LAO PEOPLE'S DEMOCRATIC REPUBLIC

PEACE INDEPENDENCE DEMOCRACY UNITY PROSPERITY

MINISTRY OF PUBLIC WORKS AND TRANSPORT (MPWT)

DEPARTMENT OF ROADS

NR 13 NORTH IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH JUNCTION – PHONHONG)
CONCEPTUAL DESIGN

LENGTH OF 56.777 Km

VOLUME IV

DRAWINGS
PART C : STANDARD
(FINAL)

PREPARED BY:

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VIENTIANE
April, 2018

LTEC CODE: SD-262-17

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NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

LIST OF DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. LDW–001
SCALE: NOT TO SCALE

LIST OF DRAWINGS

No.	DRAWING TITLE	DRAWING. No.
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6.8	REINFORCED CONCRETE PIPE STRUCTURE, INLET, OUTLET SINGLE CELL, DIA 800–1500 mm MIN.	SDD–008
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NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

LIST OF DRAWINGS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. LDW–002
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

LIST OF DRAWINGS

No.	DRAWING TITLE	DRAWING. No.
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No.	DRAWING TITLE	DRAWING. No.
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8	PROTECTION WORK	
8.1	CONCRETE SLOPE PROTECTION	SDP–001
8.2	EMBANKMENT SLOPE PROTECTION LOOSE AND GROUTED RIP RAP	SDP–002
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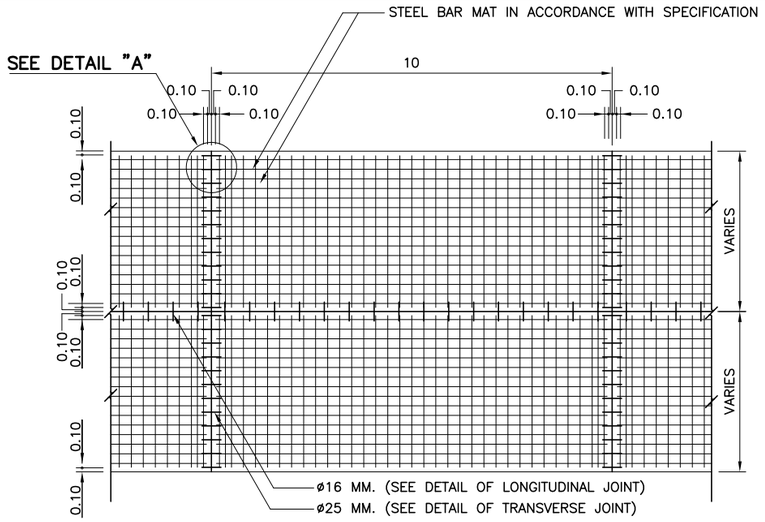
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. LDW–003
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

LTEC CODE: SD–262–17

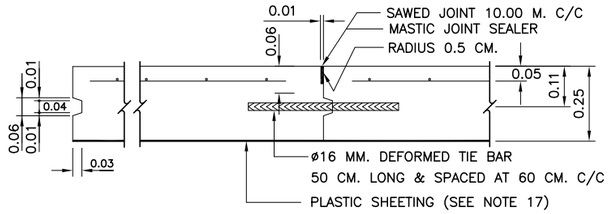
STANDARD DRAWINGS

REINFORCED CONCRETE PAVEMENT



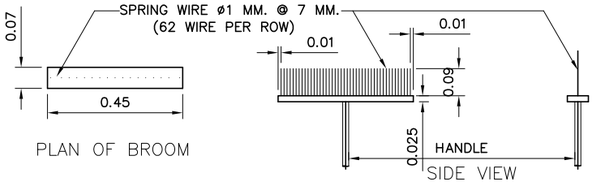
PLAN OF REINFORCEMENT

NOT TO SCALE



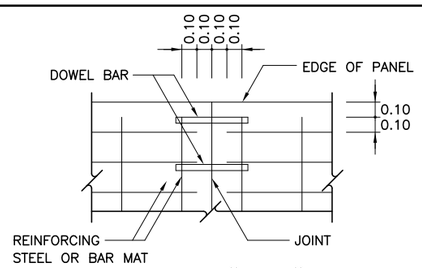
DETAIL OF LONGITUDINAL JOINT

NOT TO SCALE



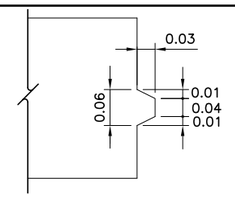
DETAIL OF BROOM SURFACE CONCRETE PAVEMENT

NOT TO SCALE



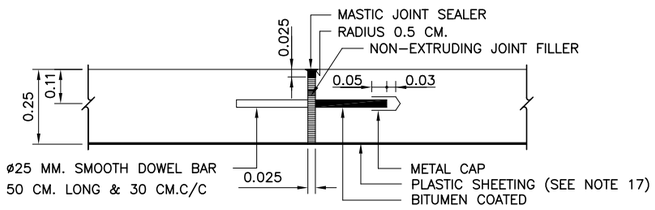
DETAIL " A "

NOT TO SCALE



SHEAR KEY DETAIL " B "

NOT TO SCALE



DETAIL OF EXPANSION JOINT

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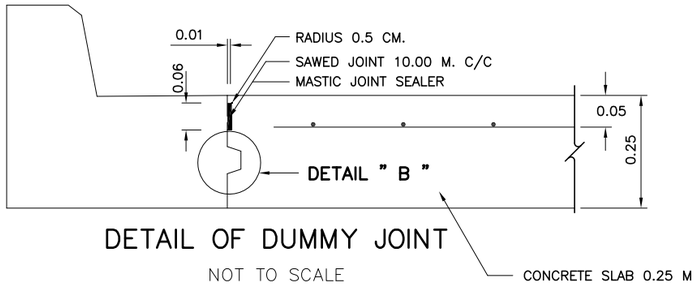
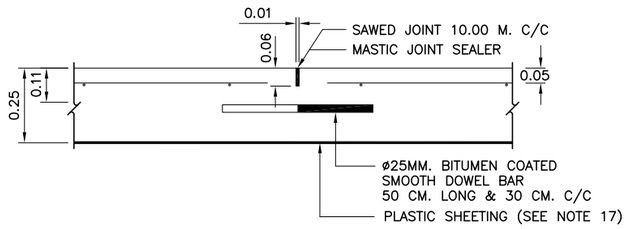


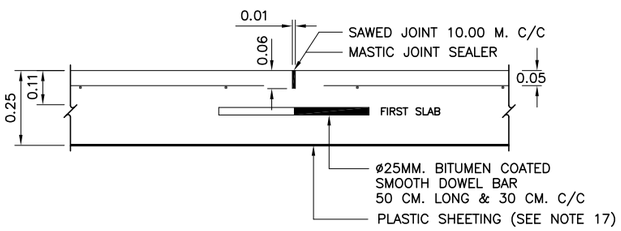
DETAIL OF DUMMY JOINT

NOT TO SCALE



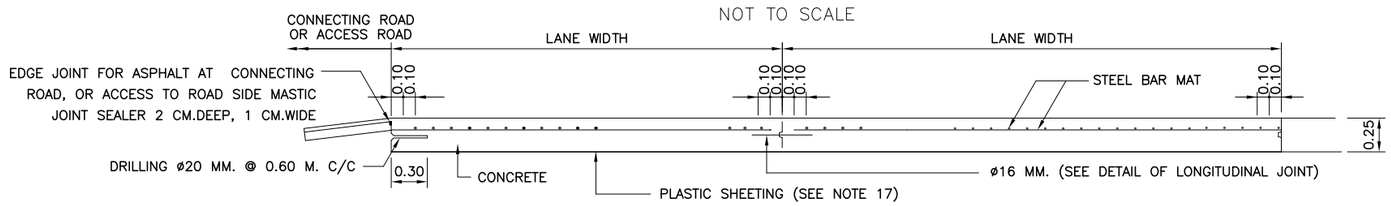
DETAIL OF CONTACTION JOINT

NOT TO SCALE



DETAIL OF CONSTRUCTION JOINT

NOT TO SCALE



DETAIL OF TRANSVERSE JOINTS

NOT TO SCALE

REINFORCEMENT DETAIL OF CONCRETE PAVEMENT CROSS-SECTION

NOT TO SCALE

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. EXPANSION JOINT SHALL BE CONSTRUCTED AT THE INTERVAL OF 100 METERS. IF THE LAST INTERVAL IS LESS THAN 100 METERS, THE INTERVALS SHALL BE AVERAGED BUT BETWEEN 40 AND 50 METERS.
3. EXPANSION JOINT SHALL BE PROVIDED AT THE OUTER EDGE OF BOTH SIDES OF THE BOX CULVERT CROSSING.
4. MASTIC JOINT SEALER SHALL BE OF THE HOT POURED ELASTIC TYPE CONFORMING TO TIS. 479.
5. JOINT FILLER SHALL CONFORM TO THE AASHTO M. 213-74 OR ASTM. D1751-73 SPECIFICATION.
6. CONCRETE SHALL BE CLASS C 30
7. REINFORCING STEEL BARS SHALL BE HIGH TENSILE STEEL BARS AND SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M31
8. WELDED CAN NOT BE USED.
9. CONCRETE PAVER SHALL BE REQUIRED FOR CONCRETE POURING. IN CASE OF NECESSARY POURING CONCRETE BY MAN-POWER, CONCRETE SHALL BE POURED ONLY GAP SPACE NOT MORE THAN 30.00 METERS LONG.
10. ALL JOINTS EXCEPT EXPANSION JOINT SHALL BE MADE BY SLOT CUTTING MACHINE ONLY.
11. TRAFFIC SHALL BE ALLOWED ONLY IF THE ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE CYLINDER CONFORMS TO THE REQUIREMENTS OF THE SPECIFICATIONS
12. ROAD CONSTRUCTION MATERIAL NOT SPECIFIED IN THIS DRAWING SHALL CONFORM TO THE STANDARD OF THE REQUIREMENTS OF THE SPECIFICATIONS.
13. BROOMING CONCRETE SURFACE WITH A BROOM OF THE STANDARD TYPE SPECIFIED SHALL BE REQUIRED. THE DIRECTION OF BROOMING SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAFFIC FROM ONE EDGE OR JOINT TO THE OTHER. ONE PHASE OF BROOM SURFACE SHALL PROPERLY OVERLAP WITH ANOTHER. CONCRETE BROOM SURFACE SHALL NOT BE OVER 3 MM DEPTH. THE SURFACE SHALL BE FREE FROM PORES, HOLES OR LUMPS OF COARSE AGGREGATE OVER THE SURFACE.
14. BROOMING SURFACE CONCRETE SHALL CORRESPOND TO THE FIGURE OR AS DIRECTED BY THE ENGINEER
15. PREPARATION OF JOINT FOR MASTIC JOINT SEALER.

15.1 THE JOINT SHALL BE CLEANED WITH A BLOWER TO GET RID OF ALL KINDS OF DIRT THE JOINT SHALL BE COMPLETELY DRY.

15.2 PRIMER SHALL BE APPLIED TO THE JOINT WITH A BRUSH OR SPRAYER THE JOINT SHALL BE LET DRY BEFORE THE POURING OF MASTIC JOINT SEALER WHICH HAS BEEN BOILED AND DISSOLVED BY MEANS OF HEAT CONDUCTIVITY TO THE SPECIFIED TEMPERATURE.

15.3 JOINTS SHALL BE CUT AND MASTIC JOINT SEALER SHALL BE DROPPED AS SOON AS POSSIBLE.

15.4 MASTIC JOINT SEALER SHALL BE DROPPED WITH JOINT SEALANT APPLYING MACHINE.

16. THE THICKNESS OF FLEXIBLE PAVEMENT CORRESPONDED TO THE FIGURE CONFORMING TO TYPICAL CROSS-SECTION.
17. PLASTIC SHEET USED IN CONSTRUCTION SHALL HAVE THE FOLLOWING REQUIREMENTS :

17.1 THICKNESS OF 0.07 MM. WITH A TOLERANCE OF NOT MORE THAN 7% SHALL BE REQUIRED.

17.2 WIDTH SHALL NOT BE LESS THAN 1.20 M.

17.3 IT SHALL BE COLOURLESS, TRANSPARENT AND WATERROOF, FREE FROM POROUS AREA, TURN AREA AND BLISTERING AREA WHICH ARE VISIBLE BY NAKED EYE. EDGE SHALL BE STRAIGHT.

17.4 CONTINUOUS LENGTH SHALL BE REQUIREMENT TO THE WIDTH OF TRAFFIC LANES. CONNECTION ALLOWED AT LONGITUDINAL JOINTS WITH NOT LESS THAN 20 CM. OVERLAPPING SHALL BE REQUIRED.

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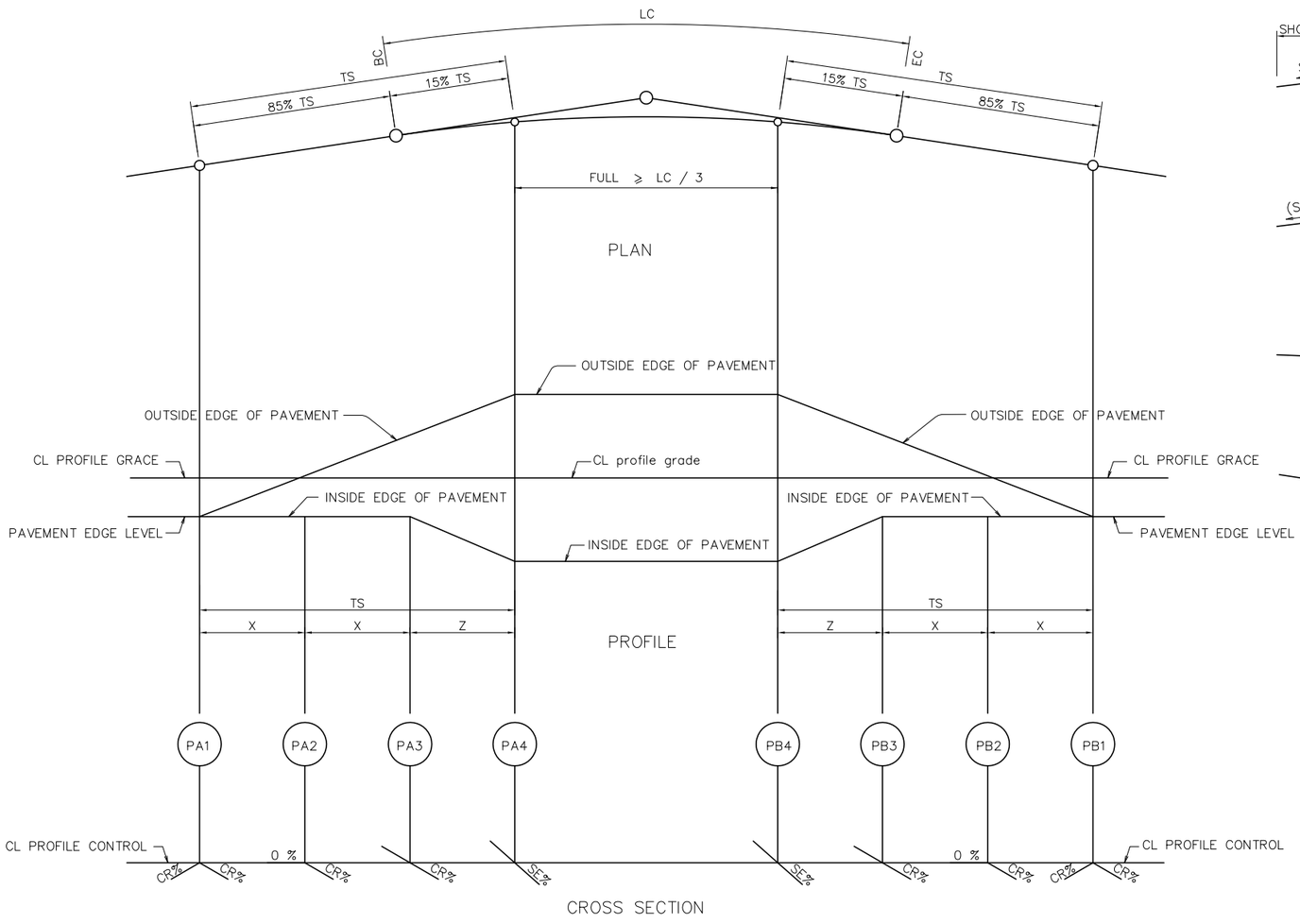
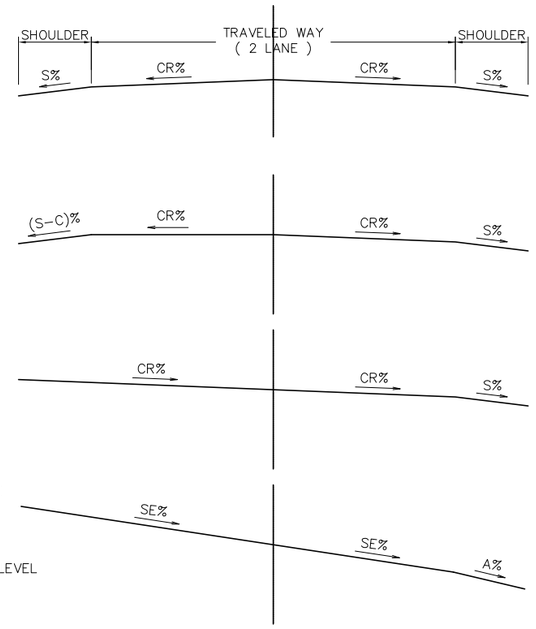
DETAILS OF REINFORCED CONCRETE PAVEMENT

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDS-001
				APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

LTEC CODE: SD-262-17

ROAD STANDARD





A% = SE% or S% WHICHEVER IS GREATER

SECTION SHOWING TYPICAL

WHERE CURVE LENGHT (LC) IS INDADEQUATE TO ENSURE
THAT THE FULL SUPER EVELATION ISN APPLIED AVER
AT LEAST (2/3) X LC THEN THE SPILT BETWEEN
THE SUPERELEVATION ATTAINMENT ON THE ANGENT AND
THE CURVE SHOLL BE AD JUSTED ACCORDINGLY

ADVERSE CROSS FULL TO BE REMOVE ON CURVES LESS THAN:

FLAT = 1,500 m
ROLLING = 1,000 m
MOUNTAINOUS = 500 m

UNLESS ORTHERWISE SHOWN ON THE DRAWINGS

SUPER ELEVATION = $SE\left(\frac{V}{127 \times R}\right) - F$

WHERE V = DESIGN SPEED (kph), R = RADIUS (m) AND F=SIDE FRICTION FACTOR

N.C = NORMAL CROWN TS = 2 X + Z

F.S FULL SUPER ELEVATION X = (H.C) x P ; $H.C = \frac{CR\%}{100} \times W/2$

H.C = HALF CROWN Z = (F.S – H.C) x P ; P = 75 + 1.5 V

F.C = FULL CROWN

CR = CROSS FALL FOR STANDARD CROSS SECTION

W = WIDTH OF TRAVELED WAY

NOTES:

1. FOR GENERAL APPEARANCE AND SAVETY ALL ANGULAR BREAK PIONTS PA1, PA2, PA3 AND PA4, ETERTANENT PROFILE CONTROL LINES ARE TO BE AROUNDED BY INSERTION OF 15m MINIMUM VERTICAL CURVE
2. EXTRA WIDENING OF PAVEMENT NOT SHOWN WHEN WIDENING IS REQUIRED THE LEVEL AT THE OUTSIDE AND INSIDE EAGES OF THE PAVEMENT SHOULD BE ADJUSTED ACCORDINGLY

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NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

SUPER ELEVATION STANDARDS
SHEET 1 OF 2

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–001
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

EXAMPLE :

FOR A TYPICAL SITUATION ON A 2 LAND ROAD

W = TRAVELED WAY WIDTH = 9.00 m

V = 80 Kph

F = 0.15

NORMALL CROSS FALL = E%

MAXIMUM SUPER ELEVATION = 7% (PAVED ROAD)

P = 75 + 1.5 x 80 = 195

HC = (4/100) x (7/2) 0.140

FS = (6/100) x (7/2) = 0.210 FOR 6% SUPER ELEVATION

= (7/100) x (7/2) = 0.245 FOR 7% SUPER ELEVATION

X = 0.140 x 195 = 27.30 SAY 27.50m

Z = 0 FOR 4% SUPER ELEVATION

= (0.21−0.140) x 195 = 13.65 SAY 14m FOR 6% SUPER ELEVATION

= (0.245−0.140) x 195 = 20.475 SAY 20.50m FOR 7% SUPER ELEVATION

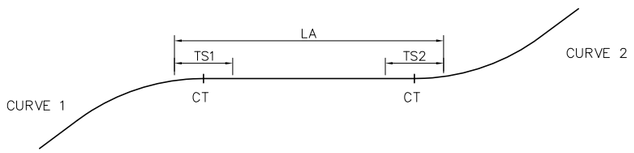
TS = 2 x 20.50 = 41m for 4% SUPER ELEVATION

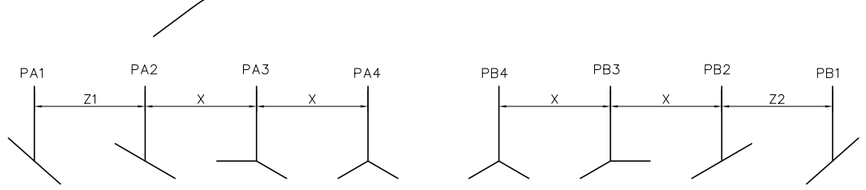
= 2 x 20.50 + 14 = 55m FOR 6% SUPER ELEVATION

= 2 x 20.50 + 20.50 = 61.50m FOR 7% SUPER ELEVATION

PARTICULAR CASE − 2 LANE OPERATION

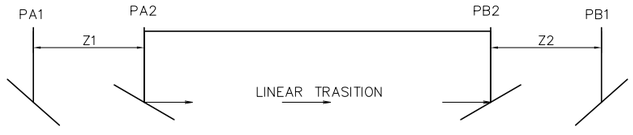
A. ADJACENT REVERSE CURVES



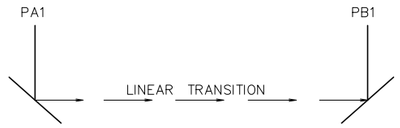


− WHERE LA IS GREATER THAN 4X + Z1 + Z2

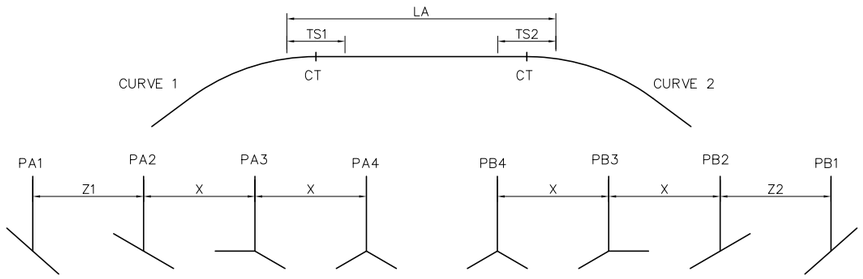
− WHERE LA IS LESS THAN 4X + Z1 + Z2 BUT GREATER THAN 2X + Z1 +Z2
THEN TRSINTION AS FOLLOWS



WHERE LA IS LESS THAN 2X + Z1 +Z2
THEN TRANSITITON AS FOLLOWS



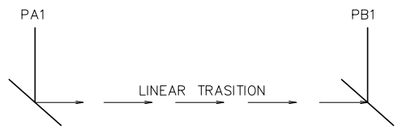
B. ADJACENT SOME HAND CURVES



− WHERE LA IS GREATER THAN 4X + Z1 + Z2 + Q
(WHERE Q = 30m FOR FLAT − ROLLING TERRIAN AND 10m FOR MOUNTAINUSE TERRAIN)

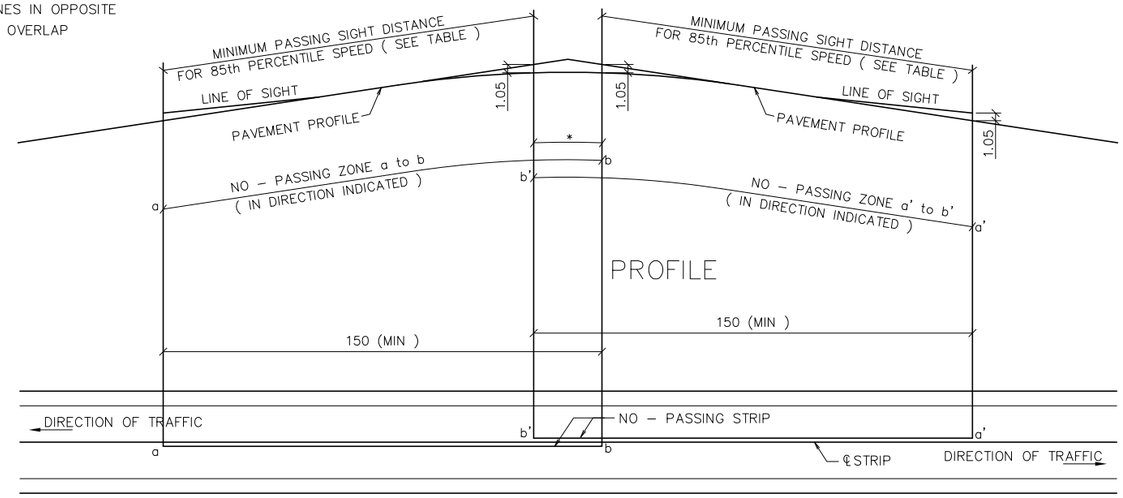
− WHERE LA IS GREATER THAN 4X + Z1 + Z2 + Q BUT MORE THAN X + Z1 + Z2
THEN TRANSITION AS FOLLOWS

− WHERE IS LESS THAN X + Z1 + Z2
THEN TRSITION AS FOLLOWS



ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH − PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD−262−17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	SUPER ELEVATION STANDARDS SHEET 2 OF 2					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR−002
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

REMARK: NO – PASSING ZONES IN OPPOSITE DIRECTIONS MAY OR MAY NOT OVERLAP DEFPENDING ON ALIGNMENT



PLAN

a , a' = BEGIN NO – PASSING ZONE

b , b' = END NO – PASSING ZONE

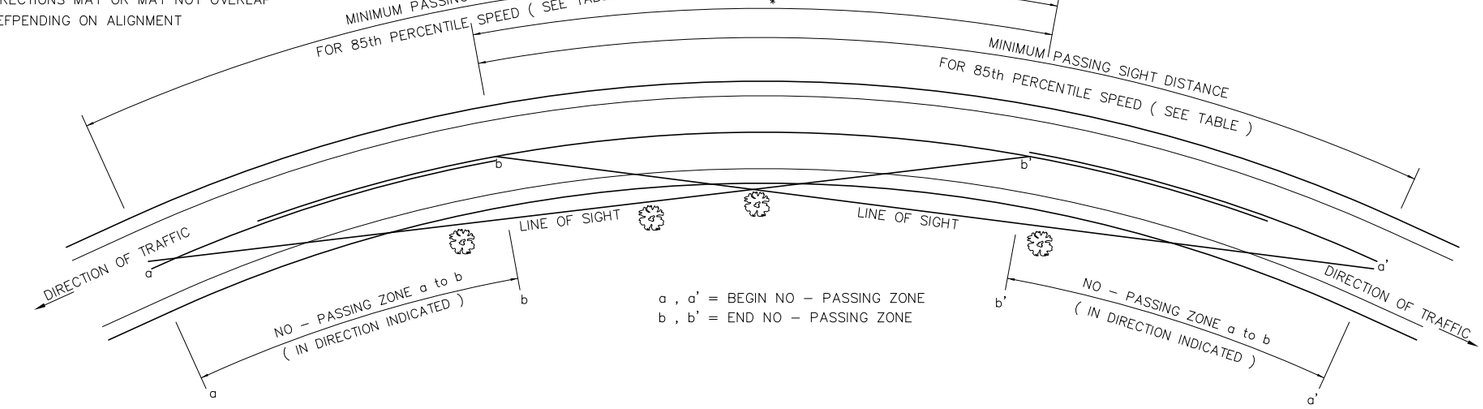
NO – PASSING ZONES AT VERTICAL CURVES

NOT TO SCALE

TABLE MINIMUM PASSING SIGHT DISTANCE

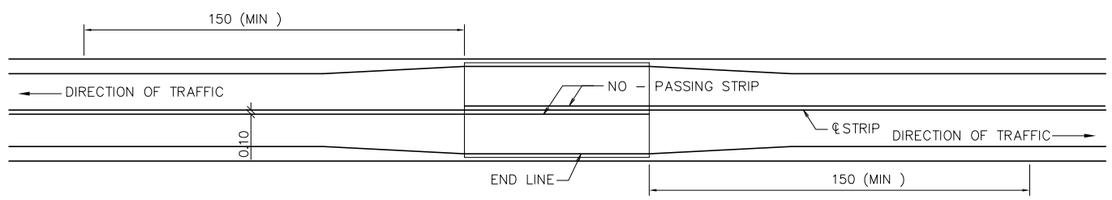
85 PERCENTILE SPEED (KPH)	MINIMUM PASSING SIGHT DISTANCE (m)
20	60
30	90
40	120
50	150
60	180
80	210

REMARK: NO – PASSING ZONES IN OPPOSITE DIRECTIONS MAY OR MAY NOT OVERLAP DEFPENDING ON ALIGNMENT



NO – PASSING ZONES AT HORIZONTAL CURVES

NOT TO SCALE



BRIDGE APPROACH

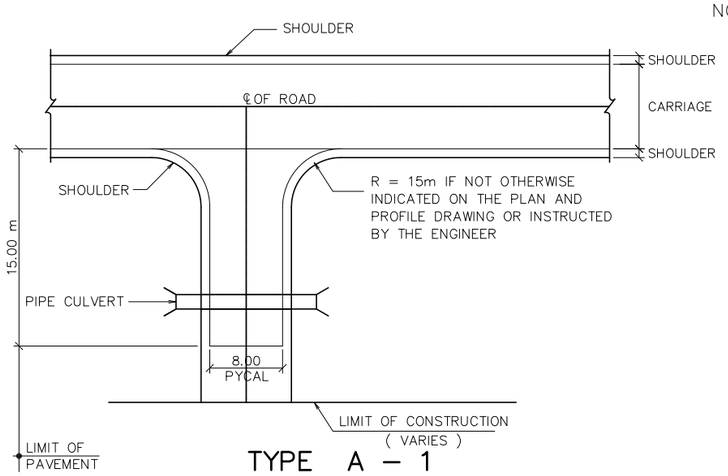
NOTES:

1. ALL DIMENSONS ARE IN METERS UNLESS OTHERWISE INDECATED.
2. ALL MARKINGS SHALL BE IN ACCORDANCE WITH THE DEPPARTMENTOF ROADS' TRAFIC CONTROL DEVICE MANUAL, OR AS DRIRECTED BY THE ENGINEER.
3. PAVEMENT MARKING FOR THE ASPHALTIC CONCRETE AND THE REINFORCED CONCRETE MAVEMENTS SHALL BE REFLECTORIZED THERMOPLASTIC PAINT AS SPECIFIED IN TECHNICAL SPECIFICATION.

ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	NO–PASSING STRIP					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–003
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

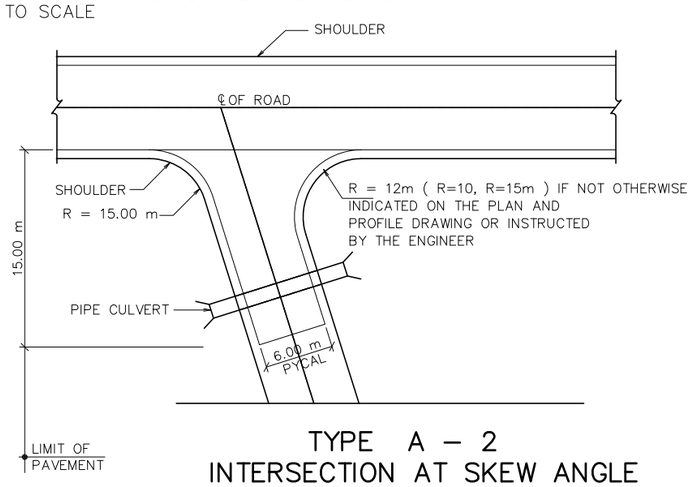
VISIBILITY SPLAYS FOR " APPROACH CONDITIONS "

NOT TO SCALE



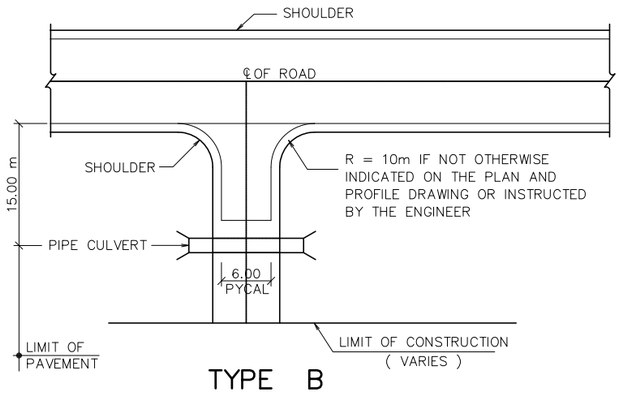
TYPE A – 1
FOR ACCESS ROADS OF MAJOR IMPORTANCE SUCH AS ROADS LEADING TO TOWNS

NOT TO SCALE



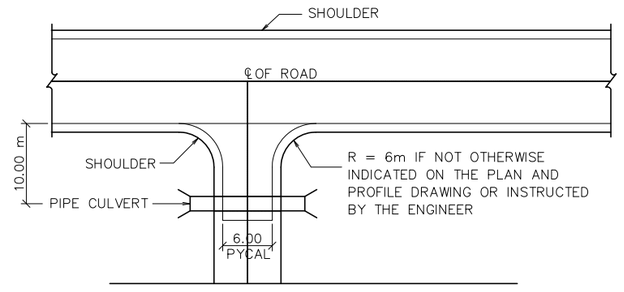
TYPE A – 2
INTERSECTION AT SKEW ANGLE
70°≤ α ≤ 110°

NOT TO SCALE



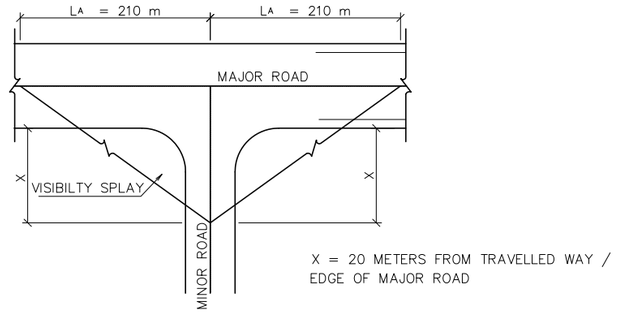
TYPE B
FOR ACCESS ROADS OF MAJOR IMPORTANCE SUCH AS ROADS LEADING TO VILLAGES

NOT TO SCALE



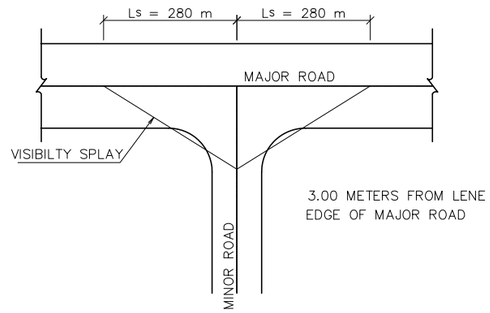
TYPE C
FOR ACCESS ROADS OF MAJOR IMPORTANCE SUCH AS ROADS LEADING TO VILLAGES OR INDIVIDUAL PROERTIED

NOT TO SCALE



CASE 1

NOT TO SCALE



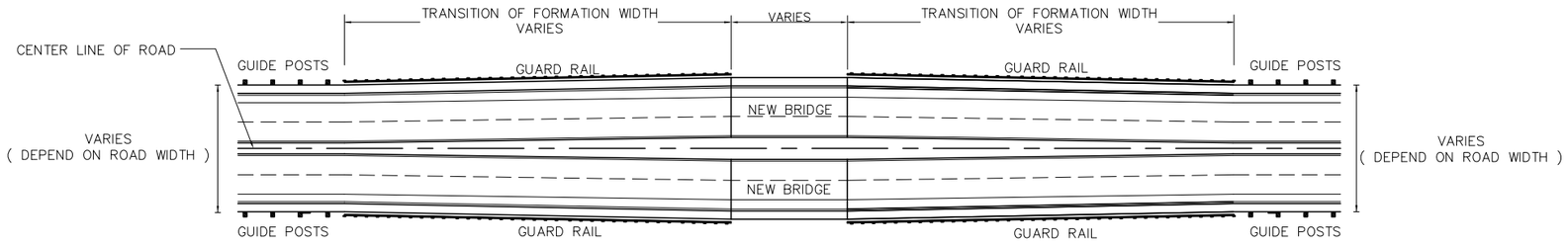
CASE 2

NOT TO SCALE

NOTES:

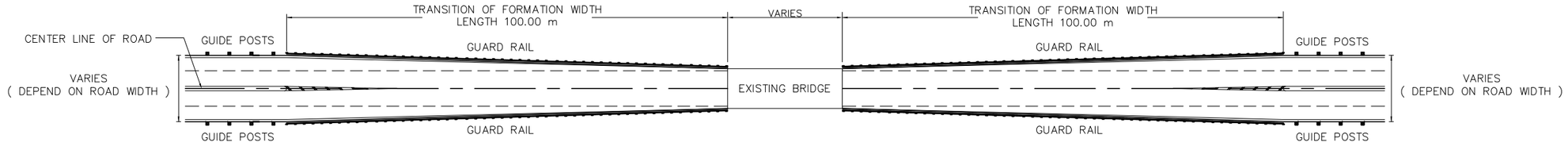
1. TYPE OF JUNCTIONS ARE AS INDICATED ON THE PLAN AND PROFILE DRAWINGS OF AS DIRECTED BY THE ENGINEER.
2. BLADE FROM EDGE TO MEET SIDE ROAD WITH A MAXIMUM LONGITUDINAL GRADE 8%.
3. SIDE ROAD CROSS FALL TO BE 2% EITHER WITH CENTRAL CROWN OR WITH ONE WAY CROSSFALL AS REQUIRED.
4. SIDE ROAD BATTERS TO BE SAME SLOPE AS THE DESIGN MAIN ROAD BATTERS AS THAT LOCATION.
5. INTERSECTION ANGLES BETWEEN MAIN AND SIDE ROAD TO BY BETWEEN 70 AND 110 DEGREES. IF SIDE ROAD APPROACH. ANGLE IS OUTSIDE THESSE LIMIT, SIDE ROAD SHALL BE REALIGNED.
6. LIMIT OF CONSTRUCTION WILL DEPEND UPON LEVEL OF SIDE ROAD.
7. CULVERTS UNDER ACCESS ROAD TO BE PLACED TO SUIT THE SITE CONDITIONS OR AS DILECTED BY THE ENGINEER.
8. PIPE CULVERTS TO BE MINIMUM OF 0.50 METRES DIAMETER (EXCEPT AT INDIVIDAULLY PROPERTY) AND TO BE PROVIDED WITH HEADWALLS OR SLOPEPROTECTION.
9. MINMUM COVER TO PIPE CULVERTS TO BE 0.40 METRES EXCEPT FOR INDIVIDUALLY PROPERTIES.
10. ACCESS ROADS TO BE PROVIDED WITH BASE COURSE 200mm THICK AND SBST UP TO 15 METRES FROM THE EDGE OF THE CARRIAGEWAY OR AS DIRECTED BY THE ENGINEER.
11. EXTEND PAVEMENT AND SEAL THROUGH TO EDGE OF FORMATION AS PER TYPICAL CROSS ECTIONS SEE DRAWING.
12. INDICATIVE LOCATIONS FOR BUS BAYS ARE SHOWN ON THE PLAN AND PROFILE DRAWINGS EXACT LOCATIONS, LENGTHS AND NUMBERS OF BUS BAYS TO BE AS DIRECTED BY THE ENGINEER.
13. THE ENGINEER WILL INSTRUCT WHICH TYPE OF ROAD JUNCTION (CASE 1 OR CASE 2) IS TO BE USED.
14. THE CONTRACTOR SHALL PREPARE LAYOUT DRAWINGS (PLAN AND LONG SECTION) FOR EACH JUNCTION FOR THE ENGINEER'S APPROVAL.
15. DETAILS TO BE ADAPTED FOR SKEW JUNCTIONS.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	SIDE ROAD CONNECTIONS					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–004
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE



TRANSITION OF FORMATION WIDTH TO NEW BRIDGE

Scale: 1:1100



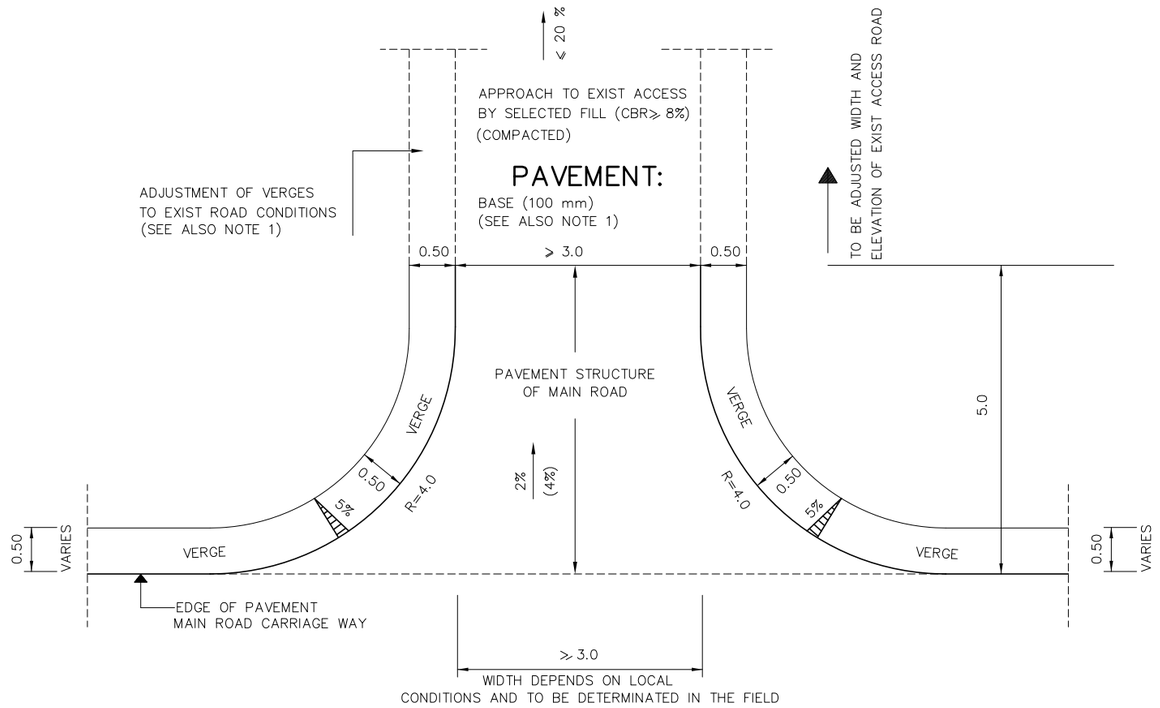
TRANSITION OF FORMATION WIDTH TO EXISTING BRIDGE

Scale: 1:1100

NOTE:

1. ALL DIMENSION ARE IN METERS.

ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	TRANSITION OF FORMATION WIDTH					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–005
						APPROVED	Mr.Vandy VORASACK		SCALE: 1:1100



ACCESS TYPE A3(MAIN ROAD WITH VERGE)

NOT TO SCALE

NOTES:

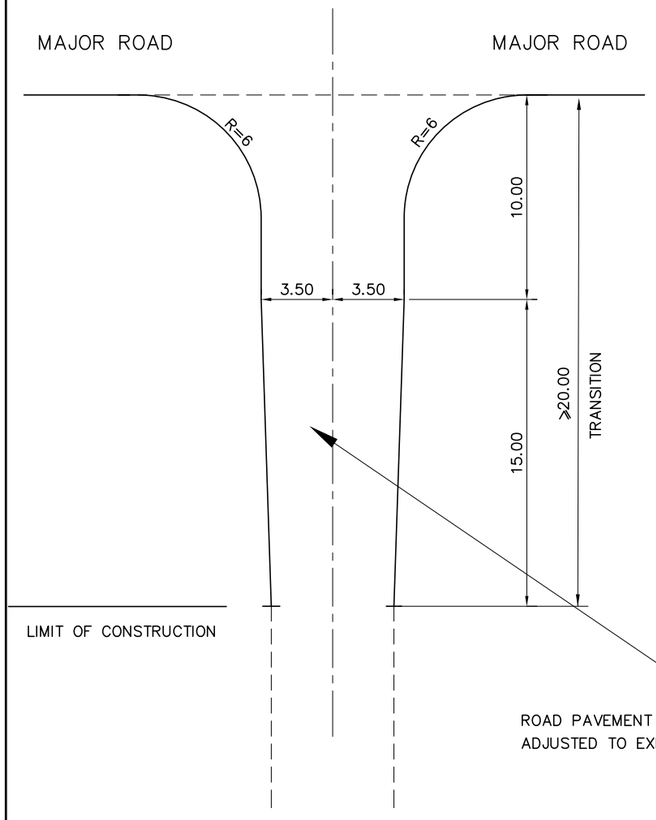
1. ADJUSTMENTS TO CORRESPOND TO ACTUAL FIELD CONDITIONS OR AS INSTRUCTED BY THE ENGINEER.
2. ALL MEASUREMENTS IN METERS.

ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	ACCESS ROAD TYPE A3					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–006
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

JUNCTION

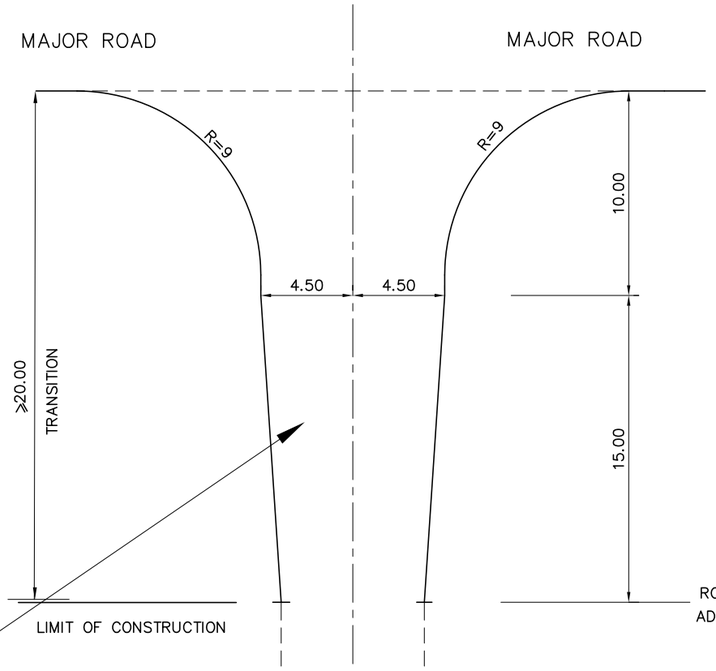
JUNCTION J1

ACCESS ROAD
MAINLY USED BY PASSENGER CARS

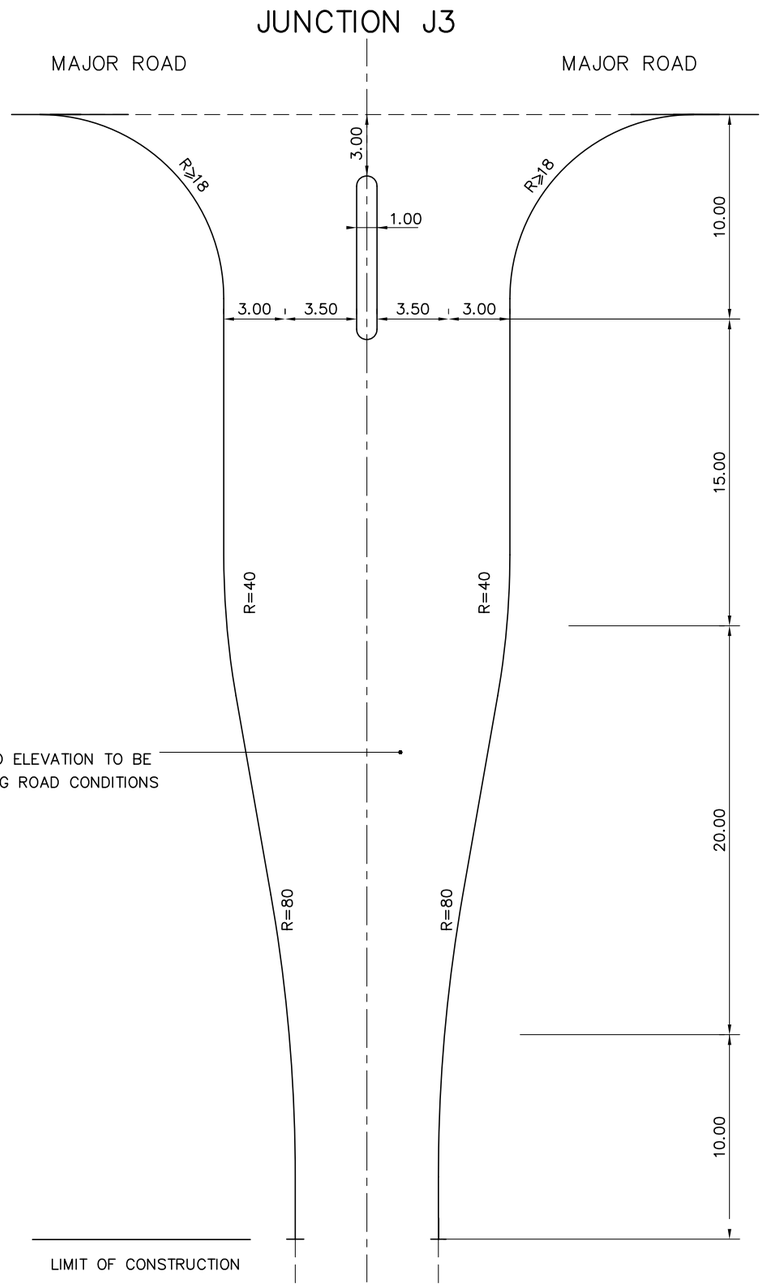


JUNCTION J2

ACCESS ROAD
OCCASIONALY USED BY SMALL TRUCKS OR BUSES



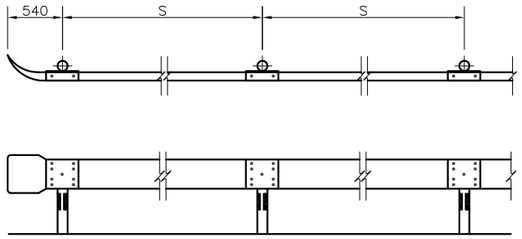
JUNCTION J3



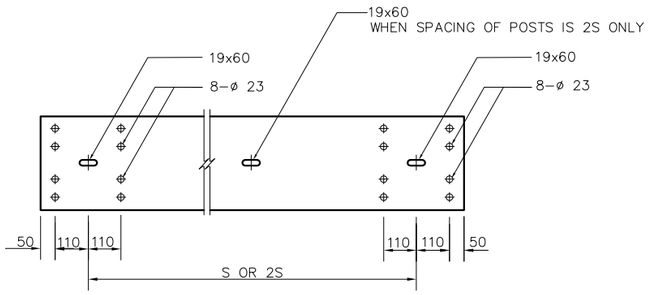
NOTES:

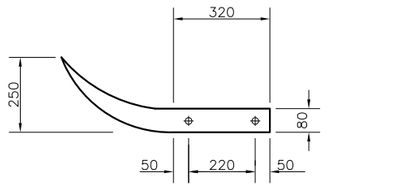
1) IN CASE OF SIDEWALK INSTALLATION,CURB STONE SHALL BE INSTALLED UP TO THE END OF SIDEWALK.
2) ALL MEASUREMENT IN METERS.

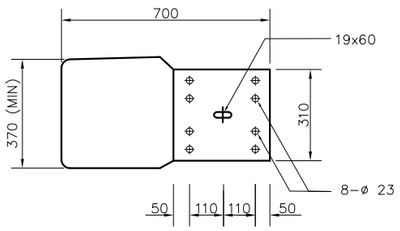
ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	JUNCTION TYPE: J1,J2,J3					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–007
						APPROVED	Mr.Vandy VORASACK		SCALE: 1:300



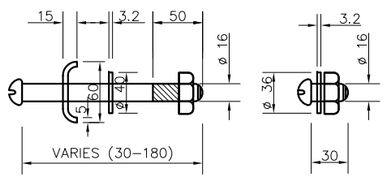
PLAN AND ELEVATION
NOT TO SCALE



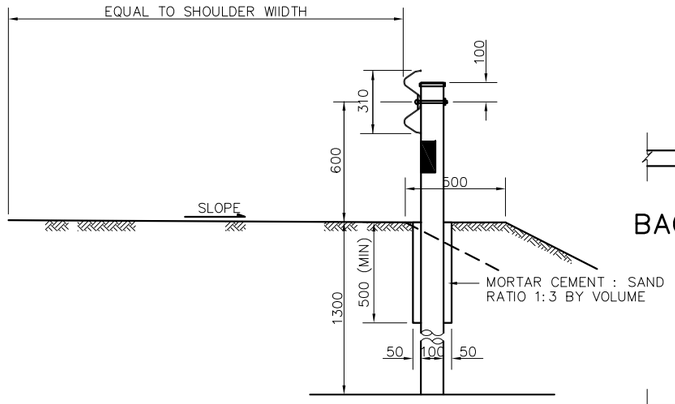


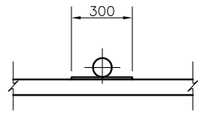


TERMINAL SECTION
NOT TO SCALE

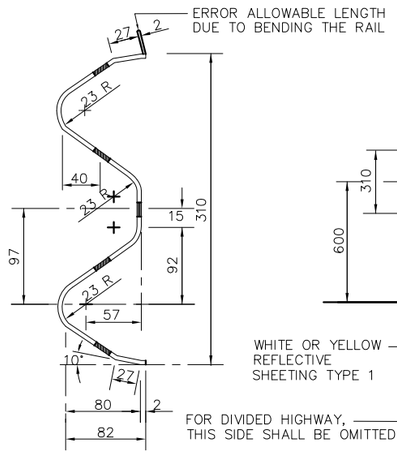


BOLT & NUT
NOT TO SCALE

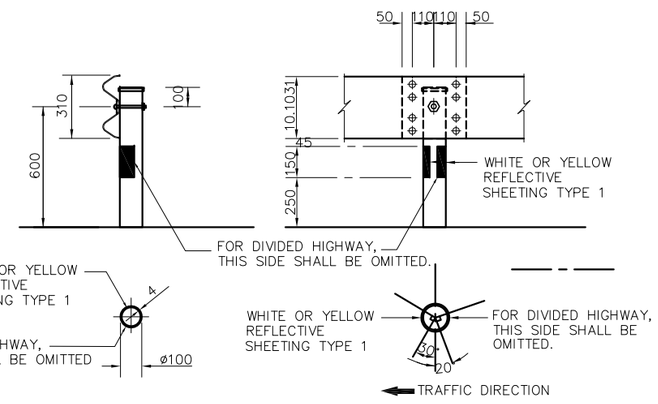




BACK–UP PLATE
SCALE 1:15



RAIL SECTION
NOT TO SCALE



POST
NOT TO SCALE

NOTES:

1. ALL DIMENSION ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. GUARDRAIL SHALL CONFORM TO THE FOLLOWING REQUIREMENT:

   2.1 STEEL RAIL SHALL BE MADE FROM STEEL OF THICKNESS NOT LESS THAN THE MINIMUM THICKNESS SPECIFIED FOR EACH CLASS OF RAIL AND SHALL BE GALVANIZED WITH THE MINIMUM WEIGHT OF ZINC COATING ACCORDING TO THE TYPE OF RAIL AS SPECIFIED IN TABLE BELOW:

RAIL		MIN.RAIL THICKNESS (MILLIMETER)	MIN.WEIGHT OF ZINC COATING (GRAMS PER SQUAREMETER)
CLASS	TYPE		
1	1	3.2	550
	2	3.2	1,100
2	1	2.5	550
	2	2.5	1,100

   2.2 MECHANICAL PROPERTES OF RAIL:

RAIL		MIN. ULTIMATE TENSILE STRENGTH (KG/MM^2)	MIN. PERCENTAGE OF ELONGATION	MAX. DEFLECTION			
				MAX. LOAD TRAFFIC FACE UP		MAX. LOAD TRAFFIC FACE DOWN	
CLASS	TYPE			KG.	DEFLECTION (MM.)	KG.	DEFLECTION (MM.)
1	1	41	21	910	50	720	50
	2			1,360	75	1,090	75
2	1	41	21	680	50	545	50
	2			910	75	720	75

   2.3 POST SHALL BE GALVANIZED STANDARD STEEL PIPE CONFORM TO THE REQUIREMENTS OF AASHTO M183

   2.4 THE GALVANIZING OF BOLTS, NUTS, WASHERS AND SIMILAR THREADED FASTENERS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO M232

3. UNLESS OTHERWISE SPECIFIED, GUARDRAIL CLASS 1 SHALL BE USED FOR HIGHWAY CLASS D AND CLASS 1 FOR OTHER HIGHWAY CLASSES, GUARDRAIL CLASS 2 SHALL BE USED.
4. IN CASE OF HIGH RESISTANCE TO CORROSION REQUIREMENT, GUARDRAIL TYPE 2 SHALL BE USED.
5. SPACING OF POSTS SHALL BE LOCATED AS FOLLOWS

RADIUS OF CURVE R (M.)	SPACING OF POSTS S (M.)
ON TANGENT OR R > 700	4.00
450 ≤ R < 700	3.00
150 ≤ R < 450	2.00
R < 50	1.00

* HEIGHT OF FILL H (M.)	SPACING OF POSTS S (M.)
H ≤ 300	4.00
3.00 < H ≤ 4.00	3.00
4.00 < H ≤ 5.00	2.00
5.00 < H ≤ 7.00	1.00

* FOR SIDE SLOFE 1:2 OR STEEPER
FOR HORIZONTAL CURVE WITH HIGH FILL, THE MINIMUM SPACING VALUE OF THE ONE SHALL BE GOVERN.

6. GUARDRAIL, IN GENERAL, IS MORE SUITABLE THAN GUIDE POST ON HORIZONTAL CURVE SECTION WITH HIGH FILL MORE THAN 5.00 M. (AND SIDE SLOPE IS STEEPER THAN 1:3) AND NOT RECOMMENDED FOR HIGH FILL OVER 7.00 M.
7. GUARDRAIL INSTALLED IN CURVE WHERE RADIUS IS LESS THAN 50 M. SHALL BE PRE–BENT FROM THE FACTORY.
8. BACK–UP PLATE OF THE SAME CLASS AND TYPE AS THE RAIL WITH INTERMEDIATE POST SHALL BE PROVIDED WHERE SPACING OF POSTS IS 25 M
9. UNLESS OTHERWISE SPECIFIED ON THIS DRAWING, GUARDRAIL SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF AASHTO M180 CLASS A TYPE1
10. REFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956–TYPE 1

REMARK:

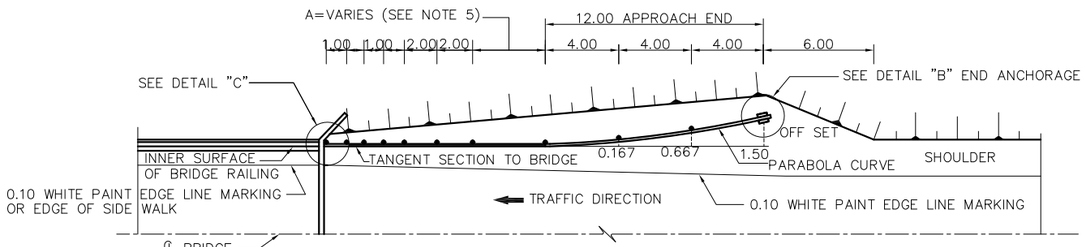
THIS BARRIER IS SUITABLE ONLY IN SPECIFIC LOCATIONS AND CERTAIN CONDITIONS, IT SHOULD BE APPLIED WITH THE FIRM INFORMATIONS CONCERNED AND RECOMMENDED BY THE ENGINEER.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

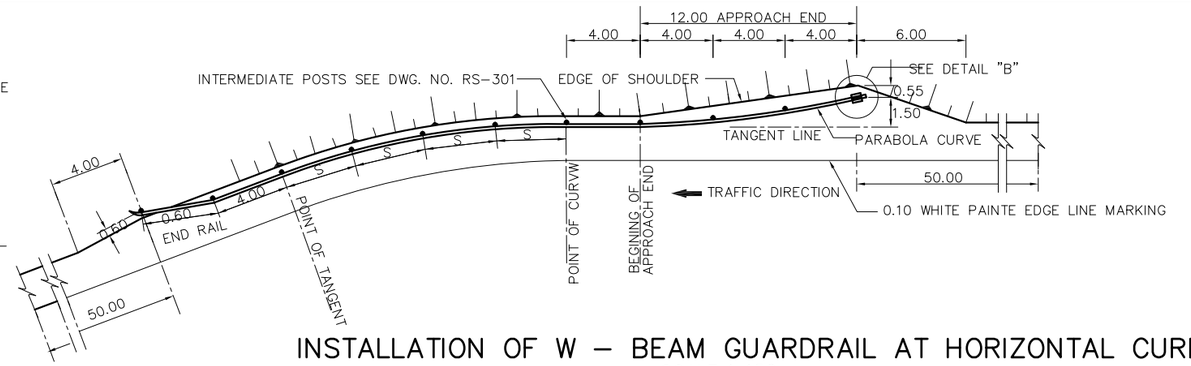
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

W–BEAM GUARDRAIL

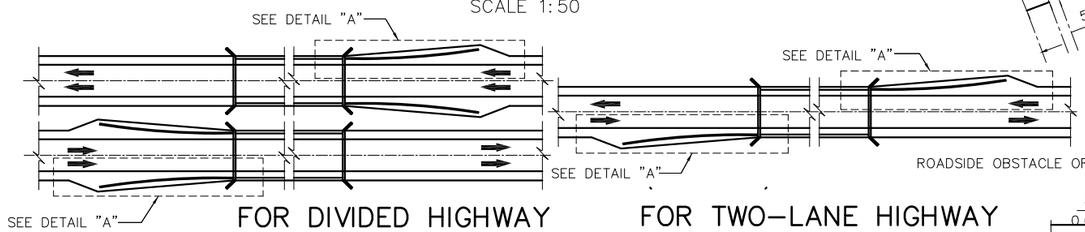
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. SDR–008
							SCALE: AS SHOWN



DETAIL "A"
SCALE 1:50

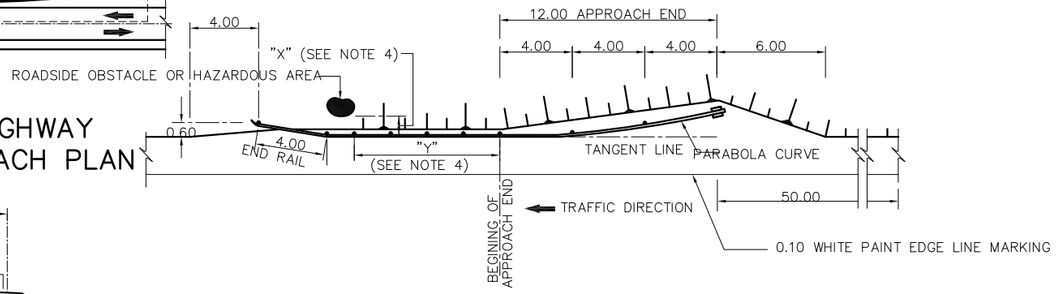


INSTALLATION OF W – BEAM GUARDRAIL AT HORIZONTAL CURE
SCALE 1:150

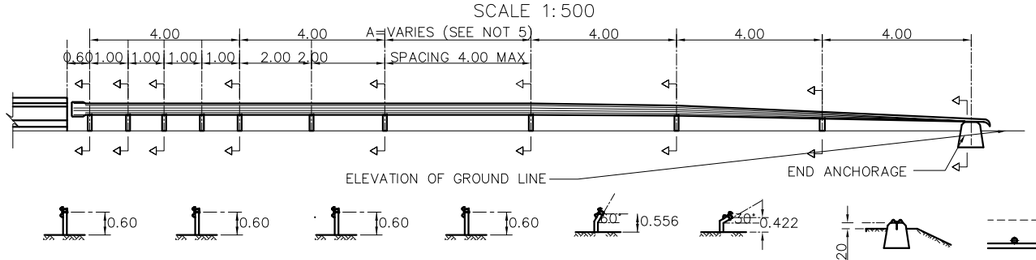


FOR DIVIDED HIGHWAY FOR TWO–LANE HIGHWAY

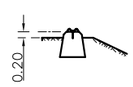
INSTALLATION OF W – BEAM GUARDRAIL AT BRIDGE APPROACH PLAN
SCALE 1:500

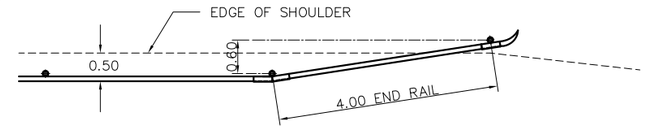


APPROACH END INSTALLATION FOR ROADSIDE OBSTACLE
SCALE 1:150

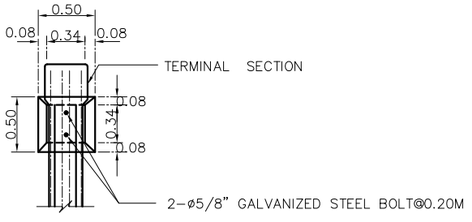


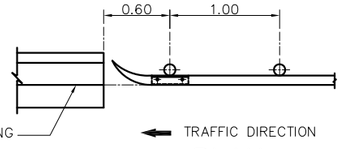
ELEVATION
SCALE 1:75



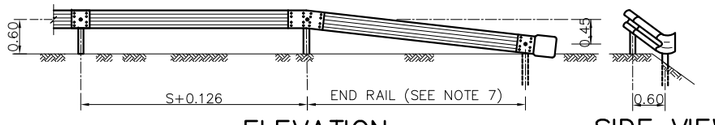


PLAN





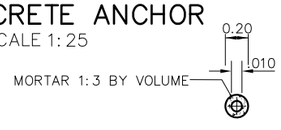
PLAN

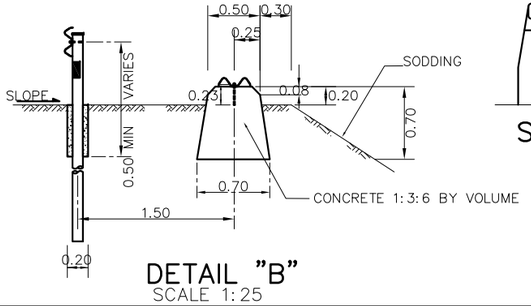


ELEVATION

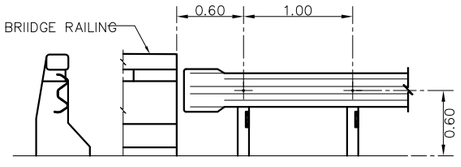
SIDE VIEW

PLAIN CONCRETE ANCHOR
SCALE 1:25



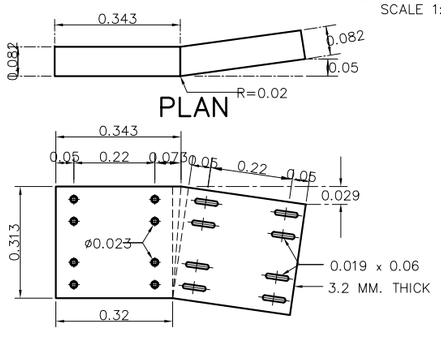


DETAIL "B"
SCALE 1:25



SIDE VIEW ELEVATION

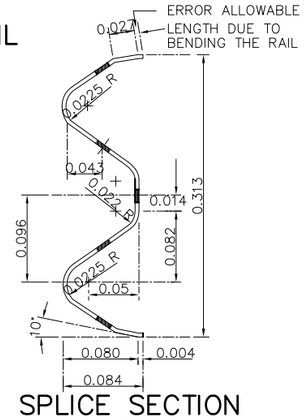
DETAIL "C"
SCALE 1:25



PLAN

ELEVATION
NOT TO SCALE

END RAIL
SCALE 1:50



SPLICE SECTION
NOT TO SCALE

REMARK:
THIS BARRIER IS SUITABLE ONLY IN SPECIFIC LOCATIONS AND CERTAIN CONDITIONS, IT SHOULD BE APPLIED WITH THE FIRM INFORMATIONS CONCERNED AND RECOMMENDED BY THE ENGINEER.

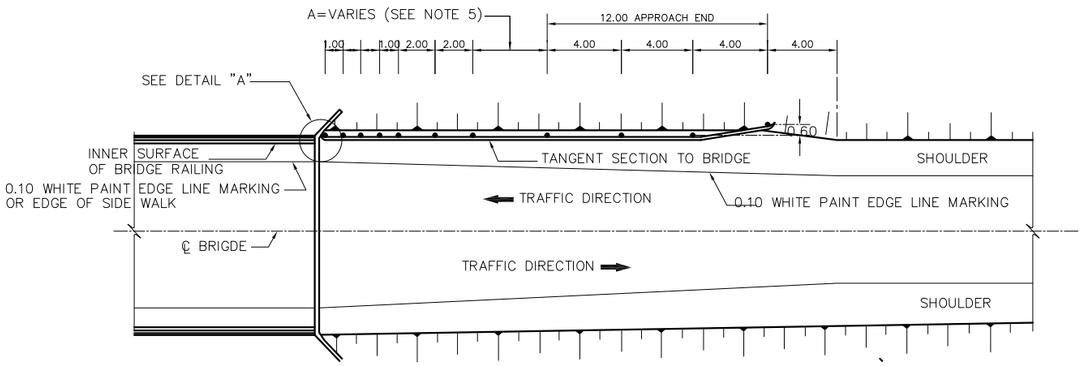
WARRANTING FEATURES FOR W–BEAM GUARDRAIL INSTALLATION

1. POSSIBLE HAZARDS FROM ROAD SIDE.
2. HEIGHT OF EMBANKMENT OF ROADWAY IS MORE THAN 5.00 M. (7.00 M. MAXIMUM.) AND SIDE SLOPE IS STEEPER THAN 1:3.
3. STEEPNESS OF DOWNGRADE IS MORE THAN 6% AND HEIGHT OF EMBANKMENT IS MORE THAN 3.00 M.
4. DEPTH OF WATER AT TOE OF SLOPE IS MORE THAN 1.50 M.
5. HORIZONTAL CURVE WITH RADIUS OF CURVE LESS THAN 150 M.
6. ROADSIDE HAZARDOUS TOPOGRAPHY, SUCH AS RIVERS, DEEP VALLEYS, ROCKS ON THE FILL SLOPE WHICH MAY POSSIBLE GIVE SERIOUS DAMAGE TO VEHICLES, SPECIAL CONSIDERATION MUST BE PAID TO BOTH ECONOMY AND SAFETY.

NOTES:

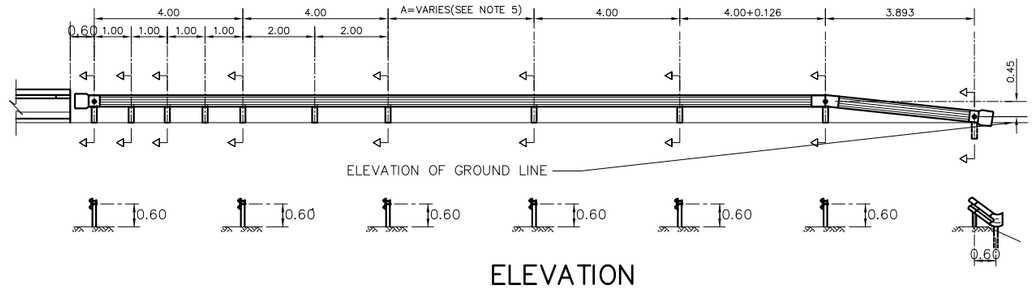
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. PAYMENT SHALL BE MEASURED BY LINEAR METERS OF RAIL INCLUDING TERMINAL SECTION CONCRETE ANCHOR AND SPLICE SECTION.
3. OBSTACLE MEANS PERMANENT STRUCTURE WHICH MAY BE DANGEROUS TO VEHICLES STRIKING SUCH AS, ELECTRIC POLE, BRIDGE PIER,ETC.
4. SPACINGS "X" AND "Y" ARE AS FOLLOWS.
   4.1 "X"= 0.50–1.50 M. "Y"=4.00 M.POST SPACING 2.00 M.
   4.2 "X"= 1.50–3.00 M. "Y"=8.00 M.POST SPACING 2.00 M.
5. THE PORTION OF GUARDRAIL INDICATED BY "A" SHALL NOT APPLY IF EMBANKMENT HEIGHT IS LESS THAN 4.00 M. (SIDE SLOPE 1:1.5 MAX.)
6. THIS TYPE OF INSTALLATON SHALL BE FOR HIGHWAY CLASSIFICATIONS OF D AND 1 OR OTHERWISE INDICATED.
7. DIVIDED HIGHWAYS DO NOT NEED END RAIL.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	W–BEAM GUARDRAIL INSTALLATION AND W–BEAM GUARDRAIL APPROACH TYPE I					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–009
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN



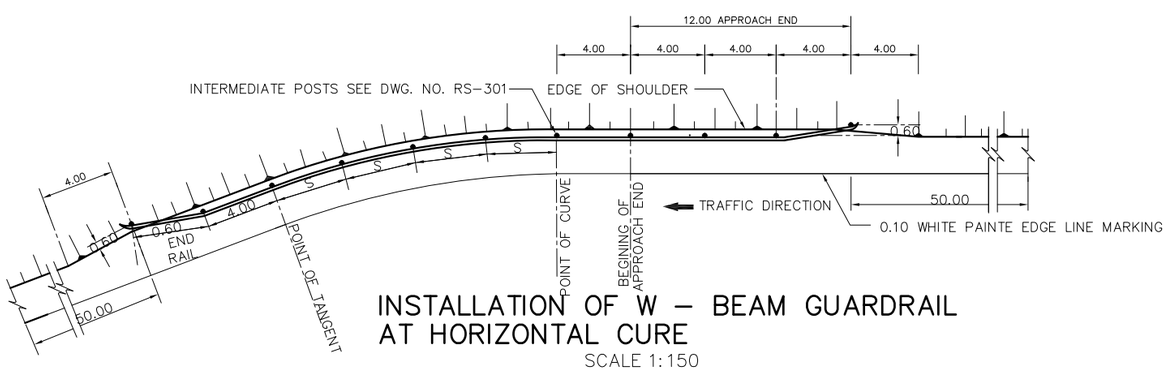
INSTALLATION OF W – BEAM GUARDRAIL AT BRIGDE APPROACH PLAN

SCALE 1:150



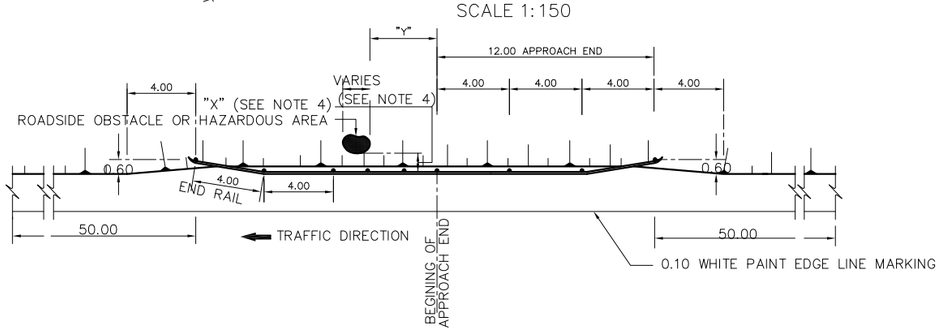
ELEVATION

SCALE 1:75



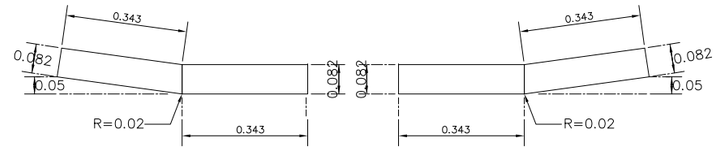
INSTALLATION OF W – BEAM GUARDRAIL AT HORIZONTAL CURE

SCALE 1:150

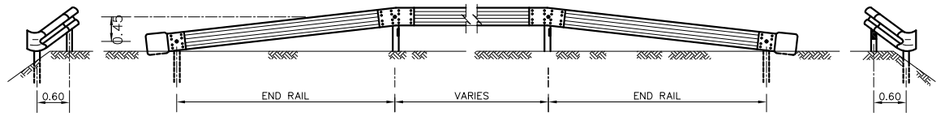


APPROACH END INSTALLATION FOR ROADSIDE OBSTACLE

SCALE 1:150

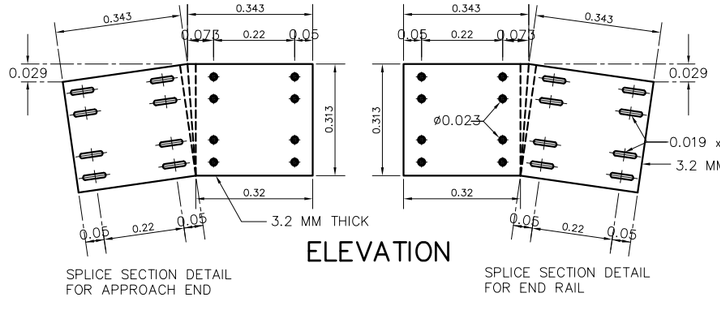


PLAN

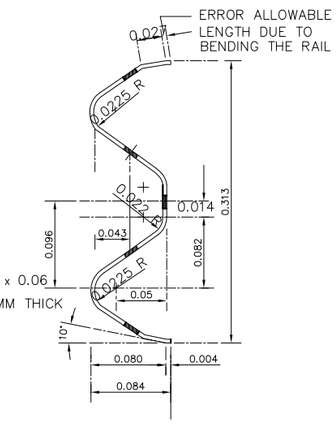


ELEVATION

SCALE 1:50

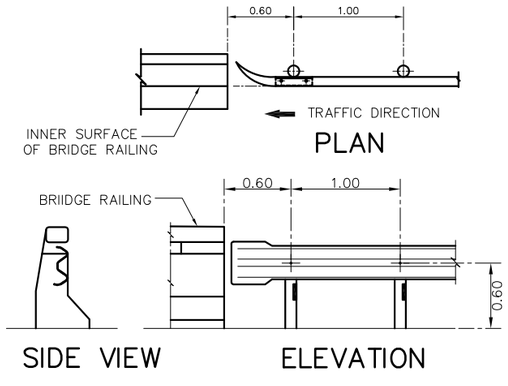


ELEVATION



SPLICE SECTION

NOT TO SCALE



DETAIL "A"

SCALE 1:25

REMARK:

THIS BARRIER IS SUITABLE ONLY IN SPECIFIC LOCATIONS AND CERTAIN CONDITIONS, IT SHOULD BE APPLIED WITH THE FIRM INFORMATIONS CONCERNED AND RECOMMENDED BY THE ENGINEER.

WARRANTING FEATURES FOR W–BEAM GUARDRAIL INSTALLATION

1. POSSIBLE HAZARDS FROM ROAD SIDE.
2. HEIGHT OF EMBANKMENT OF ROADWAY IS MORE THAN 5.00 M. (7.00 M. MAXIMUM.) AND SIDE SLOPE IS STEEPER THAN 1:3.
3. STEEPNESS OF DOWNGRADE IS MORE THAN 6% AND HEIGHT OF EMBANKMENT IS MORE THAN 3.00 M.
4. DEPTH OF WATER AT TOE OF SLOPE IS MORE THAN 1.50 M.
5. HORIZONTAL CURVE WITH RADIUS OF CURVE LESS THAN 150 M.
6. ROADSIDE HAZARDOUS TOPOGRAPHY, SUCH AS RIVERS, DEEP VALLEYS, ROCKS ON THE FILL SLOPE WHICH MAY POSSIBLE GIVE SERIOUS DAMAGE TO VEHICLES, SPECIAL CONSIDERATION MUST BE PAID TO BOTH ECONOMY AND SAFETY.

NOTES:

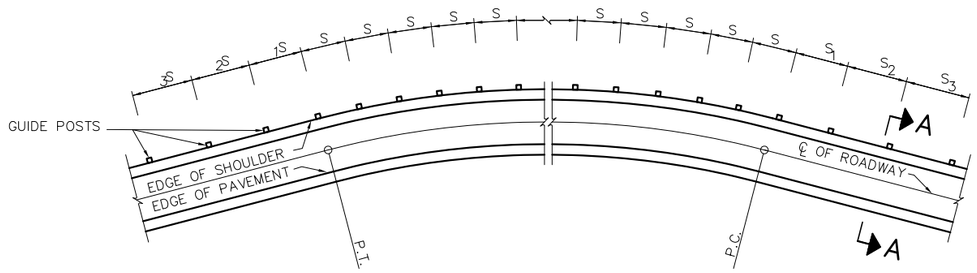
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. PAYMENT SHALL BE MEASURED BY LINEAR METERS OF RAIL INCLUDING TERMINAL SECTION CONCRETE ANCHOR AND SPLICE SECTION.
3. OBSTACLE MEANS PERMANENT STRUCTURE WHICH MAY BE DANGEROUS TO VEHICLES STRIKING SUCH AS, ELECTRIC POLE, BRIDGE PIER,ETC.
4. SPACINGS "X" AND "Y" ARE AS FOLLOWS.
   4.1 "X"= 0.50–1.50 M. "Y"=4.00 M.POST SPACING 2.00 M.
   4.2 "X"= 1.50–3.00 M. "Y"=6.00 M.POST SPACING 2.00 M.
5. THE PORTION OF GUARDRAIL INDICATED BY "A" SHALL NOT APPLY IF EMBANKMENT HEIGHT IS LESS THAN 4.00 M. (SIDE SLOPE 1:1.5 MAX.)
6. THIS TYPE OF INSTALLATON SHALL BE FOR HIGHWAY CLASSIFICATIONS OF 2, 3 AND 4.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

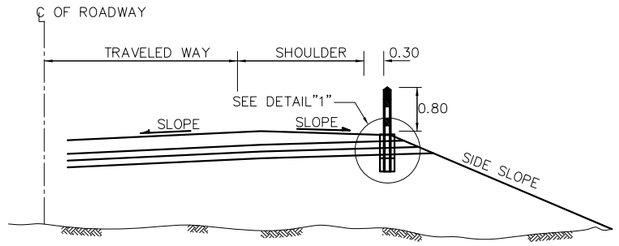
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

W–BEAM GUARDRAIL INSTALLATION AND W–BEAM GUARDRAIL APPROACH TYPE II

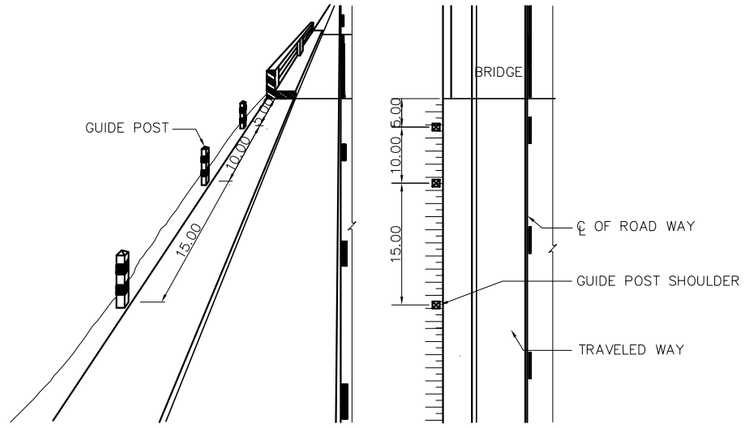
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. SDR–010
							SCALE: AS SHOWN



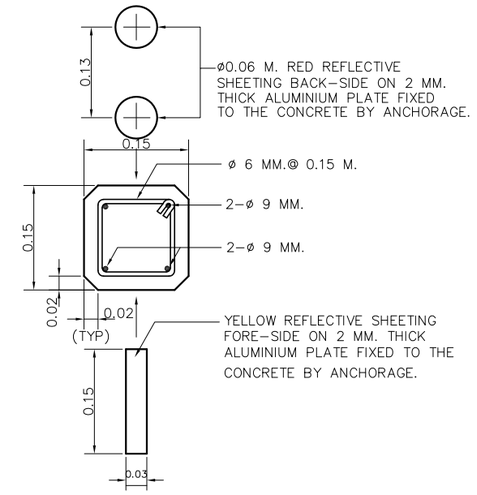
PLAN
NOT TO SCALE



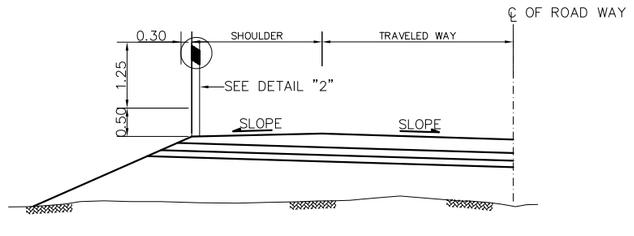
SECTION A–A CONCRETE TYPE
NOT TO SCALE



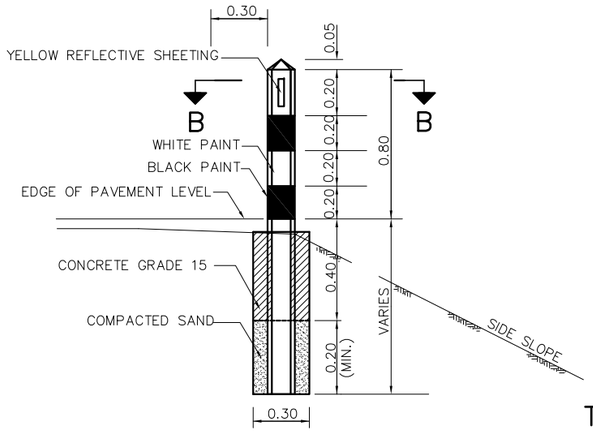
GUIDE POST INSTALLATION AT BRIDGE APPROACH
NOT TO SCALE



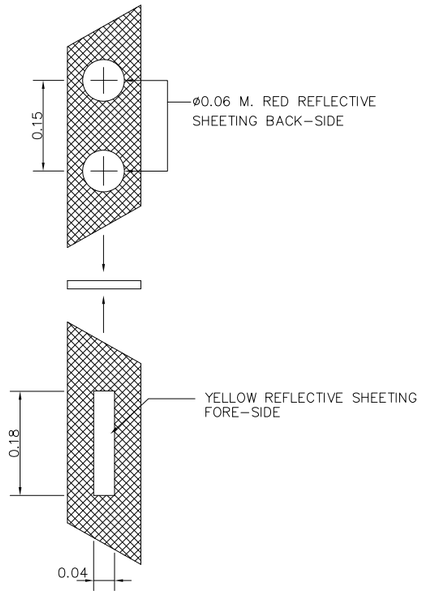
SECTION B–B CONCRETE TYPE
SCALE 1:4



SECTION A–A FLEXIBLE TYPE
NOT TO SCALE



DETAIL "1"
SCALE 1:15



DETAIL "2"
SCALE 1:4

TABLE SPACING OF GUIDE POST

RADIUS OF CURVE (METER)	SPACING OF GUIDE POST (METER)			
	S	S_1	S_2	S_3
15	6	12	18	36
75	13	26	39	78
100	16	32	48	90
150	20	40	60	90
200	23	46	69	90
300	29	58	87	90
400	33	66	90	90
500	37	74	90	90

NOTES:

1. DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. REFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956–04 TYPE I (ESEFFICIENT OF RETRO – REFLECTION LEVEL 1)
3. BLACK AND WHITE PAINTS FOR ø15x30 CM CYLINDER SHALL BE APPLIED ON ALL FACES IN TWO LAYERS.
4. POST SHALL BE ERECTED TRULY VERTICAL.
5. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 25 MPA ø15x30 cm CYLINDER AT 28 DAYS.
6. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M31 GRADE 40

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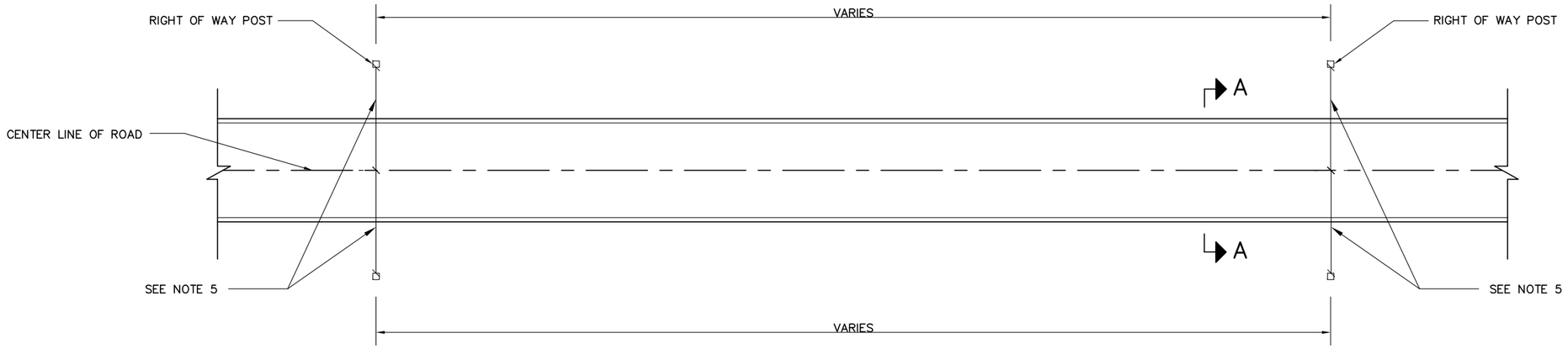
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

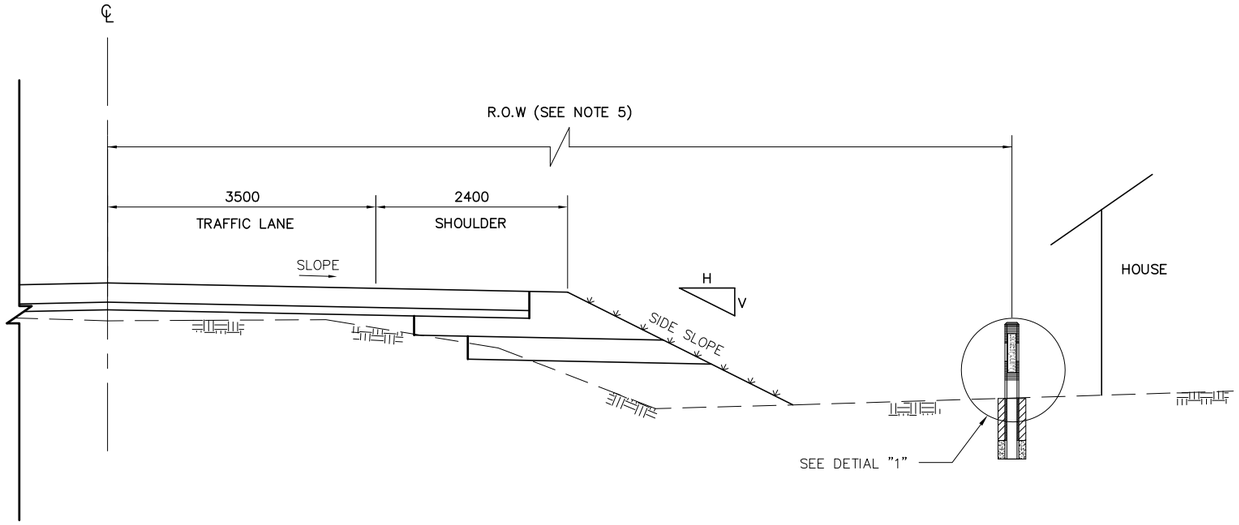
GUIDE POST INSTALLATION

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–011
				APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN



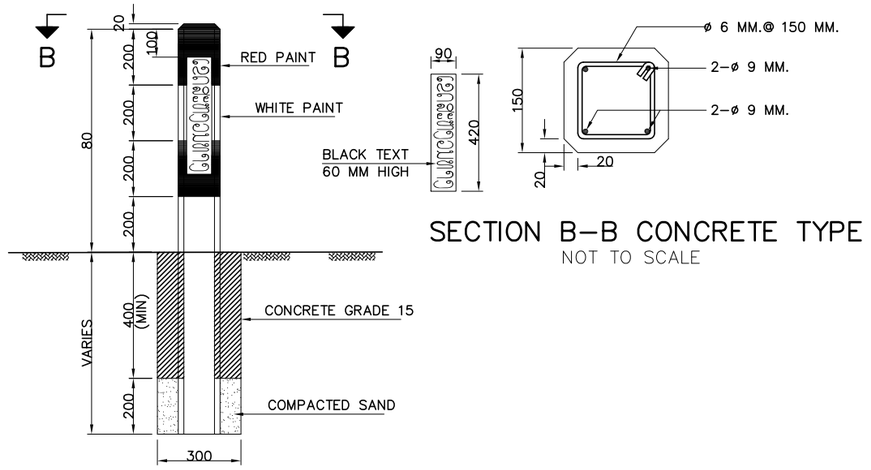
PLAN

NOT TO SCALE



SECTION A–A CONCRETE TYPE

NOT TO SCALE



SECTION B–B CONCRETE TYPE

NOT TO SCALE

DETIAL "1"

NOT TO SCALE

NOTES:

1. DIMENSION ARE IN MILLIMETERS UNLESS OTHERWISE INDICATE.
2. RIGHT OF WAY POSTS SHALL BE INSTALLED AT 100 METERS SPACING OR AS DIRECTED BY THE ENGINEER.
3. REINFORCING STEEL SHALL CONFORM TO TIS. 20 GRADE SR. 24.
4. RIGHT OF WAY POSTS SHALL BE MADE WITH CONCRETE CLASS 25.
5. WHEN ERECTION OF RIGHT OF WAY MONUMENT THE WIDTH OF RIGHT WAY SHALL BE AS DIRECTED BY DEPARTMENT OF ROAD MINISTRY OF PUBLIC WORKS AND TRANSPORT.
6. SPAECING OF ROW SHALL BE AS SHOWN IN THE SPECIFICATIONS.

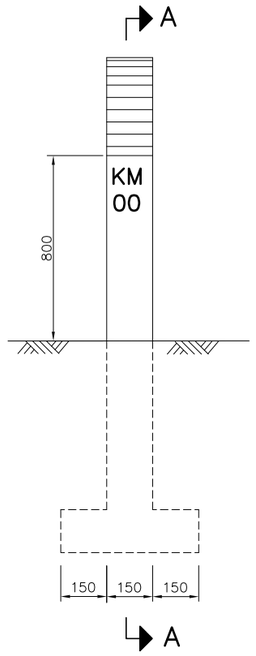
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

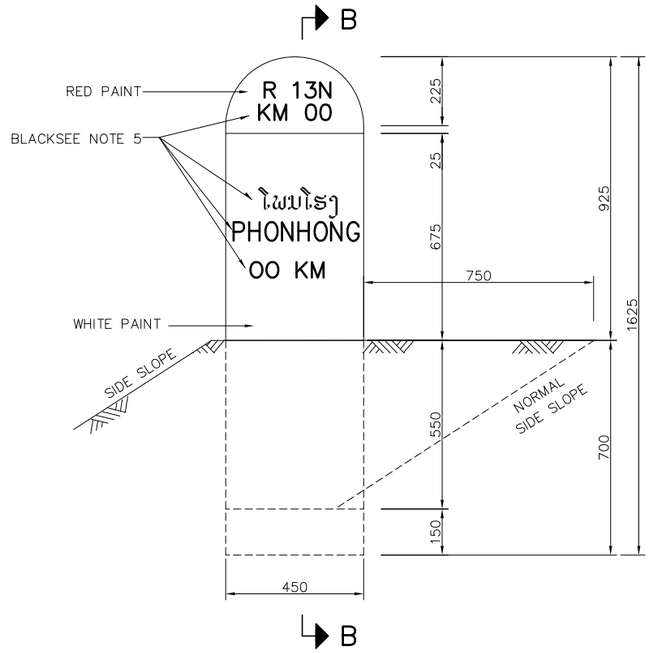
RIGHT OF WAY MONUMENT INSTALLATION

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

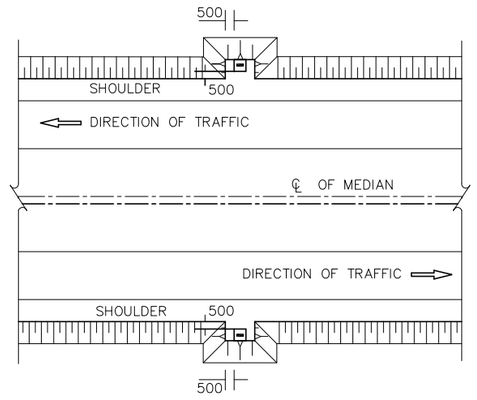
LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDR–012
SCALE: NOT TO SCALE



SIDE ELEVATION
SCALE 1:50



END ELEVATION
SCALE 1:50

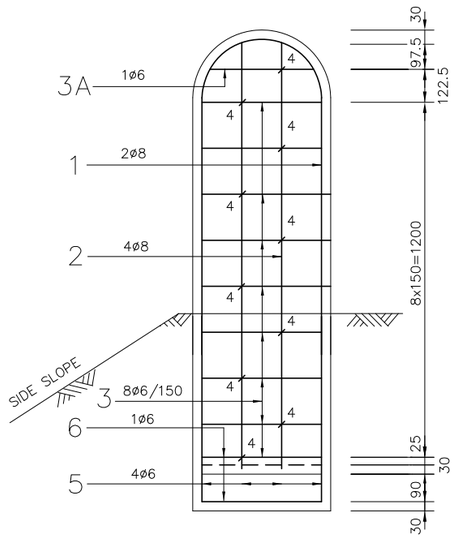


LOCATION OF KILOMETER POST AT SHOULDER
NOT TO SCALE

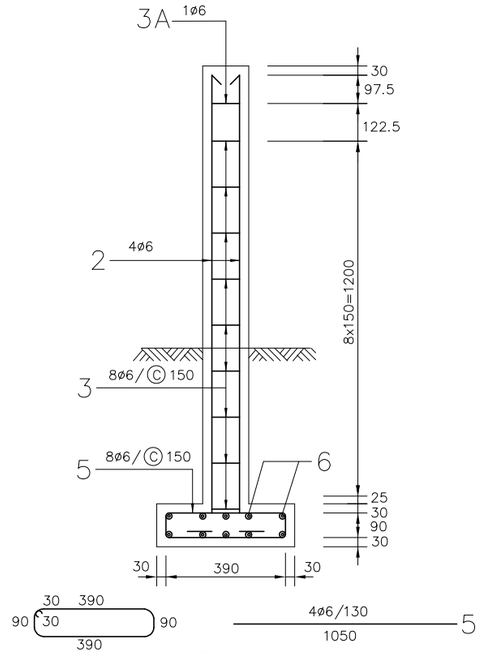
SYMBOLS	ø (MM)	NUMBERS	LENGTH (MM)
①	8	2	3340
②	8	4	1620
③	6	8	1850
③A	6	1	840
④	6	9	160
⑤	6	4	1050
⑥	6	10	460

NOTES:

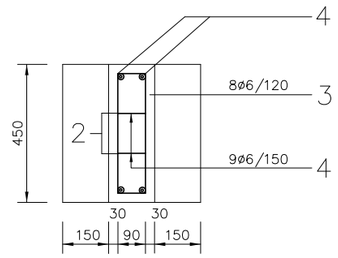
1. ALL DIMENSIONS ARE IN MILLIMETER IF NOT OTHERWISE INDICTED
2. KILOMETER POSTS AND EDGE MARKER POSTS SHALL BE MADE WITH CONCRETE CLASS 25
3. KILOMETER POSTS SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER
4. KILOMETER POSTS SHALL BE PLACED 0.5m OUTSIDE THE EDGE OF VERGE
5. THE TEXT SHOULD BE DIRRECTED BY THE ENGINEER



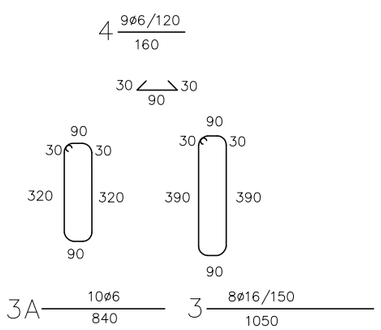
SECTION A–A
SCALE 1:50

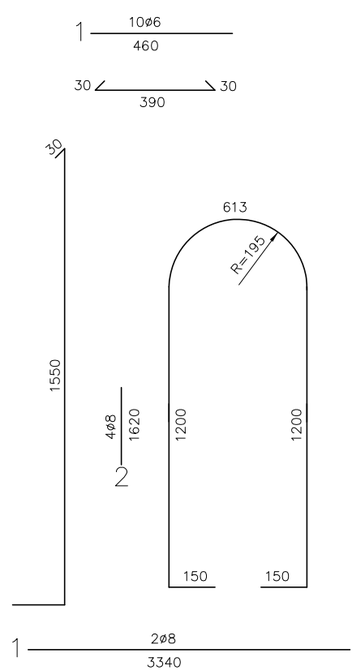


SECTION B–B
SCALE 1:10



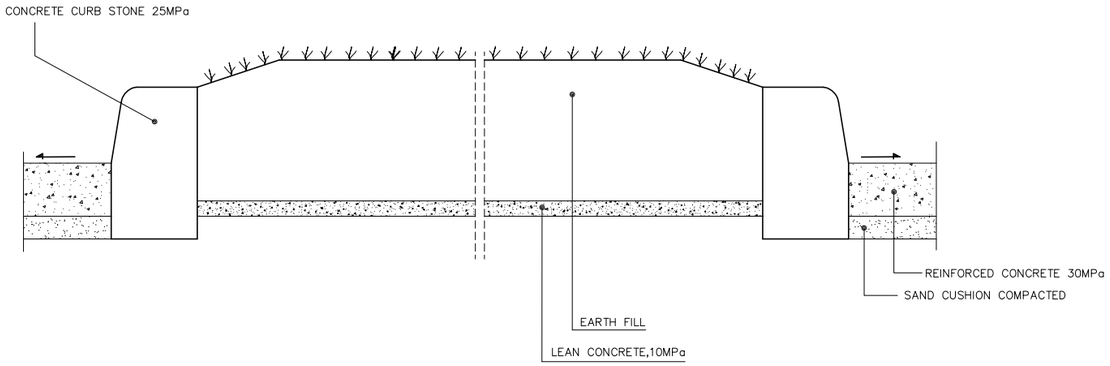
KILOMETER POST
SCALE 1:10



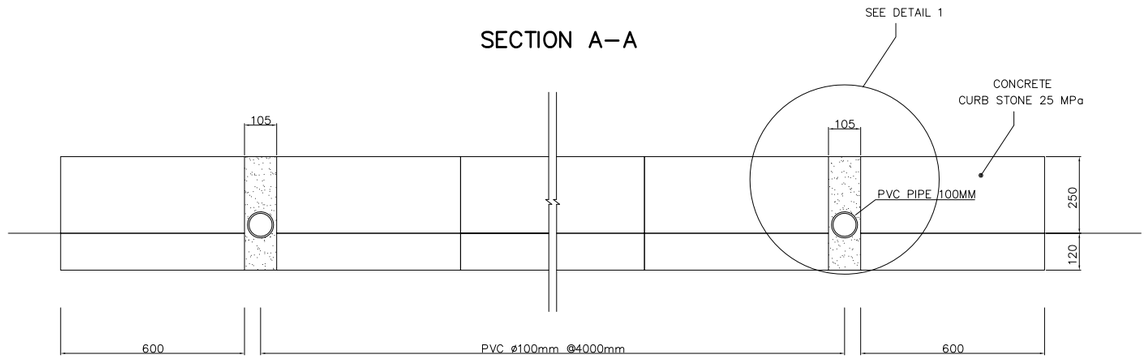


ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	TYPICAL KILOMETRE POST					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–013
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

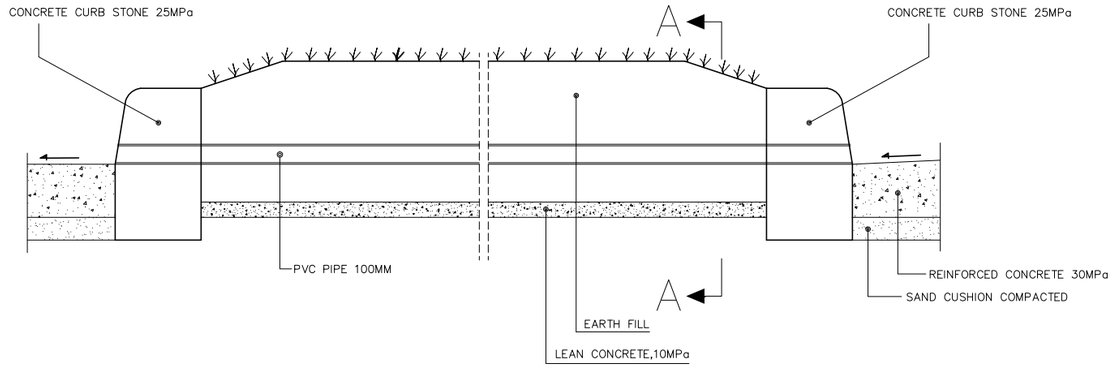
MEDIAN TYPE CONCRETE BLOCK PAVAMENT



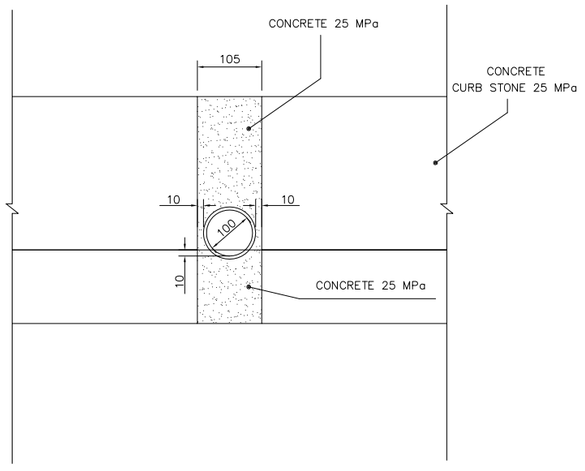
SECTION A–A



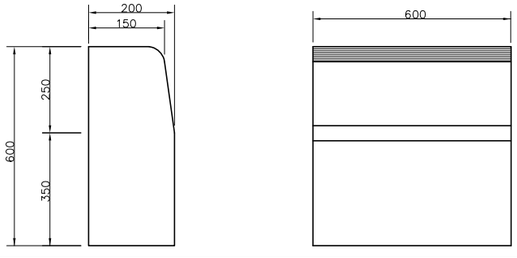
MEDIAN TYPE
FOR PVC INSTALLATION IN MEDIAN ISLAND
ON SUPER ELEVATION CURVE



DETAIL 1



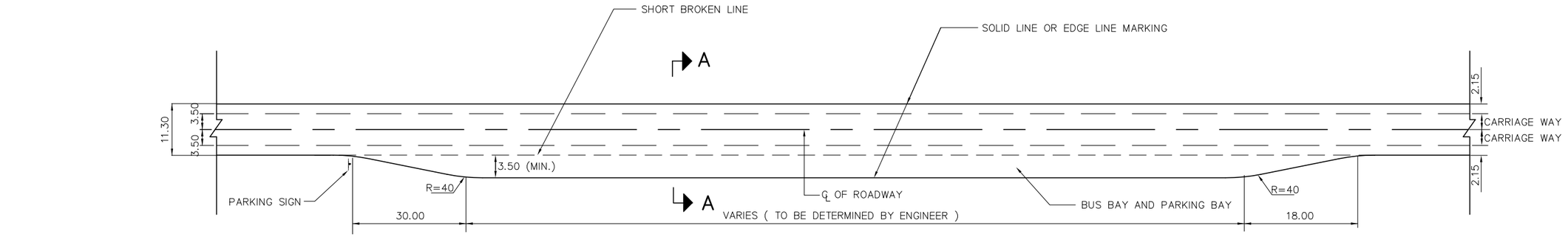
CURB STONE



NOTE:

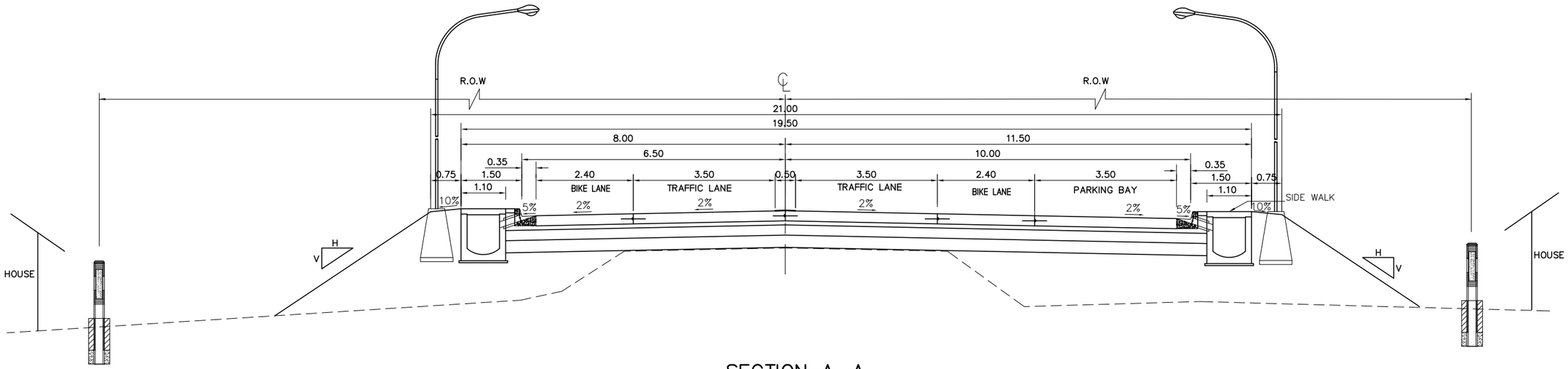
1. ALL MEASUREMENTS ARE IN MILLIMETERS.
2. SEE TYPICAL CROSS–SECTION AND PROFILE

ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	MEDIAN PAVEMENT AND DRAINAGE					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–014
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE



PLAN

NOT TO SCALE



SECTION A–A

NOT TO SCALE

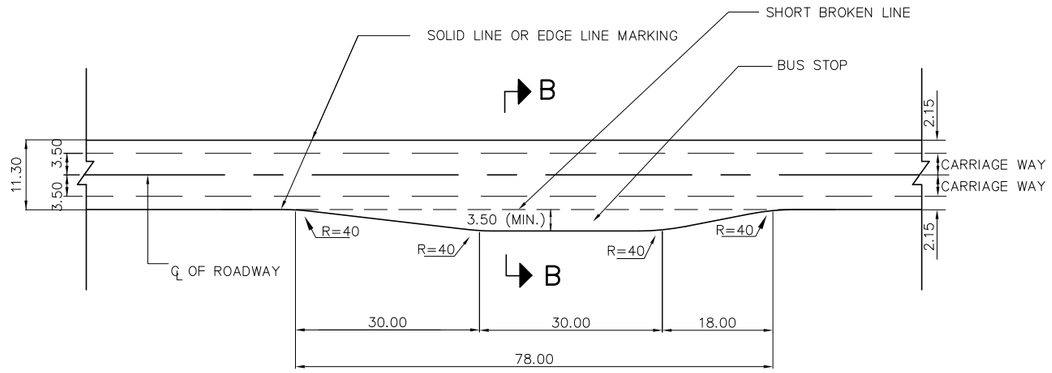
GENERAL:

THE DESCRIPTION AND REQUIREMENTS APPEARING IN ANY PART OF THE TECHNICAL SPECIFICATIONS SHALL APPLY EQUALLY TO THIS DRAWING, WHERE APPROPRIATE AND SHALL BE READ AS THOUGH REPAETED ON THIS DRAWING.

NOTES:

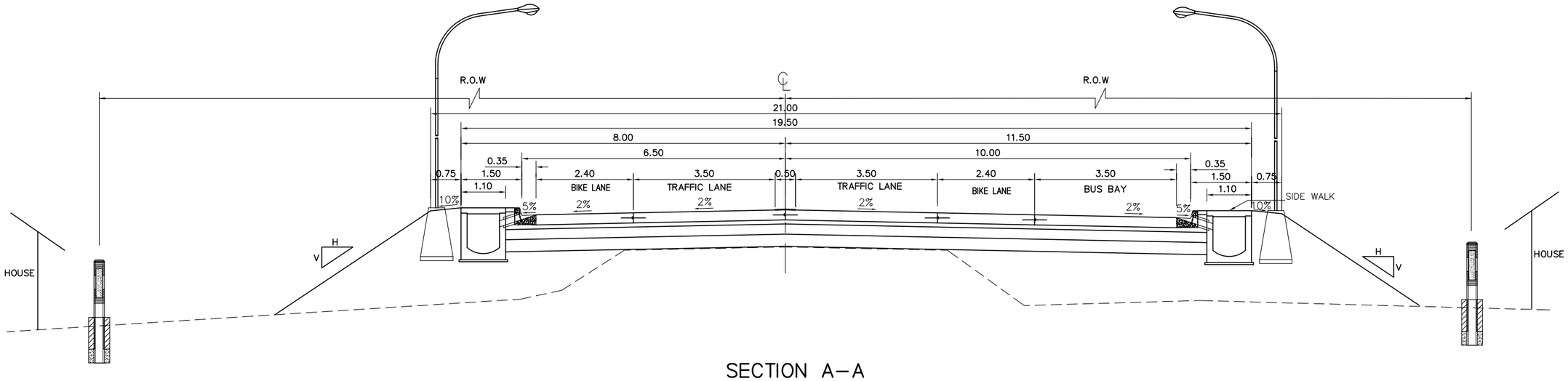
1. ALL DIMENSIONS ARE IN METERS UNLESS OTERWISE INDICATED.
2. LAY–BY AND BUS STOP SHALL BE CONSTRUCTED AT LOCATIONS AS SHOWN ON PLAN AND PROFILE DRAWINGS OR AS DIRECTED BY ENGINEER.
3. CROSS FALL AND PAVEMENT STRUCTURE OF LAY–BY AND BUS STOP ARE THE SAME AS FOR THE CARRIAGE WAY.
4. DIMENSIONS INDICATED BY MINIMUM SHALL BE DIRECTED BY THE ENGINEER DEPENDING ON TERRAIN CONDITIONS, NUMBER AND SIZE OF VEHICLES, BUSES, AND NUMBER OF PASSENGERS.

ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	TYPICAL PARKING BAY					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–015
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE



PLAN

NOT TO SCALE



SECTION A–A

NOT TO SCALE

GENERAL:

THE DESCRIPTION AND REQUIREMENTS APPEARING IN ANY PART OF THE TECHNICAL SPECIFICATIONS SHALL APPLY EQUALLY TO THIS DRAWING, WHERE APPROPRIATE AND SHALL BE READ AS THOUGH REPAETED ON THIS DRAWING.

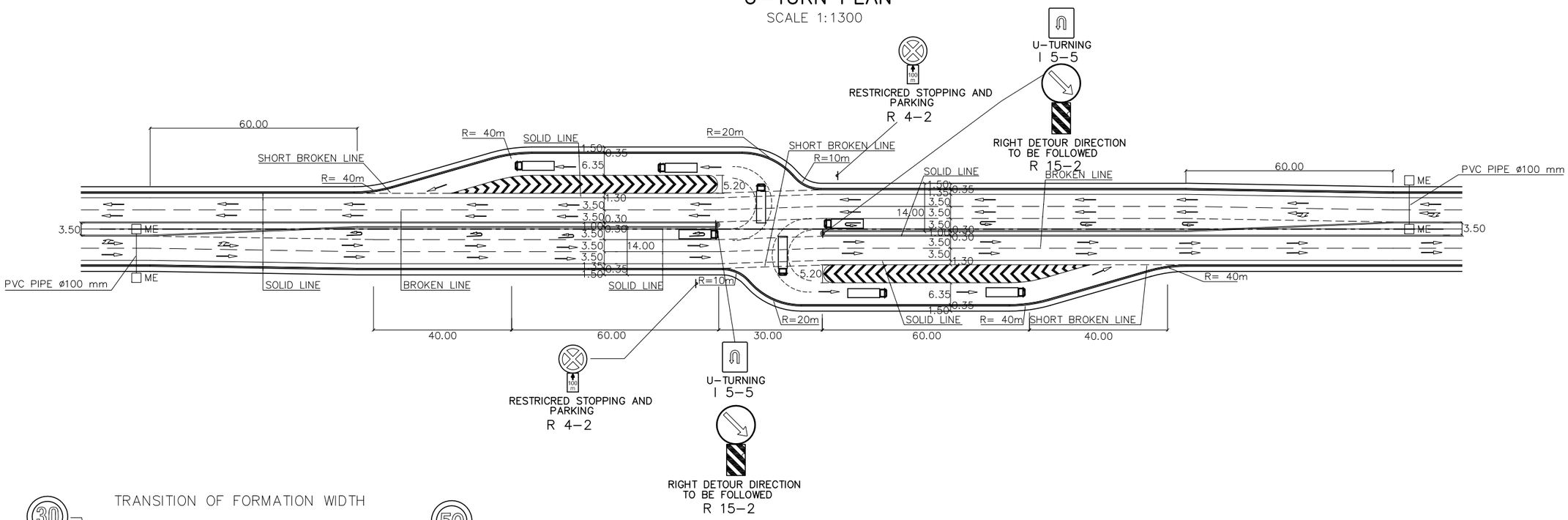
NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTERWISE INDICATED.
2. LAY–BY AND BUS STOP SHALL BE CONSTRUCTED AT LOCATIONS AS SHOWN ON PLAN AND PROFILE DRAWINGS OR AS DIRECTED BY ENGINEER.
3. CROSS FALL AND PAVEMENT STRUCTURE OF LAY–BY AND BUS STOP ARE THE SAME AS FOR THE CARRIAGE WAY.
4. DIMENSIONS INDICATED BY MINIMUM SHALL BE DIRECTED BY THE ENGINEER DEPENDING ON TERRAIN CONDITIONS, NUMBER AND SIZE OF VEHICLES, BUSES, AND NUMBER OF PASSENGERS.

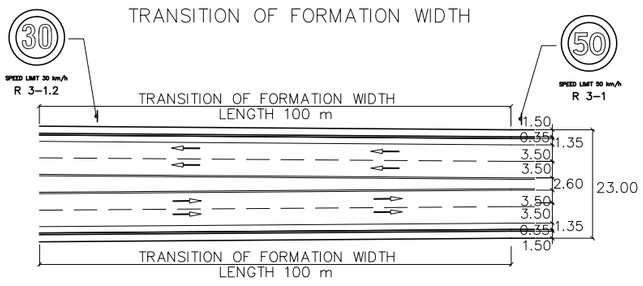
ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	TYPICAL BUS BAY					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–016
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

U-TURN PLAN

SCALE 1:1300



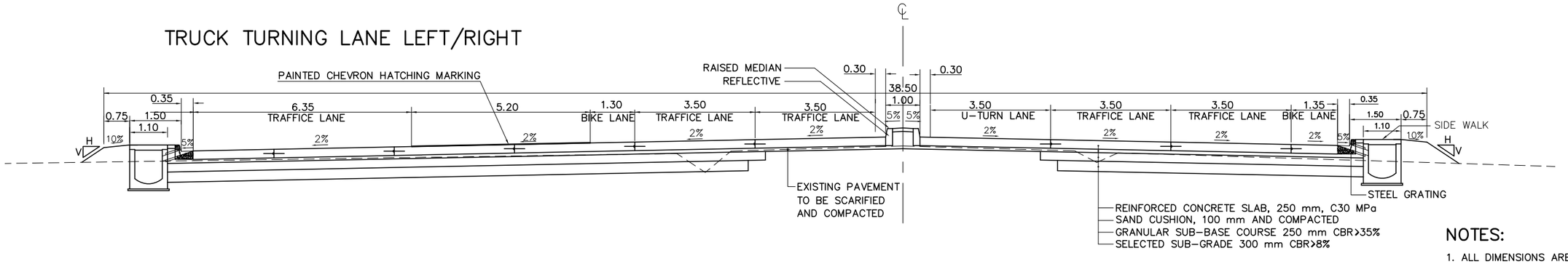
TRANSITION OF FORMATION WIDTH



AT U-TURN

SCALE 1:130

TRUCK TURNING LANE LEFT/RIGHT



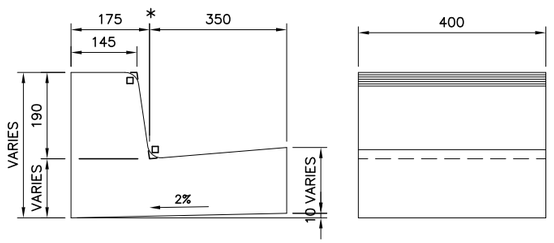
NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.

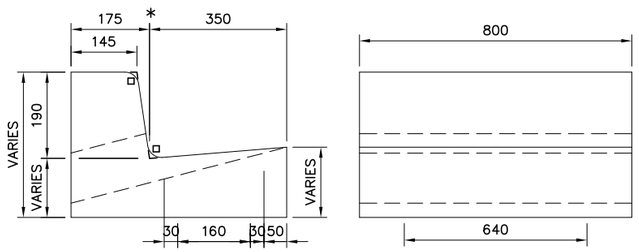
ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD-262-17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	U-TURN					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR-017
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

RAISED CURB

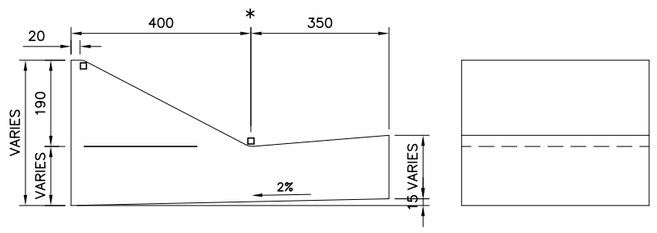
NOT TO SCALE



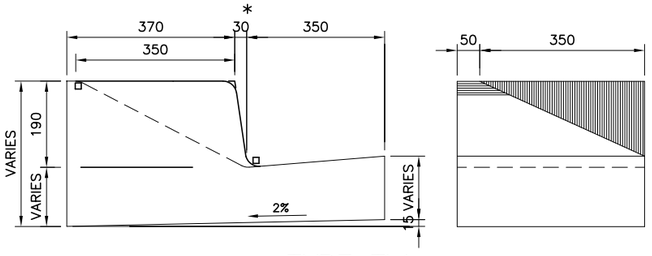
TYPE A1
STANDARD



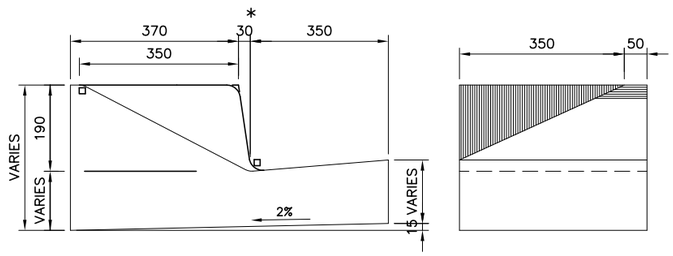
TYPE D1
DRAINAGE INLET



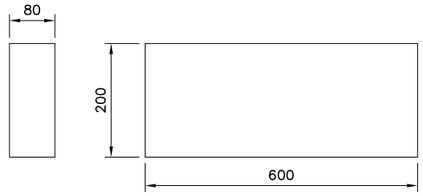
TYPE M1
MOUNTABLE CURBSTONE



TYPE TL1
TRANSITION CURBSTONE FOR LEFT SIDE



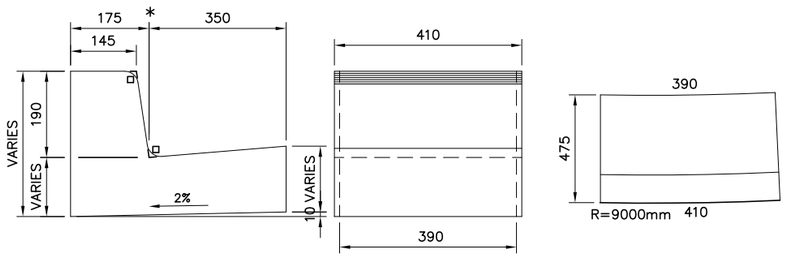
TYPE TR1
TRANSITION CURBSTONE FOR RIGHT SIDE



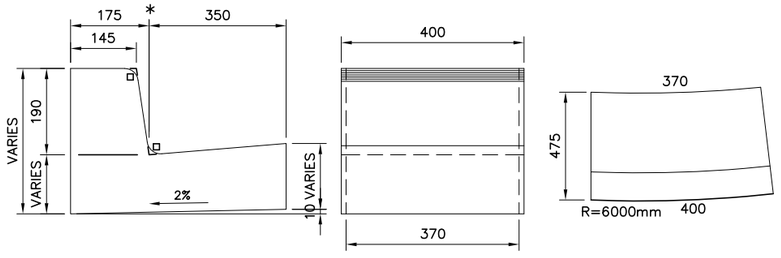
BORDER CURB
TYPE B
(BORDERING BLOCK)

RAISED CURB–RADIUS CURB

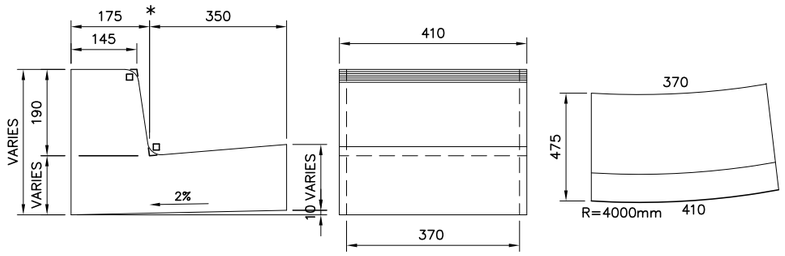
NOT TO SCALE



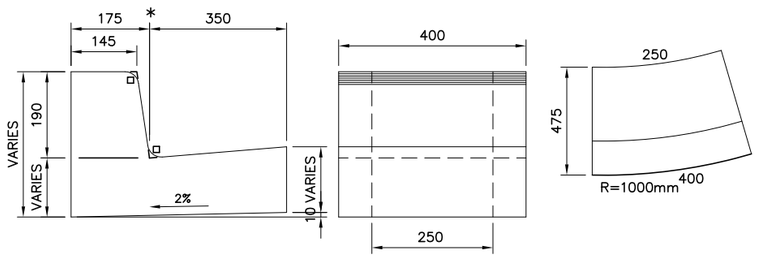
TYPE R 9000



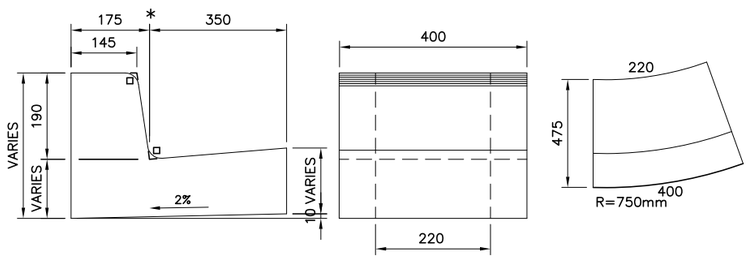
TYPE R 6000



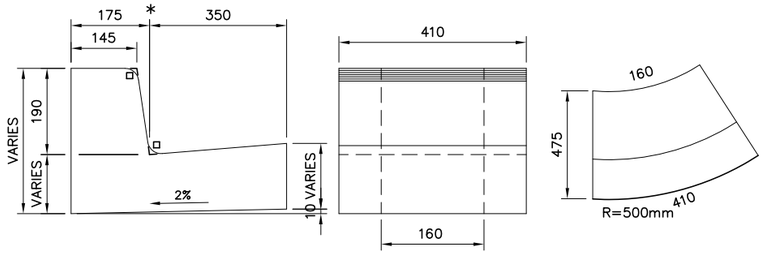
TYPE R 4000



TYPE R 1000



TYPE R 750



TYPE R 500

NOTES :

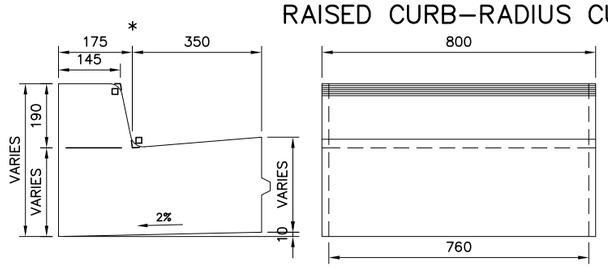
1. ALL DIMENSIONS IN MILLIMETER.
2. CONCRETE SHALL BE CLASS 25 MPa.
3. DETAILED MEASUREMENTS AND INSTALLATION SEE DRW No. SDR–021

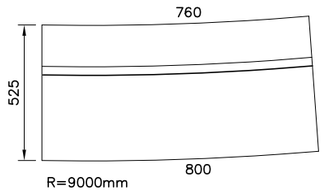
LEGEND:

- ▫ R 30 RADIUS
- * NORMINAL CURB LINE FOR SETTING OUT.

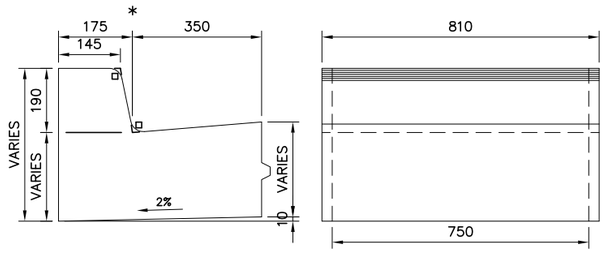
ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	CONCRETE CURB FOR ASPHALTIC CONCRETE					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–018
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

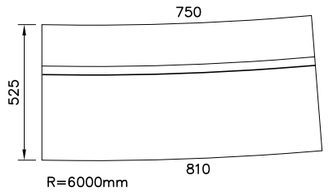
RAISED CURB–RADIUS CURB



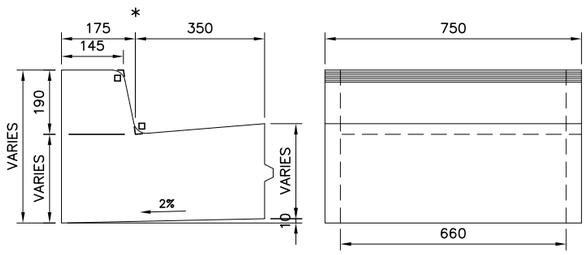


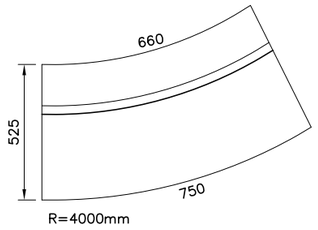
TYPE R 9000



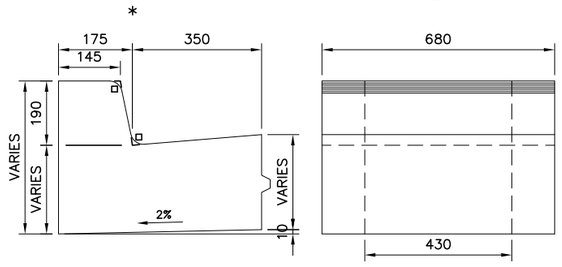


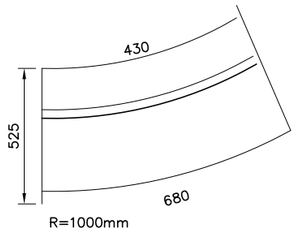
TYPE R 6000



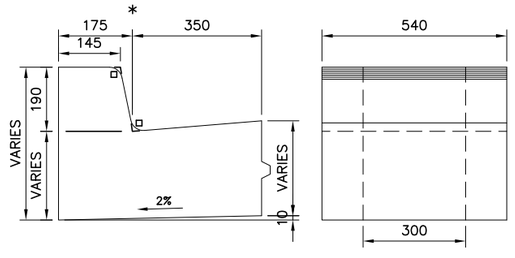


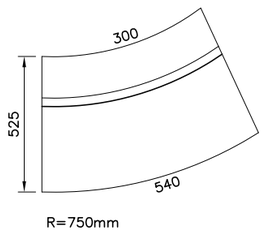
TYPE R 4000



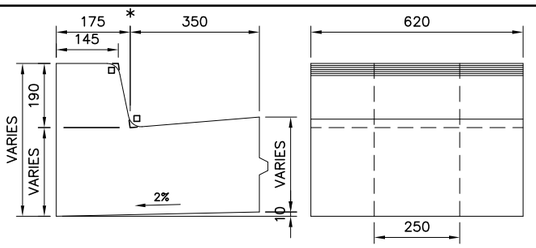


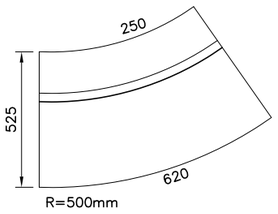
TYPE R 1000





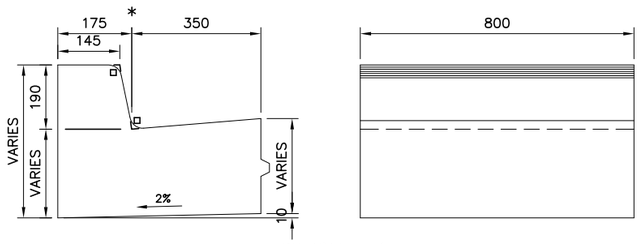
TYPE R 750





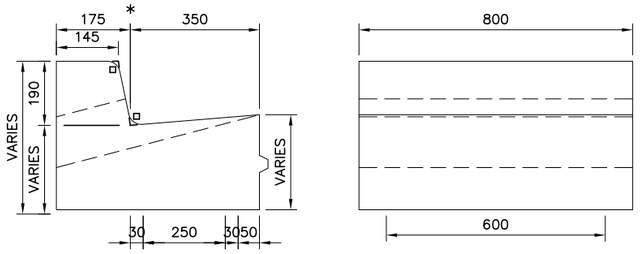
TYPE R 500

RAISED CURB



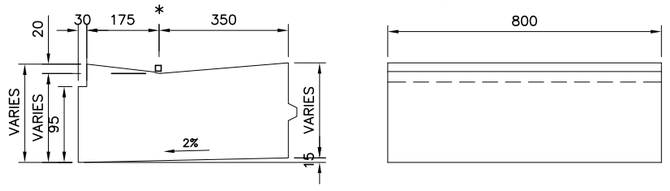
TYPE A1

STANDARD



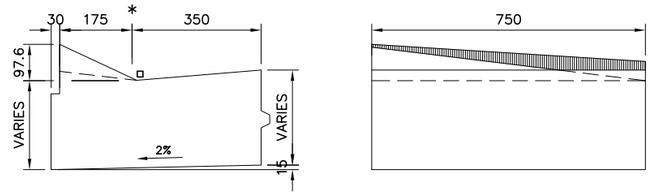
TYPE D1

DRAINAGE INLET



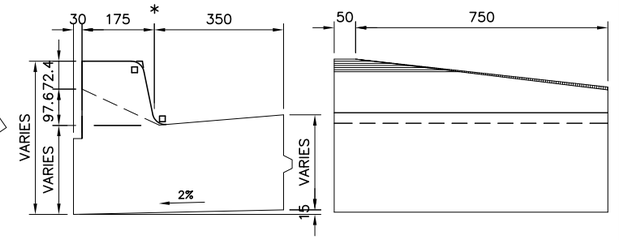
TYPE M1

MOUNTABLE CURBSTONE



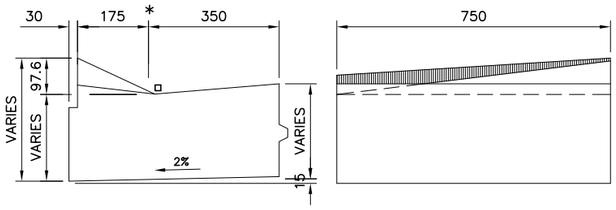
TYPE TL1

TRANSITION CURBSTONE FOR LEFT SIDE



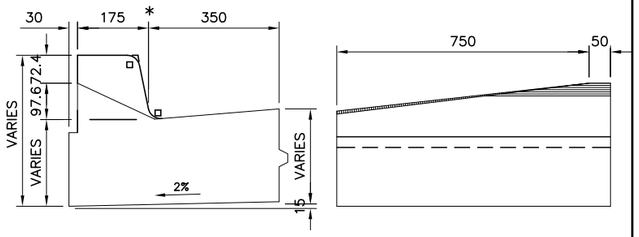
TYPE TL2

TRANSITION CURBSTONE FOR LEFT SIDE



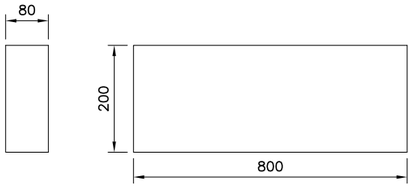
TYPE TR1

TRANSITION CURBSTONE FOR RIGHT SIDE



TYPE TR2

TRANSITION CURBSTONE FOR RIGHT SIDE



BORDER CURB

TYPE B

(BORDERING BLOCK)

NOTES :

1. ALL DIMENSIONS IN MILLIMETER.
2. CONCRETE SHALL BE CLASS 25 MPa.
3. DETAILED MEASUREMENTS AND INSTALLATION SEE DRW No. SDR–021

LEGEND:

- □ R 30 RADIUS
- * NORMINAL CURB LINE FOR SETTING OUT.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ

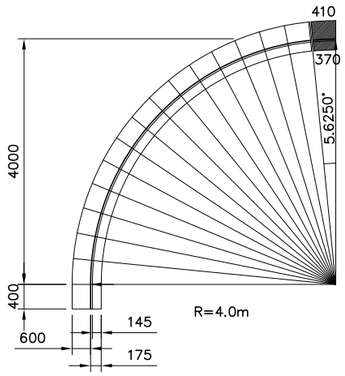
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

CONCRETE CURB FOR CONCRETE PAVEMENT

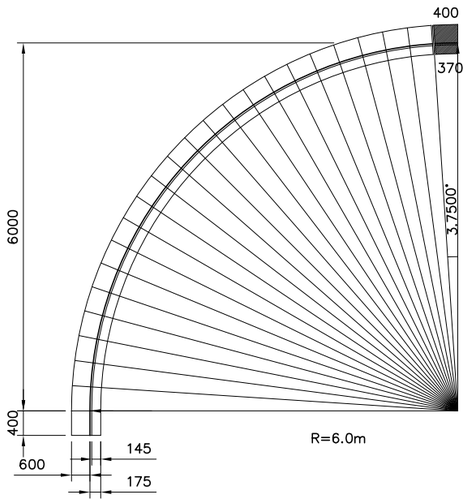
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–019
				APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

RADIUS
R=4.0m



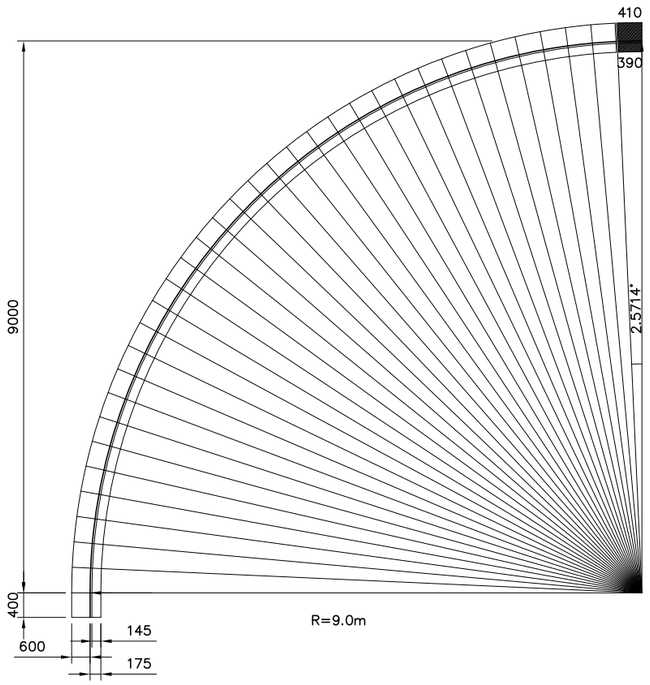
SCALE 1:100

RADIUS
R=6.0m



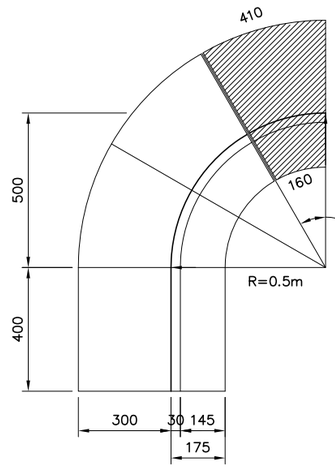
SCALE 1:100

RADIUS
R=9.0m



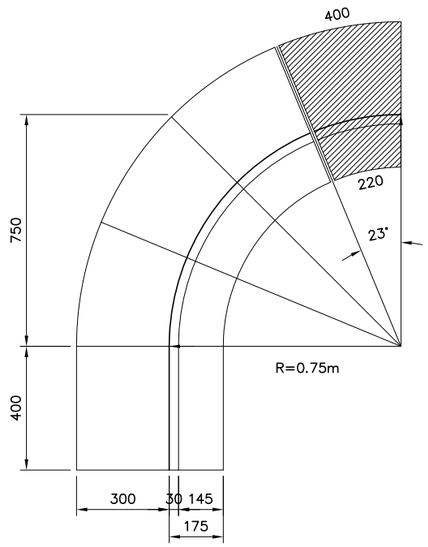
SCALE 1:100

RADIUS
R=0.5m



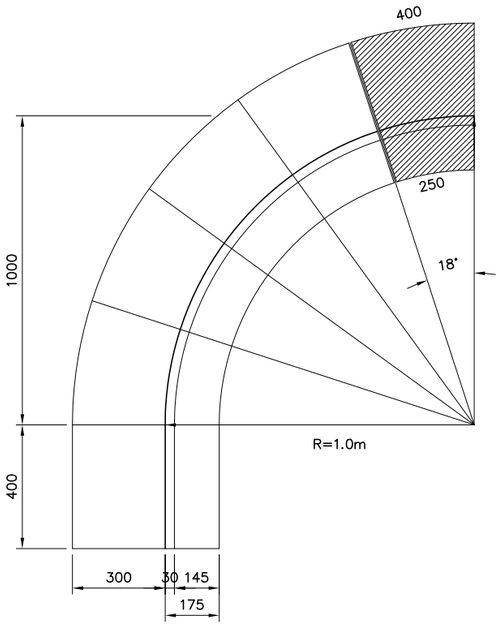
SCALE 1:20

RADIUS
R=0.75m



SCALE 1:20

RADIUS
R=1.0m



SCALE 1:20

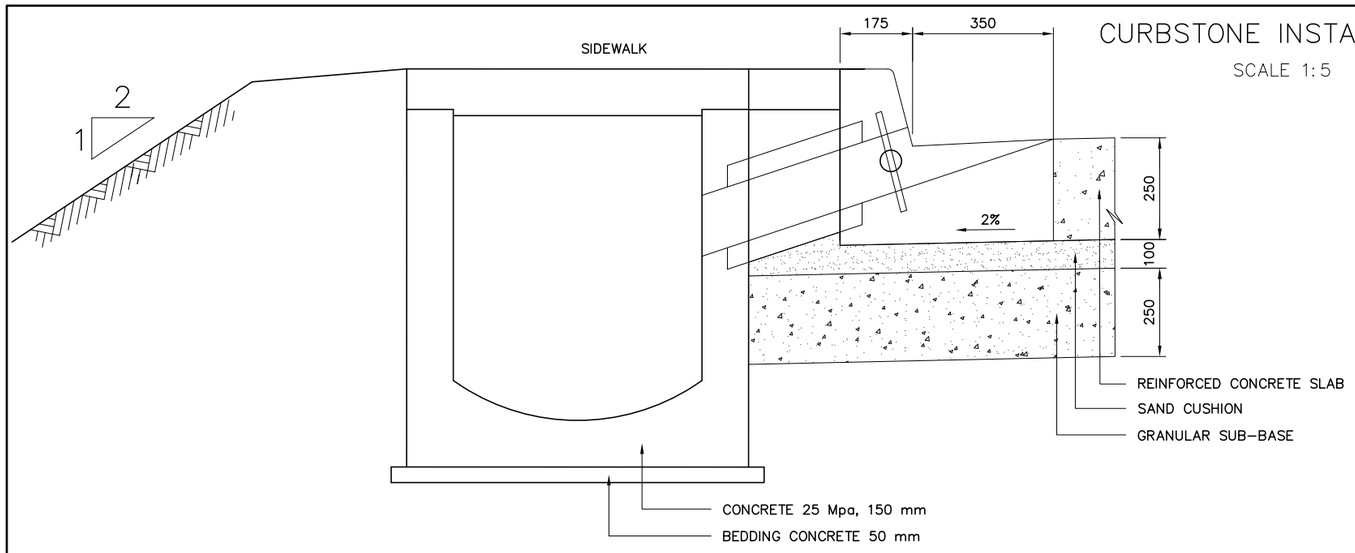
NOTES:

1. ALL MEASUREMENTS IN MILLIMETER. UNLESS OTHERWISE INDICATED.

ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
	CONCRETE CURB RADIUS CURB DETAILS					DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
						CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–020
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

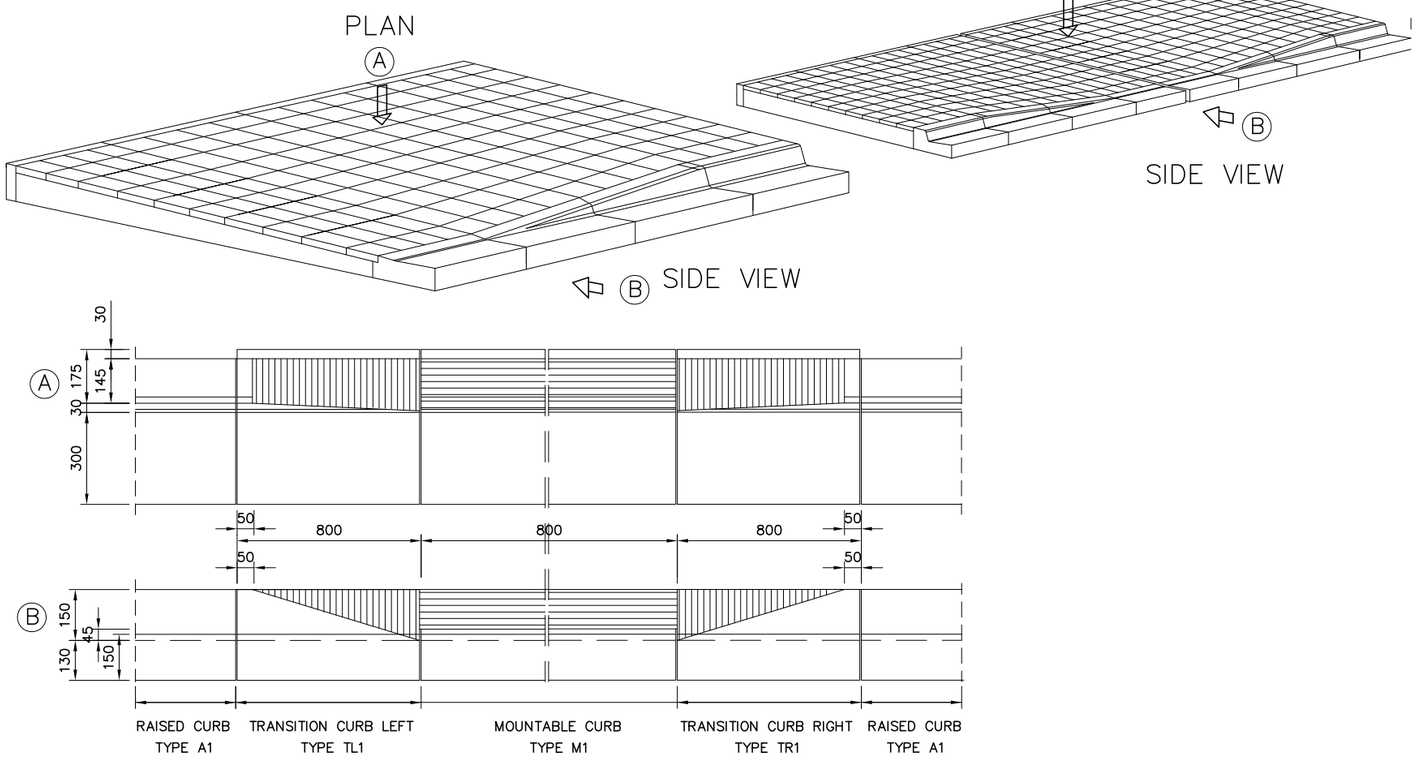
CURBSTONE INSTALLATION

SCALE 1:5



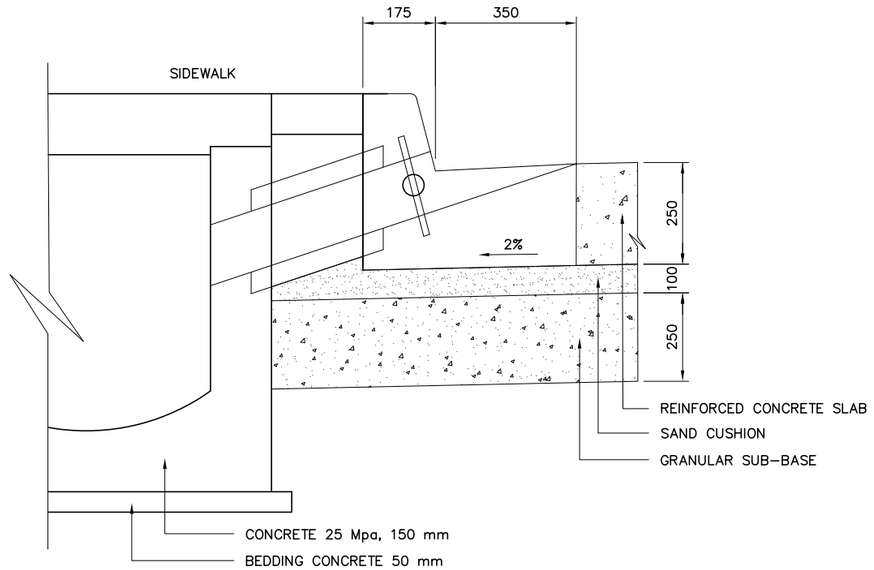
SIDEWALK AND CURBSTONE INSTALLATION

SCALE 1:5

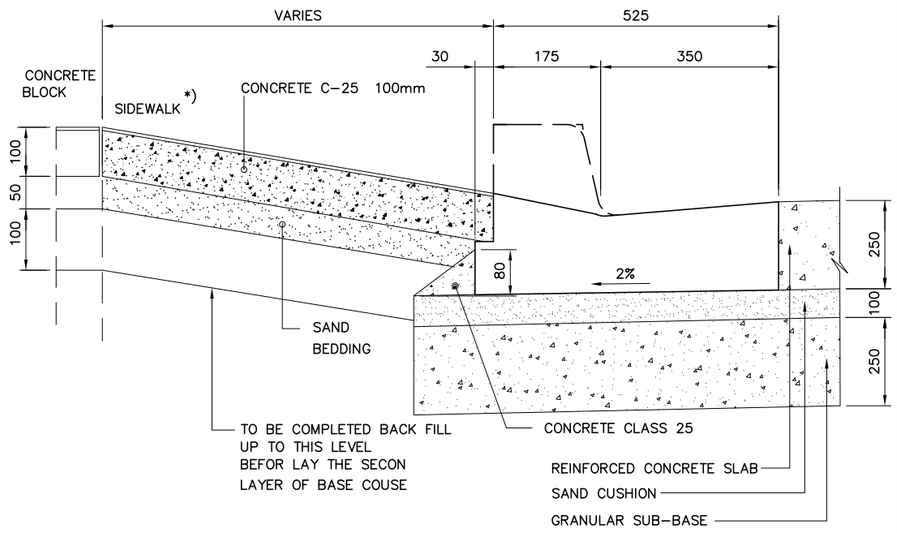


MOUNTABLE CURB AND TRANSITION CURB

NOT TO SCALE



STANDARD CURBSTONE TYPE A1

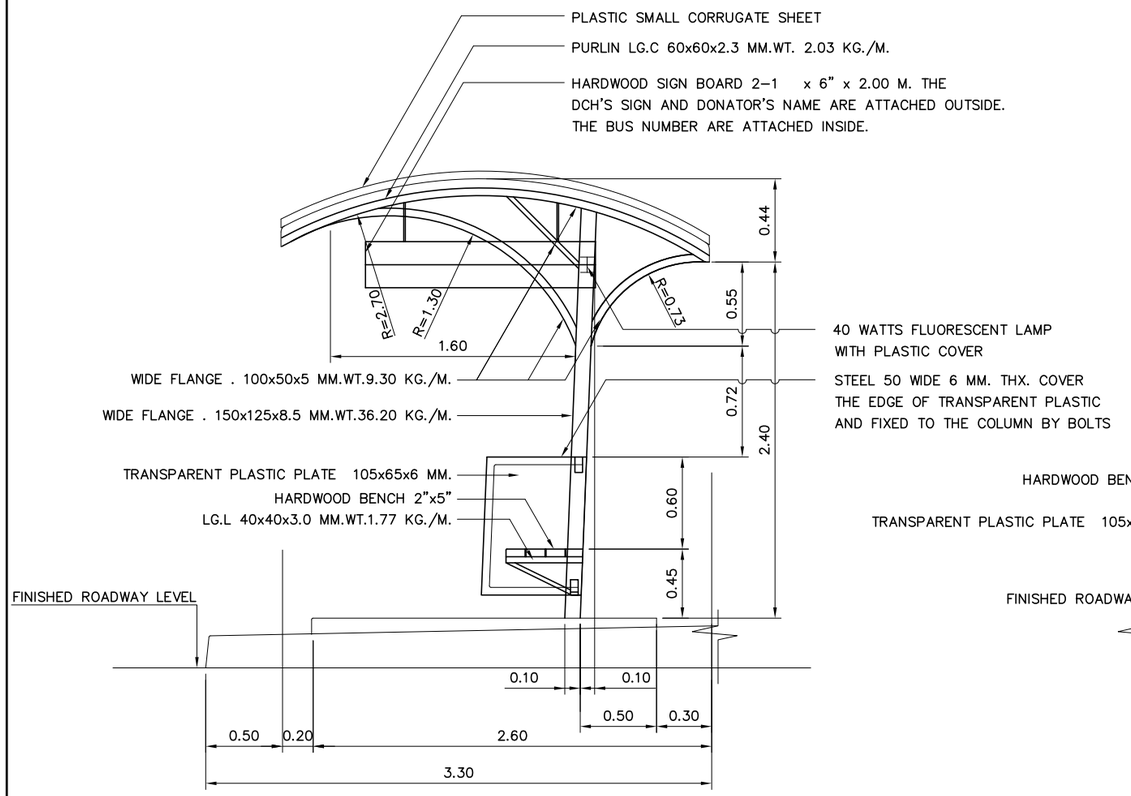


MOUNTABLE CURBSTONE TYPE M1

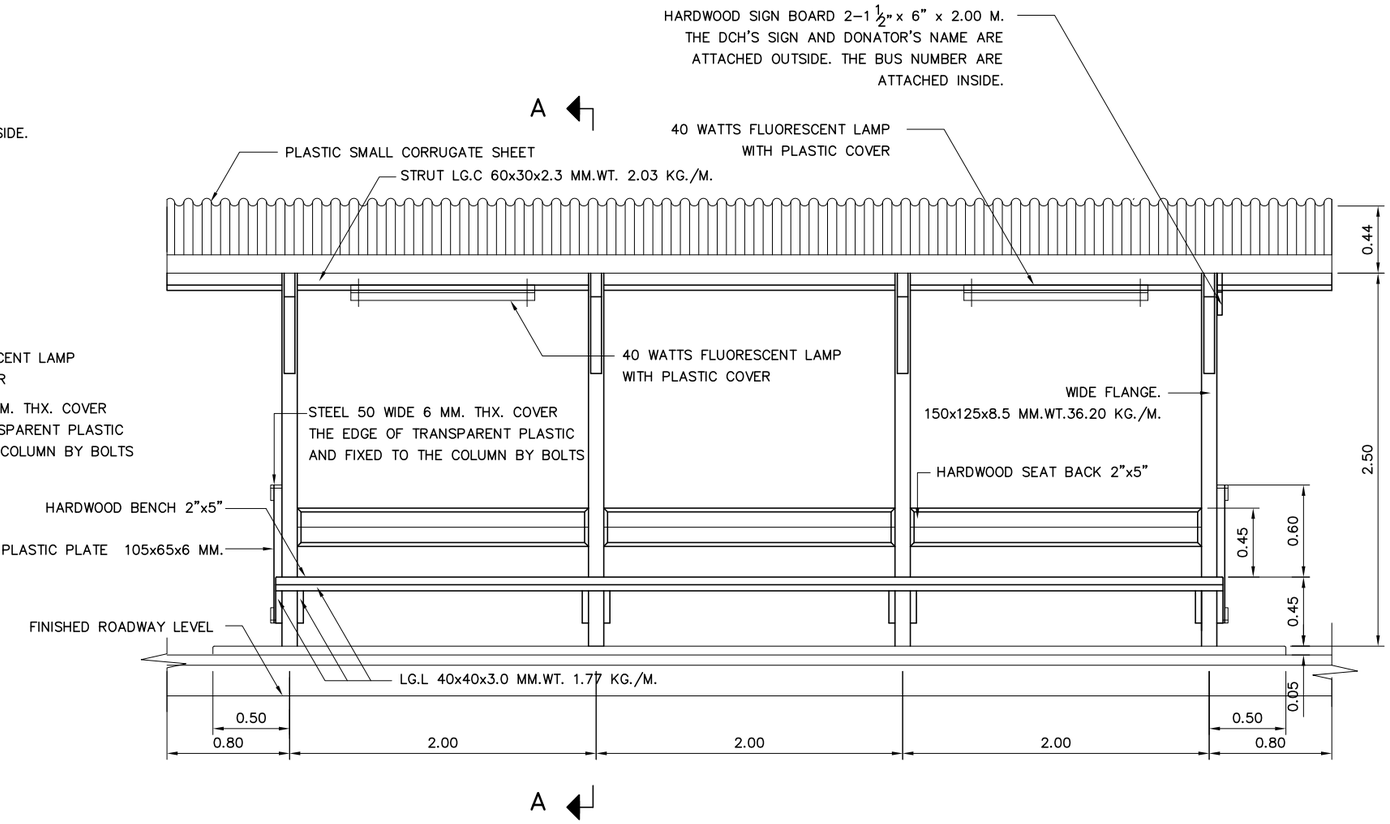
NOTES:

1. ALL MEASUREMENTS IN MILLIMETER UNLESS OTHERWISE NDICATED.
2. THE WIDTH OF THE JOINT IN BETWEEN CURB IS 10mm, SHALL BE FILLED WITH MORTAR 1:3 (CEMENT : SAND) BY VOLUME

ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG) CONCRETE CURB INSTALLATION	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD-262-17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
						CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR-021
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN



SIDE ELEVATION



FRONT ELEVATION

NOTES:

1 . ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED
2 . CONCRETE SHALL BE CLASS 25 MPa
3 . CLEAR CONCRETE COVER SHALL BE 2.5 CM.
4 . ALL WELDING SHALL BE 3/16" FILLET WELD AS AISC. SPECIFICATIONS.
5 . STEEL STRUCTURES SHALL BE PAINTED WITH RUST–OLEUM OR OTHER EQUIVALENT IN DUSKY BLACK COLOR.
6 . WOODEN PART SHALL BE POLISHED, NOT PAINTED.
7 . ONE 40 WATTS FLUORESCENT SHALL BE USED FOR OUTER SPAN.
8 . THIS DRAWING SHALL BE USED IN COMBINATION WITH DWG. NO. SDR–023.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

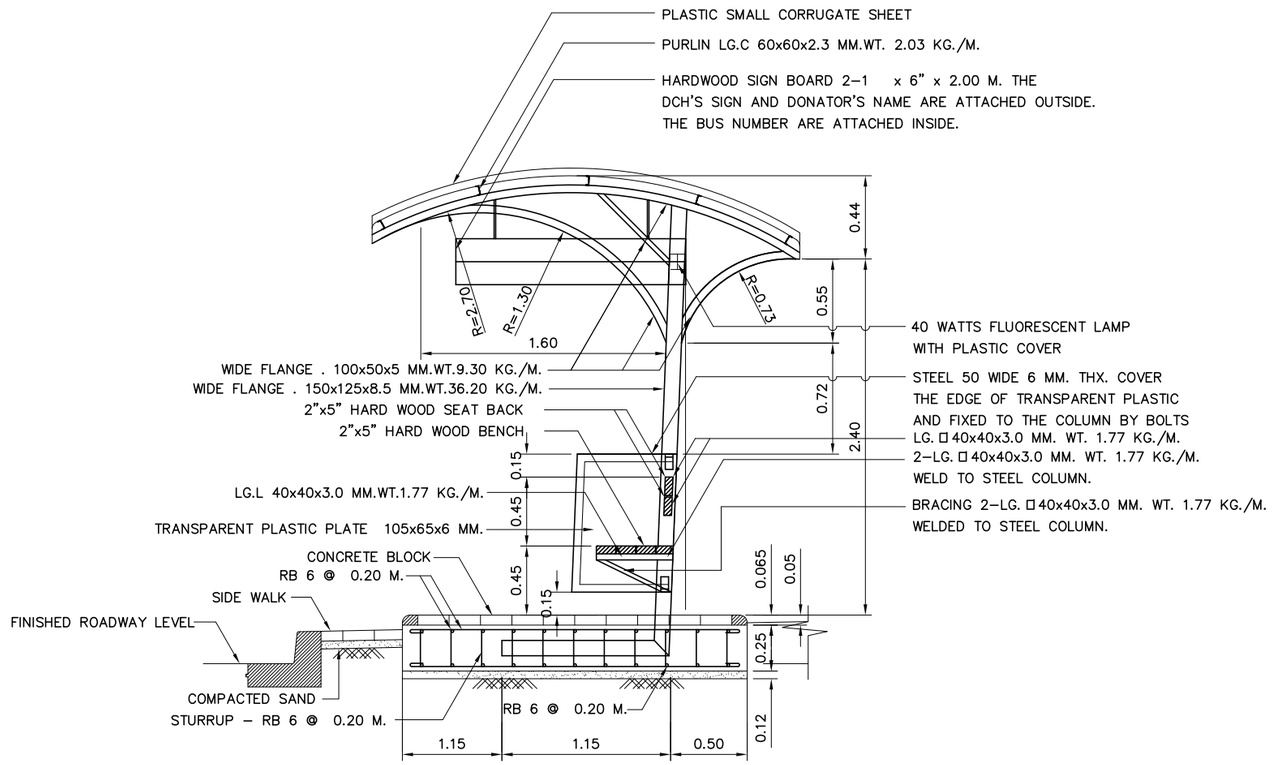
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

BUS STOP SHELTER
(SHEET 1 OF 2)

REV.	DATE	DESCRIPTION	APPROVED

	NAME	SIGNATURE
DESIGNED	Mr.Souksavanh SYPHAKHAM	
CHECKED	Mr.Khamphone SORPHABMIXAY	
APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDR–022
SCALE: AS SHOWN



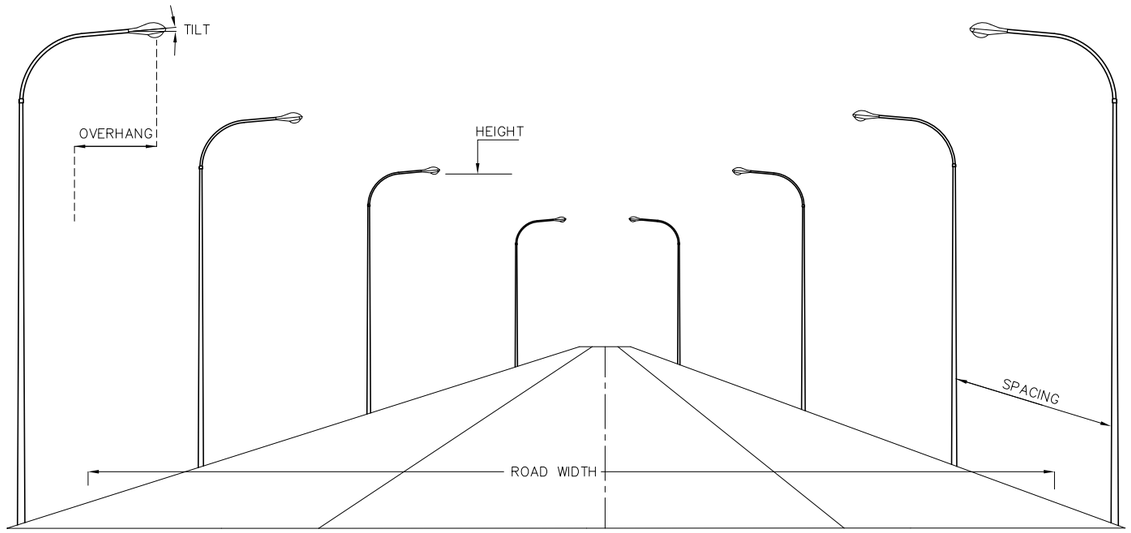
SECTION A – A
SCALE 1:40

NOTES:

1 . ALL DIMENSION ARE IN METERS UNLESS OTHERWISE INDICATED.
2 . THE DRAWING SHALL BE USED IN COMBINATION WITH DWG SDR–022

ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	BUS STOP SHELTER (SHEET 1 OF 2)					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDR–023
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

ELECTRICAL STANDARD

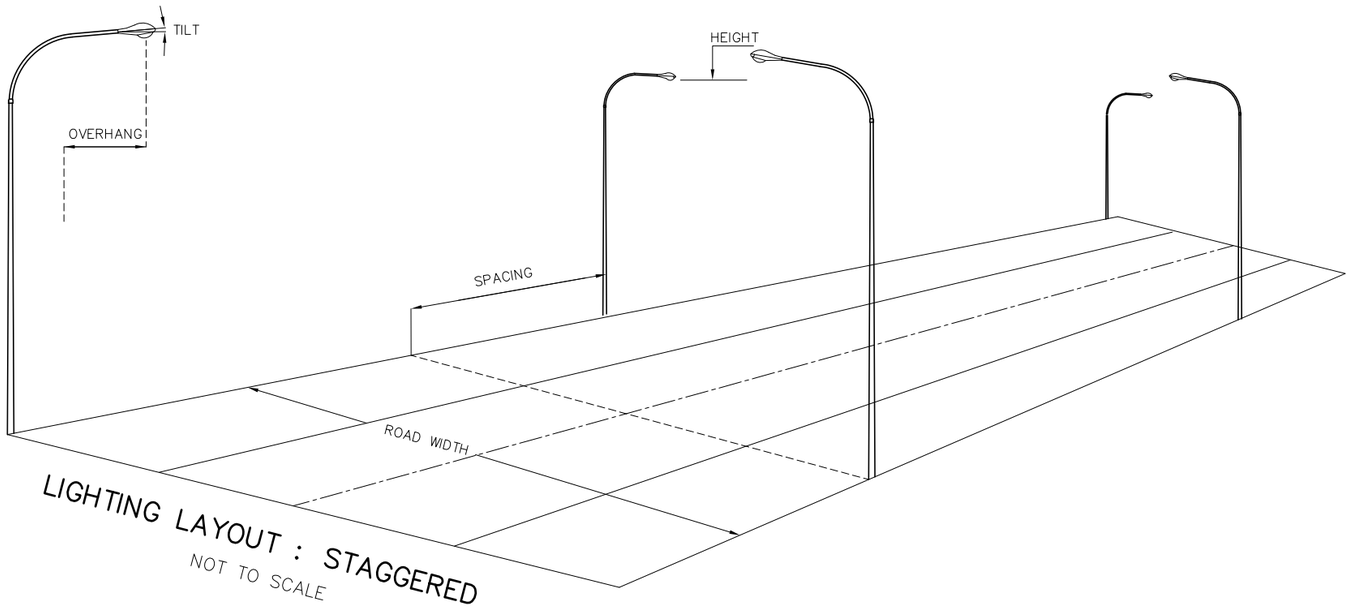


LIGHTING LAYOUT : OPPOSITE

NOT TO SCALE

LIGHTING LAYOUT : OPPOSITE

Overhang (m)	Spacing (m)	Height (m)	Tilt (Deg.)	Width (m)	Number of lanes
0.50	30.00–35.00	8.00–10.00	5	>13.50 VARIES	>2



LIGHTING LAYOUT : STAGGERED

NOT TO SCALE

LIGHTING LAYOUT : STAGGERED

Overhang (m)	Spacing (m)	Height (m)	Tilt (Deg.)	Width (m)	Number of lanes
0.50	30.00–35.00	8.00–10.00	5	VARIES	>2

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ

LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

STREET LIGHTING LAYOUT

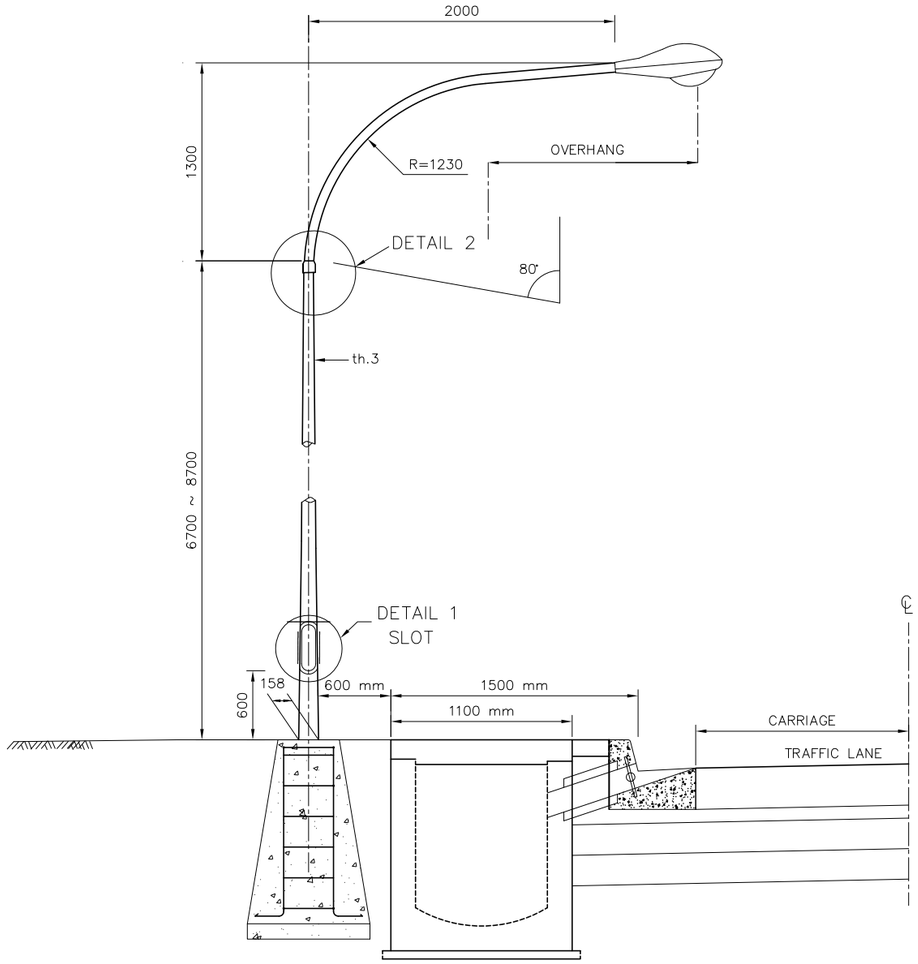
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17

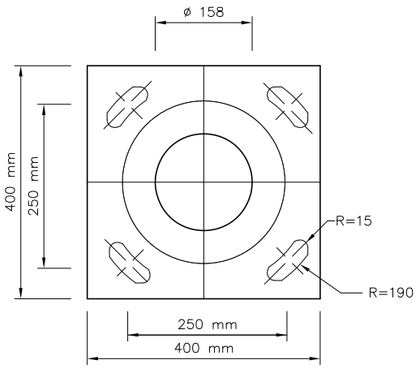
DATE: April, 2018

DRW No. STC–001

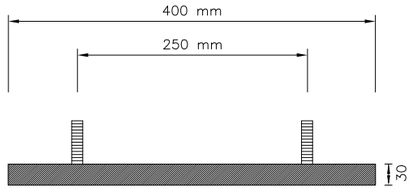
SCALE: NOT TO SCALE



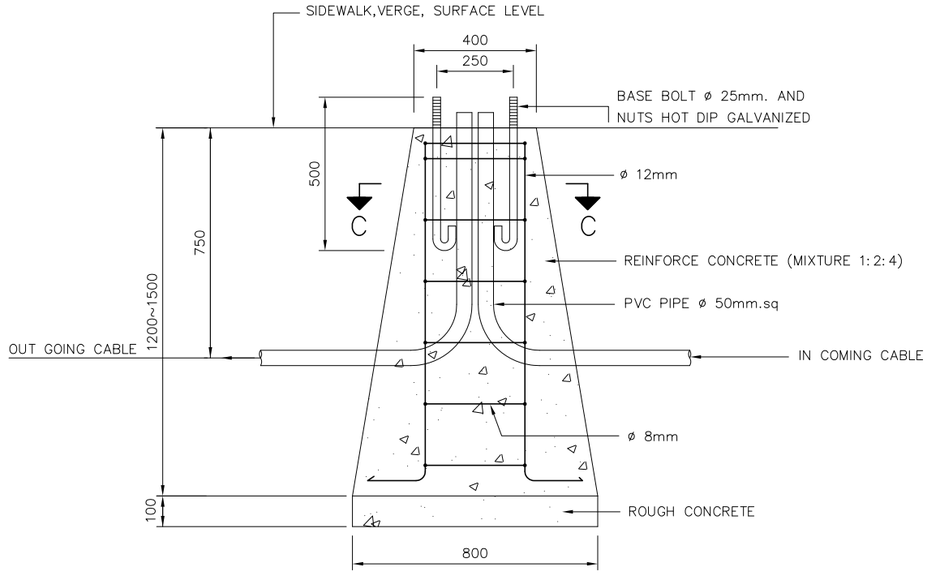
LAMP POST SINGLE BRACKET
SCALE 1:20



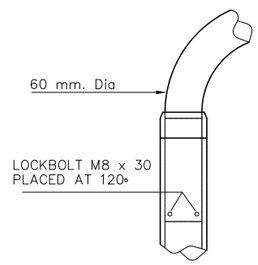
BASE PLATE
SCALE 1:5



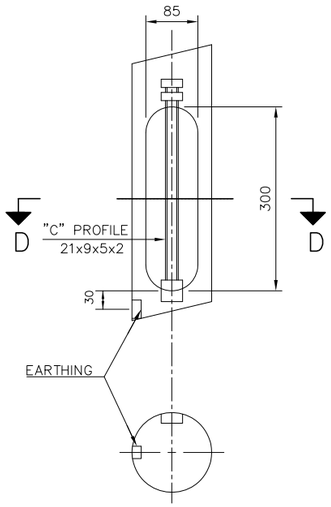
BASE PLATE
NOT TO SCALE



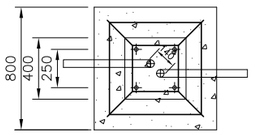
CONCRETE FOUNDATION WITH ANCHOR BOLT
SCALE 1:10



DETAIL 2
SCALE 1:5



SECTION D – D
SCALE 1:5

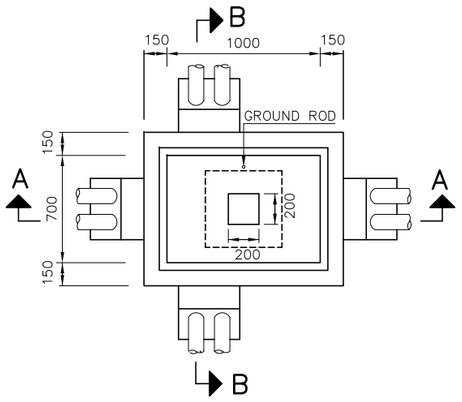


SECTION C – C
SCALE 1:20

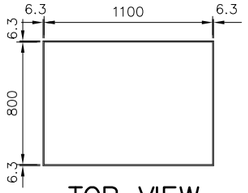
NOTES :

1. THE LIGHTING POLE ARE IN ACCORDANCE WITH BRITISH STANDARD 1840. 1960. MENTIONED BELOW:
2. THE LIGTHING POLE ARE MADE WITH ROUND STEEL TUBES TAPERED COLUMNS DETACHABLE BRACKETS.
3. THICKNESS: Min 4 mm. TENSILE STRENNGHT: Min 41 Kg/mm2
4. THE POLE AND OTHER FEROUS MATERIALS ARE GALVANIZED BOTH INSIDE AND OUTSIDE BY HOT DIPPED GALVVANIZING IN ACCORDANCE WITH ASTM A525–78, 550Gm/m2 Weight of Zinc.

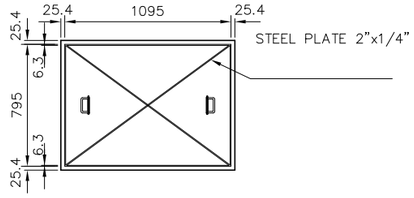
ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	LAMP POST AND CONCRETE FOUNDATION WITH ANCHOR BOLT					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. EDT–002
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN



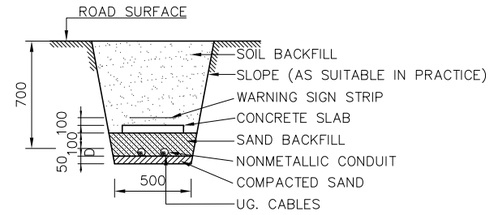
PLAN
SECTION D – D
SCALE 1:20
(MANHOLE WITHOUT COVER)



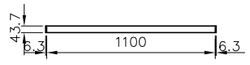
TOP VIEW



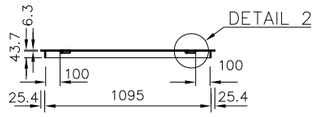
BOTTOM VIEW



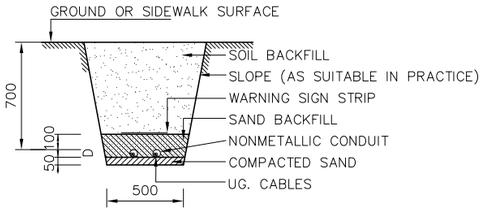
"D" INDICATES OUTSIDE DIAMETER OF CONDUIT
CABLE LAYING IN NONMETALLIC CONDUIT
NOT TO SCALE



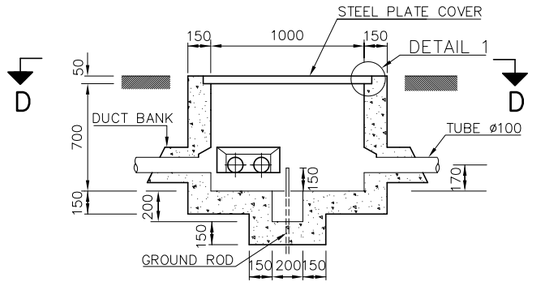
SIDE VIEW FRAME
SCALE 1:20



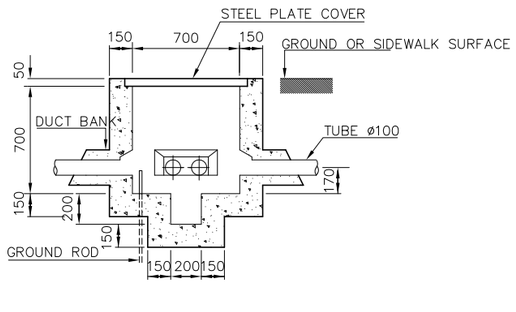
SIDE VIEW (COVER)
SCALE 1:20



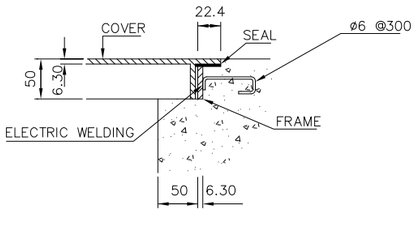
CABLE LAYING IN NONMETALLIC CONDUIT
NOT TO SCALE



SECTION A – A
SCALE 1:20

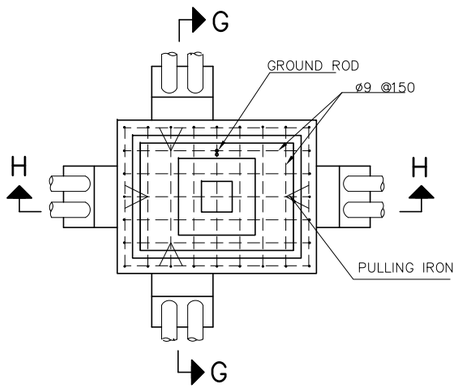


SECTION B – B
SCALE 1:20

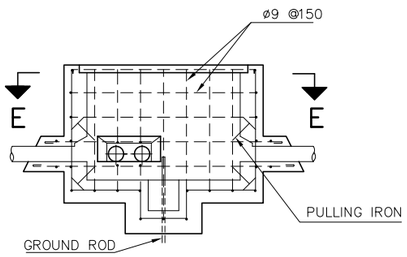


DETAIL 1
NOT TO SCALE

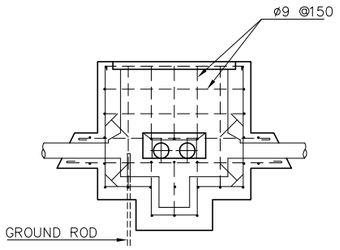
DETAIL 2
NOT TO SCALE



SECTION E – E
SCALE 1:20
(REINFORCING DETAILS)



SECTION H – H
SCALE 1:20
(REINFORCING DETAILS)



SECTION G – G
SCALE 1:20
(REINFORCING DETAILS)

NOTES :

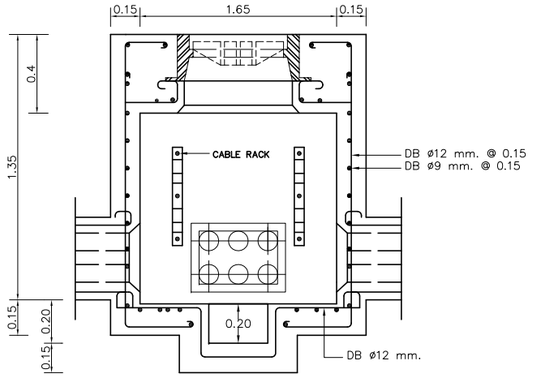
1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SHOWN
2. ALL CONCRETE SHALL BE CLASS 25 MPa.
   UNLEES OTHERWISE SHOWN . CYLINDER STRENGTH OF CONCRETE
   AT 28 DAYS fc'=25 MPa ; fc =10 MPa.
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENT OF THE
   SPECIFICATION AASHTO M 31,PLAIN BILLET FOR STEEL BARS
   FOR CONCRETE REINFORCEMENT.
4. STRUCTURE STEEL SHALL CONFORM TO AASHTO M183.
5. FLAT PLATE STEEL SHALL CONFORM TO AASHTO M 160
6. THE CONCRETE COVER SHALL BE 30 mm. AND MEASURE FROM THE SURFACE
   OF CONCRETE TO THE FACE OF NEAREST BAR.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

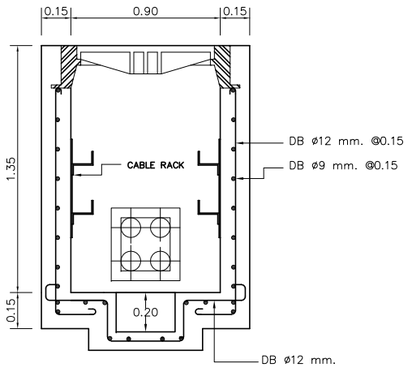
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

PULL THROUGH BOX(MANHOLE)
FOR STREET LIGHTING

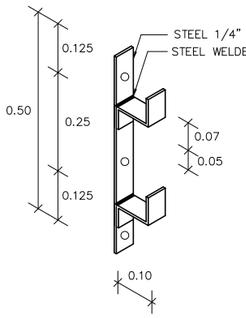
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. EDT–003
				APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN



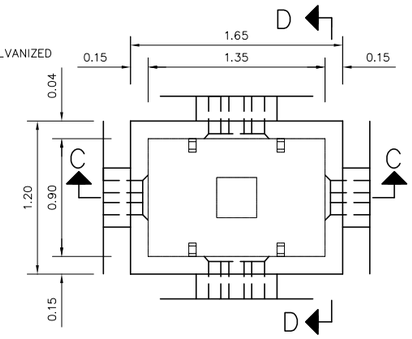
SECTION C – C



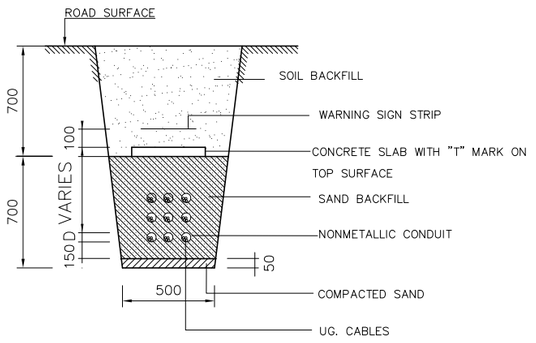
SECTION D – D



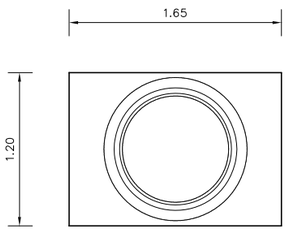
CABLE RACK



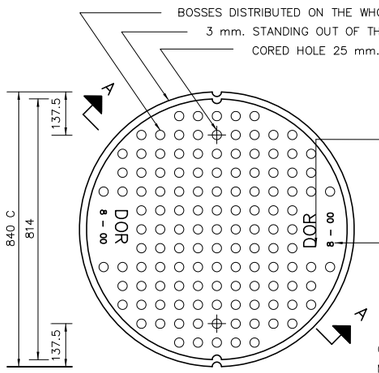
PLAN MANHOLE



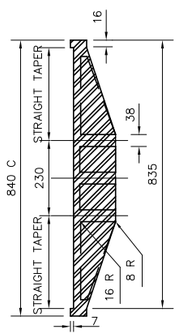
"D" INDICATES OUTSIDE DIAMETER OF CONDUIT
CABLE LAYING IN NONMETALLIC CONDUIT
NOT TO SCALE



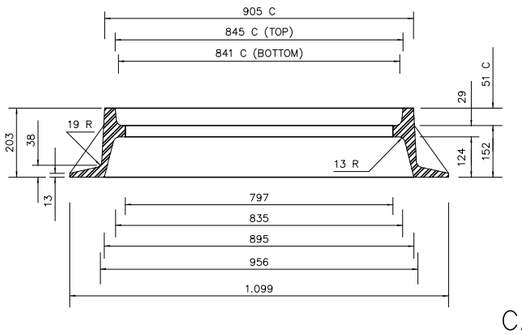
PLAN



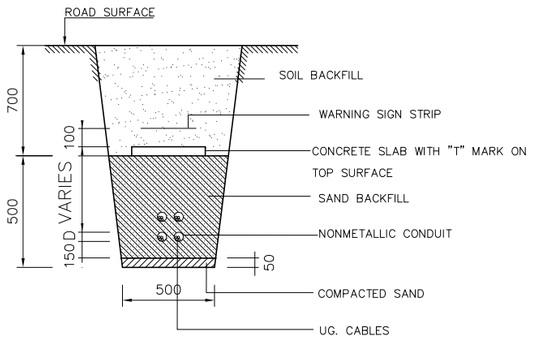
CAST MONTH AND YEAR OF MANUFACTURE WITH 25 mm. FIGURES IN 3 mm. BAS – RELIFE FLUSH WITH SURFACE.



SECTION A – A



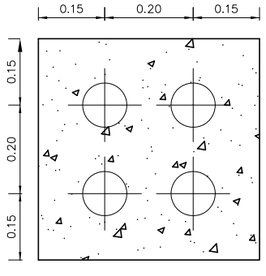
SECTION A – A



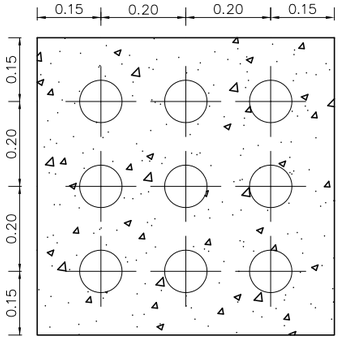
CABLE LAYING IN NONMETALLIC CONDUIT
NOT TO SCALE

TYPICAL ELECTRICAL DUCK BANK

NOT TO SCALE

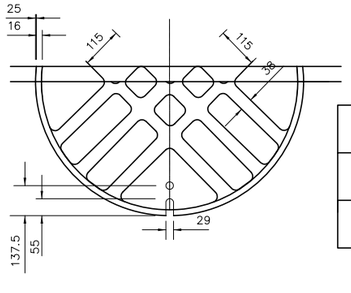


4 – ø100 CONDUIT



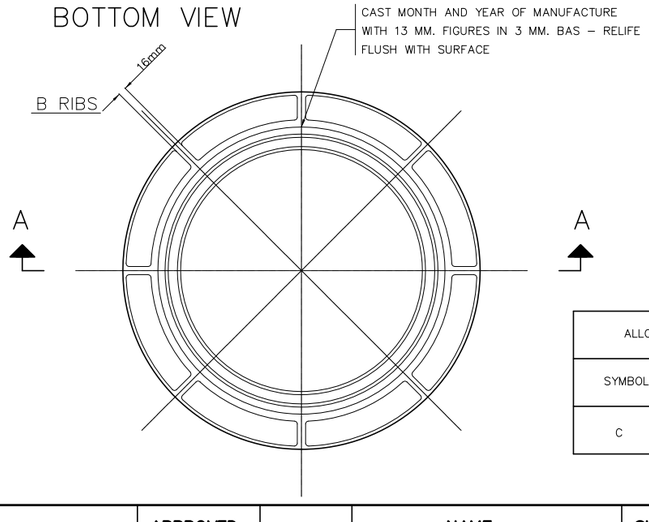
9 – ø100 CONDUIT

MANHOLE COVER



ALLOWABLE	VARIATION	
SYMBOL	OVER	UNDER
C	1.5 mm.	1.5 mm.

BOTTOM VIEW



ALLOWABLE	VARIATION	
SYMBOL	OVER	UNDER
C	1.5 mm.	1.5 mm.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

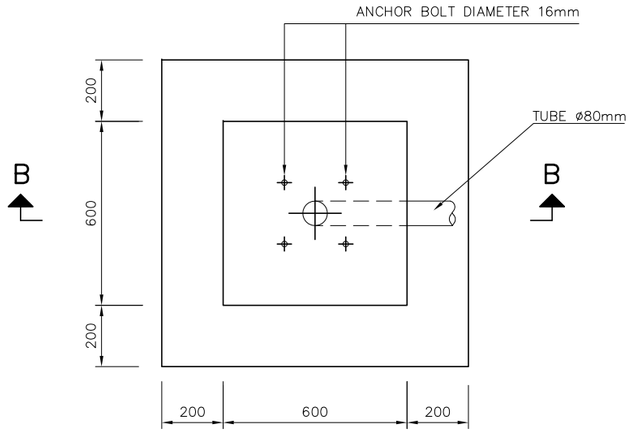
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

MANHOLE AND DUCK BANK

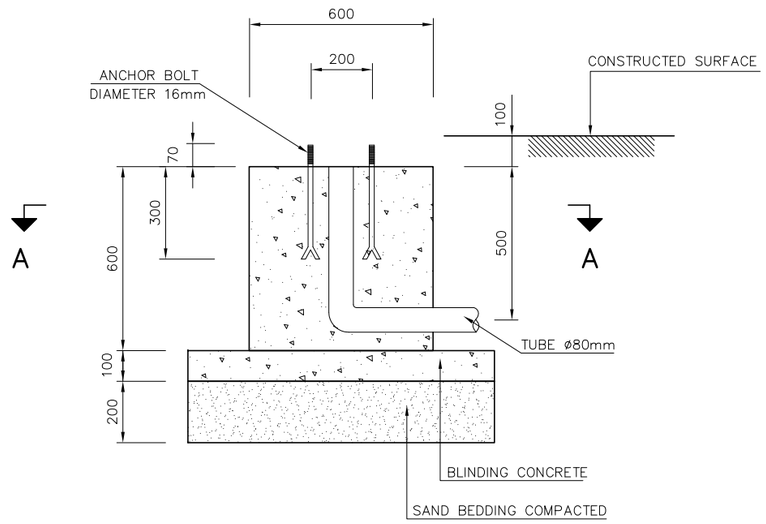
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. EDT–004
							SCALE: AS SHOWN

TRAFFICE SIGNAL STANDARD

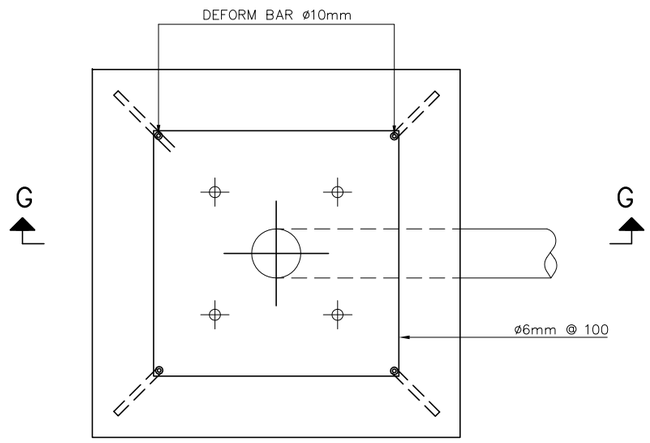
FOUNDATION FOR TRAFFIC–LIGHT ON POSTS OR POLES



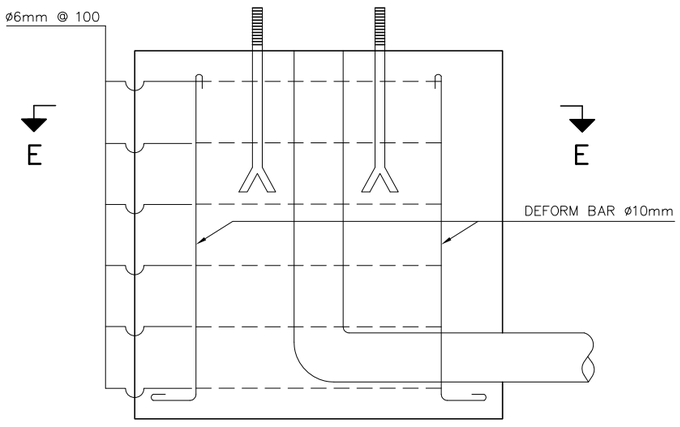
PLAN
SECTION A–A
SCALE 1:20



SECTION B–B
SCALE 1:20



PLAN
SECTION E–E
SCALE 1:10
(REINFORCING DETAILS)



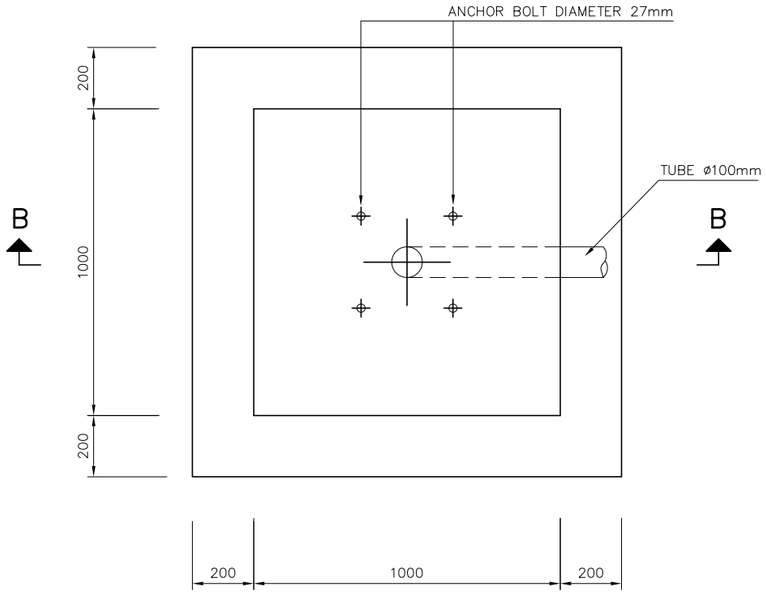
SECTION G–G
SCALE 1:10
(REINFORCING DETAILS)

NOTES :

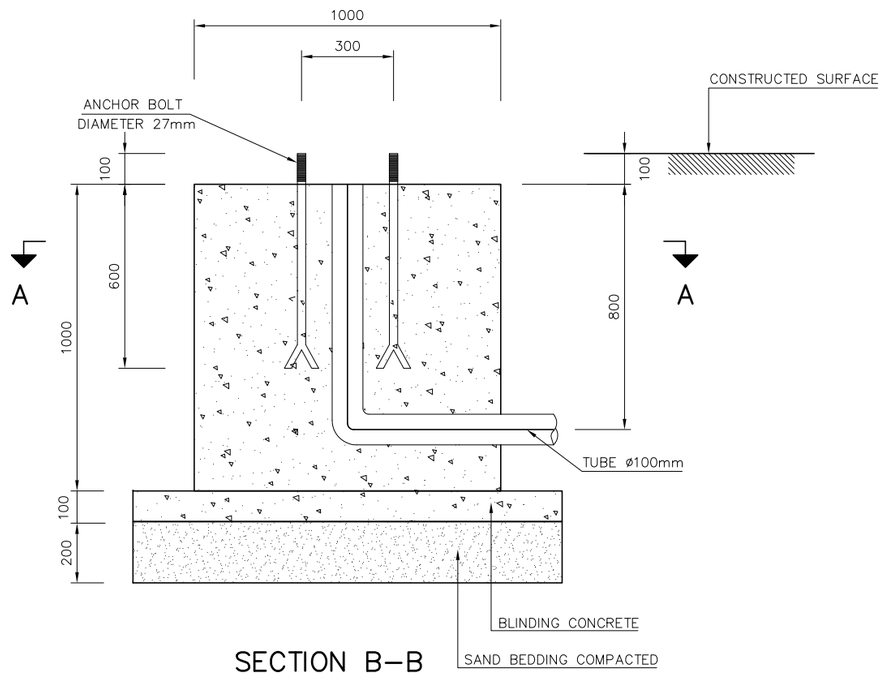
1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SHOWN
2. ALL CONCRETE SHALL BE CLASS 25 MPa.
   UNLEES OTHERWISE SHOWN . CYLINDER STRENGTH OF CONCRETE
   AT 28 DAYS fc'=25 MPa ; fc =10 MPa.
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENT OF THE
   SPECIFICATION AASHTO M 31,
   FOR CONCRETE REINFORCEMENT.
4. STRUCTURE STEEL SHALL CONFORM TO AASHTO M183.
5. FLAT PLATE STEEL SHALL CONFORM TO AASHTO M 160
6. THE CONCRETE COVER SHALL BE 30 mm. AND MEASURE FROM THE SURFACE
   OF CONCRETE TO THE FACE OF NEAREST BAR.

ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	FOUNDATIONS OF POSTS–POLES SUPPORTS FOR TRAFFIC–LIGHT					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TSP–001
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

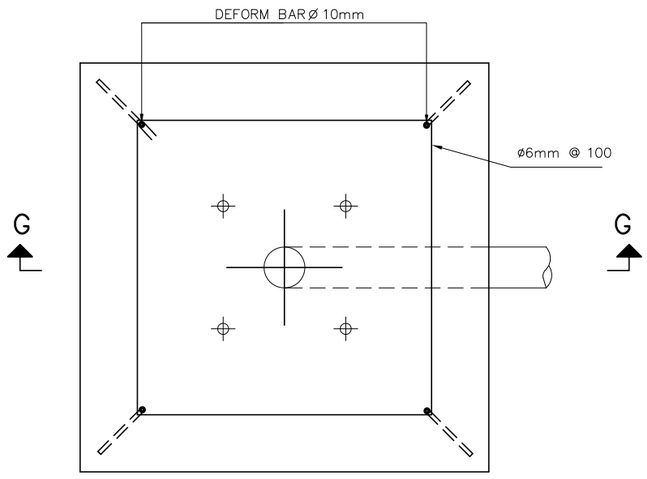
FOUNDATION FOR TRAFFIC–LIGHT ON MAST–ARM REACH 3.50m



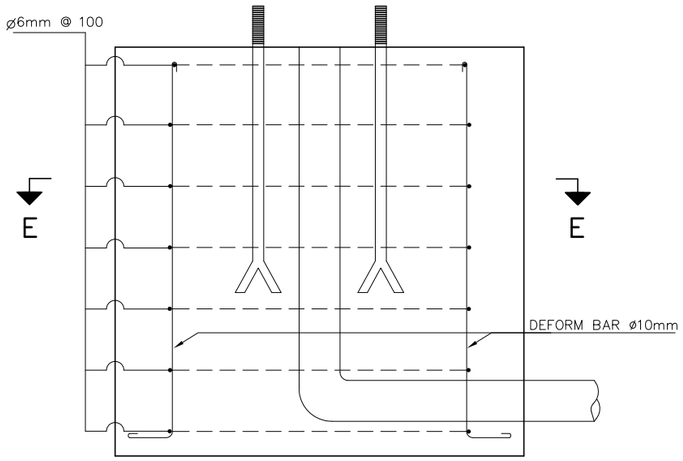
PLAN
SECTION A–A
SCALE 1:20



SECTION B–B
SCALE 1:20



PLAN
SECTION E–E
SCALE 1:15
(REINFORCING DETILS)



SECTION G–G
SCALE 1:15
(REINFORCING DETILS)

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SHOWN
2. ALL CONCRETE SHALL BE CLASS 25 MPa.
   UNLEES OTHERWISE SHOWN . CYLINDER STRENGTH OF CONCRETE
   AT 28 DAYS fc'=25 MPa ; fc =10 MPa.
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENT OF THE
   SPECIFICATION AASHTO M 31,
   FOR CONCRETE REINFORCEMENT.
4. STRUCTURE STEEL SHALL CONFORM TO AASHTO M183.
5. FLAT PLATE STEEL SHALL CONFORM TO AASHTO M 160
6. THE CONCRETE COVER SHALL BE 30 mm. AND MEASURE FROM THE SURFACE
   OF CONCRETE TO THE FACE OF NEAREST BAR.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

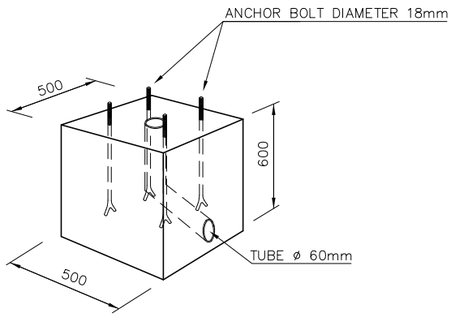
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

FOUNDATIONS OF POSTS–POLES
SUPPORTS FOR TRAFFIC–LIGHT

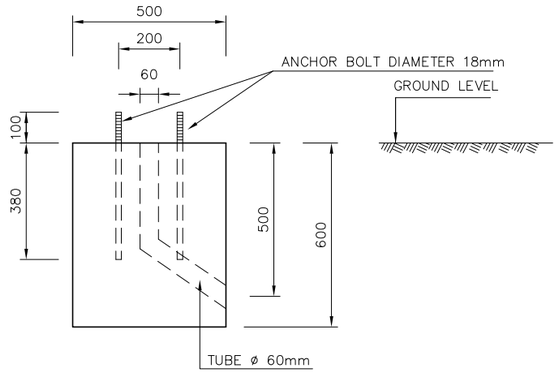
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TSP–002
				APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

FOUNDATION FOR TRAFFIC – LIGHTS ON POLES OR POSTS

NOT TO SCALE

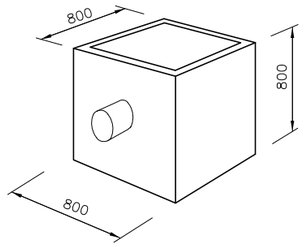


SCALE 1:10
ELEVATION



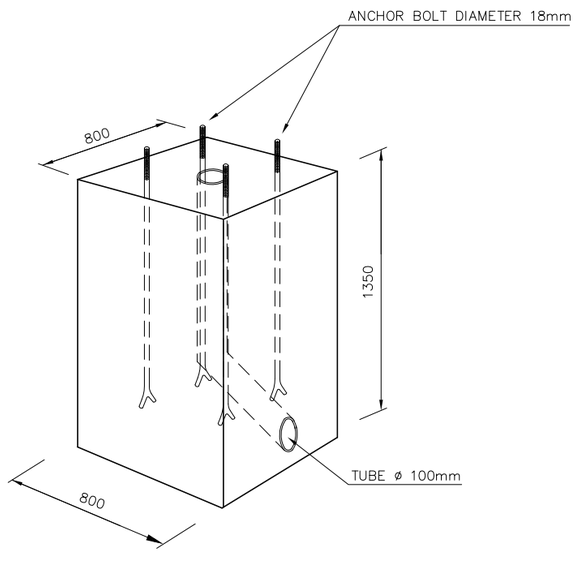
PULL THROUGH BOX

NOT TO SCALE

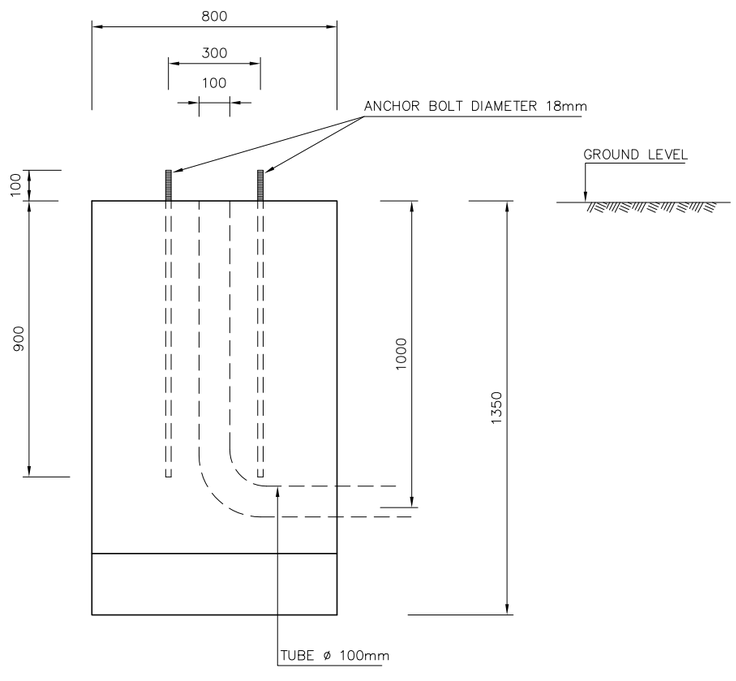


FOUNDATION FOR TRAFFIC – LIGHTS ON MAST – ARM

NOT TO SCALE



SCALE 1:10
ELEVATION



NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SHOWN
2. ALL CONCRETE SHALL BE CLASS 25 MPa.
   UNLEES OTHERWISE SHOWN . CYLINDER STRENGTH OF CONCRETE
   AT 28 DAYS fc'=25 MPa ; fc =10 MPa.
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENT OF THE
   SPECIFICATION AASHTO M 31,
   FOR CONCRETE REINFORCEMENT.
4. STRUCTURE STEEL SHALL CONFORM TO AASHTO M183.
5. FLAT PLATE STEEL SHALL CONFORM TO AASHTO M 160
6. THE CONCRETE COVER SHALL BE 30 mm. AND MEASURE FROM THE SURFACE
   OF CONCRETE TO THE FACE OF NEAREST BAR.

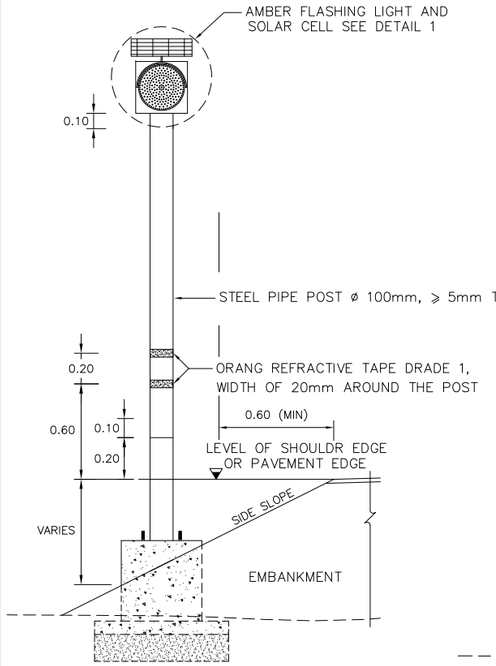
ລ.ວ.ຄ
LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

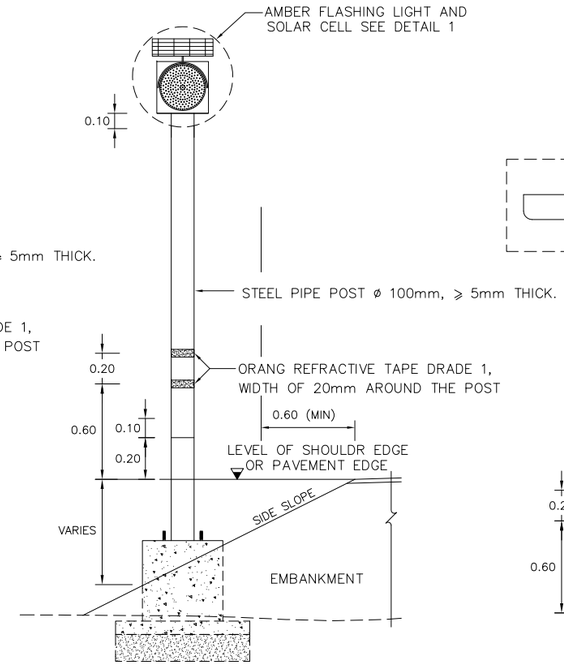
FOUNDATIONS FOR
TRAFFIC–LIGHTS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

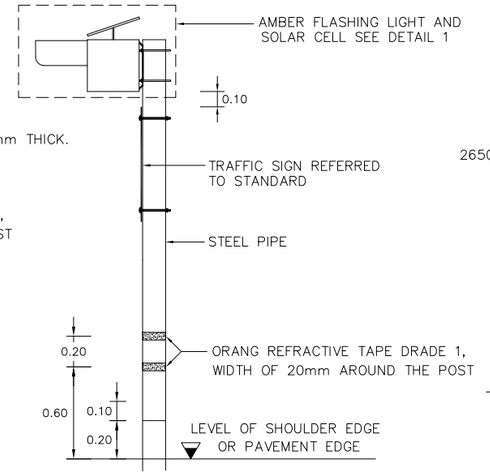
LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TSP–003
SCALE: AS SHOWN



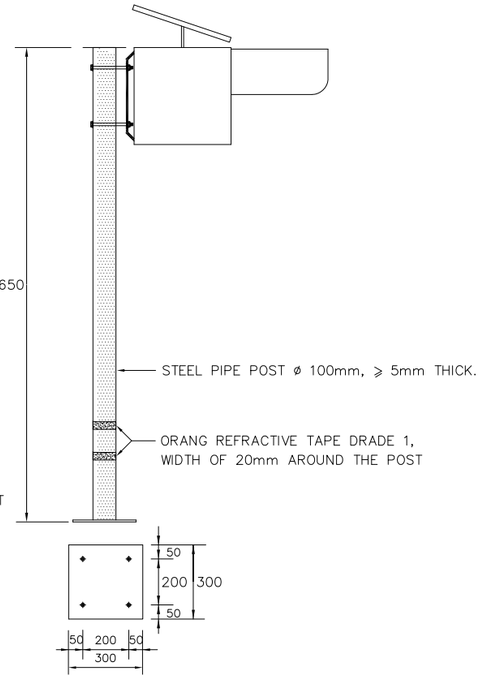
FRONT VIEW

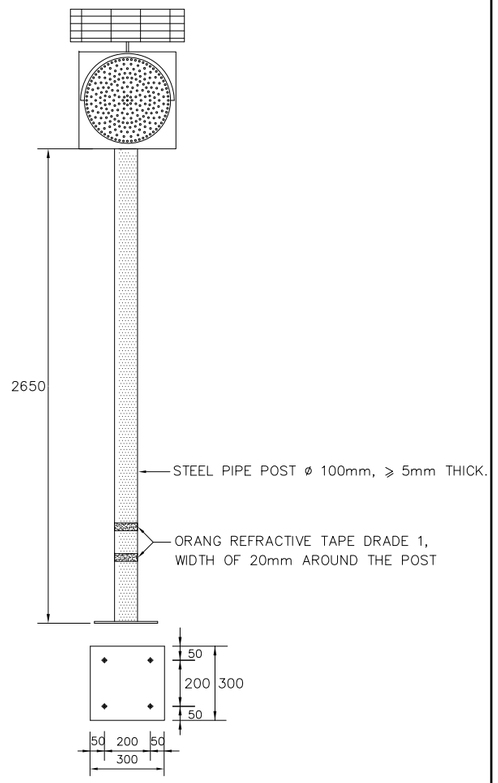


FORNT VIEW



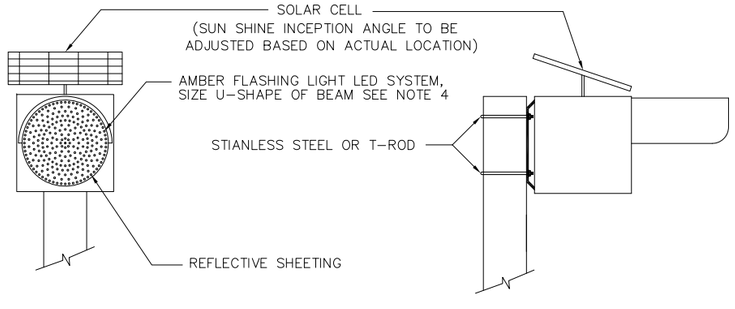
SIDE VIEW





INSTALLATION DETAILS FOR AMBER FLASHING LIGHT WITH MANDATORY/WARNING SIGN

NOT TO SCALE



DETAIL 1

NOT TO SCALE

NOTES:

1. ALL MEASUREMENT UNITS ARE IN METRE, ACCEPT OTHERWISE INDICATED.
2. DISTANCE OF IN STALLATION OF MANDATORY/WARNING SIGN, DETAIL OF FIXING SIGN SHEET, SIZE OF SIGN POST AND INSTALLATION TRAFFICE SIGN STANDARD.
3. FLASHING LIGHT BEAM SIZE ø 210 mm OR ø 300 mm MADE OF POYLCARBONTE AND LIMPID, DURABILITY, SUSTENTION TO THE HEAD AND NOT HAZARD WHEN INCIDENT.
4. LED, BUIL SHALL BE AMBER AND MADE FOR TRAFFICE SIGNAL TYPE, FIXED AT THE POSITION OF USE APPROPRIATELY AS THE FOLLOWING DETAILS:
   - 4.1 FOR THE LIGHT BEAM ø 210 mm THE NUMBER OF LEDS NOT LESS THEN 80 BULBS AND LIGHT INTENSITY SHALL NOT BE LESS THAN 450,000 Med.
   - 4.2 FOR THE LIGHT BEAM ø 300 mm THE NUMBER OF LEDS NOT LESS THEN 120 BULBS AND LIGHT INTENSITY SHALL NOT BE LESS THAN 660,000 Med.
5. THE SHARP OF NLIGHT BEAM CAN BE CHANG, BUT BE APPROVED BY THE ENGINEER PRIOR DELIVERY TO THE SITE.
6. ALL LEDS BULBS SHALL BE FLASH AT THE SAME TIME AND CAN BE ADJUSTED THE FRAGMENT FLASH NOT LESS THAN 40 TIME/Min; AND NOT MORE THAN 80 TIME/Min; AND THE LIVE NOT LESS THAN 100,00 Hrs.
7. SOLAR CELL POWER SUPPLY SHALL BE MADE OF MONO-CRYSTAL SILICON CAN BE PRODUCED POWER AND LESS THAN 10 w. SOLAR CELL SHAPE AND INSTALLATION METHOD CAN BE CHANG IN THE ACCORDANCE WITH STANDARD OF SUPPLIED, BUT IT CAN BE TURN IN 360° FOR SIUN SHINE INCEPTION AND THE CONTRUCTUR SHALL SUBMIT THE SPECIFICATION FROM SUPPLIED TO THE ENGINEER FOR APPROVAL PRIOR TO THE DELIVERY TO THE SITE.
8. BATERY SAVES POWER SHALL BE SEAL LEAD ACID TYPE OR EQUIVALENT, HAS ELECTRIC POWER NOT LES THAN 12 v AND 12 Ah, AND SAVES POWER NOT LESS THAN 48 Hrs. WHEN NO SUN SHINE.
9. POST SHYALL BE GALVENIZED STEEL PIPE, DIAMETRE NOT LESS THAN ø 100 mm AND THICKNESS NOT LESS THAN 5 mm.
10. THE CONTRUCTOR SHALL GUARANTY BULBS AND ALL ACCESSORY FOR 24 MONTHS STARTS FROM THE DATE OF OPERN TO SERVICE, IF CAN DEFECT HAPPENS DURING QUARANTY PERIOR THE CONTRUCTOR REMEDY WHININ 48 Hrs AT THE CONTRUCTOR EXPRANSES.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ

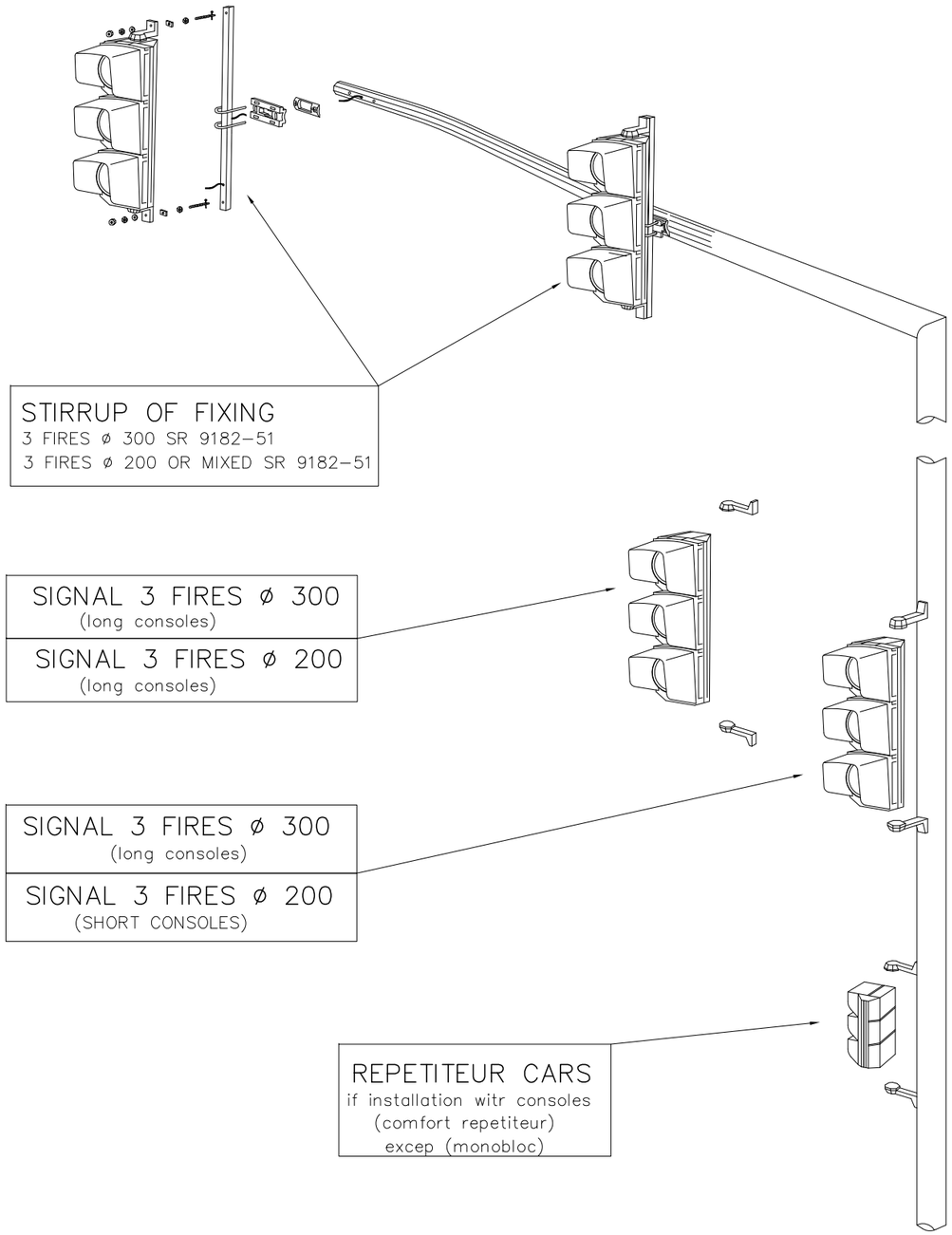
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

AMBER FLASHING LIGHT AND
SOLAR CELL INSTALLATION

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD-262-17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. TSP-004
							SCALE: NOT TO SCALE

ATLAS CARACTERISTIQUES OF THE SUPPORTS (POSTS and POTELETS)



STIRRUP OF FIXING
3 FIRES ø 300 SR 9182–51
3 FIRES ø 200 OR MIXED SR 9182–51

SIGNAL 3 FIRES ø 300
(long consoles)

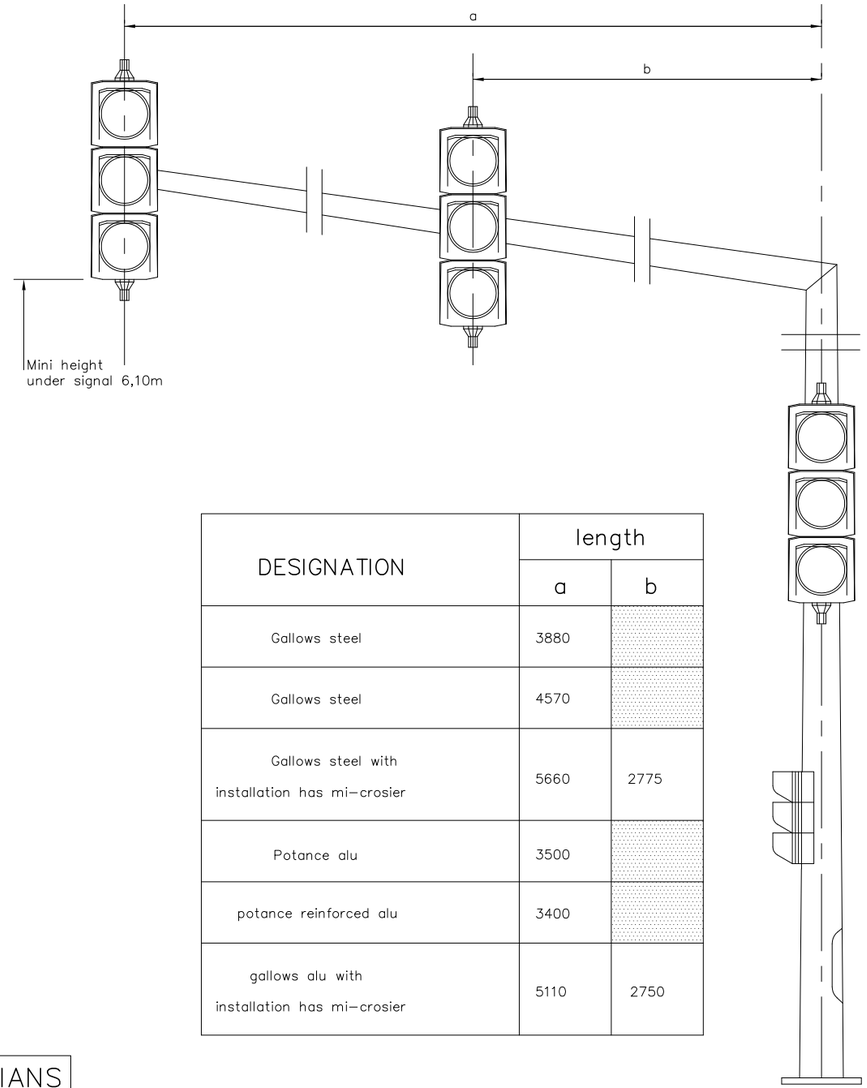
SIGNAL 3 FIRES ø 200
(long consoles)

SIGNAL 3 FIRES ø 300
(long consoles)

SIGNAL 3 FIRES ø 200
(SHORT CONSOLES)

REPETITEUR CARS
if installation witr consoles
(comfort repetiteur)
excep (monobloc)

SIGNAL PEDESTRIANS
(short consoles)



DESIGNATION	length	
	a	b
Gallows steel	3880	
Gallows steel	4570	
Gallows steel with installation has mi–crosier	5660	2775
Potance alu	3500	
potance reinforced alu	3400	
gallows alu with installation has mi–crosier	5110	2750

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

CARACTERISTIC OF
THE SUPPORTS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TSP–005
SCALE: NOT TO SCALE

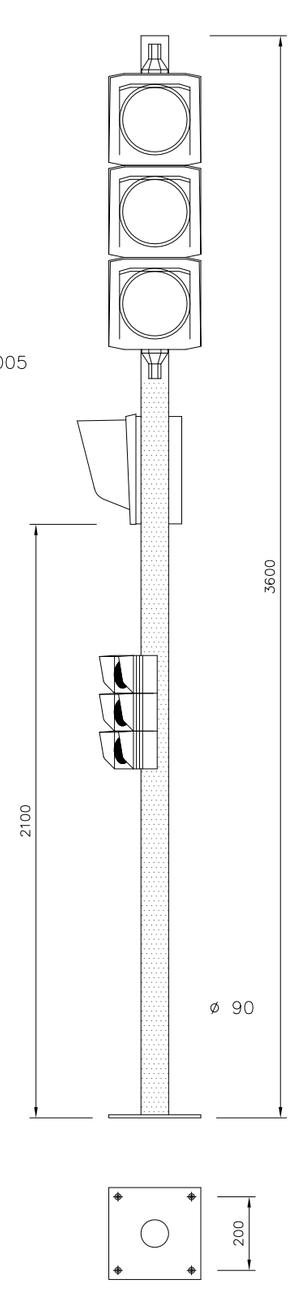
ATLAS CARACTERISTIQUES OF THE SUPPORTS (POSTS and POTELETS)

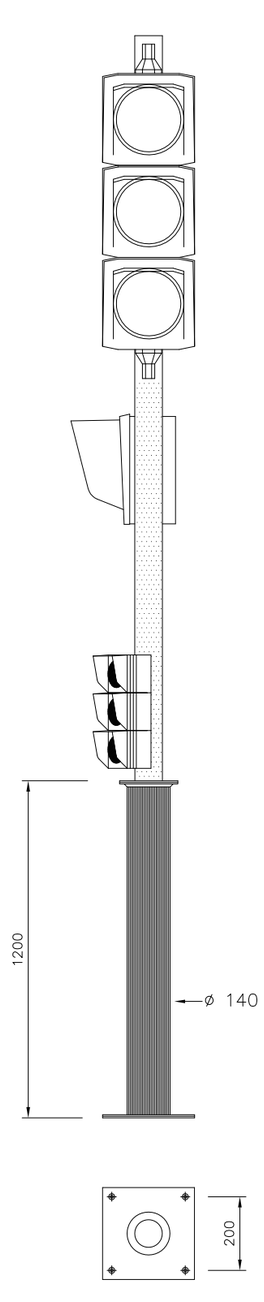
STEEL POST
ø 89 epr.3,2 mm
WEIGHT(naked) 30kg

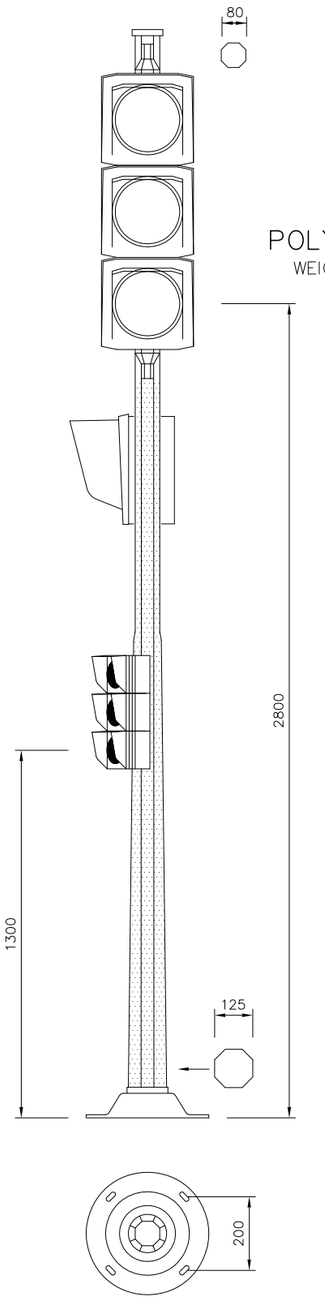
ALU POST
ø 90 epr.5 mm
WEIGHT(naked) 16kg

ALU POST EMBASE REINFORCED
Tube ø alu brushes
Embase ø 140 dark(ral) 9005

OPTION
STEEL POST ø 114
ALU POST ø 110



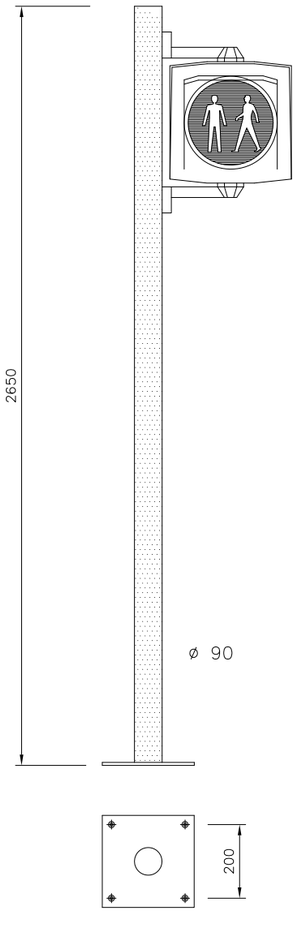




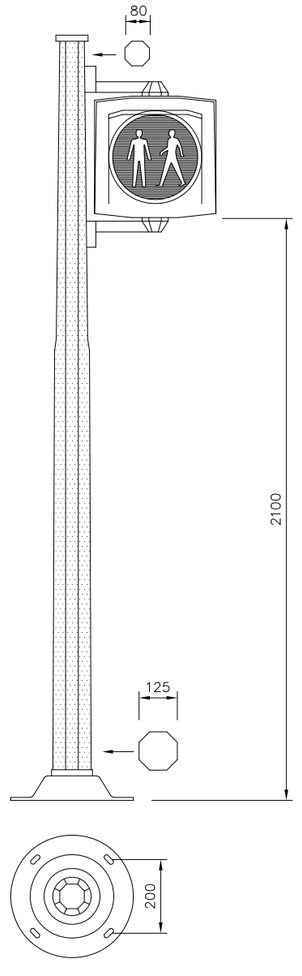
POLYSTER POST
WEIGHT(nake) 13kg

STEEL POST
ø 89 epr.3,2 mm
WEIGHT(nake) 22kg

STEEL POST
ø 90 epr. 5 mm
WEIGHT(nake) 13kg



POLYSTER POTELET
WEIGHT(nake) 10kg



ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

CARACTERISTIC OF THE SUPPORTS

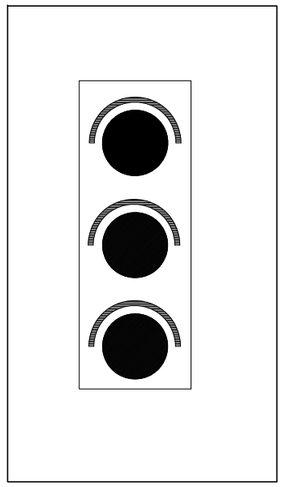
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TSP–006
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

1) THREE ASPECTS SIGNAL HEAD

CONSTITUTED BY THREE ASPECTS THE
COLOR OF WHICH ARE :

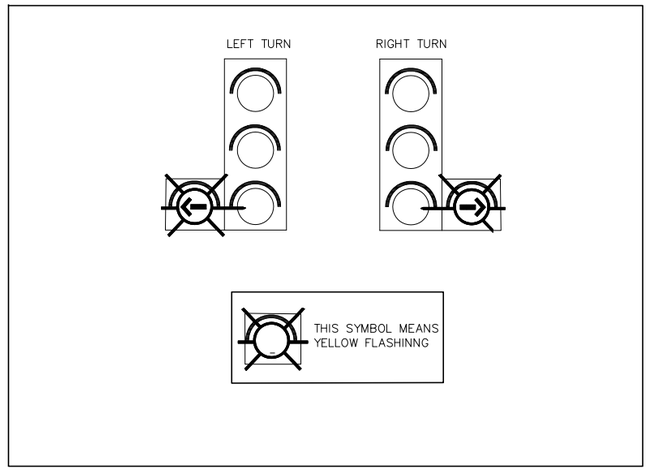
RED	ABOVE
YELLOW	IN THE MIDDLE
GREEN	UNDER

THE THREE ASPECTS HAS A DIAMETER
OF EITHER 200 MM OR 300 MM
NORMALLY THE THREE ASPECTS OF A SAME HEAD HAS
THE SAME DIAMETER, BUT HOWEVER, IF NECESSARY, IT
IS POSSIBLE TO CONSTITUTE SIGNAL HEADS WITH TWO
ASPECTS OF 200 MM (GREEN AND YELLOW) AND ONE
OF 300 MM (RED).
IN URBAN AREAS, WITH NORMAL CONDITIONS OF VISIBILITY AND
ROAD SAFETY, THE DIAMETER 200 MM IS COMMONLY USED

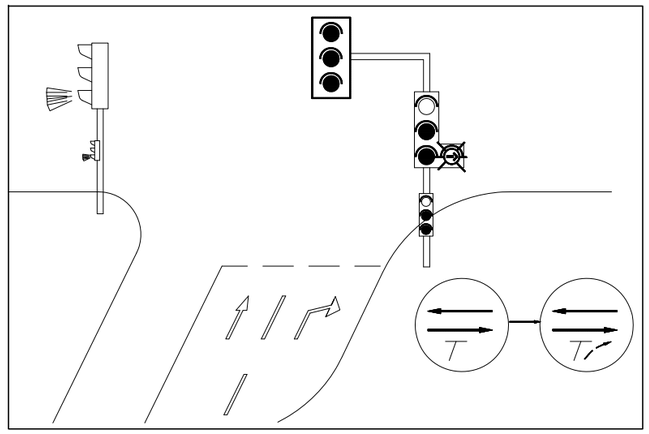


3) ANTICIPATE DIRECTIONAL ASPECTS

YELLOW FLASHING SIGNALS ARE TO BE USED WHEN A PARTICULAR MOVEMENT
CAN BE ACCEPTED OR TOLERATED DURING THE RED PHASE

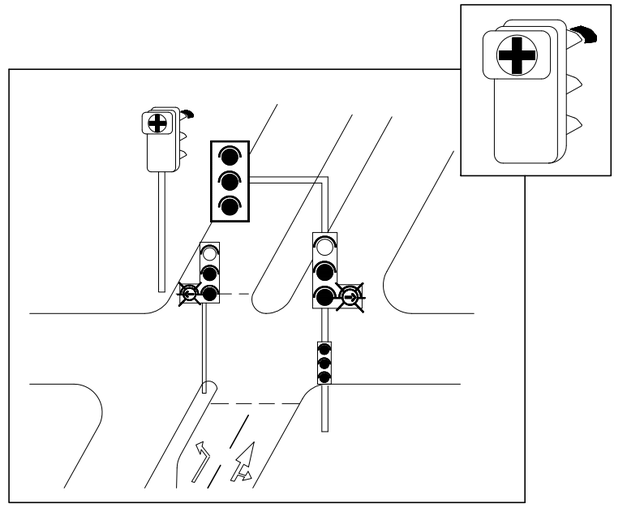


THE MOST SEEN IN THE RIGHT DRIVING COUNTRIES IS THE RIGHT TURN LIKE
SHOWN IN THE FOLLOWING



4) RED GREEN CROSS SIGNAL

WHEN USING A THREE ASPECT SIGNAL HEAD (DIRECTIONAL OR NOT), IT IS POSSIBLE
TO REPEAT THE RED LIGHT ON THE OTHER SIDE IN A SHAPE OF GREEK CROSS WHEN
IT ALLOWS THE VEHICLES COMING FROM THE OPPOSITE ENTRY TO DO THE LEFT TURN
(PARTICULARLY WHEN A PROLONGATION OF GREEN IS NEEDED)
THIS KIND OF ASPECT IS SHOWN IN THE FOLLOWING EXAMPLE :



ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

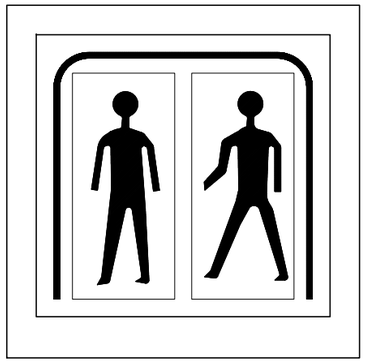
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

EXISTING AND FUTURE TRAFFIC-SIGNAL
IN PROJECT AREA GENERAL PLAN

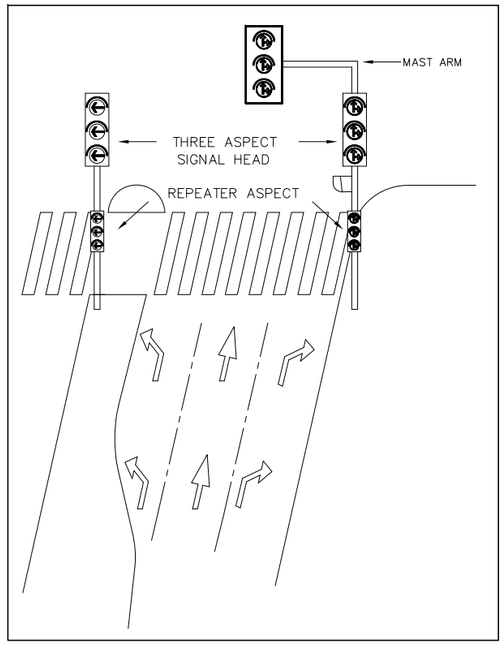
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD-262-17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. TSP-007
							SCALE: NOT TO SCALE

5) PEDESTRIAN ASPECT

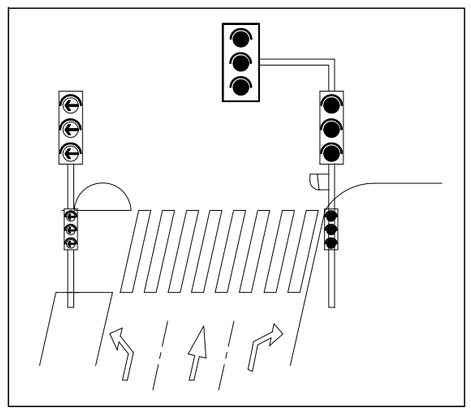
IT IS COMPOSED OF A GREEN PEDESTRIAN WALKING AND A RED PEDESTRIAN STOPPED, HORIZONTALLY FROM RIGHT TO LEFT
THEY CAN BE PUT VERTICALLY, THE GREEN ONE BEING DOWN.
EXAMPLE OF INSTALLATION



6) EXAMPLES OF INSTALLATION

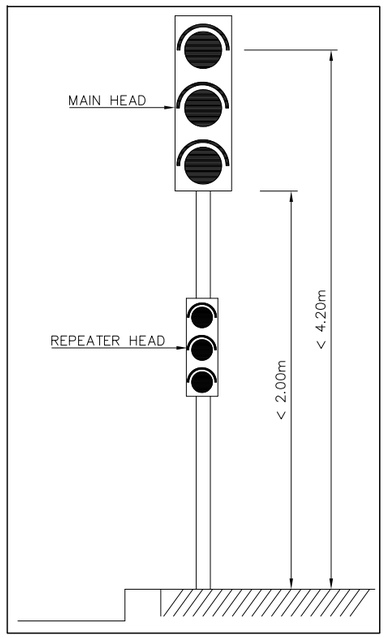


WHEN IT IS NOT POSSIBLE TO PHYSICALLY SEPARATE THE LEFT TURN MOVEMENT, THE DIRECTIONAL ASPECT SIGNALS ARE USED BUT, DIRECTIONAL ARROWS MUST PAINTED IN THE PAVEMENT.
EXCEPTIONALLY, IF THERE IS NO OTHER SOLUTION, IT CAN BE TOLERATED TO INSTALL DIRECTIONAL ASPECTS FOR THE LEFT TURN MOVEMENT.



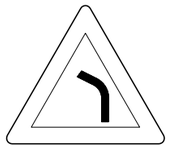
7) REPEATERS

SMALL REPEATER ASPECTS (100 MM) CAN BE USED TO REPEAT THE INFORMATION OF THE MAIN THREE ASPECT SIGNAL HEAD FOR THE DRIVERS BEING JUST IN FRONT OF THE TRAFFIC LIGHTS – THEY MUST GIVE EXECTLY THE SAME INFORMATION AS THE MAIN ONES.

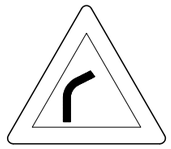


ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG) EXISTING AND FUTURE TRAFFIC-SIGNAL IN PROJECT AREA GENERAL PLAN	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD-262-17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
						CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TSP-008
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

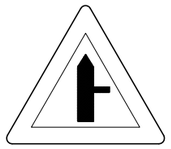
TRAFFIC SIGN AND ROAD MARKING STANDARD



LEFT BEND
W 1–1L

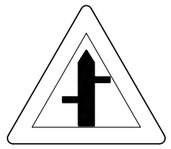


RIGHT BEND
W 1–1R

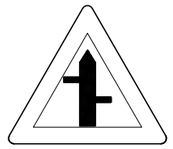


SIDE ROAD ,RIGHT
W 10–2R

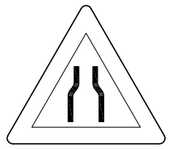
SIDE ROAD , LEFT
W 10–2L



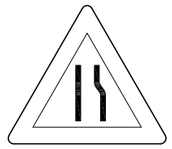
INTERSECTING SIGN
W –15



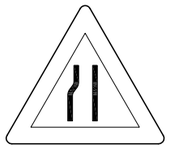
INTERSECTING SIGN
W –16



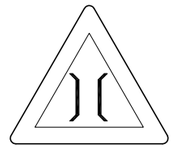
ROAD NARROWS
W 3–1



ROAD NARROWS
KEEP LEFT
W 3–2

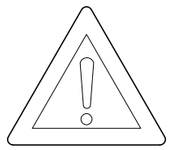


ROAD NARROWS
KEEP RIGHT
W 3–3

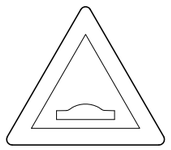


NARROW BRIDGE
W 4–1

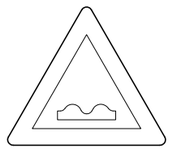
ROAD WORKS
W 5–1



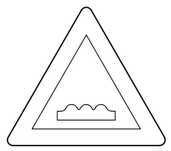
OTHER DANGER
W 5–2



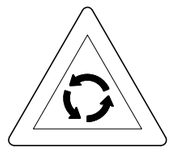
HUMP
W 6–1



ROUGH ROAD
W 6–2

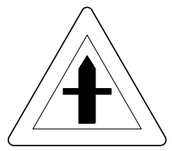


RUMBLE STRIP
W 6–3

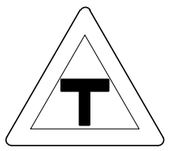


TRAFFIC ROTARY
W 8–1

SLIPPERY ROAD
W 9–1



INTERSECTION WITH A NON
PRIORITY ROAD
W 10–1

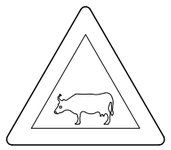


MERGE WITH
NON–PRIORITY ROAD
W 33–1

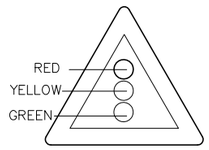
CHILDREN CROSSING
W 11–1

PEDESTRIAN CROSSING
W 12–1

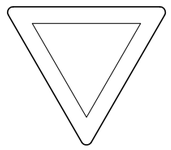
PEDESTRIAN CROSSING
W 12–2



ANIMALS CROSSING
W 14 –1



SIGNALS AHEAD
W 15–1

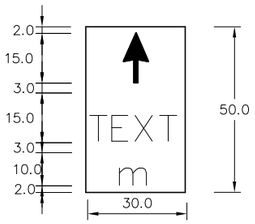


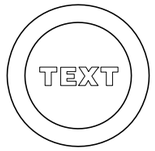
GIVE WAY
W 22–1

NOTES:

1. THE SYMBOLS OF ROAD SIGNS ARE TAKEN FROM THE DRAWING " ROAD SIGNS STANDARDS No. 1 – 6 " PREPARED BY MINISTRY OF COMMUNICATION TRANSPORT POST AND CONSTRUCTION
2. PAINTING OF THE SINGS REFER TO HANDBOOK " TRAFFIC" REGULATION " No 1122/MTCPC AUGUST 1995

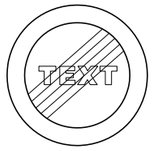
ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	TRAFFIC CONTROL DEVICES ROAD SIGNS SYMBOLS OF WARNING SIGNS					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–001
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE





SPEED LIMIT XX km/h

R 3–1

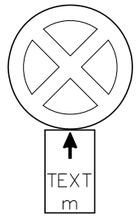


END OF SPEED LIMIT XX km/h

R 13/3–1

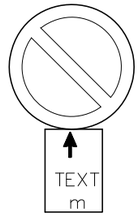
NO INT

R 4–1



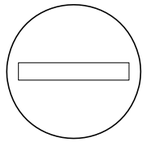
RESTRICRED STOPPING AND PARKING

R 4–2



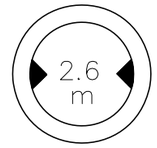
RESTRICRED STOPPING OR WAITING

R 4–3



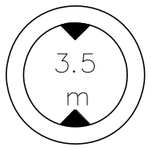
ENTRY PROHIBITED

R 5–1



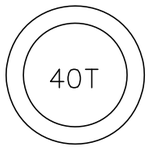
NO ENTRY FOR VEHICLES HAVINGOVERALL WIDTH EXCEEDING2.6 METERS

R 7–1



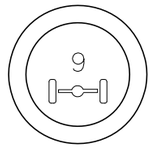
NO ENTRY FOR VEHICLES HAVING OVERALL HEIGHT EXCEEDING 3.5 METERS

R 7–2



NO ENTRY FOR VEHICLES EXCEEDING 40 TONS LADEN WEIGHT HAVING

R 7–3



NO ENTRY FOR VEHICLES AXLE WEIGHT EXCEEDING 9 TONS ON ONE AXLE

R 7–4

NO DRIVING AT DISTANCE LESS THAN70 METERS

R 7–6

NO LEFT TURN

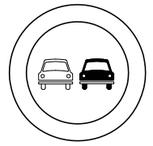
R 8–1

NO RIGHT TURN

R 8–2

NO U TURN

R 8–3



OVERTAKING PROHIBITED

R 9–1

OVERTAKING BY TRUCKS PROHIBITED

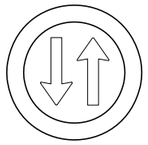
R 9–2

USE OF HORNS PROHIBITED

R 10–1

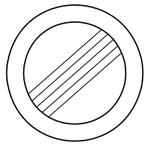
STOP CUSTOMS

R 11–1



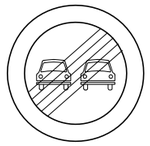
PRIORITY TO BE GIVEN TO VEHICLES COMING IN THE OPPOSITE DIRECTION

R 12–1



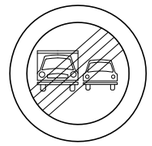
END OF ALL PROHIBITIONS

R 13



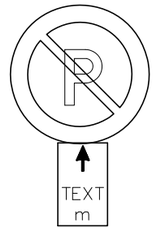
END OF OVERTAKING PROHIBITED

R 13/9–1



END OF PROHIBITION OF OVERTAKING BY TRUCKS

R 13/9–2



PARKING AND STOPPING PROHIBITED

R 14–1

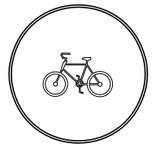
NOTES:

1. THE SYMBOLS OF ROAD SIGNS ARE TAKEN FROM THE DRAWING " ROAD SIGNS STANDARDS No. 1 – 6 " OF COMMUNICATIONS
2. PAINTING OF THE SINGS REFER TO HANDBOOK "TRAFFIC REGULATION " No 1122/MTCPC AUGUST 1995

ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	TRAFFIC CONTROL DEVICES PROHIBITORY ROAD SIGNS AND RESTRICTIVE SIGNS					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–002
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

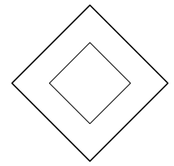
STOP
R 2–2

PRIORITY MOTOR, VEHICLES, MOTOR CYCLES BUSES
R 2–3

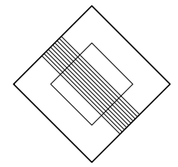


COMPULSORY CYCLE TRACK
R 2–4

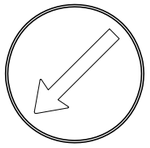
CONPULSORY FOR PEDESTRIANS
R 2–5



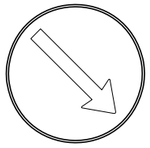
PRIORITY ROAD
R 19–1



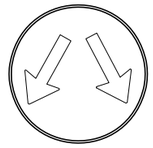
END OF PRIORITY ROAD
R 19–2



LEFT DETOUR DIRECTION TO BE FOLLOWED
R 15–1

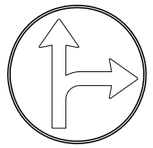


RIGHT DETOUR DIRECTION TO BE FOLLOWED
R 15–2

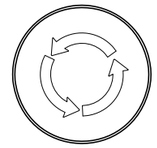


LEFT DETOUR DIRECTION AND RIGHT TO BE FOLLOWED
R 15–3

STRAIGHT DIRECTION OR TURN LEFT TO BE FOLLOWED
R 17–7l

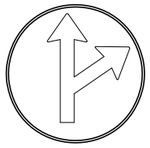


STRAIGHT DIRECTION OR TURN RIGHT TO BE FOLLOWED
R 17–7r



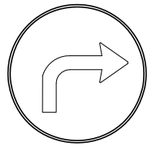
ROUNDABOUT
R 18–1

LEFT DIRECTION OR RIGHT TO BE FOLLOWED
R 16–1

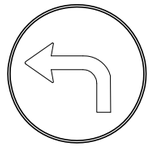


STRAIGHT DIRECTION OR RIGHT TO BE FOLLOWED
R 16–2

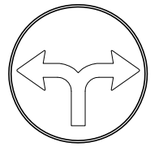
STRAIGHT DIRECTION OR LEFT TO BE FOLLOWED
R 16–3



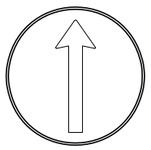
TURN RIGHT DIRECTION TO BE FOLLOWED
R 17–6r



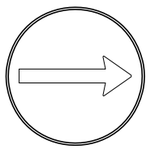
TURN LEFT DIRECTION TO BE FOLLOWED
R 17–6l



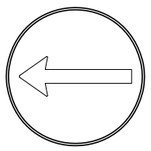
TURN LEFT DIRECTION OR TURN RIGHT TO BE FOLLOWED
R 17–5



STRAIGHT DIRECTION TO BE FOLLOWED
R 17–0



RIGHT DIRECTION TO BE FOLLOWED
R 17–2r



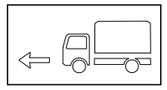
LEFT DIRECTION TO BE FOLLOWED
R 17–2l

MANDATORY MOVEMENT
R 17–3

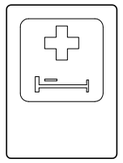
NOTES:

THE SYMBOLS OF ROAD SIGNS ARE TAKEN FROM THE DRAWING " ROAD SIGNS STANDARDS No. 1 – 6 " OF COMMUNICATIONS

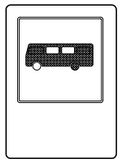
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	TRAFFIC CONTROL DEVICES SIGNS TORY SIGNS					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–003
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE



TRUCK TURNING LEFT
I 12–3



HOSPITAL
I 10–2

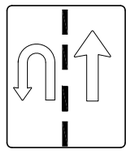


BUS STOP
I 32

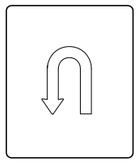
GENERAL PARKING
I 20–1

PEDESTRIAN CROSSING
I 39–1

PEDESTRIAN CROSSING
I 39–2



KEEP LEFT U–TURN
KEEP RIGHT STRAIGHT
I 5–4



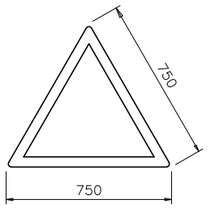
U–TURNING
I 23

NOTES:

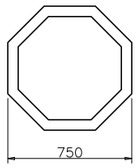
1. THE SYMBOLS OF ROAD SIGNS ARE TAKEN FROM THE DRAWING " ROAD SIGNS STANDARDS No. 1 – 6 " PREPARED BY MINISTRY OF PUBLIC WORKS AND TRANSPORT
2. PAINTING OF THE SINGS REFER TO HANDBOOK "TRAFFIC" REGULATION " No 1122/MTCPC AUGUST 1995 "

ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	INFORMATIVE ROAD SIGNS					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–004
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

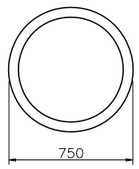
WARNING SIGN



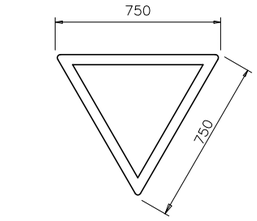
REGULATORY SIGN



PROHIBITORY SIGN

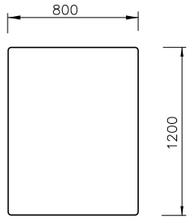


GIVEWAY SIGN

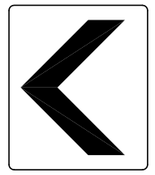


A 1–1

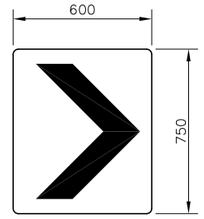
GUIDE SIGN



CHEVRON SIGNS MOUNTING AT TRAFFIC LINE CHANGE

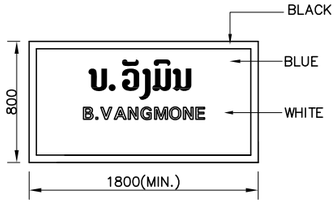


D01L

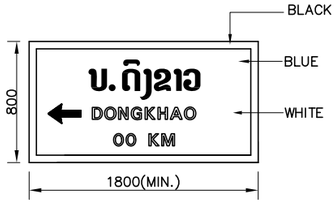


D01R

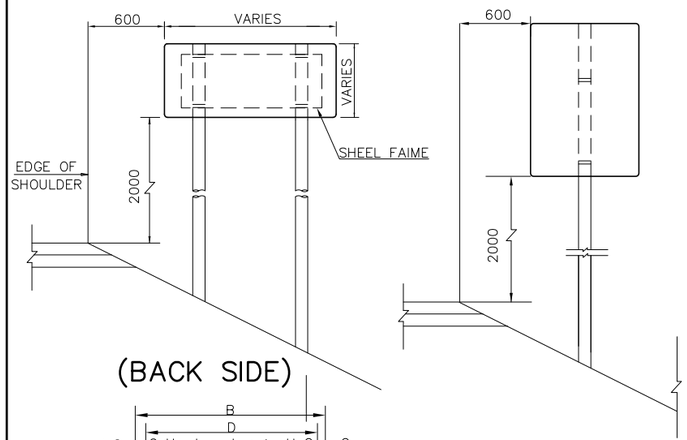
PLACE IDENTIFICATION



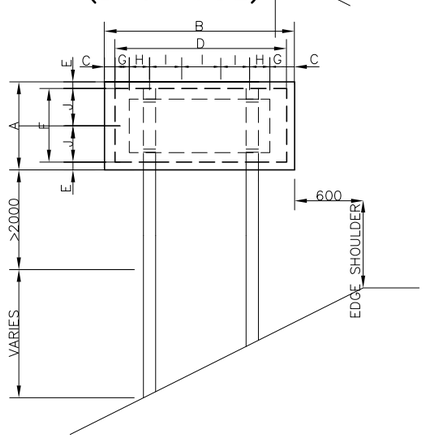
DIRECTION SIGN



INFORMATION SIGN (FORE SIDE)

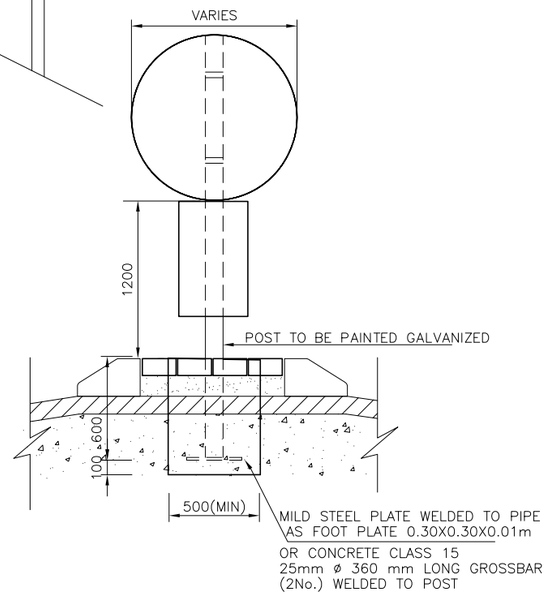


(BACK SIDE)



INSTALLATION OF SIGN POST FOR ISLAND

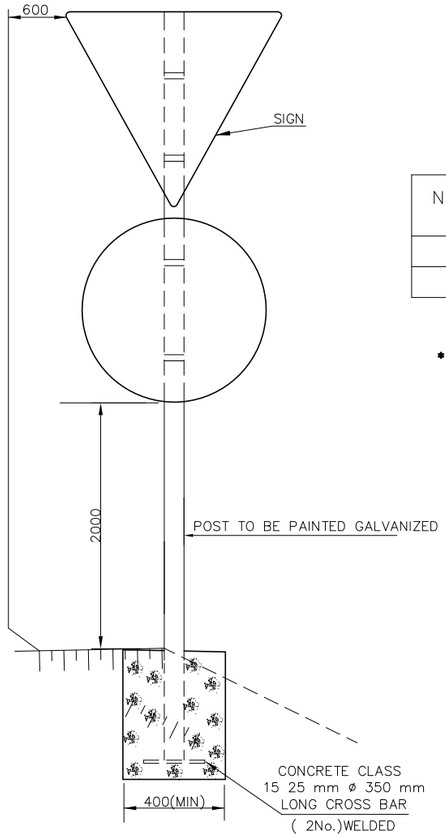
NOT TO SCALE



SIGN SIZE (CM)		DIMENSION (CM)							
WIDTH A	LENGTH B	C	D	E	F	G	H	I	J
75 30	210 240	5 20	200 200	5 12.5	65 65	7.5 7.5	17.5 17.5	50 50	32.5 32.5
60 75	210 240	5 20	200 200	5 12.5	50 50	7.5 7.5	17.5 17.5	50 50	25 25
75 90	180 180	5 5	170 170	5 12.5	65 65	7.5 7.5	27.5 27.5	50 50	32.5 32.5
60 75	180 180	5 5	170 170	5 12.5	50 50	7.5 7.5	27.5 27.5	50 50	25 25
65 90	180 180	5 5	170 170	5 12.5	55 55	7.5 7.5	27.5 27.5	50 50	27.5 27.5

ADVANCE DIRECTION SIGN FIXING DETAILS

INSTALLATION OF SIGN POST



POST TYPE A2

NOT TO SCALE

NARROW PORTION OF SIGN	EDGE SIGN LINE	SIGN CENTERLINE	SIGN CURVE RADIUS
800	60	50	30.7
900	70	60	40.5

***THE NUMBER IN THIS TABLE ARE IN MM**

NOTES:

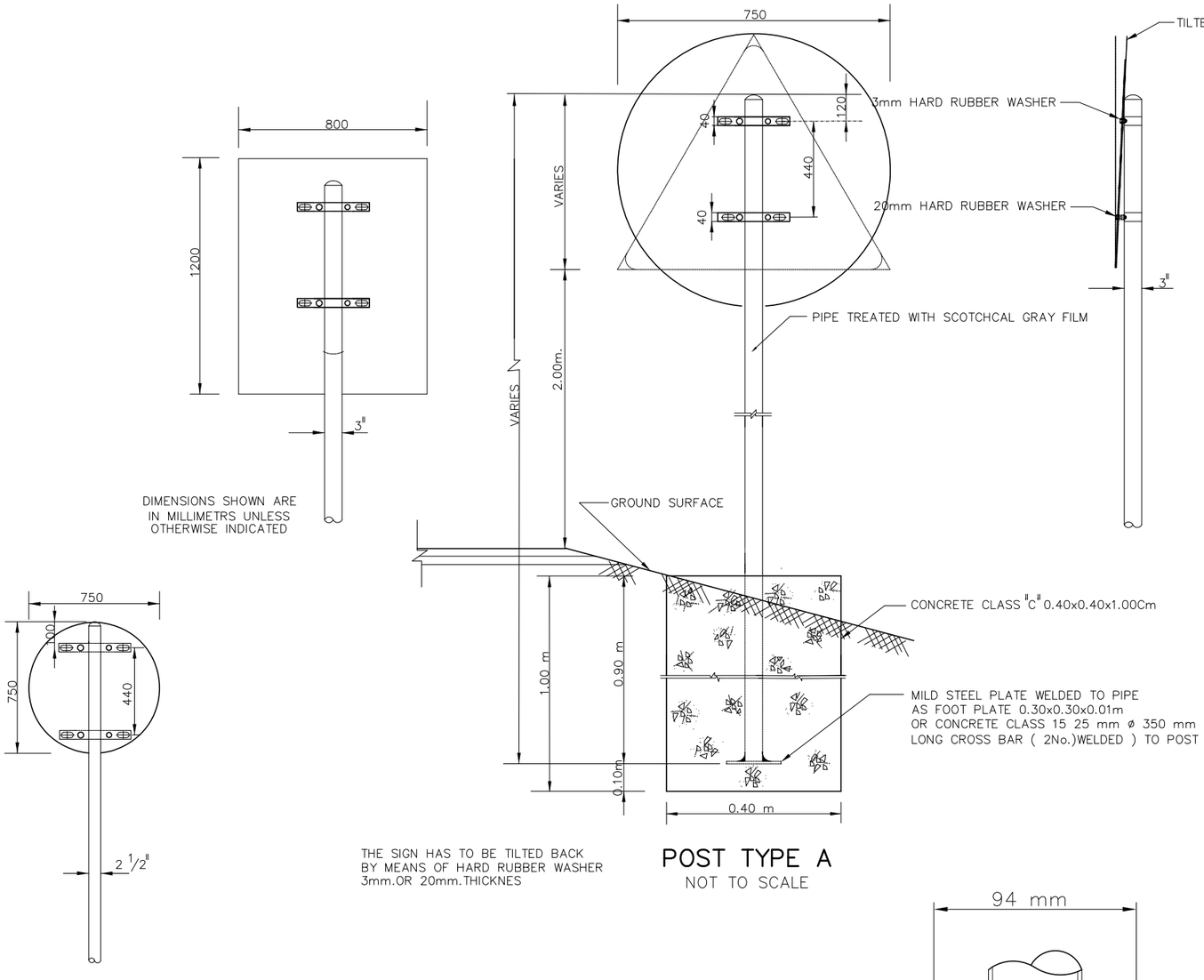
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. SIGN PLATE SHALL BE MADE OF 2mm. THICK ALLUMINIUM ALLOY.
3. ALLUMINIUM ALLOY SIGN PLATE SHALL CONFORM TO.
4. UNLESS OTHERWISE INDICATED SIGNS AND THEIR SUPPORTS SHALL BE OF THE SIZES, COLOURS AND TYPES PRESCRIBED BY, AND SITE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE DEPARTMENT'S TRAFFIC CONTROL DEVICE MANUAL, PART I ISSUED.
5. REFLECTIVE SHEETING SHALL CONFORM TO ENGINEER GRADE AND HIGH INTENSITY GRADE
6. SIGN FRAME SHALL BE MADE OF 50x25x1.6mm. STEEL RECTANGULAR TUBING FRAME WELDED AND SMOOTHED IN PRIMING. PAINT FOR FRAME SHALL BE RUST PREVENTIVE PAINT (RED LEAD BASED PRIMER FOR IRON AND STEEL SURFACED ,TYPE 3) WHICH CONFORMS TO; THE SUCCEEDING COATING SHALL BE PAINTED WITH BLACK METAL PAINT.
7. LENGTH OF SIGN POSTS AND POSITIONS OF HOLES STATED IN THE DRAWING ARE FOR THE MIN. SIZE ONLY. THESE LENGTHS AND POSITION OF HOLES SHALL BE ADJUSTED DEPENDING ON SITE CONDITIONS.
8. BACK OF SIGN, CLOSE TO EDGE OF PAVEMENT SIDE, SHALL BE STAMPED WITH DEPTH NOT LESS THAN 0.5 mm.
9. CONCRETE SHALL MEET THE REQUIREMENTS OF CONCRETE CLASS 15.
10. CLEAR CONCRETE COVER SHALL BE 30mm.
11. REINFORCING STEEL SHALL CONFORM TO AASHTO M 31.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

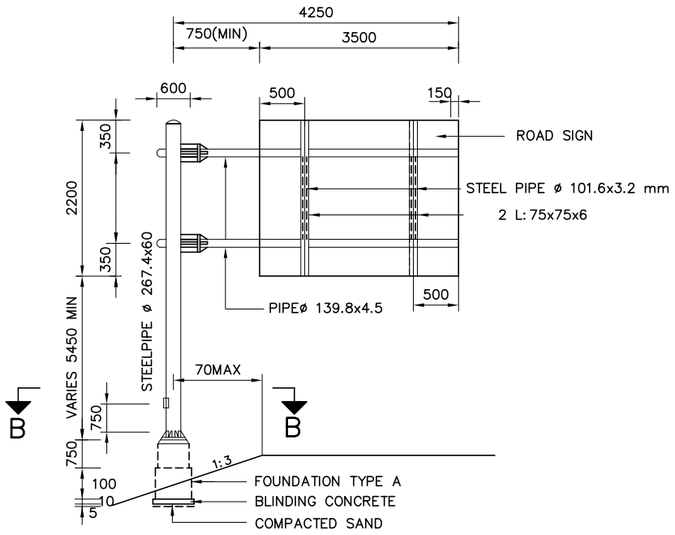
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES ROAD SIGNS GENERAL LAYOUT OF SIGNS

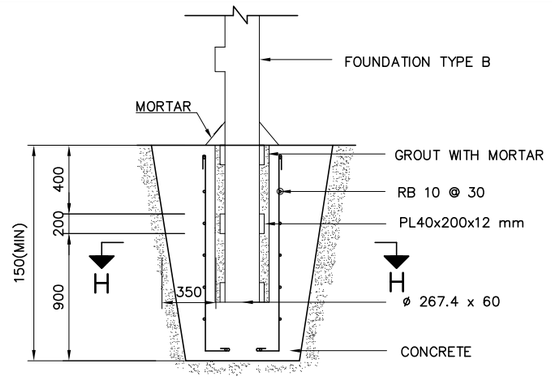
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–005
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE



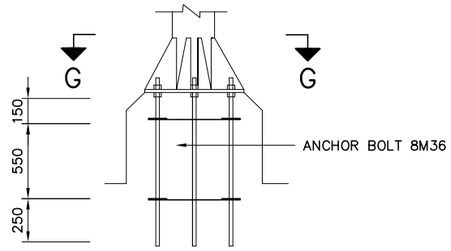
ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	SIGNS INSTALLATION					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–006
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN



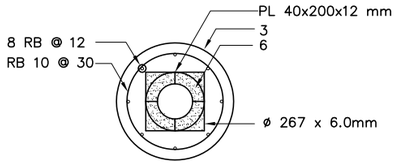
OVERHANGING ROAD SIGN TYPE A
NOT TO SCALE



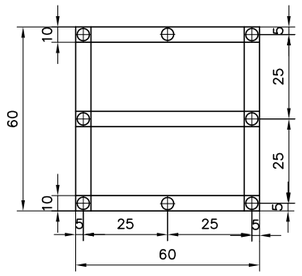
FOUNDATION TYPE B
NOT TO SCALE



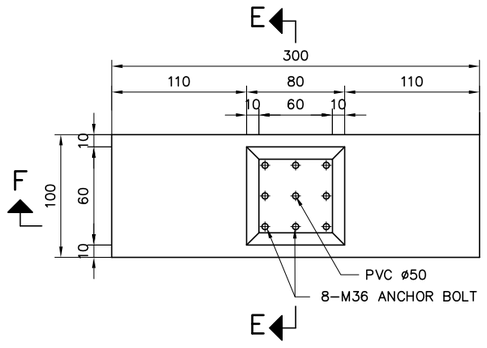
ANCHOR BOLT DETAIL
NOT TO SCALE



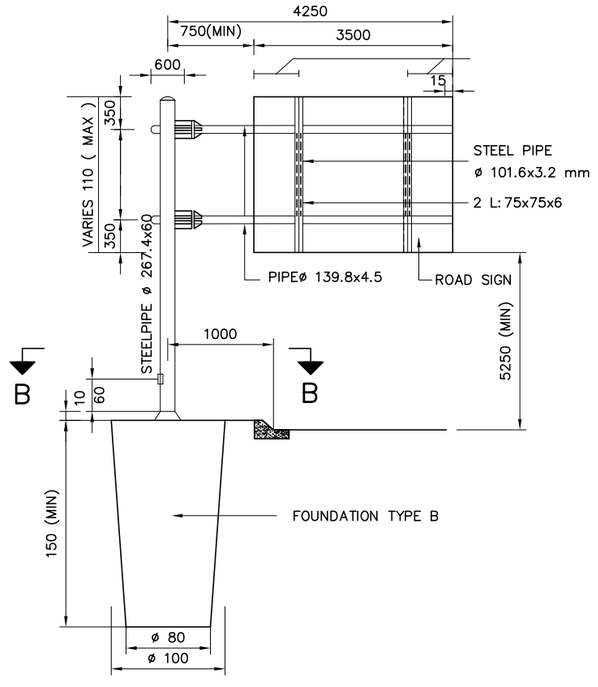
SECTION H–H
NOT TO SCALE



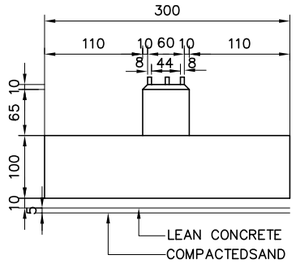
SECTION G–G
NOT TO SCALE



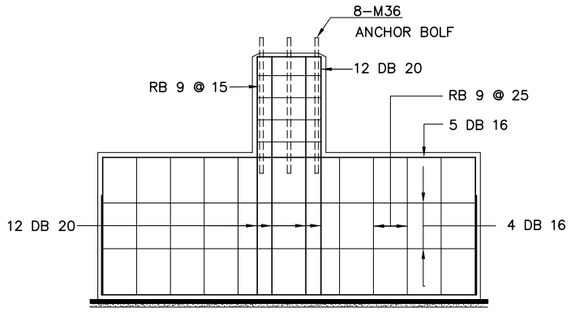
PLAN OF FOUNDATION TYPE A
NOTTO SCALE



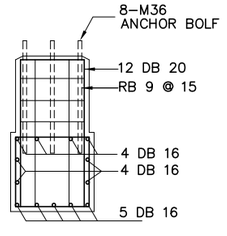
OVERHANGING TRAFFIC SIGN TYPE B
NOT TO SCALE



FRONT OF FOUNDATION TYPE A
NOT TO SCALE



SECTION F–F
NOT TO SCALE



SECTION E – E
NOT TO SCALE

NOTES:

1. DIMENSIONS FOR WELDING SYMBOLS ARE IN MILLIMETERS, ALL OTHER DIMENSIONS ARE IN CENTIMETERS UNLESS OTHERWISE INDICATED.
2. THIS DRAWING SHALL BE USED FOR TRAFFIC SIGNS, WHERE THE AREA OF THE SIGN INCLUDING THE CAPS BETWEEN PLATES IN NOT MORE THAN 52,800 SQ.CM. THE MAXIMUM LENGTH AND WIDTH OF THE SIGN SHALL NOT EXCEED 350 CM. AND 220 CM. RESPECTIVELY.
3. THE FOUNDATION TYPE (A) SHALL BE USED IN A SIDE SLOPE AREA AND FOUNDATION TYPE (B) SHALL BE USED IN A SIDEWALK OR RAISED MEDIAN.
4. THE ALLOWABLE SOIL BEARING CAPACITY UNDER THE FOUNDATION TYPE (A) SHALL BE MORE THAN 5 TONS PER SQ.M. EMBANKMENT AROUND FOUNDATION TYPE (B) SHALL BE COMPACTED TO 90% OF THE MAXIMUM STANDARD DRY DENSITY.
5. THE DIMENSIONS OF STEEL PIPE SHOWN ARE THE OUTER DIAMETER AND THE THICKNESS OF THE PIPE FOR EXAMPLE; ø267.4 X 6.0 MM. MEANS THE OUTER DIAMETER OF THE PIPE IS 267.4 MM. AND THE THICKNESS IS 6.0MM.
6. STEEL PIPE SHALL CONFORM TO ONE OF THE FOLLOWING SPECIFICATIONS
   - 6.1 TIS. 107 GRADE HS 41
   - 6.2 JIS. G34444 GRADE STK 41
   - 6.3 ASTM. A252–75 GRADE 2
7. STRUCTURAL STEEL SECTION SHALL CONFORM TO TIS 116 GRADE Fe 24.
8. STEEL PIPE, STRUCTURAL STEEL SECTION, STEEL PLATE, BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED. ZINC COATING SHALL NOT BE LESS THAN 550 GRAMS PER SQUARE METER.
9. ELECTRIC ARC WELDING WHICH CONFORMS TO AISC STANDARD SHALL BE USED FOR WELDING STEEL.
10. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210KSC. FOR 15 X 15 X 15 CM. CUBE AT 28 DAYS. AN APPROXIMATE MIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOWS:

PORTLAND CEMENT TYPE 1	350	KG. (MIN.)
SAND	0.43	M^3
CRUSHED ROCK OR GRAVEL	0.86	M^3
CONCRETE SLUMP	10	CM.(MAX.)

11. MORTAR SHALL BE COMPRISED OF PORTLAND CEMENT AND SAND IN THE PROPORTION 1 TO 1
12. REINFORCING STEEL SHALL CONFORM TO TIS.20 GRADE SR 24 FOR ROUND BARS AND TIS. 24 GRADE SD 30 FOR DEFORMED BARS.
13. CANTILEVER BEAM SHALL BE INSTALLED PERPENDICULAR TO THE ROADWAY ALIGNMENT. CAMBER SHALL BE PROVIDED FOR BEAM DEFLECTION.
14. WHERE SIGN LIGHTING IS REQUIRED, THE ELECTRICAL COMPONENTS SHALL CONFORM TO THE ELECTRICITY SUPPLY AUTHORITY'S REQUIREMENTS AND REGULATIONS.

ລ.ວ.ຄ LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

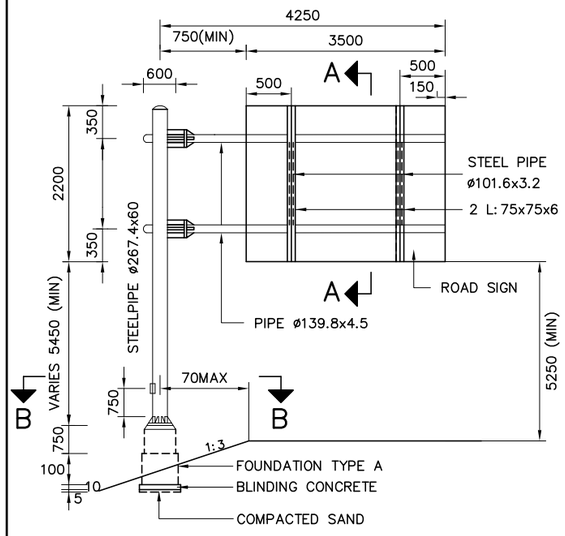
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
OVERHANGING ROAD SIGNS
FOUNDATIONS

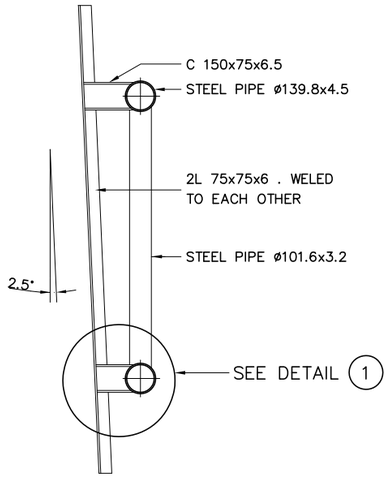
REV.	DATE	DESCRIPTION	APPROVED

	NAME	SIGNATURE
DESIGNED	Mr.Souksavanh SYPHAKHAM	
CHECKED	Mr.Khamphone SORPHABMIXAY	
APPROVED	Mr.Vandy VORASACK	

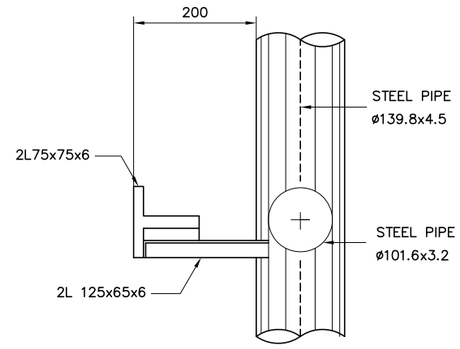
LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–007
SCALE: NOT TO SCALE



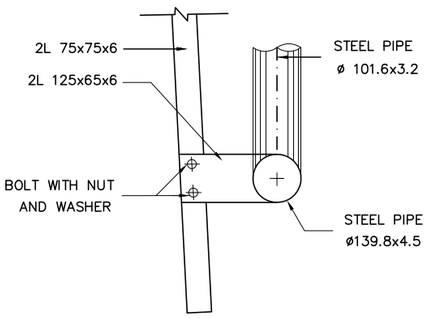
OVERHANGING ROAD SIGN TYPE A



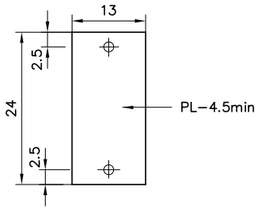
SECTION A–A
NOT TO SCALE



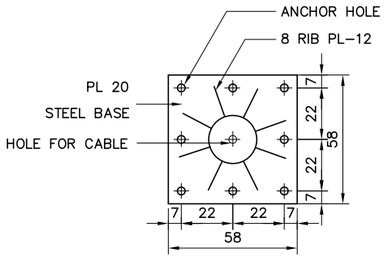
DETAIL OF TRAFFIC SIGN JOINT VIEW FROM TOP TO BOTTOM



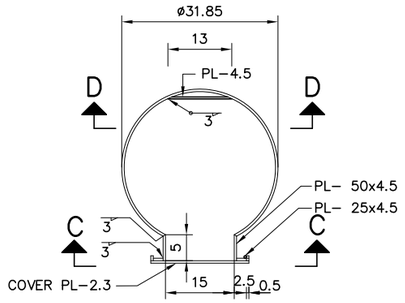
DETAIL 1



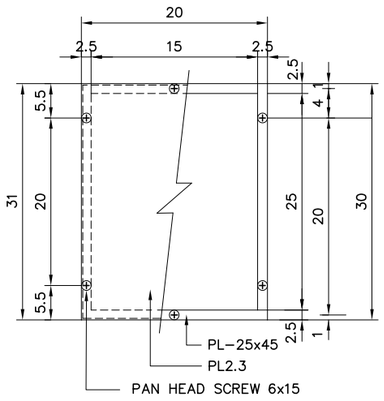
SECTION D–D



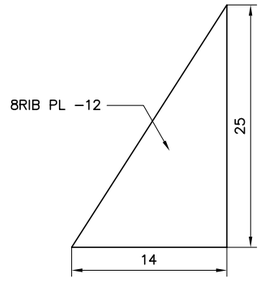
BASE OF STEEL POLE

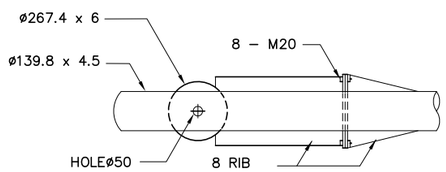


SECTION B–B
NOT TO SCALE

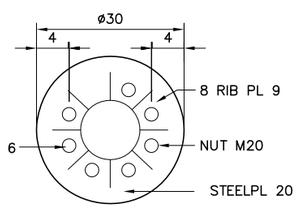


SECTION C – C





DETAIL OF STEEL POLE JOINT
NOT TO SCALE



BAR MARK		DIAMETRE ømm	LENGTH (m)	NUMBER	TOTAL LENGTH	WEIGHT (kg)
5 DB 16	285; 5; 80	16	4.55	5	22.75	35.94
4 DB 16	285; 5; 85	16	4.65	4	18.60	29.38
RB 9 @ 25	90; 90	9	3.70	12	44.4	22.15
4 DB 16	5; 287.5	16	2.975	4	11.9	18.80
12 DB 20	160	20	1.60	12	19.2	47.42
RB 9 @ 15	60; 60	9	2.50	5	12.5	6.23

NOTES

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LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
OVERHANGING ROAD SIGNS
STEEL POLE

REV.	DATE	DESCRIPTION	APPROVED

	NAME	SIGNATURE
DESIGNED	Mr.Souksavanh SYPHAKHAM	
CHECKED	Mr.Khamphone SORPHABMIXAY	
APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–008
SCALE: NOT TO SCALE

REVERSE BEND R–L
W 1–4R

REVERSE BEND L–R
W 1–4R

DANGEROUS,Z,BENDS R–L
W 1–3R

DANGEROUS Z BENDS R–L
W 1–3L

ROAD NARROWS
W 3–1

ROAD NARROWS
KEEP LEFT
W 3–2

ROAD NARROWS
KEEP RIGHT
W 3–3

NARROW BRIDGE
W 4–1

OTHER DANGER
W 5–2

ROAD WORKS
W 5–1

SLIPPERY ROAD
W 9–1

LOOSE GRAVEL
W 9–2

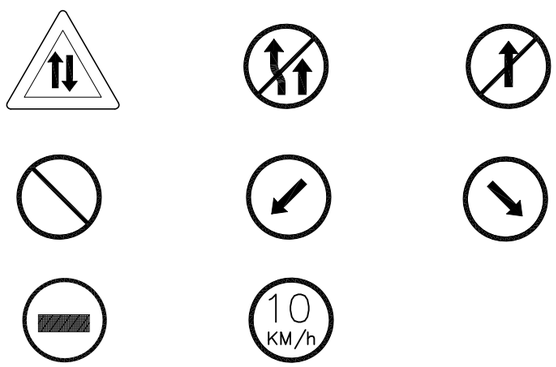
FALLING ROCKS OR SOILS
W 9–3

ROAD LEADS TO
QUAY OR RIVER BANK
W H–1

OPENING BRIDGE
W H–2

WARNING SIGNS MOUNTING AT APPROACHING WORKING SITE

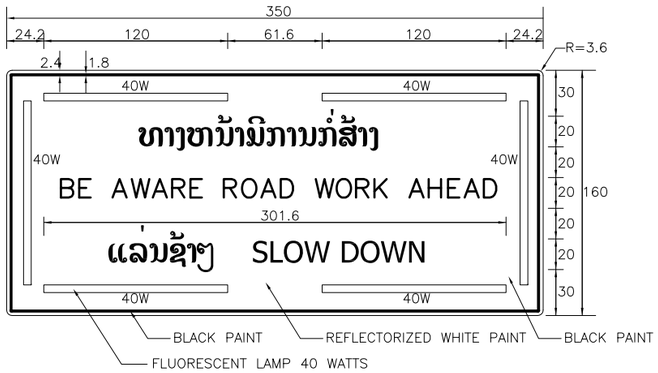
NOT TO SCALE

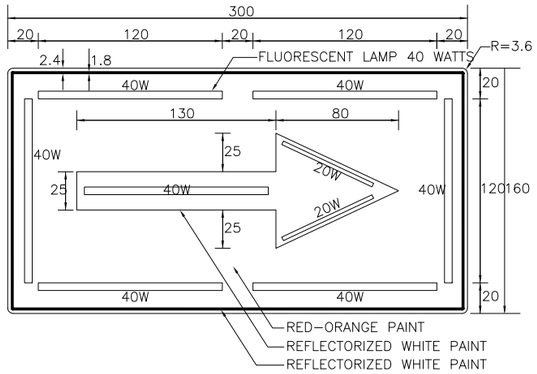


SIGNS TO CONTROL SPEED

NOT TO SCALE

TRAFFIC SIGN CONTROLLED PATTERN		SIZE (CM.)	LETTER SIZE 1 ST ROW	LETTER SIZE 2 ND ROW	TRAFFIC SIGN CONTROLLED PATTERN	REFLETO–RIZED PROPERTIES	COLOUR ON BOARD
ROAD SIGNS MOUNTING AT BEGINNING AND END OF PROJECT	2–90 –90	90 x 240	20	15	FOR EXISTING ROAD CONSTRUCTION	REFLECT	RED–ORANGE
	2–90 –90	90 x 240	20	15	FOR EXISTING ROAD CONSTRUCTION	REFLECT	RED–ORANGE
	2–91 –90	90 x 240	20	15	FOR NEW ROAD CONSTRUCTION THAT ALLOWS SOME TRAFFIC		RED–ORANGE
	2–91 –90	90 x 240	20	15	FOR NEW ROAD CONSTRUCTION THAT ALLOWS SOME TRAFFIC		RED–ORANGE
	3–100 –240	240 x 360	FOR		MOUNTING AT BEGINNING OF PROJECT		WHITE
	3–100 –240	240 x 360	1ST–2ND ROW AND		MOUNTING AT BEGINNING OF PROJECT		WHITE
			OTHER	20			
	3–101–75	75 x 360	20	–	MOUNTING WITH 3–f100 –240 SIGN BOARD		WHITE
			1ST–2ND ROW	15	MOUNTING ALONE		WHITE
			3RD ROW	20			
	3–102 –120	120 x 240	25	15	MOUNTING AT BEGINNING OF PROJECT	REFLECT	RED–ORANGE
	3–103–120	120 x 240	25	15	MOUNTING AT END OF PROJECT	REFLECT	RED–ORANGE
ROAD SIGNS MOUNTING AT OPENING WORK SITE	2–93 –90	90 x 240	20	20	MOUNTING AT 200 M. BEFORE APPROACHING	REFLECT	RED–ORANGE
	2–93 –90	90 x 240	20	20	MOUNTING AT 200 M. BEFORE APPROACHING	REFLECT	RED–ORANGE
	3–94 –90	90 x 180	20	20	MOUNTING AT 200 M. BEFORE APPROACHING	REFLECT	RED–ORANGE
	3–95 –90	75 x 120	15	15	MOUNTING AT END OF WORK SITE	REFLECT	RED–ORANGE
TEMPORARY ROAD GUIDE SIGNS	3–92 –90	90 x 135	10	10	MOUNTING WITH 3–90 OR 3–91 SIGN BOARD		WHITE





NOTES :

1. THE SIGNS WITH FLUORESCENT LAMP SHALL BE MOUNTED FOR ROAD WHICH ADT EXCEEDS 4,000 VEHICLE/DAY.
2. ALL DIMENSIONS ARE IN CENTIMETERS UNLESS OTHERWISE INDICATED.

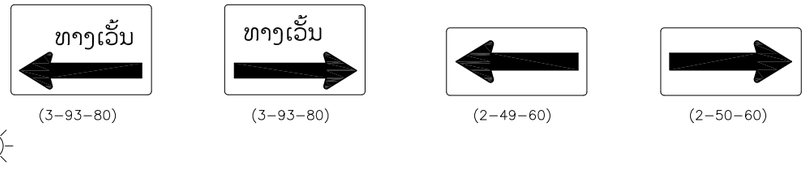
ລ.ວ.ຄ
LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົ້ນຄວ້າ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES FOR HIGHWAYS UNDER CONSTRUCTION–I

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–009
SCALE: NOT TO SCALE



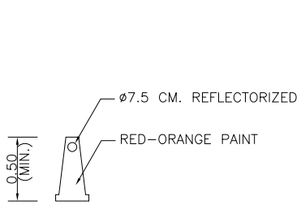
SIGNS TO INDICATE ROAD OBSTRUCTION

NOT TO SCALE

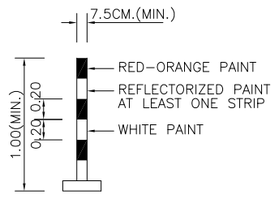
TRAFFIC SIGN CONTROLLED PATTERN		SIZE (CM.)	LETTER SIZE 1ST ROW	LETTER SIZE 2ND ROW	RECOMMENDED LOCATION	REFLECTORIZED PROPERTIES	COLOUR ON BOARD
ROAD SIGNS MOUNTING AT TRAFFIC LINE CHANGE OR TRAFFIC CONTROL ARE REQUIRED	3-93-80	80x120	15		WHERE SIGN BOARD IS VISIBLE WITH NOT LESS THAN 200 M.	REFLECT	RED-ORANGE
	3-93-80	80x120	15		WHERE SIGN BOARD IS VISIBLE WITH NOT LESS THAN 200 M.	REFLECT	RED-ORANGE
	2-49-60	60x120	–	–	MOUNTING WHERE TRAFFIC LINE CHANGE	REFLECT	RED-ORANGE
	2-50-60	60x120	–	–	MOUNTING WHERE TRAFFIC LINE CHANGE	REFLECT	RED-ORANGE
	2-42-90	UPPER SIGN BOARD 90x90	–	–	MOUNTING AT BEGINNING OF TWO-WAY TRAFFIC	REFLECT	RED-ORANGE
SIGNS TO INDICATE ROAD OBSTRUCTION	2-62-60	60x75	–	–	MOUNTING AT HORIZONTAL CURVE	REFLECT	RED-ORANGE
	2-63-60	60x75	–	–	MOUNTING AT HORIZONTAL CURVE	REFLECT	RED-ORANGE
TRAFFIC CHANNELIZATION INSTRUMENTS	CONE OR POST	–	–	–	TO INDICATE TRAFFIC LINE OR SIDE ROAD OBSTRUCTION LINE, MOUNTING @ 30 M.(MAX.) INTERVAL		
	VERTICAL PANEL	–	–	–	TO INDICATE TRAFFIC LINE OR SIDE ROAD OBSTRUCTION LINE		
	BARREL RAIL LIGHTING	–	–	–	FOR ROAD WHICH ADT EXCEEDS 8,000 VEHICLE/DAY		
SIGNS TO INDICATE ROAD OBSTRUCTION	FLASHER 9 YELLOW REFLECTORIZED CIRCLES TARGET	7.5x7.5	–	–	FOR ROAD WHICH ADT EXCEEDS 8,000 VEHICLE/DAY FOR ROAD WHICH ADT EXCEEDS 4,000 VEHICLE/DAY		
BARRICADE	SIDE ROAD BARRICADE TO REDUCE SPEED	–	–	–	MOUNTING WITH SPACING 50-100 M. APPROXIMATE, TAPERING TO PAVEMENT EDGE		

ROAD SIGN MOUNTING AT TRAFFIC LINE CHANGE OR TRAFFIC CONTROL

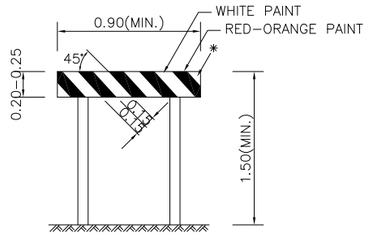
NOT TO SCALE



CONE

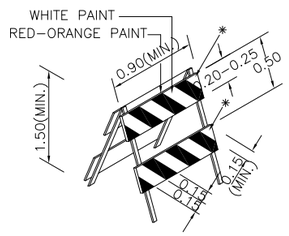


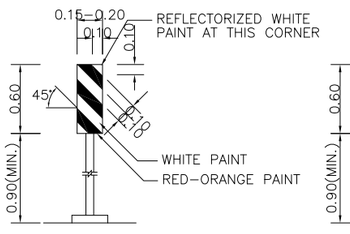
POST



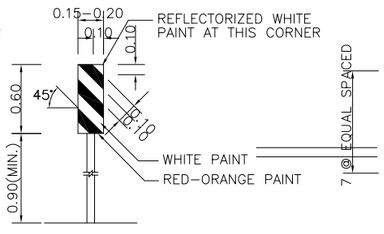
BARRICADE TYPE I

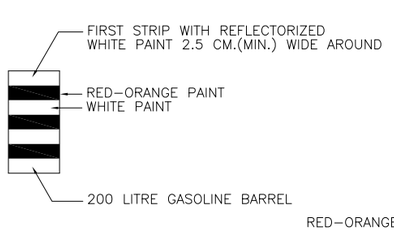
NOT TO SCALE



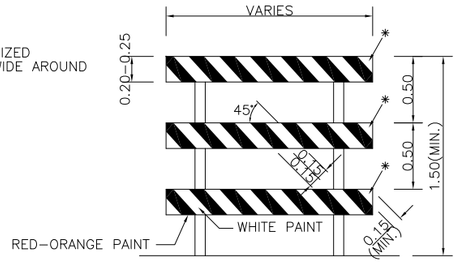


VERTICAL PANEL





BARREL



BARRICADE TYPE II

NOT TO SCALE

TRAFFIC CHANNELIZATION INSTRUMENT TO BE USED

1. TO INDICATE SIDE ROAD HAZARD, VERTICAL PANEL OR BARREL SHALL BE INSTALLED BEFORE CONES, POSTS, VERTICAL PANELS, OR BARRELS FOLLOW ON THE LINE.
2. FOR ROAD WHICH ADT EXCEEDS 8,000 VEHICLE/DAY, RAIL LIGHTING SHALL BE REQUIRED ON TRAFFIC CHANNELIZATION INSTRUMENT POSITIONS.

TRAFFIC CHANNELIZATION INSTRUMENTS

(RED-ORANGE PAINT OR RED-ORANGE PAINT ALTERNATE WITH WHITE PAINT)

FOR BARRICADE TYPE I, II

* REFLECTIVE SHEETING OR REFLECTORIZED WHITE PAINT OR REFLECTORIZED CIRCLES TARGET OR FLASHER DEPENDED ON TRAFFIC VOLUME, MOUNTING AT THE LAST CORNER.
- FOR MOUNTING, THE PAINTED STRIPE SHALL BE INCLINED TO APPROACH TRAFFIC SIDE.

PROVISION:

1. TRAFFIC CONTROL DEVICES FOR HIGHWAYS UNDER CONSTRUCTION SHALL BE IN ACCORDANCE WITH THIS DRAWING AND THE MANUAL OF TRAFFIC CONTROL DEVICES PART 3 AS PUBLISHED BY THE DOH.
2. SIGN BOARD FOR REFLECTORIZED SHALL BE METAL OR NON-METAL WHICH TOLERANCE TO ALL CLIMATES ALONG TERM OF CONTRACT UNDER THE APPROVAL OF THE ENGINEER.
3. THE AMOUNTS (IN TWO DIRECTIONS) AND SPACING OF WARNING SIGN BEFORE CONSTRUCTION AREA BESIDES OF THE NORMAL SIGNS ARE SHOWN IN THE TABLE BELOW.

CLASSIFICATION OF HIGHWAYS	WARNING SIGN SPACING BEFORE APPROACHING DIVERTED POINT(M.)	
	REDUCED TRAFFIC LANE OR DIVERTED TRAFFIC LANE	SIDE ROAD OBSTRUCTION
EXPRESSWAY AND MAJOR RURAL HIGHWAY	500-1000 (2-3)	300-500 (2)
RURAL HIGHWAY	200-300(2)	150-200(1)
URBAN HIGHWAY	70-100(1)	–

4. FOR URBAN HIGHWAY WITH AMOUNT OF PEDESTRAINS, WALKWAY WHICH SAFETY SHALL BE PROVIDED FOR PEDESTRAINS.
5. THE CONTRACTOR SHALL BE PROVIDED THE TRAFFIC CONTROL DEVICES FOR HIGHWAYS UNDER CONSTRUCTION ALL ITEMS.
6. IN CASE OF THE FORMAT IS NOT THE SAME AS THE DRAWINGS, THE MOUNTING OF TRAFFIC CONTROL DEVICES SHALL BE DIRECTED BY THE ENGINEER.

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. REFLECTORIZED PROPERTIES MEANS: SIGN BOARD WHICH REFLECTING BY REFLECTIVE SHEETING OR REFLECTIVE BEADS OR OTHERS UNDER THE APPROVAL OF THE ENGINEER.
3. SIZE OF WARNING SIGN CODE 2-49-60 AND 2-50-60 MAY BE INCREMENTED AT SUITABLE SIZE ON HIGH SPEED AND HEAVY TRAFFIC ROAD UNDER THE APPROVAL OF THE ENGINEER.

ລ.ວ.ທ LTEC

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LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES FOR HIGHWAYS UNDER CONSTRUCTION-II

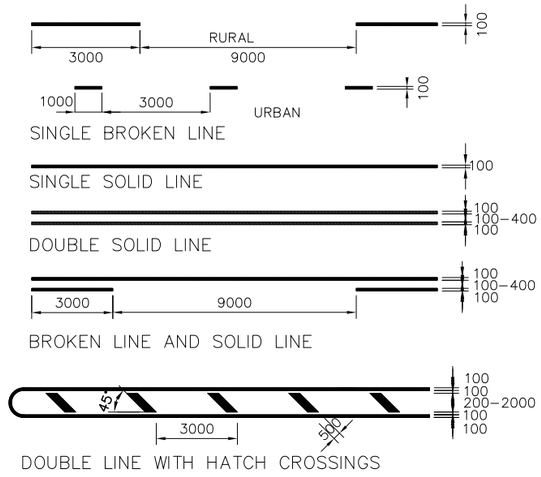
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD-262-17

DATE: April, 2018

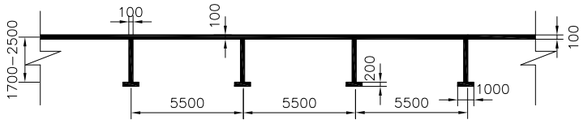
DRW No. TCP-010

SCALE: NOT TO SCALE



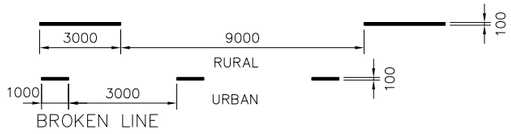
CENTER LINE MARKING
NOT TO SCALE

EDGE LINE MARKING
NOT TO SCALE



PARALELL PARKING
NOT TO SCALE

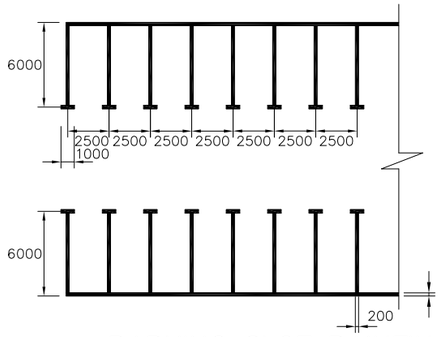
PARKING SLOT PAINTING
NOT TO SCALE



LANE LINE MARKING
NOT TO SCALE

STOP LINE MARKING
NOT TO SCALE

GIVEWAY LINE MARKING
NOT TO SCALE



PARKING SLOT PAINTING
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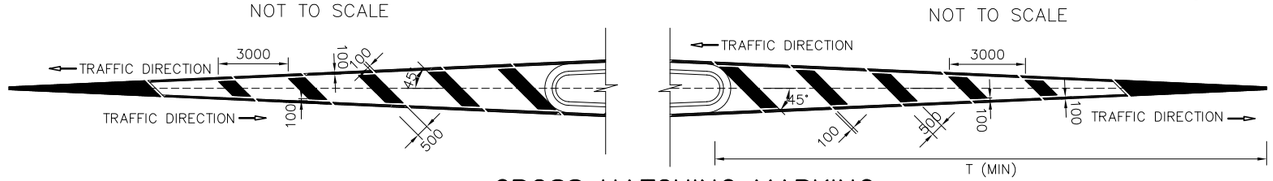
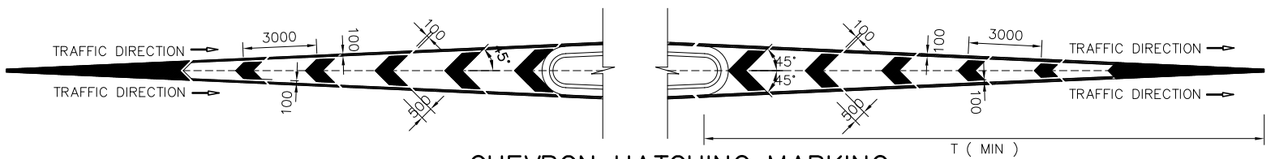
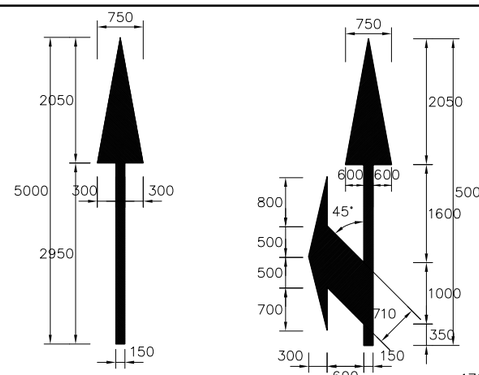


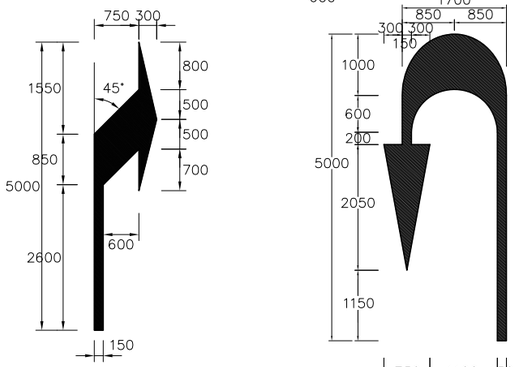
CROSS HATCHING MARKING
NOT TO SCALE

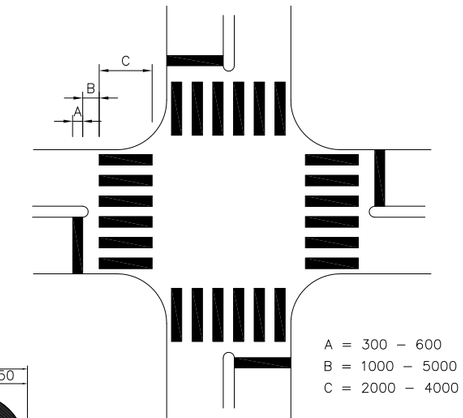


CHEVRON HATCHING MARKING

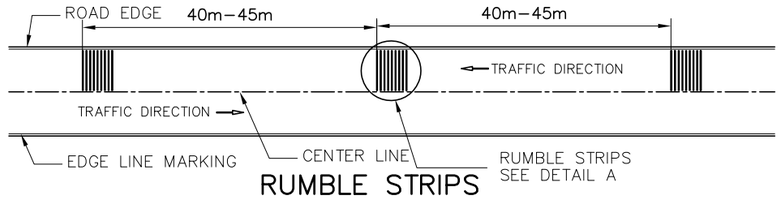


DIRECTIONAL ARROWS
SCALE 1:100

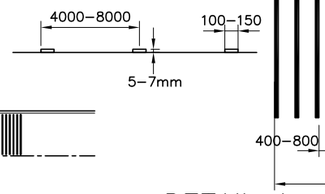




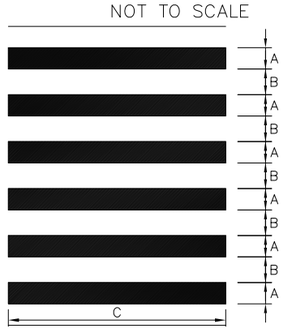
CROSS WALKS AT INTERSECTION (TYPE B)
NOT TO SCALE

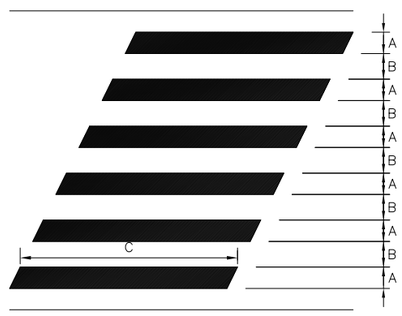


RUMBLE STRIPS
NOT TO SCALE



DETAIL A
NOT TO SCALE





CROSS WALKS
NOT TO SCALE

DESIGN SPEED (Km/h)	T (MIN) (m)
20	15
30	20
40	25
50	30
60	40

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. PAINT SHALL BE THERMAL PLASTIC MATERIAL INCORPATING GLASS BEAD AND CONFORMING WITH AASHTO M 249
3. GLASS BEADS SHALL CONFORM TO AASHTO M 247 (TYPE 2)

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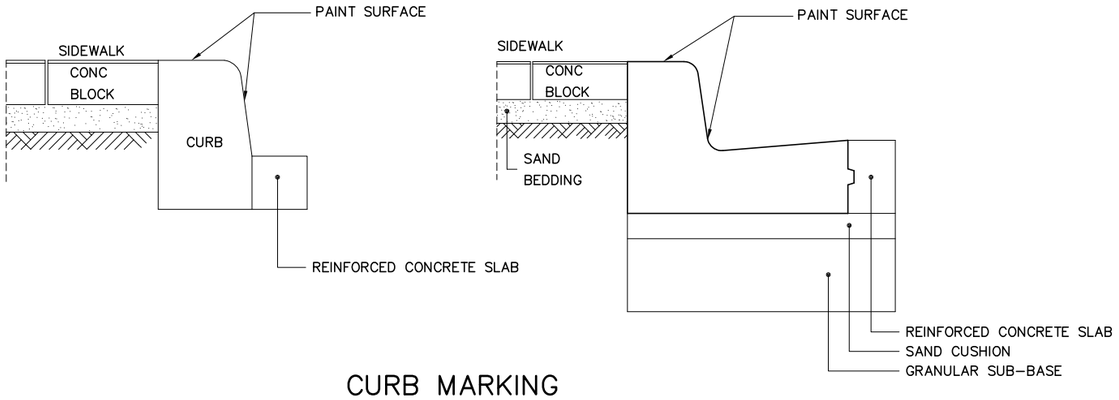
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

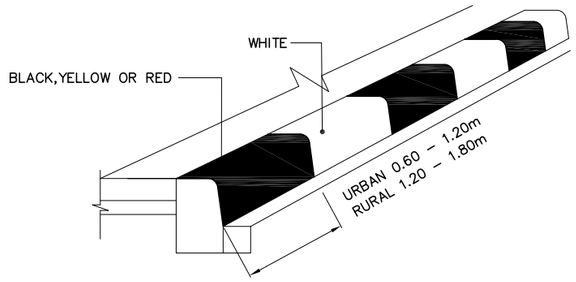
TRAFFIC CONTROL DEVICES PAVEMENT MARKINGS LINE, ARROW AND HATCHING MARKINGS

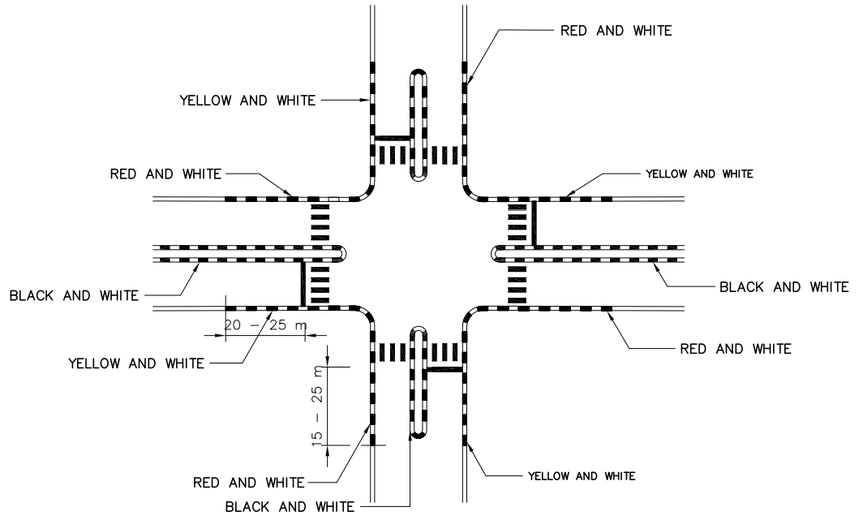
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–011
SCALE: AS SHOWN

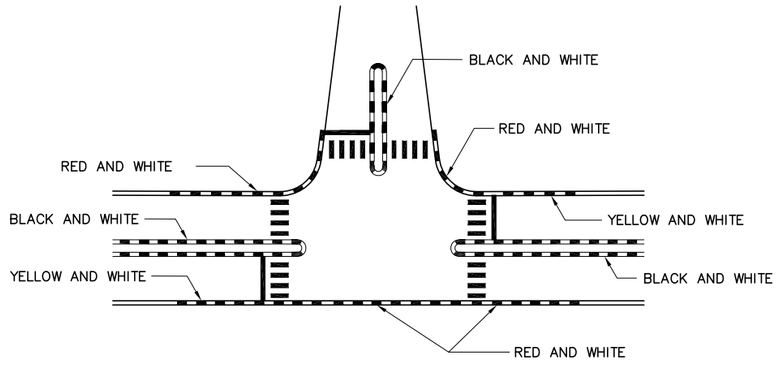


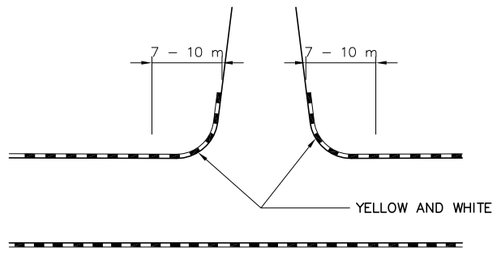
CURB MARKING
NOT TO SCALE



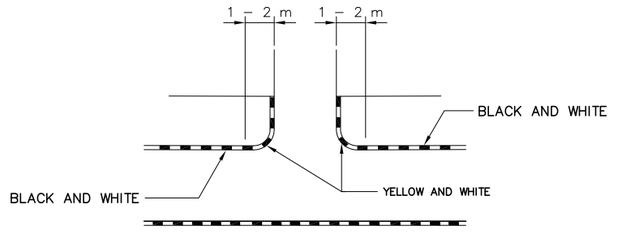


CURB PAINTING AT INTERSECTION
NOT TO SCALE





CURB PAINTING AT JUCTION
NOT TO SCALE



CURB PAINTING AT ACCESS
NOT TO SCALE

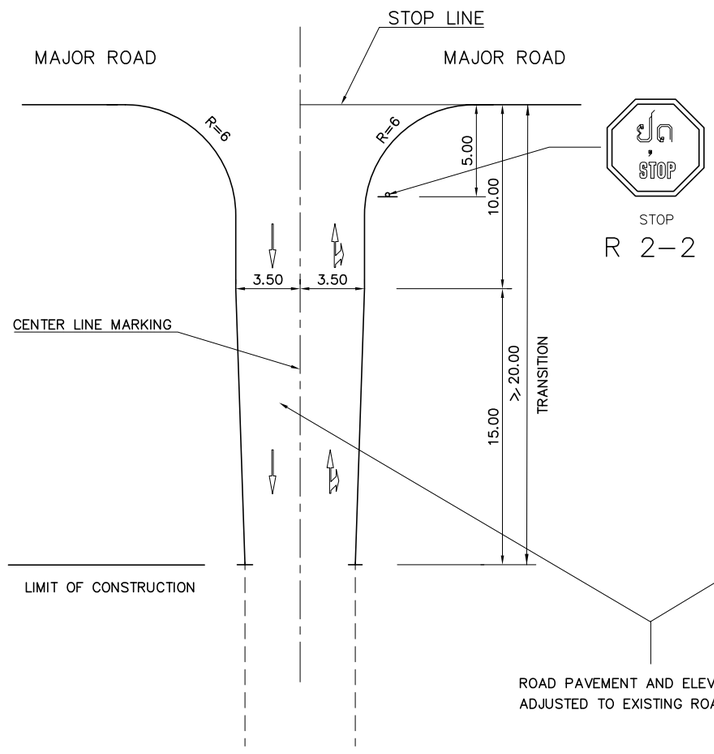
NOTE:
1. AS SPRCIFIRD ON DETAILS DRAWING OR AS DIRECTED BY THE ENGINEER

ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	CURB PAINTING					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–012
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

JUNCTION PAVEMENT MARKING

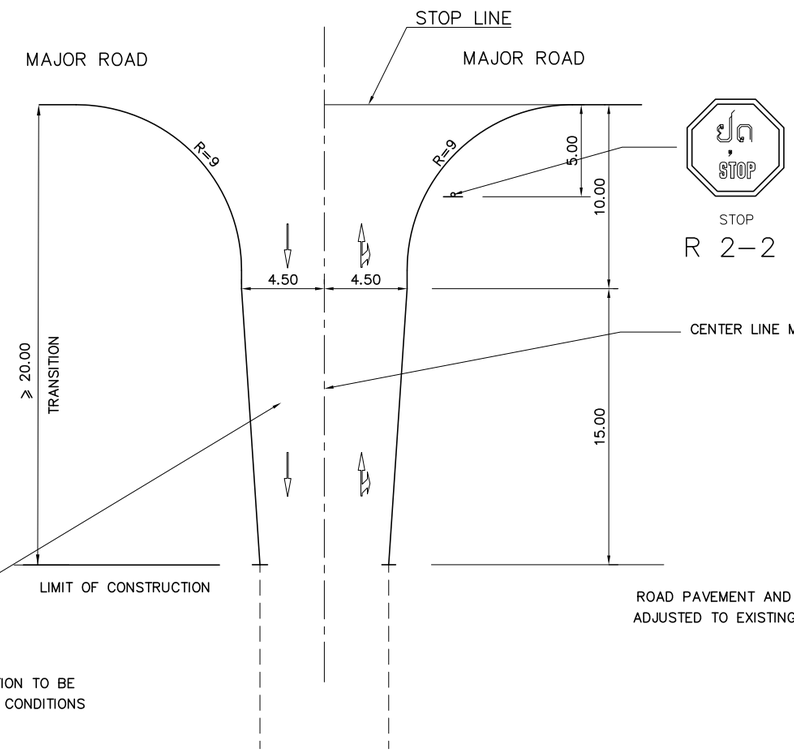
JUNCTION J1

ACCESS ROAD
MAINLY USED BY PASSENGER CARS

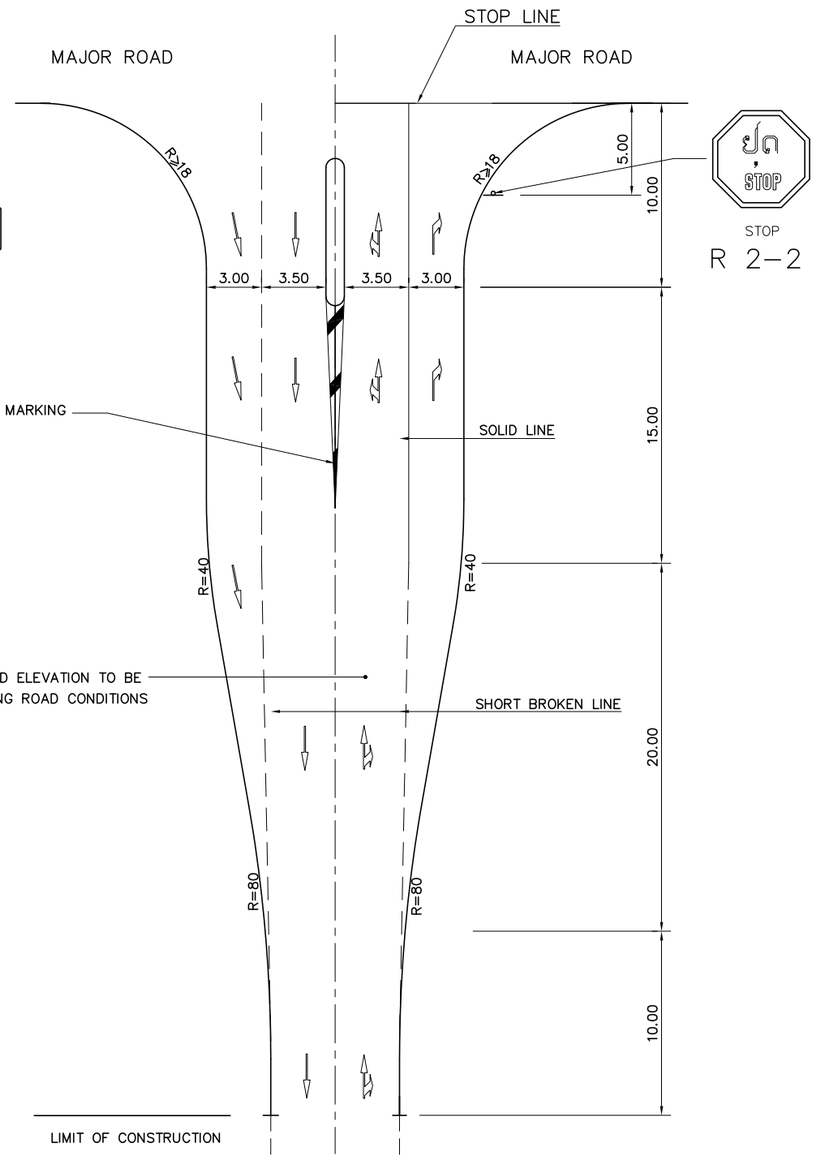


JUNCTION J2

ACCESS ROAD
OCCASIONALY USED BY SMALL TRUCKS OR BUSES



JUNCTION J3



NOTES:

1) IN CASE OF SIDEWALK INSTALLATION,CURB STONE SHALL BE INSTALLED UP TO THE END OF SIDEWALK.
2) ALL MEASUREMENT IN METERS.

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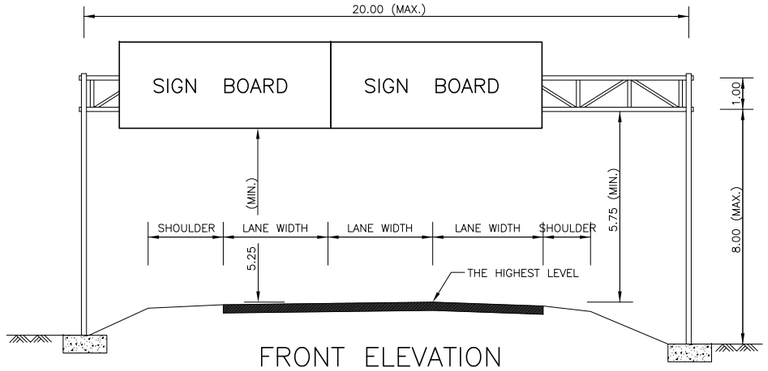
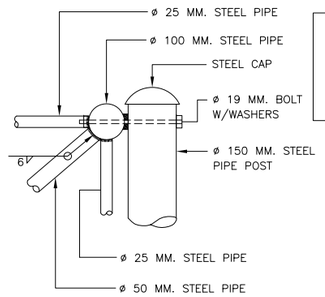
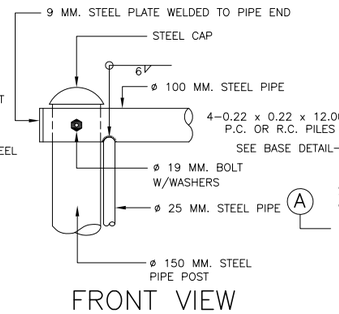
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	PAVEMENT MARKING FOR JUNCTION					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP-013
						APPROVED	Mr.Vandy VORASACK		SCALE: 1:200



FRONT ELEVATION
NOT TO SCALE

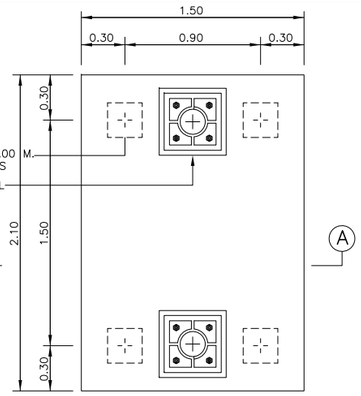


SIDE VIEW

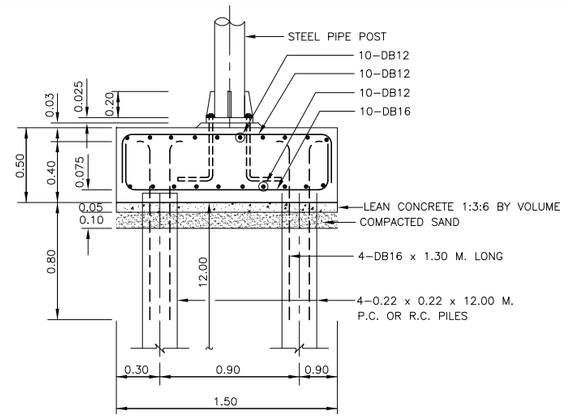


FRONT VIEW

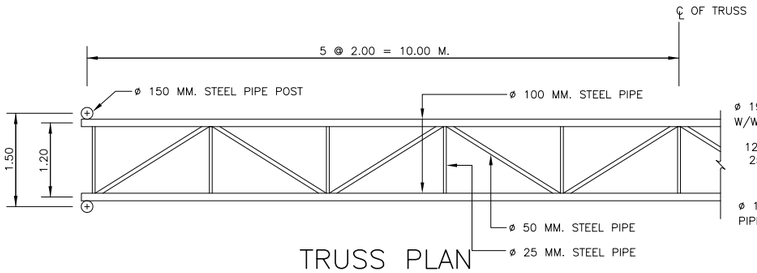
DETAIL "1"
NOT TO SCALE



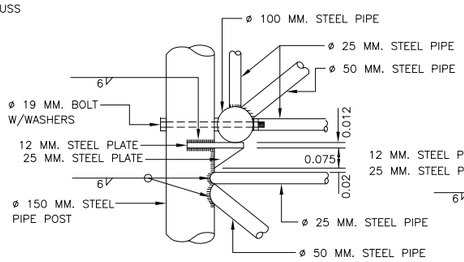
FOOTING PLAN
NOT TO SCALE



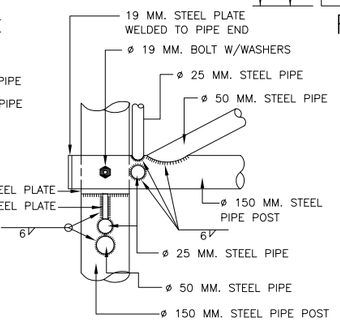
SECTION Ⓐ – Ⓐ
NOT TO SCALE



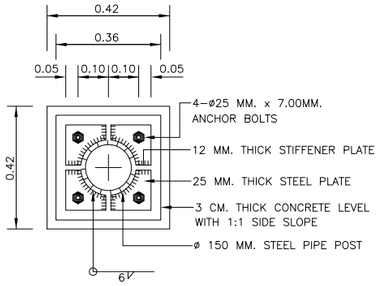
TRUSS PLAN
NOT TO SCALE



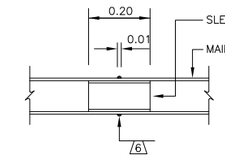
SIDE VIEW



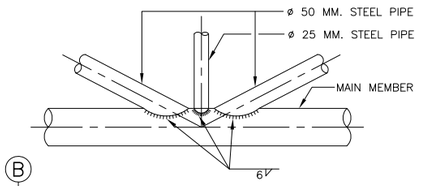
FRONT VIEW



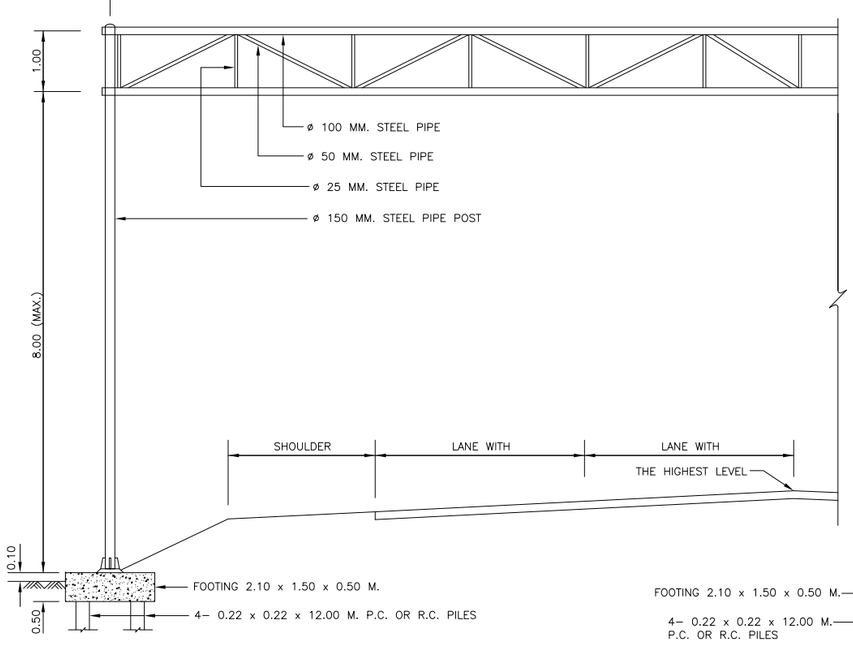
BASE DETAIL
NOT TO SCALE



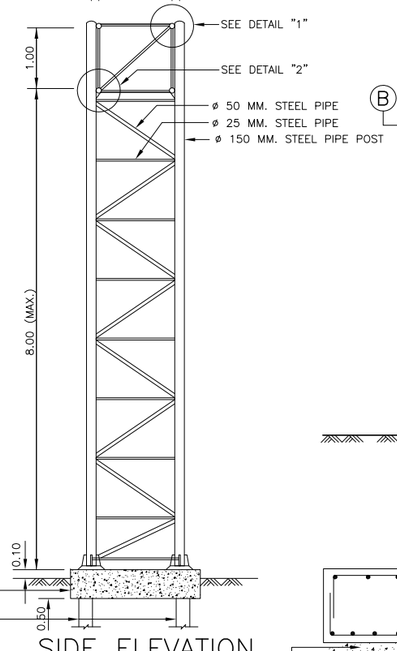
PIPE CONNECTION DETAIL
NOT TO SCALE



JOINT DETAIL
NOT TO SCALE

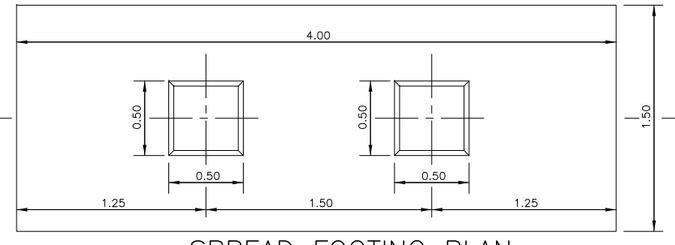


FRONT ELEVATION
NOT TO SCALE

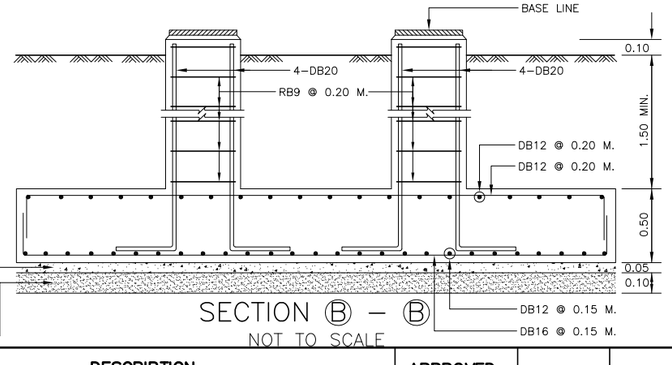


SIDE ELEVATION
NOT TO SCALE

DETAIL "2"
NOT TO SCALE



SPREAD FOOTING PLAN
NOT TO SCALE



SECTION Ⓑ – Ⓑ
NOT TO SCALE

NOTES:

1. ALL DIMENSIONS ARE IN METERS EXCEPT WELDING SYMBOLS AND PIPE DIAMETER ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 25 MPa. FOR ø15x30 CM CYLINDER AT 28 DAYS
3. REINFORCING STEEL BAR SHALL CONFORM TO THE REGUIREMENTS OF AASHTO M31 GRADE 40 FOR ROUND BARS AND GRADE 60 FOR DEFORMED BARS
4. ALL HOLLOW STEEL SECTIONS, STEEL PIPES SHALL CONFORM TO THE REGUIREMENTS OF ASTM A 252–75 GRADE 2.
   FOR ø 25 MM STEEL PIPE WT. 1.99 Kg/M.
   ø 50 MM STEEL PIPE WT. 4.11 Kg/M.
   ø 100 MM STEEL PIPE WT. 9.83 Kg/M.
   ø 150 MM STEEL PIPE WT. 17.82 Kg/M.
5. VERTICAL PIPE POST SHALL BE CONNECTED AT UPPER PART.
6. ALL WELDING SHALL BE DONE WITH WELDING RODS WHICH CONFORM TO ASTM II–2010–PART C.
7. ALL STEEL SHALL BE GALVANIZED ZINC COATING SHALL NOT BE LESS THAN 550 GRAMS PER SQUARE METER
8. SPREAD FOOTING SHALL BE USED FOR ALLOWABLE SOIL BEARING CAPACITY UNDER THE FOUNDATION MORE THAN 10 TON PER SQUARE METER

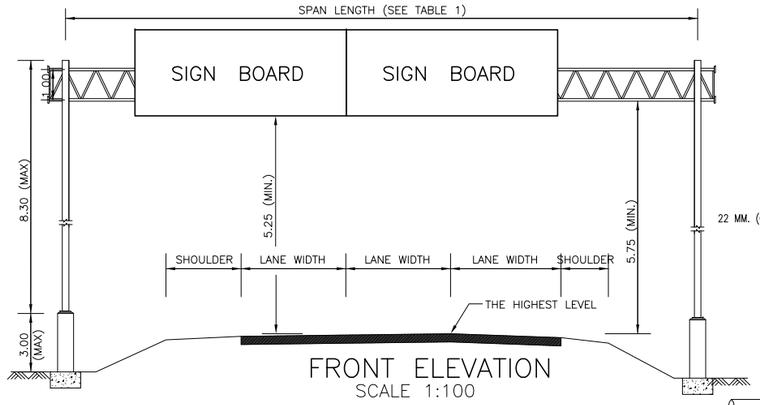
ລ.ວ.ທ
LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

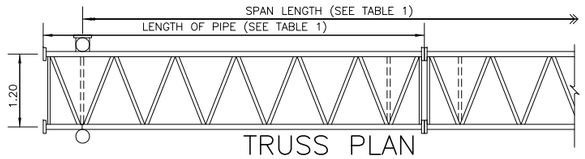
STEEL FRAME FOR MOUNTING
OVERHEAD SIGN TYPE I
SPAN 20.00 M. MAX.

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

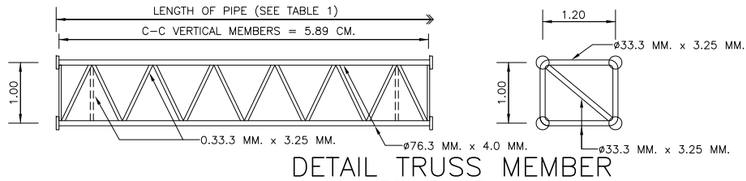
LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–014
SCALE: NOT TO SCALE



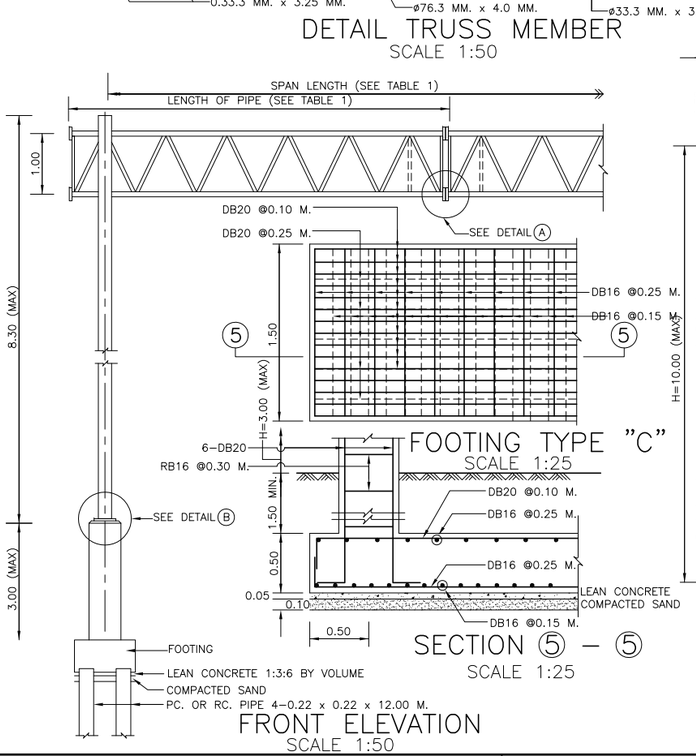
FRONT ELEVATION
SCALE 1:100



TRUSS PLAN
SCALE 1:50

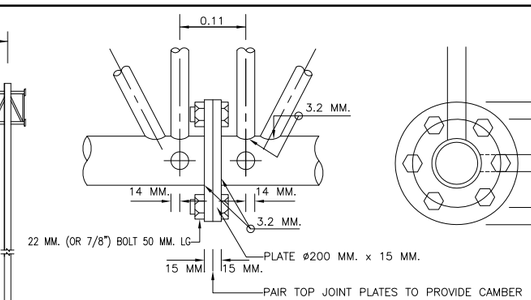


DETAIL TRUSS MEMBER
SCALE 1:50

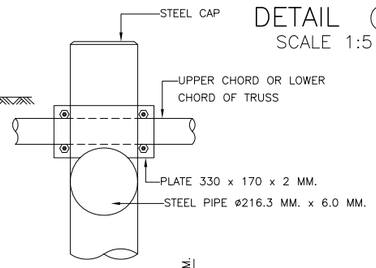


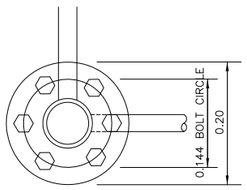
FRONT ELEVATION
SCALE 1:50

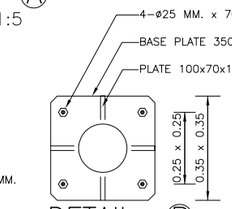
SECTION ⑤ – ⑤
SCALE 1:25



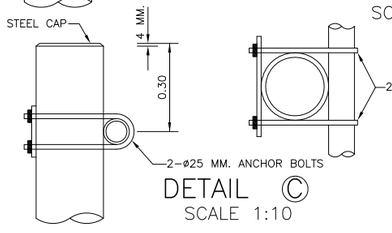
DETAIL Ⓐ
SCALE 1:5



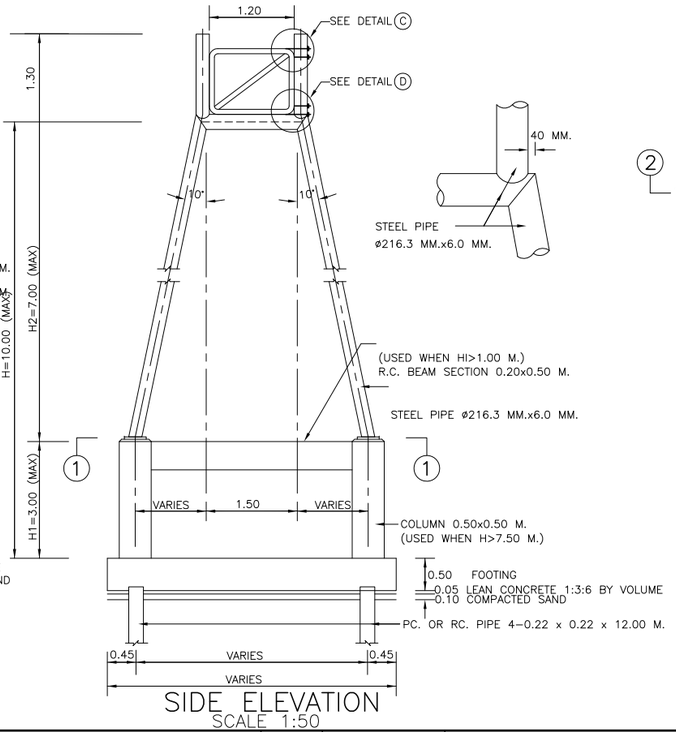




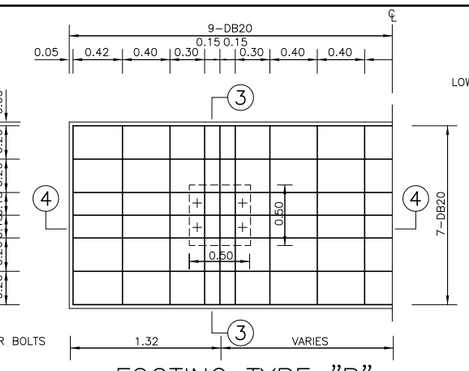
DETAIL Ⓑ
SCALE 1:10



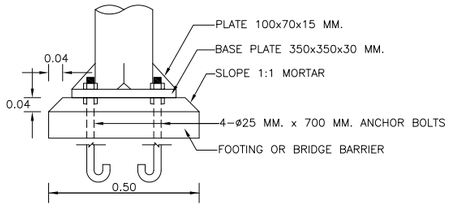
DETAIL Ⓒ
SCALE 1:10

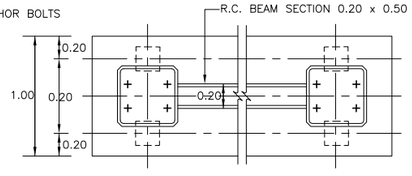


SIDE ELEVATION
SCALE 1:50

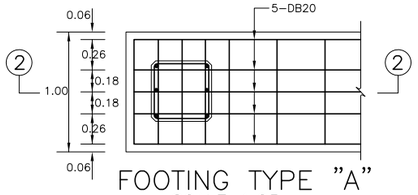


FOOTING TYPE "B"
SCALE 1:25

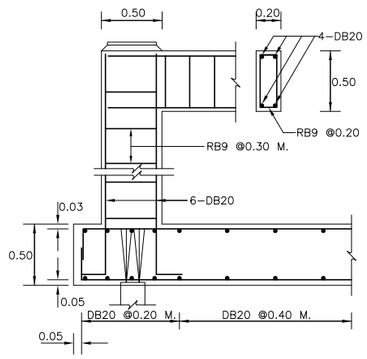




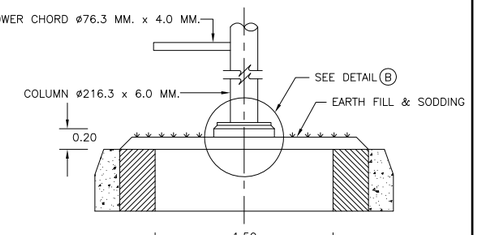
SECTION ① – ①
SCALE 1:25



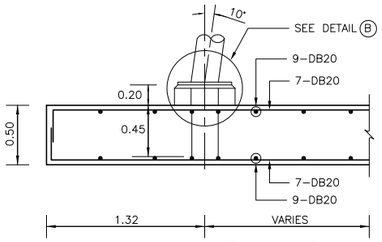
FOOTING TYPE "A"
SCALE 1:25



SECTION ② – ②
SCALE 1:25



SECTION ③ – ③
SCALE 1:25



SECTION ④ – ④
SCALE 1:25

NO.	SPAN LENGTH(M)	LENGTH OF STEEL PIPE (M)	SIZE OF STELL PIPE
1	17.00	6.00+6.00+6.00 = 18.00	ø76.3 MM. WT. 5.71 KG/M
2	19.00	6.00+4.00+4.00+6.00 = 20.00	ø76.3 MM. WT. 5.71 KG/M
3	21.00	6.00+5.00+5.00+6.00 = 22.00	ø76.3 MM. WT. 5.71 KG/M
4	23.00	6.00+6.00+6.00+6.00 = 24.00	ø76.3 MM. WT. 7.13 KG/M
5	25.00	6.00+6.00+2.00+6.00+6.00 = 26.00	ø76.3 MM. WT. 7.13 KG/M
6	28.00	6.00+6.00+4.00+6.00+6.00 = 28.00	ø89.1 MM. WT. 8.39 KG/M

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 25 MPa. FOR ø5X30 CM. CYLINDER AT 28 DAYS.
3. REINFORCING STEEL BAR SHALL CONFORM TO THE REGUIREMENTS OF AASHTO M31 GRADE 40 FOR ROUND BARS AND GRADE 60 FOR DEFORMED BARS
4. ALL HOLLOW STEEL SECTIONS, STEEL PIPES SHALL CONFORM TO THE REGUIREMENTS OF ASTM A252-75 GRADE 2.
5. DIAGONAL MEMBAR STEEL PIPES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A53 GRADE B.
6. JOINT OF MEMBER SHALL BE WELDED AROUND WITH 3.2 MM. FILLET WELD AS AISC SPECIFICATION.
7. ALL STEEL AND BOLT ASSEMBLY SHALL BE GALVANIZED ZINC COATING SHALL NOT BE LESS THAN 550 GRAMS PER SQUARE METERS.
8. FOOTING TYPE "A" SHALL BE USED ON EXISTING GROUND OR SOFT CLAY AND TYPE "B" SHALL BE USED ON RAISED MEDIAN.
9. FOOTING TYPE "C" SHALL BE USED FOR ALLOWABLE SOIL BEARING CAPACITY UNDER THE FOUNDATION MORE THAN 10 TON PER SQUARE METER.

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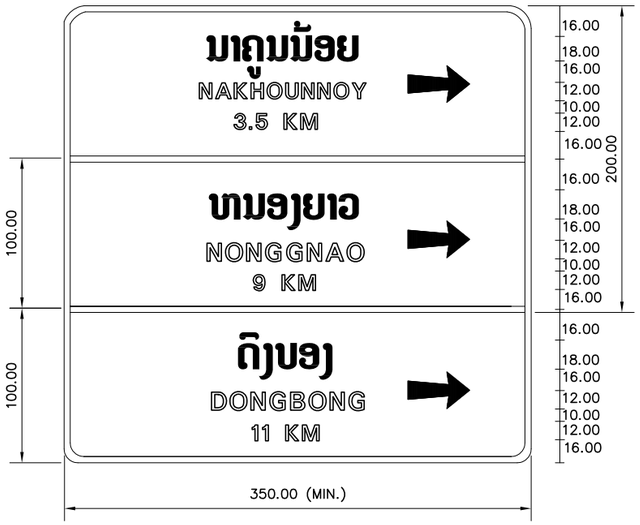
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

STEEL FRAME FOR MOUNTING
OVERHEAD SIGN TYPE II

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD-262-17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP-015
				APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

PIONT (A)



(NEW INSTALLATION)
(OVERHANGING)

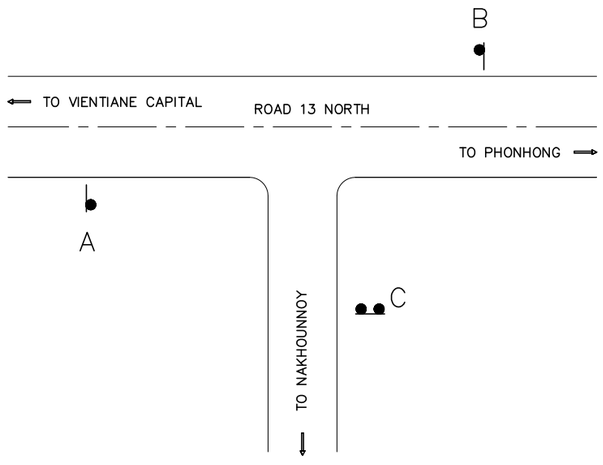
PIONT (B)

(NEW INSTALLATION)
(OVERHANGING)

PIONT (C)

(NEW INSTALLATION)
(FOR POST TYPE B)

PLAN FOR INSTALLATION SIGN KM 5+140



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

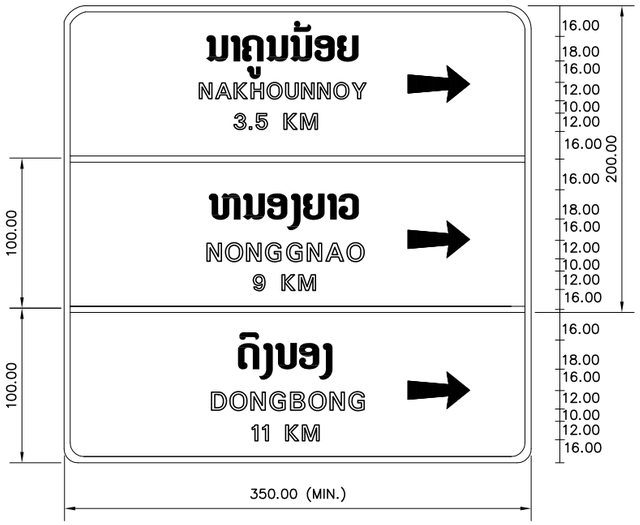
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–016
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

PIONT (A)



(NEW INSTALLATION)
(OVERHANGING)

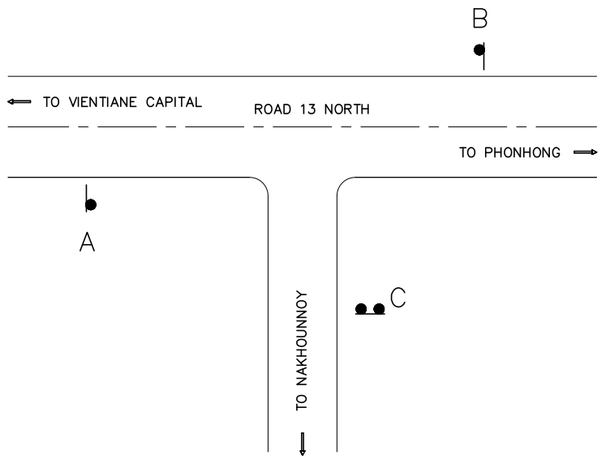
PIONT (B)

(NEW INSTALLATION)
(OVERHANGING)

PIONT (C)

(NEW INSTALLATION)
(FOR POST TYPE B)

PLAN FOR INSTALLATION SIGN KM 5+140



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

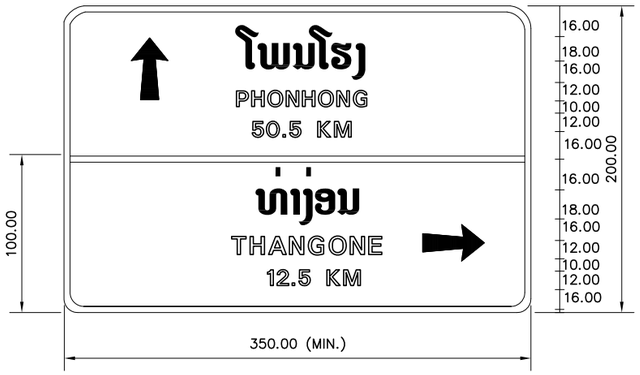
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

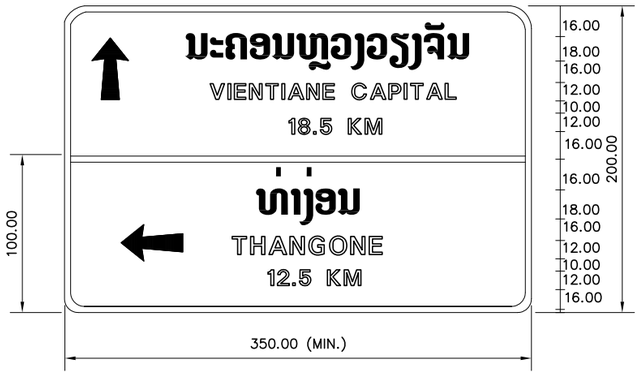
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–016
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

PIONT (A)



(NEW INSTALLATION)
(OVERHANGING)

PIONT (B)

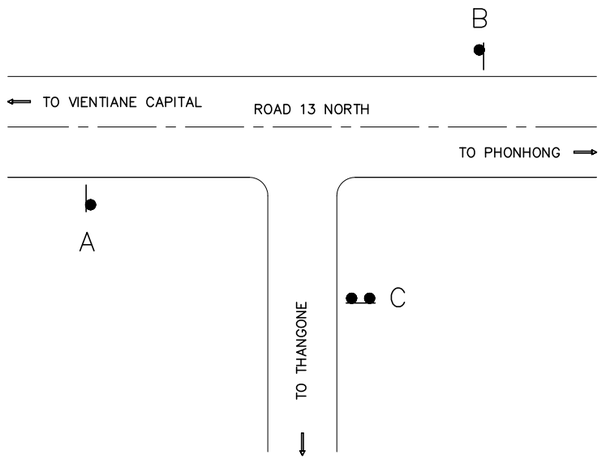


(NEW INSTALLATION)
(OVERHANGING)

PIONT (C)

(NEW INSTALLATION)
(FOR POST TYPE B)

PLAN FOR INSTALLATION SIGN KM 6+620



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

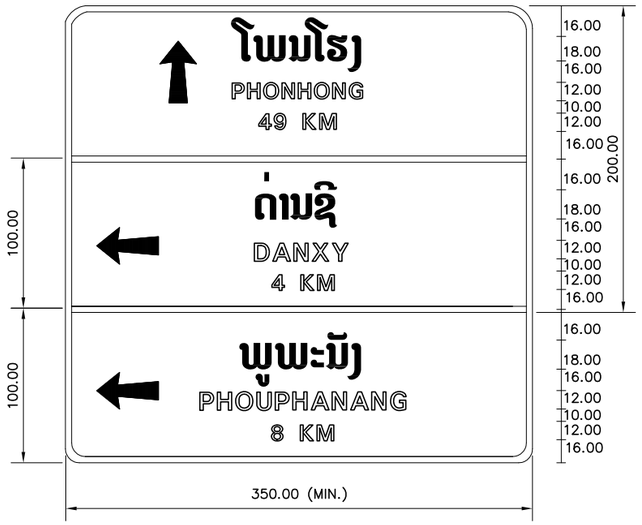
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–017
SCALE: NOT TO SCALE

PIONT (A)

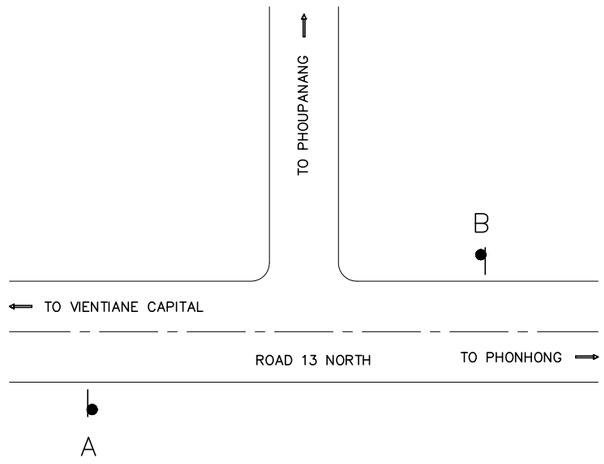


(NEW INSTALLATION)
(OVERHANGING)

PIONT (B)

(NEW INSTALLATION)
(OVERHANGING)

PLAN FOR INSTALLATION SIGN KM 8+475



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

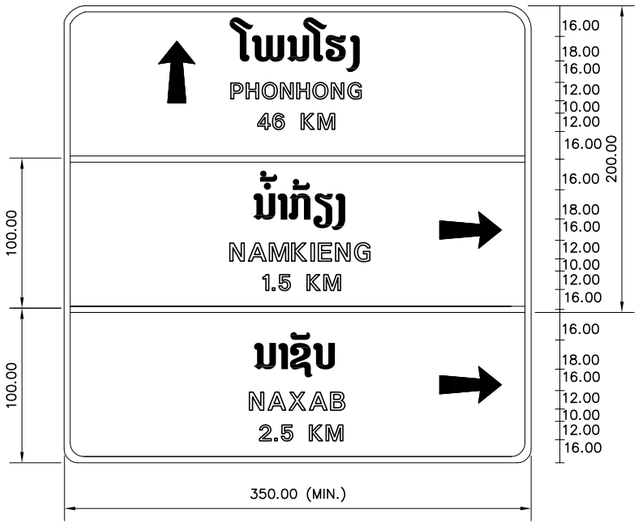
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–018
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

PIONT (A)



(NEW INSTALLATION)
(OVERHANGING)

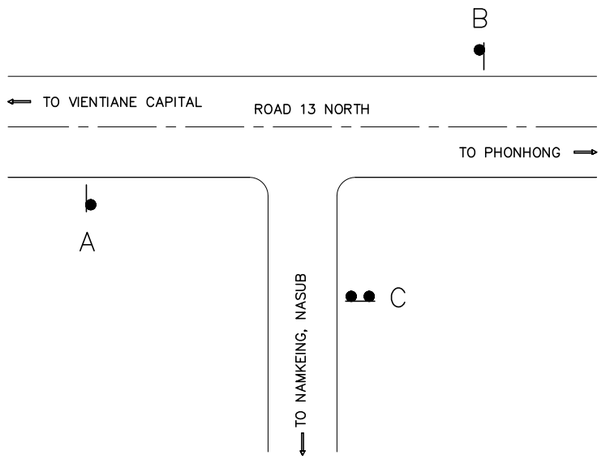
PIONT (B)

(NEW INSTALLATION)
(OVERHANGING)

PIONT (C)

(NEW INSTALLATION)
(FOR POST TYPE B)

PLAN FOR INSTALLATION SIGN KM 10+950



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

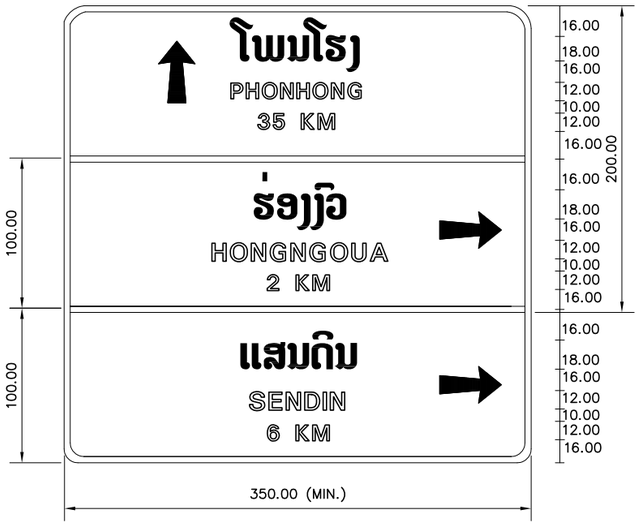
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. TCP–019
							SCALE: NOT TO SCALE

PIONT (A)



(NEW INSTALLATION)
(OVERHANGING)

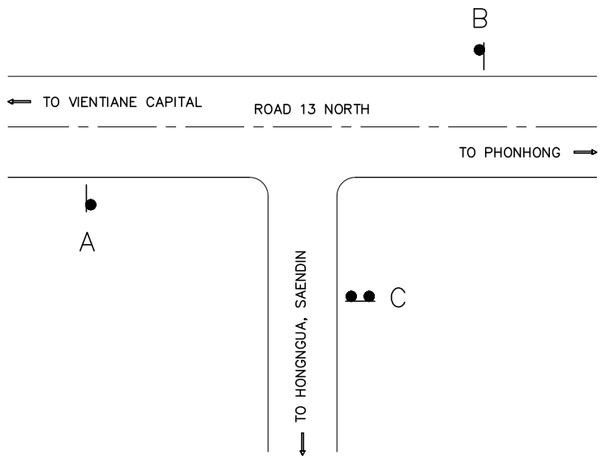
PIONT (B)

(NEW INSTALLATION)
(OVERHANGING)

PIONT (C)

(NEW INSTALLATION)
(FOR POST TYPE B)

PLAN FOR INSTALLATION SIGN KM 22+430



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

ລ.ວ.ທ
LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

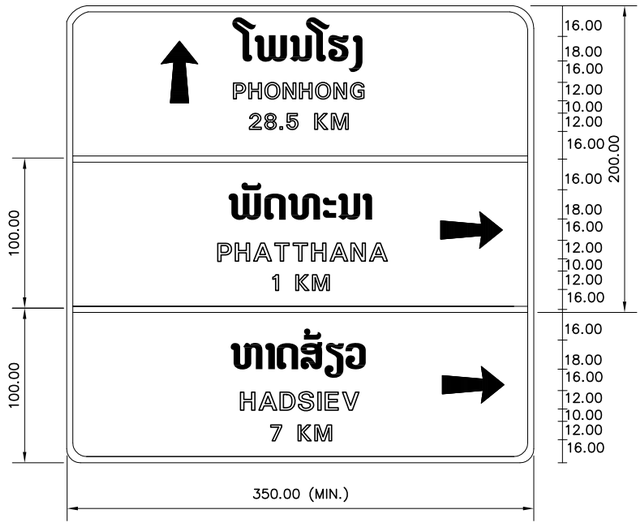
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–020
SCALE: NOT TO SCALE

PIONT (A)

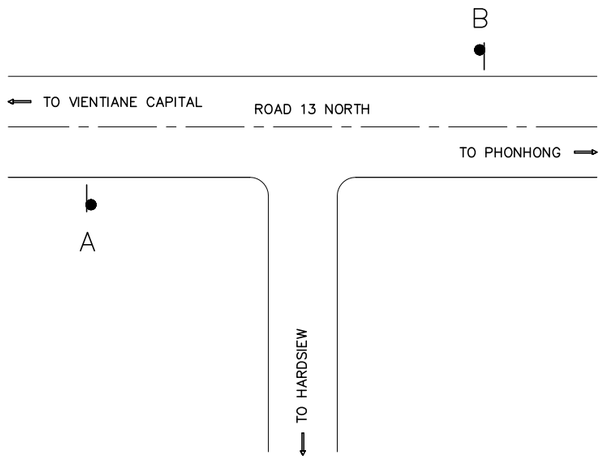


(NEW INSTALLATION)
(OVERHANGING)

PIONT (B)

(NEW INSTALLATION)
(OVERHANGING)

PLAN FOR INSTALLATION SIGN KM 28+700



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

ລ.ວ.ທ LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

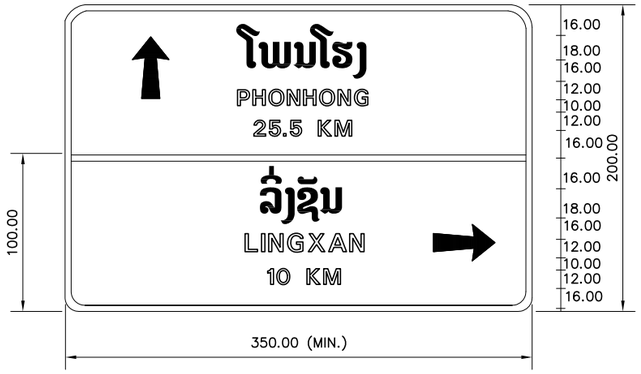
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

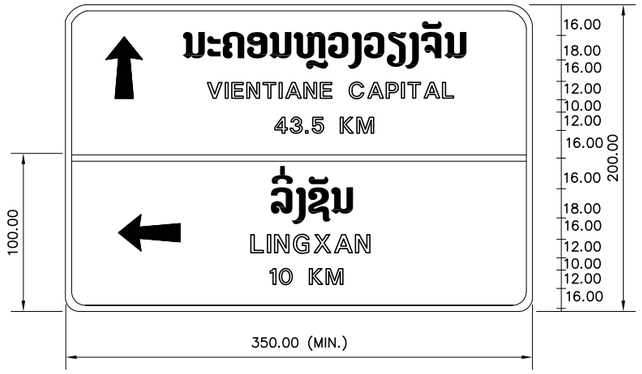
LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–021
SCALE: NOT TO SCALE

PIONT (A)



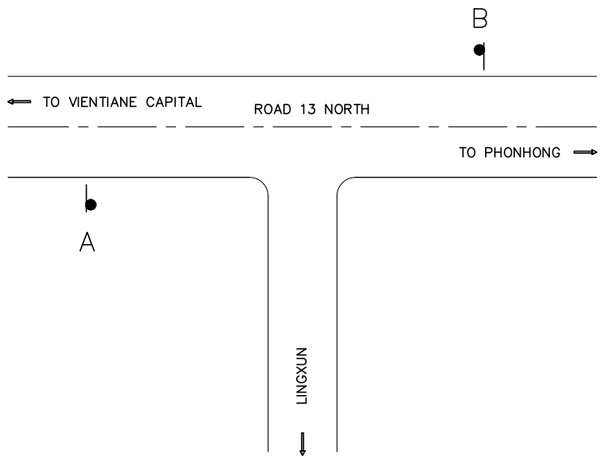
(NEW INSTALLATION)
(OVERHANGING)

PIONT (B)



(NEW INSTALLATION)
(OVERHANGING)

PLAN FOR INSTALLATION SIGN KM 31+630



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

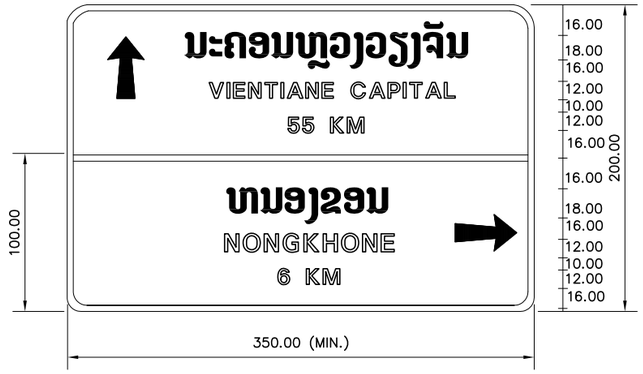
TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. TCP–022
							SCALE: NOT TO SCALE

PIONT (A)

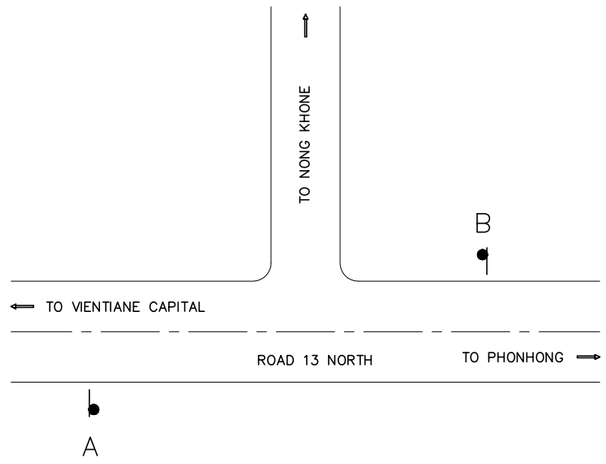
(NEW INSTALLATION)
(OVERHANGING)

PIONT (B)



(NEW INSTALLATION)
(OVERHANGING)

PLAN FOR INSTALLATION SIGN KM 43+090



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

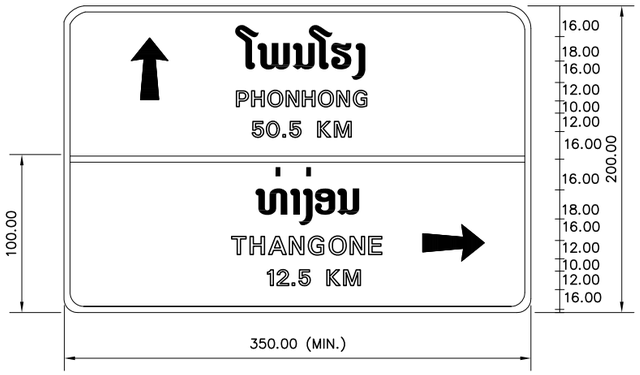
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

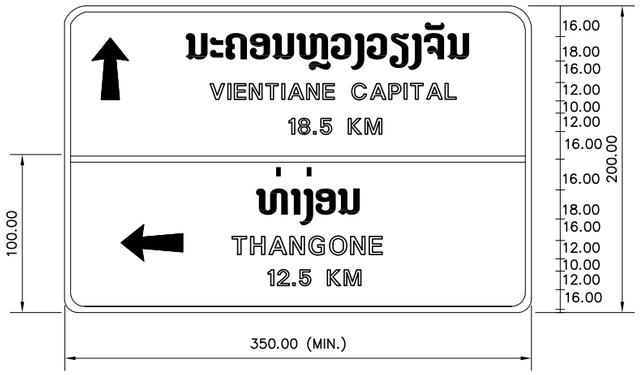
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–023
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

PIONT (A)



(NEW INSTALLATION)
(OVERHANGING)

PIONT (B)

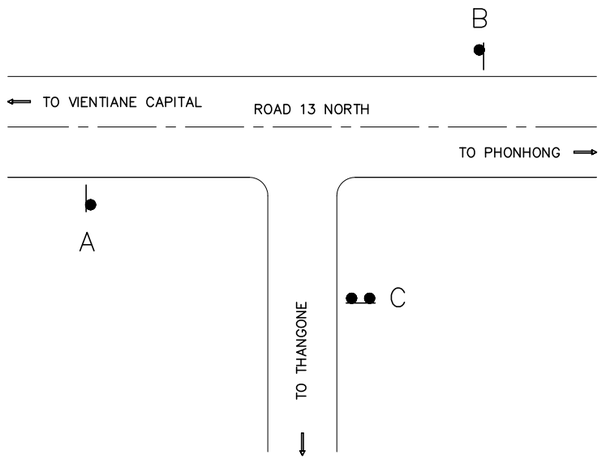


(NEW INSTALLATION)
(OVERHANGING)

PIONT (C)

(NEW INSTALLATION)
(FOR POST TYPE B)

PLAN FOR INSTALLATION SIGN KM 6+620



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

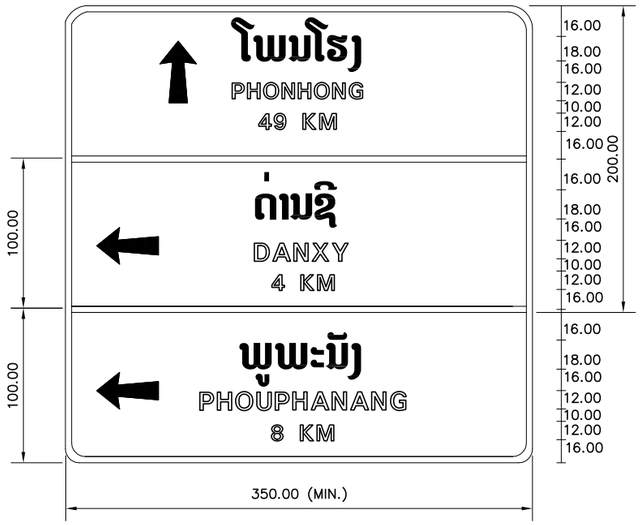
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–017
SCALE: NOT TO SCALE

PIONT (A)

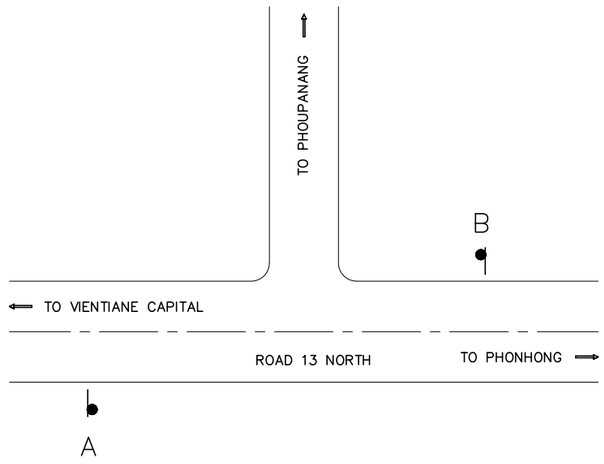


(NEW INSTALLATION)
(OVERHANGING)

PIONT (B)

(NEW INSTALLATION)
(OVERHANGING)

PLAN FOR INSTALLATION SIGN KM 8+475



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

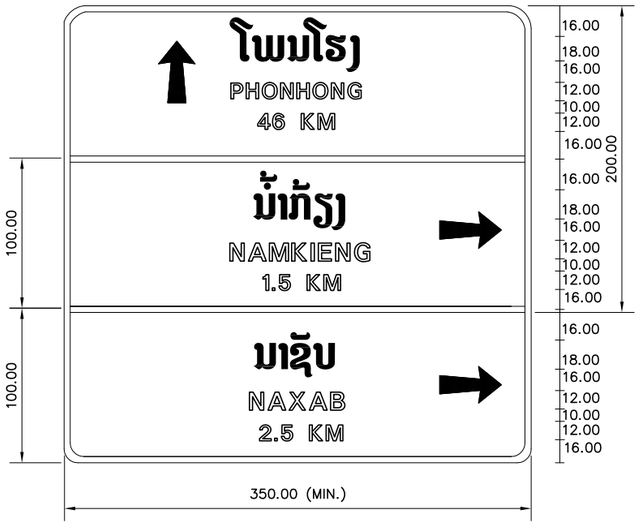
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–018
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

PIONT (A)



(NEW INSTALLATION)
(OVERHANGING)

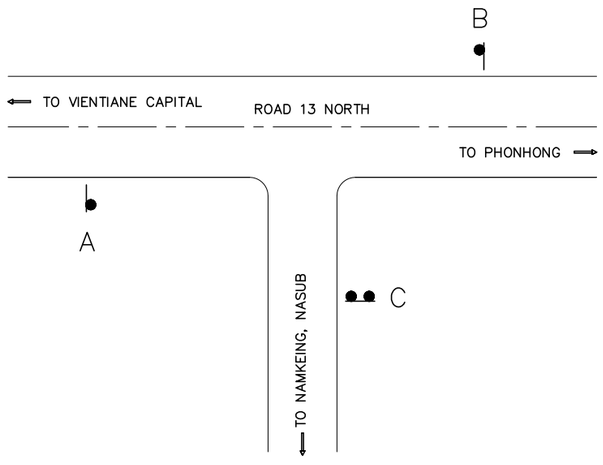
PIONT (B)

(NEW INSTALLATION)
(OVERHANGING)

PIONT (C)

(NEW INSTALLATION)
(FOR POST TYPE B)

PLAN FOR INSTALLATION SIGN KM 10+950



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

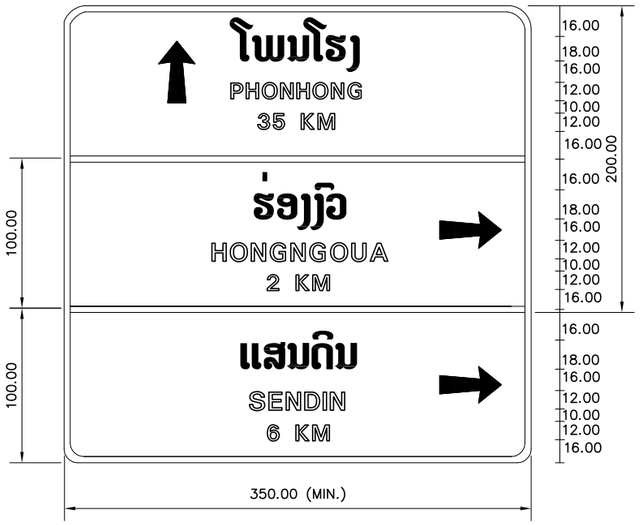
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. TCP–019
							SCALE: NOT TO SCALE

PIONT (A)



(NEW INSTALLATION)
(OVERHANGING)

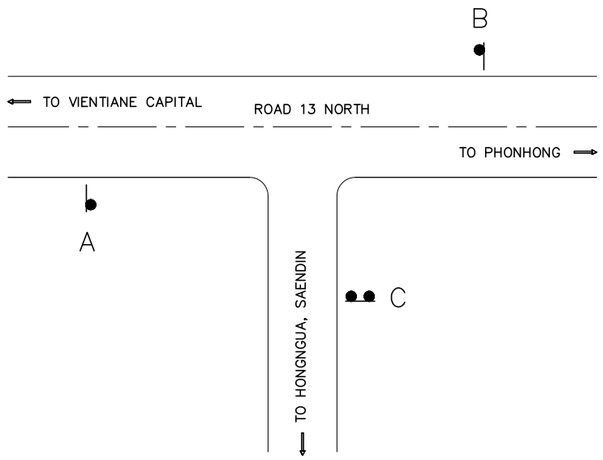
PIONT (B)

(NEW INSTALLATION)
(OVERHANGING)

PIONT (C)

(NEW INSTALLATION)
(FOR POST TYPE B)

PLAN FOR INSTALLATION SIGN KM 22+430



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

ລ.ວ.ທ
LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

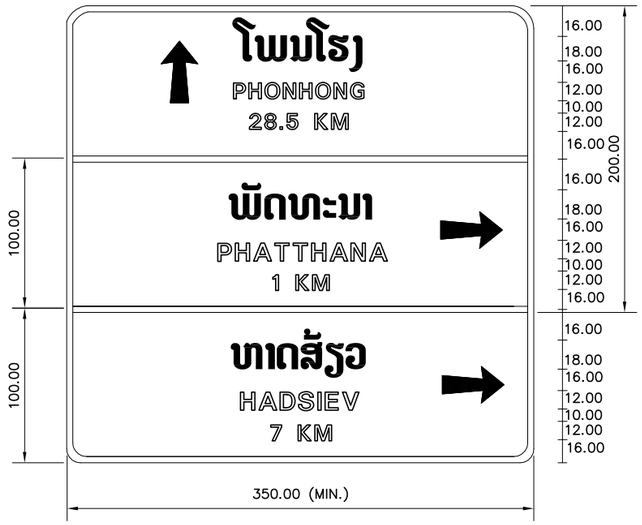
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–020
SCALE: NOT TO SCALE

PIONT (A)

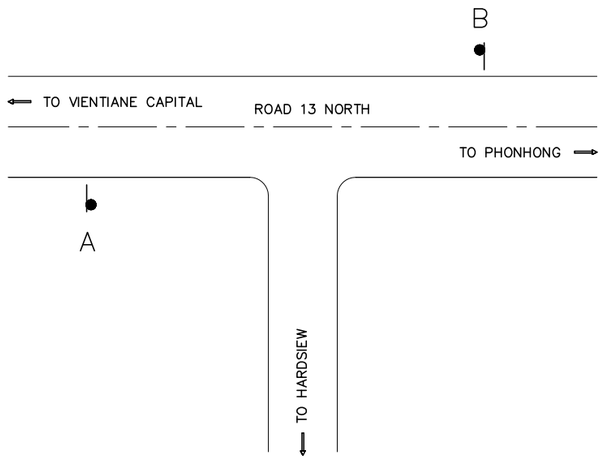


(NEW INSTALLATION)
(OVERHANGING)

PIONT (B)

(NEW INSTALLATION)
(OVERHANGING)

PLAN FOR INSTALLATION SIGN KM 28+700



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

ລ.ວ.ທ LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

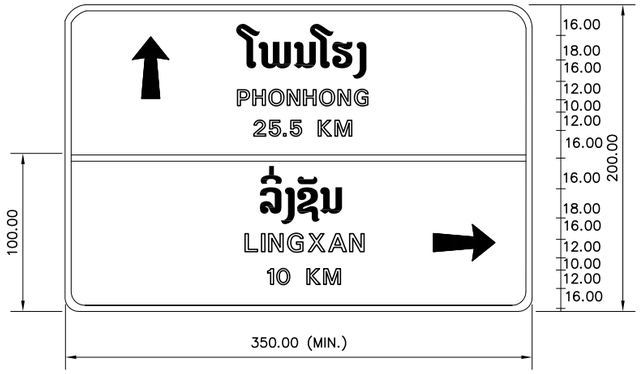
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

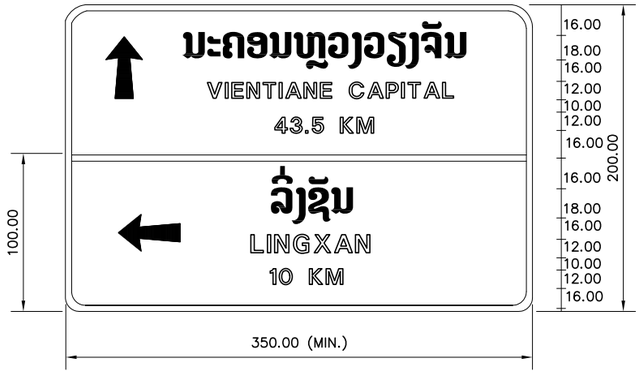
LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–021
SCALE: NOT TO SCALE

PIONT (A)



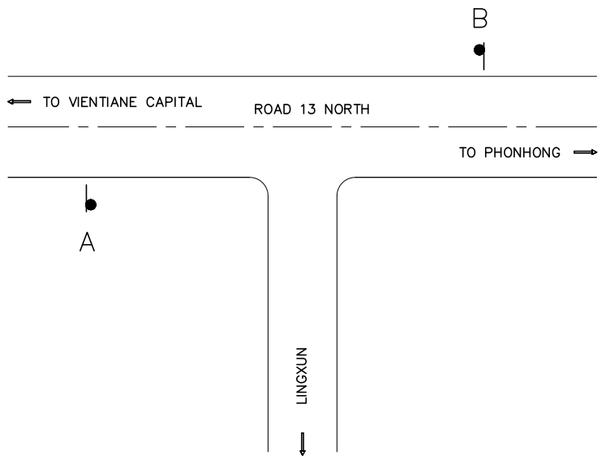
(NEW INSTALLATION)
(OVERHANGING)

PIONT (B)



(NEW INSTALLATION)
(OVERHANGING)

PLAN FOR INSTALLATION SIGN KM 31+630



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

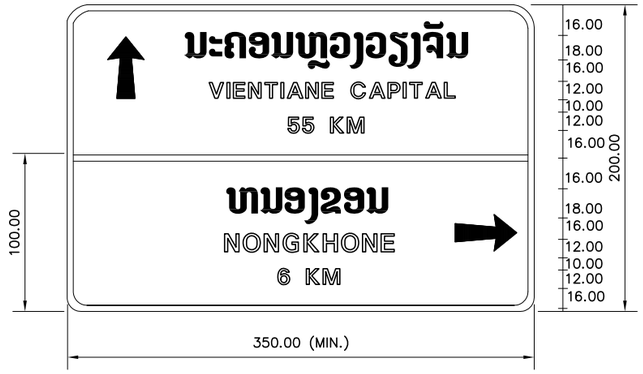
TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. TCP–022
							SCALE: NOT TO SCALE

PIONT (A)

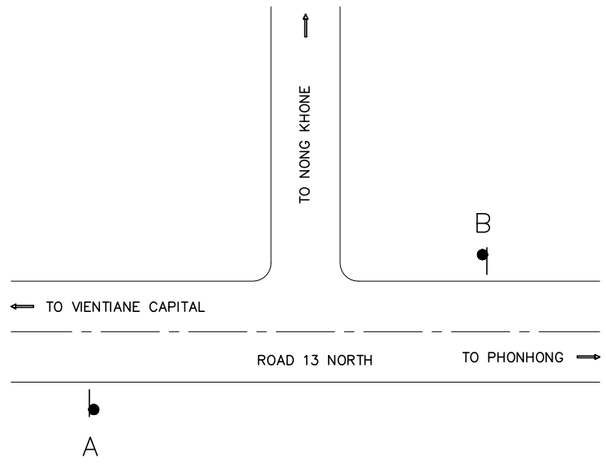
(NEW INSTALLATION)
(OVERHANGING)

PIONT (B)



(NEW INSTALLATION)
(OVERHANGING)

PLAN FOR INSTALLATION SIGN KM 43+090



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
4. FONT — WHITE REFLECTOR
   ALPHABET
   ARROW

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHANGING TYPE

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–023
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

PIONT (A)

(NEW INSTALLATION)
(OVER HEAD)

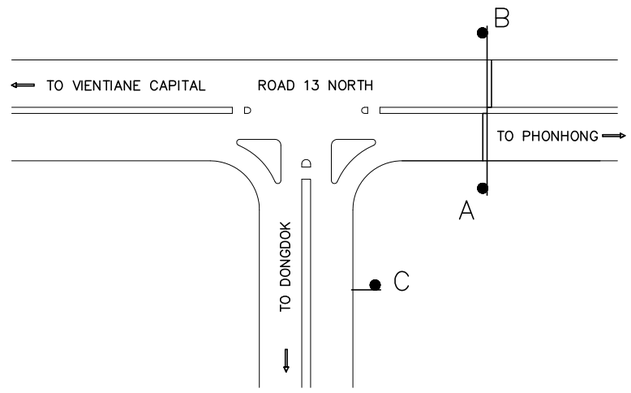
PIONT (B)

(NEW INSTALLATION)
(OVER HEAD)

PIONT (C)

(NEW INSTALLATION)
(OVER HANGING)

PLAN FOR INSTALLATION SIGN KM 0+200



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
   ALPHABET
   ARROW

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

TRAFFIC CONTROL DEVICES
FOR OVERHEAD SIGN

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–024
SCALE: NOT TO SCALE

PIONT (A)

(NEW INSTALLATION)
(OVER HEAD)

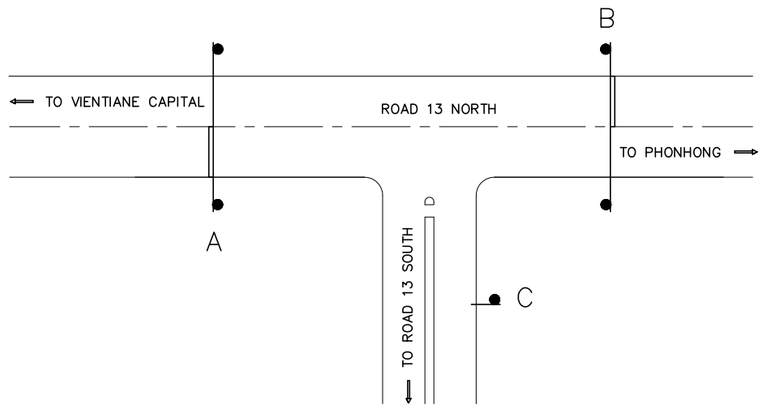
PIONT (B)

(NEW INSTALLATION)
(OVER HEAD)

PIONT (C)

(NEW INSTALLATION)
(OVER HANGING)

PLAN FOR INSTALLATION SIGN Km 48+255



NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
   ALPHABET
   ARROW

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

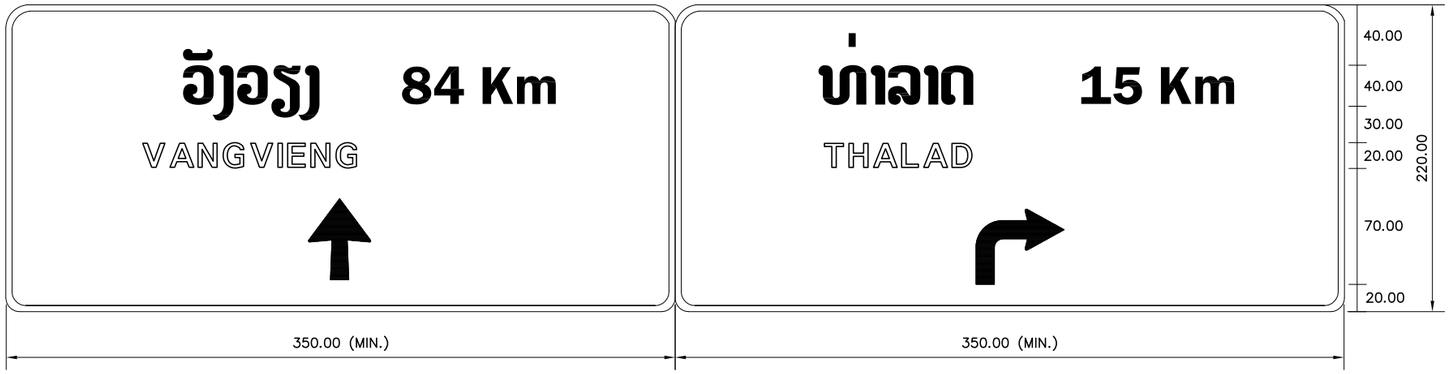
TRAFFIC CONTROL DEVICES
FOR OVERHEAD SIGN

REV.	DATE	DESCRIPTION	APPROVED

	NAME	SIGNATURE
DESIGNED	Mr.Souksavanh SYPHAKHAM	
CHECKED	Mr.Khamphone SORPHABMIXAY	
APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–025
SCALE: NOT TO SCALE

PIONT (A)

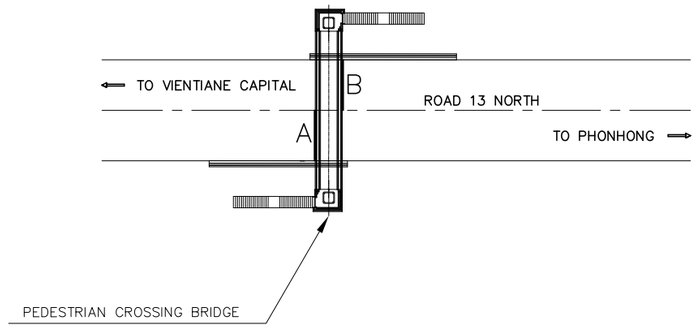


(NEW INSTALLATION)
(OVER HEAD)

PIONT (B)

(NEW INSTALLATION)
(OVER HEAD)

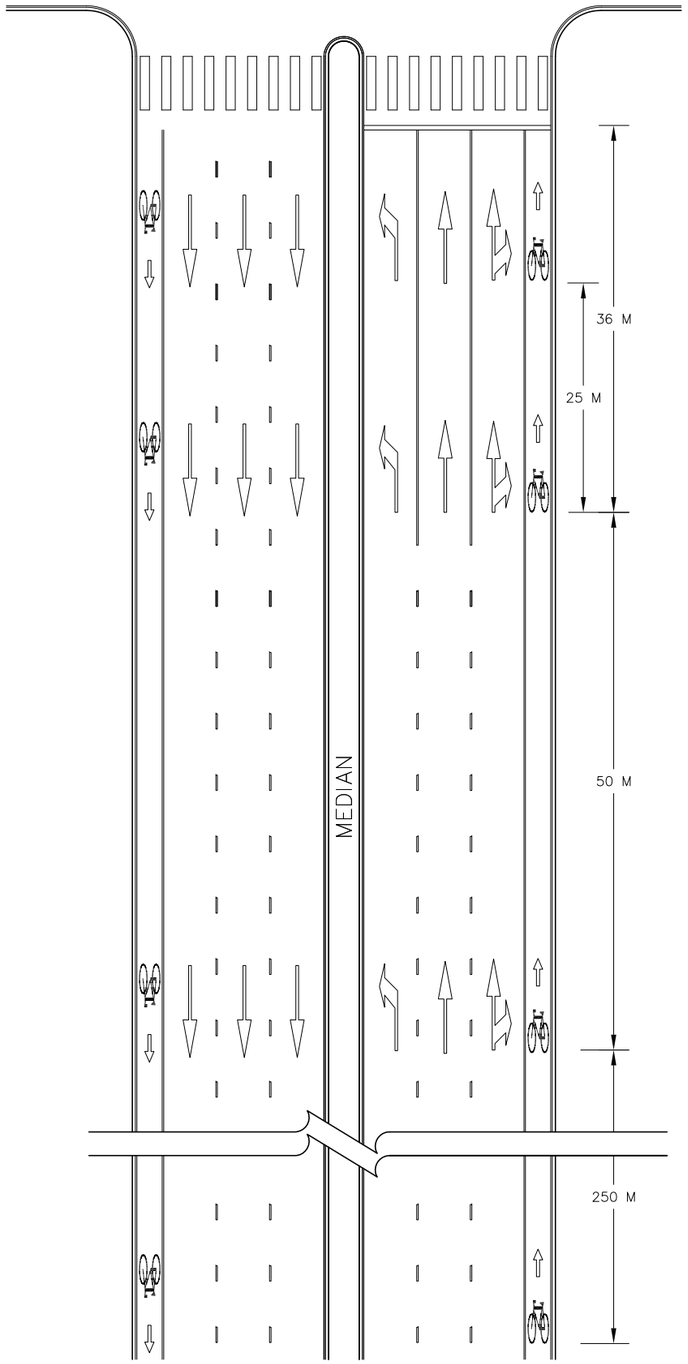
PLAN FOR INSTALLATION SIGN KM 55+553



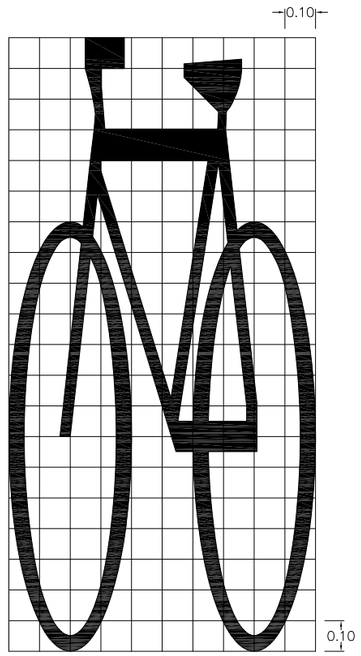
NOTES:

1. DIMENSIONS ARE IN CENTIMETERS
2. SIGN FOUNDATION — GREEN REFLECTOR
3. EDGE LINE — WHITE REFLECTOR
   ALPHABET
   ARROW

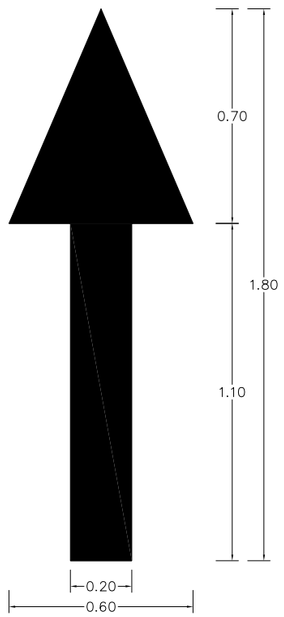
ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	TRAFFIC CONTROL DEVICES FOR OVERHEAD SIGN					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. TCP–026
						APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE



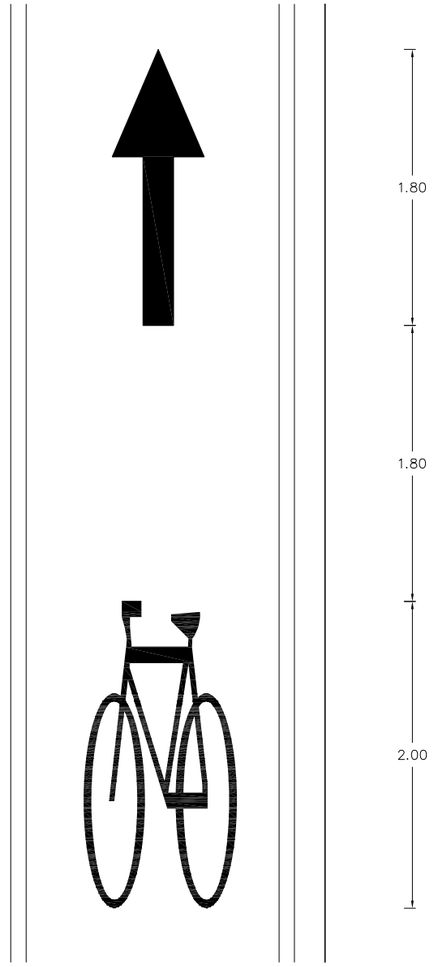
BIKE LANE LAYOUT
NOT TO SCALE



BICYCLE SYMBOL
SCALE 1:20



DIRECTIONAL ARROW
SCALE 1:20



BICYCLE SYMBOL AND DIRECTIONAL ARROW
SCALE 1:40

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. PAINT SHALL BE THERMAL PLASTIC MATERIAL INCORPATING GLASS BEAD AND CONFORMING WITH AASHTO M 249
3. GLASS BEADS SHALL CONFORM TO AASHTO M 247 (TYPE 2)
4. BYCYCLE SYMBOLS SHOULD BE PLACED EVERY 250 M IN ORDER.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

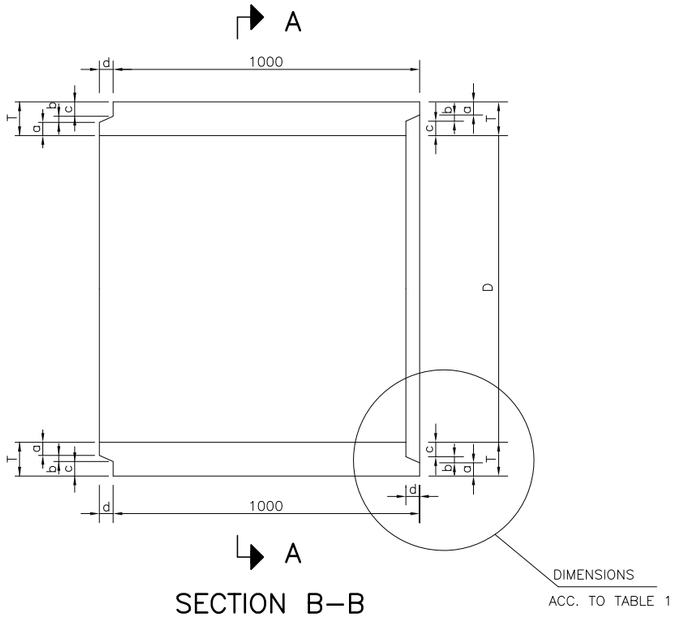
BIKE LANE LAYOUT

REV.	DATE	DESCRIPTION	APPROVED

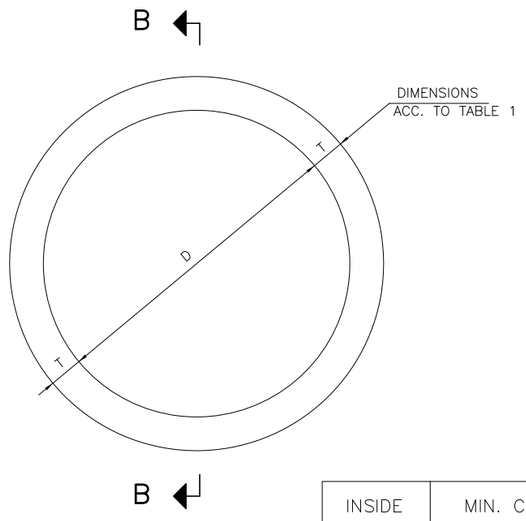
	NAME	SIGNATURE
DESIGNED	Mr.Souksavanh SYPHAKHAM	
CHECKED	Mr.Khamphone SORPHABMIXAY	
APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. TCP–027
SCALE: AS SHOWN

DRAINAGE STANDARD



SECTION B–B
NOT TO SCALE



SECTION A–A
NOT TO SCALE

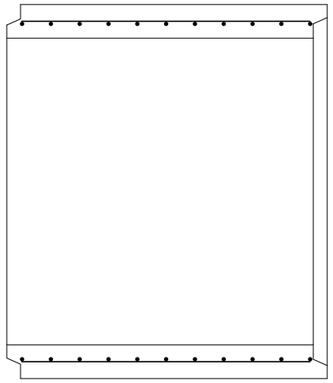
TONGUE AND GROOVE TYPE DIMENSIONS

TABLE 1

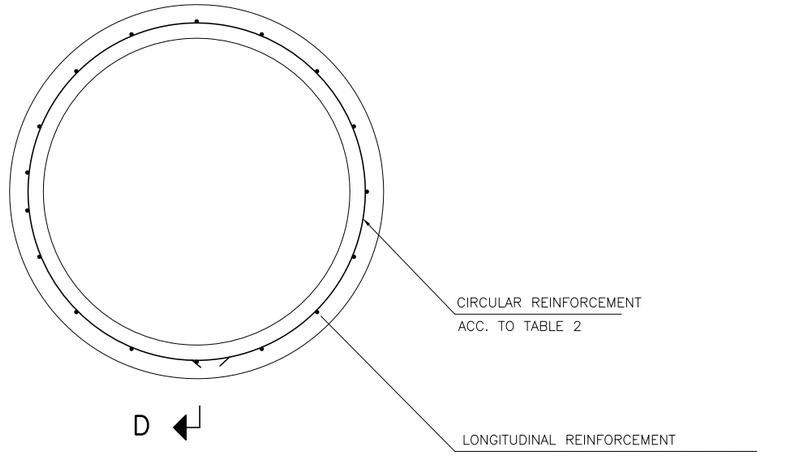
INSIDE DIAMETER D mm	WALL THICKNESS T mm	DIMENSIONS OF PIPE END DETAILS IN mm TONGUE AND GROOVE			
		a	b	c	d
300	50	19	8	23	30
400	60	23	10	27	30
500	70	28	10	32	40
600	75	28	15	32	40

TABLE 2

INSIDE DIAMETER D mm	MIN. CIRCULAR REINFORCEMENT (mm²/m)		CRUSHING LOAD TO PRODUCE 0.30mm CRACK WIDTH AND 310mm CRACK LENGTH kg/m	ULTIMATE CRUSHING LOAD kg/m	ULTIMATE STRENGTH FOR 152 X 304mm CONCRETE CYLINDER AT 28 DAY AGE MPa
	INNER CAGE	OUTER CAGE			
300	300	–	4283	5353	30
400	400	–	5710	7138	
500	500	–	7138	8922	
600	600	–	8565	10707	



SECTION D–D
NOT TO SCALE



SECTION C–C
NOT TO SCALE

TONGUE AND GROOVE TYPE REINFORCEMENT

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL PIPE BARRELS SHALL CONFORM TO REQUIREMENTS OF AASHTO M170M, REINFORCED CONCRETE CULVERT, STORM DRAIN, AND SEWER PIPE (METRIC) CLASS IV , WALL B .
3. ALL CONCRETE SHALL BE CLASS 30 MPa, UNLESS OTHERWISE SHOWN CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=30MPa,fc=12MPa.
4. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AASHTO M 31, DEFORMED AND PLAIN BILLET STEEL BARS FOR CONCRETE REINFORCEMENT, GRADE 60, EXCEPT THAT BARS OF DIAMETER UP TO AND INCLUDING 9mm MAY BE PLAIN MILD STEEL REINFORCEMENT IN ACCORDANCE WITH AASHTO M 31, GRADE 40.

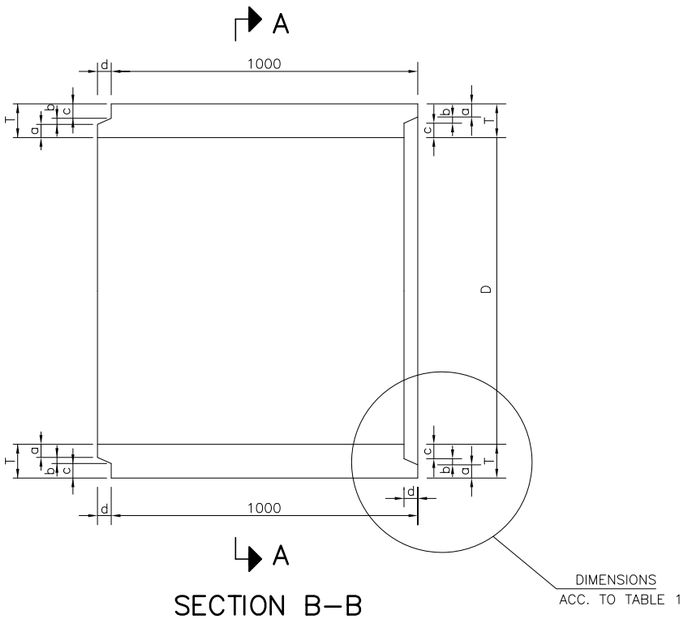
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

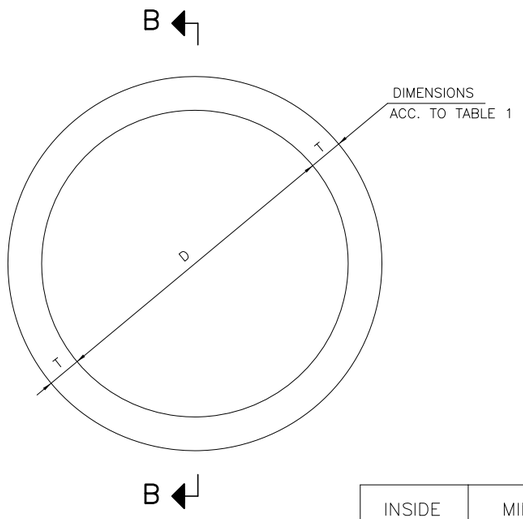
REINFORCED CONCRETE PIPE STRUCTURE, INLET, OUTLET SINGLE CELL, DIA 300–600 mm MIN. COVER 0.4 m

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD–001
SCALE: NOT TO SCALE



SECTION B–B
NOT TO SCALE



SECTION A–A
NOT TO SCALE

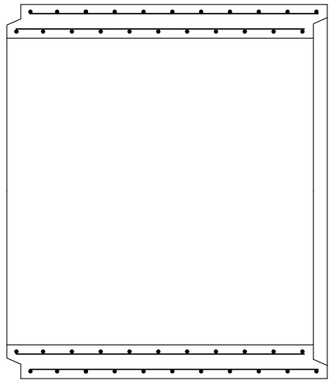
TONGUE AND GROOVE TYPE DIMENSIONS

TABLE 1

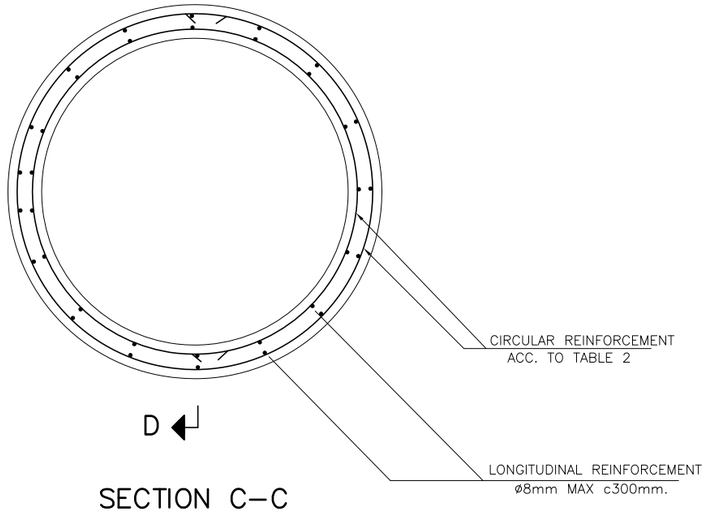
INSIDE DIAMETER D mm	WALL THICKNESS T mm	DIMENSIONS OF PIPE END DETAILS IN mm TONGUE AND GROOVE			
		a	b	c	d
800	95	38	15	42	45
1000	110	43	20	47	45
1200	125	48	25	52	50
1500	150	57	30	63	60

TABLE 2

INSIDE DIAMETER D mm	MIN. CIRCULAR REINFORCEMENT (mm^2/m)		CRUSHING LOAD TO PRODUCE 0.30mm CRACK WIDTH AND 310mm CRACK LENGTH kg/m	ULTIMATE CRUSHING LOAD kg/m	ULTIMATE STRENGTH FOR 152 X 304mm CONCRETE CYLINDER AT 28 DAY AGE MPa
	INNER CAGE	OUTER CAGE			
800	940	710	11,420	14,280	30
1000	1200	900	14,280	17,850	
1200	1550	1160	17,130	21,410	
1500	2133	1598	21,413	26,767	35



SECTION D–D
NOT TO SCALE



SECTION C–C
NOT TO SCALE

TONGUE AND GROOVE TYPE REINFORCEMENT

SCALE 1:25

NOTES:

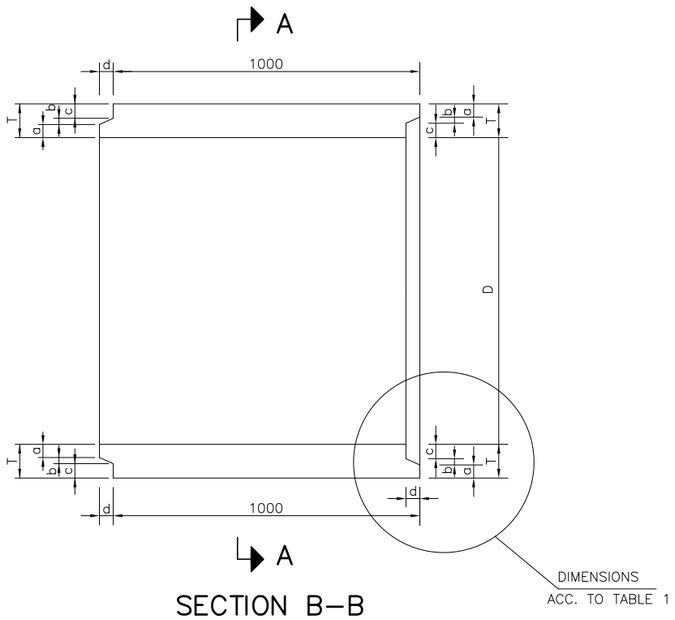
1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL PIPE BARRELS SHALL CONFORM TO REQUIREMENTS OF AASHTO M170M, REINFORCED CONCRETE CULVERT, STORM DRAIN, AND SEWER PIPE (METRIC) CLASS IV , WALL B .
3. ALL CONCRETE SHALL BE CLASS 30 MPa, UNLESS OTHERWISE SHOWN CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=30MPa,fc=12MPa.
4. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AASHTO M 31, DEFORMED AND PLAIN BILLET STEEL BARS FOR CONCRETE REINFORCEMENT, GRADE 60, EXCEPT THAT BARS OF DIAMETER UP TO AND INCLUDING 9mm MAY BE PLAIN MILD STEEL REINFORCEMENT IN ACCORDANCE WITH AASHTO M 31, GRADE 40.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

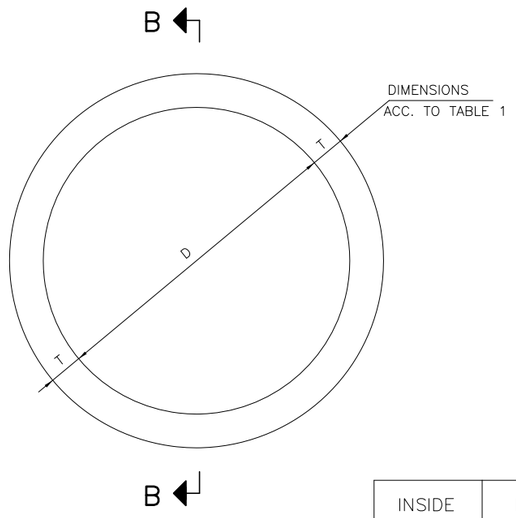
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE PIPE TONGUE AND GROOVE, DIA 800–1500 mm MIN. COVER 0.4 m

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. SDD–002
							SCALE: AS SHOWN



SECTION B–B
NOT TO SCALE



SECTION A–A
NOT TO SCALE

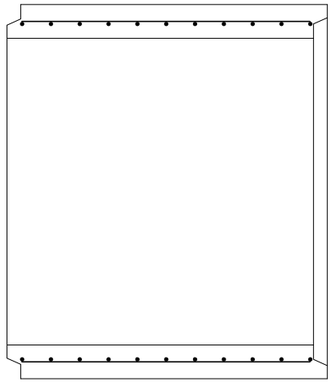
TONGUE AND GROOVE TYPE DIMENSIONS

TABLE 1

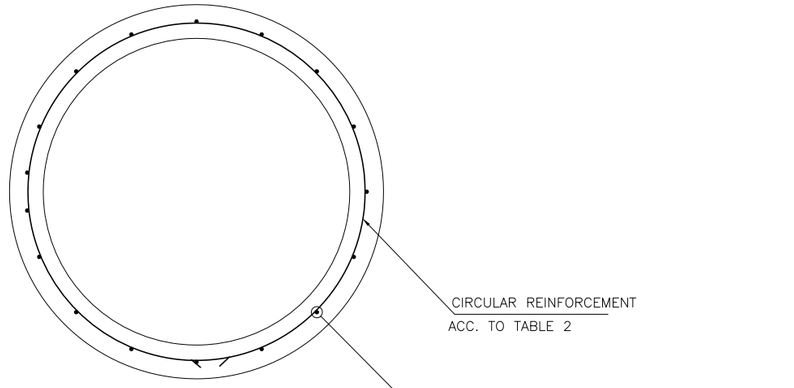
INSIDE DIAMETER D mm	WALL THICKNESS T mm	DIMENSIONS OF PIPE END DETAILS IN mm TONGUE AND GROOVE			
		a	b	c	d
300	50	19	8	23	30
400	60	23	10	27	30
500	70	28	10	32	40
600	75	28	15	32	40

TABLE 2

INSIDE DIAMETER D mm	MIN. CIRCULAR REINFORCEMENT (mm^2/m)		CRUSHING LOAD TO PRODUCE 0.30mm CRACK WIDTH AND 310mm CRACK LENGTH kg/m	ULTIMATE CRUSHING LOAD kg/m	ULTIMATE STRENGTH FOR 152 X 304mm CONCRETE CYLINDER AT 28 DAY AGE MPa
	INNER CAGE	OUTER CAGE			
300	150	–	3,060	4,590	30
400	250	–	4,080	6,120	
500	380	–	5,100	7,650	
600	570	–	6,120	9,180	



SECTION D–D
NOT TO SCALE



SECTION C–C
NOT TO SCALE

TONGUE AND GROOVE TYPE REINFORCEMENT

NOTES:

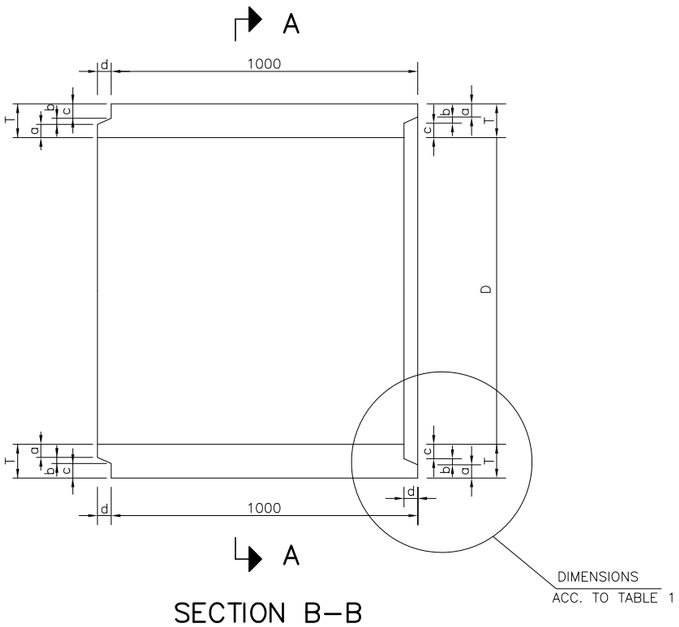
1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL PIPE BARRELS SHALL CONFORM TO REQUIREMENTS OF AASHTO M170M, REINFORCED CONCRETE CULVERT, STORM DRAIN, AND SEWER PIPE (METRIC) CLASS IV , WALL B .
3. ALL CONCRETE SHALL BE CLASS 30 MPa, UNLESS OTHERWISE SHOWN CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=30MPa,fc=12MPa.
4. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AASHTO M 31, DEFORMED AND PLAIN BILLET STEEL BARS FOR CONCRETE REINFORCEMENT, GRADE 60, EXCEPT THAT BARS OF DIAMETER UP TO AND INCLUDING 9mm MAY BE PLAIN MILD STEEL REINFORCEMENT IN ACCORDANCE WITH AASHTO M 31, GRADE 40.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

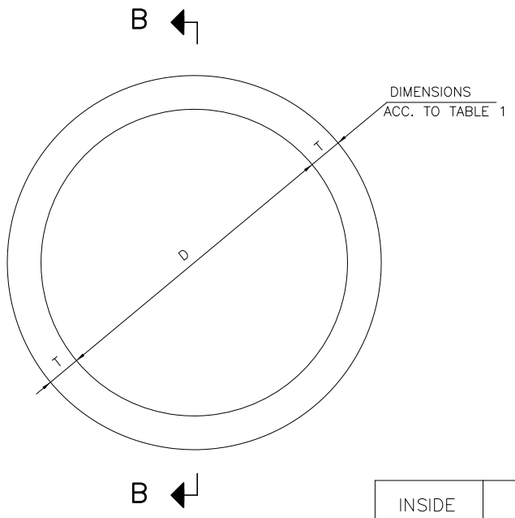
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE PIPE TONGUE AND GROOVE, DIA 300–600mm MIN. COVER 0.6 m

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–003
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE



SECTION B–B
NOT TO SCALE



SECTION A–A
NOT TO SCALE

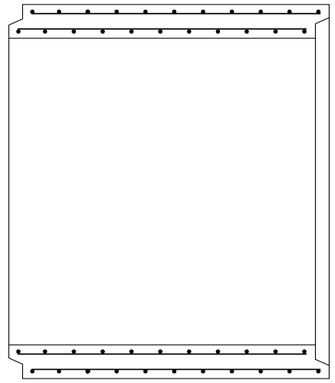
TONGUE AND GROOVE TYPE DIMENSIONS

TABLE 1

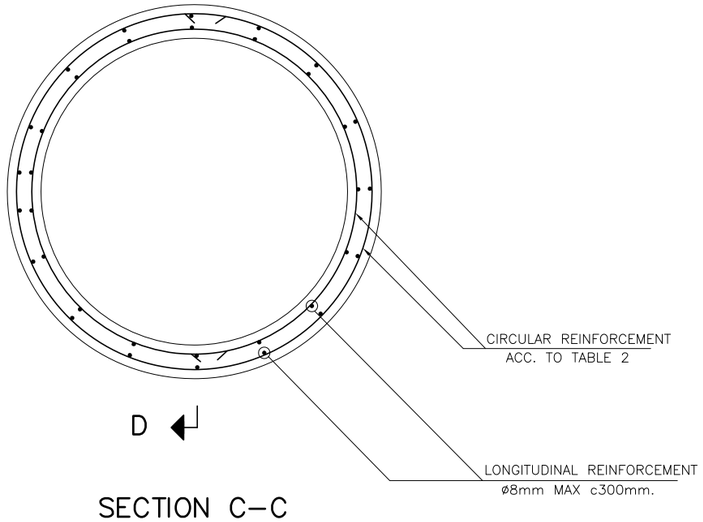
INSIDE DIAMETER D mm	WALL THICKNESS T mm	DIMENSIONS OF PIPE END DETAILS IN mm TONGUE AND GROOVE			
		a	b	c	d
800	95	38	15	42	45
1000	110	43	20	47	45
1200	125	48	25	52	50
1500	150	57	30	63	60

TABLE 2

INSIDE DIAMETER D mm	MIN. CIRCULAR REINFORCEMENT (mm^2/m)		CRUSHING LOAD TO PRODUCE 0.30mm CRACK WIDTH AND 310mm CRACK LENGTH kg/m	ULTIMATE CRUSHING LOAD kg/m	ULTIMATE STRENGTH FOR 152 X 304mm CONCRETE CYLINDER AT 28 DAY AGE MPa
	INNER CAGE	OUTER CAGE			
800	580	410	8,160	12,240	30
1000	700	520	10,200	15,300	
1200	890	680	12,240	18,360	
1500	1250	750	15,295	22,943	35



SECTION D–D
NOT TO SCALE



SECTION C–C
NOT TO SCALE

TONGUE AND GROOVE TYPE REINFORCEMENT
SCALE 1:25

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL PIPE BARRELS SHALL CONFORM TO REQUIREMENTS OF AASHTO M170M, REINFORCED CONCRETE CULVERT, STORM DRAIN, AND SEWER PIPE (METRIC) CLASS IV , WALL B .
3. ALL CONCRETE SHALL BE CLASS 30 MPa, UNLESS OTHERWISE SHOWN CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=30MPa,fc=12MPa.
4. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AASHTO M 31, DEFORMED AND PLAIN BILLET STEEL BARS FOR CONCRETE REINFORCEMENT, GRADE 60, EXCEPT THAT BARS OF DIAMETER UP TO AND INCLUDING 9mm MAY BE PLAIN MILD STEEL REINFORCEMENT IN ACCORDANCE WITH AASHTO M 31, GRADE 40.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

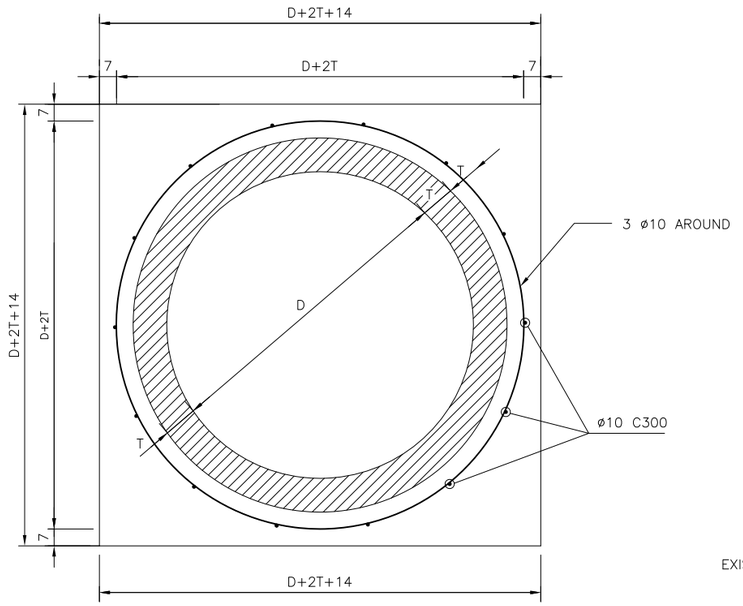
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE PIPE TONGUE AND GROOVE,DIA 800–1500 mm MIN. COVER 0.6 m

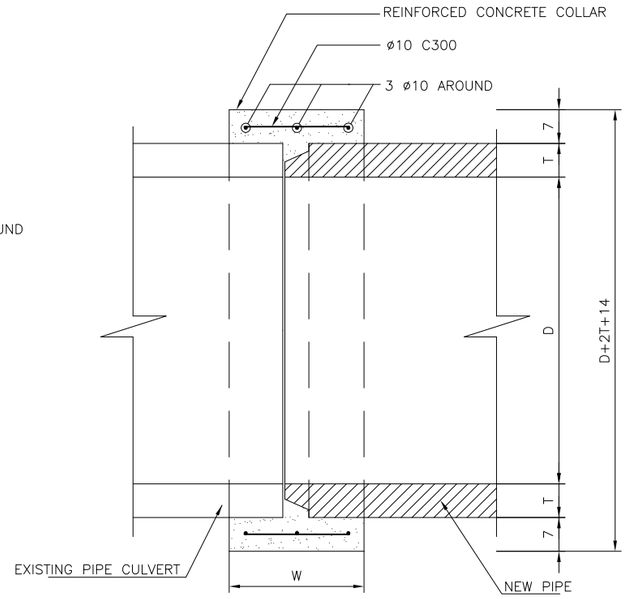
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD–004
SCALE: AS SHOWN

PIPE EXTENSION DETAILS

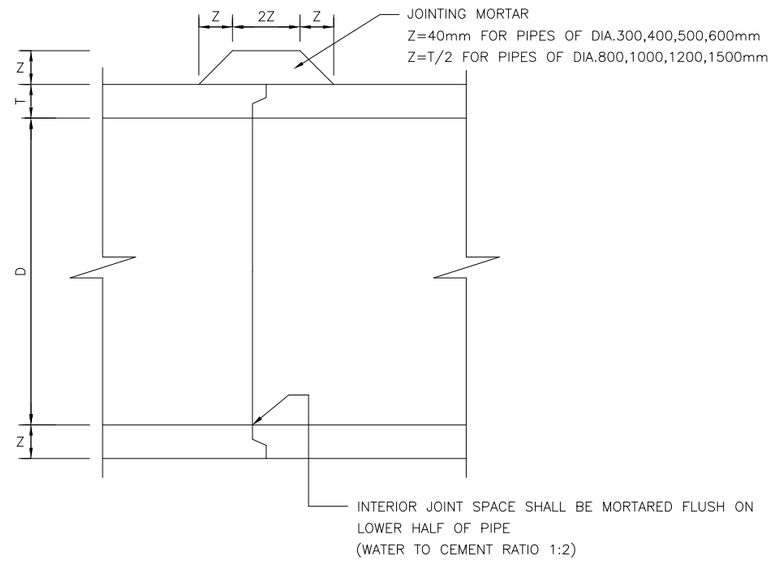


TRANSVERSE SECTION
NOT TO SCALE



W=15 FOR D LESS THAN 60
W=20 FOR D EQUALS TO 60 OR MORE

LONGITUDINAL SECTION
NOT TO SCALE



PIPE CONNECTION JOINT DETAIL
NOT TO SCALE

TABLE 1

R.C PIPE CULVERT CLASS	INSIDE DIAMETER (D) (CM)	WALL THICKNESS (T) (CM)	PIPE END DETAILS (CM)								
			BELL & SPIGOT TYPE					TONGUE & CROOVE TYPE			
			T_1	T_2	T_3	T_4	T_5 (MIN)	a	b	c	d
2 & 3	30	5.0	6.0	6.6	0.4	8.5	15.0	1.9	0.8	2.3	3.0
	40	6.0	6.7	7.6	0.4	9.7	18.0	2.3	1.0	2.7	3.0
	50	7.0	7.0	8.6	0.4	10.5	21.0	2.8	1.0	3.2	4.0
	60	7.5	7.6	9.1	0.4	11.4	22.5	2.8	1.5	3.2	4.0
	80	9.5	8.9	11.1	0.4	13.7	28.5	3.8	1.5	4.2	4.5
	100	11.0	9.5	12.6	0.4	15.0	33.0	4.3	2.0	4.7	4.5
	120	12.5	10.0	14.1	0.4	16.5	37.5	4.8	2.5	5.2	5.0
	150	15.0	10.0	16.6	0.4	17.7	45.0	5.7	3.0	6.3	6.0

NOTES:

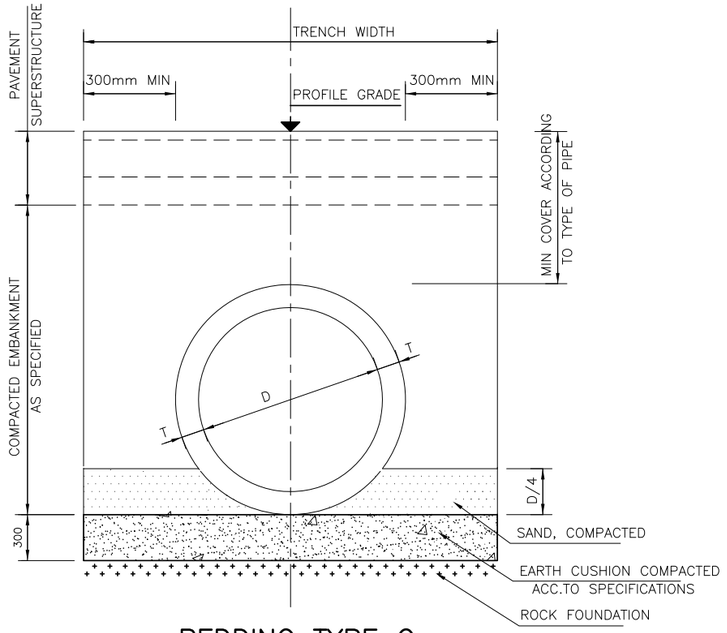
1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. MORTAR FOR PIPE CONNECTION JOINT SHALL CONSIST OF 1 PART PORTLAND CEMENT TO 2 PARTS OF SAND BY VOLUME.
3. CONCRETE COLLAR FOR PIPE EXTENSION SHALL BE CLASS 25 MPa.
4. REINFOCEMENT FOR EXTENSION SHALL BE DEFORMED BILLET STEEL BARS ACCORDING TO ASSHTO M30, GRADE 60.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

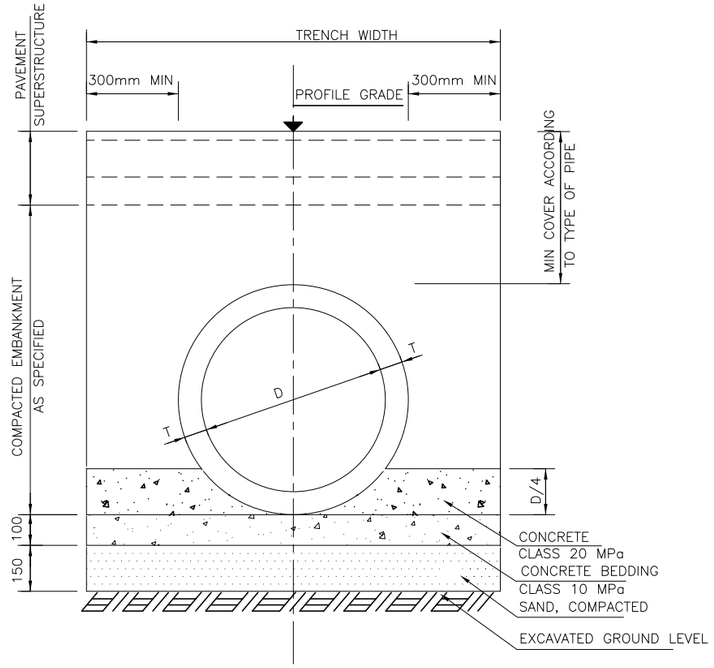
REINFORCED CONCRETE PIPE JOINTS AND EXTENSIONS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–005
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE



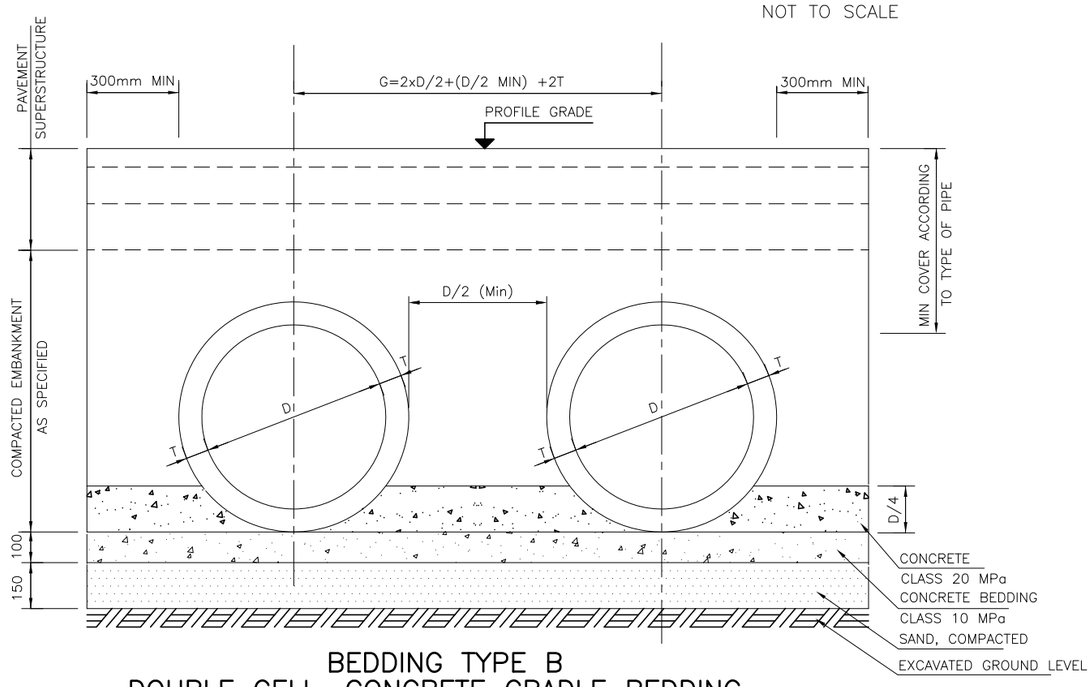
BEDDING TYPE C
SINGLE CELL ROCK FOUNDATION BEDDING

NOT TO SCALE



BEDDING TYPE B
SINGLE CELL CONCRETE CRADLE BEDDING

NOT TO SCALE



BEDDING TYPE B
DOUBLE CELL, CONCRETE CRADLE BEDDING

NOT TO SCALE

NOTES:

REINFORCED CONCRETE PIPE CULVERT INSTALLATION

1. TRENCH METHOD

1.1 PIPE INSTALLATION SHALL BE BY TRENCH METHOD, UNLESS OTHERWISE PERMITTED BY THE ENGINEER .

1.2 EMBANKMENT OR CUT SHALL FIRST BE CONSTRUCTED TO AN ELEVATION OF D/2 OR AT LEAST 450 mm OVER THE TOP OF THE PROPOSED PIPE CULVERT.

1.3 A TRENCH SHALL THEN BE EXCAVATED ALONG THE PROPOSED LINE AS SHOWN ON DRAWING. TRENCH WALLS SHALL HAVE A SMOOTH SURFACE AND SHALL BE CONSTRUCTED VERTICALY, WHERE POSSIBLE.

1.4 THE TRENCH BED SHALL BE PREPARED TO THE SPECIFIED SLOPE . BEDDING SHALL BE TYPE A, B OR C DEPENDING ON FOUNDATION SOIL / ROCK AND AS DIRECTED BY THE ENGINEER .

1.5 PIPES SHALL BE INSTALLED ACCORDING TO SIZES SHOWN ON THE DRAWINGS .

1.6 BACKFILLING OF PIPE CULVERTS SHALL NOT BE PERMITTED UNTIL AT LEAST 48 HOURS HAVE ELAPSED AFTER JOINT HAVE BEEN COMPLETED.

1.7 BACKFILL SHALL BE PLACED TO THE SUBGRADE ELEVATION .

1.8 BACKFILL SHALL BE GRANULAR SUBGRADE MEETING REQUIREMENTS OF THE SPECIFICATIONS, AND SHALL MEET THE APPROVAL OF THE ENGINEER .

1.9 METHOD OF COMPACTION SHALL BE AS DESCRIBED IN THE SPECIFICATIONS .

1.10 COMPACTION EQUIPMENT SHALL MEET THE APPROVAL OF THE ENGINEER .

1.11 THE DEGREE OF COMPACTION SHALL MEET THE REQUIREMENTS OF THE – SPECIFICATIONS.

1.12 LENGTH, LOCATION AND ELEVATION OF PIPE CULVERT SHALL BE ADJUSTED TO SUIT FIELD CONDITIONS AS APPROVED BY THE ENGINEER .

2. PROJECTION METHOD

2.1 THE PROJECTION METHOD SHALL BE EMPLOYED FOR PIPE INSTALLATION ONLY WITH APPROVAL BY THE ENGINEER .

2.2 THE PIPE LINE LAYOUT SHALL BE SUITABLE FOR THE TERRAIN.

2.3 THE EXISTING GROUND ALONG THE LINE OF THE CULVERT SHALL BE PREPARED FOR THE SPECIFIED SLOPE.

2.4 PIPE BEDDING SHALL BE TYPE A, B OR C AS SHOWN ON THE DRAWING AND SHALL DEPEND UPON PREVAILING SOIL CONDITIONS AND THE JUDGEMENT OF THE

2.5 AFTER THE PIPE HAS BEEN PLACED, THE EMBANKMENT, SUBGRADE AND/OR PORTION OF THE PAVEMENT STRUCTURE WHICH ARE TO BE LAID ALONG ROAD SIDES OF THE LINE WITHIN OF AT LEAST 4 PIPE DIAMETERS BUT NOT LESS THAN 5 m FROM CENTERLINE OF THE PIPE SHALL BE CONSTRUCTED.

2.6 COMPACTION EQUIPMENT SHALL OPERATE IN A DIRECTION PERPENDICULAR TO THE CENTERLINE OF THE ROAD, PARALELL TO THE PIPE , UNTIL THE BACKFILL HAS REACHED AN ELEVATION OF AT LEAST 300 mm ABOVE THE TOP OF THE PIPE .

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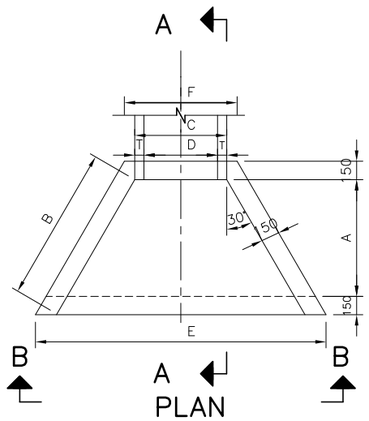
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

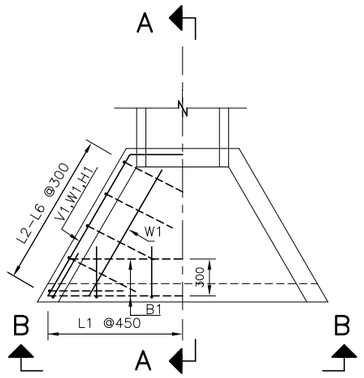
REINFORCED CONCRETE PIPE INSTALLATION

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD–006
SCALE: NOT TO SCALE



PLAN
(FOR D=600)
SCALE 1:20



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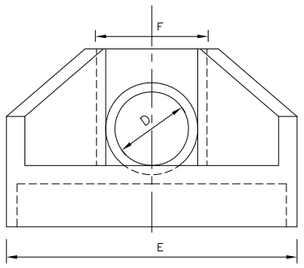

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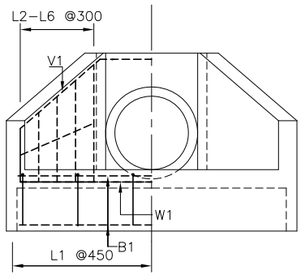
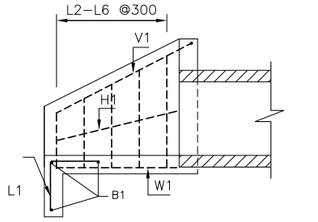
SCALE 1:20



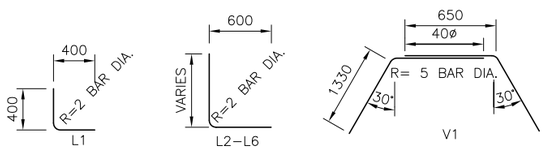
END VIEW B–B
(FOR D=600)
SCALE 1:20

SECTION A–A
(FOR D=600)
SCALE 1:20



SECTION A–A
(FOR D=600)
SCALE 1:20

DIMENSION



BENDING AS SHOWN
REINFORCEMENT

TABLE 1

DIA.OF PIPE D mm	WALL THICKNESS mm	TABEL OF DIMENSIONS					
		A mm	B mm	C mm	E mm	F mm	H mm
300	50	700	810	400	1550	570	650
400	60	900	1040	520	1900	690	750
500	70	900	1040	640	2030	810	850
600	75	1100	1270	750	2370	920	950

TABLE 2

TABLE OF REINFORCEMENT
ONE WINGWALL END

BAR MARK	SIZE Ømm	D=300mm		D=400mm		D=500mm		D=600mm	
		No.	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH
V1	12	2	1340	2	1630	2	1696	2	1980
L1	12	4	700	5	700	5	800	6	800
L2	12	2	940	2	940	2	1040	2	1040
L3	12	2	1070	2	1070	2	1170	2	1150
L4	12	2	1200	2	1200	2	1300	2	1260
L5	12	2	1300	2	1330	2	1430	2	1370
L6	12	–	–	–	–	–	–	2	1480
B1	12	3	–	3	–	3	–	3	–
W1	12	4	750	4	980	4	980	4	1210
H1	12	2	750	2	980	2	980	2	1210
CONC. m^3		0.40		0.50		0.60		0.80	
REINF. Kg		20.00		24.00		25.00		31.00	

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa, UNLESS OTHERWISE SHOWN. (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=25MPa,fc=10.0MPa).
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION FOR DEFORMED BILLET STEEL BARS AASHTO M31 GRADE 60, fy=414MPa,fs=165.5MPa.
4. CONCRETE COVER SHALL BE 50 mm,IF NOT OTHERWISE SHOWN AND MEASURE FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR.
5. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS.
6. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20mm.
7. DIMENSIONS IN BRACKETS ( ) ARE FOR PIPE CULVERT DIA.300 AND 400mm.

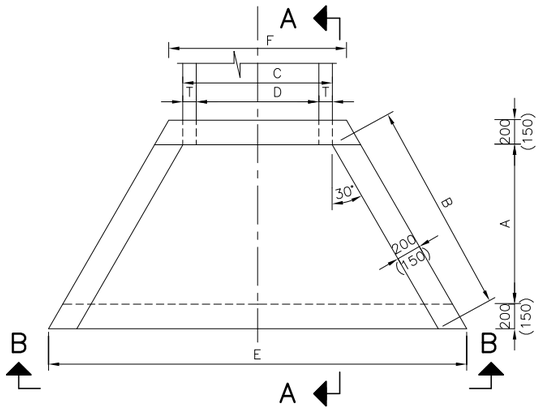
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

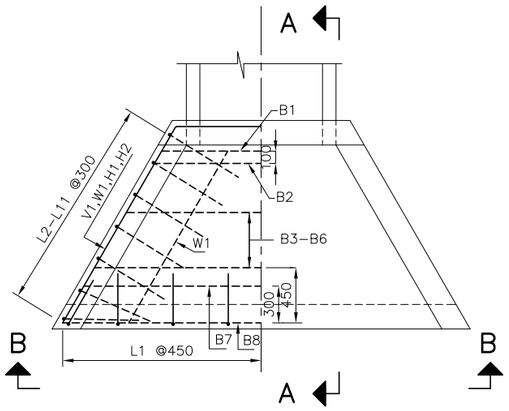
REINFORCED CONCRETE PIPE STRUCTURE, INLET, OUTLET SINGLE CELL, DIA 300–600 mm MIN.

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD–007
SCALE: 1:20



PLAN
(FOR D=1000)
SCALE 1:20



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(FOR D=1000)
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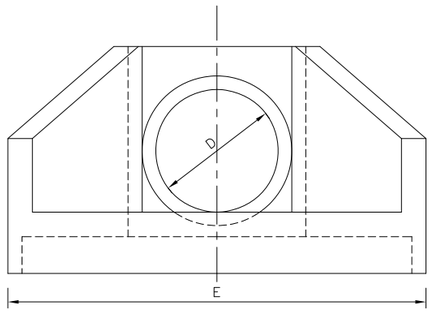
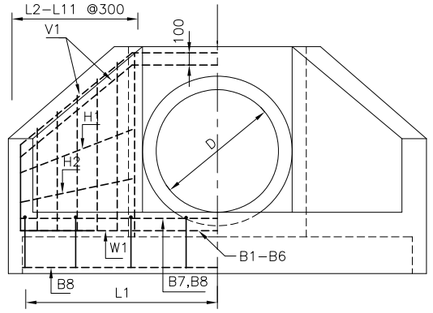


END VIEW B–B
(FOR D=1000)
SCALE 1:20



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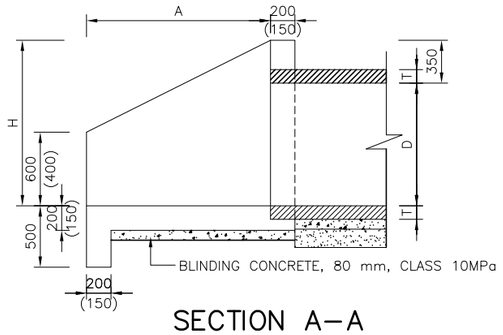
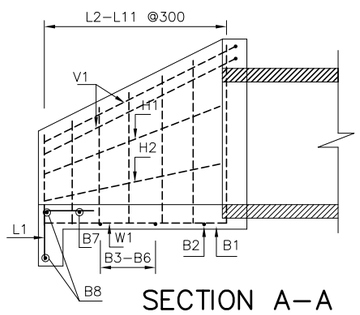
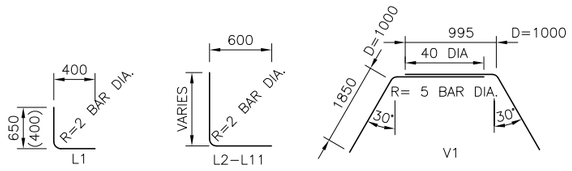


SECTION A–A
(FOR D=1000)
SCALE 1:20



SECTION A–A
(FOR D=1000)
SCALE 1:20

DIMENSIONS



BENDING AS SHOWN
REINFORCEMENT

TABLE 1

DIA. OF PIPE D mm	WALL THICKNESS mm	TABLE OF DIMENSIONS					
		A mm	B mm	C mm	E mm	F mm	H mm
800	95	1500	1730	990	3070	1160	1150
1000	110	1500	1730	1220	3410	1450	1350
1200	125	1900	2190	1450	4110	1680	1550
1500	150	2500	2900	1800	5200	2030	1850

TABLE 2

TABLE OF REINFORCEMENT
FOR ONE WINGWALL END

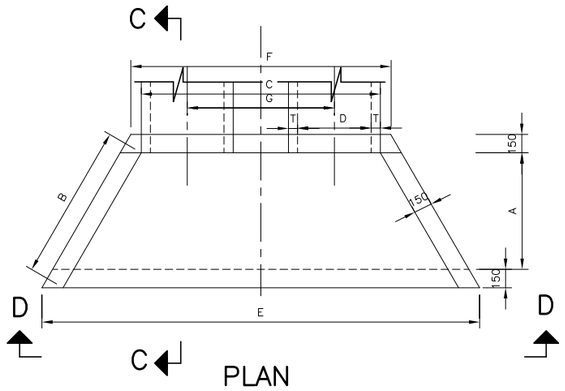
BAR MARK	SIZE ømm	D=800		D=1000		D=1200		D=1500	
		No.	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH
B1	16	–	–	1	1620	1	1850	1	2210
B2	16	–	–	1	1740	1	1970	1	2325
B3	12	–	–	1	2200	1	2420	1	2915
B4	12	–	–	1	2720	1	2940	1	3440
B5	12	–	–	–	–	1	3460	1	3970
B6	12	–	–	–	–	–	–	1	4500
B7	12	1	2550	1	2890	1	3590	1	4675
B8	12	2	2900	2	3240	2	3940	2	5025
L1	12	8	800	8	800	10	800	12	1050
L2	16(12)	2	1070	2	1320	2	1320	2	1310
L3	16(12)	2	1200	2	1450	2	1450	2	1440
L4	16(12)	2	1330	2	1580	2	1580	2	1570
L5	16(12)	2	1460	2	1710	2	1710	2	1700
L6	16(12)	2	1590	2	1840	2	1840	2	1820
L7	16(12)	2	1720	2	1970	2	1970	2	1950
L8	16	–	–	–	–	2	2100	2	2080
L9	16	–	–	–	–	2	2250	2	2210
L10	16	–	–	–	–	–	–	2	2340
L11	16	–	–	–	–	–	–	2	2470
H1	12	2	1690	2	1810	2	2250	2	2950
H2	12	–	–	2	1770	2	2230	2	2840
V1	16(12)	2	2695	4	2975	4	3590	4	4535
W1	12	4	1650	4	1650	4	2110	4	2840
CONC. m^3		1.20		2.00		2.80		4.30	
REINF. Kg		41.57		85.76		114.05		153.08	

NOTE: FOR ø 800 PIPE CULVERT V1,L2–L7 SHALL BE ø12mm REBARS

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa, UNLESS OTHERWISE SHOWN, (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=25MPa,fc=10.0MPa).
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION FOR DEFORMED BILLET STEEL BARS AASHTO M31 GRADE 60, fy=414MPa,fs=165.5MPa.
4. CONCRETE COVER SHALL BE 50 mm, IF NOT OTHERWISE SHOWN AND MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR.
5. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS.
6. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20mm.
7. DIMENSIONS IN BRACKETS ( ) ARE FOR PIPE CULVERT DIA 800.

ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
	REINFORCED CONCRETE PIPE STRUCTURE, INLET, OUTLET SINGLE CELL, DIA 800–1500 mm MIN.					DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
						CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–008
						APPROVED	Mr.Vandy VORASACK		SCALE: 1:20



PLAN
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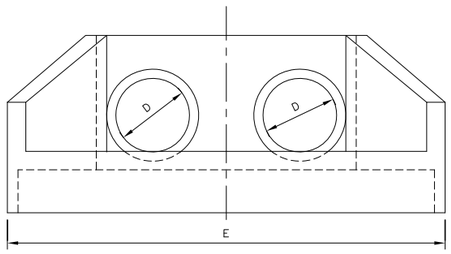
SCALE 1:20



END VIEW D–D
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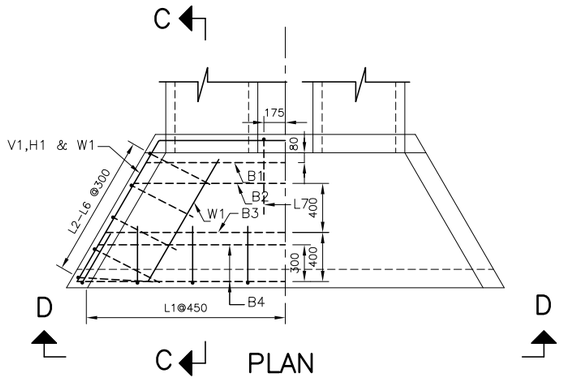
SCALE 1:20



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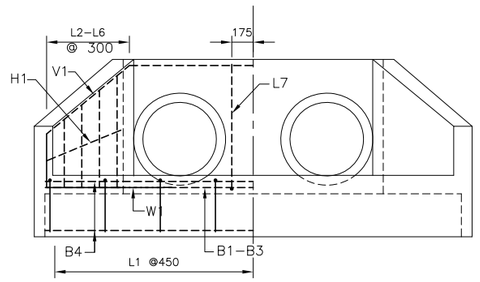

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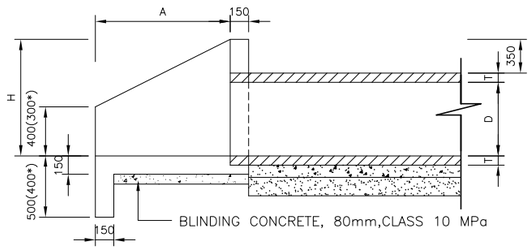
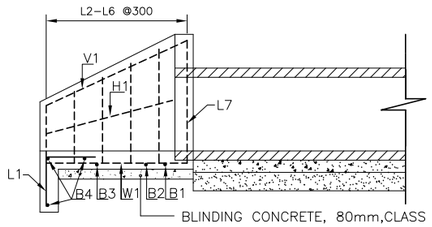
SCALE 1:20



*.DIMENSIONS IN BRACKETS ARE FOR PIPE CULVERT OF DIA.300 AND 400mm.

SECTION C–C
(FOR D=600)
SCALE 1:20

DIMENSION



SECTION C–C
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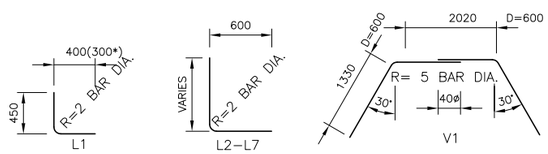
SCALE 1:20



BENDING AS SHOWN

REINFORCEMENT

TABLE 1

DIA. OF PIPE "D" mm	WALL THICKNESS mm	TABLE OF DIMENSIONS FOR 2 PIPES						
		A	B	C	E	F	G	H
300	50	700	810	1000	2150	1170	600	650
400	60	900	1040	1300	2680	1470	780	750
500	70	900	1040	1740	3130	1910	1100	850
600	75	1100	1270	1950	3570	2120	1200	950

TABLE 2

TABLE OF REINFORCEMENT									
BAR MARK	SIZE mm	FOR 2 PIPES							
		D=300mm		D=400mm		D=500mm		D=600mm	
		No	LENGTH	No	LENGTH	No	LENGTH	No	LENGTH
B1	12	1	1340	1	1640	1	2080	1	2290
B2	12	–	–	–	–	–	–	1	2480
B3	12	1	1520	1	2050	1	2500	1	2940
B4	12	3	–	3	–	3	–	3	–
L1	12	6	750	7	750	8	850	9	850
L2–L6	12	8	–	8	–	8	–	10	–
L7	12	2	1300	2	1400	2	1500	2	1600
V1	12	2	1640	2	2020	2	2240	2	2580
H1	12	2	750	2	980	2	980	2	1210
W1	12	4	750	4	980	4	980	4	1210
CONC. $(m)^3$		0.50		0.75		0.90		1.20	
REINF. Kg		29.00		34.00		38.00		47.00	

NOTE: FOR ø300,400 AND 500mm PIPE CULVERT L2–L6,L7
B1,B2,B3 AND B4 SHALL BE L2–L5,L6,B1,B3 AND B4

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa, UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=25MPa,fc=10.0MPa)
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION FOR DEFORMED BILLET STEEL BARS AASHTO M31 GRADE 60 fy=414MPa,fs=165.5MPa.
4. CONCRETE COVER SHALL BE 50 mm,IF NOT OTHERWISE SHOWN AND MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR.
5. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS.
6. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20mm.

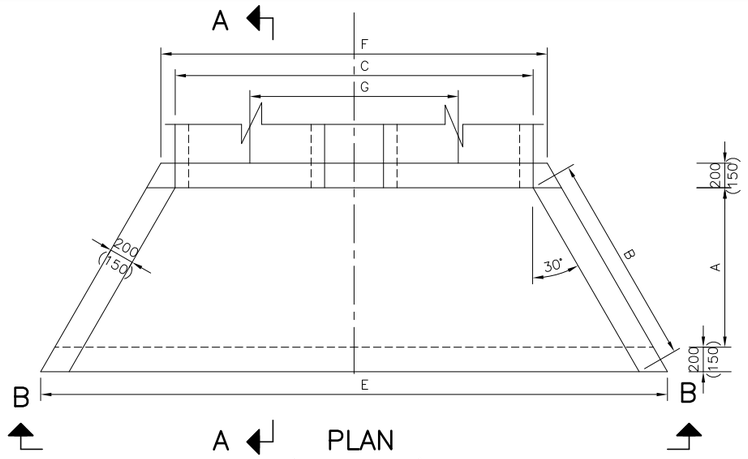
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

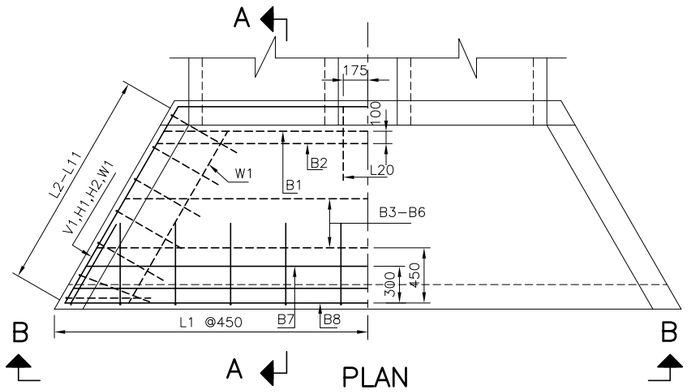
REINFORCED CONCRETE PIPE STRUCTURE, INLET, OUTLET DOUBLE CELL, DIA 300–600 mm MIN.

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD–009
SCALE: 1:20



A PLAN
(FOR D=1000)
SCALE 1:20



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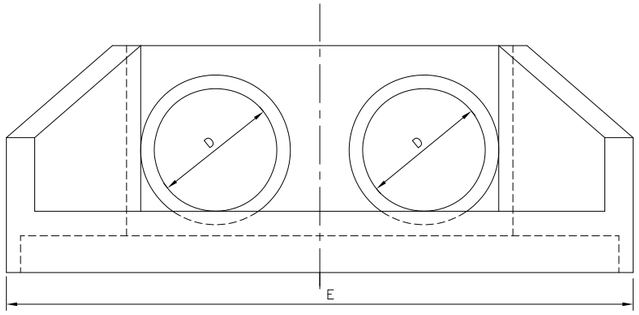

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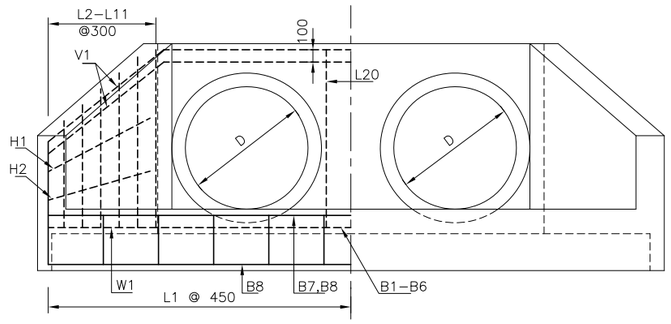

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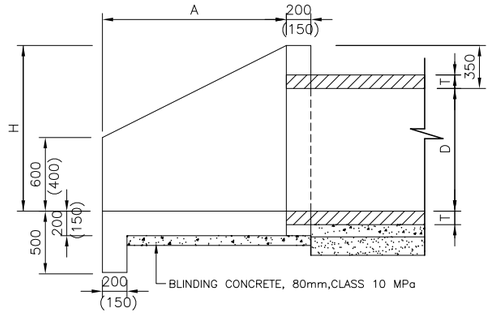
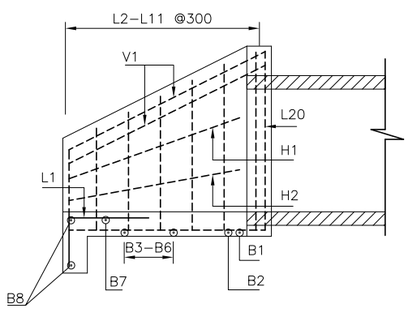


SECTION A–A
(FOR D=1000)
SCALE 1:20

DIMENSION



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(FOR D=1000)
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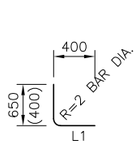
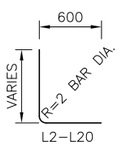
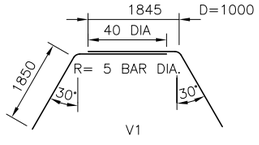






BENDING AS SHOWN
REINFORCEMENT

TABLE 1

DIA. OF PIPE D mm	WALL THICKNESS mm	TABLE OF DIMENSIONS FOR 2 PIPES						
		A mm	B mm	C mm	E mm	F mm	G mm	H mm
800	95	1500	1730	2390	4470	2560	1400	1150
1000	110	1500	1730	2920	5110	3150	1700	1350
1200	125	1900	2190	3350	6010	3580	1900	1550
1500	150	2500	2900	4050	7400	4280	2250	1850

TABLE 2

TABLE OF REINFORCEMENT FOR ONE WINGWALL END

BAR MARK	SIZE Ømm	D=800		D=1000		D=1200		D=1500	
		No.	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH
B1	16(12)	1	2670	1	3320	1	3750	1	4450
B2	16(12)	1	3360	1	3440	1	3870	1	4570
B3	12	1	3820	1	3510	1	4400	1	5150
B4	12	–	–	1	3980	1	4870	1	5670
B5	12	–	–	1	4440	1	5330	1	6190
B6	12	–	–	–	–	–	–	1	6710
B7	12	1	3950	1	4590	1	5490	1	6880
B8	12	2	4300	2	4940	2	5840	2	7230
L1	12	11	850	12	1050	14	1050	17	1050
L2	16(12)	2	1070	2	1320	2	1320	2	1310
L3	16(12)	2	1200	2	1450	2	1450	2	1440
L4	16(12)	2	1330	2	1580	2	1580	2	1570
L5	16(12)	2	1460	2	1710	2	1710	2	1700
L6	16(12)	2	1590	2	1860	2	1860	2	1820
L7	16(12)	2	1720	2	1920	2	1970	2	1950
L8	16	–	–	2	2050	2	2100	2	2080
L9	16	–	–	–	–	2	2250	2	2210
L10	16	–	–	–	–	–	–	2	2340
L11	16	–	–	–	–	–	–	2	2470
L20	16(12)	2	1800	2	2050	2	2250	2	2550
H1	12	2	1690	2	1770	2	2230	2	2950
H2	12	–	–	2	1810	2	2350	2	2840
V1	16	4	3475	4	3825	4	4540	4	5660
W1	12	4	1650	4	1650	4	2110	4	2830
CONC. m^3		1.80		2.90		4.00		6.30	
REINF. Kg		76.98		125.56		171.04		193.66	

NOTE: FOR ø 800 PIPE CULVERT B1,B2,L2–L7 SHALL BE ø12mm REBARS

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa,UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=25 MPa,fc=10 MPa)
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION FOR DEFORMED BILLET STEEL BARS AASHTO M31–GRADE 60, fy=414MPa,fs=165.5MPa.
4. CONCRETE COVER SHALL BE 50 mm, IF NOT OTHERWISE SHOWN AND MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR
5. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS.
6. ALL CONCRETE SURFACES SHALL BE CHAMFERED 20 mm.
7. DIMENSIONS IN BRACKETS ( ) ARE FOR PIPE CULVERT DIA. 800mm.

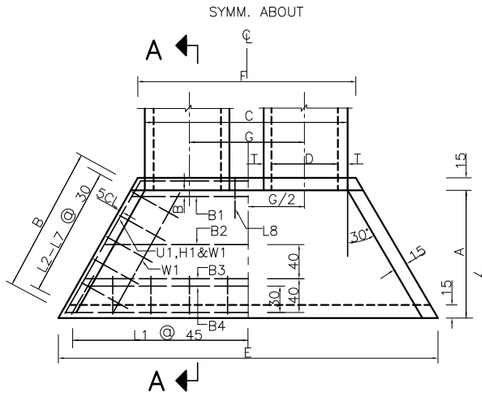
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

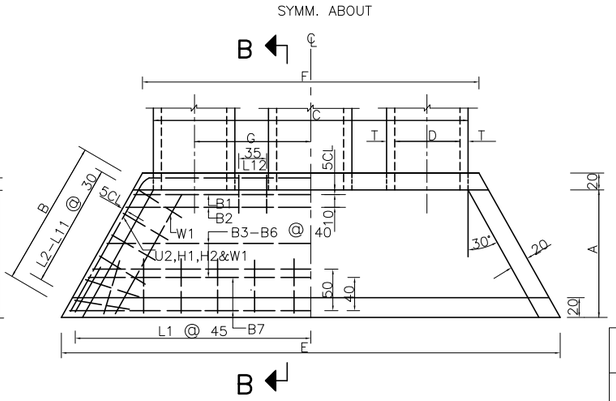
REINFORCED CONCRETE PIPE STRUCTURE, INLET, OUTLET DOUBLE CELL, DIA 800–1500 mm.

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

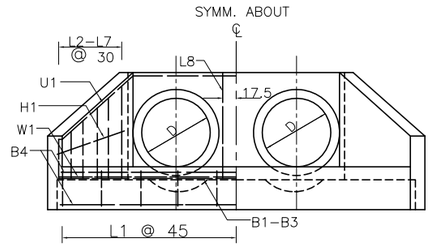
LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD–010
SCALE: 1:20



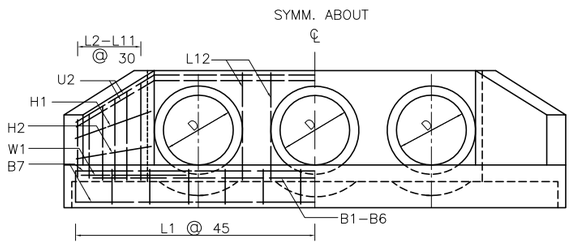
PLAN



PLAN



END VIEW



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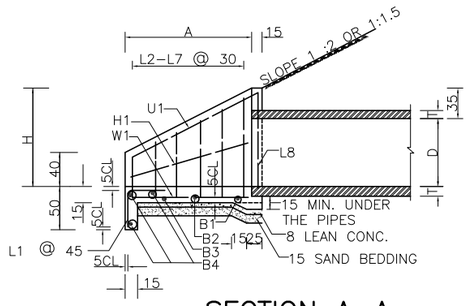
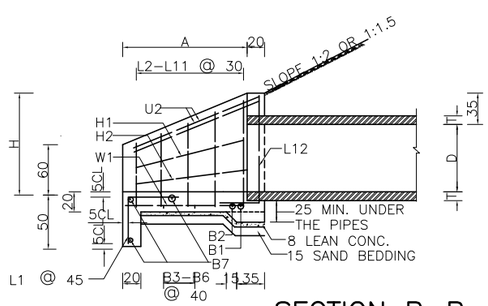


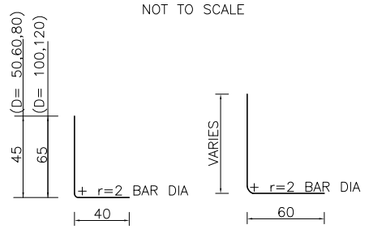
SECTION A–A



SECTION B–B

DETAILS FOR ø50, ø60, & ø80 PIPE CULVERTS

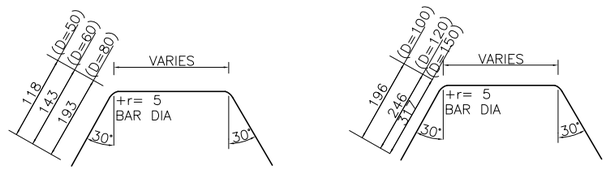
NOT TO SCALE



L1 L2 TO L10

DETAILS FOR ø100 & ø 120 & ø 150 PIPE CULVERTS

NOT TO SCALE



U1 U2

BAR BENDING DIAGRAMS

NOT TO SCALE

TABLE OF DIMENSIONS

DIA. OF PIPE "D"	T	DIMENSIONS SAME FOR ALL MULTIPLES				DIMENSIONS								
		A	B	H	G	FOR 2 PIPES C	E	F	FOR 3 PIPES C	E	F	FOR 4 PIPES C	E	F
50	7	90	75	104	85	110	174	313	191	284	423	301	–	–	–
60	7.5	110	90	127	95	120	195	357	212	315	477	332	–	–	–
80	9.5	150	120	173	115	140	239	447	256	379	587	396	–	–	–
100	11	150	120	173	135	170	292	511	315	462	681	485	632	851	655
120	12.5	190	150	219	155	190	335	601	358	525	781	548	715	981	738
150	15	250	–	290	185	225	405	740	428	–	–	–	–	–	–

TABLE OF REINFORCEMENT FOR ø50, ø60, ø80 CM.

BAR MARK	SIZE ø (MM.)	FOR 2 PIPES D=50 NO.	D=50 LENGTH	D=60 NO.	D=60 LENGTH	D=80 NO.	D=80 LENGTH	FOR 3 PIPES D=50 NO.	D=50 LENGTH	D=60 NO.	D=60 LENGTH	D=80 NO.	D=80 LENGTH
B1	12	1	202	1	223	1	267	1	312	1	343	1	407
B2	12	–	–	1	246	1	336	–	–	1	366	1	476
B3	12	1	248	1	292	1	382	1	358	1	412	1	522
B4	12	3	–	3	–	3	–	3	–	3	–	3	–
L1	12	8	85	9	85	11	85	10	85	11	85	–	85
L2–L7	12	8	–	10	–	12	–	8	–	10	–	–	–
L8	12	2	130	2	160	2	180	4	130	4	160	4	180
U1	12	1	423	1	494	1	638	1	533	1	614	1	778
H1	12	2	99	2	122	2	169	2	99	2	122	2	169
W1	12	4	96	4	119	4	165	4	96	4	119	4	165

TABLE OF QUANTITIES

DIA.OF PIPE "D"	T	CONCRETE (1–HDWL.) M.3 FOR 2 PIPES	FOR 3 PIPES	REINF. BARS, TOTAL WT. (1–HDWL.) KG. FOR 2 PIPES	FOR 3 PIPES
50	7	0.9	1.3	41	51
60	7.5	1.2	1.6	50	63
80	9.5	1.8	2.3	64	79
100	11	3.0	4.0	121	151
150	15	6.3	–	193.66	–

TABLE OF REINFORCEMENT FOR ø100 &, ø120 CM.

BAR MARK	SIZE ø (MM.)	FOR 2 PIPES D=100 NO.	D=100 LENGTH	D=120 NO.	D=120 LENGTH	D=150 NO.	D=150 LENGTH	FOR 3 PIPES D=100 NO.	D=100 LENGTH	D=120 NO.	D=120 LENGTH	FOR 4 PIPES D=100 NO.	D=100 LENGTH	D=120 NO.	D=120 LENGTH
B1	16	1	332	1	375	1	445	1	502	1	565	1	672	1	755
B2	16	1	344	1	387	1	457	1	514	1	577	1	384	1	767
B3	12	1	351	1	440	1	515	1	521	1	630	1	691	1	820
B4	12	1	398	1	487	1	567	1	568	1	677	1	738	1	867
B5	12	1	444	1	533	1	619	1	614	1	723	1	784	1	913
B6	12	3	–	3	–	3	671	–	–	–	–	–	–	–	–
B7	12	3	–	3	–	3	–	3	–	3	–	3	–	3	–
H1	12	2	177	2	223	2	295	2	177	2	223	2	177	2	223
H2	12	2	181	2	235	2	284	2	181	2	235	2	181	2	235
L1	12	14	105	14	105	17	105	16	105	18	105	20	105	23	105
L2	16	2	132	2	132	2	131	2	132	2	132	2	132	2	132
L3	16	2	145	2	145	2	144	2	145	2	145	2	145	2	145
L4	16	2	158	2	158	2	157	2	158	2	158	2	158	2	158
L5	16	2	171	2	171	2	170	2	171	2	171	2	171	2	171
L6	16	2	186	2	186	2	182	2	186	2	186	2	186	2	186
L7	16	2	197	2	197	2	195	2	197	2	197	2	197	2	197
L8	16	–	–	2	210	2	208	–	–	2	210	–	–	2	210
L9	16	–	–	2	225	2	221	–	–	2	225	–	–	2	225
L10	16	–	–	–	–	2	234	–	–	–	–	–	–	–	–
L11	16	–	–	–	–	2	247	–	–	–	–	–	–	–	–
L12	16	2	705	2	850	2	255	4	205	4	225	6	205	6	225
U2	16	2	705	2	444	2	1060	2	475	2	1035	2	162	2	1228
W1	12	4	165	4	211	4	283	4	165	4	211	4	162	4	211

NOTES :

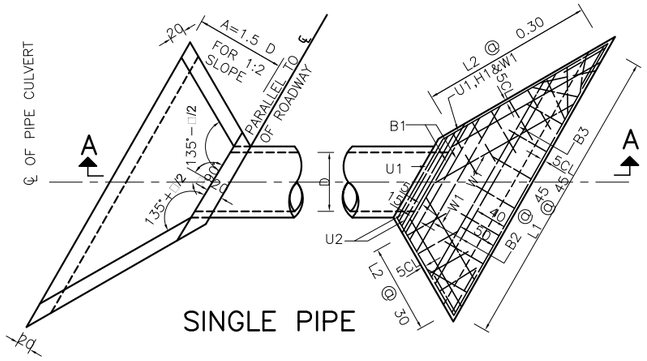
1. ALL DIMENSIONS ARE IN CENTIMETERS UNLESS OTHERWISE INDICATED.
2. CONCRETE SHALL HAVE MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 25 MPa FOR ø 15x30 CM CYLINDER AT 28 DAYS.
3. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO THE REQUIREMENTS AASHTO M31 GRADE 60.
4. CLEAR CONCRETE COVER SHALL BE 4 CM. UNLESS OTHERWISE INDCATEO
5. LOCATIONS OF LAP SPLICE OF REBARS SHALL BE APPROVED BY THE ENGINEER
6. LAP LENGTH SHALL NOT BE LESS THAN 24 BAR DIAMETERS.
7. ALL CONCRETE EXPOSED CORNERS SHALL HAVE 2.5 CM. CHAMFER UNLESS OTHERWISE INDICATED.
8. DIMENSION OF HEADWALL AND QUANTITES OF MATERIALS SHOWN IN THE TABLES ARE FOR EMBANKMENT SLOPE OF 1:2 ONLY FOR EMBANKMENT SLOPE 1:1.5, ALL DIMENSIONS SHALL BE WORKED OUT FORM DIMENSIONS OF "A" AS SHOWN TOGETHER WITH THE FLARE ANGLE OF 30° THEN QUANTITES OF MATERIALS SHALL BE CHANGED ACCORDINGLY.
9. UNLESS OTHERWISE SPECIFIED, THESE HEADWALLS SHALL BE USED FOR HIGHWAYS CLASS D AND CLASS 1.
10. FOR ROLLING AND MOUNTAINOUS TERRAINS, THESE HEADWALLS SHALL BE USED AS NECESSARY.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

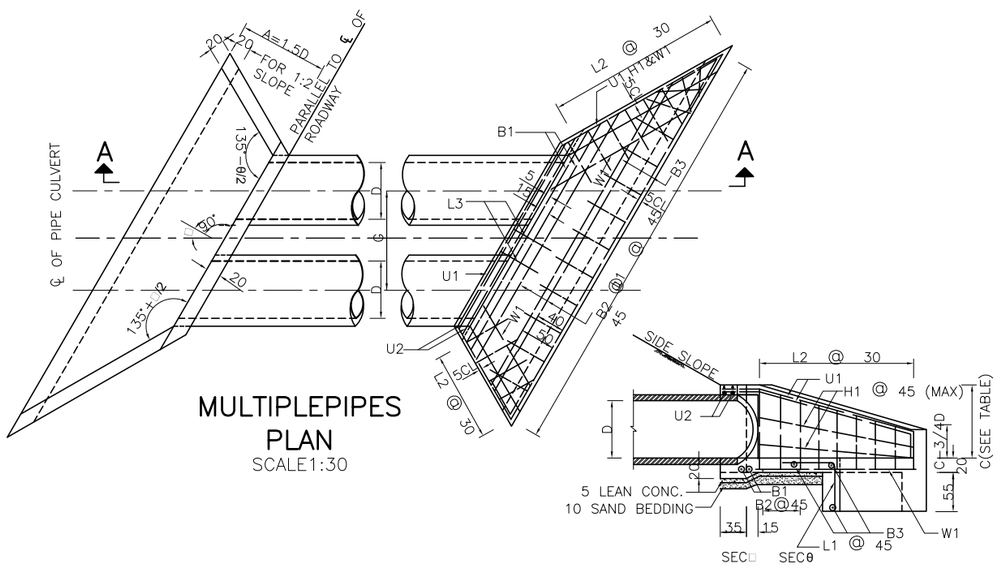
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

R.C HEADWALL FOR SKEW R.C.P CULVERT

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. SDD–011
							SCALE: NOT TO SCALE

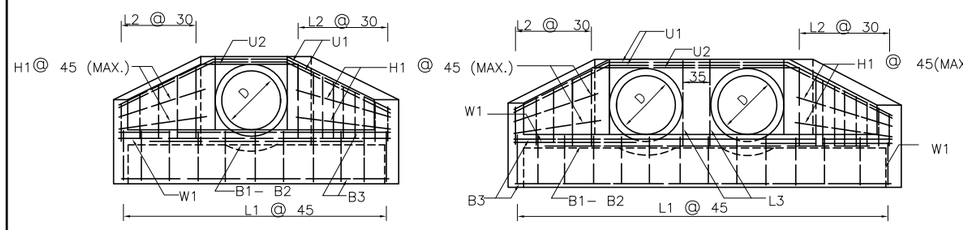


SINGLE PIPE



MULTIPLEPIPES
PLAN
SCALE1:30

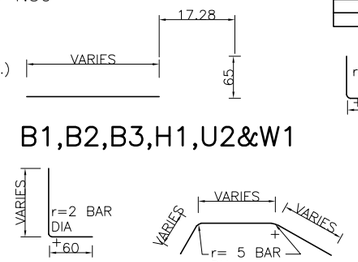
SECTION A–A
SCALE 1:30



SINGLE PIPE

MULTIPLEPIPES

END VIEWS
SCALE1:30



BARBENDINGDIAGRAMS
NOT TO SCALE

TABLE OF REINFORCEMENT FOR D = 80 CM.

BAR MARK	SIZE ø MM	@	FOR 1 PIPE						FOR 2 PIPES						FOR 3 PIPES						FOR 4 PIPES					
			SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°	
			NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L
B1	16	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–
B2	16	45	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–
B3	16	–	3	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–
H1	12	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–
L1	12	45	9	130	11	130	13	130	12	130	14	130	16	130	15	130	18	130	20	130	18	130	22	130	24	130
L2	16	30	13	–	14	–	16	–	13	–	14	–	16	–	13	–	14	–	16	–	13	–	14	–	16	–
L3	16	–	–	–	–	–	–	–	2	113	2	113	2	113	4	113	4	113	4	113		113	6	113	6	113
U1	16	–	2	488	2	144	2	175	2	275	2	306	2	373	2	420	2	468	2	571	2	565	2	630	2	769
U2	16	–	2	130	2	531	2	622	2	633	2	693	2	820	2	778	2	855	2	1018	2	923	2	1017	2	1216
W1	12	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–
CONC. (M^3)			1.74		1.93		2.29		2.45		2.72		3.26		3.16		3.51		4.23		3.87		4.30		5.20	
REINF.(KG.)			99		108		127		129		145		169		159		181		211		190		228		253	

TABLE OF REINFORCEMENT FOR D = 100 CM.

BAR MARK	SIZE ø MM	@	FOR 1 PIPE						FOR 2 PIPES						FOR 3 PIPES						FOR 4 PIPES					
			SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°	
			NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L
B1	16	–	2	_	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–
B2	16	45	2	_	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–
B3	16	–	3	_	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–
H1	12	–	4	_	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–
L1	12	45	11	130	12	130	14	130	15	130	16	130	19	130	19	130	20	130	24	130	23	130	24	130	29	130
L2	16	30	16	_	16	–	20	–	16	–	16	–	20	–	16	–	16	–	20	–	16	–	16	–	20	–
L3	16	–	–	_	–	–	–	–	2	135	2	135	2	135	4	135	4	135	4	135	6	135	6	135	6	135
U1	16	–	2	574	2	648	2	761	2	744	2	837	2	993	2	914	2	1026	2	1225	2	1084	2	1215	2	1457
U2	16	–	2	120	2	166	2	206	2	290	2	355	2	438	2	460	2	544	2	670	2	630	2	733	2	–
W1	12	–	4	_	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–
CONC. (M^3)			2.49		2.70		3.23		3.45		3.76		4.53		4.41		4.82		5.83		5.37		5.88		7.13	
REINF.(KG.)			124		124		163		162		175		214		198		216		266		237		257		317	

REINF.(KG.)

INSIDEDIA "OFPIPE"D	DIMENSION	
	C	G
80	103	140
100	125	164
120	148	190
150	180	225

NOTES :

1. ALL DIMENSION ARE IN CENTIMETERS UNLESS OTHERWISE INDICATED.
2. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 25 MPa. FOR ø15x30 CM. CYLINDER AT 28 DAYS.
3. REINFORCING STEEL SHALL BE DEFROMED BARS CONFORMING TO THE REQUIREMENTS OF AASHTO. M31 GRADE 60
4. CLEAR CONCRETE COVER SHALL BE 4 CM. UNLESS OTHERWISE INDICATED.
5. LOCATION OF LAP SPLICE OF REBARS SHALL BE APPROVED BY THE ENGINEER. EMBANKMENT
6. LAP LENGTH SHALL NOT BE LESS THAN 24 BAR DIAMETERS.
7. ALL CONCRETE EXPOSED CORNERS SHALL HAVE 2.5 CM. CHAMFER UNLESS OTHER WISE INDICATED
8. DIMENSION OF HEADWALL AND QUANTITIES OF MATERIAL SHOWN IN THE TABLE ARE FOR SLOPE OF 1:2 ONLY. FOR EMBANKMENT SLOPE 1:1.5 ALL DIMENSIONS SHALL BE WORKED OUT FROM DIMENTIONS OF "A" = 1.2 D.
9. THE SKEW ANGLE (θ) AS SHOWN ON THIS DRAWING SHALL NOT EXCEED 45
10. WALL AND SLAB THICKNESSES SHALL BE 20 CM. FOR ALL SKEWED HEADWALLS. THERE WILL BE NO SKEWED HEADWALLS FOR PIPES LESS THAN 80 CM. DIA.
11. UNLESS OTHERWISE SPECIFIED, THESE HEADWALLS SHALL BE USED FOR HIGHWAYS.
12. FOR ROLLING AND MOUNTAINOUS TERRAINS, THERE HEADWALLS SHALL BE USED AS NECESSARY.

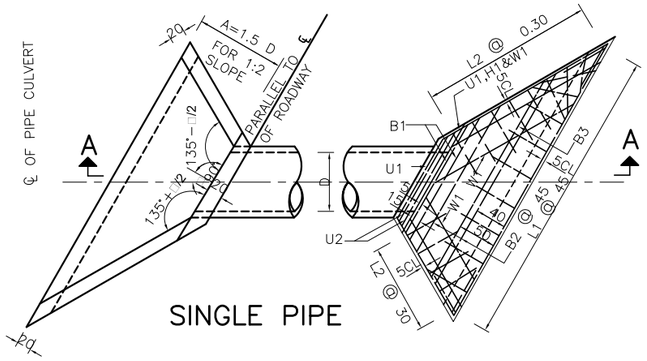
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

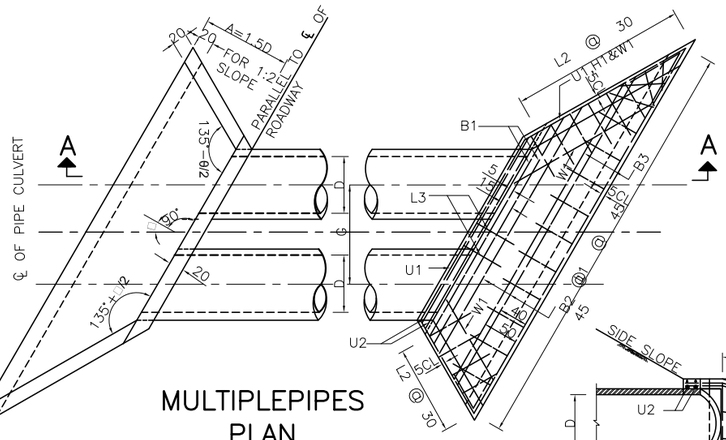
R.C HEADWALL FOR SKEW
R.C.P CULVERT

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD–012.1
SCALE: NOT TO SCALE



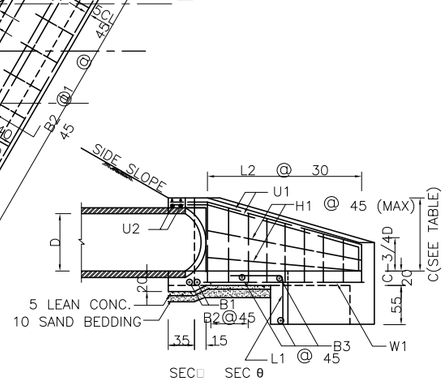
SINGLE PIPE



MULTIPLEPIPES

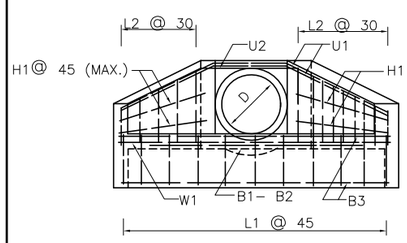
PLAN

SCALE1:30

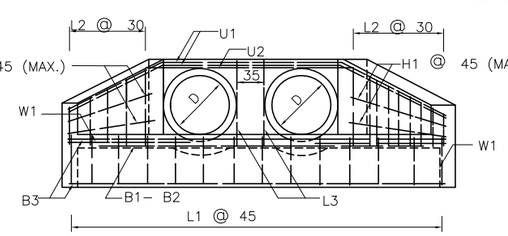


SECTION A–A

SCALE 1:30



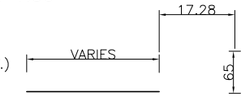
SINGLE PIPE



MULTIPLEPIPES

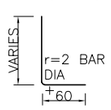
END VIEWS

SCALE1:30



B1,B2,B3,H1,U2&W1

L1



L2 & L3

U1

BARBENDINGDIAGRAMS

NOT TO SCALE

TABLE OF REINFORCEMEN
FOR D = 120 CM.

BAR MARK	SIZE ø MM	@	FOR 1 PIPE						FOR 2 PIPES						FOR 3 PIPES						FOR 4 PIPES					
			SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°	
			NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L
B1	16	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–
B2	16	45	3	–	3	–	3	–	3	–	3	–	3	–	3	–	3	–	3	–	3	–	3	–	3	–
B3	16	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–
H1	12	–	6	–	6	–	6	–	6	–	6	–	6	–	6	130	6	–	6	–	6	–	6	–	6	–
L1	12	45	13	130	14	130	17	130	17	130	19	130	23	130	21	–	24	130	29	130	25	130	29	130	35	130
L2	16	30	18	–	19	–	23	–	18	–	19	–	23	–	18	158	19	–	23	–	18	–	19	–	23	–
L3	16	–	–	–	–	–	–	–	2	158	2	158	2	158	4	1115	4	158	4	158	6	158	6	158	6	158
U1	16	–	2	721	2	783	2	919	2	918	2	1002	2	1188	2	573	2	1221	2	1457	2	1312	2	1440	2	1726
U2	16	–	2	179	2	200	2	244	2	376	2	419	2	513	2	–	2	638	2	782	2	770	2	857	2	1051
W1	12	–	4	–	4	–	4	–	4	–	4	–	4	–	4	5.82	4	–	4	–	4	–	4	–	4	–
CONC. (M^3)			3.34		3.66		4.38		4.38		5.04		6.07		256		6.42		7.76		7.06		7.80		9.45	
REINF.(KG.)			162		174		210		209		225		273				276		335		303		328		397	

TABLE OF REINFORCEMENT
FOR D = 150 CM.

BAR MARK	SIZE ø MM	@	FOR 1 PIPE						FOR 2 PIPES						FOR 3 PIPES						FOR 4 PIPES					
			SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°		SKEW15°		SKEW30°		SKEW45°	
			NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L	NO	L
B1	16	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–
B2	16	45	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–
B3	16	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–	2	–
H1	12	–	6	–	6	–	6	–	6	–	6	–	6	–	6	–	6	–	6	–	6	–	6	–	6	–
L1	12	45	16	130	17	130	21	130	21	130	2	130	28	130	26	130	29	130	35	130	31	130	35	130	42	130
L2	16	30	23	–	24	–	29	–	23	–	23	–	29	–	23	–	24	–	29	–	23	–	24	–	29	–
L3	16	–	–	–	–	–	–	–	2	190	–	190	2	190	4	190	4	190	4	190	6	190	6	190	6	190
U1	16	–	2	892	2	974	2	1146	2	1125	2	1234	2	1464	2	1358	2	1494	2	782	2	1591	2	1754	2	2100
U2	16	–	2	214	2	240	2	290	2	447	2	500	2	608	2	680	2	760	2	926	2	913	2	1020	2	1244
W1	12	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–	4	–
CONC. (M^3)			4.81		5.28		6.36		6.53		7.19		8.68		8.23		9.10		11.02		9.94		11.10		13.35	
REINF.(KG.)			216		237		280		275		299		359		335		365		438		394		431		517	

REINF.(KG.)

INSIDEDIA "OFPIPE"D	DIMENSION	
	C	G
80	103	140
100	125	164
120	148	190
150	180	225

NOTES :

1. ALL DIMENSION ARE IN CENTIMETERS UNLESS OTHERWISE INDICATED.
2. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 25 MPa . FOR ø15x30 CM. CYLINDER AT 28 DAYS.
3. REINFORCING STEEL SHALL BE DEFROMED BARS CONFORMING TO THE REQUIREMENTS OF AASHTO. M31 GRADE 60
4. CLEAR CONCRETE COVER SHALL BE 4 CM. UNLESS OTHERWISE INDICATED.
5. LOCATION OF LAP SPLICE OF REBARS SHALL BE APPROVED BY THE ENGINEER. EMBANKMENT
6. LAP LENGTH SHALL NOT BE LESS THAN 24 BAR DIAMETERS.
7. ALL CONCRETE EXPOSED CORNERS SHALL HAVE 2.5 CM. CHAMFER UNLESS OTHER WISE INDICATED
8. DIMENSION OF HEADWALL AND QUANTITIES OF MATERIAL SHOWN IN THE TABLE ARE FOR SLOPE OF 1:2 ONLY. FOR EMBANKMENT SLOPE 1:1.5 ALL DIMENSIONS SHALL BE WORKED OUT FROM DIMENTIONS OF "A" = 1.2 D.
9. THE SKEW ANGLE (θ) AS SHOWN ON THIS DRAWING SHALL NOT EXCEED 45
10. WALL AND SLAB THICKNESSES SHALL BE 20 CM. FOR ALL SKEWED HEADWALLS. THERE WILL BE NO SKEWED HEADWALLS FOR PIPES LESS THAN 80 CM. DIA.
11. UNLESS OTHERWISE SPECIFIED, THESE HEADWALLS SHALL BE USED FOR HIGHWAYS.
12. FOR ROLLING AND MOUNTAINOUS TERRAINS, THERE HEADWALLS SHALL BE USED AS NECESSARY.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ

LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

R.C HEADWALL FOR SKEW
R.C.P CULVERT

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

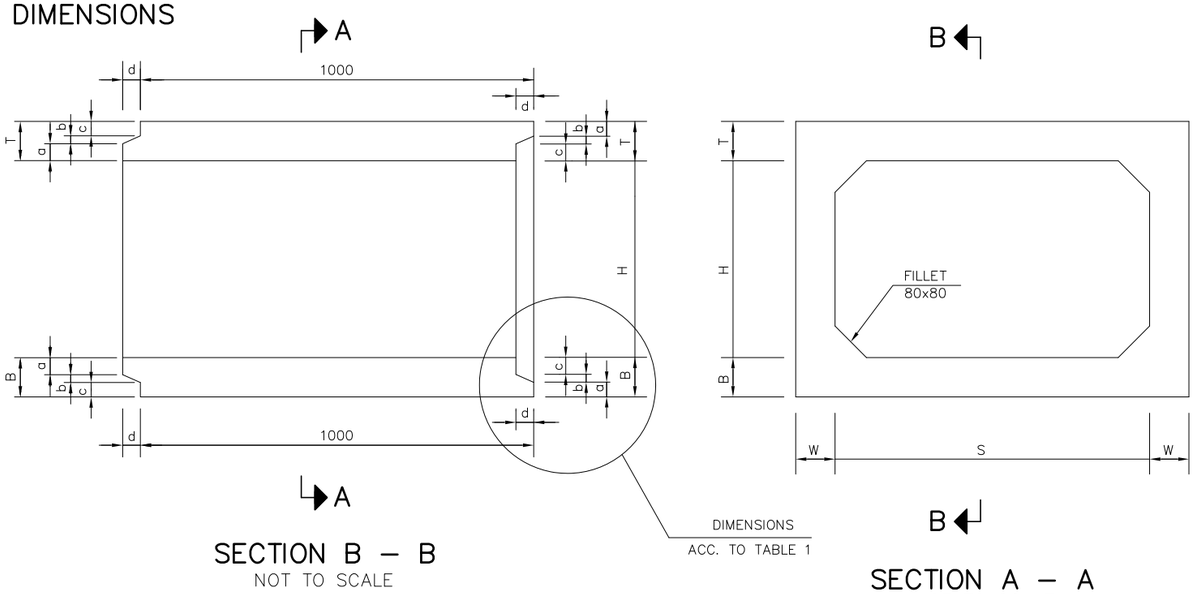
LTEC CODE: SD–262–17

DATE: April, 2018

DRW No. SDD–012.2

SCALE: NOT TO SCALE

DIMENSIONS



SECTION B – B
NOT TO SCALE

SECTION A – A
NOT TO SCALE

BARREL DIMENSIONS AND QUANTITIES

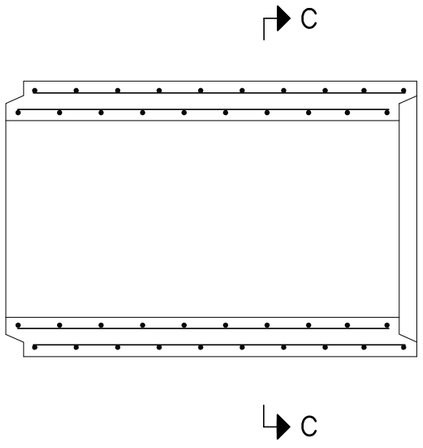
FILL COVER 0.40 m TO 0.60 m

CONCRETE						REINFORCEMENT																
						BAR DIAMETER,SPACING AND LENGTH IN MILLIMETERS																
SPAN	HEIGHT	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL	VOLUME	BARS–A1			BARS–A2			BARS–C3			BARS–G4			NUMBER OF SPACER BARS ø8@150			WEIGHT
S mm	H mm	T mm	B mm	WE mm	CUM. PER.m	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	TOP	BOTTOM	EACH WALL	Kg PER m
800	500	100	100	100	0.31	12	100	950	12	100	950	10	100	1220	10	100	1920	14	14	12	51.51
1000	500	100	100	100	0.35	12	100	1150	12	100	1150	10	100	1220	10	100	2120	16	16	12	57.85

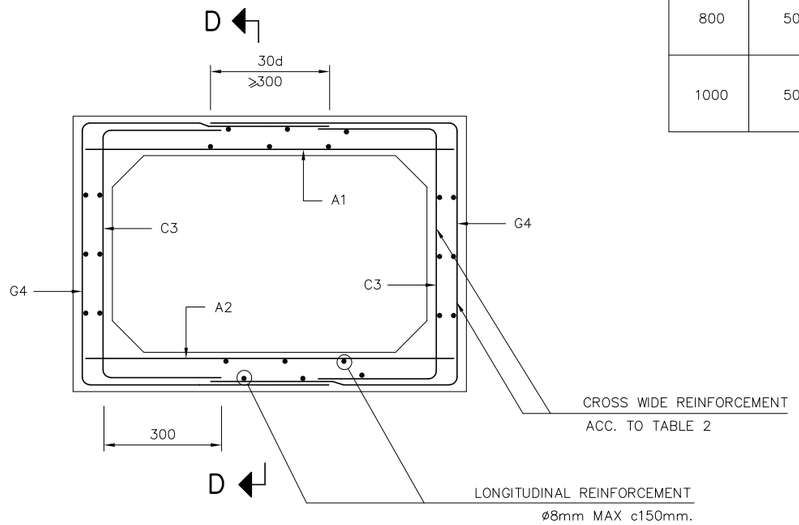
TABLE 1
DIMENSIONS

SPAN S mm	INSIDE H mm	BOTTOM SLAB B mm	TOP SLAB T mm	WALL SLAB W mm	DIMENSIONS OF BOX END DETAILS IN mm TONGUE AND GROOVE			
					a	b	c	d
800	500	100	100	100	40	16	44	45
1000	500	100	100	100	40	16	44	45

REINFORCEMENT



SECTION D – D
NOT TO SCALE



SECTION C – C
NOT TO SCALE

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=25 MPa,fc=10 MPa).
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR DEFORMED BILLET STEEL BARS AASHTO M31 GRADE 60, fy=414 MPa, fs=165.5 MPa.
4. CONCRETE COVER SHALL BE 25 mm AND MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR.
5. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20 mm.
6. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS.

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LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE BOX CULVERT SINGLE CELL, BARREL HEIGHT 0.5m, DIMENSIONS, REINFORCEMENT AND QUANTITIES

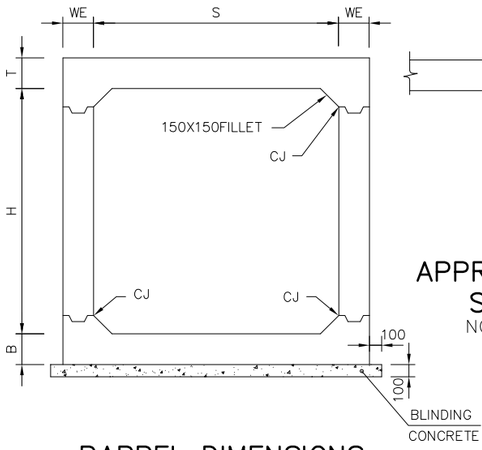
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD–013
SCALE: NOT TO SCALE

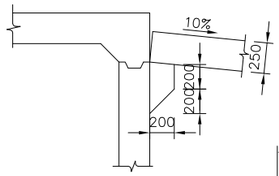
BARREL DIMENSIONS AND QUANTITIES

FILL COVER 1.50 m OR LESS

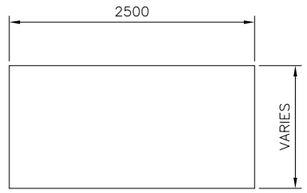
CONCRETE						REINFORCEMENT																		
						BAR DIAMETER,SPACING AND LENGTH IN MILLIMETERS															NUMBER OF SPACER BARS ø12 @300			WEIGHT
						BARS–A1			BARS–A2			BARS–B3			BARS–B4			BARS–C5						
SPAN	HEIGHT	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL	VOLUME	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	TOP	BOTTOM	EACH WALL	kg PER m
S mm	H mm	T mm	B mm	WE mm	CUM. PER.m																			
1000	1000	200	200	200	1.01	12	300	1320	16	150	1320	12	300	1260	12	300	1420	12	300	2425	12	12	6	68.1
1500	1000	250	250	200	1.40	12	200	1820	16	150	1820	12	300	1310	12	300	1720	16	300	2970	14	14	6	92.4
1500	1500	250	250	200	1.60	16	200	1820	16	150	1820	12	300	1810	12	300	1720	16	300	3470	14	14	10	111.0
2000	1500	250	250	200	1.83	16	150	2320	20	175	2320	12	225	1810	12	225	1970	16	225	3870	18	18	10	158.7
2500	1000	275	275	200	2.04	16	150	2820	20	150	2820	12	300	1335	12	300	2245	16	300	3820	22	22	6	167.0
2500	1500	275	275	200	1.14	16	150	2820	20	150	2820	12	225	1835	12	225	2245	16	225	4320	22	22	10	191.3
3000	1500	300	300	200	2.69	16	175	3320	20	150	3320	12	200	1860	12	200	2520	16	200	4770	24	24	10	216.0



BARREL DIMENSIONS
NOT TO SCALE



APPROACH SLAB SUPPORT
NOT TO SCALE

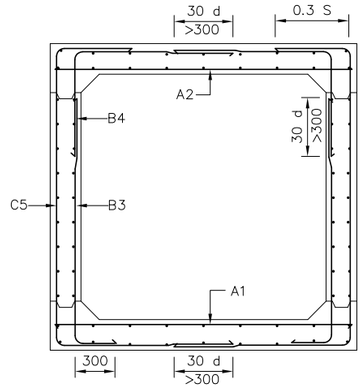


APPROACH SLAB
NOT TO SCALE

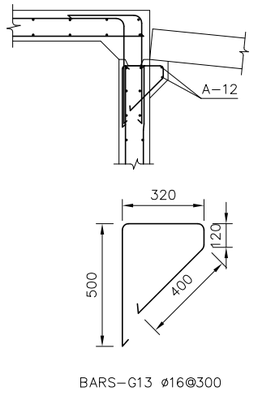
BARREL DIMENSIONS AND QUANTITIES

FILL COVER 1.50 m TO 3.00 m

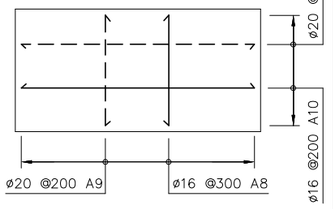
CONCRETE						REINFORCEMENT																		
						BAR DIAMETER,SPACING AND LENGTH IN MILLIMETERS															NUMBER OF SPACER BARS ø12 @300			WEIGHT
						BARS–A1			BARS–A2			BARS–B3			BARS–B4			BARS–C5						
SPAN	HEIGHT	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL	VOLUME	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	TOP	BOTTOM	EACH WALL	kg PER m
S mm	H mm	T mm	B mm	WE mm	CUM. PER.m																			
1000	1000	200	200	200	1.01	12	300	1320	12	250	1320	12	300	1260	12	300	1420	12	300	2425	12	12	6	58.0
1500	1500	200	200	200	1.41	12	275	1820	16	200	1820	12	300	1760	12	300	1670	12	300	3325	14	14	10	86.8
2000	1000	200	200	200	1.41	16	175	2320	16	150	2320	12	300	1260	12	300	1920	12	300	3225	18	18	6	113.2
2000	1500	200	200	200	1.61	16	175	2320	16	150	2320	12	225	1760	12	300	1920	12	225	3725	18	18	10	129.5
3000	1000	275	275	200	2.32	20	150	3320	20	150	3320	12	300	1335	12	300	2495	12	300	4175	24	24	6	199.2



BARREL REINFORCEMENT
NOT TO SCALE



BARS–G13 ø16@300



APPROACH SLAB
NOT TO SCALE

BARREL DIMENSIONS AND QUANTITIES

FILL COVER 6.00 m TO 9.00 m

CONCRETE						REINFORCEMENT																		
						BAR DIAMETER,SPACING AND LENGTH IN MILLIMETERS															NUMBER OF SPACER BARS ø12 @300			WEIGHT
						BARS–A1			BARS–A2			BARS–B3			BARS–B4			BARS–C5						
SPAN	HEIGHT	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL	VOLUME	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	TOP	BOTTOM	EACH WALL	kg PER m
S mm	H mm	T mm	B mm	WE mm	CUM. PER.m																			
1000	1500	250	250	250	1.55	12	200	1420	16	225	1420	12	250	1810	12	250	1470	16	250	3120	12	12	10	91.4
1500	1500	250	250	250	1.80	12	200	1820	20	180	1920	12	250	1810	12	250	1720	16	250	3520	14	14	10	126.3

REINFORCEMENT AND CONCRETE FOR APPROACH SLAB

BAR MARK	A–8	A–9	A–10	A–11	A–12	G–13
SIZE	16	20	16	20	16	16
LENGTH mm	VARIES	VARIES	2420	2420	VARIES	1290
REINFORCEMENT WEIGHT PER m kg	111.2					
CONCRETE VOLUME PER m m^3	0.63					

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=25 MPa,fc=10 MPa).
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR DEFORMED BILLET STEEL BARS AASHTO M31 GRADE 60, fy=414 MPa, fs=165.5 MPa.
4. CONCRETE COVER SHALL BE 40 mm AND MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR.
5. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20 mm.
6. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS.
7. APPROACH SLAB SHALL BE USED WHERE THE FILL COVER IS LESS THAN 0.60m.

ລ.ວ.ຄ
LTEC

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE BOX CULVERT SINGLE CELL, BARREL HEIGHT <1.5m, DIMENSIONS, REINFORCEMENT AND QUANTITIES

REV.	DATE	DESCRIPTION	APPROVED

	NAME	SIGNATURE
DESIGNED	Mr.Souksavanh SYPHAKHAM	
CHECKED	Mr.Khamphone SORPHABMIXAY	
APPROVED	Mr.Vandy VORASACK	

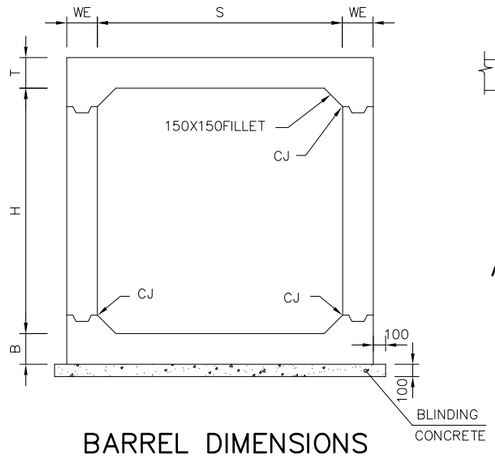
LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD–014
SCALE: NOT TO SCALE

BARREL DIMENSIONS AND QUANTITIES

FILL COVER 1.5m OR LESS																											
CONCRETE						REINFORCEMENT																					
						BAR DIAMETER,SPACING AND LENGTH IN MILLIMETERS																		NUMBER OF SPACER BARS ø12 @300			WEIGHT
						BARS–A1			BARS–A2			BARS–B3			BARS–B4			BARS–B5			BARS–B6						
SPAN	HEIGHT	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL	VOLUME	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	TOP	BOTTOM	EACH WALL	kg PER m
S mm	H mm	T mm	B mm	WE mm	CUM. PER.m																						
2000	2000	250	250	200	2.05	16	275	2320	20	175	2320	12	200	2830	12	300	2310	12	200	1970	12	300	3820	18	18	14	173.0
2500	2000	275	275	200	2.44	16	250	2820	20	150	2820	12	200	3110	12	300	2335	12	200	2145	12	300	3820	22	22	14	213.1
3000	2000	300	300	200	2.89	16	200	3320	20	150	3320	12	200	3380	12	300	2360	12	200	2320	12	300	4420	24	24	14	251.3
3000	2500	300	300	200	3.03	16	200	3320	20	150	3320	12	200	3630	12	300	2860	12	200	2570	12	300	5170	24	24	16	264.7
3000	3000	300	300	200	3.20	16	200	3320	20	150	3320	12	200	3880	12	300	3360	12	200	2820	12	300	5170	24	24	20	279.2

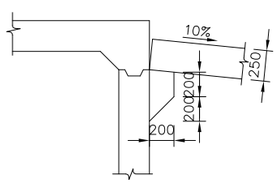
BARREL DIMENSIONS AND QUANTITIES

FILL COVER 1.50 m TO 3.00 m																											
CONCRETE						REINFORCEMENT																					
						BAR DIAMETER,SPACING AND LENGTH IN MILLIMETERS																		NUMBER OF SPACER BARS ø12 @300			WEIGHT
						BARS–A1			BARS–A2			BARS–B3			BARS–B4			BARS–B5			BARS–B6						
SPAN	HEIGHT	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL	VOLUME	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	TOP	BOTTOM	EACH WALL	kg PER m
S mm	H mm	T mm	B mm	WE mm	CUM. PER.m																						
2000	2000	250	250	200	2.05	16	200	2320	16	150	2320	16	225	2825	12	225	2310	16	225	2025	12	225	1970	18	18	14	169.9
2500	2000	275	275	200	2.44	16	250	2820	16	150	2820	16	250	3100	12	225	2335	16	250	2200	12	225	2245	20	20	14	186.1
2500	2500	275	275	200	2.64	16	250	2820	16	150	2820	16	150	3350	12	175	2835	16	150	2450	12	175	2245	20	20	16	242.0
3000	2000	275	275	200	2.32	20	200	3320	20	150	3320	16	250	3470	12	225	2335	16	250	2350	12	225	2495	24	24	14	260.3
3000	2500	275	275	200	2.92	20	150	3320	20	150	3320	16	150	3720	12	175	2835	16	150	2600	12	175	2495	24	24	16	341.3



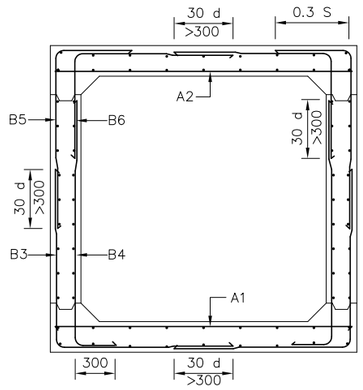
BARREL DIMENSIONS

NOT TO SCALE



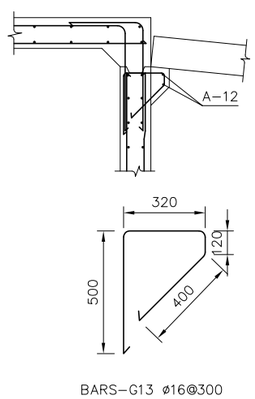
APPROACH SLAB SUPPORT

NOT TO SCALE

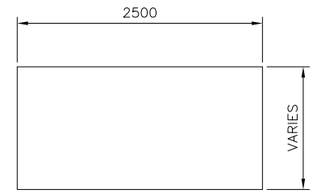


BARREL REINFORCEMENT

NOT TO SCALE

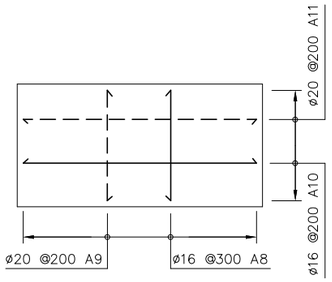


BARS–G13 ø16@300



APPROACH SLAB

NOT TO SCALE



APPROACH SLAB

REINFORCEMENT AND CONCRETE FOR APPROACH SLAB						
BAR MARK	A–8	A–9	A–10	A–11	A–12	G–13
SIZE	16	20	16	20	16	16
LENGTH mm	VARIES	VARIES	2420	2420	VARIES	1290
REINFORCEMENT WEIGHT PER m kg	111.2					
CONCRETE VOLUME PER m m^3	0.63					

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=25 MPa,fc=10 MPa).
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR DEFORMED BILLET STEEL BARS AASHTO M31 GRADE 60, fy=414 MPa, fs=165.5 MPa.
4. CONCRETE COVER SHALL BE 40 mm AND MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR.
5. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20 mm.
6. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS.
7. APPROACH SLAB SHALL BE USED WHERE THE FILL COVER IS LESS THAN 0.60m.

ລ.ວ.ທ LTEC

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LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE BOX CULVERT SINGLE CELL, BARREL HEIGHT <3.0m, DIMENSIONS, REINFORCEMENT AND QUANTITIES

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
							LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–015
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

BARREL DIMENSIONS AND QUANTITIES

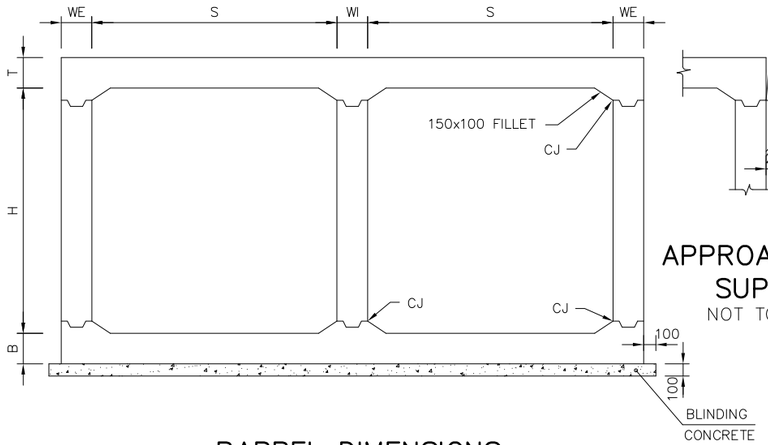
FILL COVER 1.50m OR LESS

CONCRETE							REINFORCEMENT																																	
							BAR DIAMETER,SPACING AND LENGTH IN MILLIMETERS																																				
							BARS–A1				BARS–A2				BARS–A3				BARS–A4				BARS–B5				BARS–B6				BARS–C7				NUMBER OF SPACER BARS ø12 @300			WEIGHT
SPAN	HEIGHT	TOP SLAB	BOTTOM SLAB	INTERIOR WALL	EXTERIOR WALL	VOLUME	SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		TOP	BOTTOM	EACH WALL	kg PER m
S mm	H mm	T mm	B mm	WI mm	WE mm	CUM PER m																																		
2000	1000	250	250	200	200	2.99	12	300	3020		16	150	4520		12	300	4520		16	200	4520		12	300	1370		12	300	1090		12	300	2585		32	32	6	205.2
2000	1500	250	250	200	200	3.29	12	300	3020		16	150	4520		12	300	4520		16	200	4520		12	300	1870		12	300	1090		12	300	3085		32	32	10	219.1
2500	1500	250	250	200	200	3.79	12	280	3520		20	175	5520		16	250	5520		16	150	5520		12	300	1870		12	300	1090		12	300	3385		38	38	10	314.6

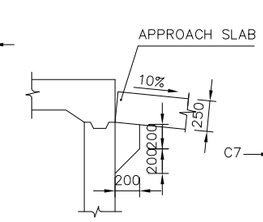
BARREL DIMENSIONS AND QUANTITIES

FILL COVER 1.50 TO 3.00m

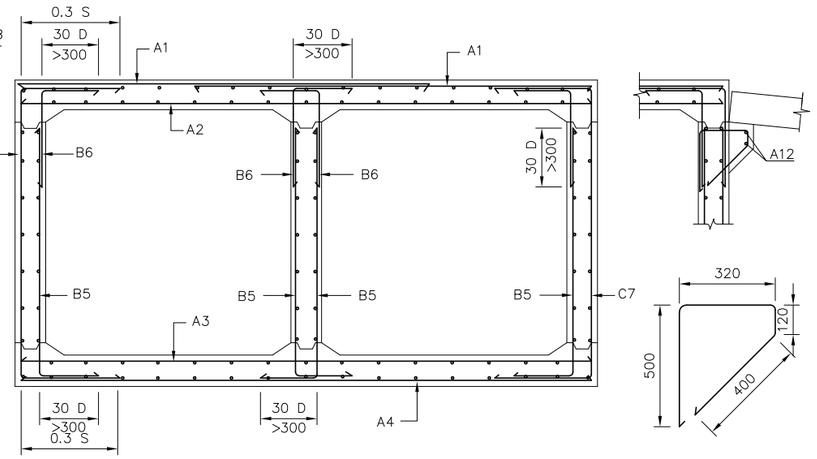
CONCRETE							REINFORCEMENT																																	
							BAR DIAMETER,SPACING AND LENGTH IN MILLIMETERS																																				
							BARS–A1				BARS–A2				BARS–A3				BARS–A4				BARS–B5				BARS–B6				BARS–C7				NUMBER OF SPACER BARS ø12 @300			WEIGHT
SPAN	HEIGHT	TOP SLAB	BOTTOM SLAB	INTERIOR WALL	EXTERIOR WALL	VOLUME	SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		SIZE	SPACING	LENGTH		TOP	BOTTOM	EACH WALL	kg PER m
S mm	H mm	T mm	B mm	WI mm	WE mm	CUM PER m																																		
2000	1000	250	250	200	200	2.99	16	300	3120		16	225	4520		12	200	4520		16	200	4520		12	300	1370		12	300	1090		12	300	2585		32	32	18	203.3
2000	1500	250	250	200	200	3.29	16	300	3120		16	225	4520		12	200	4520		16	150	4520		12	300	1870		12	300	1090		12	300	3085		32	32	30	230.3
2500	1500	250	250	200	200	3.79	16	300	3620		16	225	5520		12	200	5520		20	200	5520		12	300	1870		12	300	1090		12	300	3385		38	38	30	279.9



BARREL DIMENSIONS
NOT TO SCALE

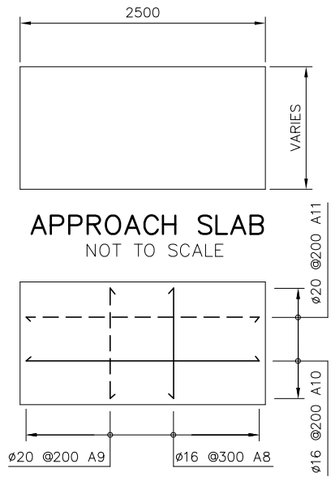


APPROACH SLAB SUPPORT
NOT TO SCALE



BARREL REINFORCEMENT
NOT TO SCALE

BARS–G13 ø16@300



APPROACH SLAB
NOT TO SCALE

APPROACH SLAB
NOT TO SCALE

REINFORCEMENT AND CONCRETE FOR APPROACH SLAB						
BAR MARK	A–8	A–9	A–10	A–11	A–12	G–13
SIZE	16	20	16	20	16	16
LENGTH mm	VARIES	VARIES	2420	2420	VARIES	1290
REINFORCEMENT WEIGHT PER m kg	111.2					
CONCRETE VOLUME PER m m^3	0.63					

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=25 MPa,fc=10 MPa).
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR DEFORMED BILLET STEEL BARS AASHTO M31 GRADE 60, fy=414 MPa, fs=165.5 MPa.
4. CONCRETE COVER SHALL BE 40 mm AND MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR.
5. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20 mm.
6. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS.
7. APPROACH SLAB SHALL BE USED WHERE THE FILL COVER IS LESS THAN 0.60m.
8. LENGTH PER 1m WIDTH OF APPROACH SLAB.

ລ.ວ.ທ LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE BOX CULVERT DOUBLE CELL, BARREL HEIGHT ≤1.5m, DIMENSIONS, REINFORCEMENT AND QUANTITIES

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr.Souksavanh SYPHAKHAM	
				CHECKED	Mr.Khamphone SORPHABMIXAY	
				APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD–016
SCALE: NOT TO SCALE

BARREL DIMENSIONS AND QUANTITIES

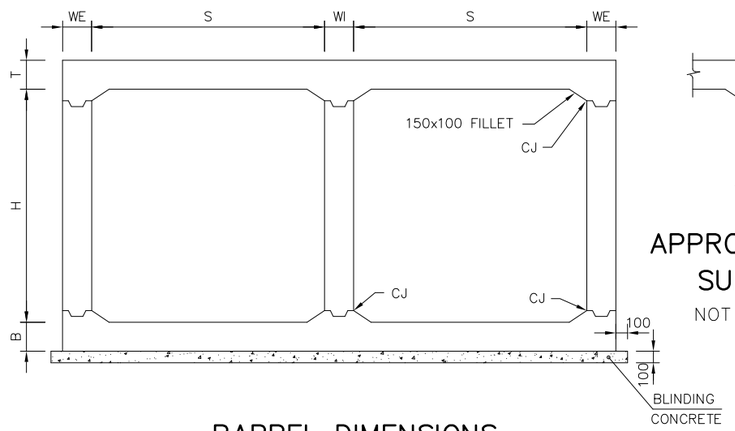
FILL COVER 1.50m OR LESS

CONCRETE							REINFORCEMENT																											
							BAR DIAMETER,SPACING AND LENGTH IN MILLIMETERS																													
							BARS–A1			BARS–A2			BARS–A3			BARS–A4			BARS–B5			BARS–B6			BARS–B7			NUMBER OF SPACER BARS ø12 @300			WEIGHT
SPAN	HEIGHT	TOP SLAB	BOTTOM SLAB	INTERIOR WALL	EXTERIOR WALL	VOLUME	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	TOP	BOTTOM	EACH WALL	kg PER m
S mm	H mm	T mm	B mm	WI mm	WE mm	CUM PER m																											
2000	2000	250	250	200	200	3.59	12	300	3020	16	150	4520	12	300	4520	16	150	4520	12	300	2370	12	200	1990	12	300	1090	32	32	14	244.1
2500	2000	250	250	200	200	4.09	12	280	3520	20	175	5520	12	225	5520	16	150	5520	12	300	2370	12	200	2140	12	300	1090	38	38	14	311.9
2500	2500	250	250	200	200	4.39	12	280	3520	20	175	5520	12	225	5520	16	150	5520	12	250	2870	16	200	2450	12	250	1090	38	38	16	332.2
3000	2500	250	250	200	200	4.89	12	200	4020	20	150	6520	16	300	6520	20	175	6520	12	250	2870	16	200	2600	12	250	1090	46	46	16	438.3
3000	3000	250	250	200	250	5.54	12	200	4070	20	150	6620	16	300	6620	20	175	6620	12	225	3370	16	175	2850	12	225	1090	46	46	20	462.7
3500	3500	300	300	250	250	7.37	16	300	4770	20	150	7670	16	300	7670	20	175	7670	12	225	3920	16	175	3300	12	225	1140	54	54	24	543.6

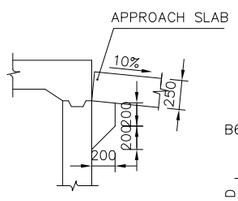
BARREL DIMENSIONS AND QUANTITIES

FILL COVER 1.50 TO 3.00m

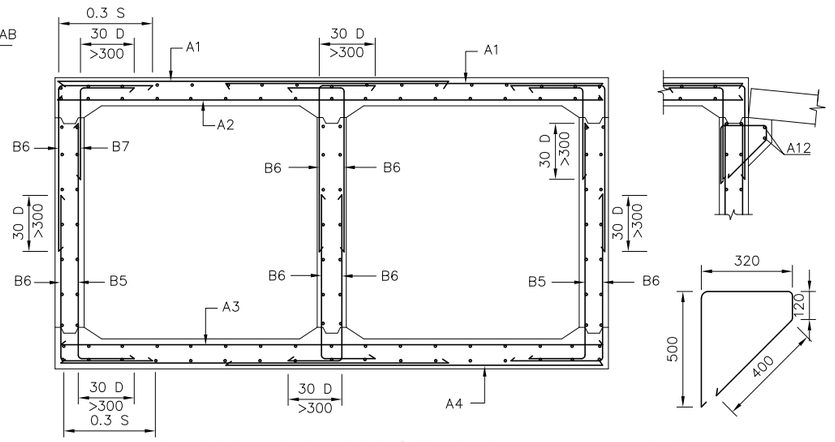
CONCRETE							REINFORCEMENT																											
							BAR DIAMETER,SPACING AND LENGTH IN MILLIMETERS																													
							BARS–A1			BARS–A2			BARS–A3			BARS–A4			BARS–B5			BARS–B6			BARS–B7			NUMBER OF SPACER BARS ø12 @300			WEIGHT
SPAN	HEIGHT	TOP SLAB	BOTTOM SLAB	INTERIOR WALL	EXTERIOR WALL	VOLUME	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	SIZE	SPACING	LENGTH	TOP	BOTTOM	EACH WALL	kg PER m
S mm	H mm	T mm	B mm	WI mm	WE mm	CUM PER m																											
2000	2000	250	250	200	200	3.59	12	300	3020	12	200	4520	12	300	4520	16	200	4520	12	250	2370	12	200	1990	12	250	1090	32	32	14	203.0
2500	2000	250	250	200	200	4.09	16	300	3620	16	225	5520	12	300	5520	16	200	5520	12	250	2370	12	175	2140	12	250	1090	38	38	14	259.4
2500	2500	250	250	200	200	4.39	16	300	3620	16	225	5520	12	300	5520	16	200	5520	12	250	2870	16	175	2450	12	250	1090	38	38	16	279.1
3000	2500	250	250	200	200	4.89	16	220	4120	20	250	6520	16	300	6520	20	200	6520	12	250	2870	16	175	2600	12	250	1090	46	46	16	394.6
3000	3000	250	250	200	250	5.54	16	220	4170	20	250	6620	16	300	6620	20	200	6620	16	300	3485	16	150	2850	16	300	1325	46	46	20	428.2
3500	3500	300	300	250	250	7.37	20	240	4870	20	225	7670	16	275	7670	20	150	7670	16	300	4035	16	150	3300	16	300	1375	54	54	24	563.5



BARREL DIMENSIONS
NOT TO SCALE

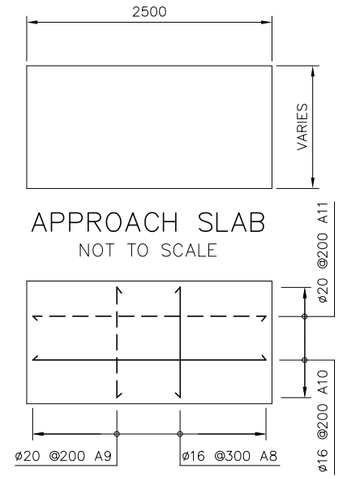


APPROACH SLAB SUPPORT
NOT TO SCALE



BARREL REINFORCEMENT
NOT TO SCALE

BARS–G13 ø16@300



APPROACH SLAB
NOT TO SCALE

APPROACH SLAB
NOT TO SCALE

REINFORCEMENT AND CONCRETE FOR APPROACH SLAB						
BAR MARK	A–8	A–9	A–10	A–11	A–12	G–13
SIZE	16	20	16	20	16	16
LENGTH mm	VARIES	VARIES	2420	2420	VARIES	1290
REINFORCEMENT WEIGHT PER m kg	111.2					
CONCRETE VOLUME PER m m^3	0.63					

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=25 MPa,fc=10 MPa).
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR DEFORMED BILLET STEEL BARS AASHTO M31 GRADE 60, fy=414 MPa, fs=165.5 MPa.
4. CONCRETE COVER SHALL BE 40 mm AND MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR.
5. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20 mm.
6. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS.
7. APPROACH SLAB SHALL BE USED WHERE THE FILL COVER IS LESS THAN 0.60m.
8. LENGTH PER 1m WIDTH OF APPROACH SLAB.

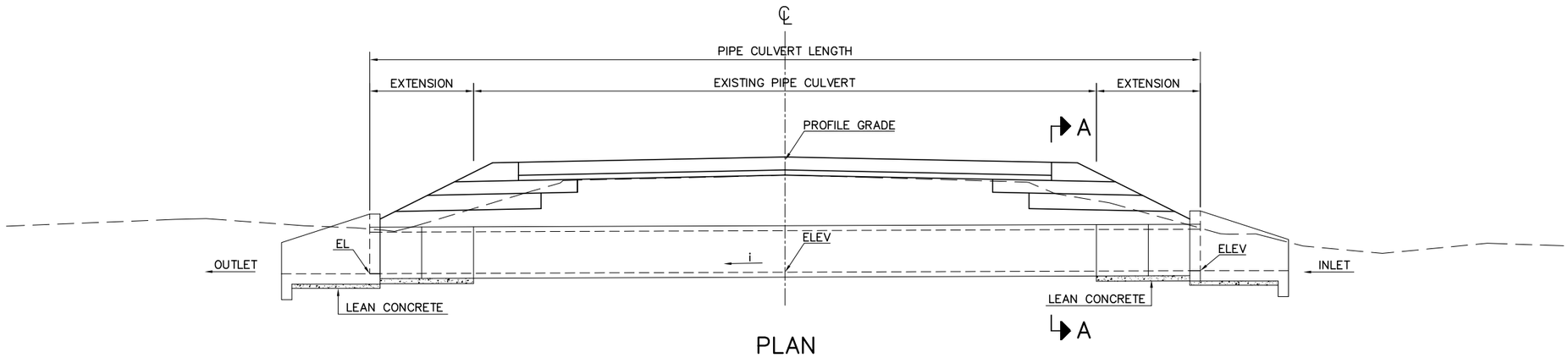
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE BOX CULVERT DOUBLE CELL, BARREL HEIGHT >1.5m, DIMENSIONS, REINFORCEMENT AND QUANTITIES

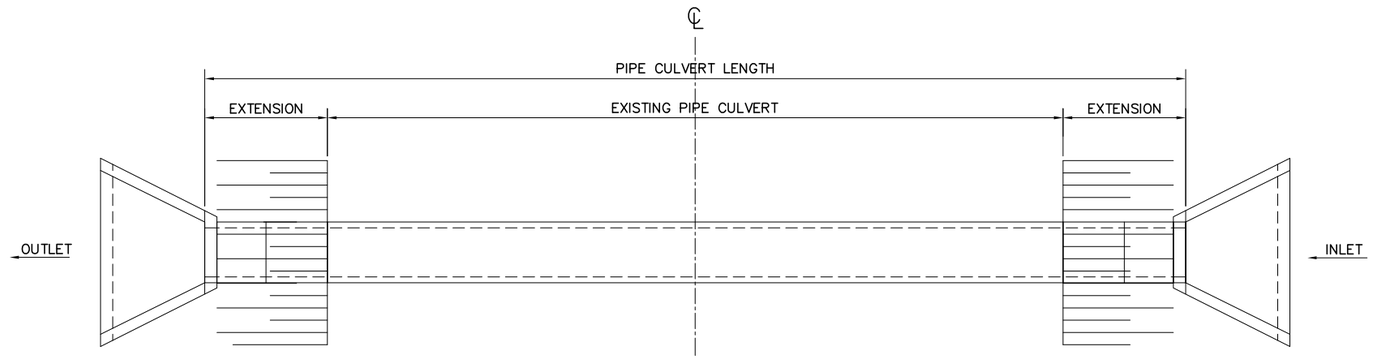
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. SDD–017
							SCALE: NOT TO SCALE

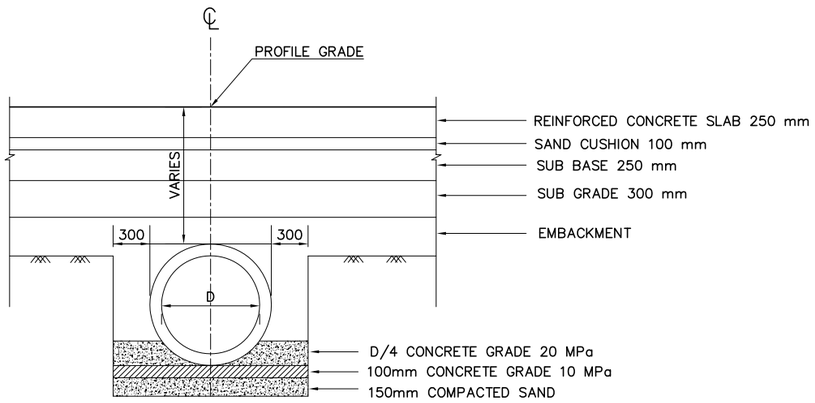
PROFILE



PLAN

SCALE 1:100





SECTION A–A

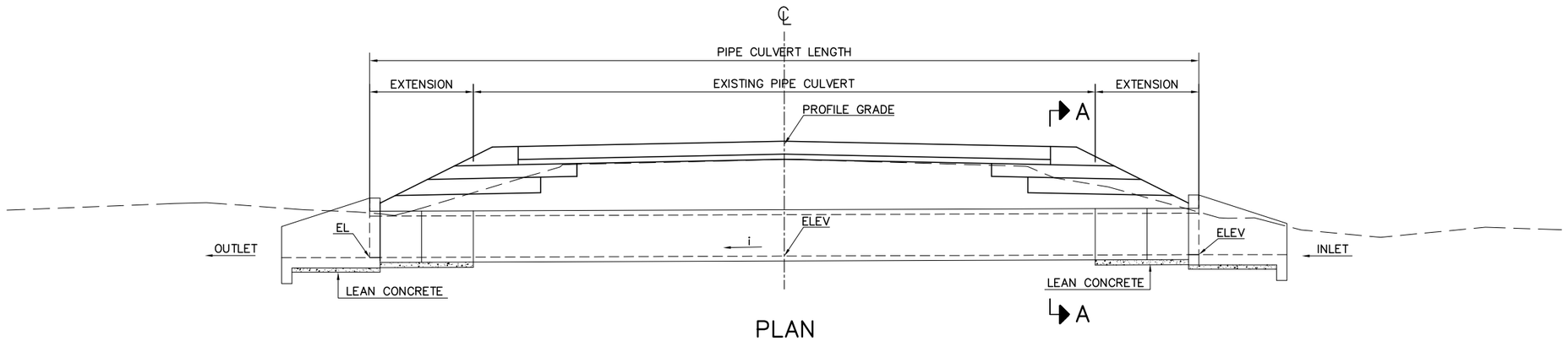
SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. LEVELS ARE IN METERS.
3. GRADIENT OF NEW PIPE CULVERT EXTENSION SHOULD BE SAME AS EXISTING.

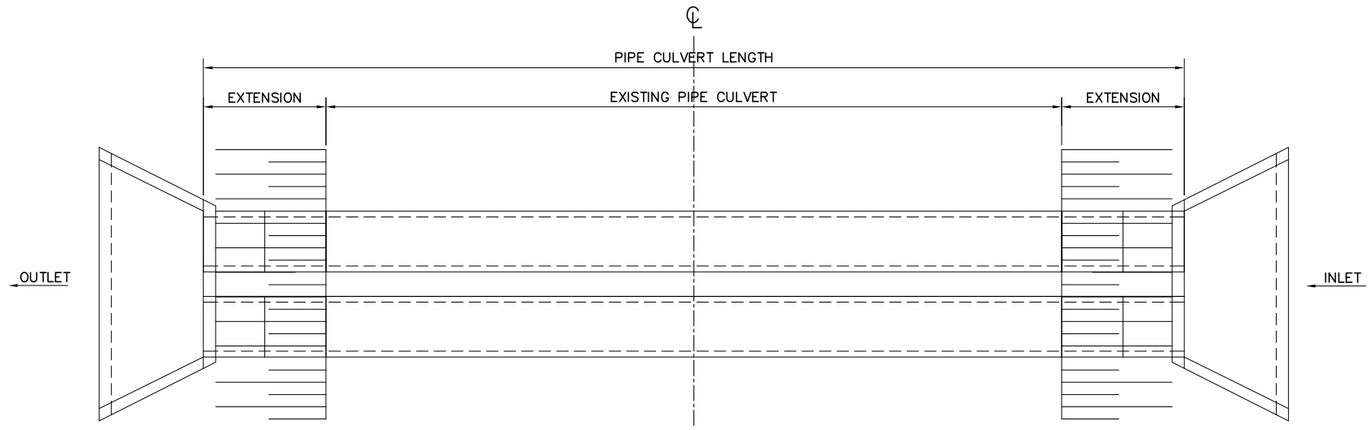
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	PLAN AND PROFILE OF PIPE CULVERT SINGLE CELL					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–018
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

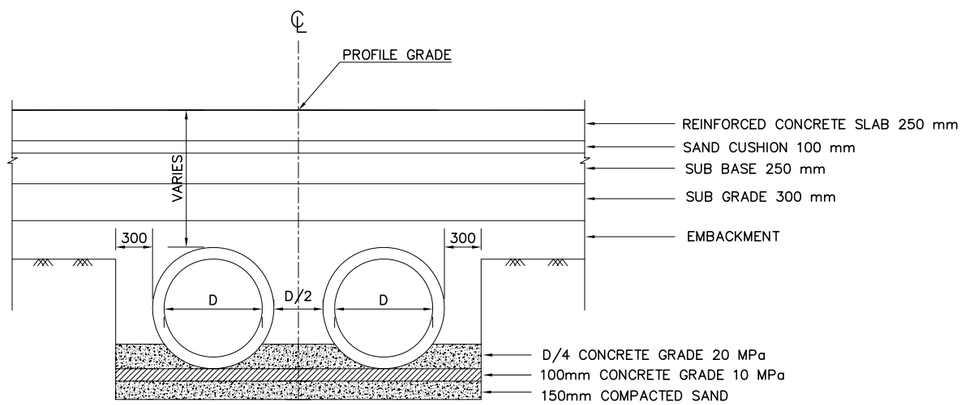
PROFILE



PLAN

SCALE 1:100





SECTION A–A

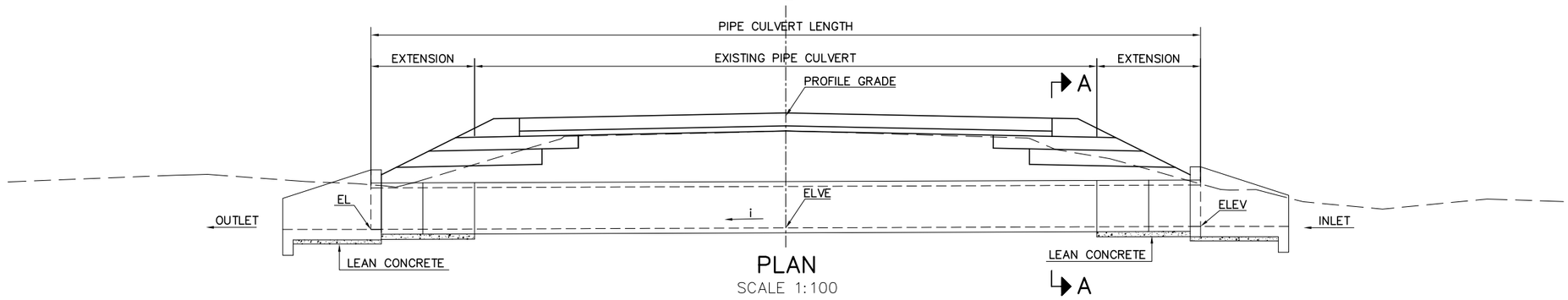
SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. LEVELS ARE IN METERS.
3. GRADIENT OF NEW PIPE CULVERT EXTENSION SHOULD BE SAME AS EXISTING .

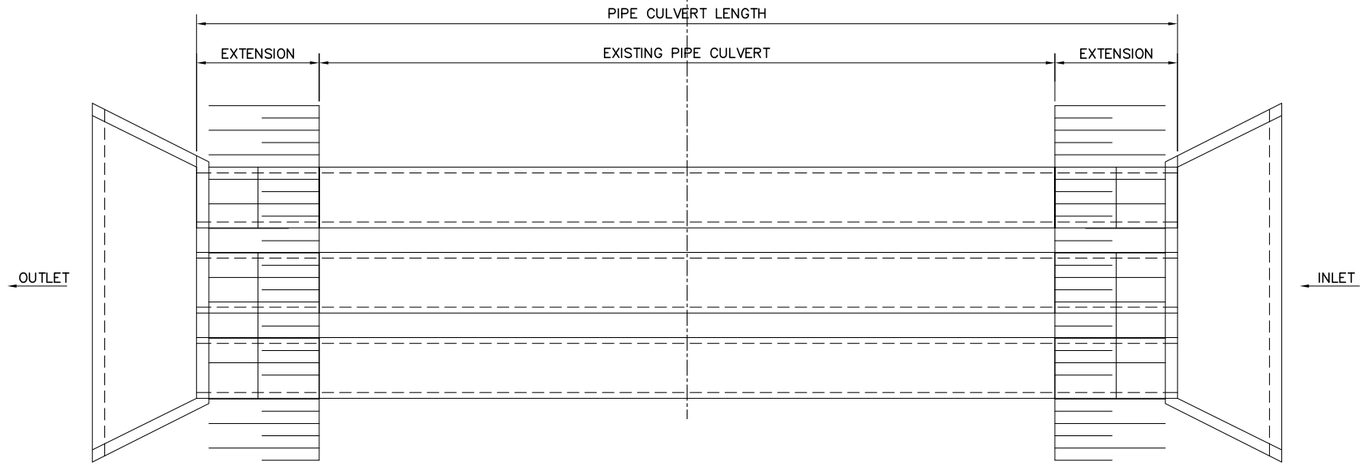
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	PLAN AND PROFILE OF PIPE CULVERT DOUBLE CELL					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–019
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

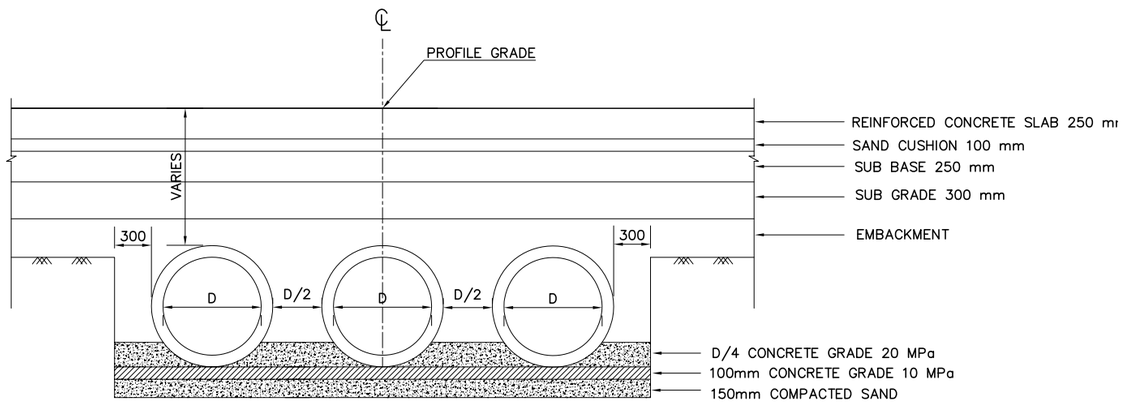
PROFILE



PLAN

SCALE 1:100





SECTION A–A

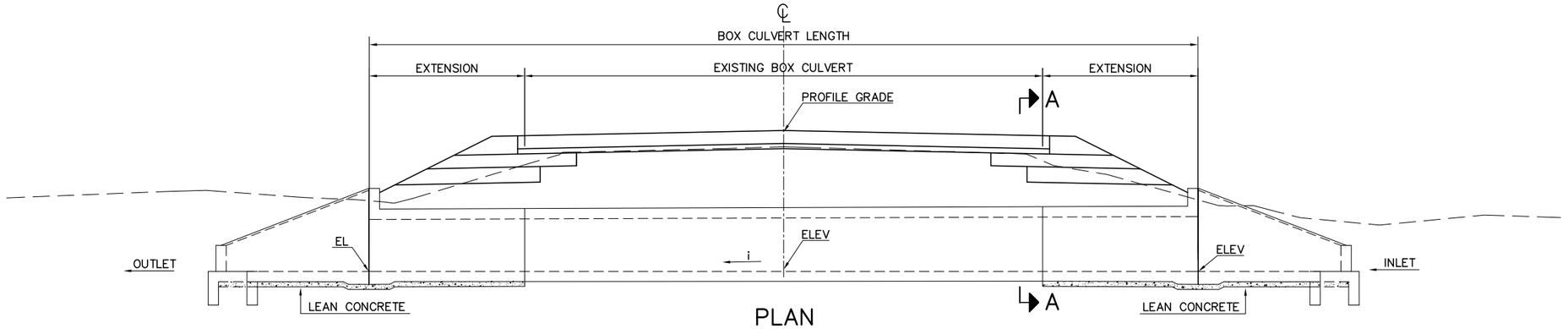
SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. LEVELS ARE IN METERS.
3. GRADIENT OF NEW PIPE CULVERT EXTENSION SHOULD BE SAME AS EXISTING .

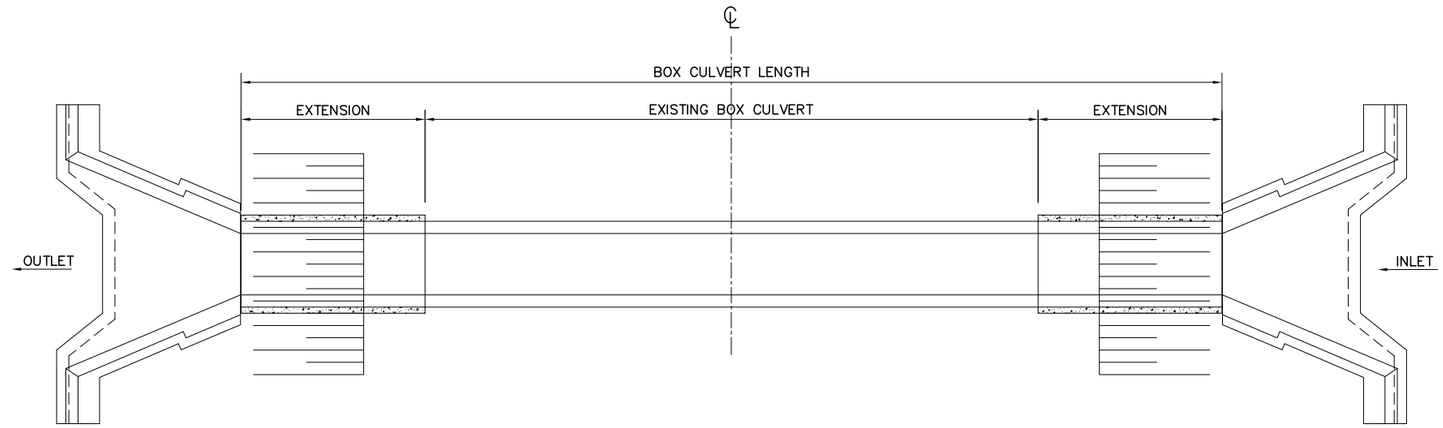
ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	PLAN AND PROFILE OF PIPE CULVERT TRIPLE CELL					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–020
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

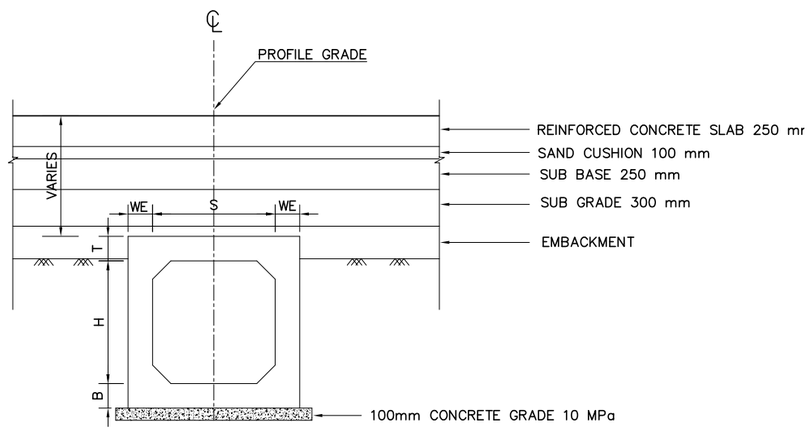
PROFILE



PLAN

SCALE 1:100





SECTION A–A

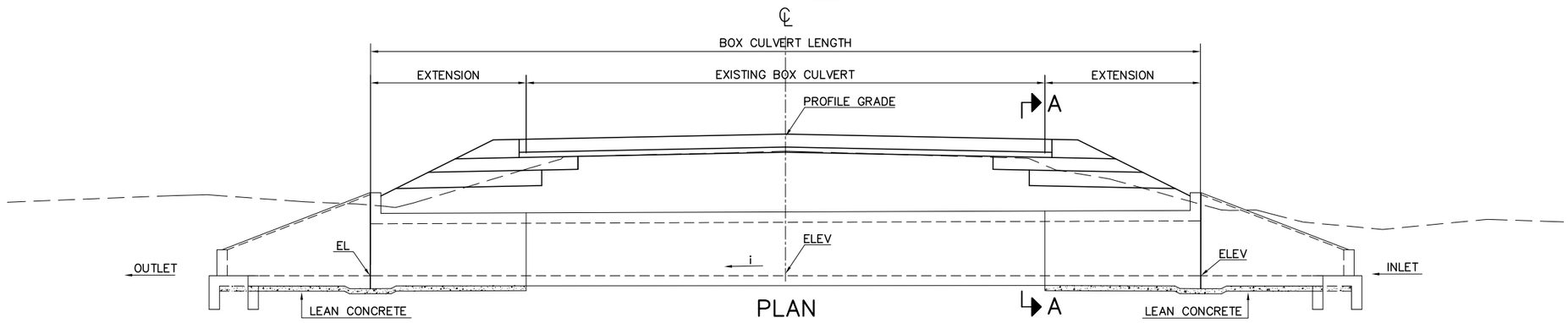
SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. LEVELS ARE IN METERS.
3. GRADIENT OF NEW PIPE CULVERT EXTENSION SHOULD BE SAME AS EXISTING .

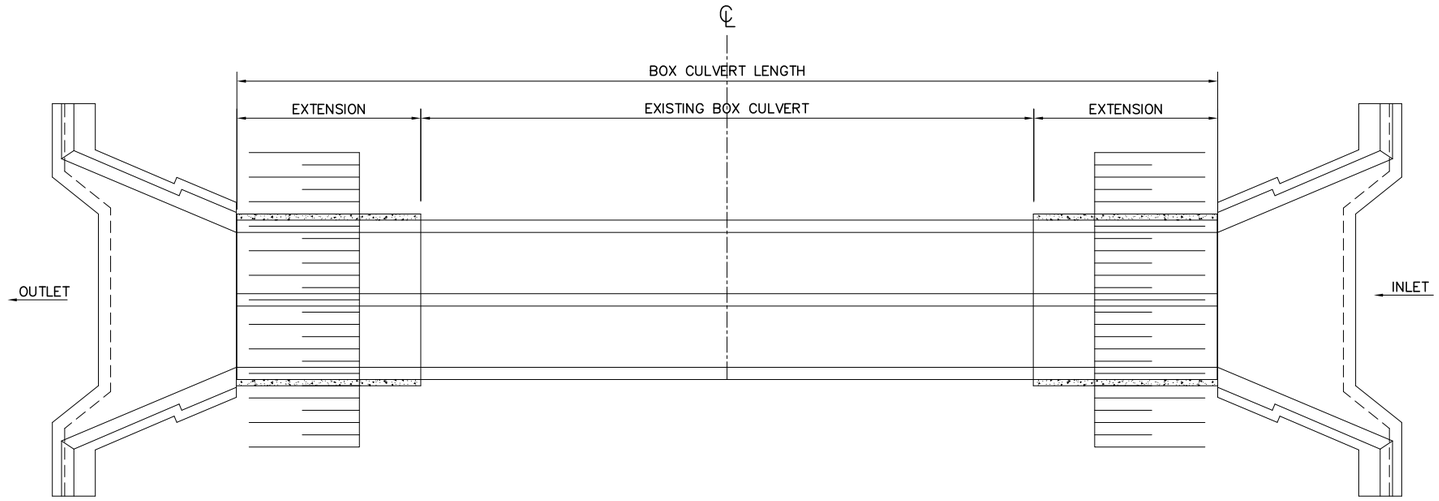
ລ.ວ.ທ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	PLAN AND PROFILE OF BOX CULVERT SINGLE CELL					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–021
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN

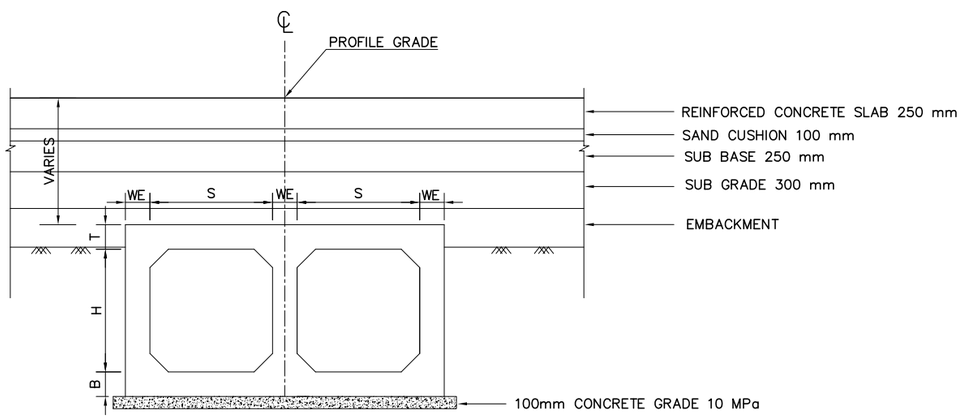
PROFILE



PLAN

SCALE 1:100





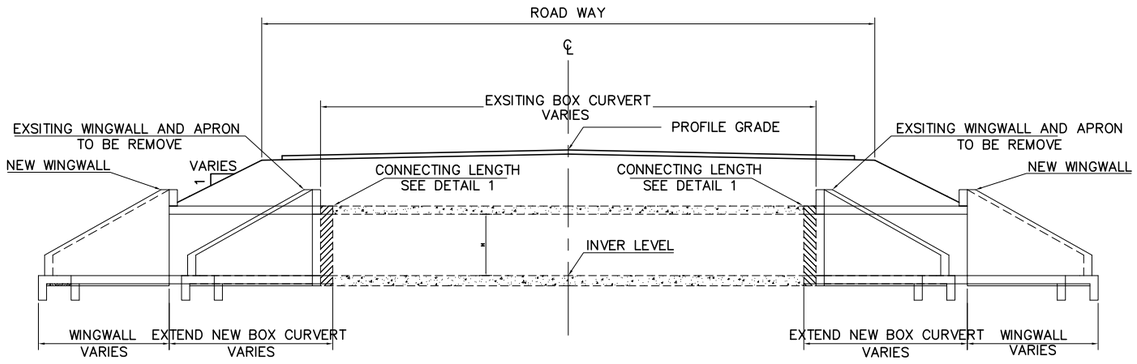
SECTION A–A

SCALE 1:50

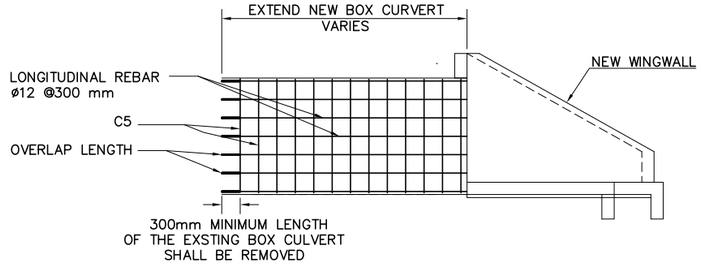
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. LEVELS ARE IN METERS.
3. GRADIENT OF NEW PIPE CULVERT EXTENSION SHOULD BE SAME AS EXISTING .

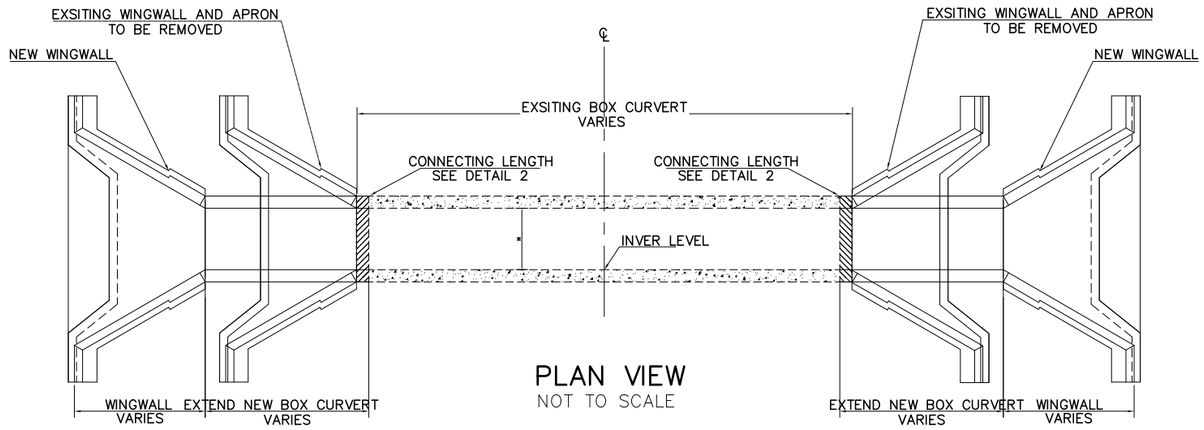
ລ.ວ.ຄ LTEC ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
	PLAN AND PROFILE OF BOX CULVERT DOUBLE CELL					CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–022
						APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN



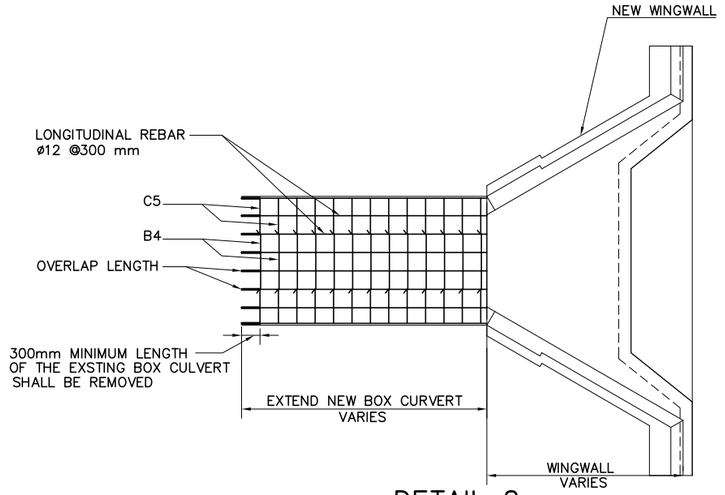
LONGITUDINAL VIEW
NOT TO SCALE



DETAIL 1
ELEVATION
NOT TO SCALE



PLAN VIEW
NOT TO SCALE



DETAIL 2
PLAN VIEW
NOT TO SCALE

NOTES:

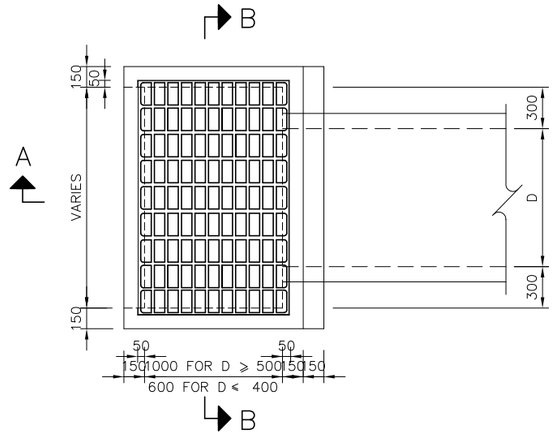
1. ALL CONCRETE SHALL BE CLASS 25 MPa UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c= 26 MPa, fc= 10.4 MPa).
2. ALL STEEL RENFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR DEFORMED BILLET STEEL BARS AASHTO M 31 GRADE 60 fy= 414 MPa, fs= 165.5 MPa.
3. CONCRETE COVER SHALL BE MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR. CONCRETE COVER SHALL BE 40 mm.
4. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20 mm.
5. REINFORCEMENT FOR EXTENTION OF NEW BOX CURVERT SUCH AS DIAMETER, LAP LENGTH, LENGTH OF BARS AND ETC. SHALL BE CONFORMED TO THE SPECIFICATIONS OF THIS PROJECT FLOWING THE DRAWINGS NO. SSD-022, SSD-023, SSD-024.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

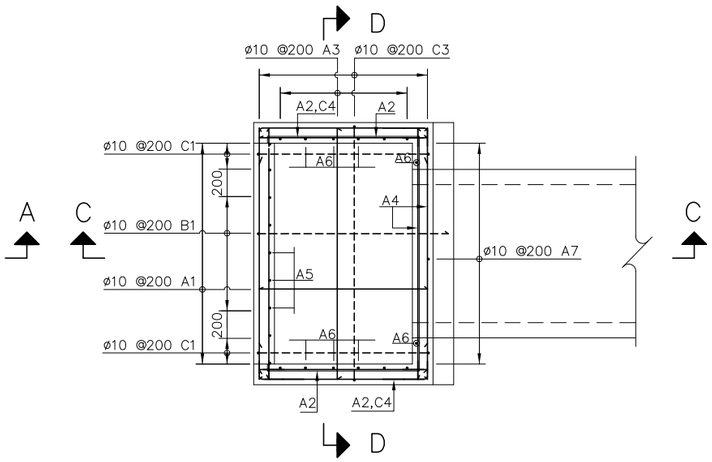
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

BOX CULVERT EXTENSION
STANDARD LAYOUT

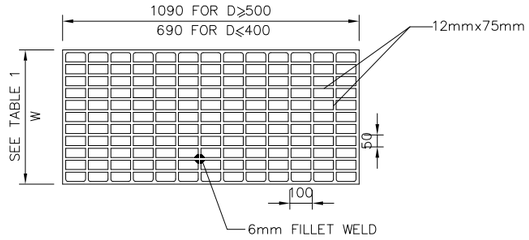
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD-262-17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD-023
				APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN



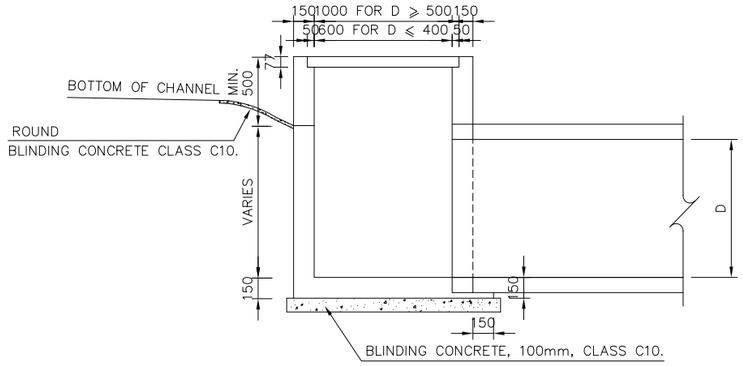
PLAN OF DROP INLET TYPE A
NOT TO SCALE



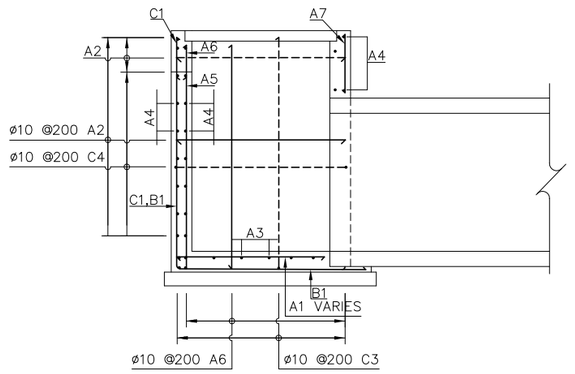
PLAN OF DROP INLET TYPE A
NOT TO SCALE



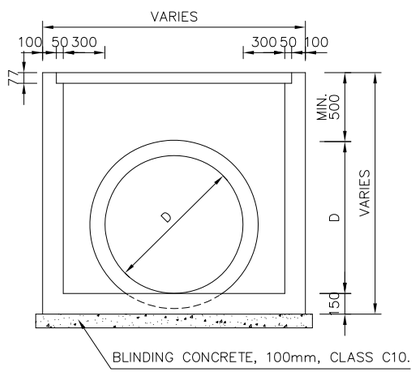
STEEL GRATING COVER DETAIL
NOT TO SCALE



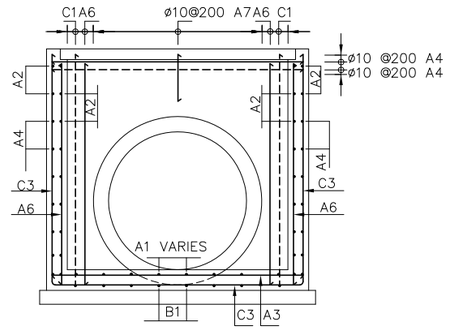
SECTION A–A
NOT TO SCALE



SECTION C–C
NOT TO SCALE



SECTION B–B
NOT TO SCALE



SECTION D–D
NOT TO SCALE

TABLE 1

D	W
ø300	990
ø400	1090
ø500	1190
ø600	1290
ø800	1490
ø1000	1690

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED
2. ALL CONCRETE SHALL BE CLASS C25, UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=25 MPa,fc=10 MPa)
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION FOR DEFORMED BILLET STEEL BARS ASSHTO M31–GRADE 60, fy=414MPa,fs=165.5MPa.
4. CONCRETE COVER SHALL BE 30 mm, IF NOT OTHERWISE SHOWN AND MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR
5. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS.
6. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20mm.

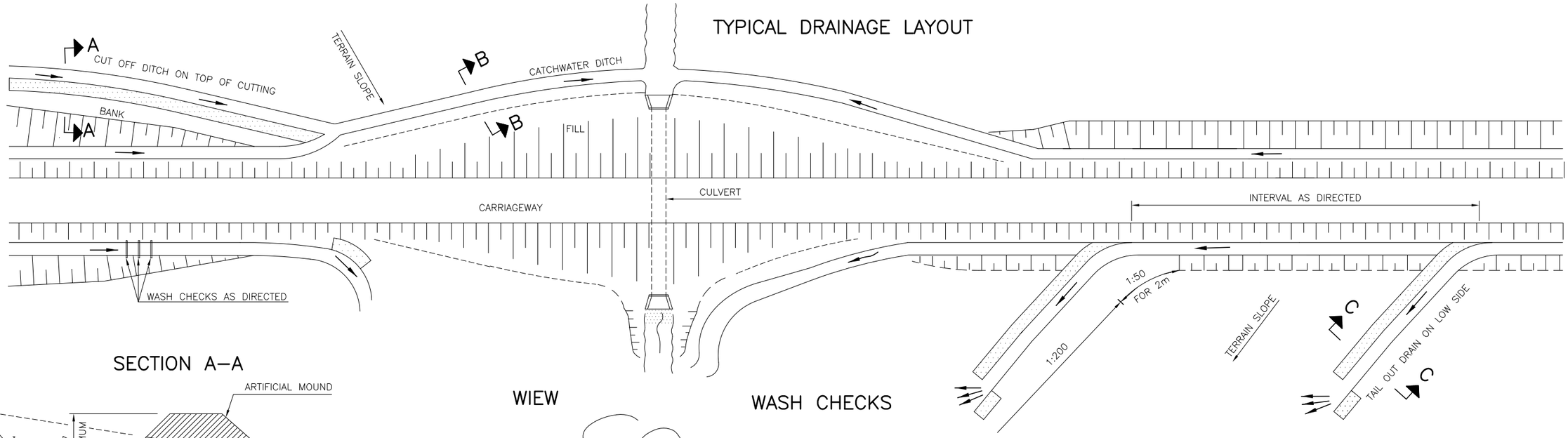
ລ.ວ.ທ
LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

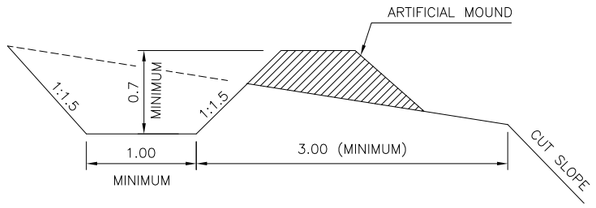
DROP INLET TYPE A
DIMENSIONS AND REINFORCEMENT

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–024
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE

TYPICAL DRAINAGE LAYOUT

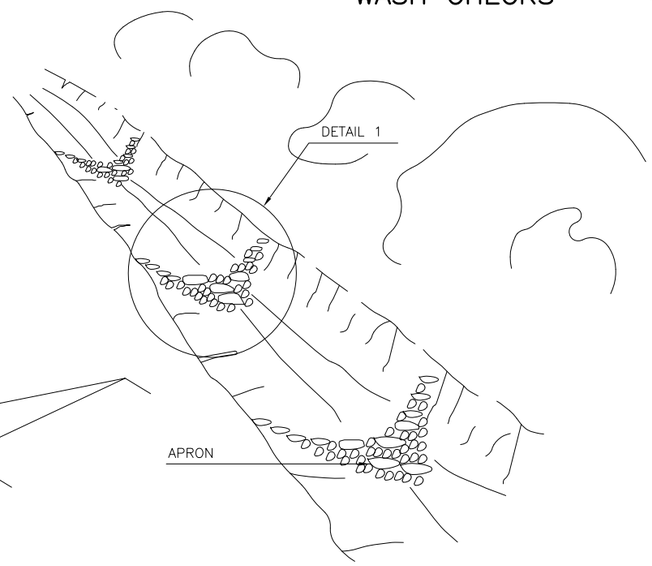


SECTION A–A



WIEW

WASH CHECKS

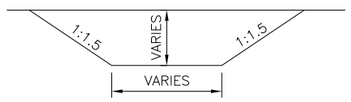


NOTES:

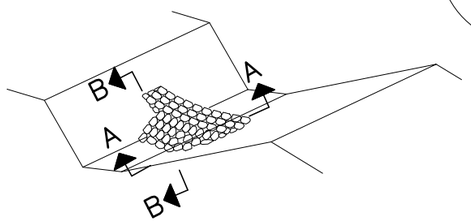
1. THE WASH CHECK INTERVAL IN THE DITCH IS DETERMINED BY THE DRAIN GRADIENT (SEE TABLE BELOW).
2. WIDTH, HEIGHT AND LENGTH
   AS DIRECTED BY ENGINEER.

SIDE OR TURNOUT DRAIN GRADIENTS(%)	WASH CHECK INTERVALS (m)
12	5
10	10
8	15
6	40
4	NOT REQUIRED
2	NOT REQUIRED

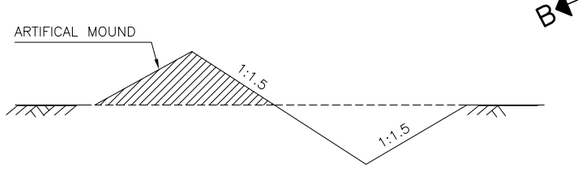
SECTION B–B



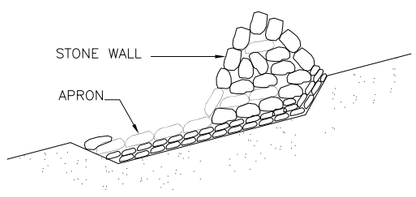
DETAIL 1



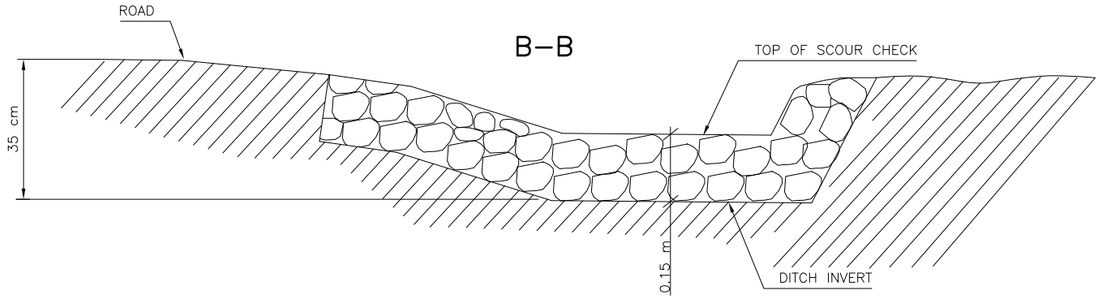
SECTION C–C



A–A



B–B

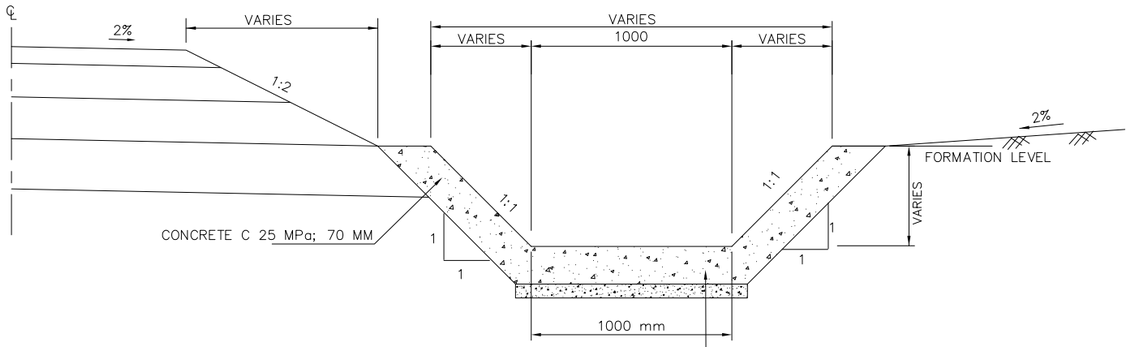


ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

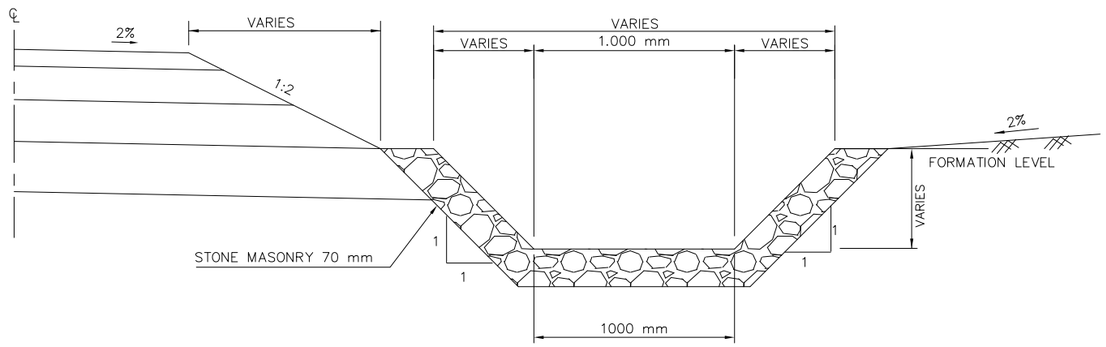
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

TYPICAL DRAINAGE DETAILS

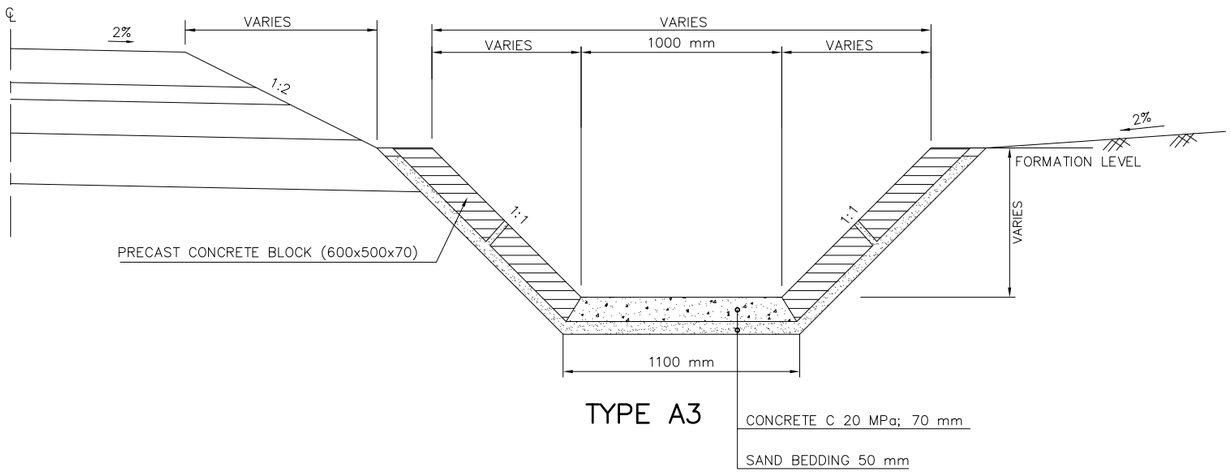
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. SDD–025
							SCALE: NOT TO SCALE



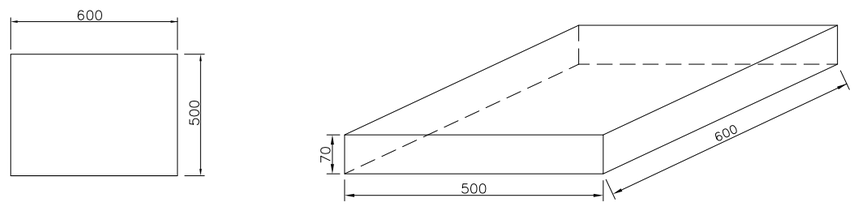
TYPE A1



TYPE A2



TYPE A3



PRE-CAST CONCRETE BLOCK

NOT TO SCALE

NOTES:

1. LINING NOT REQUIRED IN ROCK CUT EXCEPT WHERE DIRECTED BY THE ENGINEER.
2. DIMENSION MAY BE REDUCED OR BENCH OMITTED WHERE INSUFFICIENT SPACE IS AVAILABLE.
3. SIDE WALL MAY BE INCREASED IN HEIGHT WHERE NECESSARY TO ACT AS LOW HEIGHT RETAINNING STRUCTURE. CONTRACTOR TO SUBMIT DESIGN FOR ENGINEERS APPROVAL.
4. ALL DIMENSION ARE IN mm.

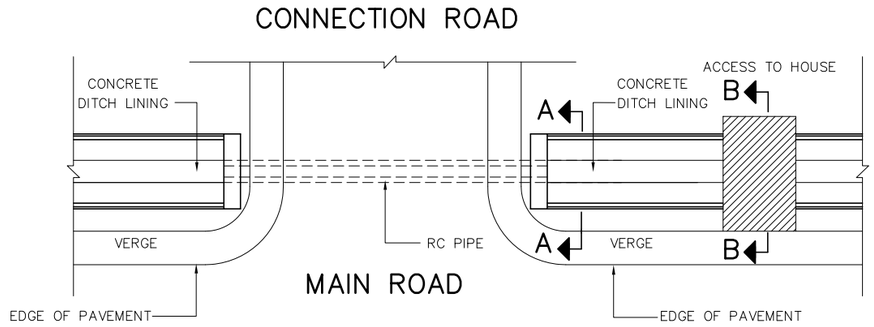
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ

LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

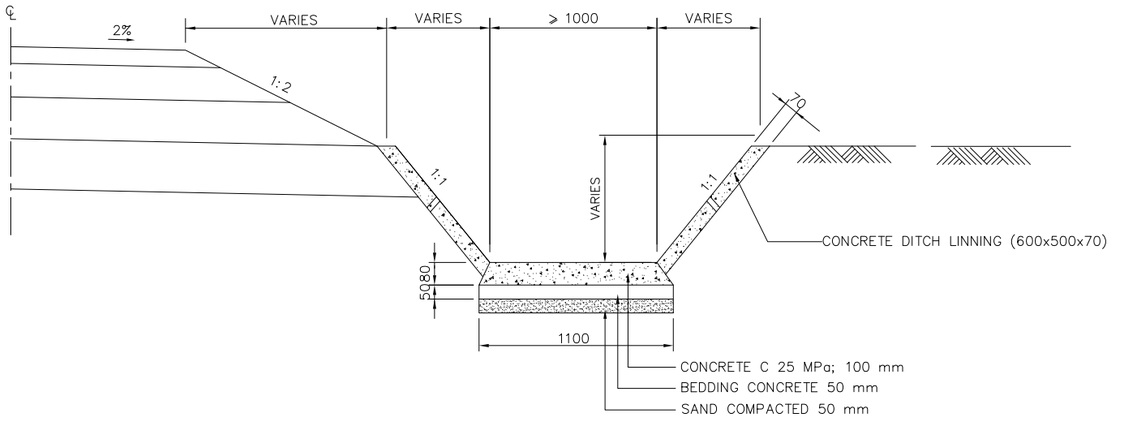
DITCH LINING DETAILS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–026
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE



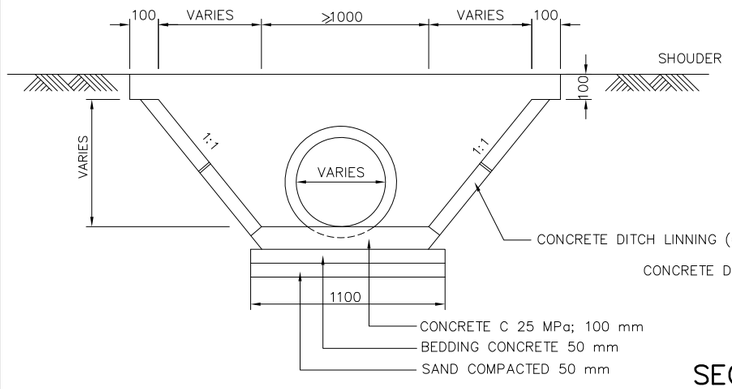
CONCRETE DITCH LINING AT SIDE ROAD CONNECTION AND ACCESS TO HOUSE

SCALE 1:100



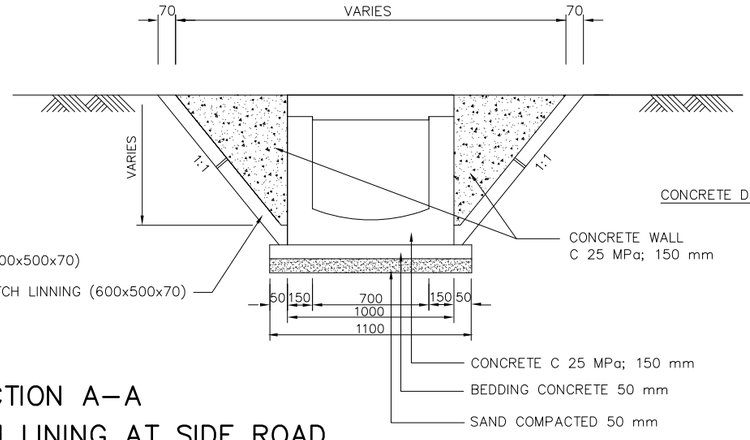
TYPICAL CONCRETE DITCH LINING TYPE A3

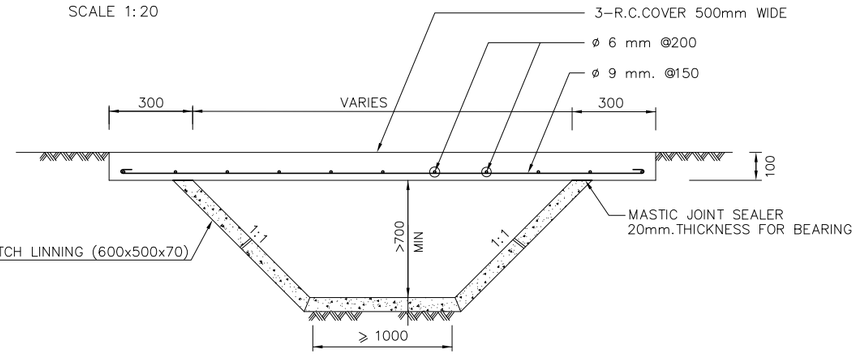
SCALE 1:20



SECTION A–A
CONCRETE DITCH LINING AT SIDE ROAD CONNECTION ACCESS TO HOUSE

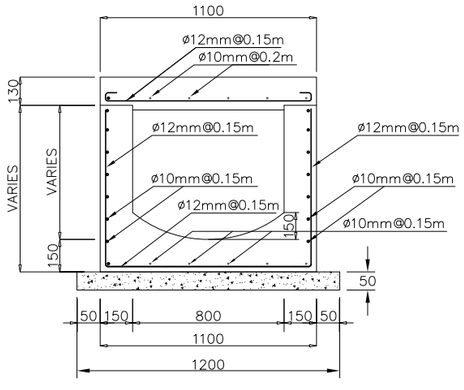
NO TO SCALE





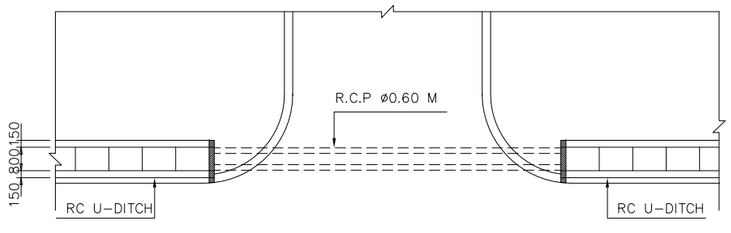
SECTION B–B
TYPICAL DITCH TYPE C
CONCRETE SIDE DITCH WITH R.C.COVER FOR CROSS AT RESEDENTIAL AREA

NOT TO SCALE



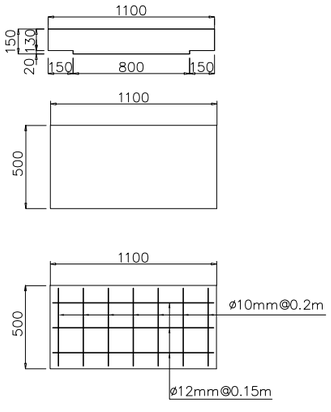
DETAIL OF RC U–DITCH

SCALE 1:10



RC U–DITCH AT SIDE ROAD CONNECTION

NO TO SCALE



DETAIL OF COVER FOR RC U–DITCH

SCALE 1:25

GENERAL:

THE DESCRIPTIONS AND REQUIREMENTS APPEARING IN ANY PART OF THE TECHNICAL SPECIFICATION SHALL APPLY EQUALLY TO THIS DRAWING, WHERE APPROPRIATE AND SHALL BE READ AS THOUGH REPEATED ON THIS DRAWING.

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.
2. IN GENERAL DITCH TYPE A IS APPLIED IN THE MOUNTAINOUS AREA, AND WHERE SPACE ON ROAD SIDE IS LIMITED DITCH TYPE B IS APPLIED AS A CHANNEL TO INTERCEPT WATER AND CARRIES TO THE NEAREST CROSS CULVERT OR CONNECTS TO SIDE DRAIN CHANNEL. DITCH TYPE C IS APPLIED AT THE ROAD SECTION THROUGH COMMUNITY OR RESIDENTIAL AREA.
3. PLACEMENT,TYPE, AND SIZE OF DITCH AS SHOWN ON PLAN AND PROFILE DRAWING OR AS DIRECTED BY THE ENGINEER.

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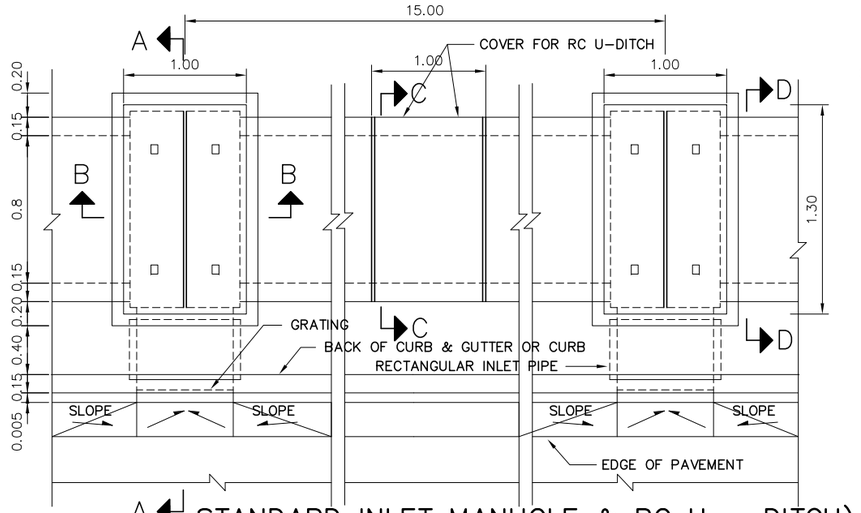
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

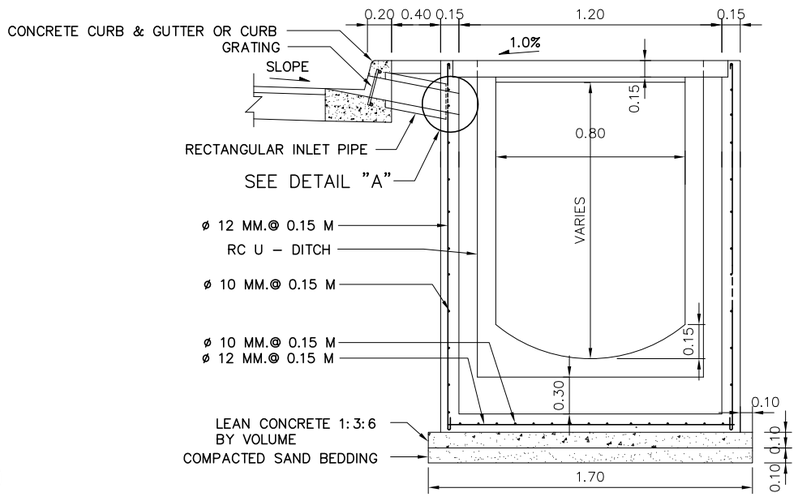
TYPICAL SIDE DITCH DETAILS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SDD–027
				APPROVED	Mr.Vandy VORASACK		SCALE: AS SHOWN



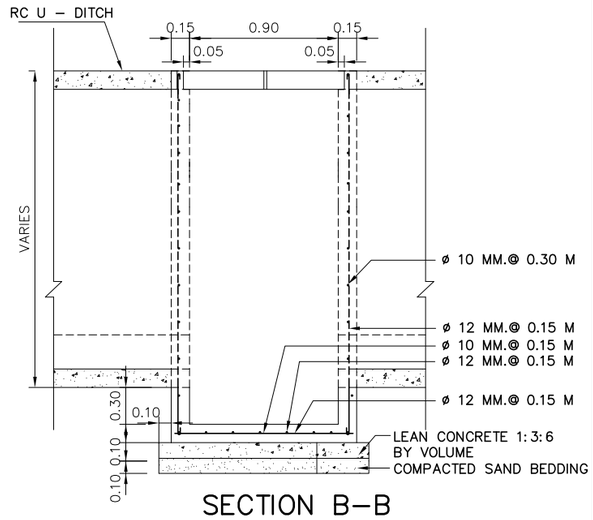
A STANDARD INLET MANHOLE & RC U – DITCH)

NOT TO SCALE



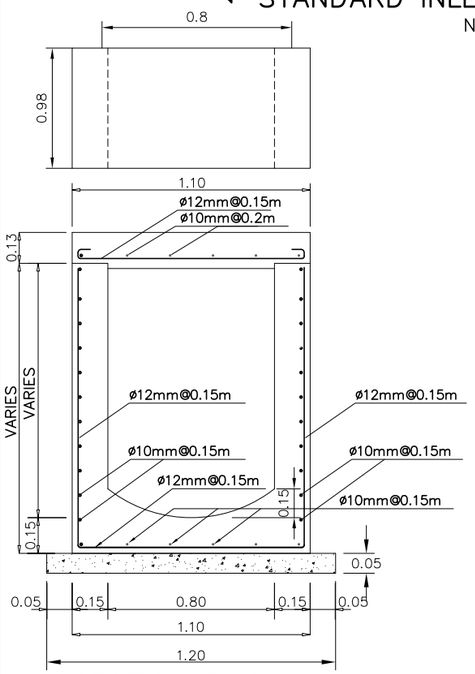
SECTION A–A

NOT TO SCALE



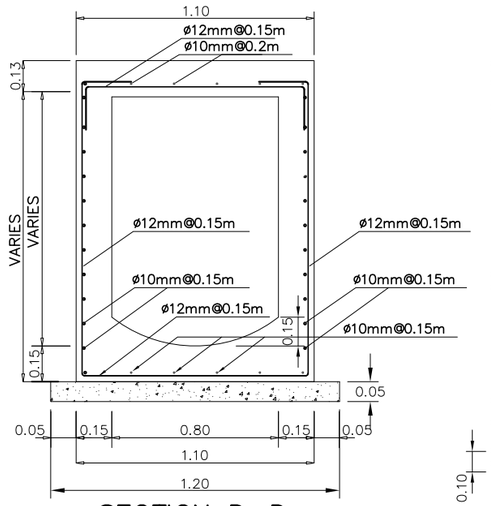
SECTION B–B

NOT TO SCALE



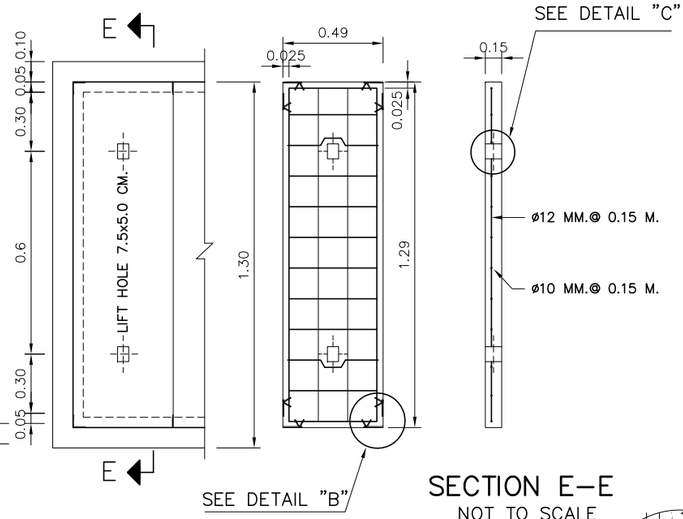
SECTION C–C

NOT TO SCALE



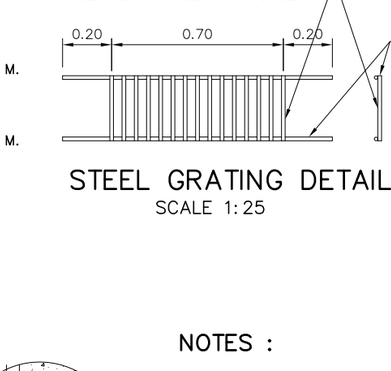
SECTION D–D

NOT TO SCALE



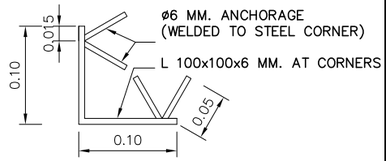
SECTION E–E

NOT TO SCALE



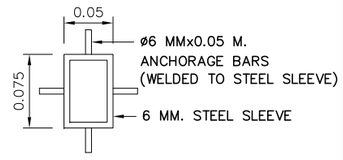
STEEL GRATING DETAILS

SCALE 1:25



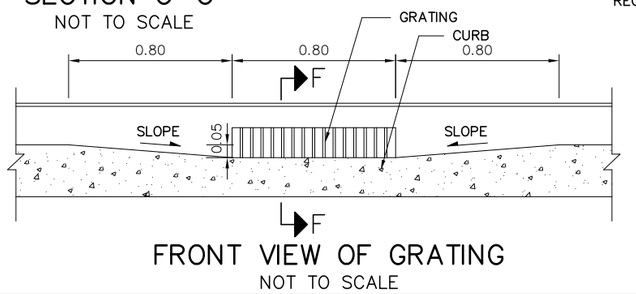
DETAIL "B"

NOT TO SCALE



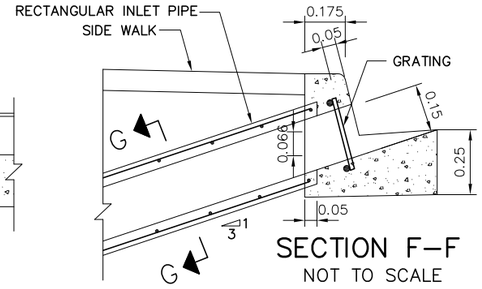
DETAIL "C"

NOT TO SCALE



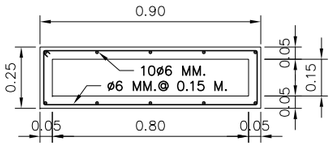
FRONT VIEW OF GRATING

NOT TO SCALE



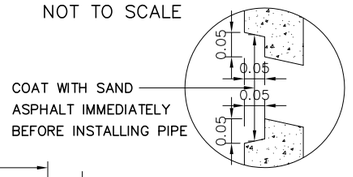
SECTION F–F

NOT TO SCALE



SECTION G–G

NOT TO SCALE



DETAIL "A"

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED
2. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATE MIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOWS :

PORTLAND CEMENT TYPE I	350	KG. (MIN.)
SAND	0.43	M^3
CRUSHED ROCK OR GRAVEL	0.86	M^3
CONCRETE SLUMP	10	CM. (MAX.)

3. REINFORCING STEEL SHALL CONFORM TO TIS. 20 GRADE SR 24.
4. STRUCTURAL STEEL SHALL CONFORM TO TIS. 116 GRADE Fe 30
5. FLAT PLATE STEEL SHALL CONFORM TO TIS. 55 GRADE SR 24
6. STRUCTURAL STEEL AND FLAT STEEL SHALL BE PAINTED WITH RUST–OLEUM PAINT OR EQUIVALENT TWICE AND WITH OIL PAINT ONCE.
7. CLEAR CONCRETE COVER SHALL BE 3 CM.
8. MANHOLES SHALL BE ARRANGED AT 15.00 M. INTERVAL OR AS DIRECTED BY THE ENGINEER.

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LAO TRANSPORT ENGINEERING CONSULTANT

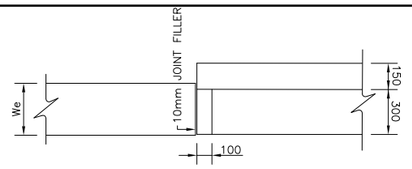
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

DETAIL OF INLET AND MANHOLE
& RC U – DITCH)

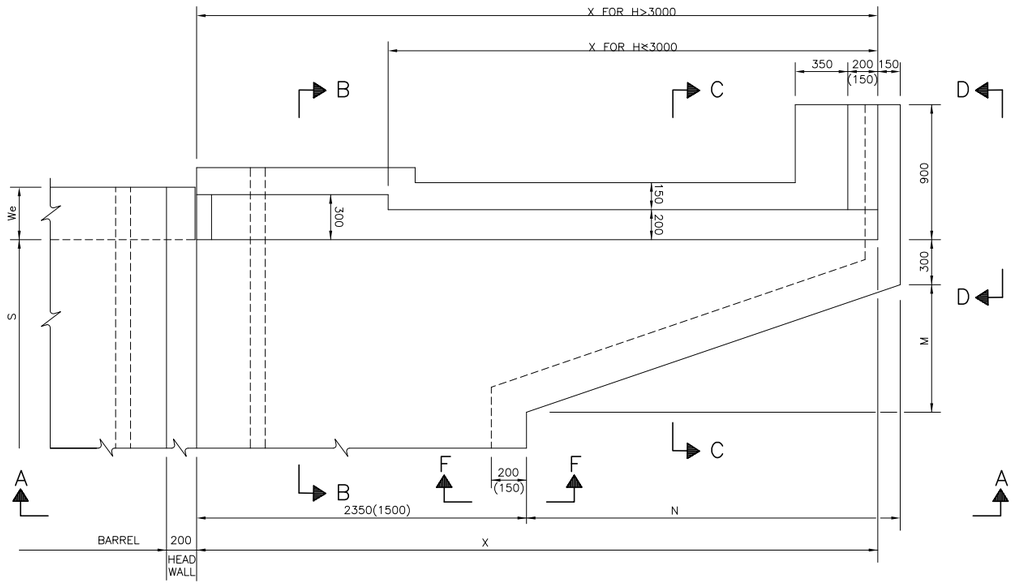
REV.	DATE	DESCRIPTION	APPROVED

	NAME	SIGNATURE
DESIGNED	Mr.Souksavanh SYPHAKHAM	
CHECKED	Mr.Khamphone SORPHABMIXAY	
APPROVED	Mr.Vandy VORASACK	

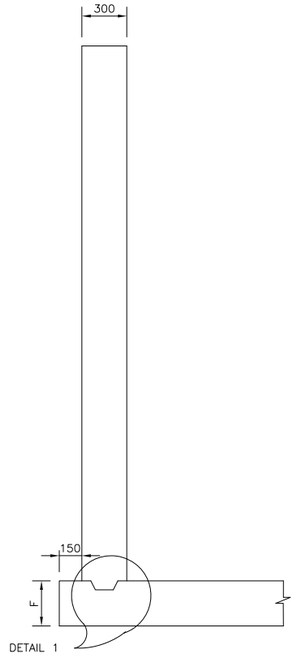
LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDD – 028
SCALE: NOT TO SCALE



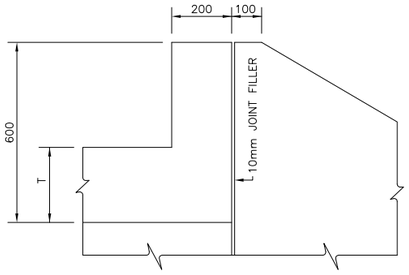
SECTION G–G
NOT TO SCALE



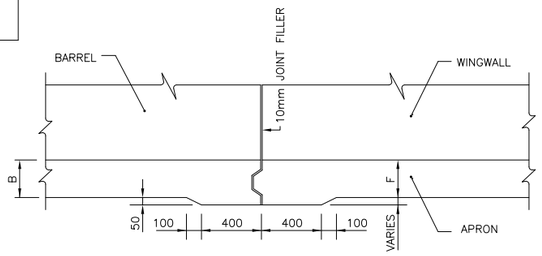
PLAN
NOT TO SCALE



SECTION B–B
NOT TO SCALE
H>3000



DETAIL 2
NOT TO SCALE



DETAIL 3
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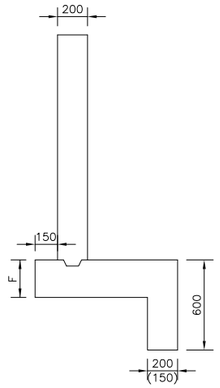
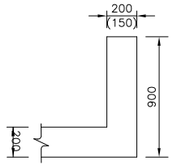
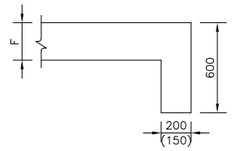


SECTION C–C
NOT TO SCALE



SECTION H–H
NOT TO SCALE

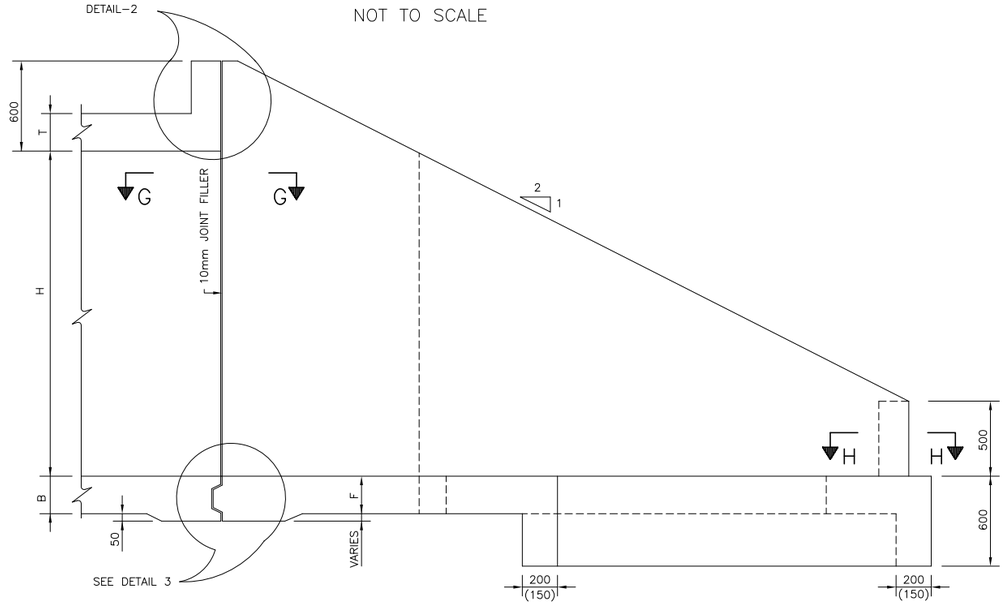


SECTION F–F
NOT TO SCALE

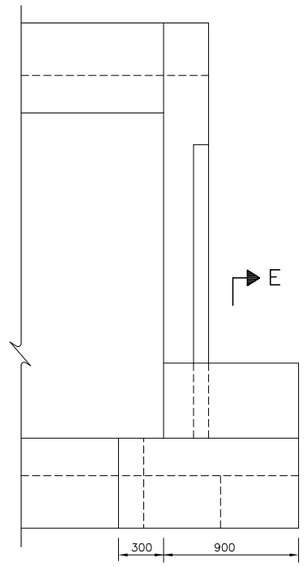
DETAIL 1
NOT TO SCALE

WINGWALL DIMENSIONS

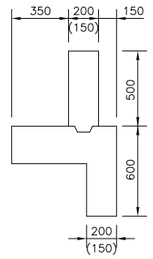
H	F	SLOPE 1:2		
		X	M	N
1000	150	2300	600	950
1500	200	3300	700	1100
2000	200	4300	900	2100
2500	250	5300	1100	3100
3000	250	6300	1300	4100
3500	250	7300	1500	5100



SECTION A–A
NOT TO SCALE



VIEW D–D
NOT TO SCALE
E



SECTION E–E
NOT TO SCALE

NOTES:

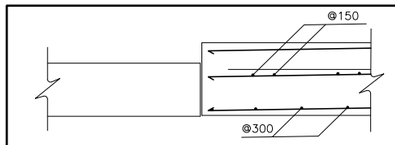
1. ALL DIMENSIONS ARE IN mm.
2. ALL CONCRETE SHALL BE CLASS 25 MPa UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=26 MPa, fc=10.4 MPa)
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR DEFORMED BILLET STEEL BARS AASHTO M 31 GRADE 60 fy=414 MPa , fs=165.5 MPa.
4. CONCRETE COVER SHALL BE MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR. CONCRETE COVER SHALL BE 40 mm.
5. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20 mm.
6. LAP LENGHT OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS
7. THE FIGURES IN PARENTHESES ARE FOR H=1000.

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

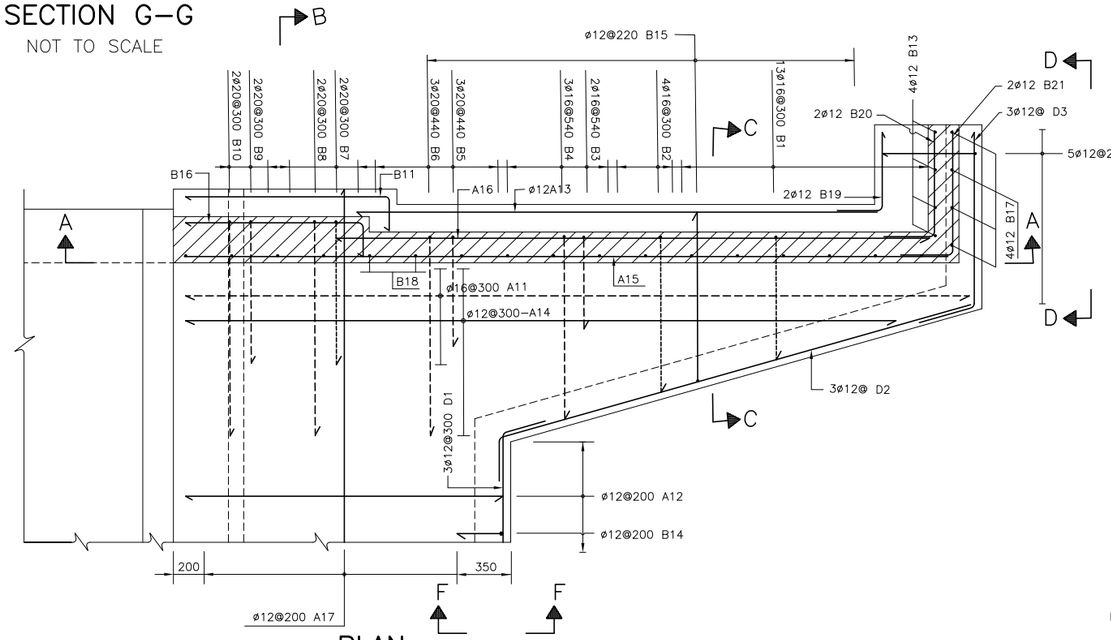
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE BOX CULVERT WINGWALL DETAILS 1:2 DIMENSIONS

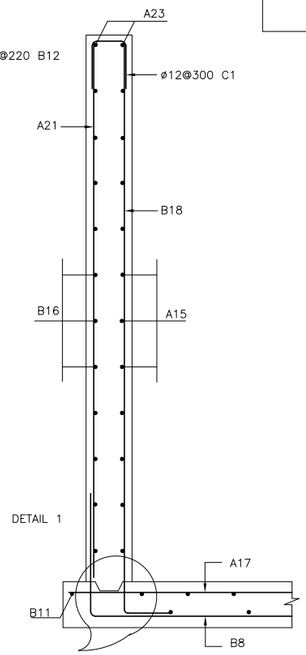
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. SDD – 029
							SCALE: NOT TO SCALE



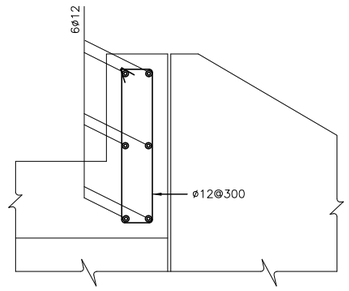
SECTION G–G
NOT TO SCALE



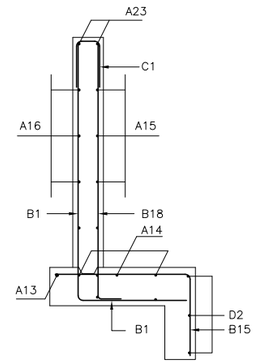
PLAN
NOT TO SCALE



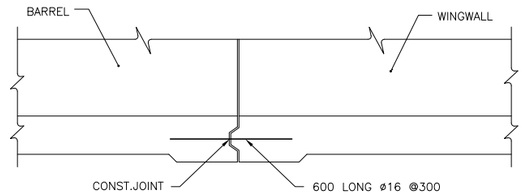
SECTION B–B
NOT TO SCALE
H>3000



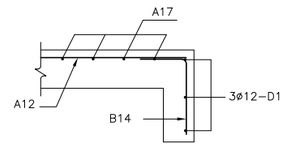
DETAIL 2
NOT TO SCALE



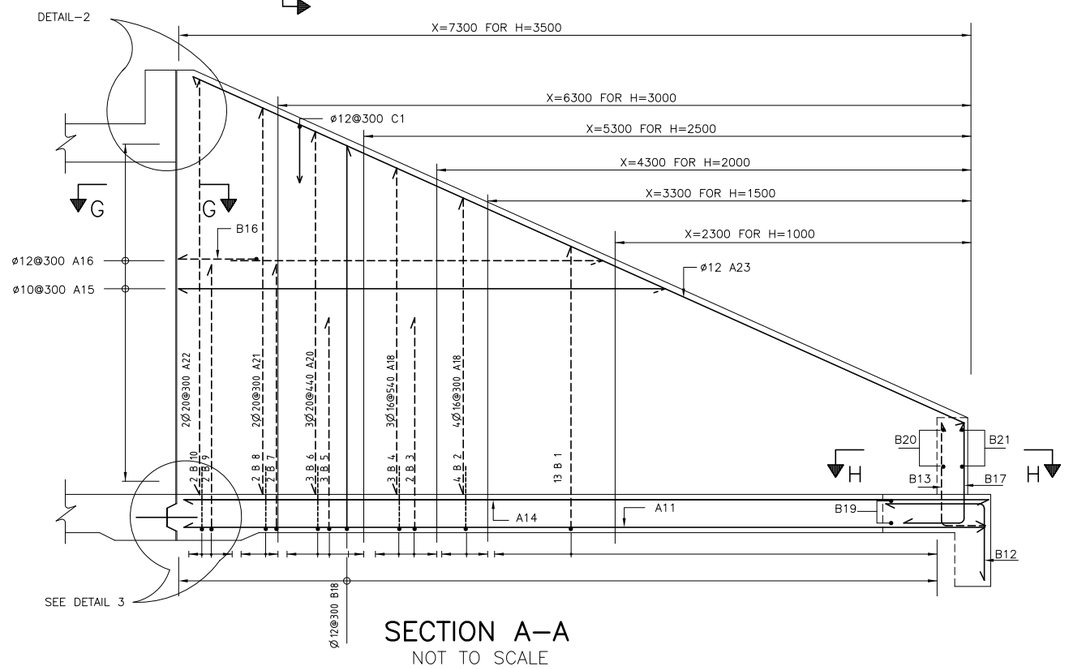
SECTION C–C
NOT TO SCALE



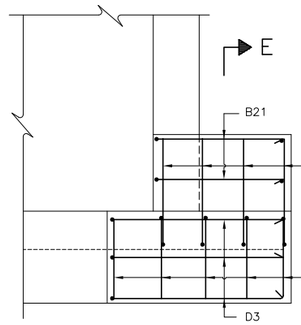
DETAIL 3
NOT TO SCALE



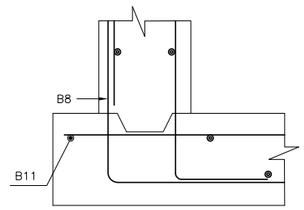
SECTION F–F
NOT TO SCALE



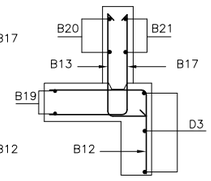
SECTION A–A
NOT TO SCALE



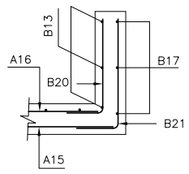
VIEW D–D
NOT TO SCALE



DETAIL 1
NOT TO SCALE



SECTION E–E
NOT TO SCALE



SECTION H–H
NOT TO SCALE

NOTES:

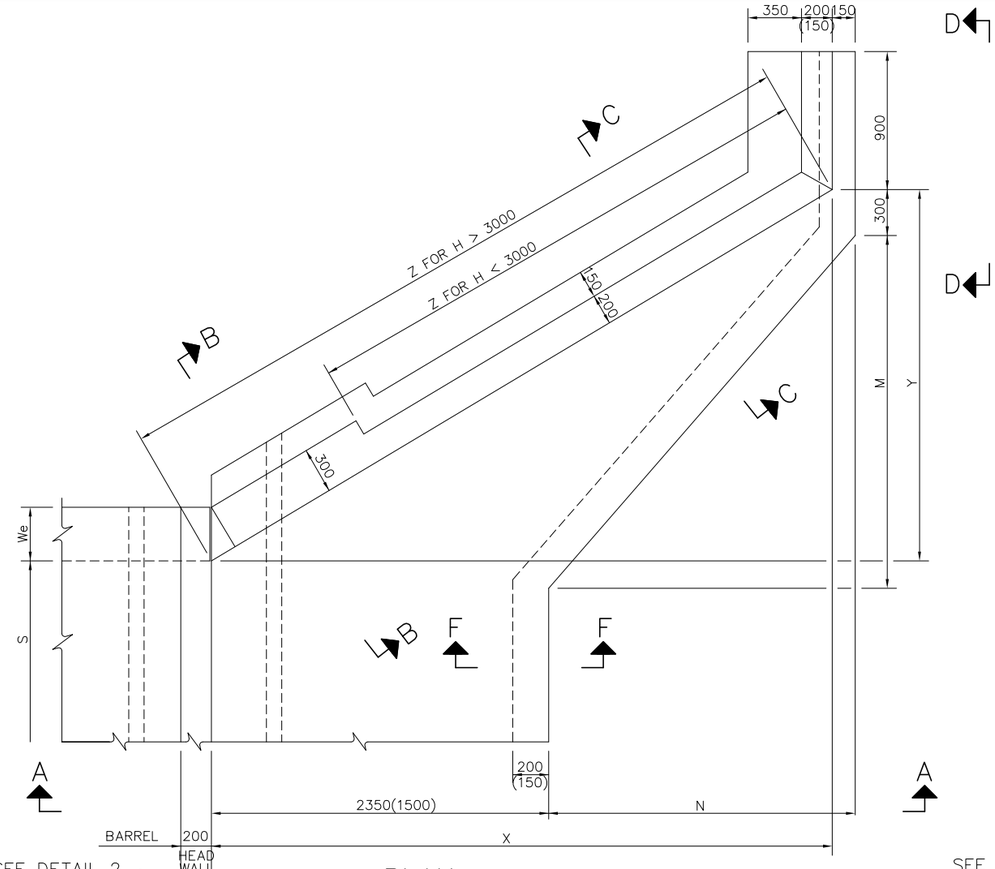
1. ALL DIMENSIONS ARE IN mm.
2. ALL CONCRETE SHALL BE CLASS 25 MPa UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=26 MPa, fc=10.4 MPa)
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR DEFORMED BILLET STEEL BARS AASHTO M 31 GRADE 60 fy=414 MPa , fs=165.5 MPa.
4. CONCRETE COVER SHALL BE MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR. CONCRETE COVER SHALL BE 40 mm.
5. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20 mm.
6. LAP LENGHT OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

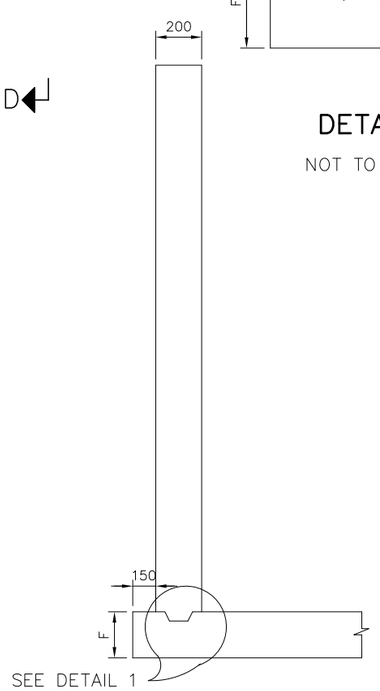
REINFORCED CONCRETE BOX CULVERT WINGWALL DETAILS, 1:2, REINFORCEMENT

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. SDD – 030
							SCALE: NOT TO SCALE



PLAN

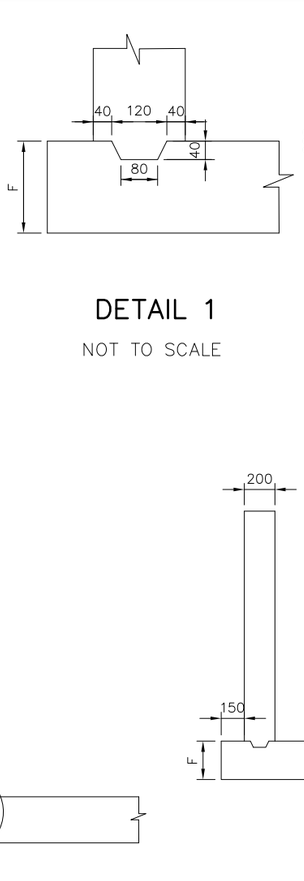
NOT TO SCALE



SECTION B–B

H>3000

NOT TO SCALE



SECTION C–C

NOT TO SCALE

SECTION F–F

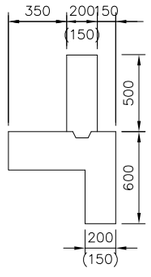
NOT TO SCALE

SECTION A–A

NOT TO SCALE

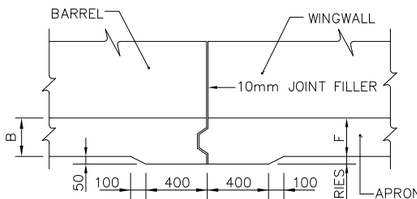
VIEW D–D

NOT TO SCALE



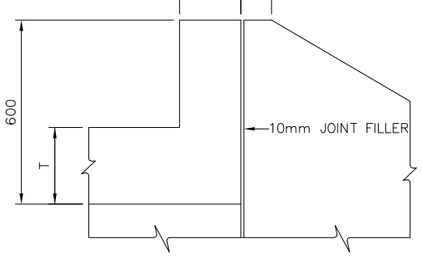
SECTION E–E

NOT TO SCALE



DETAIL 3

NOT TO SCALE

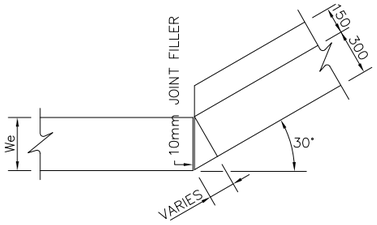


DETAIL 2

NOT TO SCALE

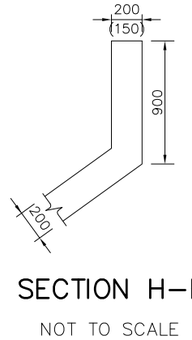
DETAIL 1

NOT TO SCALE



SECTION G–G

NOT TO SCALE



SECTION H–H

NOT TO SCALE

WINGWALL DIMENSIONS

H	F	SLOPE 1:2				
		X	Y	Z	M	N
1000	150	2250	1200	2600	600	750
1500	200	3200	1850	3700	800	1000
2000	200	4200	2420	4850	1600	2000
2500	250	5200	3000	6000	2400	3000
3000	250	6200	3580	7160	3200	4000
3500	250	7200	4200	8350	4000	5000

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=26 MPa, fc=10.4 MPa)
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR DEFORMED BILLET STEEL BARS AASHTO M 31 GRADE 60 fy=414 MPa , fs=165.5 MPa.
4. CONCRETE COVER SHALL BE MEASURED FROM THE SURFACE OF CONCRETE TO THE FACE OF NEAREST BAR. CONCRETE COVER SHALL BE 40 mm.
5. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20 mm.
6. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ

LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE BOX CULVERT WINGWALL DETAILS, 1:2, 30° DIMENSIONS

REV.	DATE	DESCRIPTION	APPROVED

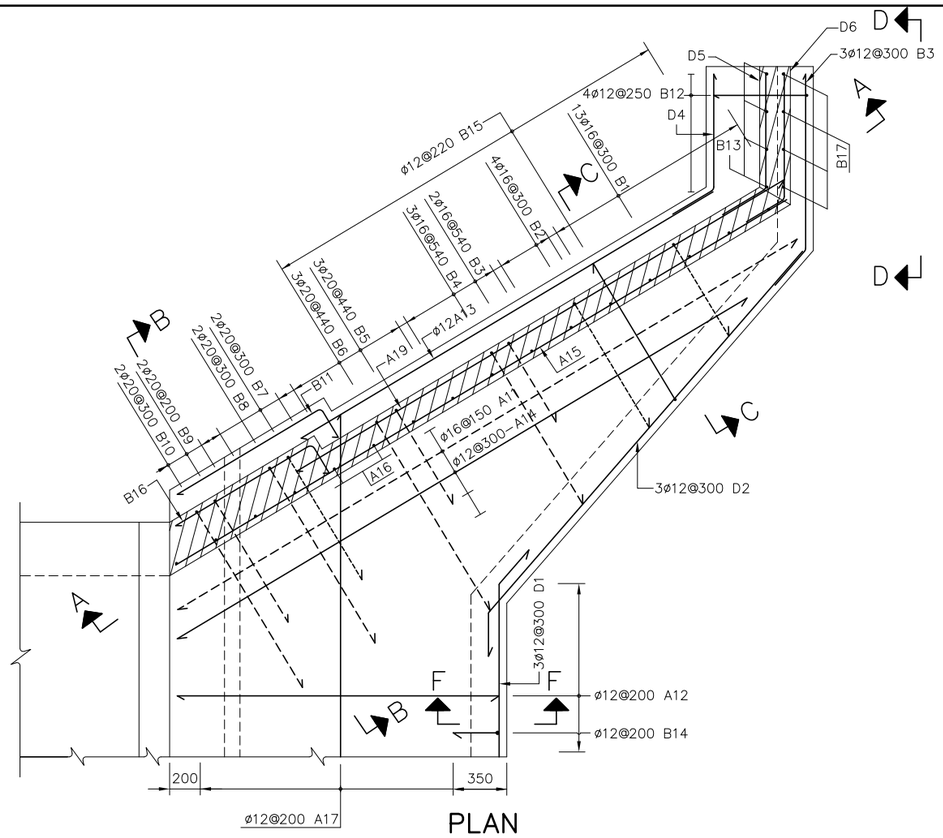
	NAME	SIGNATURE
DESIGNED	Mr.Souksavanh SYPHAKHAM	
CHECKED	Mr.Khamphone SORPHABMIXAY	
APPROVED	Mr.Vandy VORASACK	

LTEC CODE: SD–262–17

DATE: April, 2018

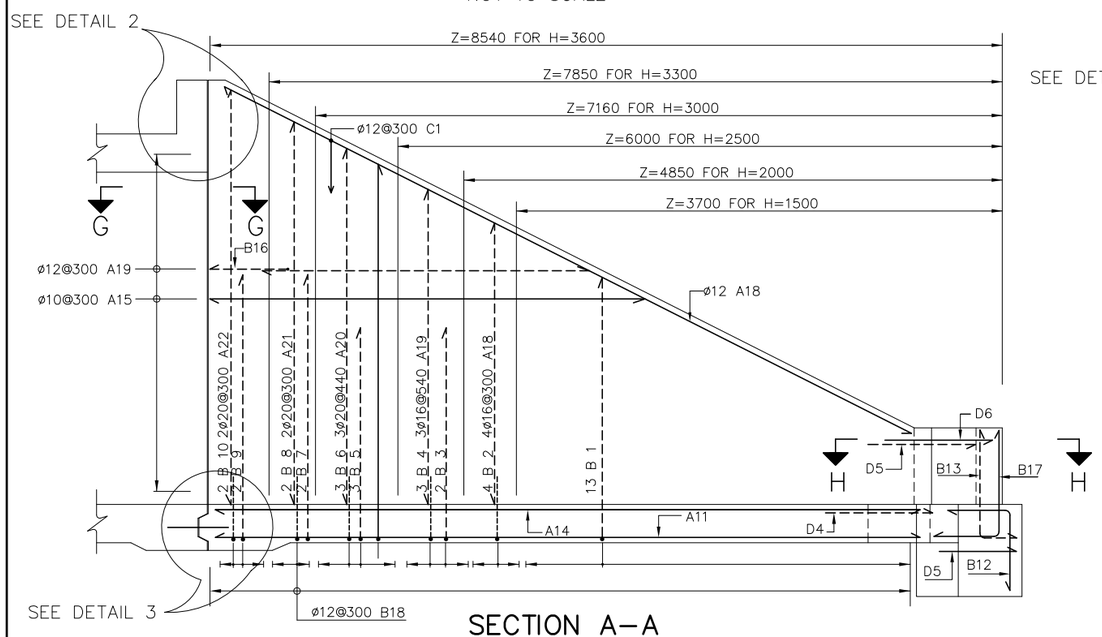
DRW No. SDD – 031

SCALE: NOT TO SCALE



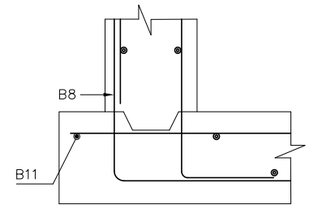
PLAN

NOT TO SCALE



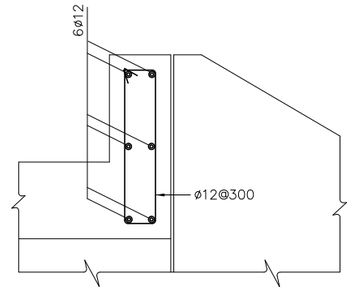
SECTION A–A

NOT TO SCALE



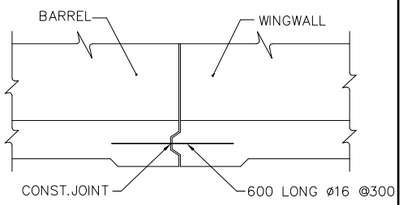
DETAIL 1

NOT TO SCALE



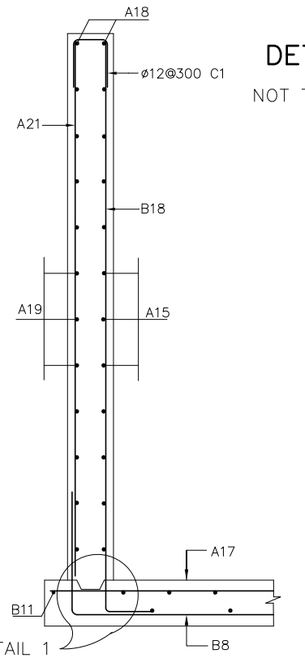
DETAIL 2

NOT TO SCALE



DETAIL 3

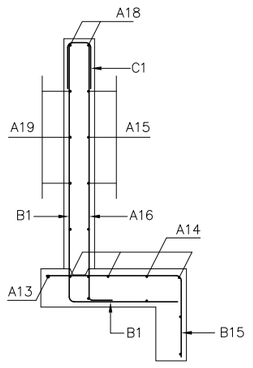
NOT TO SCALE



SECTION B–B

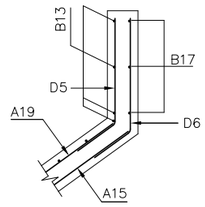
NOT TO SCALE

H>3000



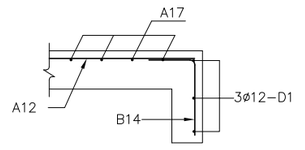
SECTION C–C

NOT TO SCALE



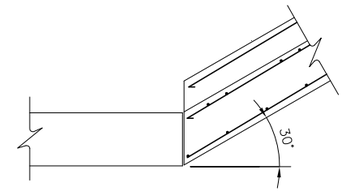
SECTION H–H

NOT TO SCALE



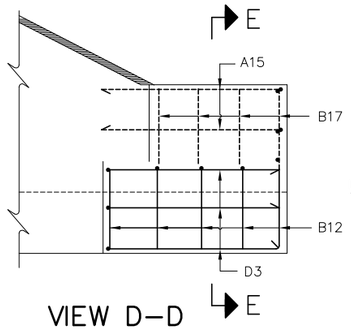
SECTION F–F

NOT TO SCALE



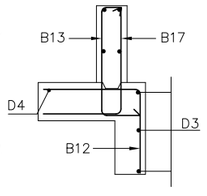
SECTION G–G

NOT TO SCALE



VIEW D–D

NOT TO SCALE



SECTION E–E

NOT TO SCALE

NOTES:

1. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL CONCRETE SHALL BE CLASS 25 MPa UNLESS OTHERWISE SHOWN (CYLINDER STRENGTH OF CONCRETE AT 28 DAYS f'c=26 MPa, fc=10.4 MPa)
3. ALL STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR DEFORMED BILLET STEEL BARS AASHTO M 31 GRADE 60 fy=414 MPa , fs=165.5 MPa.
4. CONCRETE COVER SHALL BE MEASURED FROM THE SURFACE OF CONCRETE
5. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 20 mm. TO THE FACE OF NEAREST BAR. CONCRETE COVER SHALL BE 40 mm.
6. LAP LENGTH OF REINFORCEMENT BARS SHALL BE AS SHOWN IN THE SPECIFICATIONS

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ

LAO TRANSPORT ENGINEERING CONSULTANT

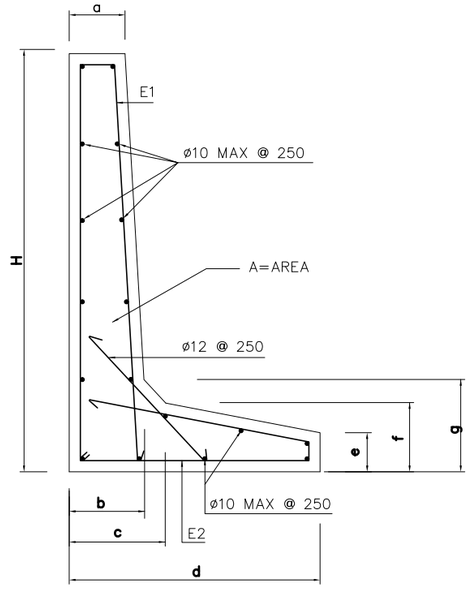
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

REINFORCED CONCRETE BOX CULVERT WINGWALL DETAILS, 1:2, 30° REINFORCEMENT

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr.Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr.Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr.Vandy VORASACK		DRW No. SDD – 032
							SCALE: NOT TO SCALE

RETAINING WALL

CONCRETE RETAINING WALL



RETAINING WALL DIMENSIONS

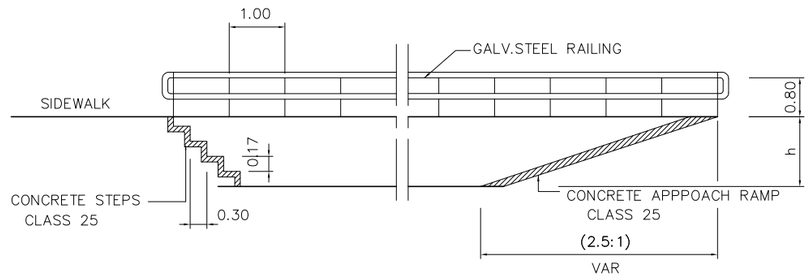
H	a	b	c	d	e	f	g	E1		E2		A $(m)^2$
								Dia.	@	Dia.	@	
500	150	150	200	400	100	150	200	12	250	12	250	0.109
700	200	200	250	500	100	150	250	12	250	12	250	0.181
900	200	200	250	600	100	150	250	12	250	12	250	0.234
1000	200	200	300	650	150	200	300	12	250	12	250	0.286
1200	200	200	300	750	150	200	300	12	250	12	250	0.344
1500	200	250	350	900	150	250	350	12	250	12	250	0.486
1800	200	250	350	1100	150	250	350	12	250	12	200	0.594
2000	200	300	400	1200	200	300	400	12	250	16	300	0.755
2500	200	300	400	1500	200	400	500	16	300	16	150	1.025

ALL MEASUREMENTS IN mm

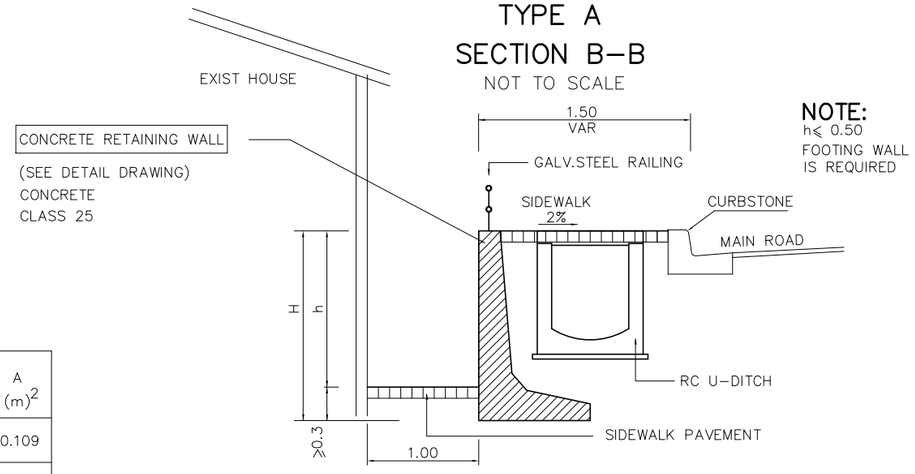
* NOTE TO TYPE A (SECTION B–B)

IN CASE OF ANY CONFLICT OF POSITION BETWEEN
DRAINAGE PIPE AND RETAINING WALL :
HORIZONTAL POSITION OF DRAINAGE PIPE HAS TO BE
SLIGHTLY SHIFTED TO THE SIDE OF MAIN ROAD
BETWEEN TWO MANHOLES
OR FOOT OF RETAINING WALL HAS TO BE INSTALLED DEEPER

TYPE A
SECTION A–A

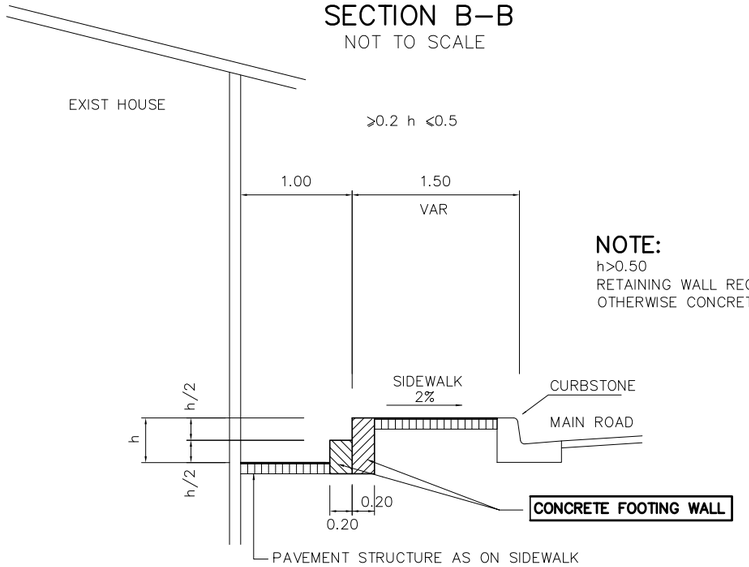


TYPE A
SECTION B–B
NOT TO SCALE



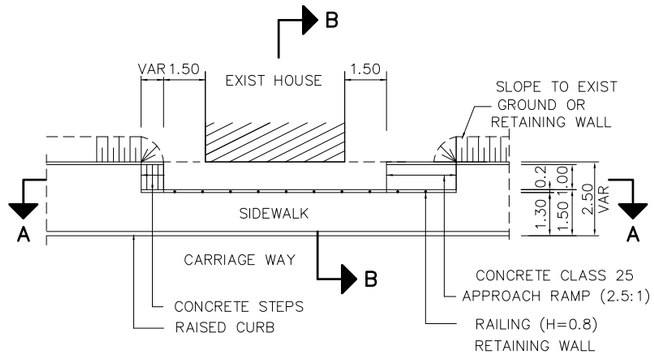
NOTE:
h≤ 0.50
FOOTING WALL
IS REQUIRED

TYPE B
SECTION B–B
NOT TO SCALE



NOTE:
h>0.50
RETAINING WALL REQUIRED
OTHERWISE CONCRETE FOOTING WALL–TYPE B

TYPE A
APPROACH TO FRONTAGE AREA
NOT TO SCALE



NOTE:
CONCRETE FOR
APPROACH RAMP
AND STEPS (CONCRETE CLASS 25)

TYPE B
APPROACH TO FRONTAGE AREA
NOT TO SCALE

NOTE: ALL MEASUREMENTS IN m UNLESS SHOWN OTHERWISE

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT
(SIKEUTH – PHONHONG)

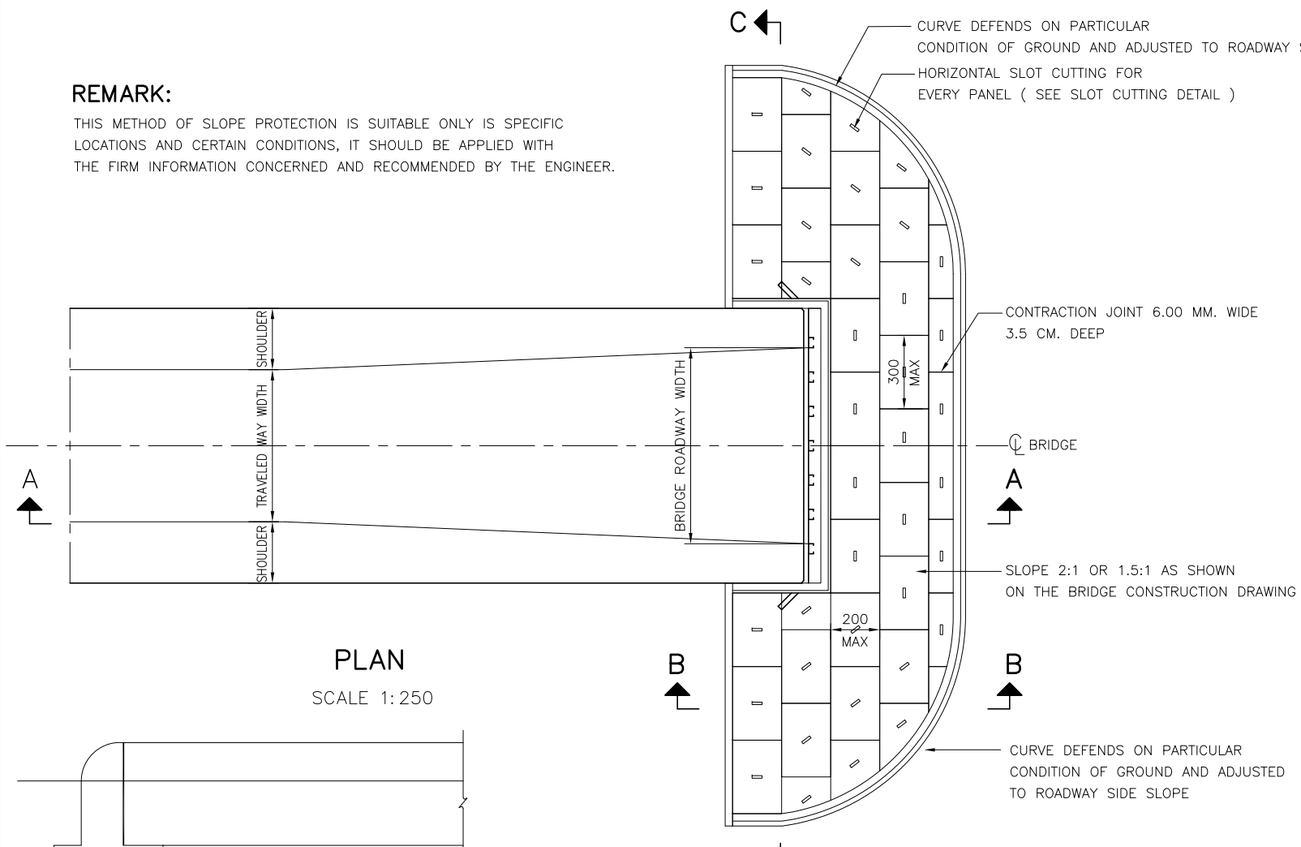
APPROACH TO
FRONTAGE AREA – TYPE A, B

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr. Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr. Khamphone SORPHABMIXAY		DRW No. RRW–001
				APPROVED	Mr. Vandy VORASACK		SCALE: AS SHOWN

PROTECTION WORK

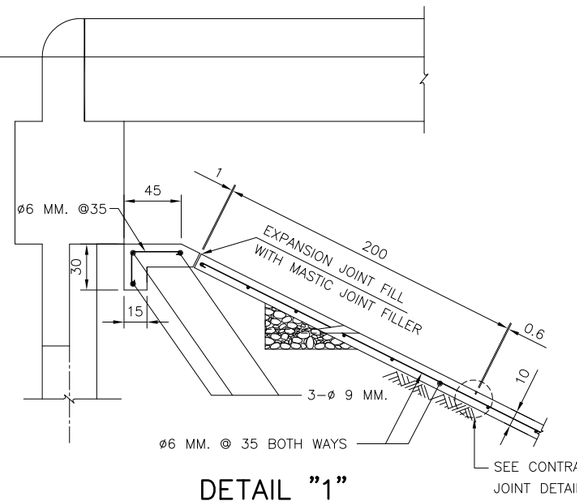
REMARK:

THIS METHOD OF SLOPE PROTECTION IS SUITABLE ONLY IS SPECIFIC LOCATIONS AND CERTAIN CONDITIONS, IT SHOULD BE APPLIED WITH THE FIRM INFORMATION CONCERNED AND RECOMMENDED BY THE ENGINEER.



PLAN

SCALE 1:250



DETAIL "1"

SCALE 1:40

DETAIL "2"

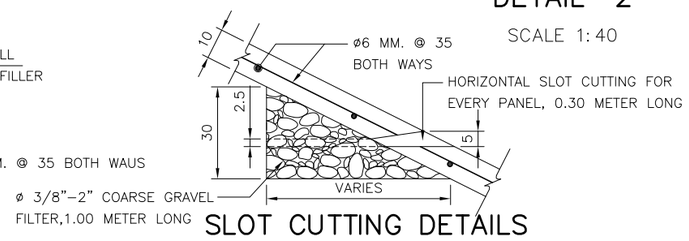
SCALE 1:40

CONTRACTION JOINT DETAILS

SCALE 1:5

DETAIL "3"

SCALE 1:40



SLOT CUTTING DETAILS

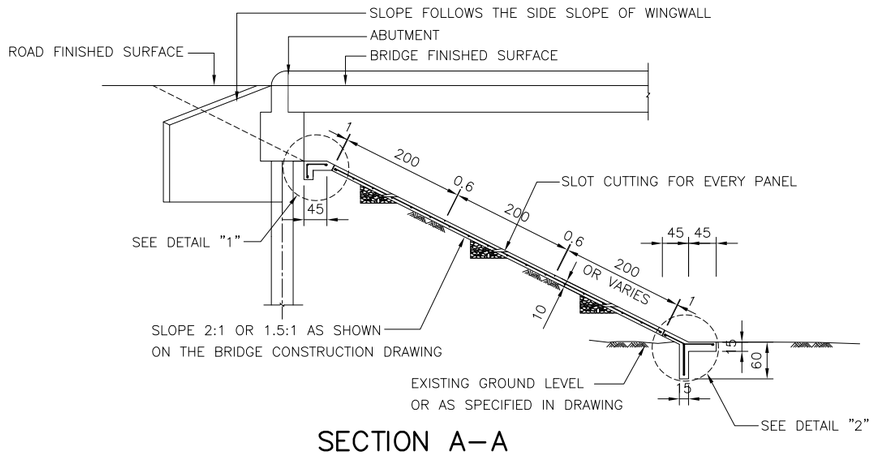
SCALE 1:20

NOTES:

1. ALL DIMENSIONS ARE IN CENTIMETER UNLESS OTHERWISE INDICATED.
2. BEFORE POURING THE CONCRETE SLAB, THE EXISTING SLOPE SHALL BE WELL PREPARED AND COMPACTED TO MEET THE SIDE SLOPES OF ROADBED.
3. WHERE EXISTING SOIL CONDITIONS ARE POOR OR WHERE ROADBED IS VERY HIGH, A DESIGN MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR, TO CONSTRUCTION
4. THE CONCRETE SLAB SHALL BE 10 CM. THICK
5. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATE MIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOWS:

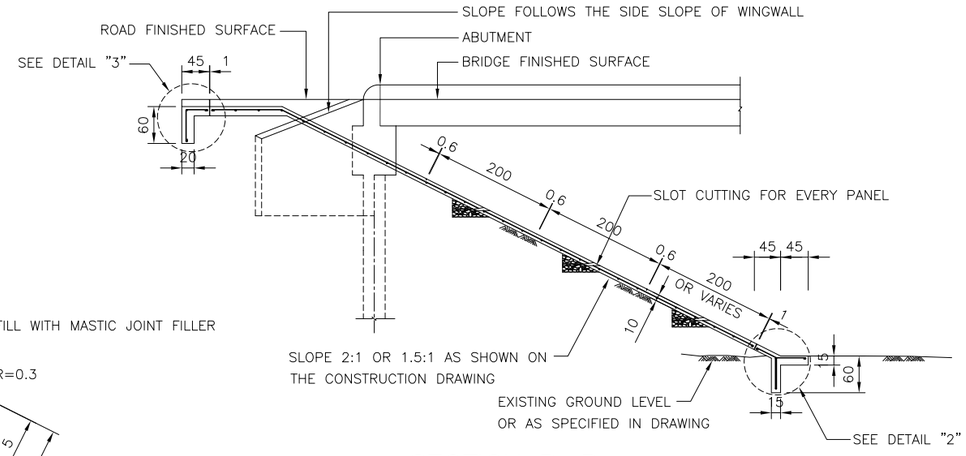
PORTLAND CEMENT TYPE 1	320 KG. (MIN.)
SAND	0.43 M^3.
CRUSHED ROCK OR GRAVEL	0.43 M^3.
CONCRETE SLUMP	10 CM. (MAX.)

6. REINFORCING STEEL SHALL CONFORM TO TIS.20 GRADE SR.24



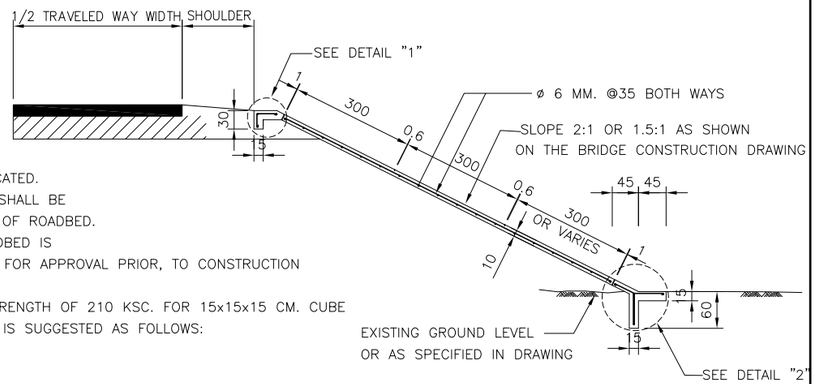
SECTION A–A

SCALE 1:100



SECTION B–B

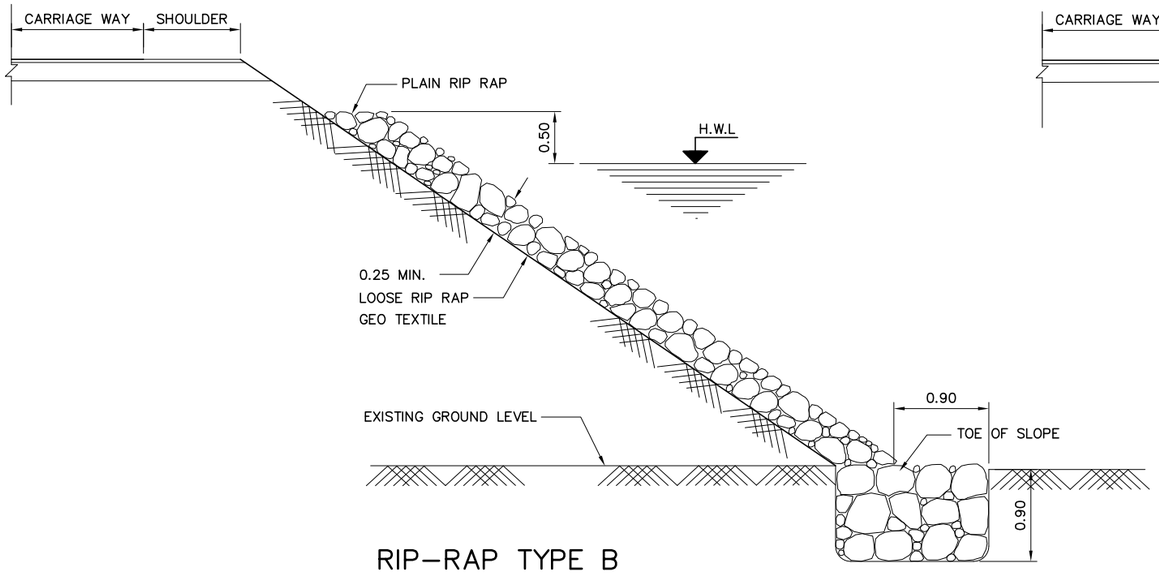
SCALE 1:100



SECTION C–C

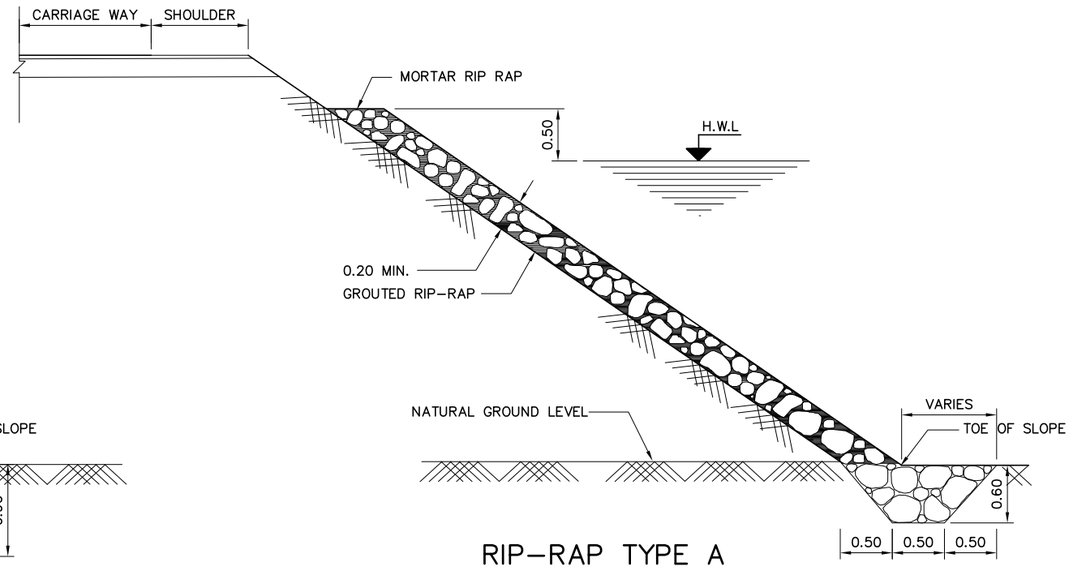
SCALE 1:100

ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ LAO TRANSPORT ENGINEERING CONSULTANT	NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)	REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
						DESIGNED	Mr. Souksavanh SYPHAKHAM		DATE: April, 2018
	CONCRETE SLOPE PROTECTION					CHECKED	Mr. Khamphone SORPHABMIXAY		DRW No. SDP–001
						APPROVED	Mr. Vandy VORASACK		SCALE: AS SHOWN



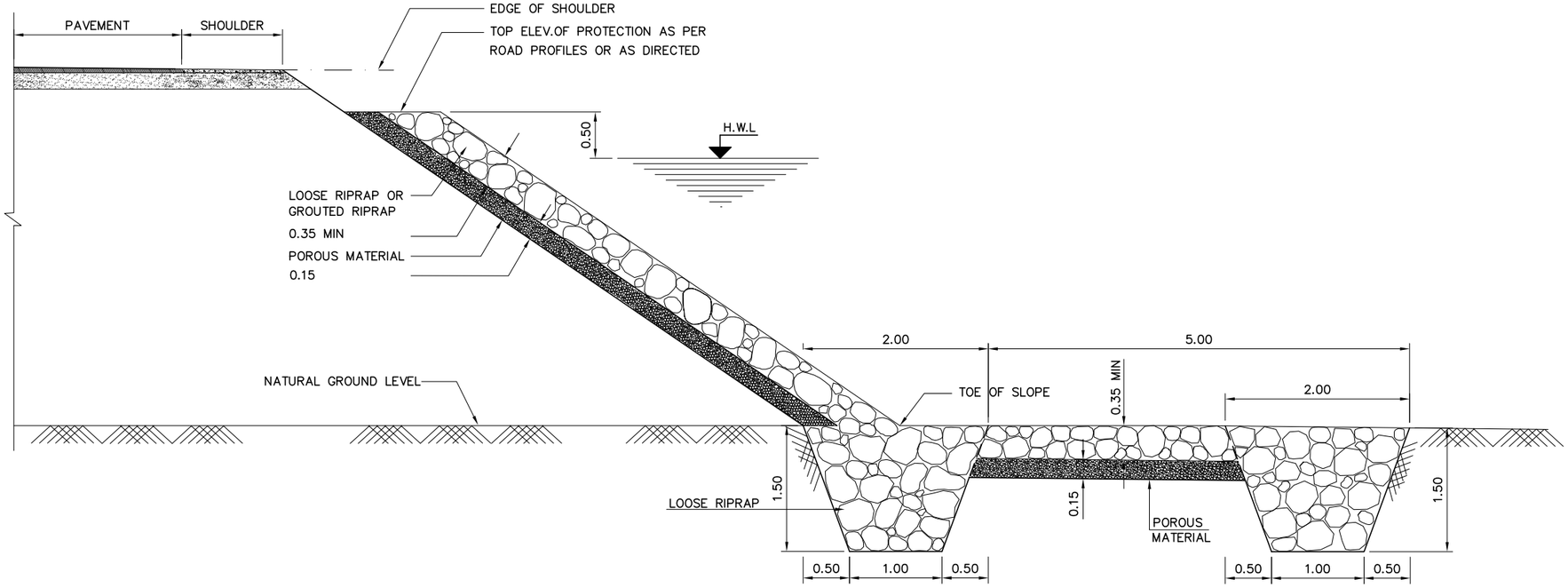
RIP–RAP TYPE B

NOT TO SCALE



RIP–RAP TYPE A

NOT TO SCALE



RIP–RAP TYPE C

NOT TO SCALE

NOTES:

1. ALL DIMENSIONS ARE IN METERS, EXCEPT IF OTHERWISE INDICATED.
2. FOR RIPRAP TYPE 'C' PROTECTION WHERE ROCK LEVEL IS LESS THAN 1.5m BELOW NATURAL GROUND LEVEL THE HORIZONTAL ROCKFILL MAT AND THE OUTER TRENCH SHALL BE ELIMINATED AND THE INNER TRENCH AT THE TOE OF EMBANKMENT SHALL BE EXTENDED TO THE ROCK FACE, UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER.
3. STONES USED FOR ALL RIPRAP PROTECTION SHALL BE HARD,DENSE, DURABLE, ANGULAR AND WITH ANY ONE DIMENSION NOT LESS THAN ONE THIRD THE LARGEST DIMENSION.
4. THE RIP RAP STONES SHALL MEET THE REQUIREMENTS OF GRADATION GIVEN BELOW:

4.1. RIP–RAP TYPE 'A'

MAX. STONE WEIGHT	=	40kg.
MIN. 50 PERCENT BY WEIGHT	≥	10kg.
MIN. 75 PERCENT BY WEIGHT	≥	2.0kg.
MIN. STONE WEIGHT	=	0.5kg.
MAX. DIMENSION	=	0.25m.

4.2. RIP–RAP TYPE 'B' AND 'C'

MAX. STONE WEIGHT	=	80kg.
MIN.50 PERCENT BY WEIGHT	≥	20kg.
MIN.75 PERCENT BY WEIGHT	≥	5kg.
MIN. STONE WEIGHT	=	1kg.
MAX. DIMENSION	=	0.30m.

4.3. RIP RAP AT MEDIUM HIGH WATER VELOCITIES

MAX. STONE WEIGHT	=	200kg.
MIN. 50 PERCENT BY WEIGHT	≥	40kg.
MIN. STONE WEIGHT	=	20kg

4.4. RIP RAP AT HIGH WATER VELOCITIES WEIGHT AND DIMENSIONS SHALL BE DETERMINED BASED ON RELATIONSHIP OF WATER VELOCITY AND REQUIRED WEIGHTS AND DIMINSIONS.

5. THE THICKNESS OF THE RIPRAP LAYER OF ISEM ACCORDINGLY 4,3 AND 4,4 SHALL RE ADJUSTED.
6. GEOTEXTILE SHALL HAVE & WEIGHT OF MIN 200g/㎡, IF NOT OTHERWISE INDICATED CONFORM TO AASHTO M288; LLASSA,ANDA.

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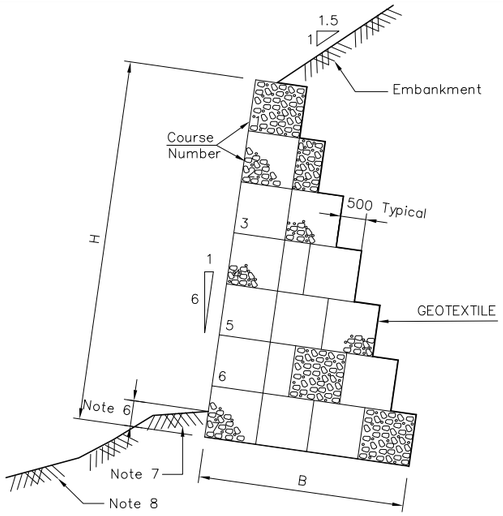
LAO TRANSPORT ENGINEERING CONSULTANT

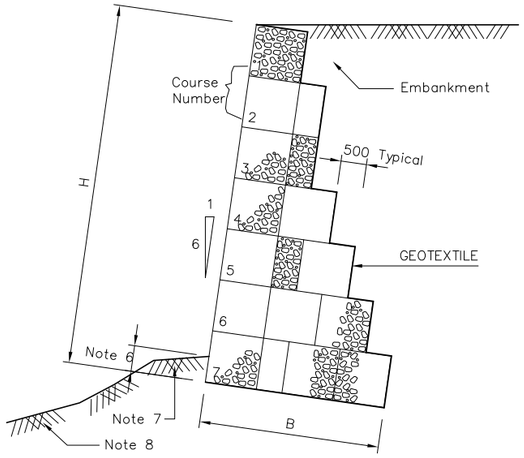
NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

EMBANKMENT SLOPE PROTECTION LOOSE AND GROUTED RIP RAP

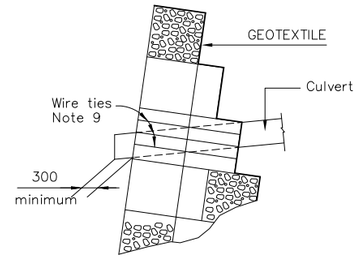
REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr. Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr. Khamphone SORPHABMIXAY		DRW No. SDP–002
				APPROVED	Mr. Vandy VORASACK		SCALE: AS SHOWN



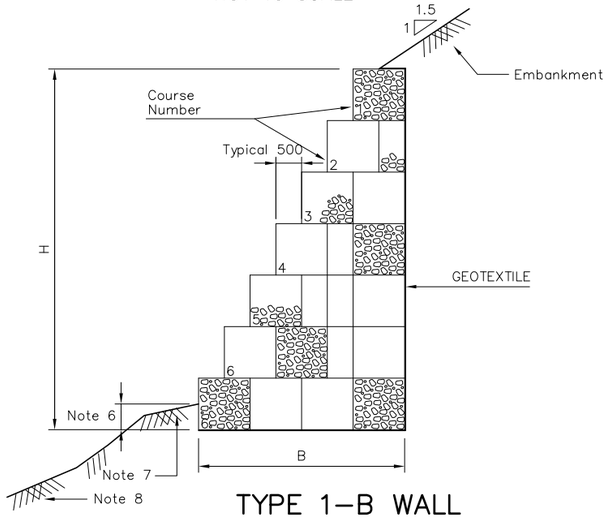
TYPE 1–A WALL
FRONT FACE ON 1:6 BATTER
NOT TO SCALE



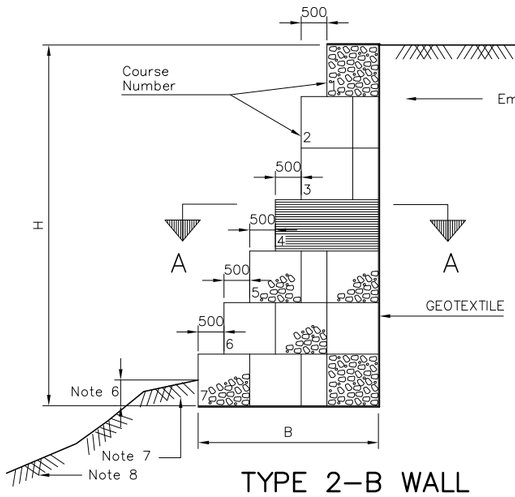
TYPE 2–A WALL
FRONT FACE ON 1:6 BATTER
NOT TO SCALE



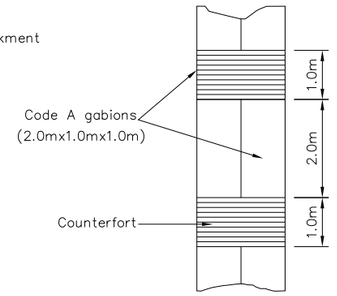
TYPICAL CULVERT INSTALLATION
THROUGH GABION WALL
NOT TO SCALE



TYPE 1–B WALL
FRONT FACE STEPPED
NOT TO SCALE



TYPE 2–B WALL
FRONT FACE STEPPED
NOT TO SCALE



SECTION A–A
NOT TO SCALE

TYPE 1 WALL

Number of Course	H (m)	8 (m)		VOLUME–m^3Per m in length	
		1–A Wall	1–B Wall	1–A Wall	1–B Wall
1	1.0	1.0	1.0	1.0	1.0
2	2.0	1.5	1.5	1.5	1.5
3	3.0	2.0	2.0	4.5	4.5
4	4.0	2.5	2.5	7.0	7.0
5	5.0	3.0	3.0	10.0	10.0
6	6.0	3.5	3.5	13.5	13.5
7	7.0	4.0	4.0	17.5	17.5

GABION WALL SURCHARGED

TYPE 2 WALL

Number of Course	H (m)	8 (m)		VOLUME–m^3Per m in length	
		2–A Wall	2–B Wall	2–A Wall	2–B Wall
1	1.0	1.0	1.0	1.0	1.0
2	2.0	1.5	1.5	2.5	2.5
3	3.0	1.5	1.5	4.0	4.0
4	4.0	2.0	2.0	6.0	6.0
5	5.0	2.5	2.5	8.5	8.5
6	6.0	3.0	3.0	11.5	11.5
7	7.0	3.5	3.5	15.0	15.0

GABION WALL UNSURCHARGED

GENERAL:

THE DESCRIPTIONS AND REQUIREMENTS APPEARING IN ANY PART OF THE TECHNICAL SPECIFICATIONS SHALL APPLY EQUALLY TO THIS DRAWING,WHERE APPROPRIATE AND SHALL BE READ AS THOUGH REPEATED ON THIS DRAWING.

NOTES:

1. GABION WALLS SHALL BE CONSTRUCTED TO THE LINES AND GRADES AS STAKED OR DIRECTED BY THE ENGINEER.
2. INTERMEDIATE WALL HEIGHTS SHALL BE OBTAINED BY USING 0.5m OR 0.3m DEEP GABIONS IN ONE OF THE COURSES
3. GABIONS SHALL BE PLACED SO THE VERTICAL JOINTS BETWEEN BASKETS ARE STAGGERED ON ALTERNATE COURSES UNLESS OTHERWISE APPROVED BY THE ENGINEER.
4. THE HORIZONTAL JOINTS BETWEEN GABION COURSES SHALL NOT BE STAGGERED UNLESS AUTHORIZED BY THE ENGINEER.
5. USE COUNTERFORTS AT 3.0m CENTER TO CENTER IN COURSES 4 WHEN WALL IS FIVE OR MORE COURSES HIGH–TYPE 2–8 WALL ONLY (SEE SECTION A–A).
6. GABIONS SHALL BE FOUNDED ON FIRM, STABLE GROUND AT LEAST 0.5.0m BELOW ORIGINAL NATURAL GROUND (NOT FILLED MATERIAL).
7. AT PLACES WHERE FOUNDATION OF GABION WALL IS BELOW THE HIGH WATER LEVEL THE GABIONS SHALL BE FOUNDED AT LEAST 1.00m BELOW ORIGINAL NATURAL GROUND, OR DEEPER AS REQUIRED
8. AT PLACES WHERE GABION WALL IS SUBJECT TO SCOUR, THE TOE OF THE WALL SHALL BE PROTECTED BY GABION MATTRESSES AS FOR EMBANKMENT SLOPE PROTECTION.
9. AT CULVERTS CUT WIRE BASKET MESH FRONT AND BACK TO OUTSIDE DIMENSIONS OF CULVERT, LACE MESH WITH SELVEDGE WIRE AROUND CULVERT AND CORRECT FRONT AND BACK MESH WITH SUFFICIENT WIRE TIES TO PREVENT WALL BULGING.
10. BELOW THE CULVERT OUTLET EROSION PROTECTION SHALL BE CONSTRUCTED ACCORDING TO REQUIREMENTS.
11. SPECIAL CONSIDERATIONS REGARDING FOUNDATION OF THE GABION WALL SHALL BE MADE WHEN NATURAL GROUND IS STEEPER THAN 1:1.5 (V:H).
12. THE CONTRACTOR SHALL PREPARE DETAILED CONSTRUCTION DRAWINGS FOR EACH LOCATION OF GABION BOX WALL.
13. THE DESIGN SHALL BE REVIEWED AND APPROVED BY THE ENGINEER BEFORE CONSTRUCTING THE GABION WALL.

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LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

SPECIAL PROVISION OF GABIONS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr. Souksavanh SYPHAKHAM	
				CHECKED	Mr. Khamphone SORPHABMIXAY	
				APPROVED	Mr. Vandy VORASACK	

LTEC CODE: SD–262–17
DATE: April, 2018
DRW No. SDP–003
SCALE: NOT TO SCALE

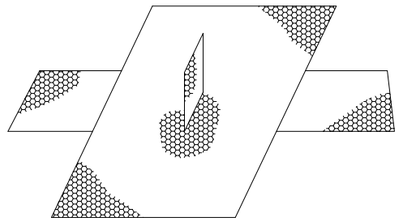

FIGURE 1.

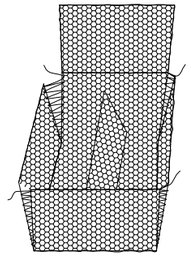

FIGURE 2.

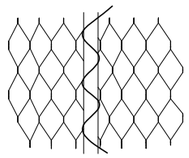

FIGURE 3.

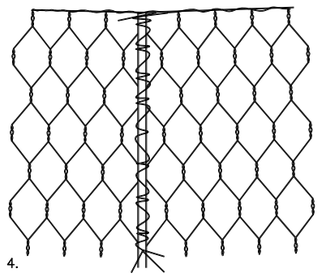

FIGURE 4.

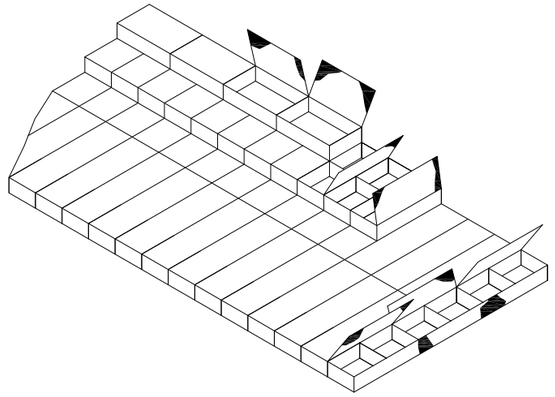

FIGURE 5.

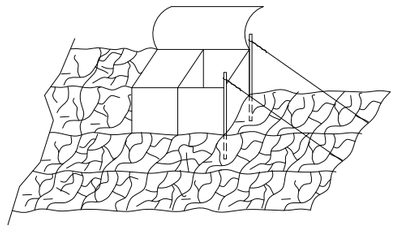

FIGURE 6.

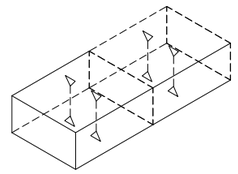

FIGURE 9.

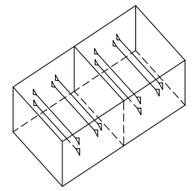

FIGURE 7.

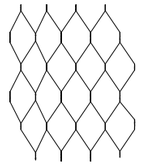

FIGURE 8.

GENERAL NOTES:

1. THE SPECIFICATION COVERS CONSTRUCTION IN BOTH GALVANIZED AND P V C. COATED GABIONS.
2. CLAUSE 6 SHOULD ONLY BE INCLUDED WHERE THE GABION MUST BE CUT AND FOLDED TO FORM MITRE JOINTS, ANGLES, CURVES OR SLOPES IN THE STRUCTURES WHICH ARE NOT POSSIBLE TO OBTAIN WITH THE STANDARD RECTANGULAR GABIONS.

1. ASSEMBLY

PRIOR TO ASSEMBLY, THE GABION MATERIAL SHALL BE OPENED OUT FLAT ON THE GROUND AND STRETCHED TO REMOVE ALL KINKS AND BENDS. (FIGURE. 1)

THE GABION BOXES SHALL THEN BE ASSEMBLED INDIVIDUALLY, BY RAISING THE SIDE, ENDS AND DIAPHRAGMS, ENSURING THAT ALL CREASES ARE IN THE CORRECT POSITION AND THAT THE TOPS OF ALL FOUR SIDE ARE EVEN.

THE FOUR CORNERS OF THE GABION BOXES SHALL BE LACED FIRST, FOLLOWED BY THE EDGES OF INTERNAL DIAPHRAGMS TO THE SIDES (FIGURE. 2)

IN ALL CASES, LACING SHALL COMMENCE AT THE TOP OF THE BOX BY TWISTING THE END OF THE LACING WIRE AROUND THE SELVEDGE. IT SHALL THEN BE PASSED ROUND THE TWO EDGES BEING JOINED, THROUGH EACH MESH IN TURN, AND SECURELY TIED OFF AT THE BOTTOM. THE ENDS OF ALL LACING WIRES SHALL BE TURNED TO THE INSIDE OF BOX ON COMPLETION OF EACH LACING OPERATION. (FIGURE. 3 & FIGURE. 4)

2. ERECTION

ONLY ASSEMBLED BOXES, OR GROUPS OF BOXES, SHALL BE POSITIONED IN THE STRUCTURE THE SIDE, OR END, FROM WHICH WORK IS TO PROCEED, SHALL BE SECURED EITHER TO COMPLETED WORK, OR BY RODS OR STAKES DRIVEN INTO THE GROUND AT THE CORNERS. THESE MUST BE SECURED AND REACH AT LEAST TO THE OF THE GABION BOX.

FURTHER GABION BOXES SHALL THEN BE POSITIONED IN THE STRUCTURE AS REQUIRED, EACH THE SIDE, OR END, FROM WHICH WORK IS TO PROCEED, SHALL BE SECURED EITHER TO COMPLETED BEING SRCURELY LACED TO THE PRECEEDING ONE AT ALL CORNERS AND DIAPHRAGM POINTS. (FIGURE. 5)

3. STRETCHING

FINAL STRETCHING OF THE GABION BOXES SHALL BE CARRIED OUT USING A WIRE STRAINER OR WINCH OF AT LEAST ONE TON CAPACITY, FIRMLY SECURED TO THE FREE END OF THE ASSEMBLED GABION BOXES. (FIGURE. 6)

WHILST UNDER TENSION THE GABION BOXES SHALL BE SECURELY LACED ALONG ALL EDGES. (TOP, BOTTOM AND SIDES) AND AT DIAPHRAGM POINTS, TO ALL ADJACENT BOXES.

4. FILLING

FILLING SHALL BE CARRIED OUT ONLY WHILST GABION BOXES ARE UNDER TENSION.

FILLING MATERIAL SHALL NOT BE LESS THAN 100 mm. OR LARGER THAN 250 mm. AND SHALL BE SO PLACED TO PRODUCE A NEAT FACE AND LINE, WITH A MINMUM OF VOIDS.

WHERE SUITABLE FILLING MATERIAL CANNOT BE OBTAINED, THE ENGINEER MAY APPROVE A PERCENTAGE OF SMALLER FILLING MATERIAL IN WHICH CASE LARGE MATERIAL SHALL BE PLACED ON OUTER EXPOSED FACES, AND SMALLER MATERIAL ON THE INSIDE AS A " CORE ".

ONLY MECHANICAL EQUIPMENT APPROVED BY THE ENGINEER MAY BE USED FOR FILLING OPERATIONS.

INTERNAL HORIZONTAL BRACING WIRE (USE BING WIRE) SHALL BE PROVIDED AT 330 mm. VERTICAL CENTERS IN 1 m . DEEP UNITS, AT A RATIO OF 4 TO 1 C U. M. (FIGURE. 7) THESE BRACING WIRES SHALL BE WRAPPED ROUND TWO MESH WIRES (FIGURE. 8) AND EXTENDED FROM FRONT TO BOCK, SO POSITIONED TO ENSURE A NEAT AND LINE, FREE OF EXCESSIVE BULGES AND DEPRESSIONS ON COMPLETION TO THE SATISFACTION OF THE ENGINEER. GABION BOXES SHALL BE FILLED IN STAGES AND HORIZONTAL BRACING WIRES INSERTED AS FILLING IS BROUGHT UP.

SIMILAR BRACING WIRES, USED VERTICALLY (FIGURE. 9) MAY BE REQUIRED IN 0.5 m. DEEP GABIONS, AT SPACINGS SPECIFIED BY THE ENGINNEER, WHERE SUCH UNITS ARE USED IMMEDIATELY DOWN – STREAM OF WIRES OR IN OTHER CASES WHERE WATER FALLS DIRECTLY ON TO THE GABIONS OR WHERE A NEAT FACE IS REQUIRED.

TENSION ON THE GABION BOXES SHALL BE RELEASED ONLY WHEN SUFFICIENTLY FULL TO PREVENT THE MESH FORM SLACKENING.

GABION BOXES SHALL BE OVERFILLED BY 20 TO 50 mm. ABOVE THEIR TOPS TO ALLOW FOR SUBSEQUENT SETTLEMENT. 100 mm. FILLING MATERIAL MAY BE USED FOR THIS PURPOSE.

5. FINAL WIRING

CLOSING AND WIRING DOWN OF LIDS SHALL PROCEED AS SOON AS PRACTICABLE AFTER FILLING OPERATIONS, AND CERTAINLY IN THE LIKELIHOOD OF STORMS OR FLOODS DURING CONSTRUCTION

LIDS SHALL BE STRETCHED TIGHT OVER THE FILLING WITH BARS AND WIRED DOWN SECURELY THROUGH EACH MESH ALONG ALL EDGES, ENDS AND DIAPHRAGMS. THE ENDS OF ALL TYING AND BRACING WIRES SHALL BE TURNED INTO THE GABION BOX ON COMPLETION OF ALL LACING OPERATIONS TIGHTNESS OF MESH, WELL PACKED FILLING AND SECURE LACING IS ESSENTIAL IN ALL STRUCTURES.

6. CUTTING AND FOLDING MESH

WHERE SHOWN ON THE DRAWING OR OTHERWISE DIRECTED BY THE ENGINEER, THE GABION MESH SHALL BE CUT, FOLDED AND WIRED TOGETHER TO FROM MITER JOINTS, ANGLES, CURVES OR SLOPES WHICH ARE NOT POSSIBLE TO OBTAIN IN THE STRUCTURES WITH THE STANDARD RECTANGULAR GABIONS. THE MESH MUST BE CLEANLY CUT, AND THE SURPLUS MEAH CUT COMPLETELY OUT, OR FOLDED BACK OR ON TO, AND NEATLY WIRED TO AN ADJACENT GABION FACE. THE CUT EDGES OF THE MESH SHALL BE SECURELY LACED TOGETHER WITH BINDING WIRE IN THE MANNER SPECIFIED UNDER ASSEMBLY ABOVE.

THE ASSEMBLY, ERECTION, STRETCHING, FILLING AND FINAL WIRING OF THE RE – SHAPED GABIONS SPECIFIED UNDER ASSEMBLY ABOVE.

7. SPECAL FINISH

WHERE SPECIFIED BY THE ENGINEER THE OUTER FACE OF THE GABIONS SHALL BE CAREFULLY PACKED OUT BY HAND WITH SELECTED (IGNEOUS OR LIMESTONE, ETC.) STONE OF A SIZE 100 mm. TO 250 mm.

REMARK :

THIS METHOD OF SLOPE PROTECTION IS SUITABLE ONLY IN SPECIFIC LOCATIONS AND CERTAIN CONDITIONS, IT SHOULD BE APPLIED WITH THE FIRM INFORMATIONS CONCERNED AND RECOMMENDED BY THE ENGINEER.

ລ.ວ.ທ LTEC

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LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

SACKED – CONCRETE SLOPE PROTECTION

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr. Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr. Khamphone SORPHABMIXAY		DRW No. SDP–004
				APPROVED	Mr. Vandy VORASACK		SCALE: NOT TO SCALE

SPECIAL PROVISION:

1. GABIONS SHALL BE AS SPECIFIED IN THE " SPECIFICATION OF GABIONS", AND BE OF THE SIZES STATED IN THE BILL OF QUANTITIES.
2. ASSEMBLY AND ERECTION OF GABIONS SHALL BE AS SPECIFIED IN THE " SPECIFICATION FOR GABIONS CONSTRUCTION ".
3. FILLING MATERIALS SHALL BE AS SPECIFIED IN TECHNICAL SPECIFICATION AND BE OF TYPES A OR B AS SPECIFIED IN THE " TABLE OF FILLING MATERIALS " WHERE THE SPECIFIED FILLING MATERIALS CAN NOT BE OBTAINED, FILLING MATERIALS OF TYPES C, D OR E MAY BE USED BY THE APPROVAL OF THE ENGINEER OF DESIGN.
4. PERVIOUS BACKFILL:
   TYPES OF PERVIOUS BACKFILL MATERIALS SHALL BE COARSE-GRAINED SOILS OR GRANULAR MATERIALS I.E. CLEAN SAND, GRAVEL OR CRUSHAED ROCK, SHALL BE HARD DURABLE AND CLEAN AND SHALL BE FREE FROM ORGANIC MATERIALS, CLAY BALLS AND OTHER DELETERIOUS SUBSTANCE. LATERITE OR CONCRETIONARY MATERIAL SHALL NOT BE USED.
   SAND USED FOR PERVIOUS BACKFILL MATERIAL SHALL CONFORM TO THE FOLLOWING GRADING REQUIREMENTS.

SIEVE DESIGNATION	PERCENTAGE BY WEIGHT PASSING
3/8"	100
No. 4	95-100
No. 16	45-80
No. 50	10-30
No. 100	2-10

GRAVEL AND CRUSHED ROCK SHALL CONFORM TO ONE OF THE FOLLOWING GRADING REQUIREMENTS.

	PERCENTAGE BY WEIGHT PASSING			
SIEVE DESIGNATION	TYPE B	TYPE C	TYPE D	TYPE E
3/8"	100	-	-	-
1 1/2"	70-100	100	_	
1"	55-85	75-100	100	-
3/4"	50-80	60-90	70-100	100
3/8"	40-70	45-75	58-75	-
No. 4	30-60	30-60	35-65	45-80
No. 10	20-50	20-50	25-50	30-60
No. 40	10-30	10-30	15-30	20-30
No. 200	0-2	0-2	0-2	0-2

REMARK:

THIS METHOD OF SLOPE PROTECTION IS SUITABLE ONLY IN SPECIFIC LOCATIONS AND CERTAIN CONDITIONS, IT SHOULD BE APPLIED WITH THE FIRM INFORMATIONS CONCERNED AND RECOMMENDED BY THE ENGINEER.

5. BACKFILLL COMPACTION
   a) BACKFILL MATERIALS SHALL BE PLACED IN THIN LAYERS AS SPECIFIED IN THE TECHNICAL SPECIFICATION EACH. EACH LAYER SHALL BE COMPACTED BEFORE THE NEXT ONE IS PLACED.
   b) BACKFILL MATERIALS SHALL BE COMPACTED BY HAND-OPERATED OR OTHER LIGHTWEIGHT COMPACTORS. CARE MUST BE MADE NOT TO OVERCOMPACT THE BACKFILL SINCE OVERCOMPACTION WILL CAUSE EXCESSIVE EARTH PRESSURE.
6. THE ENGINEER OF DESIGN SHALL MAKE ANY VARIATION OF THE FORM QUALITY OR QUANTITY OF THE WORKS OR ANY PART THERE OF THAT MAY BE NECESSARY.
7. NO VARIATION OR AMENDMENT SHALL BE MADE WITHOUT THE APPROVAL OF THE ENGINEER OF DESIGN.

BILL OF QUANTITIES

ITEM	DESCRIPTION		UNIT	QUANTITIES						
	TYPES	SIZES		APRON LAYER	1st LAYER	2nd LAYER	3rd LAYER	4th LAYER	5th LAYER	TOTAL
1.	GABIONS GALVANIZED 80 x	4x1x0.5M	No.	292	-	-	-	-	-	292
2.	100 M.MESH, 2.7 MM. WIRE	2x1x0.5M	No.	4	-	-	-	-	-	4
3.	CORE WITH NECESSARY BINDING WIRE	1.5x1x0.5M	No.	36	-	-	-	-	-	36
1.	GABIONS GALVANIZED 100 x	4x1x1M	No.	-	152	70	105	36	68	431
2.	120 M.MESH, 2.7 MM. WIRE	3x1x1M	No.	-	-	6	8	-	-	14
3.	CORE WITH NECESSARY	2x1x1M	No.	-	-	1	-	1	8	10
4.	BINDING WIRE	1.5x1x1M	No.	-	-	150	-	146	-	296
8.	ASSEMBLE, PLACE IN POSITION AND PACK WITH FILLING MATERIALS IN ITEM 1 TO 7 INCLUDING FOR TYING DOWN LIDS AFTER FILLING		CU.M.							2,645
9.	PERVIOUS BACKFILL MATERIALS PLACE IN POSITION AND COMPACT		CU.M.							1,800
10.	EMBANKMENT MATERIALS		CU.M.							APPROX. 3,700

TABLE OF FILLING MATERIALS

TYPE	FILLING MATERIAL	WEIGHT OF MATERIAL (KG./CU.M.)
A	BASALT	1,650
	GRANITE	1,600
B	SHINGLE & SLAG	1,500
	LIME STONE	1,440
C	SAND STONE	1,390
	BROKEN CONCRETE	1,340
D	BRICK	1,240
E	ORTHERS AS APPROVAL OF THE LOCATION AND AS DIRECTED BY THE ENGINEER	

REMARKS: THIS TABLE OF DIFFERENT FILLING MATERIALS INCLUDES ALLOWANCE FOR 40% VOIDS

ລ.ວ.ທ LTEC
ລັດວິສາຫະກິດ ວິສະວະກຳ ຄົມມະນາຄົມ
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH - PHONHONG)

SPECIAL PROVISION OF GABIONS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE
				DESIGNED	Mr. Souksavanh SYPHAKHAM	
				CHECKED	Mr. Khamphone SORPHABMIXAY	
				APPROVED	Mr. Vandy VORASACK	

LTEC CODE: SD-262-17
DATE: April, 2018
DRW No. SDP-005
SCALE: NOT TO SCALE

TABLE OF WEIGHTS AND MEASUREMENTS

GALVANIZED BOX GABIONS WITH DIAPHRACMS
MESH TYPE 100 x 120 MM. GALVANIZED TO SPECIFICATION

DIMENSIONS (M)			DIAPHRAGMS	APPROXIMATE WEIGHT (KG)	
LENGTH	WIDTH	HEIGHT		WIRE ø2.7MM	WIRE ø30MM
1.5	1	0.5	–	8.600	8.800
2	1	0.5	1	10.800	12.800
3	1	0.5	2	14.400	18.000
4	1	0.5	3	19.000	23.200
1.5	1	1	–	11.800	12.800
2	1	1	1	15.200	17.000
3	1	1	2	20.400	24.000
4	1	1	3	27.000	31.500

THE WEIGHT INDICATED IN THE TABLE DO NOT INCLUDE BINDING AND CONNECTING WIRE, AND ARE SUBJECT TO THE USUAL TOLERANCES.

PVC. COATED BOX GABIONS
MESH TYPE 100 x 120 MM. GALVANIZED TO SPECIFICATION

DIMENSIONS (M)			DIAPHRAGMS	APPROXIMATE WEIGHT (KG)
LENGTH	WIDTH	HEIGHT		
1.5	1	0.5	–	8.800
2	1	0.5	1	12.800
3	1	0.5	2	18.000
4	1	0.5	3	23.200
1.5	1	1	–	12.800
2	1	1	1	17.000
3	1	1	2	24.000
4	1	1	3	31.500

THE WEIGHT INDICATED IN THE TABLE DO NOT INCLUDE BINDING AND CONNECTING WIRE, AND ARE SUBJECT TO THE USUAL TOLERANCES.

MESH TYPE 80 x 100 MM. GALVANIZED TO SPECIFICATION

DIMENSIONS (M)			DIAPHRAGMS	APPROXIMATE WEIGHT (KG)	
LENGTH	WIDTH	HEIGHT		WIRE ø2.7MM	WIRE ø30MM
1.5	1	0.3	–	8.600	10.500
2	1	0.3	1	10.100	12.500
3	1	0.3	2	14.600	17.800
4	1	0.3	3	18.800	23.100
1.5	1	0.5	–	9.200	11.500
2	1	0.5	1	12.600	15.400
3	1	0.5	2	18.000	21.800
4	1	0.5	3	23.200	28.200
1.5	1	1	–	12.800	16.000
2	1	1	1	17.300	21.300
3	1	1	2	24.700	30.000
4	1	1	3	32.000	39.000

MESH TYPE 80 x 100 MM. GALVANIZED TO SPECIFICATION

DIMENSIONS (M)			DIAPHRAGMS	APPROXIMATE WEIGHT (KG)
LENGTH	WIDTH	HEIGHT		
1.5	1	0.3	–	9.100
2	1	0.3	1	11.500
3	1	0.3	2	16.700
4	1	0.3	3	21.700
1.5	1	0.5	–	10.800
2	1	0.5	1	14.500
3	1	0.5	2	21.000
4	1	0.5	3	27.000
1.5	1	1	–	15.400
2	1	1	1	20.000
3	1	1	2	28.800
4	1	1	3	37.200

1. GENERAL

GABIONS SHALL CONSIST OF WOVEN STEEL WIRE MESH BOXES OF APPROVED MODULE AS SPECIFIED IN THE CIRCULAR OF THE SENIOR COUNCIL OF THE ITALIAN LL.PP.NO. 2078 OF THE 27.8 1962 OR BY FEDERAL SPECIFICATION QQ–W–461 g INTHE UNITED STATES OR AMERICA, OR BY THE BRITISH STANDRAD INSTITUTION 443–1961 AND OR SIMILAR APPROVED, AND BE OF THE SIZE STATED IN THE " TABLES OF WEIGHTS AND MEASUREMENTS " PARTICULAR CAR SHALL BE EXERCISED THROUGHOUT CONSTRUCTION TO ENSUE TIGHTNESS OF MESH, WELL PAKED FILLING WITH MINIMUM OF VOIDS, AND SECURE LACING. THE EXPOSED FACES OF COMPLETED WORK SHALL PRESENT A NEAT FACE AND LINE, FREE OF EXCESSIVE BULGES OR DEPRESSIONS.

2. GABION FABRIC

(a) MESH : MESH OPENINGS SHALL BE HEXAGONAL IN SHAPE, THE MINIMUM DIMENSION OF WHICH SHALL NOT EXCEED 105 MM. IN THE CASE OF 100 X 120 MM MESH, AND NOT EXCEED 83 MM. IN THE CASE OF 80 X 100 MM MESH.
(b) MESH JOINT : ALL JOINTS SHALL BE FLEXIBLE AND CONSIST OF NO LESS THAN ONE AND ONE HALF FULL TURNS.
(c) GALVANZING : A;; WIRE. USE SHALL BE GALVANIZED TO BSS 443/1969 OR EQUIVALENT, PRIOR TO WEAVING OF THE MESH.

GALVANIZED GABIONS

(d) MESH WIRE : THE DIAMETER OF THE MESH WIRE SHALL BE THAT STATED IN THE RELEVANT ITEM IN THE BILL OF QUANTITIES (– 25 %)
(e) BOMDOMG WORE : THE DIAMETER OF THE WIRE USED FOR BINDING AND LACING SHALL BE 2.2 MM. (2.5%).
(f) SELVEDGE WIRE : SELVEDGE WIRE 3.4 MM. DIAMETER WHERE THE MESH WIRE DIAMETER IS 2.7 MM. AND 3.9 DIAMETER WHERE THE MESH WIRE DIAMETER IS 3.00MM. SHALL BE INCORPORATED ALONG THE EDGES OF THE WIRE MESH.

PVC. COATED GABIONS

(g) PVC. COATING : WHERE STATED IN THE BILL OF QUANTITIES OR WHER SPECIFIED BY THE ENGINEER, ALL WIRE SHALL BE ADDITIONALLY COATED WITH A MINIMUM 0.55 MM. THICNESS OF BLACK PVC. WHICH SHALL BE CAPABLE OF RESISTING DELETERIOUS EFFECTS OF IMMERSION IN SALT WATER, EXPRSURE EXPOSURE TO ULTRA VIOLET LIGHT AND ABRASION TO THE SATISFACTION OF THE ENGINEER, AND RETAIN THESE CHARACTERISICS AFTER A PERIOD OF NOT LESS THAN 3,000 HOURS UNDER TEST IN ACCORDANCE WITH ASTM. E 42 – 65.
(h) MESH WIRE : THE DIAMETER OF THE MESH WIRE CORE SHALL BE THAT STATED IN THE BILL OF QUANTITIES.
(i) MESH WIRE : THE DIAMETER OF THE CORE OF THE PVC. COATED WIRE USED OF BINDING AND VACING SHALL BE 2.2 MM.
(j) SELVEDGE WIRE : SELVEDGE WIRE WHOSE CORE DIAMTER IS 3.4 MM. SHALL BE INCORPORATED ALONG THE EDGES OF THE WIRE MESH EXCEPT IN THE CASE OF THE 80 X 100 MM. MESH IN 2.2 MM. WIRE CORE, WHERE IT SHALL BE 2.7 MM.

REMARK:

THIS METHOD OF SLOPE PROTECTION IS SUITABLE ONLY IN SPECIFIC LOCATIONS AND CERTAIN CONDITIONS, IT SHOULD BE APPLIED WITH THE FIRM INFORMATIONS CONCERNED AND RECOMMENDED BY THE ENGINEER.

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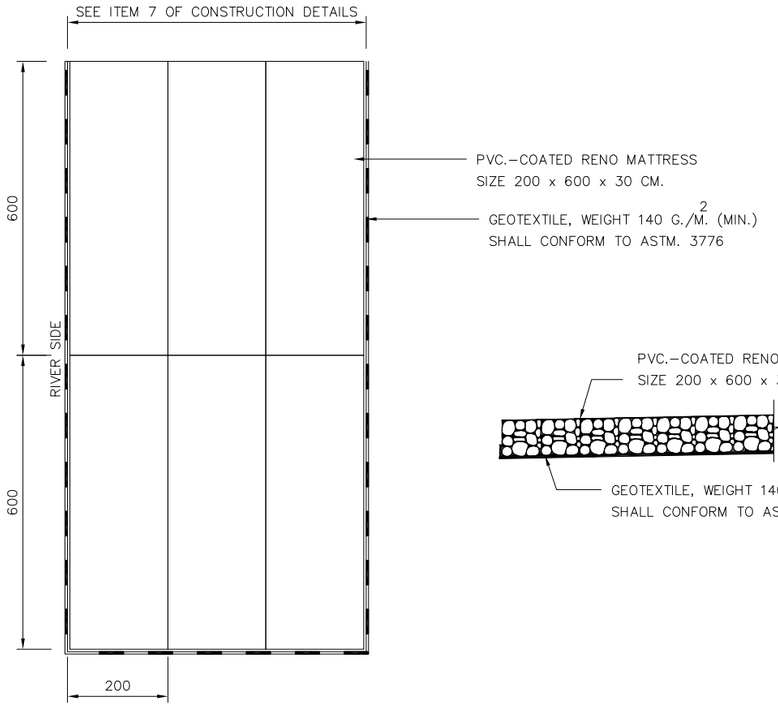
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

SPECIAL PROVISION OF GABIONS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr. Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr. Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr. Vandy VORASACK		DRW No. SDP–006
							SCALE: NOT TO SCALE



RENO MATTRESS ARRANGEMENT PLAN

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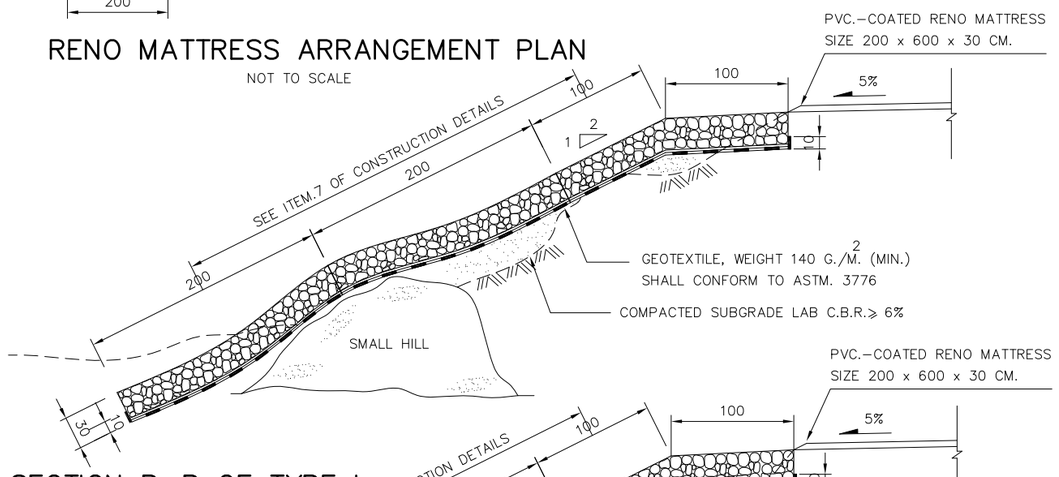

SECTION B–B OF TYPE I

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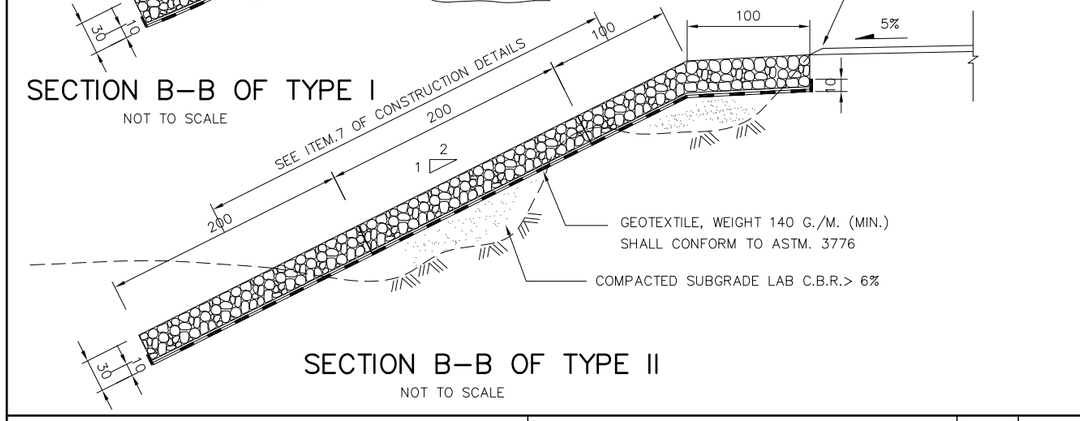

SECTION B–B OF TYPE II

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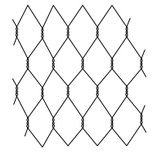
RENO OR WIRE MATTRESS

PVC. – COATED RENO MATTRESS : OR GALVANIZED WIRES THAT IS COATED WITH PVC DETAILS ARE AS FOLLOWS

1. NETTING

THE GALVANIZED WIRES COATED WITH PVC ARE MADE INTO 6x8 CM. (±10%) HEXAGONAL NETTING JOINED TOGETHER BY TWISTING THE WIRES ROUND EACH OTHER TWICE AS SHOWN IN THE PICTURE



2. WIRES

THE WIRE MUST BE ABLE TO RESIST THE TENSION OF 28.5 –51 KG./MM. (ABOUT 5% OF RENO MATRESS' WEIGHT).
THE DIAMETER OF WIRE FOR FRAME IS AT LEAST 2.7 MM.
THE DIAMETER OF WIRE FOR NETTING IS AT LEAST 2.0 MM.
THE DIAMETER OF WIRE FOR BOX WRAPPPING IS AT LEAST 2.0 MM.
AND THE WIRE IS LONG ENOUGH TO BE USED IN INSTALLATION (ABOUT 5% OF RENO MATREES' WEIGHT).

3. GALVANIZING

THE WIRES MUST BE GALVANIZED ACCORDING TO BS 443/1982 STANDARD.
THE MINIMUM OF ZINC'S WIEGHT USED IN ACCORDANCE WITH THE DIAMETER OF WIRE IS SHOWN:

WIRE'S DIAMETER (MIN.)	WEIGHT OF ZINC COATING (GM./M.)
2.0	240
2.7	260

4. PVC. – COATED

AFTER HAVING GALVANIZED, THE WIRE MUST ALSO BE COATED WITH BLACK OR GREY PAINT PVC. (POLY VINYL CHLORIDE). THE AVERAGE THICKNESS OF PVC. COATING IS 0.55 MM. (AND NOT LESS THAN 0.40 MM) THE QUALITIES OF PVC. SHOULD BE AS FLLOWS:

A. BONDING TO WIRE
THE BONDING QUALITY CAN BE TESTED BY DIPPING PVC. – COATED WIRE INTO DISSOLVED POTASSUIM PERMANGANITE (1%) FOR 50 HOURS CONTINUOUSLY AT THE ROOM TEMPERATURE. THE DISSOLVED POTASSUIM PERMANGANATE WILLERODE, INTO THE WIRE'S SURFACE AND PVC. NOT MORE THAN 15 MM. WHICH EXAMINATION BY CUTTING THE END OF WIRE.

B. EROSION DURABILITY OF PVC.
AFTER THE PVC. – COATED WIRE (NOT THE TWO END PARTS) HAS BEEN PUT INTO THE CONCENTRATED SOLUTION OF SODIUM CHLORIDE FOR 60 HOURS CONTINUOUSLY AT THE ROOM TEMPERATURE, THE PVC.'S TOTAL WEIGHT MUST STILL REMAIN.

C. EROSION DURABILITY OF END PART'S WIRE
AFTER THE PVC. – COATED WIRE HAS BEEN PUT INTO THE 50% SOLUTION OF HYDROCHLORIC ACID FOR 50 HOURS CONTINUOUSLY AT THE ROOM TEMPERATURE, ITS END PART SHOULD NOT BE ERODE MORE THAN 20 MM.

D. TEMPERATURE DURABILITY
AFTER THE PVC. – COATED WIRE HAS BEEN LEFT IN 100°C FOR 100 HOURS CONTINUOUSLY, IT QUALITIES SHOULD NOT CHANGE WHEN THE WIRE BE BROUGHT BACK TO TEST IN ACCORDING TO ITEM A–C.

5. DEVIATION

THE DEVIATION OF THE WIRE'S DIAMETER IS LESS THAN ± 2.5 %

6. ROCKS

THE ROCKS USED FOR THIS WORK MUST BE HARD ENOUGH AND NOT CRUMBLE WHEN WET AND ENDURE REGARDLESS OF THE CLIMATE THEY ARE GRANITE. LIME STONE, SAND STONE, GRAVEL AND CRACKED CONCRETE. THE AVERAGE SIZE OF THE ROCKS SHOULD BE 6–10 CM. OR ±(5%–7%)

CONSTRUCTION DETAILS OF RENO MATTRESS

1. CLEAR THE AREA OF RENO MATRESS CONSTRUCTION AND MARK THE SAHPE OF SIDE SLOPE AS SHOWN IN THE DRAWING AS WELL AS WELL COMPACT THE GROUND IF THERE IS A SMALL HILL IN TH AREA WHICH MAKES IT IMPOSSIBLE TO REGULARLY MAKE THE SIDE SLOPE. THE RENO MATTRESS ON THE SMALL HILL SHALL BE CONSTRUCTED AS SHOWN IN SECTION Ⓑ – Ⓑ OF TYPE I
2. LAY THE GEOTEXTILE ON THE SIDE SLOPE BEFORE CONSTRUCTION THE RENO MATTRESS.
SHAPE THE GROUND TO EXISTING CONDITION AFTER THE RENO MATTRESS CONSTRUCTION IS FINISHED.
GENERAL DETAILS OF PVC. – COATED RENO MATTRESS ARE AS STATED IN THE TOPEC PVC. – CAOTED RENO MATTRESS.
3. THE PROJECT ENGINEER WILL ADJUST THE SUITABLE AREA IN SITE FOR RENO MATTRESS CONSTRUCTION.
4. THE GEOTEXTILE USED IN THIS CONSTRUCTION IS MADE FROM NONWOVENS TYPE. THE INSTRUCTION ON HOW TO USE ARE
5. GIVEN BY THE PRODUCERS OF THE PRODUCTS AND ARE APPROVED BY THE ENGINEER.
6. THE PART OF RENO MATTRESS SICDING INTO STREAM CAN BE NECESSARILY ADJUSTED SO AS TO SUIT THE AREA.
ALL DIMENSIONS ARE IN CENTIMENTERS UNLESS OTHERWISE
7. INDICTED.

8. ROCKS

THIS METHOD OF SLOPE PROTECTION IS SUITABLE ONLY IN SPECIFIC LOCATIONS AND CERTAIN CONDITIONS, IT SHOULD BE APPLIED WITH THE FIRM INFORMATIONS CONCERNED AND RECOMMENDED BY THE ENGINEER.

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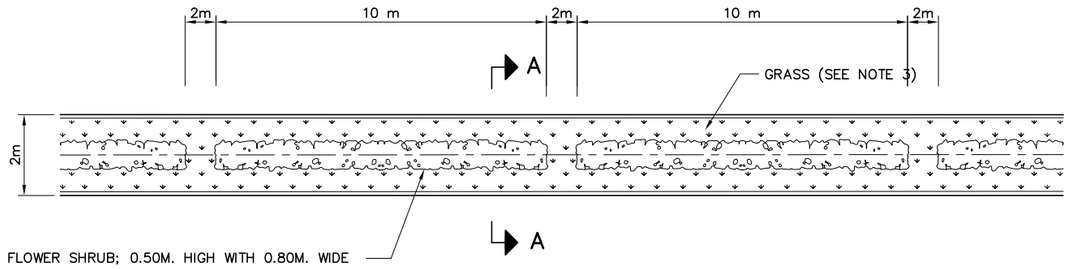
LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

RENO MATTRESS SLOPE PROTECTION

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	
				DESIGNED	Mr. Souksavanh SYPHAKHAM		LTEC CODE: SD–262–17
				CHECKED	Mr. Khamphone SORPHABMIXAY		DATE: April, 2018
				APPROVED	Mr. Vandy VORASACK		DRW No. SDP–007
							SCALE: NOT TO SCALE

BEAUTIFICATION WORK STANDARD



PLAN

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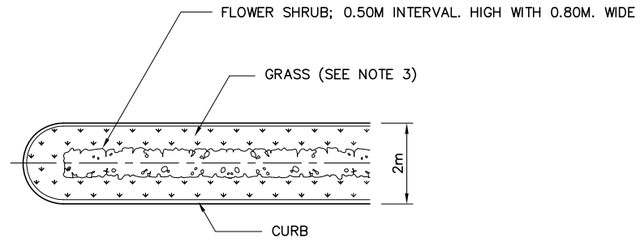

PLAN

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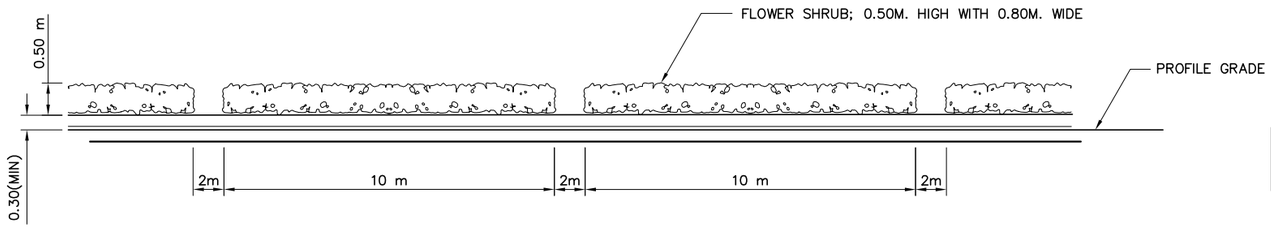

ELEVATION

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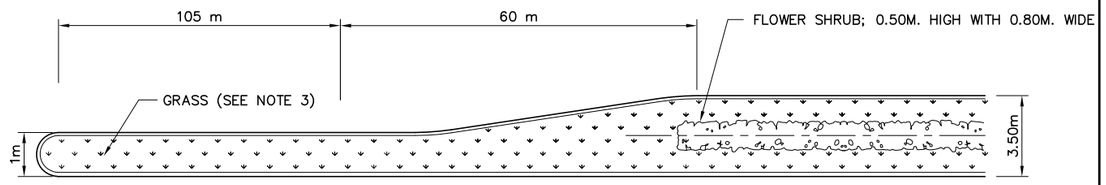
DETAIL OF PLANTING AT MEDIAN



PLAN

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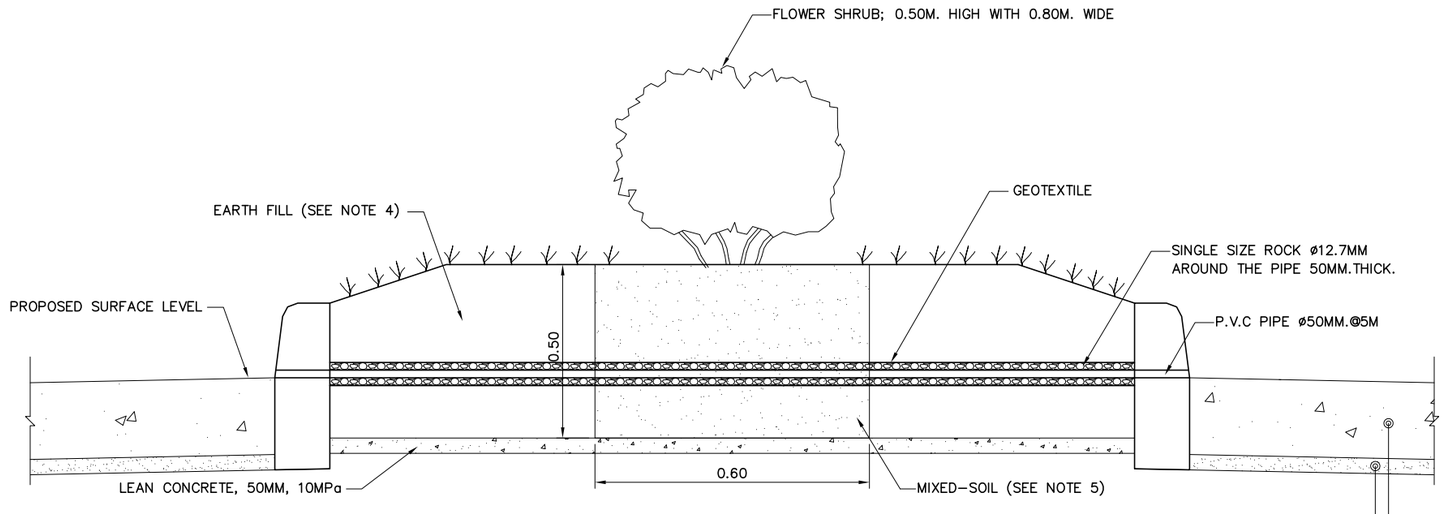

DETAIL OF DIGGING–HOLE FOR SHRUB

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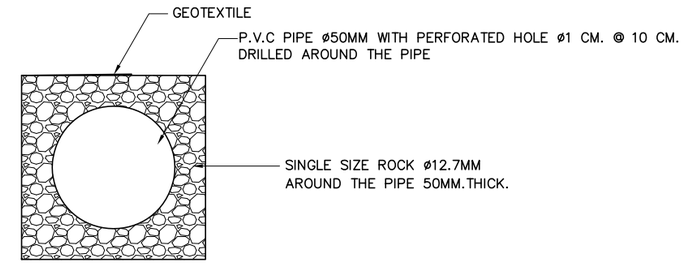

DETAIL OF SUBDRAIN

NOT TO SCALE

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. SHRUB SHALL BE DIRECTED BY ENGINEERS OR OTHERWISE INDICATED IN DRAWINGS.
3. GRASS SHALL BE NUALNOI GRASS OR OTHERWISE INDICATED IN DRAWING.
4. EARTH FILL IN MEDIAN SHALL BE ORGANIC TOPSOIL THAT BE SUITABLE FOR GROWING GRASS.
5. MIXED – SOIL SHALL BE THE PROPORTION OF SOIL, FERTILIZER, SAND EQUAL TO 4:3:2 BY VOLUME.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE PLANTS UNTIL THE END PERIOD AS SPECIFIED IN THE SPECIAL PROVISIONS.

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LAO TRANSPORT ENGINEERING CONSULTANT

NR 13N IMPROVEMENT AND MAINTENANCE PROJECT (SIKEUTH – PHONHONG)

PLANTING AND GRASSING IN MEDIANS

REV.	DATE	DESCRIPTION	APPROVED		NAME	SIGNATURE	LTEC CODE: SD–262–17
				DESIGNED	Mr.Souksavanh SYPHAKHAM		DATE: April, 2018
				CHECKED	Mr.Khamphone SORPHABMIXAY		DRW No. SLP–001
				APPROVED	Mr.Vandy VORASACK		SCALE: NOT TO SCALE