



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE 2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

C.Y. 2025 PROJECT
DETAILED ENGINEERING DESIGN PLAN FOR
CONCRETING OF ROAD IN BARANGAY TULALIAN, STO.TOMAS, DAVAO DEL NORTE

SECTION : BRGY.TULALIAN ROAD
LOCATION : STO.TOMAS, DAVAO DEL NORTE
STATION LIMITS : STA. 0+000.00 - STA. 0+322.00
NET LENGTH : 321.00 LN.M / 0.642 lane-km.
ROAD SECTION I.D : (LOCAL ROAD)

SUBMITTED:


JEZABEL E. TULING, MPA
ACTING CHIEF, PLANNING & DESIGN SECTION
DATE:

RECOMMENDED:


GARRY E. VERANO
OFFICER-IN-CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER
DATE:

APPROVED:

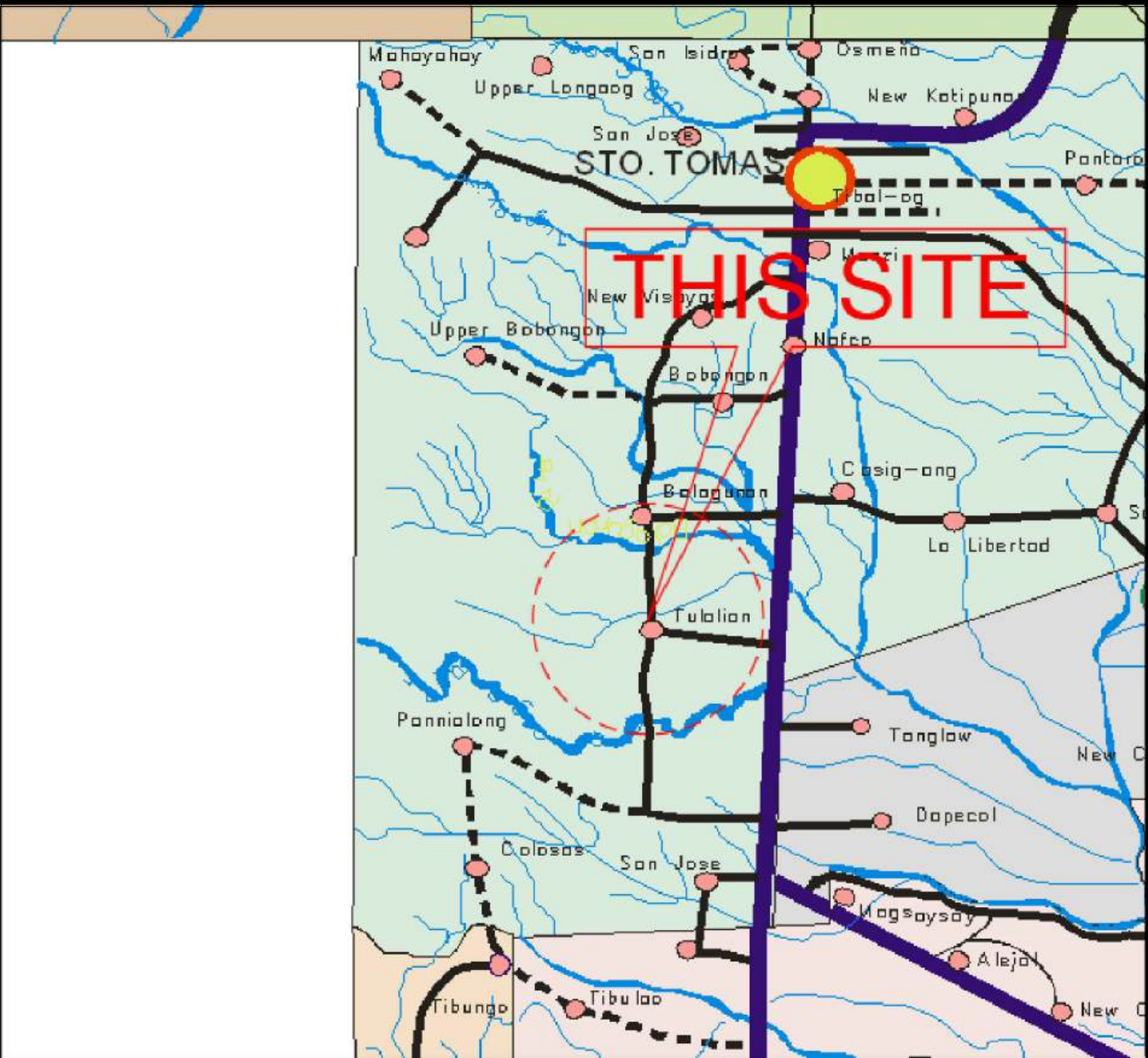

ARTURO P. LONGYAPON
DISTRICT ENGINEER
DATE:

PROJECT LIMITS :

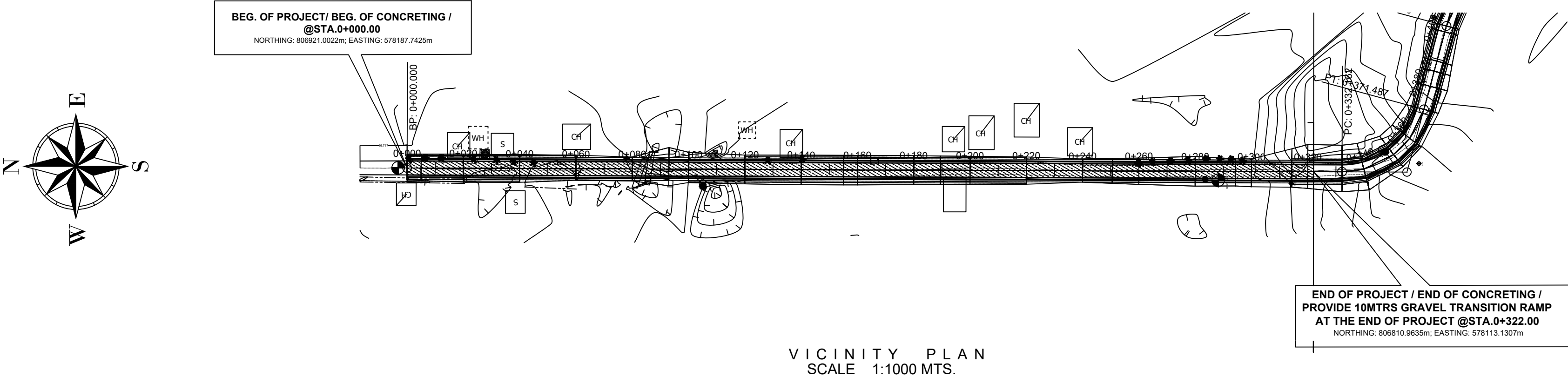
STA.0+000.00 - STA.0+322.00	=	322.00
NET LENGTH	=	322.00 LN.M. CONCRETING

INDEX OF DRAWINGS

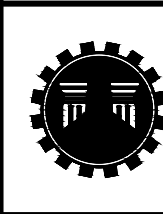

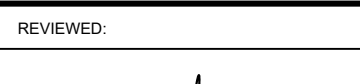
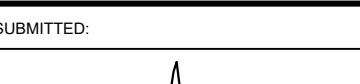
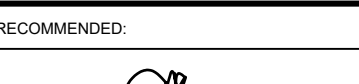
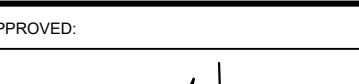
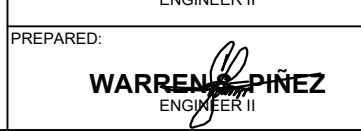
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LOCATION MAP
DRAWN NOT TO SCALE



VICINITY PLAN
SCALE 1:1000 MTS.

 REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGION XI DAVAO DEL NORTE 2ND DISTRICT ENGINEERING OFFICE TAGUM CITY	PROJECT NAME AND LOCATION: CONCRETING OF ROAD IN BARANGAY TULALIAN, STO.TOMAS, DAVAO DEL NORTE	SHEET CONTENTS: INDEX OF DRAWINGS, PROJECT LIMITS, LOCATION PLAN, VICINITY MAP	DRAFTED:  HERWIN EVAN J. HABABAG ENGINEER II	REVIEWED:  BENILDA S. PACQUIAO ENGINEER III	SUBMITTED:  JEZABEL E. TULING, MPA CHIEF, PLANNING AND DESIGN SECTION	RECOMMENDED:  GARRY A. VERANO OFFICER IN CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER	APPROVED:  ARTURO P. LONGYAPON DISTRICT ENGINEER	SET NO. A 1 1	SHEET NO. 1 16
			PREPARED:  WARREN P. PINEZ ENGINEER II	DATE:	DATE:	DATE:	DATE:		

GENERAL NOTES

SPECIFICATIONS

- ALL WORKS SHALL COMPLY WITH THE "DPWH STANDARD SPECIFICATION VOLUME II, HIGHWAYS, BRIDGES AND AIRPORTS 2013", SPECIAL PROVISION AND SUPPLEMENTAL SPECIFICATIONS PERTAINING TO THIS PROJECT.

DIMENSIONS

- DISTANCE BETWEEN THE HORIZONTAL CONTROL POINTS INCLUDING REFERENCE POINTS ARE MEASURED AND EXPRESSED IN METERS.
- UNLESS OTHERWISE SPECIFIED, DIMENSIONS OF PIPES, BOX CULVERTS, BRIDGES AND OTHER STRUCTURES ARE MEASURED AND EXPRESSED IN MILLIMETERS.
- ALL OTHER DIMENSIONS ARE EXPRESSED IN METERS.

SURVEY SPECIFICATIONS

- ALL PROJECT CONTROL POINTS ARE PROJECTED IN PRS '92 GRID COORDINATE SYSTEM (ZONE 5)
- SURVEY INSTRUMENT USED, ROVER-CHC (I70+) SN1045456, BASE - CHC (I70+) SN1060962
- DATE SURVEYED: SEPTEMBER 15, 2023
- PROJECT CONTROL POINTS, REFER TO PLAN AND PROFILE

ELEVATIONS AND GRADES

- FINISHED GRADE ELEVATION SHOWN ON PLAN AND PROFILE SHEETS REFERS TO FINISHED PAVEMENT LEVEL AS INDICATED IN THE TYPICAL ROADWAY SECTION.
- GROUND GRADE SHOWN ON THE PLAN AND PROFILE SHEETS REFERS TO THE ELEVATION OF THE ORIGINAL GROUND ALONG THE CENTERLINE OF THE PROJECT ROAD.

OTHER GENERAL REQUIREMENTS

- ALIGNMENT AND GRADES ARE SUBJECT TO ADJUSTMENTS TO SUIT ACTUAL FIELD CONDITIONS.
- DISTANCES AND ELEVATIONS ARE IN METER UNLESS OTHERWISE INDICATED.
- GRADES SHOWN ARE TOP OF FINISHED PAVEMENT.
- ALL WORKS SHALL COMPLY WITH THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, REVISED 2013 AND "A POLICY ON GEOMETRIC DESIGN", AASHTO 2011.
- WHERE NO DETOURS ARE AVAILABLE, TRAFFIC SHALL BE HANDLED IN ACCORDANCE TO THE PROVISIONS OF CLAUSE 75 OF THE DPWH STANDARD SPECIFICATIONS, VOLUME 1, REQUIREMENTS AND CONDITIONS OF CONTRACT (2013).
- THE CONTRACTOR SHALL CONTINUOUSLY KEEP THE ROAD UNDERGOING IMPROVEMENT AND THE SECTION DETOURS IN SUCH CONDITION SATISFACTORY TO THE ENGINEER THAT TRAFFIC WILL BE ACCOMMODATED DURING THE ENTIRE CONTRACT PERIOD WITHOUT ANY INCONVENIENCE TO THE TRAVELING PUBLIC IN ACCORDANCE TO CLAUSE 38 OF THE DPWH STANDARDS SPECIFICATIONS, VOLUME 1, REQUIREMENTS AND CONDITIONS OF CONTRACT (2013). THE CONTRACTOR SHALL BEAR ALL EXPENSES FOR CONSTRUCTING, RECONSTRUCTING IF NECESSARY AND MAINTAINING SUCH ROAD DETOURS, APPROACHES, INCLUDING RUN-AROUND TEMPORARY BRIDGES WITHOUT COMPENSATION.
- THE APPARENT SILENCE OF SPECIFICATIONS, PLANS, SPECIAL PROVISIONS AND SUPPLEMENTARY SPECIFICATIONS, AS TO ANY DETAIL OR THE APPARENT OMISSION FROM THEM OF A DETAILED DESCRIPTION CONCERNING ANY POINT SHALL BE REGARDED AS MEANING THAT ONLY THE BEST GENERAL PRACTICE IS TO PREVAIL AND THAT ONLY MATERIAL AND WORKMANSHIP OF FIRST CLASS QUALITY ARE TO BE USED.
- ROADS CLOSED TO TRAFFIC SHALL BE PROTECTED BY EFFECTIVE BARRICADES, AND OBSTRUCTIONS SHALL BE ILLUMINATED AT NIGHT. SUITABLE WARNING SIGNS, ILLUMINATED AT NIGHT BY LANTERNS OF FLARES, SHALL BE PROVIDED. ALL LIGHTS FOR THIS PURPOSE SHALL BE KEPT BURNING FROM SUNSET TO SUNRISE.
- THE CONTRACTOR WILL BE REQUIRED TO ERECT WARNING SIGNS OUTSIDE OF, AND 150M FROM, EACH END OF THE PROJECT, AND 150M IN ADVANCE AT ANY PLACE ON THE PROJECT WHERE OPERATIONS INTERFERE WITH THE USE OF THE ROAD BY TRAFFIC, AND AT ALL INTERMEDIATE POINTS WHERE THE NEW WORK CROSSES OR COINCIDES WITH AN EXISTING ROAD.
- BEFORE THE START OF ACTUAL CONSTRUCTION, THE AS-STAKED PLAN SHOULD BE SUBMITTED TO THE DAVAO DEL NORTE 2ND DISTRICT ENGINEERING OFFICE IN ORDER THAT IMMEDIATE STEPS MAY BE TAKEN TO CORRECT OR ADJUST WHATEVER APPRECIABLE DEVIATION THERE MAY BE FROM THE ORIGINAL PLAN.
- THE IMPLEMENTING OFFICE SHALL IDENTIFY THE LOCATIONS OF AND PROVIDE ACCESSIBILITY FACILITIES FOR PERSONS WITH DISABILITIES IN ACCORDANCE WITH DO NO. 37, S. 2009.
- QUARRY SITE FOR ITEM 200 AND ITEM 104 IS MABUHAY, CARMEN (53.520 KM. FROM THE PROJECT SITE), DISPOSAL SITE IS ONE (1) KMS. WITHIN PROJECT LIMIT.
- DESIGN WAS BASED ON SURVEY DATA SUBMITTED BY THE SURVEY INVESTIGATION UNIT OF THE PLANNING AND DESIGN SECTION OF THE DPWH-DAVAO DEL NORTE ENGINEERING 2ND DISTRICT.

SUBBASE AND BASE COURSE

- RE-PREPARATION AND COMPACTION OF THE EXISTING BASE/ SUBBASE TO THE REQUIRED DENSITY SHALL BE DONE PRIOR TO GRAVEL RESURFACING IN ACCORDANCE WITH DPWH STANDARD SPECIFICATIONS, VOLUME II, 2004, USING VIBRATING ROLLERS AND PNEUMATIC TIRE ROLLERS. IN AREAS WHERE THE SAID EQUIPMENT CANNOT BE USED, A PORTABLE MECHANICAL COMPACTOR SHALL BE USED.

SURFACE COURSE

- USE STEEL FORMS FOR ITEM 311- PORTLAND CEMENT CONCRETE PAVEMENT
- WHEN CONCRETE IS TO BE PLACED ADJOINING A PREVIOUSLY CONSTRUCTED LANE AND MECHANICAL EQUIPMENT WILL BE OPERATED UPON THE EXISTING LANE, THAT PREVIOUSLY CONSTRUCTED LANE SHALL HAVE ATTAINED THE STRENGTH OF FOURTEEN (14) DAY CONCRETE. IF ONLY FINISHING EQUIPMENT IS CARRIED ON THE EXISTING LANE, PAVING IN ADJOINING LANES MAY BE PERMITTED AFTER THREE (3) DAYS.
- AT TRANSVERSE CONSTRUCTION JOINTS, HOLES OF 60MM DIA. AND SPACED AT 300MM (FOR 230MM AND 280MM THICK CONCRETE PAVEMENT) SHALL BE DRILLED AT ONE-HALF (1/2) OF THE EXISTING CONCRETE PAVEMENT THICKNESS SO AS TO PERMIT THE LOAD TRANSFER DEVICE (28MM DIA. PLAIN DOWEL BARS FOR 230MM THICK PCCP; 36MM DIA PLAIN DOWEL BARS FOR 280MM THICK PCCP; 36MM DIA. FOR 300MM THICK PCCP) TO BE INSERTED AT ONE-HALF (1/2) OF ITS LENGTH. THE SAID DEVICE SHALL BE INSTALLED FIRMLY AT THE HOLES AND SHALL BE HELD IN POSITION PARALLEL TO THE SURFACE OF THE SLAB. THE DOWEL BARS SHALL BE PAINTED WITH RED LEAD AND THE SURFACE OF ONE-HALF (1/2) OF THE LENGTH TO BE INSERTED SHALL BE COATED WITH CONCRETE EPOXY WHILE THE OTHER HALF SHALL BE COATED WITH APPROVED BITUMINOUS MATERIALS.
-DO 54, S.2012
- TRANSVERSE CONTRACTION JOINT SHALL BE CUT USING A CONCRETE SAW TO THE REQUIRED DEPTH (ONE-FOURTH TO ONE-THIRD OF THE CONCRETE PAVEMENT THICKNESS) AND WIDTH AS SHOWN IN THE APPROVED PLANS.
- ALL JOINTS SHALL BE SUFFICIENTLY SEALED WITH ASPHALT SEALANT PRIOR TO OPENING TO VEHICULAR TRAFFIC.
- 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". 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 THAN 3.8 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.

EARTHWORK

- CLEARING SHALL EXTEND ONE (1) METER BEYOND THE TOE OF THE FILL SLOPES OR BEYOND ROUNDING OF CUTS SLOPES AS THE CASE MAY BE 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.
- ALL CONCRETE PAVEMENT, BASE COURSE, SIDEWALKS, CURBS, GUTTERS, ETC., DESIGNATED FOR REMOVAL SHALL BE BROKEN INTO PIECES, THE SIZE OF WHICH SHALL NOT EXCEED 300MM (12IN) IN ANY DIMENSION AND STOCKPILED AT DESIGNATED LOCATIONS ON THE PROJECT OR AS DIRECTED BY THE ENGINEER.
- 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 LIMIT OF SLOPES WILL NOT BE DISTURBED.
- SPOILS FROM DEMOLISHED/ EXCAVATED MATERIALS SHALL NOT BE ALLOWED TO BE STOCKPILED AT THE SHOULDER OR PART OF THE TRAVELED ROADWAY AND SHALL BE REMOVED IMMEDIATELY TO PREVENT OBSTRUCTION. SPOILS REMOVED SHALL BE DISPOSED OFF IN DESIGNATED AREAS APPROVED BY THE ENGINEER.
- IN CASE OF USE, ALL EXPLOSIVES SHALL BE STORED IN A SECURE MANNER, IN COMPLIANCE WITH LOCAL LAWS AND ORDINANCES, AND ALL SUCH STORAGE PLACES SHALL BE MARKED CLEARLY "DANGEROUS EXPLOSIVES". WHERE NO LOCAL LAWS OR ORDINANCE APPLY, STORAGE SHALL BE PROVIDED IN A PLACE SATISFACTORY TO THE ENGINEER, AND IN GENERAL, NOT CLOSER THAN 300M FROM ANY BUILDING OR CAMPING AREA.
- BORROW MATERIALS SHALL NOT BE PLACED UNTIL AFTER THE READILY ACCESSIBLE 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.
- ALL EMBANKMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF ITEM 104-EMBANKMENT. IT SHALL BE COMPACTED IN HORIZONTAL LAYERS NOT EXCEEDING 200MM (LOOSE MEASUREMENT). AFTER FIVE SUCCESSIVE LAYERS, THE FILL/ EMBANKMENT SHALL BE SATURATED WITH WATER THEN DRIED BEFORE PLACING THE SUCCEEDING LAYERS. THE PROCEDURE SHALL BE REPEATED UNTIL THE DESIRED ELEVATION IS ATTAINED.
- WATERING AND COMPACTION OF ALL EMBANKMENTS SHALL BE CONSIDERED AS SUBSIDIARY WORK PERTAINING TO OTHER CONTRACT ITEMS. THE COST OF PERFORMANCE THEREOF SHALL BE CONSIDERED TO BE INCLUDED IN THE CONTRACT UNIT BID PRICE FOR OTHER ITEMS.
- CUT SLOPES, EXCEPT IN ROCKS AND FILL SLOPES SHALL BE ADJUSTED AND WARPED TO FLOW INTO EACH OTHER OR INTO NATURAL GROUND SURFACE WITHOUT NOTICEABLE BREAK.
- APPROACHES AND ROAD CONNECTIONS SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER IN SUCH MANNERS AS TO ENSURE PROPER CONNECTIONS TO THE RIDING SURFACES.
- PRIOR TO COMMENCING PREPARATION OF THE SUBGRADE, ALL CULVERTS, CROSS DRAINS, DUCTS AND THE LIKE (INCLUDING THEIR FULLY COMPLETED BACKFILL), DITCHES, DRAINS AND DRAINAGE OUTLETS SHALL BE COMPLETED. ANY WORK ON THE PREPARATION OF THE SUBGRADE SHALL NOT BE STARTED UNLESS PRIOR WORK HEREIN DESCRIBED SHALL HAVE BEEN APPROVED BY THE ENGINEER.

DRAINAGE AND SLOPE PROTECTION STRUCTURES

- EXACT LOCATIONS, GRADIENTS, LENGTHS, TOP AND INVERT ELEVATIONS OF ALL DRAINAGE STRUCTURES THAT ARE REQUIRED SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
- EXTENSIONS AND OTHER IMPROVEMENTS OF EXISTING DRAINAGE STRUCTURES ARE SUBJECT TO CHANGE AND SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER IN-CHARGE.
- DURING CONSTRUCTION, ANY EXISTING PIPES FOUND DAMAGED OR DEFECTIVES SHALL BE REMOVED AND REPLACED AS DIRECTED BY THE ENGINEER. THE REMOVAL OF EXISTING STRUCTURES SHALL BE PAID FOR UNDER ITEM 101(4)- REMOVAL OF EXISTING PIPE CULVERT.
- ANY MISCELLANEOUS REMOVAL NOT SHOWN ON THE PLANS INCLUDING REMOVAL OF HEADWALLS AND WINGWALLS OF EXISTING DRAINAGE STRUCTURES THAT ARE TO BE EXTENDED OR IMPROVED AND DISPOSAL OF RESULTING MATERIALS SHALL BE CONSIDERED SUBSIDIARY WORK PERTAINING TO OTHER CONTRACT ITEMS. THE COST OF PERFORMANCE THEREOF SHALL BE CONSIDERED TO BE INCLUDED IN THE UNIT PRICE FOR THOSE ITEMS.

REMOVAL OF EXISTING STRUCTURES AND OBSTRUCTIONS

- NO PAYMENT SHALL BE MADE FOR REMOVAL OF OTHER MISCELLANEOUS STRUCTURES THAT MAY BE REQUIRED AS SUBSIDIARY WORK PERTAINING TO OTHER CONTRACT ITEMS EXCEPT FOR SPECIFIC ITEMS EXPRESSLY IDENTIFIED FOR PAYMENT.
- IMPROVEMENTS AND OTHER SIMILAR STRUCTURES THAT WILL BE AFFECTED DURING THE IMPLEMENTATION OF THIS PROJECT SHALL BE PAID FOR UNDER THE ROAD RIGHT-OF-WAY IMPROVEMENT.

MISCELLANEOUS STRUCTURES

- OBSTRUCTIONS WITHIN THE ROADWAY, IF NOT ILLUMINATED SHALL BE MARKED WITH REFLECTORIZED HAZARD MARKERS (REFER TO SECTION 7 OF THE HIGHWAY SAFETY DESIGN STANDARDS PART 2 MAY 2012 EDITION). FOR ADDITIONAL EMPHASIS, IT IS ADVISABLE TO MARK OBSTRUCTIONS WITH NO LESS THAN FIVE ALTERNATING REFLECTORIZED BLACK AND WHITE STRIPES.
- THE APPLICATION OF PAINT FOR PAVEMENT MARKINGS SHALL BE PREFERABLY CARRIED OUT BY A MACHINE SPECIALLY MADE FOR THIS PROPOSE BUT WHERE BRUSHED ARE USED, ONLY ROUND OR OVAL BRUSHES NOT EXCEEDING 100MM IN WIDTH WILL BE PERMITTED. THE PAINT SHALL BE SO APPLIED AS TO PRODUCE A UNIFORM, EVEN COATING IN CLOSE CONTACT WITH THE SURFACE BEING PAINTED.
- THE APPLIED THERMOPLASTIC PAVEMENT MARKINGS SHALL HAVE A MINIMUM OF 2 YEARS OF LONGEVITY/DURABILITY.
- MATERIALS WHICH ARE DEFECTIVE OR HAVE BEEN APPLIED IN AN UNSATISFACTORY MANNER OR TO INCORRECT DIMENSIONS OR IN A WRONG LOCATION SHALL BE REMOVED. THE ROAD PAVEMENT SHALL BE MADE GOOD AND MATERIALS REPLACED, RECONSTRUCTED AND/OR PROPERLY LOCATED, ALL AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE ENGINEER.

FACILITIES FOR THE ENGINEER

- THE CONTRACTOR SHALL AT ALL TIMES DURING THE DURATION OF THE CONTRACT PROVIDE FOR THE USE OF THE ENGINEER ALL EQUIPMENT, INSTRUMENTS AND APPARATUS, ALL INFORMATION AND RECORDS AND QUALIFIED CHAINMEN AND LABOURERS REQUIRED BY THE ENGINEER FOR INSPECTING AND MEASURING THE WORKS. SUCH EQUIPMENT, INSTRUMENTS AND APPARATUS SHALL INCLUDE THOSE LISTED IN THE SPECIAL PROVISIONS.
- THE CONTRACTOR SHALL PROVIDE WITHIN THIRTY (30) CALENDAR DAYS AFTER NOTICE TO COMMENCE WORK, THE VEHICLE LISTED IN THE SPECIAL PROVISIONS FOR THE EXCLUSIVE USE OF THE ENGINEER. THE VEHICLES ON DELIVERY SHALL BE NEW AND SHALL BE DRIVEN BY A COMPETENT QUALIFIED AND EXPERIENCED DRIVER WHO SHALL BE UNDER THE DIRECT ORDER OF THE ENGINEER.

CONSTRUCTION REQUIREMENTS

STAKING ACTIVITIES SHALL BE INCLUDED IN THE CONSTRUCTION SCHEDULE TO BE SUBMITTED BY THE CONTRACTOR. DATES AND SEQUENCE OF EACH STAKING ACTIVITY SHALL BE INCLUDED.

THE ENGINEER SHALL SET INITIAL REFERENCE LINES, HORIZONTAL AND VERTICAL CONTROL POINTS, AND SHALL FURNISH THE DATA FOR USE IN ESTABLISHING CONTROL FOR THE COMPLETION OF EACH ELEMENT OF THE WORK. DATA RELATING TO HORIZONTAL AND VERTICAL ALIGNMENTS, THEORETICAL SLOPE STAKE CATCH POINTS, AND OTHER DESIGN DATA SHALL BE FURNISHED.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRUE SETTLLING OF THE WORKS OR IMPROVEMENTS AND FOR CORRECTNESS OF POSITIONS, LEVELS, DIMENSIONS AND ALIGNMENT OF ALL PARTS OF THE WORKS. HE SHALL PROVIDE ALL NECESSARY INSTRUMENTS, APPLIANCES, MATERIALS AND SUPPLIES, AND LABOR IN CONNECTION THEREWITH. THE CONTRACTOR SHALL PROVIDE A SURVEY CREW SUPERVISOR AT THE PROJECT SITE WHENEVER SURVEYING/STAKING ACTIVITY IS IN PROGRESS.

PRIOR TO CONSTRUCTION, THE ENGINEER SHALL BE NOTIFIED OF ANY MISSING INITIAL REFERENCE LINES, CONTROLS, POINTS, OR STAKES. THE ENGINEER SHALL REESTABLISH MISSING INITIAL REFERENCE LINES, CONTROLS, POINTS, OR STAKES.

THE CONTRACTOR FOR CONVENIENT USE OF GOVERNMENT-FURNISHED DATA SHALL PERFORM ADDITIONAL CALCULATIONS. IMMEDIATE NOTIFICATION OF APPARENT ERRORS IN THE INITIAL STAKING OR IN THE FURNISHED DATA SHALL BE PROVIDED.

ALL INITIAL REFERENCE AND CONTROL POINTS SHALL BE PRESERVED. AT THE START OF CONSTRUCTION, ALL DESTROYED OR DISTURBED INITIAL REFERENCE OR CONTROL POINTS NECESSARY TO THE WORK SHALL BE REPLACED.

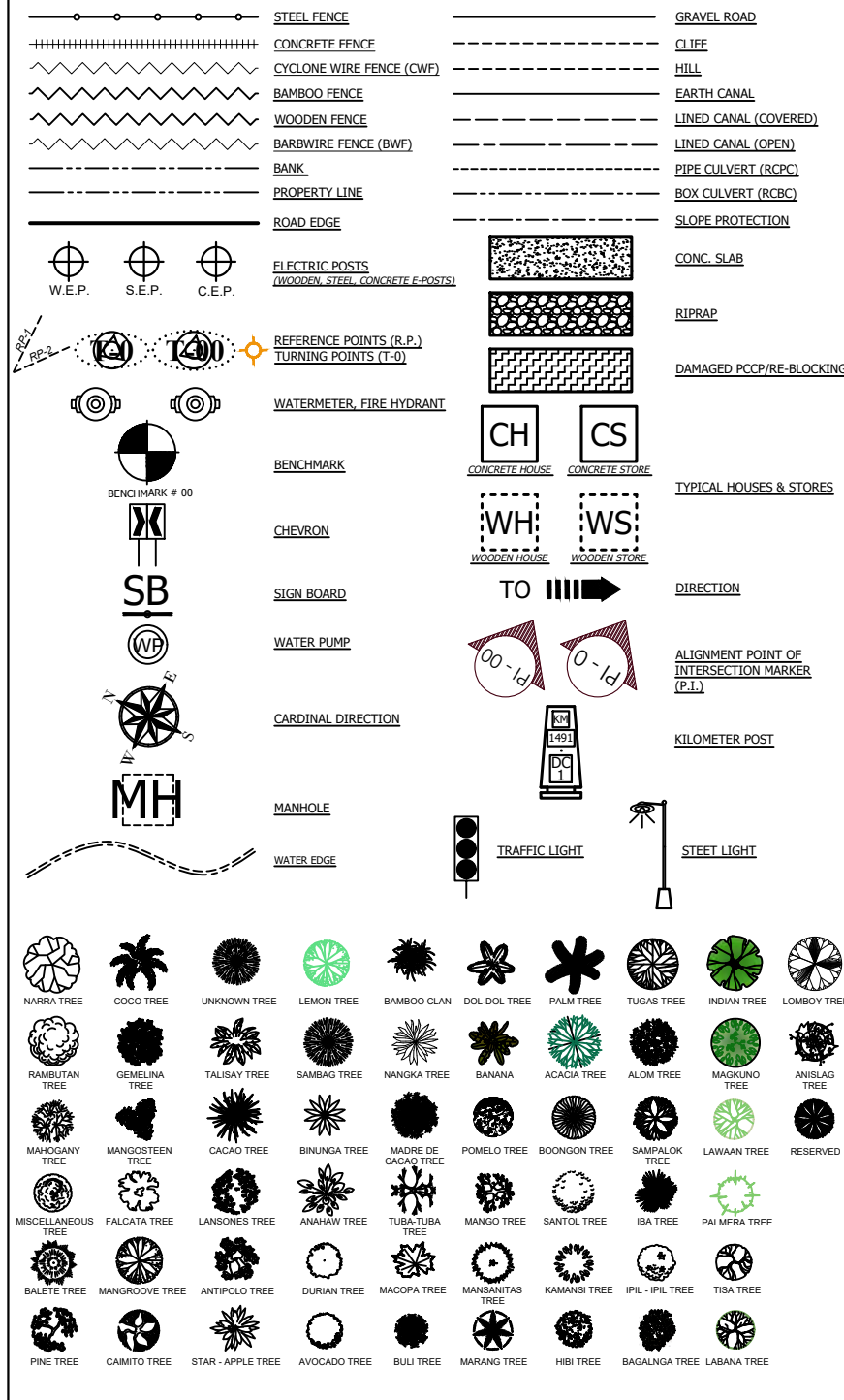
BEFORE SURVEYING AND STAKING, THE CONTRACTOR SHALL DISCUSS AND COORDINATE THE FOLLOWING WITH THE ENGINEER:

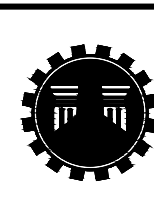
- SURVEYING AND STAKING METHODS
- STAKE MARKING/CONCRETE MONUMENTS
- GRADE CONTROL FOR COURSES OF MATERIAL
- REFERENCING
- STRUCTURE CONTROL
- ANY OTHER PROCEDURES AND CONTROLS NECESSARY FOR THE WORK

REFERENCES:

- REVISED DPWH MANUAL ON HIGHWAY SAFETY DESIGN STANDARDS,MAY 2012 EDITION
- FOR ROAD SAFETY PLANNING AND DESIGN ACTIVITIES AS WELL AS ROAD SAFETY MAINTENANCE ACTIVITIES SUCH AS THE PROPER WAY OF INSTALLING ,APPLYING ROAD SIGNS,ROAD SAFETY DEVICES AND PAVEMENT MARKINGS - D.O. 41,S. 2012
- LABOR CODE OF THE PHILIPPINES AND ITS IMPLEMENTING RULES AND REGULATIONS DOLE DO NO. 13,S. 1998, OCCUPATIONAL SAFETY AND HEALTH STANDARDS AND ITS PROCEDURAL GUIDELINES.
- FOR MONITORING, ENFORCEMENT AND IMPLEMENTATION OF CONSTRUCTION SAFETY AND HEALTH - D.O. 56,S. 2005
- DESIGN REFERENCES
- DPWH DESIGN GUIDELINES, CRITERIA & STANDARDS (DGCS), 2015 EDITION
- GUIDELINES FOR THE PREPARATION OF COST ESTIMATES FOR TRAFFIC MANAGEMENT AND SAFETY & HEALTH REQUIREMENTS FOR THE CONSTRUCTION AND MAINTENANCE OF ROADS, BRIDGES AND SAFETY & HEALTH REQUIREMENTS FOR SCHOOL BUILDINGS, 2018
- AASHTO A POLICY ON GEOMETRIC DESIGN STANDARD OF HIGHWAYS AND STREETS, 2011 6TH EDITION
- AASHTO GUIDE ON PAVEMENT DESIGN, 1993 EDITION
- HIGHWAY SAFETY DESIGN STANDARDS: PART 1 - ROAD SAFETY DESIGN, AND PART 2 - ROAD SIGNS AND PAVEMENT MARKINGS, 2012 EDITION

LEGENDS



 <div>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGION XI DAVAO DEL NORTE 2ND DISTRICT ENGINEERING OFFICE TAGUM CITY</div>	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED: HERWIN EVAN J. HABABAG ENGINEER II	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
	CONCRETING OF ROAD IN BARANGAY TULALIAN, STO.TOMAS, DAVAO DEL NORTE	GENERAL NOTES,LEGENDS	PREPARED: WARREN PINEZ ENGINEER II	BENILDA S. MACQUIAO ENGINEER III DATE:	JEZABEL E. TULING, MPA CHIEF, PLANNING AND DESIGN SECTION DATE:	GARRY VERANO OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER DATE:	ARTURO P. LONGYAPON DISTRICT ENGINEER DATE:	B 1 2	2 16

GENERAL NOTES

1. DESIGN STANDARDS

- A. ALL WORKS SHALL COMPLY WITH THE DPWH DESIGN GUIDLINES CRITERIA AND STANDARDS (DGCS), VOLUME IV - 2015 EDITION, AASHTO - A POLICY ON GEOMETRIC DESIGN STANDARD OF HIGHWAYS AND STREETS, 2011, 6TH EDITION AND AASHTO GUIDE ON PAVEMENT DESIHN, 1993 EDITION.
- B. THE PROVISION FOR ROADWAY SAFETY SHALL COMPLY WITH THE HIGHWAY SAFETY DESIGN STANDARDS: PART 1 - ROAD SAFETY DESIGN, AND PART 2 - ROAD SIGNS AND PAVEMENT MARKINGS, 2012 EDITION

1. DESIGN SPECIFICATIONS:

- FOR GEOMETRIC DESIGN CRITERIA (IN GENERAL)
 - A. THE DESIGN MUST BE SUITABLE FOR THE TRAFFICE VOLUME, BOTH DAILY AND AT THE DESIGN PEAK HOUR, FOR THE DESIGN SPEDD AND FOR THE CHARACTER OF THE VEHICLES TO USE THE FACILITY.
 - B. THE DESIGN MUST BE CONSISTENT AND MUST AVOID SURPRISE CHANGES IN ALIGNMENT, GRADE AND SIGHT DISTANCE, AND MUST BE PLEASING TO THE USER AND TO THOSE WHO LIVE ALONG IT.
 - C. THE DESIGN MUST BE COMPLETE HOWEVER, FOR THE DESIGNER TO BE ABLE TO ENSURE THE EFFECTIVENESS OF HIS DESIGN TO A LARGE DEGREE, THE NECESSARY ROADSIDE TREATMENT AND THE PROVISION OF CONTROL DEVICES, SUCH AS LANE MARKERS AND SPECIAL SIGNS, ARE TAKEN INTO ACCOUNT.
 - D. THE DESIGN SHALL BE AS SIMPLE AS POSSIBLE FROM THE STANDPOINT OF THE BUILDER. EXCESSIVE CHANGES IN CROSS SECTIONAL DESIGN OR THE USE OF VARIETY OF TYPES WITHIN A PROJECT WILL IN MANY CASES INCREASE THE COST AND DIFFICULTY OF CONSTRUCTION BEYOND THE COMMENSURATE VALUE OF SUCH "UNIQUENESS".
 - E. THE DESIGN SHOULD BE SUCH THAT THE FINISHED ROAD CAN BE MAINTAINED AT THE LEAST COST, AND MUST BE SAFE FOR DRIVING AND SHOULD ENSURE CONFIDENCE FOR MOTORIST.
- FOR GEOMETRIC DESIGN CRITERIA (HORIZONTAL ALIGNMENT AND CONTROLS)
 - A. FOR THE DESIGN SPEEDOF 30KPH, THE MINIMUM RADIUS IS 30M AND A SUPERELEVATION OF 6% - 8%.
 - B. THE RECOMMENDED MINIMUM LENGTH OF TANGENT BETWEEN REVERSED CURVES SHOULD BE 50M.
 - C. IN NO CASES SHALL THE TANGENT LENGTH BE LESS THAN 30M. THE TANGENT IS NECESSARY TO EFFECT THE TRANSITION FROM SUPERELEVATION IN ONE DIRECTION TO SUPERELEVATION IN THE OPPOSITE DIRECTION
 - D. A SUPERELEVATED SECTION IS PROCEESED BY A TRANSITION SECTION. THE VALUES OD SUPERELEVATION ARE DETERMINED FROM THE AASHTO POLICY ON GEOMETRIC DESIGN AND ARE A FUNCTION OF THE RATE OF SUPERELEVATION AND THE CURVE RADIUS.
 - E. SUPERELEVATION IS USUALLY NOT PROVIDED ON LOCAL STREETS IN RESIDENTIAL AND COMMERCIAL AREAS WHERE WIDE PAVEMENTS, PROXIMITY OF ADJACENT DEVELOPMENT, CONTROL OF CROSS SLOPE, DRAINAGE PROFILES, FREQUENCY OF CROSS STREETS, AND OTHE URBAN FEATURES MAKE ITS USE IMPRACTICAL.
 - F. ON SIMPLE CURVES, WIDENING SHOULD BE APPLIED ON THE INSIDE EDGE ONLY WITH A RECOMMENDED MINIMUM WIDTH OF 0.60 METERS.
 - G. ON CURVE DESIGN WITH SPIRAL, WIDENING MAY BE PLACES ON THE INSIDE OR DIVIDED EQUALLY BETWEEN THE INSIDE AND OUTSIDE CURVE.
 - H. CURVE WIDENING SHOULD BE ATTAINED GRADUALLY OVER A LENGTH SUFFICIENT TO MAKE THE WHOLE OF THE TRAVELED WAY FULLY USABLE.
 - I. ALIGNMENT SHOULD BE AS DIRECTIONAL AS POSSIBLE BUT SHOULD BE CONSISTENT WITH THE TOPOGRAPHY AND WITH PRESERVING DEVELOPED PROPERTIES.
 - J. ALIGNMENT SHOULD BE CONSISTENT AND SHARP CURVES SHOULD NOT BE INTRODUCED AT THE LONG TANGENTS
 - K. FOR SMALL DEFLECTION ANGLE, CURVES SHOULD BE SUFFICIENTLY LONG TO AVOID THE APPEARANCE OF KINK.
 - L. TANGENTS OR FLAT CURVATURE SHOULD BE USED ON HIGH, LONG FILLS.

- A. CAUTION SHOULD BE EXERCISED IN THE USE OF COMPOUND CURVE. WHERE TOPOGRAPHY OR RROW RESTRICTIONS MAKE THEIR USE NECESSARY, THE RADIUS OF THE FLATTER CURVE SHOULD NOT BE MORE THAN 50% GREATER THAN THE RADIUS OF THE SHARPER CURVE.
- B. ANY ABRUPT REVERSAL IN ALIGNMENT SHOULD BE AVOIDED. THE REVERSION LENGTH OF TANGENT BETWEEN REVERSED CURVES SHOULD BE 50 METERS AND IN NO CASE SHOULD BE LESS THAN 30 METERS.
- C. THE "BROKEN-BACK" OR "FLAT-BACK" ARRANGEMENT OF CURVE (HAVING A SHORT TANGENT BETWEEN TWO CURVES IN THE SAME DIRECTION) SHOULD BE AVOIDED EXCEPT WHEN VERY UNUSUAL TOPOGRAPHICAL OR R-O-W DICTATE OTHERWISE.
- D. TO AVOID THE APPEARANCE OF INCONSISTENT DISTORTION, THE HORIZONTAL ALIGNMENT SHOULD BE COORDINATED CAREFULLY WITH THE PROFILE DESIGN.
- E. ENDING A CURVE ON A BRIDGE IS UNDESIRABLE, UNSIGHTLY AND ADDS NEEDLESS COMPLICATIONS TO DESIGN AND CONSTRUCTION. LIKEWISE CURVES BEGINNING OR ENDING NEAR A BRIDGE SHOULD BE PLACED SUCH THAT NO PART OF THE SUPPERELEVATION TRANSITION EXTENDS ON TO THE BRIDGE. COMPOUND CURVES ON A BRIDGE ARE EQUALLY UNDESIRABLE. IF CURVATURE IS UNAVOIDABLE, THE BRIDGE SHOULD BE ENTIRELY ON A SIMPLE CURVE AS FLAT AS PHYSICAL CONDITIONS PERMIT.

• FOR GEOMETRIC DESIGN CRITERIA (VERTICAL ALIGNMENT AND CONTROLS)

- A. IN AREAS SUBJECTED TO INUNDATION, GRADES SHOULD BE ESTABLISHED 0.50M. ABOVE WATER LEVEL.
- B. GRADES OF BRIDGES SHOULD ALLOW 1.50M FREEBOARD ABOVE THE MAXIMUM FLOOD WATER ELEVATION.
- C. MAXIMUM GRADES OF 5% ARE CONSIDERED APPROPRIATE FOR A DESIGN SPEED OF 110KPH. FOR A DESIGN OF 50KPH MAXIMUM GRADES ARE GENERALLY IN THE RANGE OF 7 TO 12%, DEPENDING ON TOPOGRAPHY. IN THE PHILIPPINES THE MAXIMUM GRADE WIDELY USED ID 6%.
- D. ON THROUGH CUT SECTION, GRADES SHOULD AT LEAST BE 0.50% TO PROVIDE LONGITUDINAL DRAINAGE.
- E. A MINIMUM OF 0.35% MAY BE USED ON HIGH TYPE PAVEMENTS AND ACCURATELY CROWNED TO FACILITATE DRAINAGE DISCHARGE.
- F. THE FOLLOWING CRITICAL LENGTH OF UPGRADES WHEN APPROACHED BY A LEVEL SECTION SHOULD NOT BE USED A CONTROL BUT REFERRED TO AS A GUIDE:

CRITICAL LENGTH (m)	UPGRADE (%)
500	3
340	4
240	5
200	6
170	7
150	8

- G. THE MINIMUM REQUIREMENT OF VERTICAL CURVE LENGTH IS 60M.
- H. A SMOOTH GRADE LINE WITH GRADUAL CHANGES SHOULD BE SOUGHT FOR IN PREFERENCE TO A LINE WITH NUMEROUS BREAKS/SHORT LENGTH OF GRADES.
- I. THE "ROLLER COASTER" OR THE HIDDEN-DIP TYPE OF PROFILE SHOULD BE AVOIDED.
- J. A "BROKEN-BACK" GRADE LINE SHOULD BE AVOIDED.
- K. ON LONG GRADES, IT MAY PREFERABLE TO PLACE THE STEEPEST GRADES AT THE BOTTOM AND FLATTER THE GRADES NEAR THE TOP OF THE ASCENT.
- L. WHERE AT-GRADE INTERSECTIONS OCCUR ON ROADWAY SECTORS WITH MODERATE TO STEEP GRADES, IT IS DESIRABLE TO REDUCE THE GRADES THROUGH THE INTERSECTION.
- M. SAG VERTICAL CURVES SHOULD BE AVOIDED IN CUTS UNLESS ADEQUATE DRAINAGE CAN BE PROVIDED.

• FOR GEOMETRIC DESIGN CRITERIA (CROSS SECTIONS)

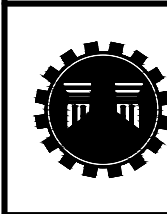
- A. FOR MULTILANE HIGHWAY, THE TWO LANES ADJACENT TO THE CROWN LINE SHOULD BE PITCHED AT THE NORMAL MINIMUM SLOPE, AND ON EACH SUCCESSIVE PAIR OF LANES OR PORTION THEREOF OUTWARD, THE RATE MAY BE INCREASED BY ABOUT 0.50 TO 1%. THE FOLLOWING CROSS-SLOPE RATING SHALL BE APPLIED FOR EACH SURFACE TYPE:

SURFACE TYPE	CROSS SLOPE RATING
HIGH	1.50 - 2.0%
INTERMEDIATE	2.00 - 3.0%
LOW	3.00 - 4.0%

- B. DESIRABLE LANE WIDTH IS 3.65M WHICH ALLOWS LARGE VEHICLES TO PASS WITHOUT EITHER VEHICLE HAVING TO MOVE SIDEWAYS TOWARDS THE EDGE OF PAVEMENT.
- C. LANE WIDTH AS LOW AS 2.75M MAY BE USED ON GROUNDS OF ECONOMY.
- D. ROADS WITH PAVEMENT WIDTHS LESS THAN 5.5M SHOULD REGARDED AS SINGLE LANE.
- E. PAVEMENT WIDTH GREATER THAN 7.32M FOR 2-WAY MOVEMENT IS NOT RECOMMENDED FOR 2-LANE ROADS AS SOME DRIVERS WILL ATTEMPT TO TRAVEL THREE VEHICLES ABREAST ON WIDE PAVEMENT.
- F. SHOULDERS ON FILL PREFERABLY SHOULD BE WIDER THAN IN CUTS ALTHOUGH THE PRESENT PRACTICE IS TO MAKE THEM EQUAL.
- G. REGARDLESS OF THE WIDTH, SHOULDERS SHOULD BE CONTINUOUS.
- H. ALTHOUGH, IT IS DESIRABLE THAT SHOULDER BE WIDE ENOUGH FOR A VEHICLE TO BE DRIVEN COMPLETELY OFF THE TRAVEL WAY, NARROWER SHOULDERS ARE BETTER THAN NONE AT ALL.
- I. SHOULDER WIDTH OF 0.60M MAY BE CONSIDERED ON DIFFICULT TERRAIN AND ON LOW-VOLUME HIGHWAY.
- J. PAVING OF SHOULDERS WITH A MINIMUM WIDTH OF 1.5M SHALL BE CONSIDERED WHEN AADT IS GREATER THAN 1,250 VEHICLES, WHEN CLOSELY SPACED DRIVEWAYS AND/OR FREQUENT TURNING MOVEMENTS AFFECT MAINTENANCE, ON HIGH EMBANKMENT SECTIONS, ON CURVED ALIGNMENT WITH MORE THAN 7% SUPERELEVATION, WHERE PEDESTRIANS ARE NORMALLY CONCENTRATED, AND IN AREAS WITH STEEP (>6%) AND LONG (>100M) GRADIENTS.

THIS IS TO CERTIFY THAT THE DETAILED ENGINEERING SURVEYS AND DESIGNS HAVE BEEN CONDUCTED ACCORDING TO THE PRESCRIBED AGENCY STANDARDS AND SPECIFICATIONS IN CONFORMANCE WITH THE PROVISIONS OF ANNEX"A" OF THE REVISED IMPLEMENTING RULES AND REGULATIONS OF RA 9184, AND THAT THE DETAILED ENGINEERING OUTPUTS ARE ADEQUATE FOR THE PROCUREMENT AT HAND.

WARREN S. PIÑEZ
HEAD, SURVEY & INVESTIGATION UNIT



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:

CONCRETING OF ROAD IN BARANGAY
TULALIAN, STO.TOMAS, DAVAO DEL NORTE

SHEET CONTENTS:

GENERAL NOTES,LEGENDS

DRAFTED:

HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:

WARREN S. PIÑEZ
ENGINEER II

REVIEWED:

BENILDA S. MACQUIAO
ENGINEER III

DATE:

SUBMITTED:

JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION

DATE:

RECOMMENDED:

GARRY C. VERANO
OFFICER IN CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED:

ARTURO P. LONGYAPON
DISTRICT ENGINEER

DATE:

SET NO.

3

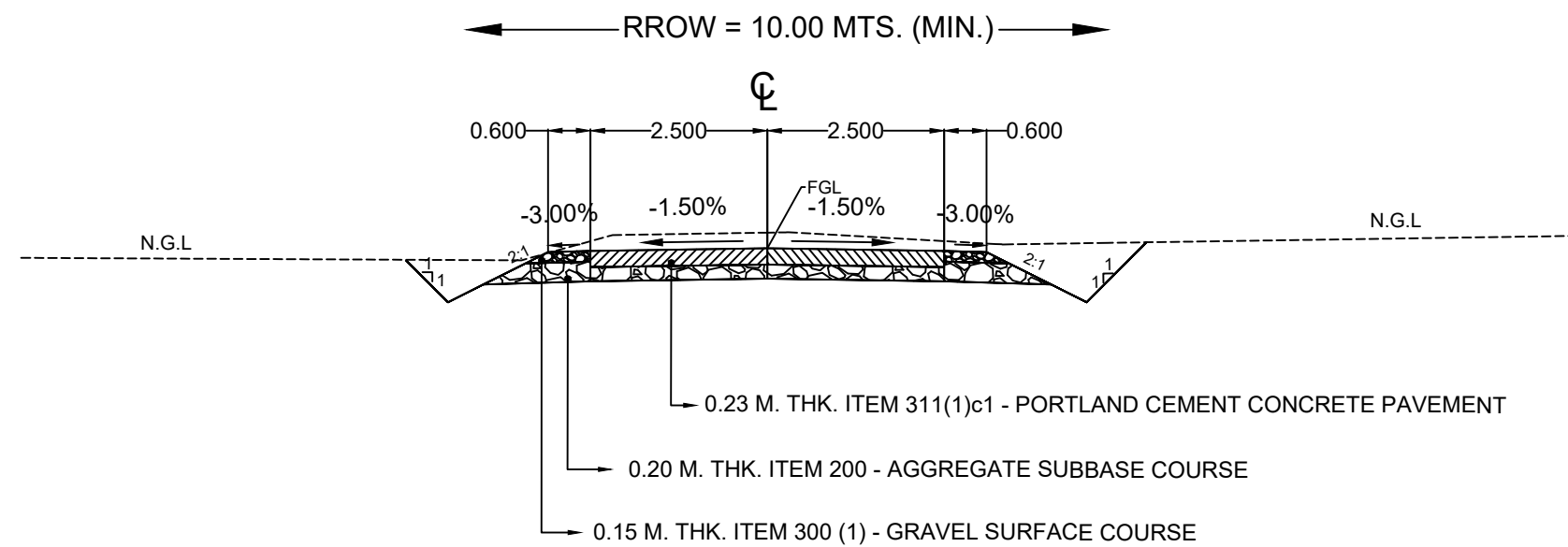
SHEET NO.

16

SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	REMARKS
PART B	OTHER GENERAL REQUIREMENT			
B.3	PERMITS AND CLEARANCES	ls	1.00	
B.4(1)	CONSTRUCTION SURVEY AND STAKING	km.	0.32	
B.5	PROJECT BILLBOARD/SIGNBOARD	ea	4.00	DPWH AND COA BILLBOARD
B.7(2)	OCCUPATIONAL SAFETY AND HEALTH PROGRAM	ls	1.00	
B.8(2)	TRAFFIC MANAGEMENT	ls	1.00	
B.9	MOBILIZATION AND DEMOBILIZATION	ls	1.00	
PART C	EARTHWORKS			
100(3)a2	INDIVIDUAL REMOVAL OF TREES (SMALL - 301-500mm dia.)	ea.	9.00	
102(2)	SURPLUS COMMON EXCAVATION	cu.m.	700.00	
103(1)a	STRUCTURE EXCAVATION - COMMON SOIL	cu.m.	17.00	
103(3)	FOUNDATION FILL	cu.m.	1.15	
104(1)a	EMBANKMENT FROM ROADWAY / STRUCTURE EXCAVATION (COMMON SOIL)	cu.m.	308.00	
105(1)a	SUBGRADE PREPARATION (COMMON MATERIAL)	sq.m.	1,675.00	
PART D	SUBBASE AND BASE COURSE			
200(1)	AGGREGATE SUBBASE COURSE	cu.m.	557.00	INCLUDES GRAVEL TRANSITION
PART E	SURFACE COURSE			
300(1)	GRAVEL SURFACE COURSE	cu.m.	75.00	FOR SHOULDERING
311(1)c1	PCC PAVEMENT (UNREINFORCED), 0.23m. thk., 14 days	sq.m.	1,605.00	
PART G	DRAINAGE AND SLOPE PROTECTION STRUCTURES			
404(1)a	REINFORCING STEEL - GRADE 40	kg	89.00	
404(1)b	REINFORCING STEEL - GRADE 60	kg	521.00	
405(1)a2	STRUCTURAL CONCRETE, CLASS "A", 20.68MPa, 14days	cu.m.	6.00	FOR SLOPE PROTECTION
PART D	MISCELLANEOUS STRUCTURES			
605(6)e1	HAZARD MARKERS (450X600mm - CHEVRON SIGNS)	ea	1.00	
612 (1)	REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS (WHITE)	sq.m	80.40	
624(18)a1	SINGLE ARM SOLAR LED LIGHTING; 8M-POLE 80W-125W	ea	8.00	

NOTE: THE QUANTITIES OF ALL WORK ITEMS INVOLVED ARE SUBJECT TO INCREASE/DECREASE AS PER ACTUAL FIELD REQUIREMENTS.



TYPICAL ROADWAY SECTION SHOWING CUT SECTION
SCALE 1:100

DESIGN CONDITIONS :			
Design Period	=	20	Years
Actual Loading	=	100 %	(including overloaded trucks)
Design ESAL	=	993,771	One direction
Conc. Strength	=	650	psi @ 28 Days
Design CBR: = Mean CBR - $\frac{1}{2}S$			
where: $S = \sqrt{\frac{\sum (x_i - \bar{x})^2}{(n-1)}}$			
Mean CBR	=	6.6667	
$S = \left(\frac{281.6}{8.00} \right)^{0.5} = 5.9325$			
Resilient Modulus of Subgrade: $M_R = CBR \times 1500$			
$M_R = 2.712 \times 1500 = 4,067.51$			
Composite Modulus of Subgrade: $k_a = 250$			
Corrected k, (from the graphs): $k_{cor} = 750$			

PAVEMENT STRUCTURE	
PCC Thickness, T_{PCC}	= 230 mm
Subbase, Item 200	= 200 mm
Subgrade CBR	= 2.712
(M_R , resilient modulus)	= 4,068

RIGID PAVEMENT DESIGN

NOTE:

ALL EMBANKMENT SHALL BE COMPACTED IN HORIZONTAL LAYERS NOT EXCEEDING 200mm (LOOSE MEASUREMENT). AFTER FIVE SUCCESSIVE LAYERS , THE FILL/ EMBANKMENT SHALL BE SATURATED WITH WATER THEN DRIED BEFORE PLACING THE SUCCEEDING LAYERS. THE PROCEDURE SHALL BE REPEATED UNTIL THE DESIRED ELEVATION IS ATTAINED.

REFERENCE:

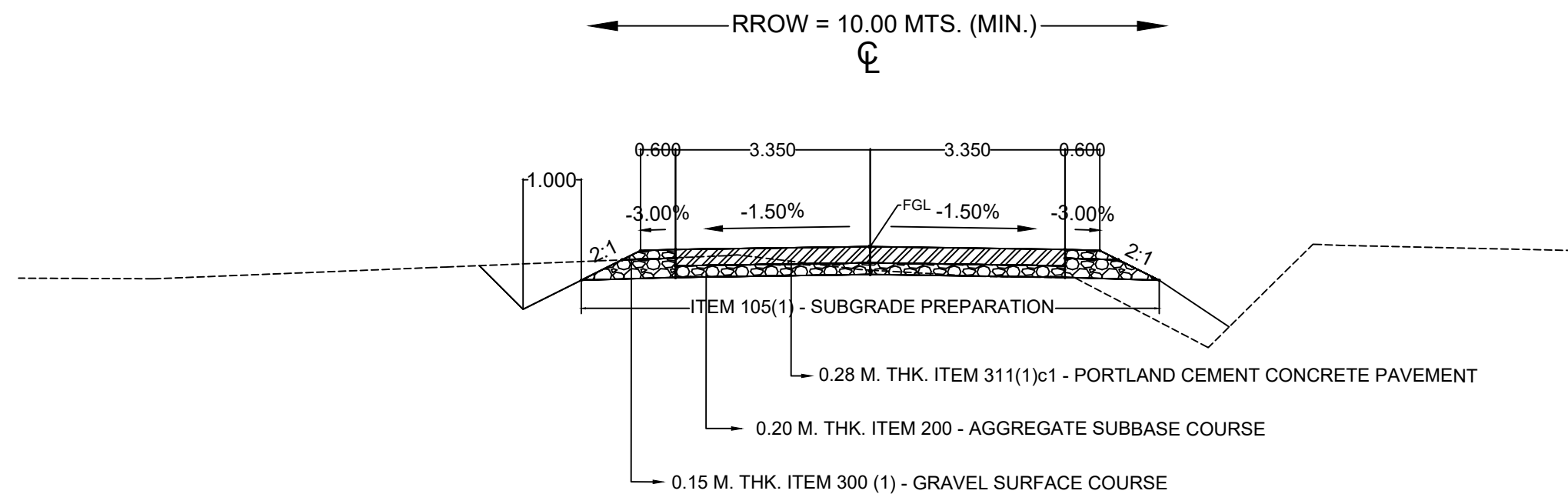
- DPWH DESIGN, GUIDELINES CRITERIA AND STANDARDS (DGCS) 2015 EDITION
- FOR THE MINIMUM REQUIREMENT OF ROAD RIGHT OF WAY (RROW) WIDTH D.O. 179, S. 2015

SCHEDULE FOR RULE OF 7

+ e% < 5% = -3%
+ e% ≥ 5% = -2%
+ e% ≥ 6% = -1%
+ e% ≥ 7% = -0%
+ e% ≥ 8% = +1%

CUT/FILL SLOPE SCHEDULE

NATURE OF MATERIAL	CUT SLOPE	FILL SLOPE
COMMON EARTH	1:1	1.5:1
RIPPABLE ROCK	1/2:1	-
SOLID ROCK	1/4:1	-



TYPICAL ROADWAY SECTION AT NORMAL CROWN
SCALE 1:100



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:

CONCRETING OF ROAD IN BARANGAY
TULALIAN, STO. TOMAS, DAVAO DEL NORTE

SHEET CONTENTS:

TYPICAL ROADWAY SECTION, DESIGN
PARAMETERS, AND SHOULDER SCHEDULE

DRAFTED:

HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:

WARREN P. PINEZ
ENGINEER II

REVIEWED:

BENILDA S. PACQUIAO
ENGINEER III

DATE:

SUBMITTED:

JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION

DATE:

RECOMMENDED:

GARRY VERANO
OFFICER IN CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED:

ARTURO P. LONGYAPON
DISTRICT ENGINEER

DATE:

SET NO.

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SHEET NO.

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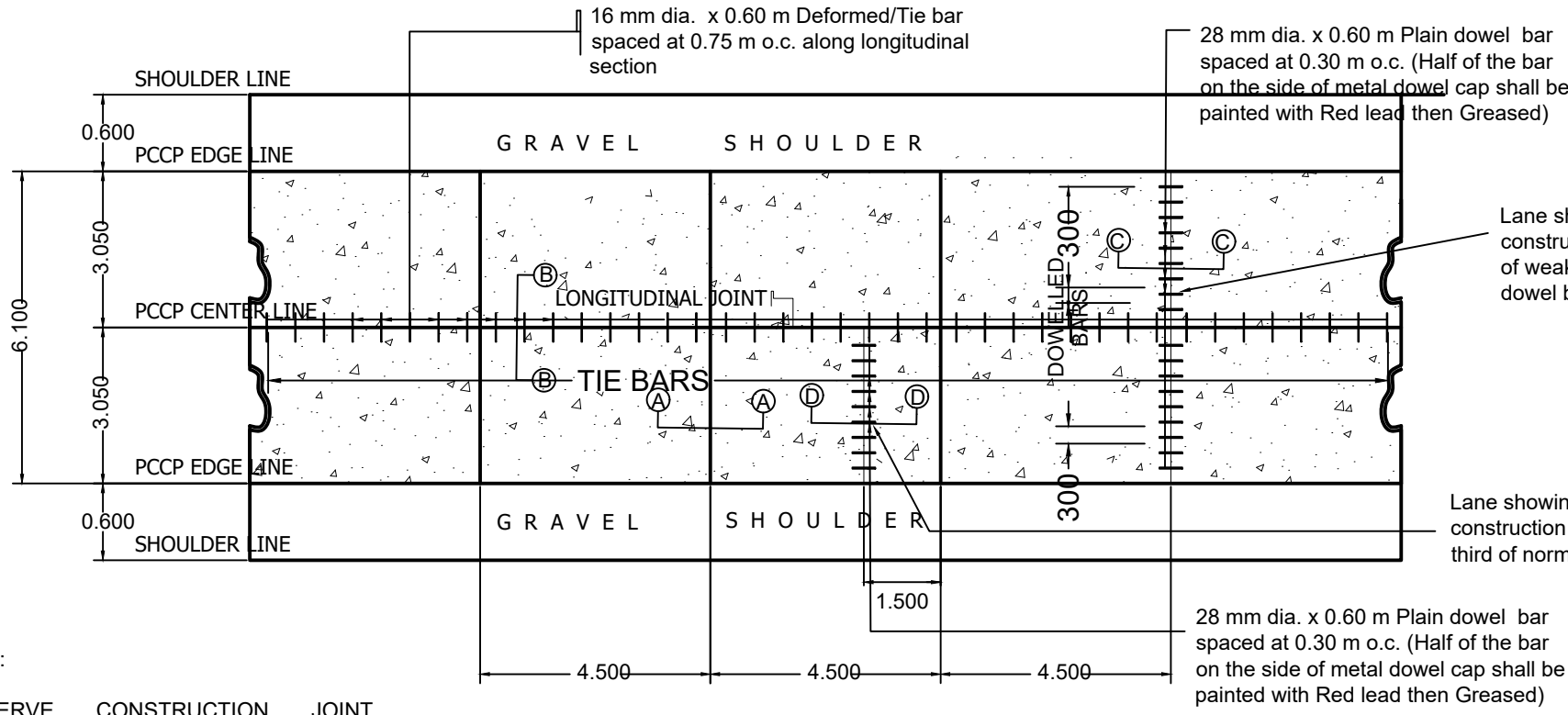
TABLE SPACING OF TIE BARS (L=600 mm)		
SLAB THICKNESS (mm)	SPACING S1 (mm)	
	12 mm dia.	16 mm dia.
230	600	750
240	600	750
250	600	750
260	500	750
270	500	750
280	500	750
290	500	750
300	500	750
310	400	750
320	400	750
330	400	750
340	400	750

BASED ON AASHTO GUIDE FOR DESIGN OF PAVEMENT STRUCTURES 1993

TABLE SPACING OF PLAIN DOWEL BARS (L=600 mm)		
SLAB THICKNESS (mm)	DIAMETER, D (mm)	SPACING, S2(mm)
230	28	300
240	30	300
250	32	300
260	32	300
270	34	300
280	36	300

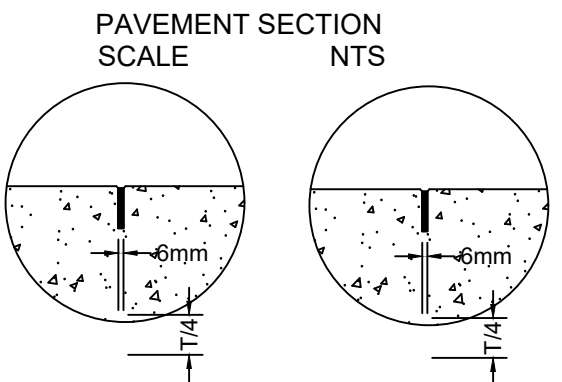
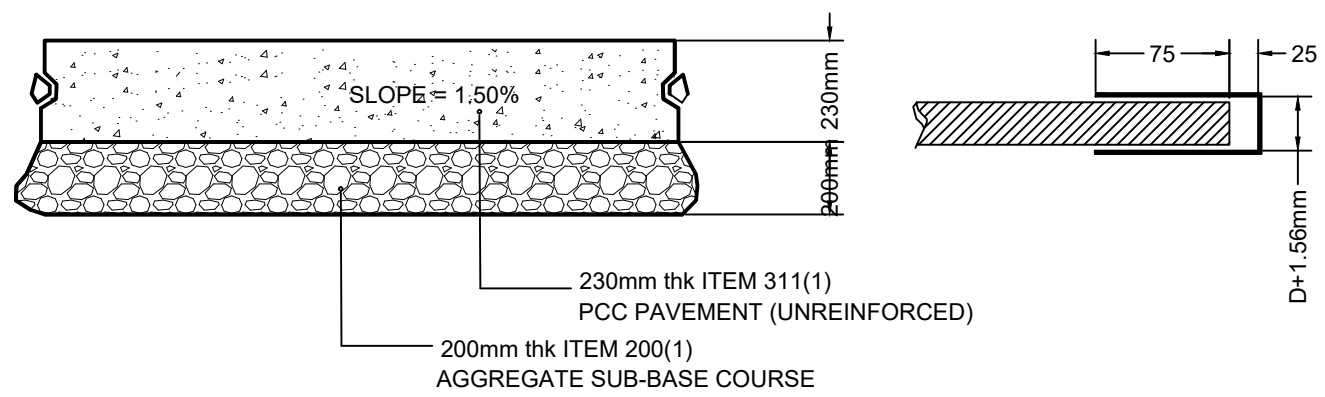
NOTE:
DIAMETER AND SPACING OF PLAIN DOWEL BARS MAY BE MODIFIED AS LONG AS THE EQUIVALENT STEEL AREA IS SUSTAINED.

- Materials and workmanship shall conform with the DPWH Standard Specification for Highways, Bridges and Airport, 2013
- Contraction joints are formed when concrete on one side of the joint is poured ahead and allowed to set before pouring on the other side. No construction joint shall be placed within 1.50 m. from the weakened plane joint.
- At construction joint (longitudinal or transverse) care should be taken that no concrete from the last slab placed overhangs any portion of the first slab.
- Tie bars should be deformed steel bars. All dowel bars shall be smooth round steel bar free from rust and other defects which might restrict their movement.
- Type of weakened plane joint to be used shall be as specified in the plans and only one type should be used for the whole project.
- Material for the metal side form shall be brand new sheet metal Gauge no. 15 of black iron free from rust and links.
- At least six (6) successive dowelled butt joints at normal joint spacing shall be provided before or after an expansion joint.
- The groove or cracks above joints (longitudinal or transverse) shall be sealed with 30-50 penetration asphalt seal or cold applied liquid rubber compound after the concrete had been cured and before opening pavement to traffic. Asphalt sealed should be poured in such manner that spalling shall be prevented/ eliminated, thus, provide a smooth leveling/ riding surface.
- All transverse joints except construction joint shall be continuous from edge to edge.
- All longitudinal joints shall meet at intersections with no gaps or offset.
- All dimensions are in millimeters unless otherwise specified.
- Avoid stoppage of formworks along curves.
- Construct expansion joint at every 90 meters and/or every adjacent existing structures.

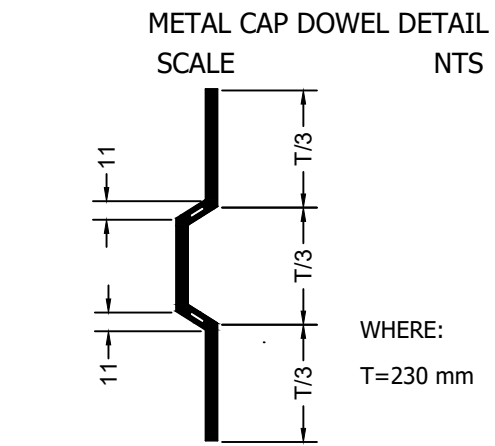


NOTE:
TRANSVERSE CONSTRUCTION JOINT SHALL BE PROVIDED OF ANY RUN WHERE LAYING OF CONCRETE HAS BEEN STOPPED FOR THIRTY (30) MINUTES OR LONGER.
ALL TRANSVERSE CONSTRUCTION JOINTS SHOULD BE BUTT JOINTS WITH DOWEL.

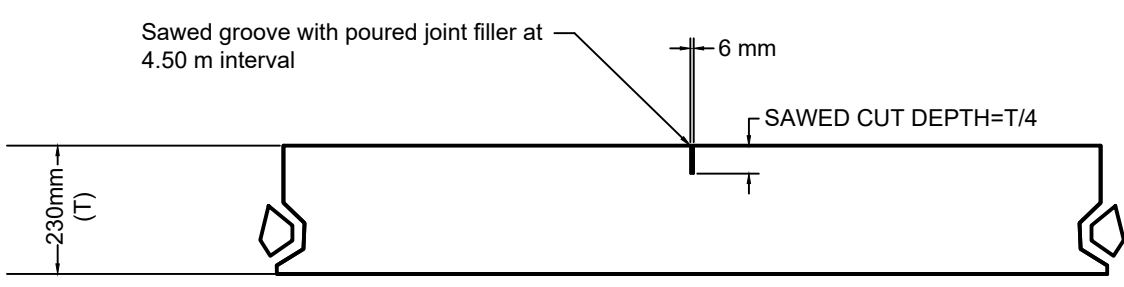
TYPICAL BAR LAYOUT "T" THICK PAVEMENT
TYPICAL PLAN OF TWO-LANE DOWELLED PAVEMENT
NOT TO SCALE



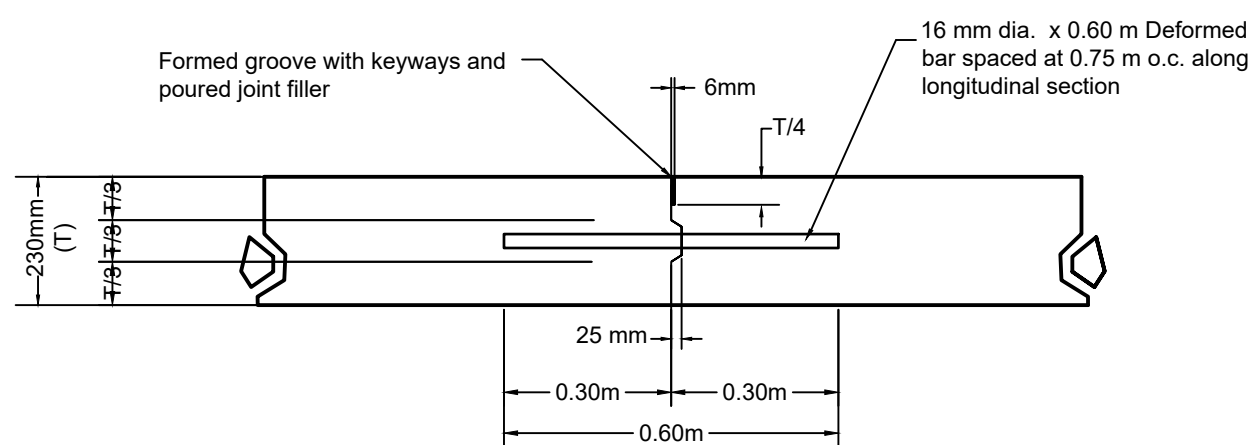
POURED ASPHALT SEAL 30-50 PENETRATION
SAWED GROOVE TYPE
PRE-MOLDED JOINT FILLER
PRE-MOLDED STRIP TYPE



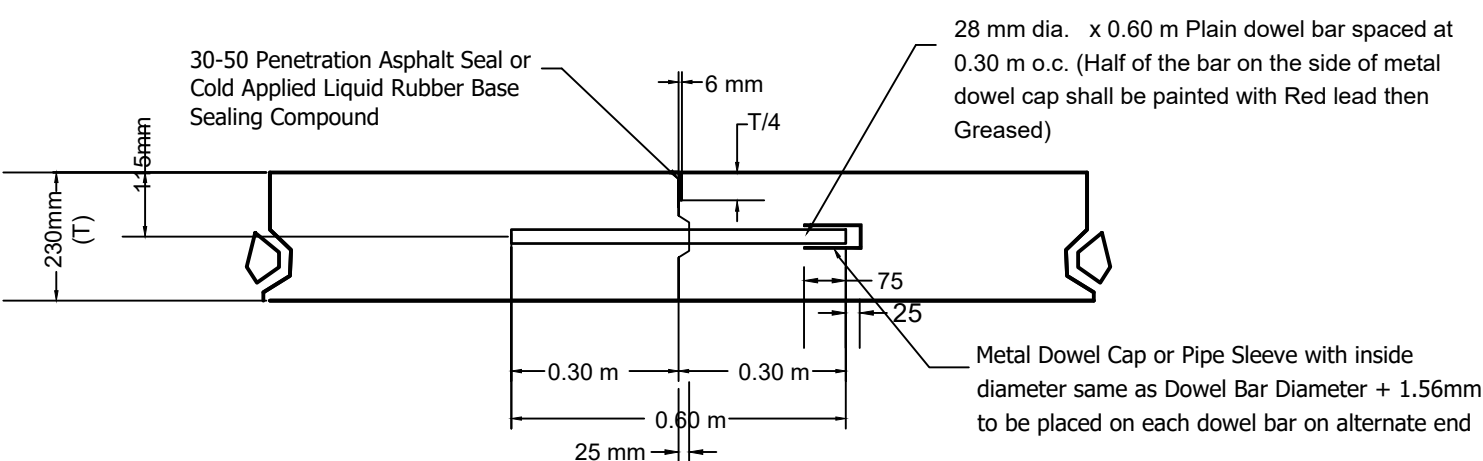
METAL CAP DOWEL DETAIL
SCALE NTS
METAL SIDE FORM (KEYED JOINT)
DETAIL OF SIDE FORMS
SCALE NTS



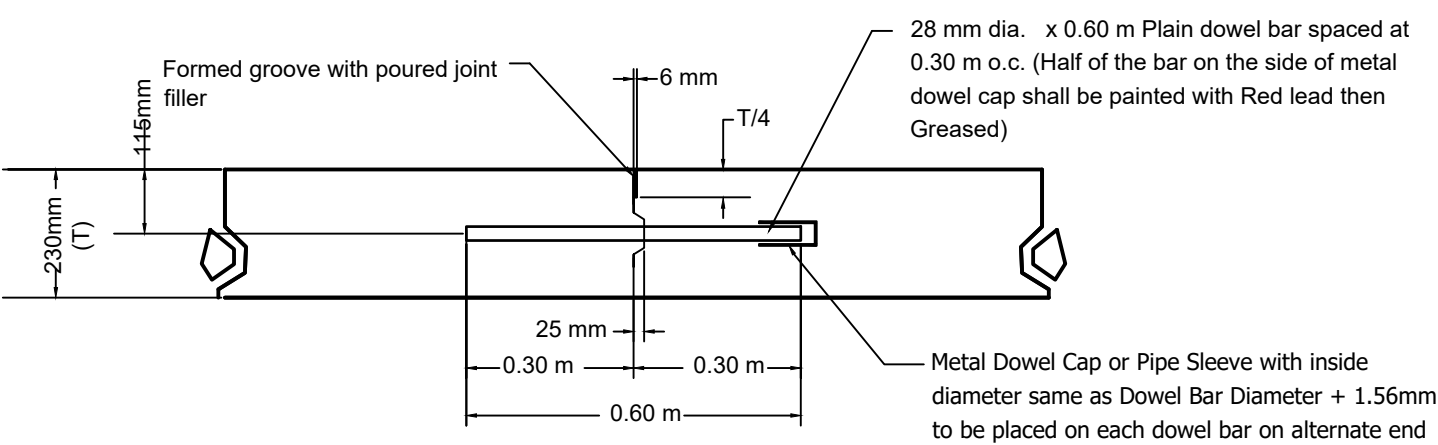
SECTION A - A
CONTRACTION JOINT SECTION
SCALE 1 : 20 M.



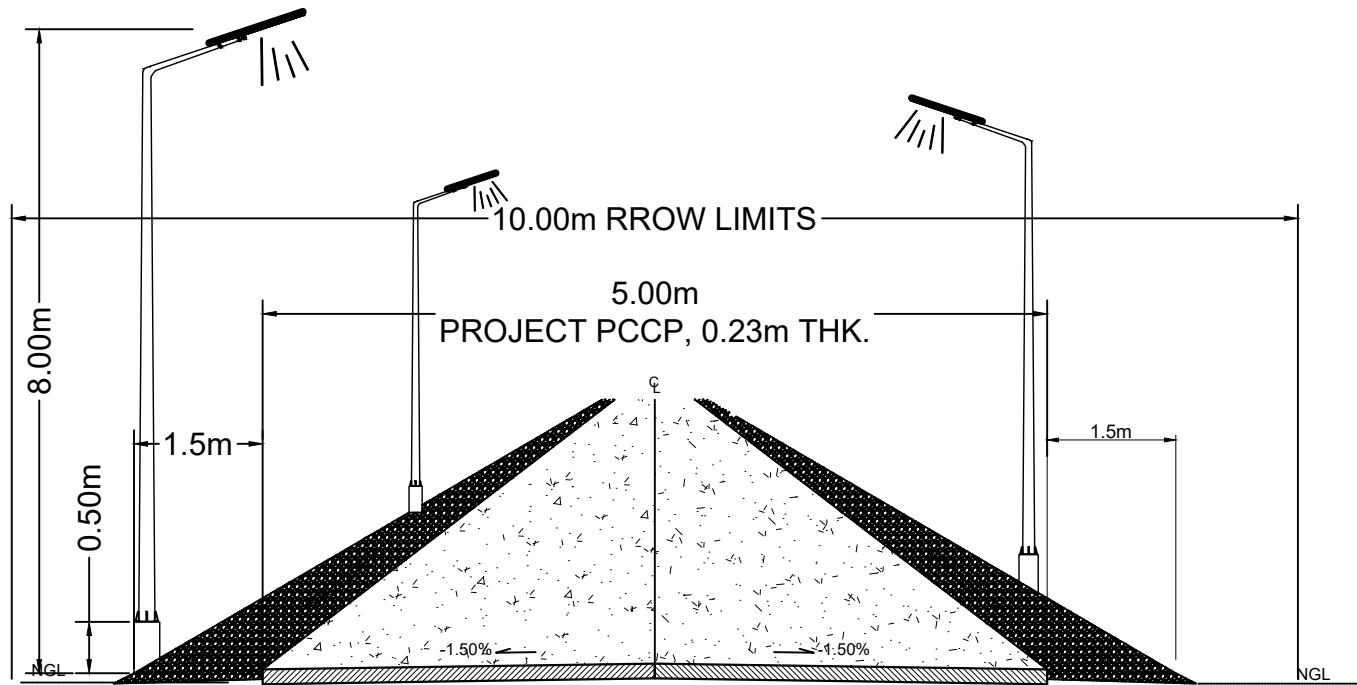
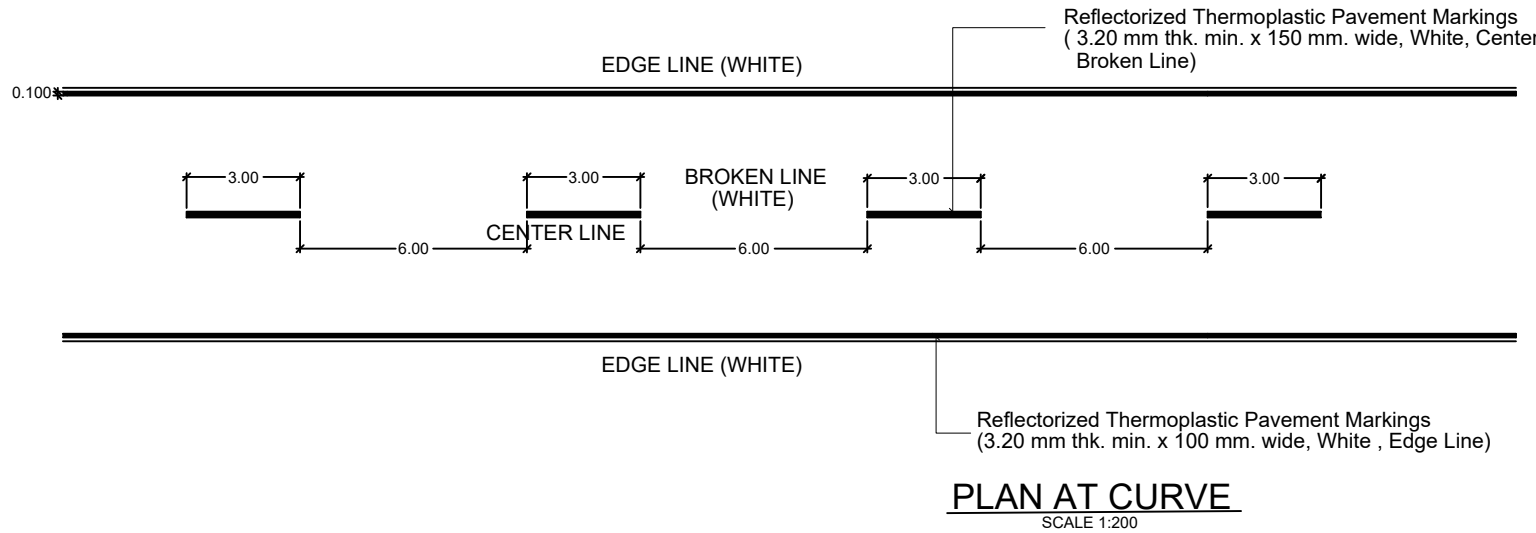
SECTION B - B
LONGITUDINAL CONSTRUCTION JOINT
SCALE 1 : 20 M.



SECTION C - C
DOWELLED EXPANSION JOINT DETAIL
SCALE 1 : 20 M.



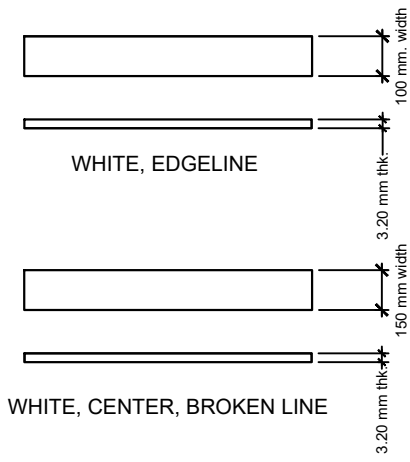
SECTION D - D
BUTT TRANSVERSE CONSTRUCTION
OR CONTACT JOINT
SCALE 1 : 20 M.



TYPICAL ROADWAY SECTION

DRAWN NOT TO SCALE

SCHEDULE OF SOLAR STREET LIGHTS			
STATION	DISTANCE OF ST. LIGHTS	QUANTITY	LOCATION
0+000.00 - 0+140.00	20.00m	8	STAGGERED B/S



REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS DETAIL

GENERAL NOTES:

1. THE MATERIALS, DIMENSIONS, SHAPE, COLOR, SIZE OF NUMERALS, LETTERS AND INSTALLATION SHALL CONFORM IN ACCORDANCE WITH SPECIFICATIONS OF DPWH MANUAL ON PAVEMENT MARKINGS.
2. REFLECTORIZED THERMOPLASTIC PAVEMENT STRIPPING MATERIAL SHALL CONFORM TO AASHTO M249 IN WHICH THE ROAD MUST BE APPLIED IN A MOLTEN STATE BY MECHANICAL MEANS W/ SURFACE APPLICATION OF GLASS BEADS AT A RATE OF NOT LESS THAN 350 G/L OF GLASS BEADS HAVING A SIZE RANGE OF DROP-IN TYPE AND WILL PRODUCE AN ADHERENT REFLECTORIZED STRIPE OF SPECIFIED THICKNESS AND WIDTH CAPABLE OF RESISTING DEFORMATION BY TRAFFIC.

REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS

STATION	EDGE LINE (W = 0.10 m)	BROKEN LINES (W = 0.15 m L = 3.0 m)		SOLID CENTERLINE (W = 0.15 m)	AREA (SQ.M.) WHITE	AREA (SQ.M.) YELLOW	DESCRIPTION
		LENGTH	No. OF STRIPS				
STA. 0+000.00 - STA. 0+322.00	321 x 2				64.20		WHITE , EDGELINE (BOTHSIDES)
STA. 0+000.00 - STA. 0+322.00		321.00	36.00		16.20		WHITE , CENTER , BROKENLINE
				TOTAL	80.40		

LAMP WATTAGE	LED - 80 TO 125 WATTS, HFS - 150 TO 250 WATTS
EFFICIENCY	SHALL HAVE AT LEAST 85%
LUMINAIRE DIMENSION	LENGTH NOT MORE THAN 1200mm
	WIDTH NOT MORE THAN 400mm
	HEIGHT NOT MORE THAN 200mm
WEIGHT	16 KILOGRAMS (MINIMUM)
LUMINAIRE EFFICACY	100 LUMENS/ WATT (MINIMUM)
COLOUR TEMPERATURE	COOL WHITE (3000K - 4500K)
COLOUR RENDERING INDEX (CRI)	80 +/-10 (MINIMUM)
IP RATING	IP66 (MINIMUM)
ALL MATERIALS	PHILIPPINE STANDARD QUANTITY MARK OR IMPORT COMMODITY CLEARANCE ISSUED BY DTI-BPS
BURNING HOURS	>50,000 HOURS
OPERATING TEMPERATURE	OPERATING AMBIENT TEMPERATURE BETWEEN 10° C TO 50° C
MOUNTING HEIGHT	8.00 meters
MASH ARM LENGTH	1.500 meters
LUMINAIRE SPACING	20.00 meters
TEST REPORT	LABORATORY ACCREDITED ISO/IEC 17025 & TESTING OF LED LIGHTING PRODUCTS RECOGNIZED BY ILAC/ APLAC

NOTES:

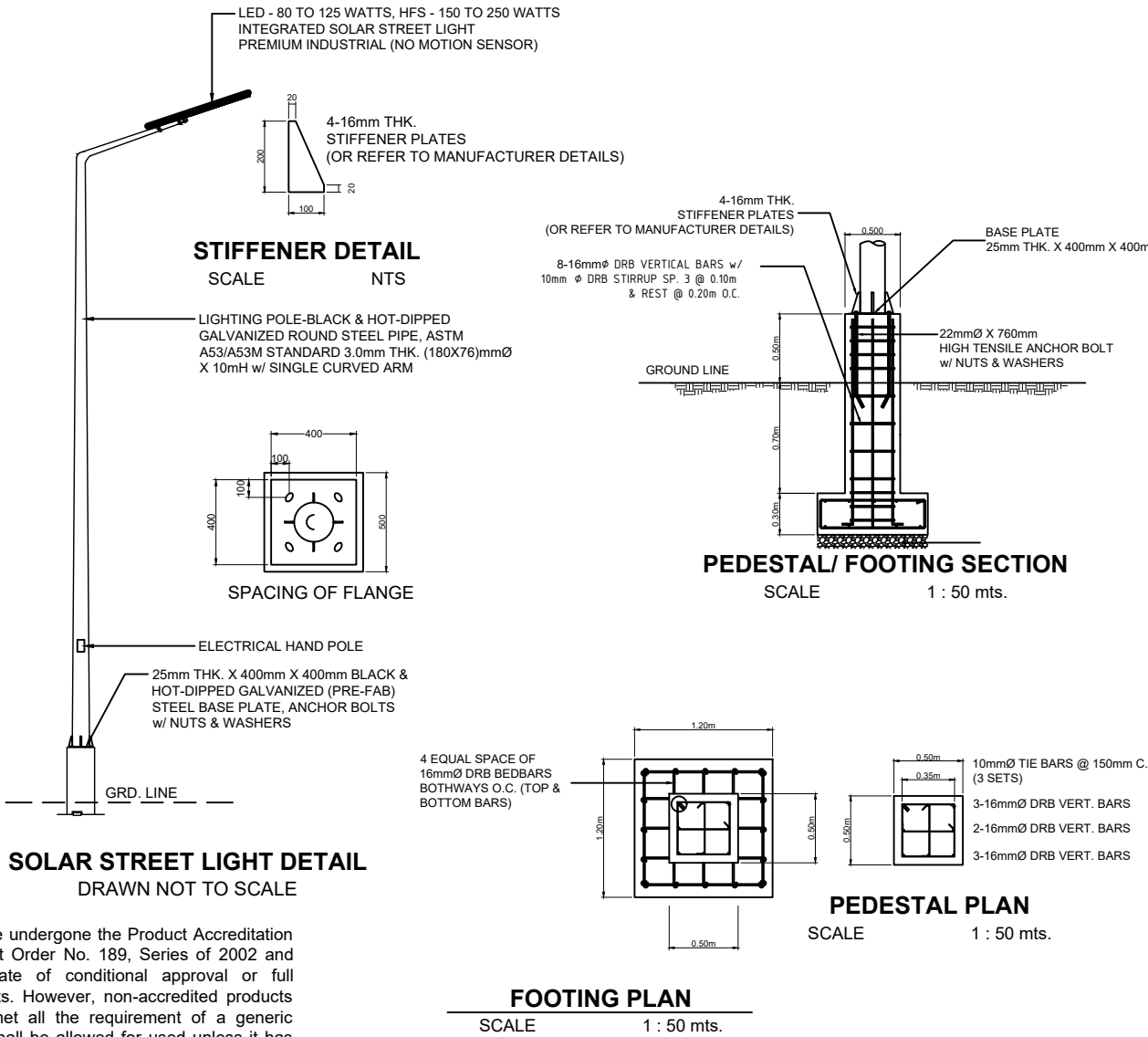
1. ALL ELECTRICAL INSTALLATIONS MADE HEREIN SHALL CONFORM WITH THE RULES AND REGULATIONS OF THE LATEST EDITION OF THE PHILIPPINE ELECTRICAL CODE (PEC), AND THE EXISTING LOCAL ORDINANCE OF THE LOCAL ENFORCING AUTHORITY.
2. ALL MATERIALS AND DEVICES TO BE USED AND INSTALLED HEREIN SHALL BE NEW, GOOD WORKMANSHIP AND OF APPROVED TYPE BY THE BUREAU OF STANDARDS.
3. LIGHTING POLE MUST BE BLACK HOT-DIPPED GALVANIZED ROUND STEEL PIPE, ASTM A53/A53M STANDARD 3.0mm THICK X 180mmØ X 76mmØ.
4. A WARRANTY MUST BE PROVIDED FOR THE FULL REPLACEMENT OF THE LUMINAIRE DUE TO ANY FAILURE FOR SIX(6) YEARS. THE WARRANTY SHALL PROVIDE FOR THE REPAIR OR REPLACEMENT OF DEFECTIVE ELECTRICAL PARTS (INCLUDING LIGHT SOURCE AND POWER SUPPLIES/ DRIVERS CHIP, AND OTHER ACCESSORY) FOR A MINIMUM OF EIGHT(8) YEARS FROM DATE OF PURCHASE. WARRANTY COVERS LUMINAIRE INTEGRITY AND FUNCTIONALITY; LUMINAIRE HOUSING, WIRING AND CONNECTIONS; LED LIGHT SOURCE(S) NEGLIGIBLE LIGHT OUTLET FROM MORE THAN 10% OF THE LED SOURCES CONSTITUTES LUMINAIRE FAILURE; LED DRIVERS.
5. THE CONTRACTOR SHALL VERIFY AND ORIENT THE ACTUAL LOCATIONS OF EACH SOLAR STREET LIGHTS.
6. ALL ELECTRICAL WORKS SHALL BE DONE UNDER THE STRICT SUPERVISIONS OF A DULY REGISTERED ELECTRICAL ENGINEER.

FOR ROADWAY LIGHTING

1. All materials shall be brand new and shall have undergone the Product Accreditation Scheme (PAS) in accordance with Department Order No. 189, Series of 2002 and were consequently awarded with a certificate of conditional approval or full accreditation to be used in the DPWH projects. However, non-accredited products may be used provided that it satisfactorily met all the requirement of a generic specification. No new products/ technologies shall be allowed for used unless it has undergone the Product Accreditation Scheme or covered by a generic specification. It shall also conform with requirements of the Philippine Electrical Code and the Products locally manufactured shall bear a Philippine Standard (PS) Mark. While imported products shall bear Import Commodity Clearance (ICC) certificate marks duly issued by the Bureau of Philippine Standards (BPS).
2. All works shall be executed in the best practice in a workmanlike manner by qualified and experienced electricians under the immediate supervision of a duly registered Electrical Engineer.

FOR LED LUMINAIRES:

3. For Light Emitting Diodes (LED) Luminaires, housing shall be primarily constructed of corrosion-resistant cast aluminum with a powder coated finish of neutral color.
4. All mounting hardware shall be of non-corrosive or suitable protected material.
5. Driver and Led Modules shall be replaceable as separate units with tool-less plug-in electrical connections.
6. Luminaire housing shall be listed for wet locations optical assembly shall be minimum IP-66 rated per IEC.



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
2ND DISTRICT ENGINEERING OFFICE
TAGUM CITY

PROJECT NAME AND LOCATION:

CONCRETING OF ROAD IN BARANGAY
TULALIAN, STO.TOMAS, DAVAO DEL NORTE

SHEET CONTENTS:

REF. THERMOPLASTIC PAVEMENT MARKING
DETAILS AND SCHEDULES, SOLAR STREET
LIGHT DETAILS AND SCHEDULES

DRAFTED:

HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:

WARREN PINEZ
ENGINEER II

REVIEWED:

BENILDA S. MACQUIAO
ENGINEER III

DATE:

SUBMITTED:

JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION

DATE:

RECOMMENDED:

GARRY VERANO
OFFICER-IN-CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED:

ARTURO P. LONGYAPON
DISTRICT ENGINEER

DATE:

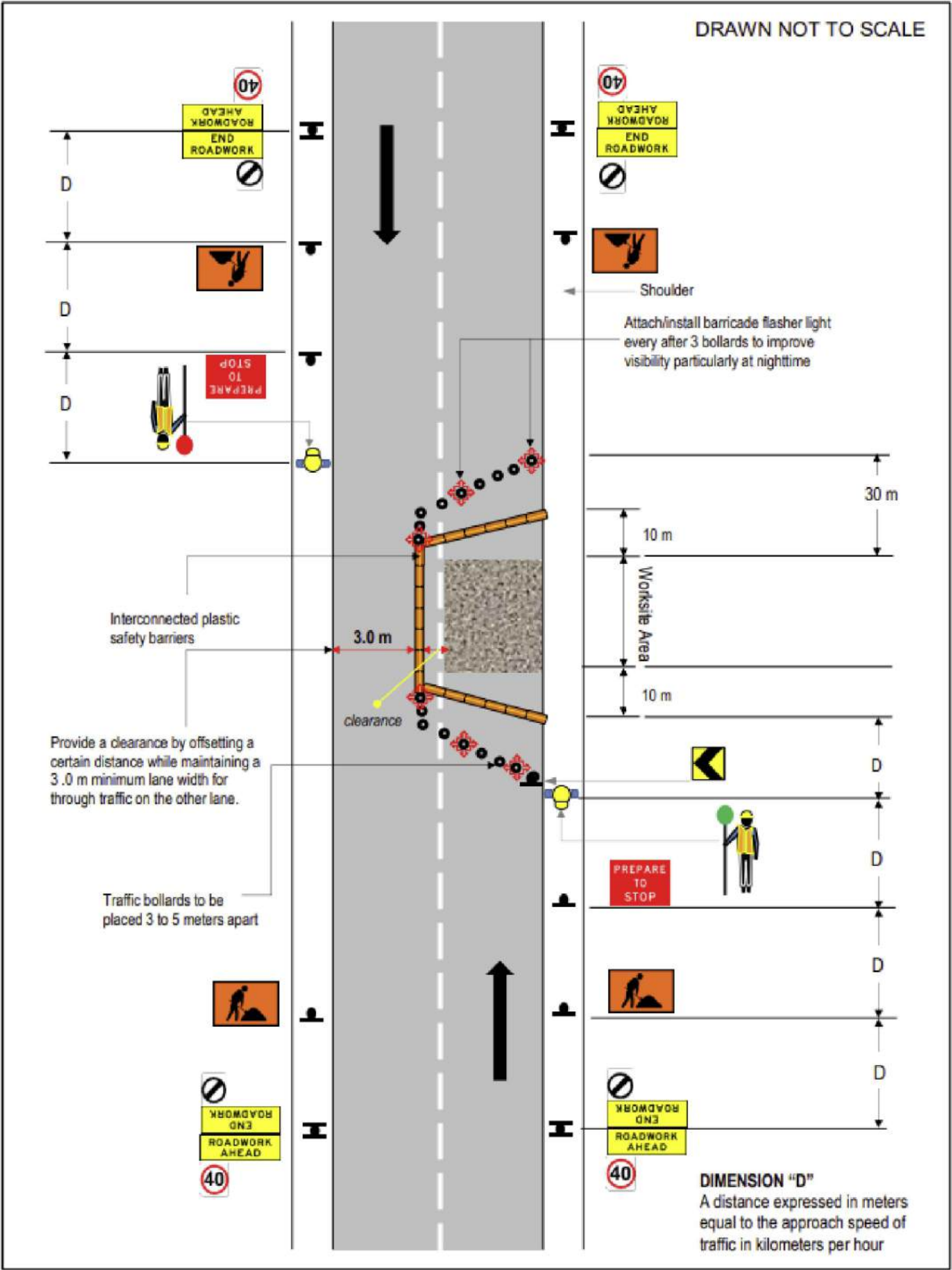
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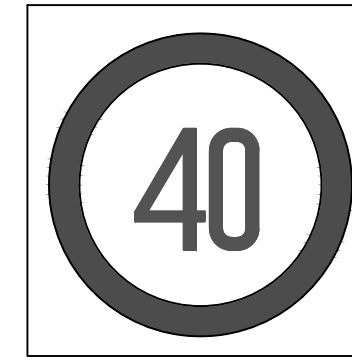
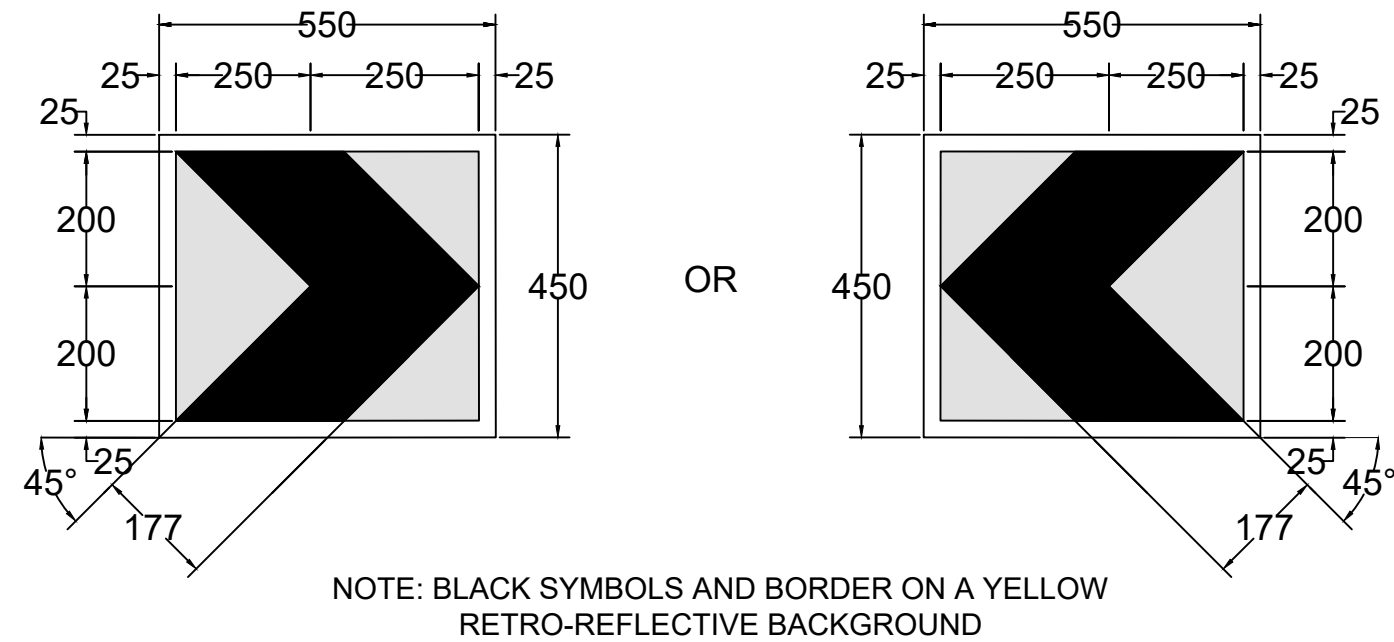
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TRAFFIC MANAGEMENT LAY-OUT (LAY-OUT 7 - CASE 1 -
PART LANE CLOSURE - 2 LANE, 2 WAY ROAD, LONG TERM)

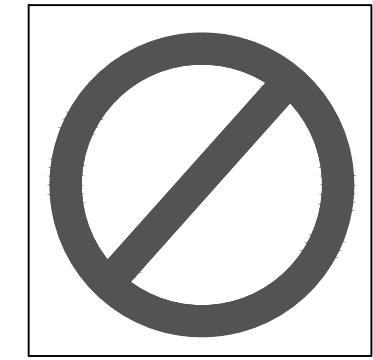


ROAD & BRIDGE WORK SITE TEMPORARY SIGNAGE		SIGN No.	SIZE (mm) (WidthxHeight)
LEGEND:			
	SPEED RESTRICTION	R4-10	600x800
	ROADWORK AHEAD	T1-1	1800x600
	END ROADWORK	T2-16	1800x600
	END SPEED RESTRICTION	R4-2	600x800
	WORKMEN AHEAD (SYMBOLIC)	T1-5	900x600
	PREPARE TO STOP	T1-18	900x600
	TEMPORARY HAZARD MARKER	T5-5	550x450
	TEMPORARY BOLLARDS		
	TEMPORARY BOLLARDS WITH FLASHER		



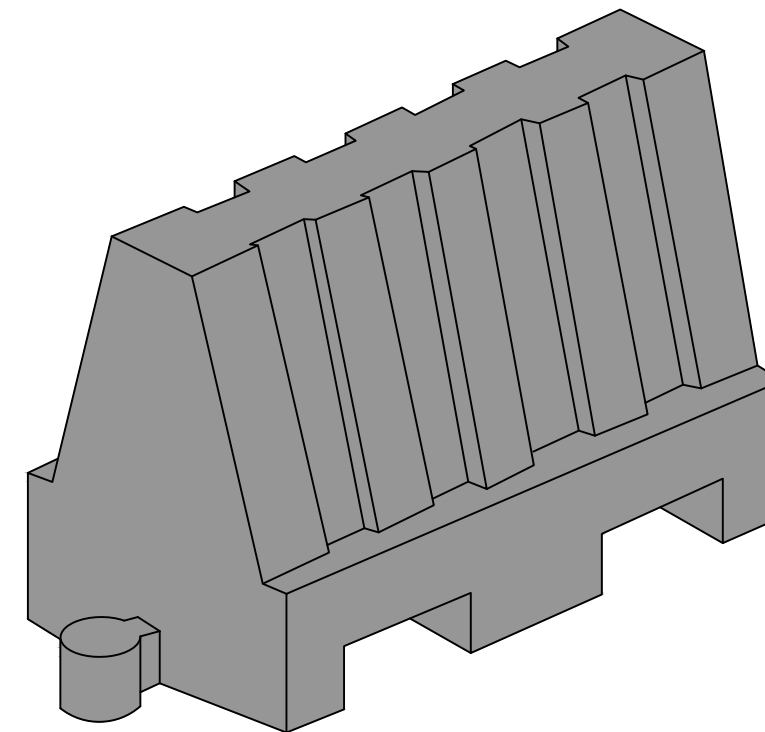
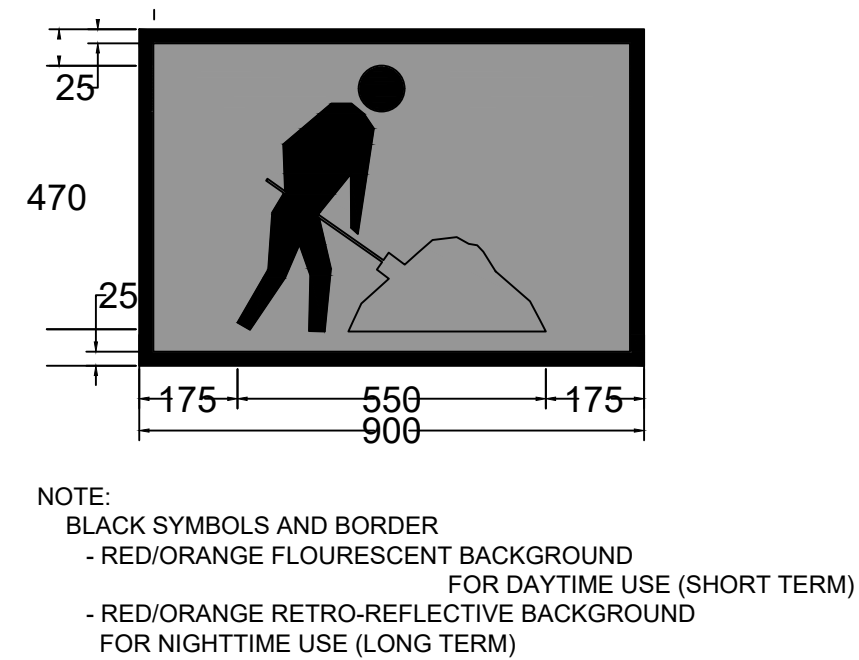
NOTE: BLACK NUMERALS ON A WHITE RETRO-REFLECTIVE BACKGROUND AND RED REFLECTORIZED CIRCLE

SPEED RESTRICTION

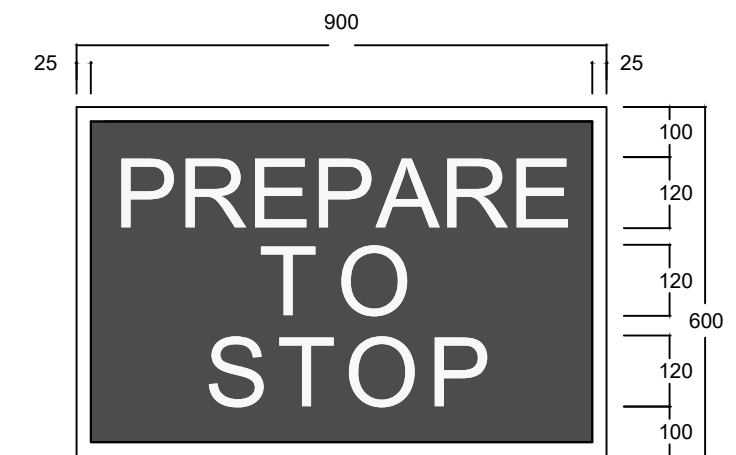


NOTE: SYMBOL 600 DIA BLACK ON A WHITE RETRO-REFLECTORIZED BACKGROUND

END SPEED RESTRICTION

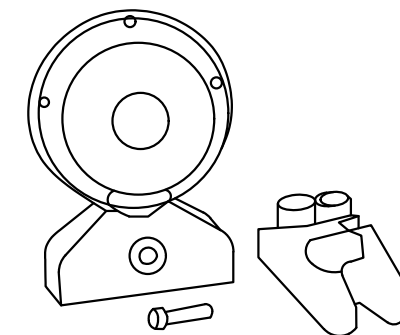
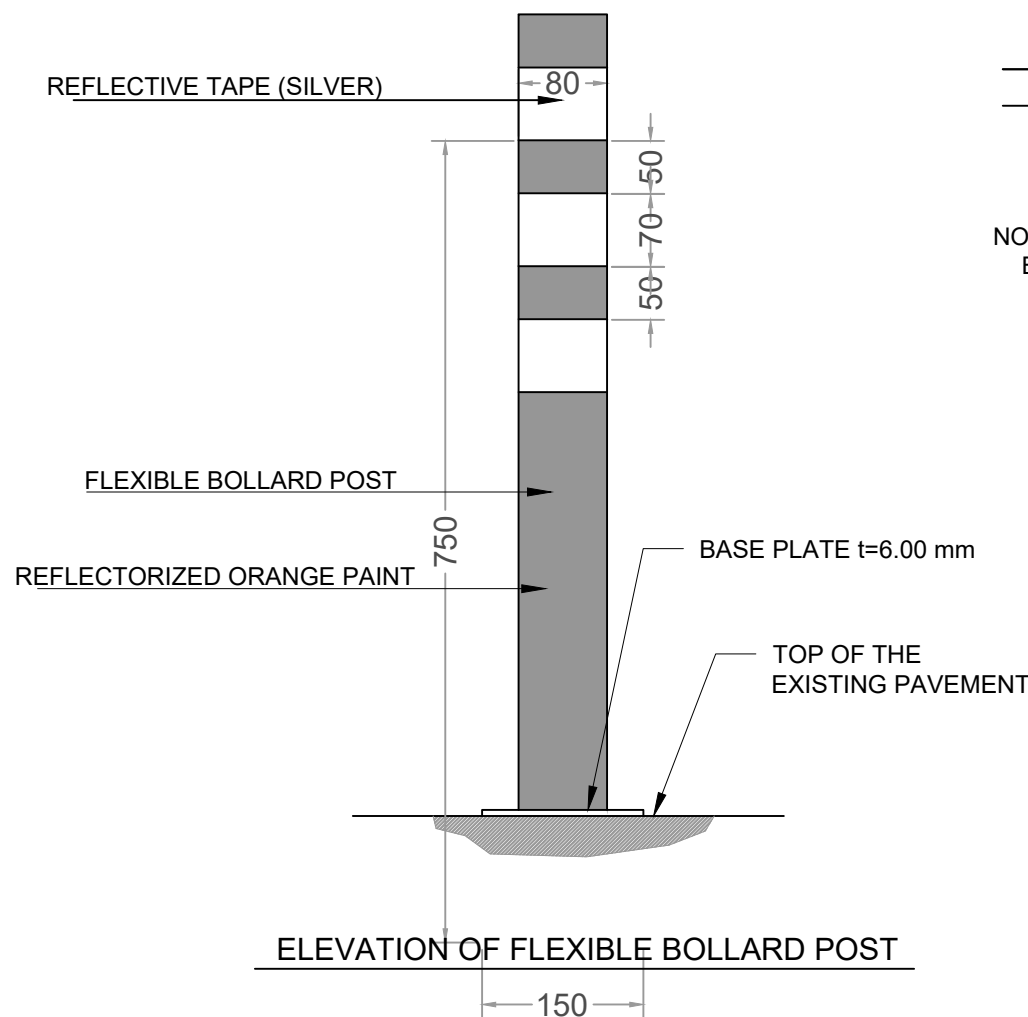


PLASTIC SAFETY BARRIER



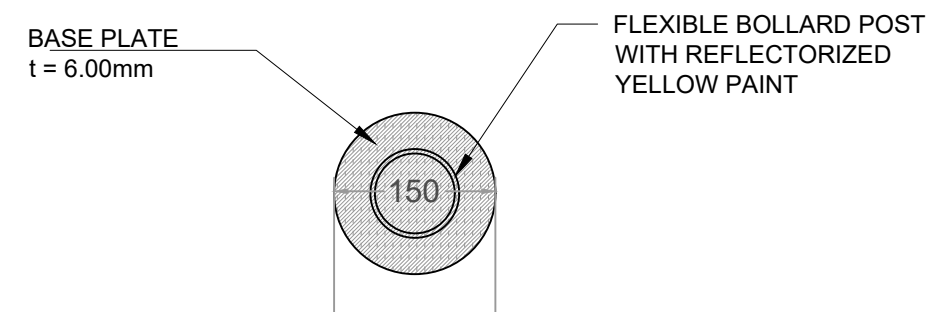
NOTE: WHITE LETTERS ON A RED RETRO-REFLECTIVE BACKGROUND

PREPARE TO STOP DETAIL



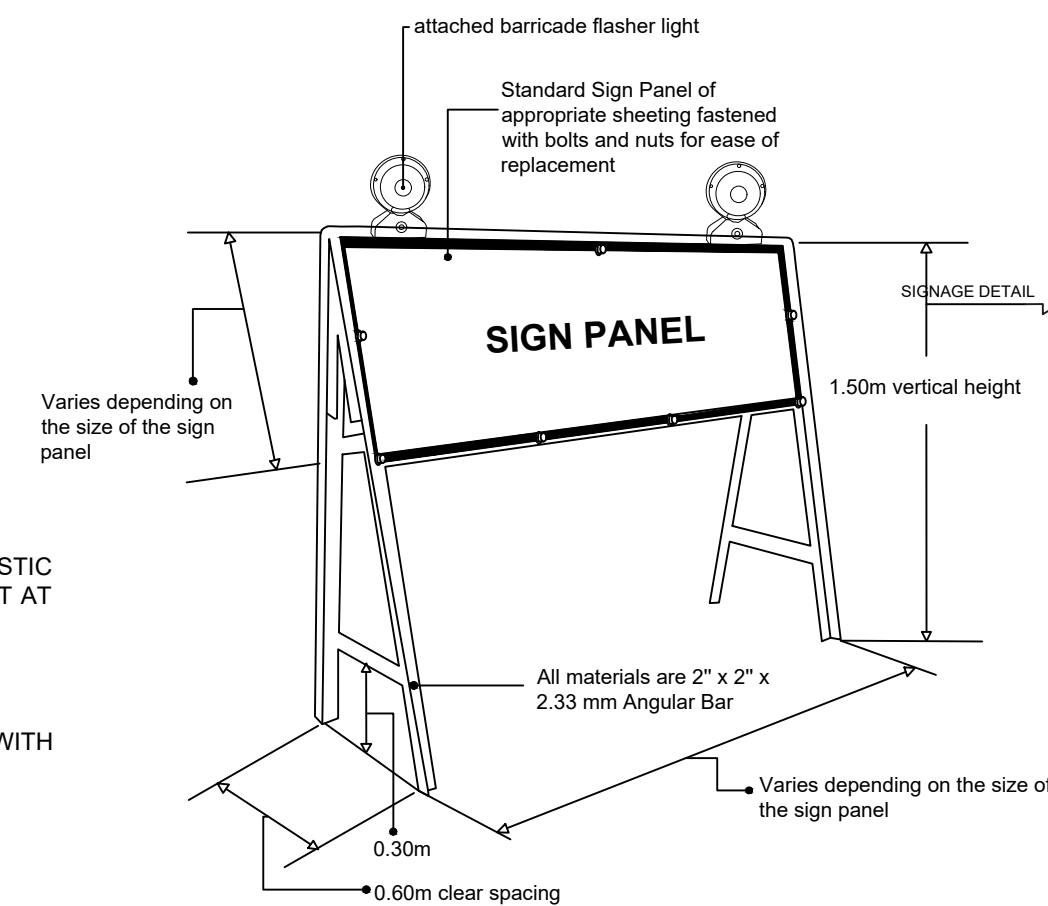
NOTE: FLASHER LIGHT 3 VOLTS, BATTERY OPERATED, AMBER COLOR W/ LIFESPAN CONSIDERATION OF 6 MONTHS

FLASHER LIGHT

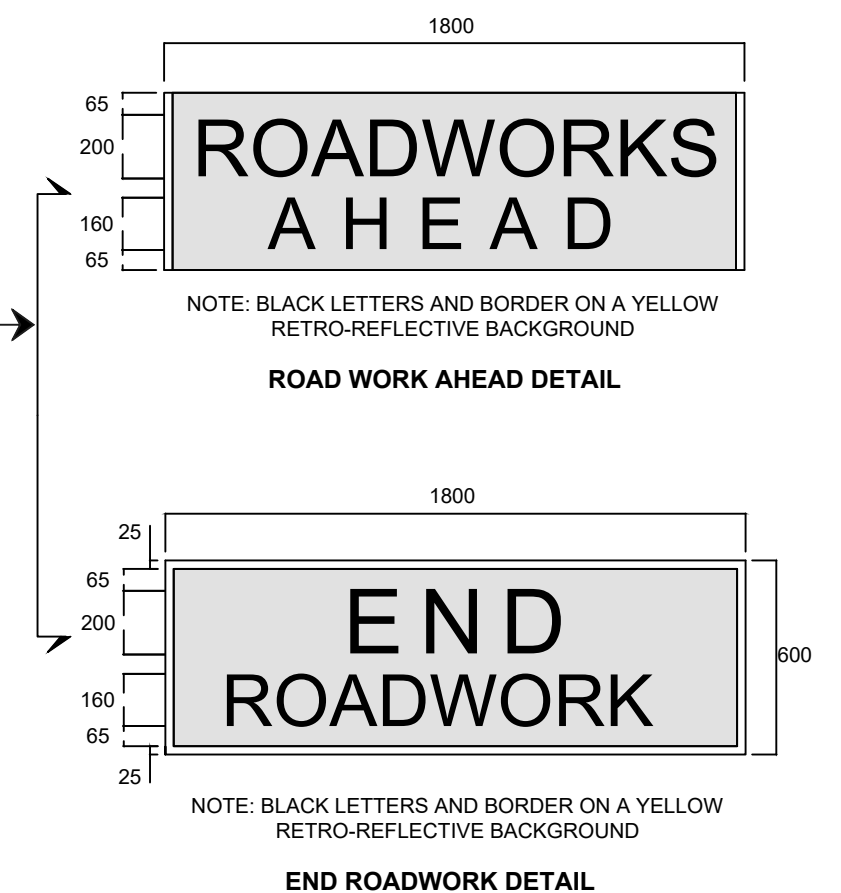


PLAN VIEW OF FLEXIBLE BOLLARD POST

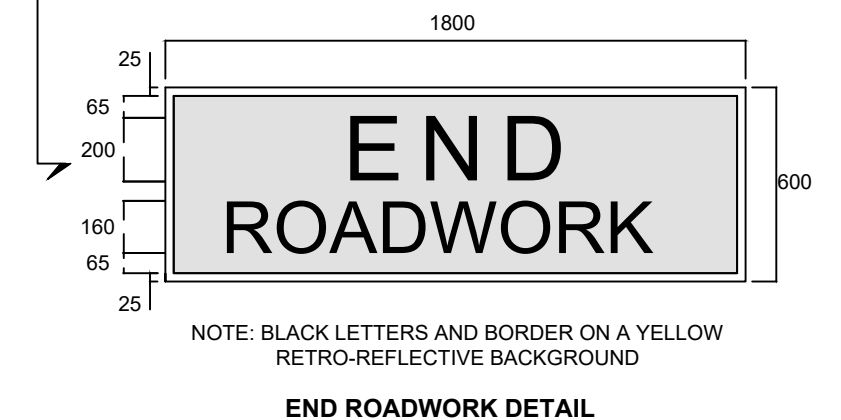
- NOTE :
1. TEMPORARY BOLLARD SHALL BE FLUORESCENT RED OR ORANGE PLASTIC THAT IS RESILIENT TO IMPACT & WILL NOT DAMAGE VEHICLES WHEN HIT AT LOW SPEED.
 2. THE HEIGHT OF BOLLARDS IS UP TO 1 METER.
 3. FOR NIGHT TIME OPERATION THE BOLLARDS MUST BE FITTED WITH REFLECTIVE TAPE WITH A MINIMUM BANDWIDTH OF 250mm. (See Lay-out Plan for the Standard Spacing)



DETAILS OF THE TWO SIDED SIGN FRAMES



ROAD WORK AHEAD DETAIL



END ROADWORK DETAIL



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CONCRETING OF ROAD IN BARANGAY
TULALIAN, STO. TOMAS, DAVAO DEL NORTE

SHEET CONTENTS:

TRAFFIC MANAGEMENT PLAN AND DETAILS

DRAFTED:

HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:

WARREN PINO
ENGINEER II

REVIEWED:

BENILDA S. PACQUIAO
ENGINEER III

DATE:

SUBMITTED:

JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION

DATE:

RECOMMENDED:

GARRY VERANO
OFFICER IN CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED:

ARTURO P. LONGYAPON
DISTRICT ENGINEER

DATE:








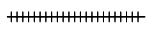
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LEGEND:

-  BENCH MARK
-  PROPOSED PCCP
-  CHEVRON
-  VARIOUS TREES
-  EXISTING CROSS DRAIN
-  CONTOUR
-  WARNING SIGN
-  FENCES

ELEMENTS OF CURVE

PI No.	PI STATION	NORTHING	EASTING	I	Dc	R	Lc	T	E	Pc	Pt	e	w	V(kph)
PI - 1	0+355.225	824083.4550	564454.5253	75-06-13	38-11-50	30.000	39.324	23.063	7.840	0+332.162	0+371.487			

TRAVERSE (NEW)

PI No.	DISTANCE	AZIMUTH
L1	332.162	0-09-32.951
L2	30.696	285-03-19.914

REFERENCE POINT

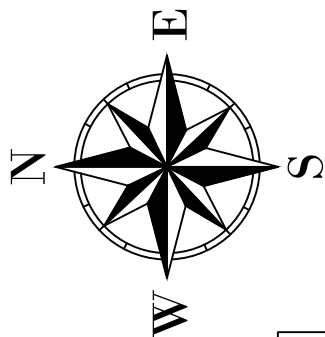
RP NO.	LENGTH	AZIMUTH	NORTHING	EASTING
RP1	4.108m	S64°35'58.12"W	775178.1375m	580063.3930m

RP1 TUGOP TREE

BENCHMARK

BM. #	AZIMUTH	DISTANCE	NORTHINGS	EASTINGS	ELEVATION
BM- 1	181-09-05.80	11.384	784621.1887	799838.7427	137.20m.

R.P. - 1 : NAILED ON THE HUB



**BEG OF PROJECT /BEG OF CONCRETING /
@ STA.0+000.00**

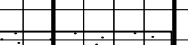
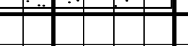
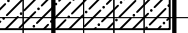

NORTHING: 806921.0022 m ; EASTING: 578187.7425 m

**END OF PROJECT /END OF CONCRETING /
PROVIDE 10MTRS GRAVEL TRANSITION
RAMP AT THE END OF PROJECT
@ STA.0+322.00**

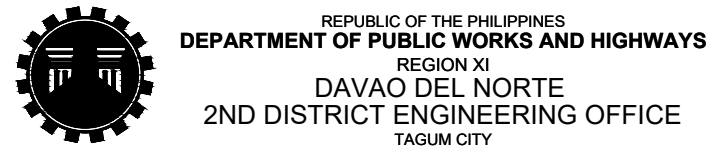
NORTHING: 806810.9635 m ; EASTING: 578113.1307 m

**PLAN
SCALE 1:1250mts**
**PROFILE
SCALE 1:1250mts HOR.
SCALE 1:125mts VERT.**

LEGEND:

-  FILL AREA
-  CUT AREA
-  FINISH GRADE LINE
-  EXISTING GROUND LINE

STATION	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+260	0+280	0+300	0+320
FINISHED GRADE ELEVATION	27.747	27.689	27.610	27.569	27.548	27.545	27.561	27.596	27.649	27.707	27.774	27.889	28.061	28.281	28.510	28.729	28.779
EXISTING GROUND ELEVATION	27.747	27.472	27.610	27.105	27.061	27.134	27.581	27.709	27.870	27.749	27.545	27.599	27.648	27.501	27.597	27.916	29.055
WIDENING																	
SUPER ELEVATION																	



PROJECT NAME AND LOCATION:

CONCRETING OF ROAD IN BARANGAY
TULALIAN, STO.TOMAS, DAVAO DEL NORTE

SHEET CONTENTS:

PLAN AND PROFILE

DRAFTED:
HERWIN EVAN J. HABABAG
ENGINEER II

PREPARED:
WARREN P. PINEZ
ENGINEER II

REVIEWED:
BENILDA S. PACQUIAO
ENGINEER III

DATE:

SUBMITTED:
JEZABEL E. TULING, MPA
CHIEF, PLANNING AND DESIGN SECTION

DATE:

RECOMMENDED:
GARRY VERANO
OFFICER IN CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER

DATE:

APPROVED:
ARTURO P. LONGYAPON
DISTRICT ENGINEER

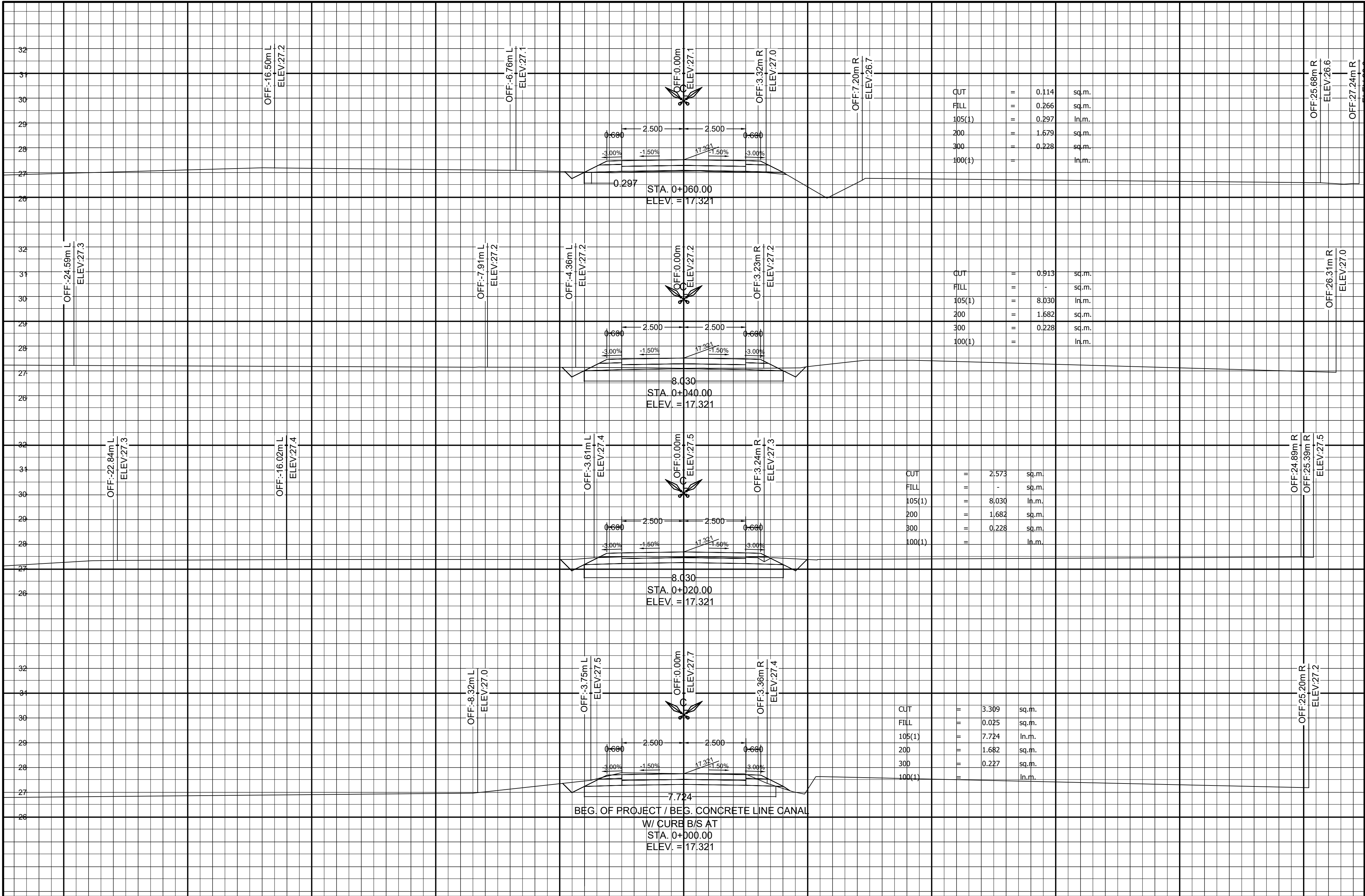
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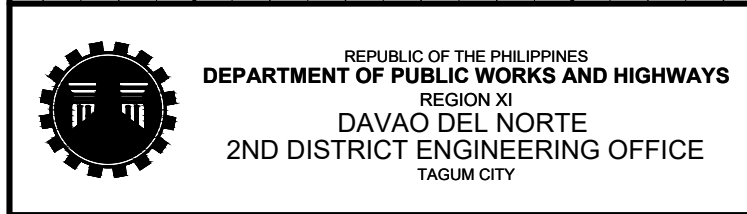
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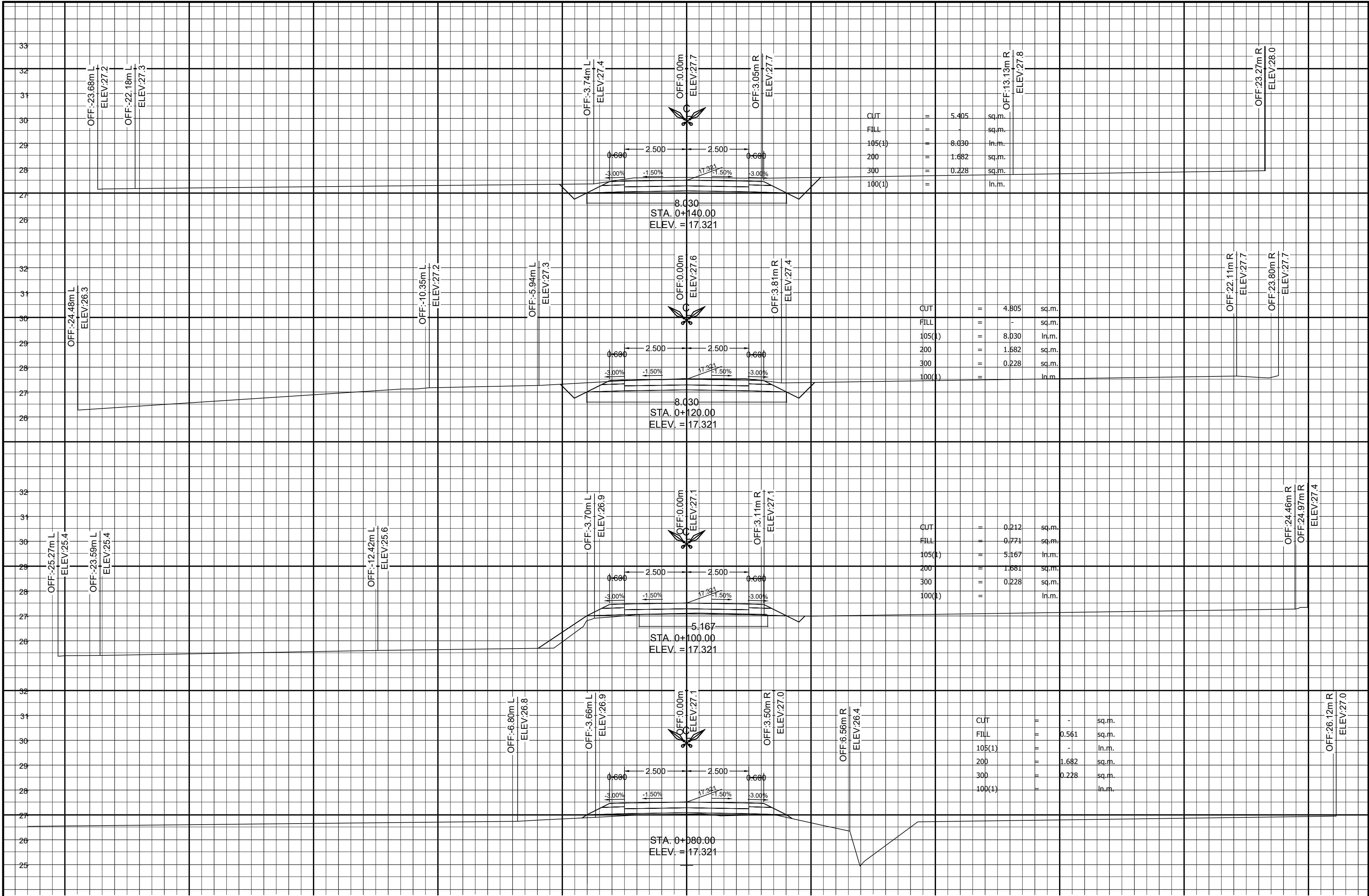
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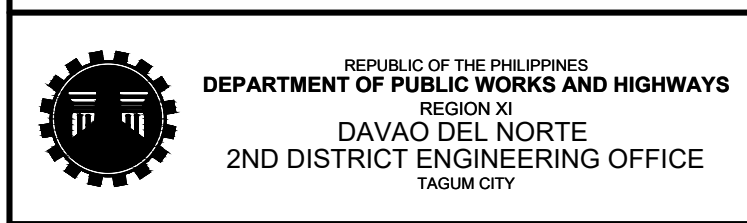
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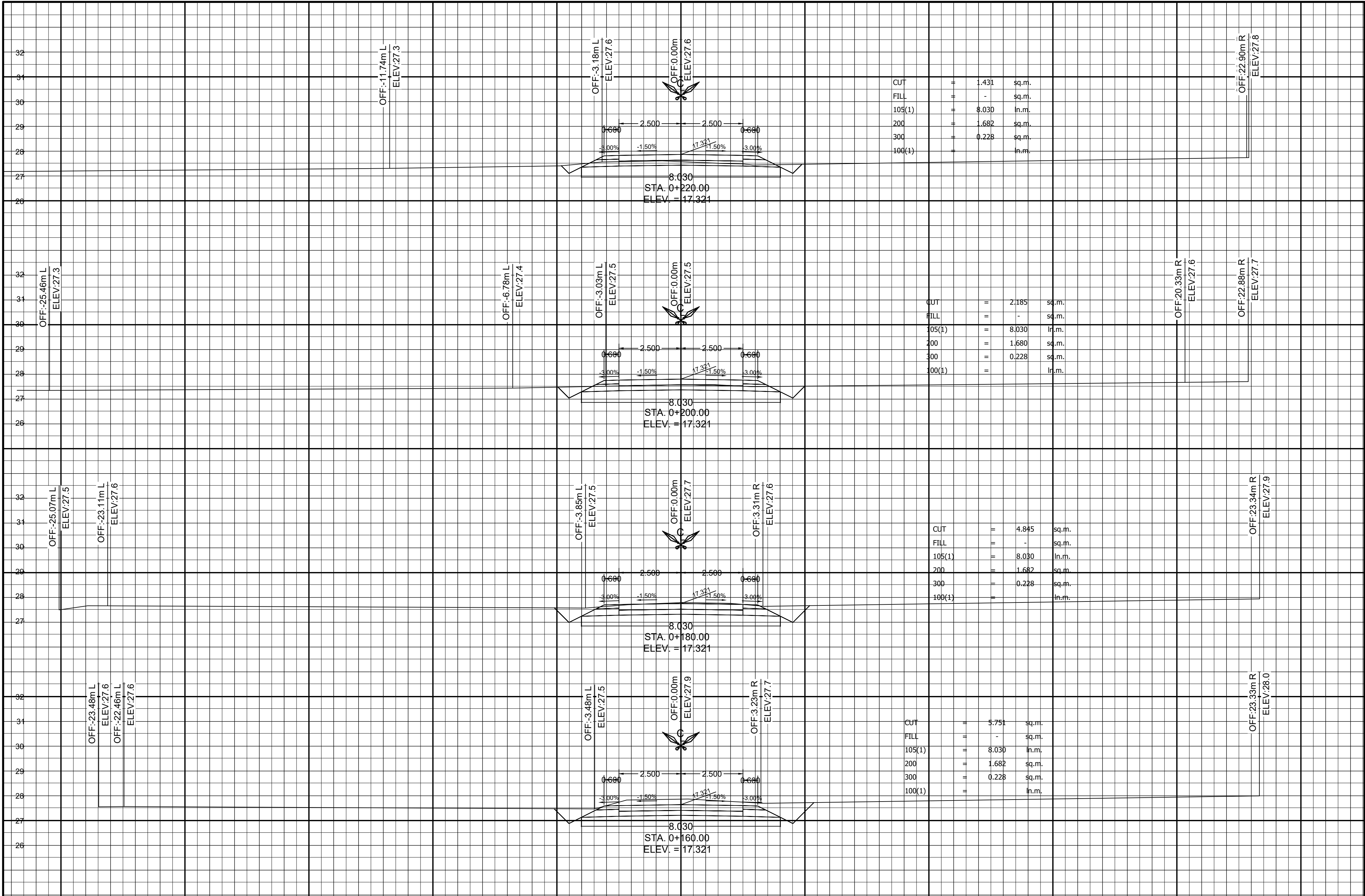
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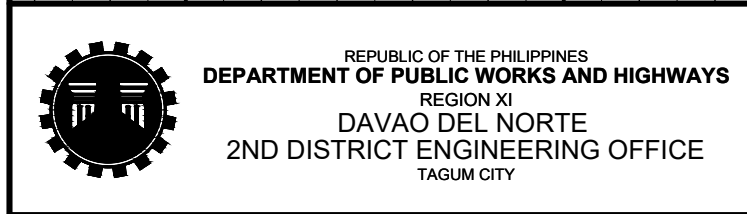


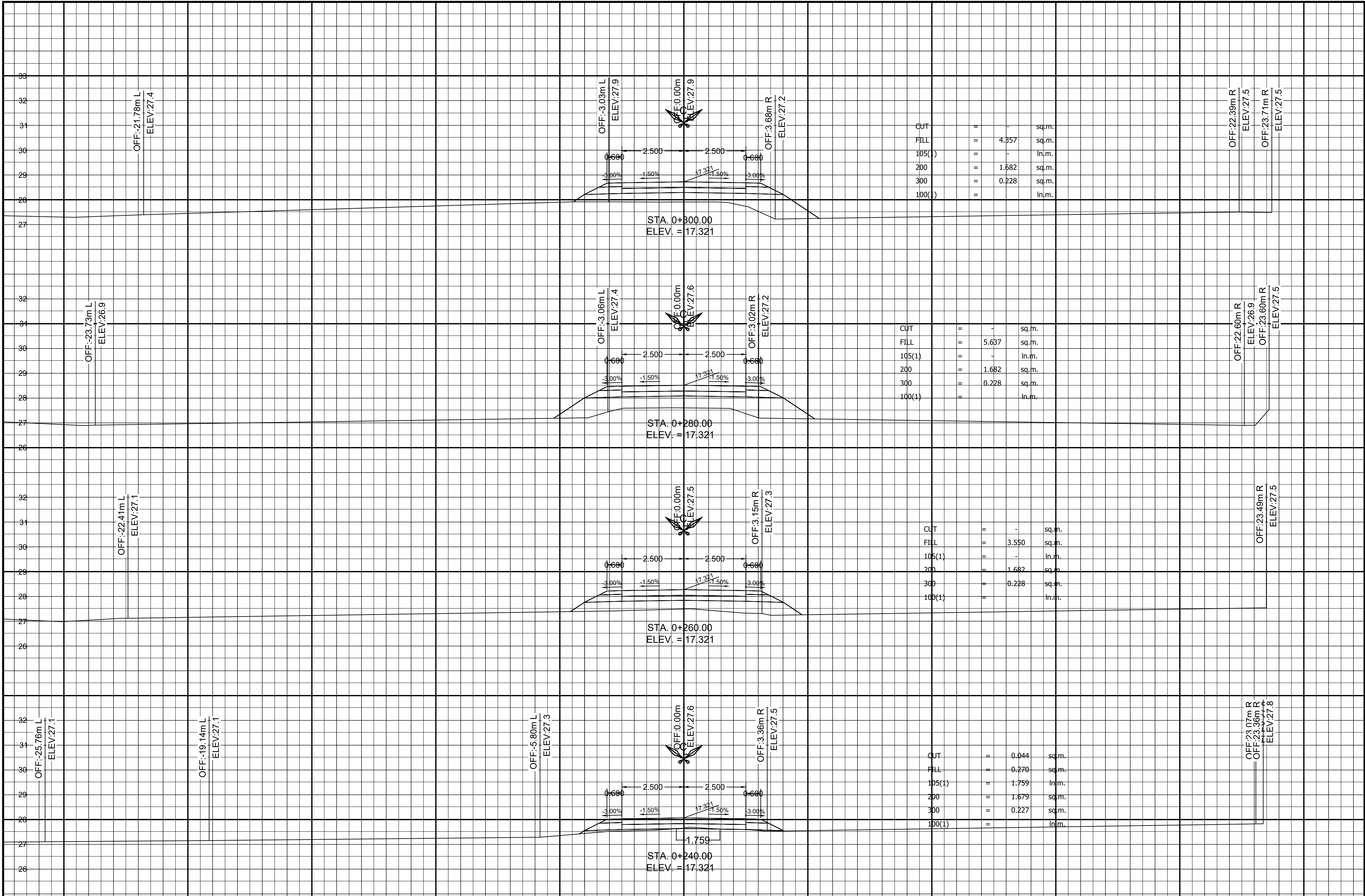
	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
	CONCRETING OF ROAD IN BARANGAY TULALIAN, STO. TOMAS, DAVAO DEL NORTE	CROSS SECTION	HERWIN EVAN J. HABABAG ENGINEER II	BENILDA S. PACQUIAO ENGINEER III	JEZABEL E. TULING, MPA CHIEF, PLANNING AND DESIGN SECTION	GARRY VERANO OFFICER IN CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER	ARTURO P. LONGYAPON DISTRICT ENGINEER	J 1 5	12 16
			PREPARED: WARREN PINEZ ENGINEER II	DATE:	DATE:	DATE:	DATE:		



	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED: HERWIN EVAN J. HABABAG ENGINEER II	REVIEWED: BENILDA S. PACQUIAO ENGINEER III	SUBMITTED: JEZABEL E. TULING, MPA CHIEF, PLANNING AND DESIGN SECTION	RECOMMENDED: GARRY VERANO OFFICER IN CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER	APPROVED: ARTURO P. LONGYAPON DISTRICT ENGINEER	SET NO. J	SHEET NO. 13
	CONCRETING OF ROAD IN BARANGAY TULALIAN, STO. TOMAS, DAVAO DEL NORTE	CROSS SECTION	PREPARED: WARREN PINEZ ENGINEER II	DATE:	DATE:	DATE:	DATE:	2	5



	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
	CONCRETING OF ROAD IN BARANGAY TULALIAN, STO. TOMAS, DAVAO DEL NORTE	CROSS SECTION	HERWIN EVAN J. HABABAG ENGINEER II	BENILDA S. PACQUIAO ENGINEER III	JEZABEL E. TULING, MPA CHIEF, PLANNING AND DESIGN SECTION	GARRY VERANO OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER	ARTURO P. LONGYAPON DISTRICT ENGINEER	J 3 5	14 16
			PREPARED:	DATE:	DATE:	DATE:	DATE:		



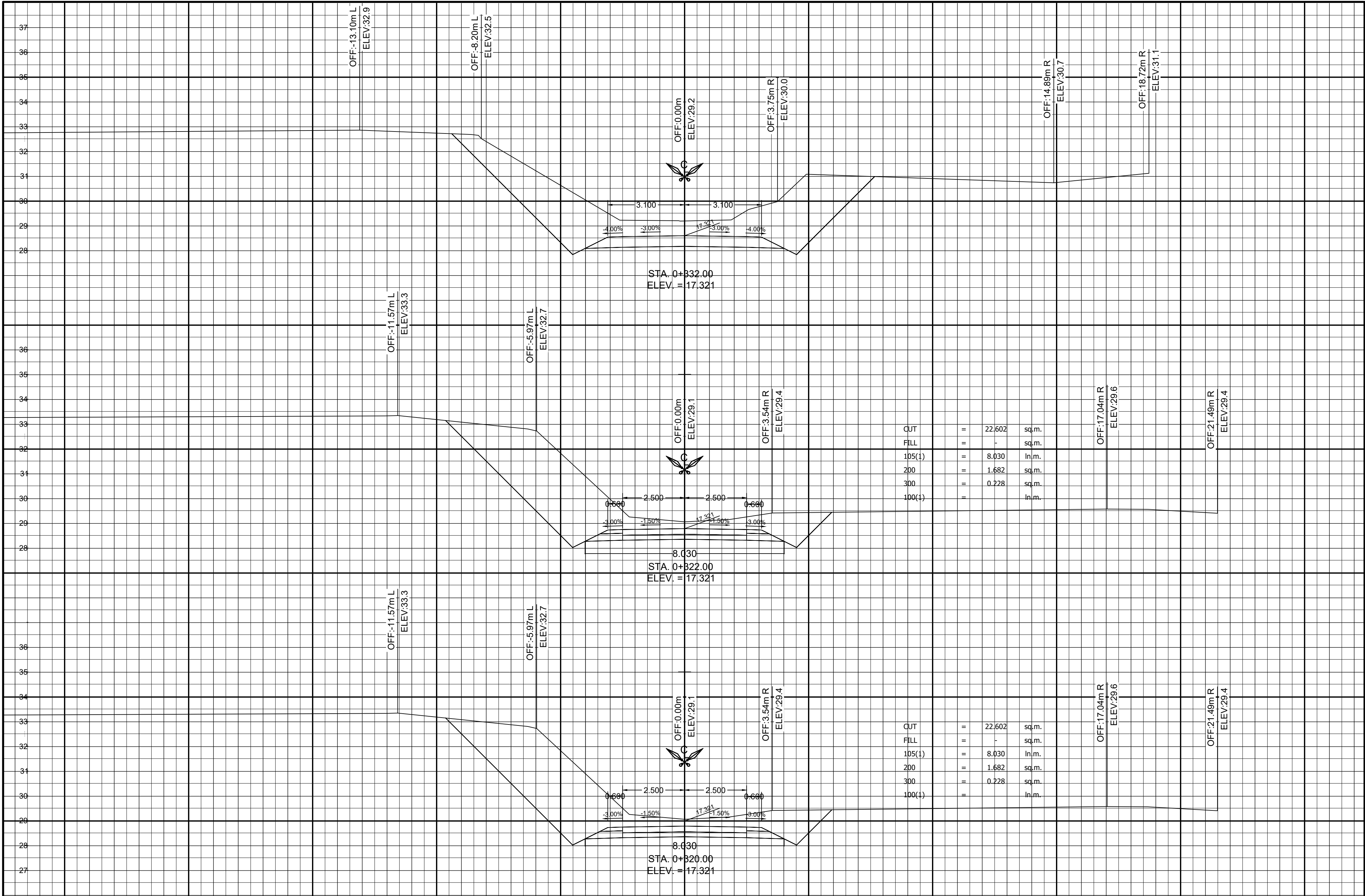
CUT	=	=	=	sq.m.
FILL	=	=	4.357	sq.m.
105(1)	=	=	-	ln.m.
200	=	=	1.682	sq.m.
300	=	=	0.228	sq.m.
100(1)	=	=	-	ln.m.


CUT	=	=	=	sq.m.
FILL	=	=	5.637	sq.m.
105(1)	=	=	-	ln.m.
200	=	=	1.682	sq.m.
300	=	=	0.228	sq.m.
100(1)	=	=	-	ln.m.

CUT	=	=	=	sq.m.
FILL	=	=	3.550	sq.m.
105(1)	=	=	-	ln.m.
200	=	=	1.682	sq.m.
300	=	=	0.228	sq.m.
100(1)	=	=	-	ln.m.

CUT	=	=	0.044	sq.m.
FILL	=	=	0.270	sq.m.
105(1)	=	=	1.759	ln.m.
200	=	=	1.679	sq.m.
300	=	=	0.227	sq.m.
100(1)	=	=	-	ln.m.

	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED:	REVIEWED:	SUBMITTED:	RECOMMENDED:	APPROVED:	SET NO.	SHEET NO.
	CONCRETING OF ROAD IN BARANGAY TULALIAN, STO.TOMAS, DAVAO DEL NORTE	CROSS SECTION	HERWIN EVAN J. HABABAG ENGINEER II	BENILDA S. PACQUIAO ENGINEER III	JEZABEL E. TULING, MPA CHIEF, PLANNING AND DESIGN SECTION	GARRY C. VERANO OFFICER IN CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER	ARTURO P. LONGYAPON DISTRICT ENGINEER	J 4 5	15 16
			PREPARED: WARREN P. PINEZ ENGINEER II	DATE:	DATE:	DATE:	DATE:		



 <div>REPUBLIC OF THE PHILIPPINES DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGION XI DAVAO DEL NORTE 2ND DISTRICT ENGINEERING OFFICE TAGUM CITY</div>	PROJECT NAME AND LOCATION:	SHEET CONTENTS:	DRAFTED: HERWIN EVAN J. HABABAG ENGINEER II	REVIEWED: BENILDA S. PACQUIAO ENGINEER III	SUBMITTED: JEZABEL E. TULING, MPA CHIEF, PLANNING AND DESIGN SECTION	RECOMMENDED: GARRY C. VERANO OFFICER IN CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER	APPROVED: ARTURO P. LONGYAPON DISTRICT ENGINEER	SET NO. J 5 5	SHEET NO. 16 16
	CONCRETING OF ROAD IN BARANGAY TULALIAN, STO. TOMAS, DAVAO DEL NORTE		CROSS SECTION	PREPARED: WARREN P. PINEZ ENGINEER II	DATE:	DATE:	DATE:	DATE:	