Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
PART 2 : ELECTRO-MECHANICAL EQUIPMENT
PART 3 : TRANSMISSION LINE

VOLUME 4

DRAWINGS

PCM PROJECT AND COMMUNICATION MANAGEMENT
P&C MANAGEMENT CO.,LTD.

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

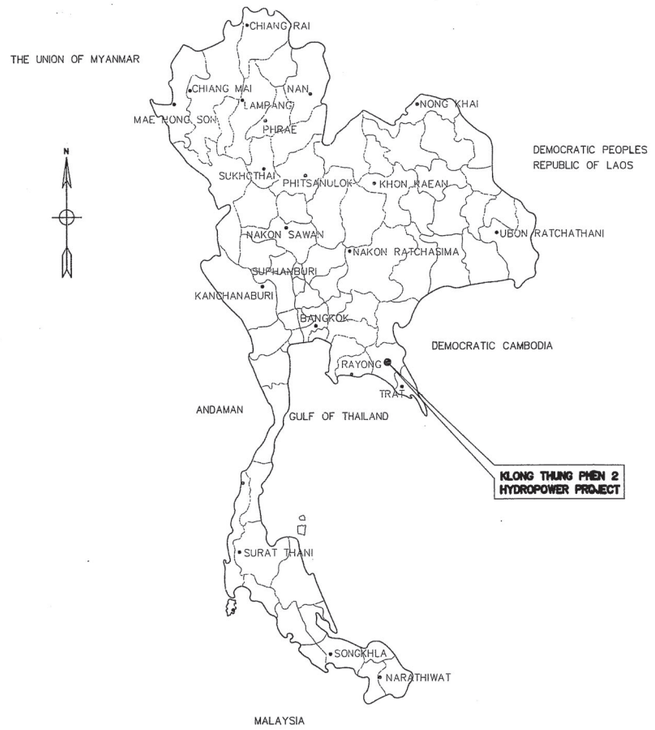
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SHEET NO.	DRAWING NO.	DRAWING DETAILS
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16	KTP2-PS-01	PLAN AND PROFILE, KM. 0+000 TO KM. 0+600
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53	KTP2-PH-23	LIGHTING AND SMALL POWER
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84	KTP2-TS-05	22 kV., PLAN AND PROFILE, KM. 1+800 TO KM. 2+400
85	KTP2-TS-06	22 kV., PLAN AND PROFILE, KM. 2+400 TO KM. 3+000
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94	KTP2-TS-15	22 kV., POLE ASSEMBLY ACCESSORIES, ANCHOR BOLT FOR GUY
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96	KTP2-TS-17	22 kV., OVERHEAD GROUND WIRE BAYONET ASSEMBLY
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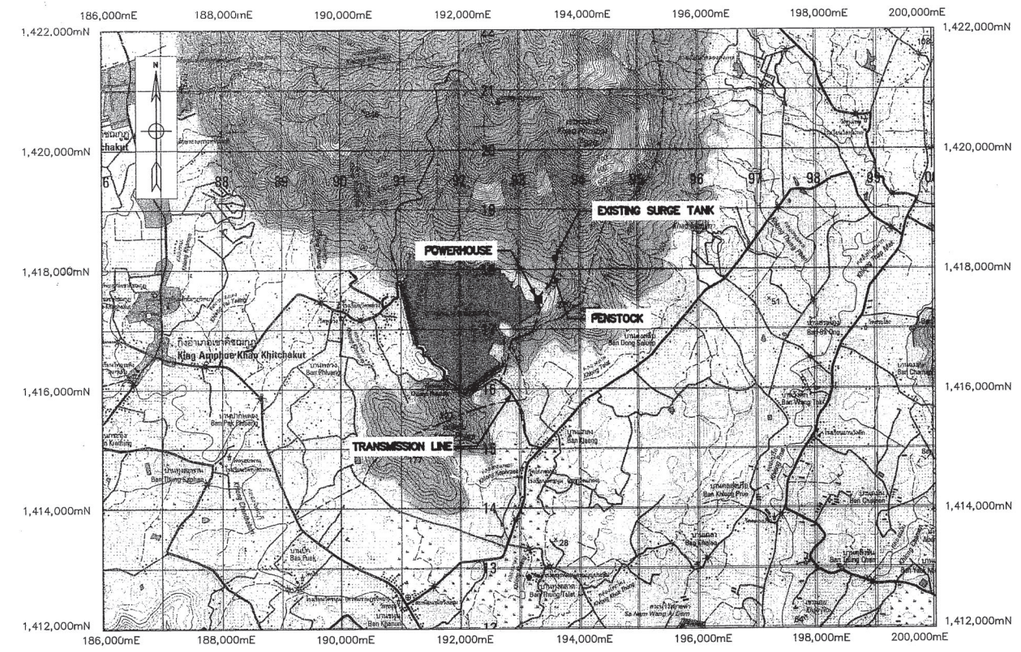
LIST OF EXISTING STRUCTURE DRAWINGS

SHEET NO.	DRAWING NO.	DRAWING DETAILS
		IN HEADRACE TUNNEL TO POWER STATION
1	TPUS-C1-W303/1	PLAN AND SECTION
		PENSTOCK CROSSING AND IMPROVEMENT OF EXISTING FOR IRRIGATION AREA
2	TPUS-C1-W310-ADD/1	GENERAL LAYOUT PLAN
		POWER STATION AND TAILRACE CANAL
3	TPUS-C1-P001	GENERAL ARRANGMENT



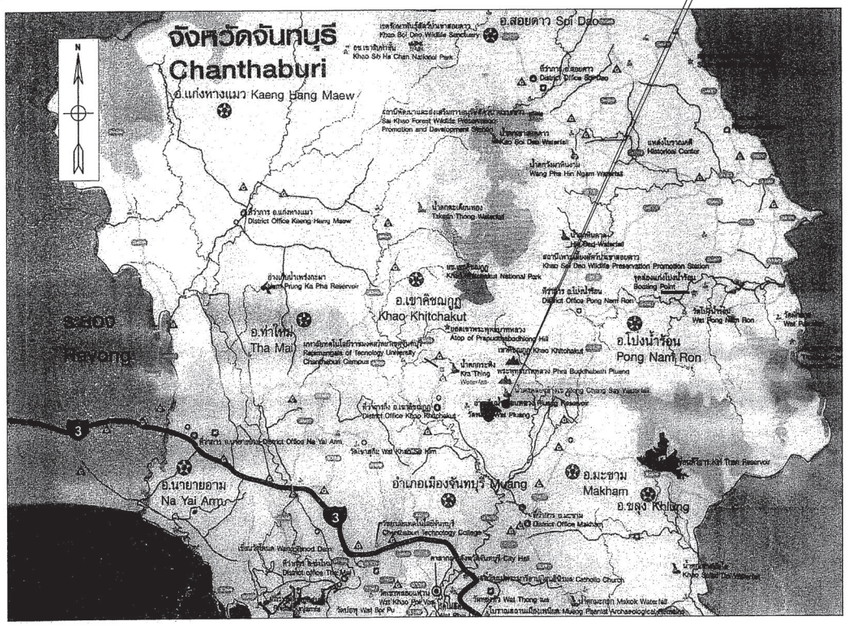
LOCATION MAP

NOT TO SCALE



PROJECT AREA

SCALE 1:50,000



KLONG THUNG PHEN 2 HYDROPOWER PROJECT SITE LOCATION

NOT TO SCALE

LEGEND :

- 3322 — NATIONAL HIGHWAYS
- RIVER, CANAL
- PROVINCE LOCATION
- DISTRICT
- TOURIST ATTRACTION
- GAS STATION

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METRES, DISTANCES ARE IN KILOMETRES, UNLESS OTHERWISE SHOWN.
2. SITE LOCATION MAP IS BASED ON THE HIGHWAY MAP 1:1,000,000 SCALE, PUBLISHED BY TOURISM AUTHORITY OF THAILAND.
3. THE MAP OF KLONG THUNG PHEN 2 HYDROPOWER PROJECT SITE AND RESERVOIR IS BASED ON TOPOGRAPHIC MAPS, SCALE 1:50,000 (SHEET 5434IV WGS 84) PUBLISHED BY THE ROYAL THAI SURVEY DEPARTMENT, 1999.

0 1,000 2,000 3,000 4,000 METERS

SCALE 1:50,000

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS | DEDE

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

GENERAL

LOCATION MAP AND PROJECT AREA MAP

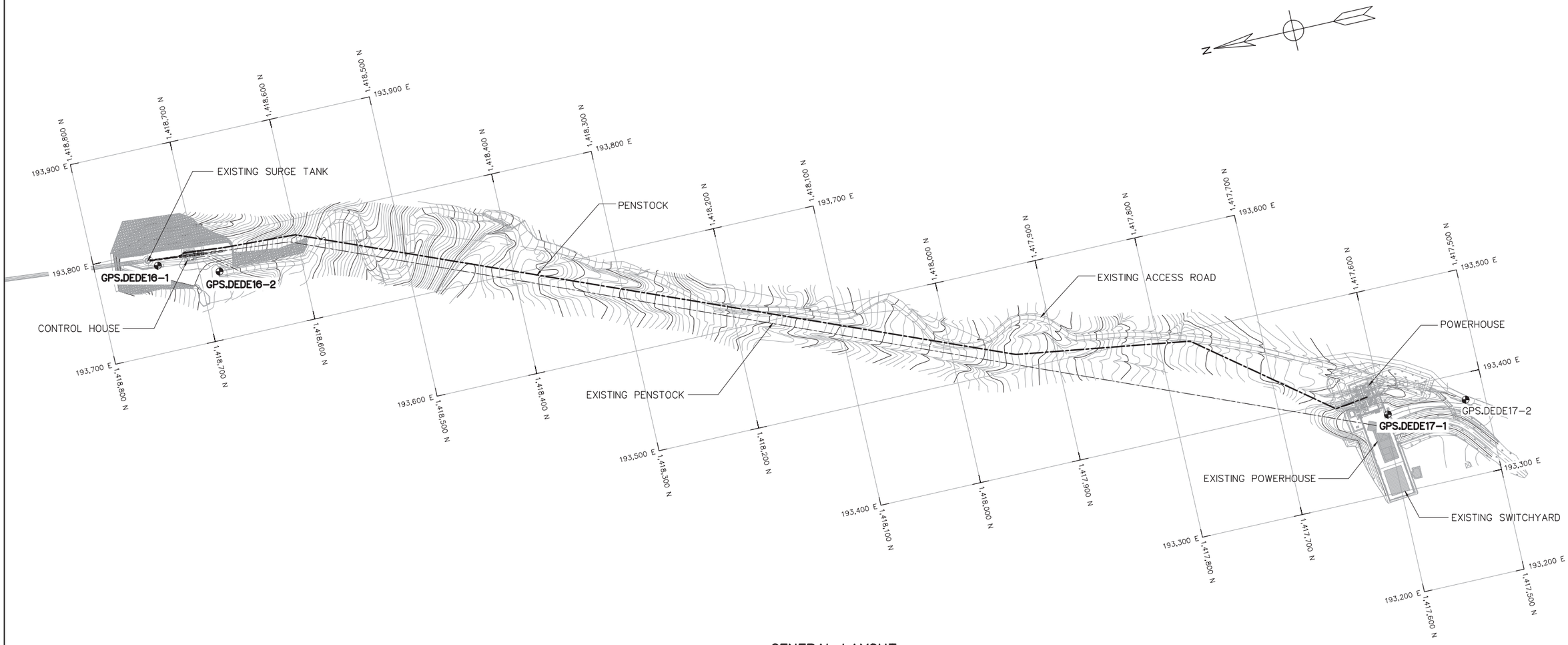
PCM P&C MANAGEMENT CO.,LTD.

DESIGNED	พ.ย.1957	REVIEWED
DRAWN		SUBMITTED
CHECKED	พ.ย.1957	RECOMMENDED
PROJECT MANAGER	17/03/2020 (DATE)	APPROVED

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DRAWING NO. KTP2-GN-01

SHEET NO. 1 OF 97



GENERAL LAYOUT

SCALE 1:2,000

NO.	BENCH MARK	WGS 84 GRID CO–ORDINATE		ELEVATION M. (M.S.L)	AZIMUTH	DISTANCE (M.)	REMARK
		NORTHING	EASTING				
1	GPS. DEDE16–1	1,418,738.276	193,784.797	+243.144			BRASS PINS BURIED IN A CONCRETE RETAINING WALL BESIDE THE SURGE TANK
					198° 10' 17.1"	60.634	DISTANCE & AZIMUTH FROM GPS DEDE 16–1 TO GPS DEDE 16–2
2	GPS. DEDE16–2	1,418,680.666	193,765.888	+238.101			BRASS PIN BURIED IN THE CONCRETE ROAD SURFACE AT THE END OF THE ROAD
3	GPS. DEDE17–1	1,417,596.587	193,376.896	+73.401			BRASS PINS BURIED IN THE MIDDLE OF THE CONCRETE IN THE MIDDLE OF THE POWER HOUSE ENTRANCE KLONG THUNG PHEN PROJECT
					182° 01' 47.8"	77.458	DISTANCE & AZIMUTH FROM GPS DEDE 17–1 TO GPS DEDE 17–2
4	GPS. DEDE17–2	1,417,519.177	193,374.153	+74.376			BRASS PINS BURIED ON CONCRETE AT THE CORNER OF THE ENTRANCE TO THE POWER PLANT OF KLONG THUNG PHEN PROJECT

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03

REFERENCE DRAWINGS :

1. CONTROL HOUSE, GENERAL LAYOUT	KTP2–CH–01
2. PENSTOCK, PLAN AND PROFILE, KM. 0+000 TO KM. 0+600	KTP2–PS–01
3. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860	KTP2–PS–02
4. POWERHOUSE, GENERAL LAYOUT	KTP2–PH–01
5. TAILRACE, LAYOUT PLAN	KTP2–TR–01

0 50 100 150

SCALE 1:2,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
GENERAL
GENERAL LAYOUT

PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2–GN–02	SHEET NO. 2 OF 97

ABBREVIATIONS :

A	CROSS-SECTION AREA OF FLOW	MAX.	MAXIMUM
AC.	ASBESTOS CEMENT PIPE	M.S.L.	MEAN SEA LEVEL
AGG.	AGGREGATE	MISC.	MISCELLANEOUS
ALT.	ALTERNATIVE	N.	NORTH
APPROX.	APPROXIMATE	n.	MANNING'S ROUGHINESS COEFFICIENT
AZ.	AZIMUTH	N.F.	NEAR FACE
B.	BEGINNING OF SURVEY	NGL.	NATURAL GROUND LEVEL
BC.	BEGINNING OF CURVE	NO. OR #	NUMBER
BF.	BOTTOM FACE	N.W.L.	NORMAL WATER LEVEL
B	BEAM	OD.	OUTSIDE DIAMETER
B.M.	BENCH MARK	O.F.	OUTSIDE FACE
BOTT.	BOTTOM	O&M	OPERATION & MAINTENANCE
BRG.	BEARING	PC.	POINT OF HONRIZONTAL CURVATURE
C.B.R.	CALIFORNIA BEARING RATIO	PI.	POINT OF HORIZONTAL INTERSECTION
C/C	CENTER TO CENTER	PL.	PLATE
℄	CENTER LINE	P.O.C.	POINT ON CURVE
CL.	CLEARANCE	P.O.T.	POINT ON TANGENT
CM. OR cm.	CENTIMETER	P.O.S.T.	POINT ON SUB-TANGENT
CMS. OR cms.	CUBIC METER PER SECOND	PRC.	POINT OF HORIZONTAL REVERSE CURVE
COL.	COLUMN	PT.	POINT OF TANGENT
CONC.	CONCRETE	PVC.	POLYVINYL CHLORIDE
D	DEGREE OF CURVE	PVC.	POINT OF VERTICAL CURVATURE
DB.	DEFORM BAR	PVI.	POINT OF VERTICAL INTERSECTION
d.	DEPTH OF WATER	PVRC.	POINT OF VERTICAL REVERSE CURVE
DIA. OR ø	DIAMETER	PVT.	POINT OF VERTICAL TANGENT
DOH.	DEPARTMENT OF HIGHWAY	Q.	DISCHARGE
DWG.	DRAWING	QTY. QUAN.	QUANTITY
DEDE.	DEPARTMENT OF ALTERNATIVE ENERGY	R	RADIUS OF CURVATURE
	DEVELOPMENT AND EFFICIENCY	r	HYDRAULIC RADIUS
E	EAST	RB.	ROUND BAR
E	END OF SURVEY	RC.	REINFORCED CONCRETE
EA.	EACH	RD.	ROAD
E.C.	END OF CURVE	REF.	REFERENCE
E.I.T.	THE ENGINEERING INSTITUTE OF THAILAND	REINF.	REINFORCEMENT
	UNDER H.M. THE KINGS PATRONAGE	REQ'D	REQUIRED
E.F.	END OF FACE	RID.	ROYAL IRRIGATION DEPARTMENT
EL. OR ELEV.	ELEVATION	R.W.L	RETENTION WATER LEVEL
EXIST.	EXISTING	SCH.	SCHEDULE
EXP.	EXPANSION	SE.	SUPERELEVATION
EXT.	EXTERIOR	SETC.	SECTION
EX.	EXTERNAL DISTANCE OF CURVE	S.P.C.T.	STANDARD PROCTOR COMPACTION TEST
f	FREE BOARD , FINISH	S.S.	SIDE SLOPE
F.F.	FAR FACE	STIR.	STIRRUP
F.S.L.	FULL SUPPLY LEVEL	STA.	STATION
FTG.	FOOTING	STD.	STANDARD
HD.	HEAD	STR.	STRUCTURE
HEX.	HEXAGONAL	SYMM.	SYMMETRICAL
HOR.	HORIZONTAL	T.	TANGENT LENGTH , THICKNESS
H.W.L	HIGH WATER LEVEL	T	TON
I.D.	INSIDE DIAMETER	THK.	THICKNESS
I.F.	INSIDE FACE	T.F.	TOP FACE
IN. OR "	INCH	T.I.S.	THAI INDUSTRIAL STANDARD
INT.	INTERIOR	Ts.	SUPERELEVATION TRANSITION LENGTH
INV.	INVERT	TYP.	TYPICAL
Kg.	KILOGRAM	V.	VELOCITY OF FLOW
Km.	KILOMETER	V.C.	VERTICAL CURVE
KPH.	KILOMETER PER HOUR	Vc.	LENGTH OF VERTICAL CURVE
KSC.	KILOGRAM PER SQUARE CENTIMETER	VER.	VERTICAL
L	LENGTH OF CURVE	VOL.	VOLUME
LC.	LENGTH OF HORIZONTAL CURVE	W/	WITH
LONG.	LONGITUDINAL	W.C.	WATER CLOSET
LT.	LEFT	◎	ANGLE
L.W.L.	LOW WATER LEVEL	△	DEFLECTION ANGLE
M. OR m.	METER		
$M.^2$ OR $m.^2$	SQUARE METER		
$M.^3$ OR $m.^3$	CUBIC METER		
MM. OR mm.	MILLIMETER		
M./S OR m./s	METER PER SECOND		
MIN.	MINIMUM		

SYMBOLS :



TYPICAL NORTH ARROW

CENTER LINE

PAVED ROAD

DIRT ROAD, LATEITE ROAD OR TRACK

VILLAGE

CITY OR DISTRICT

POND OR SWAMP

CULVERT UNDER ROAD

BRIDGE

POLE

TEST PIT

EXISTING HAND AUGER

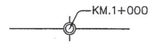
EXISTING BOREHOLES

BOREHOLES

DEGREE, MINUTE, SECOND

AT EQUAL DISTANCE BETWEEN CENTER TO CENTER

B.M.



STATION

BC., EC., PC., PI., PT., PCV., PVT.

WATER LEVEL

PLAN OF RIPRAP

PLAN OF SLOPE RIPRAP

SECTION OF DUMPED RIPRAP

SECTION OF HAND PLACED RIPRAP

SECTION OF SAND

SECTION OF GRAVEL OR COARSE AGGREGATE

SECTION OF ROCK

SECTION OF EARTH

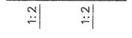
SECTION OF BACKFILL

SECTION OF CONCRETE

STEEL SECTION

ELEVATION OR PLAN OF EARTH CUT OR FILL

ELEVATION OR PLAN OF ROCK CUT



ELEVATION OR PLAN OF SLOPE

NATURAL GROUND LEVEL



CONTOUR LINE

RIVER, STREAM OR NATURAL DRAIN

FLOW DIRECTION



SLOPE DIRECTION



SLOPE RATIO

GENERAL NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS UNLESS OTHERWISE SHOWN.
2. DURING THE CONSTRUCTION PERIOD, IT IS THE CONTRACTOR'S OBLIGATION TO CHECK THE CORRECTION OF ALL RELEVANT LOCATIONS, DIMENSIONS, ELEVATIONS AND OTHER DATA AS PROVIDED BY THE DRAWINGS AND TECHNICAL SPECIFICATIONS BEFORE IMPLEMENTATION OF THE WORKS.
3. IN CASE OF ANY DETAILS NOT MENTIONED OR NOT SHOWN IN THE DRAWINGS OR TECHNICAL SPECIFICATIONS, OR IN CASE OF ANY DISCREPANCY, DEFECTIVE DESCRIPTION, ERROR, DIMENSION OR AMBIGUITY BETWEEN OR IN ANY OF THE DRAWINGS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO CORRECT AND/OR ADJUST THE RELEVENT DRAWINGS TO OBTAIN FIELD ENGINEER APPROVAL.
4. ADDITIONAL SYMBOLS, IF REQUIRED, ARE DEFINED IN THE RESPECTIVE DRAWINGS.
5. THE SPECIFICATIONS AND THE QUANTITIES OF MATERIALS ARE SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
6. ALL PLAIN CONCRETE CORNERS ARE TO BE CHAMFERED 2 cm. UNLESS OTHERWISE SHOWN.
7. SLOPE IN CUT AND FILL SECTIONS, UNLESS OTHERWISE SHOWN, SHALL BE CONFORMED TO THE FOLLOWING TABLE OR AS DIRECTED BY FIELD ENGINEER.

EXISTING GROUND SLOPE 1:S	EARTH		HARD ROCK	
	CUT 1:S	FILL 1:S	CUT 1:S	FILL 1:S
OVER 1:1	OVER 1:0.5 2/	1/	1:0	1/
1:1 – 1:1.5	1:0.5	1	1:0	1/
1:1.5 – 1:2	1:1	1:1	1:0	1:1
1:2 – 1:3	1:1	1:1.5	1:0	1:1.5
LOWER 1:3	1:1	1:2	1:0	1:2

2/ = FILL SHOULD BE AVOIDED

1/ = FOR DOUBTFUL CASES CONSULT FIELD ENGINEER

STRUCTURAL DESIGN NOTES :

1. THE ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE OF STANDARD CYLINDER (ø0.15x0.30 m.) TEST AT AGE 28 DAYS SHALL BE AS THE FOLLOWING, UNLESS OTHERWISE SHOWN.

fc' (ksc)	DESCRIPTION
350	PRESTRESS CONCRETE
210	1. CONTROL HOUSE
	2. POWERHOUSE
	3. TAILRACE
	4. MANHOLE
	5. ANCHOR BLOCK, PIPE SUPPORT
	6. BOX CULVERT
210	SECONDARY CONCRETE
140	LEAN CONCRETE

2. UNLESS OTHERWISE SHOWN, THE FOLLOWING CLEAR COVER OF CONCRETE OVER OF THE REINFORCEMENT SHALL BE USED :
   - FACE EXPOSED TO SCOUR 5.0 cm.
   - FACE EXPOSED TO EARTH OR WEATHER 5.0 cm.
   - FACE UNEXPOSED TO EARTH OR WEATHER 3.0 cm.
3. THE REINFORCEMENT LAP SPLICES SHALL NOT BE LESS THAN 50 DIAMETERS OF BIGGER THAN BAR WITH HOOKS, UNLESS OTHERWISE SHOWN.
4. EMBEDDED METALWORK SHALL BE SECURELY FASTENED IN POSITION BEFORE PLACING CONCRETE.
5. ALL CONSTRUCTION JOINT SHOULD BE TREATED AS DIRECTED IN ORDER TO ASSURE THE BEST BOND.
6. A 5 cm. (MIN.) LAYER OF LEAN CONCRETE (1:3:5 BY VOLUME) SHOULD BE PLACED BELOW CONCRETE STRUCTURES.
7. THE STRUCTURES SHOULD BE PLACED ON UNDISTURBED SOILS OR COMPACTED FILL AND BACKFILL AROUND THE STRUCTURES SHOULD BE COMPACTED.
8. THE FOUNDATION ELEVATIONS ARE SUBJECT TO CHANGE AS DIRECTED ACCORDING TO THE SOIL CONDITIONS.
9. ALL SIZES OF REINFORCING BARS AND STRUCTURAL STEELS ARE IN MILLIMETERS.
10. ALL STRUCTURAL STEELS ARE THOSE OF T.I.S. DESIGNATION Fe24.
11. REINFORCED STEEL BARS SHALL BE CONFORM TO T.I.S. AS FOLLOW :
    - DEFORMED BARS (SD30) – T.I.S. 24–2559
    - ROUND BARS (SR24) – T.I.S. 20–2559
12. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN AS FOLLOW :
    - CONTROL HOUSE Q_a = 15 T/M.^{2}
    - PENSTOCK Q_a = 15 T/M.^{2}
    - POWERHOUSE & TAILRACE Q_a = 30 T/M.^{2}

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

GENERAL

SYMBOLS, ABBREVIATIONS AND GENERAL NOTES

PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	28.1.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2-GN-03	SHEET NO. 3 OF 97

TABLE 1 CLIMATOLOGICAL DATA FOR THE PERIOD 1988–2017

Station	Amphoe Mueang Changwat Chanthaburi	Elavation of station above M.S.L.	2.68 Meters
Index station	48480	Height of barometer above M.S.L.	3.60 Meters
Latitude	12° 37' 0.0" N	Height of thermometer above ground	1.25 Meters
Longtitude	102° 6' 48.0" E	Height of wind vane above ground	12.00 Meters
		Height of rain gauge	1.00 Meters

Elements	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Temperature (Celcius)													
Mean	15.0	15.4	17.7	22.2	22.1	21.9	21.4	21.4	22.1	18.7	16.5	13.1	13.1
Relative Humidity (%)													
Mean	69	74	77	78	83	84	84	84	86	82	72	66	78.4
Mean Max.	85	89	92	92	94	94	94	94	95	93	85	81	90.7
Mean Min.	49	55	59	60	67	70	71	71	71	65	56	49	61.8
Ext.Min.	24	23	33	37	39	51	51	43	41	30	28	19	19
Pan Evaporation (mm.)													
Mean	138.5	125.0	144.4	140.5	121.9	108.6	108.6	107.1	94.7	118.9	135.4	145.5	1,489.1

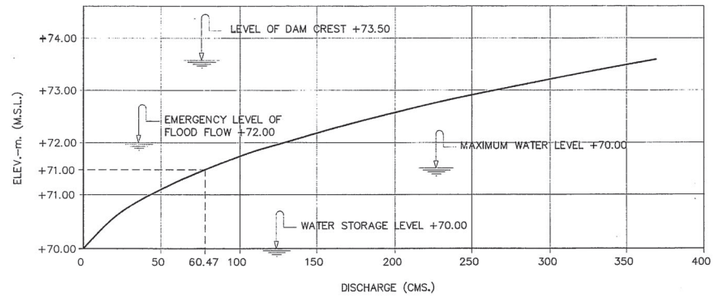
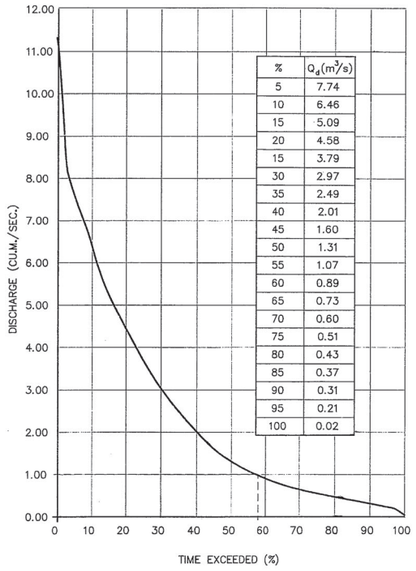


FIGURE 1 RELATIONSHIP BETWEEN TAIL WATER LEVEL AND DISCHARGE AT PHLUANG DAM



%	Q_d (m^3/s)
5	7.74
10	6.46
15	5.09
20	4.58
15	3.79
30	2.97
35	2.49
40	2.01
45	1.60
50	1.31
55	1.07
60	0.89
65	0.73
70	0.60
75	0.51
80	0.43
85	0.37
90	0.31
95	0.21
100	0.02

FIGURE 2 FLOW DURATION CURVE AT THUNG PHEN DAM

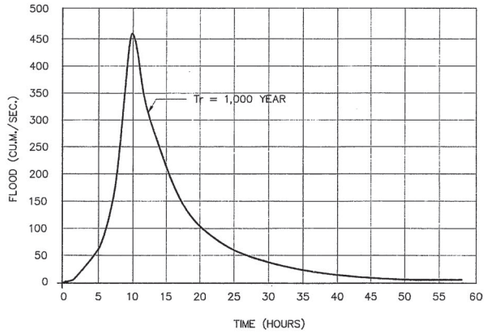
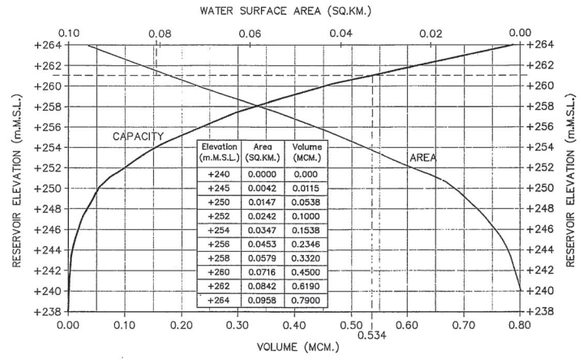


FIGURE 3 RETURN PERIOD 1,000 YEAR AT THUNG PHEN DAM



Elevation (m.M.S.L.)	Area (SQ.KM.)	Volume (MCM.)
+240	0.0000	0.000
+245	0.0042	0.0115
+250	0.0147	0.0538
+252	0.0242	0.1000
+254	0.0347	0.1538
+256	0.0453	0.2346
+258	0.0579	0.3320
+260	0.0716	0.4500
+262	0.0842	0.6190
+264	0.0958	0.7900

FIGURE 4 RELATIONSHIP BETWEEN AREA AND VOLUME CURVE AT THUNG PHEN DAM

MONTH	DISCHARGE (CMS.)
APR	0.45
MAY	0.95
JUN	2.99
JUL	4.77
AUG	5.81
SEP	5.71
OCT	3.52
NOV	1.26
DEC	1.05
JAN	1.01
FEB	0.62
MAR	0.82

FIGURE 5 AVERAGE MONTHLY DISCHARGE AT THUNG PHEN DAM

MONTH	RAINFALL (mm.)
APR	111.00
MAY	301.04
JUN	400.38
JUL	452.74
AUG	422.36
SEP	429.27
OCT	260.52
NOV	36.10
DEC	7.15
JAN	19.48
FEB	28.98
MAR	76.85

FIGURE 6 AVERAGE MONTHLY RAINFALL AT THUNG PHEN DAM

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. DATA TABLE 1 OBTAINED FROM OUTFLOW RECORDS OF AMPHOE MUEANG CHANGWAT CHANTHABURI BY ROYAL IRRIGATION DEPARTMENT DURING 1988–2017.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
GENERAL
HYDROLOGY DATA

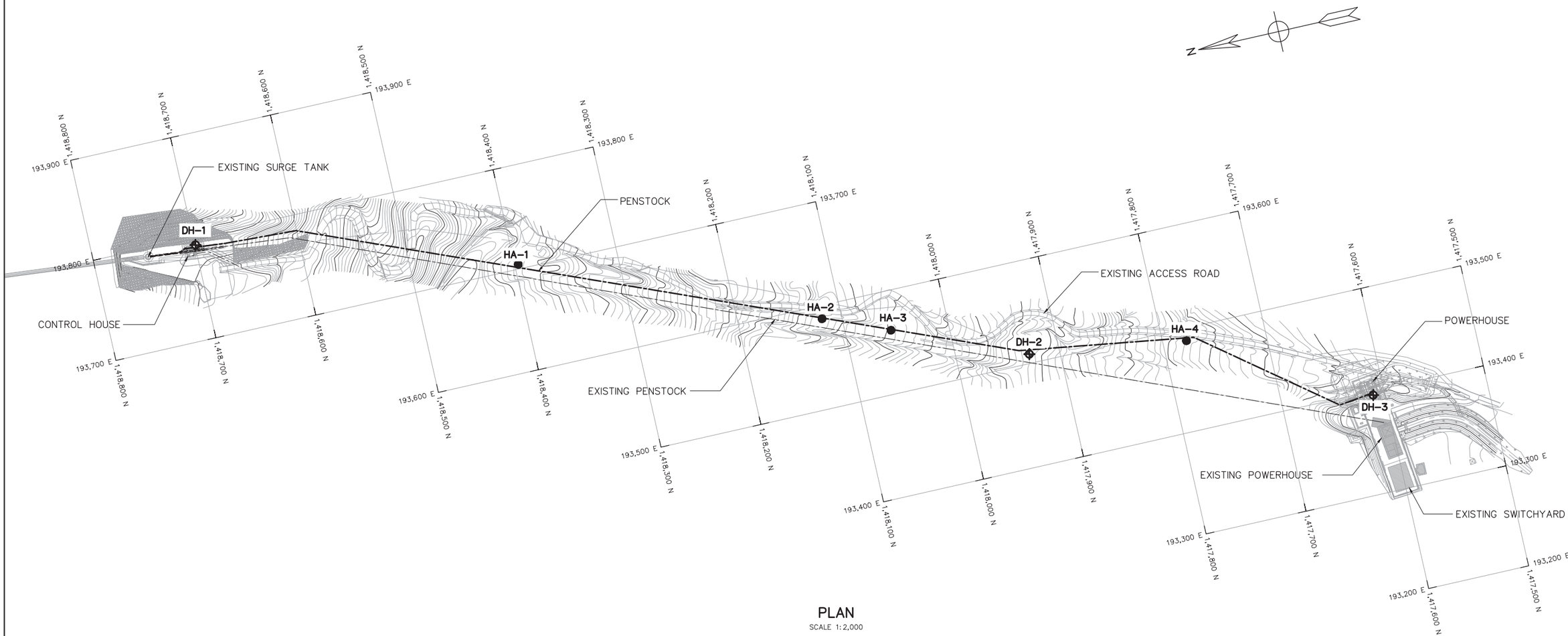
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DRAWING NO. KTP2–GN–04

SHEET NO. 4 OF 97



PLAN

SCALE 1:2,000

NO.	BENCH MARK	DRILL TYPE	WGS 84 GRID CO–ORDINATE		DEPTH
			NORTHING	EASTING	M.
1	DH–1	ROTARY	1,418,690	193,797	10.95
2	DH–2	ROTARY	1,417,953	193,512	12.45
3	DH–3	ROTARY	1,417,613	193,387	25.00
4	HA–1	HAND AUGUR	1,418,419	193,715	0.15
5	HA–2	HAND AUGUR	1,418,145	193,598	0.30
6	HA–3	HAND AUGUR	1,418,054	193,560	0.50
7	HA–4	HAND AUGUR	1417,765	193,482	1.00

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03

REFERENCE DRAWINGS :

1. GENERAL, GEOLOGICAL (SHEET 2/2) KTP2–GN–06

SYMBOL

- DRILL HOLE
- HAND AUGUR

0 50 100 150

SCALE 1:2,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

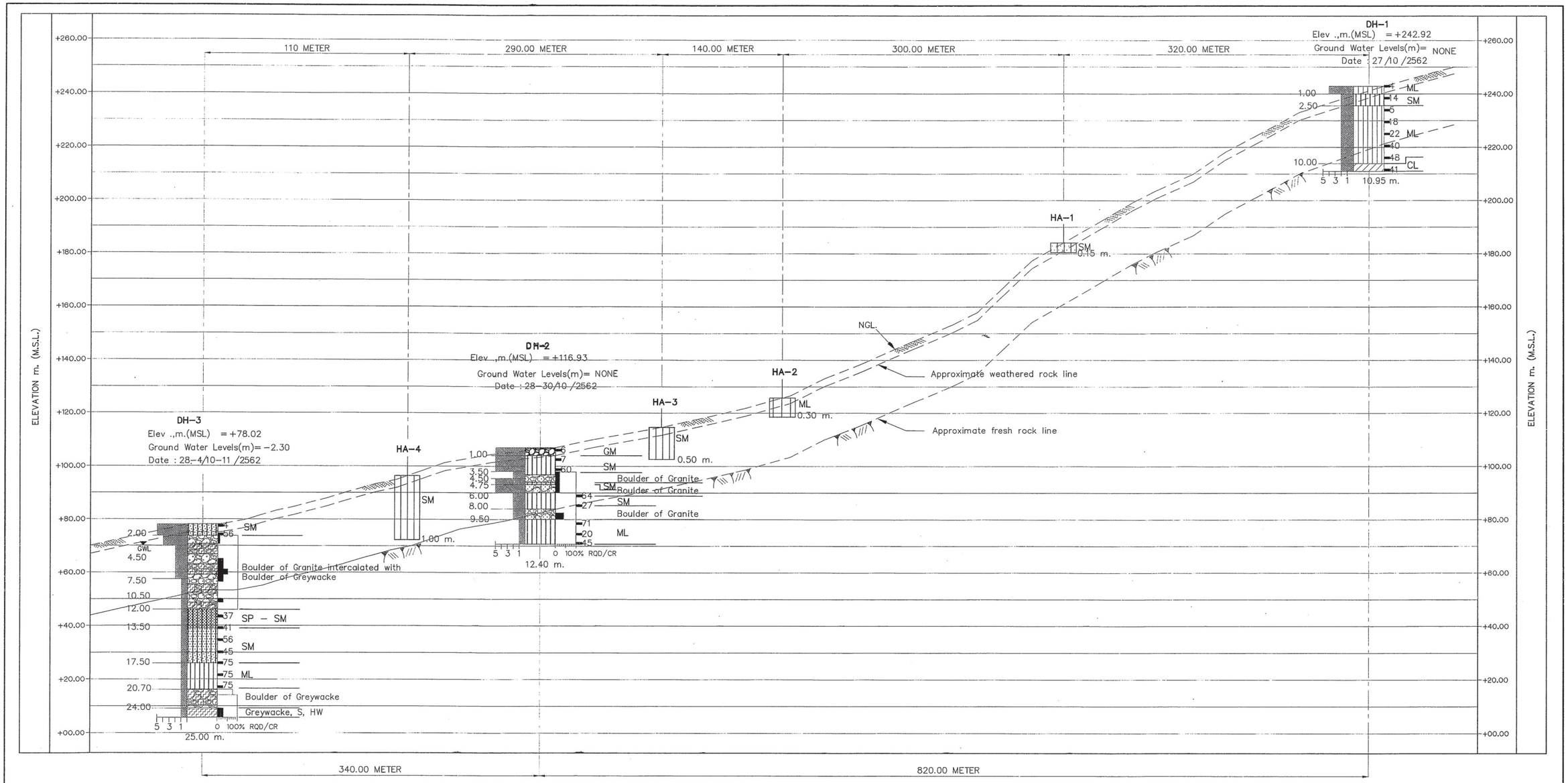
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

GENERAL

GEOLOGICAL DATA (SHEET 1/2)

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PROFILE GEOLOGICAL OF PENSTOCK

HORIZONTAL SCALE	1:2000
VERTICAL SCALE	1:1000
SCALE OF DRILL HOLE	1:300
SCALE OF HAND AUGER	NOT TO SCALE

DEGREE OF HARDNESS

- VS = VERY SOFT ROCK
- S = SOFT ROCK
- MH = MEDIUM HARD ROCK
- H = HARD ROCK
- VH = VERY HARD ROCK

% RQD

- < 25% = VERY POOR ROCK
- 25-50% = POOR ROCK
- 50-75% = FAIR ROCK
- 75-90% = GOOD ROCK
- 90-100% = VERY GOOD ROCK

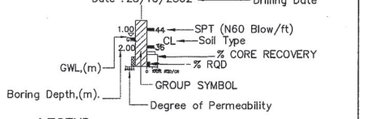
DEGREE OF WEATHERING

- F = FRESH ROCK
- SW = SLIGHTLY WEATHERED ROCK
- MW = MODERATELY WEATHERED ROCK
- HW = HIGHLY WEATHERED ROCK
- CW = COMPLETELY WEATHERED ROCK

DEGREE OF PERMEABILITY

1 = < 1 LUGEON OR $<10^{-5}$ CM/SEC = IMPERVIOUS
2 = 1-5 LUGEON OR 10^{-5} - $5X10^{-5}$ CM/SEC = SEMI - IMPERVIOUS
3 = 5-10 LUGEON OR $5X10^{-5}$ - 10^{-4} CM/SEC = SEMI - PERVIOUS
4 = 10-50 LUGEON OR 10^{-4} - $5X10^{-4}$ CM/SEC = RATHER - PERVIOUS
5 = > 50 LUGEON OR $>5X10^{-4}$ CM/SEC = PERVIOUS

Explanation



LEGEND

- CL = LEAN CLAY TO SANDY LEAN CLAY
- SM = SILTY SAND, SILTY SAND WITH GRAVEL
- SP-SM = POORLY GRADED SAND WITH SILT
- ML = SILT WITH SAND TO SANDY SILT
- GM = SILTY WITH GRAVEL
- BOULDER OF GRANITE
- BOULDER OF GREYWACKE
- GREYWACKE

SOIL PROPERTIES AND SPT (N,BLOWS) RELATIONSHIP FOR COHESIVE SOILS.

NUMBER BLOW/FOOT (N)	CONSISTENCY
LESS THAN 2	VARY SOFT
2-4	SOFT
4-8	MEDIUM
8-15	STIFF
15-30	VARY STIFF
MORE THAN 30	HARD

ROCK PROPERTIES : CORE RECOVERY, CR (%)

DEGREE	PERCENTAGE OF CR	PROPERTY
CR1	90-100%	VERY GOOD
CR2	80-90%	GOOD
CR3	70-80%	FAIR
CR4	60-70%	POOR
CR5	< 60%	VERY POOR

SOIL PROPERTIES AND SPT (N,BLOWS) FOR COHESION LESS SOILS.

NUMBER BLOW/FOOT (N)	CONSISTENCY
0-4	VARY LOOSE
4-10	LOOSE
10-30	MEDIUM DENSE
30-50	DENSE
MORE THAN 50	VERY DENSE

0 5 10 15 20 25
SCALE 1:300 METERS
0 10 20 40 50 80
SCALE 1:1,000 METERS
0 50 100 150
SCALE 1:2,000 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

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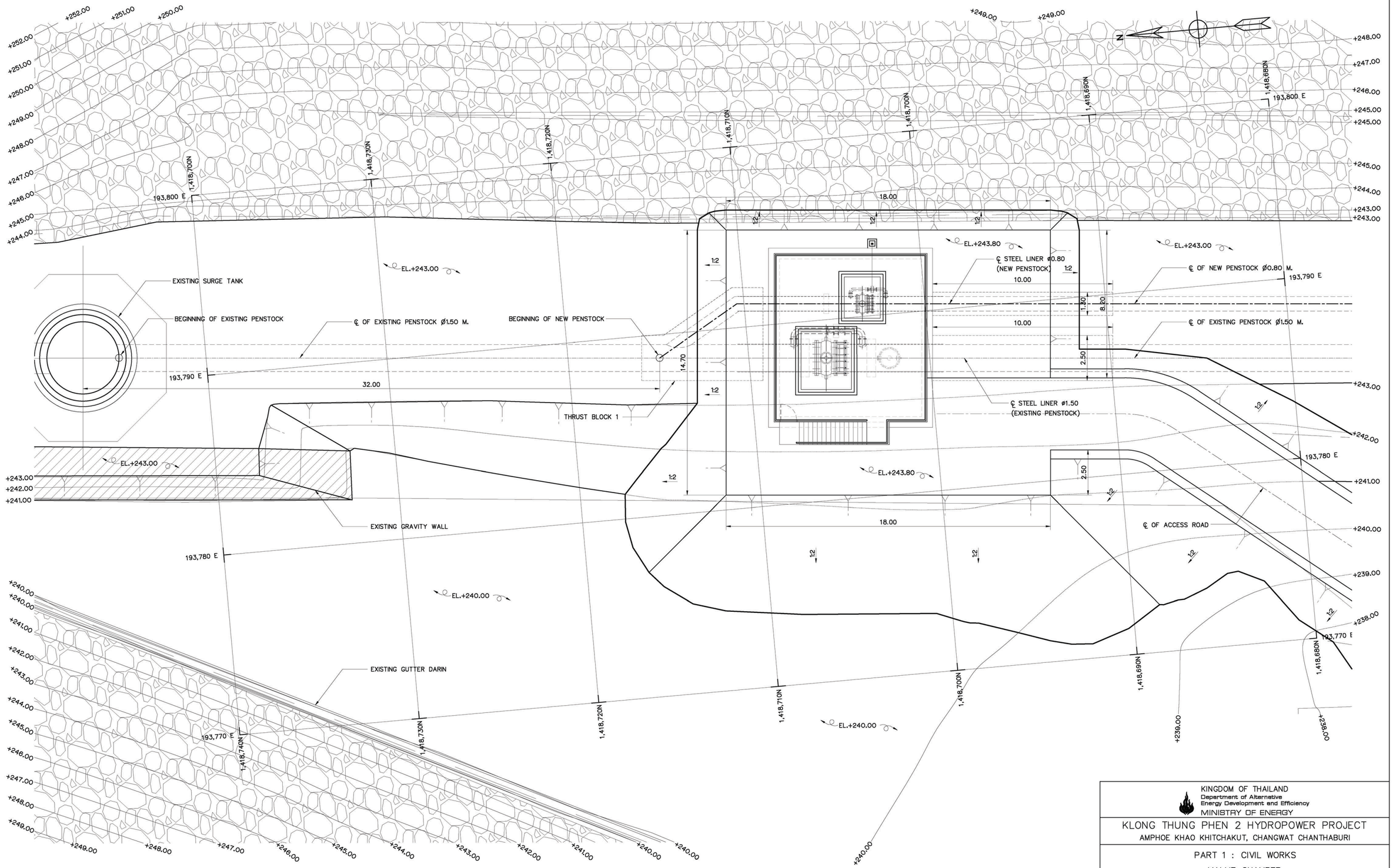
KINGDOM OF THAILAND
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MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
GENERAL
GEOLOGICAL DATA (SHEET 2/2)

PCM P&C MANAGEMENT CO.,LTD.

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PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2-GN-06
		SHEET NO.	6 OF 97



GENERAL LAYOUT

SCALE 1:100

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. ALIGNMENT OF PENSTOCK SHALL BE JUSTIFIED BY FIELD ENGINEER IN THE FIELD TO SUIT THE TOPOGRAPHY

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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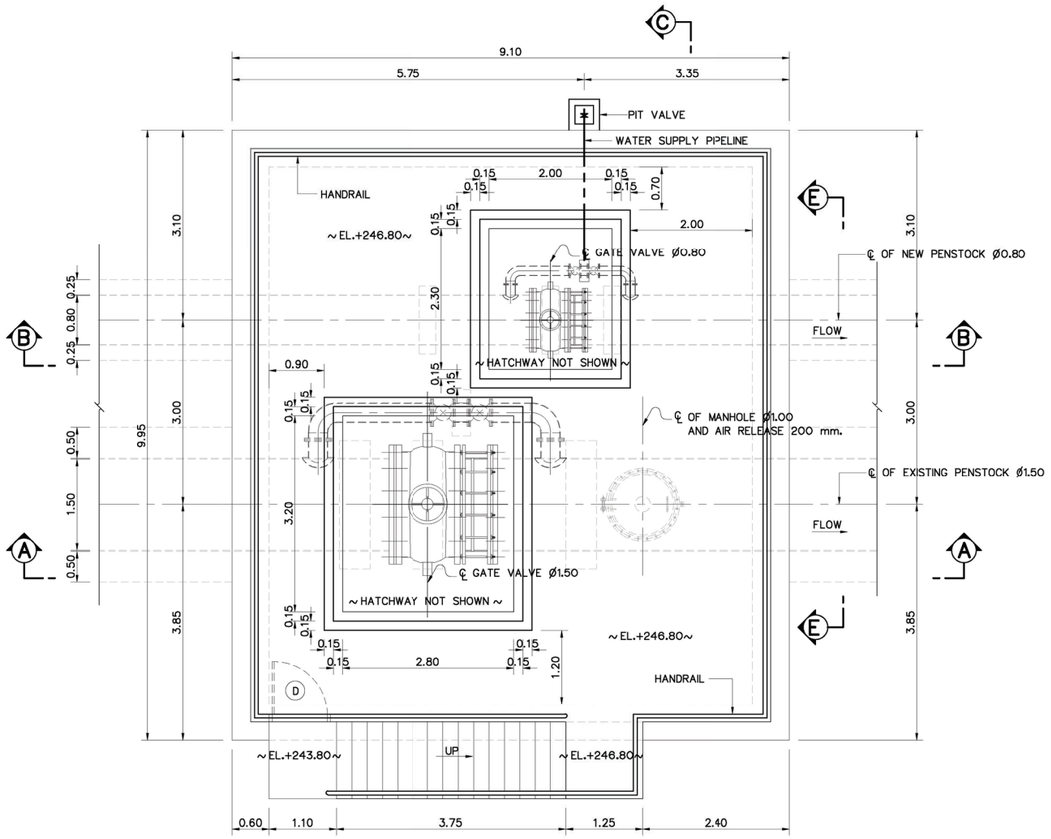
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
VALVE CHAMBER
GENERAL LAYOUT

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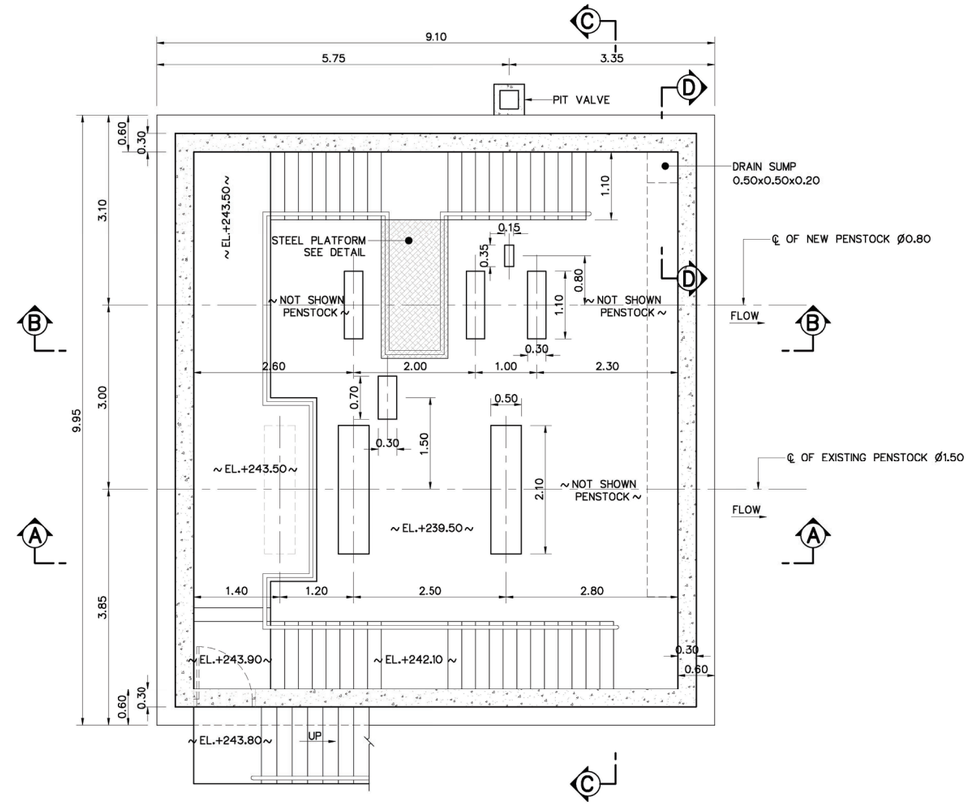
DESIGNED	28.1957
DRAWN	
CHECKED	28.1957
PROJECT MANAGER	17/03/2020 (DATE)
REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	KTP2-CH-01
SHEET NO.	7 OF 97



PLAN

SCALE 1:50

(EL.+246.80)



PLAN

SCALE 1:50

(EL.+239.50)

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 30 TONS/M.
4. THE CONTRACTOR SHALL DESIGN THE MECHANICAL COUPLING AND INSTALLATION. THE SHOP DRAWIGNS SHALL BE SUBMITTED TO DEDE. FOR APPROVAL PRIOR TO THE CONSTRUCTION.

0 1 2 3 4

SCALE 1:50 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

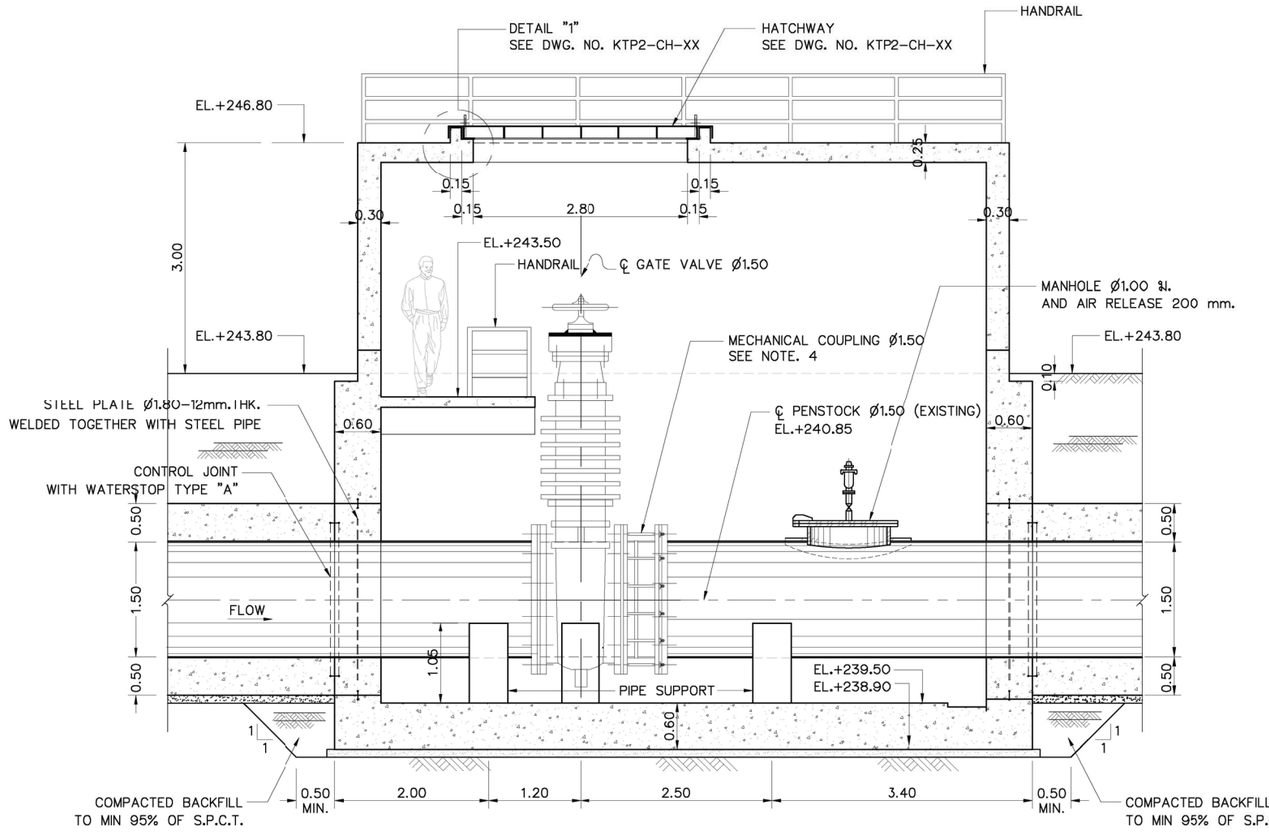
VALVE CHAMBER

PLAN

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		DRAWING NO. KTP2-CH-02	SHEET NO. 8 OF 97



SECTION A-A

SCALE 1:40

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 30 TONS/M.
4. THE CONTRACTOR SHALL DESIGN THE MECHANICAL COUPLING AND INSTALLATION. THE SHOP DRAWIGNS SHALL BE SUBMITTED TO DEDE. FOR APPROVAL PRIOR TO THE CONSTRUCTION.

0 1 2 3 4

SCALE 1:40 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
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KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
VALVE CHAMBER
SECTION

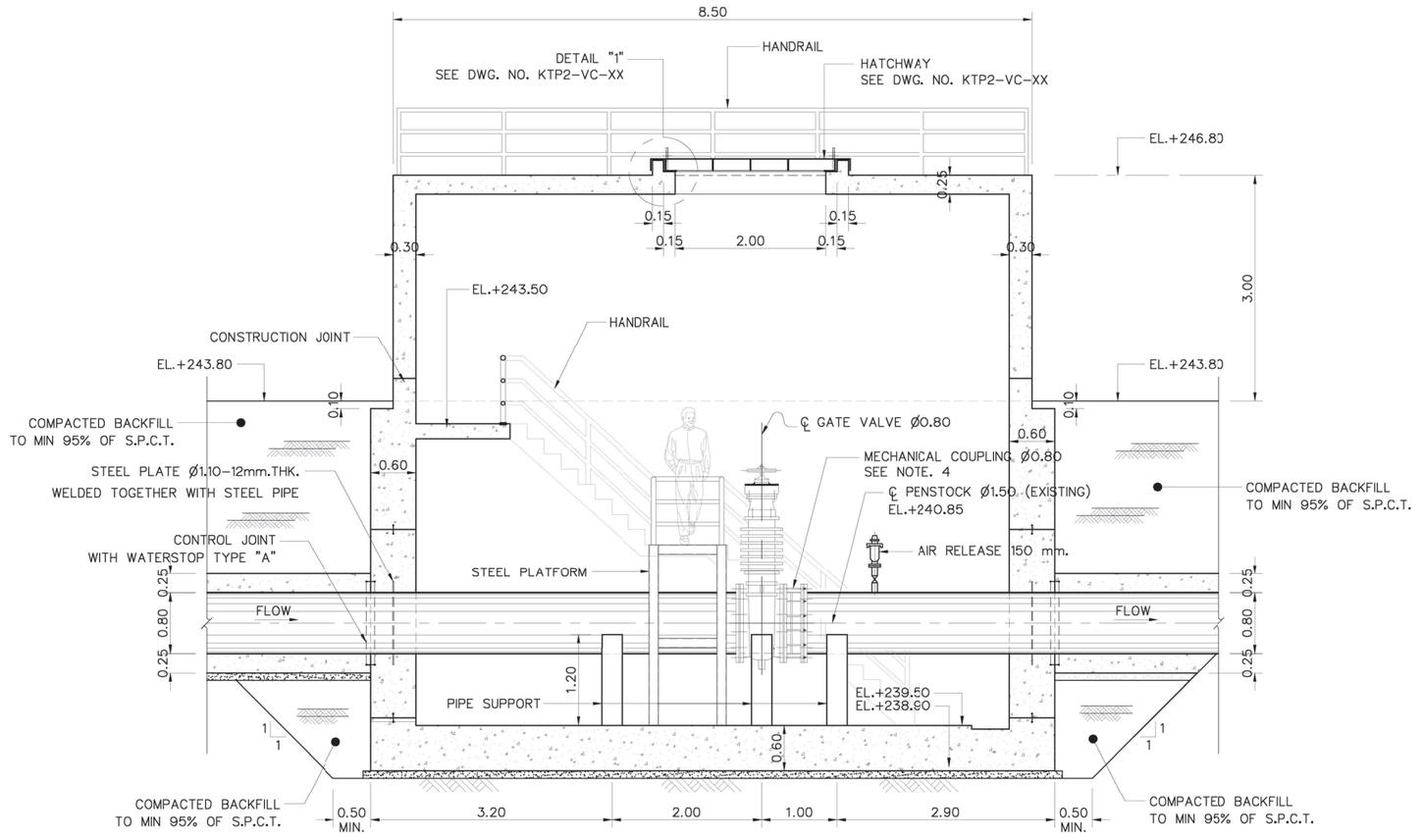
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DRAWING NO. KTP2-CH-03

SHEET NO. 9 OF 97



SECTION B-B

SCALE 1:40

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 30 TONS/M.
4. THE CONTRACTOR SHALL DESIGN THE MECHANICAL COUPLING AND INSTALLATION. THE SHOP DRAWIGNS SHALL BE SUBMITTED TO DEDE. FOR APPROVAL PRIOR TO THE CONSTRUCTION.

0 1 2 3 4

SCALE 1:40 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
VALVE CHAMBER
SECTION

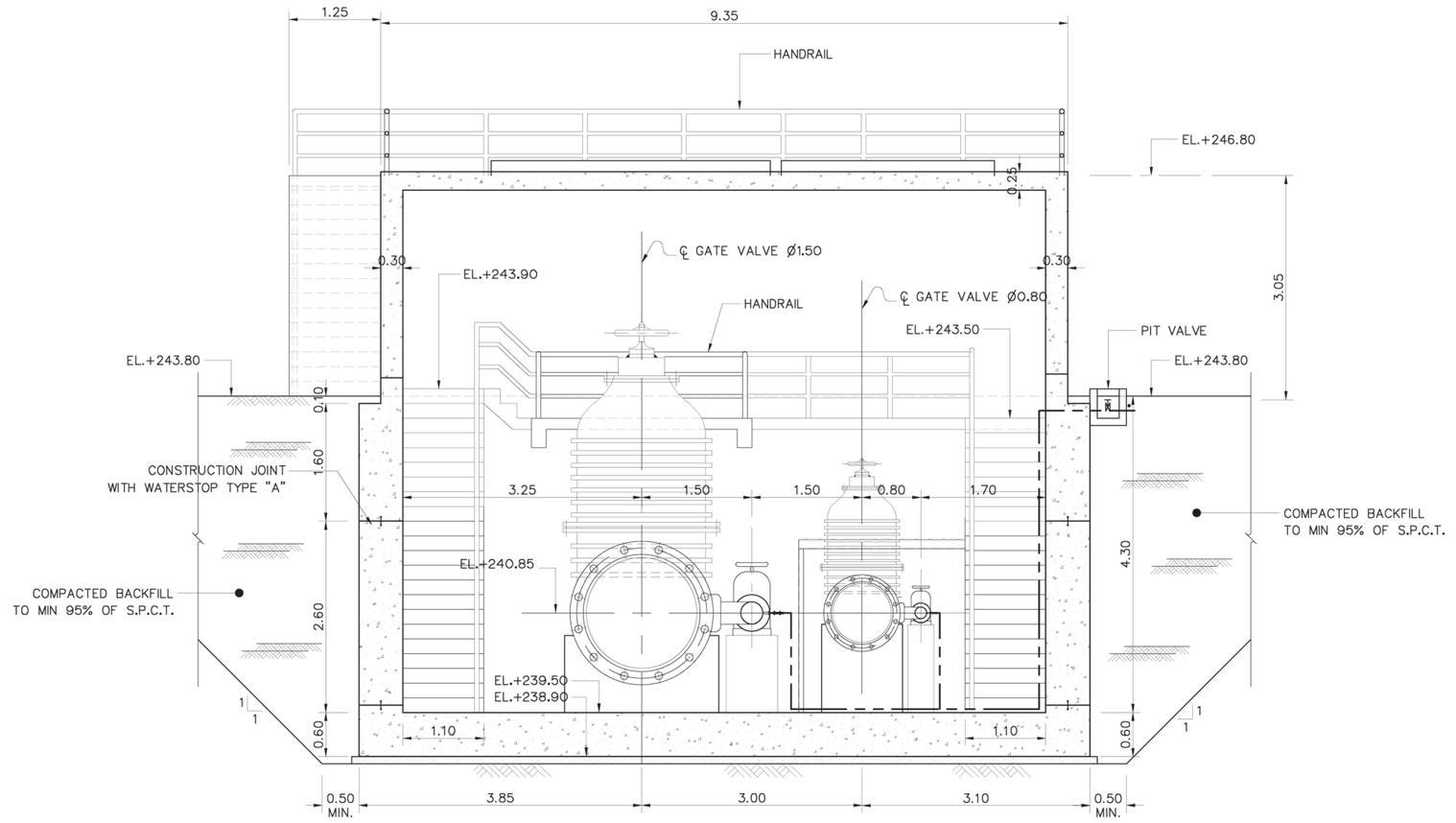
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Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DRAWING NO. KTP2-CH-04

SHEET NO. 10 OF 97



SECTION C–C

SCALE 1:40

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 30 TONS/M.
4. THE CONTRACTOR SHALL DESIGN THE MECHANICAL COUPLING AND INSTALLATION. THE SHOP DRAWIGNS SHALL BE SUBMITTED TO DEDE. FOR APPROVAL PRIOR TO THE CONSTRUCTION.

0 1 2 3 4

SCALE 1:40 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
VALVE CHAMBER
SECTION

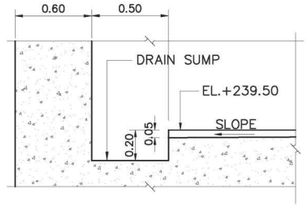
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PROJECT MANAGER	17/03/2020 DATE	APPROVED

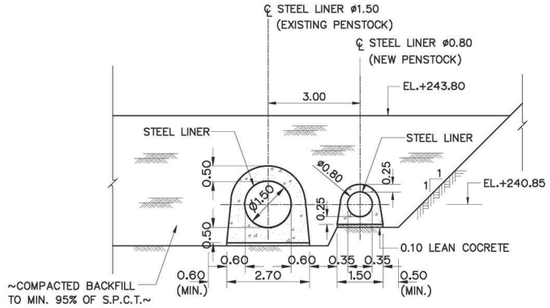
DRAWING NO. KTP2–CH–05

SHEET NO. 11 OF 97



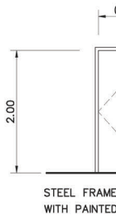
SECTION D–D

SCALE 1:20



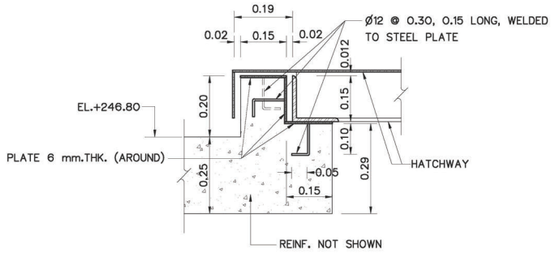
SECTION E–E

SCALE 1:100



DETAIL OF DOOR (D)

SCALE 1:50



DETAIL "1"

SCALE 1:10

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 30 TONS/M.
4. THE CONTRACTOR SHALL DESIGN THE MECHANICAL COUPLING AND INSTALLATION. THE SHOP DRAWIGNS SHALL BE SUBMITTED TO DEDE. FOR APPROVAL PRIOR TO THE CONSTRUCTION.

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1:10 METERS

0 0.2 0.4 0.8 1.2 1.6
SCALE 1:20 METERS

0 1 2 3 4
SCALE 1:50 METERS

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

VALVE CHAMBER

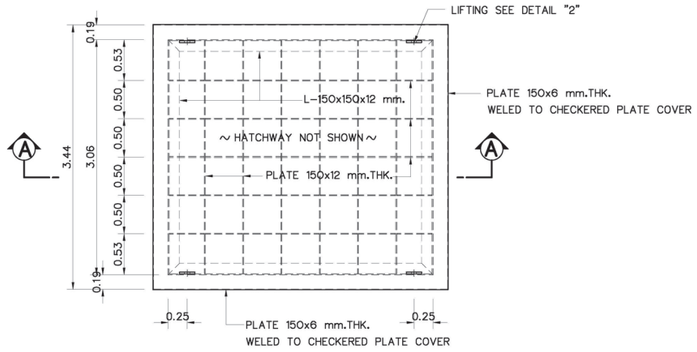
SECTION AND DETAILS

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED 28.1957
DRAWN
CHECKED 28.1957
PROJECT MANAGER 17/03/2020 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

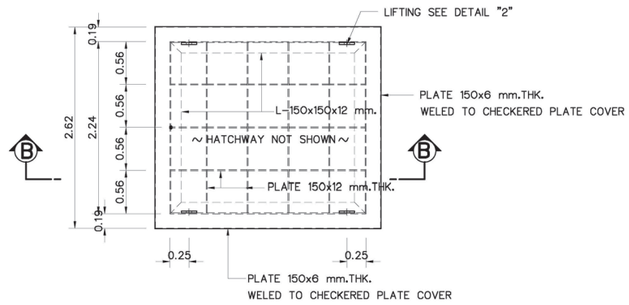
DRAWING NO. KTP2–CH–06
SHEET NO. 12 OF 97



HATCHWAY PLAN

SCALE 1:40

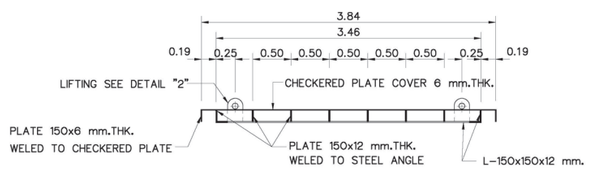
(SIZE 3.84x3.44)



HATCHWAY PLAN

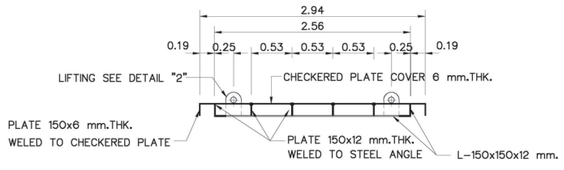
SCALE 1:40

(SIZE 2.94x2.62)



SECTION A-A

SCALE 1:40



SECTION B-B

SCALE 1:40

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, REINFORCEMENT BARS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. WELDING CONNECTION USE 6 MM. UNLESS OTHERWISE SHOWN.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

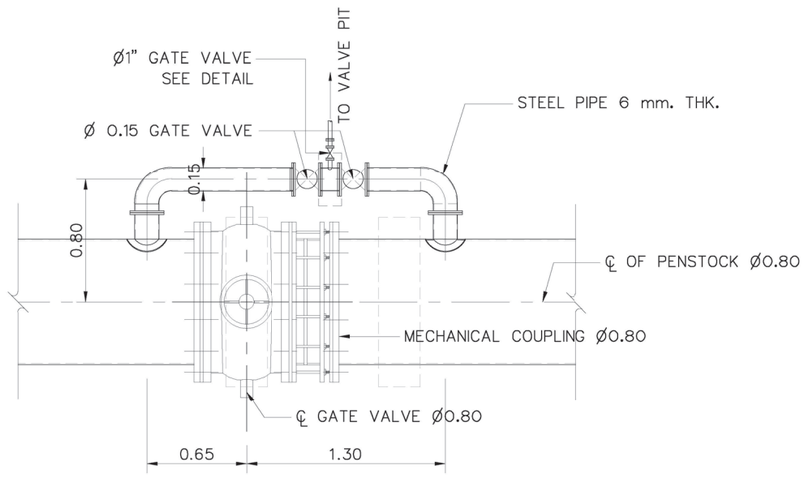
PART 1 : CIVIL WORKS
VALVE CHAMBER
GENERAL DETAILS

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED 28.1957
DRAWN
CHECKED 28.1957
PROJECT MANAGER 17/03/2020 DATE

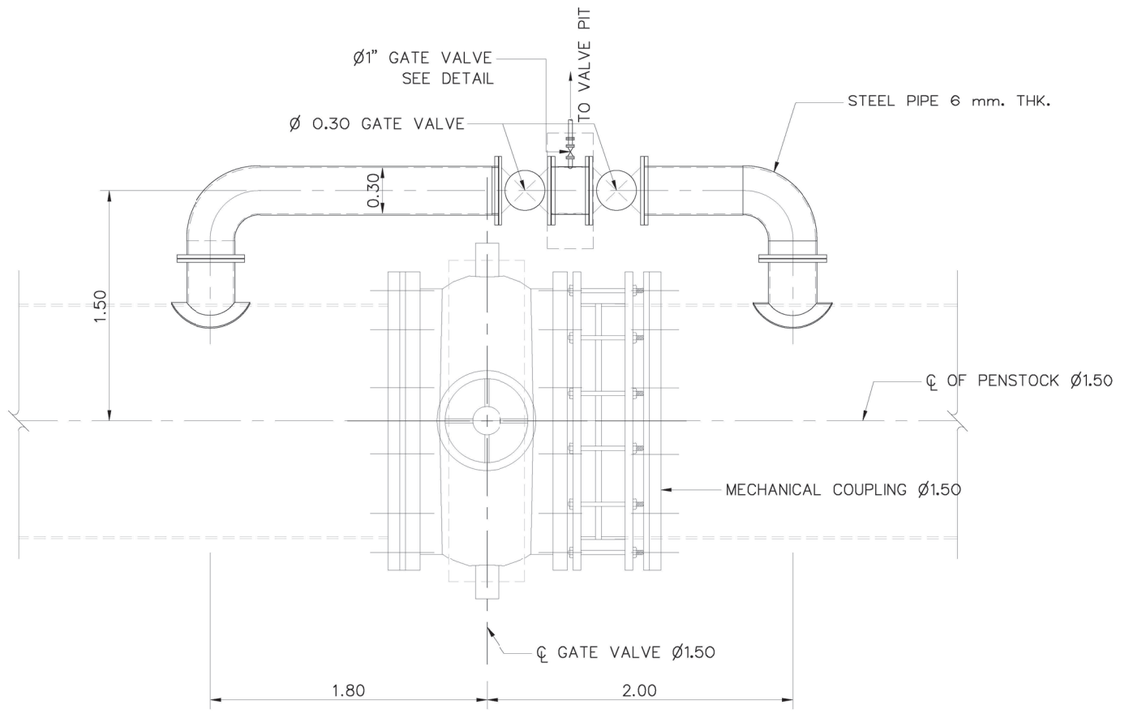
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2-CH-07
SHEET NO. 13 OF 97



DETAIL OF BYPASS PIPE PENSTOCK Ø0.80

SCALE 1:20



DETAIL OF BYPASS PIPE PENSTOCK Ø1.50

SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, REINFORCEMENT BARS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. WELDING CONNECTION USE 6 MM. UNLESS OTHERWISE SHOWN.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

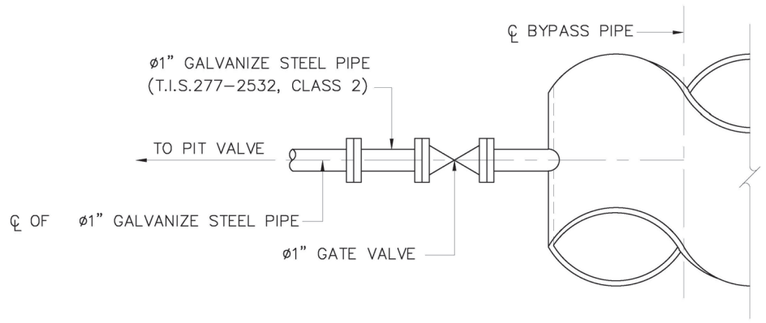
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
VALVE CHAMBER
GENERAL DETAILS

PCM P&C MANAGEMENT CO.,LTD.

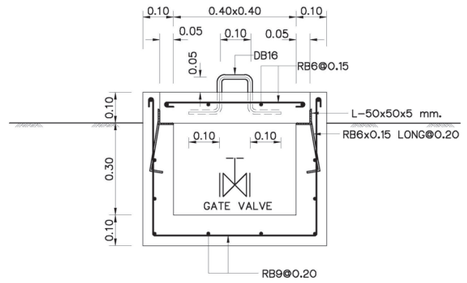
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DESIGNED	28.1957
DRAWN	
CHECKED	28.1957
PROJECT MANAGER	17/03/2020 DATE
DRAWING NO.	KTP2-CH-08
SHEET NO.	14 OF 97



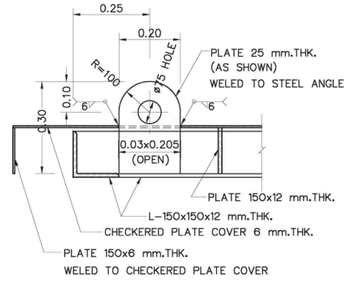
DETAIL OF GATE VALVE

NOT TO SCALE



PIT VALVE DETAIL

SCALE 1:10



DETAIL "2"

SCALE 1:10

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, REINFORCEMENT BARS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. WELDING CONNECTION USE 6 MM. UNLESS OTHERWISE SHOWN.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

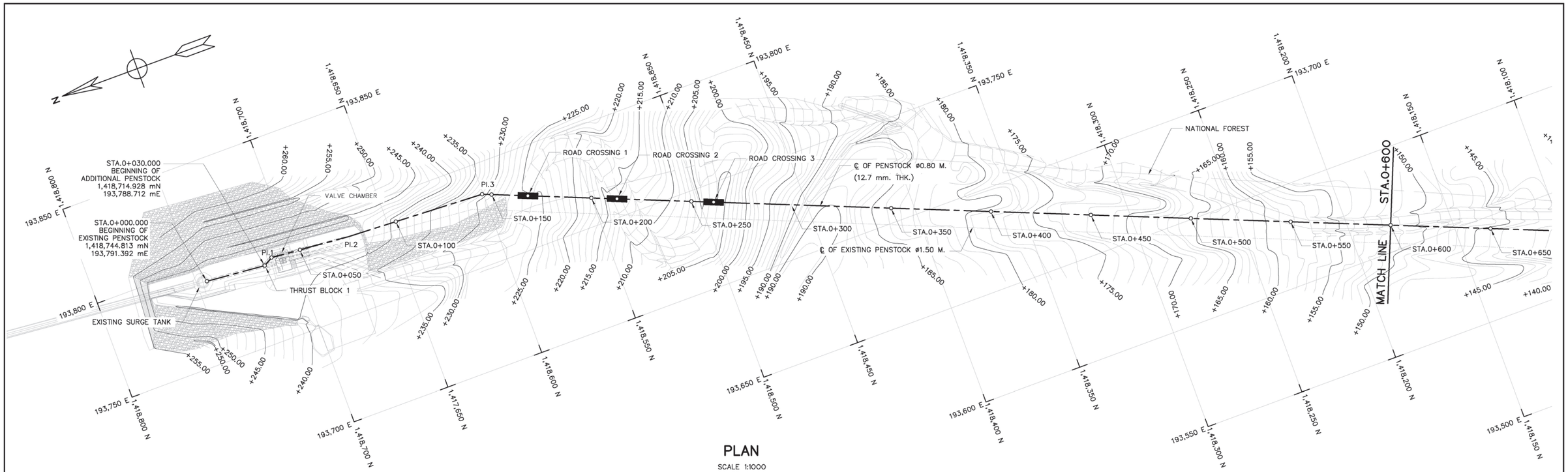
PART 1 : CIVIL WORKS
VALVE CHAMBER
GENERAL DETAILS

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED 28.1957
DRAWN
CHECKED 28.1957
PROJECT MANAGER 17/03/2020 DATE

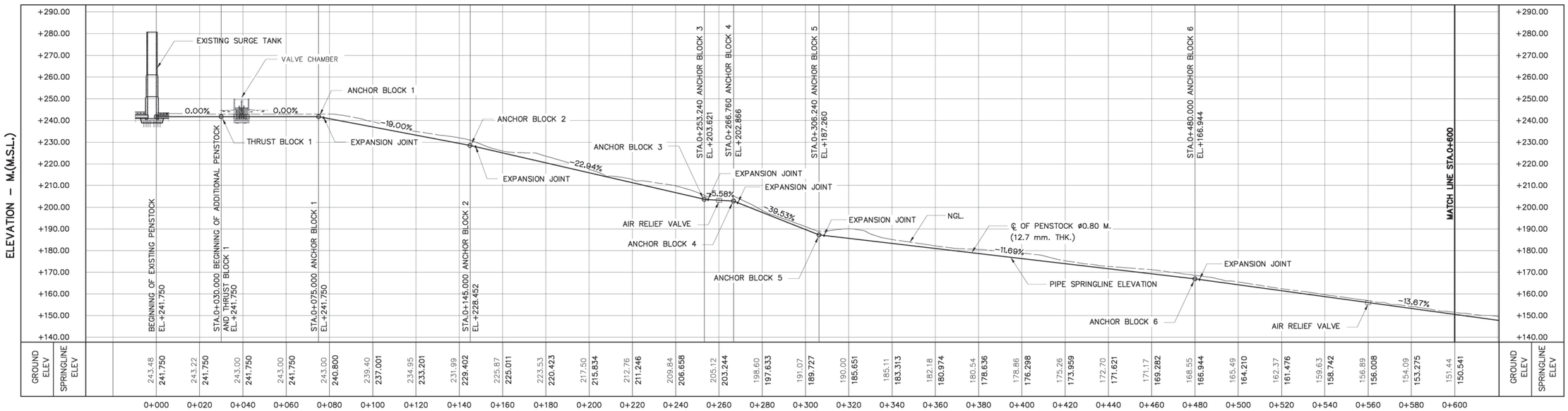
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2–CH–09
SHEET NO. 15 OF 97



PLAN

SCALE 1:1000



PROFILE

HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:1000

HORIZONTAL CURVE

NO. OF CURVE	PI. Sta.	PI. TO PI. m.	COORDINATE OF PI. N	COORDINATE OF PI. E	ANGLE I	BEARING
BEGIN	0+030.00		1,418,744.8093	193,791.3915		
		5.00				S5° 07' 30"W
PI.1	0+035.23		1,418,714.9292	193,788.7116	35°0'16.31"	
		40.045				S29° 52' 12"E
PI.2	0+075.28		1,418,710.3931	193,791.3169	2°30'6.82"	
		69.984				S5° 07' 26"W
PI.3	0+145.26		1,418,670.5083	193,787.7405	19°33'48.06"	
		715.00				S2° 37' 20"W
PI.4	0+860.26		1,418,600.5977	193,784.5388	13°46'18.57"	
		171.00				S22° 11' 07"W
PI.5	1+031.26		1,417,938.5310	193,514.5523	29°12'32.27"	
		157.15				S8° 24' 49"W
PI.6	1+188.41		1,417,769.3713	193,489.5323	45°18'9.22"	
		32.447				S37° 37' 21"W
END	1+220.86		1,417,644.8997	193,393.5984		

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. ALIGNMENT OF PENSTOCK SHALL BE JUSTIFIED BY FIELD ENGINEER IN THE FIELD TO SUIT THE TOPOGRAPHY
4. THE CONTRACTOR SHELL SUBMIT DETAILED WORKSHOP DRAWING FOR APPROVAL BY THE ENGINEER BEFORE MANUFACTURE OF PENSTOCK

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860 KTP2-PS-02

0 10 20 40 50 80
SCALE 1:1,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

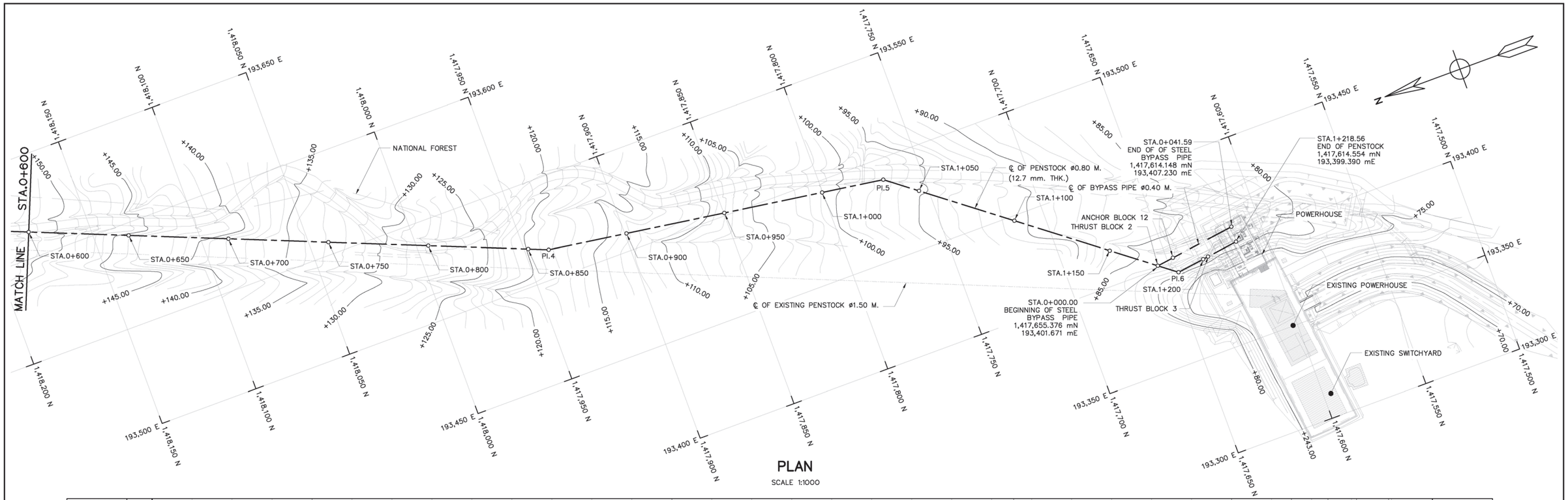
PENSTOCK

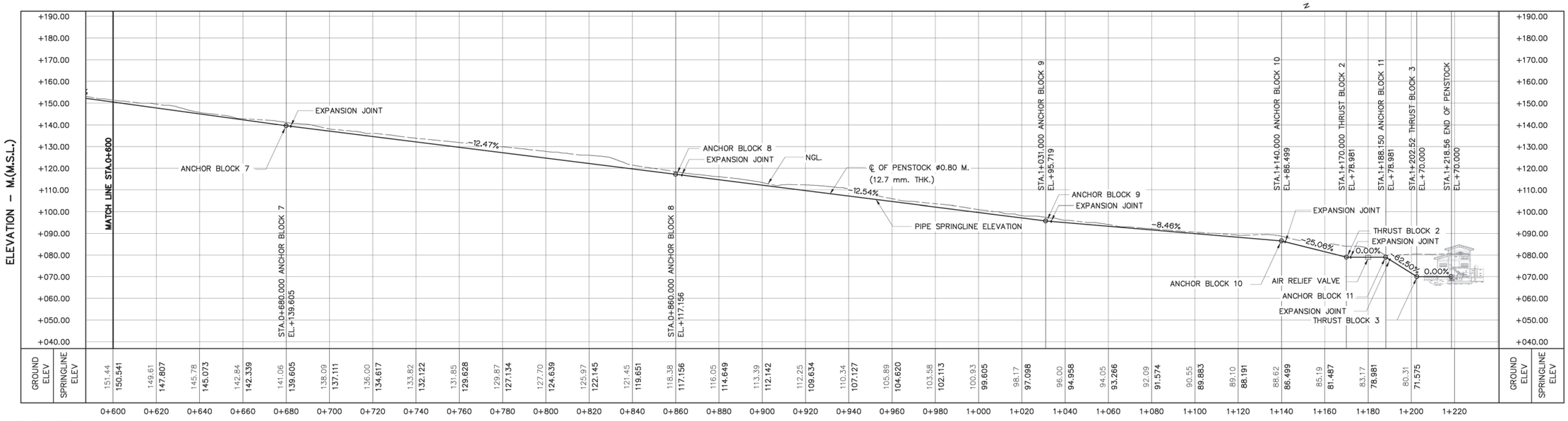
PLAN AND PROFILE, KM. 0+000 TO KM. 0+600

PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED			
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO.	KTP2-PS-01
		SHEET NO.	16 OF 97





PROFILE

HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:1000

HORIZONTAL CURVE

NO. OF CURVE	PI. Sta.	PI. TO PI. m.	COORDINATE OF PI. N	COORDINATE OF PI. E	ANGLE I	BEARING
BEGIN	0+030.00		1,418,744.8093	193,791.3915		
		5.00				S5° 07' 30"W
PI.1	0+035.23		1,418,714.9292	193,788.7116	35°0'16.31"	
		40.045				S29° 52' 12"E
PI.2	0+075.28		1,418,710.3931	193,791.3169	2°30'6.82"	
		69.984				S5° 07' 26"W
PI.3	0+145.26		1,418,670.5083	193,787.7405	19°33'48.06"	
		715.00				S2° 37' 20"W
PI.4	0+860.26		1,418,600.5977	193,784.5388	13°46'18.57"	
		171.00				S22° 11' 07"W
PI.5	1+031.26		1,417,938.5310	193,514.5523	29°12'32.27"	
		157.15				S8° 24' 49"W
PI.6	1+188.41		1,417,769.3713	193,489.5323	45°18'9.22"	
		32.447				S37° 37' 21"W
END	1+220.86		1,417,644.8997	193,393.5984		

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. ALIGNMENT OF PENSTOCK SHALL BE JUSTIFIED BY FIELD ENGINEER IN THE FIELD TO SUIT THE TOPOGRAPHY
4. THE CONTRACTOR SHELL SUBMIT DETAILED WORKSHOP DRAWING FOR APPROVAL BY THE ENGINEER BEFORE MANUFACTURE OF PENSTOCK

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, KM. 0+000 TO KM. 0+600 KTP2-PS-01

SCALE 1:1,000
0 10 20 40 50 80
METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

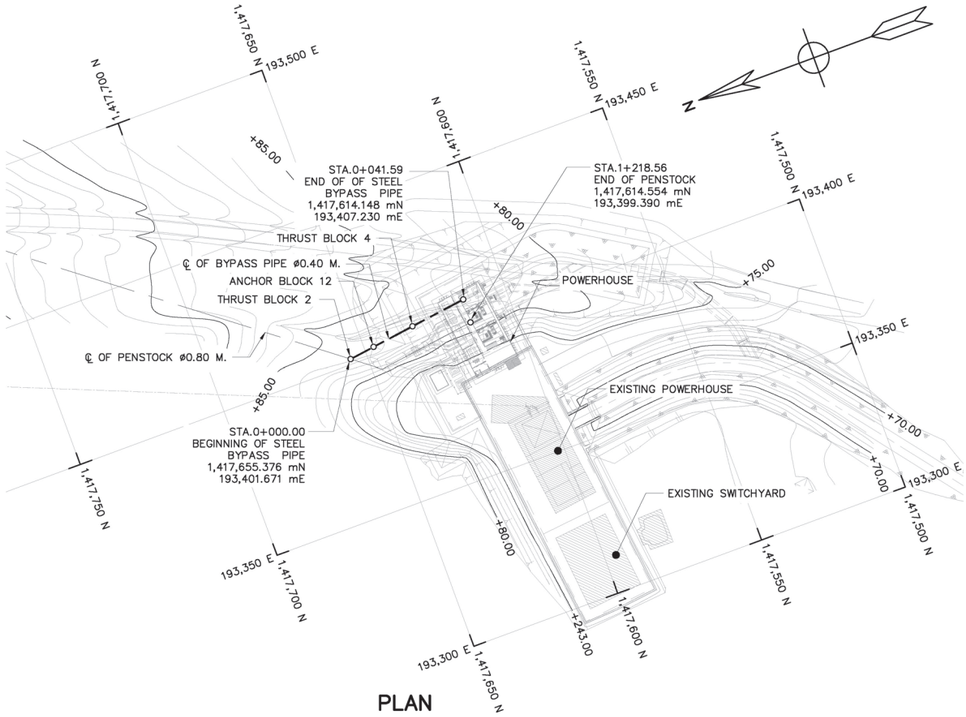
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
PENSTOCK
PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860

PCM P&C MANAGEMENT CO.,LTD.

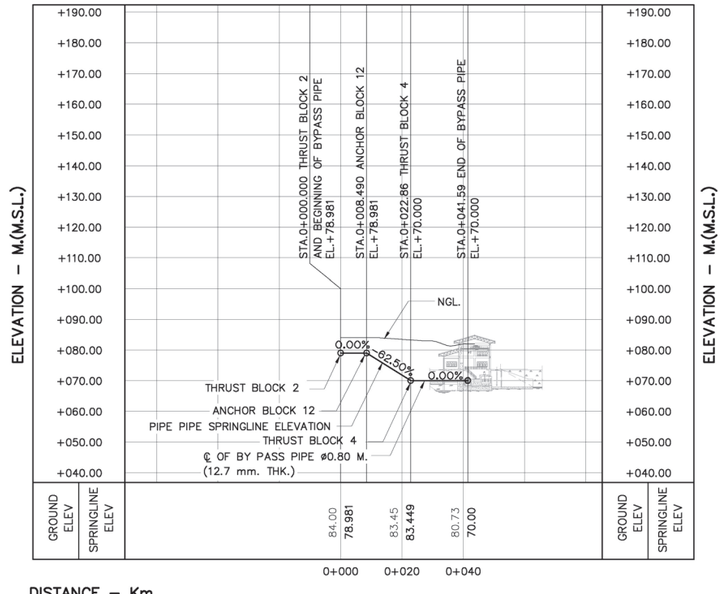
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2-PS-02
		SHEET NO.	17 OF 97



PLAN

SCALE 1:1000



PROFILE

HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:1000

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. ALIGNMENT OF PENSTOCK SHALL BE JUSTIFIED BY FIELD ENGINEER IN THE FIELD TO SUIT THE TOPOGRAPHY
4. THE CONTRACTOR SHELL SUBMIT DETAILED WORKSHOP DRAWING FOR APPROVAL BY THE ENGINEER BEFORE MANUFACTURE OF PENSTOCK

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860 KTP2–PS–02

0 10 20 40 50 80
SCALE 1:1,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

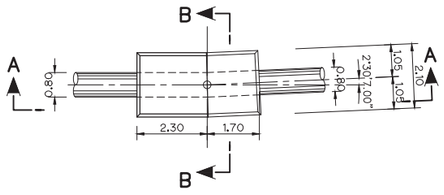
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

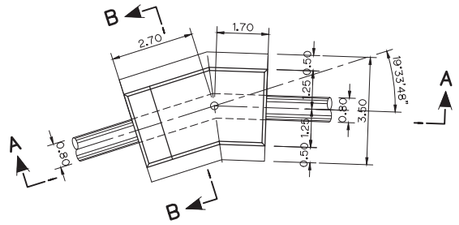
PENSTOCK

PLAN AND PROFILE OF BYPASS PIPE, KM. 0+000 TO KM. 0+043.70

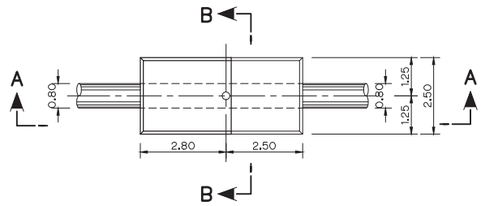
PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2–PS–03	SHEET NO. 18 OF 97



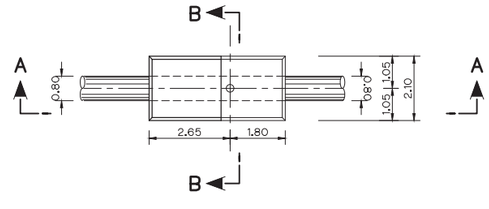
PLAN
ANCHOR BLOCK (1)
SCALE 1:100



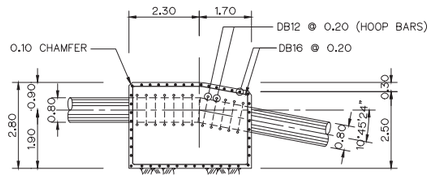
PLAN
ANCHOR BLOCK (2)
SCALE 1:100



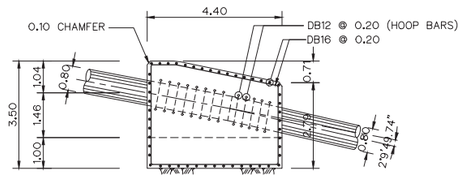
PLAN
ANCHOR BLOCK (3)
SCALE 1:100



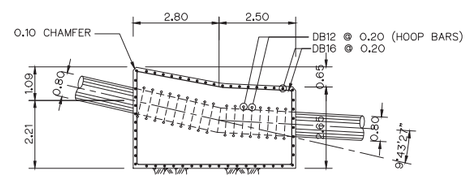
PLAN
ANCHOR BLOCK (4)
SCALE 1:100



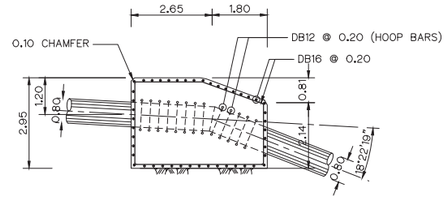
SECTION A–A
ANCHOR BLOCK (1)
SCALE 1:100



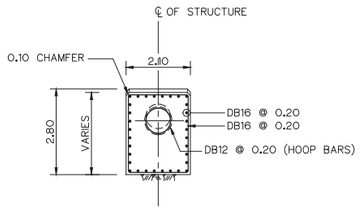
SECTION A–A
ANCHOR BLOCK (2)
SCALE 1:100



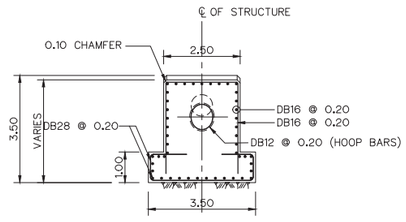
SECTION A–A
ANCHOR BLOCK (3)
SCALE 1:100



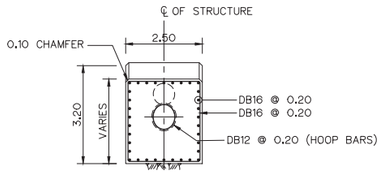
SECTION A–A
ANCHOR BLOCK (4)
SCALE 1:100



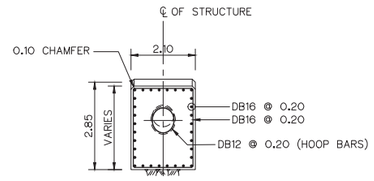
SECTION B–B
ANCHOR BLOCK (1)
SCALE 1:100



SECTION B–B
ANCHOR BLOCK (2)
SCALE 1:100



SECTION B–B
ANCHOR BLOCK (3)
SCALE 1:100



SECTION B–B
ANCHOR BLOCK (4)
SCALE 1:100

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. CONCRETE COVER OF STEEL BARS 8.0 CM.
4. REINFORCED CONCRETE IS PLAIN CONCRETE WITH 40% DUMPED ROCK
5. CORROSIVE PROTECTION IS WARNED TO STRICTLY FOLLOW PAINTING SPECIFICATION

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, STA. 0+000 TO STA. 0+600 KTP2–PS–01

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

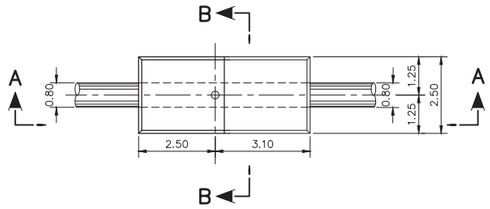
PART 1 : CIVIL WORKS
PENSTOCK
ANCHOR BLOCK NO. 1, 2 ,3 AND 4 – PLAN AND SECTIONS

PCM P&C MANAGEMENT CO.,LTD.

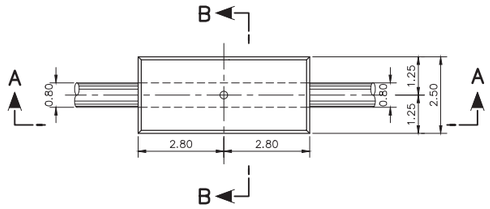
DESIGNED	28.1.1957	REVIEWED
DRAWN		SUBMITTED
CHECKED	28.1.1957	RECOMMENDED
PROJECT MANAGER	17/03/2020 DATE	APPROVED

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

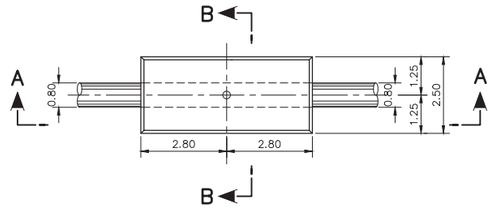
DRAWING NO. KTP2–PS–04
SHEET NO. 19 OF 97



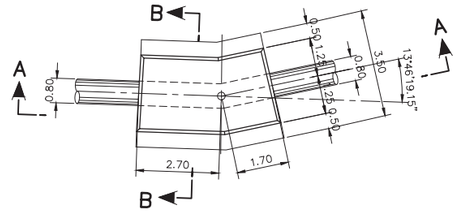
PLAN
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SCALE 1:100



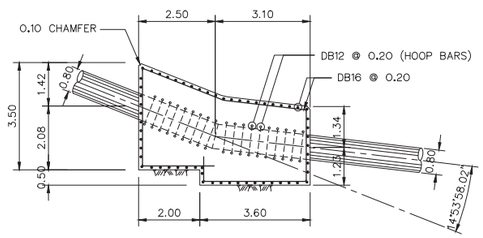
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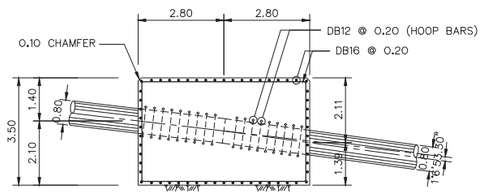
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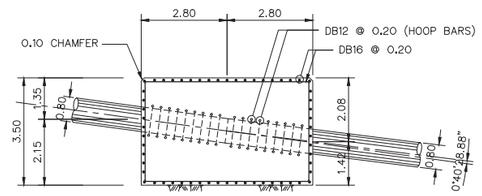
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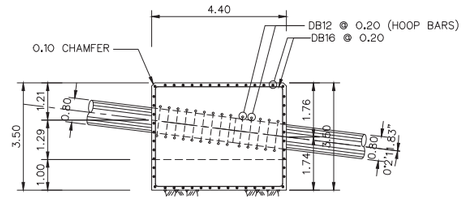
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ANCHOR BLOCK (5)
SCALE 1:100



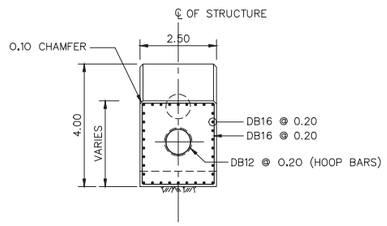
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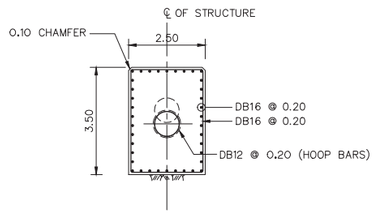
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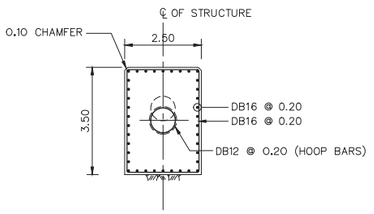
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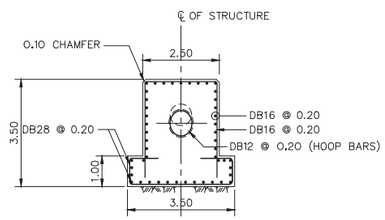
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ANCHOR BLOCK (5)
SCALE 1:100



SECTION B–B
ANCHOR BLOCK (6)
SCALE 1:100



SECTION B–B
ANCHOR BLOCK (7)
SCALE 1:100



SECTION B–B
ANCHOR BLOCK (8)
SCALE 1:100

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. CONCRETE COVER OF STEEL BARS 8.0 CM.
4. REINFORCED CONCRETE IS PLAIN CONCRETE WITH 40% DUMPED ROCK
5. CORROSIVE PROTECTION IS WARNED TO STRICTLY FOLLOW PAINTING SPECIFICATION

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, STA. 0+000 TO STA. 0+600	KTP2–PS–01
2. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860	KTP2–PS–02

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

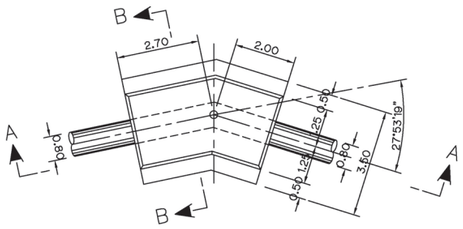
PENSTOCK

ANCHOR BLOCK NO. 5, 6 ,7 AND 8 – PLAN AND SECTIONS

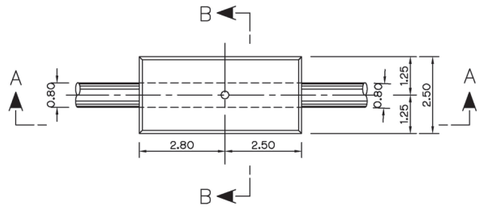
PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

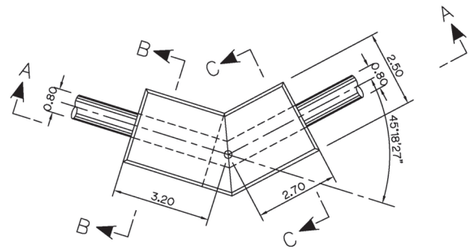
DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2–PS–05
		SHEET NO.	20 OF 97



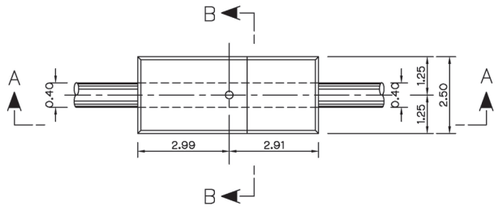
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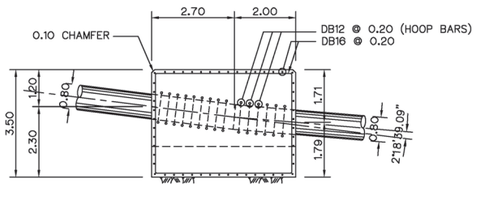
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ANCHOR BLOCK (10)
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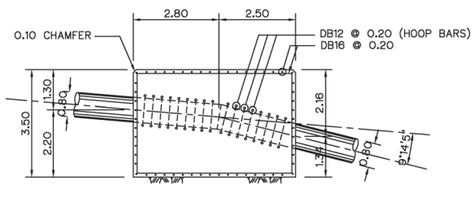
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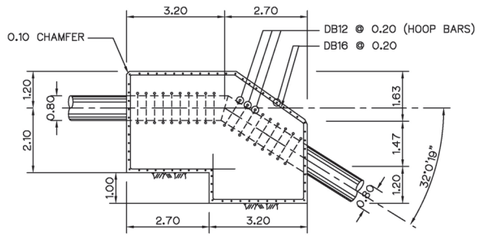
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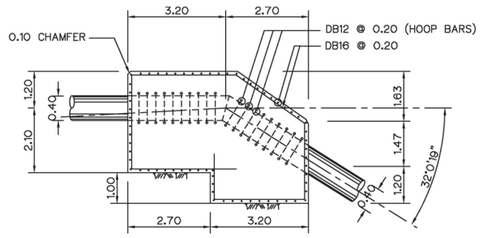
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ANCHOR BLOCK (9)
SCALE 1:100



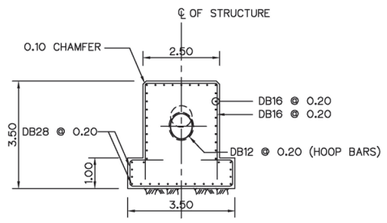
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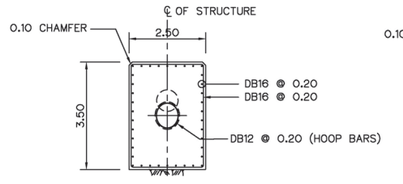
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ANCHOR BLOCK (11)
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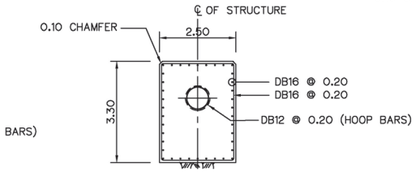
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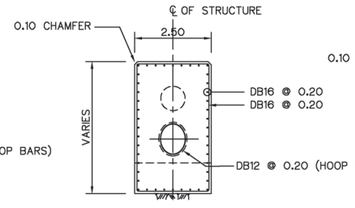
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ANCHOR BLOCK (9)
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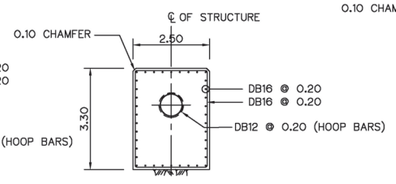
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ANCHOR BLOCK (10)
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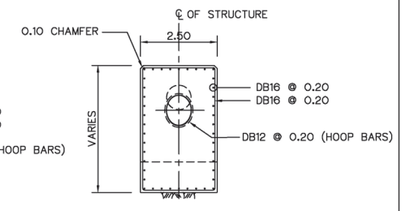
SECTION B–B
ANCHOR BLOCK (11)
SCALE 1:100



SECTION C–C
ANCHOR BLOCK (11)
SCALE 1:100



SECTION B–B
ANCHOR BLOCK (12)
SCALE 1:100



SECTION C–C
ANCHOR BLOCK (12)
SCALE 1:100

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. KTP2–GN–03
3. CONCRETE COVER OF STEEL BARS 8.0 CM.
4. REINFORCED CONCRETE IS PLAIN CONCRETE WITH 40% DUMPED ROCK
5. CORROSIVE PROTECTION IS WARNED TO STRICTLY FOLLOW PAINTING SPECIFICATION

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860 KTP2–PS–02

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

PENSTOCK

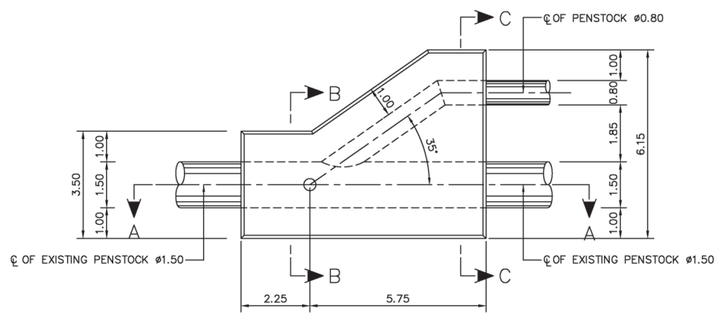
ANCHOR BLOCK NO. 9, 10, 11 AND 12 – PLAN AND SECTIONS

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED	28.1957
DRAWN	
CHECKED	28.1957
PROJECT MANAGER	17/03/2020

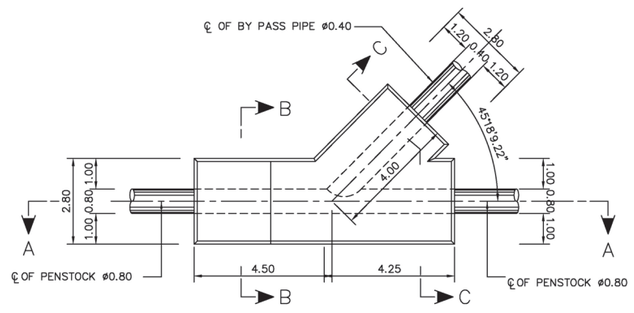
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

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SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	KTP2–PS–06
SHEET NO.	21 OF 97



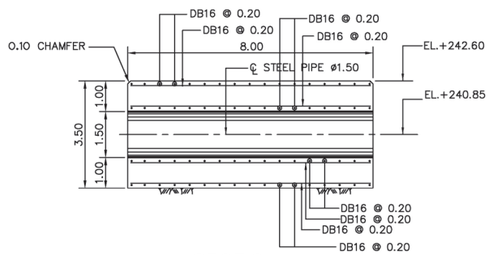
PLAN OF THRUST BLOCK ①

SCALE 1:100



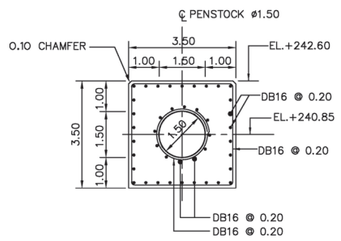
PLAN OF THRUST BLOCK ②

SCALE 1:100



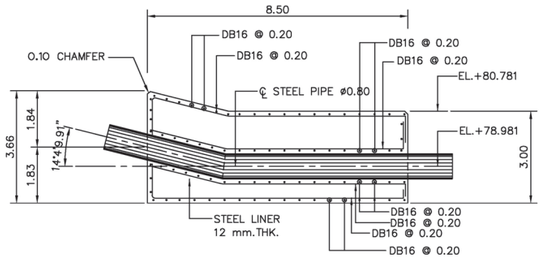
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SCALE 1:100



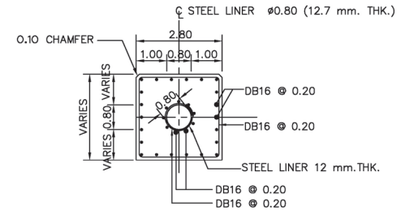
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SCALE 1:100



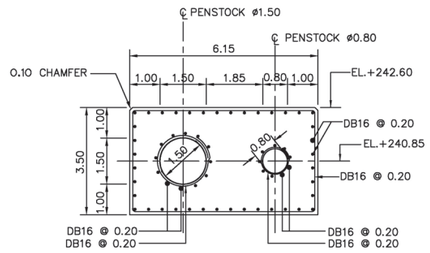
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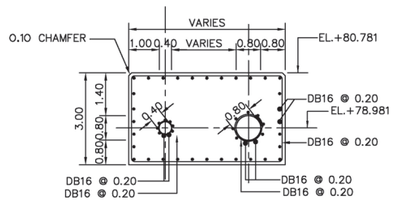
SECTION B–B

SCALE 1:100



SECTION C–C

SCALE 1:100



SECTION C–C

SCALE 1:100

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. CONCRETE COVER OF STEEL BARS 8.0 CM.
4. REINFORCED CONCRETE IS PLAIN CONCRETE WITH 40% DUMPED ROCK
5. CORROSIVE PROTECTION IS WARNED TO STRICTLY FOLLOW PAINTING SPECIFICATION

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, STA. 0+000 TO STA. 0+600	KTP2–PS–01
2. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860	KTP2–PS–02

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
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KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

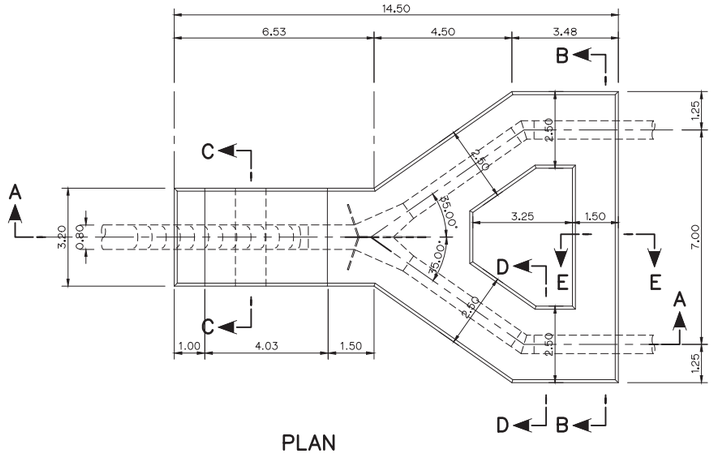
PENSTOCK

THRUST BLOCK NO. 1 AND 2 – PLAN AND SECTIONS

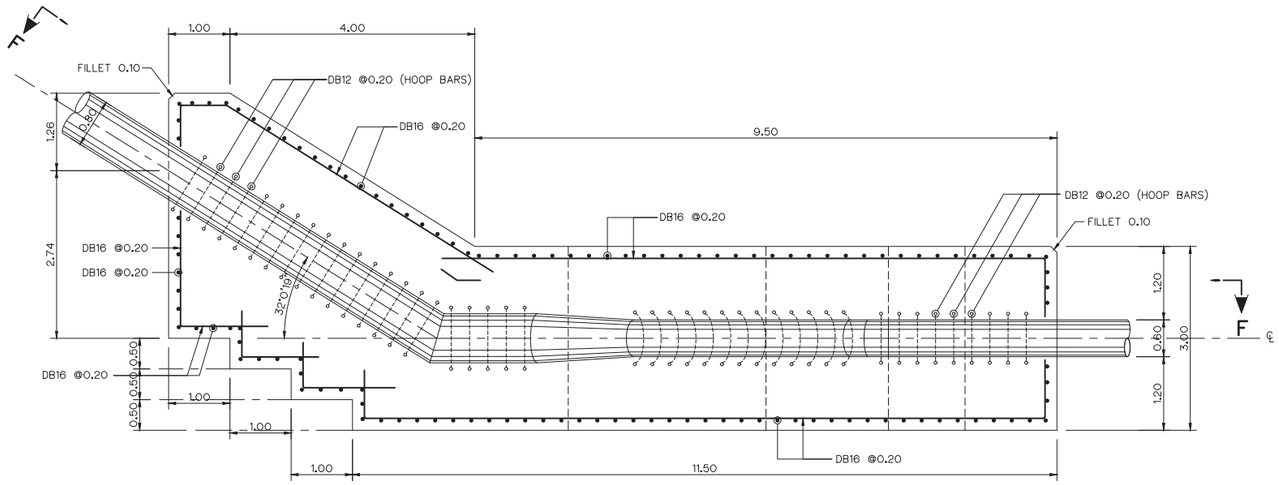
PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

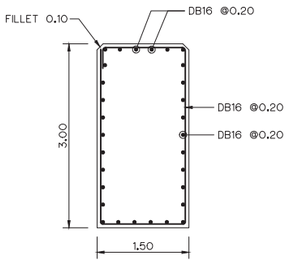
REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DESIGNED 28.1957	
DRAWN	
CHECKED 28.1957	
PROJECT MANAGER 17/03/2020 DATE	DRAWING NO. KTP2–PS–07
	SHEET NO. 22 OF 97



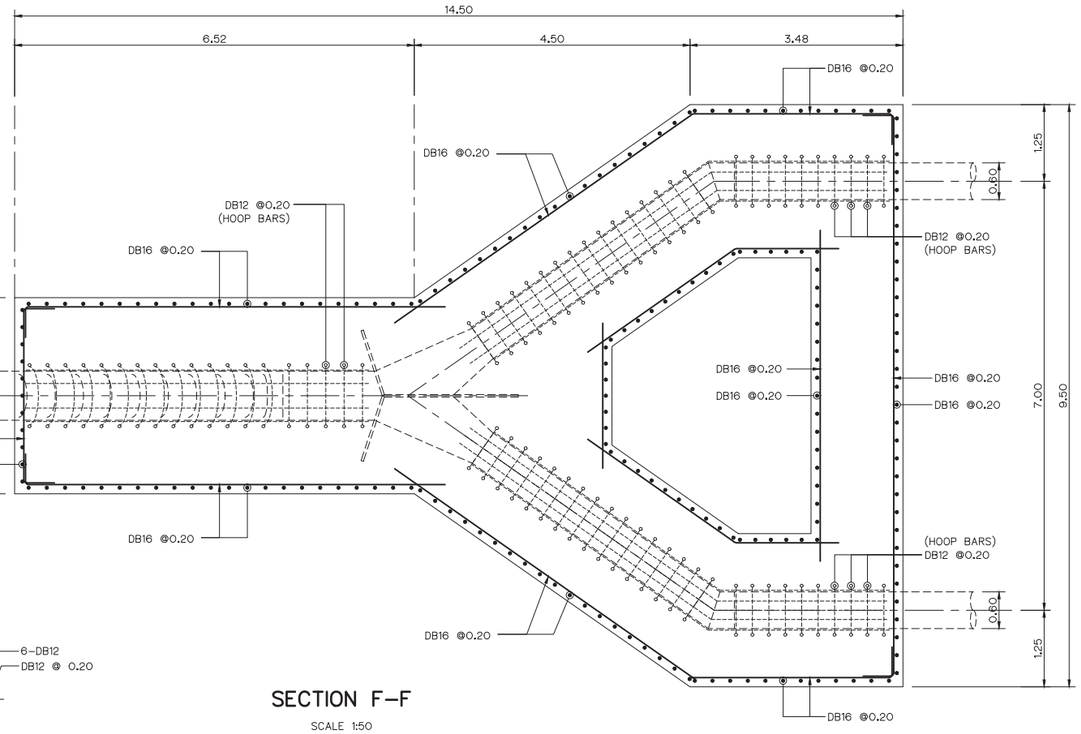
PLAN
ANCHOR BLOCK (3)
SCALE 1:100



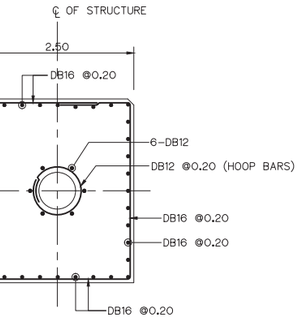
SECTION A–A
SCALE 1:50



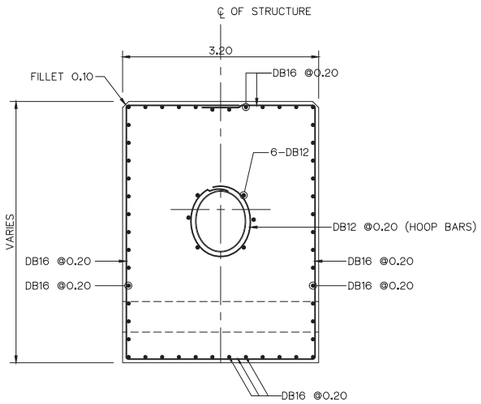
SECTION E–E
SCALE 1:50



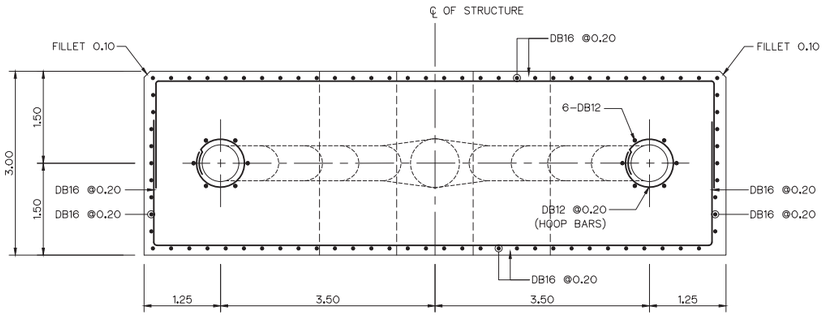
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SCALE 1:50



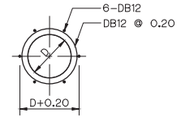
SECTION D–D
SCALE 1:50



SECTION C–C
SCALE 1:50



SECTION B–B
SCALE 1:50



TYPICAL HOOP BAR
SCALE 1:50

0 0.5 1.0 2.0 3.0 4.0
SCALE 1:50 METERS

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NOTES :
1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. CONCRETE COVER OF STEEL BARS 8.0 CM.
4. REINFORCED CONCRETE IS PLAIN CONCRETE WITH 40% DUMPED ROCK
5. CORROSIVE PROTECTION IS WARNED TO STRICTLY FOLLOW PAINTING SPECIFICATION

REFERENCE DRAWING :
1. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860 KTP2–PS–02

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
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MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

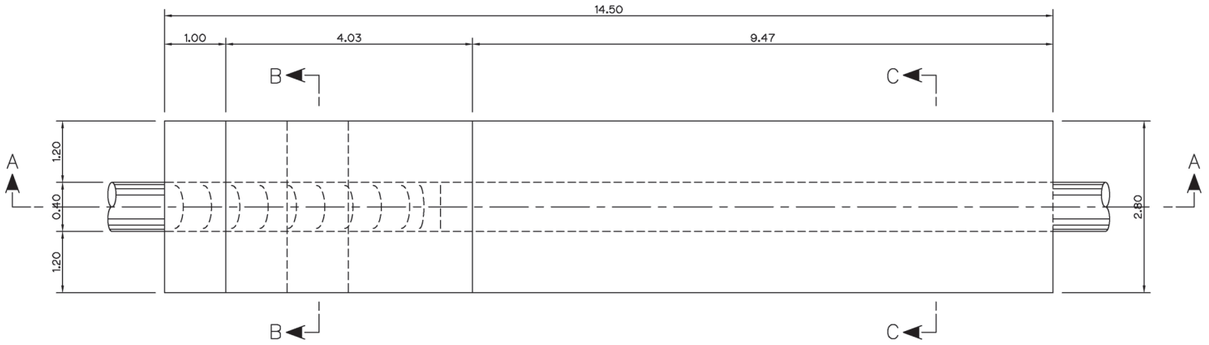
PART 1 : CIVIL WORKS
PENSTOCK
THRUST BLOCK NO. 3 – PLAN AND SECTIONS

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED	28.1957	
DRAWN		
CHECKED	28.1957	
PROJECT MANAGER	17/03/2020	DATE

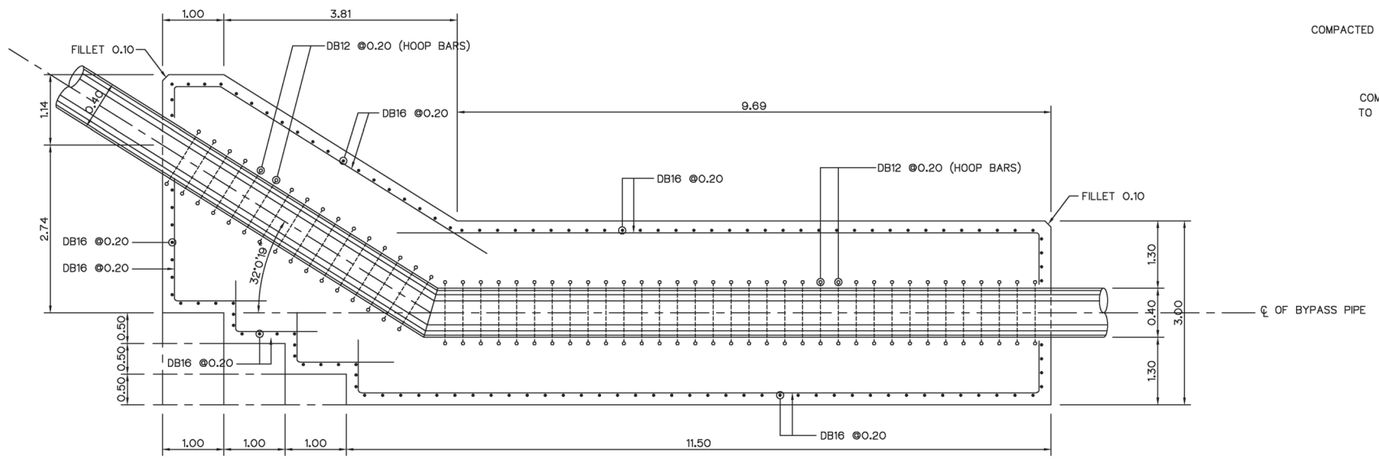
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	KTP2–PS–08
SHEET NO.	23 OF 97



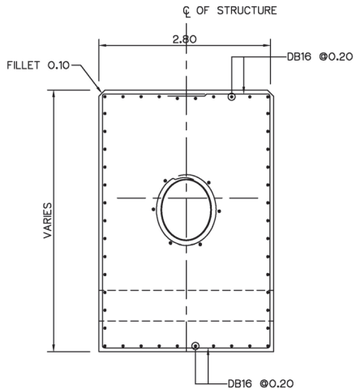
PLAN OF THRUST BLOCK ④

SCALE 1:50



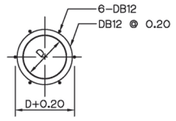
SECTION A–A

SCALE 1:50



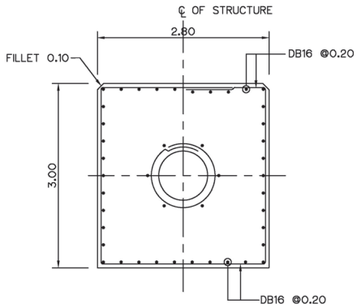
SECTION B–B

SCALE 1:50



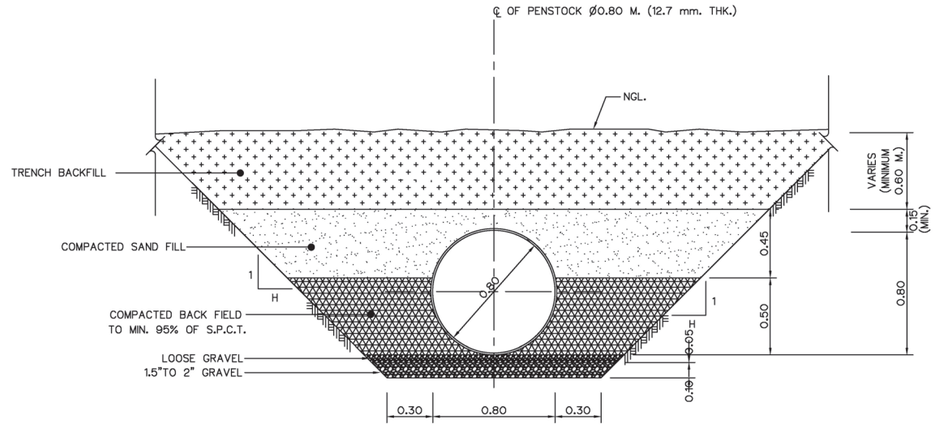
TYPICAL HOOP BAR

SCALE 1:50



SECTION C–C

SCALE 1:50



TYPICAL SECTION OF BURIED PENSTOCK

SCALE 1:20

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. CONCRETE COVER OF STEEL BARS 8.0 CM.
4. REINFORCED CONCRETE IS PLAIN CONCRETE WITH 40% DUMPED ROCK
5. CORROSIVE PROTECTION IS WARNED TO STRICTLY FOLLOW PAINTING SPECIFICATION

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860 KTP2–PS–01

0 0.1 0.5 1 1.5
SCALE 1:20 METERS

0 0.5 1.0 2.0 3.0 4.0
SCALE 1:50 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
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2				
1				
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KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

PENSTOCK

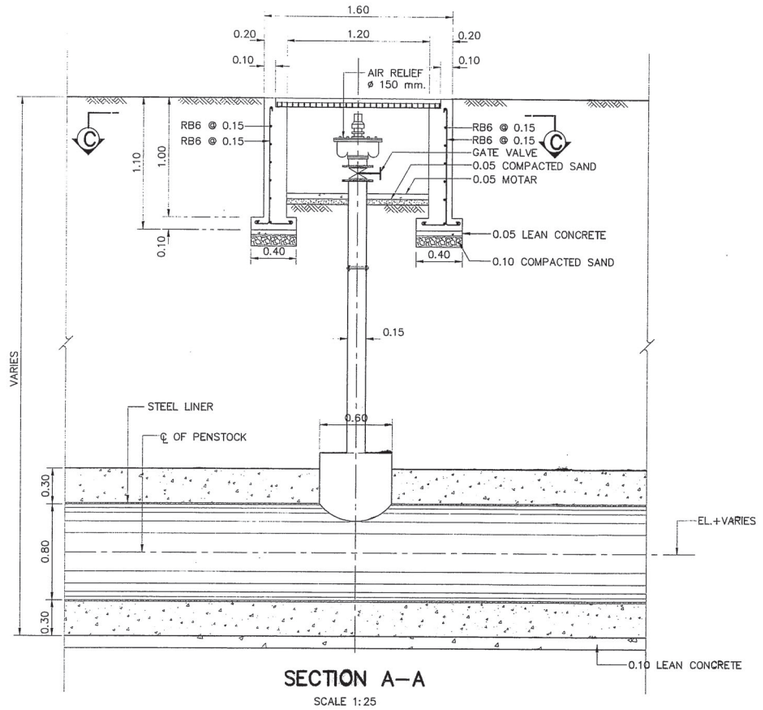
THRUST BLOCK NO. 4 – PLAN AND SECTIONS AND TYPICAL SECTION

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED	2E.1957	
DRAWN		
CHECKED	2E.1957	
PROJECT MANAGER	17/03/2020	DATE

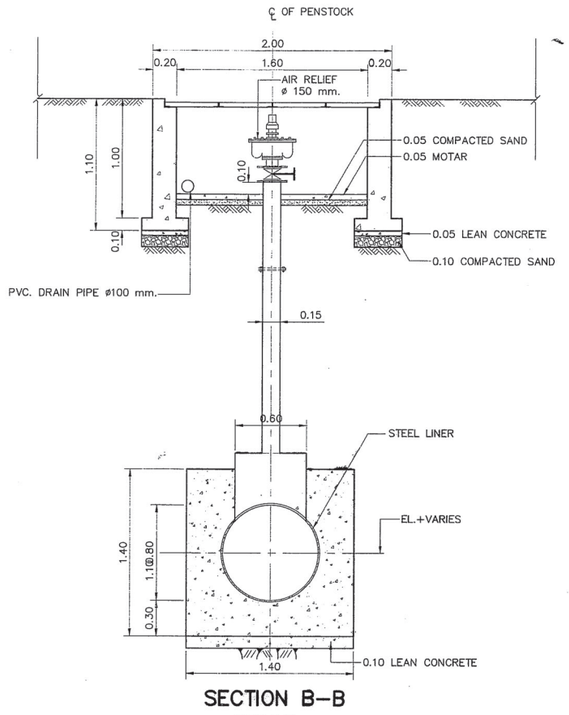
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	KTP2–PS–09
SHEET NO.	24 OF 97



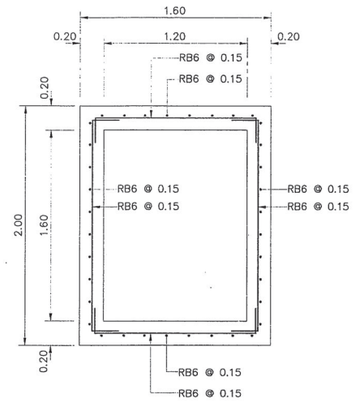
SECTION A–A

SCALE 1:25



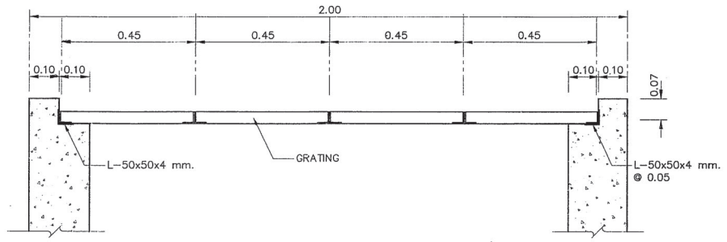
SECTION B–B

SCALE 1:25



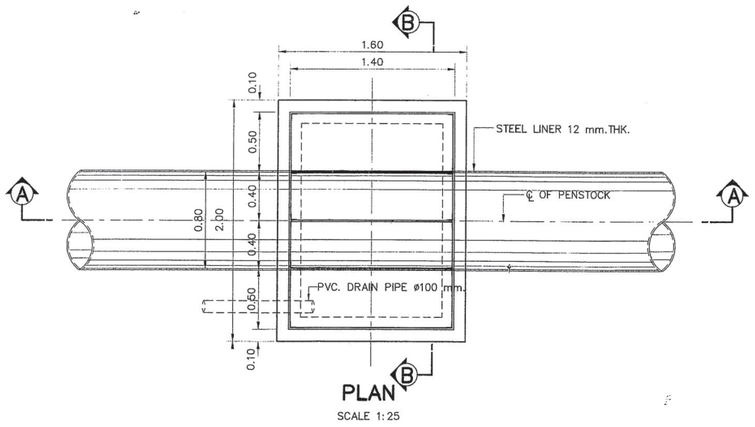
SECTION C–C

SCALE 1:25



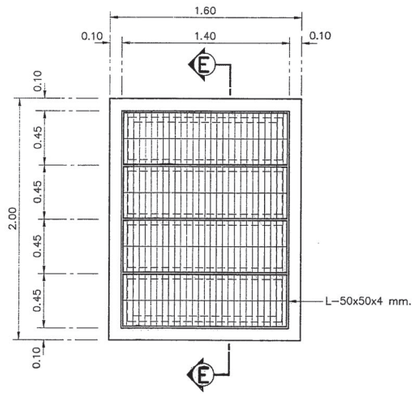
SECTION E–E

SCALE 1:10



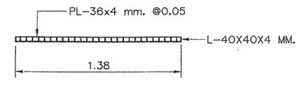
PLAN

SCALE 1:25



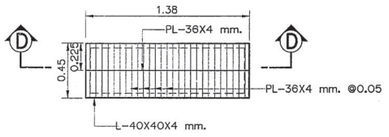
DETAIL MANHOLE

SCALE 1:25



SECTION D–D

SCALE 1:25



DETAIL OF GRATING

SCALE 1:25

0 0.10 0.2 0.4 0.6 0.8
SCALE 1:10 METERS

0 0.25 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03

REFERENCE DRAWINGS :

1. PENSTOCK, PLAN AND PROFILE, KM. 0+000 TO KM. 0+600	KTP2–PS–01
2. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860	KTP2–PS–02

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

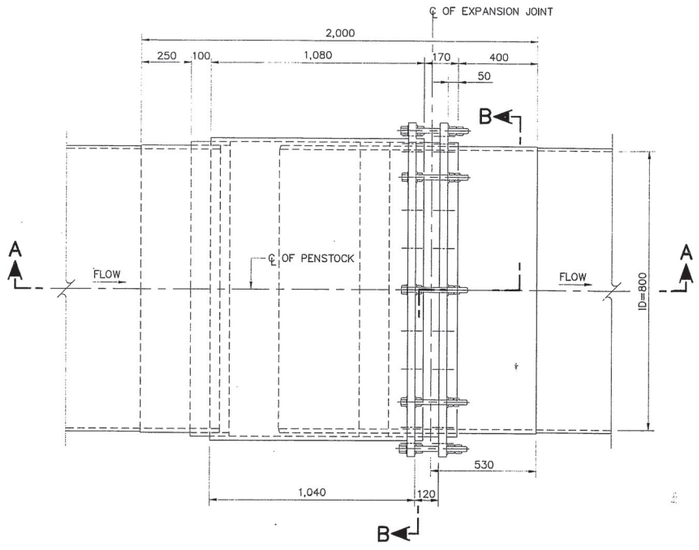
PART 1 : CIVIL WORKS
PENSTOCK
DETAILS AIR RELIEF VALVE AND INSTALLATION

PCM P&C MANAGEMENT CO.,LTD.

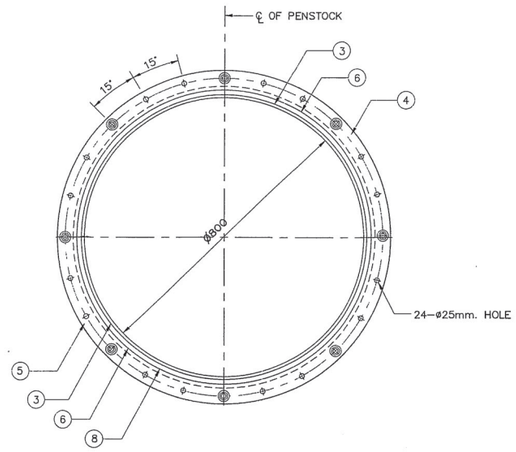
DESIGNED	28.1.1957	
DRAWN		
CHECKED	28.1.1957	
PROJECT MANAGER	17/03/2020	DATE

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RECOMMENDED	
APPROVED	
DRAWING NO.	KTP2–PS–10
SHEET NO.	25 OF 97



ELEVATION
SCALE 1:7.5



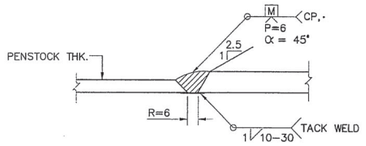
SECTION B–B
SCALE 1:7.5

TABLE OF DETAIL 1 SQUARE – GROOVE WELD , BUTT JOINT

ITEM	DESCRIPTION	MATERIAL	QUANT.	REMARKS
1	PENSTOCK	ASTM A–283, GRADE D	–	---
2	PENSTOCK	ASTM A–283, GRADE D	1	NOTE 2 & 3
3	INNER SLEEVE	ASTM A–283, GRADE D	1	NOTE 2 & 4
4	GRAND RING	ASTM A–283, GRADE D	1	SEAMLESS, NOTE 3
5	OUTER RING	ASTM A–283, GRADE D	1	SEAMLESS, NOTE 3
6	STUFFING BOX	ASTM A–283, GRADE D	1	NOTE 2 & 3
7	DOUBLING PLATE	ASTM A–283, GRADE D	1	NOTE 2 & 3
8	OUTER SLEEVE	ASTM A–283, GRADE D	1	NOTE 2 & 3
9	PACKING STOPPER	ASTM A–283, GRADE D	1	NOTE 2 & 3
10	ø25 mm. BOLTS	ASTM A–325	24	---
11	ø25 mm. NUT	ASTM A–325	72	---
12	ø25 mm. WASHER	ASTM A–325	48	---
13	PACKING RINGS (16 mm. S.Q. RING)	ASBESTOS–GRAPHITE	6	NOTE 5

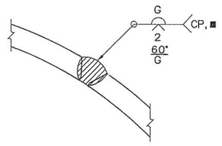
NOTES :

1. LONGITUDINAL SEAMS HAVE TO BE COMPLETE JOINT PENETRATION WELDS BY COMBINING SINGLE–V–GROOVE WITH BACKING WELDS AND GROUND FLUSH WELDING WITH BASE MATAL AS REQUIRED (SEE DETAIL "2")
2. GALVANIZED ALL SURFACES WITH 0.10 mm. THK.
3. NICKEL CLADDING ON OUTER SURFACE WITH 0.50 mm. THK. AND GALVANIZED INNER SURFACE WITH 0.10 mm. THK.
4. EACH JOINT OF EACH PACKING RING SHALL BE MIN. 25 cm. APART DO NOT LINE UP JOINTS
5. ALL DIMENSION ARE IN MILIMETER UNLESS OTHERWISE SHOWN
6. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03



TRANSITION THICKNESS OF BUTT JOINT IN PARTS OF UNEQUAL THICKNESS

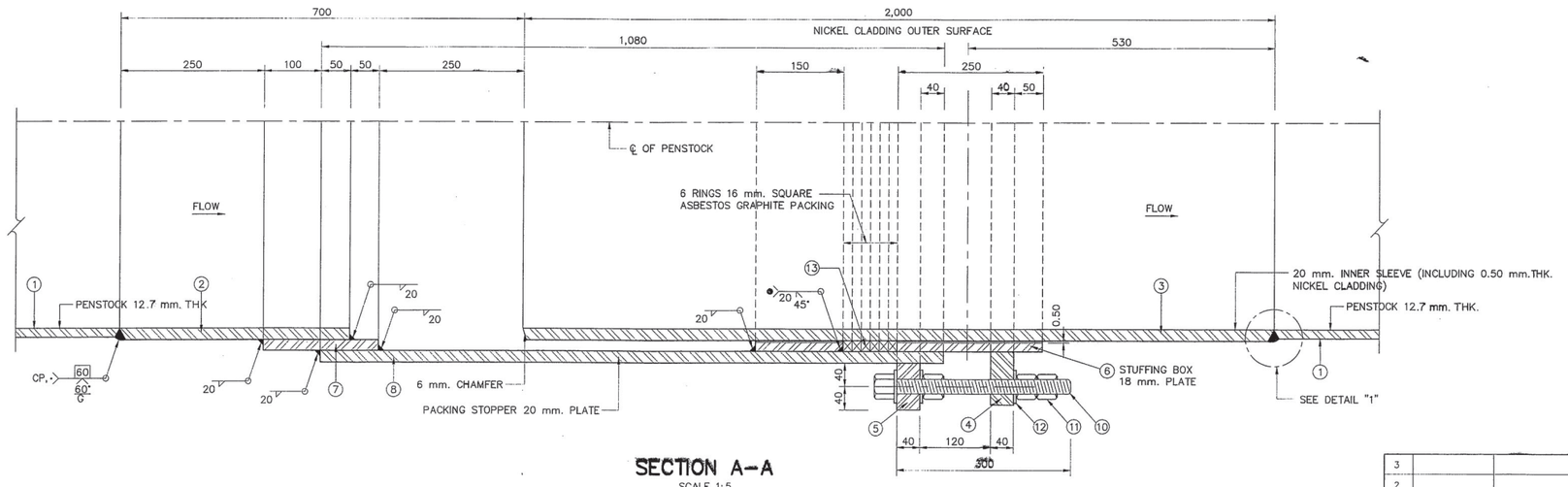
DETAIL "1"
NOT TO SCALE



LONGITUDINAL WELD
DETAIL "2"
NOT TO SCALE

WELDING NOTATION :

CP = COMPLETE JOINT PENETRATION GROOVE WELD
G = GRINDING WELD DEPOSITE FLUSH WITH BASE METAL
• = BACKING PLATE SIZE 0.10x1.50 mm. AND SAME METERIAL AS PENSTOCK
● = BEVEL PLATE 9 mm. BEFORE ROLLING CHIP SQUARE AFTER WELDING
▲ = ROOT OPENING R = 2.0 mm.
ROOT FACE t = 3.0 mm.
GROOVE ANGLE = 45°
■ = ROOT OPENING R = 2.0 mm.
ROOT FACE t = 2.0 mm.
GROOVE ANGLE = 60°



SECTION A–A
SCALE 1:5

0 0.10 0.20 0.30 0.40 0.50
SCALE 1:5 METERS

0 0.1 0.2 0.3 0.4 0.5 0.6
SCALE 1:7.5 METERS

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
PENSTOCK
EXPANSION JOINT, PLAN, SECTIONS AND DETAILS

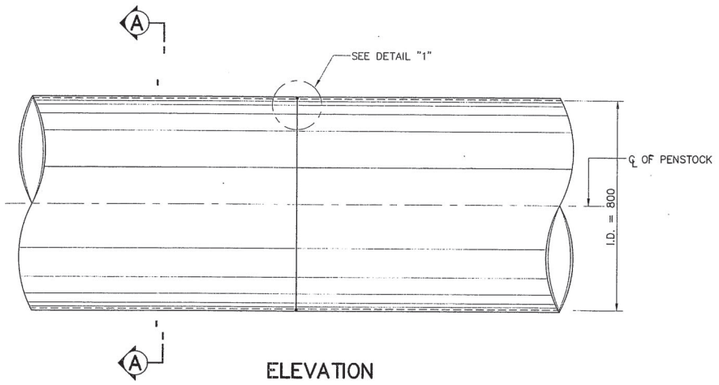
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED	2E.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	2E.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	

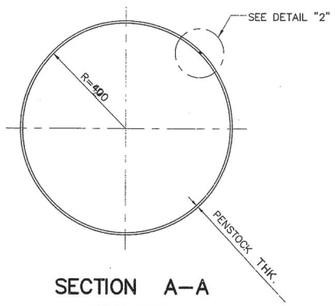
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DRAWING NO. KTP2–PS–11
SHEET NO. 26 OF 97



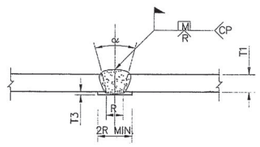
ELEVATION

NOT TO SCALE



SECTION A–A

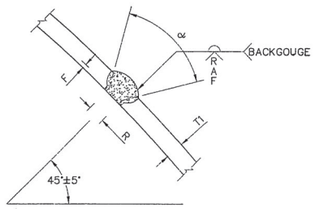
NOT TO SCALE



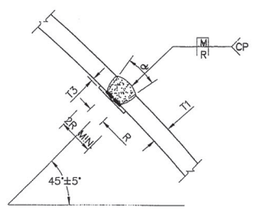
CIRCULAR BUTT JOINT
TYPE "A"

DETAIL "1"

NOT TO SCALE



LONGITUDINAL BUTT JOINT
TYPE "B"



LONGITUDINAL BUTT JOINT (ALTERNATIVE)
TYPE "A"

DETAIL "2"

NOT TO SCALE

TABLE OF TYPE "1" SINGLE–V–GROOVE WELD, BUTT JOINT

WELDING PROCESS	JOINT DESIGNATION	BASE METAL THICKNESS (U= UNLIMITED)		GROOVE PREPARATION		ALLOWED WELDING POSITIONS	GAS SHIELDING FOR FCAW	REMARK	TOLERANCES	
		T1	T3	ROOT OPENING	GROOVE ANGLE				AS DETAILED	AS FIT–UP
SMAW	B–U2a	U	10	R = 6	α = 45°	ALL	–	e,j	R = +2,–0 α = +10°,–0°	+6,–2 +10°,–5°
				R = 10	α = 30°	F,V,OH	–	e,j		
				R = 12	α = 20°	F,V,OH	–	e,j		
GMAW FCAW	B–U2a–GF	U	10	R = 5	α = 30°	F,V,OH	REQUIRED	a,j		
				R = 10	α = 30°	F,V,OH	NOT REQ.	a,j		
				R = 6	α = 45°	F,V,OH	NOT REQ.	a,j		
GMAW	B–L2a–S	50 MAX.	10	R = 6	α = 30°	F	–	j		
GMAW	B–L2–S	U	10	R = 16	α = 20°	F	–	j		

TABLE OF TYPE "2" SINGLE–V–GROOVE WELD, BUTT JOINT

WELDING PROCESS	JOINT DESIGNATION	BASE METAL THICKNESS (U= UNLIMITED)		GROOVE PREPARATION			ALLOWED WELDING POSITIONS	GAS SHIELDING FOR FCAW	REMARK
				ROOT OPENING ROOT FACE GROOVE ANGLE	TOLERANCES				
		T1	T3		AS DETAILED	AS FIT–UP			
SMAW	B–U2	U	10	R = 0–3 f = 0 TO 3 α = 60°	+2,–0 +2,–0 +10°,–0°	+2,–3 NOT LIMITED +10°,–5°	ALL	–	d,e,j
GMAW FCAW	B–U2–GF	U	10	R = 0–3 f = 0 TO 3 α = 60°	+2,–0 +2,–0 +10°,–0°	+2,–3 NOT LIMITED +10°,–5°	ALL	NOT REQ.	a,d,j
SAW	B–L2c–s	OVER 12 TO 25	10	R = 0 f = 6 MAX. α = 60°					
		OVER 12 TO 38	10	R = 0 f = 6 MAX. α = 60°	R = +0,–0 f = +0,–f α = +10°,–0°	+2,–0 +2,–2 +10°,–5°	F	–	d,j
		OVER 38 TO 50	10	R = 0 f = 6 MAX. α = 60°					

REMARK :

a : NOT PREQUALIFIED FOR GMAW–S NOR GTAW.

d : BACKGOUGE ROOT TO SOUND METAL BEFORE WELDING SECOND SIDE.

e : SMAW DETAILED JOINTS MAY BE USED FOR PREQUALIFIED GMAW (EXCEPT GMAW–S) AND FCAW.

j : THE ORIENTATION OF THE TWO MEMBERS IN THE JOINTS MAY VARY FROM 135° TO 180 ° FOR BUTT JOINTS, OR 45° TO 135° FOR CORNER JOINTS, OR 45° TO 90° FOR t–JOINTS.

LEGEND :

WELDING PROCESSES

SMAW = SHIELD METAL ARC WELDING

GMAW = GAS METAL ARC WELDING

FCAW = FLUX CORED ARC WELDING

SAW = SUBMERGED ARC WELDING

WELDING POSITIONS

F = FLAT

H = HORIZONTAL

V = VERTICAL

OH = OVERHEAD

NOTES :

1. ALL DIMENSION ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. GROOVE WELD MADE AFTER WELDING OTHER SIDE
4. USE WELDING ELECTRODE TYPE "E" 70XX
5. MATERIAL OF BACKING IS THE SAME AS OF PIPE
6. WELDED JOINT SHALL CONFORM TO AWS D1.1

WELDING SYMBOLS

FIELDWELD SYMBOL	WELD – ALL – AROUND SYMBOL	SQUARE GROOVE WELDING SYMBOL R=ROOT OPENING	V–GROOVE WELDING SYMBOL R=ROOT OPENING A=GROOVE ANGLE F=ROOT FACE	BACKING SYMBOL (MATERIAL OF BACKING THE SAME AS OF PIPE)	COMPLETE JOINT PENETRATION WELD	FILLET WELD S=WELDING SIZE L=LENGTH OF WELD P=PITCH (CENTER TO CENTER OF WELD)	BACK OR BACKING WELD SYMBOL	COMBINED WELDS. BACKING WELD ON FAR SIDE AND V–GROOVE WELD ON NEAR SIDE	BEVEL GROOVE WELDING SYMBOL	FLARE–BEVEL GROOVE WELDING SYMBOL

KINGDOM OF THAILAND
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MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

PENSTOCK

WELDING DETAILS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS

DEDE

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED 28.1957

DRAWN

CHECKED 28.1957

PROJECT MANAGER

17/03/2020 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED

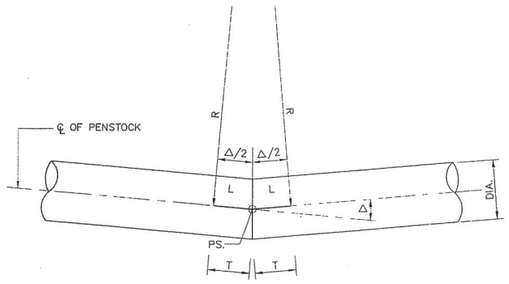
SUBMITTED

RECOMMENDED

APPROVED

DRAWING NO. KTP2–PS–12

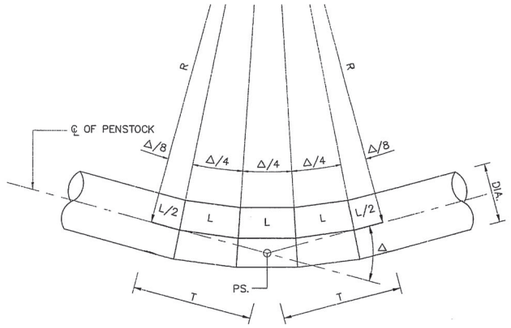
SHEET NO. 27 OF 97



BEND TYPE "1"

DELTA (Δ) 0°–5°

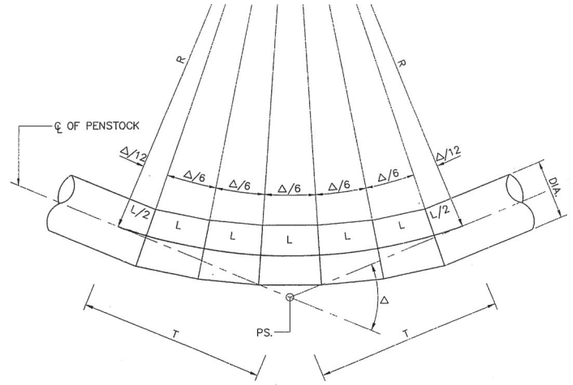
SCALE 1:20



BEND TYPE "4"

DELTA (Δ) 25°–35°

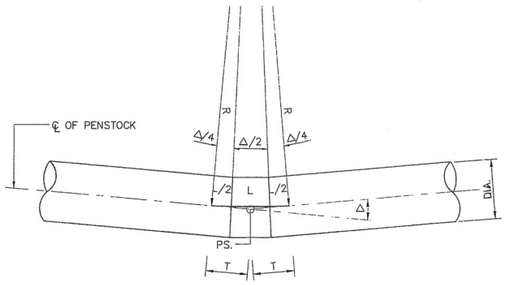
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BEND TYPE "6"

DELTA (Δ) 45°–OVER

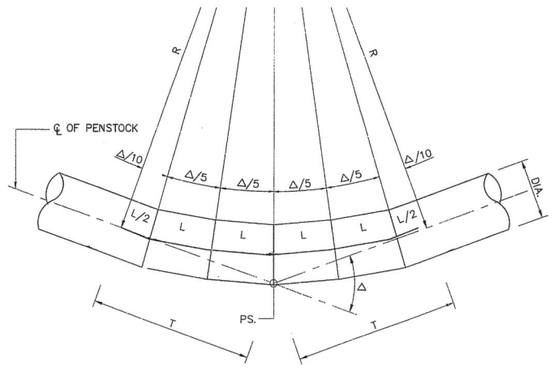
SCALE 1:20



BEND TYPE "2"

DELTA (Δ) 5°–15°

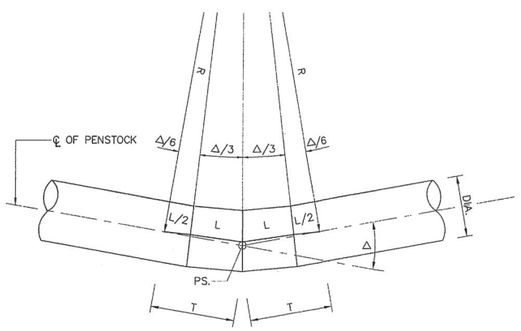
SCALE 1:20



BEND TYPE "5"

DELTA (Δ) 35°–45°

SCALE 1:20



BEND TYPE "3"

DELTA (Δ) 15°–25°

SCALE 1:20

DIMENSIONS OF BENDS

BEND	KM. OF PS.	PS. NO.	Δ (DEGREE)	TYPE	DIA. (m.)	THICKNESS (mm.)
1	0+035.23	PI.1	35°0'16.31"	5	0.80	12
2	0+075.28	PI.2	2°30'6.82"	1	0.80	12
3	0+145.26	PI.3	19°33'48.06"	3	0.80	12
4	0+860.26	PI.4	13°46'18.57"	2	0.80	12
5	1+031.26	PI.5	29°12'32.27"	4	0.80	12
6	1+188.41	PI.6	45°18'9.22"	6	0.80	12

NOTE :

1. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
2. THIS DRAWING USE FOR GUIDE ONLY, THE CONTRACTOR HAS TO SUBMITTED SHOP DRAWING TO FIELD ENGINEER FOR APPROVAL

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, KM. 0+000 TO KM. 0+600 — KTP2–PS–01
2. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860 — KTP2–PS–02

0 0.5 1.0 1.5

SCALE 1:20 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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MINISTRY OF ENERGY

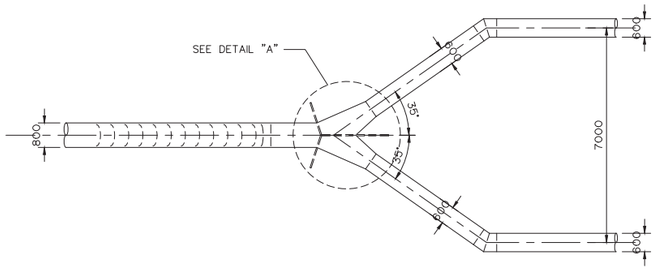
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
PENSTOCK
BEND DETAILS

PCM P&C MANAGEMENT CO.,LTD.

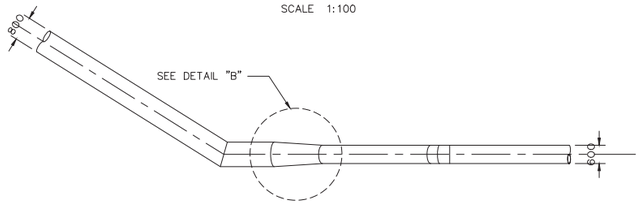
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	ธ.ค.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	ธ.ค.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 (DATE)	APPROVED	
		DRAWING NO.	KTP2–PS–13
		SHEET NO.	28 OF 97



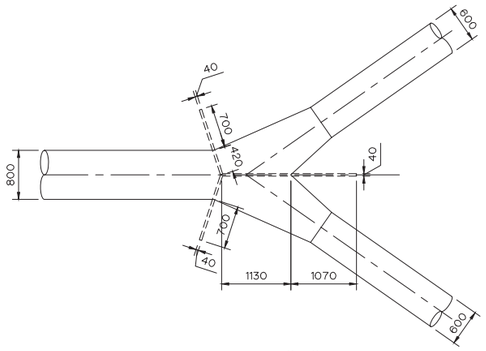
PLAN

SCALE 1:100



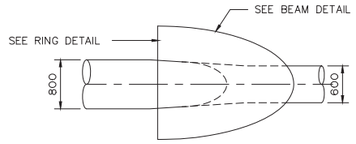
ELEVATION

SCALE 1:100



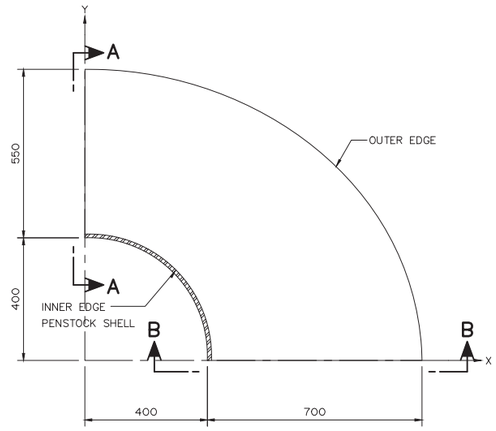
DETAIL "A"

SCALE 1:50



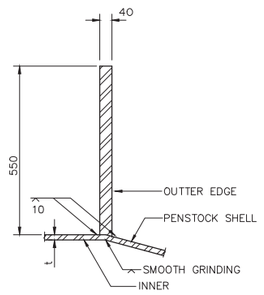
DETAIL "B"

SCALE 1:50



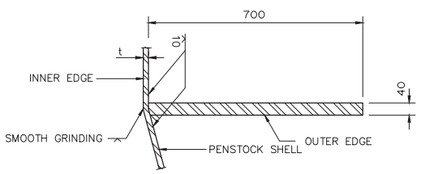
RING DETAIL

SCALE 1:10



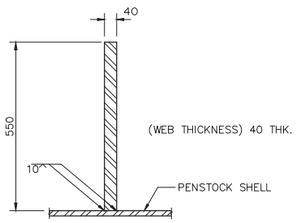
SECTION A–A

SCALE 1:10



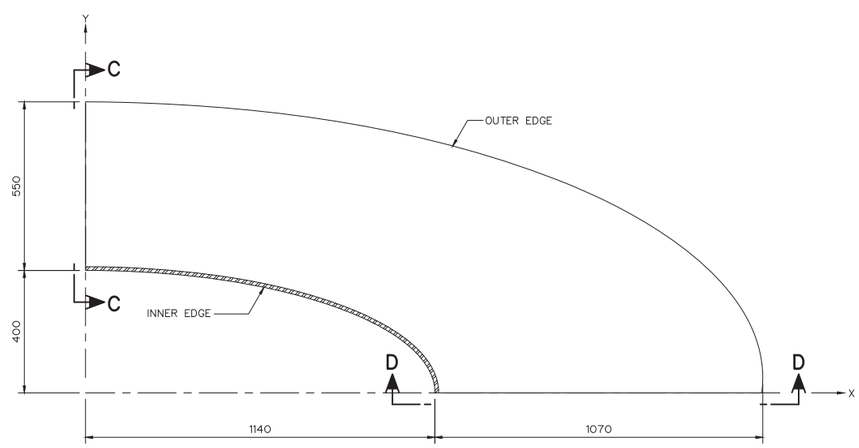
SECTION B–B

SCALE 1:10



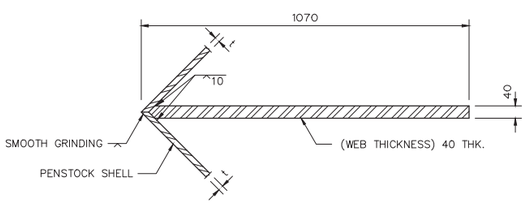
SECTION C–C

SCALE 1:10



BEAM DETAIL

SCALE 1:10



SECTION D–D

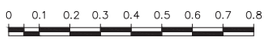
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NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. THIS DRAWING USE FOR GUIDE ONLY, THE CONTRACTOR HAS TO SUBMITTED SHOP DRAWING TO FIELD ENGINEER FOR APPROVAL

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860 KTP2–PS–02







NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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KLONG THUNG PHEN 2 HYDROPOWER PROJECT

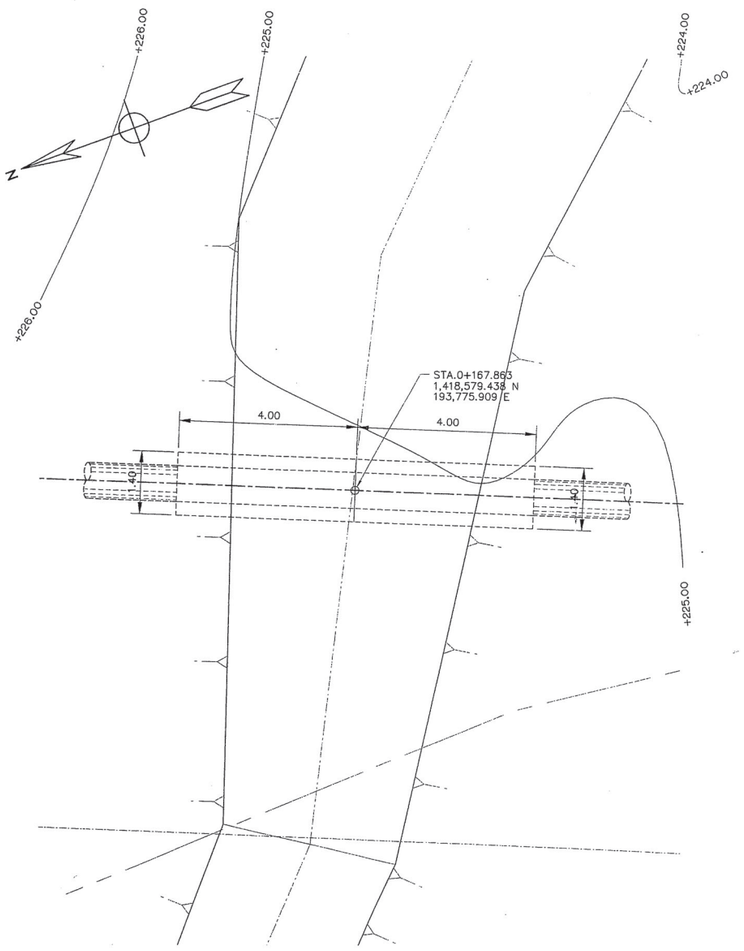
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

PENSTOCK

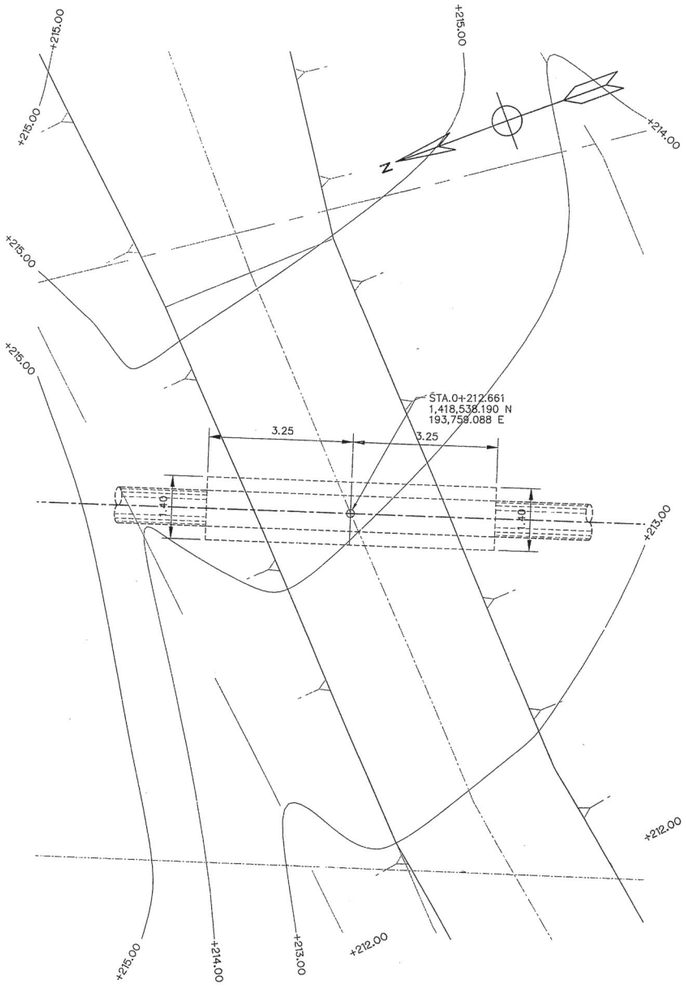
WYE – PLAN, SECTIONS AND DETAILS

P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2–PS–14	SHEET NO. 29 OF 97



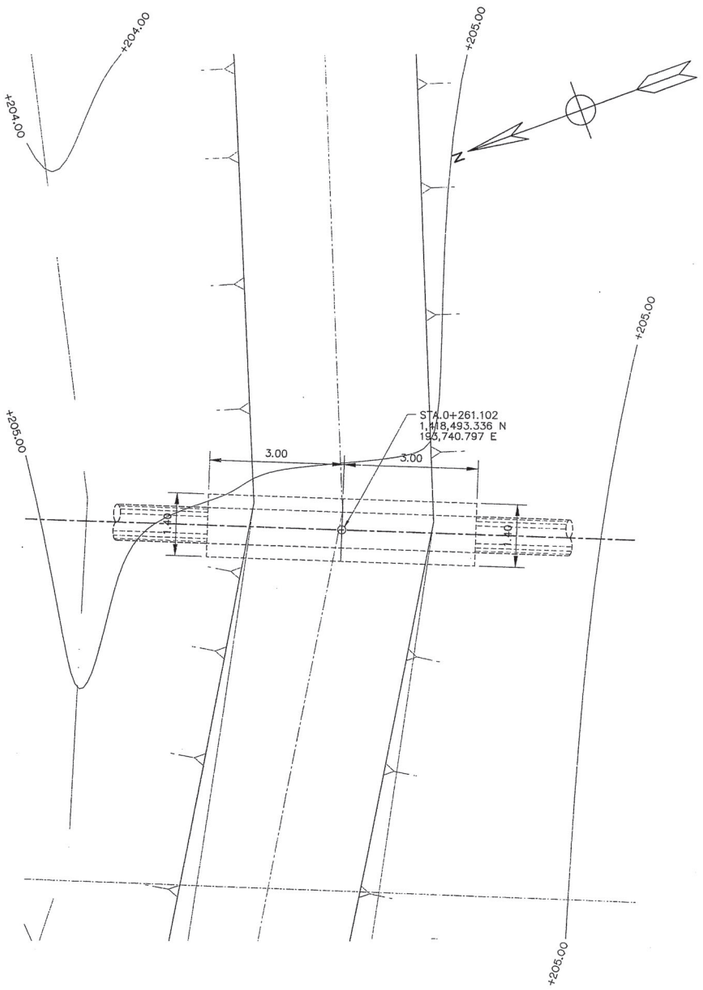
PLAN OF ROAD CROSSING 1 STA.0+167.863

SCALE 1:150



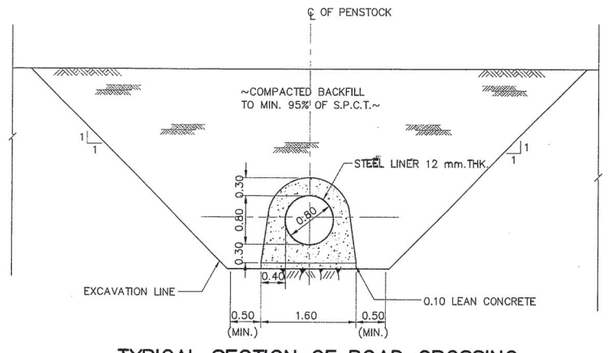
PLAN OF ROAD CROSSING 2 STA.0+212.661

SCALE 1:150



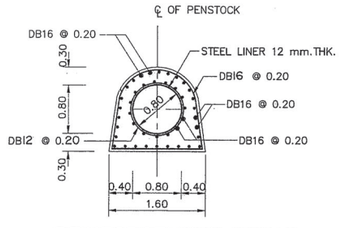
PLAN OF ROAD CROSSING 3 STA.0+261.102

SCALE 1:150



TYPICAL SECTION OF ROAD CROSSING

SCALE 1:50



REINFORCEMENT DETAIL

SCALE 1:50

0 1 2 3 4

SCALE 1:50 METERS

0 1 2 4 6 8 10 12

SCALE 1:150 METERS

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. ALIGNMENT OF PENSTOCK SHALL BE JUSTIFIED BY FIELD ENGINEER IN THE FIELD TO SUIT THE TOPOGRAPHY
4. THE CONTRACTOR SHELL SUBMIT DETAILED WORKSHOP DRAWING FOR APPROVAL BY THE ENGINEER BEFORE MANUFACTURE OF PENSTOCK

REFERENCE DRAWING :

1. PENSTOCK, PLAN AND PROFILE, KM. 0+600 TO KM. 1+220.860 KTP2–PS–02

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

PENSTOCK

ROAD CROSSING, PLAN AND TYPICAL SECTION

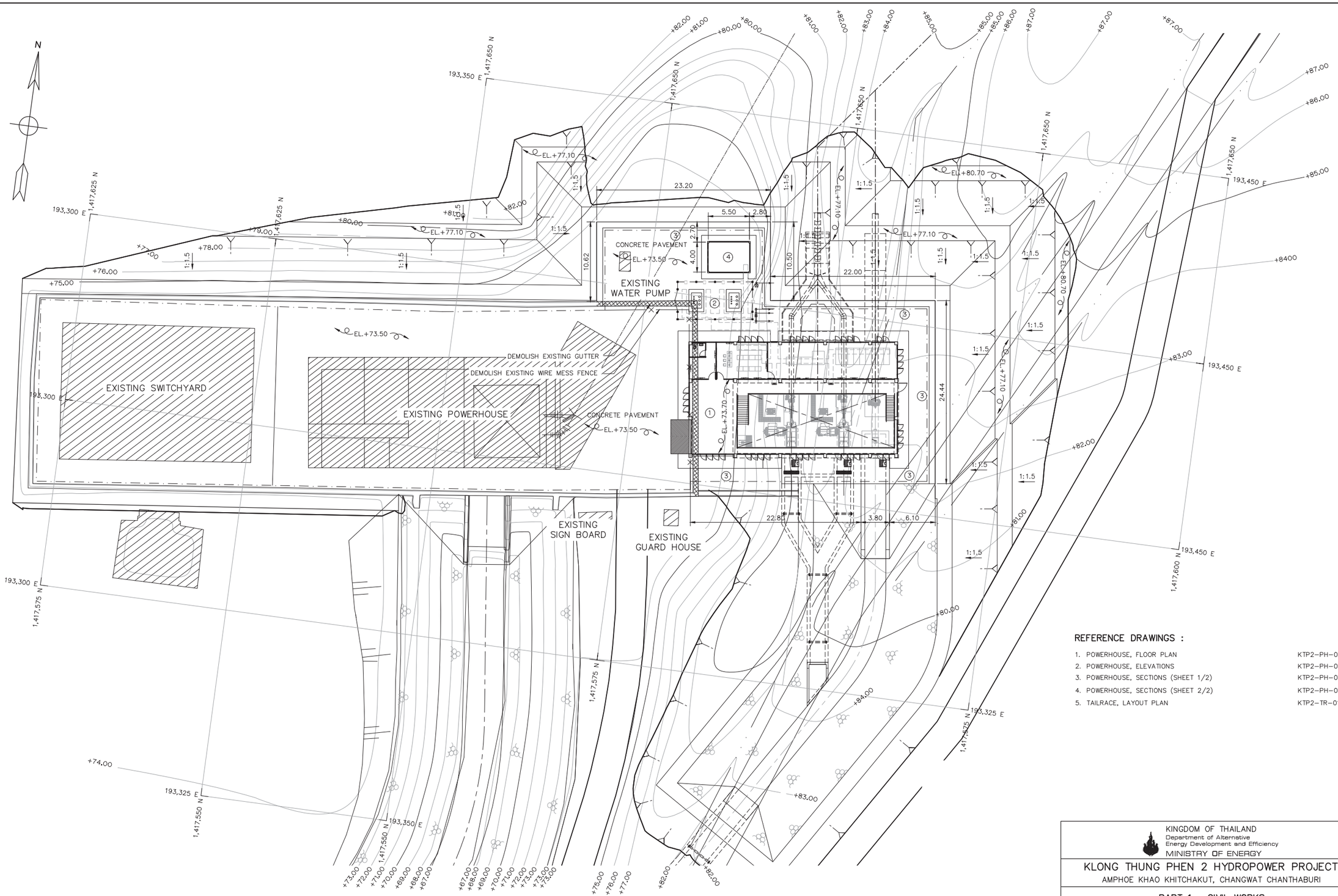
PCM P&C MANAGEMENT CO.,LTD.

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DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	

DRAWING NO. KTP2–PS–15

SHEET NO. 30 OF 97



GENERAL LAYOUT

SCALE 1:250

0 1 2 3 4 5 10 15 20

SCALE 1:250 METERS

LEGENDS :

1. POWERHOUSE
2. SWITCHYARD
3. NEW WIRE MESS FENCE
4. EDG. 50kVA

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03

REFERENCE DRAWINGS :

1. POWERHOUSE, FLOOR PLAN	KTP2–PH–02
2. POWERHOUSE, ELEVATIONS	KTP2–PH–04
3. POWERHOUSE, SECTIONS (SHEET 1/2)	KTP2–PH–05
4. POWERHOUSE, SECTIONS (SHEET 2/2)	KTP2–PH–06
5. TAILRACE, LAYOUT PLAN	KTP2–TR–01

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
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KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

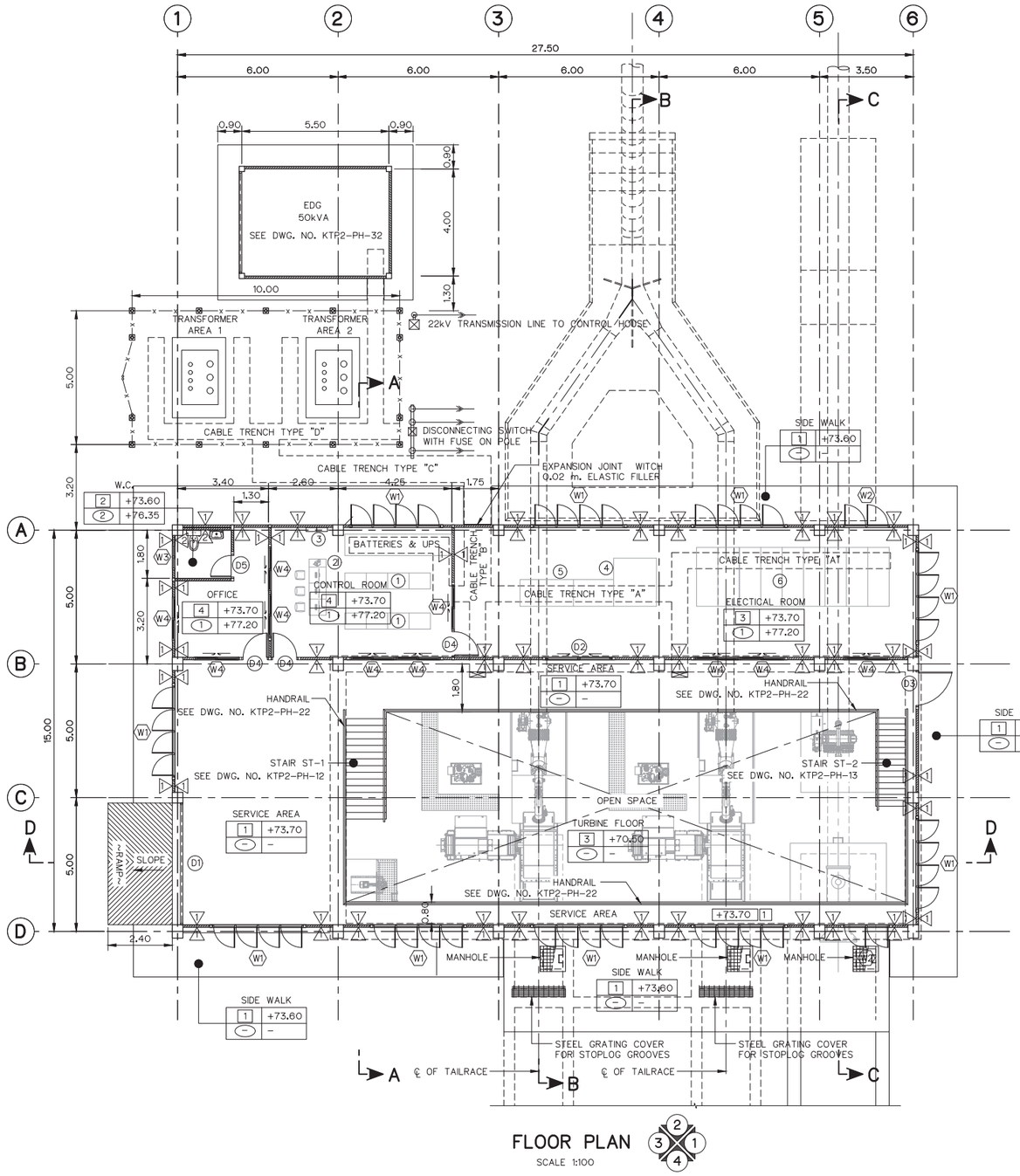
POWERHOUSE

GENERAL LAYOUT

PCM P&C MANAGEMENT CO.,LTD.

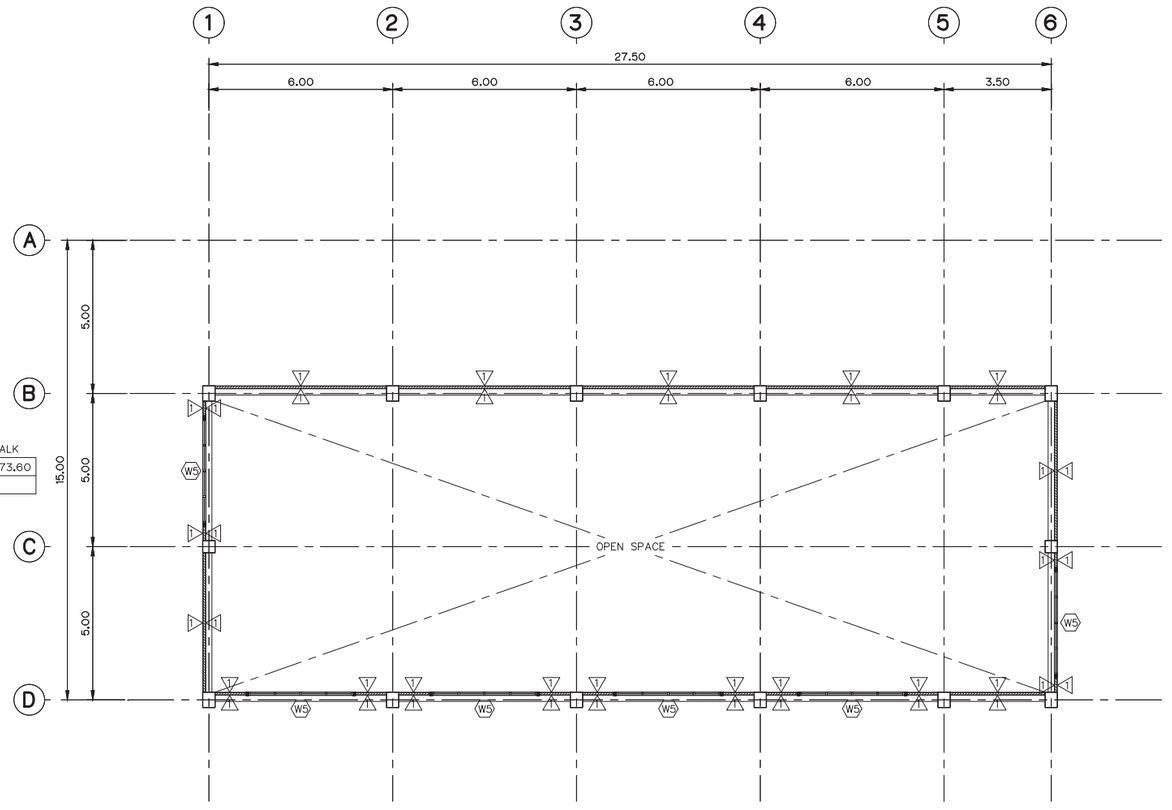
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED			
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO.	KTP2–PH–01
		SHEET NO.	31 OF 97



FLOOR PLAN

SCALE 1:100



PLAN (EL.+77.95)

SCALE 1:100

FLOOR FINISH SYMBOLS :

1. COARSE FINISHED
2. 12"x12" CERAMIC FLOOR TILES
3. COATED WITH EPOXY RESIN
4. 12"x12" VINYL TILES

WALL FINISH SYMBOLS :

1. CEMENT PLASTER
2. 8"x8" CERAMIC WALL TILES

CEILING SYMBOLS :

1. PLASTERING W/PAINT
2. 9 mm.THK. GYPSUM BOARD WITH T-BAR STUD 0.60X0.60

DESCRIPTION :

1. ELECTRICAL AND CONTROL CABINET
2. CONTROL DESK
3. LIGHTING AND FIRE ALARM PANEL
4. AUXILIARY TRANSFORMER
5. MDB
6. 22kV SWGR

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. PORTABLE FIRE EXTINGUISHERS SHALL BE MOUNTED ON SUITABLE BRAEKET ON THE WALL AT LOCATION TO BE ADVISED BY ENGINEER
4. GUTTER FOR TURBINE DRAIN IN POWERHOUSE SHOULD BE DESIGN AND LOCATED BY E&M CONTRACTOR

REFERENCE DRAWINGS :

1. POWERHOUSE, GENERAL LAYOUT	KTP2-PH-01
2. POWERHOUSE, ELEVATIONS	KTP2-PH-04
3. POWERHOUSE, SECTIONS (SHEET 1/2)	KTP2-PH-05
4. POWERHOUSE, SECTIONS (SHEET 2/2)	KTP2-PH-06
5. POWERHOUSE, DETAIL OF DOORS AND WINDOWS	KTP2-PH-07

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

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MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

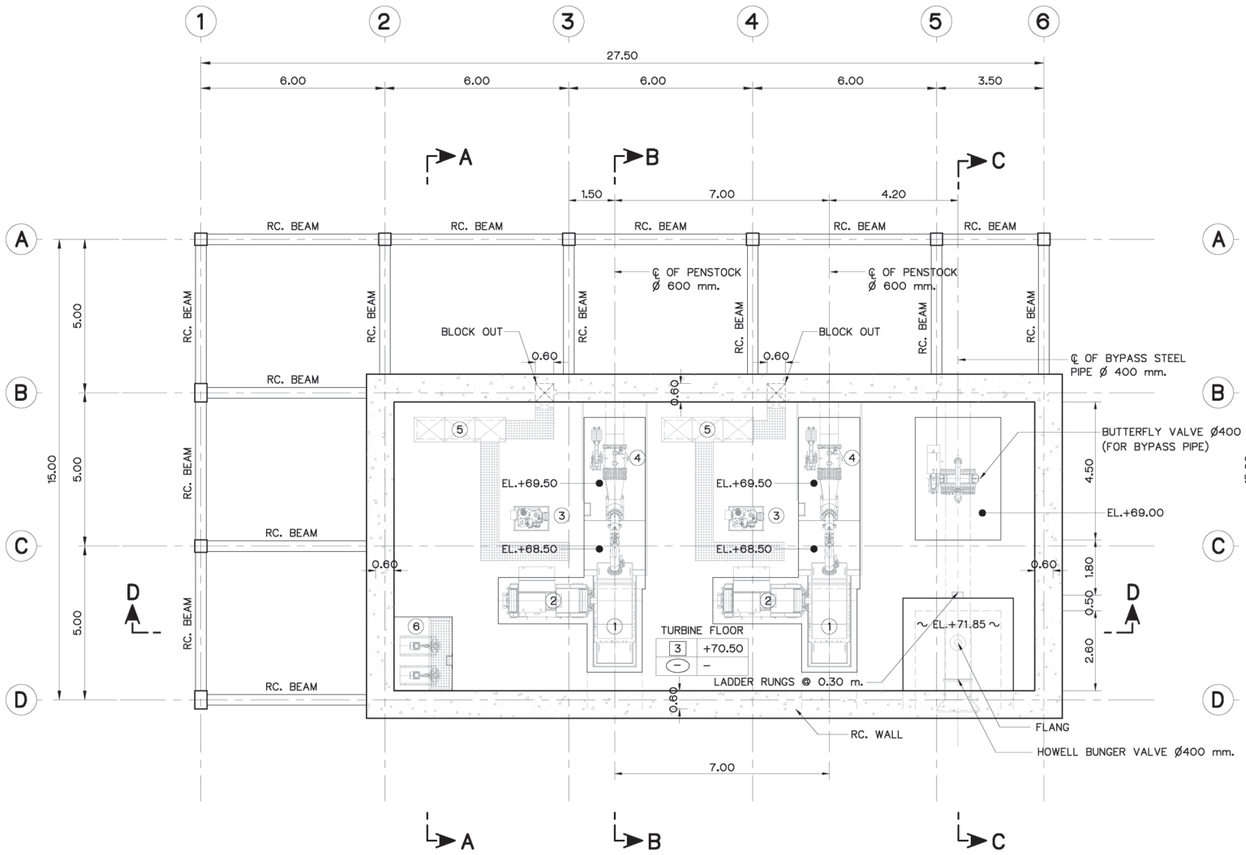
PART 1 : CIVIL WORKS
POWERHOUSE
FLOOR PLAN

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED	28.1957	
DRAWN		
CHECKED	28.1957	
PROJECT MANAGER	17/03/2020 DATE	

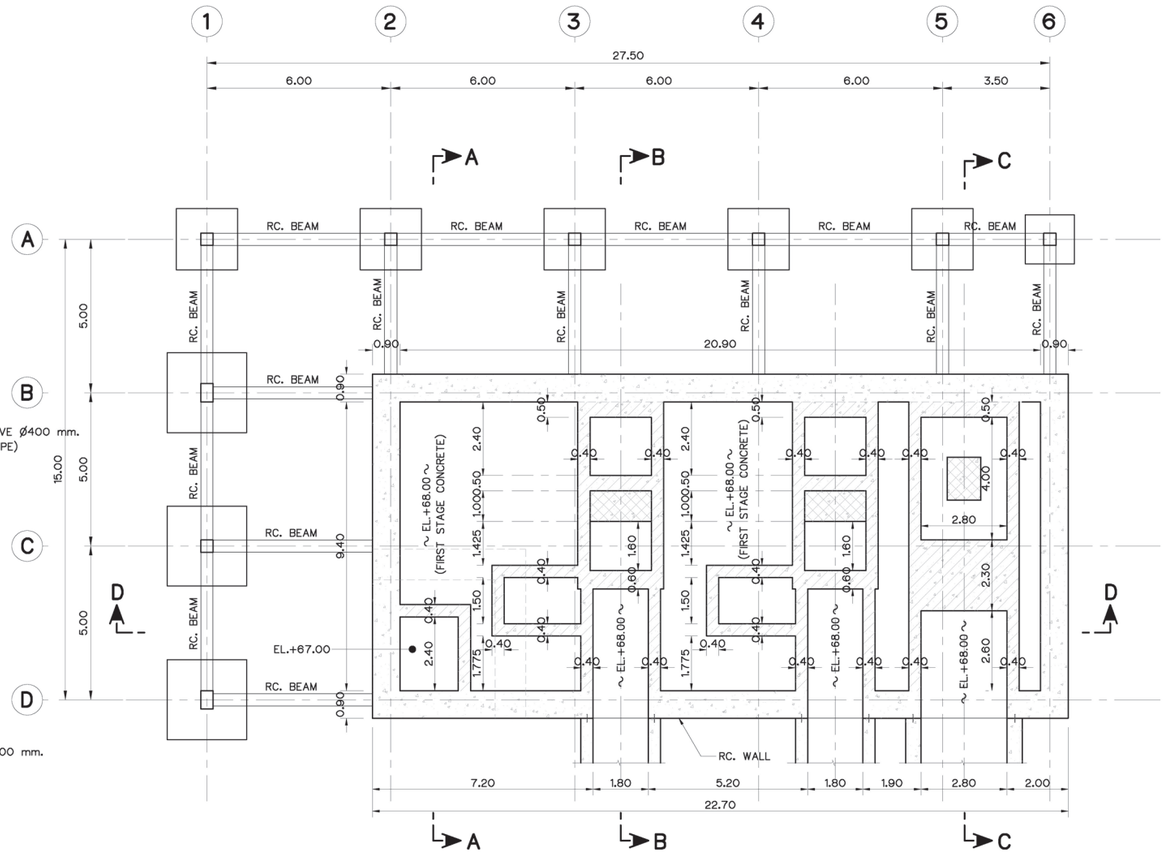
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SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	KTP2-PH-02
SHEET NO.	32 OF 97



TURBINE FLOOR PLAN (EL.+70.50)

SCALE 1:100



GALLERY FLOOR PLAN

SCALE 1:100

DESCRIPTION :

1. TURBINE CASING
2. GENERATOR
3. HYDRAULIC PRESSURE UNIT
4. BUTTERFLY VALVE DN 600
5. LAVT, NGT CUBICLE
6. DRAINAGE SYSTEM

LEGEND :

- FIRST STAGE CONCRETE
- SECOND STAGE CONCRETE
- THIRD STAGE CONCRETE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. PORTABLE FIRE EXTINGUISHERS SHALL BE MOUNTED ON SUITABLE BRAEKET ON THE WALL AT LOCATION TO BE ADVISED BY ENGINEER
4. GUTTER FOR TURBINE DRAIN IN POWERHOUSE SHOULD BE DESIGN AND LOCATED BY E&M CONTRACTOR
5. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 30 TON/M.^{2}

REFERENCE DRAWINGS :

1. POWERHOUSE, GENERAL LAYOUT	KTP2-PH-01
2. POWERHOUSE, ELEVATIONS	KTP2-PH-04
3. POWERHOUSE, SECTIONS (SHEET 1/2)	KTP2-PH-05
4. POWERHOUSE, SECTIONS (SHEET 2/2)	KTP2-PH-06

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

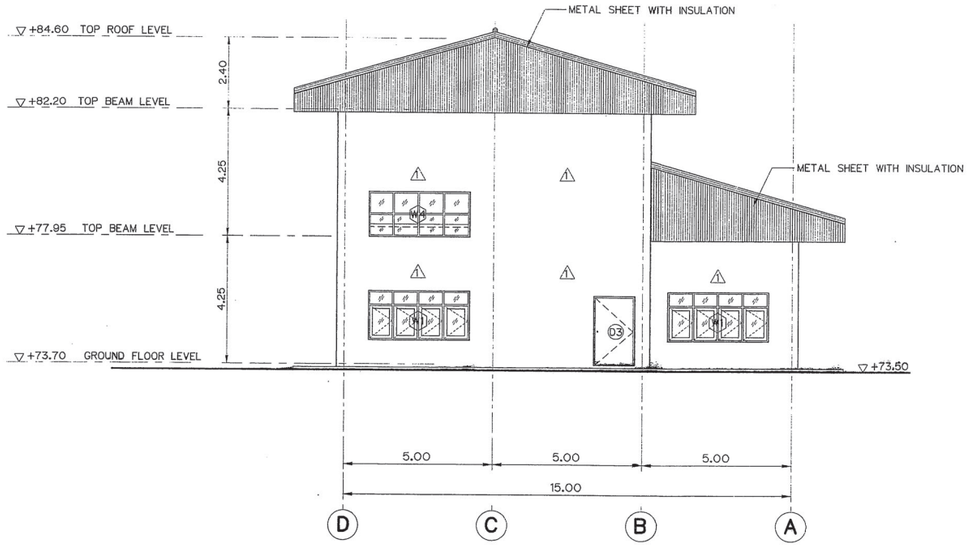
NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

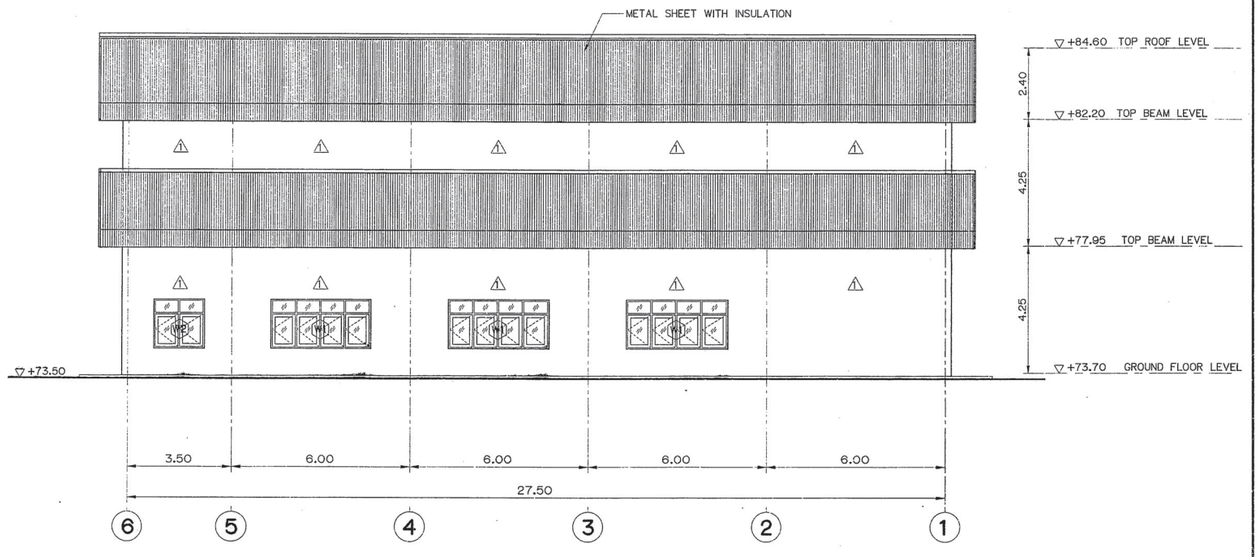
PART 1 : CIVIL WORKS
POWERHOUSE
TURBINE AND GALLERY FLOOR PLAN

PCM P&C MANAGEMENT CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED 28.1957	REVIEWED
DRAWN	SUBMITTED
CHECKED 28.1957	RECOMMENDED
PROJECT MANAGER 17/03/2020 DATE	APPROVED
DRAWING NO. KTP2-PH-03	SHEET NO. 33 OF 97



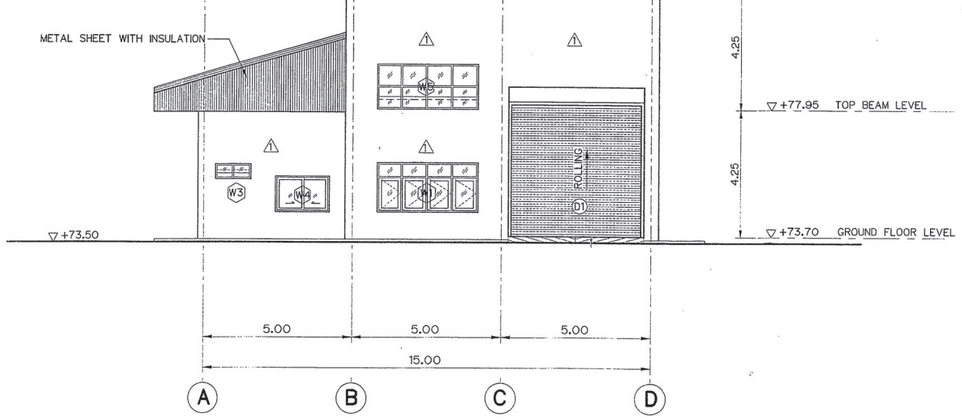
ELEVATION "1"

SCALE 1:100



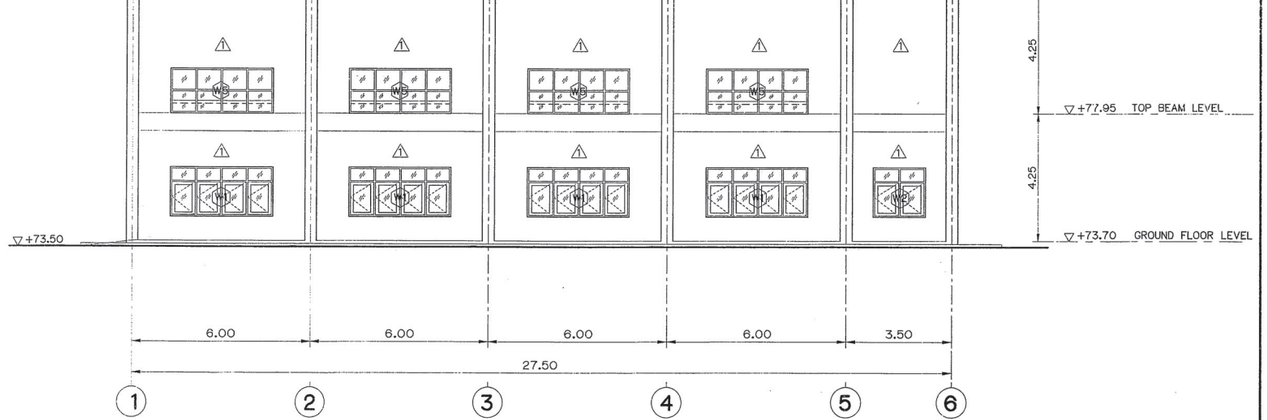
ELEVATION "2"

SCALE 1:100



ELEVATION "3"

SCALE 1:100



ELEVATION "4"

SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

REFERENCE DRAWINGS :

1. POWERHOUSE, FLOOR PLAN	KTP2-PH-02
2. POWERHOUSE, TURBINE AND GALLERY FLOOR PLAN	KTP2-PH-03
3. POWERHOUSE, SECTIONS (SHEET 1/2)	KTP2-PH-05
4. POWERHOUSE, SECTIONS (SHEET 2/2)	KTP2-PH-06
5. POWERHOUSE, DETAIL OF DOORS AND WINDOWS	KTP2-PH-07

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

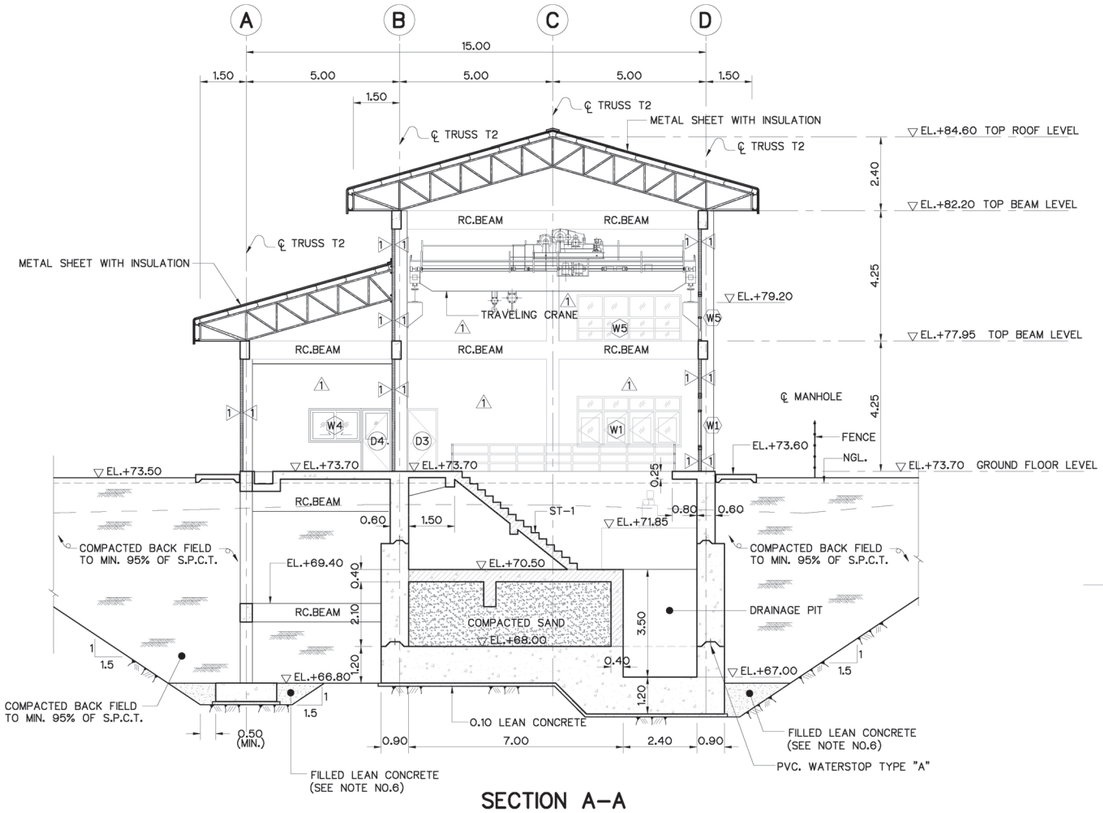
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

POWERHOUSE

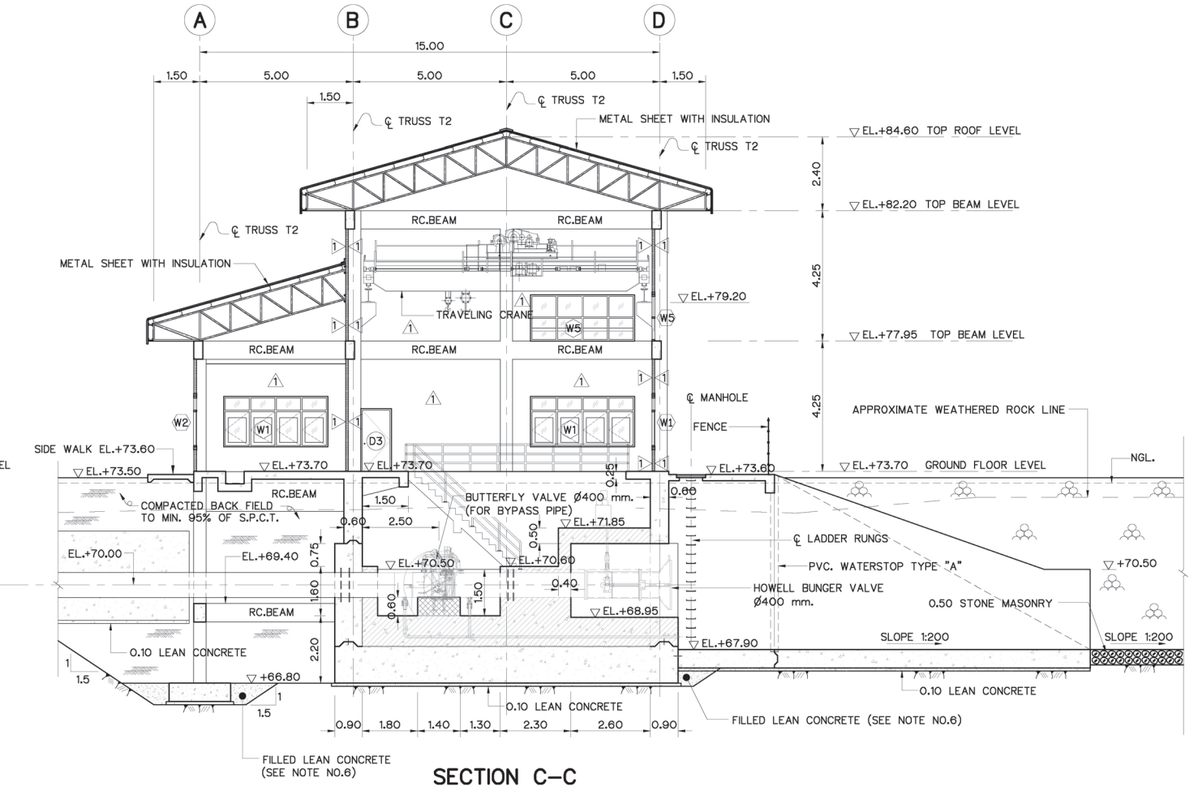
ELEVATIONS

PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
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DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2-PH-04	SHEET NO. 34 OF 97



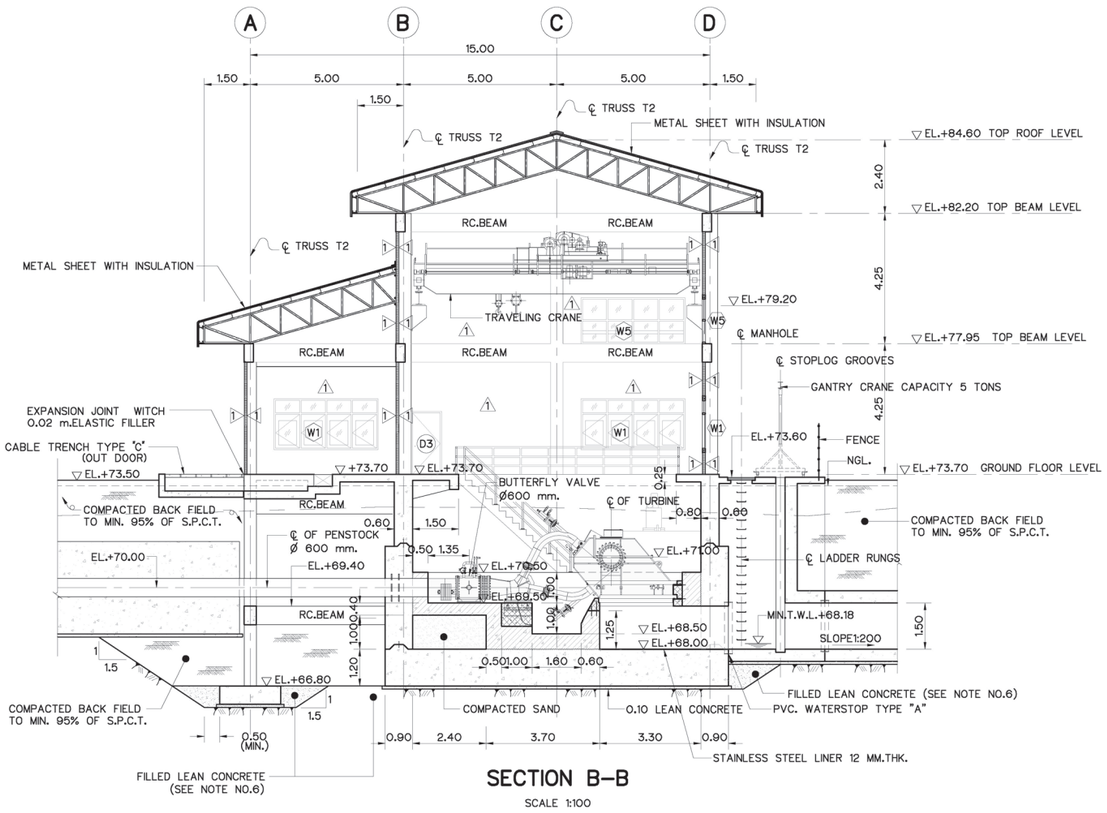
SECTION A–A

SCALE 1:100



SECTION C–C

SCALE 1:100



SECTION B–B

SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. LOCATIONS, DIMENSIONS OF TURBINE, GENERATOR AND TRENCHES FOUNDATION SHOWN ON THIS DRAWING ARE APPROXIMATELY THE FINAL DESIGN OF FOUNDATIONS SHALL BE DONE BY THE E&M CONTRACTOR AND HAVE TO SUBMITTED TO DEDE. FOR APPROVAL.
4. FOOTING SHALL BE PLACED ON BED ROCK FOUNDATION. THE CONTRACTOR SHALL REMOVE UNSUITABLE MATEIAL AND REPLACE OR BACKFILL IT WITH LEAN CONCRETE UP TO THE FOUNDATION ELEVATION
5. FOUNDATION SHALL HAVE MINIMUM 30 TON/M^2 (ULTIMATE CAPACITY)
6. COMPACTED BACKFILL SHALL BE DONE AFTER THE CONCRETE STRUCTURES HAVE BEEN FINISHED AND HAVE THE MINIMUM DESIGN STRENGTH TO SUPPORT THE FULL LOAD

REFERENCE DRAWINGS :

1. POWERHOUSE, GENERAL LAYOUT	KTP2-PH-01
2. POWERHOUSE, FLOOR PLAN	KTP2-PH-02
3. POWERHOUSE, TURBINE AND GALLERY FLOOR PLAN	KTP2-PH-03
4. POWERHOUSE, ELEVATIONS	KTP2-PH-04
5. POWERHOUSE, DETAIL OF DOORS AND WINDOWS	KTP2-PH-07

LEGEND :

- FIRST STAGE CONCRETE
- SECOND STAGE CONCRETE
- THIRD STAGE CONCRETE

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

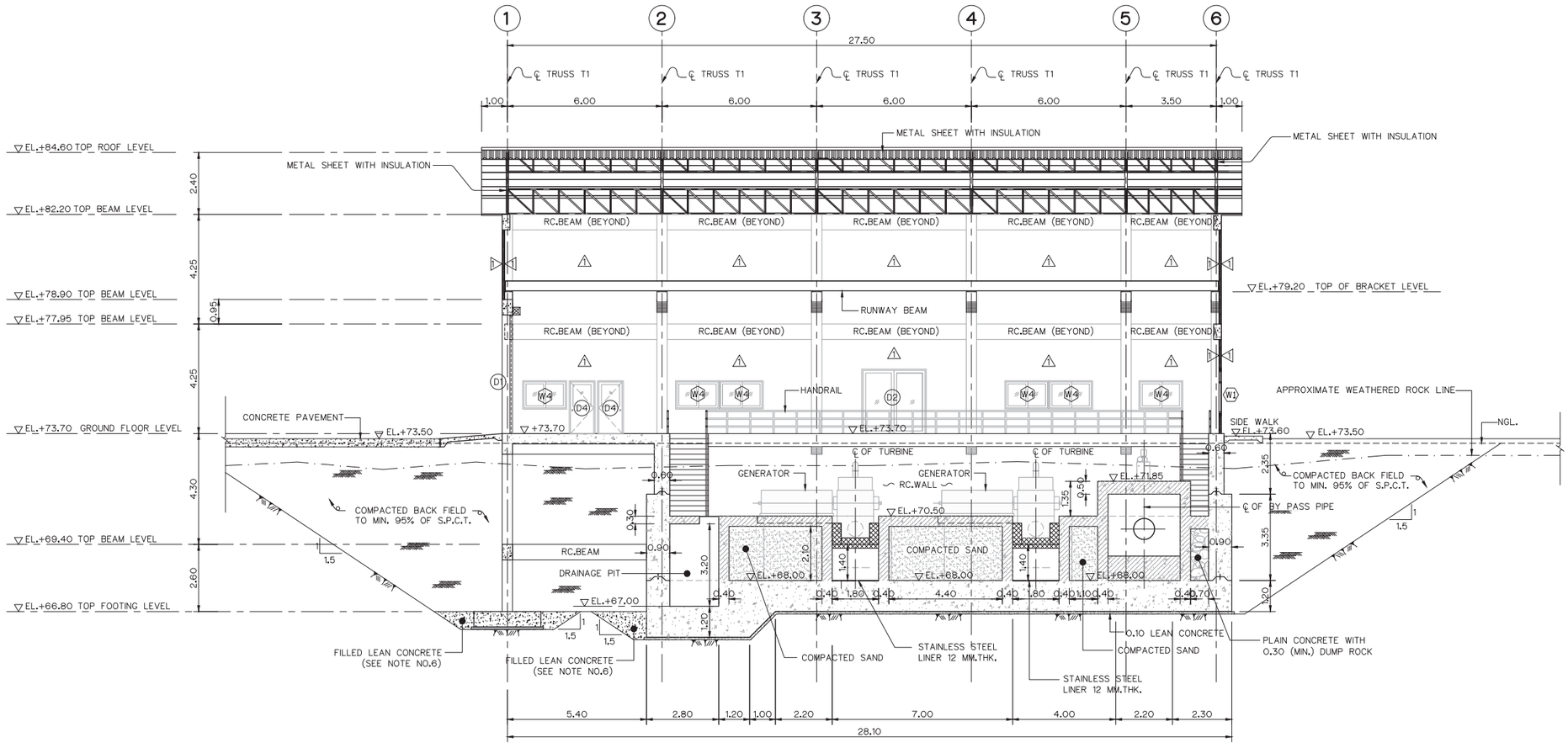
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

POWERHOUSE

SECTIONS (SHEET 1/2)

PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2-PH-05	SHEET NO. 35 OF 97



SECTION D–D

SCALE 1:100

LEGEND :

- FIRST STAGE CONCRETE
- SECOND STAGE CONCRETE
- THIRD STAGE CONCRETE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. LOCATIONS, DIMENSIONS OF TURBINE, GENERATOR AND TRENCHES FOUNDATION SHOWN ON THIS DRAWING ARE APPROXIMATELY THE FINAL DESIGN OF FOUNDATIONS SHALL BE DONE BY THE E&M CONTRACTOR AND HAVE TO SUBMITTED TO DEDE. FOR APPROVAL.
4. FOOTING SHALL BE PLACED ON BED ROCK FOUNDATION. THE CONTRACTOR SHALL REMOVE UNSUITABLE MATEIAL AND REPLACE OR BACKFILL IT WITH LEAN CONCRETE UPTO THE FOUNDATION ELEVATION
5. FOUNDATION SHALL HAVE MINIMUM 30 TON/M.^{2} (ULTIMATE CAPACITY)
6. COMPACTED BACKFILL SHALL BE DONE AFTER THE CONCRETE STRUCTURES HAVE BEEN FINISHED AND HAVE THE MINIMUM DESIGN STRENGTH TO SUPPORT THE FULL LOAD

REFERENCE DRAWINGS :

1. POWERHOUSE, GENERAL LAYOUT	KTP2–PH–01
2. POWERHOUSE, FLOOR PLAN	KTP2–PH–02
3. POWERHOUSE, TURBINE AND GALLERY FLOOR PLAN	KTP2–PH–03
4. POWERHOUSE, ELEVATIONS	KTP2–PH–04
5. POWERHOUSE, DETAIL OF DOORS AND WINDOWS	KTP2–PH–07

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

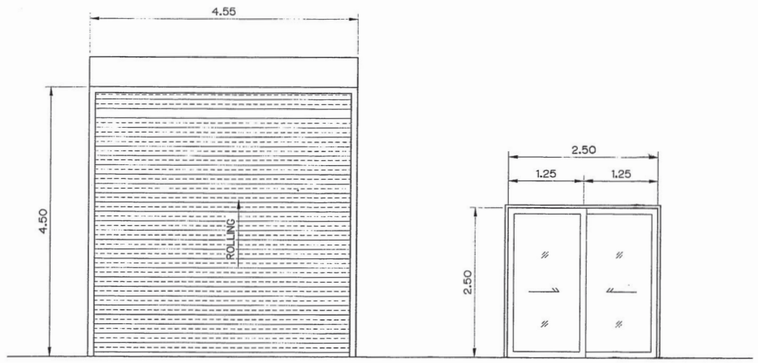
KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
SECTIONS (SHEET 2/2)

PCM P&C MANAGEMENT CO.,LTD.

		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
DRAWN	28.1957	RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2–PH–06	SHEET NO. 36 OF 97



D1

ROLLING DOOR

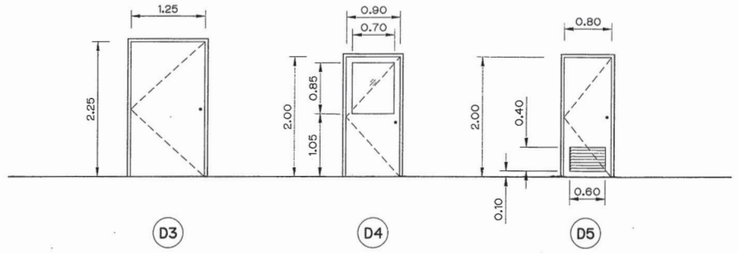
SCALE 1:50

D2

SLIDE DOOR

SCALE 1:50

SYMBOL	DESCRIPTIONS	SIZE		FRAME	RAIL & STILE	PANEL	HINGE	LOCKSET	HANDLE	REMARKS
		WIDTH	HEIGHT							
D1	ROLLING DOOR (STEEL NO.18,1.2 mm. Thk.)	4.55	4.50	GALVANIZED STEEL	—	—	—	NORMAL KEY	—	MOTOR OPERATING
D2	SLIDE DOOR	2.50	2.50	ALUMINIUM(NA) 2"x 4"	—	GLASS 5 mm.thk.	—	CYLINDER LOCK	—	FULL SET OF ACCESSORIES FROM MANUFACTURER
D3	OPENING DOOR	1.25	2.25	GALVANIZED STEEL		GALVANIZED STEEL WITH POWDER COATING	STAINLESS STEEL 4"x3"x2.5mm.	CYLINDER LOCK	—	
D4	OPENING DOOR	0.90	2.00	ALUMINIUM(NA) 2"x 4"	—	GLASS 5 mm.thk. & TEAK LOUVER	STAINLESS STEEL 4"x3"x2.5mm.	CYLINDER LOCK	—	
D5	OPENING DOOR	0.80	2.00	P.V.C. 2"x 4"	—	P.V.C.	STAINLESS STEEL 4"x3"x2.5mm.	CYLINDER LOCK	—	
W1	OPENING WINDOW	3.40	1.50	ALUMINIUM(NA) 2"x 4"	—	GLASS 5 mm.thk.	●	●	●	FULL SET OF ACCESSORIES FROM MANUFACTURER
W2	OPENING WINDOW	1.70	1.50	ALUMINIUM(NA) 2"x 4"	—	GLASS 5 mm.thk.	—	—	—	
W3	FIXED GLASS WINDOW	1.20	0.50	ALUMINIUM(NA) 2"x 4"	—	GLASS 5 mm.thk.	—	—	—	
W4	SLIDING WINDOW	1.70	1.00	ALUMINIUM(NA) 2"x 4"		GLASS 5 mm.thk.	—	—	—	
W5	FIXED GLASS WINDOW	3.40	1.50	ALUMINIUM(NA) 2"x 4"		GLASS 5 mm.thk.	—	—	—	
●	SHALL BE USED SPACIFIED ACCESSORIES									



D3

OPENING DOOR

SCALE 1:50

D4

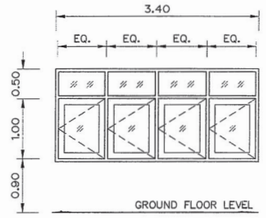
OPENING DOOR

SCALE 1:50

D5

OPENING DOOR

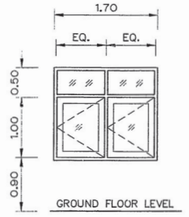
SCALE 1:50



W1

OPENING WINDOW

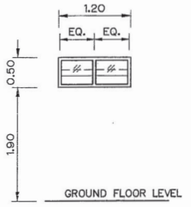
SCALE 1:50



W2

OPENING WINDOW

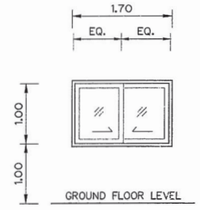
SCALE 1:50



W3

FIX GRASS WINDOW

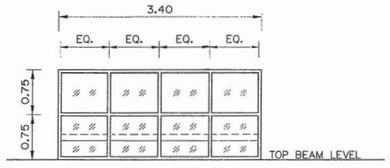
SCALE 1:50



W4

SLIDING WINDOW

SCALE 1:50



W5

FIX GRASS WINDOW

SCALE 1:50

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. FOR PAINTING WORKS SEE TECHNICAL SPECIFICATION

REFERENCE DRAWINGS :

1. POWERHOUSE, GENERAL LAYOUT	KTP2-PH-01
2. POWERHOUSE,FLOOR PLAN	KTP2-PH-02
3. POWERHOUSE, ELEVATIONS	KTP2-PH-04
4. POWERHOUSE, SECTIONS (SHEET 1/2)	KTP2-PH-05
5. POWERHOUSE, SECTIONS (SHEET 2/2)	KTP2-PH-06

0 1 2 3 4

SCALE 1:50 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

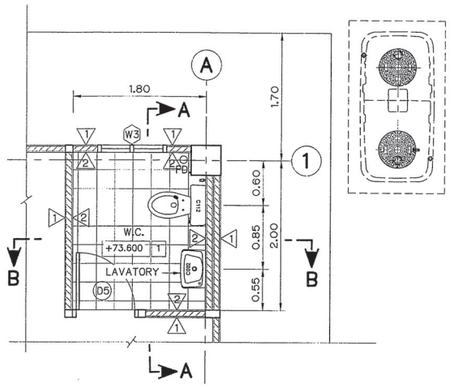
POWERHOUSE

DETAIL OF DOORS AND WINDOWS

PCM P&C MANAGEMENT CO.,LTD.

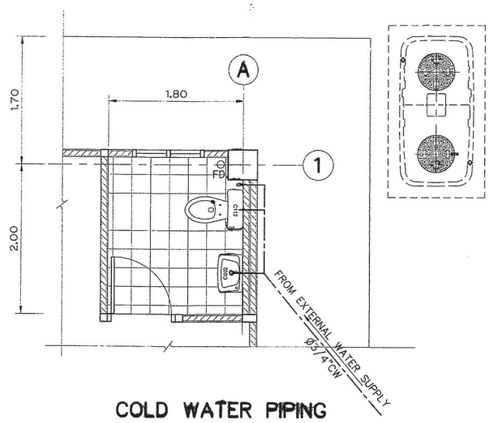
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	28.1957
DRAWN	
CHECKED	28.1957
PROJECT MANAGER	17/03/2020 (DATE)
REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	KTP2-PH-07
SHEET NO.	37 OF 97



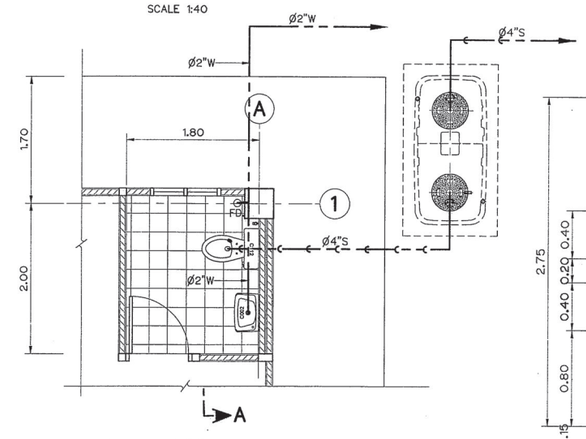
PLAN W.C.

SCALE 1:40



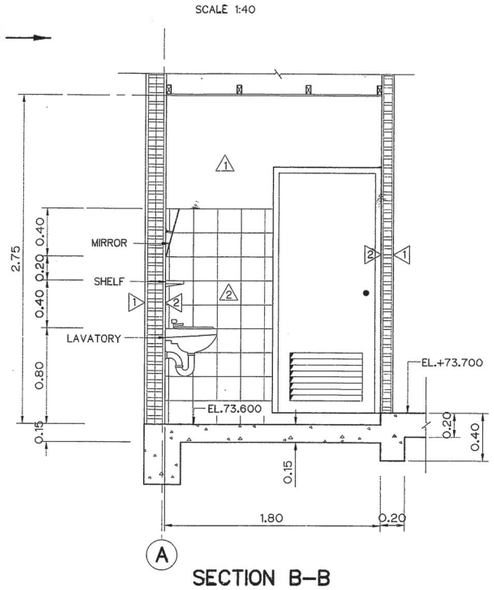
COLD WATER PIPING

SCALE 1:40



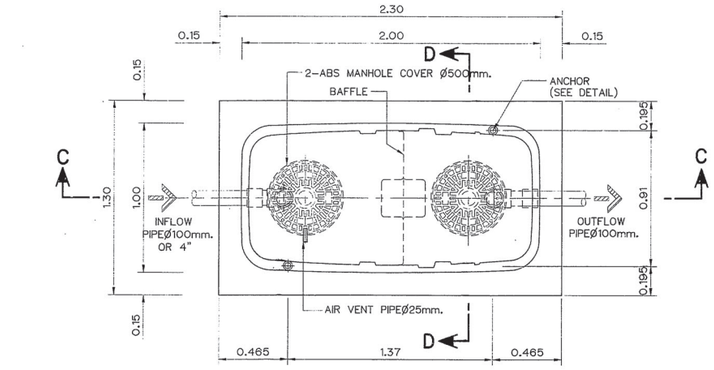
SOIL, WASTE AND VENT PIPING

SCALE 1:40



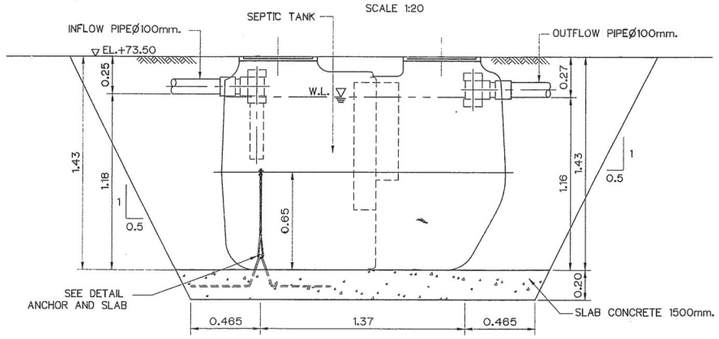
SECTION B–B

SCALE 1:25



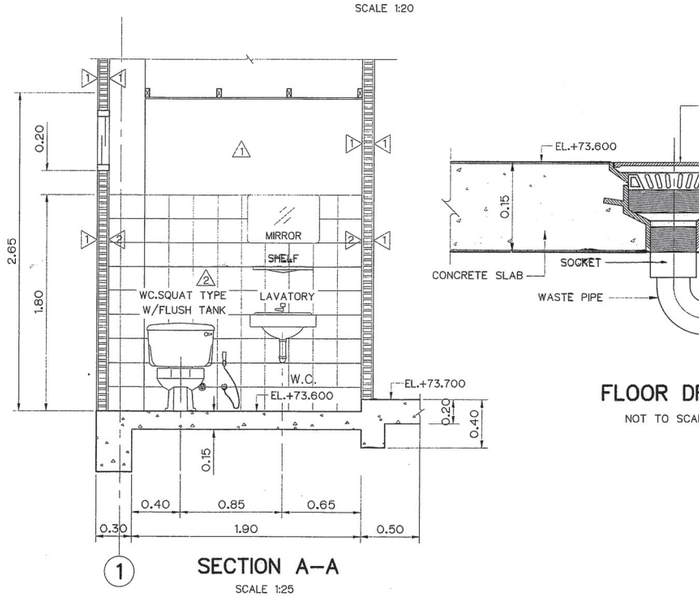
SEPTIC TANK

SCALE 1:20



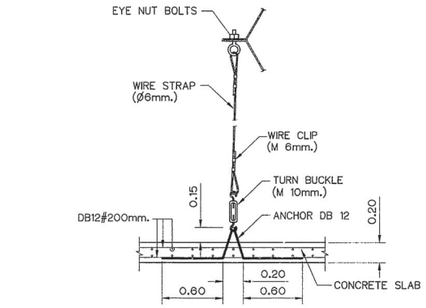
SECTION C–C

SCALE 1:20



SECTION A–A

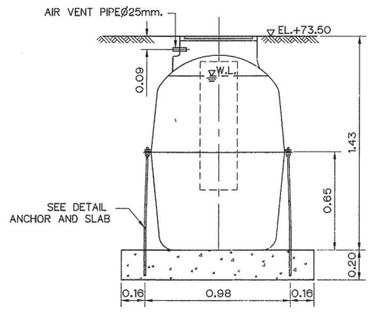
SCALE 1:25



DETAIL ANCHOR AND SLAB

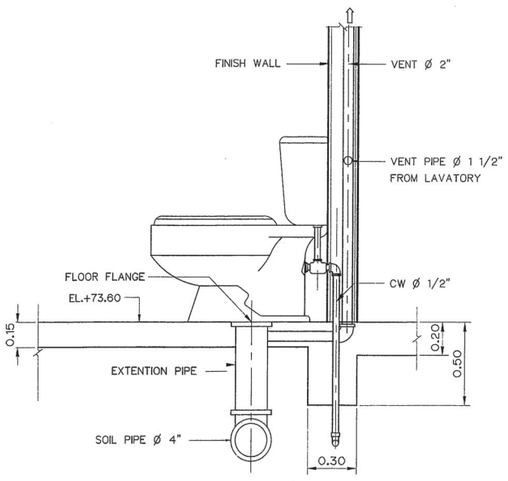
NOT TO SCALE

SPECIFICATION TABLE			
No.	ITEM		CONTENT
1	CAPACITY		
	1.1	SEPTIC TANK	1.500 m^3
2	MATERIAL		
	2.1	CHAMBER	FRP
	2.2	SEPARATION PLATE , BAFFLE	FRP
	2.3	MANHOLE COVER	ABS
	2.4	INFLOW , OUTFLOW PIPE	PVC(ø100mm.)



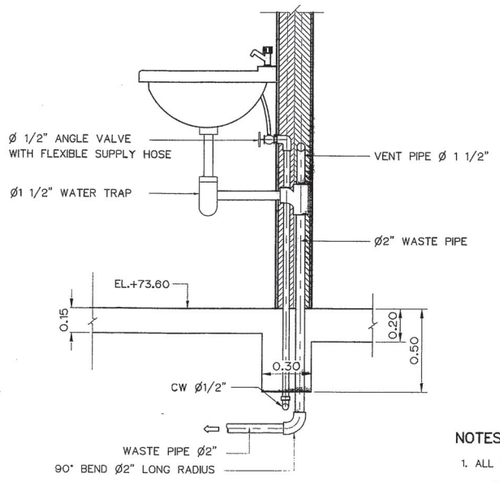
SECTION D–D

SCALE 1:20



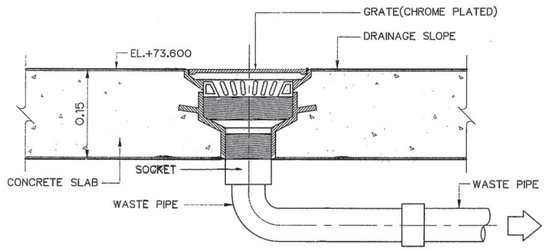
WATER CLOSET (FLUSH TANK)

NOT TO SCALE



LAVATORY

NOT TO SCALE



FLOOR DRAIN

NOT TO SCALE

SYMBOLS :

- SOIL PIPE
- WASTE PIPE
- COLD WATER PIPE
- VENT PIPE

REFERENCE DRAWING :

1. POWERHOUSE, GENERAL LAYOUT — KTP2–PH–01
2. POWERHOUSE, PLAN — KTP2–PH–02
3. POWERHOUSE, WATER SUPPLY SYSTEM LAY–OUT AND TYPICAL DETAILS — KTP2–PH–29

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03

0 0.5 1.0 1.5 SCALE 1:20 METERS

0 0.5 1.0 1.5 2.0 SCALE 1:25 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS — DEDE

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

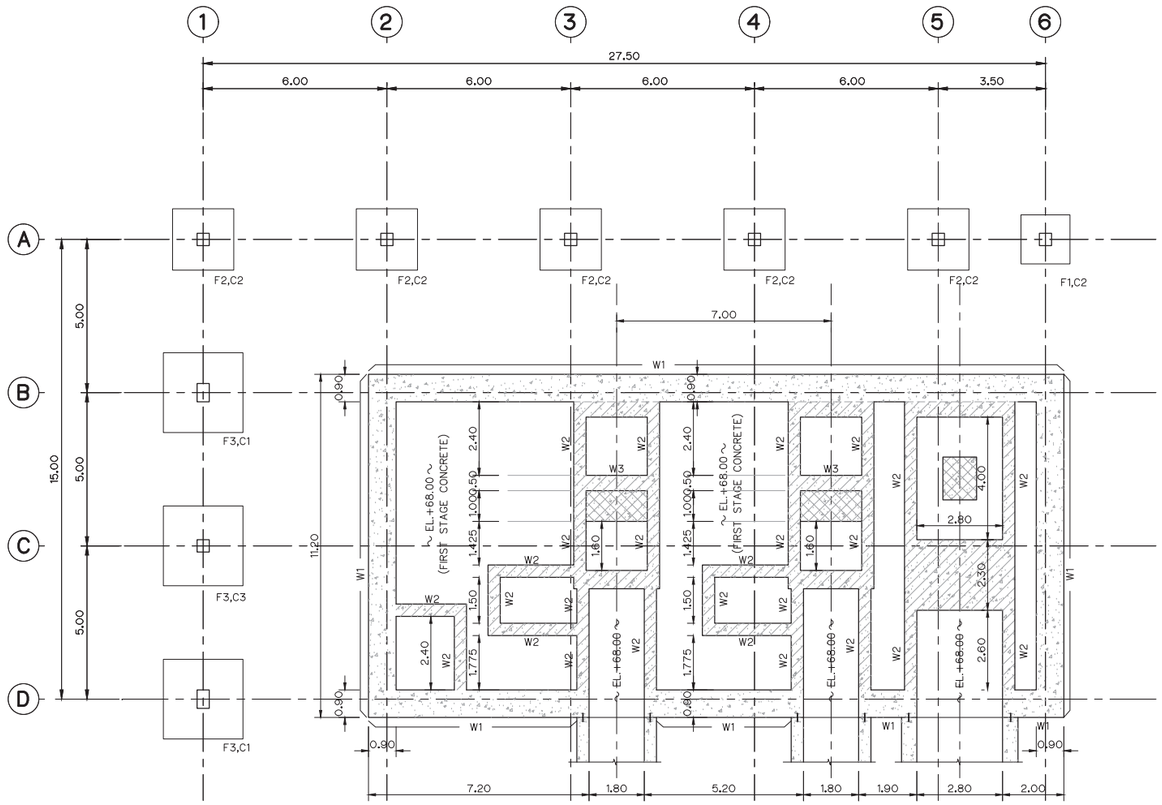
POWERHOUSE

DETAILS OF TOILET AND SEPTIC TANK

PCM P&C MANAGEMENT CO.,LTD.

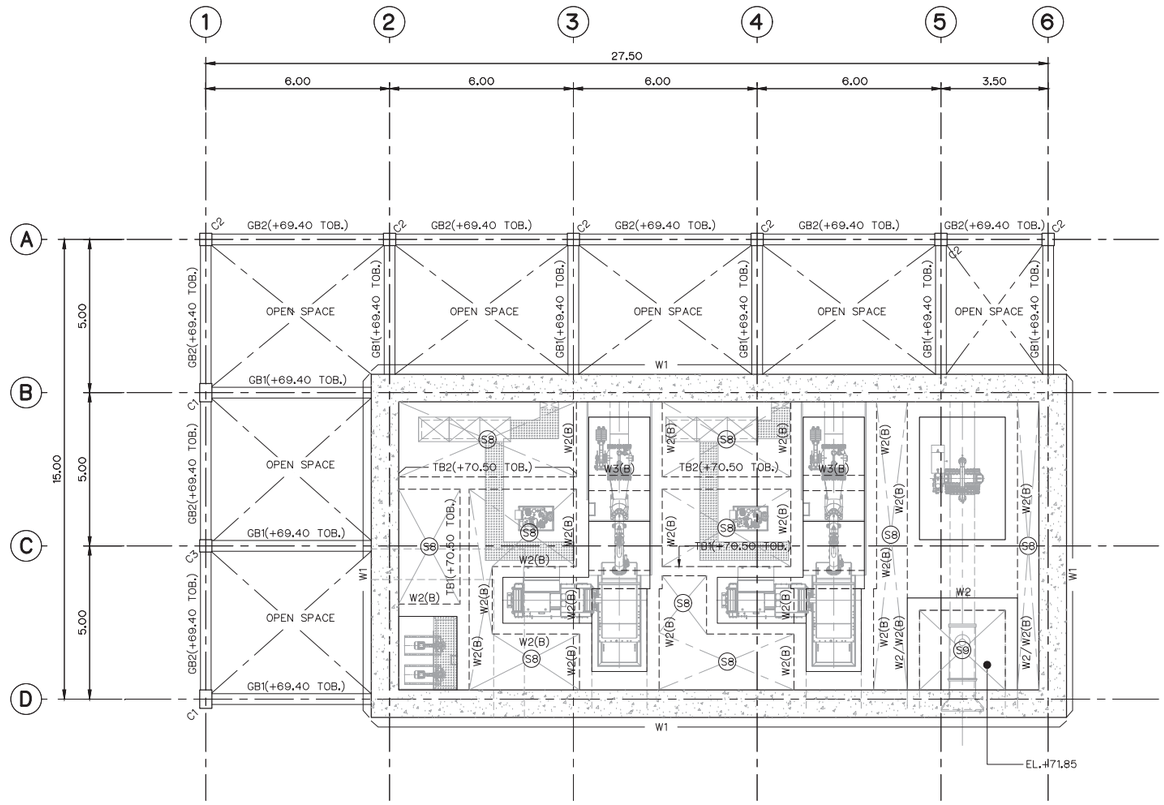
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED			
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO.	KTP2–PH–08
		SHEET NO.	38 OF 97



FOOTING PLAN

SCALE 1:100



FRAMING PLAN (EL.+69.40, EL.+70.50)

SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. THE MAIN CONTRACTOR SHALL BE CALCULATED EXACT TOP OF FOOTING BEFORE START CONSTRUCTION.

LEGEND

TOB. = TOP OF BEAM
TOW. = TOP OF WALL
(B) = BELOW

REFERENCE DRAWINGS :

1. POWERHOUSE, GENERAL LAYOUT	KTP2-PH-01
2. POWERHOUSE, ELEVATIONS	KTP2-PH-04
3. POWERHOUSE, SECTIONS (SHEET 1/2)	KTP2-PH-05
4. POWERHOUSE, SECTIONS (SHEET 2/2)	KTP2-PH-06

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

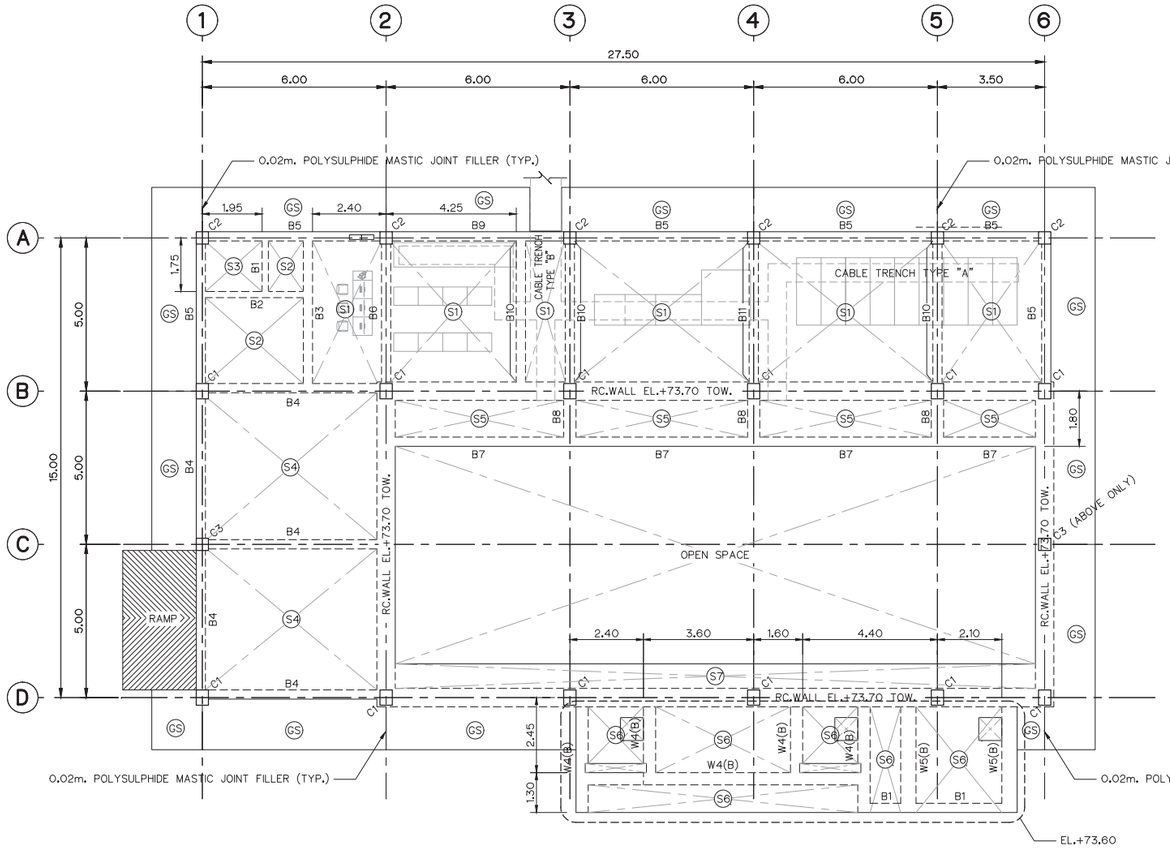
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
FOOTING PLAN AND PLAN OF BEAM (EL.+69.40, EL.+70.50)

PCM P&C MANAGEMENT CO.,LTD.

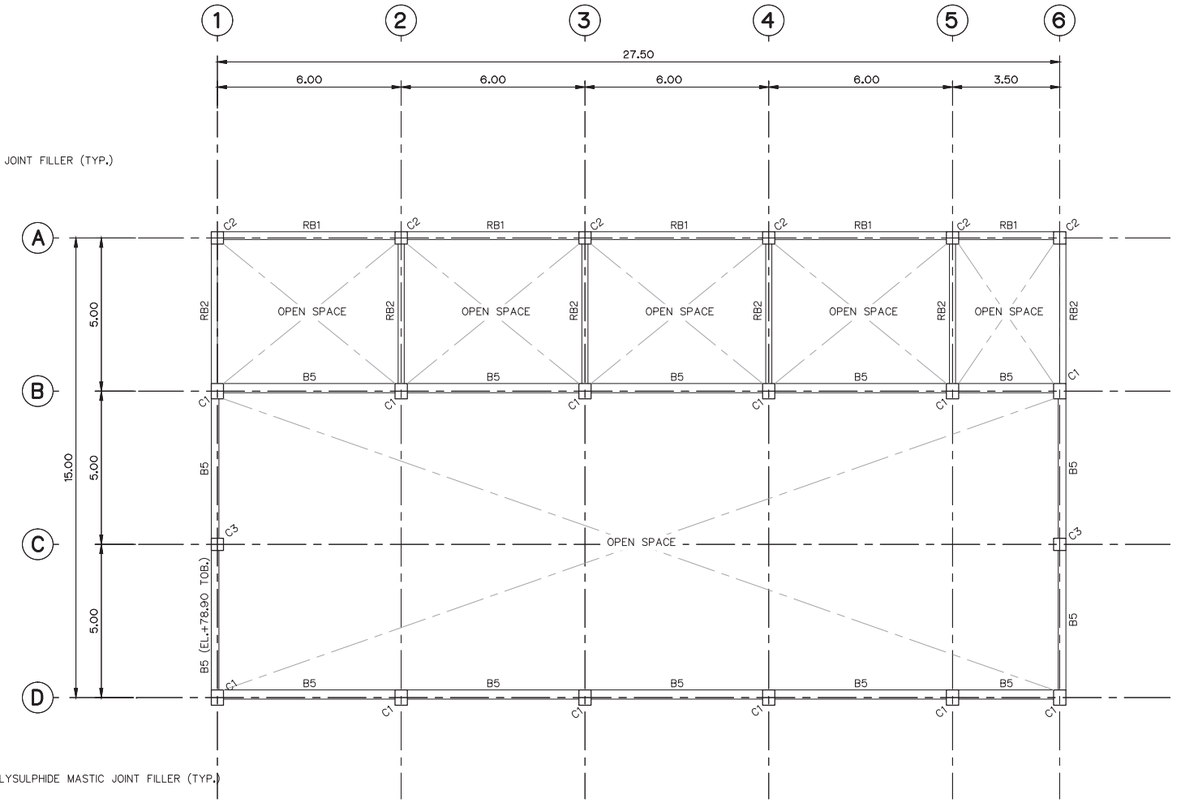
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO. KTP2-PH-09	SHEET NO. 39 OF 97



FRAMING PLAN (EL.+73.70)

SCALE 1:100



FRAMING PLAN (EL.+77.95)

SCALE 1:100

LEGEND

TOB. = TOP OF BEAM

TOW. = TOP OF WALL

(B) = BELOW

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. THE MAIN CONTRACTOR SHALL BE CALCULATED EXACT TOP OF FOOTING BEFORE START CONSTRUCTION.

REFERENCE DRAWINGS :

1. POWERHOUSE, GENERAL LAYOUT	KTP2-PH-01
2. POWERHOUSE, ELEVATIONS	KTP2-PH-04
3. POWERHOUSE, SECTIONS (SHEET 1/2)	KTP2-PH-05
4. POWERHOUSE, SECTIONS (SHEET 2/2)	KTP2-PH-06

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

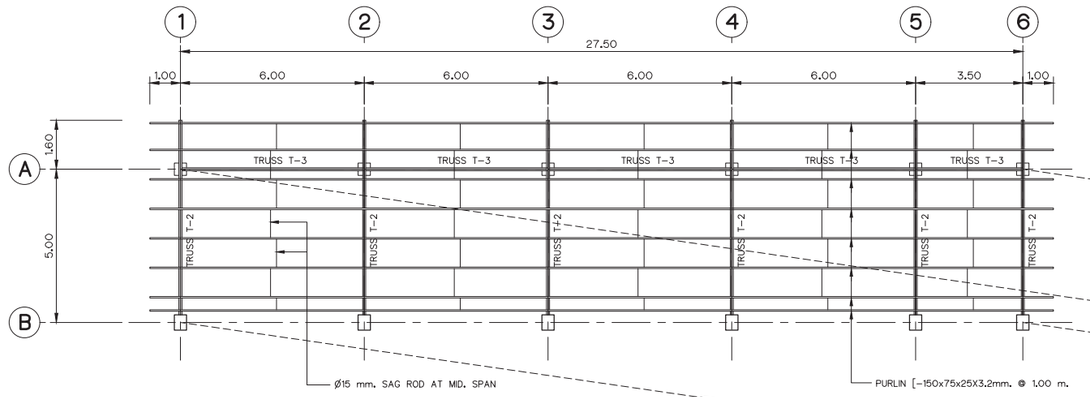
POWERHOUSE

FRAMING PLAN EL.+73.70 AND FRAMING PLAN EL.+77.95

PCM P&C MANAGEMENT CO.,LTD.

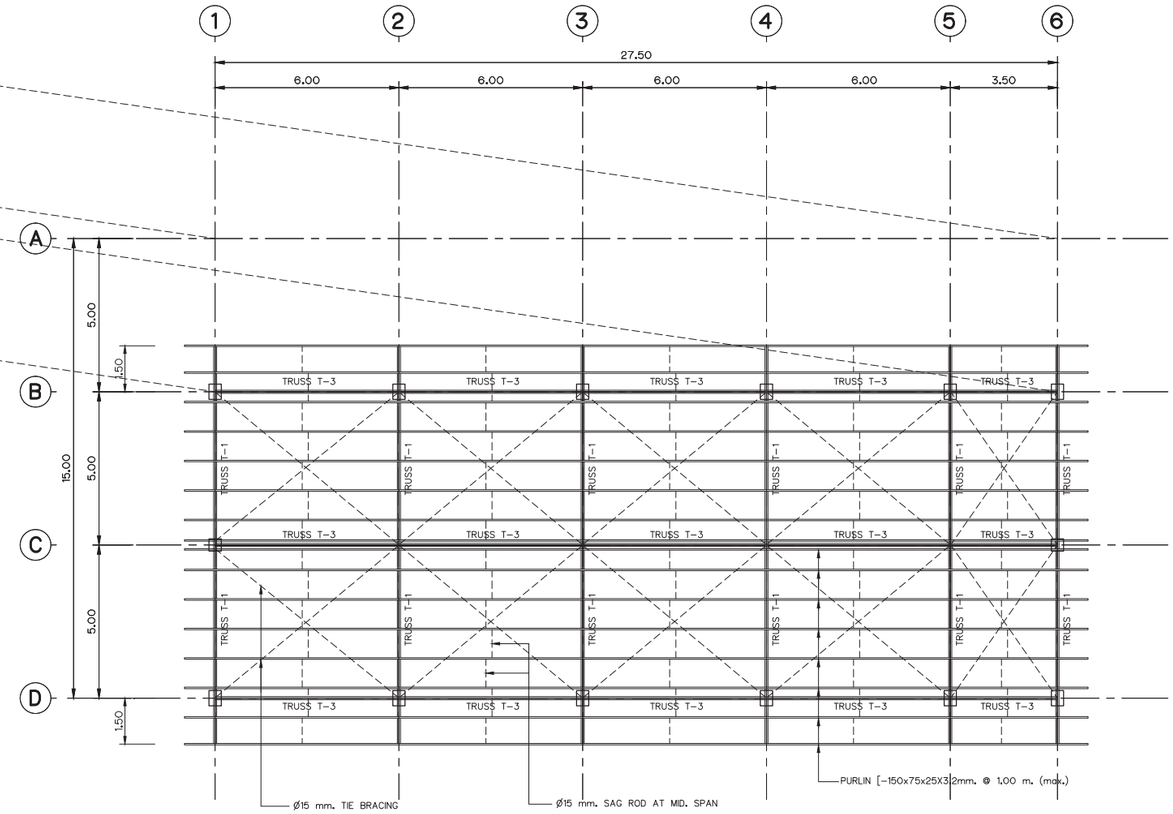
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วย.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วย.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO. KTP2-PH-10	SHEET NO. 40 OF 97



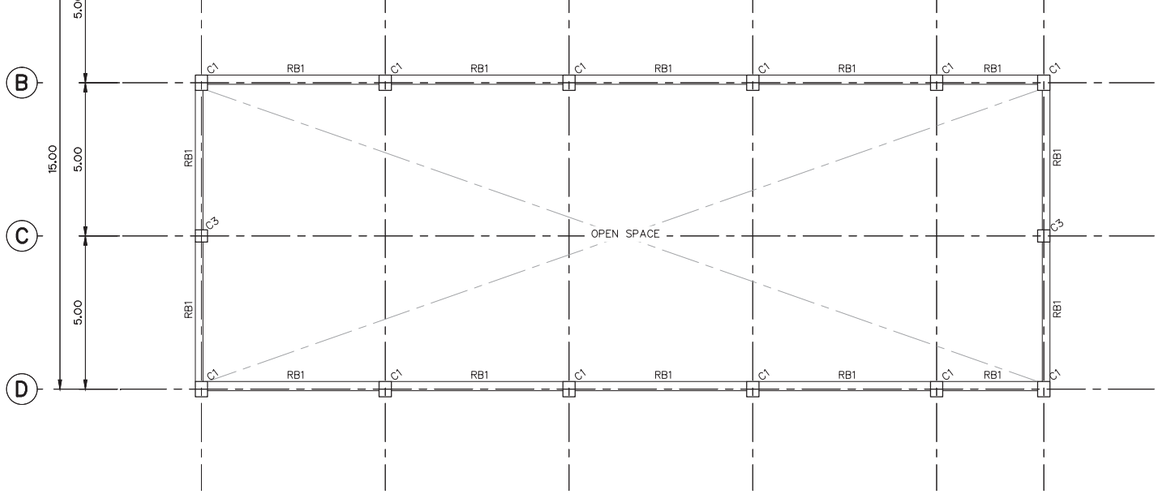
ROOF PLAN (EL.+77.95)

SCALE 1:100



ROOF PLAN (EL.+82.20)

SCALE 1:100



FRAMING PLAN (EL.+82.20)

SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

REFERENCE DRAWINGS :

1. DETAILS TRUSS T-1, T-2, T-3 AND T-4 (1/2) KTP2-PH-19

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

POWERHOUSE

PLAN OF ROOF BEAM AND PLAN OF TRUSS

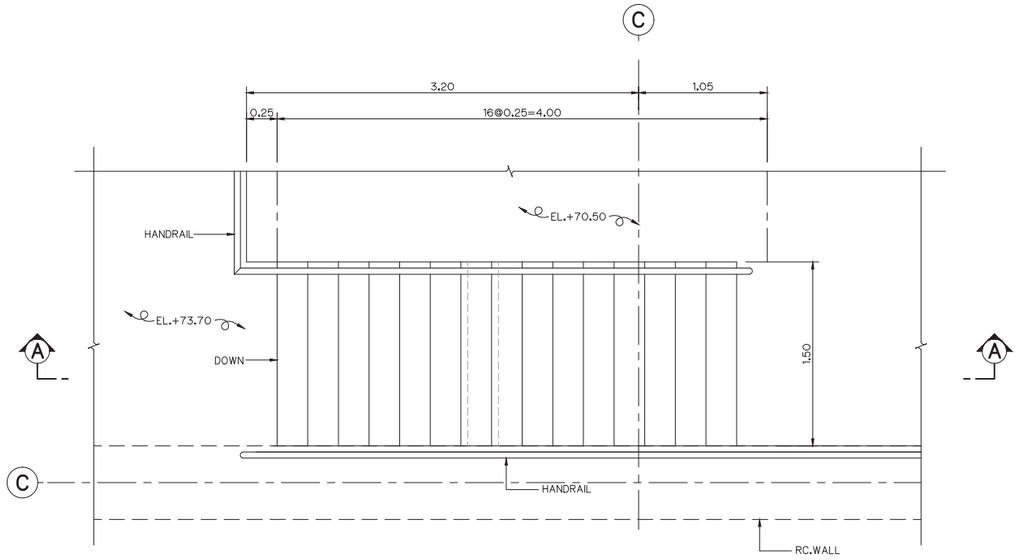
PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

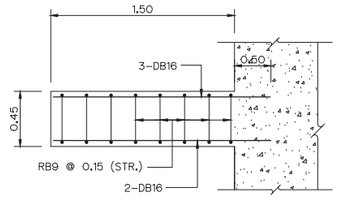
DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	

DRAWING NO. KTP2-PH-11

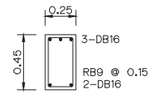
SHEET NO. 41 OF 97



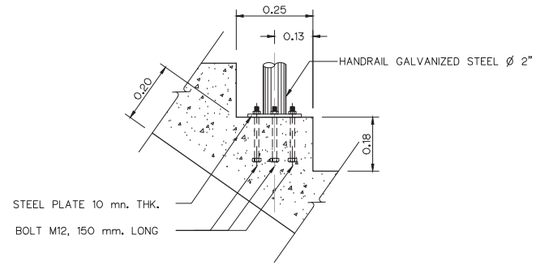
STAIR ST-1 PLAN
SCALE 1:25



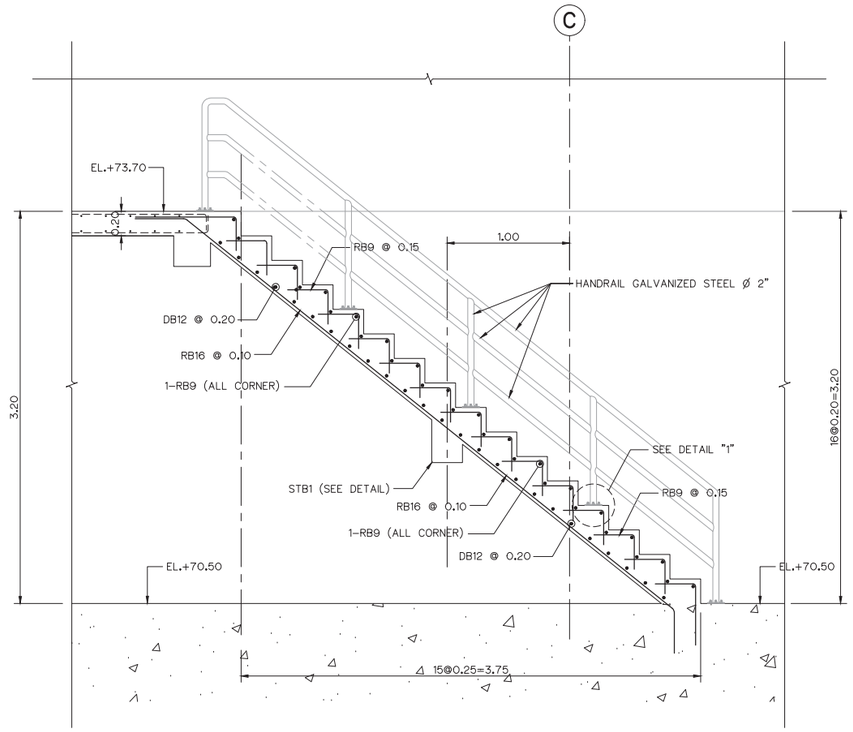
STB1 DETAIL
SCALE 1:25



STB1 DETAIL
SCALE 1:25



DETAIL "1"
SCALE 1:10



SECTION A-A
SCALE 1:25

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

REFERENCE DRAWINGS :

1. POWERHOUSE, FLOOR PLAN	KTP2-PH-02
2. POWERHOUSE, SECTIONS (SHEET 1/2)	KTP2-PH-05
3. POWERHOUSE, SECTIONS (SHEET 2/2)	KTP2-PH-06

0 0.25 0.50 0.75
SCALE 1:10 METERS

0 0.5 1 1.5 2
SCALE 1:25 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
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2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

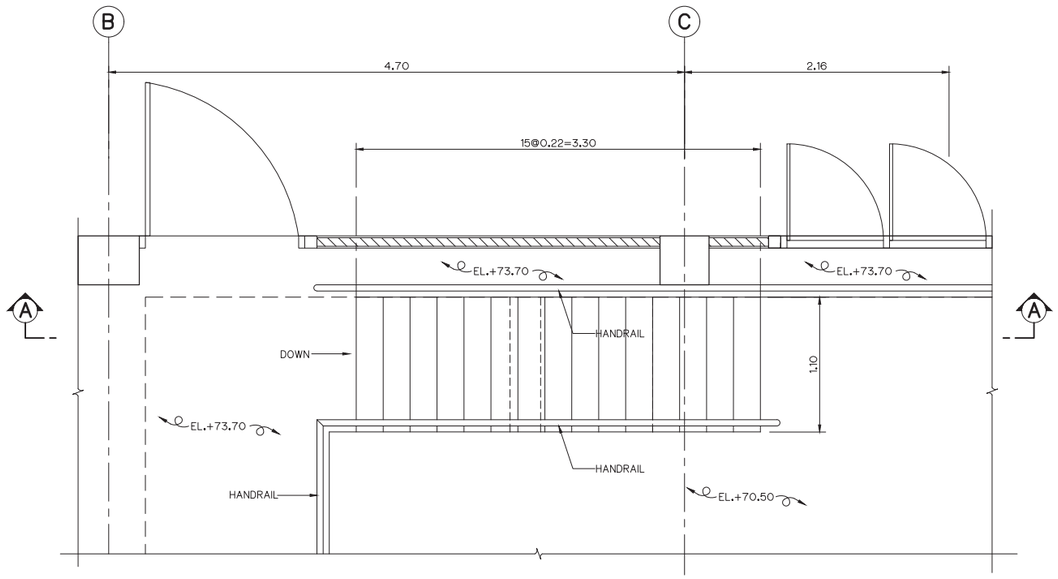
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
RC. STAIR ST-1, PLAN AND REINFORCEMENT DETAIL

PCM P&C MANAGEMENT CO.,LTD.

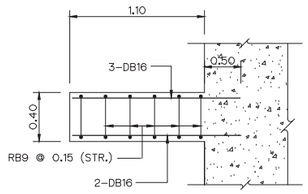
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2-PH-12
		SHEET NO.	42 OF 97



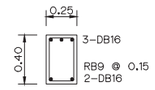
STAIR ST-2 PLAN

SCALE 1:25



STB2 DETAIL

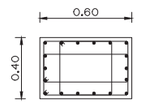
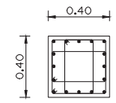
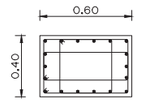
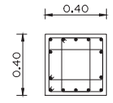
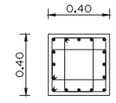
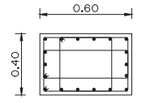
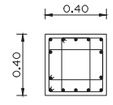
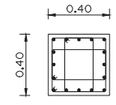
SCALE 1:25

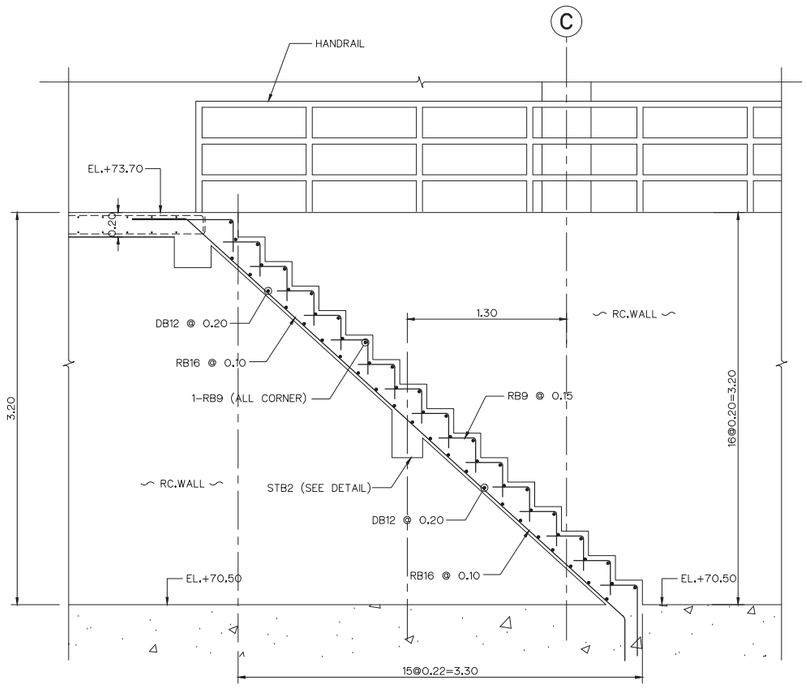


STB2 DETAIL

SCALE 1:25

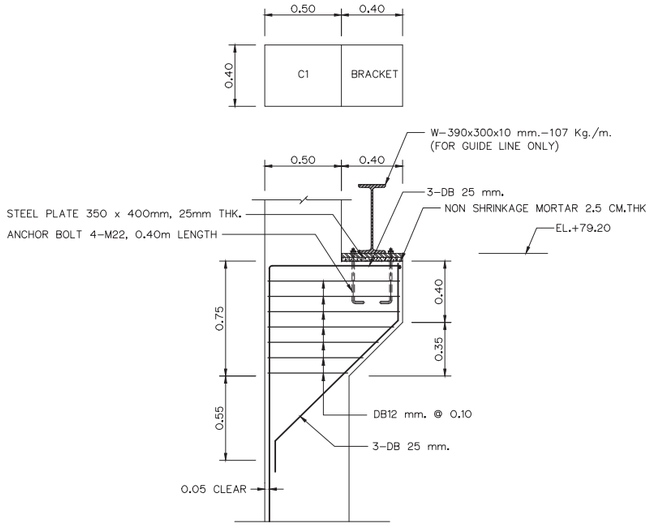
COLUMN SCHEDULE

COLUMNS / LEVEL	C1	C2	C3
ROOF (EL.+82.20) ↑ (EL.+77.95)	 20-DB25 3-RB9 @ 0.25 (STR.)	—	 16-DB25 2-RB9 @ 0.25 (STR.)
(EL.+77.95) ↑ GROUND FLOOR	 20-DB25 3-RB9 @ 0.25 (STR.)	 14-DB25 2-RB9 @ 0.25 (STR.)	 16-DB25 2-RB9 @ 0.25 (STR.)
GROUND FLOOR ↑ FOOTING	 20-DB25 3-RB9 @ 0.25 (STR.)	 14-DB25 2-RB9 @ 0.25 (STR.)	 16-DB25 2-RB9 @ 0.25 (STR.)



SECTION A-A

SCALE 1:25



BRACKET

SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

REFERENCE DRAWINGS :

1. POWERHOUSE, FLOOR PLAN	KTP2-PH-02
2. POWERHOUSE, SECTIONS (SHEET 1/2)	KTP2-PH-05
3. POWERHOUSE, SECTIONS (SHEET 2/2)	KTP2-PH-06





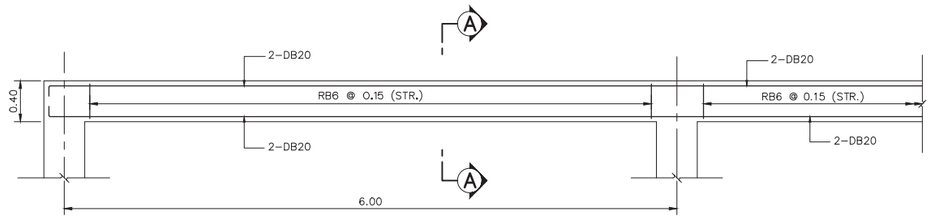
NO.	DATE	REVISIONS	CHECKED	APPROVED
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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

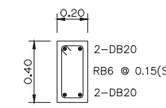
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
RC. STAIR ST-2 AND COLUMN AND BRACKET REINFORCEMENT DETAIL

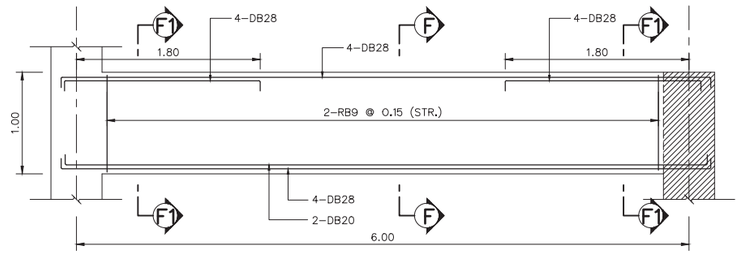
PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2-PH-13	SHEET NO. 43 OF 97



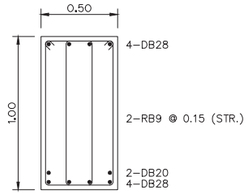
BEAM RB1
SCALE 1:30



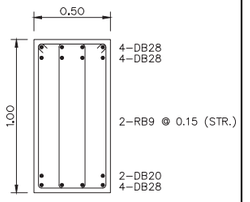
SECTION A–A
SCALE 1:20



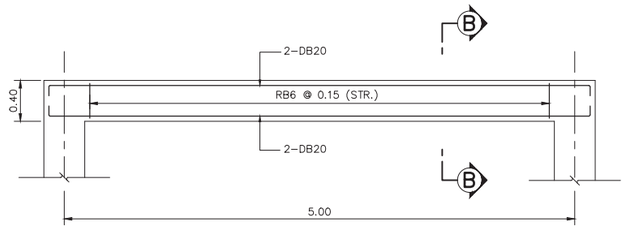
BEAM B4
SCALE 1:30



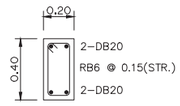
SECTION F–F
SCALE 1:20



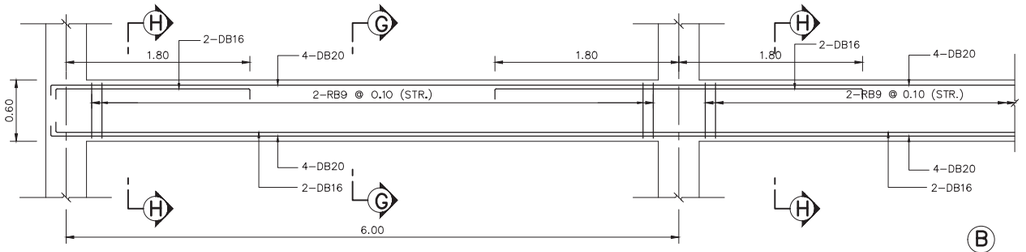
SECTION F1–F1
SCALE 1:20



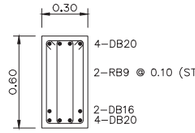
BEAM RB2
SCALE 1:30



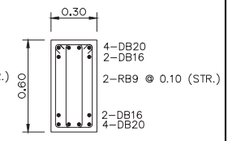
SECTION B–B
SCALE 1:20



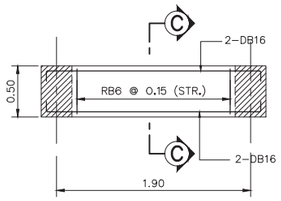
BEAM B5
SCALE 1:30



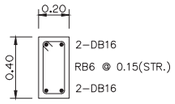
SECTION G–G
SCALE 1:20



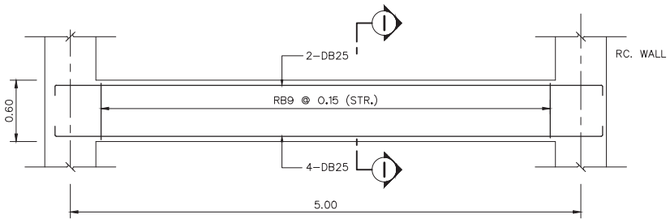
SECTION H–H
SCALE 1:20



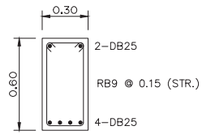
BEAM B1
SCALE 1:30



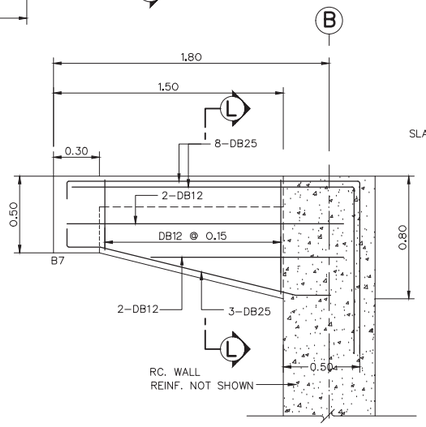
SECTION C–C
SCALE 1:20



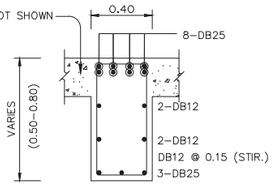
BEAM B6
SCALE 1:30



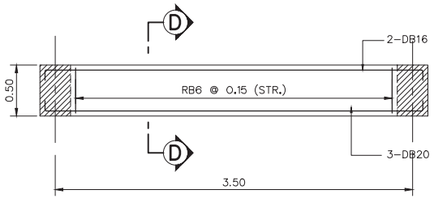
SECTION I–I
SCALE 1:20



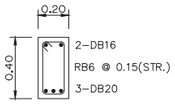
BEAM B8
SCALE 1:20



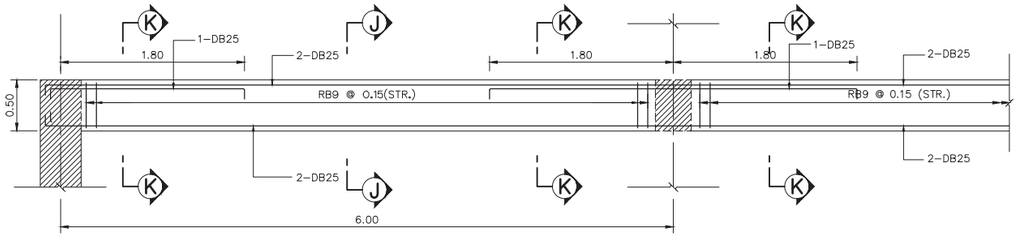
SECTION L–L
SCALE 1:20



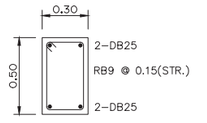
BEAM B2
SCALE 1:30



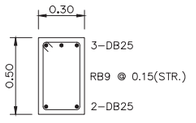
SECTION D–D
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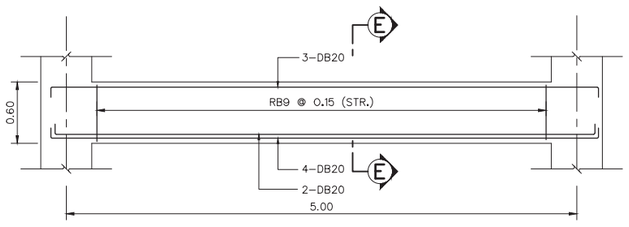
BEAM B7
SCALE 1:30



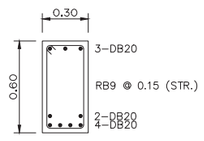
SECTION J–J
SCALE 1:20



SECTION K–K
SCALE 1:20



BEAM B3
SCALE 1:30



SECTION E–E
SCALE 1:20

0 0.2 0.4 0.8 1.2 1.6
SCALE 1:20 METERS

0 0.5 1.0 1.5 2.0 2.5
SCALE 1:30 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03

REFERENCE DRAWING :

1. POWERHOUSE, FRAMING PLAN EL.+73.70 AND FRAMING PLAN EL.+77.95	KTP2–PH–10
1. POWERHOUSE, PLAN OF ROOF BEAM AND PLAN OF TRUSS	KTP2–PH–11

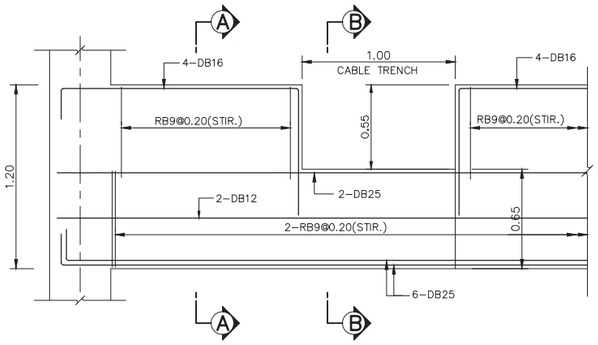
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	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

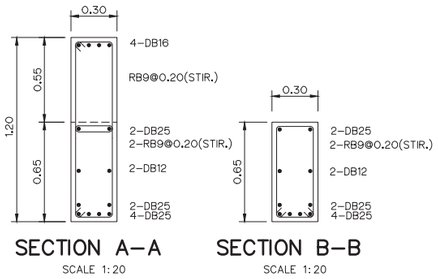
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
BEAM REINFORCEMENT DETAILS (SHEET 1/2)

PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2–PH–14	SHEET NO. 44 OF 97

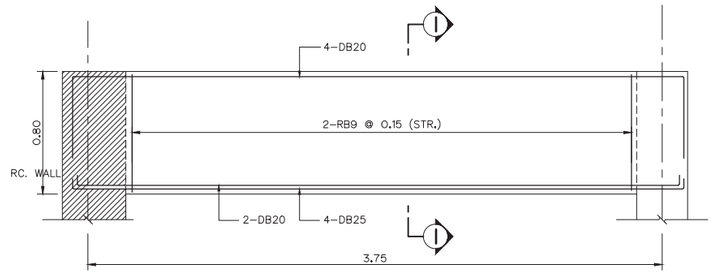


BEAM B9
SCALE 1:20

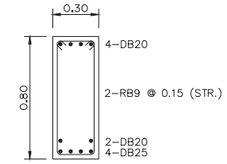


SECTION A–A
SCALE 1:20

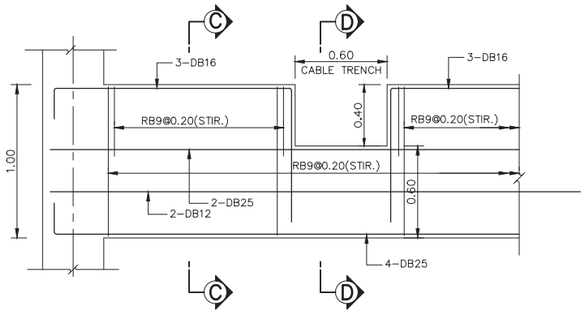
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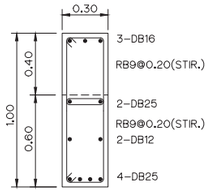
BEAM TB1
SCALE 1:20



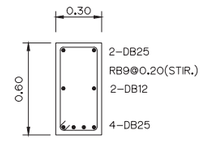
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SCALE 1:20



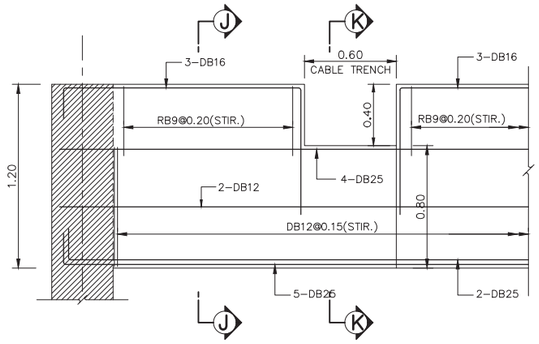
BEAM B10
SCALE 1:20



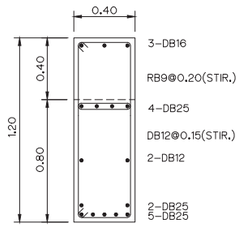
SECTION C–C
SCALE 1:20



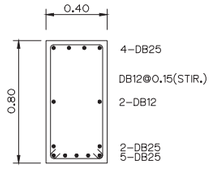
SECTION D–D
SCALE 1:20



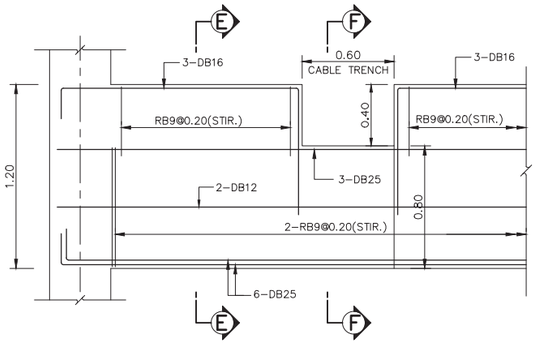
BEAM TB2
SCALE 1:20



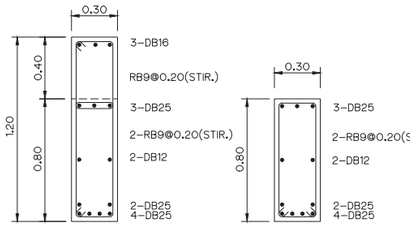
SECTION J–J
SCALE 1:20



SECTION K–K
SCALE 1:20

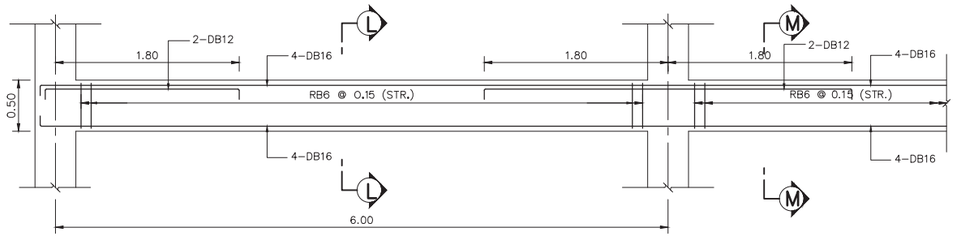


BEAM 11
SCALE 1:20

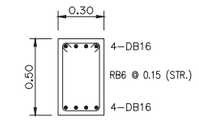


SECTION E–E
SCALE 1:20

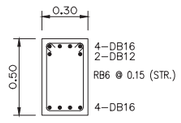
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SCALE 1:20



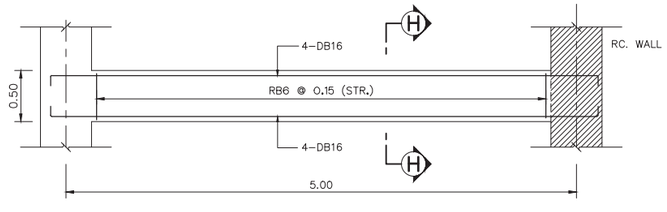
BEAM GB2
SCALE 1:30



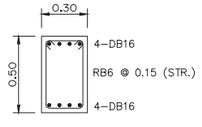
SECTION L–L
SCALE 1:20



SECTION M–M
SCALE 1:20



BEAM GB1
SCALE 1:30



SECTION H–H
SCALE 1:20

0 0.2 0.4 0.8 1.2 1.6
SCALE 1:20 METERS

0 0.5 1.0 1.5 2.0 2.5
SCALE 1:30 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03

REFERENCE DRAWING :

1. POWERHOUSE, FRAMING PLAN EL.+73.70 AND FRAMING PLAN EL.+77.95 KTP2–PH–10
1. POWERHOUSE, PLAN OF ROOF BEAM AND PLAN OF TRUSS KTP2–PH–11

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
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MINISTRY OF ENERGY

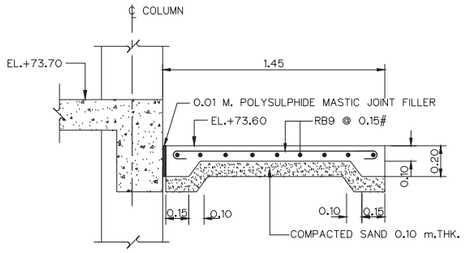
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
BEAM REINFORCEMENT DETAILS (SHEET 2/2)

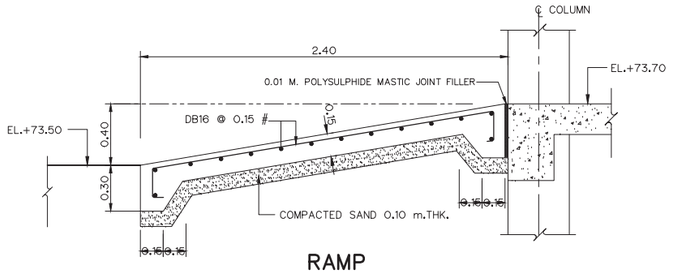
PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

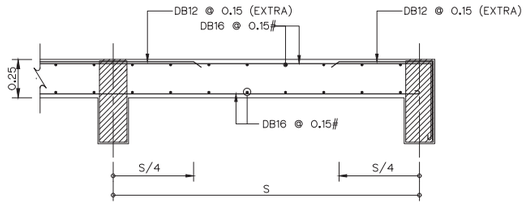
DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2–PH–15
		SHEET NO.	45 OF 97



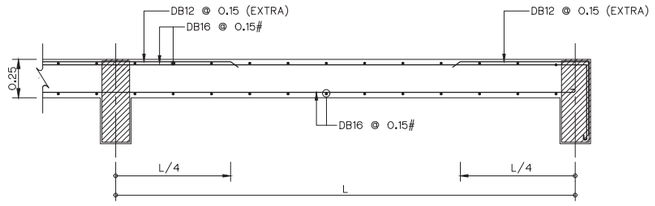
SLAB GS
SCALE 1:20



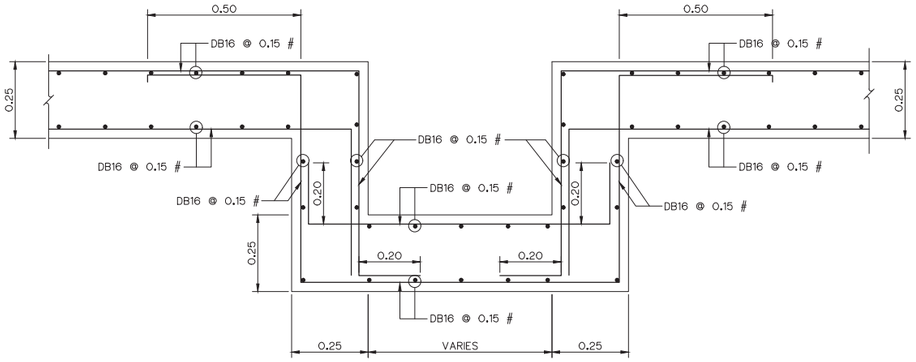
RAMP
SCALE 1:20



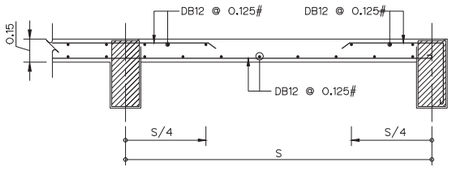
SLAB S1 (SHOT)
SCALE 1:20



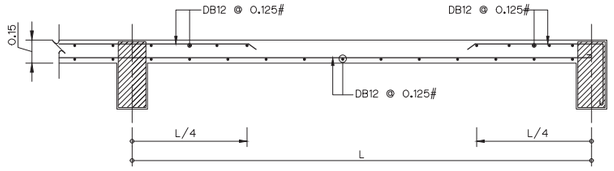
SLAB S1 (LONG)
SCALE 1:20



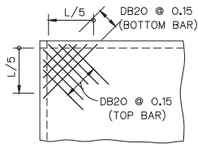
REINFORCEMENT DETAILS OF CABLE TRENCH AT SLAB S1
SCALE 1:10



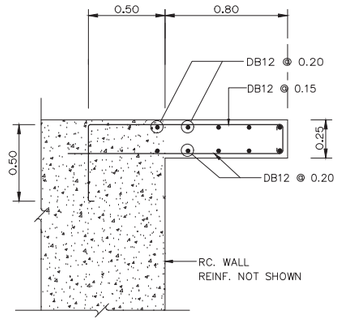
SLAB S2 (SHOT)
SCALE 1:20



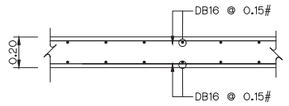
SLAB S2 (LONG)
SCALE 1:20



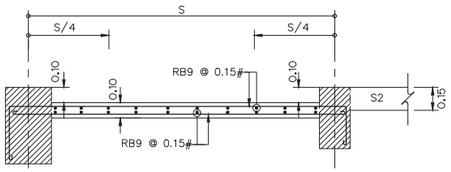
TYP. ALL CORNER
SCALE 1:20



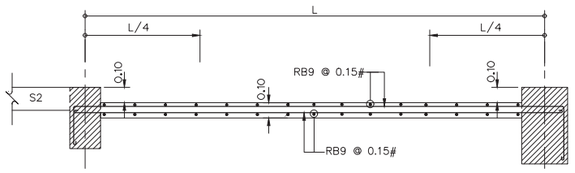
SLAB S7
SCALE 1:20



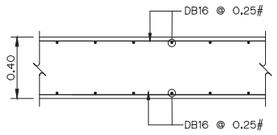
SLAB S6
SCALE 1:20



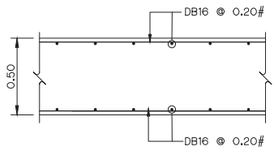
SLAB S3 (SHORT)
SCALE 1:20



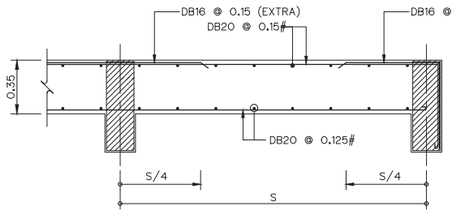
SLAB S3 (LONG)
SCALE 1:20



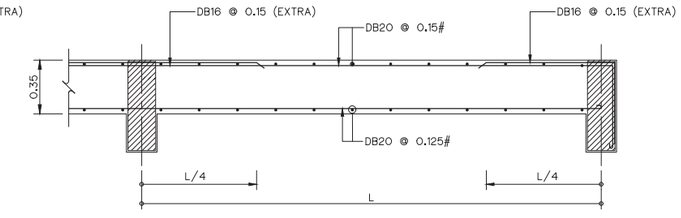
SLAB S8
SCALE 1:20



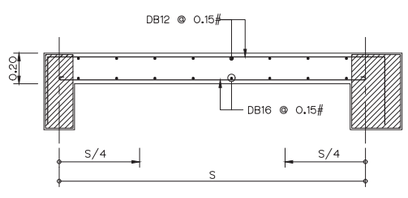
SLAB S9
SCALE 1:20



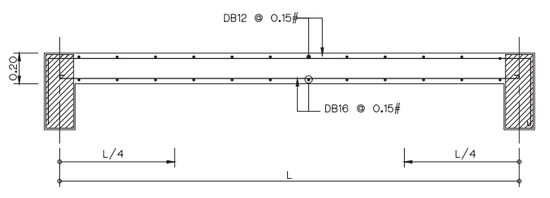
SLAB S4(SHOT)
SCALE 1:20



SLAB S4(LONG)
SCALE 1:20



SLAB S5(SHOT)
SCALE 1:20



SLAB S5(LONG)
SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

REFERENCE DRAWINGS :

1. POWERHOUSE, FRAMING PLAN EL.+73.70 AND FRAMING PLAN EL.+77.95 KTP2-PH-10

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1:10 METERS

0 0.50 1.00 1.50
SCALE 1:20 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

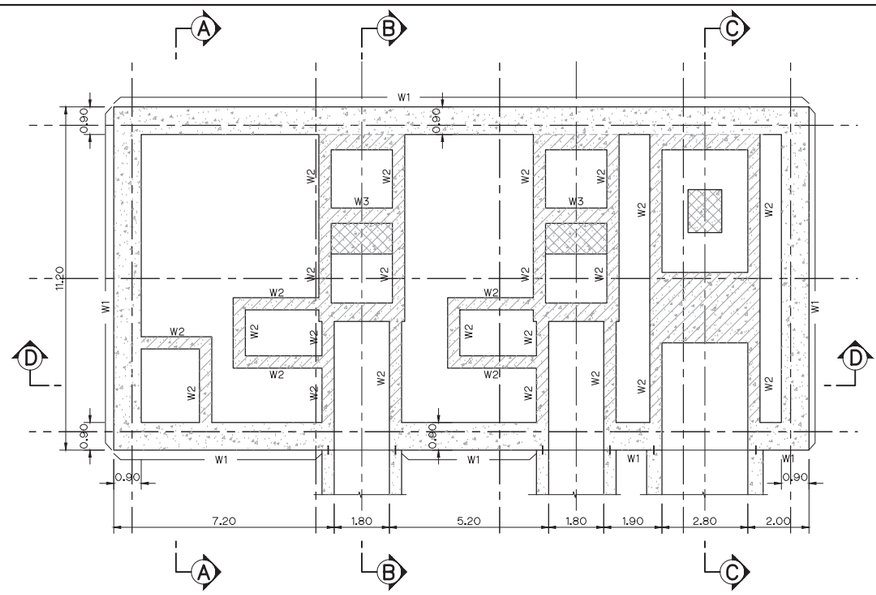
PART 1 : CIVIL WORKS
POWERHOUSE
SLAB REINFORCEMENT DETAILS

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED	28.1957	
DRAWN		
CHECKED	28.1957	
PROJECT MANAGER	17/03/2020 DATE	

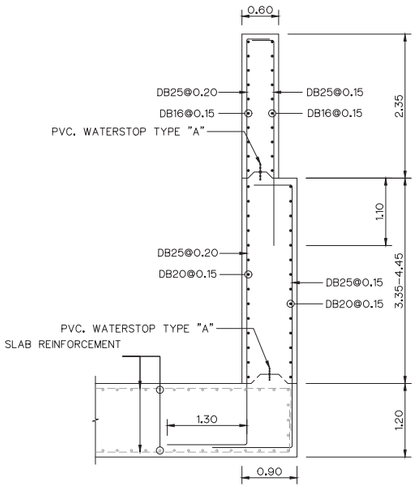
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	KTP2-PH-16
SHEET NO.	46 OF 97



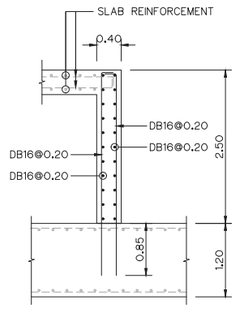
KEY PLAN

SCALE 1:100



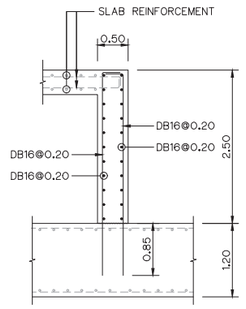
W1 DETAIL

SCALE 1:50



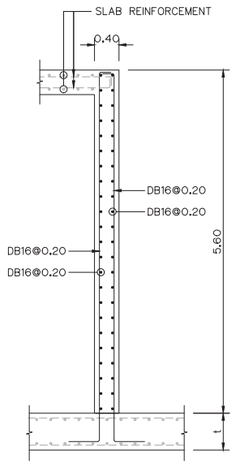
W2 DETAIL

SCALE 1:50



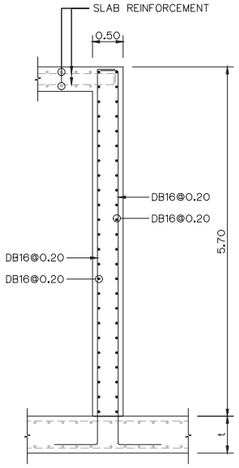
W3 DETAIL

SCALE 1:50



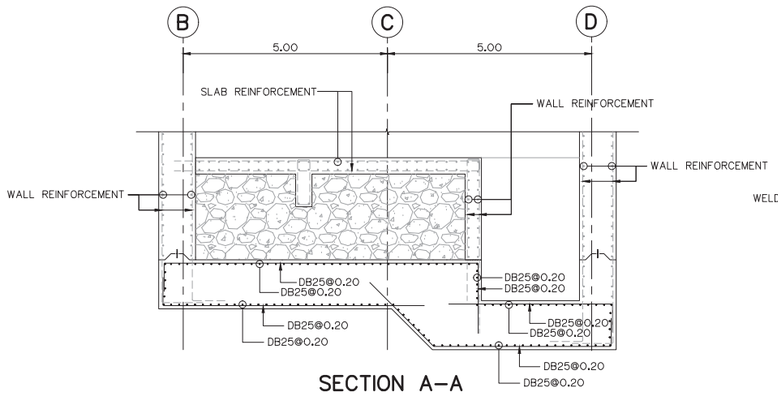
W4 DETAIL

SCALE 1:50



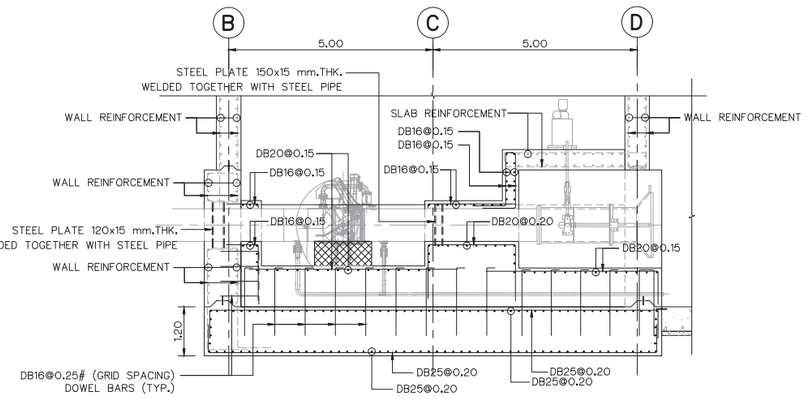
W5 DETAIL

SCALE 1:50



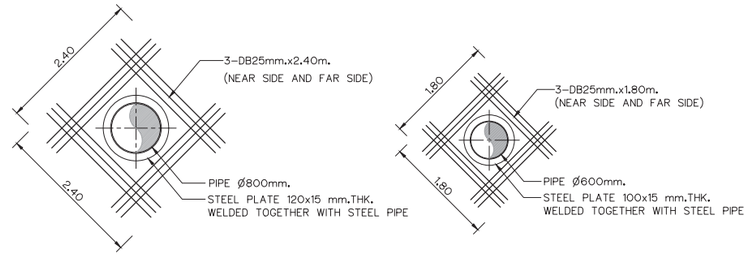
SECTION A-A

SCALE 1:75



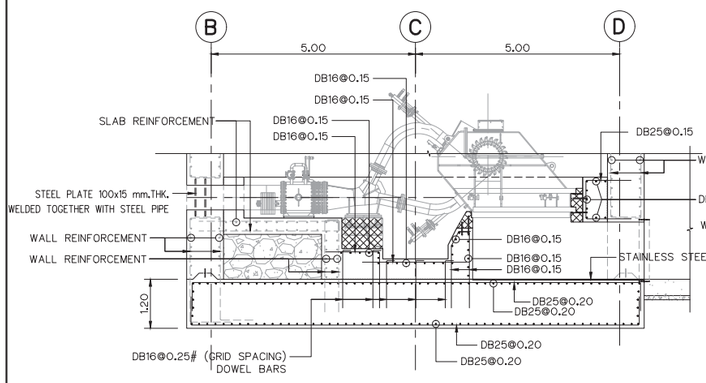
SECTION C-C

SCALE 1:75



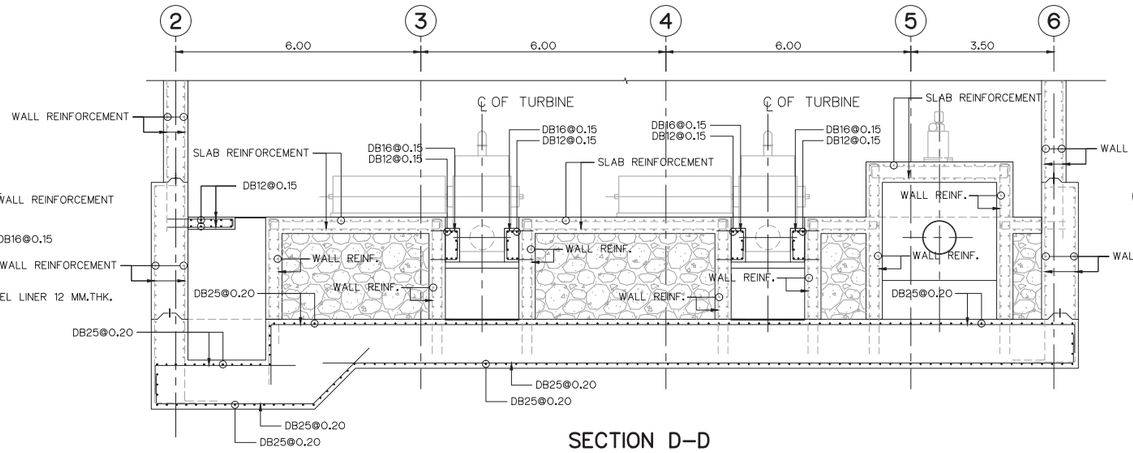
PIPE THROUGH WALL REINFORCEMENT DETAIL

SCALE 1:50



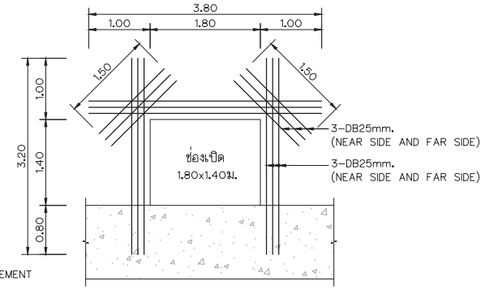
SECTION B-B

SCALE 1:75



SECTION D-D

SCALE 1:75



OPENING THROUGH WALL REINFORCEMENT DETAIL

SCALE 1:50

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

REFERENCE DRAWINGS :

1. POWERHOUSE, TURBINE AND GALLERY FLOOR PLAN	KTP2-PH-03
2. POWERHOUSE, SECTIONS (SHEET 1/2)	KTP2-PH-05
3. POWERHOUSE, SECTIONS (SHEET 2/2)	KTP2-PH-06

0 1 2 3 4
SCALE 1:50 METERS

0 0.5 1.0 2.0 3.0 4.0 6.0
SCALE 1:75 METERS

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

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MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

POWERHOUSE

TURBINE FLOOR REINFORCEMENT DETAILS

PCM P&C MANAGEMENT CO.,LTD.

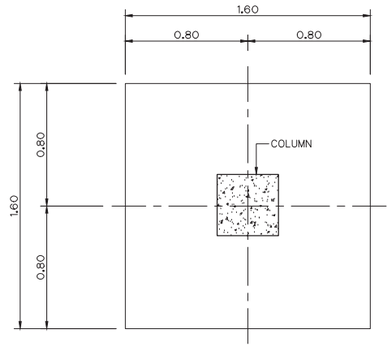
DESIGNED		28.1957
DRAWN		
CHECKED		28.1957
PROJECT MANAGER		17/03/2020
		DATE

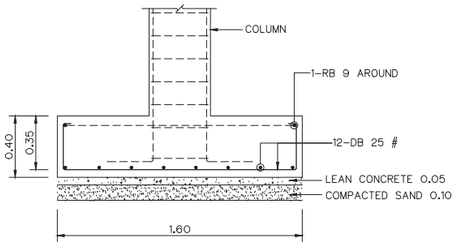
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	

DRAWING NO. KTP2-PH-17

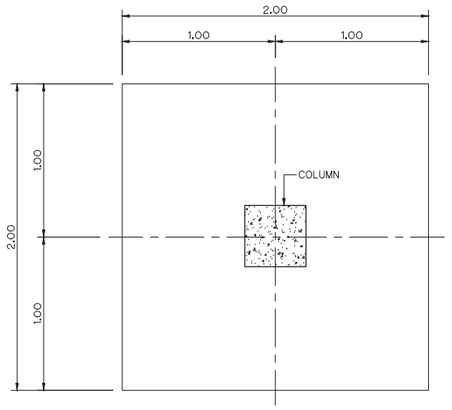
SHEET NO. 47 OF 97

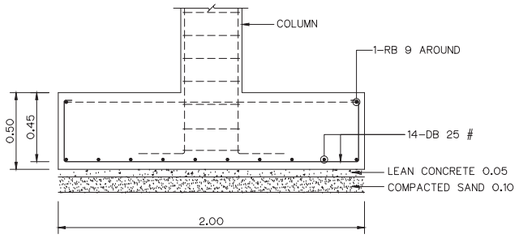




FOOTING (F1)

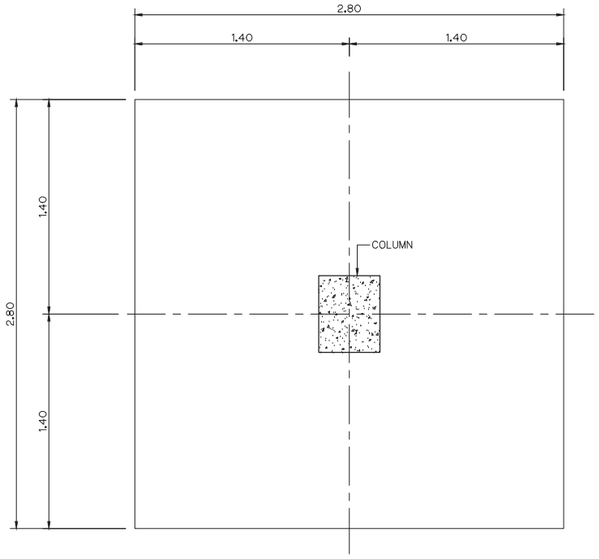
SCALE 1:20

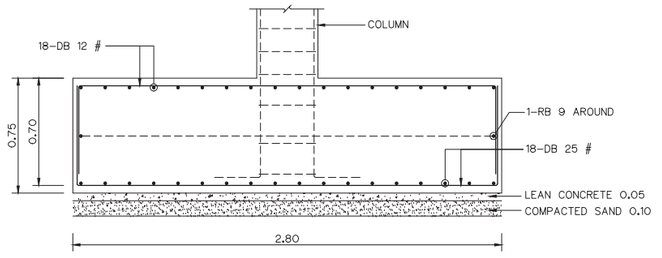




FOOTING (F2)

SCALE 1:20





FOOTING (F3)

SCALE 1:20

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

REFERENCE DRAWINGS :

1. POWERHOUSE, FOOTING PLAN AND PLAN OF BEAM (EL.+68.10, EL.+70.90) KTP2-PH-09

0 0.50 1.00 1.50

SCALE 1:20 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

POWERHOUSE

FOOTING REINFORCEMENT DETAILS

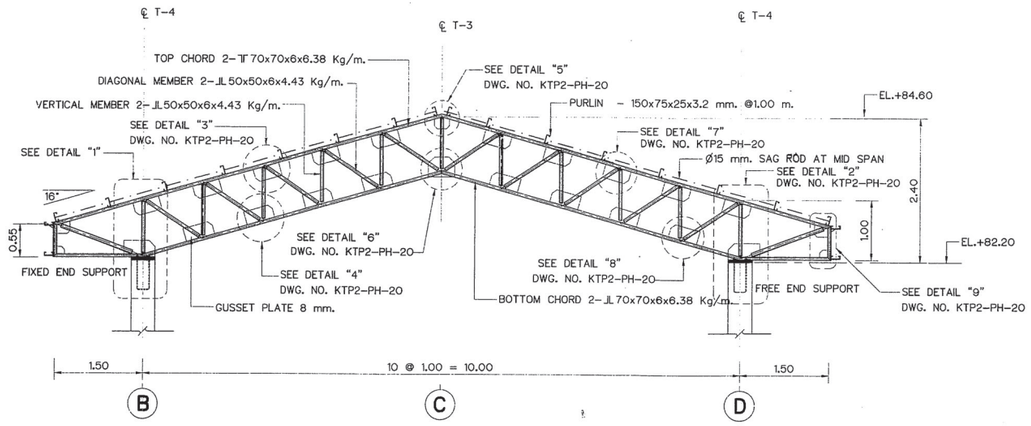
PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	

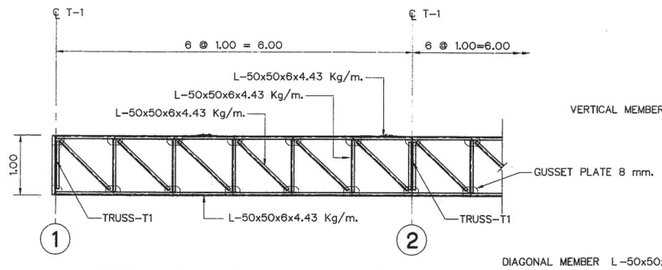
DRAWING NO. KTP2-PH-18

SHEET NO. 48 OF 97



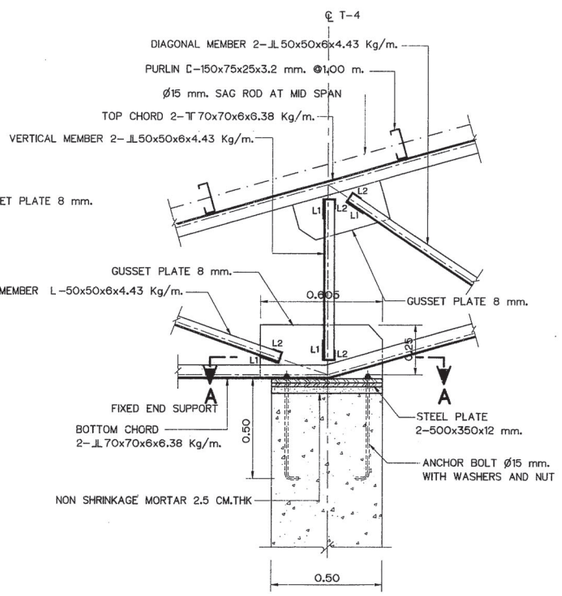
TRUSS T-1

SCALE 1:50



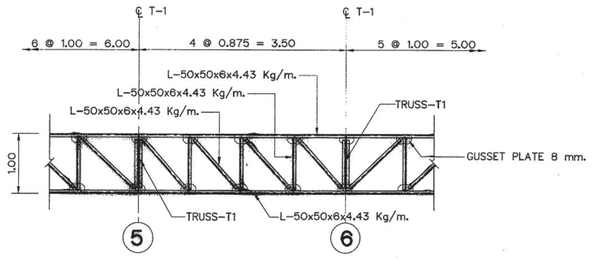
TRUSS T-3 (SPAN 6.00m.)

SCALE 1:50



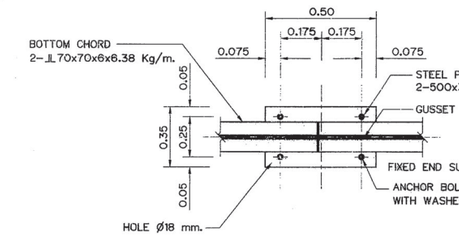
DETAILS "1"

SCALE 1:15



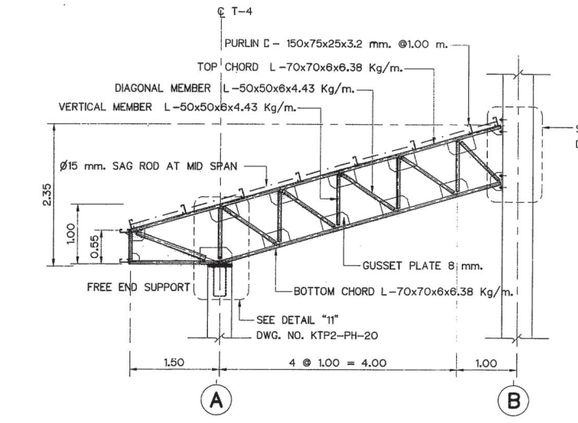
TRUSS T-3 (SPAN 3.50m.)

SCALE 1:50



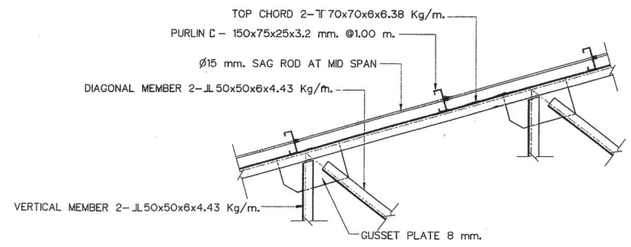
SECTION A-A

SCALE 1:15

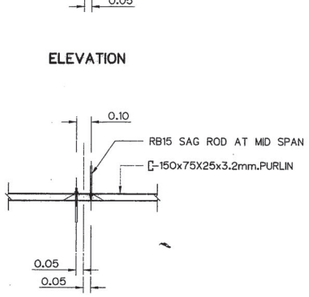


TRUSS T-2

SCALE 1:50



SECTION

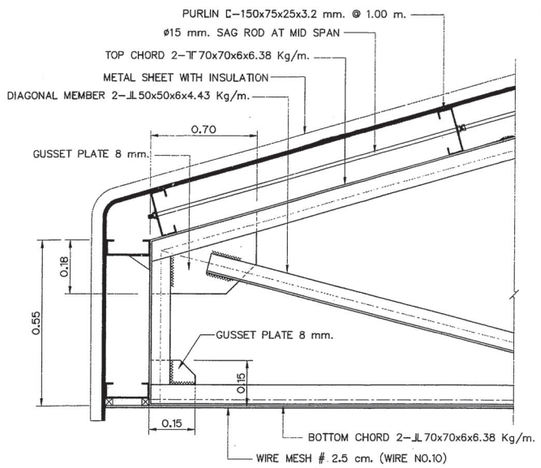


ELEVATION

PLAN

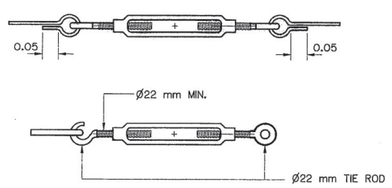
SAG ROD DETAILS

SCALE 1:20



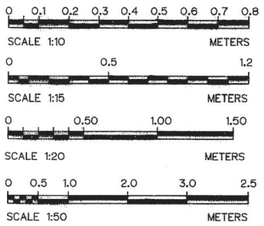
EAVES DETAIL

SCALE 1:10



TURNBUCKLE

NOT TO SCALE



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

REFERENCE DRAWINGS :

1. POWERHOUSE, ELEVATIONS	KTP2-PH-04
2. POWERHOUSE, PLAN OF ROOF BEAM AND PLAN OF TRUSS	KTP2-PH-11
3. POWERHOUSE, DETAILS TRUSS T-1, T-2, T-3 AND T-4 (2/2)	KTP2-PH-20

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

POWERHOUSE

DETAILS TRUSS T-1, T-2, T-3 AND T-4 (1/2)

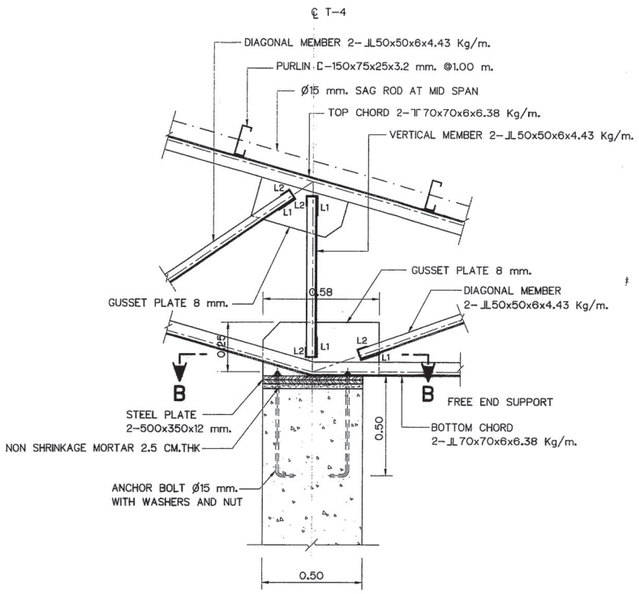
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

PCM P&C MANAGEMENT CO.,LTD.

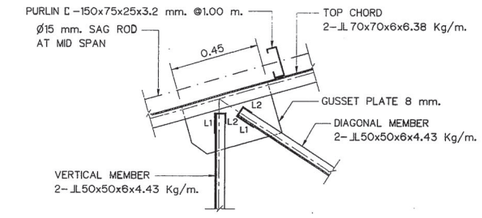
DESIGNED	28.1957	
DRAWN		
CHECKED	28.1957	
PROJECT MANAGER	17/03/2020	DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

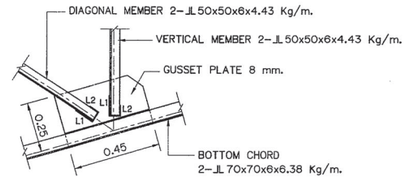
REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	KTP2-PH-19
SHEET NO.	49 OF 97



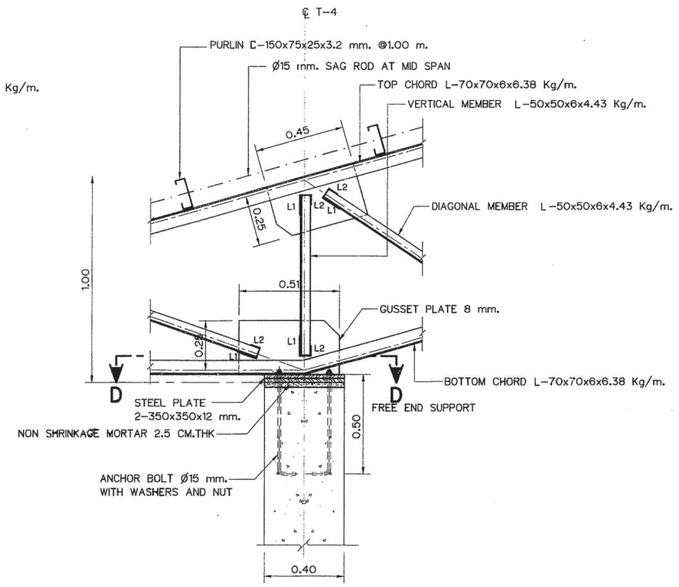
DETAILS "2"
SCALE 1:15



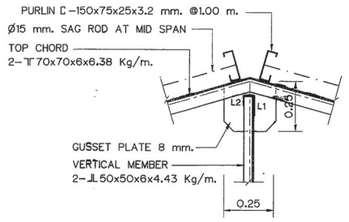
DETAILS "3"
SCALE 1:15



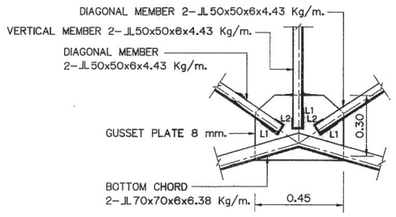
DETAILS "4"
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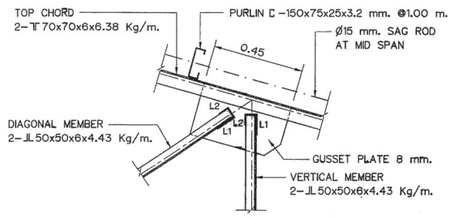
DETAILS "11"
SCALE 1:15



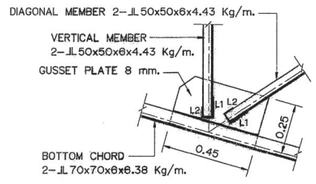
DETAILS "5"
SCALE 1:15



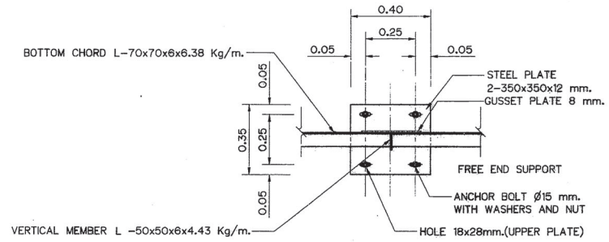
DETAILS "6"
SCALE 1:15



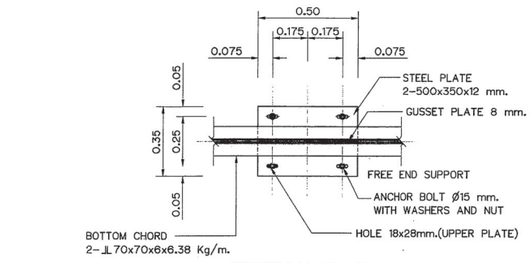
DETAILS "7"
SCALE 1:15



DETAILS "8"
SCALE 1:15



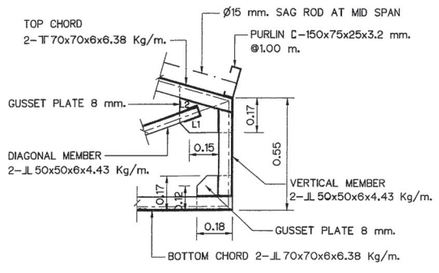
SECTION D-D
SCALE 1:15



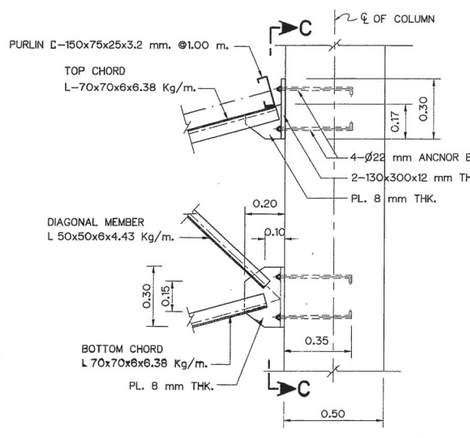
SECTION B-B
SCALE 1:15

MEMBER SCHEDULE TABLE

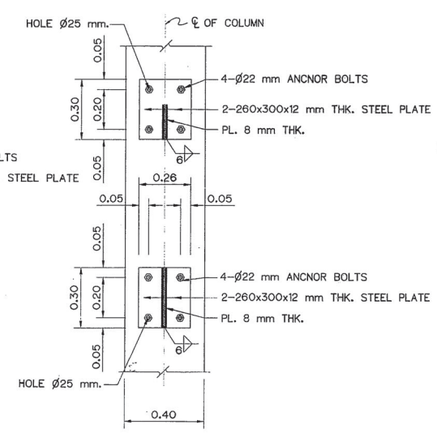
TRUSS TYPE	MEMBER	FILLET WELD SIZE (mm)		
		L1	L2	t
TRUSS T-1	2-⊥L 70x70x6x6.38 Kg/m.	125	75	5
TRUSS T-2	1-⊥L 70x70x6x6.38 Kg/m.	125	75	5
TRUSS T-3	1-⊥L50x50x6x4.43 Kg/m.	100	50	5



DETAILS "9"
SCALE 1:15



DETAILS "10"
SCALE 1:15



SECTION C-C
SCALE 1:15

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

REFERENCE DRAWINGS :

1. POWERHOUSE, PLAN OF ROOF BEAM AND PLAN OF TRUSS KTP2-PH-11
2. POWERHOUSE, DETAILS TRUSS T-1, T-2, T-3 AND T-4 (1/2) KTP2-PH-19

0 0.5 1.2
SCALE 1:15 METERS

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
DETAILS TRUSS T-1, T-2, T-3 AND T-4 (2/2)

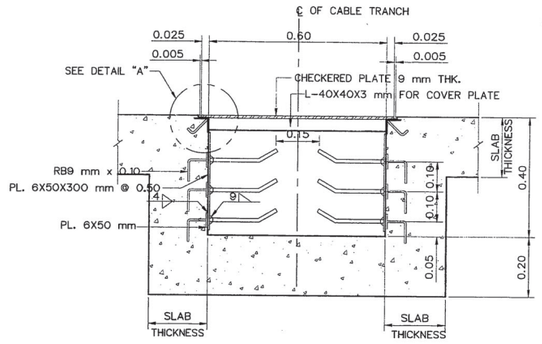
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS | DEDE

PCM P&C MANAGEMENT CO.,LTD.

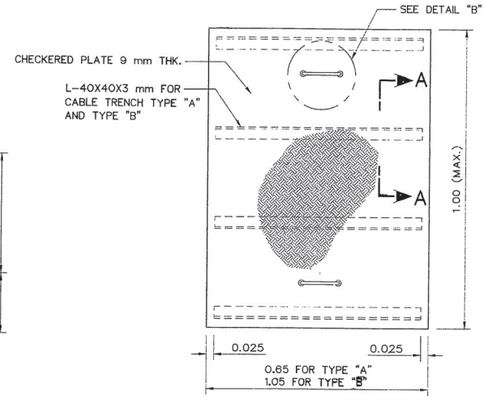
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2-PH-20
		SHEET NO.	50 OF 97



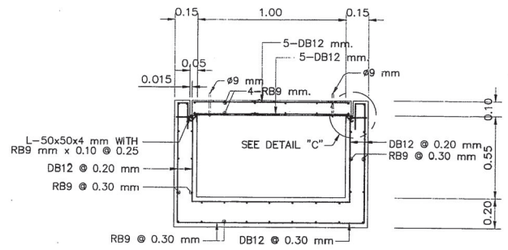
IN DOOR CABLE TRENCH TYPE "A"

REINFORCEMENT DETAIL SEE KTP2-PH-16
SCALE 1:10



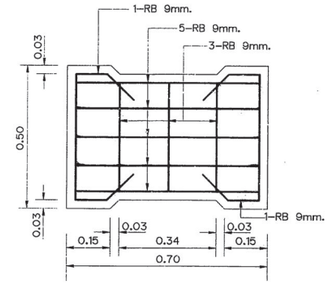
COVER PLATE FOR TYPE "A" AND "B"

NOT TO SCALE



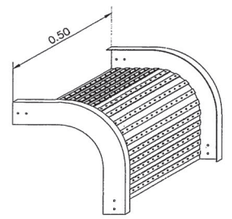
OUT DOOR CABLE TRENCH TYPE "C"

SCALE 1:20



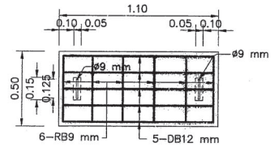
RC COVER FOR TYPE "D"

SCALE 1:10



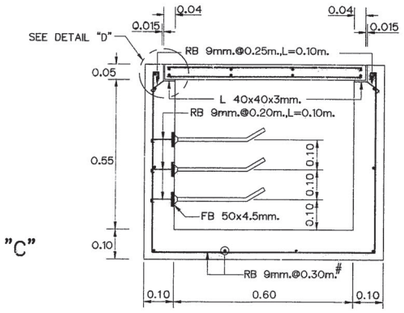
INSIDE VERTICAL RISERS

NOT TO SCALE



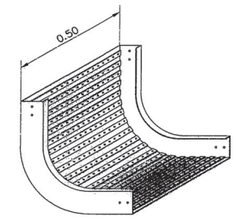
COVER CABLE TRENCH FOR TYPE "C"

SCALE 1:20



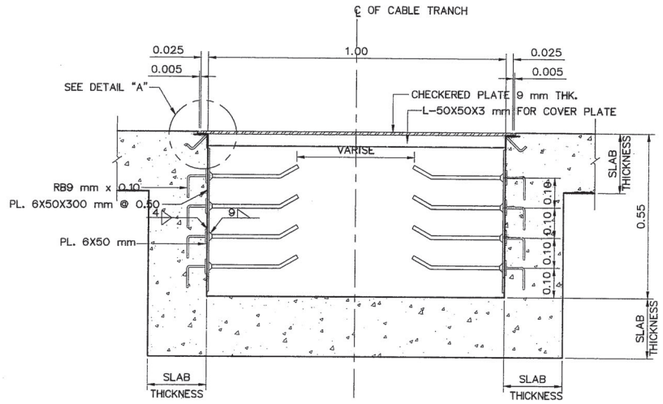
CABLE TRENCH IN SWITCHYARD TYPE "D"

SCALE 1:10



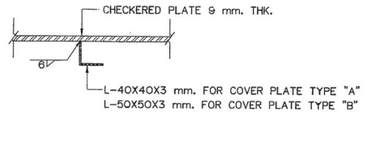
OUTSIDE VERTICAL RISERS

NOT TO SCALE



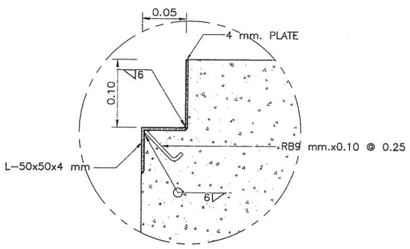
IN DOOR CABLE TRENCH TYPE "B"

REINFORCEMENT DETAIL SEE KTP2-PH-16
SCALE 1:10



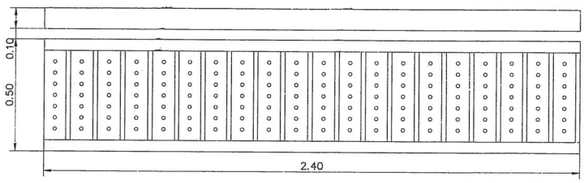
SECTION A-A

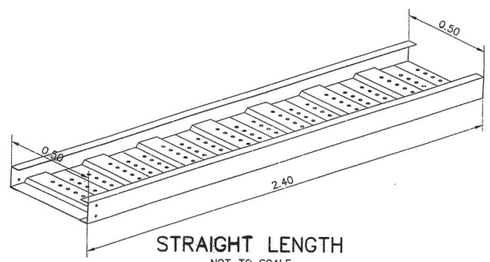
SCALE "C"



DETAIL "C"

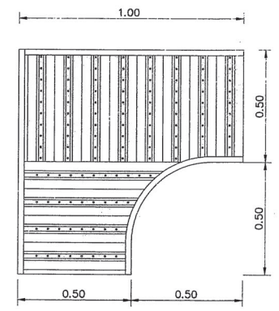
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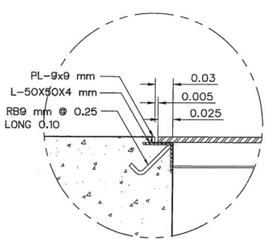
STRAIGHT LENGTH

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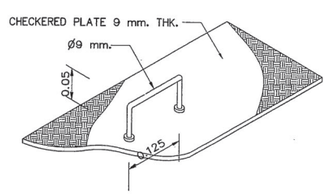
HORIZONTAL 90 ELBOWS

NOT TO SCALE



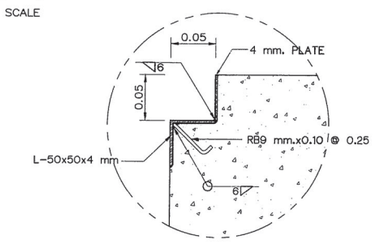
DETAIL "A"

SCALE 1:5



DETAIL "B"

NOT TO SCALE



DETAIL "D"

NOT TO SCALE

0 0.10 0.20 0.30 0.40
SCALE 1:5 METERS

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1:10 METERS

0 0.5 1.0 1.5
SCALE 1:20 METERS

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATION AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. STEEL COVER FOR IN DOOR TRENCH SHALL BE COATED WITH NON BLEEDING TYPE COAL TAR EPOXY

REFERENCE DRAWINGS :

1. POWERHOUSE, FLOOR PLAN	KTP2-PH-02
2. POWERHOUSE, TURBINE AND GALLERY FLOOR PLAN	KTP2-PH-03

NOTES :

MATERIALS : SHEET STEEL 1.5MM.
SURFACE FINISH : POWDER COATED IN TEXTURED RAL 7032 OR HOT-DIP GALVANIZED (UPON YOU REQUIREMENTS)
ASSEMBLY : WELDING METHOD
APPLICATION : USING FOR INDOOR & OUTDOOR INSTALLATION WORK

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

POWERHOUSE

CABLE TRENCH DETAILS

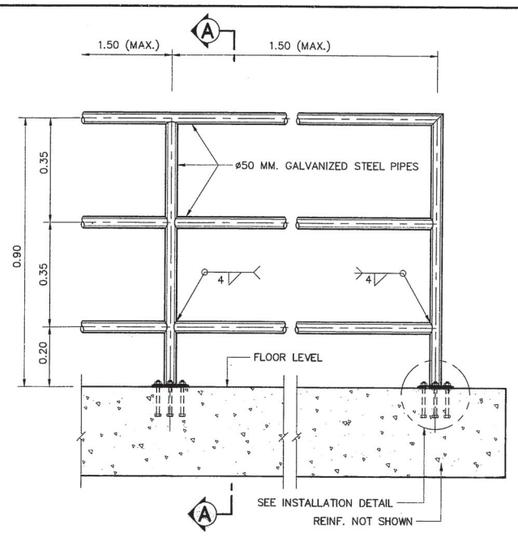
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS: PCM P&C MANAGEMENT CO.,LTD.
DEDE

DESIGNED	28.1957	REVIEWED: S.Kitichai
DRAWN		SUBMITTED
CHECKED	28.1957	RECOMMENDED
PROJECT MANAGER	17/03/2020 DATE	APPROVED

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

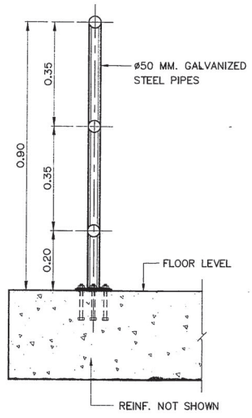
DRAWING NO. KTP2-PH-21
SHEET NO. 51 OF 97



INTERMEDIATE POST END POST

DETAILS OF HANDRAIL

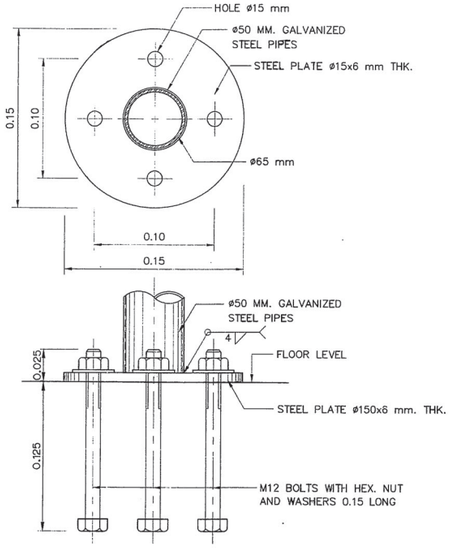
NOT TO SCALE



TYPICAL SECTION

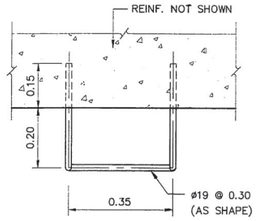
SECTION A–A

NOT TO SCALE

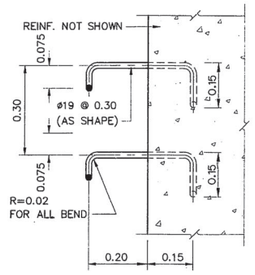


INSTALLATION DETAIL

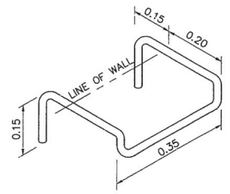
NOT TO SCALE



PLAN



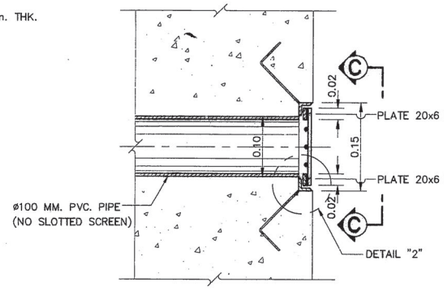
SECTION



ISOMETRIC VIEW

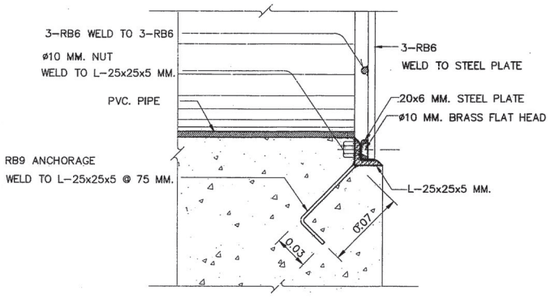
DETAIL OF LADDER RUNGS

NOT TO SCALE



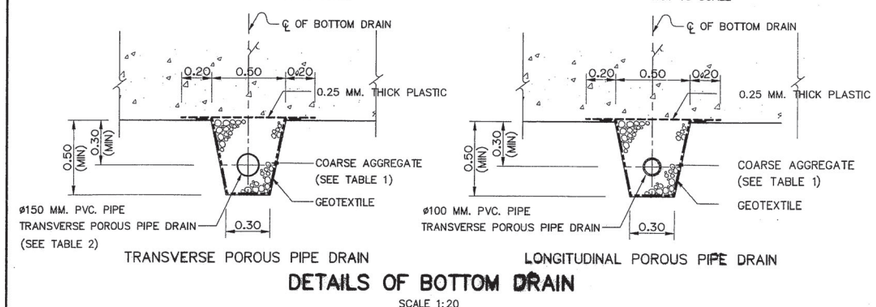
DETAILS OF ø100 MM. PVC. PIPE

SCALE 1:5



DETAILS "2"

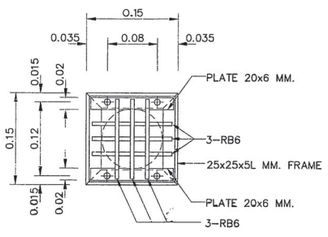
NOT TO SCALE



TRANSVERSE POROUS PIPE DRAIN LONGITUDINAL POROUS PIPE DRAIN

DETAILS OF BOTTOM DRAIN

SCALE 1:20

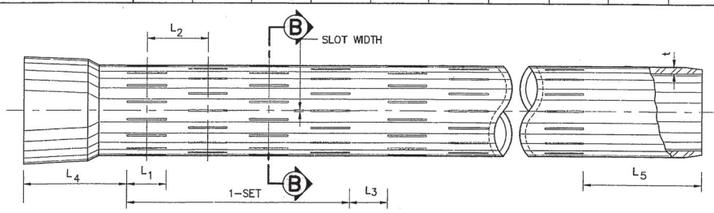


SECTION C–C

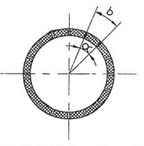
SCALE 1:5

TABLE 1 GRADATION OF FILTER MATERIALS

FILTER MATERIALS	PERCENT BY WEIGHT RETAINED ON STANDARD SIEVE										
	1 1/2"	3/4"	3/6"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200
COARSE AGGREGATE	0	20–35	40–60	0	60–80	75–90	95–100	–	–	–	–



ELEVATION



SECTION B–B

NOT TO SCALE

SLOTTED uPVC SCREEN PIPE OF BOTTOM DRAIN AND SIDE DRAIN DETAILS

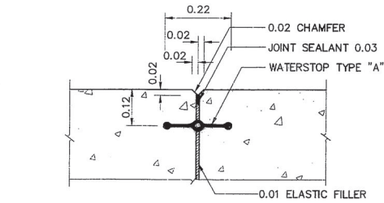
NOT TO SCALE

TABLE 2 SIZE OF SLOTTED uPVC SCREEN PIPE

NOMINAL SIZE (MM.)	L_1 (MM.)	L_2 (MM.)	L_3 (MM.)	L_4 (MM.)	L_5 (MM.)	SLOT WIDTH (MM.)	α (MM.)	b (MM.)	No. OF SLOT ON THE SAME CIRCUMFERENCE	No. OF SET PER LENGTH (4.00 M)	APPROX OPENING AREA
55	80±10	120±10	80±10	215	220	2.4±0.2	45°	23.5	8	7	5.7 %
100	80±10	120±10	80±10	210	220	2.4±0.2	22.5°	22.4	16	7	6.0 %
150	80±10	120±10	80±10	200	220	2.4±0.2	18°	25.9	20	7	5.2 %

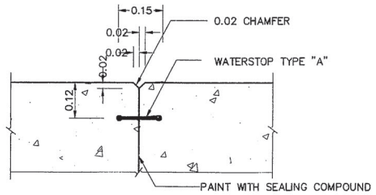
NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03



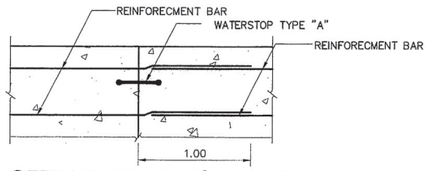
DETAILS OF EXPANSION JOINT

SCALE 1:10



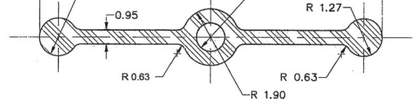
DETAILS OF CONTRACTION JOINT

SCALE 1:10



DETAILS OF CONTROL JOINT

SCALE 1:10

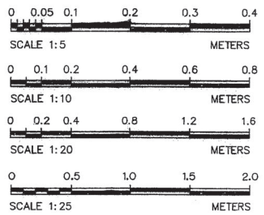


PVC. WATERSTOP TYPE "A"

NOT TO SCALE

TABLE OF DIMENSIONS

WATERSTOP TYPE	W	a	R
A	22.86	4	20



NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

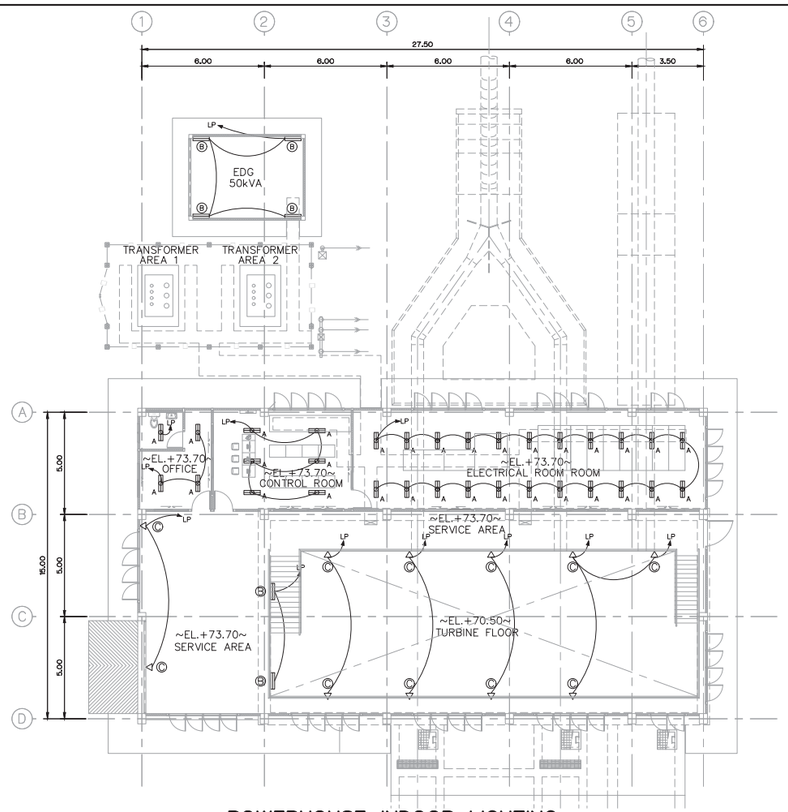
PART 1 : CIVIL WORKS
POWERHOUSE
MISCELLANEOUS DETAILS

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED 28.1957
DRAWN
CHECKED 28.1957
PROJECT MANAGER 17/03/2020 DATE

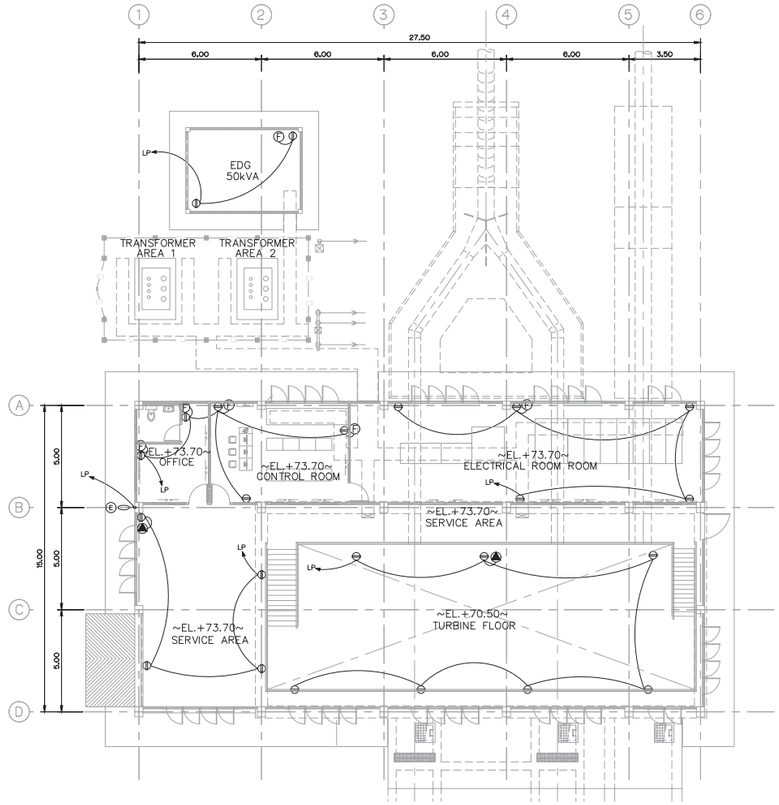
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2–PH–22
SHEET NO. 52 OF 97



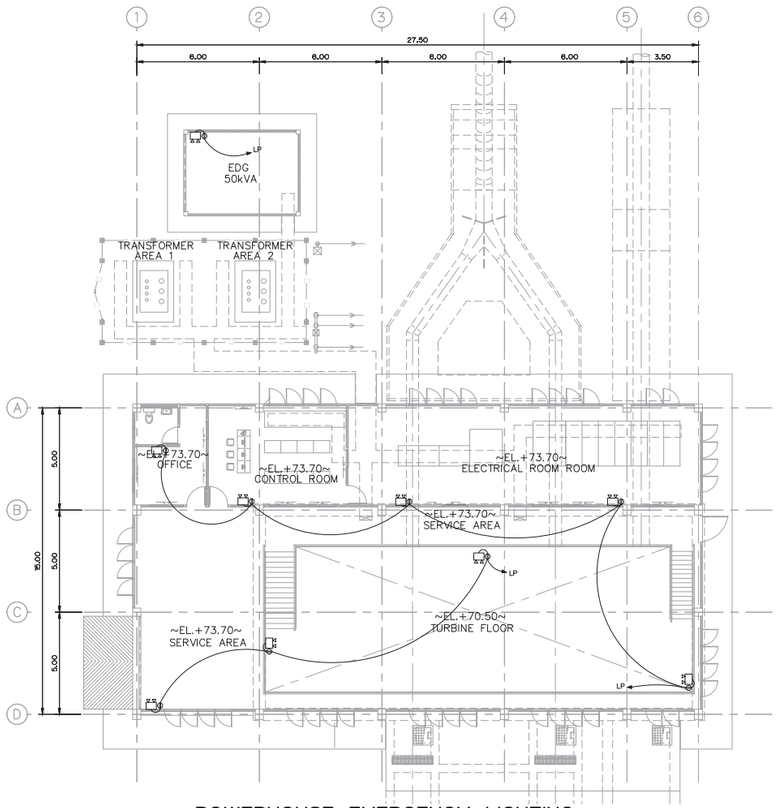
POWERHOUSE INDOOR LIGHTING

SCALE 1:150



POWERHOUSE RECEPTACLE

SCALE 1:150



POWERHOUSE EMERGENCY LIGHTING

SCALE 1:150

LEGENDS :

- (A) LOUVRED LUMINAIRE COMPOSED OF WHITE POLYESTER POWDER COATING STEEL HOUSING, ALUMINIUM PROFILE LOUVERS FOR REDUCING GLARE,PURITY ALUMINIUM REFLECTOR, BUILT IN COMPLETE WIRING OF ROTARY LOCK LAMPHOLDERS. (LED 2x14.5 WATT)
- (B) WEATHER PROOF LUMINAIRE COMPOSED OF ACID–RESISTANT POLYCARBONATE HOUSING, AND AND DIFFUSER TAMPER RESISTANCE BUILT–IN COMPLETED WIRING OF ROTARY LOCK LAMPHOLDER, IP65
- (C) FLOOD LIGHT LUMINAIRE COMPOSED OF DIE–CAST ALUMINIUM BODY, ALUMINIUM REFLECTOR, BODY, ALUMINIUM REFLECTOR, THERMAL SHOCK SAFETY GLASS WITH HINGE ALUMINIUM LOCK, IP65 (LED 1x120 WATT)
- (D) SAME AS TYPE E (LED 1x30 WATT)
- (E) FLOOD LIGHT LUMINARIES 1x120 WATT LED TYPE : MOUNTING ON CONCRETE POLE
- (F) EXHAUST FAN 12"
- DUPLEX RECEPTACLE WITH GROUND, 16 A. 220 VAC.
- POWER RECEPCTACLE 3P+N+E 32 A. 400 VAC.
- HIGH BAY FIXTURE 1x400 W. HIGH PRESSURE SODIUM
- EMERGENCY LIGHTING 2x55 W. HALOGEN W/SEALED LEAD ACID BATTERY BACKUP 2 HOURS
- A/C AIR CONDITIONING, SPLIT TYPE
- LP LOAD PANEL 3 PHASE (18 CIRCUITS) WITH MAIN CIRCUIT BREAKER
- LCP1 LIGHTING CONTROL PANEL

NOTES

1. GROUNDING CONDUCTOR, TAP AND RISER FROM GROUNDING NETWORK TO POWER EQUIPMENT SHALL BE FORMED BY BARE COPPER CONDUCTOR NOT LESS THAN 95 SQ.MM.
2. GROUNDING SYSTEM RESISTANCE WILL NOT EXCEED 5 OHM.
3. CONNECTOR TO WITH IN & BETWEEN THE GROUNDING NETWORK TO POWER PLANT EQUIPMENT WILL BE MADE BY THERMAL CADWELD
4. GROUND ROD WILL BE COPPER COVER STEEL DIAMETER 15.87 MM. 2,400 MM. LONG
5. THIS DRAWING USE FOR GUIDE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM EIT'S STANDARD.

0 1 2 3 4

SCALE 1:50 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS | DEDE

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
LIGHTING AND SMALL POWER

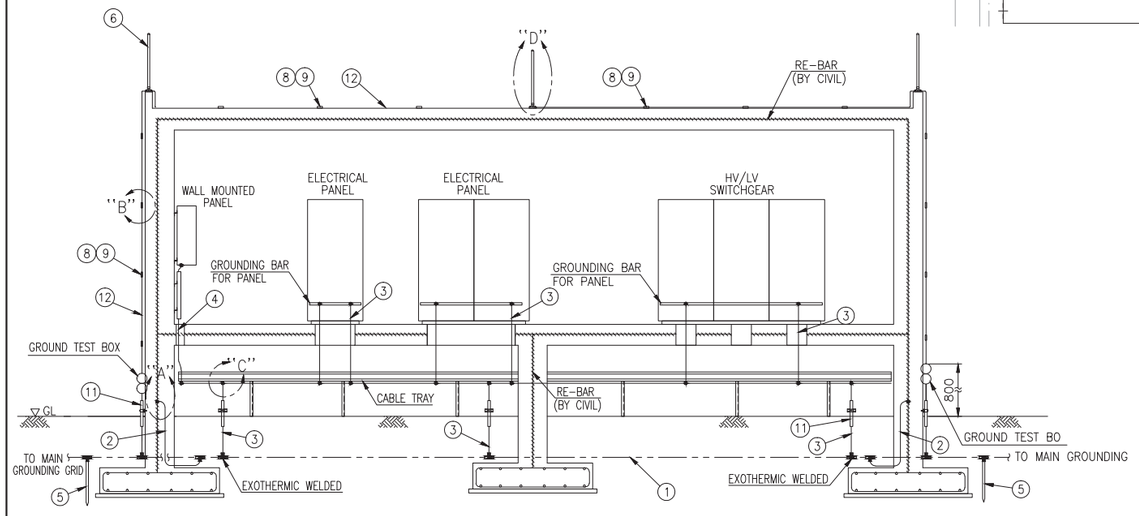
PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
DESIGNED	วิทวัฒน์	REVIEWED	S.Kitchakai
DRAWN		SUBMITTED	
CHECKED	วิทวัฒน์	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2–PH–23
		SHEET NO.	53 OF 97

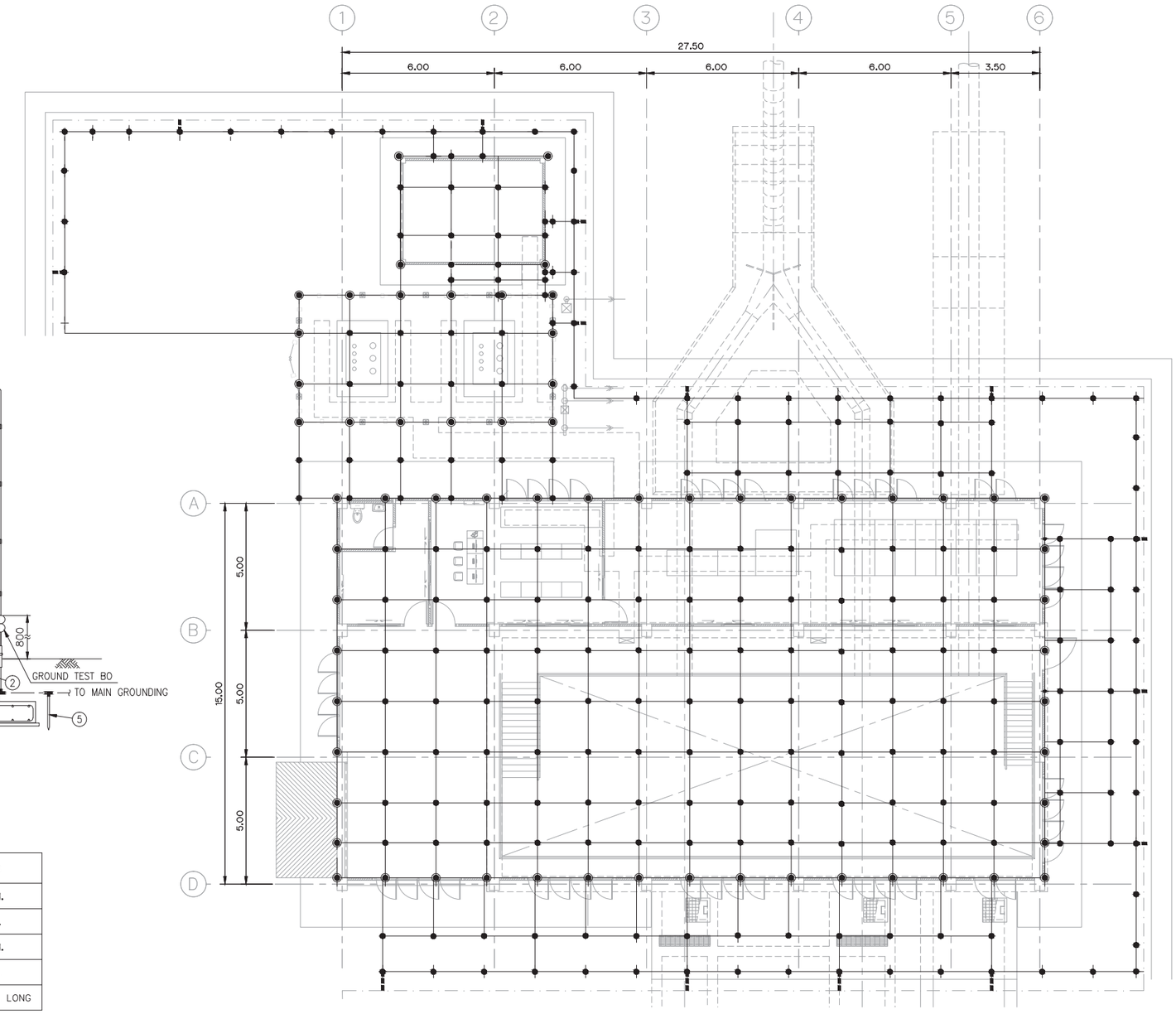
NOTES

1. GRIDS SHALL BE DESIGNED SUCH THAT THE OVERALL RESISTANCE OF THE GROUNDING GRID IS WITHIN 5 OHM
2. GROUNDING CONDUCTOR SIZE SHALL BE 120 SQ.MM. OR GREATER THAT BASE ON CALCULATION.
3. TOUCH AND STEP VOLTAGES SHALL BE MAINTAINED WITHIN ACCEPTABLE LIMITS ACCORDING TO STANDARD
4. THIS DRAWING USE FOR GUIDE ONLY

LEGENDS :

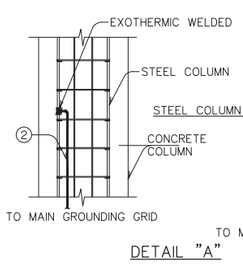
- GROUND CONNECTION CONNECTED BY EXOTHERMIC WELDING
- GROUND ROD COPPER CLAD STEEL, ø 20MM, 3M LONG
- FENCE GROUNDING CONDUCTOR



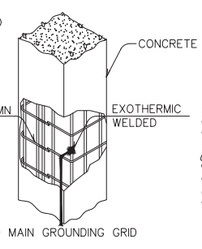


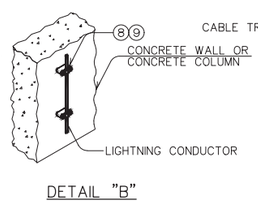
GROUNDING SYSTEM PLAN
SCALE 1:100

ITEM	DESCRIPTION	MATERIAL SPEC	SIZING
1.	MAIN UNDERGROUND GROUNDING CONDUCTOR ANNEALED COPPER STRANDED WIRE	BAR COPPER	120 SQMM.
2.	BRACH GROUNDING WIRE	BAR COPPER	70 SQMM.
3.	BRACH GROUNDING WIRE (PVC INSULATION GREEN COLOR)	THW	120 SQMM.
4.	BRACH GROUNDING WIRE (PVC INSULATION GREEN COLOR)	THW	35 SQMM.
5.	GROUND ROD	COPPER-CLAD	DAI,3/4", 6M. LONG

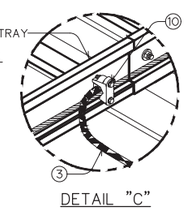


DETAIL "A"

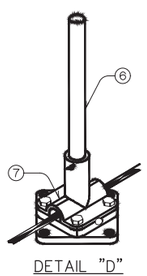




DETAIL "B"



DETAIL "C"



DETAIL "D"

(TYPICAL GROUNDING INSTALLATION)

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

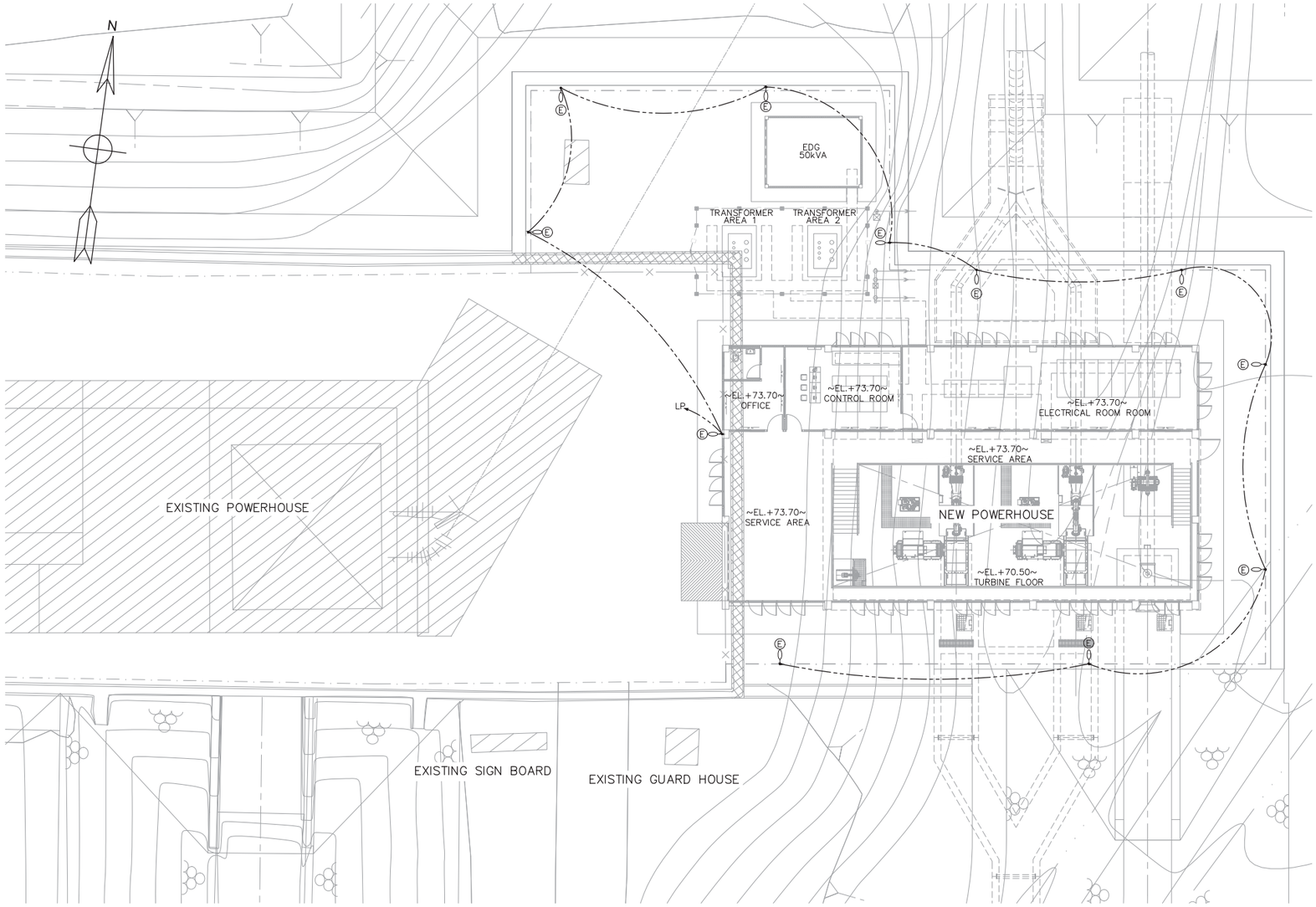
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
GROUNDING SYSTEM, PLAN AND TYPICAL DETAILS

P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วพ.604	REVIEWED	S.Kitchai
DRAWN		SUBMITTED	
CHECKED	วพ.604	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2-PH-24
		SHEET NO.	54 OF 97



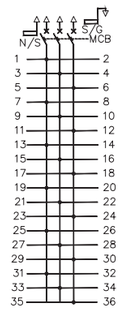
SWITCH YARD OUTDOOR LIGHTING

SCALE 1:150

LOAD SCHEDULE OF PANEL BOARD 3Ph 400V 50Hz

PANEL NO.LP LOCATION : POWERHOUSE

CCT No.	DESCRIPTION	LOAD IN VA		
		R	S	T
	MECHANICAL AUXILIARY EQUIPMENT			
1	WATER DRAINAGE SYSTEM			
	– DRAINAGE	625	625	625
	– DEWATERING	125	125	125
2	WATER SUPPLY SYSTEM (COOLING WATER SYSTEM)	215	215	215
3	PORTABLE AIR COMPRESSOR (IF APPLICABLE)	315	315	315
4	VENTILATION AND AIR CONDITIONING SYSTEM			
	– VENTILATION	180	180	180
	– AIR CONDITION	4300	4300	4300
5	OVERHEAD TRAVELING CRANE	3125	3125	3125
6	LIGHTING INDOOR	1250	1250	1250
7	LIGHTING OUTDOOR	500	500	500
8	RECEPTACLE	15000	15000	15000
	SUM	25635	25635	25635
	TOTAL		76905	



NOTES

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2. GROUNDING SYSTEM RESISTANCE WILL NOT EXCEED 5 OHM.
3. CONNECTOR TO WITH IN & BETWEEN THE GROUNDING NETWORK TO POWER PLANT EQUIPMENT WILL BE MADE BY THERMAL CADWELD
4. GROUND ROD WILL BE COPPER COVER STEEL DIAMETER 15.87 MM. 2,400 MM. LONG
5. THIS DRAWING USE FOR GUIDE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM EIT'S STANDARD.

LEGENDS :

(E) — FLOOD LIGHT LUMINARIES 1x120 WATT LED TYPE : MOUNTING ON CONCRETE POLE

——— SECONDARY LINES, 380/220 V 50 MM THW OVERHEAD INSULATED CABLES, 3Ø 4 WIRE

0 1 2 3 4 5 10 15 20
SCALE 1:250 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
EXTERIOR LIGHTING AND LOAD SCHEDULE

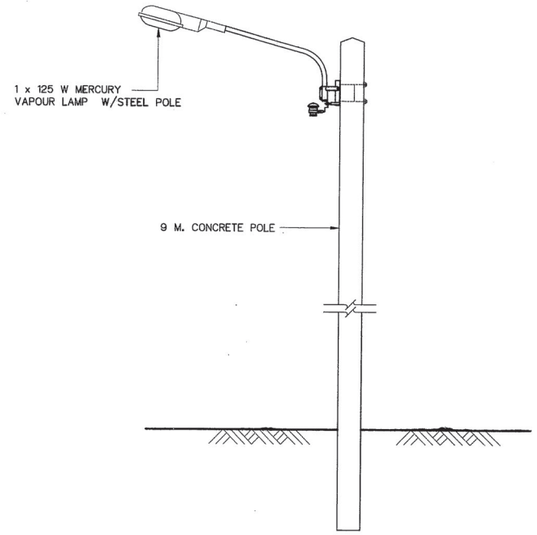
PCM P&C MANAGEMENT CO.,LTD.

DESIGNED วิทย์.604
DRAWN
CHECKED วิทย์.604
PROJECT MANAGER 17/03/2020 DATE

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

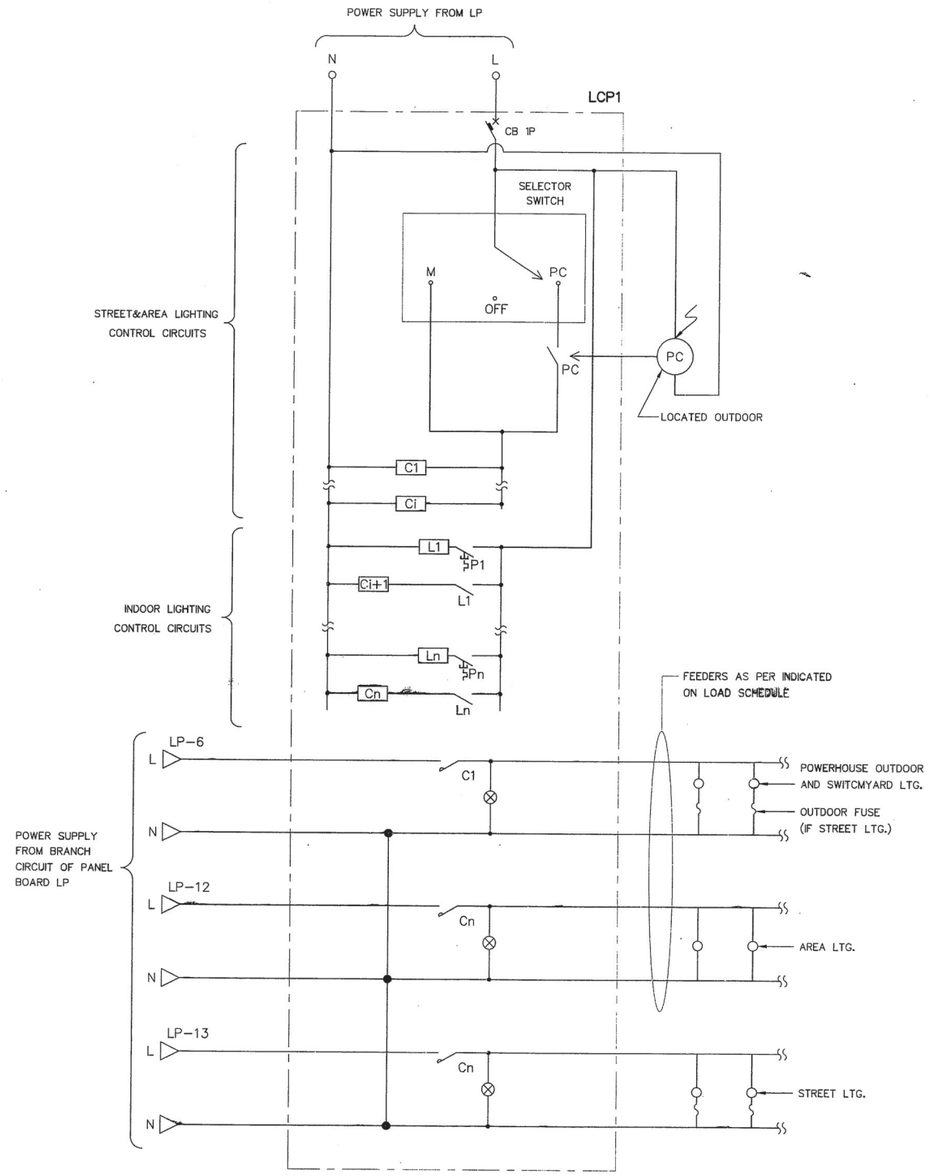
REVIEWED S. kitchai
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2-PH-25
SHEET NO. 55 OF 97

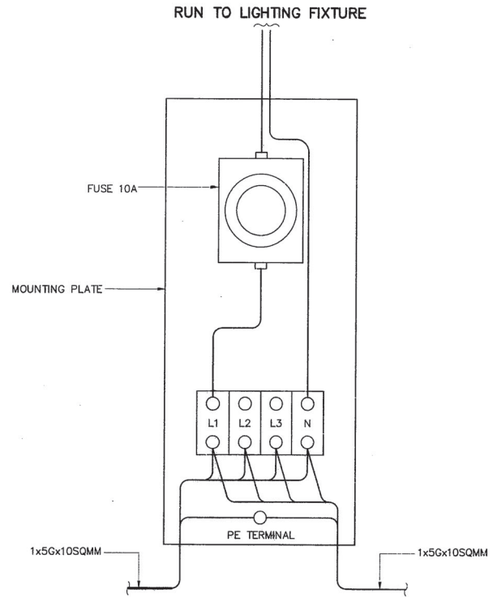


STREET LIGHTING WITH CONCRETE POLE
INSTALLATION TYPICAL

NOT TO SCALE



LIGHTING CONTROL PANEL(LCP1) DIAGRAM



TYPICAL FOR FUSE PLATE

NOT TO SCALE

NOTE :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. ELEVATIONS ARE ASSUMED BY REFERING THE DAM CREST LEVEL AS THE REFERENCE ELEVATION
3. REINFORCEMENT BARS ARE IN MILLMETRES.
4. DISTANCES BETWEEN LAMP POST IS 40 METRES.
5. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS OTHER WISE SHOWN.
6. HANDHOLE MUST BE INSTALLED EVERY 20 METRES LENGTH FOR WIRING IN CONDUIT UNDERGROUND, SIZE 0.3x0.3x0.3 METRES. W/COVER
7. SIDE SLOPE SEE ACCESS ROAD DRAWING

LEGEND :

- PC = PHOTO CELL
- PC = PHOTO CELL SWITCH CONTACT
- Cn = MAGNETIC CONTACTOR n : 1, 2, 3...
- Ln = LATCHING CONTACTOR n : 1, 2, 3...
- Pn = PUSH BUTTON SWITCH, NON-LATCHED TYPE
- Cn = MAGNETIC RELAY n : 1, 2, 3...
- Ln = LATCHING RELAY n : 1, 2, 3...

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

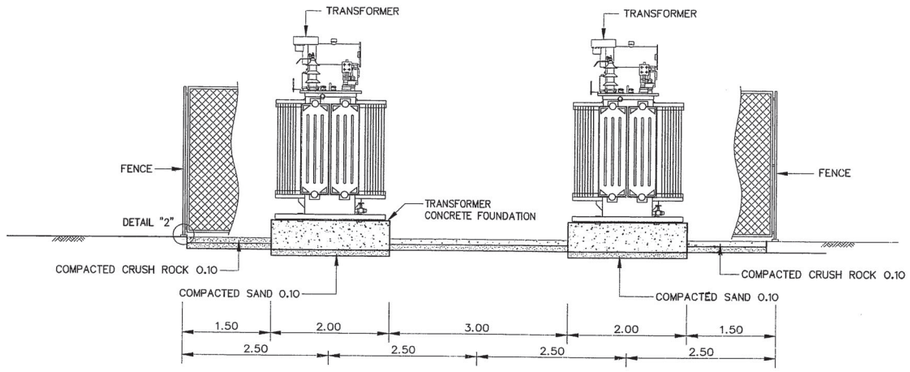
KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

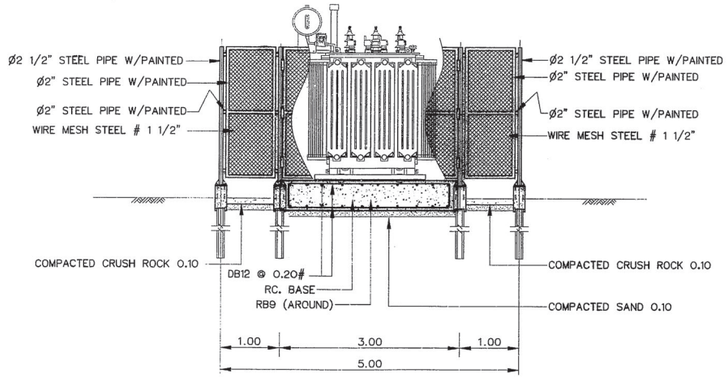
PART 1 : CIVIL WORKS
POWERHOUSE

DETAILS OF STREET LIGHTING AND LIGHTING CONTROL PANEL DIAGRAM

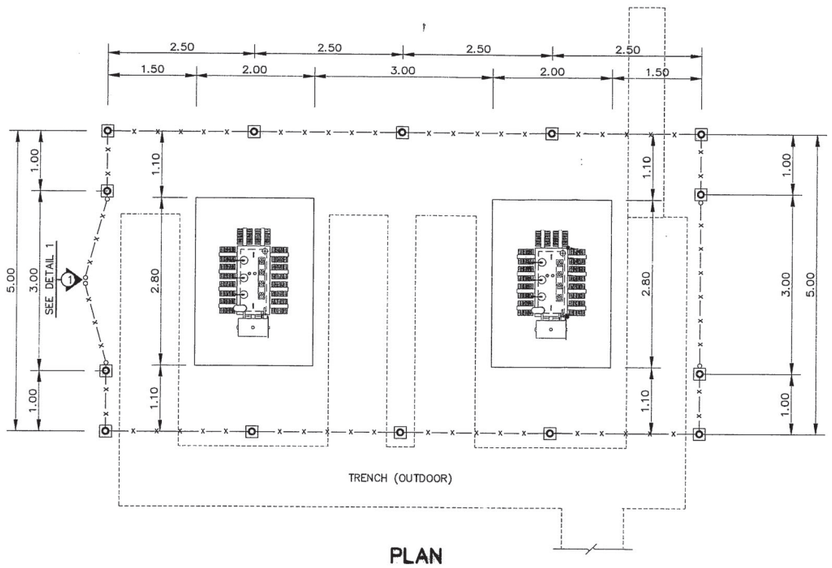
P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	PM.604	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	PM.604	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO.	KTP2-PH-26
		SHEET NO.	56 OF 97



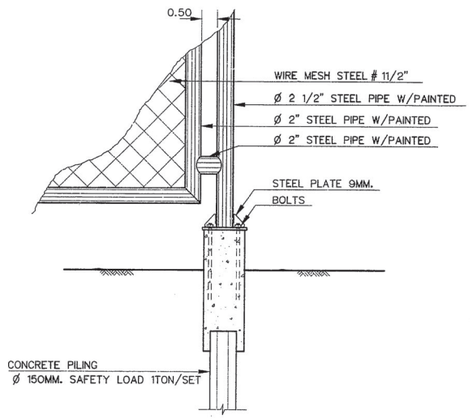
SECTION
SCALE 1:50



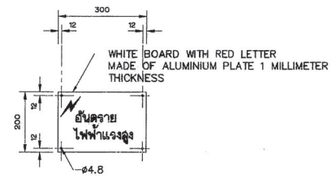
DETAIL "1"
SCALE 1:50



PLAN
SCALE 1:50



DETAIL "2"
NOT TO SCALE



WARNING SIGN PLATE
NOT TO SCALE
(DIMENSIONS ARE IN MILLIMETER)

NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. REINFORCEMENT BARS ARE IN MILLIMETRES, UNLESS OTHERWISE SHOWN.
4. CONCRETE SHALL HAVE A MINIMUM ULTIMATE
   COMPRESSIVE STRENGTH OF 175 ksc. FOR A STANDARD
   CYLINDER AT 28 DAYS.
5. THE TRANSFORMER AREA WILL BE ACCORDING TO PEA STANDARD.

0 0.5 1 2 3 4
SCALE 1:50 METERS

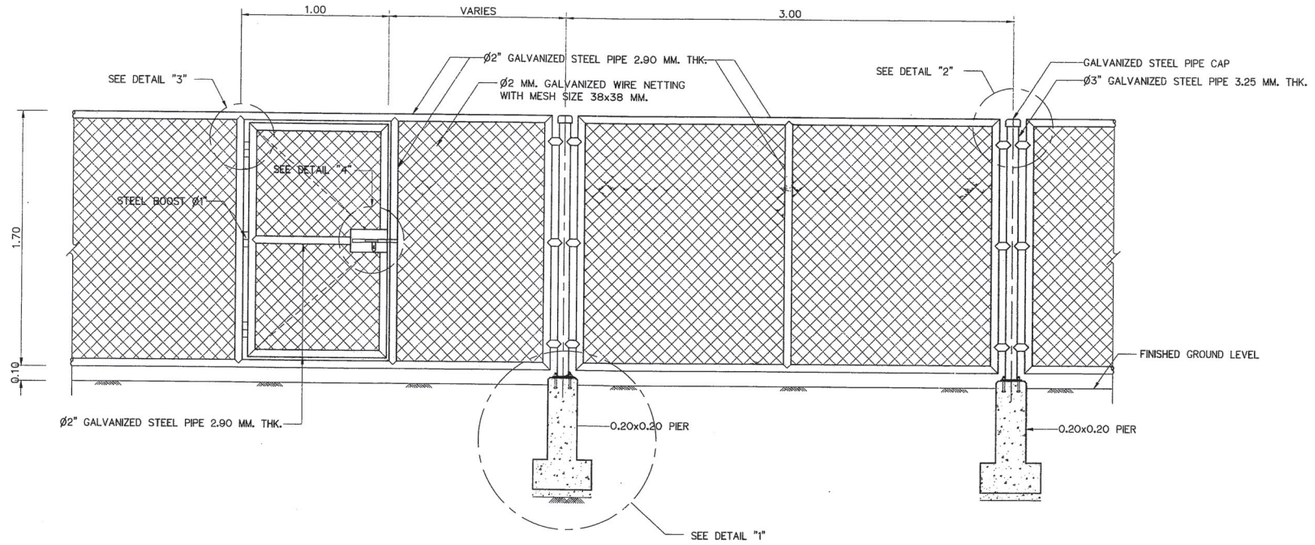
NO.	DATE	REVISIONS	CHECKED	APPROVED
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KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

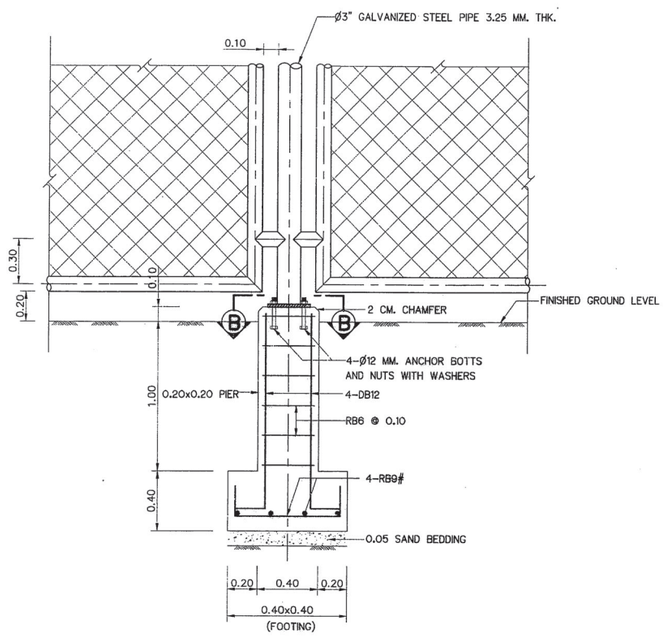
PART 1 : CIVIL WORKS
POWERHOUSE
TRANSFORMER AREA PLAN, SECTION AND DETAILS

PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO. KTP2-PH-27	SHEET NO. 57 OF 97



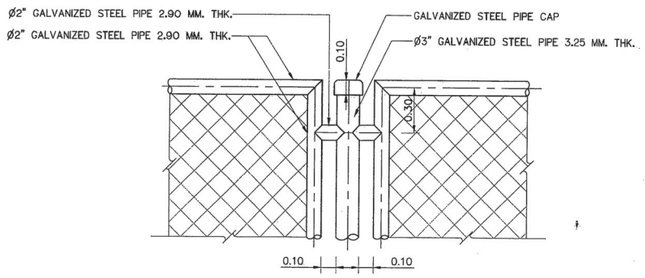
CHAIN LINK FENCE AND GATE WIDTH 1.00 M.

SCALE 1:20



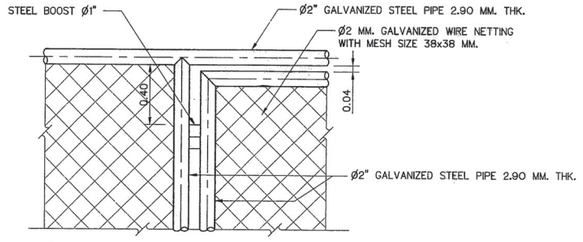
DETAIL "1"

SCALE 1:10



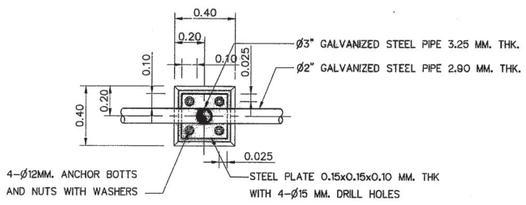
DETAIL "2"

SCALE 1:10



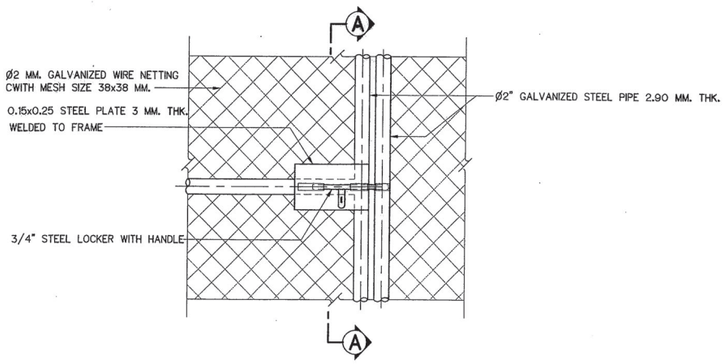
DETAIL "3"

SCALE 1:10



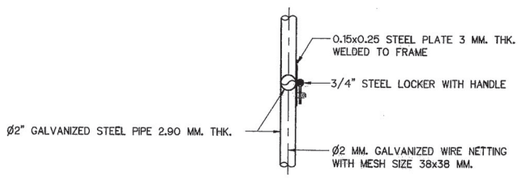
SECTION B-B

SCALE 1:10



DETAIL "4"

SCALE 1:10



SECTION A-A

SCALE 1:10

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. CHAIN LINK SHALL GALVANIZED AS SPECIFIED BY TIS 208

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1:10 METERS

0 0.1 0.5 1 1.5
SCALE 1:20 METERS

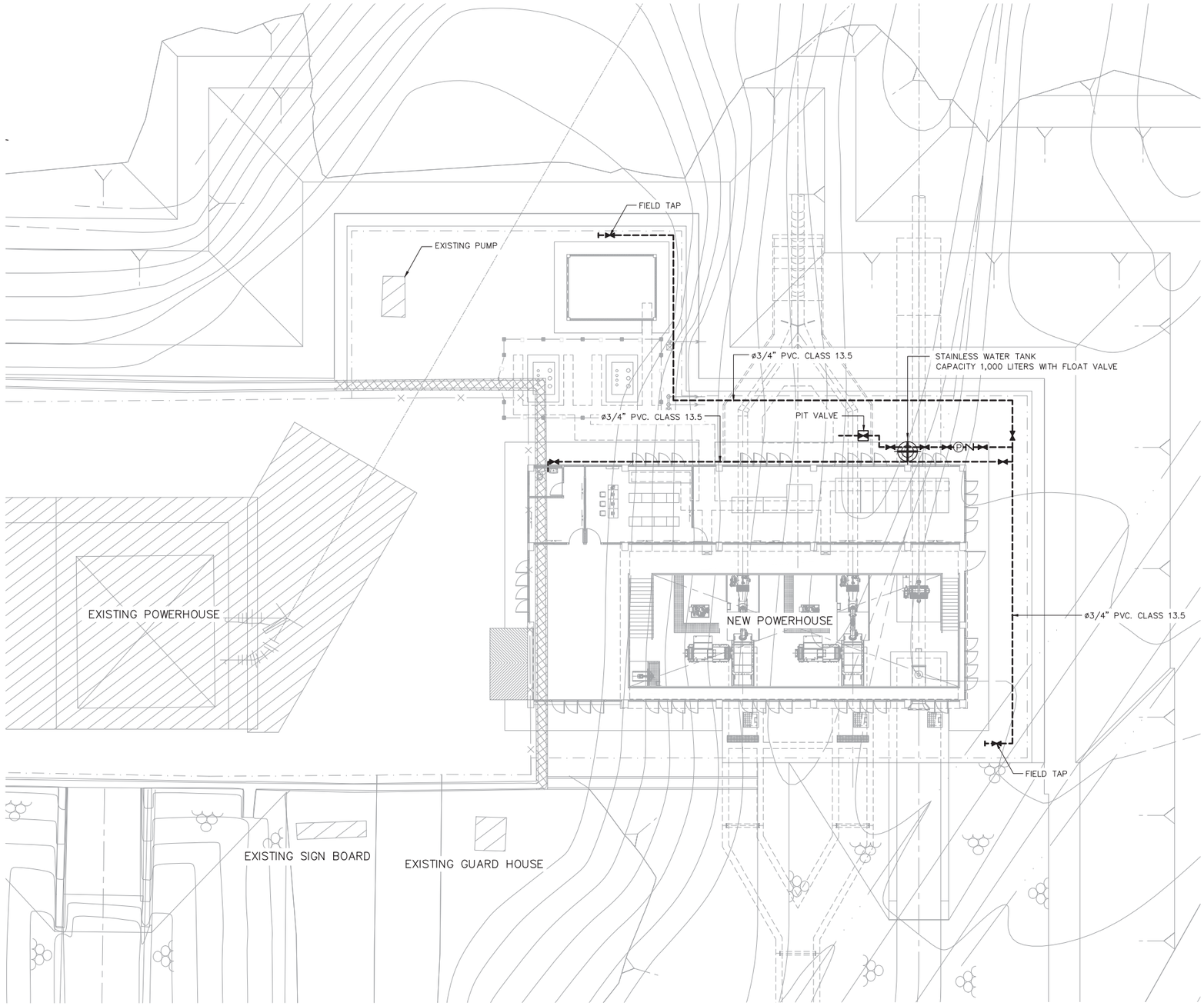
NO.	DATE	REVISIONS	CHECKED	APPROVED
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KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

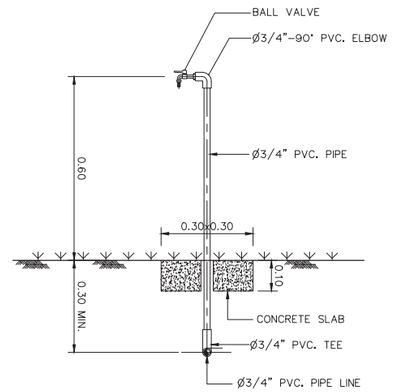
PART 1 : CIVIL WORKS
POWERHOUSE
CHAIN LINK FENCE AND GATE WIDTH 1.00 M.

PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
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DRAWN		SUBMITTED	
CHECKED	ผวน.604	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO. KTP2-PH-28	SHEET NO. 58 OF 97



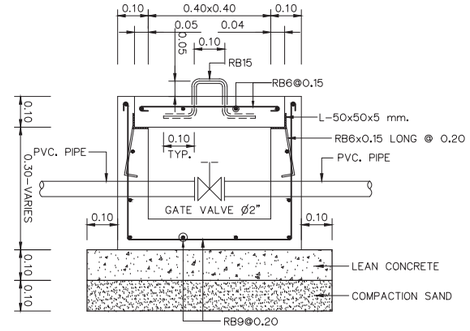
WATER SUPPLY SYSTEM LAY-OUT

SCALE 1:150



FIELD TAP TYPICAL INSTALLATION

SCALE 1:10



PIT VALVE DETAIL

SCALE 1:10

LEGENDS :

- (P) PUMP
- GATE VALVE
- CHECK VALVE
- PVC. PIPE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

0 1 2 4 6 8 10 12

SCALE 1:150 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS | DEDE

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE

WATER SUPPLY SYSTEM LAY-OUT AND TYPICAL DETAILS

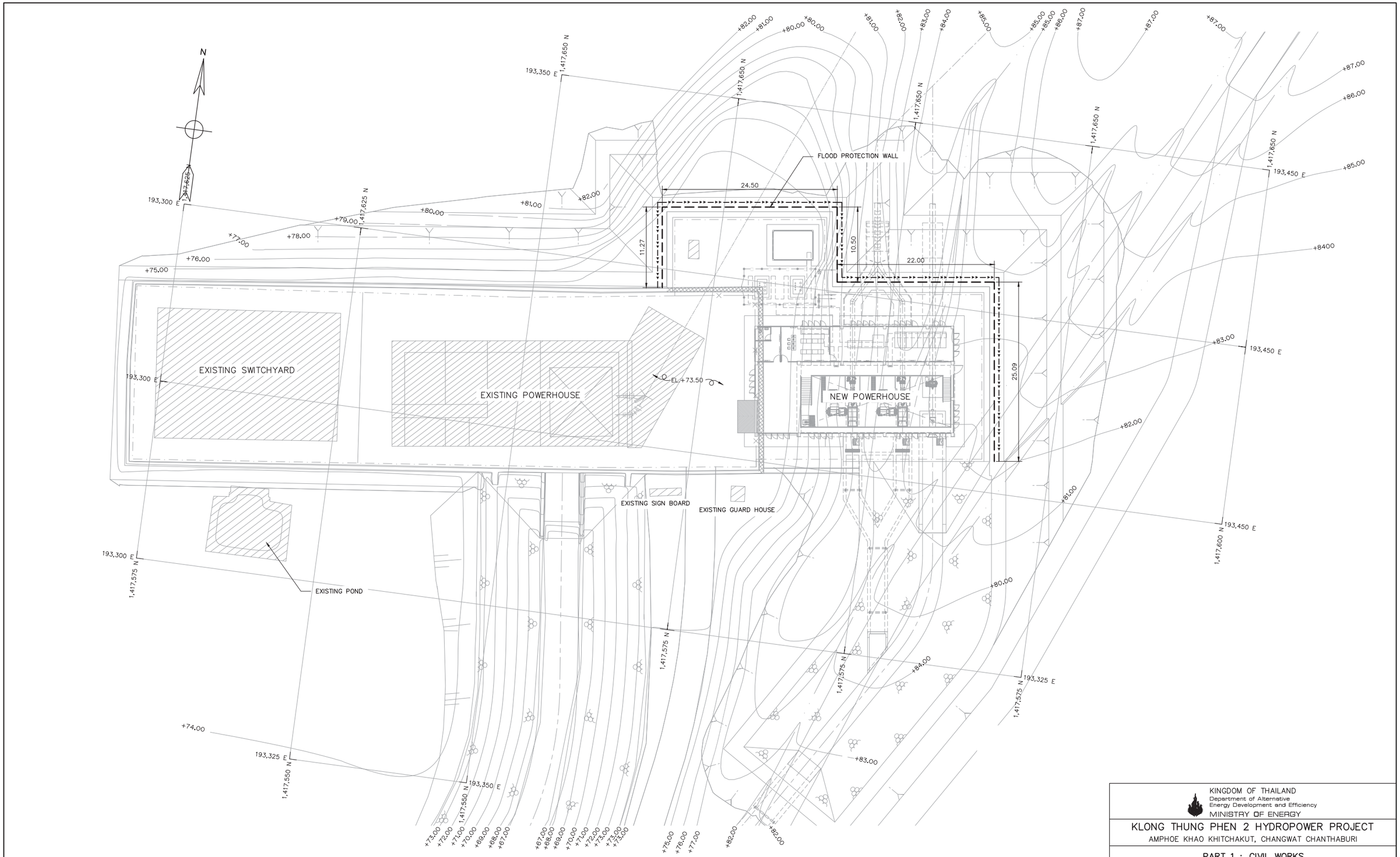
P&C MANAGEMENT CO.,LTD.

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DESIGNED	28.1957	REVIEWED
DRAWN		SUBMITTED
CHECKED	28.1957	RECOMMENDED
PROJECT MANAGER	17/03/2020 DATE	APPROVED

DRAWING NO. KTP2-PH-29

SHEET NO. 59 OF 97



FLOOD PROTECTION LAYOUT

SCALE 1:250

0 1 2 3 4 5 10 15 20

SCALE 1:250 METERS

LEGENDS :

- ----- FLOOD PROTECTION WALL
- —▸▸— SIDE DRAINAGE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. THE CONTRACTOR (C1) HAS TO SUBMIT THE SHOP DRAWINGS OF ALL HOUSING, GUARD HOUSE, ELEVATED TANK FLAG POLE, ENTRANCE GATE AND GATE WIDTH 6.00 M. TO FIELD ENGINEER FOR APPROVAL, BEFORE CONSTRUCTION.

REFERENCE DRAWINGS :

1. POWERHOUSE, TYPICAL SECTION OF FLOOD PROTECTION WALL AND GENERAL DETAILS KTP2-PH-31

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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	CONSULTANTS		DEDE	

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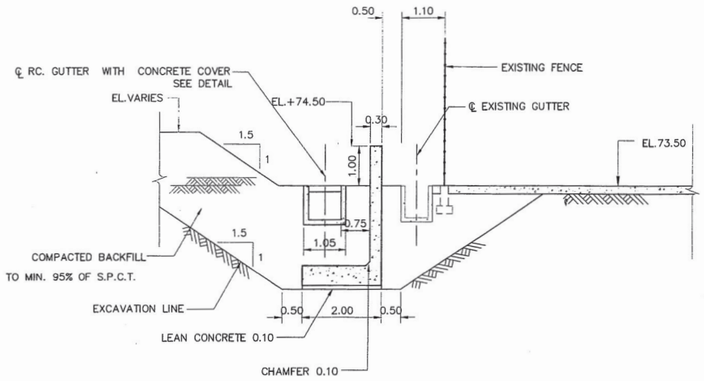
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
FLOOD PROTECTION LAYOUT

PCM P&C MANAGEMENT CO.,LTD.

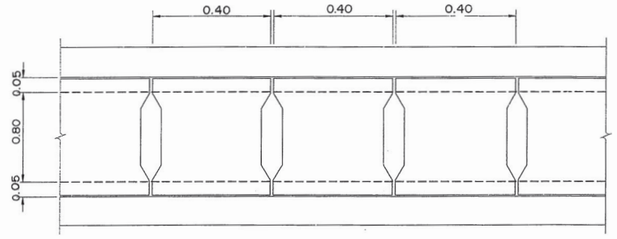
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO. KTP2-PH-30	SHEET NO. 60 OF 97



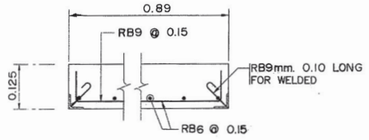
TYPICAL SECTION OF FLOOD PROTECTION WALL

SCALE 1:75



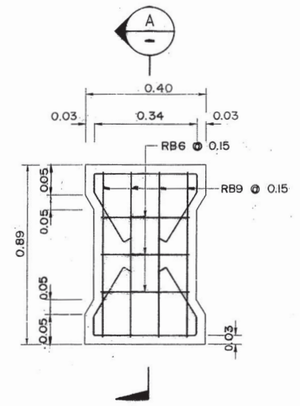
RC. COVER PLAN

SCALE 1:100



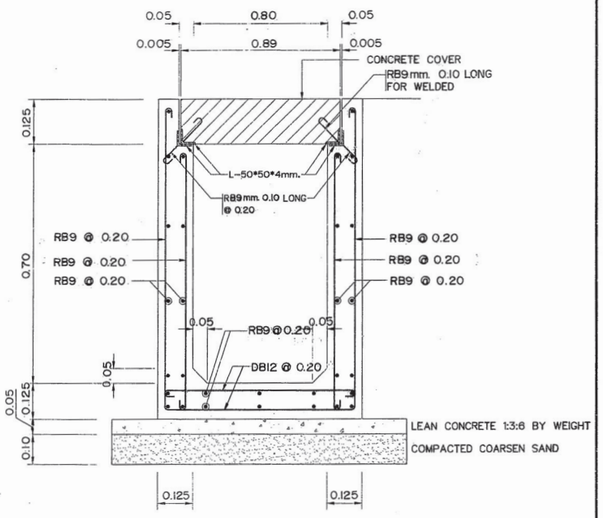
SECTION A-A
RC. COVER LIGHT DUTY DETAIL

SCALE 1:100



RC. COVER LIGHT DUTY DETAIL

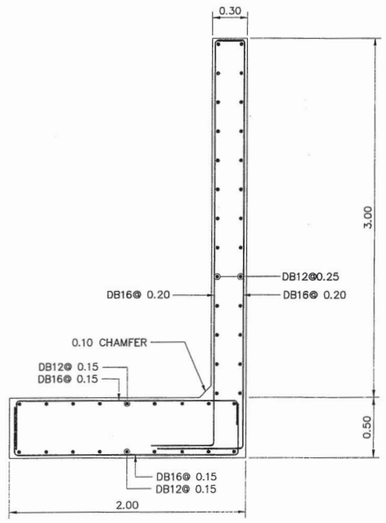
SCALE 1:100



THICKNESS (T2) REFER TO THICKNESS OF RC.COVER.

RC. GUTTER WITH CONCRETE COVER DETAIL

SCALE 1:100



FLOOD PROTECTION WALL REINFORCEMENT DETAIL

SCALE 1:25

NOTES :

1.) ALL DIMENSIONS ARE IN MATER UNLES OTHERWISE INDICATED.
2.) WIDTH AND DEPTH OF RC GUTTER CAN BE VARIES BASED ON THE DRAINAGE PLAN
3.) CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 24 MPa.
4.) REINFORCING STEEL SHALL CONFORM TO TIS. 20 GRADE SR 24.
5.) FLAT PLATE STEEL SHALL CONFORM TO TIS. 55 GRADE SR 24.
6.) STRUCTURAL STEEL AND FLAT PLATE STEEL SHALL BE PAINTED WITH RUST-OLEUM PAINT OR EQUIVALENT TWICE AND WITH OIL PAINTED ONCE.
7.) ALL STEEL GRATING TO BE GALVANIZED AND FABRICATED IN SHOP FOLLOWING THE MANUFACTURER STANDARD (SIAM STEEL OR WEBFORGE BRAND). CONTRACTOR SHALL SUBMIT THE PROFILE OF GRATING TO CONSULTANT FOR APPROVAL PRIOR TO STARTING THE WORK.

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1:10 METERS

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

0 0.5 1.0 2.0 3.0 4.0 6.0
SCALE 1:75 METERS

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

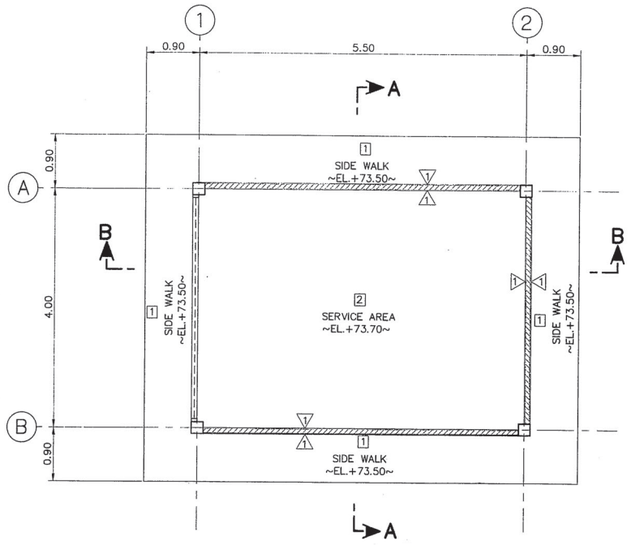
KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE

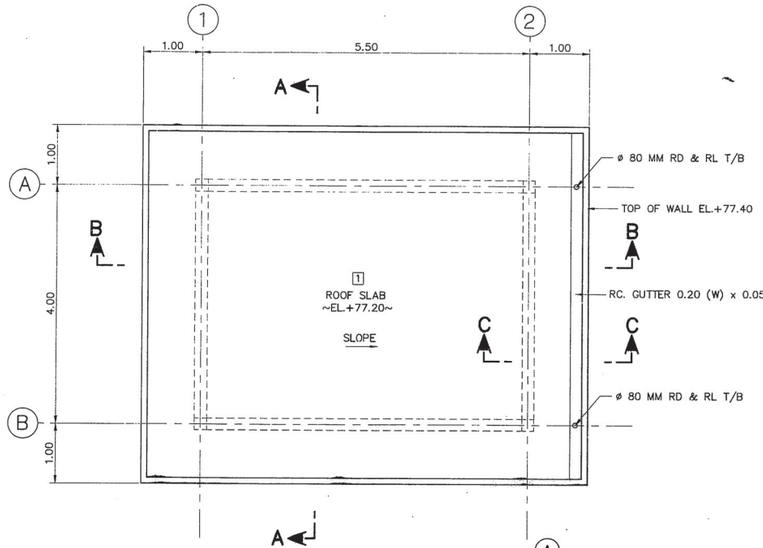
TYPICAL SECTION OF FLOOD PROTECTION WALL AND GENERAL DETAILS

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		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
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PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2-PH-31	SHEET NO. 61 OF 97



GROUND FLOOR PLAN

SCALE 1:50



ROOF PLAN

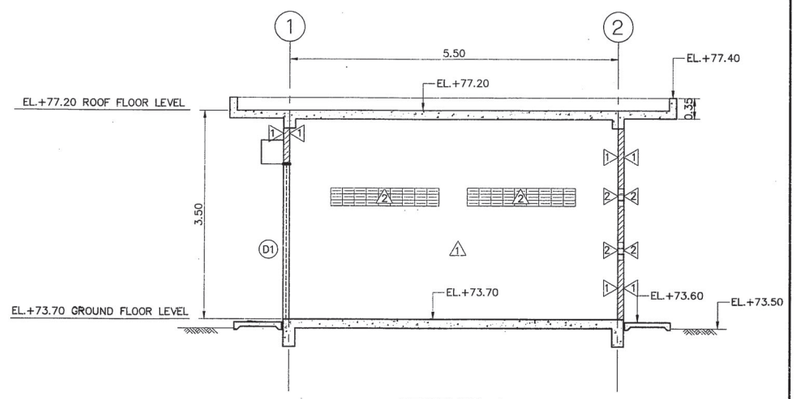
SCALE 1:50

WALL FINISH SYMBOLS :

1. CEMENT PLASTER
2. HOLLOW CONCRETE BLOCK

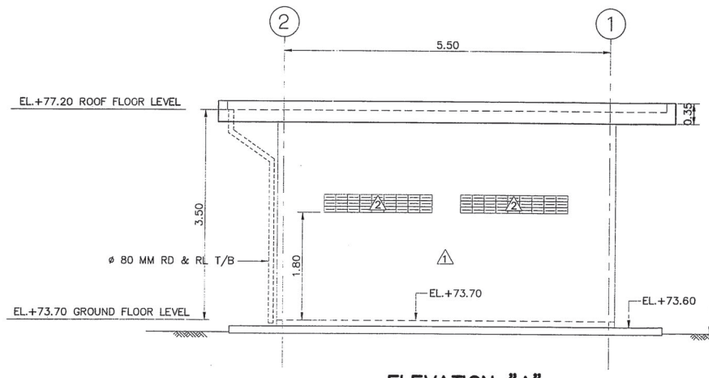
FLOOR FINISH SYMBOLS :

1. COARSE FINISHED
2. COATED WITH EPOXY RESIN



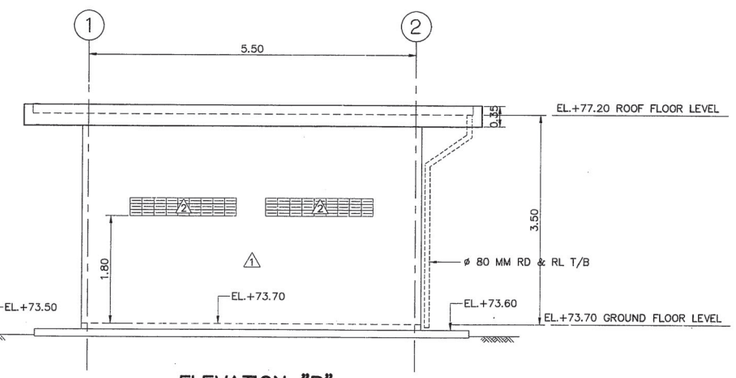
SECTION A

SCALE 1:50



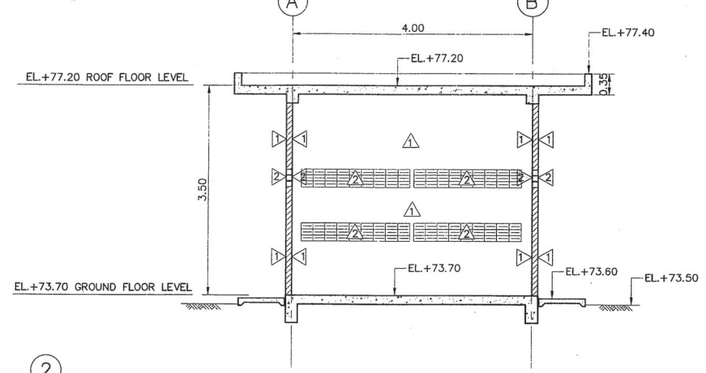
ELEVATION "A"

SCALE 1:50



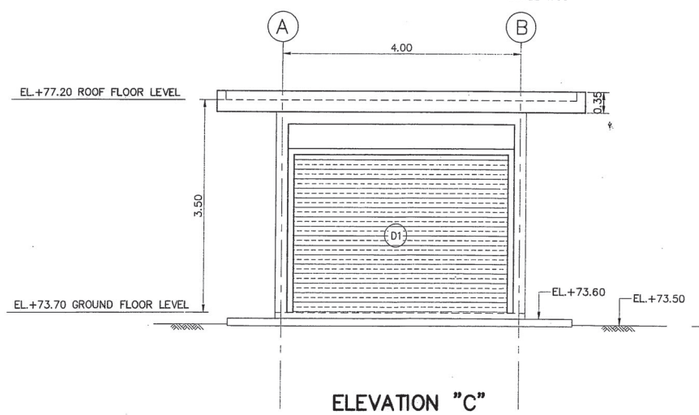
ELEVATION "B"

SCALE 1:50



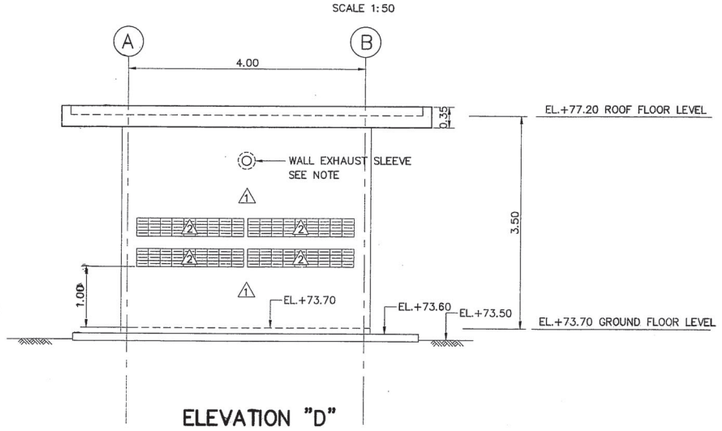
SECTION A

SCALE 1:50



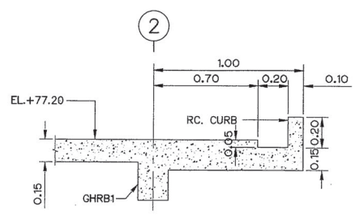
ELEVATION "C"

SCALE 1:50



ELEVATION "D"

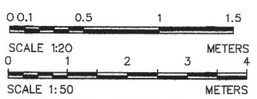
SCALE 1:50



SECTION C

(FLOOR DEPRESS DETAIL)

SCALE 1:20



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. POSITION AND SIZE OF THE WALL EXHAUST SLEEVE IN THE WALL IS ASSIGN BY CONTRACTOR

REFERENCE DRAWINGS :

1. POWERHOUSE, GENERAL LAYOUT — KTP2-PH-01
2. POWERHOUSE, EDG. HOUSE DETAILS (SHEET 2/3) — KTP2-PH-33

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

POWERHOUSE

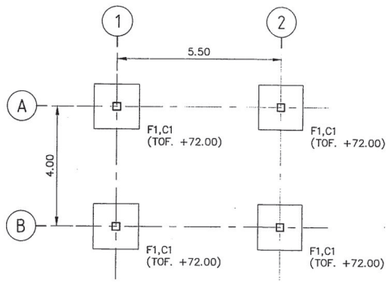
EDG. HOUSE DETAILS (SHEET 1/3)

P&C MANAGEMENT CO.,LTD.

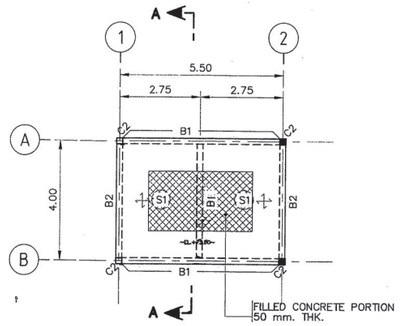
DESIGNED	28.1.1957	
DRAWN		
CHECKED	28.1.1957	
PROJECT MANAGER	17/03/2020	DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

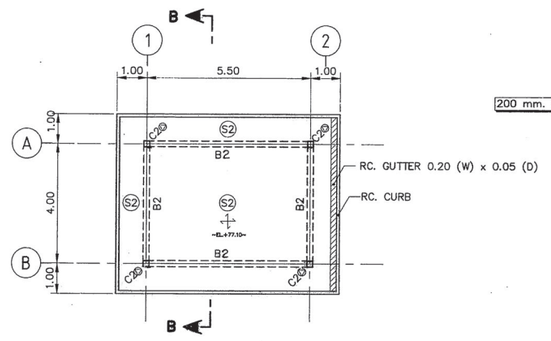
REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	KTP2-PH-32
SHEET NO.	62 OF 97



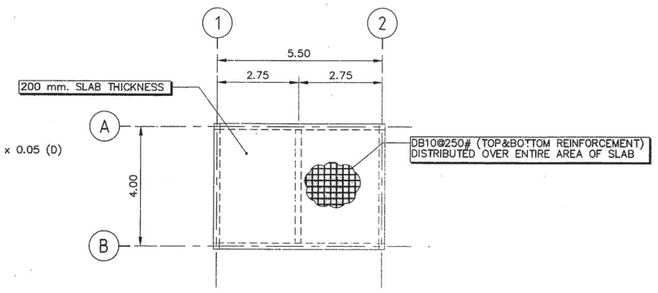
FOUNDATION LAYOUT PLAN
SCALE 1:100



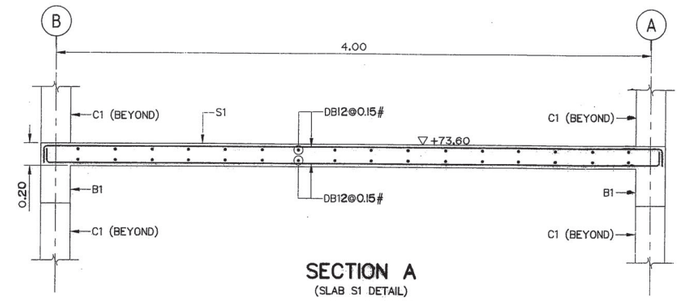
GROUND FLOOR FRAMING PLAN
SCALE 1:100



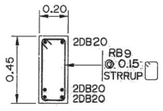
ROOF FLOOR FRAMING PLAN
SCALE 1:100



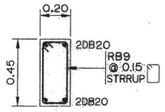
GROUND FLOOR SLAB REINFORCEMENT DETAIL
SCALE 1:100



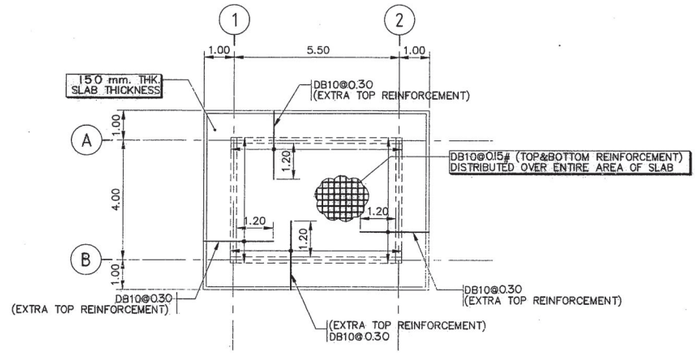
SECTION A
(SLAB S1 DETAIL)
NOT TO SCALE



B1 DETAIL
SCALE 1:20



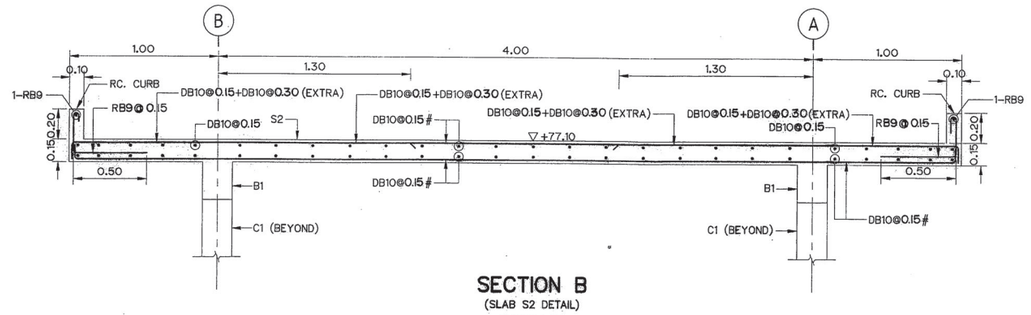
B2 DETAIL
SCALE 1:20



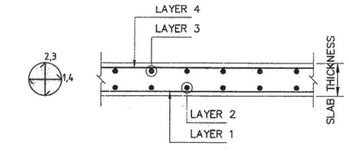
ROOF FLOOR SLAB REINFORCEMENT DETAIL
SCALE 1:100

COLUMN SCHEDULE

COLUMNS / LEVEL	C1	C2
ROOF FLOOR ↑ GROUND FLOOR	—	0.25 × 0.25, 6DB12 MAIN, RB6@0.15 TIES
GROUND FLOOR ↑ FOOTING	0.25 × 0.25, 6DB12 MAIN, RB9@0.15 TIES	—



SECTION B
(SLAB S2 DETAIL)
SCALE 1:20



SLAB BARS PLACING ORDER

NOTES :
1. # DENOTES EQUAL SPACING REINFORCEMENT IN BOTH DIRECTIONS, I.E., AT LAYER 1 AND LAYER 2 FOR BOTTOM REINFORCEMENT AND AT LAYER 3 AND LAYER 4 FOR TOP REINFORCEMENT.

NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. THE MAIN CONTRACTOR SHALL BE CALCULATED EXACT TOP OF FOOTING BEFORE START CONSTRUCTION.
4. ALL SYMBOLS AND ABBREVIATIONS REPRESENT ;
   - ⊹ DENOTES TWO-WAY SLAB SYSTEM.
   - ⊙ DENOTES COLUMN BELOW ONLY.
   - ● DENOTES COLUMN ABOVE ONLY.

REFERENCE DRAWINGS :

1. POWERHOUSE, EDG. HOUSE DETAILS (SHEET 1/3)	KTP2-PH-32
2. POWERHOUSE, EDG. HOUSE DETAILS (SHEET 3/3)	KTP2-PH-34

0 0.1 0.5 1 1.5
SCALE 1:20 METERS
0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

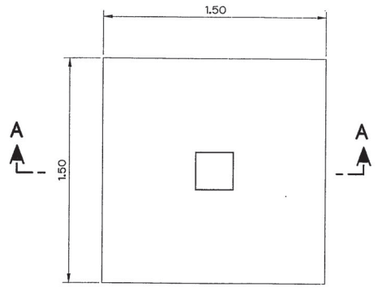
KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
POWERHOUSE
EDG. HOUSE DETAILS (SHEET 2/3)

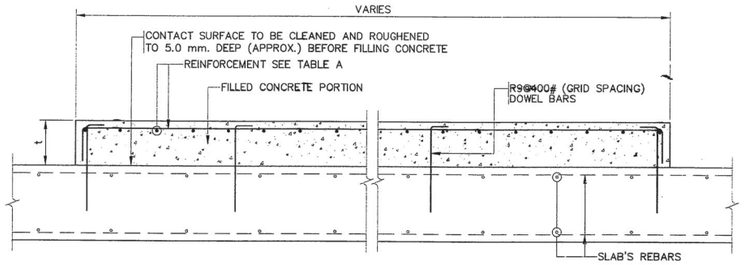
P&C MANAGEMENT CO.,LTD.

DESIGNED	2EL1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	2EL1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2-PH-33
		SHEET NO.	63 OF 97



F1 DETAIL

SCALE 1:20

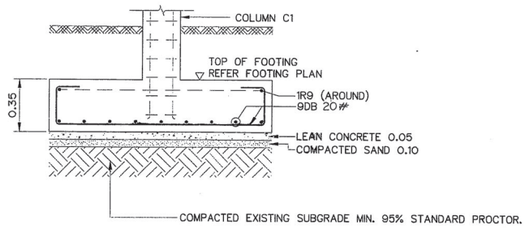


TYPICAL FILLED CONCRETE PORTION DETAILS

NOT TO SCALE

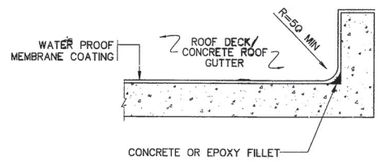
TABLE A

THICKNESS, t (mm.)	REINFORCEMENT	
	DEFORMED BAR	WIREMESH (Fy > 3,000 KSC)
50–200	DB12@300#	Ø9@200#
201–400	DB12@175#	–
401–600	2 LAYER–DB16@400#	–
601–900	2 LAYER–DB16@250#	–



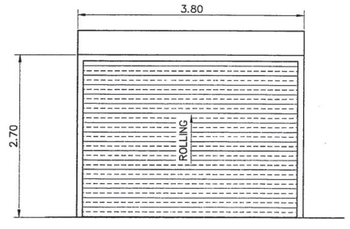
SECTION A

SCALE 1:20



TYPICAL DETAILS FOR WATERPROOF MEMBRANE COATING AT CURB

NOT TO SCALE



(D1)

ROLLING DOOR

SCALE 1:50

SYMBOL	DESCRIPTIONS	SIZE		FRAME	RAIL & STILE	PANEL	HINGE	LOCKSET	HANDLE	REMARKS
		WIDTH	HEIGHT							
(D1)	ROLLING DOOR (STEEL NO.18,1.2 mm. Thk.)	3.80	2.70	GALVANIZED STEEL	—	—	—	NORMAL KEY	—	MOTOR OPERATING

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. THE MAIN CONTRACTOR SHALL BE CALCULATED EXACT TOP OF FOOTING BEFORE START CONSTRUCTION.

REFERENCE DRAWINGS :

1. POWERHOUSE, EDG. HOUSE DETAILS (SHEET 1/3)	KTP2–PH–32
2. POWERHOUSE, EDG. HOUSE DETAILS (SHEET 2/3)	KTP2–PH–33

0 0.1 0.5 1 1.5

SCALE 1:20 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

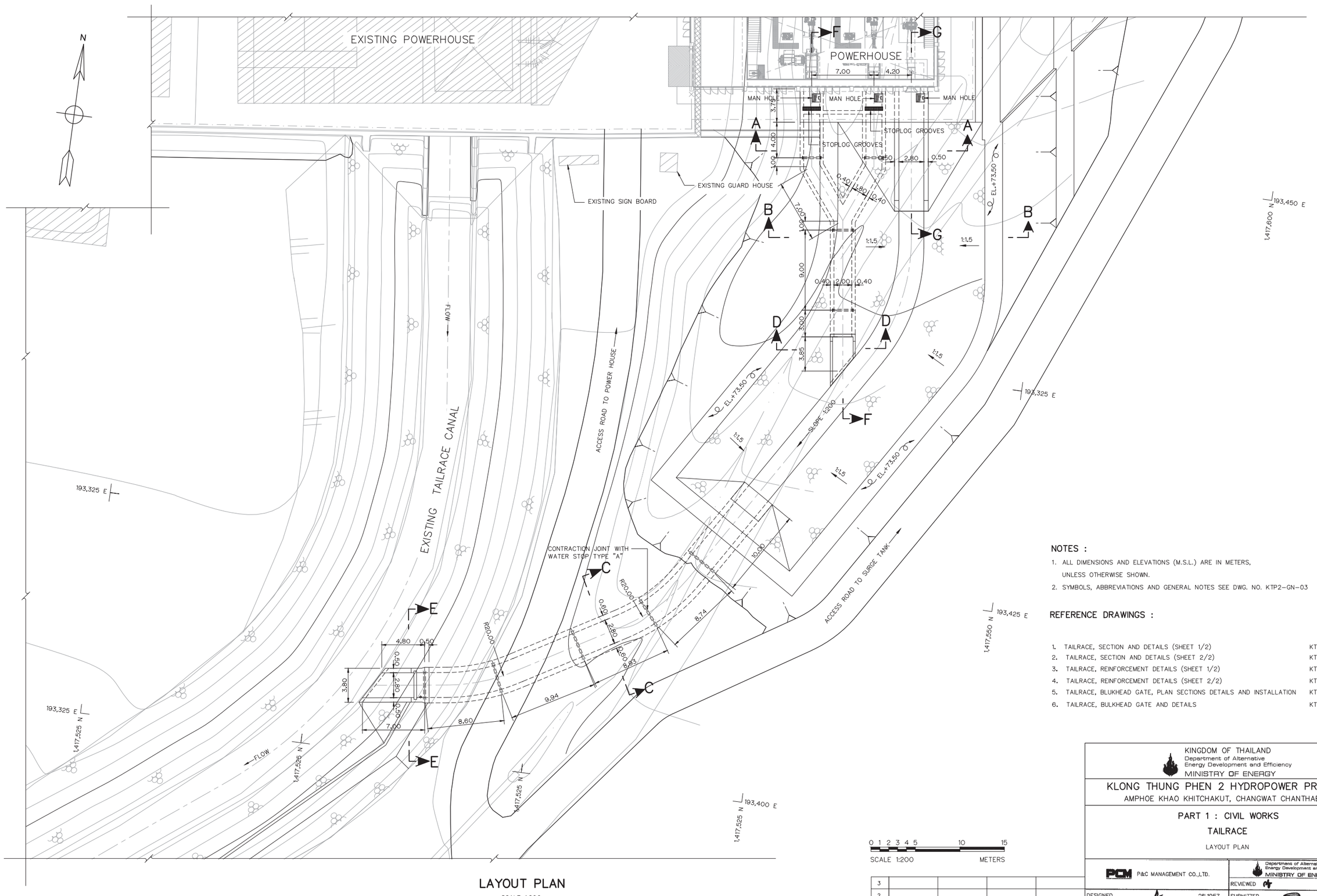
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

POWERHOUSE

EDG. HOUSE DETAILS (SHEET 3/3)

PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2–PH–34	SHEET NO. 64 OF 97



LAYOUT PLAN

SCALE 1:200

0 1 2 3 4 5 10 15

SCALE 1:200 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

REFERENCE DRAWINGS :

1.	TAILRACE, SECTION AND DETAILS (SHEET 1/2)	KTP2-TR-02
2.	TAILRACE, SECTION AND DETAILS (SHEET 2/2)	KTP2-TR-03
3.	TAILRACE, REINFORCEMENT DETAILS (SHEET 1/2)	KTP2-TR-04
4.	TAILRACE, REINFORCEMENT DETAILS (SHEET 2/2)	KTP2-TR-05
5.	TAILRACE, BLUKHEAD GATE, PLAN SECTIONS DETAILS AND INSTALLATION	KTP2-TR-06
6.	TAILRACE, BULKHEAD GATE AND DETAILS	KTP2-TR-07

KINGDOM OF THAILAND
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KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
TAILRACE
LAYOUT PLAN

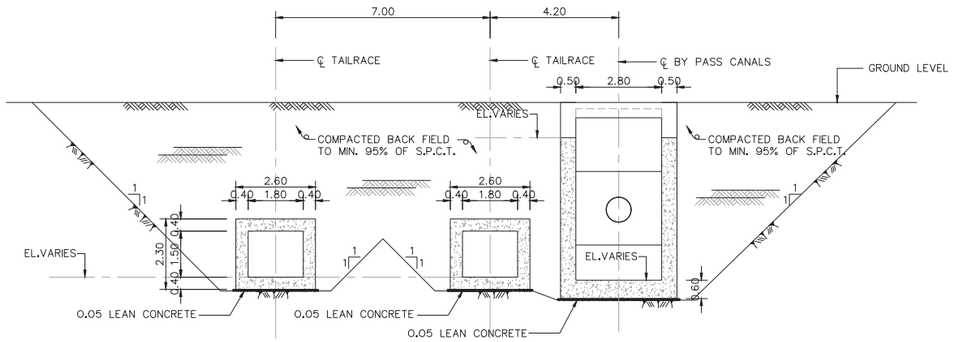
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

P&C MANAGEMENT CO.,LTD.

DESIGNED	28.1957	
DRAWN		
CHECKED	28.1957	
PROJECT MANAGER	17/03/2020 DATE	

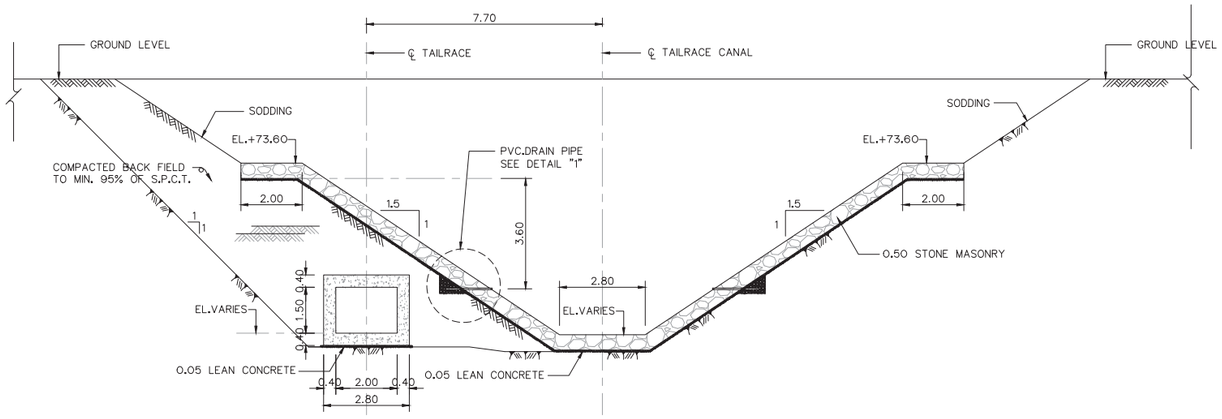
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

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SUBMITTED	
RECOMMENDED	
APPROVED	
DRAWING NO.	SHEET NO.
KTP2-TR-01	65 OF 97



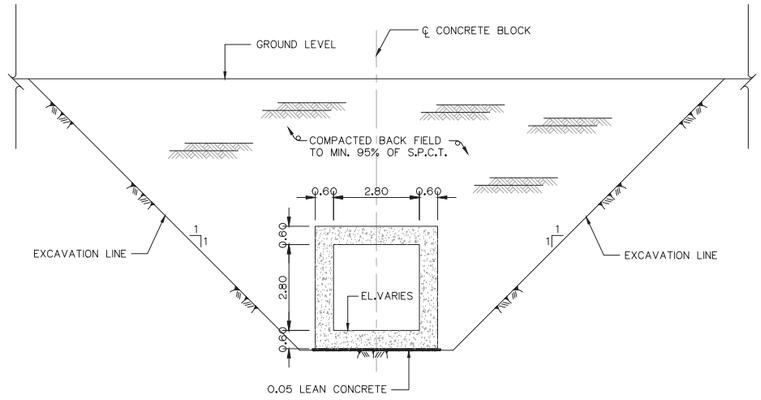
SECTION A–A

SCALE 1:100



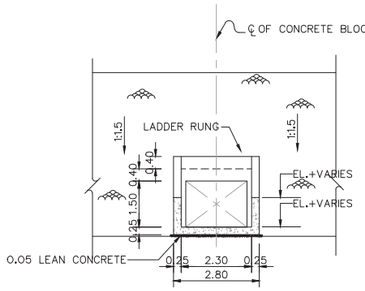
SECTION B–B

SCALE 1:100



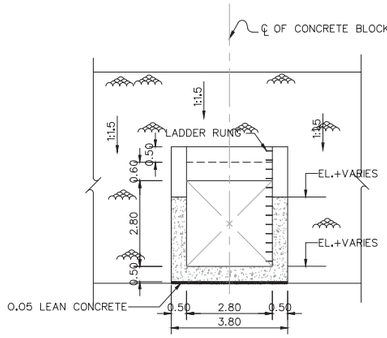
SECTION C–C

SCALE 1:100



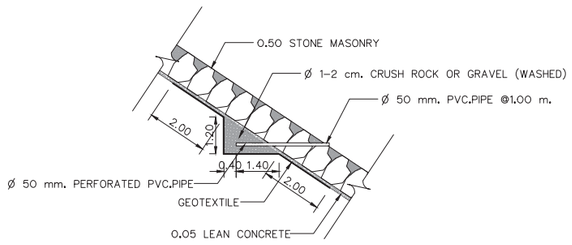
SECTION D–D

SCALE 1:100



SECTION E–E

SCALE 1:100



DETAIL "1" (PVC.DRAIN PIPE)

SCALE 1:50

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 30 TON/M.^{2}

REFERENCE DRAWINGS :

1.	TAILRACE, LAYOUT PLAN	KTP2–TR–01
2.	TAILRACE, REINFORCEMENT DETAILS (SHEET 1/2)	KTP2–TR–04
3.	TAILRACE, REINFORCEMENT DETAILS (SHEET 2/2)	KTP2–TR–05

0 1 2 3 4
SCALE 1:50 METERS

0 1 2 3 4 5 6 7 8
SCALE 1:100 METERS

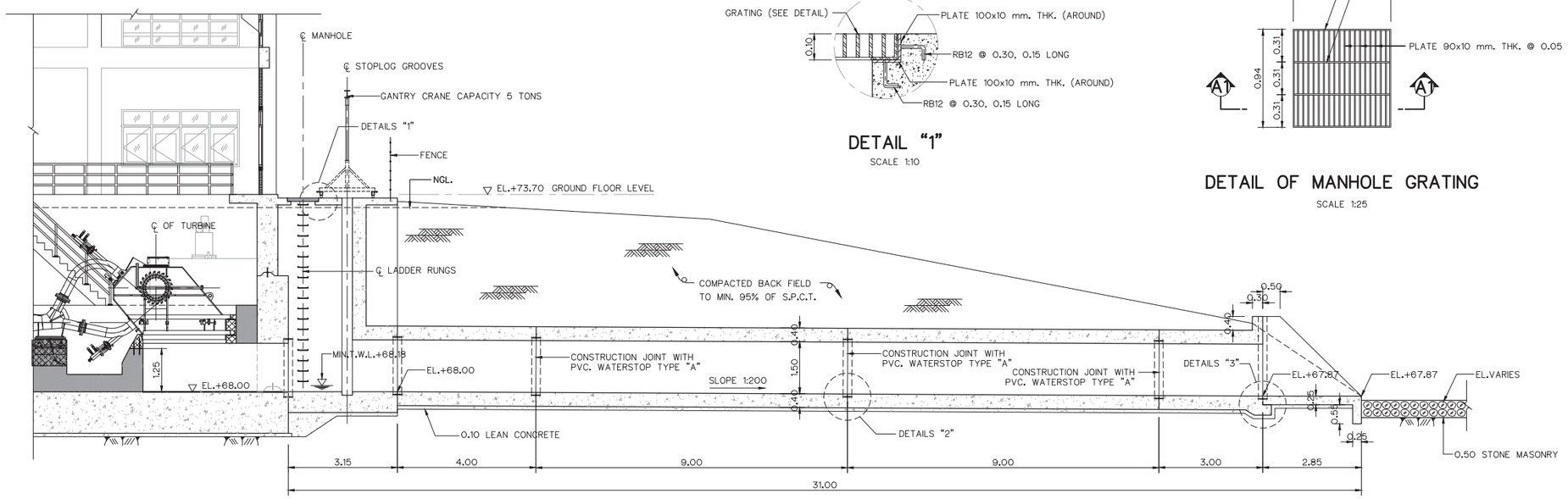
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
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MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
TAILRACE
SECTION AND DETAILS (SHEET 1/2)

PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2–TR–02	SHEET NO. 66 OF 97



SECTION F–F

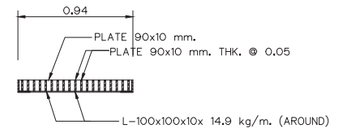
SCALE 1:75

DETAIL "1"

SCALE 1:10

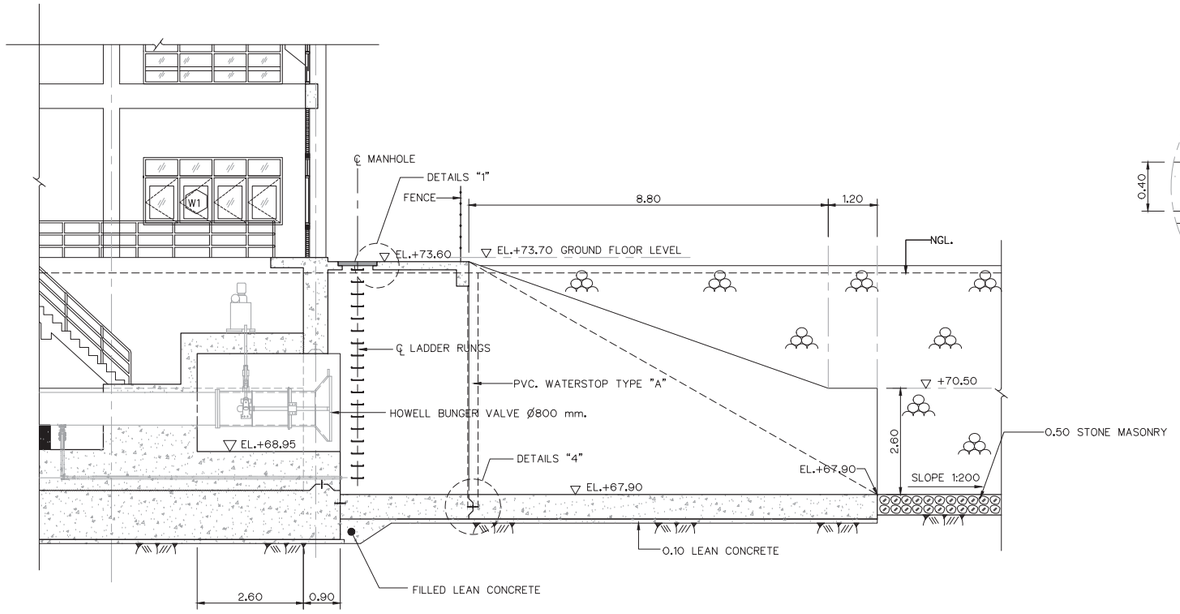
DETAIL OF MANHOLE GRATING

SCALE 1:25



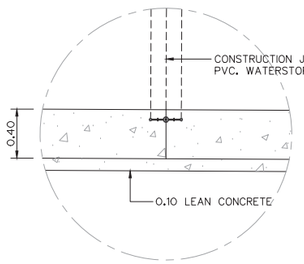
SECTION A1–A1

SCALE 1:25



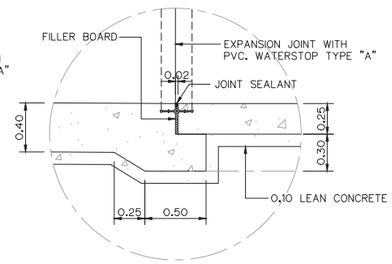
SECTION G–G

SCALE 1:75



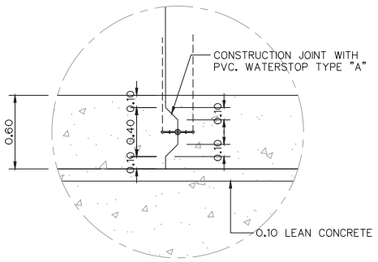
DETAIL "2"

SCALE 1:25



DETAIL "3"

SCALE 1:25



DETAIL "4"

SCALE 1:25

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8
SCALE 1:10 METERS
0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS
0 0.5 1.0 2.0 3.0 4.0 6.0
SCALE 1:75 METERS

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03 2
3. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN 30 TON/M.

REFERENCE DRAWINGS :

1.	TAILRACE, LAYOUT PLAN	KTP2-TR-01
2.	TAILRACE, REINFORCEMENT DETAILS (SHEET 1/2)	KTP2-TR-04

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

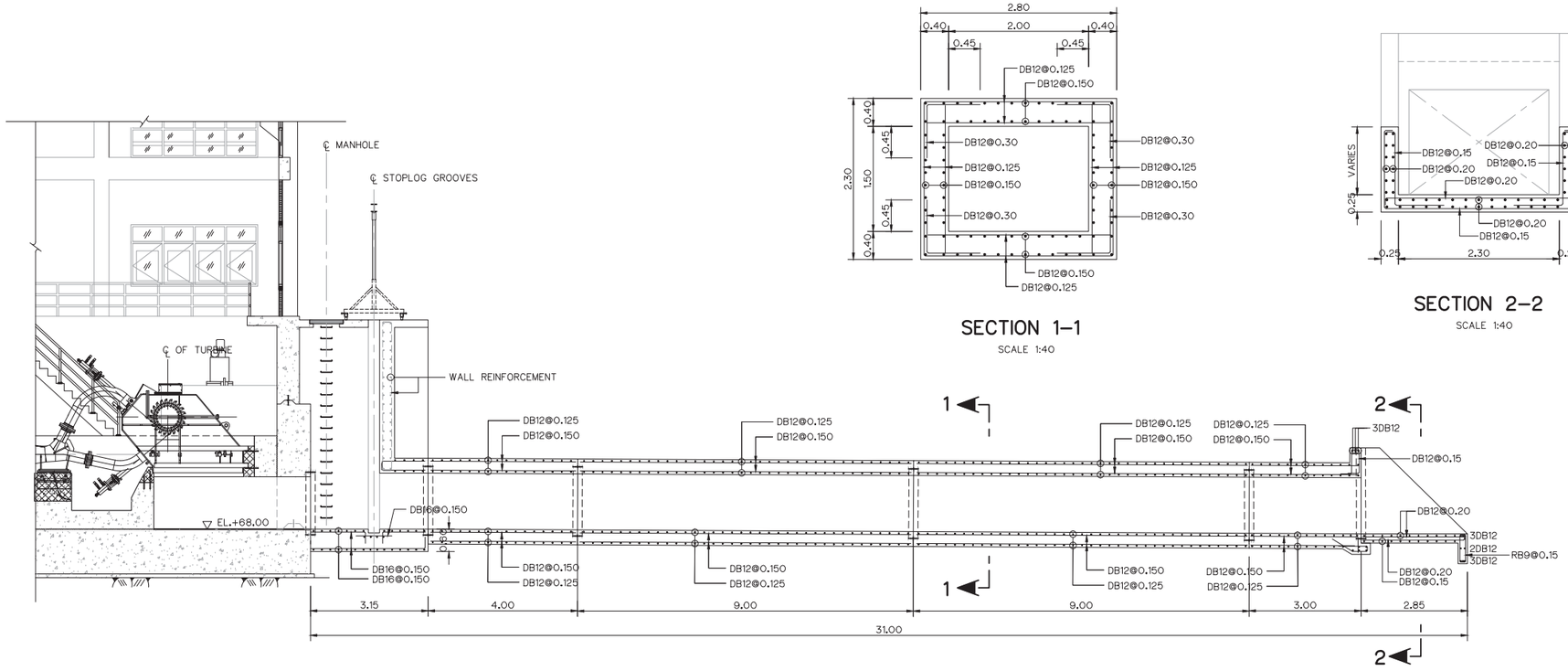
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

TAILRACE

SECTION AND DETAILS (SHEET 2/2)

PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	วิ.ย.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	วิ.ย.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2-TR-03	SHEET NO. 67 OF 97



SECTION F–F

SCALE 1:75

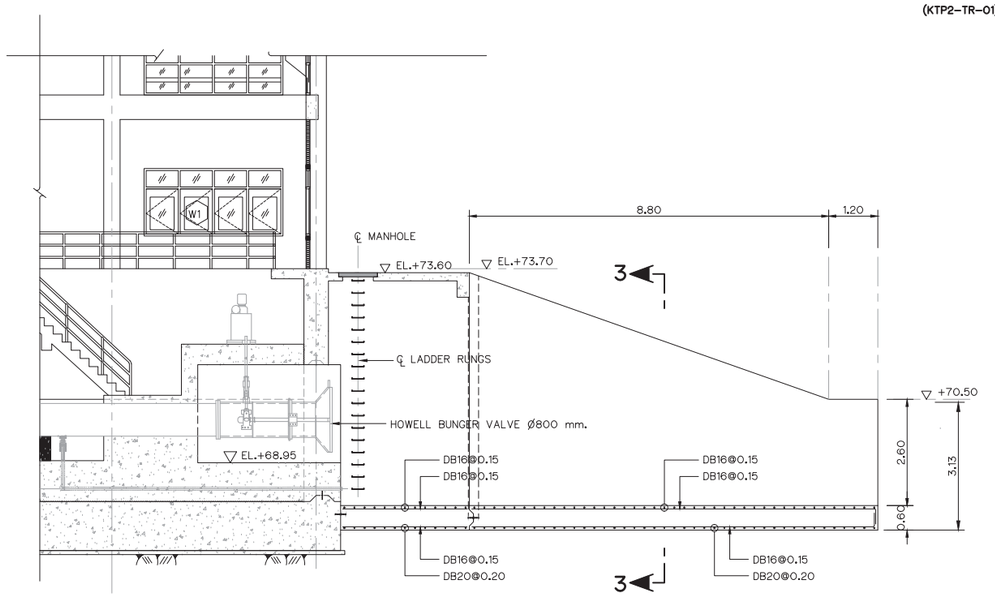
(KTP2–TR–01)

SECTION 1–1

SCALE 1:40

SECTION 2–2

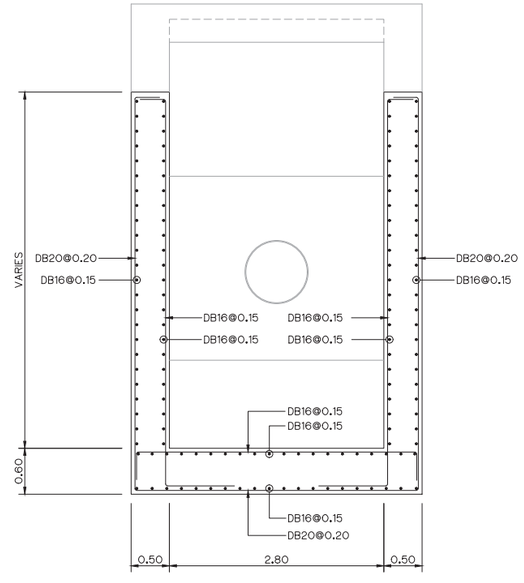
SCALE 1:40



SECTION G–G

SCALE 1:75

(KTP2–TR–01)



SECTION 3–3

SCALE 1:40

0 1 2 3

SCALE 1:40 METERS

0 0.5 1.0 2.0 3.0 4.0 6.0

SCALE 1:75 METERS

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L) ARE IN METERS
   REINFORCEMENT BARS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03

REFERENCE DRAWINGS :

1.	TAILRACE, LAYOUT PLAN	KTP2–TR–01
2.	TAILRACE, SECTION AND DETAILS (SHEET 2/2)	KTP2–TR–03

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

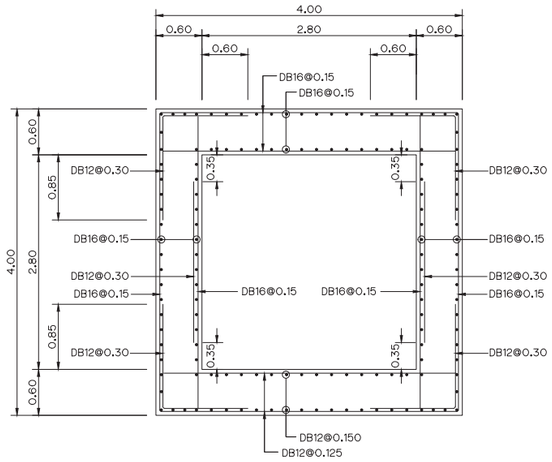
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

TAILRACE

REINFORCEMENT DETAILS (SHEET 1/2)

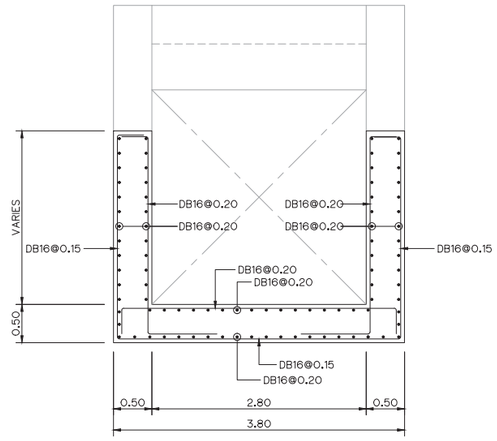
PCM P&C MANAGEMENT CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
		REVIEWED	
DESIGNED	28.1957	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	28.1957	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2–TR–04	SHEET NO. 68 OF 97



SECTION C–C

SCALE 1:40

(KTP2–TR–01)



SECTION E–E

SCALE 1:40

(KTP2–TR–01)

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L) ARE IN METERS
   REINFORCEMENT BARS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03

REFERENCE DRAWINGS :

1.	TAILRACE, LAYOUT PLAN	KTP2–TR–01

0 1 2 3

SCALE 1:40 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

TAILRACE

REINFORCEMENT DETAILS (SHEET 2/2)

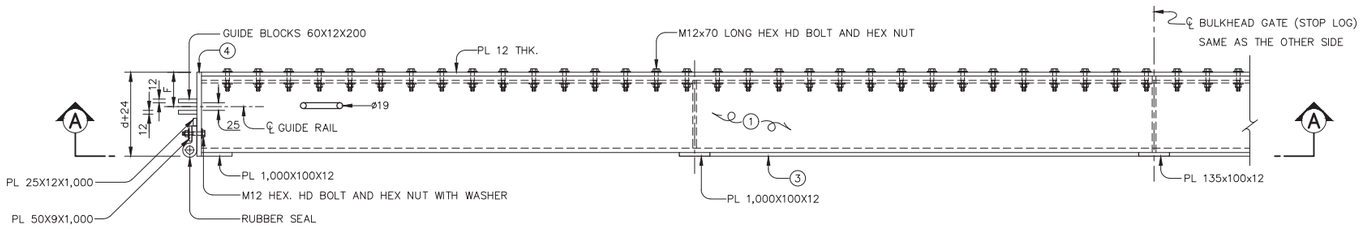
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MINISTRY OF ENERGY

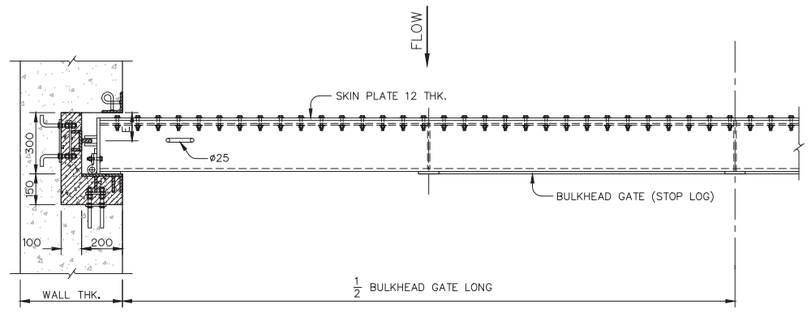
DESIGNED	28.1957	REVIEWED
DRAWN		SUBMITTED
CHECKED	28.1957	RECOMMENDED
PROJECT MANAGER	17/03/2020 DATE	APPROVED

DRAWING NO. **KTP2–TR–05**

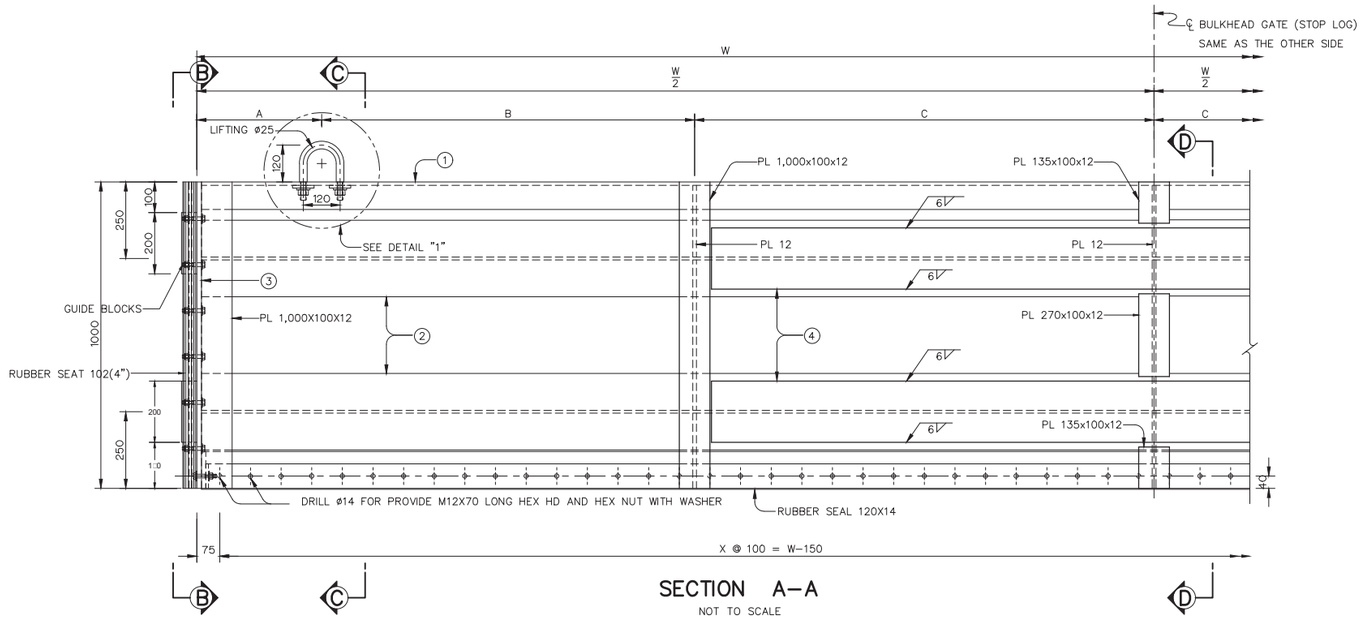
SHEET NO. 69 OF 97



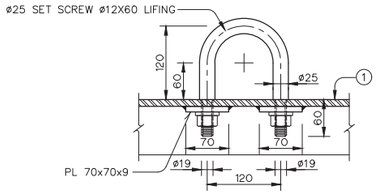
PLAN
BULKHEAD GATE
NOT TO SCALE



INSTALLATION
NOT TO SCALE



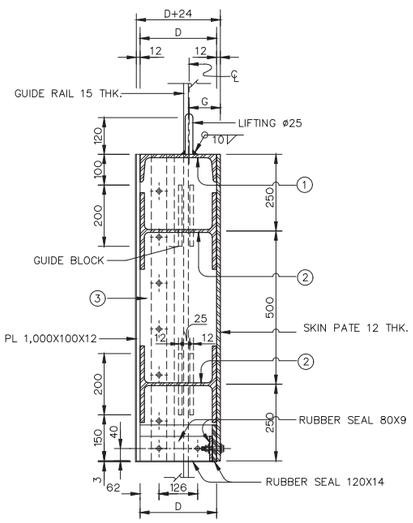
SECTION A–A
NOT TO SCALE



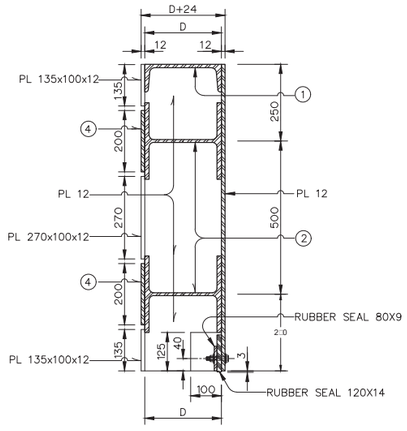
DETAIL "1"
NOT TO SCALE

BULKHEAD GATE PROPERTIES

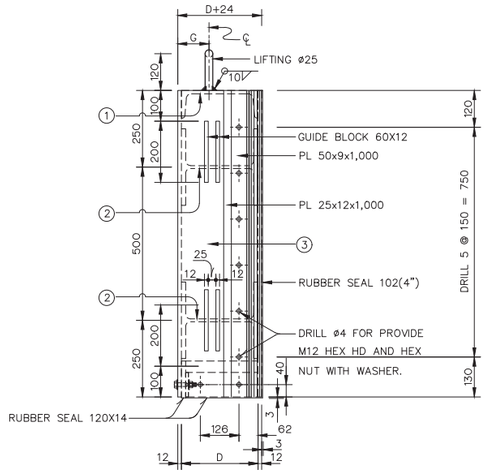
BULKHEAD GATE (WIDTH , m.)	W	A	B	C	D	E	F	G	①	②	③	④
1.85	2000	250	500	750	200	138	62	89	[200x90x8	W 200x200x8x12	PL 1000x224x15	PL 1380x160x12



SECTION A–A
NOT TO SCALE



SECTION B–B
NOT TO SCALE



SECTION C–C
NOT TO SCALE

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. WELDING CONNECTION USE 6 mm., UNLESS OTHERWISE SHOWN
4. 12 SETS OF BULKHEAD GATES ARE REQUIRED

REFERENCE DRAWINGS :

1. TAILRACE, LAYOUT PLAN	KTP2–TR–01
2. TAILRACE, BULKHEAD GATE AND DETAILS	KTP2–TR–07

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS
TAILRACE

BLUKHEAD GATE, PLAN SECTIONS DETAILS AND INSTALLATION

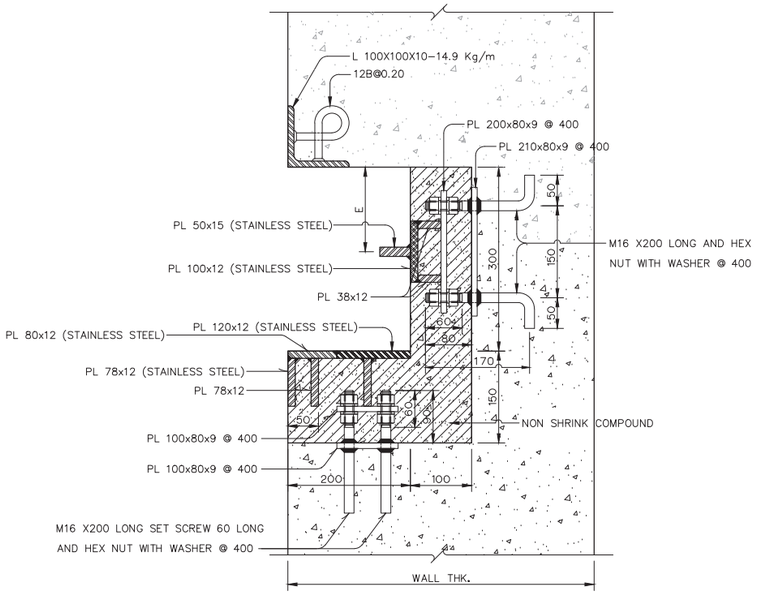
NO.	DATE	REVISIONS	CHECKED	APPROVED
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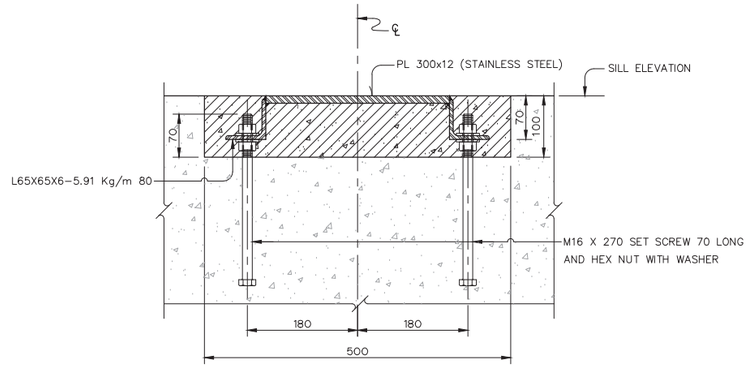
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DESIGNED	28.1957	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	28.1957	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2–TR–06
		SHEET NO.	70 OF 97



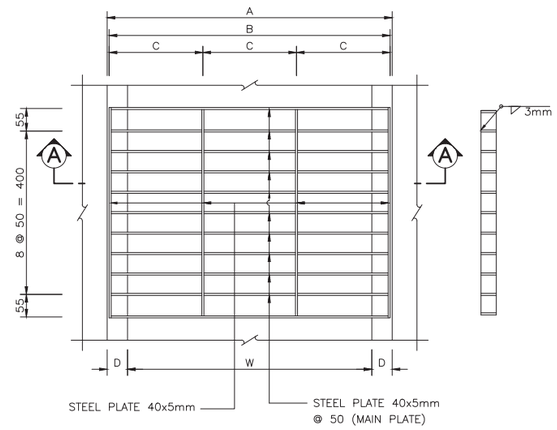
WALL DETAIL

NOT TO SCALE



BOTTOM DETAIL

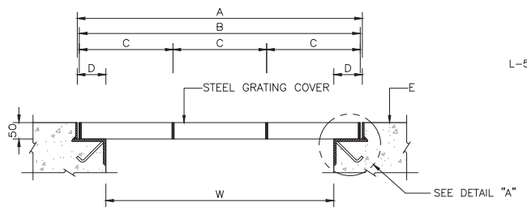
NOT TO SCALE



DETAIL OF STEEL GRATING COVER FOR STOPLOG GROOVES

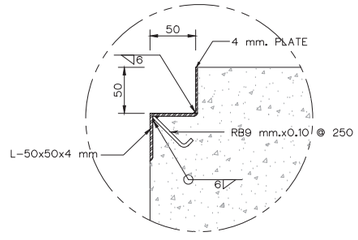
NOT TO SCALE

STEEL GRATING COVER	W	A	B	C	D	E
DRAFT TUBE STOPLOG 1800x1500	300	430	422	140	65	+73.60



SECTION A-A

NOT TO SCALE



DETAIL "A"

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER AND ELEVATIONS (M.S.L.) ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. WELDING CONNECTION USE 6 mm., UNLESS OTHERWISE SHOWN

REFERENCE DRAWINGS :

1. TAILRACE, LAYOUT PLAN	KTP2-TR-01
2. TAILRACE, BLUKHEAD GATE, PLAN SECTIONS DETAILS AND INSTALLATION	KTP2-TR-06

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 1 : CIVIL WORKS

TAILRACE

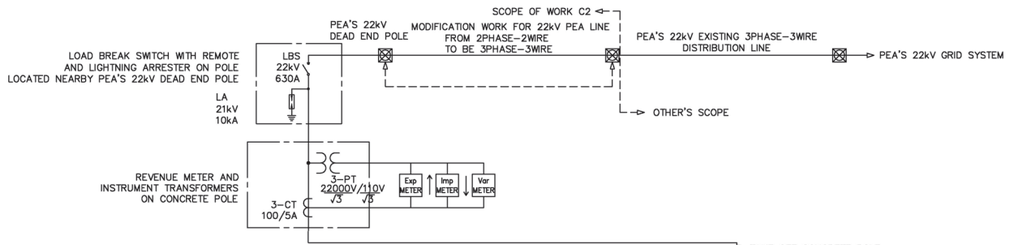
BULKHEAD GATE AND DETAILS

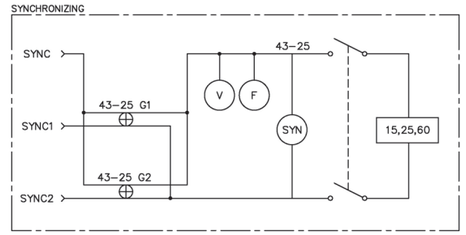
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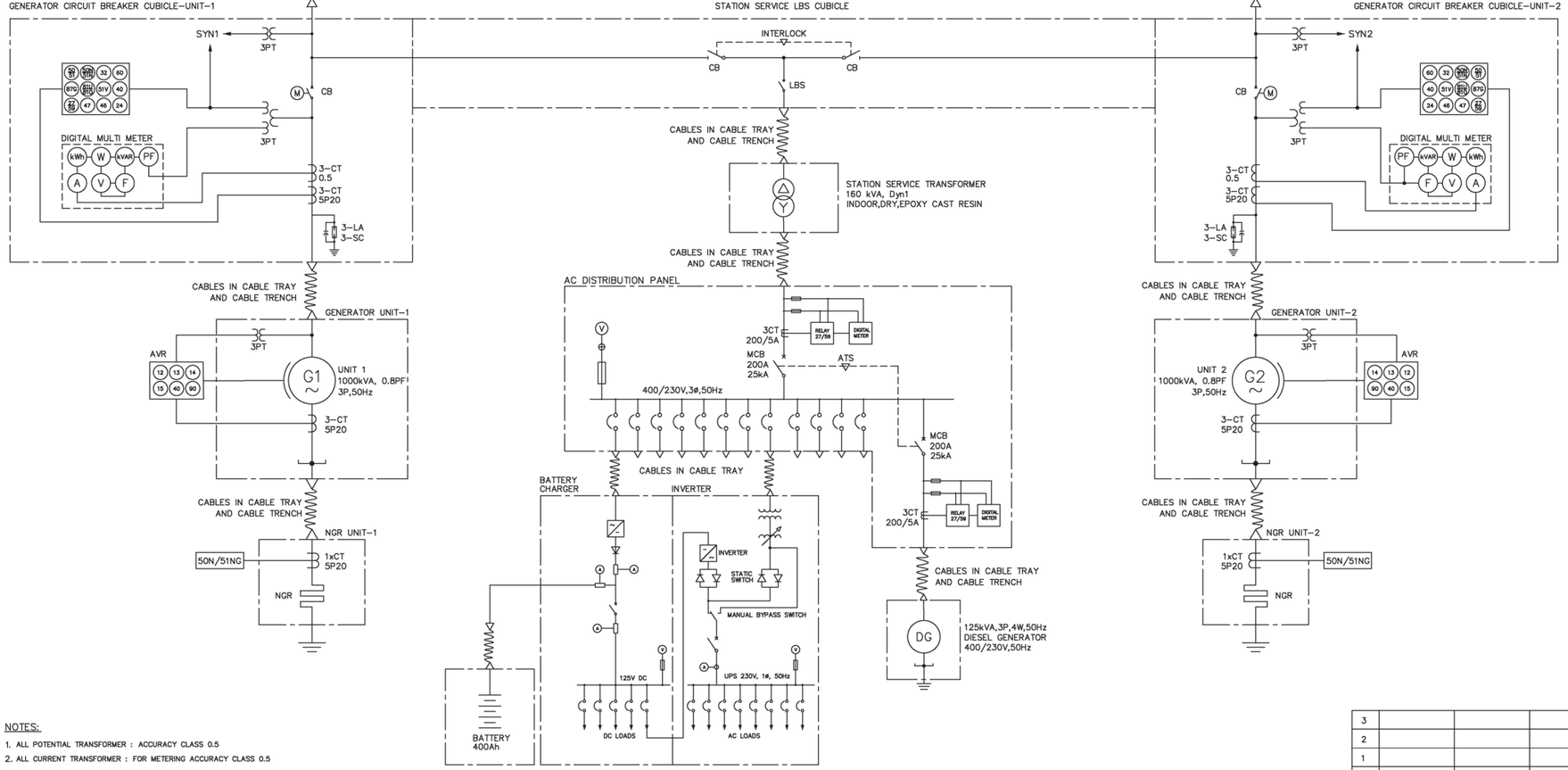
DESIGNED 28.1957
DRAWN
CHECKED 28.1957
PROJECT MANAGER 17/03/2020 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2-TR-07
SHEET NO. 71 OF 97







LEGEND

	DROP OUT FUSE WITH CUTOUT
	TRANSFORMER
	CIRCUIT BREAKER (CB) MOTOR DRIVE
	CIRCUIT BREAKER (CB)
	LOAD BREAK SWITCH
	FUSE
	LIGHTNING ARRESTER
	MOLD CASE CIRCUIT BREAKER (MCB)
	NEUTRAL GROUNDING RESISTOR (NGR)
	BATTERY
	INVERTER
	BATTERY CHARGER
M	MOTOR OPERATED EQUIPMENT
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
ATS	AUTOMATIC TRANSFER SWITCH
12	OVER SPEED DEVICE
13	SYNCHRONOUS SPEED DEVICE
14	UNDER SPEED DEVICE
15	SPEED OR FREQUENCY MATCHING DEVICE/RELAY
24	VOLT PER HERTZ RELAY
25	SYNCHRO CHECK RELAY
27R	REMANENT UNDER VOLTAGE RELAY
27/59	UNDER AND OVER VOLTAGE RELAY
32	REVERSE POWER RELAY
40	LOSS OF EXCITATION
46	PHASE UNBALANCE CURRENT RELAY
47	PHASE UNBALANCE VOLTAGE RELAY
50BF	BREAKER FAILURE
50/51	PHASE OVERCURRENT RELAY
50N/51N	GROUND OVERCURRRENT RELAY
51V	VOLTAGE RESTRAINED TIME OVERCURRENT
59N	NEUTRAL OVERVOLTAGE RELAY
60	VOLTAGE OR CURRENT UNBALANCE RELAY
64R	ROTOR EARTH FAULT RELAY
64S	STATOR EARTH FAULT RELAY
64	GROUND FAULT PROTECTION RELAY
67	DIRECTIONAL OVERCURRENT RELAY
67N	NEUTRAL DIRECTIONAL OVERCURRENT RELAY
78	PHASE ANGLE MEASURING RELAY
81	OVER FREQUENCY RELAY
81R	RATE OF CHANGE OF FREQUENCY RELAY (RCOF)
DG	STANDBY DIESEL GENERATOR
PF	POWER FACTOR METER
F	FREQUENCY METER
V	VOLT METER
A	AMP METER
W	WATT METER
kWh	KILO WATT HOUR METER
kVar	KILO VAR METER
SYN	SYNCHRONIZING RELAY
&	SYNCHRONOUS AC GENERATOR

NOTES:

1. ALL POTENTIAL TRANSFORMER : ACCURACY CLASS 0.5
2. ALL CURRENT TRANSFORMER : FOR METERING ACCURACY CLASS 0.5
   : FOR RELAY ACCURACY CLASS 5P 20
3. THIS DRAWING IS FOR GUIDE ONLY, CONTRACTOR SHALL DESIGN THE DETAILS AND SUBMITTED TO DEDE FOR APPROVAL
4. PROTECTION SYSTEM SHALL BE ACCORDING TO PEA'S REGULATION (POWER NETWORK SYSTEM INTERCONNECTION CODE)

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 2 : ELECTRO-MECHANICAL EQUIPMENT
E&M EQUIPMENT
OVERALL SINGLE LINE DIAGRAM

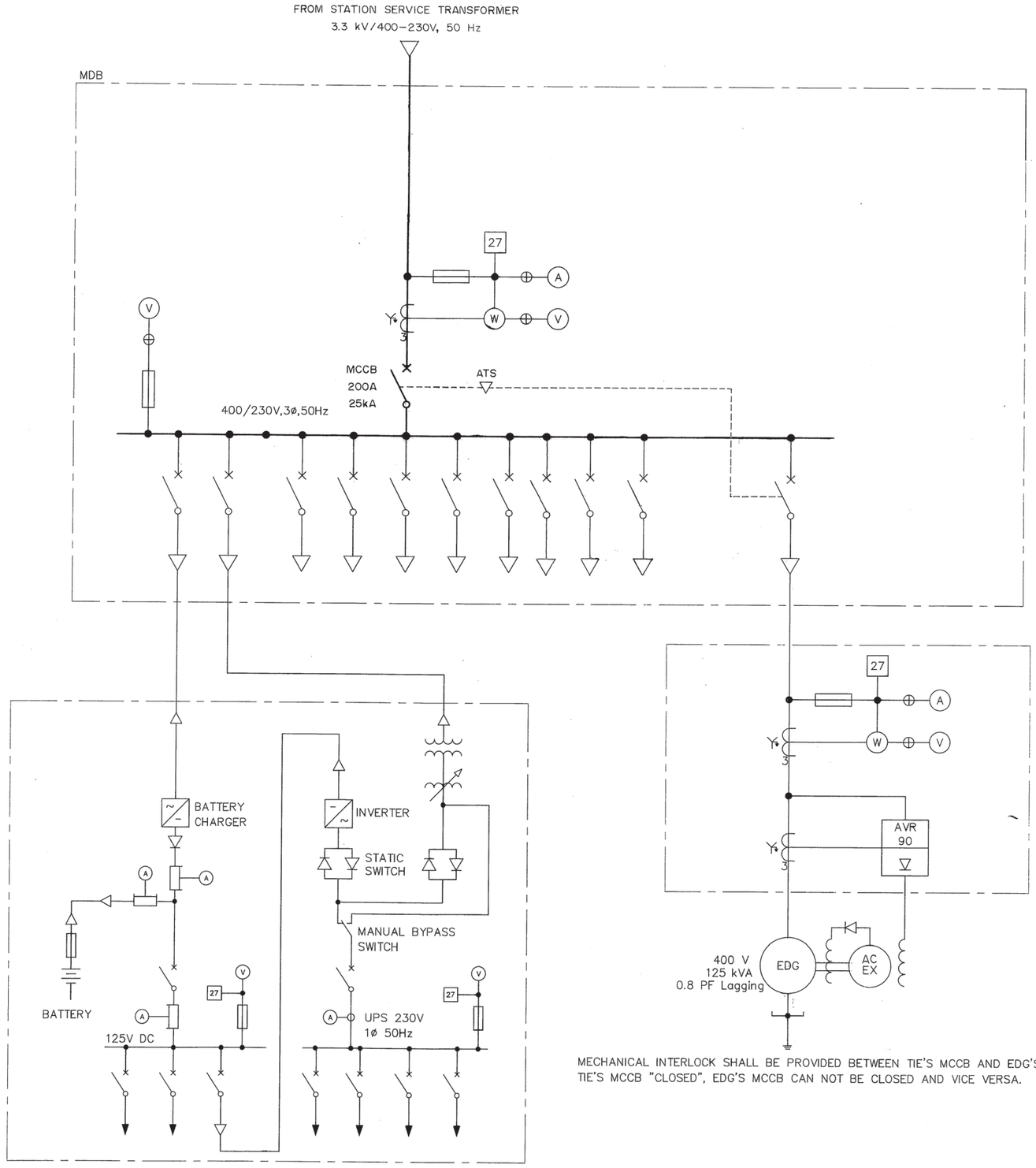
PCM P&C MANAGEMENT CO.,LTD.

DESIGNED	วพ.804	
DRAWN		
CHECKED	วพ.804	
PROJECT MANAGER	17/03/2020	DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED	S. Kitichai
SUBMITTED	
RECOMMENDED	
APPROVED	

DRAWING NO. KTP2-EM-01
SHEET NO. 72 OF 97



MECHANICAL INTERLOCK SHALL BE PROVIDED BETWEEN TIE'S MCCB AND EDG'S MCCB.
TIE'S MCCB "CLOSED", EDG'S MCCB CAN NOT BE CLOSED AND VICE VERSA.

LEGEND

	STEP-UP POWER TRANSFORMER
	WITHDRAWABLE AIR CIRCUIT BRKAKER (ACB)
	MOLDED CASE CIRCUIT BREAKER (MCCB)
	DISCONNECTING OR ISOLATING SWITCH
	FUSE
	LIGHTNING ARRESTER
f	FREQUENCY METER
V	VOLT METER
A	AMP METER
W	WATT METER
⊕	SELECTOR SWITCH
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
25	SYNCHRO CHECK RELAY
27R	REMANENT UNDER VOLTAGE RELAY
27 59	UNDER AND OVER VOLTAGE RELAY
32	REVERSE POWER RELAY
50 51	PHASE OVERCURRENT RELAY
50N 51N	GROUND OVERCURRRENT RELAY
59N	RESIDUAL VOLTAGE RELAY
67	DIRECTIONAL PHASE FAULT RELAY
67N	DIRECTIONAL GROUD FAULT RELAY
81	OVER FREQUENCY RELAY
EDG	EMERGENCY DIESEL GENERATOR
Y	WYE CONNECTION
▽	DELTA CONNECTION
∠	OPENED DELTA CONNECTION
	BATTERY CHARGER
	INVERTER
	ISOLATION TRANSFORMER
	VOLTAGE REGURATOR
	STATIC SWITCH
	DIODE
	BATTERY BANK
A	SHUNT AMP METER
	MANUAL BYPASS SWITCH
	MECHANICAL INTERLOCK

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
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KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 2 : ELECTRO-MECHANICAL EQUIPMENT
E&M EQUIPMENT
LV SINGLE LINE DIAGRAM (AC/DC/UPS)

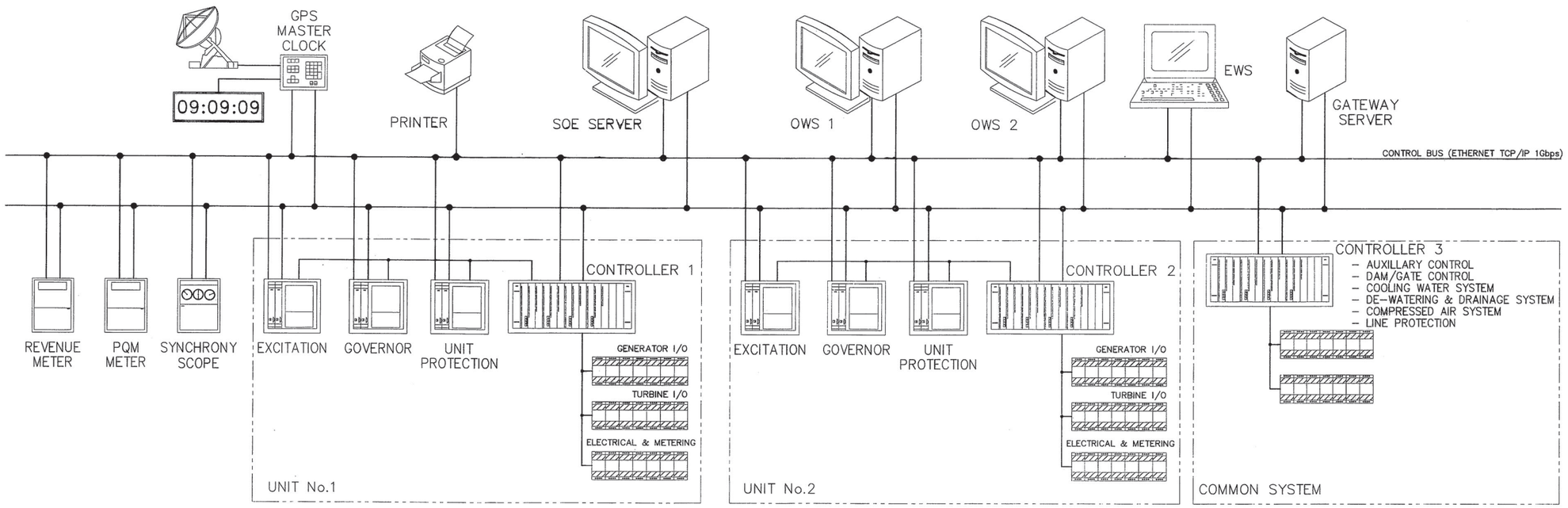
NO.	DATE	REVISIONS	CHECKED	APPROVED
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DRAWN		
CHECKED	an.1950	
PROJECT MANAGER	17/03/2020 DATE	

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REVIEWED S.Krichai
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2-EM-02
SHEET NO. 73 OF 97



CONTROL CONFIGURATION DIAGRAM

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 2 : ELECTRO–MECHANICAL EQUIPMENT
E&M EQUIPMENT
CONTROL CONFIGURATION DIAGRAM

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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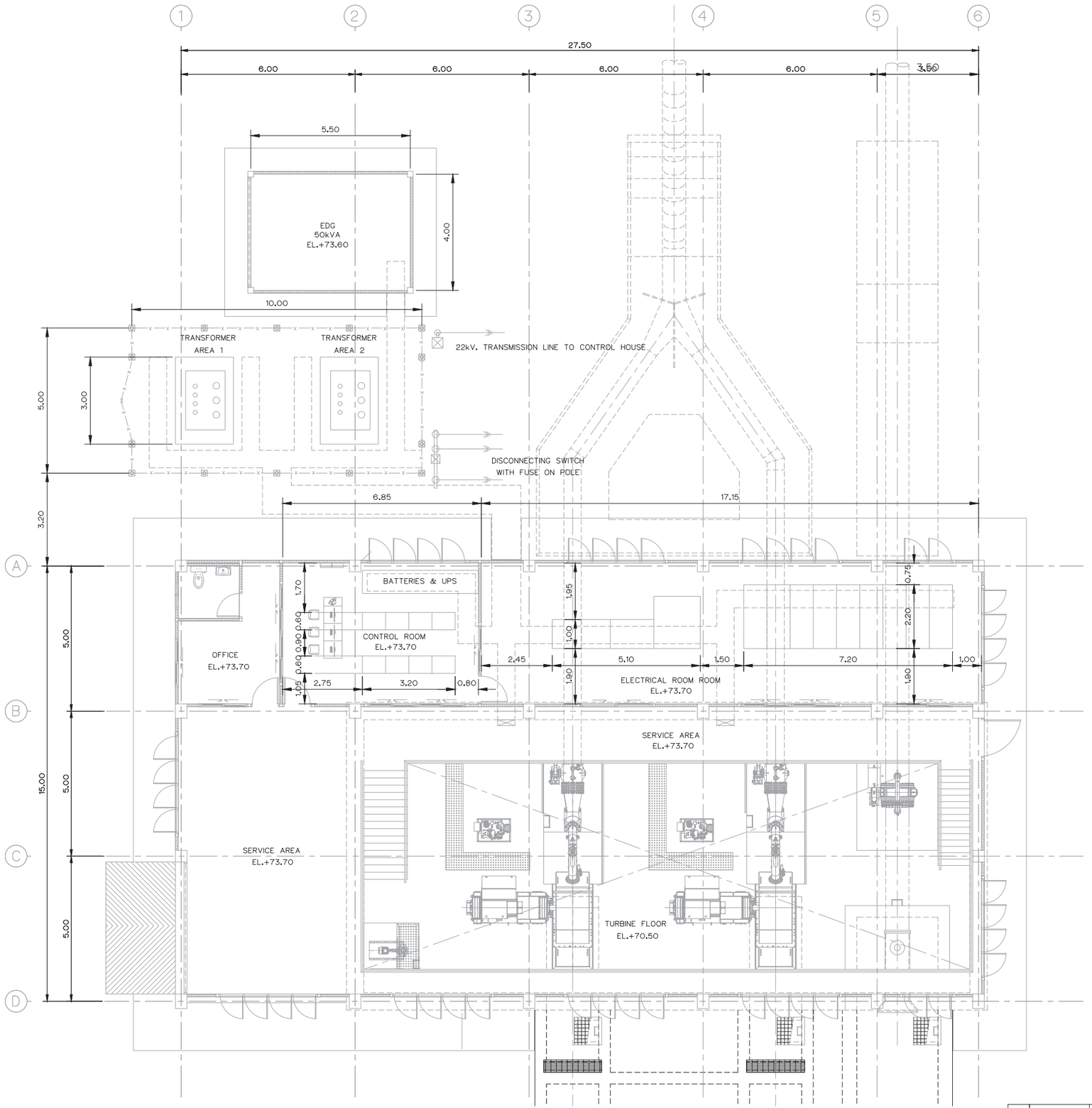
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PCM P&C MANAGEMENT CO.,LTD.

DESIGNED ดก.1950
DRAWN
CHECKED ดก.1950
PROJECT MANAGER 17/03/2020 DATE

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REVIEWED S.Kitichai
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2–EM–03
SHEET NO. 74 OF 97



CONTROL ROOM AND ELECTRICAL ROOM LAYOUT

SCALE 1:75

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

0 0.5 1.0 2.0 3.0 4.0 6.0

SCALE 1:75 METERS

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

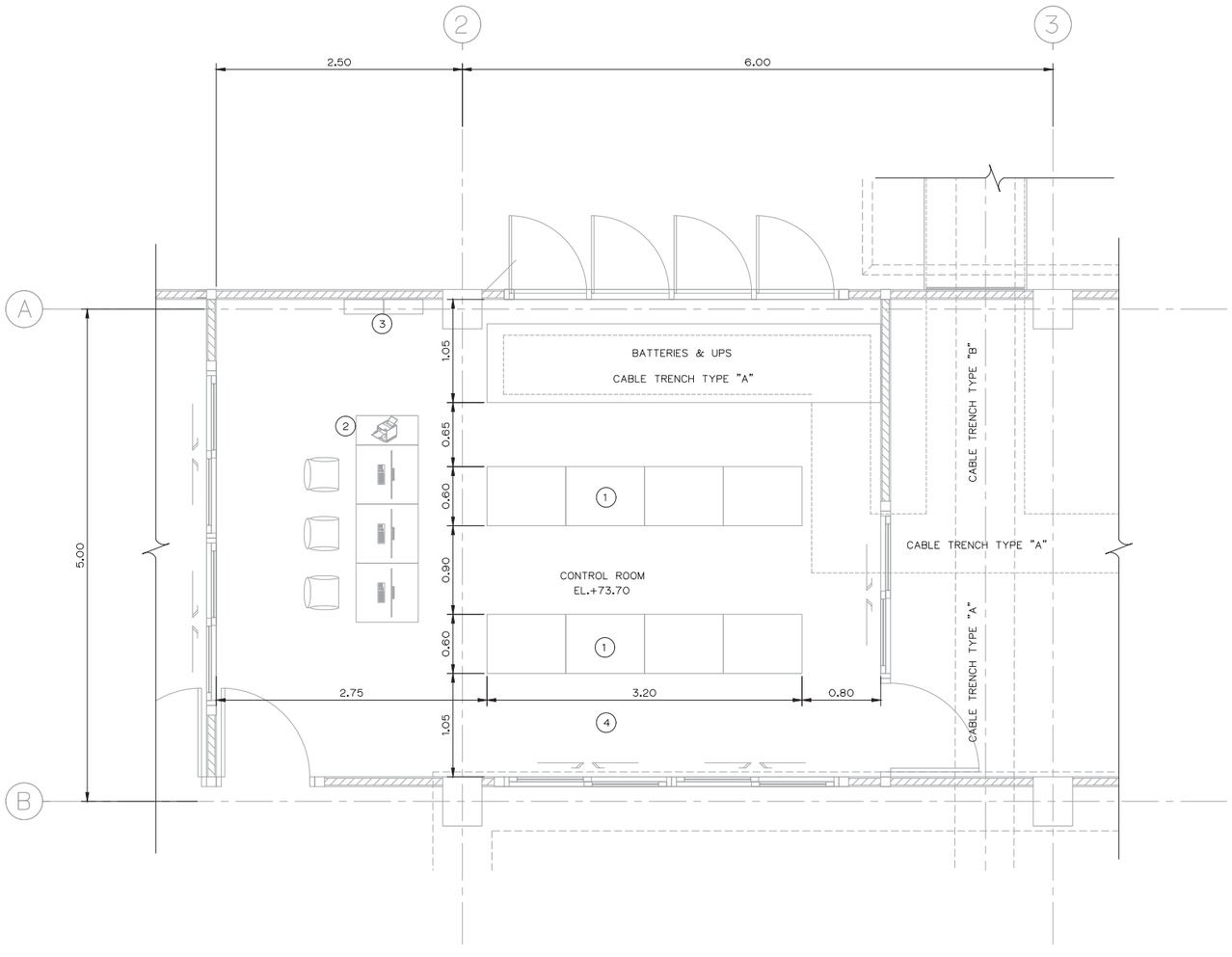
PART 2 : ELECTRO-MECHANICAL EQUIPMENT
E&M EQUIPMENT
CONTROL ROOM AND ELECTRICAL ROOM LAYOUT

NO.	DATE	REVISIONS	CHECKED	APPROVED
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2				
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DRAWN		SUBMITTED	
CHECKED	สก.1950	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2-EM-04
		SHEET NO.	75 OF 97



CONTROL ROOM LAYOUT

SCALE 1:30

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03

LEGENDS:

(1) ELECTRICAL AND CONTROL CABINET
(2) CONTROL DESK
(3) LIGHTING AND FIRE ALARM PANEL
(4) ANTI-STATIC FLOOR TILE RAISED FLOOR 40 cm. IN HEIGH

0 0.2 0.4 0.8 1.2 1.6 2.0 2.4
SCALE 1:30 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
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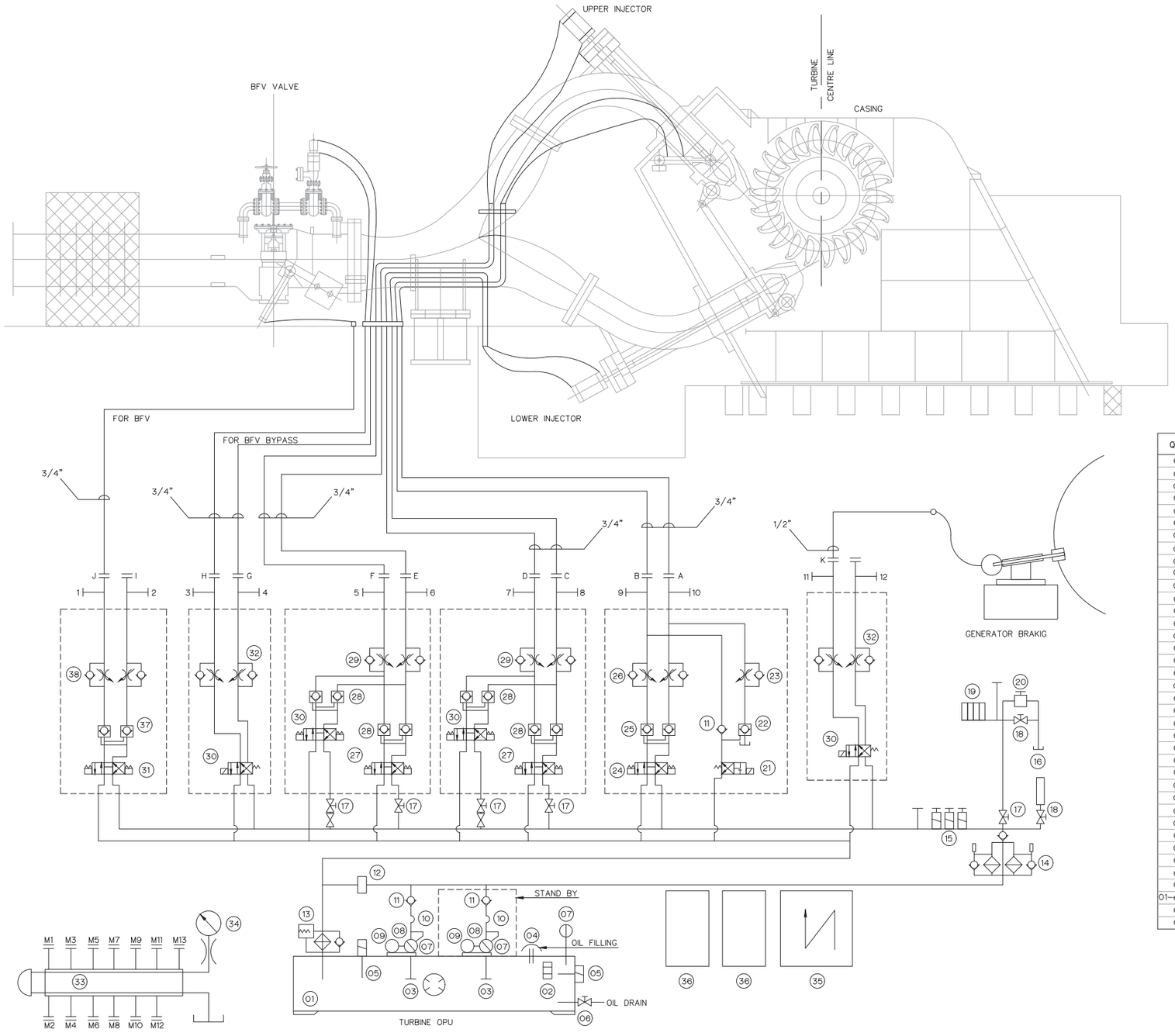
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 2 : ELECTRO-MECHANICAL EQUIPMENT
E&M EQUIPMENT
CONTROL ROOM LAYOUT

P&C MANAGEMENT CO.,LTD.

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DRAWN		SUBMITTED
CHECKED	สก.1950	RECOMMENDED
PROJECT MANAGER	17/03/2020 DATE	APPROVED

DRAWING NO. KTP2-EM-05
SHEET NO. 76 OF 97



SERVO SPECIFICATIONS							
DESCRIPTION		DEFLECTOR	NEEDLE-1	NEEDLE-2	BFY BYPASS	BUTTER FLY VALVE CYLINDERS	*GENERATOR BRAKING CYLINDERS
NO. OF CYLINDERS		1	1	1	1	1	1
BORE x ROD (mm)		80X45	160X70	160X70	80X45	160X70	90
STROKE (mm)		96	180	180	80	460	100
TIME (sec)	OPEN	20	20	20	20	80	30
	CLOSE	2	30	30	20	40	30
OP PRESSURE (Bar)		30-100	30-100	30-100	30-100	30-100	30-100

QTY	SI.NO	DESCRPTION	SPEC'N	REF/DWG
01	01	OIL RESERVOIR	750 Liters	-
01	02	OIL LEVEL INDICATOR	-	-
02	03	SUCTION STRAINER	-	-
01	04	OIL FILLER/BREATHER	10 Microns	-
02	05	OIL LEVEL SENSOR	-	-
01	06	GATE VALVE	-	-
03	07	VARIABLE DISPLACEMENT PUMP	23 LPM	-
02	08	FLEXIBLE DRIVE COUPLING	-	-
02	09	ELECTRIC MOTOR 3 PHASE	3.7 kW (5 hp) 1500 RPM B5 50 Hz 400v IP 55 Class F Insulation	-
02	10	FLEXIBLEHOSE	-	-
03	11	INLINE TYPE CHECK VALVE	-	-
01	12	PILOT OPERATED RELIEF VALVE	-	-
01	13	RETURN LINE FILTER	-	-
01	14	OUPLEX PRESSURE LINE FILLTER	-	-
01	15	PRESSURE SWITCH	-	-
01	16	PRESSURE TRANSDUCER	-	-
05	17	SHUT OFF VALVE	3/4" Gosket mounted type	-
02	18	SHUT OFF VALVE	1/2" Gosket mounted type	-
01	19	ACCUMULATOR (PISTON TYPE)	2 x 55 Ltrs	-
01	20	DIRET TYPE RELIEF VALVE	-	-
01	21	PILOT-OPERATED CHECK VALVE	-	-
01	22	MODULAR PILOT OPERATED CHECK VALVE	-	-
01	23	MODULAR THROTTLE & CHECK VALVE	-	-
01	24	SOLENOID OPERATED DIRECTION CONTROL VALVE	-	-
01	25	MODULAR PILOT OPERATED CHECK VALVE	-	-
01	26	MODULAR THROTTLE & CHECK VALVE	-	-
02	27	PROPOTIONAL VALVE	Diff P<5bar, command + 10 VDC	-
04	28	MODULAR PILOT OPERATED CHECK VALVE	-	-
02	29	MODULAR THROTTLE & CHECK VALVE	-	-
04	30	DIRECTION CONTROL CHECK VALVE	220V D.C	-
01	31	DIRECTION CONTROL CHECK VALVE	220V D.C	-
02	32	MODULAR THROTTLE & CHECK VALVE	-	-
01	33	MULTISTATION PRESSURE GAUGE ISOLATOR	SPECIAL	-
01	34	PRESSURE GAUGE	100 mm dia (4") 0-210 bars FB mounting glycerine filled	-
01	35	TERMINAL BOX	Retail make	-
01-each	36	ACCUMULATOR CHARGING KIT	-	-
01	37	MODULAR PILOT OPERATED CHECK VALVE	-	-
01	38	MODULAR THROTTLE & CHECK VALVE	-	-

NOTES:

1. THE 5NOS. DEFLECTORS ON THE TURBINE (1NO EACH FOR EACH NOZZLE)
   BOTH TOP AND BOTTOM DEFLECTORS ARE CONNECTED WITH LINK ARRANGEMENT TO A COMMON HYDRAULIC CYLINDER.
2. PUMP SETTING-50 LPM @ 100 BAR.
3. PRESSURE TRANDUCER/SWITCH SETTING.
   P>100 BAR PUMP OFF.
   P>70 BAR PUMP ON.
   P>60 BAR ALARM
   P>50 BAR TRIP.
4. PUMP SETTING-50 LPM @ 100 BAR.
   PR. RELIFT VALVE SETTING = 110 BAR (ITEM No. 14)
   SAFETY REUEF VALVE SETTING + 120 BAR (ITEM No. 22)
5. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, IT SHALL BE DESIGNED AND SPECIFIED LATER BY CONTRACTOR AND SUBMITTED TO FIELD ENGINEER FOR APPROVAL

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 2 : ELECTRO-MECHANICAL EQUIPMENT

E&M EQUIPMENT

OIL PUMPING UNIT DIAGRAM (UNIT 1 AND 2) DETAILS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

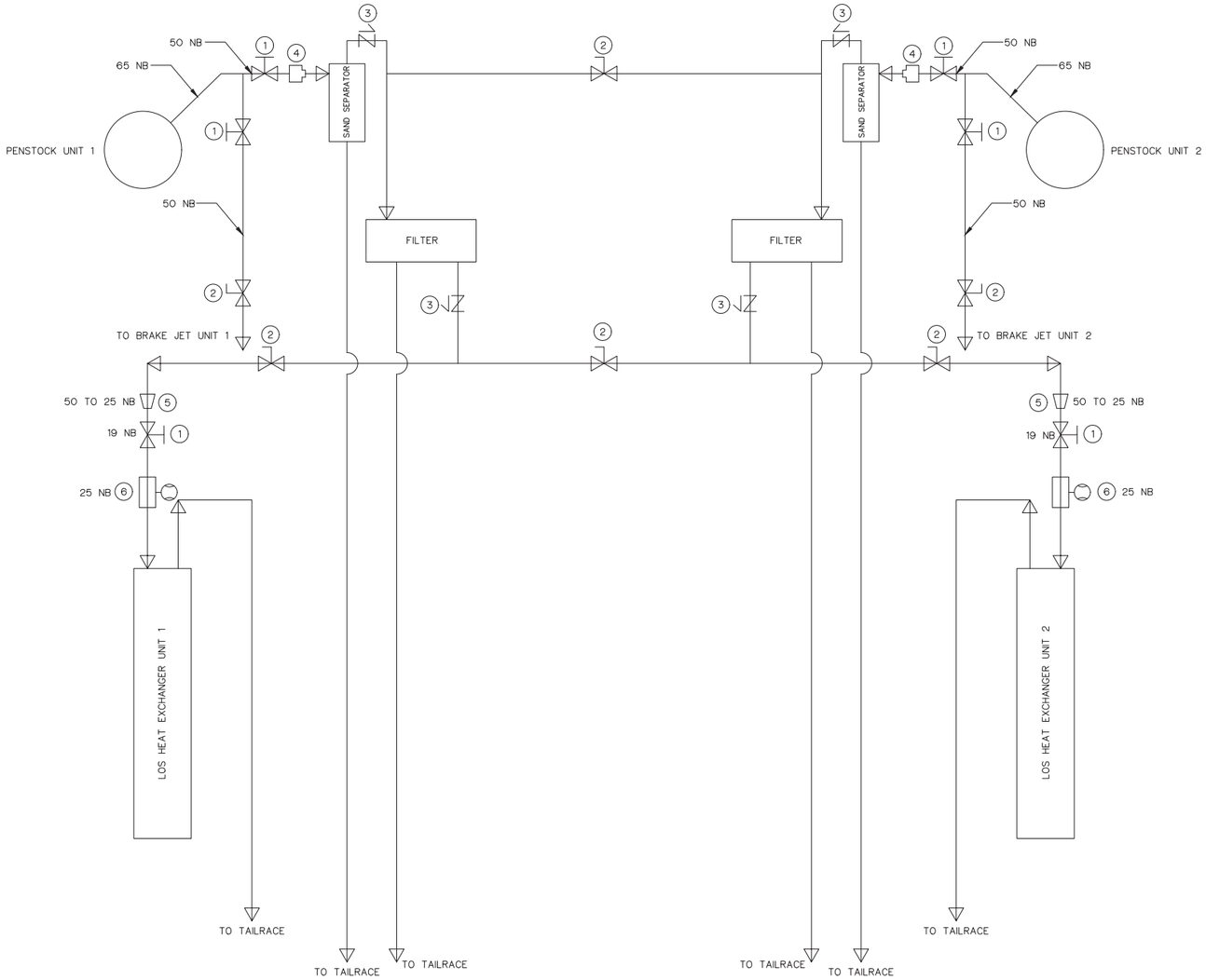
PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED		REVIEWED
DRAWN		SUBMITTED
CHECKED		RECOMMENDED
PROJECT MANAGER	17/03/2020 DATE	APPROVED

DRAWING NO. KTP2-EM-06

SHEET NO. 77 OF 97



NO.	SYMBOL	DESCRIPTION
1		GATE VALVE
2		BALL VALVE
3		CHECK VALVE
4		PRESSURE REDUCING
5		REDUCE
6		FLOW INDICATOR

NOTE :

1. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, IT SHALL BE DESIGNED AND SPECIFIED LATER BY CONTRACTOR AND SUBMITTED TO FIELD ENGINEER FOR APPROVAL

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

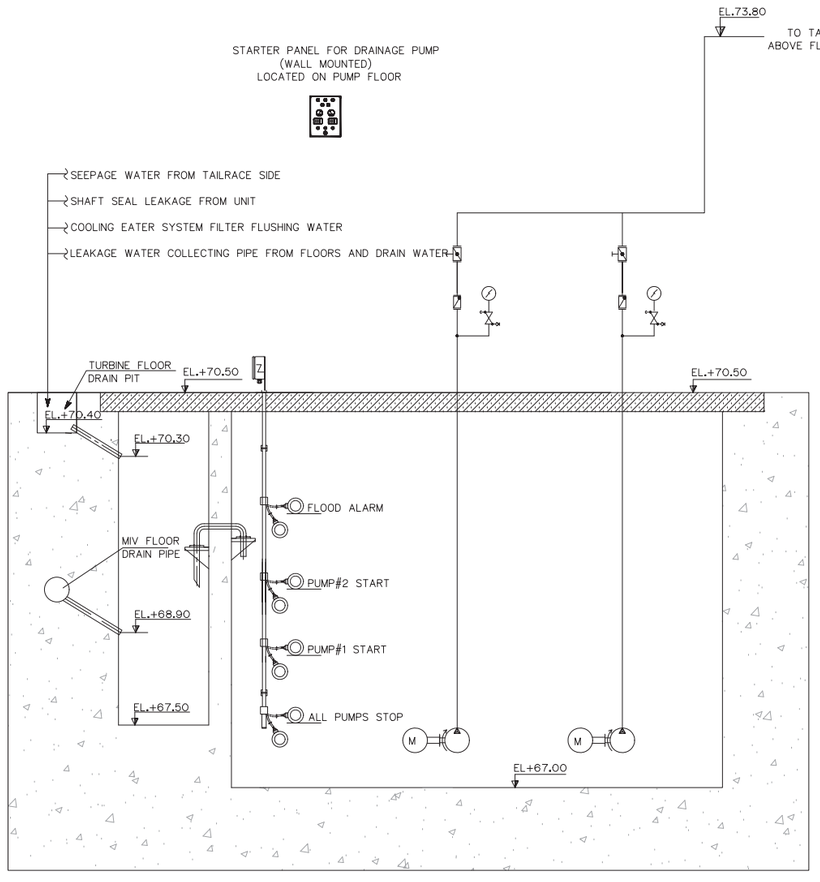
PART 2 : ELECTRO-MECHANICAL EQUIPMENT
E&M EQUIPMENT
COOLING WATER DIAGRAM (UNIT 1 AND 2) DETAILS

PCM P&C MANAGEMENT CO.,LTD.

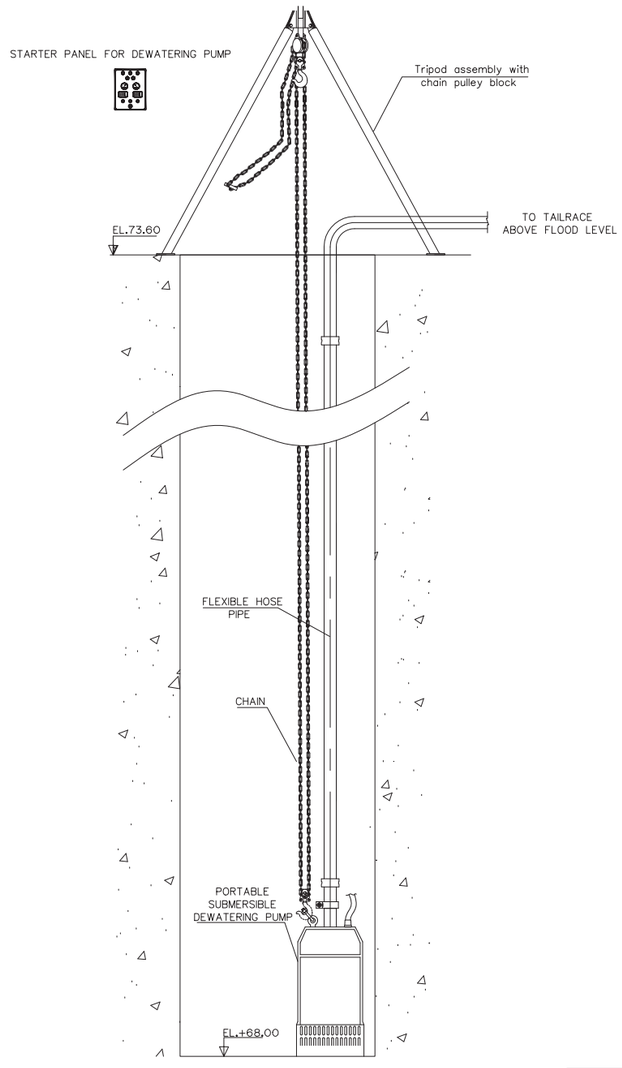
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	20.1950	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	20.1950	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	
		DRAWING NO.	KTP2-EM-07
		SHEET NO.	78 OF 97

SYMBOL LEGEND					
NAME	CENTRIFUGAL PUMP MOTOR SET	ISOLATION VALVE (BUTTERFLY VALVE)	CHECK VALVE	INSTRUMENT ISOLATION VALVE	FOOT VALVE
SYMBOL					
NAME	PRESSURE GAUGE	LEVEL SWITCH	LEVEL SWITCH	SUBMERSIBLE PUMP MOTOR SET	
SYMBOL					



DRAINAGE PIT COMMON FOR
ALL UNITS



DEWATERING PIT
SEPERATE FOR EACH UNIT

NOTES:

1. ALL ELEVATIONS ARE IN METER.
2. SUPPLY VOLTAGE: 400 VAC ±10% 3PH, 50 HZ −3% TO +5%.
3. MATERIAL OF CONSTRUCTION OF PIPES SHALL BE ERW CARBON STEEL AS PER IS:1239(M).
4. ALL FITTINGS SHALL BE OF CARBON STEEL BUTT WELDED ASME B 16.9
5. MOC FOR ALL VALVES SHALL BE BODY−CAST STEEL & INTERNAL−SS.
6. THIS DRAWING IS DESIGN FOR GUIDE LINE ONLY, IT SHALL BE DESIGNED AND SPECIFICATION LATER BY CONTRACTOR AND SUBMITTED TO FIELD FOR APPROVAL

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS | DEDE

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 2 : ELECTRO−MECHANICAL EQUIPMENT
E&M EQUIPMENT

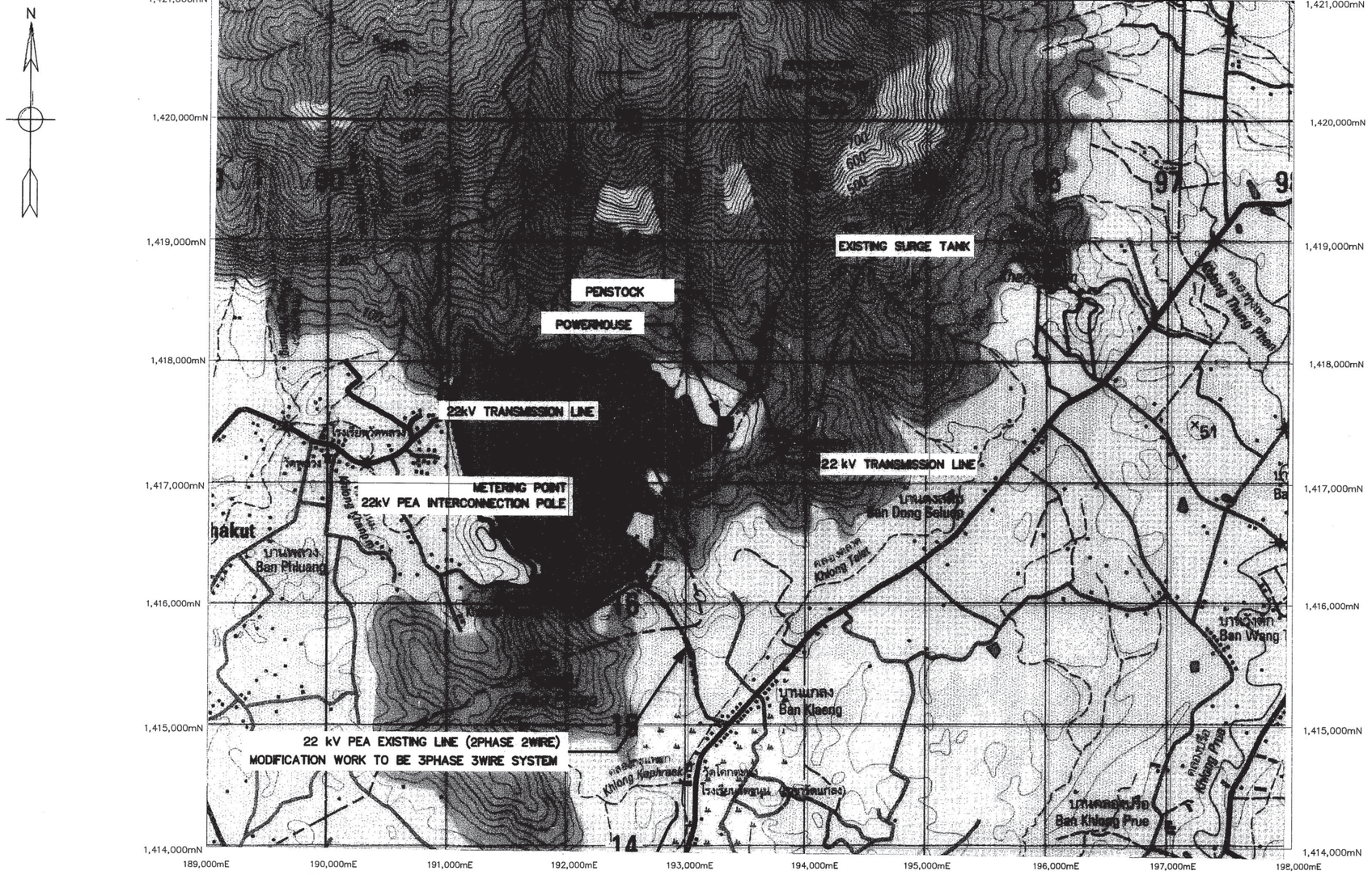
SCHEMATIC DIAGRAM FOR DRAINAGE & DEWATERING SYSTEM

PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	an.1950	REVIEWED S.Khichai
DRAWN		SUBMITTED
CHECKED	an.1950	RECOMMENDED
PROJECT MANAGER	17/03/2020 DATE	APPROVED

DRAWING NO. KTP2−EM−08 | SHEET NO. 79 OF 97



LEGENDS :

- 105 — HIGHWAY
- STREAM
- SURGE TANK
- PENSTOCK
- POWERHOUSE
- BRIDGE
- 22 kV TRANSMISSION LINE
- 22 kV TRANSMISSION LINE (TO CONTROL HOUSE)

GENERAL LAYOUT

SCALE 1:20,000

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATION AND GENERAL NOT SEE DWG. NO. KTP2-GN-03
3. THE CONTRACTOR HAS TO SUBMIT SURVEYING AND DETAIL DESIGN TO FIELD ENGINEER FOR APPROVAL

REFERENCE DRAWING :

1. TRANSMISSION LINE, 22kV., PLAN AND PROFILE, KM. 0+000 TO KM. 0+600	KTP2-TS-02
2. TRANSMISSION LINE, 22kV., PLAN AND PROFILE, KM. 0+600 TO KM. 1+200	KTP2-TS-03
3. TRANSMISSION LINE, 22kV., PLAN AND PROFILE, KM. 1+200 TO KM. 1+800	KTP2-TS-04
4. TRANSMISSION LINE, 22kV., PLAN AND PROFILE, KM. 1+800 TO KM. 2+400	KTP2-TS-05
5. TRANSMISSION LINE, 22kV., PLAN AND PROFILE, KM. 2+400 TO KM.3+000	KTP2-TS-06
6. TRANSMISSION LINE, 22kV., PLAN AND PROFILE, KM. 3+000 TO KM. 3+600	KTP2-TS-07
7. TRANSMISSION LINE, 22kV., PLAN AND PROFILE, KM. 3+600 TO KM. 3+840.71	KTP2-TS-08
8. TRANSMISSION LINE, 22kV., PLAN AND PROFILE, KM. 0+000 TO KM.0+600	KTP2-TS-09
9. TRANSMISSION LINE, 22kV., PLAN AND PROFILE, KM. 0+600 TO KM. 1+200	KTP2-TS-10
10. TRANSMISSION LINE, 22kV., PLAN AND PROFILE, KM. 1+200 TO KM. 1+351.80	KTP2-TS-11

0 500 1,000 1,500

SCALE 1:20,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
GENERAL LAYOUT

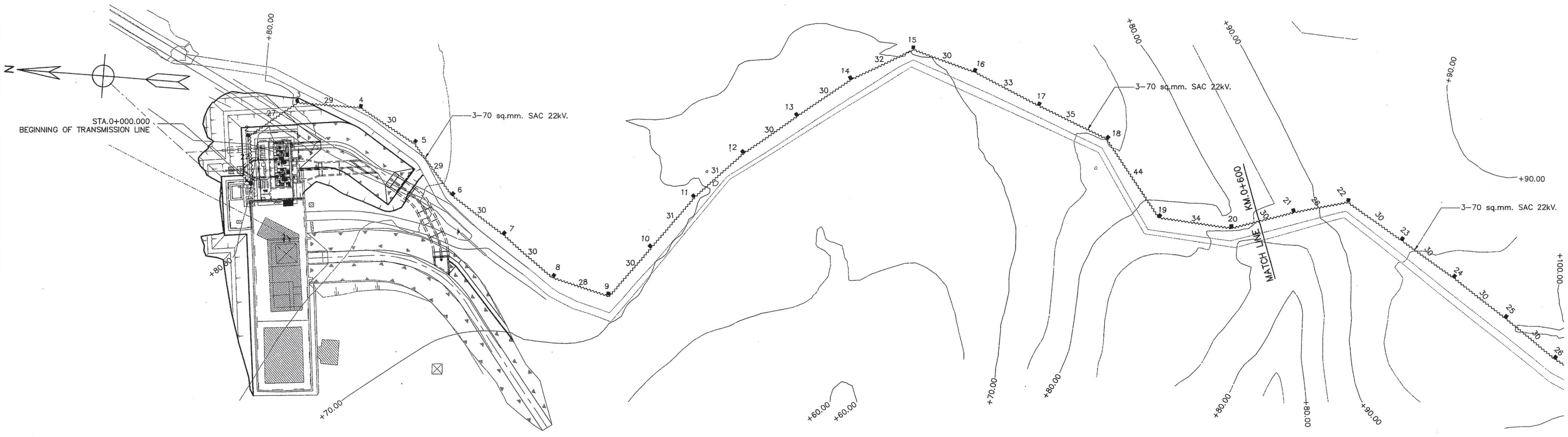
PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วพ.604	REVIEWED	S.Kitichai
DRAWN		SUBMITTED	
CHECKED	วพ.604	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	

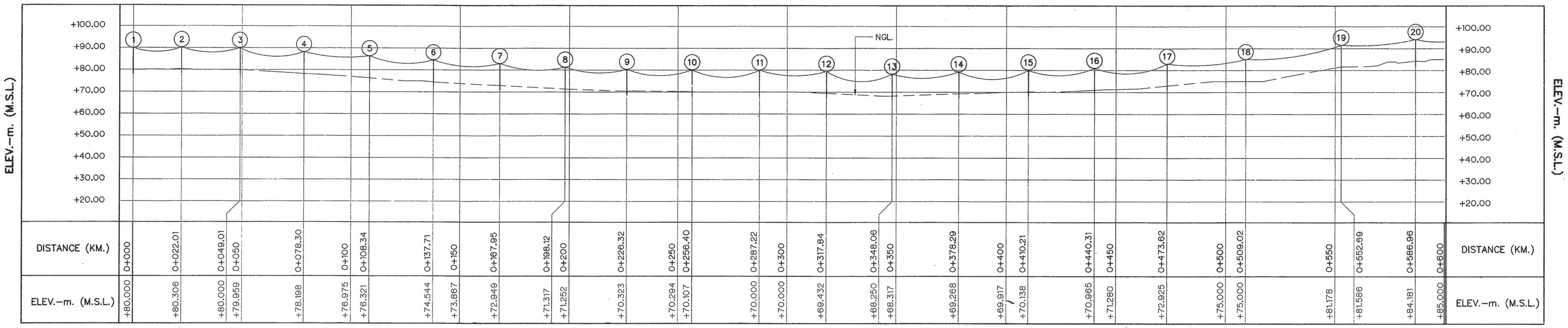
DRAWING NO. KTP2-TS-01

SHEET NO. 80 OF 97



PLAN

SCALE 1:1,000



PROFILE

HORIZONTAL SCALE 1:1,000
VERTICAL SCALE 1:1,000

TRANSMISSION LINE PROPERTIES

POLE NO.	DISTANCE (METERS)	ACCUMULATIVE DISTANCE (METERS)	QUANTITY										
			POLE TYPE					GUY TYPE					
			A	B	C	D	E	G1	G2	G3	G4	G5	G6
TAKE OFF STRUCTURE	0	0			1								
1	22	22			1			1					
2	27	49				1			1				
3	29	78		1					1				
4	30	108		1				1					
5	29	138		1				1					
6	30	168		1				1					
7	30	198		1									
8	28	226		1				1					
9	30	256				1						1	
10	31	287		1									
11	31	318		1				1					
12	30	348		1				1					
13	30	378		1							1		
14	32	410		1				1					
15	30	440				1			1				
16	33	474		1				1					
17	35	509		1									
18	44	553			1				1				
19	34	587			1				1				
20	30	617			1			1					

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. THE DRAWING IS DESIGNED FOR GUIDE LINE ONLY,
   THE CONTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATION

LEGENDS :

1. (wavy line) 22 kV. SPACE AERIAL CABLE
2. (dashed line) EXISTING 22 kV. PEA. OVERHEAD TRANSMISSION LINE
3. ■ NEW 12M. CONCRETE POLE
4. □ EXISTING 12M. CONCRETE POLE
5. ▨ REMOVE 12M. CONCRETE POLE
6. 3 – 100A. FUSE CUTOUT 22 kV.
7. GUY
8. [R] LOAD BREAK SWITCH, SF6, 630A, 22KV. WITH AUTOMATIC REMOTE CONTORLLED
9. DISCONNECTING SWITCH 600A, 22KV.

REFERENCE DRAWINGS :

1. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 0+600 TO KM. 1+200	KTP2–TS–03
2. TRANSMISSION LINE, 22 kV., POLE TYPE "A" AND "B"	KTP2–TS–12
3. TRANSMISSION LINE, 22 kV., POLE TYPE "C" AND "D"	KTP2–TS–13
4. TRANSMISSION LINE, 22 kV., POLE TYPE "E"	KTP2–TS–14
5. TRANSMISSION LINE, 22 kV., TYPE OF ANCHOR GUY	KTP2–TS–15

0 10 20 30 40 50 60 70 80
SCALE 1:1,000 METERS

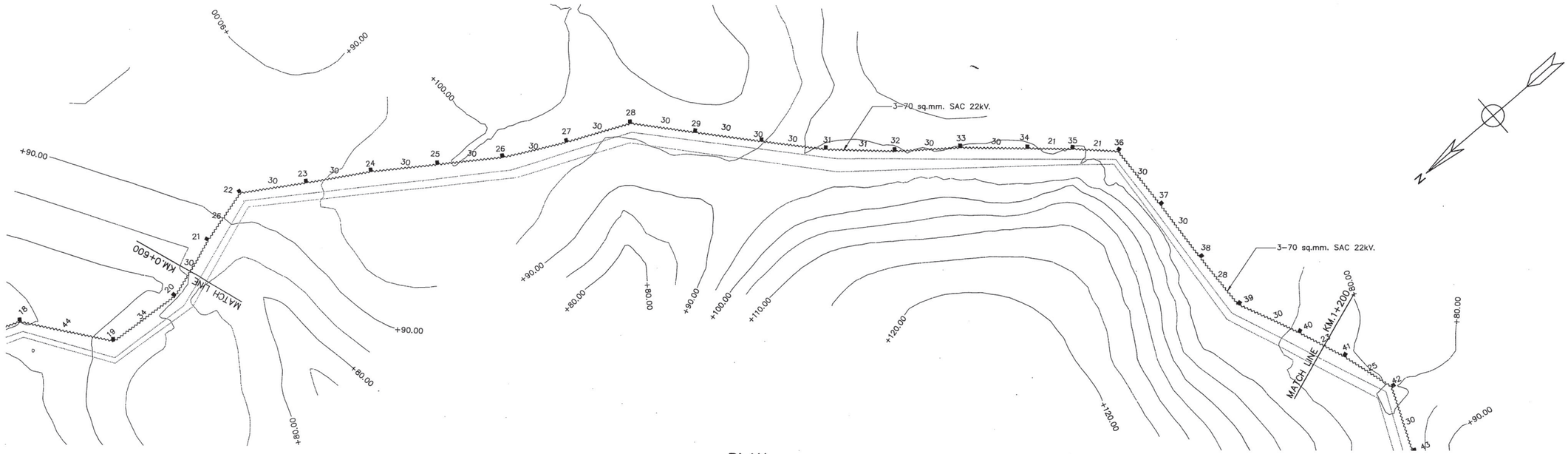
NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

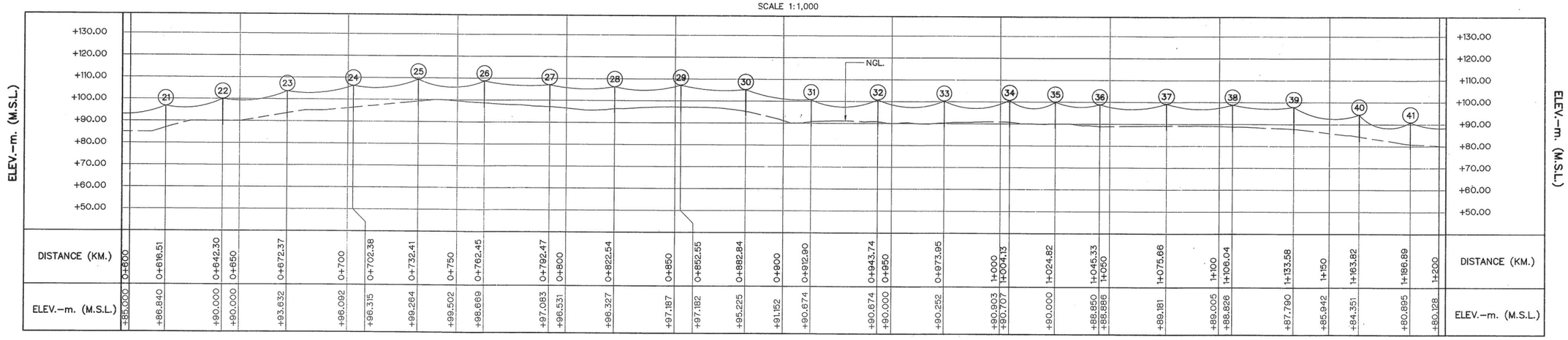
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22 kV., PLAN AND PROFILE, KM. 0+000 TO KM. 0+600

PCM P&C MANAGEMENT CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED S.Kitichai
DESIGNED (signature) วฟก.604	SUBMITTED (signature)
DRAWN (signature)	RECOMMENDED (signature)
CHECKED (signature) วฟก.604	APPROVED (signature)
PROJECT MANAGER (signature) DATE 17/03/2020	DRAWING NO. KTP2–TS–02 SHEET NO. 81 OF 97



PLAN
SCALE 1:1,000



DISTANCE (KM.)	0+600	0+616.51	0+642.30	0+650	0+672.37	0+700	0+702.38	0+732.41	0+750	0+762.45	0+792.47	0+800	0+822.54	0+850	0+852.55	0+882.84	0+900	0+912.90	0+943.74	0+950	0+973.95	1+000	1+004.13	1+024.82	1+045.33	1+050	1+075.66	1+100	1+106.04	1+133.58	1+150	1+163.82	1+186.89	1+200	DISTANCE (KM.)
ELEV.–m. (M.S.L.)	+85.000	+86.840	+90.000	+90.000	+93.632	+96.092	+96.315	+98.264	+99.502	+98.669	+97.083	+96.531	+96.327	+97.187	+97.182	+95.225	+91.152	+90.674	+90.674	+90.000	+90.252	+90.903	+90.707	+90.000	+88.850	+88.886	+89.181	+89.005	+88.826	+87.780	+85.942	+84.351	+80.895	+80.128	ELEV.–m. (M.S.L.)

PROFILE
HORIZONTAL SCALE 1:1,000
VERTICAL SCALE 1:1,000

TRANSMISSION LINE PROPERTIES

POLE NO.	DISTANCE (METERS)	ACCUMULATIVE DISTANCE (METERS)	QUANTITY										
			POLE TYPE					GUY TYPE					
			A	B	C	D	E	G1	G2	G3	G4	G5	G6
20	30	617			1			1					
21	26	642		1									
22	30	672				1			1				
23	30	702		1									
24	30	732		1									
25	30	762		1									
26	30	792		1				1					
27	30	823		1									
28	30	853		1				1					
29	30	883		1									
30	30	913		1									
31	31	944		1									
32	30	974		1				1					
33	30	1,004		1									
34	21	1,025		1									
35	21	1,045		1									
36	30	1,076			1				1				
37	30	1,106		1									
38	28	1,134		1									
39	30	1,164		1				1					
40	23	1,187		1									
41	25	1,212			1								

NOTES:
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. THE DRAWING IS DESIGNED FOR GUIDE LINE ONLY,
   THE CONTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATION

LEGENDS :
1. 22 kV. SPACE AERIAL CABLE
2. EXISTING 22 kV. PEA. OVERHEAD TRANSMISSION LINE
3. NEW 12M. CONCRETE POLE
4. EXISTING 12M. CONCRETE POLE
5. REMOVE 12M. CONCRETE POLE
6. 3 – 100A. FUSE CUTOUT 22 kV.
7. GUY
8. LOAD BREAK SWITCH, SF6, 630A, 22KV. WITH AUTOMATIC REMOTE CONTORLLED
9. DISCONNECTING SWITCH 600A, 22KV.

REFERENCE DRAWINGS :

1. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 0+000 TO KM. 0+600	KTP2–TS–02
2. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 1+200 TO KM. 1+800	KTP2–TS–04
3. TRANSMISSION LINE, 22 kV., POLE TYPE "A" AND "B"	KTP2–TS–12
4. TRANSMISSION LINE, 22 kV., POLE TYPE "C" AND "D"	KTP2–TS–13
5. TRANSMISSION LINE, 22 kV., POLE TYPE "E"	KTP2–TS–14
6 TRANSMISSION LINE, 22 kV., TYPE OF ANCHOR GUY	KTP2–TS–15

0 10 20 30 40 50 60 70 80
SCALE 1:1,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22 kV., PLAN AND PROFILE, KM. 0+600 TO KM. 1+200

PCM P&C MANAGEMENT CO.,LTD.

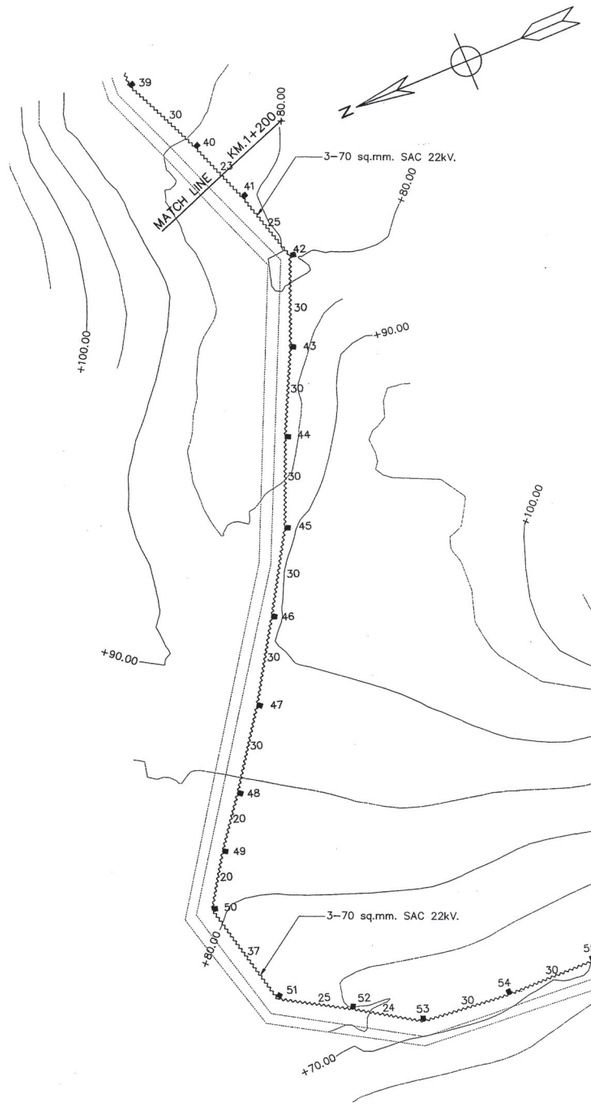
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วิฑูรย์	REVIEWED	S. Kitichai
DRAWN		SUBMITTED	
CHECKED	วิฑูรย์	RECOMMENDED	
		APPROVED	

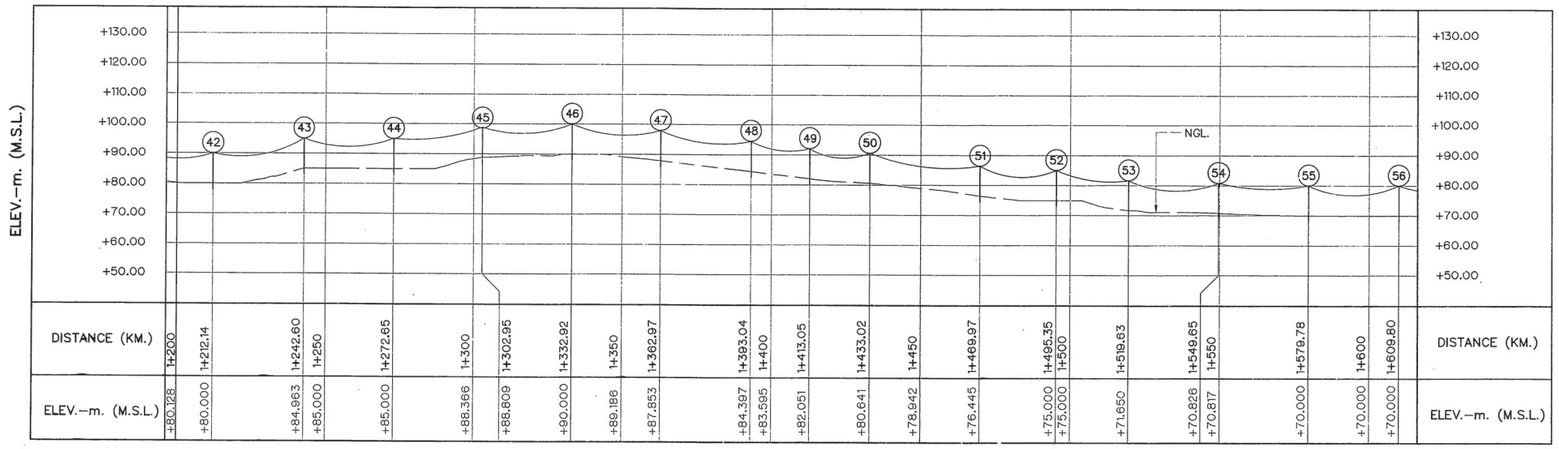
PROJECT MANAGER 17/03/2020 DATE

DRAWING NO. KTP2–TS–03

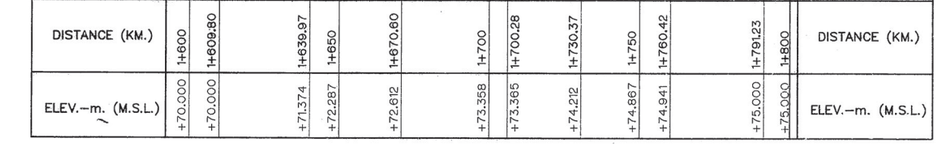
SHEET NO. 82 OF 97



PLAN
SCALE 1:1,000



PROFILE
HORIZONTAL SCALE 1:1,000
VERTICAL SCALE 1:1,000



PROFILE
HORIZONTAL SCALE 1:1,000
VERTICAL SCALE 1:1,000

TRANSMISSION LINE PROPERTIES

POLE NO.	DISTANCE (METERS)	ACCUMULATIVE DISTANCE (METERS)	QUANTITY										
			POLE TYPE					GUY TYPE					
			A	B	C	D	E	G1	G2	G3	G4	G5	G6
41	25	1,212			1								
42	30	1,243		1					1				
43	30	1,273		1									
44	30	1,303			1								
45	30	1,333		1				1					
46	30	1,363		1									
47	30	1,393		1									
48	20	1,413		1									
49	20	1,433		1									
50	37	1,470				1			1				
51	25	1,495			1				1				
52	24	1,520		1									
53	30	1,550			1			1					
54	30	1,580		1									
55	30	1,610		1				1					
56	30	1,640		1									
57	31	1,671		1									
58	30	1,700		1									
59	30	1,730		1									
60	30	1,760		1									
61	31	1,791		1					1				
62	25	1,816		1									

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. THE DRAWING IS DESIGNED FOR GUIDE LINE ONLY,
   THE CONTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATION

REFERENCE DRAWINGS :

1. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 0+600 TO KM. 1+200	KTP2–TS–03
2. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 1+800 TO KM. 2+400	KTP2–TS–05
3. TRANSMISSION LINE, 22 kV., POLE TYPE "A" AND "B"	KTP2–TS–12
4. TRANSMISSION LINE, 22 kV., POLE TYPE "C" AND "D"	KTP2–TS–13
5. TRANSMISSION LINE, 22 kV., POLE TYPE "E"	KTP2–TS–14
6 TRANSMISSION LINE, 22 kV., TYPE OF ANCHOR GUY	KTP2–TS–15

LEGENDS :

1. 22 kV. SPACE AERIAL CABLE
2. EXISTING 22 kV. PEA. OVERHEAD TRANSMISSION LINE
3. NEW 12M. CONCRETE POLE
4. EXISTING 12M. CONCRETE POLE
5. REMOVE 12M. CONCRETE POLE
6. 3 – 100A. FUSE CUTOUT 22 kV.
7. GUY
8. LOAD BREAK SWITCH, SF6, 630A, 22KV. WITH AUTOMATIC REMOTE CONTORLLED
9. DISCONNECTING SWITCH 600A, 22KV.

0 10 20 30 40 50 60 70 80
SCALE 1:1,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS | DEDE

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

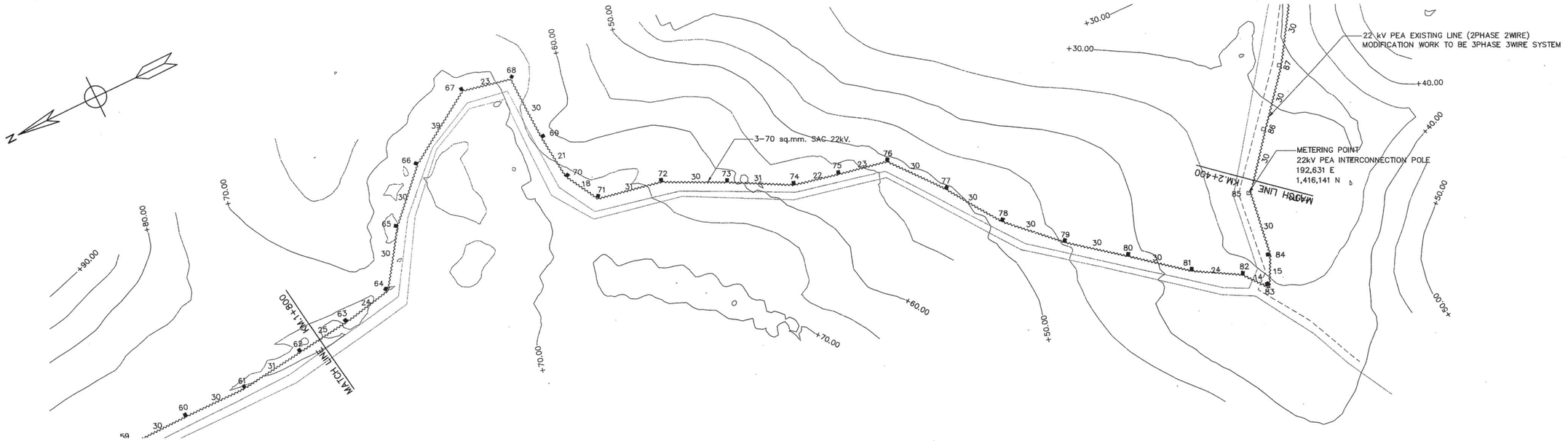
PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22 kV., PLAN AND PROFILE, KM. 1+200 TO KM. 1+800

P&C MANAGEMENT CO.,LTD.

DESIGNED	วิทัน.604	SUBMITTED
DRAWN		RECOMMENDED
CHECKED	วิทัน.604	APPROVED
PROJECT MANAGER	17/03/2020 DATE	

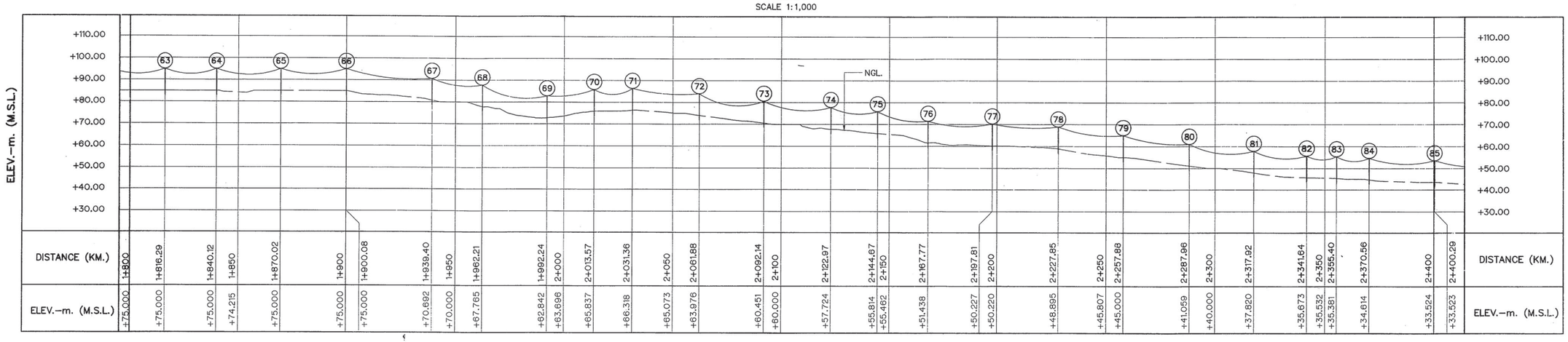
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED S. Kitichai

DRAWING NO. KTP2–TS–04
SHEET NO. 83 OF 97



PLAN

SCALE 1:1,000



PROFILE

HORIZONTAL SCALE 1:1,000
VERTICAL SCALE 1:1,000

TRANSMISSION LINE PROPERTIES

POLE NO.	DISTANCE (METERS)	ACCUMULATIVE DISTANCE (METERS)	QUANTITY										
			POLE TYPE					GUY TYPE					
			A	B	C	D	E	G1	G2	G3	G4	G5	G6
62	25	1,816		I									
63	24	1,840		I									
64	30	1,870			I				I				
65	30	1,900		I				I					
66	39	1,939		I				I					
67	23	1,962			I				I				
68	30	1,992				I						I	
69	21	2,014		I									
70	18	2,031			I			I					
71	31	2,062			I				I				
72	30	2,092		I				I					
73	31	2,123		I									
74	22	2,145		I				I					
75	23	2,168		I									
76	30	2,198		I					I				
77	30	2,228		I									
78	30	2,258		I				I					
79	30	2,288		I				I					
80	30	2,318		I									
81	24	2,342		I				I					
82	14	2,355				I		I					
83	15	2,371			I								
84	30	2,400			I			I					
85	30	2,430			I								

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. THE DRAWING IS DESIGNED FOR GUIDE LINE ONLY,
   THE CONTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATION

LEGENDS :

1. 22 kV. SPACE AERIAL CABLE
2. EXISTING 22 kV. PEA. OVERHEAD TRANSMISSION LINE
3. NEW 12M. CONCRETE POLE
4. EXISTING 12M. CONCRETE POLE
5. REMOVE 12M. CONCRETE POLE
6. 3 – 100A. FUSE CUTOUT 22 kV.
7. GUY
8. LOAD BREAK SWITCH, SF6, 630A, 22KV. WITH AUTOMATIC REMOTE CONTORLLED
9. DISCONNECTING SWITCH 600A, 22KV.

REFERENCE DRAWINGS :

1. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 1+200 TO KM. 1+800	KTP2–TS–04
2. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 2+400 TO KM. 3+000	KTP2–TS–06
3. TRANSMISSION LINE, 22 kV., POLE TYPE "A" AND "B"	KTP2–TS–12
4. TRANSMISSION LINE, 22 kV., POLE TYPE "C" AND "D"	KTP2–TS–13
5. TRANSMISSION LINE, 22 kV., POLE TYPE "E"	KTP2–TS–14
6 TRANSMISSION LINE, 22 kV., TYPE OF ANCHOR GUY	KTP2–TS–15

0 10 20 30 40 50 60 70 80
SCALE 1:1,000 METERS

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE

TRANSMISSION LINE

22 kV., PLAN AND PROFILE, KM. 1+800 TO KM. 2+400

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS: PCM P&C MANAGEMENT CO.,LTD.

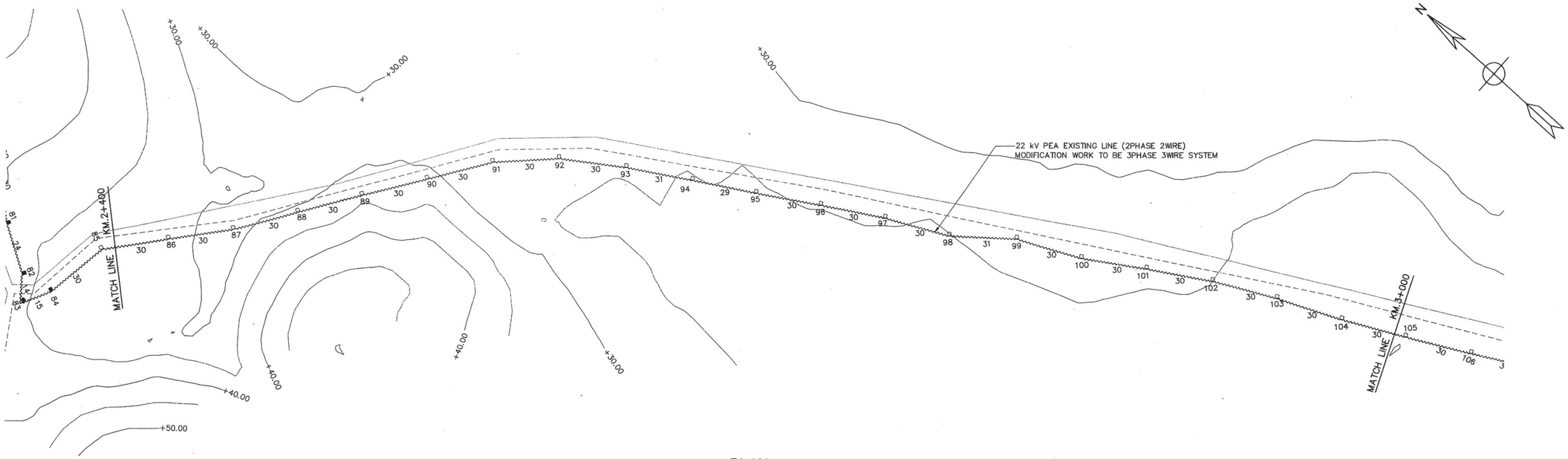
DEDE: Department of Alternative Energy Development and Efficiency, MINISTRY OF ENERGY

DESIGNED	วพ.604	REVIEWED	S.Kitichai
DRAWN		SUBMITTED	
CHECKED	วพ.604	RECOMMENDED	
		APPROVED	

PROJECT MANAGER — DATE 17/03/2020

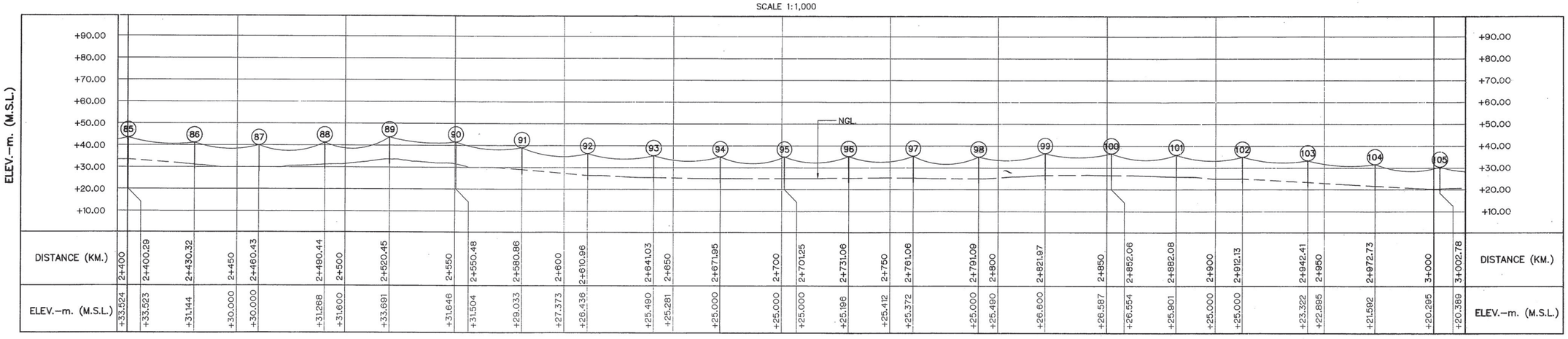
DRAWING NO. KTP2–TS–05

SHEET NO. 84 OF 97



PLAN

SCALE 1:1,000



PROFILE

HORIZONTAL SCALE 1:1,000
VERTICAL SCALE 1:1,000

TRANSMISSION LINE PROPERTIES

POLE NO.	DISTANCE (METERS)	ACCUMULATIVE DISTANCE (METERS)	QUANTITY										
			POLE TYPE					GUY TYPE					
			A	B	C	D	E	G1	G2	G3	G4	G5	G6
84	30	2,400			I			I					
85	30	2,430			1								
86	30	2,460		I									
87	30	2,490		I				I					
88	30	2,520		1									
89	30	2,550		1									
90	30	2,581		1									
91	30	2,611		1				I					
92	30	2,641		I				I					
93	31	2,672		1									
94	29	2,701		1									
95	30	2,731		1									
96	30	2,761		I									
97	30	2,791		I									
98	31	2,822		1				I					
99	30	2,852		1				I					
100	30	2,882		1				I					
101	30	2,912		1									
102	30	2,942		I									
103	30	2,973		I									
104	30	3,003		I									
105	30	3,033		I									

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. THE DRAWING IS DESIGNED FOR GUIDE LINE ONLY,
   THE CONTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATION

LEGENDS :

1. 22 kV. SPACE AERIAL CABLE
2. EXISTING 22 kV. PEA. OVERHEAD TRANSMISSION LINE
3. NEW 12M. CONCRETE POLE
4. EXISTING 12M. CONCRETE POLE
5. REMOVE 12M. CONCRETE POLE
6. 3 – 100A. FUSE CUTOUT 22 kV.
7. GUY
8. LOAD BREAK SWITCH, SF6, 630A, 22KV. WITH AUTOMATIC REMOTE CONTORLLED
9. DISCONNECTING SWITCH 600A, 22KV.

REFERENCE DRAWINGS :

1. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 1+800 TO KM. 2+400	KTP2–TS–05
2. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 3+000 TO KM. 3+600	KTP2–TS–07
3. TRANSMISSION LINE, 22 kV., POLE TYPE "A" AND "B"	KTP2–TS–12
4. TRANSMISSION LINE, 22 kV., POLE TYPE "C" AND "D"	KTP2–TS–13
5. TRANSMISSION LINE, 22 kV., POLE TYPE "E"	KTP2–TS–14
6 TRANSMISSION LINE, 22 kV., TYPE OF ANCHOR GUY	KTP2–TS–15

0 10 20 30 40 50 60 70 80
SCALE 1:1,000 METERS

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE

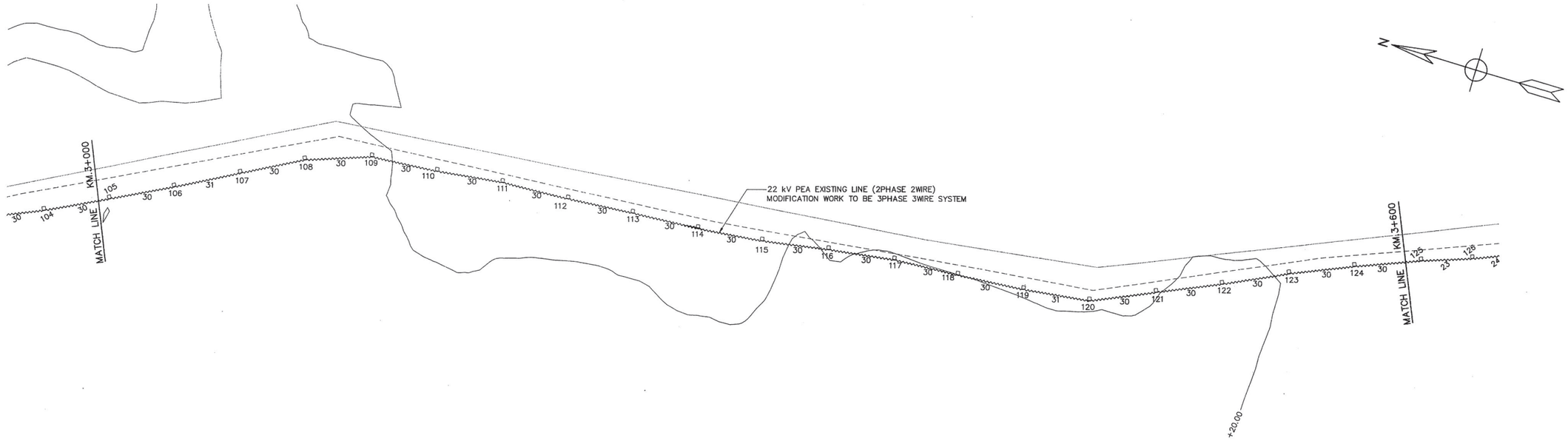
TRANSMISSION LINE

22 kV., PLAN AND PROFILE, KM. 2+400 TO KM. 3+000

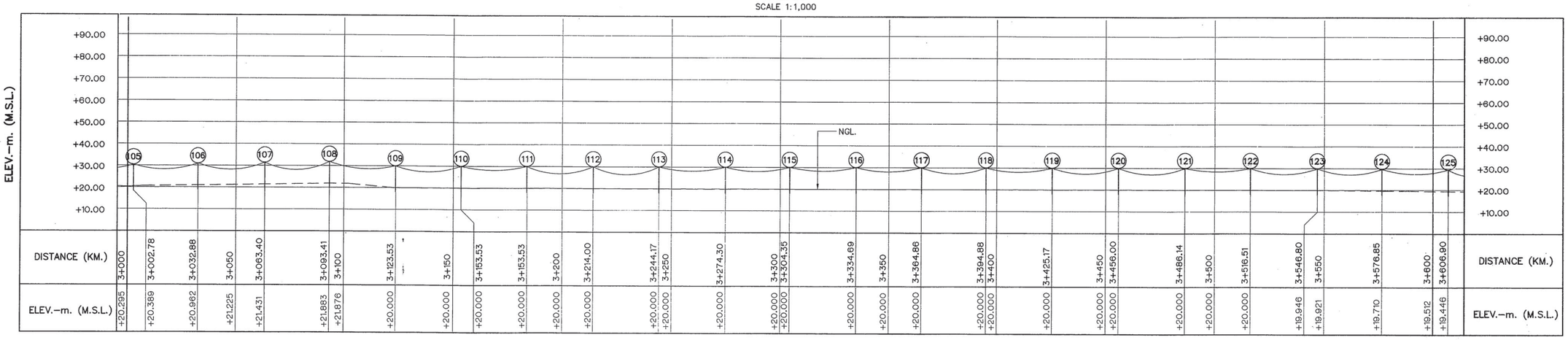
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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1				

CONSULTANTS: P&C MANAGEMENT CO.,LTD.
DEDE: Department of Alternative Energy Development and Efficiency, MINISTRY OF ENERGY

REVIEWED	S. Kitchai		
DESIGNED	วพ.604	SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED	วพ.604	APPROVED	
PROJECT MANAGER	17/03/2020 DATE	DRAWING NO. KTP2–TS–06	SHEET NO. 85 OF 97



PLAN
SCALE 1:1,000



PROFILE
HORIZONTAL SCALE 1:1,000
VERTICAL SCALE 1:1,000

TRANSMISSION LINE PROPERTIES

POLE NO.	DISTANCE (METERS)	ACCUMULATIVE DISTANCE (METERS)	QUANTITY											
			POLE TYPE					GUY TYPE						
			A	B	C	D	E	G1	G2	G3	G4	G5	G6
104	30	3,003		1									
105	30	3,033		1									
106	31	3,063		1									
107	30	3,093		1									
108	30	3,124		1				1					
109	30	3,154		1				1					
110	30	3,184		1				1					
111	30	3,214		1									
112	30	3,244		1									
113	30	3,274		1									
114	30	3,304		1									
115	30	3,335		1									
116	30	3,365		1									
117	30	3,395		1									
118	30	3,425		1									
119	31	3,456		1									
120	30	3,486		1				1					
121	30	3,517		1									
122	30	3,547		1									
123	30	3,577		1									
124	30	3,607		1									
125	23	3,630		1									

NOTES:
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2–GN–03
3. THE DRAWING IS DESIGNED FOR GUIDE LINE ONLY,
   THE CONTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATION

LEGENDS :
1. 22 kV. SPACE AERIAL CABLE
2. EXISTING 22 kV. PEA. OVERHEAD TRANSMISSION LINE
3. NEW 12M. CONCRETE POLE
4. EXISTING 12M. CONCRETE POLE
5. REMOVE 12M. CONCRETE POLE
6. 3 – 100A. FUSE CUTOUT 22 kV.
7. GUY
8. LOAD BREAK SWITCH, SF6, 630A, 22KV. WITH AUTOMATIC REMOTE CONTORLLED
9. DISCONNECTING SWITCH 600A, 22KV.

REFERENCE DRAWINGS :

1. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 2+400 TO KM. 3+000	KTP2–TS–06
2. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. KM. 3+600 TO KM. 3+840.71	KTP2–TS–08
3. TRANSMISSION LINE, 22 kV., POLE TYPE "A" AND "B"	KTP2–TS– 12
4. TRANSMISSION LINE, 22 kV., POLE TYPE "C" AND "D"	KTP2–TS–13
5. TRANSMISSION LINE, 22 kV., POLE TYPE "E"	KTP2–TS–14
6 TRANSMISSION LINE, 22 kV., TYPE OF ANCHOR GUY	KTP2–TS–15

0 10 20 30 40 50 60 70 80
SCALE 1:1,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

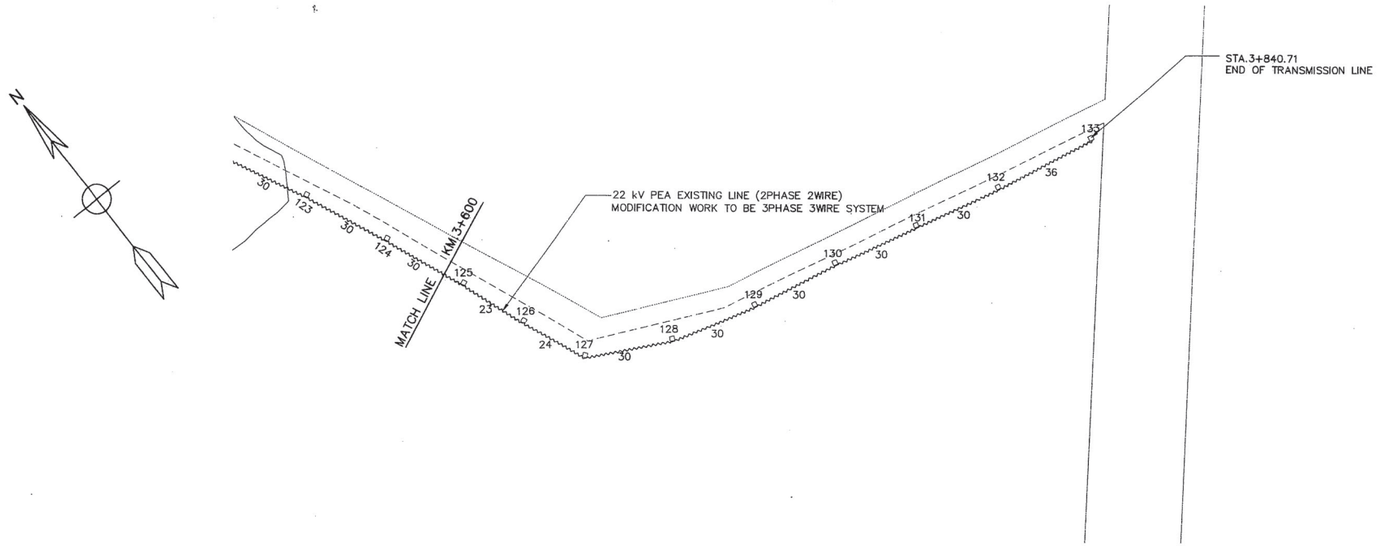
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22 kV., PLAN AND PROFILE, KM. 3+000 TO KM. 3+600

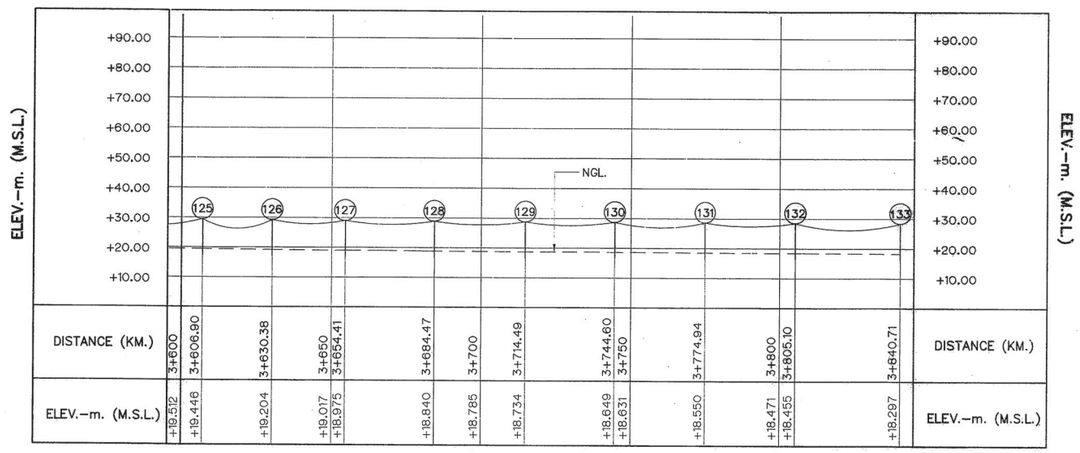
PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

REVIEWED	S. Kitchakul		
DESIGNED	วิฑูรย์	2พ.ค.64	SUBMITTED
DRAWN			RECOMMENDED
CHECKED	วิฑูรย์	2พ.ค.64	APPROVED
PROJECT MANAGER		17/03/2020 DATE	DRAWING NO. KTP2–TS–07
			SHEET NO. 86 OF 97



PLAN
SCALE 1:1,000



PROFILE
HORIZONTAL SCALE 1:1,000
VERTICAL SCALE 1:1,000

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. KTP2-GN-03
3. THE DRAWING IS DESIGNED FOR GUIDE LINE ONLY,
   THE CONTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATION

REFERENCE DRAWINGS :

1. TRANSMISSION LINE, 22 kV., PLAN AND PROFILE, KM. 3+000 TO KM. 3+600	KTP2-TS-07
2. TRANSMISSION LINE, 22 kV., POLE TYPE "A" AND "B"	KTP2-TS-12
3. TRANSMISSION LINE, 22 kV., POLE TYPE "C" AND "D"	KTP2-TS-13
4. TRANSMISSION LINE, 22 kV., POLE TYPE "E"	KTP2-TS-14
5. TRANSMISSION LINE, 22 kV., TYPE OF ANCHOR GUY	KTP2-TS-15

TRANSMISSION LINE PROPERTIES

POLE NO.	DISTANCE (METERS)	ACCUMULATIVE DISTANCE (METERS)	QUANTITY										
			POLE TYPE					GUY TYPE					
			A	B	C	D	E	G1	G2	G3	G4	G5	G6
124	30	3,607		1									
125	23	3,630		1									
126	24	3,654		1									
127	30	3,684			1				1				
128	30	3,714		1				1					
129	30	3,745		1									
130	30	3,775		1									
131	30	3,805		1									
132	36	3,841				1							

LEGENDS :

1. 22 kV. SPACE AERIAL CABLE
2. EXISTING 22 kV. PEA. OVERHEAD TRANSMISSION LINE
3. NEW 12M. CONCRETE POLE
4. EXISTING 12M. CONCRETE POLE
5. REMOVE 12M. CONCRETE POLE
6. 3 – 100A. FUSE CUTOUT 22 kV.
7. GUY
8. LOAD BREAK SWITCH, SF6, 630A, 22KV. WITH AUTOMATIC REMOTE CONTORLLED
9. DISCONNECTING SWITCH 600A, 22KV.

0 10 20 30 40 50 60 70 80
SCALE 1:1,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS | DEDE

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

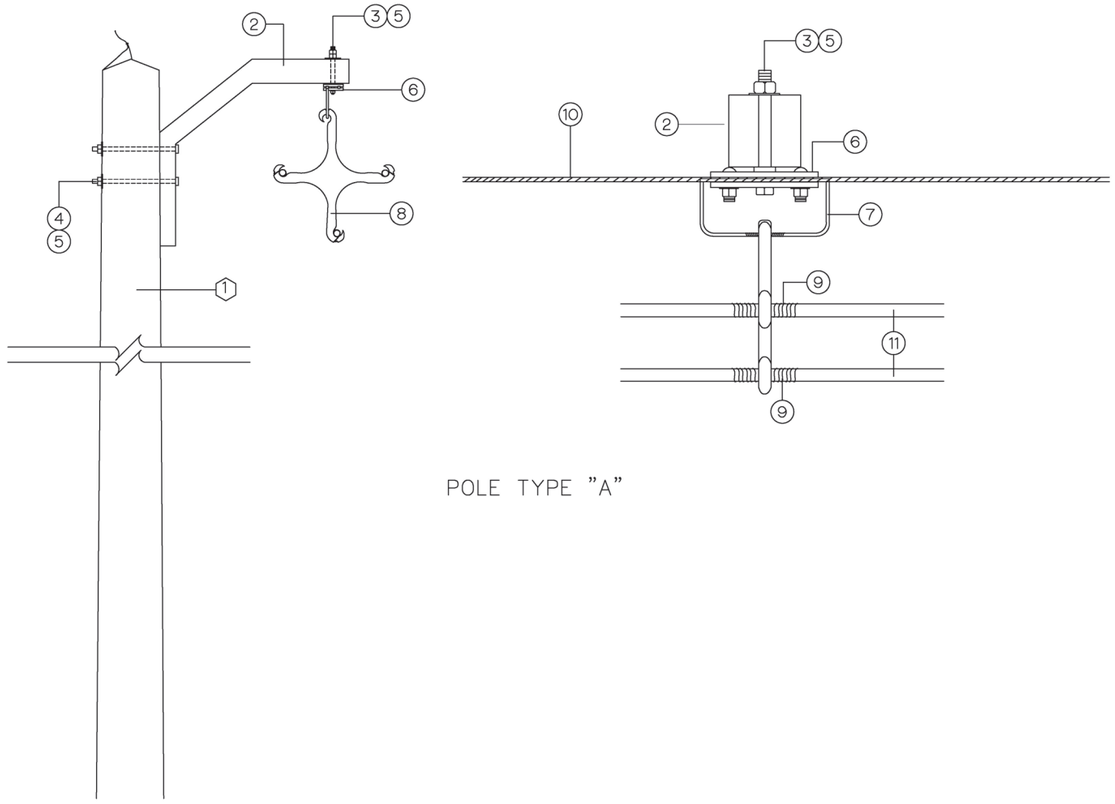
KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22 kV., PLAN AND PROFILE, KM. 3+600 TO KM. 3+840.71

P&C MANAGEMENT CO.,LTD.

DESIGNED	วิทวัส	REVIEWED	S.Kitichai
DRAWN		SUBMITTED	
CHECKED	วิทวัส	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	

DRAWING NO. KTP2-TS-08
SHEET NO. 87 OF 97



POLE TYPE "A"

BILL OF MATERIAL POLE TYPE "A"	
ITEM	DESCRIPTION
1	POLE CONCRETE 12 M.LONG
2	BRACKET FOR AERIAL CABLE FOR STRAIGHT TYPE
3	BOLT,MACHINE, M16x170 mm.
4	BOLT,MACHINE, M16x250 mm.
5	WASHER,SQUARE,FLAT, 52x52x4.5 mm. HOLE Dia.18 mm. TIS 258
6	CLAMP, GUY, TRIPLE BOLT
7	LINK, CABLE SPACER (MADE OF GALV. STEEL Dia. 9 mm.)
8	CABLE SPEACER, 22 KV.
9	TIE WIRE 4.0 sq.mm.
10	WIRE, STEEL STRANDED, 50/7 DIN 48201
11	AERIAL CABLE 70 sq.mm.25 KV.

NOTE :

1. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATIONS.

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22kv., POLE TYPE "A"

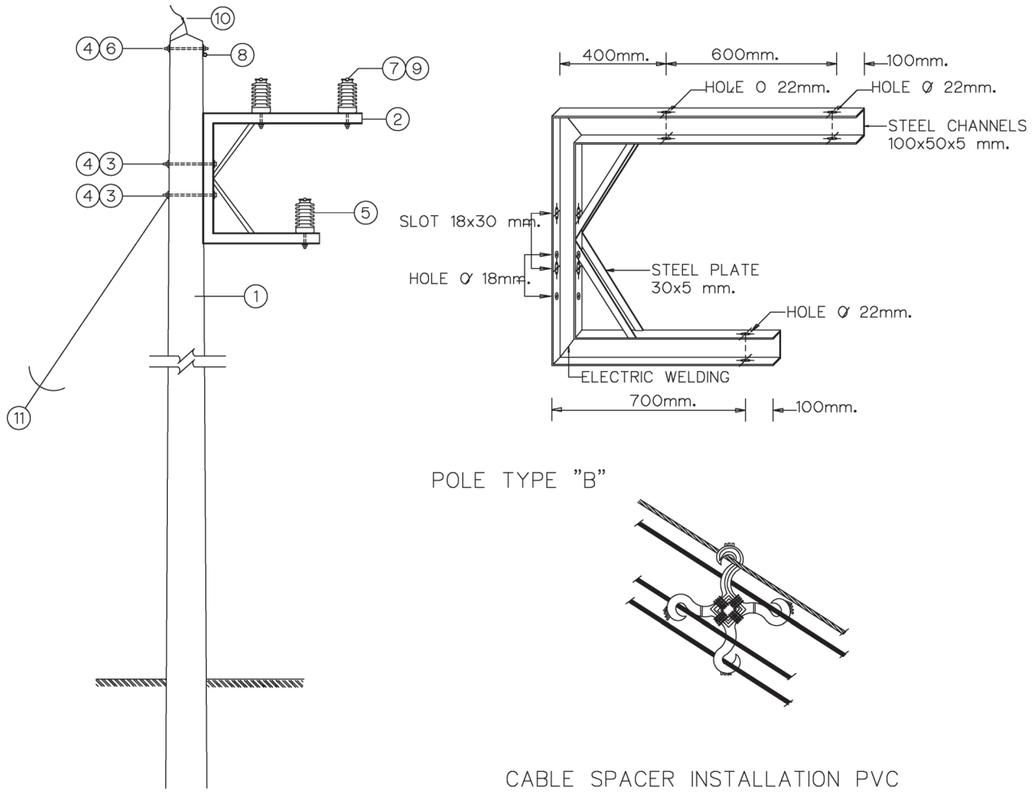
NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

PCM P&C MANAGEMENT CO.,LTD.

DESIGNED วพ.804
DRAWN
CHECKED วพ.804
PROJECT MANAGER 17/03/2020 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED S. Kitichai
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2-TS-09
SHEET NO. 88 OF 97



POLE TYPE "B"

CABLE SPACER INSTALLATION PVC

BILL OF MATERIAL POLE TYPE "B"	
ITEM	DESCRIPTION
1	POLE, CONCRETE 12 M.LONG
2	BRACKET AERIAL CABLE FOR CORNER TYPE
3	BOLT,MACHINE, M16x350 mm.
4	WASHER,SQUARE,FLAT, 52x52x4.5 mm. HOLE Dia. 18 mm. TIS 258
5	INSULATOR,LINE POST TYPE, ANSI C 29.7 CLASS 57-2L
6	GROUND WIRE SUPPORT AND CLAMP FOR CONCRETE POLE
7	AERIAL CABLE 70 sq.mm. 25kV.
8	GROUND WIRE SUPPORT AND STEEL STRANDED 50/7 DIN 48201
9	TIE WIRE 4.0 sq.mm.
10	CLAMP, SINGLE U-BOLT M8
11	GUY (STEEL STARNDARD WIRE 70 Sq.mm.)

NOTE :

1. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATIONS.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS | DEDE

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE

TRANSMISSION LINE

22kV., POLE TYPE "B"

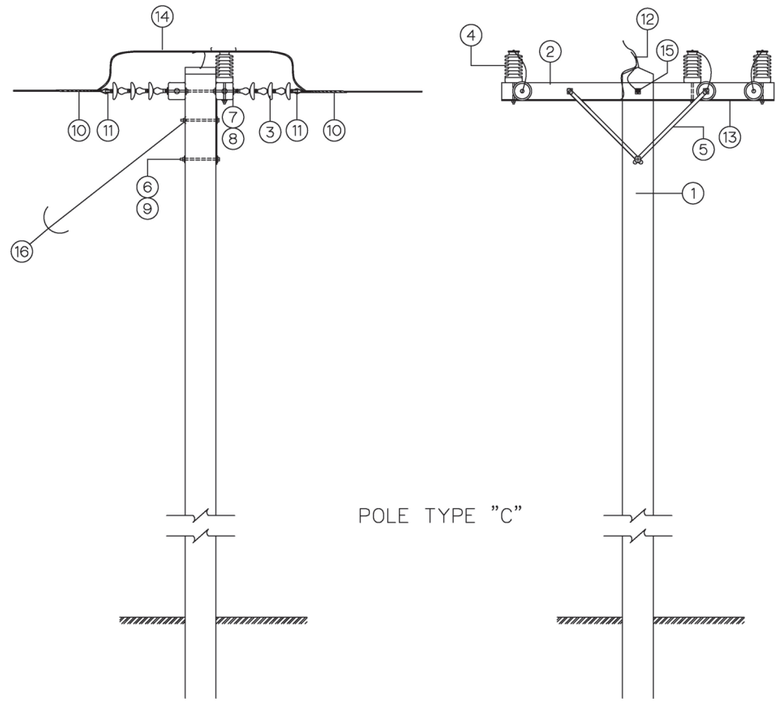
PCM P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED วพ.604 | REVIEWED S. Kitichai
DRAWN | SUBMITTED
CHECKED วพ.604 | RECOMMENDED
PROJECT MANAGER | APPROVED
17/03/2020 DATE

DRAWING NO. KTP2-TS-10

SHEET NO. 89 OF 97



POLE TYPE "C"

BILL OF MATERIAL POLE TYPE "C"	
ITEM	DESCRIPTION
1	POLE CONCRETE 12.0 M. LONG
2	CROSSARM SPUN PRESTERSSED CONCRETE 120x120x2,000 mm.
3	INSULATOR SUSPENSION TYPE TIS 354 TYPE A (CLASS 52-1)
4	INSULATOR LINE POST TYPE ANSI C 29.7 CLASS 57-2L
5	BRACE FLAT FOR CROSSARM 30x6x760 mm.
6	BOLT MACHINE M16x200 mm.
7	BOLT DOUBLE ARMING ROUND EYE M16x450 mm.
8	NUT EYE M 16 DIN 582
9	WASHE SQUARE FLAT 52x52x4.5 mm. HOLE Dia. 18 mm.TIS 258
10	PREFORMED DEAD-END FOR AERIAL CABLE 70 sq.mm.
11	CLEVIS THIMBLE FOR PREFORMED DEAD-END
12	CLAMP SINGLE U-BOLT M 8
13	WIRE STEEL SOLID Dia. 4 MM.
14	AERIAL CABLE 70 sq.mm. 25kV.
15	GROUND WIRE STEEL STRANDED 50/7 DIN 48201
16	GUY (STEEL STANDARD WIRE 70 Sq.mm.)

NOTE :

1. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATIONS.

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE

TRANSMISSION LINE

22kV., POLE TYPE "C"

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

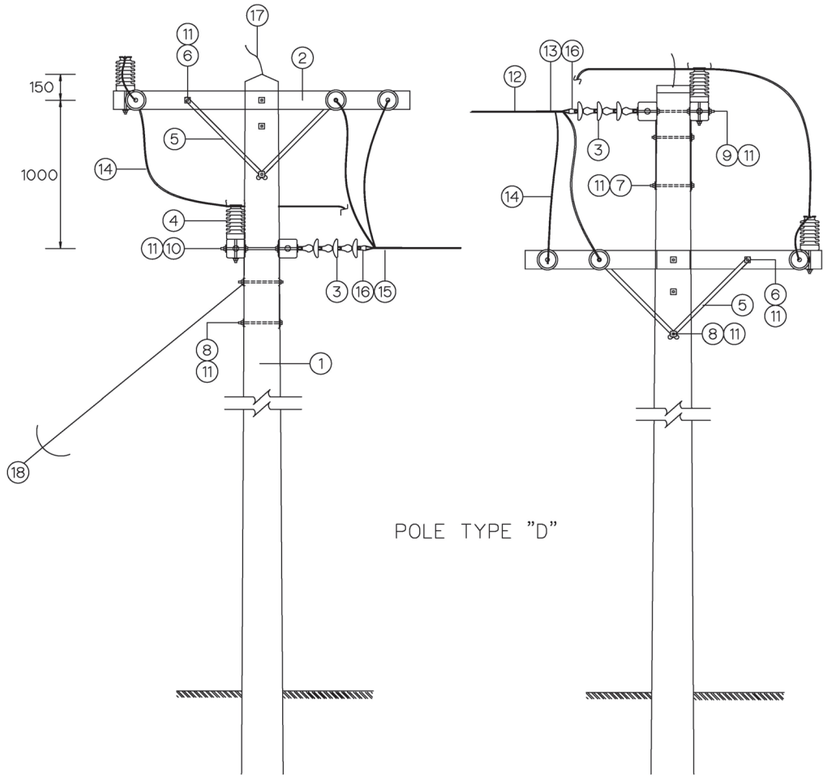
PCM P&C MANAGEMENT CO.,LTD.

DESIGNED วพ.604
DRAWN
CHECKED วพ.604
PROJECT MANAGER 17/03/2020 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED S. Kitichai
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2-TS-11
SHEET NO. 90 OF 97



POLE TYPE "D"

BILL OF MATERIAL POLE TYPE "D"	
ITEM	DESCRIPTION
1	POLE CONCRETE 12 M.LONG
2	CROSSARM SPUN PRESTERSSED CONCRETE 120x120x2,000 mm.
3	INSULATOR SUSPENSION TYPE TIS 354 TYPE A (CLASS 52-1)
4	INSULATOR LINE POST TYPE ANSI C 29.7 CLASS 57-2L
5	BRACE FLAT FOR CROSSARM 30x6x760 mm.
6	BOLT MACHINE M16x170 mm.
7	BOLT MACHINE M16x200 mm.
8	BOLT MACHINE M16x250 mm.
9	BOLT DOUBLE ARMING ROUND EYE M16x450 mm.
10	BOLT DOUBLE ARMING ROUND EYE M16x500 mm.
11	WASHER SQUARE FLAT 52x52x4.5 mm. HOLE Dia.18 mm. TIS 258
12	AERIAL CABLE 70 sq.mm. 25 kV.
13	PERFOR DEAD-END FOR AERIAL CABLE 70 sq.mm.
14	AERIAL CABLE 70 sq.mm. 25 kV.
15	PERFOR DEAD-END FOR AERIAL CABLE 70 sq.mm.
16	CLEVIS THIMBLE FOR PERFORMED DEAD-END
17	CLAMP SINGLE U-BOLT M 8
18	GUY (STEEL STARNDARD WIRE 70 Sq.mm.)

NOTE :

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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22kV., POLE TYPE "D"

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

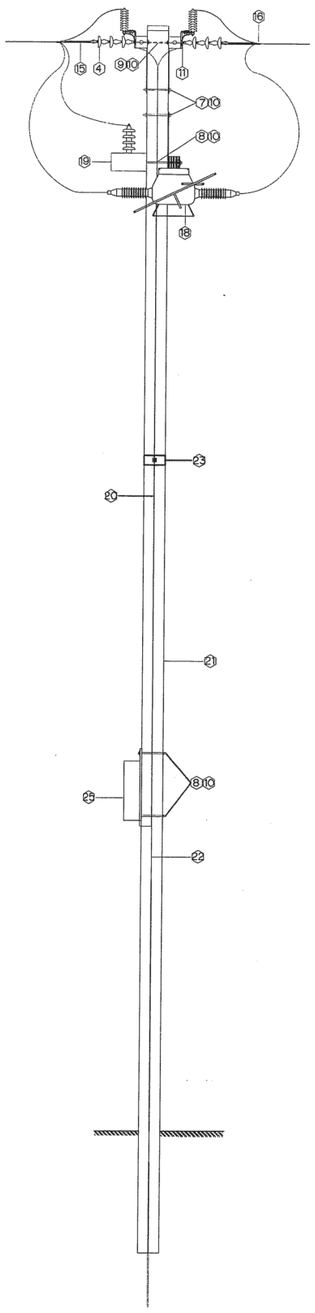
CONSULTANTS | DEDE

PCM P&C MANAGEMENT CO.,LTD.

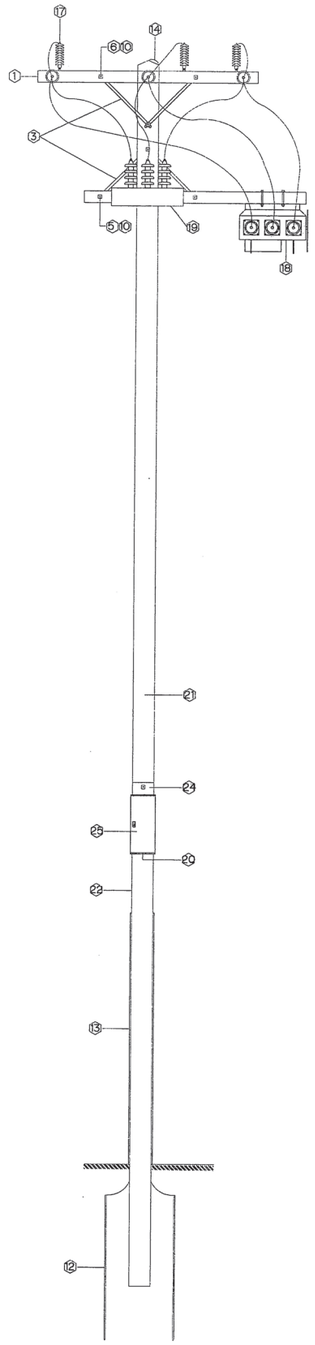
DESIGNED วิทวัส 2พ.ค.64
DRAWN
CHECKED วิทวัส 2พ.ค.64
PROJECT MANAGER 17/03/2020 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED S. Kitichai
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2-TS-12
SHEET NO. 91 OF 97

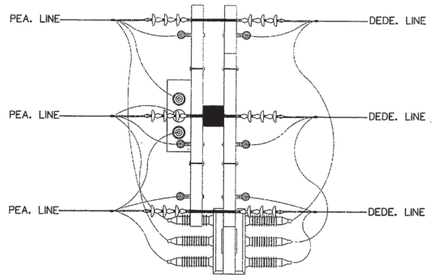


SIDE VIEW



FRONT VIEW

POLE TYPE "E"



TOP VIEW

BILL OF MATERIAL POLE TYPE "E"	
ITEM	DESCRIPTION
1	CROSS ARM, SPUN, PRESTRESSED CONCRETE 120X120x2,000 mm.
2	STEEL, SQUARE, 100x3.2 mm., 2,000 mm. LONG
3	BRACE, FLAT FOR CROSS ARM 30X6X760 mm.
4	INSULATOR, SUSPENSION (TYPE D TIS.354) TYPE (CLASS 52-3)
5	BOLT, MACHINE M.16X130 mm. COMPLETE WITH SQUARE NUT
6	BOLT, MACHINE M.16X170 mm. COMPLETE WITH SQUARE NUT
7	BOLT, MACHINE M.16X250 mm. COMPLETE WITH SQUARE NUT
8	BOLT, MACHINE M.16X300 mm. COMPLETE WITH SQUARE NUT
9	BOLT, DOUBLE ARMING, ROUND EYE M.16X450 mm. COMPLETE WITH SQUARE NUT
10	WASHER, SQUARE, FLAT 50X50X5 mm. HOLE Dia.18 mm.
11	NUT, EYE M.16 DIN 582
12	ROD, GROUND, 60X60X5 mm. LONG
13	CONDUIT, PVC, RIGID, Dia. 20X2,500 mm. TIS.216
14	CLAMP, SINGLE U-BOLT, M.8 (WIRE ROPE CLIP)
15	PREFORMED DEAD-END, FOR AERIAL CABLE 25 KV. 70 sq.mm.
16	CONNECTOR, PARALLEL GROOVE, TRIPLE BOLT, AL. 70-185 sq.mm.
17	LIGHTING ARRESTER 21KV. 10 KA.
18	LOAD BREAK SWITCH, SF6, 630A, 24KV.
19	TRANSFORMER, VOLTAGE 3 PHASE, OUTDOOR, RATIO 22,000/400 V., 10 VA.
20	CONTROL CABLE
21	POLE, CONCRETE, 12 m. LONG
22	WIRE, STEEL STRANDED 50/7 sq.mm. TIS.404
23	PLATE, WOOD, SIZE 2X20X30 cm.
24	PLATE, WOOD, SIZE 2X20X60 cm.
25	CONTROL UNIT, AUTOMATIC REMOTE CONTORLLED, FOR SF6

NOTE :

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NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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CONSULTANTS | DEDE

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE

TRANSMISSION LINE

22kV., POLE TYPE "E"

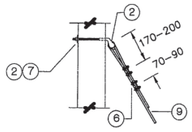
P&C MANAGEMENT CO.,LTD.

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DRAWN
CHECKED วท.604
17/03/2020
PROJECT MANAGER DATE

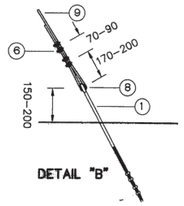
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED S. kitichai
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2-TS-13
SHEET NO. 92 OF 97

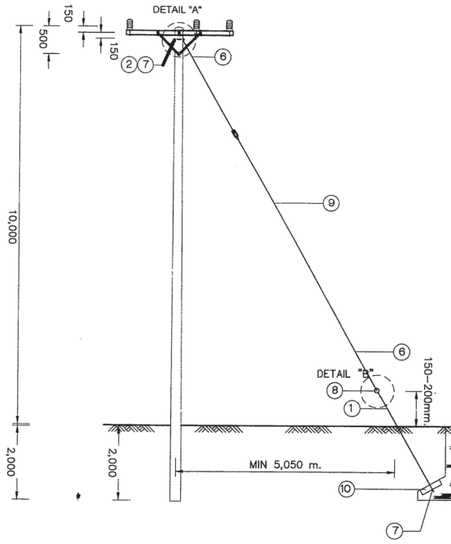
METHOD OF SINGLE ANCHOR GUY



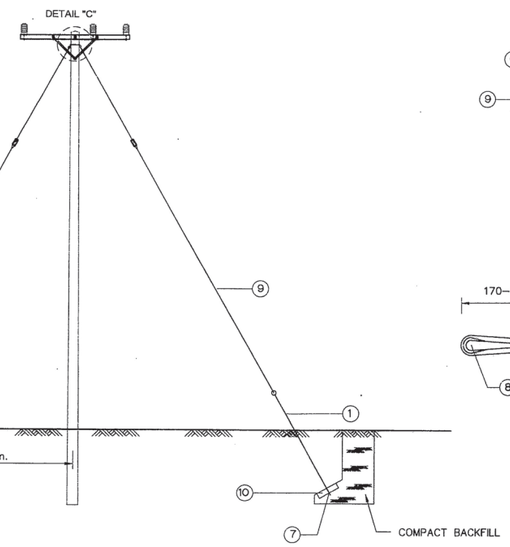
DETAIL "A"

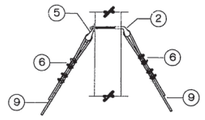


DETAIL "B"

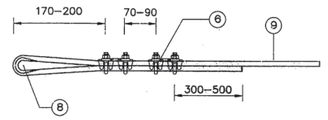


METHOD OF DOUBLE ANCHOR GUY

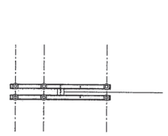




DETAIL "C"



DETAIL "D"



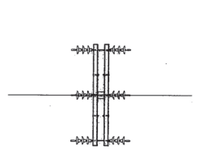
G1

SIDE GUY 5°– 30°



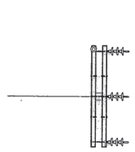
G2

SIDE GUY 30°– 60°



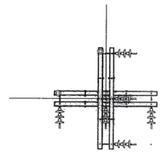
G3

LINE GUY



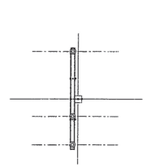
G4

DEAD END GUY



G5

BUCK ARM, 60°– 90°
DEAD END GUY



G6

FIXED OR STORM GUY

BILL OF MATERIAL FOR ANCHOR GUY

ITEM	DESCRIPTION	REQ'D					
		G1	G2	G3	G4	G5	G6
1	ANCHOR ROD, M. 16 x 2,000 mm. COMPLETE WITH SQUARE NUT	1	2	2	1	2	4
2	BOLT, SINGLE STRANDED EYE 45° M. 16 x 250 mm. COMPLETE WITH SQUARE NUT	1	1	1	1	2	2
3	BOLT, SINGLE STRANDED EYE 30° M. 16 x 250 mm. COMPLETE WITH SQUARE NUT	–	1	–	1	2	–
4	BOLT, DOUBLE ARMING, ROUND EYE, M. 16 x 200 mm. COMPLETE WITH SQUARE NUT	–	–	–	–	–	–
5	STRAND EYE SINGLE ANGLE 45°	–	–	1	–	–	2
6	CLAMP, DOUBLE U–BOLT, M. 16 mm.	4	8	8	8	16	16
7	WASHER, SQUARE FLAT 50 x 50 x 5 mm. HOLE Ø18 mm.	2	2	2	4	6	4
8	GUY, THIMBLE, FOR STEEL STRANDED WIRE 50 Sq.mm.	1	2	2	2	4	4
9	STEEL STRANDED WIRE 50 Sq.mm.	15 m.	35 m.	30 m.	35 m.	70	60
10	CONCRETE ANCHOR 550 x 550 x 180 mm.	1	1	2	2	2	4
11	STRAIN INSULATOR CLASS 54–4	1	1	2	2	2	4

NOTE :

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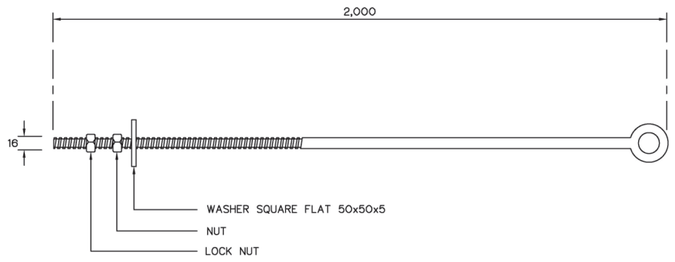
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

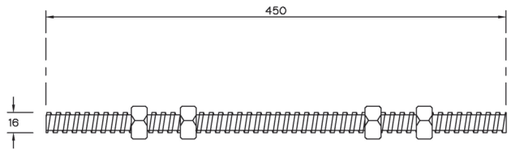
PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22kV., TYPE OF ANCHOR GUY

P&C MANAGEMENT CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED	REVIEWED S.Kritchai
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
PROJECT MANAGER 17/03/2020 DATE	APPROVED
DRAWING NO. KTP2–TS–14	SHEET NO. 93 OF 97



DETAIL OF ANCHOR BOLT FOR GUY WIRE

NOT TO SCALE



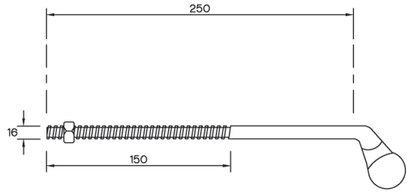
BOLT, DOUBLE ARMING

NOT TO SCALE



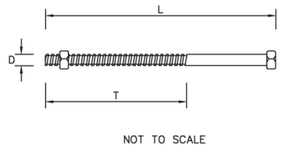
STRAND EYE SINGLE ANGLE 30°

NOT TO SCALE



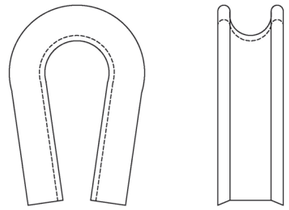
BOLT, SINGLE STRANDED EYE 45°

NOT TO SCALE



NOT TO SCALE

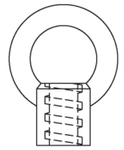
BOLT, MACHINE (D x L)	
1	M. 16 x 130 mm. (T = 35 mm.)
2	M. 16 x 170 mm. (T = 50 mm.)
3	M. 16 x 200 mm. (T = 50 mm.)
4	M. 16 x 250 mm. (T = 75 mm.)
5	M. 16 x 300 mm. (T = 75 mm.)
6	M. 16 x 400 mm. (T = 100 mm.)



GUY THIMBLE

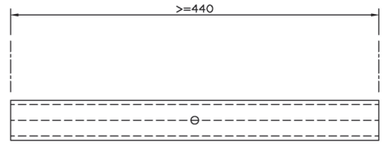
FOR STEEL STRAND GUY WIRE 35Sq.mm.

NOT TO SCALE



NUT EYE

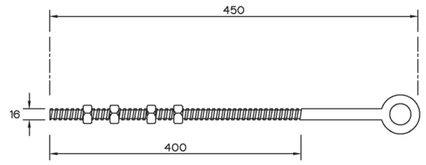
NOT TO SCALE



CONNECTOR, SPLICE, COMPRESSION TYPE

TENSION LOADED FOR PIC(ACSR) 120/8 Sq.mm.

NOT TO SCALE



BOLT, DOUBLE ARMING, ROUND EYE

NOT TO SCALE

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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT

AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE

TRANSMISSION LINE

22kv., POLE ASSEMBLY ACCESSORIES, ANCHOR BOLT FOR GUY

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS: PCM P&C MANAGEMENT CO.,LTD.

DEDE

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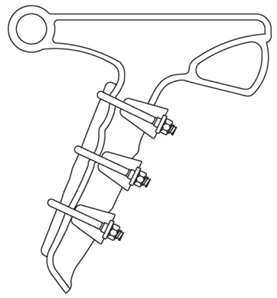
PROJECT MANAGER | 17/03/2020 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

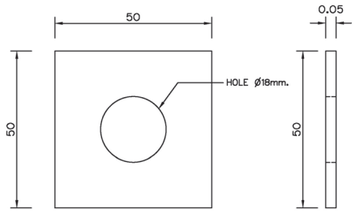
REVIEWED S. Kitichai | SUBMITTED | RECOMMENDED | APPROVED

DRAWING NO. KTP2-TS-15

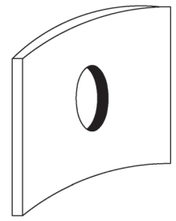
SHEET NO. 94 OF 97



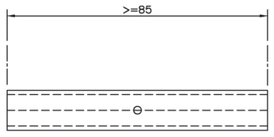
CLAMP, STRAIN, WITH CLAMPING KEEPER
FOR PIC(ACSR) 120/8 Sq.mm.
NOT TO SCALE



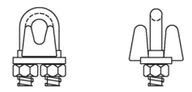
WASHER SQUARE FLAT
NOT TO SCALE



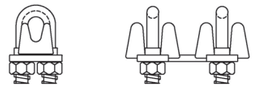
WASHER, CURVE, SQUARE 60x60x5mm.
HOLE Ø22 mm.
NOT TO SCALE



CONNECTOR, SPLICE, COMPRESSION TYPE
TENSIONLESS LOADED FOR PIC(ACSR) 120/8 Sq.mm.
NOT TO SCALE



CLAMP, SINGLE U-BOLT M.8
NOT TO SCALE



CLAMP, SINGLE U-BOLT M.16
NOT TO SCALE

NOTE :

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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22kV., POLE ASSEMBLY ACCESSORIES, ANCHOR BOLT FOR GUY

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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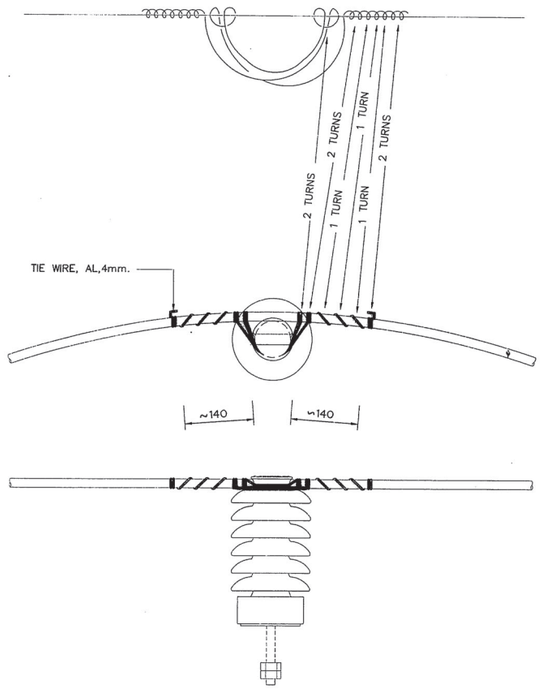
CONSULTANTS: PCM P&C MANAGEMENT CO.,LTD.
DEDE: Department of Alternative Energy Development and Efficiency, MINISTRY OF ENERGY

DESIGNED วท.604
DRAWN
CHECKED วท.604
PROJECT MANAGER 17/03/2020 DATE

REVIEWED S. Kitichai
SUBMITTED
RECOMMENDED
APPROVED

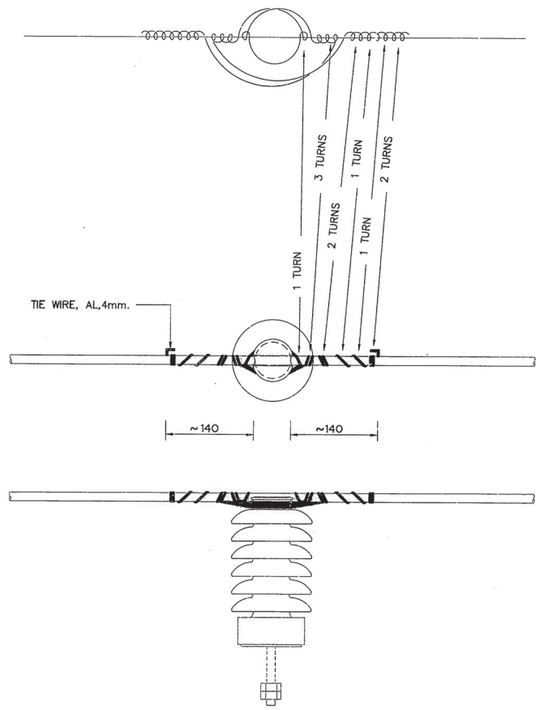
DRAWING NO. KTP2-TS-16
SHEET NO. 95 OF 97

PARTIALLY INSULATED CONDUCTOR TIE,
ON H.T. PIN TYPE INSULATOR
(FOR SIDE GROOVE TIE)

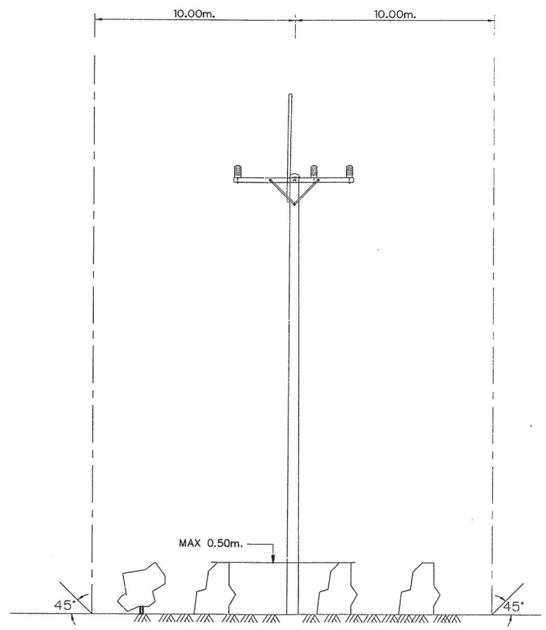


SIDE GROOVE TIE

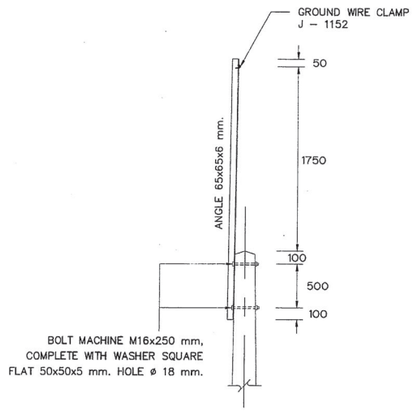
PARTIALLY INSULATED CONDUCTOR TIE,
ON H.T. PIN TYPE INSULATOR
(FOR TOP GROOVE TIE)



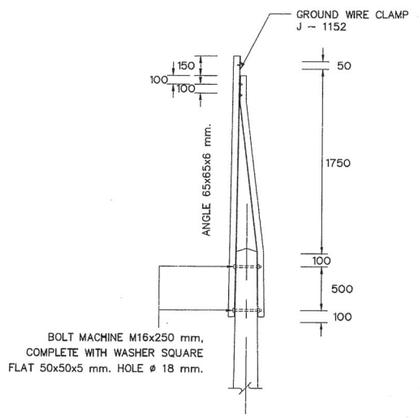
TOP GROOVE TIE



TREE TRIMMING
NOT TO SCALE

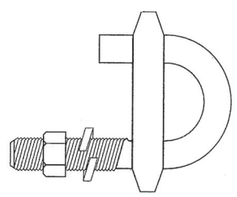


STRAIGHT BAYONET



CORNER BAYONET

OVER HEAD GROUND WIRE BAYONET ASSEMBLY
NOT TO SCALE



GROUND WIRE CLAMP J–1152
NOT TO SCALE

NOTE :

1. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONSTRUCTION DRAWING SHALL CONFORM TO PEA'S STANDARD AND REGULATIONS.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

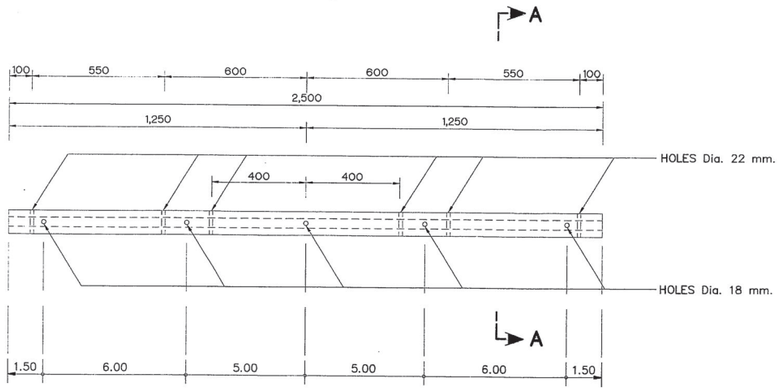
PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22kV., OVERHEAD GROUND WIRE BAYONET ASSEMBLY

PCM P&C MANAGEMENT CO.,LTD.

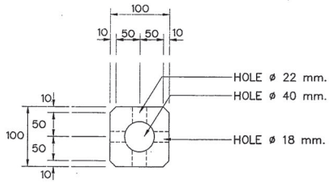
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	27/1.64	REVIEWED	S.Kitichai
DRAWN		SUBMITTED	
CHECKED	27/1.64	RECOMMENDED	
PROJECT MANAGER	17/03/2020 DATE	APPROVED	

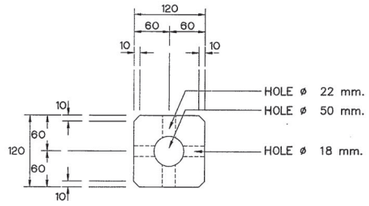
DRAWING NO. KTP2–TS–17
SHEET NO. 96 OF 97



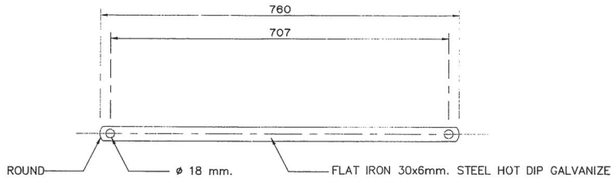
PRESTRESSED CROSS ARM 100x100x2,500mm.



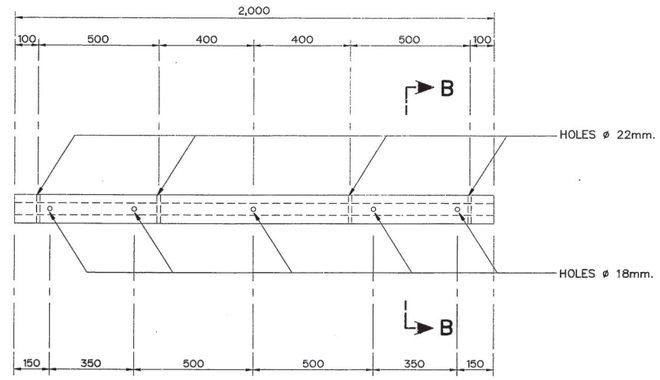
SECTION A–A



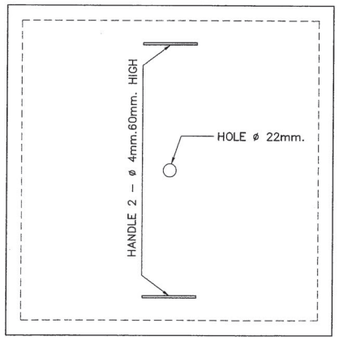
SECTION B–B

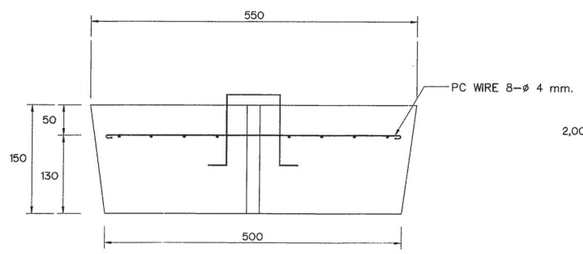


BRECE FLAT FOR CROSS ARM

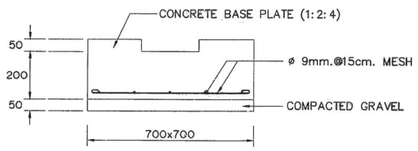


PRESTRESSED CROSS ARM 120X120x2,000mm.

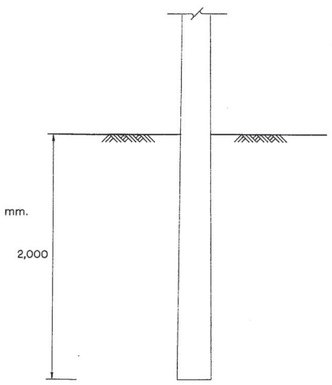




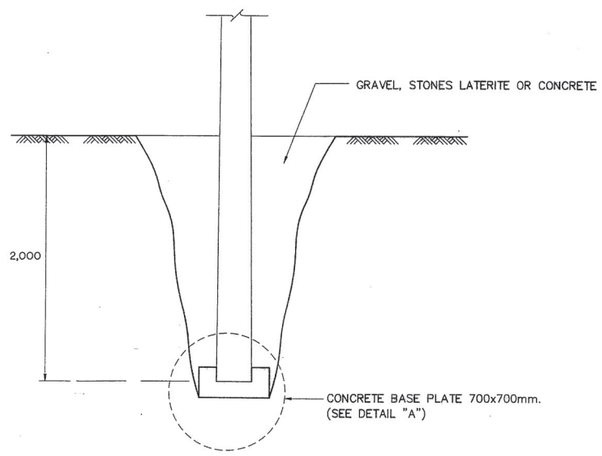
REINFORCED CONCRETE ANCHOR PLATE
550x550x180mm.



DETAIL "A"



FOR NORMAL SOIL CONDITION



POLE WITH CONCRETE BASE PLATE

NOTES :

CONCRETE BASE PLATE WILL BE USE FOR

1. POLES WITH ANCHOR GUY TYPES G5 AND G6
2. POLES CONSTRUCTED ON SOFT SOIL WITH PRESSURE NOT MIN 1 kg/Sq.mm.
3. CONTRACTOR SHALL INVESTIGATE THE SOIL CONDITION FOR EVERY POLES AND VERIFY TO USE CONCRETE BASE PLATE OR NOT. THE INVESTIGATION RESULT SHALL BE SUBMITTED TO FIELD ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION

KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

KLONG THUNG PHEN 2 HYDROPOWER PROJECT
AMPHOE KHAO KHITCHAKUT, CHANGWAT CHANTHABURI

PART 3 : TRANSMISSION LINE
TRANSMISSION LINE
22kV., BURYING DEPTH AND FOUNDATION

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

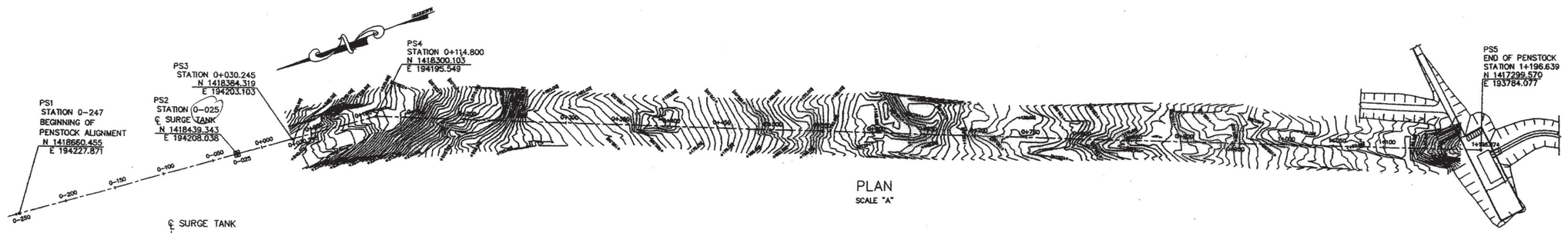
PCM P&C MANAGEMENT CO.,LTD.

DESIGNED วท.604
DRAWN
CHECKED วท.604
PROJECT MANAGER 17/03/2020 DATE

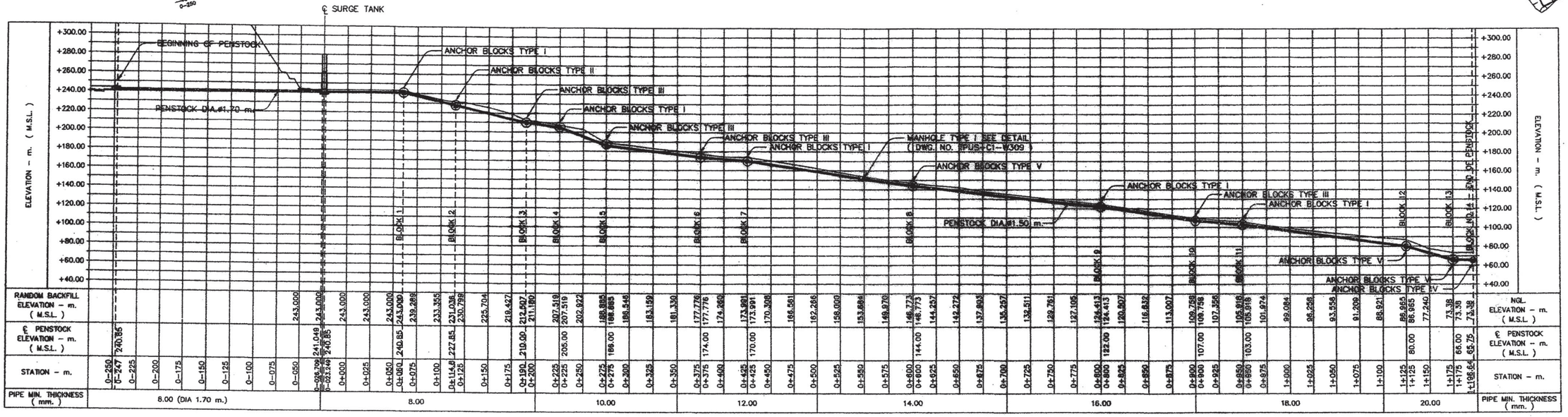
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED S.Kitchkaj
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. KTP2–TS–18
SHEET NO. 97 OF 97

EXISTING STRUCTURE



PLAN
SCALE "A"



LONGITUDINAL SECTION

SCALE "A"

TABLE OF PENSTOCK ALIGNMENT

POINT	DESCRIPTION	COORDINATES		REMARK
		N	E	
PS1	BEGINNING OF PENSTOCK ALIGNMENT	1,418,660.455	194,227,871	PI-12
PS2	℄ SURGE TANK	1,418,439.343	194,208.038	PI-8
PS3	PENSTOCK ALIGNMENT	1,418,384.319	194,203.103	–
PS4	PENSTOCK ALIGNMENT	1,418,300.103	194,195.549	–
PS5	END OF PENSTOCK ALIGNMENT	1,417,299.570	193,784.077	PI-10

TABLE OF DRILL HOLES

DRILL HOLE NO.	LOCATION	COORDINATES		DEPTH (m)	ANGLE
		N	E		
0-1	OUTLET PORTAL	1,418,464.269	194,205.506	30.00	VERTICAL
0-2	PENSTOCK ALIGNMENT	1,418,414.470	194,205.510	30.00	VERTICAL
0-3	OUTLET PORTAL	1,418,452.000	194,239.000	20.00	VERTICAL
0-4	SURGE TANK	1,418,439.370	194,207.740	25.00	VERTICAL
0-5	PENSTOCK ALIGNMENT	1,418,344.750	194,199.250	26.00	VERTICAL
0-6	PENSTOCK ALIGNMENT	1,418,224.368	194,188.455	30.00	VERTICAL
0-7	PENSTOCK ALIGNMENT	1,417,391.500	193,823.930	33.00	VERTICAL
0-8	POWER HOUSE	1,417,298.500	193,774.500	40.00	VERTICAL

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. CONTOURS SHOWN ARE BASED ON MAPS TO THE SCALE 1:400 SURVEYED BY THE CONTACTOR IN DECEMBER 2001.
3. AFTER INSTALLATION OF THE PENSTOCK TO THE APPROVAL OF THE ENGINEER. THE EXCAVATED PENSTOCK TRENCH SHALL BE BACKFILLED TO NATURAL GROUND LEVEL OR AS DIRECTED BY THE ENGINEER. THE TOP OF THE BACKFILL SHALL BE PROTECTED WITH 10 cm TOPSOIL AND SODDING.
4. STEPPED CATCH DRAINS SHALL BE CONNECTED TO THE TOE DRAIN AT THE SURGE TANK AREA AND SHALL BE EXTENDED TO NATURAL GULLIES AND TO THE INTERCEPTION DITCH AT THE POWER STATION AS DIRECTED BY THE ENGINEER.
5. STATIONS ALONG THE PENSTOCK ALIGNMENT ARE MEASURED HORIZONTALLY ALONG THE CENTRE LINE OF THE PENSTOCK.
6. STEEL PLATE FOR PENSTOCK AND PENSTOCK COMPONENTS SHALL COMPLY WITH ASTM A516 GRADE 70.
7. CONCRETE QUALITY FOR ANCHOR BLOCK AT BIFURCATION SHALL BE CLASS B21.
8. THE CONTRACTOR SHALL SUBMIT DETAILED WORKSHOP DRAWINGS FOR APPROVAL BY THE ENGINEER BEFORE MANUFACTURE OF PENSTOCK.
9. ONE CONTROL CABLE AND ONE POWER CABLE FROM THE POWER HOUSE TO THE ULTRASONIC FLOW MEASURING INSTRUMENT IN THE HEADRACE TUNNEL SHALL BE DESIGNED BY THE CONTRACTOR TO THE APPROVAL OF THE ENGINEER.
10. ACCESS ROAD TO SURGE TANK AREA NOT SHOWN.
11. THE DRAWING NO. TPUS-PS-001 PENSTOCK IS CANCELED AND REPLACED BY TPUS-PS-001A
12. ANCHOR BLOCK DETAIL SEE DWG.NO. TPUS-PS-006A

LEGEND:

———— PENSTOCK ALIGNMENT

REFERENCE DRAWINGS:

1.	GENERAL DRAWINGS, PROJECT LAYOUT	TPUS-GD-001
2.	HEADRACE TUNNEL, HEADRACE OUTLET PORTAL EXCAVATION, PLAN AND SECTIONS	TPUS-HT-003
3.	POWER HOUSE, GENERAL LAYOUT	TPUS-PH-001
4.	PENSTOCK, ANCHOR BLOCKS PLAN AND SECTIONS	TPUS-PS-006
5.	PENSTOCK, DRAINAGE ARRANGEMENTS	TPUS-C1-W304
6.	PENSTOCK, TYPICAL MANHOLE	TPUS-C1-W309

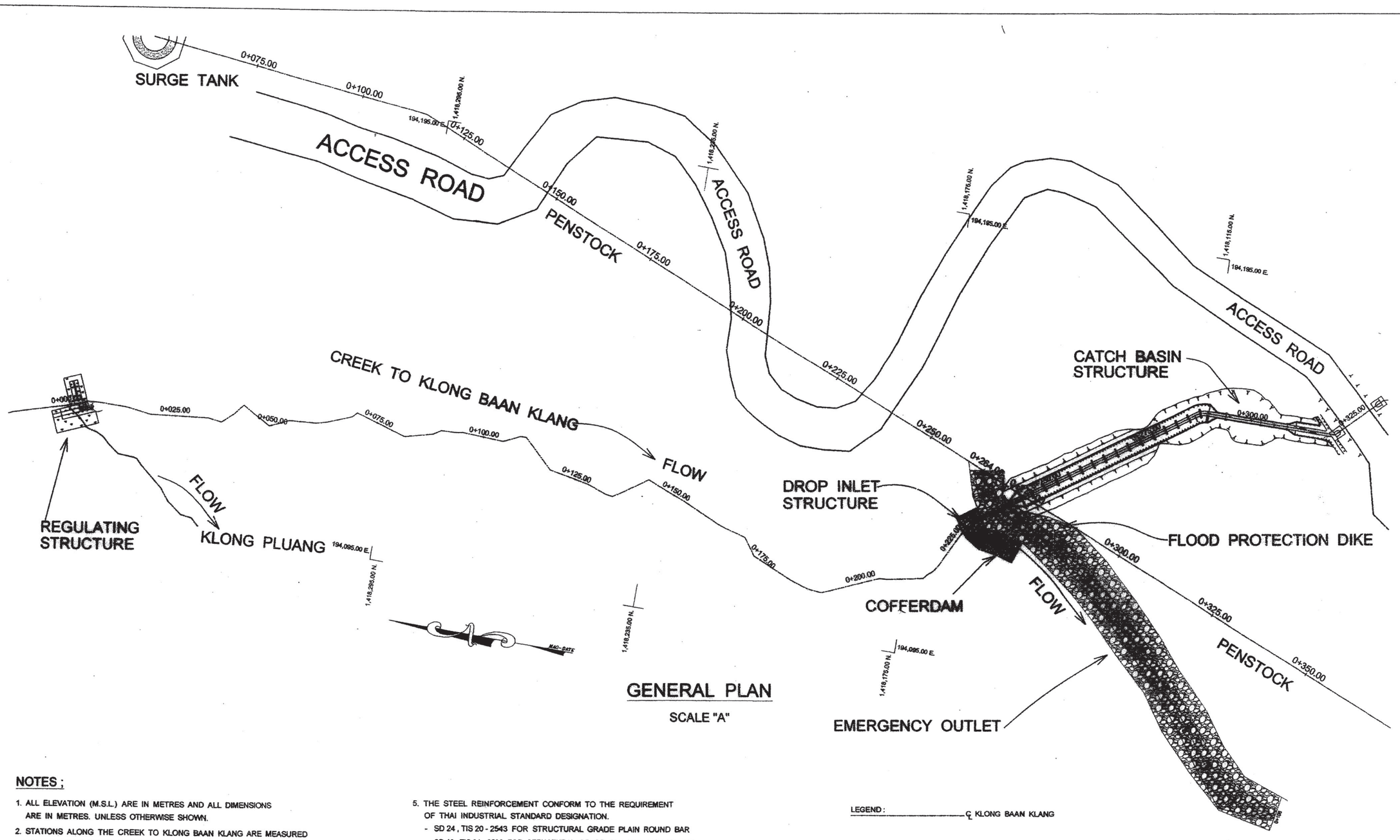
SCALE "A" 0 20 40 60 80 100 200
ORIGINAL SCALE 1:4500

KINGDOM OF THAILAND
MINISTRY OF ENERGY
DEDARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY

KLONG THUNG PHEN HYDROELECTRIC PROJECT
UPPER SCHEME

THUNG PHEN DAM
PENSTOCK
IN HEADRACE TUNNEL TO POWER STATION
PLAN AND SECTIONS
AS-BUILD DRAWING

THAIWAT ENGINEERING CO.,LTD	TEAM CONSULTING ENGINEERING AND MANAGEMENT C P&C MANAGEMENT CO.,LTD.
SUBMITTED PROJECT ENGINEER	CHECKED Sommart Y. APPROVED Sommart Y. RESIDENT ENGINEER
DATE 20/8/54	DRAWING NO. TPUS-C1-W303/1



GENERAL PLAN

SCALE "A"

LEGEND : ——— ℄ KLONG BAAN KLANG

SCALE "A" 0 10 20 30 METERS

SCALE 1 : 1250

NOTES ;

1. ALL ELEVATION (M.S.L.) ARE IN METRES AND ALL DIMENSIONS ARE IN METRES. UNLESS OTHERWISE SHOWN.
2. STATIONS ALONG THE CREEK TO KLONG BAAN KLANG ARE MEASURED HORIZONTALLY ALONG THE CENTER LINE OF THE CREEK TO KLONG BAAN KLANG.
3. THE DROP INLET STRUCTURE , THE HEADWALL FOR RC.PIPE CULVERT , THE DITCH LINING , THE RC.DRAIN OUTLET AND THE CATCH BASIN SHALL BE FOLLOWED THE STANDARD DRAWING OF HIGHWAY DEPARTMENT DWG. NO. DS - 102 , DS - 201 , DS - 203 AND DS - 301
4. CONCRETE CLASS
   - STRUCTURAL CONCRETE , SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 210 ksc. IN 28 DAY BY Ø 0.15 x 0.30 M. CYLINDER TEST
   - CONCRETE LINING FOR SURFACE DRAINS , SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 150 ksc. IN 28 DAY BY Ø 0.15 x 0.30 M. CYLINDER TEST
   - LEAN CONCRETE , SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 150 ksc. IN 28 DAY BY Ø 0.15 x 0.30 M. CYLINDER TEST
5. THE STEEL REINFORCEMENT CONFORM TO THE REQUIREMENT OF THAI INDUSTRIAL STANDARD DESIGNATION.
   - SD 24 , TIS 20 - 2543 FOR STRUCTURAL GRADE PLAIN ROUND BAR
   - SD 40 , TIS 24 - 2536 FOR STRUCTURAL GRADE PLAIN DEFORMED BAR
6. THE CONTRACTOR SHALL NOT INTERFERE WITH THE NATURAL FLOW OF THE CREEK TO THE KLONG BAAN KLANG WITHOUT PRIOR APPROVAL BY THE ENGINEER.
7. WHERE THE SIDE SLOPE IS POOR , DETAILED DRAWINGS SHALL BE RESUBMITTED FOR APPORVAL BY THE ENGINEER , OR AS DIRECTED BY THE ENGINEER.

KINGDOM OF THAILAND
MINISTRY OF ENERGY
DEDARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY

KLONG THUNG PHEN HYDROELECTRIC PROJECT
UPPER SCHEME

DAM AND POWER DEVELOPMENT
THUNG PHEN DAM
PENSTOCK CROSSING AND IMPROVEMENT
OF EXISTING CREEK FOR BAAN KLANG IRRIGATION AREA
GENERAL PLAN

THAIWAT ENGINEERING CO.,LTD

TEAM CONSULTING ENGINEERING AND MANAGEMENT CO.,LTD.
P&C MANAGEMENT CO.,LTD.

AS-BUILT DRAWING

CONTRACTOR REPRESENTATIVE

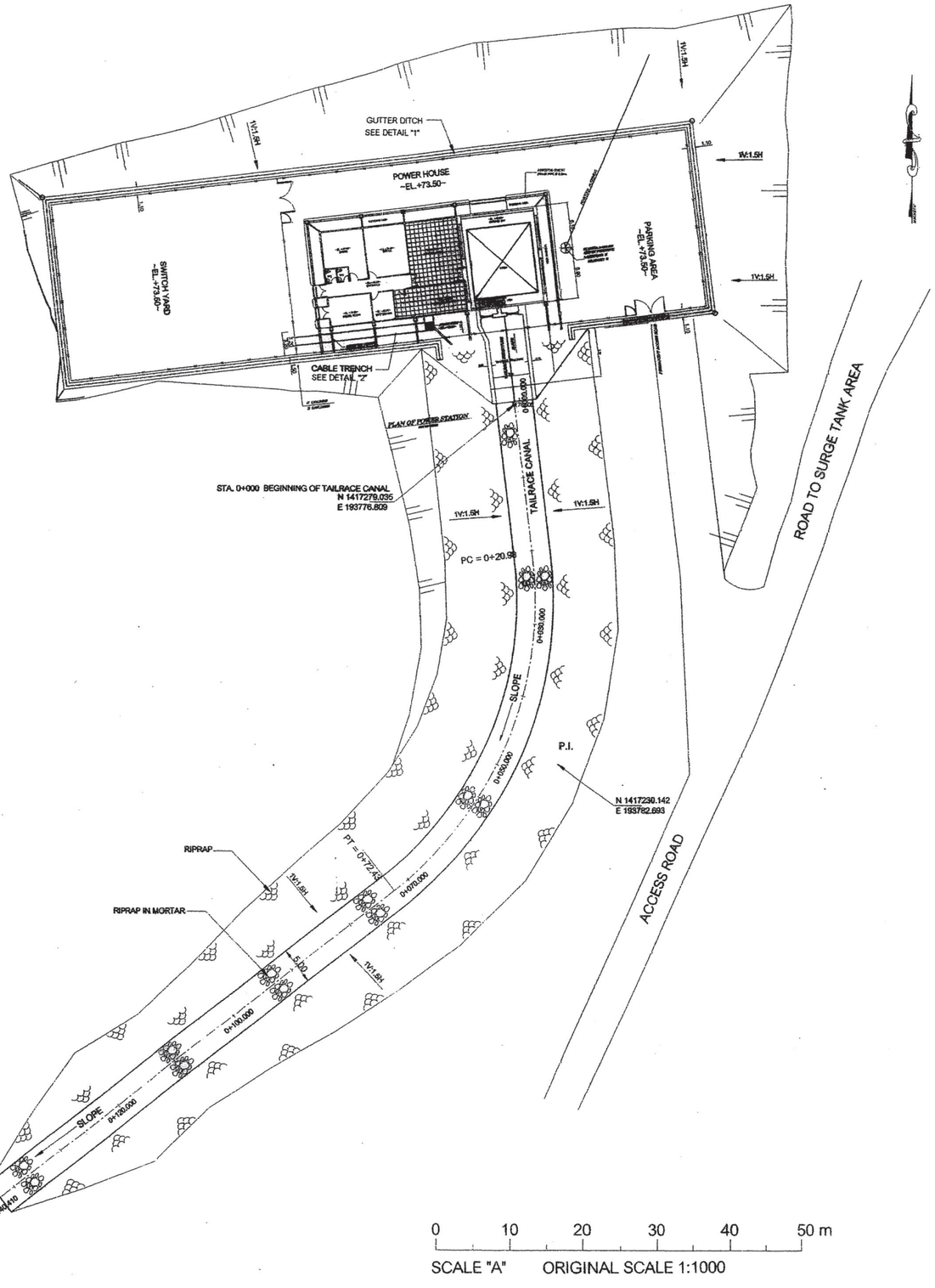
CHECKED Sommart Y.

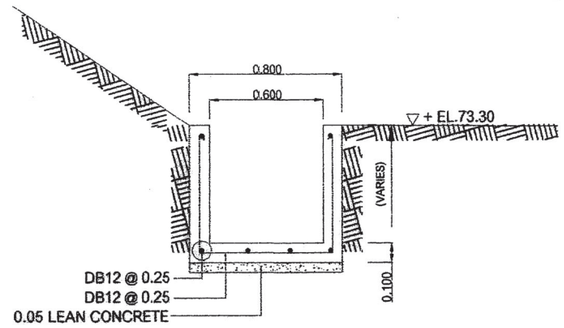
APPROVED Sommart Y.
RESIDENT ENGINEER

DATE 24/2/58

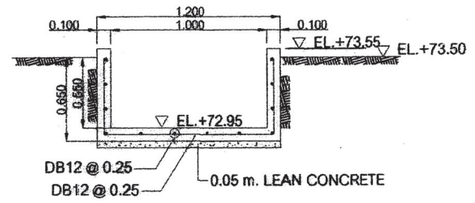
DRAWING NO. TPUS-C1-W310-ADD/1

A4





GUTTER DITCH DETAIL "1"
NOT TO SCALE



CABLE TRENCH DETAIL "2"
NOT TO SCALE

NOTE

1. ALL ELEVATIONS (M.S.L.) AND DIMENSIONS ARE IN METRES. UNLESS OTHERWISE SHOWN.

REFERENCE DRAWINGS

1. POWER HOUSE AND TAILRACE CANAL. GENERAL ARRANGEMENT — TPUS-C1-P001
2. POWER HOUSE. GENERAL LAYOUT — TPUS-C1-P101

KINGDOM OF THAILAND
MINISTRY OF ENERGY
DEDARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY

KLONG THUNG PHEN HYDROELECTRIC PROJECT
UPPER SCHEME

THUNG PHEN DAM
POWER STATION AND TAILRACE CANAL
GENERAL ARRANGEMENT
AS-BUILT DRAWING

THAIWAT ENGINEERING CO.,LTD	TEAM CONSULTING ENGINEERING AND MANAGEMENT CO.,LTD. P&C MANAGEMENT CO.,LTD.
SUBMITTED PROJECT ENGINEER	CHECKED Sommart. Y. APPROVED Sommart. Y. RESIDENT ENGINEER
DATE 24/11/56	DRAWING NO. TPUS-C1-P001 A4