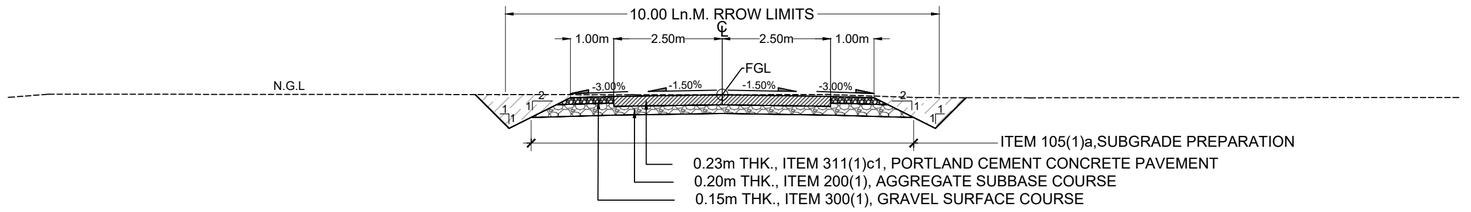
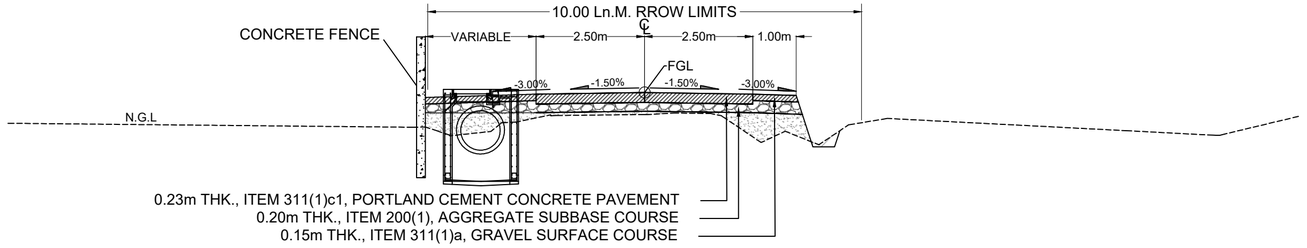



**TYPICAL ROADWAY SECTION**
**AT NORMAL CROWN SHOWING CUT AREA**

SCALE 1:100 mts




**TYPICAL ROADWAY SECTION**
**AT NORMAL CROWN SHOWING FILL AREA**
**SHOWING CONCRETE PAVING OF SHOULDER B/S**
**AND 36" LATERAL RCPC WITH MANHOLE L/S**

SCALE 1:100 mts

## DESIGN PARAMETERS

**DESIGN CONDITIONS :**

| | | | |
|---|---|---|---|
| Design Period | = | 20 | Years |
| Actual Loading | = | 100% | (including overloaded trucks) |
| Design E SAL | = | 993,771 | One direction |
| Conc. Strength | = | 650 | psi @ 28 Days |

**Design CBR :** = Mean CBR - ⅔S

where : $S = \sqrt{((x_i - \bar{x})^2/(n-1))}$

Mean CBR = 6.6667

$S = (\ 281.6\ /\ 8.00\ )^{0.5} = 5.9925$

CBR = 2.712

4,067.51

**Resilient Modulus of Subgrade :**

$M_R$ = CBR X 1500 $M_R$ = 4,068

**Composite Modulus of Subgrade :** $k_\alpha$ = 250

**Corrected k, ( from the graphs ) :** $k_{cor}$ = 750

## RIGID PAVEMENT ANALYSIS

**PAVEMENT STRUCTURE**

PCC Thickness , $T_{PPC}$ = 230 mm

Subbase , item 200 = 200 mm

Subgrade CBR = 2.712

( MR, resilient modulus = 4,068

## STANDARD CUT/ FILL SLOPE

| CUT : | | | |
|---|---|---|---|
| CLASSIFICATION | SLOPE | | |
| COMMON EARTH | 1:1 | TO | 2:1 |
| RIPPABLE ROCK | 1/2:1 | TO | 1:1 |
| SOLID ROCK | 1/4:1 | TO | 1/2:1 |

| FILL/ EMBANKMENT : | |
|---|---|
| HEIGHT | SLOPE |
| 3.00m OR LESS | 2 :1 |
| ABOVE 3.00m | 1.50 : 1 |

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

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 ALEJAL, CARMEN, DAVAO DEL NORTE**

SHEET CONTENTS:
TYPICAL ROADWAY SECTION
DESIGN PARAMETERS
RIGID PAVEMENT ANALYSIS

DRAFTED: **HERWIN EVAN J. HABABAG** ENGINEER II
PREPARED: **WARREN S. PIÑEZ** ENGINEER II

REVIEWED: **BENILDA S. PACQUIAO** ENGINEER III DATE:

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

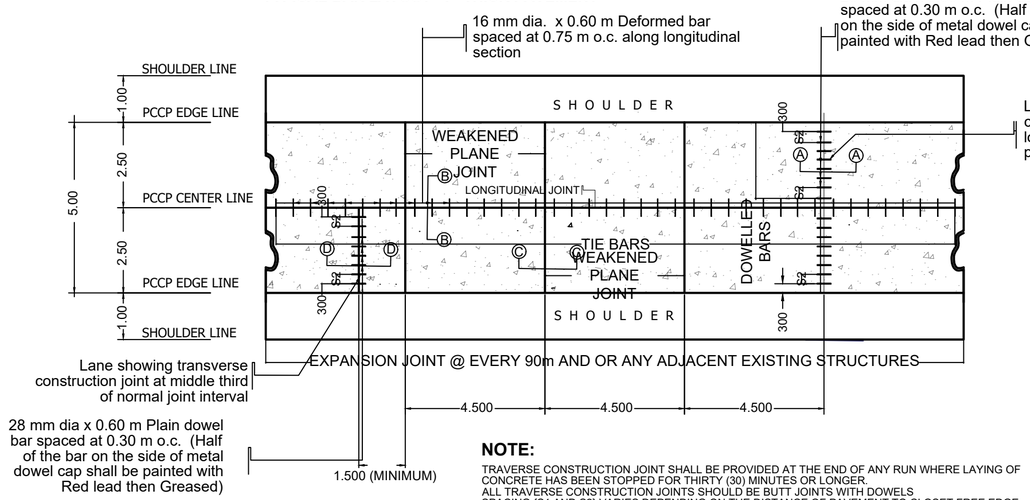
RECOMMENDED: **GARRY E. VERANO** OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER DATE:

APPROVED: **ARTURO F. LONGYAPON** DISTRICT ENGINEER DATE:

SET NO. D 1 1

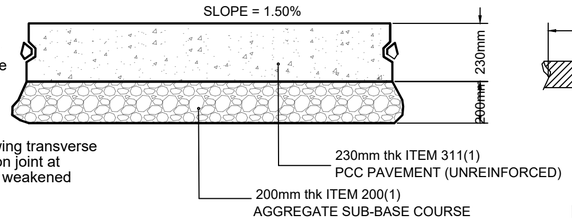
SHEET NO. 5 20

## TYPICAL BAR LAYOUT "T" THICK PAVEMENT

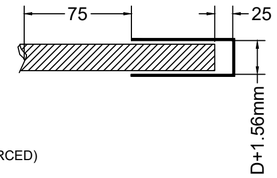



**NOTE:**

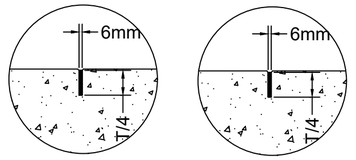
TRAVERSE CONSTRUCTION JOINT SHALL BE PROVIDED AT THE END OF ANY RUN WHERE LAYING OF CONCRETE HAS BEEN STOPPED FOR THIRTY (30) MINUTES OR LONGER.
ALL TRAVERSE CONSTRUCTION JOINTS SHOULD BE BUTT JOINTS WITH DOWELS
SPACING {S1 AND S2} VARIES DEPENDING ON THE DISTANCE OF PAVEMENT TO CLOSET FREE EDGE




PAVEMENT SECTION
SCALE NTS



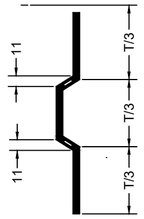

METAL CAP DOWEL DETAIL
SCALE NTS




*POURED ASPHALT SEAL 30-50 PENETRATION*
**SAWED GROOVE TYPE**

*PRE-MOLDED JOINT FILLER*
**PRE-MOLDED STRIP TYPE**

F WEAKENED GROOVE DETAIL
SCALE NTS




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

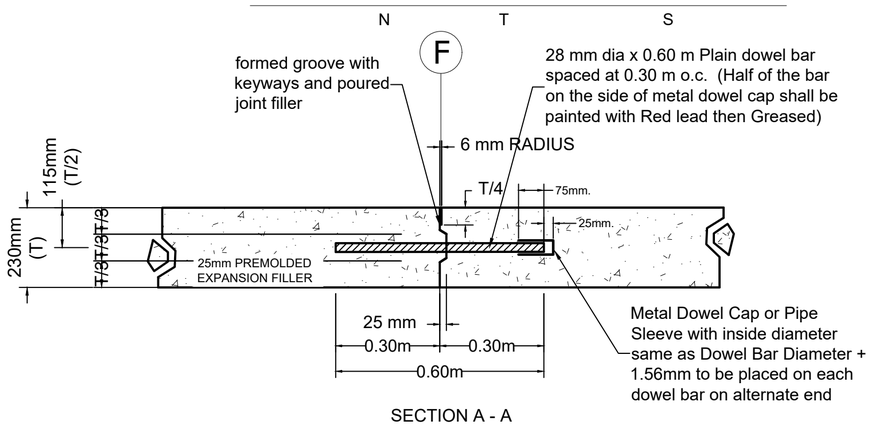
| TABLE SPACING OF TIE BARS (L=600 mm) | | |
|---|---|---|
| SLAB THICKNESS (mm) | SPACING S1 (mm) | |
| | 12 mm dia. | 16 mm dia. |
| 230 | 600 | 750 |
| 240 | 600 | 750 |
| 250 | 600 | 750 |
| 260 | 500 | 750 |
| 270 | 500 | 750 |
| 280 | 500 | 750 |
| 290 | 500 | 750 |
| 300 | 500 | 750 |
| 310 |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

**BASED ON AASHTO GUIDE FOR DESIGN OF PAVEMENT STRUCTURES 1993**

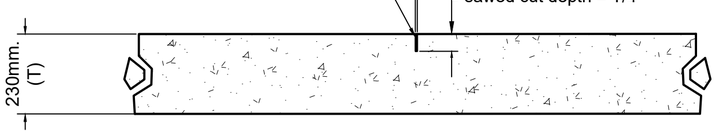
| TABLE SPACING OF PLAIN DOWEL BARS (L=600 mm) | | |
|---|---|---|
| SLAB THICKNESS (mm) | DIAMETER,D (mm) | SPACING, S2(mm) |
| 230 | 28 | 300 |
| 240 | 30 | 300 |
| 250 | 32 | 300 |
| 260 | 32 | 300 |
| 270 | 34 | 300 |
| 280 | 36 | 300 |

## TYPICAL PLAN FOR TWO-LANE PAVEMENT

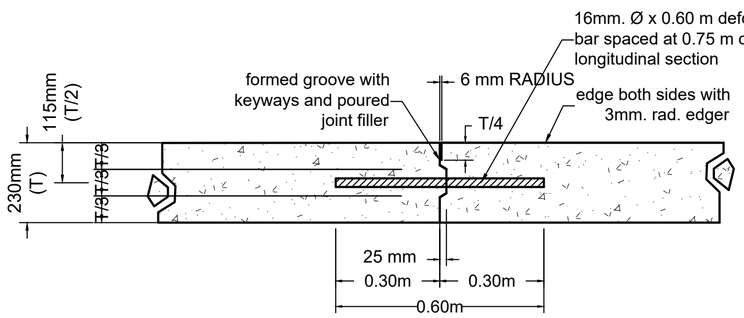
N T S



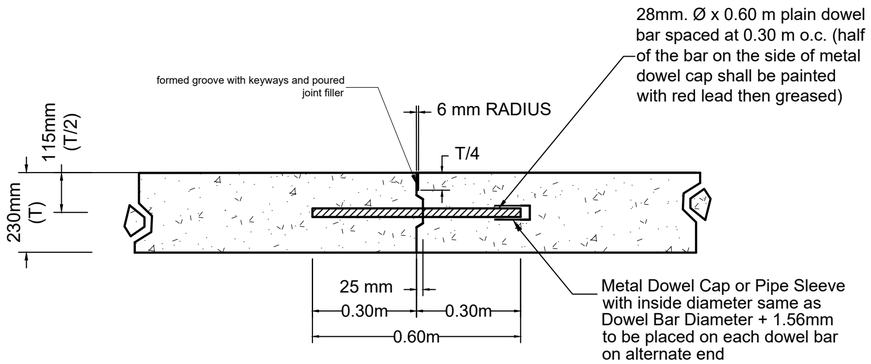

SECTION A - A
DOWELLED EXPANSION JOINT DETAIL
SCALE NTS




SECTION C - C
CONTRACTION JOINT SECTION
SCALE NTS




SECTION B - B
LONGITUDINAL CONSTRUCTION JOINT
SCALE NTS




SECTION D - D
BUTT TRANSVERSE CONSTRUCTION JOINT
SCALE NTS

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

1. **Materials and workmanship shall conform with the DPWH Standard Specification for Highways, Bridges and Airport, 2013**
2. **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.**
3. **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.**
4. **Tie bars should be deformed steel bars. All dowel bars were smooth round steel bar free from rust and other defects which might restrict their movement.**
5. **Type of weakened plane joint to be used shall be specified in the plans and only one type should be used for the whole project.**
6. **Material for the metal side form shall be brand new sheet metal Gauge no. 15 of black iron free from rust and links.**
7. **At least six (6) successive dowelled butt joints at normal joint spacing shall be provided before or after an expansion joint.**
8. **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.**
9. **All transverse joints except construction joint shall be continuous from edge to edge.**
10. **All longitudinal joints shall meet at intersections with no gaps or offset.**
11. **All dimensions are in millimeters unless otherwise specified.**
12. **Avoid stoppage of formworks along curves.**
13. **Constructed expansion joint at every 90 meters and/or every adjacent existing structures.**

REPUBLIC OF THE PHILIPPINES
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TAGUM CITY

| PROJECT NAME AND LOCATION: | SHEET CONTENTS: | DRAFTED: | REVIEWED: | SUBMITTED: | RECOMMENDED: | APPROVED: | SET NO. | SHEET NO. |
|---|---|---|---|---|---|---|---|---|
| **CONCRETING OF ROAD IN BARANGAY ALEJAL, CARMEN, DAVAO DEL NORTE** | STANDARD PORTLAND CEMENT CONCRETE PAVEMENT JOINTS | **HERWIN EVAN J. HABABAG** ENGINEER II<br>PREPARED: **WARREN S. PIÑEZ** ENGINEER II | **BENILDA S. PACQUIAO** ENGINEER III<br>DATE: | **JEZABEL E. TULING, MPA** CHIEF, PLANNING AND DESIGN SECTION<br>DATE: | **GARRY E. VERANO** OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER<br>DATE: | **ARTURO F. LONGYAPON** DISTRICT ENGINEER<br>DATE: | E 1 2 | 6 20 |

GENERAL NOTES FOR WARNING SIGNS

1. ALL POST SHALL BE THOROUGHLY CLEANED, FREE FROM GREASE, SCALE AND RUSTS BE GIVEN ONE COAT OF RUST-INHIBITING PRIMING PAINT AND TWO COATS OF INTERNATIONAL ORANGE IN ACCORDANCE WITH ITEM 411, PAINT DPWH STANDARD SPECIFICATION.

2. ALL DETAILS SHALL COMPLY WITH THE DPWH STANDARD SPECIFICATIONS FOR ROAD SIGN, DO. 158, S. 2015

*DESIGN*

3. IN GENERAL, WARNING SIGNS ARE TRIANGULAR IN SHAPE (WITH ONE ANGLE VERTICAL), WITH A BLACK SYMBOL, REFLECTORIZED RED BORDER ON A RETRO-REFLECTIVE WHITE, OR FLUORESCENT YELLOW GREEN BACKGROUND.

4. THE SIDE OF ONE SIDE OF EQUILATERAL TRIANGULAR SHAPED SIGNS SHALL NOT BE LESS THAN 600 mm. FOR HIGH-SPEED EXPRESSWAYS, LARGER SIGNS (UP TO 1200 mm) ARE USUALLY ADOPTED.

*LOCATION*

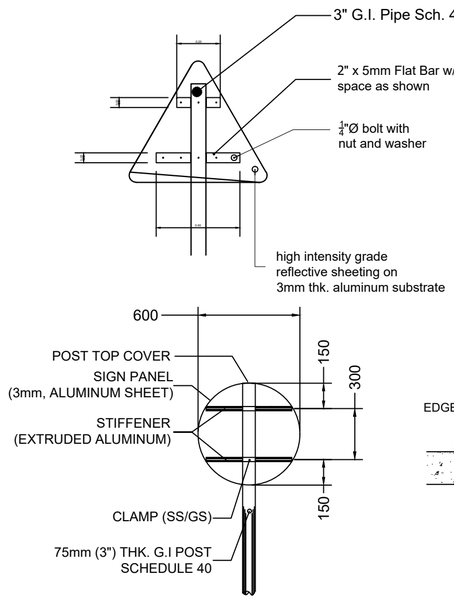
5. AS WARNING SIGNS ARE PLACED PRIMARILY FOR THE PROTECTIONOF THE DRIVER WHO IS NOT FAMILIAR WITH THE ROAD, IT IS VERY IMPORTANT THAT THEIR LOCATION AND INSTALLATION MUST BE UNDERTAKEN WITH CARE.

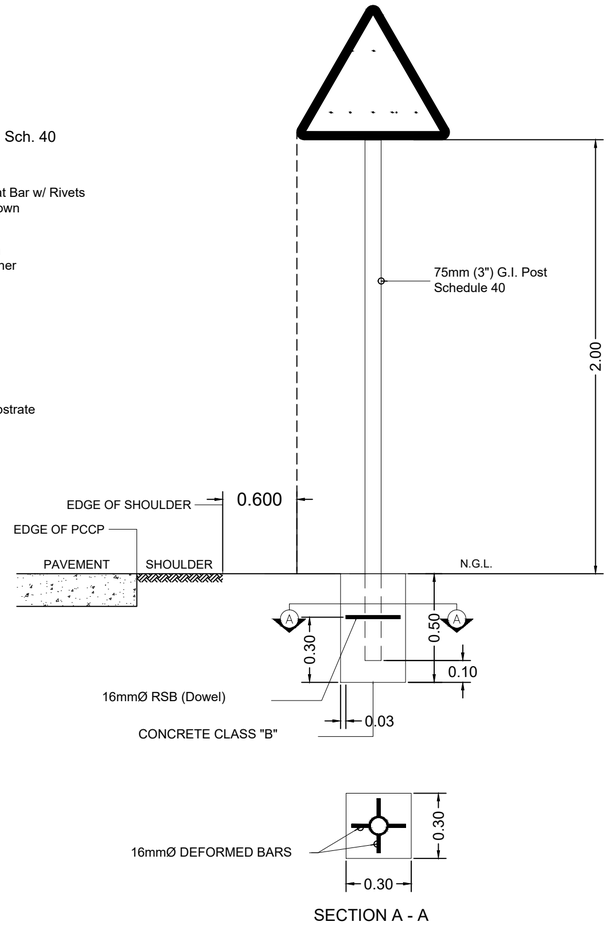
5.1 TEST RUNS SHOULD BE MADE BY DAY AND BY NIGHT FROM BOTH DIRECTIONS TO CHECK THE LOCATION AND MOUNTING OF EACH INSTALLATION.

5.2 A WARNING SIGN SHOULD BE GENERALLY BE INSTALLED ON THE RIGHT SIDE OF THE ROAD AND BE POSITIONED SO THAT IT WILL CONVEY ITS MESSAGE WITHOUT RESTRICTING LATERAL CLEARANCE OR SIGHT DISTANCE.

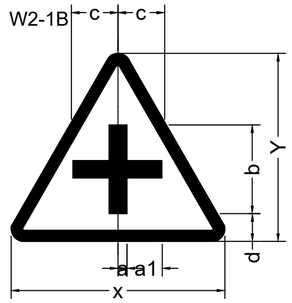
5.3 IN URBAN AREAS, ADVANCE WARNING SIGN SHOULD BE PLACED AT NOT LESS THAN 30.0 m. IN ADVANCE OF THE HAZARDOUS AREA.

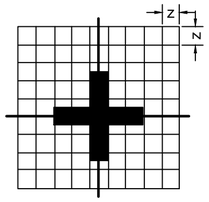
5.4 EXACT LOACTION OF ALL WARNING SIGNS TO BE INSTALLED SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.



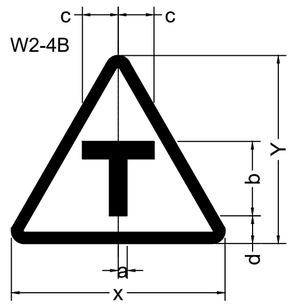



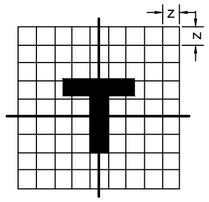

SECTION A - A




| | |
|---|---|
| X | 600 |
| Y | 520 |
| a | 25 |
| b | 250 |
| c | 125 |
| d | 75 |
| Z | 50 |



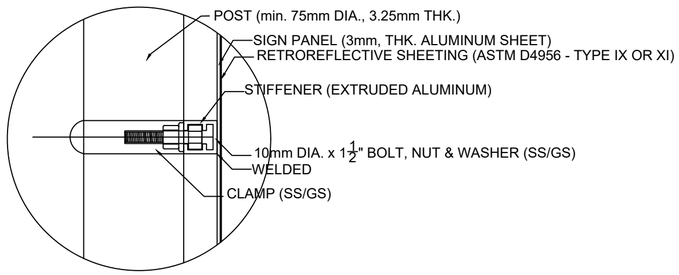




| | |
|---|---|
| X | 600 |
| Y | 520 |
| a | 25 |
| b | 200 |
| c | 100 |
| d | 74 |
| Z | 50 |

R6-9

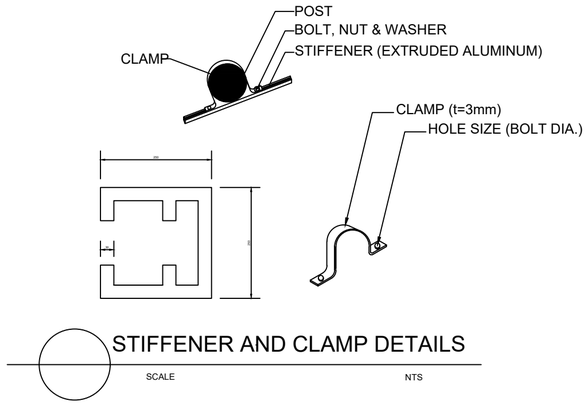
**BLACK SYMBOL, LEGEND AND BORDER**
**REFLECTORIZED FLUORESCENT YELLOW GREEN BACKGROUND**
**SIZE= 600mm diam.**

*IT IS A REGULATORY SIGN TO BE PLACED AT THE STOP LINES ON THE APPROACHES TO A MARKED SCHOOL CHILDREN CROSSING.*




MOUNTING DETAILS

SCALE NTS




STIFFENER AND CLAMP DETAILS

SCALE NTS

## WARNING SIGN SCHEDULE

| TYPE | QUANTITY | LOCATION / STATION |
|---|---|---|
| W2- 1B | 2 | 0 +020.00 @ RIGHT SIDE<br>0 +120.00 @ LEFT SIDE |
| W2- 4B | 2 | 0 +050.00 @ LEFT SIDE<br>0 +180.00 @ RIGHT SIDE |
| R6-9 | 2 | 0 +152.00 @ RIGHT SIDE<br>0 +158.00 @ LEFT SIDE |

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PROJECT NAME AND LOCATION:
**CONCRETING OF ROAD IN BARANGAY ALEJAL, CARMEN, DAVAO DEL NORTE**

SHEET CONTENTS:
WARNING SIGNS DETAILS AND SCHEDULE

DRAFTED:
**HERWIN EVAN J. HABABAG**
ENGINEER II

PREPARED:
**WARREN S. PIÑEZ**
ENGINEER II

REVIEWED:
**BENILDA S. PACQUIAO**
ENGINEER III
DATE:

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

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

APPROVED:
**ARTURO P. LONGYAPON**
DISTRICT ENGINEER
DATE:

SET NO. H 1 1

SHEET NO. 10 20

LEGEND:

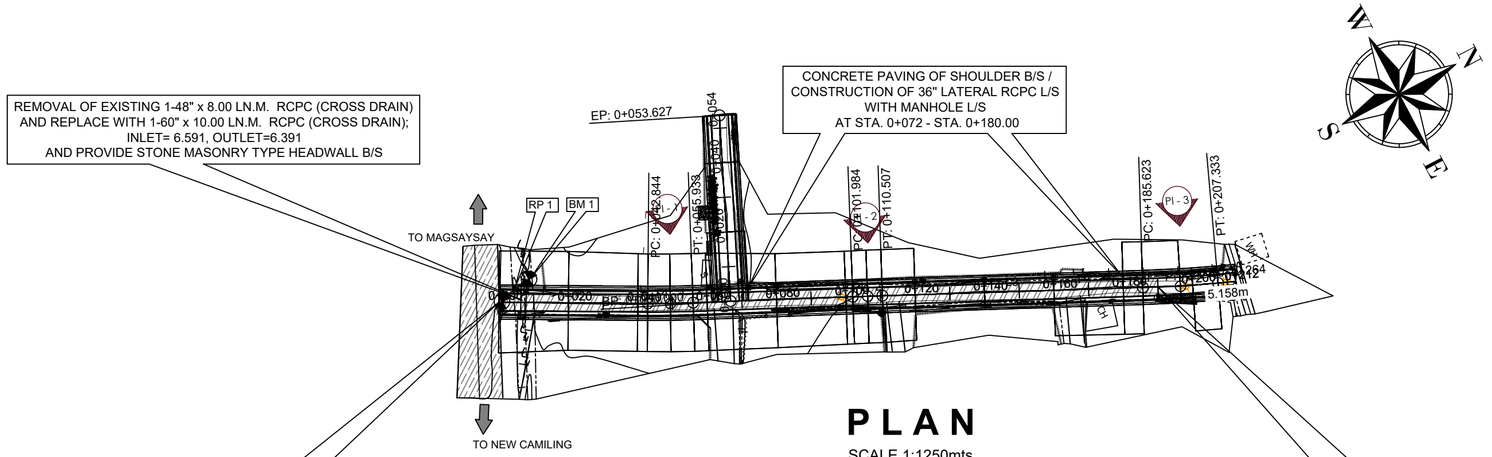
- BENCH MARK
- PROPOSED PCCP
- EXISTING PCCP
- VARIOUS TREES
- WATER FLOW
- CONTOUR
- WARNING SIGN
- FENCES

| ELEMENTS OF CURVE | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PI No. | PI STATION | NORTHING | EASTING | I | Dc | R | Lc | T | E | Pc | Pt | e | w | V(kph) |
| PI - 1 | 0+049.389 | 816607.9096 | 572803.5488 | 2-36-42 | 3-59-26 | 287.162 | 13.089 | 6.546 | 0.075 | 0+042.844 | 0+055.933 | | | 20 |
| PI - 2 | 0+106.245 | 816659.1526 | 572828.1869 | 0-17-42 | 0-41-32 | 1655.085 | 8.522 | 4.261 | 0.005 | 0+101.984 | 0+110.507 | | | 20 |
| PI - 3 | 0+196.481 | 816740.2741 | 572867.7065 | 3-08-05 | 2-53-16 | 396.807 | 21.710 | 10.858 | 0.149 | 0+185.623 | 0+207.333 | | | 20 |

| TRAVERSE (NEW) | | |
|---|---|---|
| PI No. | DISTANCE | AZIMUTH |
| L1 | 42.844 | 208-17-25.143 |
| L2 | 46.051 | 205-40-43.374 |
| L3 | 75.117 | 205-58-25.486 |

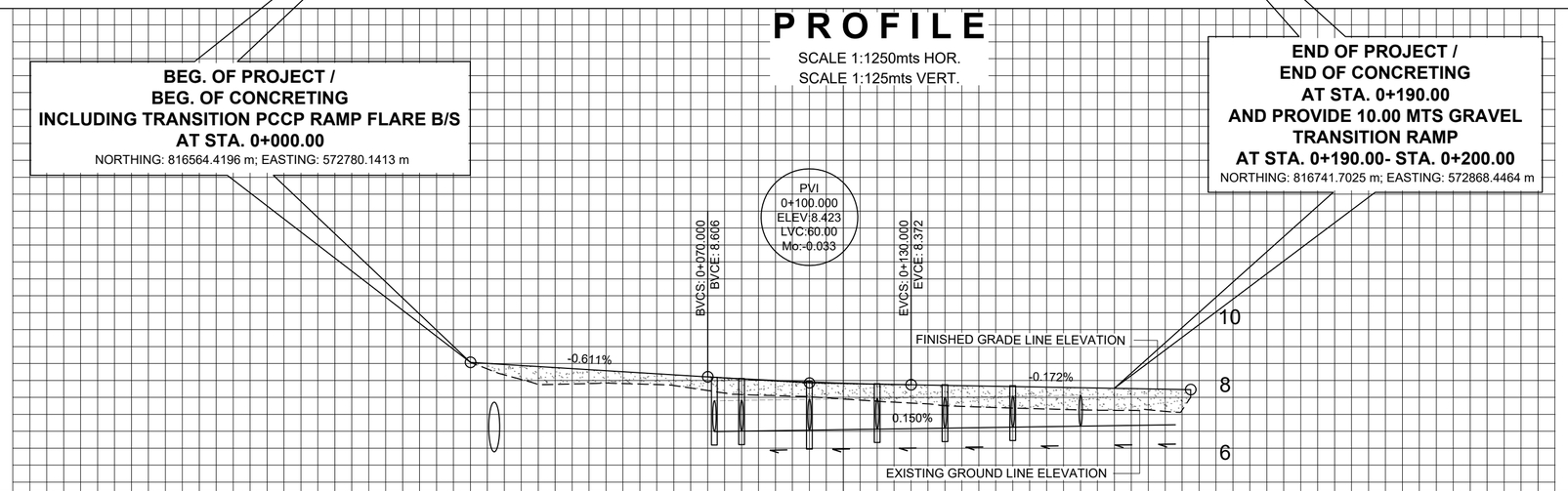
| BENCHMARK | | | | | |
|---|---|---|---|---|---|
| BM. # | AZIMUTH | DISTANCE | NORTHINGS | EASTINGS | ELEVATION |
| BM - 1 | 350° 15' 27.95" | 10.842 m. | 816575.1056 m | 572778.3066 m | 8.516 m |
| R.P. - 1 : EXPOSED DOWEL ALONG SLOPE PROTECTION L/S | | | | | |

| REFERENCE POINT | | | | |
|---|---|---|---|---|
| RP NO. | LENGTH | AZIMUTH | NORTHING | EASTING |
| RP1 | 4.687 m | 339° 03' 03.78" | 816570.2738 m | 572778.8970 m |
| RP-1 : CONCRETE ELECTRIC POST L/S | | | | |




**PLAN**

SCALE 1:1250mts




**PROFILE**

SCALE 1:1250mts HOR.
SCALE 1:125mts VERT.

| STATION | 0+000 | 0+020 | 0+040 | 0+060 | 0+080 | 0+100 | 0+120 | 0+140 | 0+160 | 0+180 |
|---|---|---|---|---|---|---|---|---|---|---|
| FINISHED GRADE LINE ELEVATION | 9.034 | 8.912 | 8.789 | 8.667 | 8.549 | 8.456 | 8.392 | 8.354 | 8.320 | 8.286 |
| EXISTING GROUND LINE ELEVATION | 9.034 | 8.384 | 8.424 | 8.353 | 8.082 | 8.019 | 7.885 | 7.755 | 7.686 | 7.630 |
| I.E. OF 36" LATERAL RCPC | | | | | 7.002 | 7.032 | 7.062 | 7.092 | 7.122 | 7.152 |
| WIDENING | W = 0 | | | | | | | | | |
| SUPER ELEVATION | W = 0 | | | | | | | | | |
| | NORMAL CROWN = -1.50% | | | | | | | | | |
| | NORMAL CROWN = -1.50% | | | | | | | | | |

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SHEET CONTENTS:
PLAN AND PROFILE

DRAFTED:
**HERWIN EVAN J. HABABAG**
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OFFICE OF THE ASSISTANT DISTRICT ENGINEER
DATE:

APPROVED:
**ARTURO P. LONGYAPON**
DISTRICT ENGINEER
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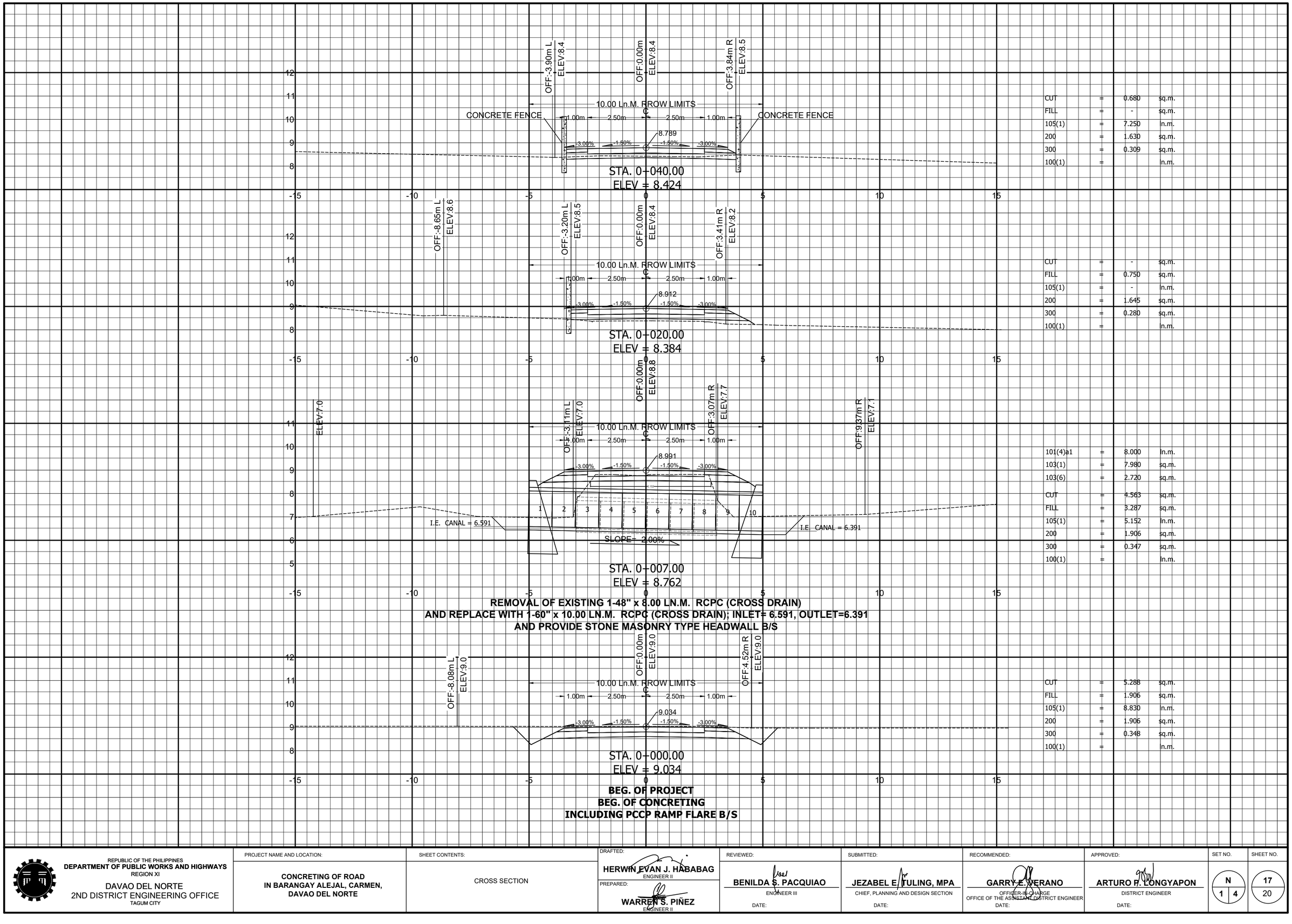
SET NO.: M 1 1

SHEET NO.: 16 / 20

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PROJECT NAME AND LOCATION:
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SHEET CONTENTS:
CROSS SECTION

DRAFTED:
**HERWIN EVAN J. HABABAG**
ENGINEER II

PREPARED:
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REVIEWED:
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DATE:

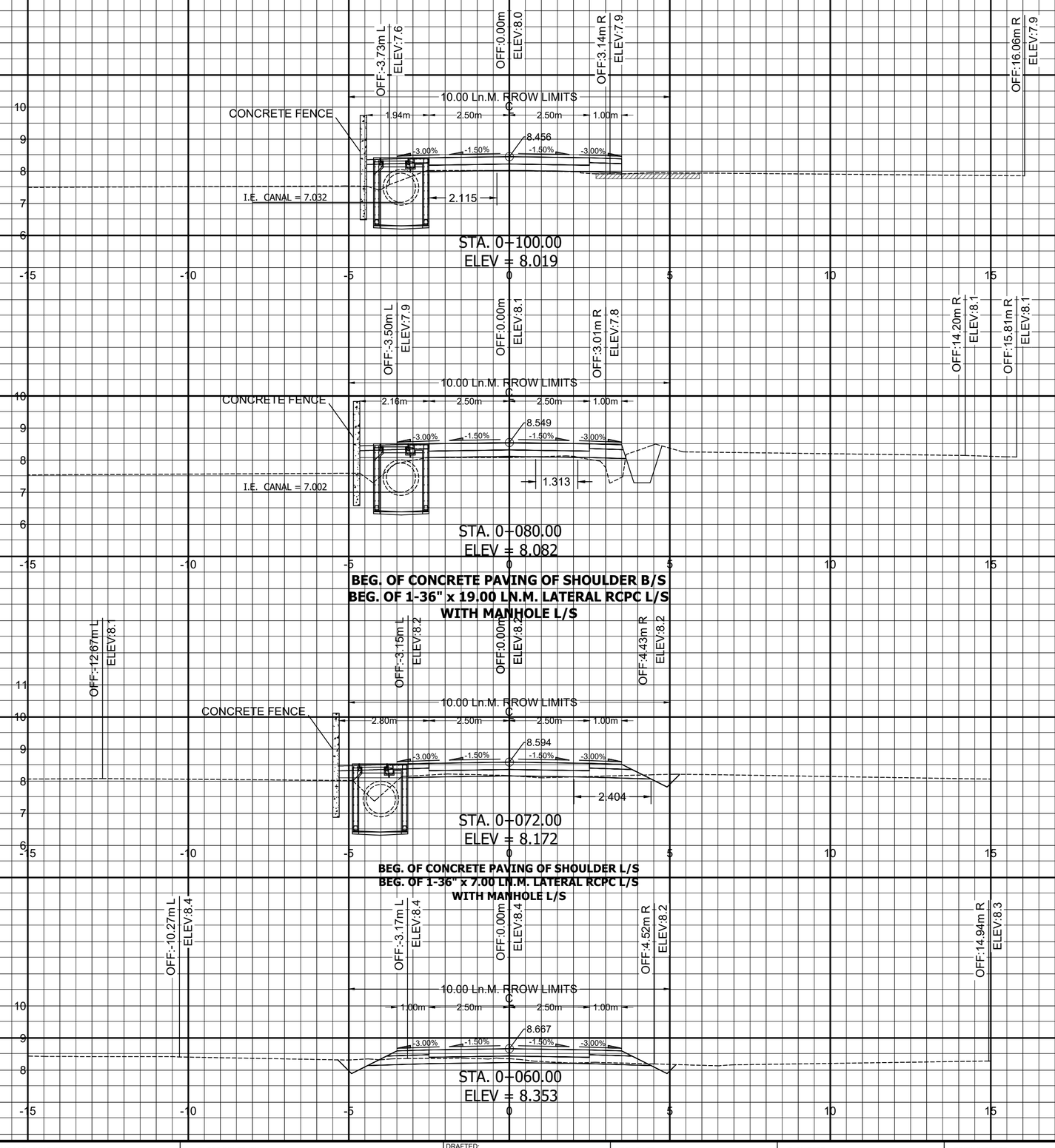
SUBMITTED:
**JEZABEL E. TULING, MPA**
CHIEF, PLANNING AND DESIGN SECTION
DATE:

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

APPROVED:
**ARTURO F. LONGYAPON**
DISTRICT ENGINEER
DATE:

SET NO. N 1 | 4

SHEET NO. 17 | 20




| | | | |
|---|---|---|---|
| 103(1) | = | 3.945 | sq.m. |
| 103(6) | = | 1.864 | sq.m. |
| CUT | = | 0.022 | sq.m. |
| FILL | = | 3.731 | sq.m. |
| 105(1) | = | 2.115 | ln.m. |
| 200 | = | 1.742 | sq.m. |

| | | | |
|---|---|---|---|
| 103(1) | = | 4.048 | sq.m. |
| 103(6) | = | 2.124 | sq.m. |
| CUT | = | 0.916 | sq.m. |
| FILL | = | 2.760 | sq.m. |
| 105(1) | = | 1.313 | ln.m. |
| 200 | = | 1.842 | sq.m. |

| | | | |
|---|---|---|---|
| 103(1) | = | 4.343 | sq.m. |
| 103(6) | = | 2.197 | sq.m. |
| CUT | = | 0.516 | sq.m. |
| FILL | = | 3.612 | sq.m. |
| 105(1) | = | 5.722 | ln.m. |
| 200 | = | 2.161 | sq.m. |

| | | | |
|---|---|---|---|
| CUT | = | 1.300 | sq.m. |
| FILL | = | - | sq.m. |
| 105(1) | = | 8.830 | ln.m. |
| 200 | = | 1.906 | sq.m. |
| 300 | = | 0.348 | sq.m. |
| 100(1) | = | | ln.m. |

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 ALEJAL, CARMEN, DAVAO DEL NORTE**

SHEET CONTENTS:
CROSS SECTION

DRAFTED:
**HERWIN EVAN J. HABABAG**
ENGINEER II

PREPARED:
**WARREN S. PIÑEZ**
ENGINEER II

REVIEWED:
**BENILDA S. PACQUIAO**
ENGINEER III
DATE:

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

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

APPROVED:
**ARTURO P. LONGYAPON**
DISTRICT ENGINEER
DATE:

SET NO.: N 2 4

SHEET NO.: 18 20

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 ALEJAL, CARMEN, DAVAO DEL NORTE

| | | |
|---|---|---|
| SECTION | : | BRGY. ALEJAL ROAD |
| LOCATION | : | CARMEN, DAVAO DEL NORTE |
| STATION LIMITS | : | STA. 0+000.00 - STA. 0+190.00 |
| NET LENGTH | : | 190.00 LN.M CONCRETING/ 0.380 LANE-KM. |

SUBMITTED:

**JEZABEL E. TULING, MPA**
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

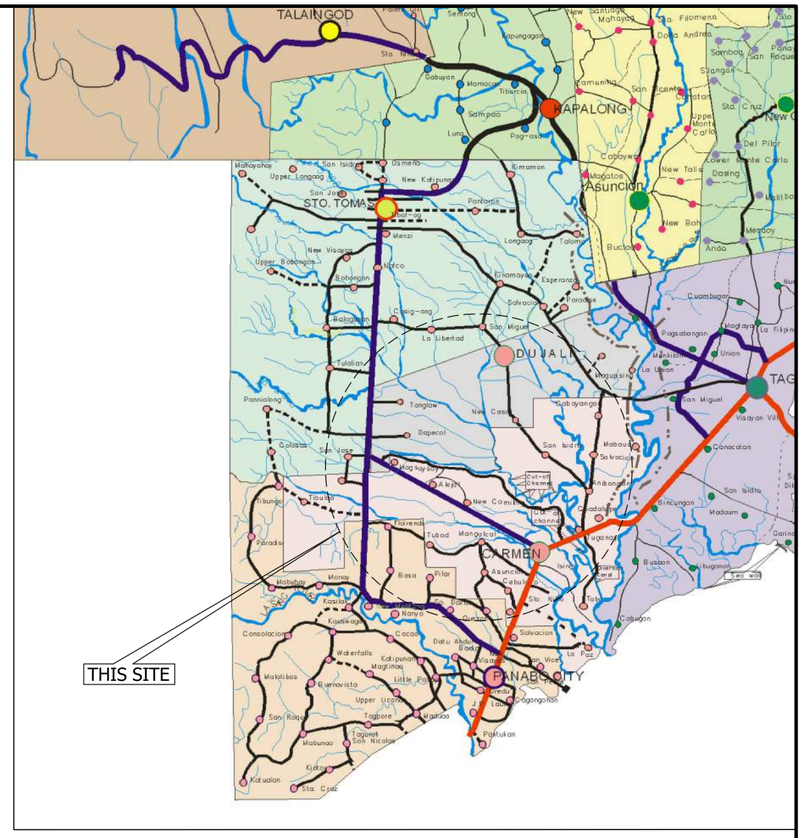
BEG. OF PROJECT/ BEG. OF CONCRETING = STA. 0+000.00
END OF PROJECT/ END OF CONCRETING = STA. 0+190.00

NET LENGTH = 190 LN.M. CONCRETING (TWO LANES)

NOTE:

- CONCRETE PAVING OF SHOULDER L/S AT STA. 0+072.00 - STA. 0+180.00
- PROVIDE 10 mts GRAVEL TRANSITION RAMP AT THE END OF THE CONCRETING STA. 0+190.00 - STA 0+200.00 (INCLUDED IN THE SCOPE OF WORKS)

| SHEET NO. | SHEET CONTENTS |
|---|---|
| 0 | COVER PAGE |
| 1 | PROJECT LIMITS, INDEX OF DRAWINGS, LOCATION MAP, VICINITY PLAN |
| 2-3 | GENERAL NOTES, LEGENDS |
| 4 | SUMMARY OF QUANTITIES |
| 5 | TYPICAL ROADWAY SECTION, DESIGN PARAMETERS, RIGID PAVEMENT ANALYSIS |
| 6-7 | STANDARD PORTLAND CEMENT CONCRETE PAVEMENT JOINTS |
| 8 | METHODS OF PIPE INSTALLATION, DETAILS OF RCPC JOINT, DESIGN REQUIREMENTS OF RCPC, DRAINAGE SCHEDULE |
| 9 | STONE MASONRY DETAIL, SUMMARY OF DRAINAGE QUANTITIES, INDIVIDUAL REMOVAL OF TREES, REMOVAL OF STRUCTURE & OBSTRUCTION |
| 10 | WARNING SIGNS DETAILS AND SCHEDULE |
| 11 | REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS DETAILS AND SCHEDULE PCCP TRANSITION RAMP FLARE DETAIL, REMOVAL AND RELOCATION OF UTILITIES |
| 12 | DESIGN REQUIREMENTS OF CURVE |
| 13 | DPWH, COA AND DENR BILLBOARD DETAILS |
| 14-15 | TRAFFIC MANAGEMENT PLAN AND DETAILS |
| 16 | PLAN AND PROFILE |
| 17-20 | CROSS SECTION |

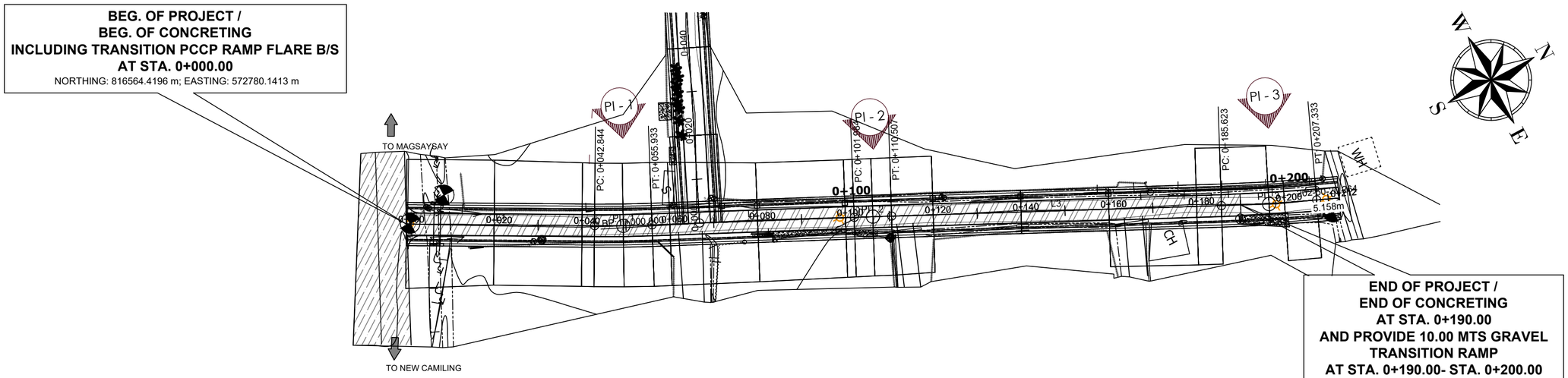



## LOCATION MAP

DRAWN NOT TO SCALE

## VICINITY PLAN

SCALE 1:750mts




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

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|---|---|---|---|---|---|---|---|---|
| **CONCRETING OF ROAD IN BARANGAY ALEJAL, CARMEN, DAVAO DEL NORTE** | PROJECT LIMITS, INDEX OF DRAWINGS, LOCATION MAP, VICINITY PLAN | **HERWIN EVAN J. HABABAG** ENGINEER II<br>PREPARED: **WARREN S. PIÑEZ** ENGINEER II | **BENILDA S. PACQUIAO** ENGINEER III<br>DATE: | **JEZABEL E. TULING, MPA** CHIEF, PLANNING AND DESIGN SECTION<br>DATE: | **GARRY E. VERANO** OFFICER-IN-CHARGE OFFICE OF THE ASSISTANT DISTRICT ENGINEER<br>DATE: | **ARTURO P. LONGYAPON** DISTRICT ENGINEER<br>DATE: | A 1 1 | 1 20 |

# GENERAL NOTES

**SPECIFICATIONS**

1. 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**

1. Distance between the horizontal control points including reference points are measured and expressed in meters.
2. Unless otherwise specified, dimensions of pipes, box culverts, bridges and other structures are measured and expressed in millimeters.
3. All other dimensions are expressed in meters.

**SURVEY SPECIFICATIONS**

1. All project control points are projected in PRS '92 Grid Coordinate System (Zone 5)
2. Survey Instrument used, Stonex S9111 Plus STNS95321007 (Base), Stonex S9111 Plus STNS95491002 (Rover)
3. Date surveyed: August 22, 2023
4. Project Control Points, Refer to Plan and Profile

**ELEVATIONS AND GRADES**

1. Finished grade elevation shown on plan and profile sheets refers to finished pavement level as indicated in the typical roadway section.
2. 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**

1. Alignment and grades are subject to adjustments to suit actual field conditions.
2. Distances and elevations are in meter unless otherwise indicated.
3. Grades shown are top of finished pavement.
4. All works shall comply with the Standard Specifications for Highways and Bridges, Revised 2013 and "A Policy on Geometric Design", AASHTO 2011.
5. 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).
6. 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.
7. 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.
8. 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.
9. 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.
10. **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.**
11. The Implementing office shall identify the locations of and provide accessibility facilities for persons with disabilities in accordance with DO NO. 37, S. 2009.
12. Quarry site for Item 200 and Item 104 is Mabuhay, Carmen (40.00 km. from the project site), Disposal site is one (1) km. away from project limit.
13. Design was based on survey data submitted by the Survey Investigation Unit of the Planning and Design Section of the DPWH-Davao del Norte, 2nd District Engineering Office.

**SUBBASE AND BASE COURSE**

1. 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**

1. Use steel forms for item 311- Portland Cement Concrete Pavement
2. 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.
3. 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
4. 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.
5. All joints shall be sufficiently sealed with asphalt sealant prior to opening to vehicular traffic.
6. 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**

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. Watering and compacting 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.
9. 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.
10. 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.
11. 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.

**REMOVAL OF EXISTING STRUCTURES AND OBSTRUCTIONS**

1. 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.
2. 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**

1. 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.
2. 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.
3. The applied thermoplastic pavement markings shall have a minimum of 2 years of longevity/durability.
4. 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.

**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 settling 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:

1. SURVEYING AND STAKING METHODS
2. STAKE MARKING/CONCRETE MONUMENTS
3. GRADE CONTROL FOR COURSES OF MATERIAL
4. REFERENCING
5. STRUCTURE CONTROL
6. ANY OTHER PROCEDURES AND CONTROLS NECESSARY FOR THE WORK

REFERENCES:

1. 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
2. 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
3. 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

STEEL FENCE
CONCRETE FENCE
CYCLONE WIRE FENCE (CWF)
BAMBOO FENCE
WOODEN FENCE
BARBWIRE FENCE (BWF)
BANK
PROPERTY LINE
ROAD EDGE
ELECTRIC POSTS (WOODEN, STEEL, CONCRETE E-POSTS) — W.E.P., S.E.P., C.E.P.
REFERENCE POINTS (R.P.) TURNING POINTS (T-0)
WATERMETER, FIRE HYDRANT
BENCHMARK (BENCHMARK # 00)
CHEVRON
SIGN BOARD (SB)
WATER PUMP (WP)
CARDINAL DIRECTION
MANHOLE (MH)
WATER EDGE

GRAVEL ROAD
CLIFF
HILL
EARTH CANAL
LINED CANAL (COVERED)
LINED CANAL (OPEN)
PIPE CULVERT (RCPC)
BOX CULVERT (RCBC)
SLOPE PROTECTION
CONC. SLAB
RIPRAP
DAMAGED PCCP/RE-BLOCKING
CH — CONCRETE HOUSE; CS — CONCRETE STORE
TYPICAL HOUSES & STORES
WH — WOODEN HOUSE; WS — WOODEN STORE
DIRECTION (TO)
ALIGNMENT POINT OF INTERSECTION MARKER (P.I.)
KILOMETER POST (149)
TRAFFIC LIGHT
STEET LIGHT

NARRA TREE, COCO TREE, UNKNOWN TREE, LEMON TREE, BAMBOO CLAN, DOL-OOL TREE, PALM TREE, TUGAS TREE, INDIAN TREE, LOMBOY TREE, RAMBUTAN TREE, GEMELINA TREE, TALISAY TREE, SAMMAG TREE, NANGKA TREE, BANANA, ACACIA TREE, ALOM TREE, MAGKUNO TREE, ANELAG TREE, MAHOGANY TREE, MANGOSTEEN TREE, CACAO TREE, BINUNGA TREE, MADRE DE CACAO TREE, POMELO TREE, BOONGON TREE, SAMPALOK TREE, LAWAAN TREE, RESERVED, MISCELLANEOUS TREE, FALCATA TREE, LANSONES TREE, ANAHAW TREE, TUBA-TUBA TREE, MANGO TREE, SANTOL TREE, IBA TREE, PALMERA TREE, BAUETE TREE, MANGROOVE TREE, ANTIPOLO TREE, DURIAN TREE, MACOPA TREE, MANGANITAS TREE, KAIMANSI TREE, IPIL - IPIL TREE, TISA TREE, PINE TREE, CAIMITO TREE, STAR - APPLE TREE, AVOCADO TREE, BULI TREE, MARANG TREE, HIBI TREE, BAGALUNGA TREE, LABANA TREE

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