS AS COARSE AGGREGATES (REINFORCED)	SQUARE METER
311(6)	PCCP PAVEMENT WITH DOLOMITES A AGGREGATES (UNREINFORCED)	SQUARE METER
311(7)	PCCP PAVEMENT WITH DOLOMITES AS AGGREGATES (REINFORCED)	SQUARE METER

ITEM 404 - REINFORCING STEEL BARS

404.1 DESCRIPTION

THIS ITEM SHALL CONSIST OF FURNISHING, BENDING, FABRICATING AND PLACING OF STEEL REINFORCEMENT OF THE TYPE, SIZE, SHAPE AND GRADE REQUIRED IN ACCORDANCE WITH THIS SPECIFICATION AND IN CONFORMITY WITH THE REQUIREMENTS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

404.2 MATERIAL REQUIREMENTS

REINFORCING STEEL SHALL MEET THE REQUIREMENTS OF ITEM 710, REINFORCING STEEL AND WIRE ROPE.

404.3 CONSTRUCTION REQUIREMENTS

404.3.1 ORDER LIST

BEFORE MATERIALS ARE ORDERED, ALL ORDER LISTS AND BENDING DIAGRAMS SHALL BE FURNISHED BY THE CONTRACTOR, FOR APPROVAL OF ORDER LIST AND BENDING DIAGRAMS BY THE ENGINEER SHALL IN NO WAY RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR THE CORRECTNESS OF SUCH LISTS AND DIAGRAMS. ANY EXPENSE INCIDENT TO THE REVISIONS OF MATERIAL FURNISHED IN ACCORDANCE WITH SUCH LISTS AND DIAGRAMS TO MAKE THEM COMPLY WITH THE PLANS SHALL BE BORNE BY THE CONTRACTOR.

404.3.2 PROTECTION OF MATERIAL

STEEL REINFORCEMENT SHALL BE STORED ABOVE THE SURFACE OF THE GROUND UPON PLATFORMS, SKIDS, OR OTHER SUPPORTS AND SHALL BE PROTECTED AS FAR AS PRACTICABLE FROM MECHANICAL INJURY AND SURFACE DETERIORATION CAUSED BY EXPOSURE TO CONDITIONS PRODUCING RUST. WHEN PLACED IN THE WORK. REINFORCEMENT SHALL BE FREE FROM DIRT, DETRIMENTAL RUST, LOOSE SCALE, PAINT, GREASE, OIL, OR OTHER FOREIGN MATERIALS. REINFORCEMENT SHALL BE FREE FROM INJURIOUS DEFECTS SUCH AS CRACKS AND LAMINATIONS. RUST, SURFACE SEAMS, SURFACE IRREGULARITIES OR MILL SCALE WILL NOT BE CAUSE FOR REJECTION, PROVIDED THE MINIMUM DIMENSION, CROSS SECTIONAL AREA AND TENSILE PROPERTIES ALL OF A HAND WIRE BRUSHED SPECIMEN MEETS THE PHYSICAL REQUIREMENTS FOR THE SIZE AND GRADE IN THIS ITEM. OF STEEL SPECIFIED.

404.3.3 BENDING

ALL REINFORCING BARS REQUIRING BENDING SHALL BE COLD-BENT TO THE SHAPES SHOWN ON

THE PLANS OR AS REQUIRED BY THE ENGINEER. BARS SHALL BE BENT AROUND A CIRCULAR PIN HAVING PAYMENT WILL BE MADE LINDER. THE

S OR AS REQUIRED BY THE OWING DIAMETER (D) IN RE	E ENGINEER. BARS SHALL ELATION TO THE NOMINAL	BE BENT AROUND A CIRCULAR PIN HAVING DIAMETER OF THE BAR (D).	PAYMENT WILL BE MADE U	NDER:			CURING	MATERIALS	SHALL CONF	ORM TO THE F	REQUIREMENTS	OF SUBSECTION	1 311.2.8
/INAL DIAMETER, D, MM	PIN DIAMETER (D))	PAY ITEM NUMBER	DESCRIPTION REINFORCING STEEL			405.2.8 EXPANS	ION JOINT	MATERIALS				
10 TO 20	6D				RECORAM		EXPANSI	ON JOINT N	ATERIALS SH	ALL BE:			
25 TO 28 32 AND GREATER	8D 10D		ITEM 405 - STRUC	URAL CONCRETE			1. PREFORM	IED SPONG	GE RUBBER AN	ID CORK, CON	FORMING TO A	ASHTO M 153	
IDS AND HOOKS IN STIRRU	IPS OR TIES MAY BE BENT	TO THE DIAMETER OF THE PRINCIPAL BAR	405.1 DESCRIPTION				 HOT-POUL PREFORM 	RED ELAST /IED FILLER	TIC TYPE, CON S, CONFORMI	FORMING TO AND T	AASHTO M 173. O M 213.		
			405.1.1 SCOPE				405.2.9 ELASTO	MERIC CON	IPRESSION JC	DINT SEAL			
			THIS ITEM SHALL STRUCTURES EXCEPT PA	CONSIST OF FURNISHING	, PLACING AND FINISHING C WITH THIS SPECIFICATION AND	CONCRETE IN ALL	THESE SI	HALL CONF	ORM TO AASH	ITO M 220.			
L STEEL REINFORCEMENT SHALL BE ACCURATELY PLACED IN THE POSITION SHOWN ON THE OR AS REQUIRED BY THE ENGINEER AND FIRMLY HELD THERE DURING THE PLACING AND OF THE CONCRETE. BARS SHALL BE TIED AT ALL INTERSECTIONS EXCEPT WHERE SPACING IS AN 200 MM IN EACH DIRECTIONS. IN WHICH CASE AN TERNATIVE INTERSECTIONS SHALL BE TIED.		PLACED IN THE POSITION SHOWN ON THE HELD THERE DURING THE PLACING AND TERSECTIONS EXCEPT WHERE SPACING IS 'ERNATIVE INTERSECTIONS SHALL BE TIED.	THE LINES, GRADES, AND I PORTLAND CEMENT, FINE PROPORTIONS SPECIFIED	MENSIONS SHOWN ON PLA AGGREGATE, ADMIXTURE OR APPROVED BY THE ENGL	NS. CONCRETE SHALL CONSIST WHEN SPECIFIED, AND WAT NEER.	T OF A MIXTURE OF ER MIXED IN THE	405.2.10 ELASTO	OMERIC BE	ARING PADS				
BE FASTENED ON THE IN	ISIDE.		405.1.2 CLASSES AND USE	S OF CONCRETE			THESE SI	HALL CONF	ORM TO AASH	ITO M 251 OF	ITEM 412 - ELAS	TOMERIC BEARIN	NG PADS.
ANCE FROM THE FORM OR OTHER APPROVED	S SHALL BE MAINTAINE SUPPORTS, SO THAT IT	D BY MEANS OF STAYS, CLOCKS, TIES, DOES NOT VARY FROM THE POSITION S FOR HOLDING REINFORCEMENT FROM	FIVE CLASSES OF C		FOR IN THIS ITEM, NAMELY: A, I	B, C, P, AND SEAL.	405.2.11 STORA	GE OF CEM	IENT AND AGG	REGATES			
WITH THE FORMS SHAL IS. LAYERS OF THE BARS	LL BE PRECAST MORTA SHALL BE SEPARATED BY	R BLOCKS OF APPROVED SHAPES AND PRECAST MORTAR BLOCKS OR BY OTHER	THE CLASSES OF CC	NCRETE WILL GENERALLY E	BE USED AS FOLLOWS:	HE PLANS	STORAGE SUBSECTION 31	E OF CEME 1.2.10	ENT AND AGO	GREGATES SH	ALL CONFORM	I TO ALL THE F	REQUIREMENTS
DEN BLOCKS SHALL NOT BY THE ENGINEER, 1 EMENT IN ANY MEMBER \$	se of pebbles, pieces (7 be permitted. Unles) The minimum distanci Shall be placed and t	S OTHERWISE SHOWN ON PLANS OR AS E BETWEEN BARS SHALL BE 40 MM. THEM INSPECTED AND APPROVED BY THE	CLASS A - ALL SUPE IMPORTANT PART OF THE BOX CULVERTS, REINFORC	R STRUCTURES AND HEAVIL STRUCTURE INCLUDED ARE ED ABUTMENTS, RETAINING	Y REINFORCED SUBSTRU E SLABS, BEAMS, GIRDERS, COL WALLS, AND REINFORCED FOO	ictures. The Jumns, Arch Ribs, Itings.	405.3 SAMPLING	g and tes	TING OF STRU	ICTURAL CON	CRETE		
BEFORE THE PLACING C MAY BE REJECTED AN I ROLLS, IT SHALL BE STR AT NOT MORE THAN 1.8M	DF CONCRETE BEGINS. C ID REMOVAL MAY BE RI AIGHTENED BEFORE BEIN I INTERVALS.	ONCRETE PLACED IN VIOLATION OF THIS EQUIRED. IF FABRIC REINFORCEMENT IS NG PLACED. BUNDLED BARS SHALL BE TIES	CLASS B - FOOTINGS, PEDESTALS MASSIVE PIER SHAFTS, PIPE BEDDING, AND GRAVITY WALLS, UNREINFORCED OR WITH ONLY A SMALL AMOUNT OF REINFORCEMENT.			AS WORK TEST SPECIMEN EACH CLASS OF	CPROGRES NS, 150 X 3 CONCRET	SES, AT LEAS 800 MM, SHALI E OR FRACTIC	t one (1) san L be taken f Dn thereof f	IPLE CONSISTIN ROM EACH SEV PLACED EACH D	NG OF THREE CO VENTY FIVE (75) AY.	NCRETE CYLIN CUBIC METERS	
ICING			CLASS C - THIN REINFORCED SECTIONS, RAILINGS, PRECAST R.C. PILES AND CRIBBING AND FOR FILLER IN STEEL GRID FLOORS.			CRIBBING AND FOR	COMPLIANCE WITH THE REQUIREMENTS OF THIS SECTION SHALL BE DETERMINED ACCORDANCE WITH THE FOLLOWING STANDARD METHOD OF AASHTO:						
L REINFORCEMENT SHALL BE FURNISHED IN THE FULL LENGTHS INDICATED ON THE PLANS. 5 OF BARS, EXCEPT WHERE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT THE		CLASS P - PRESTRESSED CONCRETE STRUCTURES AND MEMBERS.				SAMPLING OF FRESH CONCRETE T 141 WEIGHT PER CUBIC METER AND AIR CONTENT							
APPROVAL OF THE ENGINEER. SPLICES SHALL BE STAGGERED AS FAR POSSIBLE AND WITH A SEPARATION OF NOT LESS THAN 40 BAR DIAMETERS. NOT MORE THAN ONE-THIRD OF THE Y BE SPLICED IN THE SAME CROSS-SECTION, EXCEPT WHERE SHOWN ON THE PLANS.			CLASS SEAL - CONCRETE DEPOSITED IN WATER.			(GRAVI-METRIC) OF CONCRETE T 121 SIEVE ANALYSIS OF FINE AND COURSE							
ILESS OTHERWISE SHOWN ON THE PLANS, BARS SHALL BE LAPPED A MINIMUM DISTANCE OF:			405.2 MATERIAL REQUIREM	405.2 MATERIAL REQUIREMENTS			AG SLUMP OF	GREGATES	3 ID CEMENT CC	NCRETE	T 27 T 119		
CE TYPE GRADE 280	(40) GRADE 420 (60)	BUT NOT LESS	405.2.1 PORTLAND CEMEN	ĩ			SPECIFIC AG	GRAVITY A	AND ABSORPT	ION OF FINE	T 84		
		THAN	IT SHALL CONFORM	TO ALL THE REQUIREMENTS	OF SUBSECTION 311.2.1.								
RESSION 24 BAR DI 20 BAR DI	IA. 36 BAR DIA. IA. 24 BAR DIA.	300 MM 300 MM	405.2.2 FINE AGGREGATE				TEST FOR	R STRENGT	H SHALL BE M	ADE IN ACCOR	RDANCE WITH T	HE FOLLOWING:	
PPED SPLICES THE BAR	S SHALL BE PLACED IN (IT SHALL CON	IT SHALL CONFORM TO ALL THE REQUIREMENTS OF SUBSECTION 311.2.2.									
L NOT BE PERMITTED A	T LOCATIONS WHERE TH	E CONCRETE SECTION IS INSUFFICIENT TO	405.2.3 COARSE AGGREGA	ΓE			COMPRE	SSIVE STR	ENGTH OF MO	IS IN THE FIEL	D 123		
E BETWEEN THE SPLICE	E AND THE NEAREST AD ETAILED ON THE PLANS	JACENT BAR. WELDING OF REINFORCING OR IF AUTHORIZED BY THE ENGINEER IN DRING AT LEAST ONE AND A HALE TURNS	IT SHALL CON GRADATION SHALL CONFO	IFORM TO ALL THE REQUIF RM TO TABLE 405.1.	REMENTS OF SUBSECTION 311	.2.3 EXCEPT THAT	CONCR	RETE CYLIN	DERS		T 22		
WELDING UNLESS OTHE	RWISE SHOWN ON PLANS	PPING AT LEAST ONE AND A HALF TURNS	TABLE 405.1 - GRADI	NG REQUIREMENTS FOR CO.	ARSE AGGREGATE		405.4 PRODUCTION REQUIREMENTS						
ING OF BAR MAT							405.4.1 PROPOR	TIONING A	ND STRENGTH	I OF STRUCTU	IRAL CONCRET	E	
			SIEVE DESIGNATION	MASS PERCENTA	AGE PASSING ASS, CLASS		THE CO	NCRETE	MATERIALS	SHALL BE	PROPORTIONEI	D IN ACCORD	ANCE WITH
IS OF MESH OR BAR MA UNIFORM STRENGTH AI	T REINFORCEMENT SHALI ND SHALL BE SECURELY	L OVERLAP EACH OTHER SUFFICIENTLY TO FASTENED AT THE END AND EDGES. THE	MM STANDARD	A B C	P SEAL		REQUIREMENTS	FOR EACH	H CLASS OF C	CONCRETE AS	SPECIFIED IN	TABLE 405.2, USI	NG THE ABSOL
ALL NOT BE LASS THAN	ONE MESH IN WIDTH.		63 2-1/2"				"RECOMMENDE	D PRACTIC	E FOR SELE	CTING PROP	ORTIONS FOR	NORMAL AND H	EAVY CONCRE
			50 2" 1 37.5 1.1/2"	0 100	100		OTHER METHOD OF THE ENGINE	DS OF PRO ER. THE MI	PORTIONING	MAY BE EMPL ER BE DESIGN	OYED IN THE N ED OR APPROV	/IX DESIGN WITH ED BY THE ENGI	I PRIOR APPRO
			25 1" -	35-70 10 [°]	0 95-100		THE SOURCE OF	F MATERIAL	L DURING THE	PROGRESS C	F WORK MAY N	ECESSITATE A NI	EW MIX DESIGN
JALITY OF REINFORCING	G STEEL BAR TO BE PAID STRUCTURE.	FOR WILL BE THE FINAL QUANTITY PLACED	19.0 3/4"	35-70 - 100			THE STRE	ENGTH REC	QUIREMENTS I	FOR EACH CL	ASS OF CONCR	RETE SHALL BE S	PECIFIED IN T
			12.0 1/2" 9.5 3/8"	- 10-30 90-100 10-30 - 40-70	- ∠ə-o∪ 20-55 -		405.2.						
LOWANCE WILL BE M ISED IN FASTENING THE	ADE FOR TIE-WIRES, S	EPARATORS, WIRE CHAIRS AND OTHER I PLACE. IF BARS ARE SUBSTITUTED UPON	4.75 NO. 4	0-5 0-5 0-15*	0-10* 0-10*		TABLE 405.2 - CC	CLASS OF			RETE FOR USE		
D THAN SPECIFIED, ONLY	APPROVED BY THE ENG Y THE MASS SPECIFIED SH	INCER AND AS A RESULT THEREOF MORE HALL BE MEASURED FOR PAYMENT.	*THE MEASURED CEMENT DESIGN CEMENT CONTENT	CONTENT SHALL BE WITHIN	N PLUS (+) OR MINUS (-) 2 MASS	PERCENT OF THE			CEMENI WATE CONTENT CEME PER M ³ RATI 40KG/BAG** KG/KG	RK/ RANGE IN NT SLUMP O MM G	SIZE OF COARSE AGGREGATE SQUARE	COMPRESSIVE STRENGTH OF 150X300MMCONCRE CYLINDER SPECIME	
EASUREMENT OR PAYM	ient will be made foi Y the engineer.	R SPLICES ADDED BY THE CONTRACTOR	405.2.4 WATER					A B	364 0.53 (9.1 BAGS) 321 0.58 (8.0 BAGS)	50-100 50-100	37.5 - 4.75 (1-1/2" - NO. 4) 50.0 - 4.75 (2" - NO. 4)	20.7 16.5	·
N THERE IS NO ITEM FOR D AS INCIDENTAL TO THE	R REINFORCING STEEL IN OTHER ITEMS IN THF RII	N THE BILL OF QUANTITIES, COST WILL BE L OF QUANTITIES.	IT SHALL CONFORM	TO THE REQUIREMENTS OF	SUBSECTION 311.2.4			C P	380 0.55 (9.5 BAGS) 440 0.49 (11.0 BAGS)	5 50-100 100 MAX.	12.5 - 4.75 (1/2" - NO. 4) 19.0 - 4.75 (3/4" - NO. 4)	20.7 37.7	
			405.2.5 REINFORCING STEE	L				SEAL	380 0.58 (9.5 BAGS)	3 100-200	25.0 - 4.75 (1" - NO. 4)	20.7	
BASIS OF PAYMENT							405.4.2 CONSIST	TENCY					
CCEPTED QUANTITY M	IEASURED AS PRESCRIBE	ED IN SECTION 404.4. SHALL BF PAID AND	IT SHALL CONFORM	IU THE REQUIREMENTS OF	IIEM /10, REINFORCING STEEL	AND WIRE ROPE.							
HALL BE FULL COMPENS EQUIPMENT, TOOLS AND	SATION FOR FURNISHING D INCIDENTALS NECESSAI	AND PLACING ALL MATERIALS, INCLUDING RY TO COMPLETE THE WORK PRESCRIBED	405.2.6 ADMIXTURES				CONCRET POSITION. IT SH	TE SHALL H IALL BE OF	HAVE A CONS	ISTENCY SUC SISTENCY THI	H THAT IT WILI IT WILL FLOW	L BE WORKABLE AROUND REINFO	IN THE REQUI

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PLAN SET LESS TIES

404.3

FOLLOWING DIAMETER (D) IN	N RELATION TO THE NOMINAL	DIAMETER OF THE BAR (D).		DEN.			CORING	WATERIALS STAL				F SUBSECTION 5	11.2.0
			PAY ITEM NUMBER	DESCRIPTION	UNIT OF MEASUREMENT		405.2.8 EXPANS	SION JOINT MATER	RIALS				
NUMINAL DIAMETER, D, MM	א PIN DIAMETER (D)		404	REINFORCING STEEL	KILOGRAM								
10 TO 20	6D					l	EXPANSI	ION JOINT MATER	RIALS SHALL BI	E:			
	8D		ITEM 405 - STRUCT	URAL CONCRETE									
32 AND GREATER	100						1. PREFORM	MED SPONGE RUE	BBER AND COR	RK, CONFORMI	NG TO AAS	HTO M 153	
BENDS AND HOOKS IN STIF	RRUPS OR TIES MAY BE BENT	TO THE DIAMETER OF THE PRINCIPAL BAR	405.1 DESCRIPTION			 HOT-POU PREFORM 	JRED ELASTIC TYF MED FILLERS, COI	PE, CONFORM NFORMING TO	IING TO AASHTO AASHTO M 213	O M 173. 3.			
			405.1.1 SCOPE										
3.4 PLACING AND FASTENING							405.2.9 ELASTO	MERIC COMPRES	SION JOINT S	EAL			
ALL STEEL REINFORCEMENT SHALL BE ACCURATELY PLACED IN THE POSITION SHOWN ON THE NS OR AS REQUIRED BY THE ENGINEER AND FIRMLY HELD THERE DURING THE PLACING AND TING OF THE CONCRETE. BARS SHALL BE TIED AT ALL INTERSECTIONS EXCEPT WHERE SPACING IS S THAN 300 MM IN EACH DIRECTIONS, IN WHICH CASE, ALTERNATIVE INTERSECTIONS SHALL BE TIED.			THIS ITEM SHALL	CONSIST OF FURNISHING, EMENT IN ACCORDANCE WI	PLACING AND FINISHING CO TH THIS SPECIFICATION AND	ONCRETE IN ALL CONFORMING TO	THESE S	HALL CONFORM	TO AASHTO M	220.			
			THE LINES, GRADES, AND D	MENSIONS SHOWN ON PLANS	S. CONCRETE SHALL CONSIST	OF A MIXTURE OF							
			PORTLAND CEMENT, FINE	AGGREGATE, ADMIXTURE V	WHEN SPECIFIED, AND WATE	ER MIXED IN THE	405.2.10 ELAST	OMERIC BEARING	9 PADS				
					LIX.								
SHALL DE FASTEINED UN TH			405.1.2 CLASSES AND USES	OF CONCRETE			THESE S	SHALL CONFORM	TO AASHTO M	251 OF ITEM 41	12 - ELASTO	DMERIC BEARING	FADS.
DISTANCE FROM THE FO	ORMS SHALL BE MAINTAINE	D BY MEANS OF STAYS, CLOCKS, TIES,											
GERS, OR OTHER APPROV	ED SUPPORTS, SO THAT IT	DOES NOT VARY FROM THE POSITION	FIVE CLASSES OF CO	NCRETE ARE PROVIDED FO	r in this item, namely: A, e	3, C, P, AND SEAL.	405.2.11 STORA	GE OF CEMENT A	ND AGGREGA	ATES			
CATED ON THE PLANS BY	MORE THAN 6 MM. BLOCK	S FOR HOLDING REINFORCEMENT FROM	EACH CLASS SHALL BE USE	D IN THAT PART OF THE STRU	CTURE AS CALLED FOR ON TH	HE PLANS				ATEO 0			
ENSIONS. LAYERS OF THE BA	ARS SHALL BE SEPARATED BY	PRECAST MORTAR BLOCKS OR BY OTHER	THE CLASSES OF CO	ICRETE WILL GENERALLY BE	USED AS FOLLOWS:		SUBSECTION 31	E OF CEMENT A 11 2 10	ND AGGREGA	ATES SHALL C	ONFORM .	IU ALL THE RE	QUIREMENTS C
ALLY SUITABLE DEVICES. TH	IE USE OF PEBBLES, PIECES	OF BROKEN STONE OR BRICK, METAL PIPE					CODOLOTION 31	2. 10					
WOODEN BLOCKS SHALL	NOT BE PERMITTED. UNLES	S OTHERWISE SHOWN ON PLANS OR AS		STRUCTURES AND HEAVILY	REINFORCED SUBSTRU	CTURES. THE	405.3 SAMPLIN	IG AND TESTING (OF STRUCTUR	AL CONCRETE			
IFORCEMENT IN ANY MEMBE	R SHALL BE PLACED AND T	HEM INSPECTED AND APPROVED BY THE	BOX CULVERTS, REINFORC	ED ABUTMENTS, RETAINING W	ADO, DEANIO, GINDERO, COLU	UNING, ARCH KIBO, TINGS.							
INEER BEFORE THE PLACIN	IG OF CONCRETE BEGINS. C	ONCRETE PLACED IN VIOLATION OF THIS					AS WORK	K PROGRESSES, A	AT LEAST ONE	E (1) SAMPLE C	ONSISTING	OF THREE CON	CRETE CYLINDE
VISION MAY BE REJECTED	AND REMOVAL MAY BE RE	LQUIKED. IF FABRIC REINFORCEMENT IS	CLASS B - FOOTINGS, PI	DESTALS MASSIVE PIER SH	HAFTS, PIPE BEDDING, AND	GRAVITY WALLS,	TEST SPECIME	NS, 150 X 300 MM	M, SHALL BE T	TAKEN FROM E	EACH SEVE	NTY FIVE (75) CI	UBIC METERS C
ETHER AT NOT MORE THAN 1	1.8M INTERVALS.	STERES BORDED DATO OTALE DE TIES	UNREINFORCED OR WITH O	NLY A SMALL AMOUNT OF REI	NFORCEMENT.		EACH CLASS OF		FRACTION THE	EREUF PLACED	DEACH DAY		
			01400 0 7				COMPLIA	NCE WITH THE		ENTS OF THI	IS SECTIO	N SHALL RE	DETERMINED
3.5 SPLICING			CLASS C - THIN REIN FILLER IN STEEL GRID FI OC	FURCED SECTIONS, RAILINGS RS.	5, PRECAST R.C. PILES AND C	KIBBING AND FOR	ACCORDANCE	WITH THE FOLLON	WING STANDA	RD METHOD OF	F AASHTO:	SINCE DE	
ALL REINFORCEMENT SHA	ALL BE FURNISHED IN THE F FERE SHOWN ON THE PLANS	ULL LENGTHS INDICATED ON THE PLANS.	CLASS P - PRESTRES	SED CONCRETE STRUCTURES	S AND MEMBERS.		SAMPLIN	G OF FRESH CON	ICRETE		T 141		
TTEN APPROVAL OF THE EN	GINEER. SPLICES SHALL BE S	TAGGERED AS FAR POSSIBLE AND WITH A					WEIGHT I	PER CUBIC METER	R AND AIR CO	NTENT			
MUM SEPARATION OF NOT	LESS THAN 40 BAR DIAMETE	RS. NOT MORE THAN ONE-THIRD OF THE	CLASS SEAL - CONC	RETE DEPOSITED IN WATER.			(GI	RAVI-METRIC) OF	CONCRETE	T 12	21		
S WAT DE SPLICED IN THE SA	INIE URUSS-SEUTION, EXCEPT	WHERE SHOWN ON THE PLANS.					SIEVE AN	NALYSIS OF FINE A	AND COURSE		T - -		
			405.2 MATERIAL REQUIREM	ENTS			AG				T 27		
UNLESS OTHERWISE SHOWN ON THE PLANS, BARS SHALL BE LAPPED A MINIMUM DISTANCE OF.							SLUMP O				19		
SPLICE TYPE GRADE	280 (40) GRADE 420 (60)	BUT NOT LESS	405.2.1 PORTLAND CEMENT				SPECIFIC		JOURPTION OF	F FIINE T 0.	4		
		THAN					AG			1.04			
TENSION 24 BA	R DIA. 36 BAR DIA.	300 MM	ANS 2 2 FINE ACCRECATE		F SUDSECTION 311.2.1.		TEST FOR	R STRENGTH SHA	LL BE MADE I	N ACCORDANC	E WITH THE	E FOLLOWING:	
COMPRESSION 20 BA	R DIA. 24 BAR DIA.	300 MM	405.2.2 FINE AGGREGATE										
			IT SHALL CONF	ORM TO ALL THE REQUIREME	NTS OF SUBSECTION 311.2.2.		MAKING	AND CURING CON	NCRETE COMP	PRESSIVE			
IN LAPPED SPLICES, THE	BARS SHALL BE PLACED IN (405.2.3 COARSE AGGREGA	E			AND FL	LEXURAL TEST SP	PECIMENS IN T	THE FIELD T 2	3		
VIDE MINIMUM CLEAR DIS	TANCE OF ONE AND ONE-	THIRD THE MAXIMUM SIZE OF COARSE					COMPRESSIVE STRENGTH OF MOLDED						
REGATE BETWEEN THE SP	LICE AND THE NEAREST AD	JACENT BAR. WELDING OF REINFORCING	IT SHALL CON	FORM TO ALL THE REQUIRE	MENTS OF SUBSECTION 311.	.2.3 EXCEPT THAT	CONCF	RETE CYLINDERS		T 22	2		
EL SHALL BE DUNE UNLY II TING. SPIRAL REINFORCEME	NT SHALL BE SPLICED BY LA	PPING AT LEAST ONE AND A HALF TURNS	GRADATION SHALL CONFOR	IN TO TABLE 405.1.			405.4						
BY BUTT WELDING UNLESS O	THERWISE SHOWN ON PLANS						405.4 PRODUCTION REQUIREMENTS						
							405.4.1 PROPOR	RTIONING AND ST	RENGTH OF S		ONCRETE		
3.6 LAPPING OF BAR MAT			SIEVE DESIGNATION	MASS PERCENTAG	E PASSING								
	MAT REINEORCEMENT QUAL		STANDARD ALTERNATE US	CLASS CLASS CLASS CLASS	S CLASS		THE CC	ONCRETE MATE	RIALS SHALL	L BE PROPC	ORTIONED	IN ACCORDAN	NCE WITH TH
ITAIN A UNIFORM STRENGT	H AND SHALL BE SECURELY	FASTENED AT THE END AND EDGES. THE	MM STANDARD	A B C	P SEAL			S FOR EACH CLA		RETE AS SPECI	IFIED IN TA	BLE 405.2, USING	G THE ABSOLUT
RLAP SHALL NOT BE LASS TH	AN ONE MESH IN WIDTH.		63 2-1/2"				"RECOMMENDE	D PRACTICE FO	R SELECTING	PROPORTION	NS FOR NO	ORMAL AND HEA	AVY CONCRETE
			50 2" 10	0 100			OTHER METHO	DS OF PROPORT	IONING MAY E	BE EMPLOYED	IN THE MIX	DESIGN WITH F	PRIOR APPROV/
4 METHOD OF MEASUREMEN	NT		37.5 1-1/2"	95-100 -	100			ER. THE MIX SHA	ILL EITHER BE	DESIGNED OR	RK MAY NEC	J BY THE ENGINE	LER. A CHANGE
			25 1" -	35-70 100	95-100								
ACCEPTED IN THE COMPLET	CING STEEL BAR TO BE PAID	FOR WILL BE THE FINAL QUANTITY PLACED	19.0 3/4"	35-70 - 100			THE STR	ENGTH REQUIRE	MENTS FOR E	EACH CLASS OF	F CONCRET	TE SHALL BE SPE	ECIFIED IN TABI
			12.0 1/2" 0.5 2/0"	- 10-30 90-100 10_30 40.70 4	- 20-00 20-55 -		405.2.						
NO ALLOWANCE WILL BI	E MADE FOR TIE-WIRES, S	EPARATORS, WIRE CHAIRS AND OTHER	4.75 N∩ 4	0-5 0-5 0-15* 0	20-00 -)-10* 0-10*		TABLE 405.2 - C	OMPOSITION AND	O STRENGTH C	OF CONCRETE F	FOR USE IN	STRUCTURES	
ERIALS USED IN FASTENING	THE REINFORCING STEEL IN	PLACE. IF BARS ARE SUBSTITUTED UPON						CLASS OF MINIMU			IGNATED]
EL I USED THAN SPECIFIED. (ONLY THE MASS SPECIFIED SH	AND AS A RESULT THEREOF MORE	*THE MEASURED CEMENT	CONTENT SHALL BE WITHIN P	PLUS (+) OR MINUS (-) 2 MASS	PERCENT OF THE			NT CEMENT	SLUMP CO	ARSE	STRENGTH OF	
			DESIGN CEMENT CONTENT					40KG/BA	G** KG/KG			CYLINDER SPECIMEN	
NO MEASUREMENT OR P.	AYMENT WILL BE MADE FOR	R SPLICES ADDED BY THE CONTRACTOR						A 364	0.53	50-100 37 (1-1)	7.5 - 4.75 /2" - NO 4)	20.7	1
ESS DIRECTED OR APPROVE	D BY THE ENGINEER.		405.2.4 WATER					B 321	0.58 ()	50-100 50	0.0 - 4.75 2" - NO. 4)	16.5	
								C 380 (9.5 BAG	0.55 SS)	50-100 12 (1/2	2.5 - 4.75 /2" - NO. 4)	20.7	
WHEN THERE IS NO ITEM	FOR REINFORCING STEEL IN THE OTHER ITEMS IN THE BII	I THE BILL OF QUANTITIES, COST WILL BE	II SHALL CONFORM	U THE REQUIREMENTS OF SU	JESECTION 311.2.4			P 440 (11.0 BA	0.49 (GS)	100 MAX. 19 (3)	9.0 - 4.75 8/4" - NO. 4)	37.7	
			405 2 5 REINFORCING STEE					SEAL 380 (9.5 BAG	0.58 SS)	100-200 25	25.0 - 4.75 1" - NO. 4)	20.7	
5 BASIS OF PAYMENT				-							1		L
			IT SHALL CONFORM	O THE REQUIREMENTS OF IT	EM 710, REINFORCING STEEL	AND WIRE ROPE.	405.4.2 CONSIS	TENCY					
THE ACCEPTED QUANTITY	Y, MEASURED AS PRESCRIBE	D IN SECTION 404.4, SHALL BE PAID AND			.,								
MENT SHALL BE FULL COMP	ENSATION FOR FURNISHING		405.2.6 ADMIXTURES					TE SHALL HAVE		ICY SUCH THA	T IT WILL E		
LADUR, EQUIPHIENT, TOULS	AND INCIDENTALS NECESSA	VE TO COMPLETE THE WORK PRESCRIBED					FUSHIUN. IT SP	INLL DE UF SUCH	1 2 0011919151E		LL FLUVV A	NOUND REINFUR	VOING STEEL BU

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405.2.7 CURING MATERIALS

SPECIFICATION AND CONSTRUCTION REQUIREMENTS Gen-10

NOT TO SCALE

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	PREPARED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
CONSTRUCTION OF ROAD, PAYACPAC - PALAKPAK - LUMES - APNE, BARANGAY SAN PASCUAL,TUBA, BENGUET TUBA. BENGUET	-SPECIFICATION AND CONSTRUCTION REQUIREMENTS	MARK ANTHONY L. FERRER ENGINEER II	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION	EDGARDO G. ENRIQUEZ	ISAGANI C. CAYME, CESE	SENERAL 10 16	11 120
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ADMIXTURES SHALL CONFORM TO THE REQUIREMENTS OF SUBSECTION 311.2.7

INDIVIDUAL PARTICLES OF THE COARSE AGGREGATE WHEN ISOLATED SHALL SHOW A COATING OF MORTAR CONTAINING ITS PROPORTIONATE ABILITY OF THE EQUIPMENT TO PROPERLY PLACE IT AND NOT BY DIFFICULTY IN MIXING AND TRANSPORTING. THE QUALITY OF MIXING WATER SHALL BE DETERMINED BY THE ENGINEER AND SHALL NOT BE VARIED WITHOUT HIS CONSENT. CONCRETE AS DRY AS IT IS PRACTICAL TO PLACE WITH THE EQUIPMENT SPECIFIED SHALL BE USED.

405.5 METHOD OF MEASUREMENT

THE QUANTITY OF STRUCTURAL CONCRETE TO BE PAID FOR WILL BE THE FINAL QUANTITY PLACED AND ACCEPTED IN THE COMPLETED STRUCTURE. NO DEDUCTION WILL BE MADE FOR THE VOLUME OCCUPIED BY PIPE LESS THAN 100 MM IN DIAMETER OR BY REINFORCING STEEL, ANCHOR, CONDUITS, WEEP HOLES OR EXPANSION JOINT MATERIALS.

405.6 BASIS OF PAYMENT

THE ACCEPTED QUANTITIES, MEASURED AS PRESCRIBED IN SECTION 405.5, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR EACH OF THE PAY ITEM LISTED BELOW THAT IS INCLUDED IN THE BILL OF QUANTITIES

PAYMENT SHALL CONSTITUTE FULL COMPENSATION FOR FURNISHING, PLACING AND FINISHING CONCRETE INCLUDING ALL LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THE WORK PRESCRIBED IN THE ITEM.

PAYMENT WILL BE MADE UNDER:

PAY ITEM	DESCRIPTION	UNIT OF
NUMBER		MEASUREMENT
405(1)	STRUCTURAL CONCRETE, CLASS A	CUBIC METER
405(2)	STRUCTURAL CONCRETE, CLASS B	CUBIC METER
405(3)	STRUCTURAL CONCRETE, CLASS C	CUBIC METER
405(4)	STRUCTURAL CONCRETE, CLASS P	CUBIC METER
405(5)	SEAL CONCRETE	CUBIC METER

ITEM 503 - HIGH-DENSITY POLYETHYLENE PIPE (STRUCTURED WALL PIPE)

503.1 NON-REINFORCED CONCRETE PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 86 (ASTM C 14) FOR THE SPECIFIED DIAMETERS AND STRENGTH CLASSES.

503.2 REINFORCED CONCRETE PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 170 OR AASHTO M 242 (ASTM C 655) FOR SPECIFIED DIAMETERS AND STRENGTH CLASSES.

ELLIPTICAL PIPE CONFORMING TO THE REQUIREMENTS OF AASHTO M 207 (ASTM C 507) SHALL BE FURNISHED WHERE SPECIFIED. UNLESS OTHERWISE SPECIFIED, PIPE WALL DESIGN AND USE OF ELLIPTICAL REINFORCED CONCRETE ARCH CULVERT PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M 206 (ASTM C 506).

PRECAST REINFORCED CONCRETE AND SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF THE CITED SPECIFICATIONS TO THE EXTENT WHICH THEY APPLY. REINFORCED CONCRETE D-LOAD PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M 242 (ASTM C 655).

503.3 PERFORATED CONCRETE PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 175 FOR THE SPECIFIED DIAMETERS AND STRENGTH CLASSES,

503.4 DRAIN TILE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 178 OR M 179 (ASTM C 4) FOR THE SPECIFIED MATERIAL, DIAMETERS AND QUALITY CLASSES.

503.5 POROUS CONCRETE PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 176 (ASTM C 654) FOR THE SPECIFIED DIAMETERS.

503.6 VITRIFIED CLAY LINED REINFORCED CONCRETE PIPE

DESIGNS FOR FULLY LINED OR HALF LINED PIPES OF THE SPECIFIED STRENGTH CLASSES SHALL BE SUBMITTED BY THE MANUFACTURER FOR APPROVAL. THE APPLICABLE REQUIREMENTS OF AASHTO M 170 AND AASHTO M 65 SHALL GOVERN. LINER OR LINER ELEMENTS, SHALL BE CLAY OF FIRST-CLASS QUALITY, SOUND, THOROUGHLY AND PERFECTLY BURNED WITHOUT WARPS, CRACKS OR OTHER IMPERFECTIONS AND FULLY AND SMOOTHLY SALT GLAZED.

503.7 PERFORATED VITRIFIED CLAY PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 65. FOR PIPE WITH FULL CIRCULAR CROSS-SECTION, FOR THE SPECIFIED DIAMETERS AND STRENGTH CLASS. WHEN SPECIFIED, THE BELL SHALL HAVE INTEGRAL SPACER LUGS TO PROVIDE FOR AN ANNULAR OPENING AND SELF-CENTERING FEATURE

503.8 VITRIFIED CLAY PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF SECTION 706.7 FOR THE SPECIFIED DIAMETERS AND STRENGTH CLASSES FOR CIRCULAR, UNPERFORATED OR PERFORATED PIPE AS SHOWN ON THE PLANS

503.9 CRADLE INVERT CLAY PIPE

THIS PIPE SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M 65.

503.10 ASBESTOS CEMENT PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 217 (ASTM C 428) FOR THE SPECIFIED DIAMETERS AND STRENGTH CLASSES.

503.11 PERFORATED ASBESTOS CEMENT PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 189 FOR THE SPECIFIED DIAMETERS.

503.12 BITUMINIZED FIBER PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 177, ASTM D 1861 OR D 1862.

503.13 PERFORATED BITUMINIZED FIBER PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF SECTIONS 706.12 FOR THE SPECIFIED DIAMETERS. UNLESS OTHERWISE SPECIFIED, EITHER TYPE I OR TYPE II COUPLINGS MAY BE FURNISHED.

503.14 REINFORCED CONCRETE ARCH CULVERT, STORM DRAIN AND SEWER PIPE	
THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 206 (ASTM C 506).	
503.15 REINFORCED CONCRETE ELLIPTICAL CULVERT, STROM DRAIN AND SEWER PIPE	
THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 207 (ASTM C 507).	
503.16 REINFORCED CONCRETE D-LOAD CULVERT, STORM DRAIN AND SEWER PIPE	

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 242 (ASTM C 655).

503.17 PLASTIC AND POLYETHYLENE CORRUGATED DRAINAGE PIPE OR TUBING

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 252.

503.18 PRECAST REINFORCED CONCRETE BOX SECTIONS FOR CULVERTS, STORM DRAINS AND SEWERS

THESE SECTIONS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 259.

503.19 ACRYLONITRILE-BUTADIENE-STYRENE (ABS) SEWER PIPE AND FITTINGS

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF ASTM D 2751.

503.20 ACRYLONITRILE-BUTADIENE-STYRENE (ABS) COMPOSITE SEWER PIPE

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 264 (ASTM D 2680).

503.21 POLYVINYL CHLORIDE (PVC) SEWER PIPE AND DRAIN PIPE

SHEET CONTENTS

REQUIREMENTS

THIS PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 304M (ASTM D 2729).

ITEM 506 - STONE MASONRY

506.1 DESCRIPTION

THIS ITEM SHALL CONSIST OF STONE MASONRY IN MINOR STRUCTURES, IN HEADWALLS FOR CULVERTS, IN RETAINING WALLS AT THE TOES OF SLOPES, AND AT OTHER PLACES CALLED FOR ON THE PLANS, CONSTRUCTED ON THE PREPARED FOUNDATION BED, IN ACCORDANCE WITH THIS SPECIFICATION AND IN CONFORMITY WITH THE LINES, GRADES, SECTIONS, AND DIMENSIONS SHOWN ON THE PLANS OR AS ORDERED IN WRITING BY THE ENGINEER.

506.2 MATERIAL REQUIREMENTS

506.2.1 STONE

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

SIZES AND SHAPES - UNLESS OTHER SIZES ARE SHOWN ON THE PLANS, STONES SHALL 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 HALT 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 PROPERTY BEDDED.

-SPECIFICATION AND CONSTRUCTION

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



PREPARED:



DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS PALAKPAK - LUMES - APNE, BARANGAY SAN CORDILLERA ADMINISTRATIVE REGION BENGUET 1ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET

REPUBLIC OF THE PHILIPPINES

TUBA. BENGUET

CONSTRUCTION OF ROAD, PAYACPAC -

PASCUAL.TUBA. BENGUET

PROJECT NAME AND LOCATION

506.2.2 MORTAR

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 THE QUANTITY TO BE PAID FOR SHALL BE THE NUMBER OF CUBIC METERS OF STONE MASONRY SUCH CONSISTENCY THAT IT CAN BE HANDLED EASILY AND SPREAD WITH A TROWEL. MORTAR SHALL BE COMPLETE IN PLACE AND ACCEPTED. PROJECTIONS EXTENDING BEYOND THE FACES OF THE WALLS 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 SHALL NOT BE INCLUDED. IN COMPUTING THE QUANTITY FOR PAYMENT, THE DIMENSIONS USED SHALL BE THOSE SHOWN ON THE PLANS OR AS ORDERED IN WRITING BY THE ENGINEER. NO DEDUCTIONS UNTIL THE MIXTURE ASSUMES A UNIFORM COLOR, AFTER WHICH, WATER SHALL BE ADDED AS THE SHALL BE MADE FOR WEEPHOLES, DRAIN PIPES OR OTHER OPENINGS OF LESS THAN ONE SQUARE MIXING CONTINUES UNTIL THE MORTAR ATTAINS THE PROPER CONSISTENCY, MORTAR THAT IS NOT METER IN AREA USED WITHIN 90 MINUTES AFTER THE WATER HAS BEEN ADDED SHALL BE DISCARDED. RETEMPERING OF MORTAR WILL NOT BE PERMITTED

506.5 BASIS OF PAYMENT

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

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

THE STONES SHALL BE SO 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 THIS ITEM SHALL CONSIST OF THE CONSTRUCTION OF CURB AND GUTTER EITHER PRECAST OR CAST IN PLACE, MADE OF CONCRETE IN ACCORDANCE WITH THIS SPECIFICATION AT THE LOCATION, 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 AND IN CONFORMITY WITH THE LINES, GRADES, DIMENSIONS AND DESIGN, SHOWN THE PLANS OR AS MORTAR CLEANED OFF, AND THE STONE RELAID WITH FRESH MORTAR. REQUIRED BY THE ENGINEER.

BEDS FOR FACE STONES MAY VARY FROM 20 MM TO 50 MM THICKNESS. THEY SHALL NOT EXTEND IN AN UNBROKEN LINE THROUGH MORE THAN 5 STONES. JOINTS MAY VARY FROM 20 MM TO 50 MM IN BED COURSE MATERIALS AS SHOWN ON THE PLANS SHALL CONSIST OF CINDERS, SAND, SLAG, THICKNESS THEY SHALL NOT EXTEND IN AN UNBROKEN LINE THROUGH MORE THAN STONES THEY MAY GRAVEL, CRUSHED STONE, OR OTHER APPROVED POROUS MATERIAL OF SUCH GRADING THAT ALL THE BE AT ANGLES WITH THE VERTICAL FROM 0° TO 45°. FACE STONE SHALL BOND AT LEAST 150 MM LONGITUDINALLY AND 50 MM VERTICALLY. AT NO PLACE SHALL CORNERS OF FOUR STONES BE PARTICLES WILL PASS THROUGH 12.5 MM SIEVE. ADJACENT TO EACH OTHER.

CROSS BEDS FOR VERTICAL FACED WALLS SHALL BE LEVEL, AND FOR BATTERED WALLS MAY VARY FROM LEVEL TO NORMAL TO THE BATTER LINE OF THE FACE OF THE WALL. 506.3.3 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.

506.3.4 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.

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

UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE MATERIAL 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 BED COURSE MATERIAL SHALL BE PLACED AND COMPACTED TO FORM A BED OF THE REQUIRED MINIMUM HEIGHT OF 150 MM. STONE SHALL BE LAID IN SUCH A MANNER THAT THE TOP COURSE IS AN THICKNESS AS SHOWN THE PLANS. INTEGRAL PART OF THE WALL. THE TOPS OF TOP COURSE OF STONE SHALL BE PITCHED TO LINE, IN BOTH VERTICAL AND HORIZONTAL PLANES. 600.3.2 CAST IN PLACE CURB AND GUTTER

MARK ANTHONY L. FE

ENGINEER I

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 THE PITCH LINES SHALL NOT BE MORE THAN 50 MM.

506.3 CONSTRUCTION REQUIREMENT

506.3.1 SELECTION AND PLACING

506.3.2 BED AND JOINTS

506.3.5 POINTING

506.3.6 COPING

506.3.7 WEEPHOLES

IT SHALL CONFORM TO THE REQUIREMENTS OF ITEM 505, RIPRAP AND GROUTED RIPRAP UNDER SUBSECTION 505.3.4, WEEPHOLES

506.3.8 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.

506.3.9 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.

506.4 METHOD OF MEASUREMENT

THE QUANTITY OF MASONRY, DETERMINED AS PROVIDED IN SECTION 506.4, METHOD OF MEASUREMENT, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER CUBIC METER FOR STONE MASONRY, WHICH PRICE AND PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING AND PLACING ALL MATERIALS, INCLUDING MORTAR FOR MASONRY, FOR ALL NECESSARY EXCAVATIONS, AND FOR ALL LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THE ITEM.

PAYMENT BE MADE UNDER:

PAY ITEM NUMBER	DESCRIPTION	UNIT OF
		MEASUREMENT
506	STONE MASONRY	CUBIC METER

ITEM 600 - CURB AND GUTTER

600.1 DESCRIPTION

600.2 MATERIAL REQUIREMENTS

600.2.1 MATERIAL FOR BED COURSE

600.2.2 CONCRETE

CONCRETE SHALL BE OF THE CLASS INDICATED ON THE PLANS AND SHALL CONFORM TO THE REQUIREMENTS OF ITEM 405, STRUCTURAL CONCRETE.

600.2.3 EXPANSION JOINT FILLER

EXPANSION JOINT FILLER SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 153 / ITEM 705.

600.2.4 CEMENT MORTAR

CEMENT MORTAR SHALL CONSIST OF ONE PART OF PORTLAND CEMENT AND TWO PARTS OF FINE AGGREGATES WITH WATER ADDED AS NECESSARY TO OBTAIN THE REQUIRED CONSISTENCY. THE MORTAR SHALL BE USED WITHIN 30 MINUTES OF PREPARATION.

600.2.5 BONDING COMPOUND

WHERE BONDING COMPOUND IS USED, IT SHALL CONFORM TO AASHTO M 200.

600.3 CONSTRUCTION REQUIREMENTS

600.3.1 BEDDING

EXCAVATION SHALL BE MADE TO THE REQUIRED DEPTH AND THE BASE UPON WHICH THE CURB AND/OR GUTTER IS TO BE SET SHALL BE COMPACTED TO A FIRM AND EVEN SURFACE. ALL SOFT AND

	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
RER	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER	ISAGANI C. CAYME, CESE DISTRICT ENGINEER	GENERAL 11 16	12 120

600.3.2.1 PLACING

FORMS SHALL CONFORM TO THE REQUIREMENTS OF ITEM 407, CONCRETE STRUCTURES. METAL 3. EXTREME CARE SHALL BE EXERCISED IN HANDLING AND MOVING PRECAST CURB AND GUTTER TO FORMS SHALL BE OF AN APPROVED SECTION.

FORMS TO HOLD THE CONCRETE SHALL BE BUILT AND SET-IN-PLACE AS DESCRIBED IN ITEM 407, CONCRETE STRUCTURES. FORMS FOR AT LEAST 50 M OF CURB AND GUTTER SHALL BE IN-PLACE AND CHECKED FOR ALIGNMENT AND GRADE BEFORE IS PLACED. CURBS AND GUTTERS CONSTRUCTED ON CURVES SHALL HAVE FORMS OF EITHER WOOD OR METAL AND THEY SHALL BE ACCURATELY SHAPED TO THE CURVATURE SHOWN ON THE PLANS.

MIXING, PLACING, FINISHING AND CURING OF CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF ITEM 405, STRUCTURAL CONCRETE, AS MODIFIED BY THE REQUIREMENTS BELOW.

THE CONCRETE SHALL BE PLACED IN THE FORMS IN LAYERS OF 100 OR 125 MM EACH, AND TO THE DEPTH REQUIRED IT SHALL BE TAMPED AND SPADED UNTIL MORTAR ENTIRELY COVERS THE TOP AND SURFACES OF THE FORMS. THE TOP OF THE CONCRETE SHALL BE FINISHED TO A SMOOTH AND EVEN SURFACE AND THE EDGES ROUNDED TO THE RADII SHOWN ON THE PLANS. BEFORE THE CONCRETE IS GIVEN THE FINAL FINISHING, THE SURFACE OF THE GUTTER SHALL BE TESTED WITH A 3-M STRAIGHT-EDGE AND ANY IRREGULARITIES OF MORE THAN 10 MM IN 3 M SHALL BE CORRECTED.

THE CURB AND GUTTER SHALL BE CONSTRUCTED IN UNIFORM SECTIONS OF NOT MORE THAN 50 M IN LENGTH EXCEPT WHERE SHORTER SECTIONS ARE REQUIRED TO COINCIDE WITH THE LOCATION OF WEAKENED PLANES OR CONTRACTION JOINTS OF THE PAVEMENT, OR FOR CLOSURES, BUT NO SECTION SHALL BE LESS THAN 2 M LONG. THE SECTIONS SHALL BE SEPARATED BY SHEET TEMPLATES SET PERPENDICULAR TO THE FACE AND TOP OF THE CURB AND GUTTER. THE TEMPLATES SHALL BE APPROXIMATELY 5 MM IN THICKNESS AND OF THE SAME WIDTH AS THAT OF THE CURB AND/OR GUTTER AND NOT LESS THAN 50 MM DEEPER THAN THE DEPTH OF THE CURB AND/OR GUTTER. TEMPLATES SHALL BE SET CAREFULLY AND HELD FIRMLY DURING THE PLACING OF THE CONCRETE AND SHALL REMAIN IN PLACE UNTIL THE CONCRETE HAS SET SUFFICIENTLY TO HOLD ITS SHAPE BUT SHALL BE REMOVED WHILE THE FORMS ARE STILL IN PLACE. A PREFORMED JOINT FILLER APPROVED BY THE ENGINEER MAY BE USED IN LIEU OF THE SHEET TEMPLATE MENTIONED ABOVE. IN THIS EVENT THE FIBER BOARD SHALL BE PRE-CUT TO THE SHAPE OF THE CURB SO THAT ITS OUTER EDGE WILL BE FLUSHED WITH THE ABUTTING CURB AND/OR GUTTER.

EXPANSION JOINTS SHALL BE FORMED AT INTERVALS SHOWN ON THE PLANS. WHERE A CURB IS PLACED NEXT TO A CONCRETE PAVEMENT, EXPANSION JOINTS IN THE CURB SHALL BE LOCATED OPPOSITE EXPANSION JOINTS IN THE PAVEMENT.

THE FORM SHALL BE REMOVED WITHIN 24 HOURS AFTER THE CONCRETE HAS BEEN PLACED. MINOR DEFECTS SHALL BE REPAIRED WITH MORTAR CONTAINING ONE PART OF PORTLAND CEMENT AND TWO PARTS OF FINE AGGREGATE. PLASTERING SHALL NOT BE PERMITTED AND ALL REJECTED PORTIONS SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE. THE EXPOSED SURFACE SHALL BE FINISHED WHILE THE CONCRETE IS STILL FRESH BY RUBBING THE SURFACES WITH A WETTED SOFT BRICK OR WOOD UNTIL THEY ARE SMOOTH. THE SURFACES SHALL BE WETTED THOROUGHLY, EITHER BY DIPPING THE BRICK OR WOOD IN WATER, OR BY THROWING WATER ON THE SURFACES WITH A BRUSH. AFTER THE CONCRETE HAS BEEN RUBBED SMOOTH USING WATER, IT SHALL THEN BE RUBBED WITH A THIN GROUT CONTAINING ONE PART OF PORTLAND CEMENT AND ONE PART OF FINE AGGREGATES. RUBBING WITH GROUT SHALL CONTINUE UNTIL UNIFORM COLOR IS PRODUCED. WHEN COMPLETED, THE CONCRETE SHALL BE COVERED WITH SUITABLE MATERIAL AND KEPT MOIST FOR A PERIOD OF 3 DAYS. OR A MEMBRANE-FORMING MATERIAL MAY BE APPLIED AS PROVIDED IN ITEM 405, STRUCTURAL CONCRETE. THE CONCRETE SHALL BE SUITABLY PROTECTED FROM THE WEATHER UNTIL THOROUGHLY HARDENED.

AFTER THE CONCRETE HAS SET SUFFICIENTLY, THE SPACES ON THE BACK OF THE CURB WHICH WERE EXCAVATED FOR PLACING THE CURB SHALL BE REFILLED TO THE REQUIRED ELEVATION WITH SUITABLE MATERIAL WHICH SHALL BE TAMPED IN LAYERS OF NOT MORE THAN 150 MM UNTIL CONSOLIDATED.

600.3.3 PRECAST CURB AND GUTTER

600.3.3.1 PLACING

THE PRECAST CONCRETE CURB AND GUTTER SHALL BE SET IN 20 MM OF CEMENT MORTAR AS SPECIFIED IN SUBSECTION 600.2.4 TO THE LINE LEVEL AND GRADE AS SHOWN ON THE APPROVED PLANS.

THE PRECAST CURB SHALL NOT BE MORE THAN 20 CM IN WIDTH AT THE TOP PORTION AND NOT BE MORE THAN 25 CM AT THE BASE. THE PRECAST CURB AND GUTTER SHALL BE 1.0 M IN LENGTH AND SHALL BE PUT SIDE BY SIDE CONSECUTIVELY WITH JOINT IN BETWEEN.

JOINTS BETWEEN CONSECUTIVE CURB AND GUTTER SHALL BE FILLED WITH CEMENT MORTAR TO THE FULL SECTION OF THE CURB AND GUTTER. EXPANSION JOINTS SHALL BE FORMED AT INTERVALS SHOWN ON THE PLANS. WHERE A CURB AND GUTTER IS PLACED NEXT TO A CONCRETE PAVEMENT, EXPANSION JOINTS IN THE CURB AND GUTTER SHALL BE LOCATED OPPOSITE EXPANSION JOINTS IN THE PAVEMENT.

MINOR DEFECTS SHALL BE REPAIRED WITH MORTAR CONTAINING ONE PART OF PORTLAND CEMENT AND TWO PARTS OF FINE AGGREGATES. PLASTERING SHALL NOT BE PERMITTED AND ALL REJECTED PORTIONS SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE. THE EXPOSED SURFACE SHALL BE FINISHED BY RUBBING THE SURFACES WITH A WETTED SOFT BRICK OR WOOD UNTIL THEY ARE SMOOTH THE SURFACES SHALL BE WETTED THOROUGHLY FITHER BY DIPPING THE BRICK OR WOOD IN WATER. OR BY THROWING WATER ON THE SURFACES WITH A BRUSH. AFTER THE CONCRETE HAS BEEN RUBBED SMOOTH USING WATER, IT SHALL THEN BE RUBBED WITH A THIN GROUT CONTAINING ONE PART OF PORTLAND CEMENT AND ONE PART OF FINE AGGREGATE. RUBBING WITH GROUT SHALL CONTINUE UNTIL UNIFORM COLOR IS PRODUCED.

600.3.3.2 HANDLING PRECAST CURB AND GUTTER

IN PREPARATION FOR THE HANDLING OF PRECAST CURB AND GUTTER, ALL FABRICATED CURB AND GUTTER OF ONE (I) METER IN LENGTH SHALL BE PROVIDED OR INSERTED WITH 2 (25 MM) Ø PVC PIPES FOR FITTING AT THEIR REQUIRED LOCATIONS. THE PVC PIPES SHALL BE PLACED 25 MM FROM BOTH EDGE DURING THE PLASTIC STATE OF FRESH CONCRETE.

2. PRECAST CURB AND GUTTER SHALL BE LIFTED ON UPRIGHT POSITION AND NOT AT THE POINTS

OF SUPPORT AND SHALL BE THE SAME DURING TRANSPORTING AND STORAGE.

AVOID CRACKING

NO PRECAST CURB AND GUTTER SHALL BE USED THAT DOES NOT REACH ITS FINAL POSITION IN 4 THE FORMS WITH THE REQUIRED TIME STIPULATED PRIOR TO INSTALLATION.

PRECAST CURB AND GUTTER SHALL BE TRANSFERRED TO THE CONSTRUCTION SITE. FRESH CURB AND GUTTER SHALL NOT BE PLACED AGAINST IN-SITU CONCRETE WHICH HAS BEEN IN A POSITION FOR MORE THAN 30 MINUTES.

PRECAST CURB AND GUTTER MAY ONLY BE TRANSPORTED TO THE DELIVERY POINT IN TRUCK AGITATORS OR TRUCK MIXER OPERATING AT THE SPEED DESIGNATED BY THE MANUFACTURER OF THE EQUIPMENT, PROVIDED THAT THE CONSISTENCY AND WORKABILITY OF THE MIX CONCRETE UPON DISCHARGE AT THE DELIVERY POINT IS SUITABLE FOR ADEQUATE PLACEMENT.

600.4 METHOD OF MEASUREMENT

THE LENGTH OF CURB AND GUTTER TO BE PAID FOR SHALL BE THE NUMBER OF LINEAR METERS OF CURB AND GUTTER (CAST IN PLACE) OR THE NUMBER OF PIECES OF PRECAST CURB AND GUTTER OF THE REQUIRED DIMENSIONS SHOWN ON THE PLANS MEASURED ALONG ITS FRONT FACE IN-PLACE. COMPLETED AND ACCEPTED. NO DEDUCTIONS SHALL BE MADE FOR FLATTENING OF CURBS ENTRANCES AND NO ADDITIONAL ALLOWANCES SHALL BE MADE FOR CURBS AND GUTTERS CONSTRUCTED ON CURVES

600.5 BASIS OF PAYMENT

THE LENGTH OF CURB AND GUTTER DETERMINED IN SUBSECTION 600.4, METHOD OF MEASUREMENT, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER LINEAR METER FOR CURB AND GUTTER WHICH PRICE AND PAYMENT SHALL CONSTITUTE FULL COMPENSATION FOR FURNISHING AND PLACING ALL MATERIALS FOR CONCRETE, REINFORCING STEEL IF REQUIRED ON THE PLANS, EXPANSION JOINT MATERIALS, FORMS FOR DRAINAGE OPENINGS, EXCAVATION FOR CURB AND GUTTER. BACKFILLING, DUMPING AND DISPOSAL OF SURPLUS MATERIALS, AND FOR ALL LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THE ITEM.

PAYMENT WILL BE MADE UNDER:

PAY ITEM NUMBER	DESCRIPTION	UNIT OF MEASUREMENT
600(1)	CONCRETE CURB	LINEAR METER
	(CAST INT EACE)	
600(2)	CONCRETE GUTTER	LINEAR METER
	(CAST IN PLACE)	
600(3)	CURB AND GUTTER	LINEAR METER
	(CAST IN PLACE)	
600(4)	CONCRETE CURB	PIECE
	(PRECAST)	
600(5)	CONCRETE GUTTER	PIECE
	(PRECAST)	
600(6)	CURB AND GUTTER	PIECE
	(PRECAST)	

ITEM 611 - TREE PLANTING

611.1 DESCRIPTION

THIS ITEM SHALL CONSIST OF FURNISHING AND PLANTING DECIDUOUS SHADE, FLOWERING TREES AND EVERGREEN TREES LESS THAN 150 MM IN DIAMETER ON THE AREAS AND IN THE ARRANGEMENTS INDICATED ON THE PLANS OR AS INDICATED BY THE ENGINEER INCLUDING THE DIGGING AND PREPARATION OF POCKET HOLES, FURNISHING AND PLACING THE NECESSARY TOPSOIL, MULCH, WATER, FERTILIZER AND OTHER INCIDENTALS NECESSARY TO COMPLETE THE ITEM.

611.2 MATERIAL REQUIREMENTS

611.2.1 TOPSOIL

TOPSOIL SHALL CONFORM TO THE REQUIREMENTS OF ITEM 608, TOPSOIL.

611.2.2 MULCHING

MULCHING MATERIAL SHALL CONSIST OF APPROVED WOOD CHIPS GROUND OR CRUSHED CORN COBS, WOOD SHAVINGS, SAWDUST OR PEAT MOSS. WOOD CHIPS SHALL BE COMBINATION OF WOOD SLIVERS WITH GROUND WOOD OR SAWDUST

BRACING STAKES FOR PLANTS SHALL BE 50 MM X 50 MM OF ROUGH WOOD FREE FROM UNSOUND LOOSE KNOTS, ROT, CROSS GRAIN AND SAPWOOD OR OTHER DEFECTS THAT MAY IMPAIR ITS STRENGTH.

ANCHOR STAKES SHALL BE OF THE SAME QUALITY AS BRACING STAKES AND OF THE SIZE SPECIFIED UNDER OPERATIONS CALLING FOR THEIR USE.

WRAPPING MATERIAL FOR TREES SHALL BE WATERPROOF PAPER OR BURLAP.

-SPECIFICATION AND CONSTRUCTION

SHEET CONTENTS

REQUIREMENTS

THE TYING MATERIAL TO BE USED IN WRAPPING TREES SHALL BE JUTE TWINE OR SIMILAR MATERIAL NOT LESS THAN 2-PLY FOR TREES 7.5 MM OR LESS IN DIAMETER AND 3-PLY FOR TREES OVER 7.5 MM IN DIAMETER.

THE WIRE TO BE USED IN BRACING TREES 7.5 MM OR LESS IN DIAMETER SHALL BE 3 MM

SPECIFICATION AND CONSTRUCTION REQUIREMENTS Gen-12 NOT TO SCALE

MARK ANTHONY L. FE

ENGINEER I

PREPARED:

CONSTRUCTION OF ROAD, PAYACPAC -EPARTMENT OF PUBLIC WORKS AND HIGHWAYS PALAKPAK - LUMES - APNE, BARANGAY SAN CORDILLERA ADMINISTRATIVE REGION BENGUET 1ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET

REPUBLIC OF THE PHILIPPINES

TUBA. BENGUET

PASCUAL, TUBA, BENGUET

PROJECT NAME AND LOCATION:

OR KINKS.

PLANTS.

611.3.2 DIGGING PLANTS

AFTER PLANTING AND PRIOR TO MULCHING, FERTILIZERS SHALL BE APPLIED EVENLY ALL PLANTS, NURSERY-GROWN OR COLLECTED, SHALL BE DUG WITH CARE AND SKILL OVER THE TOP OF THE BACKFILLED AREA. CARE SHALL BE USED SO THAT THE FERTILIZER IMMEDIATELY BEFORE SHIPPING AND AVOIDING ALL POSSIBLE INJURY TO THE PLANTS, LOSS DOES NOT GET INTO CONTACT WITH THE STEM, TRUNK, BRANCHES OR LEAVES OF THE OR DAMAGE OF THE ROOTS, PARTICULAR ATTENTION BEING GIVEN TO FIBROUS ROOTS IN PLANTS. THIS RESPECT. AFTER THE PLANTS ARE DUG, THEIR ROOTS SHALL NOT BE PERMITTED TO DRY OUT. THEY SHALL NOT BE EXPOSED TO HOT TEMPERATURES. ALL PLANTS SHALL BE DUG 611.3.8.1 TREE PLANTING ALONG NATIONAL ROAD IN DORMANT STATE AND SHALL BE SO HELD UNTIL PLANTED.

AFTER DELIVERY AND INSPECTION, THE PLANTS SHALL BE SPRAYED WITH AN APPROVED ANTI-DESICCANT PRIOR TO PLANTING, HEELING-IN OR STORING, EXCEPT IN THE CASE OF COLLECTED STOCK WHICH SHALL NOT BE HEELED-IN OR STORED, BUT SHALL BE SPRAYED WITH ANTI-DESICCANT IMMEDIATELY AND PLANTED WITHIN 36 HOURS AFTER DIGGING

TREES SHALL BE PLANTED IN A NEAT ROW, WITHIN THE ROAD RIGHT-OF-WAY (ROW) AND AS CLOSE AS POSSIBLE TO THE ROW LIMIT, WITH SUFFICIENT ALLOWANCE SO THAT THE TREES WHEN FULLY GROWN WILL NOT ENCROACH ON THE ADJOINING PROPERTY OR TOUCH ELECTRIC AND OTHER OVERHEAD UTILITY LINES. THE CENTER-TO-CENTER SPACING THE SPRAY SHALL COVER BOTH UPPER AND LOWER SURFACES OF THE BRANCHES AND BETWEEN TREES SHALL BE 10-20 METERS (M). FOR ROAD SECTIONS WITH A GENERALLY FOILAGE TO THE POINT OF RUN-OFF. SPRAY NOZZLES SHALL BE THE TYPE TO PRODUCE A NORTH-SOUTH ALIGNMENT, THE TREES ON ONE SIDE OF THE ROAD SHALL BE STAGGERED VIS-A-VIS THE TREES ON THE OTHER SIDE OF THE ROAD. THIS ARRANGEMENT WILL HELP TO FINE MIST ENSURE THAT ENOUGH SUNLIGHT WILL FALL ON THE ROAD AND THUS HELP TO KEEP THE ROAD DRY EVEN DURING THE RAINY SEASON.

SPRAYING SHALL BE INCLUDED FOR PAYMENT IN THE PERTINENT PLANTING ITEM. FOLLOWING SPRAY TREATMENT WITH ANTI-DESICCANT, ALL PLANTS WHICH CANNOT BE PLANTED PROMPTLY SHALL BE HEELED-IN IN A TRENCH, SPREAD AND THE ROOTS COVERED FOR ROADS WITHOUT CURBS, THE TREES SHALL BE PLANTED WITH A MINIMUM WITH MOIST SOIL. IF PLANTS ARE NOT TO BE STORED FOR A PERIOD LONGER THAN 10 DAYS, CLEAR DISTANCE OF 0.60 M BEYOND THE EDGE OF THE SHOULDER, BUT IN NO CASE LESS THAN 3.0 M FROM THE EDGE OF THE PAVEMENT. FOR ROADS WITH CURBS. PARTICULARLY IN THEY MAY BE PLACED IN AN APPROVED WELL- VENTILATED, COOL AND MOIST STORAGE SHED URBAN AREAS, THE TREES SHALL BE PLANTED WITH A MINIMUM SETBACK OF 1.00 M BEYOND AND THE ROOTS COMPLETELY COVERED WITH MOIST STRAW. ALL PLANTS HEELED-IN OR STORED SHALL BE PROPERLY MAINTAINED BY THE CONTRACTOR UNTIL PLANTED. IN THE THE FACE OF THE CURB. EVENT HEELED-IN PLANT MATERIAL MUST BE HELD OVER FOR A LONGER PERIOD, SUCH HEELED-IN MATERIAL SHALL BE LIFTED AND REPLANTED IN A SATISFACTORY MANNER IN WHERE THERE ARE LONGITUDINAL DRAINAGE CANALS, PLANTED ON THE OUTER SIDE NURSERY ROWS. OF SUCH CANALS. ON THE ROADWAY CURVES AND INTERSECTIONS, THE PERTINENT DESIGN STANDARDS ON SIGHT DISTANCE SHALL BE OBSERVED.

SUCH EMERGENCY STORAGE OF PLANT SHALL BE AT THE ENTIRE RISK OF THE CONTRACTOR INCLUDING MAINTENANCE OF SAME

BEFORE DIGGING POCKET HOLES OR BEDS, THE CONTRACTOR SHALL LAY OUT, BY SUITABLE STAKING, THE LOCATION OF ALL POCKET HOLES AND BEDS. THE LAYOUT OF

(NO. 11) GALVANIZED STEEL WIRE AND FOR TREES OVER 75 MM IN DIAMETER, 40 MM (NO. 9) GALVANIZED STEEL WIRE SHALL BE USED. ALL WIRES SHALL BE NEW AND FREE FROM BENDS

611.2.3 TREES

ALL TREES FURNISHED UNDER THIS ITEM SHALL BE 150 MM OR LESS IN DIAMETER AND SHALL BE TRUE TO NAME AND TYPE AND SHALL FOLLOW STANDARD NAMES OF TREES IN ACCORDANCE WITH THE BUREAU OF FORESTRY STANDARDS AS ADOPTED BY THE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS.

WHEN SPECIFIED IN THE PROVISIONS, CERTAIN VARIETIES OF PLANTS WILL BE FURNISHED BY THE GOVERNMENT

THE CONTRACTOR SHALL SUBMIT COMPLETE AND DETAILED INFORMATION CONCERNING THE SOURCES OF SUPPLY FOR EACH ITEM OF PLANT MATERIALS BEFORE PLANTING OPERATIONS.

ALL EXISTING LAWS AND REGULATIONS REQUIRING INSPECTION FOR PLANT DISEASES AND INFECTIONS SHALL BE COMPLIED WITH AND EACH DELIVERY SHALL BE ACCOMPANIED BY NECESSARY CERTIFICATES OF CLEARANCE TO BE PRESENTED TO THE ENGINEER.

PLANTS FURNISHED BY THE CONTRACTOR SHALL BE HEALTHY, SHAPELY AND WELL-ROOTED AND ROOTS SHALL SHOW NO EVIDENCE OF HAVING BEEN RESTRICTED OR DEFORMED AT ANY TIME. PLANTS SHALL BE WELL-GROWN AND FREE FROM INSECT PEST AND DISEASE.

ROOT CONDITION OF PLANTS FURNISHED BY THE CONTRACTOR IN CONTAINERS WILL BE DETERMINED BY THE REMOVAL OF EARTH FROM THE ROOTS OF NOT LESS THAN TWO PLANTS NOR MORE THAN TWO (2) PERCENT OF TOTAL NUMBER OF PLANTS OF EACH SPECIE OR VARIETY EXCEPT WHEN CONTAINER-GROWN PLANTS ARE FROM SEVERAL SOURCES, THE ROOTS OF NOT LESS THAN TWO PLANTS OF EACH SPECIE OR VARIETY FROM EACH SOURCE WILL BE INSPECTED BY THE ENGINEER. IN CASE THE SAMPLE PLANTS INSPECTED ARE FOUND TO BE DEFECTIVE, THE GOVERNMENT RESERVES THE RIGHT TO REJECT THE ENTIRE LOT OR LOTS OF PLANTS REPRESENTED BY THE DEFECTIVE SAMPLES. ANY PLANT RENDERED UNSUITABLE FOR PLANTING BECAUSE OF THIS INSPECTION WILL BE CONSIDERED AS SAMPLES AND WILL NOT BE PAID FOR.

611.3 CONSTRUCTION METHODS

611.3.1 BALLING OF PLANTS AND TREES

BALLING IS EMPLOYED IN PLANTS AND TREES TO BE TRANSPLANTED OR TRANSFERRED. TO BALL OUT THE TREES. THE DEPTH TO WHICH THE ROOT SYSTEM REACHES IS FIRST DETERMINED. DIGGING AROUND THE TREE IS THEN DONE, BEING CAREFUL NOT TO CUT MANY ROOTS. WATERING THE SOIL BEFORE BALLING IS PROHIBITED. THE SURFACE OF THE EARTH IS KEPT AS SMOOTH AS POSSIBLE. AFTER THE TREE IS DUG OUT, THE ROOTS AND EARTH IS WRAPPED IMMEDIATELY WITH THE SACKING MATERIAL. THE TREE COULD NOW BE TIPPED OVER AND ROLLED TO A NEW LOCATION. THESE PLANTS SHALL BE HAULED BY THE BALL ONLY AND NOT BY THE PLANT ITSELF. THE SLIGHTEST INDICATION OF MANUFACTURED EARTH BALLS OR HAULING OF THE PLANTS ITSELF WILL BE A CAUSE FOR REJECTION OF SUCH

611.3.3 TEMPORARY STORAGE AND PLANT SPRAY

THE BALL OF SOIL AND ROOTS OF BALLED AND BURLAPPED PLANTS, IF NOT IMMEDIATELY PLANTED AFTER DELIVERY AND INSPECTION, SHALL BE ADEQUATELY PROTECTED BY TOPSOIL COVERING UNTIL REMOVED FOR PLANTING IN A MANNER APPROPRIATE TO THE CONDITIONS AND SATISFACTORY TO THE ENGINEER.

611.3.4 LAYOUT OF PLANTING

PLANTING SHALL BE APPROVED BY THE ENGINEER. 611.3.5 ROOTS AND TOP PRUNING

THE ENDS OF ALL BROKEN AND DAMAGED ROOTS, 6 MM DIAMETER OR LARGER, SHALL BE PRUNED WITH A CLEAN CUT, REMOVING NO MORE THAN THE INJURED PORTION. ALL PLANTS SHALL BE PRUNED TO BALANCE THE TOP WITH THE ROOT SYSTEM KEEPING THE NATURAL SHAPE OF THE SPECIES. ALL DEAD WOODS SHALL BE REMOVED. ALL CUTS AND WOUNDS, 12 MM OR OVER IN DIAMETER, SHALL BE PAINTED WITH TREE WOUND DRESSING IMMEDIATELY AFTER THE PRUNING.

611.3.6 POCKET HOLES

POCKET HOLES SHALL BE DUG AT THE LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY ENGINEER. THE HOLES SHALL BE DUG TO THE DEPTH AND CROSS-SECTION SPECIFIED AND SHOULD BE OF SUFFICIENT SIZE TO PROVIDE FOR NOT LESS THAN 150 MM OF TOP SOIL BACKFILL BENEATH AND AROUND THE ROOT SYSTEM. THE HOLES SHALL BE DUG WITH THE SIDES VERTICAL, SURPLUS EXCAVATION FROM THE BED AND POCKET HOLES SHALL BE DISPOSED OFF AS DIRECTED BY THE ENGINEER.

611.3.7 BACKFILL

THE POCKET HOLES SHALL BE BACKFILLED WITH TOPSOIL AS EACH PLANT IS SET. THE TOPSOIL SHALL BE WELL-TAMPED BY THE WORKER'S FEET, RODS OR OTHER APPROVED TAMPING DEVICES AS IT IS SHOVELLED INTO THE HOLES. THE BACKFILL IN HOLES ON SLOPES SHALL BE BUILT-UP ON THE LOWER SIDE TO CATCH AND HOLD WATER. DURING PLANTING THE TOPSOIL SURROUNDING THE PLANT BE SLIGHTLY DEPRESSED TO HOLD WATER.

611.3.8 PLANTING

THE PLANTS TO BE PLANTED SHALL BE THE SPECIE, VARIETY AND SIZE SPECIFIED. THE OPERATION OF THE ACTUAL PLANTING SHALL NOT BE PERFORMED AT ANY TIME WHEN THE SOIL IS NOT IN A FRIABLE OR WORKABLE CONDITION. THE ENGINEER SHALL ALSO APPROVE THE LOCATION OF EACH INDIVIDUAL PLANT TAKING INTO CONSIDERATION ITS SIZE AND SHAPE, IN ORDER THAT THE BEST POSSIBLE ARRANGEMENT WILL RESULT.

ONE PLANT SHALL BE PLANTED IN THE CENTER OF EACH POCKET HOLE AND IN THE ARRANGEMENT SHOWN ON THE PLANS. THE PLANTS SHALL BE SET ON TAMPED TOPSOIL BACKEILL BROUGHT TO THE HEIGHT NECESSARY TO PLANT THEM AT THE SAME DEPTH THEY GREW, CAREFULLY SPREADING OUT THE ROOTS OF BAREFOOT STOCK IN THEIR NATURAL POSITION. UPRIGHT PLANTS SHALL BE KEPT IN A VERTICAL POSITION. AFTER PLACING THE PLANT IN THE HOLE, THE BACKFILL SHALL BE CAREFULLY MADE, TAMPING WITH THE WORKER'S FEET AND WITH ROUND-END RODS OR OTHER APPROVED TAMPING DEVICES TO INSURE TOPSOIL IN AND ABOUT ALL THE ROOTS. THE TOPSOIL SHALL BE SETTLED IN AND ABOUT THE PLANT ROOTS BY APPLICATION OF WATER BUT AT NO TIME SHALL TAMPING OR FURTHER TOPSOIL BACKFILL BE MADE WHILE THIS WET TOPSOIL BACKFILL IS OF A CONSISTENCY THAT WOULD PERMIT ITS BEING COMPACTED OR PUDDLED BY SO DOING. ALL COMPACTION SHALL BE SUCH THAT NO PLANT WILL SETTLE LOWER THAN THE DEPTH ABOVE SPECIFIED. NO AIR POCKET SHALL BE LEFT AROUND THE ROOT OF ANY PLANTS.

AFTER FILLING HALFWAY ON THE EARTH BALL, THE BURLAP SHALL BE LOOSENED AND THE TOP HALF CUT OFF AND REMOVED AFTER WHICH THE BALANCE OF THE POCKET HOLE SHALL BE BACKFILLED AND TAMPED.

THE TREES TO BE USED FOR THIS PURPOSE SHALL BE THE VARIETIES, THE ROOT SYSTEMS OF WHICH GROW DOWNWARD RATHER THAN SIDEWARD TO AVOID SITUATIONS WHERE THE ROOTS SPREAD SIDEWARD AND CONSEQUENTLY DESTROY THE ROAD AND SIDEWALK SLABS.

NON-TRAVERSABLE HAZARDS (RAVINE, WAITING SHED, ETC.) ALONG THE LINE OF TREES SHALL BE PROVIDED WITH APPROPRIATE BARRIERS, E.G., GUARDRAILS, AND CLEARLY MARKED, SO THAT THESE DO NOT POSE HAZARDS TO MOTORISTS.

THE CONTRACTOR CONCERNED SHALL UNDERTAKE AND BE RESPONSIBLE FOR THE MAINTENANCE OF THE PLANTED TREES DURING THE CONTRACT WARRANTY PERIOD OF THE ROAD PROJECT COVERED BY HIS CONTRACT. THE CONTRACTOR'S MAINTENANCE WORK SHALL COMPLY WITH THE PROVISION OF SUBSECTION 611.3.10 (WATERING AND MAINTENANCE). THE MAINTENANCE OF TREES SHALL BE FAITHFULLY UNDERTAKEN AS AN INTEGRAL PART OF THE REGULAR ROAD MAINTENANCE PROGRAM AND SHALL BE INCLUDED IN THE REPORTS THEREFORE AS A REGULAR WORK ITEM UNDER ACTIVITY NO. 209 OF THE HIGHWAY MAINTENANCE ACTIVITY STANDARDS.

	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
RRER	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER DATE:	ISAGANI C. CAYME, CESE DISTRICT ENGINEER DATE:	GENERAL 12 16	13 120

THE TREE PLANTING SHALL BE UNDERTAKEN NOT ONLY ALONG NATIONAL ROADS PROGRAMMED FOR CONSTRUCTION OR IMPROVEMENT, BUT ALSO ALONG EXISTING NATIONAL ROADS ESPECIALLY THOSE OUTSIDE DEVELOPED URBAN AREAS WHERE THERE ARE NO TREES OR ONLY A FEW TREES HAVE BEEN PLANTED. FOR SUCH EXISTING ROADS, THE REQUIRED TREE PLANTING SHALL BE UNDERTAKEN BY THE DISTRICT ENGINEERING OFFICE CONCERNED. THE TREE PLANTING SHALL BE UNDERTAKEN IN BOTH CONTRACTUAL PROJECTS AND PROJECTS BY ADMINISTRATION.

611.3.9 MULCHING

WITHIN 24 HOURS AFTER PLANTING, MULCHING MATERIAL SHALL BE SPREAD TO COVER THE PLANT HOLE AND THE AREA 150 MM OUTSIDE THE PERIPHERY OF THE PLANT HOLE. THE DEPTH AND APPLICATION FOR WOOD CHIPS SHALL BE A MINIMUM OF 150 MM. FOR GROUND OR CRUSHED CORN COBS, SAWDUST OR PEAT MOSS THE MINIMUM DEPTH SHALL BE 100 MM.

611.3.10 WATERING AND MAINTENANCE

ALL PLANTS SHALL BE WATERED DURING THE PLANTING OPERATIONS, SUBJECT TO DIRECTION AND APPROVAL OF THE ENGINEER.

FROM TIME TO TIME DURING THE LIFE OF THE CONTRACT, SUFFICIENT WATER SHALL BE APPLIED SO THAT NOT ONLY WILL THE TOPSOIL BACKFILL ABOUT EACH PLANT BE KEPT MOIST, BUT ALSO FOR MOISTURE TO EXTEND INTO THE SURROUNDING SOIL.

THE CONCTRACTOR SHALL, DURING THE LIFE OF THE CONTRACT, PROPERLY CARE FOR ALL PLANTS FURNISHED, PLANTED OR STORED, PERFORMING SUCH, WATERING, WEEDING, CULTIVATING OR OTHER ORDINARY MAINTENANCE WORK AS SHALL BE NECESSARY TO KEEP THE STOCK IN A LIVE AND HEALTHY CONDITION. PLANTS WHICH HAVE DIED BACK INTO THE CROWN OR BEYOND A NORMAL PRUNING LINE SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE GOVERNMENT.

611.3.11 BRACING

ALL DECIDUOUS AND EVERGREEN TREES SHALL BE BRACED IMMEDIATELY AFTER PLANTING, DECIDUOUS TREES FROM 1.20 M TO 1.80 M IN HEIGHT SHALL HAVE ONE VERTICAL SUPPORT STAKE. DECIDUOUS TREES FROM 1.80 M TO 2.50 M IN HEIGHT SHALL HAVE TWO VERTICAL SUPPORT STAKES.

BALLED AND BURLAPPED DECIDUOUS OR EVERGREEN TREES WITHIN THE ABOVE SIZE RANGES SHALL BE SUPPORTED WITH THE NUMBER OF STAKES SPECIFIED FOR THE GROUP BUT INSTEAD OF BEING PLACED VERTICALLY, SHALL BE DRIVEN SO THAT THE STAKE DOES NOT ENTER OR CONTACT THE EARTH BALL AROUND THE PLANT ROOTS. THE STAKE OR STAKES SHALL BE SO PLACED THAT AFTER BEING DRIVEN IN PLACE. THE UPPER FOOT OF THE STAKE IS WITHIN APPROXIMATELY 100 MM OF THE TRUNK AT ONE-HALF OF THE HEIGHT OF THE TREE. IF TWO ARE REQUIRED, THEY SHALL BE DRIVEN ON OPPOSITE SIDES OF THE TREE WITH THE STAKE TOPS ON OPPOSITE SIDES FOR FASTENING.

ALL TREES, DECIDUOUS OR EVERGREEN OVER TWO AND ONE-HALF METERS SHALL BE BRACED BY THE TRIPOD METHOD AS DIRECTED BY THE ENGINEER.

611.3.12 DEAD TREES

BEFORE COMPLETION AND FINAL ACCEPTANCE OF THE PROJECT, ALL TREES NOT HEALTHY OR THAT HAVE DIED BACK INTO THE CROWN OR BEYOND THE NORMAL PRUNING LINE SHALL BE REPLACED BY THE CONTRACTOR AT HIS OWN EXPENSE WITH TREES OF THE SPECIFIED SPECIES OR VARIETY, SIZE AND QUALITY AND MEETING THE SPECIFICATION.

611.4 METHOD OF MEASUREMENT

THE QUANTITY TO BE PAID FOR SHALL BE THE NUMBER OF TREES OF EACH SPECIE OR VARIETY CALLED FOR IN THE PLANS FURNISHED, PLANTED AND ACCEPTED WITH THE NECESSARY MULCH, TOPSOIL, WATER, FERTILIZER AND OTHER INCIDENTALS TO COMPLETE THE ITEM.

611.5 BASIS OF PAYMENT

THE QUANTITIES AS DETERMINED IN SECTION 611.4, METHOD OF MEASUREMENT, SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE EACH OF THE TREES OF EACH SPECIE OR VARIETY FURNISHED, PLANTED AND ACCEPTED WHICH PRICE AND PAYMENT SHALL CONSTITUTE FULL COMPENSATION FOR FURNISHING ALL LABOR, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THE ITEM.

PAYMENT WILL BE MADE UNDER:

PAY ITEM NUMBER	DESCRIPTION	UNIT OF MEASUREMENT
611(1)	TREES (FURNISHING AND TRANSPLANTING)	EACH
611(2)	TREES (TRANSPLANTING)	EACH

SPECIFICATION AND CONSTRUCTION REQUIREMENTS

NOT TO SCALE



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Gen-13

REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS CORDILLERA ADMINISTRATIVE REGION BENGUET 1ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET

CONSTRUCTION OF ROAD, PAYACPAC -PALAKPAK - LUMES - APNE, BARANGAY SAN PASCUAL, TUBA, BENGUET

-SPECIFICATION AND MISCELLANEOUS REQUIREMENTS

-SUMMARY OF QUANTITIES -SCHEDULE OF DRAINAGE & MISCELLANEOUS WORKS

PROJECT NAME AND LOCATION:

TEM NO.	DESCRIPTION	071/		SUMMARY OF QUANTITIES								
		QIY.	UNIT	REMARKS								
PART B	OTHER GENERAL REQUIREMENTS											
B.3	Permits and Clearances	1.00	lumpsum	Tree Cutting Permits & Clearances								
B.5 (1)	Project Billboard/ Signboard	3.00	each	COA Billboards and DPWH Project Sign Board								
B.7 (2)	Occupational Safety and Health Program	1.00	lumpsum	Personal Protective Equipment								
B.8 (2)	Traffic Management	1.00	lumpsum	Informative and Regulatory Traffic Signages								
B.9	Mobilization/ Demoblization	1.00	lumpsum	Mobilization and Demobilization of Equipment								
PART C	EARTHWORKS											
100(1)	Clearing & Grubbing	3.78	ha.	Removal and Disposal of Vegetation and Debris at project site								
100(3)a1	Individual Removal of Trees (Small, 150-300mm dia.)	9.00	each	Removal of Trees								
100(3)a2	Individual Removal of Trees (Small, 301-500mm dia.)	6.00	each									
102(2)	Surplus Common Excavation	199,146.00	cu.m.	Roadway Excavation for Common Soil								
102(3)a	Surplus Rock Excavation (Soft)	46,377.00	cu.m.	Roadway Excavation for Soft Rock								
102(3)b	Surplus Rock Excavation (Hard)	24,810.00	cu.m.	Roadway Excavation for Hard Rock								
103(1)a	Structure Excavation (Common Soil)	1,127.00	cu.m.	Structure Excavation for Common Soil								
104(1)a	Embankment from Roadway / Structure Excavation (Common Soil)	1,775.00	cu.m.	For Slope Protection Structures, Drainage Structures								
105(1)a	Subgrade Preparation (Common Material)	5,500.00	sq.m.	Preparation of subgrade base								
PART D	SUBBASE AND BASE COURSE											
200(1)	Aggregate Subbase Course	550.00	cu.m.	Well-compacted subbase course								
PART E	SURFACE COURSES											
311(1)c1	Portland Cement Concrete Pavement (Unreinforced), 0.23m thick, 14 days	5,500.00	sq.m.	Well-compacted subbase course								
PART G	DRAINAGE AND SLOPE PROTECTION STRUCTURES											
404(1)a	Reinforcing Steel (Grade 40)	1,510.00	kgs.	For Proposed HDPE Inlat & Painforced Concrete Eluma								
405(1)a2	Structural Concrete, 20.68 Mpa, Class A, 14 days	27.00	cu.m.	For Froposed FIDEE filler & Reinforced Concrete Filline								
503(13)	High-Density Polyethylene Pipe (Structured Wall Pipe)	72.00	ln.m.	1000mmØ Structured Wall Pipe - Load-bearing High Density Polyethylene (HDPE) Pipe								
506(1)	Stone Masonry	1,865.00	cu.m.	Embankment of Slope Protection,Dumpsite Structure & HDPE Headwall								
PART H	MISCELLANEOUS STRUCTURES											
600(4)	Curb and Gutter (Cast in Place)	1,097.00	ln.m.	Curb and Gutter construction along various sections								
611 (1)	Trees (Furnishing and Transplanting)	1,500.00	each	Tree Planting								

SCHEDULE OF SLOPE PROTECTION STRUCTURE & MISCELLANEOUS WORKS

TYPE OF TYPE OF WORK STRUCTURE		STATION	QUANTITY	UNIT	REMARKS
ROAD CONCRETING	PCCP	STA.0+000.00- STA.1+100.00	1,100.00	LN.M.	WIDTH=5.00M
ROAD OPENING	GRAVEL ROAD	STA.1+100.00- STA.4+859.50	3,760.00	LN.M.	WIDTH=6.70M (MIN)
		STA.0+302.00- STA.0+312.00	10.00	LN.M.	LEFT SIDE
	STONE MASONRY-A	STA.0+957.00- STA.0+977.00	20.00	LN.M.	LEFT SIDE
		STA.1+938.15- STA.1+948.15	10.00	LN.M.	LEFT SIDE
SLOPE PROTECTION		STA.3+022.73- STA.3+032.73	10.00	LN.M.	LEFT SIDE
STRUCTURE		STA.3+932.20- STA.3+942.20	10.00	LN.M.	LEFT SIDE
		STA.4+849.50- STA.4+859.50	10.00	LN.M.	LEFT SIDE
	STONE MASONRY-B	STA.4+114.25- STA.4+129.25	15.00	LN.M.	LEFT SIDE
	STONE MASONRY-C/ DUMPING SITE STRUCTURE	STA.1+200.00	20.00	LN.M.	LEFT SIDE
	STONE MASONRY-	STA.1+700.00- STA.1+760.00	60.00	LN.M.	MOUNTAIN SIDE
	BREASTWALL	STA.1+820.00- STA.1+920.00	100.00	LN.M.	MOUNTAIN SIDE
	CURB AND GUTTER	STA.0+000.00- STA.1+100.00	1,100.00	LN.M.	MOUNTAIN SIDE
		STA.0+307.00	12.00	LN.M.	WITH INLET & REINFORCED CONCRETE FLUME
		STA.0+967.00	12.00	LN.M.	WITH INLET & REINFORCED CONCRETE FLUME
DRAINAGE	HDPE Pipe	STA.1+943.15	12.00	LN.M.	WITH INLET & REINFORCED CONCRETE FLUME
STRUCTURE	(1000mm Ø)	STA.3+027.73	12.00	LN.M.	WITH INLET & REINFORCED CONCRETE FLUME
		STA.3+937.20	12.00	LN.M.	WITH INLET & REINFORCED CONCRETE FLUME
		STA.4+121.75	12.00	LN.M.	WITH INLET & REINFORCED CONCRETE FLUME
SHEET CONTENTS:		PREPARED:			REVIEWED:



Gen-13

SUMMARY OF QUANTITIES

NOT TO SCALE



NOT TO SCALE

ED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO
MARK ANTHONY L. FERRER ENGINEER II	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER	ISAGANI C. CAYME, CESE DISTRICT ENGINEER	GENERAL 13 16	14

E	EXISTIN	NG TOPOGF	RAPHIC	FEATURES		NEW TO	POGRAPH	IC FEA	TURES	
CONTOUR		R.C. BOX CULVERT			PROJECT ROAD	R.	.C. BOX CULVERT			
TREES		REINFORCED CONCRETE PIPE CULVERT (SINGLE)			€ OF PROJECT ROAD	s	STONE MASONRY			
ROAD		REINFORCED CONCRETE PIPE CULVERT (DOUBLE)	PLAN PROFILE		REINFORCED CONCRETE PIPE CULVERT (SINGLE)	PLAN PROFILE G	GROUTED RIPRAP			
RIPRAP		BRIDGE	$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} $		REINFORCED CONCRETE PIPE CULVERT (DOUBLE)	PLAN PROFILE				
CONCRETE BARRIER					EMBANKMENT	<i>₹////////////////////////////////////</i>				
BENCH MARK	\bullet				EXCAVATION	<u>+</u>				
PORTLAND CEMENT CONCRETE PAVEMENT					SLOPE PROTECTION	+				
ORIGINAL GROUND					SECTION IN EARTH					
GUARDRAIL	r1.511.511.511				NORTH SIGNS					
KILOMETER POST	- The second sec				FINISHED GRADE ON PROFILE	g = +3.00 %				
ROAD					POINT OF INTERSECTION	PI-01				
CONCRETE HOUSE					PORTLAND CEMENT CONCRETE PAVEMENT					

LEGENDS 1 Gen-14 NOT TO SCALE

ABBREVIATION / SYMBOL DESCRIPTION **ABBREVIATION / SYMBOL** DESCRIPTION EACH WAY ELEVATION ABUTMENT AHEAD STATION AND ABUT AH. Sta. EW ELEV./EL. ENGR. ENGR. EQ. EXC. EXTG. & APP ACP EMBANKMENT ENGINEER APPROACH EQUATION ASPHALT CONCRETE PAVEMENT ACP @ AZIM. BK.STA. BGY. BRG. BEG. BMSL BM BET. BST BST BH EXCAVATION AT EXISTING AZIMUTH BACK STATION EXPANSION EXPN. BARANGAY EXTENSION EXTN. EXTERIOR EXTR. OFFS BEARING EXTR E FIN. FG FPL FTG. e GIP GEN. EXTERNAL DISTANCE/EASTING FINISHED BEGINNING BELOW MEAN SEA LEVEL FINISHED GRADE BENCH MARK FINISHED PAVEMENT LEVEL BETWEEN BITUMINOUS SURFACE TREATMENT FOOTING BH BW BOT. BR. BLDG. CB CTR. FULL SUPERELEVATION BOREHOLE GALVANIZED IRON PIPE GENERAL BOTHWAYS BOTTOM g G GL HW HFL HTL HWL HOR. INV. GRADE IN PERCENT BRIDGE GRAVEL BUILDING GROUND LEVEL HEAD WALL CATCH BASIN CENTER HIGH FLOOD LEVEL CENTERLINE £ HIGH TIDE LEVEL CENTIMETER cm CLR COL. HIGH WATER LEVEL CLEAR HORIZONTAL COLUMN INVERT CONCRETE CONC. IN. ∞ ID INCHES CONCRETE HOLLOW BLOCK CHB CONC. MON. INFINITY CONCRETE MONUMENT CONST. CONST. JT. INSIDE DIAMETER PORTLA CONSTRUCTION CONSTRUCTION JOINT INTERIOR INT. CONT. COV. CP INTERMEDIATE INTERM. CONTINUOUS INTERSECTION ANGLE l JT. KG. COVER JOINT CROSS PIPE CUBIC METER cu.m. / m³ CYLINDRICAL DEPARTMENT OF PUBLIC WORKS CYL DPWH KILOMETER km. KPH Lt. LC LVC REIN KILOMETER PER HOUR REIN REINF LEFT AND HIGHWAYS LENGTH OF CIRCULAR CURVE LENGTH OF VERTICAL CURVE LENGTH OF WIDTH OF FULL WIDENING Df. DEPTH OF FILL DESIGN VELOCITY V DETAIL DIAMETER DIAPHRAGM W DET. LM LONGIT LS MAX. MFL MSL LINEAR METER DIA. / Ø DIAP. LONGITUDINAL LUMP SUM DISTANCE DIST. MAXIMUM DRWG. EA. EF DRAWING MAXIMUM FLOOD LEVEL MEAN SEA LEVEL EACH EACH FACE

2 ABBREVIATION AND SYMBOLS Gen-14

NOT TO SCALE

	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	PREPARED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS CORDILLERA ADMINISTRATIVE REGION BENGUET 1 ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET	CONSTRUCTION OF ROAD, PAYACPAC - PALAKPAK - LUMES - APNE, BARANGAY SAN PASCUAL,TUBA, BENGUET TUBA, BENGUET	-LEGENDS -ABBREVIATION AND SYMBOLS	MARK ANTHONY L. FERRER ENGINEER II	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION DATE:	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER DATE:	ISAGANI C. CAYME, CESE DISTRICT ENGINEER	GENERAL 14 15	15 120

DESCRIPTION	ABBREVIATION / SYMBOL	DESCRIPTION	ABBREVIATION / SYMBOL
METER	m	SPACES	SPC
METRIC TON	MT	SPECIAL	SPL
MIDDLE ORDINATE	MO	SQUARE	SQ.
MILLIMETER	mm	SQUARE METER	sq.m. / m²
MINIMUM	MIN.	STANDARD	STD
NEAR FACE	NF	STATION	STA.
NORTHING	N	STIFFENERS	STIFF.
NOT APPLICABLE	NA	STIRRUPS	STIRR.
NUMBER	NO.	STRAIGHT	STR
SET WITH RESPECT TO DISTANCE X	Y	STREET	ST.
(VERTICAL CURVE)		STRUCTURE	STRUCT.
ON CENTER	OC	SUPERELEVATION RUN OFF	Lo
ORDINARY WATER LEVEL	OWL	SYMMETRY	SYMM.
ORIGINAL GROUND LEVEL	OGL	TANGENT DISTANCE	Т
OUT INVERT	OUT INV.	TEMPERATURE	TEMP.
OUTSIDE DIAMETER	bc.	TEMPORARY BENCH MARK	ТВМ
PAVEMENT WIDTH	PW	TRANSITION LENGTH OF WIDENING	Ld
PERCENT	%	(DECREASING SECTION)	
PHILIPPINES	PHIL.	TRANSITION LENGTH OF WIDENING	Li
PLUS/MINUS	+/-	(INCREASING SECTION)	
POINT OF REVERSE CURVE	PRC	TRANSVERSÉ	TRANSV.
POINT OF COMPOUND CURVE	PCC	TYPICAL	TYP.
POINT OF CURVATURE	PC	VARIABLE	VAR
POINT OF INTERSECTION	PI	VERIFIED	VER
POINT OF TANGENCY	PT	VERTICAL	VERT
POINT OF VERTICAL CURVE	PVC	WATER TANK	wт
POINT OF VERTICAL INTERSECTION	PVI	WIDENING ON CURVE	w
POINT OF VERTICAL TANGENT	PVT	WIDTH	w
POINT ON TANGENT	РОТ	WINGWALL	ww
AND CEMENT CONCRETE PAVEMENT	PCCP	WITH	w/
PROJECT	PROJ	WOODEN ELECTRICAL POST	WEP
PROJECT ROAD	PROJ RD	FOLLOW EXISTING SUPERELEVATION	FES
RADIUS	R	FOLLOW EXISTING WIDENING	FFW
RATE OF VERTICAL CURVATURE	ĸ	SUPERELEVATION per LANE of PAVEMENT	we
REFERENCE POINT	RP	DEGREE OF CURVATURE	D
REINFORCED	RFINE	END OF VERTICAL CURVE ELEVATION	EVCE
NEORCED CONCRETE BOX CUI VERT	RCBC	BEG OF VERTICAL CURVE STATION	BVCS
	BCDG	POINT OF VERTICAL INTERSECTION STATION	PVIS
VEORCED CONCRETE PIPE CI II VERT	RCPC	BEG OF VERTICAL CURVE ELEVATION	BVCE
RETAINING WALL	RET WALL	POINT OF VERTICAL INTERSECTION	PVIF
RIGHT	Rt		
	R-O-W	END OF VERTICAL CURVE STATION	EVCS
	RD		2100
	RDWY		
	SHIDR		
	SDWK		
SPACED			





DE
В

REPUBLIC OF THE PHILIPPINES PARTMENT OF PUBLIC WORKS AND HIGHWAYS CONSTRUCTION OF ROAD, PAYACPAC -PALAKPAK - LUMES - APNE, BARANGAY SAN CORDILLERA ADMINISTRATIVE REGION PASCUAL, TUBA, BENGUET BENGUET 1ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET TUBA, BENGUET

MARK ANTHONY L. FE ENGINEER II PREPARED: DEXTER G. BIALN ENGINEER II

-SURVEY PLAN AND PROFILE

-ELEMENTS OF CURVE

I Station	Easting	Northing	Chord length	Radius	Design Speed, V (kilometer/hour)	De <mark>lta angl</mark> e	External Tangent	External Secant	Degree of Curvature by Arc	e%	Widening on Curves
+030.27m	443222.1245m	1814230.2489m	15.692m	22.741m	30	40.3672 (d)	8.360m	1.488m	75.5863 (d)	-4.00%	1.60m
+060.21m	443200.8559m	1814252.3011m	18.213m	16.646m	30	66.3352 (d)	10.879m	3.240m	103.2631 (d)	4.00%	1.82m
+091.67m	443169.0163m	1814240.5238m	20.874m	56.076m	30	21.4529 (d)	10.623m	0.997m	30.6524 (d)	-3.20%	2.86m
+127.66m	443132.7844m	1814241.2536m	16.927m	16.884m	30	60.1683 (d)	9.781m	2.629m	101.8021 (d)	-4.00%	1.98m
+158.51m	443117.1033m	1814269.9220m	19.635m	20.552m	30	57.0682 (d)	11.175m	2.842m	83.6337 (d)	4.00%	2.70m
+212.48m	443061.4010m	1814274.0652m	22.086m	26.710m	30	48.8416 (d)	12.128m	2.624m	64.3533 (d)	-4.00%	2.07m
+247.62m	443039.4071m	1814303.3536m	33.516m	32.748m	30	61.5572 (d)	19.505m	5.369m	52.4881 (d)	3.80%	1.64m
+297.93m	442985.8652m	1814295.3883m	21.643m	26.434m	30	48.3311 (d)	11.861m	2.539m	65.0255 (d)	-4.00%	2.91m
+327.51m	442962.0709m	1814315.2619m	23.441m	80.138m	30	16.8200 (d)	11.848m	0.871m	21.4488 (d)	2.80%	1.59m
+353.67m	442937.8431m	1814325.5707m	18.524m	21.347m	30	51.4276 (d)	10.280m	2.346m	80.5215 (d)	-4.00%	1.52m
+387.10m	442928.5204m	1814359.1353m	18.307m	13.316m	30	86.8490 (d)	12.603m	5.019m	129.0811 (d)	4.00%	2.28m
+443.09m	442868.9282m	1814346.0638m	20.439m	13.356m	30	99.8405 (d)	15.872m	7.388m	128.6949 (d)	-4.00%	1.52m
+469.95m	442867.3678m	1814381.3605m	15.213m	30.009m	30	29.3665 (d)	7.863m	1.013m	57.2787 (d)	-4.00%	1.53m

	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
RRER					PLAN AND	
10	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION	COMUALDO T. APALIAS	EDGARDO G. ENRIQUEZ	DISTRICT ENGINEER	01 10	
<u>.</u>	DATE:	DATE:	DATE:	DATE:		

_	RADIUS OF	CURVE					
Т	TANGENT [DISTANCE					
I	INTERSECT	ION ANGLE					
W	WIDENING	OF CURVE					
E	EXTERNAL						
е							
we	PAVEMENT	VATION per LANE OF					
v	SPEED OR	VELOCITY					
MO	MIDDLE OR	DINATE					
D	DEGREE OI	- CURVATURE					
PC	POINT OF C	URVATURE					
PT	POINT OF T	ANGENCY					
PI							
EVCE	ELEVATION						
BVCS	BEG. OF VE	RTICAL CURVE STATION					
PVIS	POINT OF V	ERTICAL					
BVCE	BEG. OF VE ELEVATION	RTICAL CURVE					
PVIE	POINT OF V	ERTICAL INTERSECTION					
EVCS	END OF VE	RTICAL CURVE STATION					
	LE	GEND					
—EL	EVATION-	MAJOR TOPOGRAPHY					
		MINOR TOPOGRAPHY					
÷		ROAD ALIGNMENT					
MATCHI	INE @ STA. XX	MATCHLINE					
		UNPAVED ROADWAY					
		RIGHT OF WAY LIMIT					
		PRS CONTROL POINT					
	BM 01	BENCHMARK					
(
	BH-01	BOREHOLE					
	BH-01 PI-01	BOREHOLE POINT OF INTERSECTION					
	ВН-01 РІ-01	BOREHOLE POINT OF INTERSECTION ROAD CONCRETING					

HORIZONTAL PROFILE GRID

VERTICAL PROFILE GRID

50m

1:1250 MTS.

1:125 MTS.

68.5r





BENGUET 1ST DISTRICT ENGINEERING OFFICE PASCUAL, TUBA, BENGUET WANGAL, LA TRINIDAD, BENGUET TUBA, BENGUET

PREPARED: DEXTER G. BIALNO ENGINEER II

OIC-CHIEF PLANNING AND DESIGN SECTION

DATE

DATE:

DATE:

PLANNING AND DESIGN SECTION

DATE:

02 10



R=39.59m

28



HORIZONTAL

GEOMETRY

PROJECT NAME AND LOCATION: SHEET CONTENTS: DRAFTED: REPUBLIC OF THE PHILIPPINES MARK ANTHONY L. FE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS -SURVEY PLAN AND PROFILE CONSTRUCTION OF ROAD, PAYACPAC --ELEMENTS OF CURVE ENGINEER II CORDILLERA ADMINISTRATIVE REGION PALAKPAK - LUMES - APNE, BARANGAY SAN BENGUET 1ST DISTRICT ENGINEERING OFFICE PASCUAL, TUBA, BENGUET PREPARED: WANGAL, LA TRINIDAD, BENGUET TUBA, BENGUET DEXTER G. BIALN ENGINEER II

L=60.45n

R=29.20

L=6.98m

e=-400% e=-400% e=400% e=400%

Easting	Northing	Chord length	Radius	Design Speed, V (kilometer/hour)	Delta angle	External Tangent	External Secant	Degree of Curvature by Arc	e%	Widening on Curves
442582.7263m	1814676.7229m	19.296m	26.724m	30	42.3247 (d)	10.345m	1.933m	64.3189 (d)	-4.00%	1.86m
442555.6830m	1814690.2783m	23.644m	29.205m	30	47.7568 (d)	12.929m	2.734m	58.8561 (d)	4.00%	3.10m
442469.5515m	1814656.9833m	32.984m	33.421m	30	59.1356 (d)	18.961m	5.004m	51.4302 (d)		1.81m
442439.6292m	1814680.3620m	20.379m	15.683m	30	81.0404 (d)	13.404m	4.948m	109.6032 (d)		2.10m
442414.3974m	1814656.8004m	23.092m	30.011m	30	45.2527 (d)	12.508m	2.502m	57.2751 (d)		1.32m
442370.8928m	1814658.4817m	21.119m	39.586m	30	30.9413 (d)	10.956m	1.488m	43.4209 (d)		1.71m
442312.6815m	1814626.5749m	5.341m	79.363m	30	3.8567 (d)	2.672m	0.045m	21.6583 (d)		1.51m
442272.4260m	1814607.9135m	47.822m	299.880m	30	9.1466 (d)	23.987m	0.958m	5.7319 (d)		1.94m
442210.5239m	1814566.1318m	39.853m	25.769m	30	101.3005 (d)	31.427m	14.873m	66.7042 (d)		0.78m
442190.8989m	1814613.0069m	29.296m	50.244m	30	33.9007 (d)	15.313m	2.282m	34.2107 (d)		0.74m

	333 LOW PT STA: 13+86.41 LOW PT STA: 13+86.41 LOW PT STA: 13+86.41 LOW PT STA: 135.77 PVI STA: 135.77 STA: 135.77 STA: 13+86.41 LOW PT STA: 13+86.	AL GROUND 320 319 318	HIGH PT STA: 14+26.77 HIGH PT ELEV: 323.39 PVI ELEV: 320.82 K.7.63 LVC:86.47 ORIGINAL GROUND STA: 14/70.00 PVI ELEV: 320.82 K.7.63 LVC:86.47 ORIGINAL GROUND STA: 14+26.77 HIGH PT ELEV: 320.82 K.7.63 LVC:86.47		STA	. 1+000 - STA. 1+5	F 500
AL GROUND	325 FINAL GROUND	5-3-3-55 00 000 000 000 000 000 000 000 000 0			PLAN 1:1250 MTS	E DRIZONTAL PRO 1:125 ERTICAL PROFIL)FILE GRID 0 MTS.
300 1+320 37.72 334.71	323 322 0 1+340 1+360 1+380 333.77 330.12 328.12	315 314 1+400 1+420 1+440 327.60 325.52 325.15	1+460 1+480 1+500 324.36 321.61 319.99		GRAPHICAL 01m ξm 01m ξm	1:12 SCALE	<u>5 MTS.</u>
3.980 331.657	7 329.488 327.666 326.192 LVC=65.27 L=5,54m <u>R=29,88m</u> 30 L=17.71m 31	324 985 323 795 322 491 40:36 L=19.27m 32	320.693 318.371 315 524 LVC=86.47		01m 5m 10m 25m 01m 5m 10m 25m 1:1000 ME	TERS	50m
	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	:	SET NO.	SHEET NO

	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
ERRER					PLAN AND	
10	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION DATE:	CONTRACTOR	ASSISTANT DISTRICT ENGINEER	DISTRICT ENGINEER	03 10	19

LC	LENGTH OF	F HORIZONTAL CURVE				
R	RADIUS OF	CURVE				
Т	TANGENT [DISTANCE				
I	INTERSECT	FION ANGLE				
W	WIDENING	OF CURVE				
E	EXTERNAL					
е	SUPER ELE	VATION (m./m.)				
we	SUPER ELE PAVEMENT	EVATION per LANE OF				
V	SPEED OR	VELOCITY				
MO	MIDDLE OR					
D	DEGREE O					
PC						
EVCE	END OF VE	RTICAL CURVE				
BVCS	BEG. OF VE	ERTICAL CURVE STATION				
PVIS	POINT OF \	/ERTICAL				
	INTERSECT	TION STATION				
BVCE	BEG. OF VE	ERTICAL CURVE				
PVIE	POINT OF V	/ERTICAL INTERSECTION				
EVCS	END OF VE	RTICAL CURVE STATION				
	LE	GEND				
—EL	EVATION-	MAJOR TOPOGRAPHY				
		MINOR TOPOGRAPHY				
÷		ROAD ALIGNMENT				
MATCH	INE @ STA. XX	MATCHLINE				
		UNPAVED ROADWAY				
		RIGHT OF WAY LIMIT				
		PRS CONTROL POINT				
	BM-01	BENCHMARK				
	BH-01	BOREHOLE				
	PI-01	POINT OF INTERSECTION				
		ROAD CONCRETING				
		ROAD OPENING				

ABBREVIATIONS





REPUBLIC OF THE PHILIPPINES MARK ANTHONY L. FER DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS -SURVEY PLAN AND PROFILE CONSTRUCTION OF ROAD, PAYACPAC --FLEMENTS OF CURVE ENGINEER II CORDILLERA ADMINISTRATIVE REGION PALAKPAK - LUMES - APNE, BARANGAY SAN BENGUET 1ST DISTRICT ENGINEERING OFFICE PASCUAL, TUBA, BENGUET PREPARED: WANGAL, LA TRINIDAD, BENGUET TUBA, BENGUET DEXTER G. BIALN ENGINEER II

PI Station	Easting	Northing	Chord length	Radius	Design Speed, V (kilometer/hour)	Delta angle	External Tangent	External Secant	Degree of Curvature by Arc	Widening on Curves
1+516.11m	442197.2524m	1814645.1438m	11.557m	31.166m	30	21.3710 (d)	5.881m	0.550m	55.1530 (d)	2.64m
1+538.49m	442193.2691m	1814667.3093m	17.987m	29.465m	30	35.5435 (d)	9.444m	1.477m	58.3367 (d)	0.93m
1+588.93m	442215.1309m	1814713.4421m	40.580m	242.261m	30	9.6087(d)	20.362m	0.854m	7.0951 (d)	2.16m
1+674.51m	442238.3817m	1814795.8990m	22.263m	29.528m	30	44.2944 (d)	12.018m	2.352m	58.2124 (d)	0.82m
1+721.21m	442279.8873m	1814819.8222m	38.557m	142.653m	30	15.5338 (d)	19.457m	1.321m	12.0493 (d)	4.51m
1+800.55m	442335.6749m	1814876.5769m	32.288m	40.041m	30	47.5558 (d)	17.642m	3.714m	42.9280 (d)	3.55m
1+859.71m	442332.4198m	1814937.7043m	25.347m	34.413m	30	43.2187 (d)	13.631m	2.601m	49.9487 (d)	0.69m
1+891.00m	442353.4404m	1814962.6048m	13.606m	67.408m	30	11.5846 (d)	6.838m	0.346m	25.4997 (d)	0.48m
1+910.13m	442362.6206m	1814979.4522m	16.481m	28.025m	30	34.2000 (d)	8.622m	1.296m	61.3341 (d)	0.58m
1+946.85m	442395.7312m	1814996.4790m	17.253m	12.011m	30	91.8115 (d)	12.397m	5.250m	143.1076 (d)	2.75m
1+980.56m	442376.6862m	1815030.8010m	36.201m	75.299m	30	27.8177 (d)	18.647m	2.275m	22.8272 (d)	1.10m

Wide	ening			ABBRE	EVIA	ATIONS	5			
on Cu	arves 4m		LC	LENGTH OF	HOR	ZONTAL CU	RVE			
0.9	3m		R	RADIUS OF		/E				
0.8	om 2m			I ANGENT D	JIS FAN TION A					
4.5	1m 5m		Ŵ	WIDENING	OF CL	JRVE				
0.6	9m		E							
0.4	8m 8m		e	SUPER ELF	VATIC	ON per LANE	OF			
2.7	5m 0m		we	PAVEMENT						
4.4			V MO	SPEED OR MIDDLE OR		E				
			D	DEGREE OF	F CUR	VATURE				
			PC PT							
			LVC	LENGTH OF	VER		ATURE			
			PI	POINT OF I						
			EVCE	END OF VE	RTICA I	L CURVE				
			BVCS	BEG. OF VE	RTICA	AL CURVE ST	TATION			
			PVIS	POINT OF V	ERTIC	CAL TATION				
			BVCF	BEG. OF VE	RTICA	AL CURVE				
					 /EDT!/					
			PVIE			JAL INTERSE				
			EVCS	END OF VE	RTICA	L CURVE ST	ATION			
				LE	GE	ND				
			ELE	EVATION-	MAJO	DR TOPOGR	APHY			
					MINC	R TOPOGRA	APHY			
			s		ROA	D ALIGNMEN	т			
			МАТСИ		MAT	CHLINE				
					RIGH	IT OF WAY L	IMIT			
					PRS	CONTROL P	OINT			
				BM-01	BENG	CHMARK				
			G	BH-01	BOR	EHOLE				
				PI-01	POIN		SECTION			
					ROA		ING			
					DOM					
					ROA					
					STA. 1+	500 - STA. 2+000	ŀ			
			PLAN 1:12	250 MTS. GRAPH		DRIZONTAL PRO 1:125 RTICAL PROFIL 1:12 SCALE 50m	OFILE GRID 0 MTS. E GRID 5 MTS. 68.5m			
				2pm						
		1:1250 METERS 01m 5m 10m 25m 50m								
				1.10	00 ME.	TERS				
				1.100						
	APPI	ROVE	D:			SET NO.	SHEET NO.			

	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
RRER					PLAN AND	
0	EDISON C. AMBALES ASSISTANT CHIEF PLANNING AND DESIGN SECTION	ROMUALDO T. APALIAS OIC-CHIEF PLANNING AND DESIGN SECTION	EDGARDO G. ENRIQUEZ ASSISTANT DISTRICT ENGINEER	ISAGANI C. CAYME, CESE DISTRICT ENGINEER	04 10	20 120
<u> </u>	DATE:	DATE:	DATE:	DATE:		\bigcirc







REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS CORDILLERA ADMINISTRATIVE REGION BENGUET 1ST DISTRICT ENGINEERING OFFICE WANGAL, LA TRINIDAD, BENGUET

-SURVEY PLAN AND PROFILE CONSTRUCTION OF ROAD, PAYACPAC --ELEMENTS OF CURVE PALAKPAK - LUMES - APNE, BARANGAY SAN PASCUAL, TUBA, BENGUET TUBA, BENGUET

SHEET CONTENTS:

PROJECT NAME AND LOCATION:

DRAFTED: MARK ANTHONY L. FE ENGINEER II PREPARED: DEXTER G. BIALNO ENGINEER II

PI Station	Easting	Northing	Chord length	Radius	Design Speed, V (kilometer/hour)	Delta angle	External Tangent	External Secant	Degree of Curvature by Arc	Widening on Curves
2+068.97m	442374.8071m	1815119.9335m	22.989m	65.275m	30	20.2842 (d)	11.677m	1.036m	26.3326 (d)	0.96m
2+094.67m	442383.2857m	1815144.4508m	13.506m	28.160m	30	27.7517 (d)	6.956m	0.846m	61.0403 (d)	4.16m
2+121.68m	442379.1706m	1815171.4209m	19.922m	24.425m	30	48.1366 (d)	10.910m	2.326m	70.3730 (d)	0.78m
2+156.96m	442402.4209m	1815199.6645m	26.110m	21.580m	30	74.4526 (d)	16.395m	5.522m	79.6529 (d)	3.48m
2+195.94m	442377.3436m	1815235.4903m	19.029m	22.464m	30	50.1189 (d)	10.503m	2.334m	76.5182 (d)	4.50m
2+220.22m	442351.8085m	1815237.6749m	16.872m	15.759m	30	64.7331(d)	9.988m	2.899m	109.0751 (d)	1.79m
2+334.02m	442311.4257m	1815346.3944m	48.219m	66.131m	30	42.7627 (d)	25.892m	4.888m	25.9920 (d)	1.98m
2+380.85m	442330.1837m	1815391.9370m	28.803m	40.501m	30	41.6582 (d)	15.409m	2.832m	42.4398 (d)	5.24m
2+428.51m	442313.9997m	1815438.2221m	33.637m	46.137m	30	42.7585 (d)	18.062m	3.409m	37.2559 (d)	0.95m
2+488.12m	442338.4298m	1815494.4452m	30.865m	38.700m	30	47.0037 (d)	16.829m	3.501m	44.4153 (d)	0.74m

									_		4		
176	170				159	154					-		
175	169	167	162			153						J	
	168	166	161		157	152		AL GROUND	200				
173	ORIGINAL	ROUND	160		156	151			A. 2+			— STA. 2+000 - ST	A. 2+500
81 02 172	+334.81 165.02	164	159 LOW	PT STA: 24+37.82 / PT ELEV: 149.48 / STA: 2+303.77	ORIGINAL O	BROUND 150			@ ST				
171	ECCS: 2 163 163 163	S: 2+349.7 /C1骰161.8	158	VI ELEV:152.53 K:6.18 LVC:88.10	154	149	147.96		NOIT				÷
FINAL GRO	164		157		153	91 6.93 148	BVCE: 24		STA.				
	163	2, 16 , 16	156		152	147			N T T				
168	<u>FINA¢≵ GR</u>		155		161	<u>FINAL</u> 146			IATCI	-			
167	161	159		$\Delta \perp$	150	145			2		PLAN	HORIZONTAL PRC	
166	160	158	153			144					1:1250 MTS.	VERTICAL PROFIL 1:12	E GRID 5 MTS.
165	159	157	152		148	143					GRAPHIC	AL SCALE	
+300 2+ 6.76 170	320 2+ 0.97 169	340 2+ 9.43 16	+360 2+380 3.46 161.55	2+400 160.16) <u>2+420</u> <u>2+</u> 154.31 152	440 2.75	2+460 152.17	2+480 2+ 147.46 14	+500 18.80		01m 5m 10m 25m	50m	68.5m
2.468 168	172 163	.922 159 12-92	9.770 156.189	153.255	150.970 149	21-98	147,943	46.861 14	<u>6</u> .371 4		1:1250 N	IETERS	
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	к=оо. I.3m 51	Ŀ	=7.95m 52	L=15.56	66m 53	[;	=26.41m	54	- '		1:1000 N	IETERS	
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	REVIEWED	D:		SUBMITTE	ED:		RECOMMENDE):		APPROVED:		SET NO.	SHEET NO.
ERRER												PLAN AND	
	r		MBALES	R R		s	FDGA			ISAG	ANIC CAYME CESE	PROFILE	/ 21 \

DATE:

EDGARDO G. ENRIQUEZ

ASSISTANT DISTRICT ENGINEER

ROMUALDO T. APALIAS

OIC-CHIEF PLANNING AND DESIGN SECTION

DATE:

EDISON C. AMBALES

ASSISTANT CHIEF

PLANNING AND DESIGN SECTION

DATE:

we	SUPER ELEVATION per LANE OF PAVEMENT		
V	SPEED OR	VELOCITY	
MO			
PC			
PT	POINT OF T	ANGENCY	
LVC	LENGTH OF	VERTICAL CURVATURE	
PI	POINT OF II	NTERSECTION	
EVCE	END OF VE		
BVCS	BEG. OF VE	RTICAL CURVE STATION	
PVIS	INTERSECT		
BVCE	BEG. OF VE		
PVIE	POINT OF V	ERTICAL INTERSECTION	
EVCS	END OF VE	RTICAL CURVE STATION	
	LE	GEND	
ELE	EVATION-	MAJOR TOPOGRAPHY	
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MATCHL	INE @ STA. XX	MATCHLINE	
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		ROAD CONCRETING	
		ROAD OPENING	
		STA. 2+000 - STA. 2+500	
SCALE			_
PLAN 1:12	250 MTS.	HORIZONTAL PROFILE GRID 1:1250 MTS. VERTICAL PROFILE GRID 1:125 MTS.	
	GRAP	HICAL SCALE	

PROFILE

120

05 10

ISAGANI C. CAYME, CESE

DISTRICT ENGINEER

DATE:

ABBREVIATIONS

LC LENGTH OF HORIZONTAL CURVE

RADIUS OF CURVE

TANGENT DISTANCE INTERSECTION ANGLE

WIDENING OF CURVE

EXTERNAL DISTANCE

SUPER ELEVATION (m./m.)

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