



Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI PA PU HYDROPOWER PROJECT CHANGWAT TAK

CONTRACT C2

ELECTRO – MECHANICAL EQUIPMENT

VOLUME 4 DRAWINGS

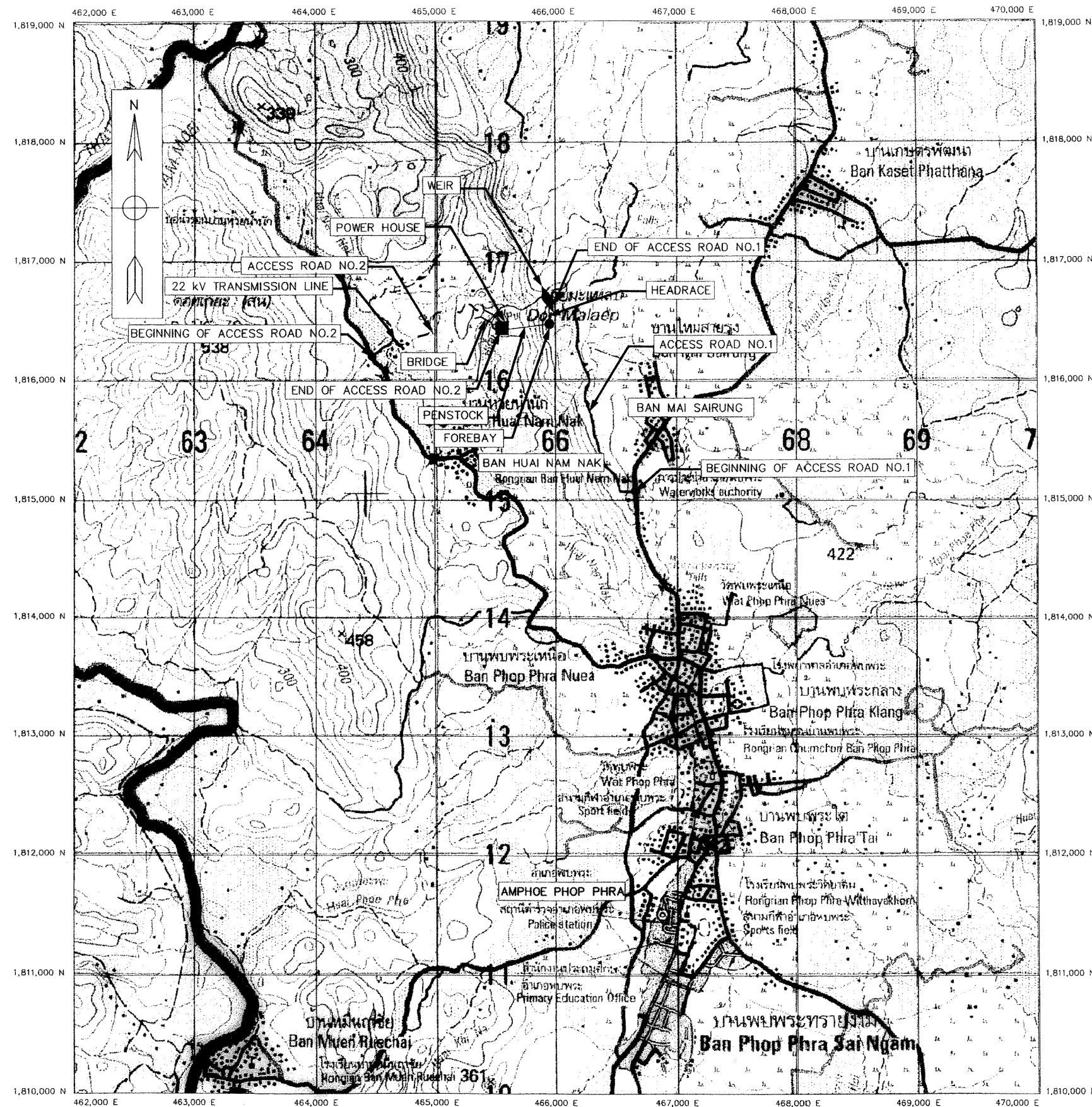


MAHA NAKORN CO.,LTD.

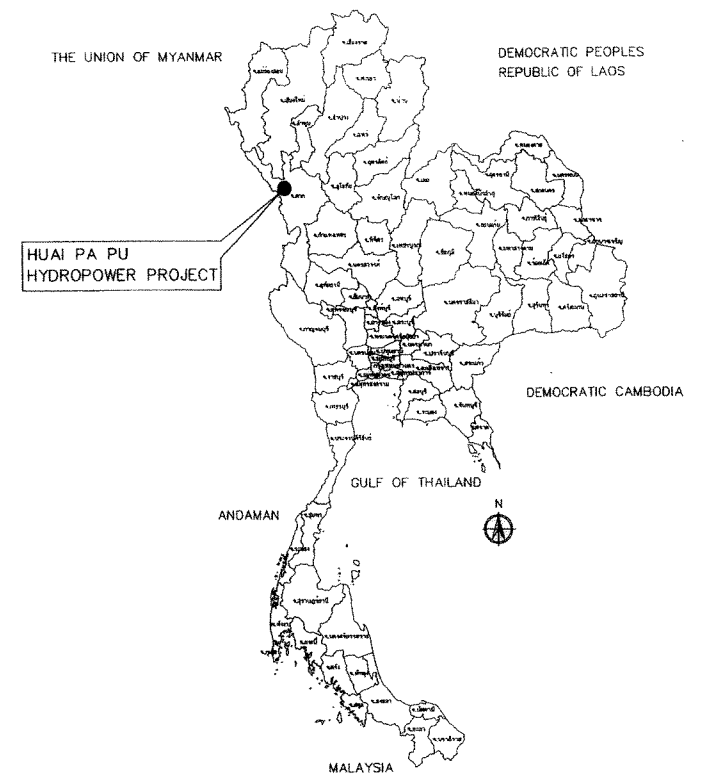
LIST OF DRAWINGS
HUI PA PU HYDROPOWER PROJECT

SHEET NO.	DRAWING NO.	DRAWING DETAILS
GENERAL		
1	HPP-GN-01	LOCATION MAP AND PROJECT AREA MAP
2	HPP-GN-02	SITE PLAN
3	HPP-GN-03	SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES
4	HPP-GN-04	HYDROLOGY DATA
5	HPP-GN-05	POWER WATERWAY HYDRAULIC GRADE LINE
WEIR		
6	HPP-WE-01	GENERAL PLAN
7	HPP-WE-02	SECTION A-A
8	HPP-WE-03	SECTION B-B, C-C
FOREBAY		
9	HPP-FB-01	GENERAL LAY OUT
10	HPP-FB-02	PLAN AND SECTION A-A, B-B
11	HPP-FB-03	SECTION C-C, D-D, E-E, F-F, G-G
PENSTOCK		
12	HPP-PS-01	PLAN AND PROFILE, STA. 0+000.000 TO STA. 0+200.000
13	HPP-PS-02	PLAN AND PROFILE, STA. 0+200.000 TO STA. 0+373.556

SHEET NO.	DRAWING NO.	DRAWING DETAILS
POWER HOUSE		
14	HPP-PH-01	GENERAL LAY-OUT
15	HPP-PH-02	CROSS SECTION
16	HPP-PH-03	PLAN AND SECTIONS
17	HPP-PH-04	ELEVATIONS
18	HPP-PH-05	TRANSFORMER SWITCHYARD, PLAN AND SECTION
19	HPP-PH-06	TRANSFORMER SWITCHYARD, DETAILS
TAILRACE		
20	HPP-TR-01	PLAN
21	HPP-TR-02	SECTIONS AND DETAILS
E&M EQUIPMENT		
22	HPP-EM-01	MAIN POWER SINGLE LINE DIAGRAM
23	HPP-EM-02	MAIN CONTROL SWITCH BOARD
24	HPP-EM-03	0.4 kV AIR CIRCUIT BREAKER CUBICLE
25	HPP-EM-04	WATER SUPPLY AND DRAINAGE SCHEMATIC DIAGRAM
26	HPP-EM-05	COMPRESS AIR SYSTEM SCHEMATIC DIAGRAM



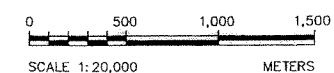
PROJECT AREA MAP
SCALE 1:20,000



LOCATION MAP
NOT TO SCALE

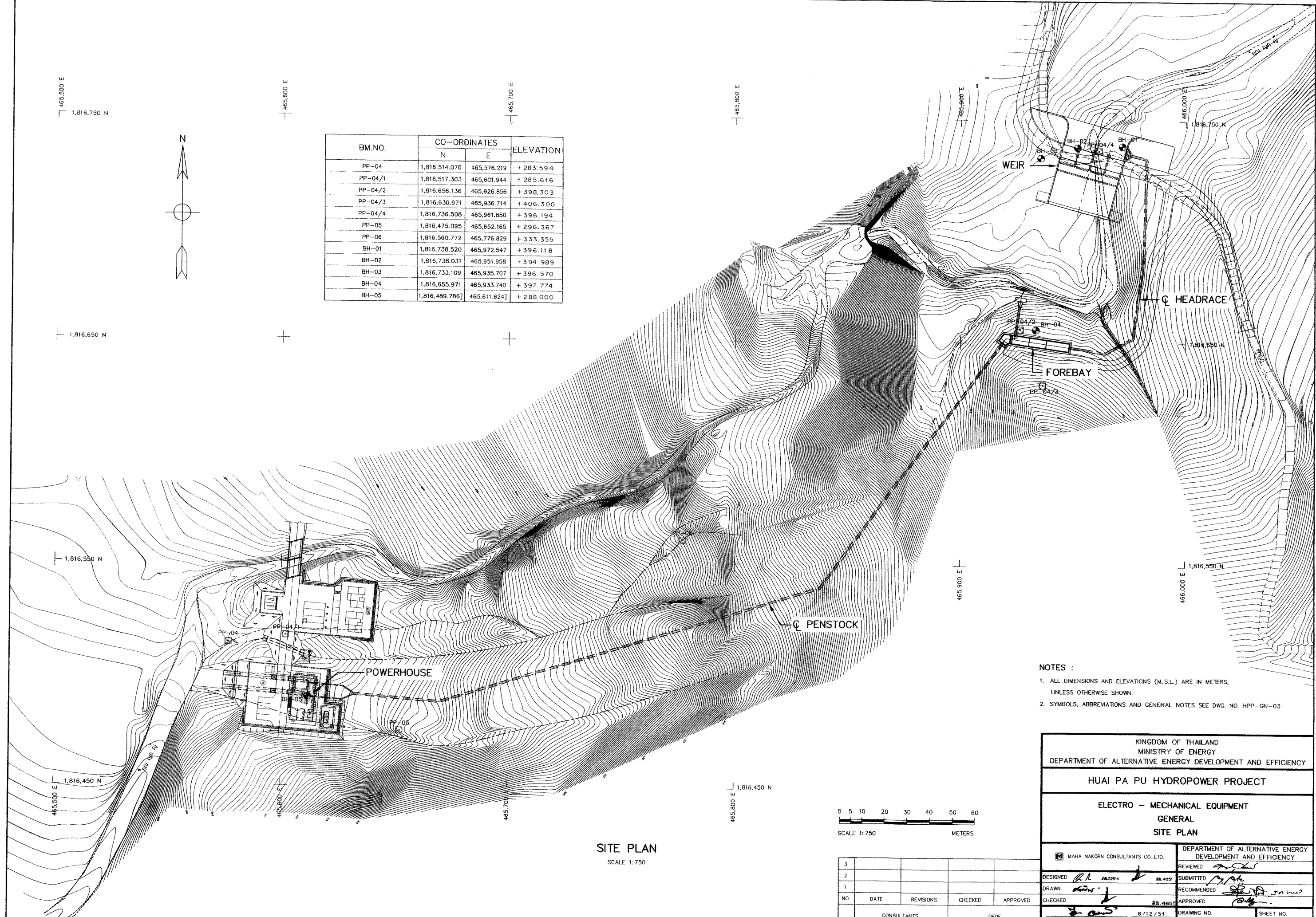
LEGENDS :

- 1206 HIGHWAY
- STREAM
- WEIR
- HEADRACE
- FOREBAY
- PENSTOCK
- POWERHOUSE
- EXISTING ROAD
- ACCESS ROAD
- O&M ROAD
- BRIDGE
- PROPOSED TRANSMISSION LINE



KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUI PA PU HYDROPOWER PROJECT	
ELECTRO - MECHANICAL EQUIPMENT GENERAL LOCATION MAP AND PROJECT AREA MAP	
MAHA NAKORN CONSULTANTS CO., LTD.	
REVIEWED	
DESIGNED	SUBMITTED
DRAWN	RECOMMENDED
CHECKED	APPROVED
PROJECT MANAGER	
DATE	
DRAWING NO.	
SHEET NO.	

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED



BM.NO.	CO-ORDINATES		ELEVATION
	N	E	
PP-04	1,816,514.076	465,576.219	+ 283.594
PP-04/1	1,816,517.303	465,601.944	+ 285.616
PP-04/2	1,816,656.136	465,926.856	+ 398.303
PP-04/3	1,816,630.971	465,936.714	+ 406.300
PP-04/4	1,816,736.508	465,961.850	+ 396.194
PP-05	1,816,475.095	465,652.165	+ 296.367
PP-06	1,816,560.772	465,776.829	+ 333.355
BH-01	1,816,738.520	465,972.547	+ 396.118
BH-02	1,816,738.031	465,951.958	+ 394.989
BH-03	1,816,733.109	465,935.707	+ 396.570
BH-04	1,816,655.971	465,933.740	+ 397.774
BH-05	1,816,489.786	465,611.624	+ 288.000

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

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUI PA PU HYDROPOWER PROJECT	
ELECTRO - MECHANICAL EQUIPMENT GENERAL SITE PLAN	
MAHA NAKORN CONSULTANTS CO.,LTD.	
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	REVIEWED
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
APPROVED	APPROVED
PROJECT MANAGER	DATE
SHEET NO. 2 OF 26	

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 ROUGHNESS 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
BRC.	BEARING	PC.	POINT OF HORIZONTAL CURVATURE
C.B.R.	CALIFORNIA BEARING RATIO	PI.	POINT OF HORIZONTAL INTERSECTION
C/C	CENTER TO CENTER	PL.	PLATE
CL	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
CM./S OR cm./s	CENTIMETER 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 DEVELOPMENT AND EFFICIENCY	R	RADIUS OF CURVATURE
E	EAST	r	HYDRAULIC RADIUS
E.	END OF SURVEY	RØ , Ø	ROUND BAR
EA.	EACH	RC.	REINFORCED CONCRETE
E.C.	END OF CURVE	RD.	ROAD
E.F.	END OF FACE	REF.	REFERENCE
EL. OR ELEV.	ELEVATION	REINF.	REINFORCEMENT
EXIST.	EXISTING	REQ'D	REQUIRED
EXP.	EXPANSION	RID.	ROYAL IRRIGATION DEPARTMENT
EXT.	EXTERIOR	SCH.	SCHEDULE
EX.	EXTERNAL DISTANCE OF CURVE	SE.	SUPERELEVATION
f	FREE BOARD , FINISH	SETC.	SECTION
F.F.	FAR FACE	S.P.C.T.	STANDARD PROCTOR COMPACTION TEST
F.S.L.	FULL SUPPLY LEVEL	S.S.	SIDE SLOPE
FTG.	FOOTING	STIR.	STIRRUP
HD.	HEAD	STA.	STATION
HEX.	HEXAGONAL	STD.	STANDARD
HOR.	HORIZONTAL	STR.	STRUCTURE
I.D.	INSIDE DIAMETER	SYMM.	SYMMETRICAL
I.F.	INSIDE FACE	T.	TANGENT LENGTH , THICKNESS
IN. OR "	INCH	T	TON
INT.	INTERIOR	THK.	THICKNESS
INV.	INVERT	T.F.	TOP FACE
Kg.	KILOGRAM	T.I.S.	THAI INDUSTRIAL STANDARD
Km.	KILOMETER	Ts.	SUPERELEVATION TRANSITION LENGTH
KPH.	KILOMETER PER HOUR	TYP.	TYPICAL
KSC.	KILOGRAM PER SQUARE CENTIMETER	V.	VELOCITY OF FLOW
L	LENGTH OF CURVE	V.C.	VERTICAL CURVE
LC.	LENGTH OF HORIZONTAL CURVE	Vc.	LENGTH OF VERTICAL CURVE
LONG.	LONGITUDINAL	VER.	VERTICAL
LT.	LEFT	VOL.	VOLUME
L.W.L.	LOW WATER LEVEL	W/	WITH
M. OR m.	METER	W.C.	WATER CLOSET
M ² OR m. ²	SQUARE METER	⊙	ANGLE
M ³ OR m. ³	CUBIC METER	△	DEFLECTION ANGLE
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 DRILL HOLES
	DRILL HOLES
	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 :

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

EXISTING GROUND SLOPE	EARTH		HARD ROCK	
	1:1	1:1	1:1	1:1
OVER 1:1	OVER 1:0.5	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 :

- 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. CONCRETE FOR SLAB IN BRIDGE
	2. WEIR
	3. FOREBAY
	4. POWER HOUSE
	5. TAILRACE
175	1. MANHOLE
	2. ANCHOR
140	LEAN CONCRETE

- 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.
- THE REINFORCEMENT LAP SPLICES SHALL NOT BE LESS THAN 50 DIAMETERS OF BIGGER THAN BAR WITH HOOKS, UNLESS OTHERWISE SHOWN.
- EMBEDDED METALWORK SHALL BE SECURELY FASTENED IN POSITION BEFORE PLACING CONCRETE.
- ALL CONSTRUCTION JOINT SHOULD BE TREATED AS DIRECTED IN ORDER TO ASSURE THE BEST BOND.
- A 5 cm. (MIN.) LAYER OF LEAN CONCRETE (1:3:5 BY VOLUME) SHOULD BE PLACED BELOW CONCRETE STRUCTURES.
- THE STRUCTURES SHOULD BE PLACED ON UNDISTURBED SOILS OR COMPACTED FILL AND BACKFILL AROUND THE STRUCTURES SHOULD BE COMPACTED.
- THE FOUNDATION ELEVATIONS ARE SUBJECT TO CHANGE AS DIRECTED ACCORDING TO THE SOIL CONDITIONS.
- ALL SIZES OF REINFORCING BARS AND STRUCTURAL STEELS ARE IN MILLIMETERS.
- ALL STRUCTURAL STEELS ARE THOSE OF T.I.S. DESIGNATION Fe24.
- REINFORCED STEEL BARS SHALL BE CONFORM TO T.I.S. AS FOLLOW :
 - DEFORMED BARS (SD30) - T.I.S. 24-2548
 - ROUND BARS (SR24) - T.I.S. 20-2543

- ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN AS FOLLOW :
 - WEIR $Q_0 = 25 \text{ T/M}^2$
 - FOREBAY $Q_0 = 15 \text{ T/M}^2$
 - HEADRACE $Q_0 = 10 \text{ T/M}^2$
 - POWERHOUSE $Q_0 = 20 \text{ T/M}^2$
 - PENSTOCK $Q_0 = 20 \text{ T/M}^2$
 - BRIDGE $Q_0 = 15 \text{ T/M}^2$

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED
		CONSULTANTS		DEDE

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUA PA PU HYDROPOWER PROJECT			
ELECTRO - MECHANICAL EQUIPMENT GENERAL SYMBOLS, ABBREVIATIONS AND GENERAL NOTES			
Maha Nakorn Consultants Co., Ltd.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED <i>DL</i>	7/11/2554	REVIEWED <i>DL</i>	REB. 4051
DRAWN <i>DL</i>		RECOMMENDED <i>DL</i>	
CHECKED <i>DL</i>		APPROVED <i>DL</i>	
PROJECT MANAGER		DATE	
DRAWING NO. HPP-GN-03		SHEET NO. 3 OF 26	

TABLE 1 CLIMATOLOGICAL DATA FOR THE PERIOD 1971-2000

Station	MAE SOT												Elevation of station above M.S.L.	196	Meters
Index station	48375												Height of barometer above M.S.L.	197	Meters
Latitude	16 40 N												Height of thermometer above ground	1.50	Meters
Longitude	98 33 E												Height of wind vane above ground	11.50	Meters
													Height of rain gauge	0.86	Meters
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL		
Pressure (Hectopascal)															
Mean	1012.3	1010.7	1009.1	1007.5	1006.2	1005.5	1005.8	1006.0	1007.3	1009.3	1011.5	1013.2	1008.7		
Ext. max.	1023.1	1021.1	1021.4	1016.2	1014.0	1012.8	1012.1	1012.4	1014.9	1017.1	1021.2	1024.0	1024.0		
Ext. min.	1002.6	1001.7	1000.2	999.0	997.4	997.1	997.0	997.3	998.6	999.9	1001.8	1003.4	997.0		
Mean daily range	6.3	6.4	6.4	6.0	4.9	3.6	3.6	3.8	4.9	5.3	5.3	5.9	5.2		
Temperature (Celsius)															
Mean	21.9	24.2	27.1	29.0	27.8	26.2	25.6	25.4	26.0	25.9	24.1	21.7	25.4		
Mean max.	31.0	33.4	35.6	36.5	33.9	31.1	30.1	29.8	31.2	31.8	30.9	30.0	32.1		
Mean min.	14.6	16.2	19.6	22.9	23.9	23.5	23.1	23.0	23.1	22.2	19.0	15.1	20.5		
Ext. max.	35.4	37.5	39.4	40.6	41.6	36.4	35.6	35.4	35.8	36.2	36.5	35.0	41.6		
Ext. min.	5.5	9.4	11.8	17.6	19.5	21.1	20.9	21.0	19.3	14.2	8.4	4.5	4.5		
Relative Humidity (%)															
Mean	72	64	60	63	76	84	86	87	85	82	78	75	76		
Mean max.	94	90	85	84	90	95	95	96	96	95	95	95	93		
Mean min.	40	34	34	40	56	69	73	67	62	62	52	45	54		
Ext. min.	72	64	60	63	76	84	86	87	85	82	78	75	76		
Ext. min.	72	64	60	63	76	84	86	87	85	82	78	75	76		
Dew Point (Celsius)															
Mean	15.7	15.8	17.7	20.3	22.6	23.1	22.9	22.9	23.1	22.4	19.4	16.2	20.2		
Evaporation (mm.)															
Mean-pan	119.8	144.8	196.9	212.0	164.9	103.6	95.0	88.1	103.8	122.3	121.4	118.3	1590.9		
Cloudiness (0-10)															
Mean	2.6	2.4	2.8	4.1	6.9	8.6	8.9	9.1	8.1	6.2	4.2	2.8	5.6		
Sunshine Duration (hr.)						NO OBSERVATION									
Visibility (km.)															
0700 L.S.T.	2.0	2.8	3.0	4.9	7.2	8.0	7.7	7.4	6.8	4.9	4.0	2.4	5.1		
Mean	6.1	5.6	5.0	7.1	10.0	10.0	9.6	9.2	9.9	9.1	8.5	7.3	8.1		
Wind (Knots)															
Mean wind speed	1.4	2.0	2.8	3.6	2.8	2.3	2.2	2.0	1.5	1.7	2.2	1.9	2.2		
Prevailing wind	W	W	W	W	W	W	W	W	W	E	E	E	-		
Max. wind speed	21	38	58	42	38	33	25	28	33	35	25	27	58		
Rainfall (mm.)															
Mean	2.3	8.0	8.7	38.9	168.8	235.3	312.4	333.3	159.9	98.8	24.7	4.2	1395.3		
Mean rainy day	0.7	0.8	1.7	4.8	16.6	24.8	26.4	26.9	20.3	12.3	3.6	0.8	139.7		
Daily maximum	14.4	73.0	22.6	58.7	96.2	89.3	207.4	118.8	79.0	67.9	51.0	61.7	207.4		
Number of days with															
Haze	24.0	26.6	29.9	22.6	3.8	0.0	0.1	0.0	0.7	3.6	7.0	13.6	131.9		
Fog	15.9	5.6	1.8	0.2	0.1	0.1	0.1	0.3	1.4	4.9	7.8	16.4	54.6		
Hail	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1		
Thunderstorm	0.1	0.9	1.8	5.5	10.2	2.8	2.2	1.6	6.0	5.5	0.8	0.1	37.5		
Squall	0.0	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.6		

FIGURE 1 DESIGN FLOOD HYDROGRAPH FOR VARIOUS RETURN PERIODS

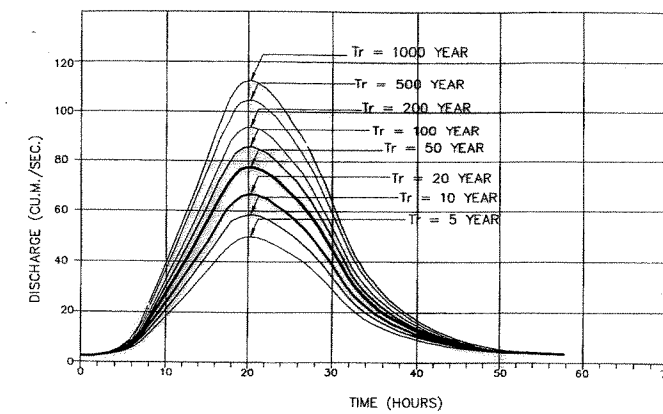


FIGURE 2 FLOW DURATION CURVE AT WEIR SITE

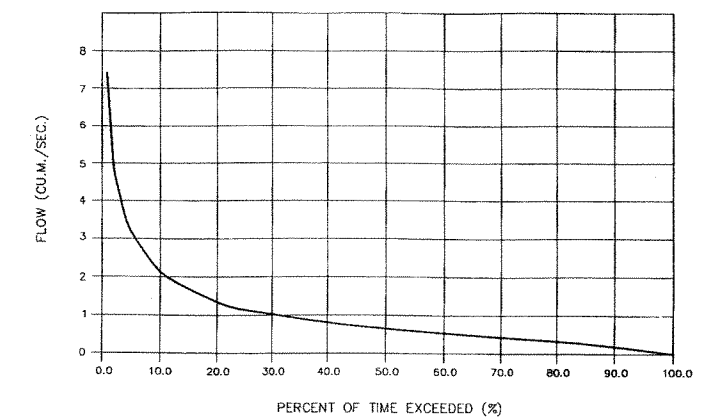


FIGURE 3 RELATIONSHIP BETWEEN ELEVATION AND DISCHARGE AT WEIR SITE

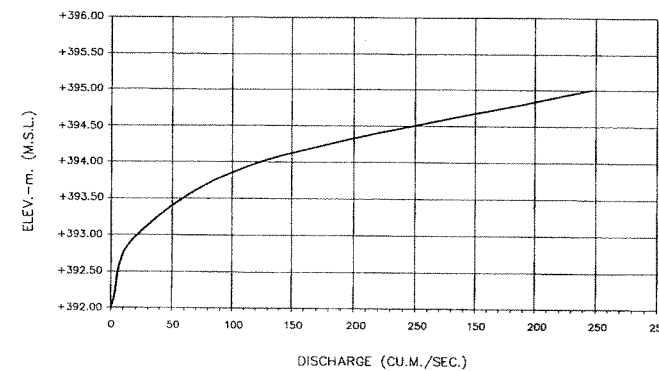


FIGURE 4 RELATIONSHIP BETWEEN ELEVATION AND DISCHARGE AT POWERHOUSE

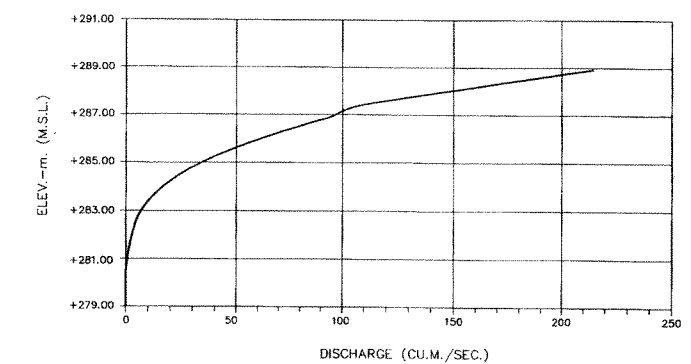


FIGURE 5 RELATIONSHIP BETWEEN ELEVATION AND DISCHARGE AT BRIDGE

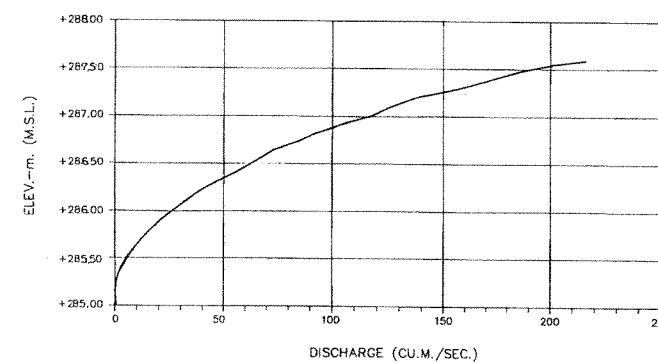


FIGURE 6 RELATIONSHIP BETWEEN MEAN ANNUAL SUSPENDED SEDIMENT AND CATCHMENT AREA.

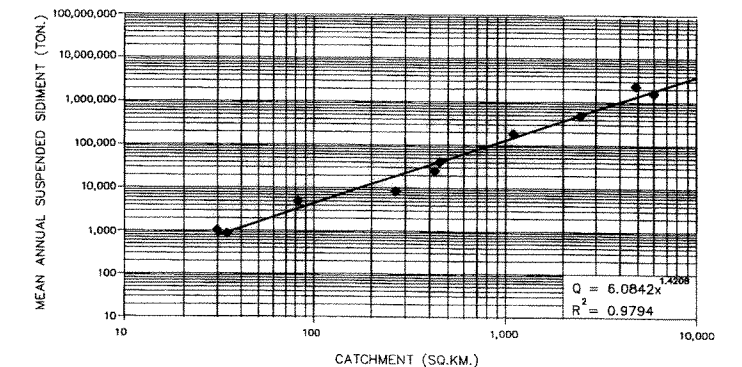
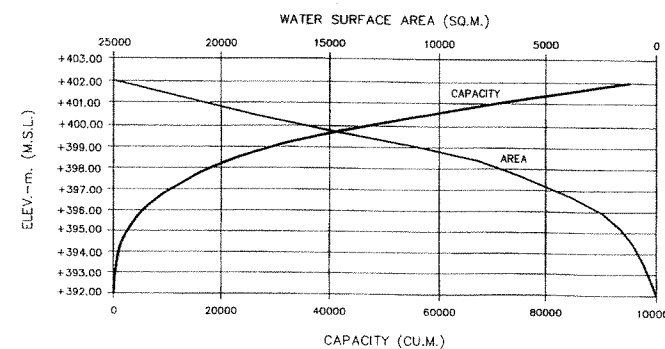
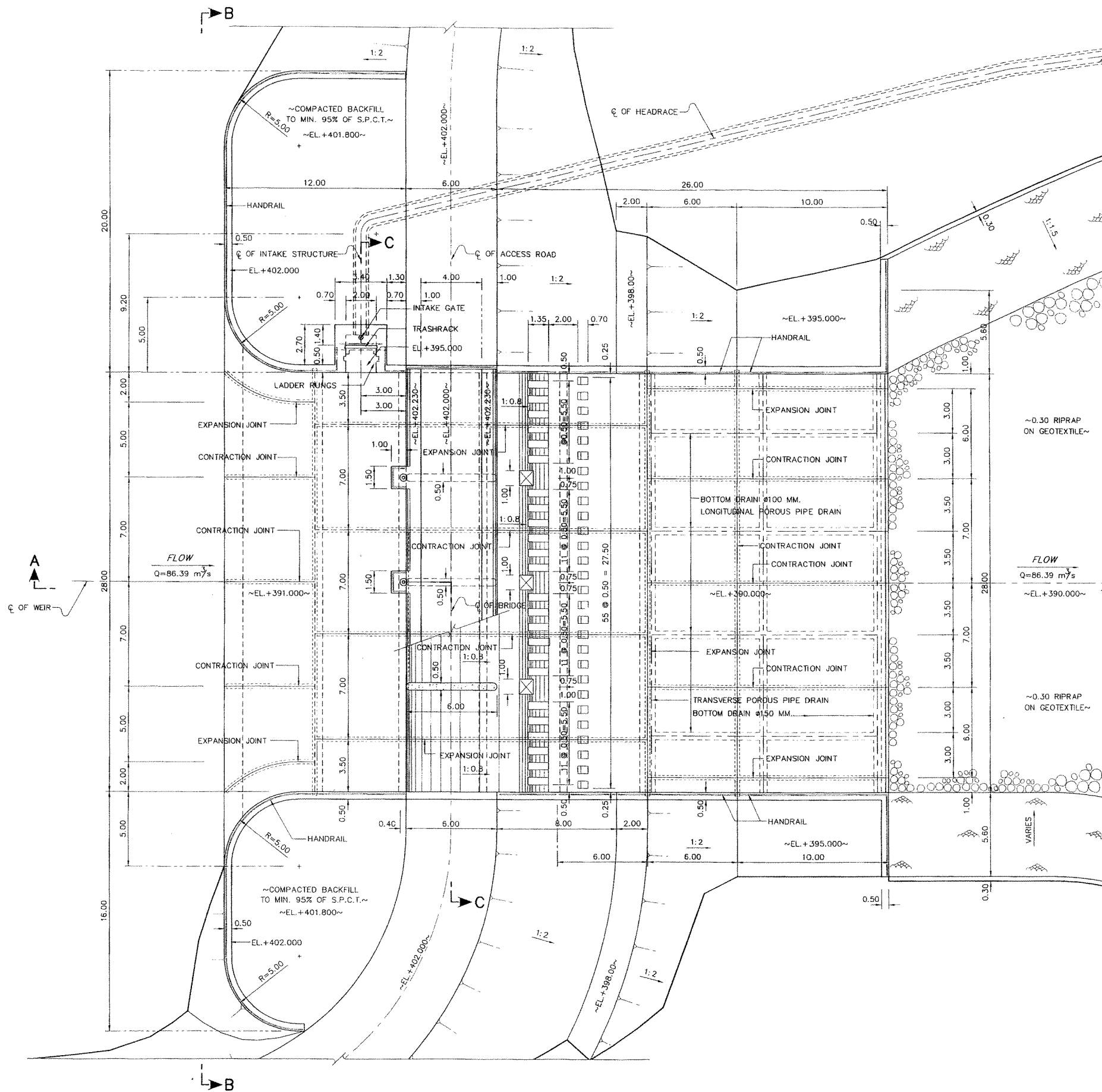


FIGURE 7 RELATIONSHIP BETWEEN CAPACITY-AREA AND ELEVATION AT WEIR SITE



KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUA PA PU HYDROPOWER PROJECT	
ELECTRO - MECHANICAL EQUIPMENT GENERAL HYDROLOGY DATA	
DESIGNED <i>BA</i> 28.225H 28.4651	REVIEWED <i>BA</i>
DRAWN <i>BA</i>	SUBMITTED <i>BA</i>
CHECKED <i>BA</i> 28.4651	RECOMMENDED <i>BA</i> 28.4651
APPROVED <i>BA</i>	APPROVED <i>BA</i>
DRAWING NO. HPP-GN-04	SHEET NO. 4 OF 26

3				
2				
1				
NO	DATE	REVISIONS	CHECKED	APPROVED
CONSULTANTS		DEVE		



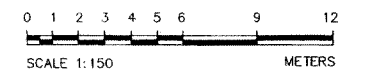
GENERAL PLAN
SCALE 1:150

NOTES :

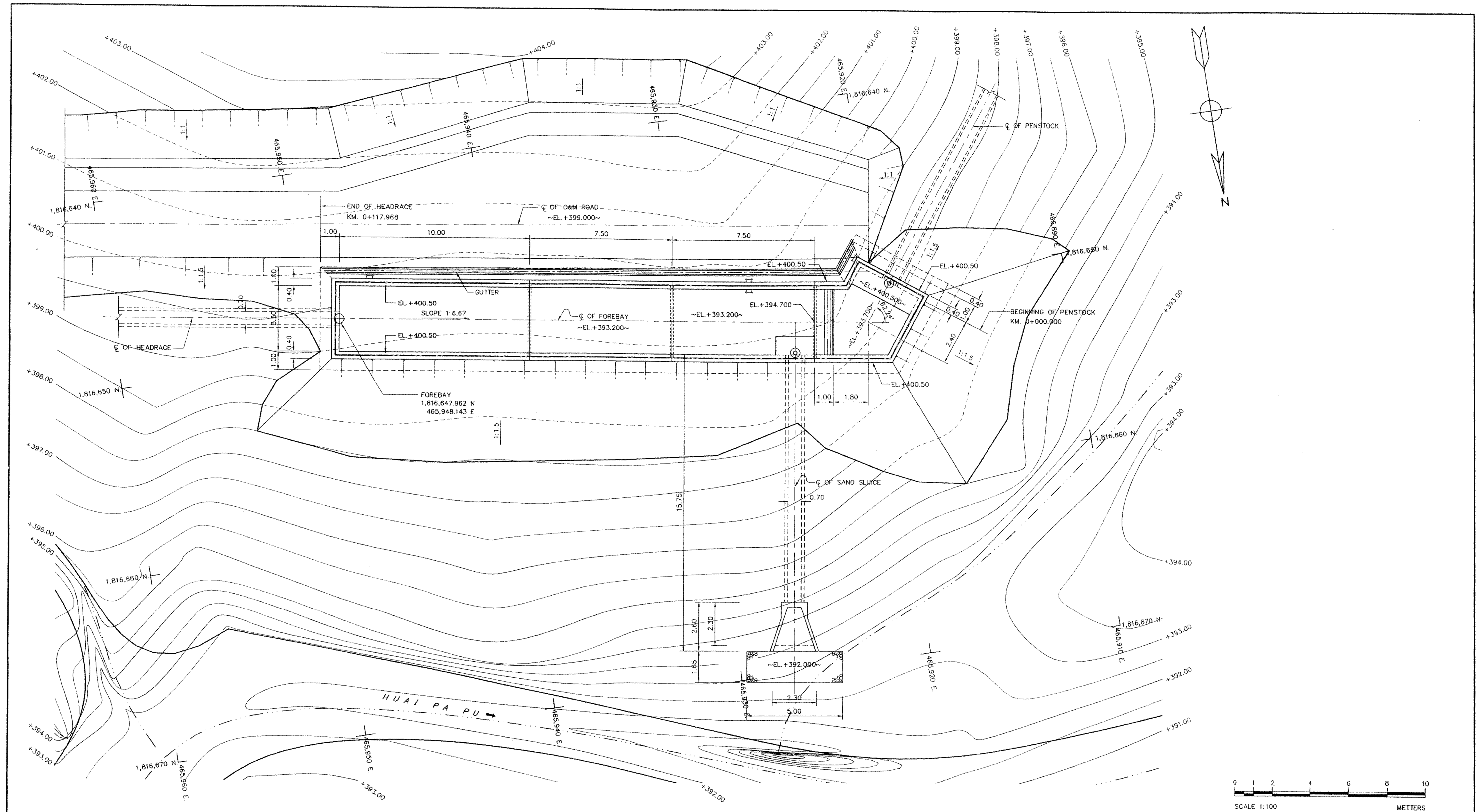
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HPP-GN-03
3. ALLOWABLE BEARING CAPACITY NOT LESS THAN 25 TON/M²
4. SLUICE GATES WITH OUTSIDE-SCREW RISING STEM SHALL BE MOTOR AND HAND OPERATED, MIN. CAPACITY 6.5 TONS.
5. WEIR HAS A MAXIMUM DISCHARGE 86.39 m³/s AT WATER LEVEL +398.50 (M.S.L.)

REFERENCE DRAWINGS :

1. WEIR, SECTIONS A-A HPP-WE-02
2. WEIR, SECTIONS B-B, C-C HPP-WE-03



KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUI PA PU HYDROPOWER PROJECT			
ELECTRO - MECHANICAL EQUIPMENT WEIR GENERAL PLAN			
MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	28.12.2551	28.1.2551	REVIEWED
DRAWN	28.1.2551	28.1.2551	SUBMITTED
CHECKED	28.1.2551	28.1.2551	RECOMMENDED
PROJECT MANAGER		DATE	
DRAWING NO. HPP-WE-01		SHEET NO. 6 OF 25	



GENERAL LAYOUT
SCALE 1:100

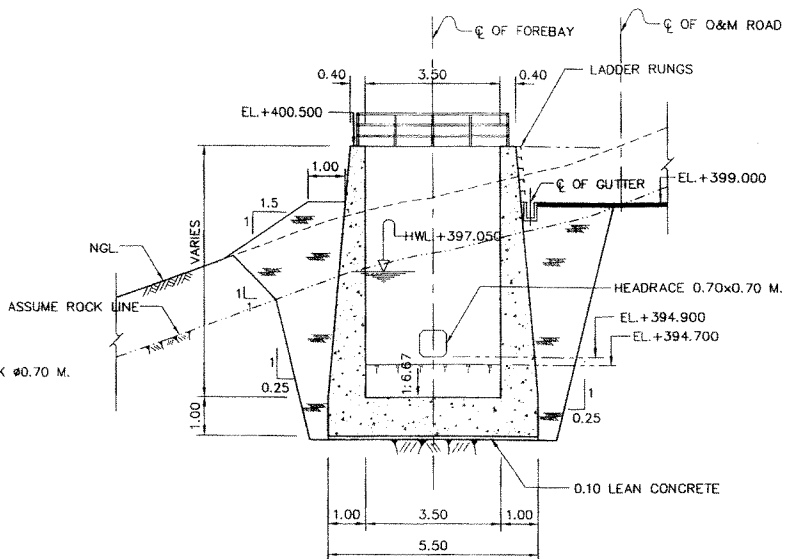
NOTES :

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

REFERENCE DRAWINGS :

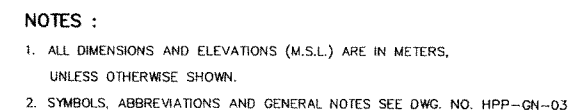
1. FOREBAY, PLAN AND SECTIONS A-A, B-B HPP-FB-02
2. FOREBAY, SECTIONS C-C, D-D, E-E, F-F, G-G HPP-FB-03

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUI PA PU HYDROPOWER PROJECT			
ELECTRO - MECHANICAL EQUIPMENT FOREBAY GENERAL LAYOUT			
MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	20.4651	REVIEWED	20.4651
DRAWN	20.4651	RECOMMENDED	20.4651
CHECKED	20.4651	APPROVED	20.4651
PROJECT MANAGER		DATE	
8/12/51		HPP-FB-01	
CONSULTANTS		DEDE	
3		SHEET NO.	
2		9 OF 26	
1			
NO.			
DATE			
REVISIONS			
CHECKED			
APPROVED			



SECTION B-B

SCALE 1:100

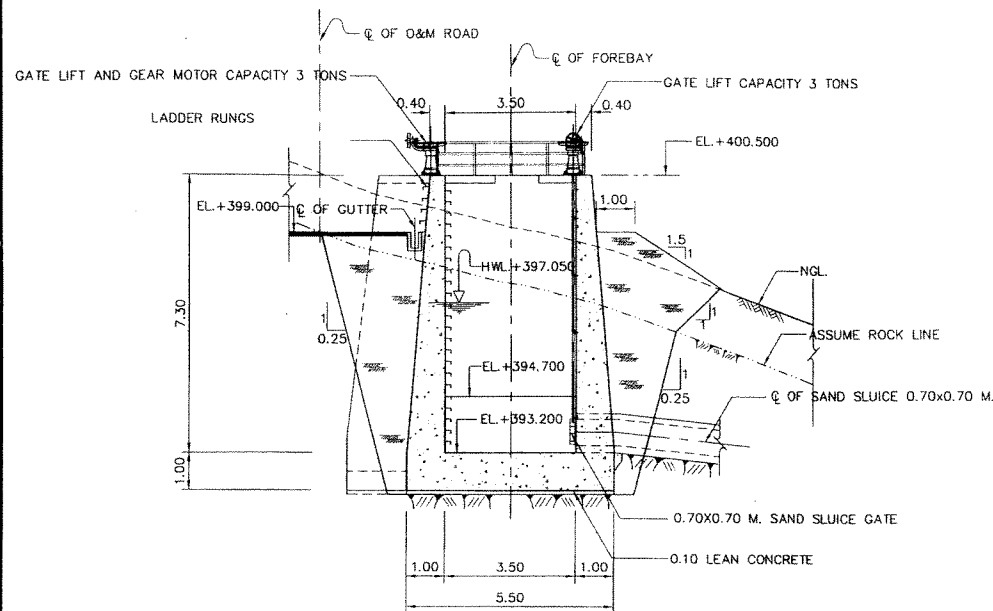


REFERENCE DRAWINGS :

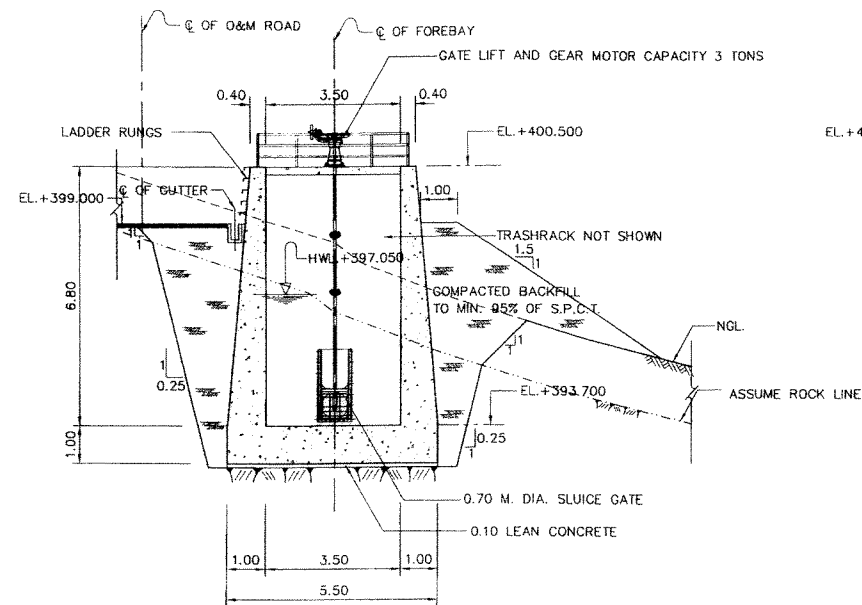
- | | |
|--|-----------|
| 1. FOREBAY, GENERAL LAY-OUT | HPP-FB-01 |
| 2. FOREBAY, SECTIONS C-C, D-D, E-E, F-F, G-G | HPP-FB-03 |



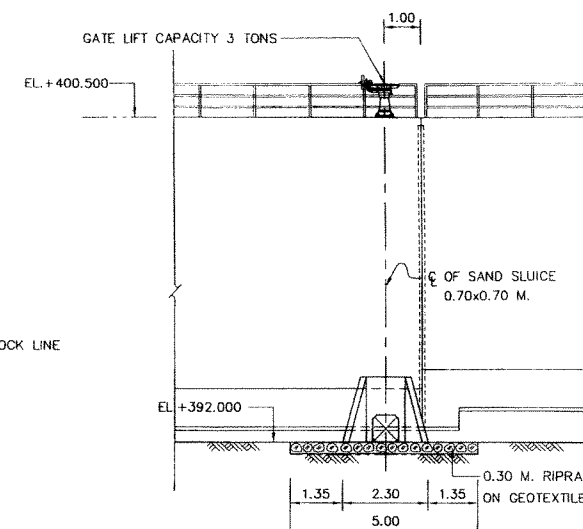
KINGDOM OF THAILAND	
MINISTRY OF ENERGY	
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUALI PA PU HYDROPOWER PROJECT	
ELECTRO - MECHANICAL EQUIPMENT	
FOREBAY	
PLAN AND SECTIONS A-A, B-B	
 MAHA NAKORN CONSULTANTS CO., LTD.	DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY
DESIGNED  TEL. 40150	REVIEWED 
DRAWN 	SUBMITTED 
CHECKED 	RECOMMENDED 
DATE 8/12/51	APPROVED 
PROJECT MANAGER	DRAWING NO. HPP-FB-02
DATE	SHEET NO. 10 OF 26



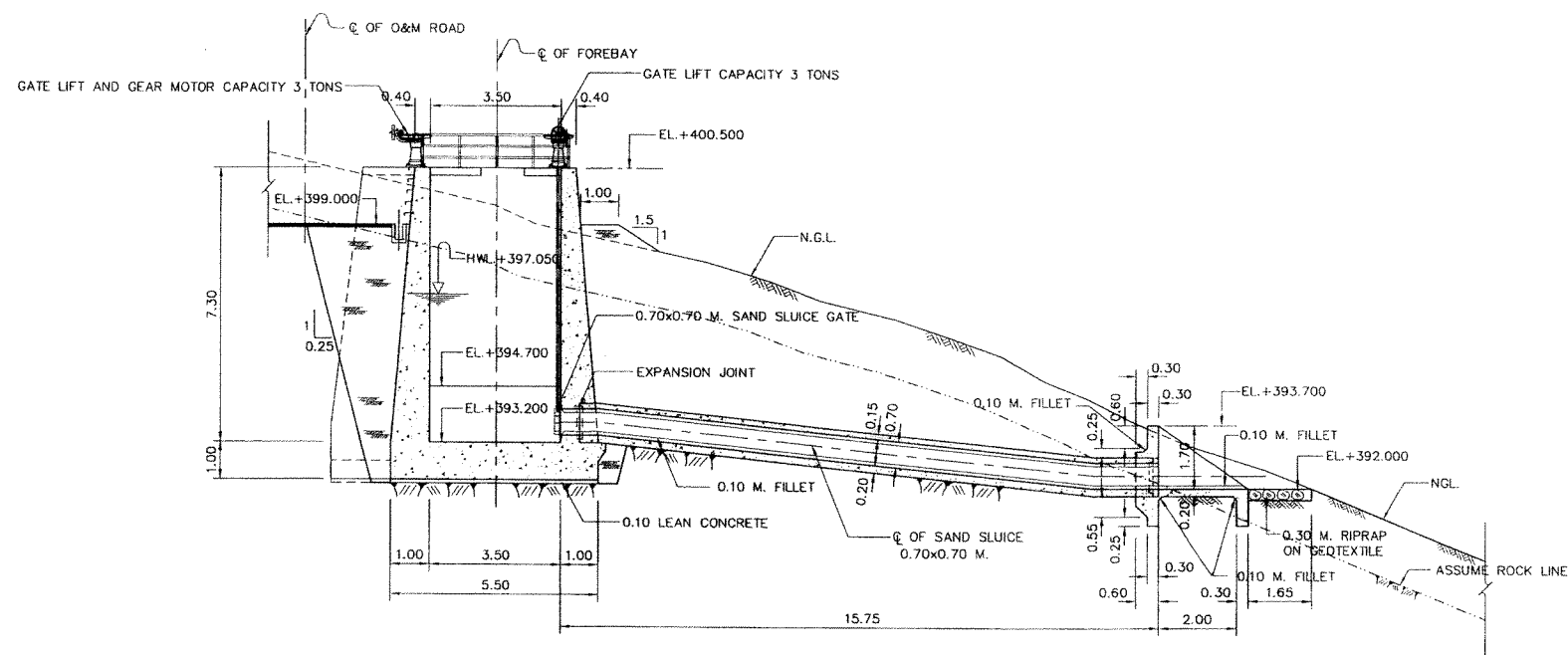
SECTION C-C
SCALE 1:100



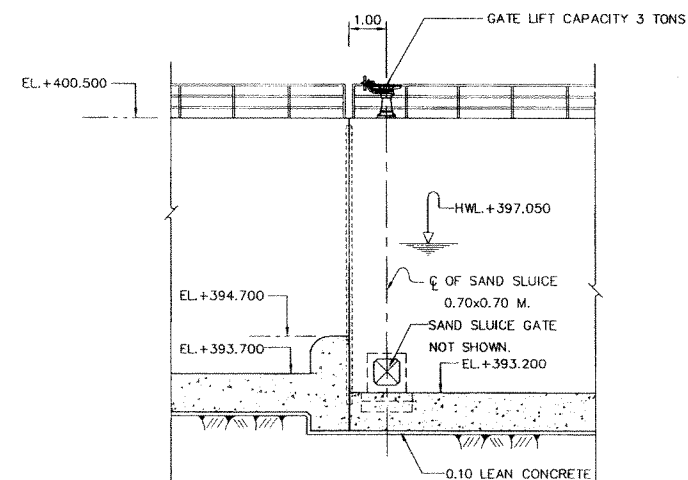
SECTION D-D
SCALE 1:100



SECTION F-F
SCALE 1:100



SECTION E-E
SCALE 1:100



SECTION G-G
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. HPP-GN-03

REFERENCE DRAWINGS :

1. FOREBAY, GENERAL LAY-OUT
2. FOREBAY, PLAN AND SECTIONS A-A, B-B

HPP-FB-01
HPP-FB-02

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED

CONSULTANTS

DEDE

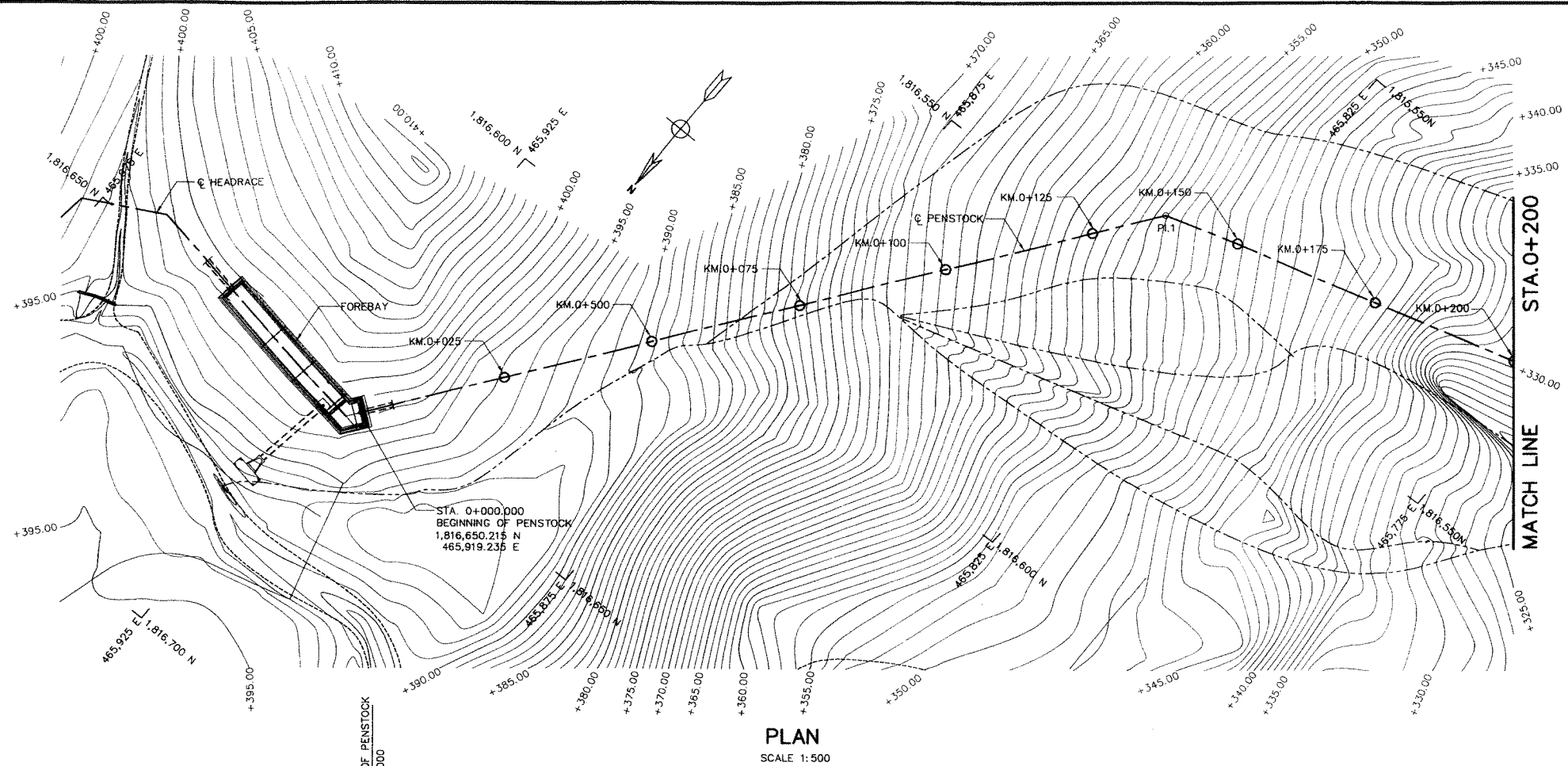
KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUA PA PU HYDROPOWER PROJECT			
ELECTRO - MECHANICAL EQUIPMENT FOREBAY SECTIONS C-C, D-D, E-E, F-F, G-G			
MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	REVIEWED	SUBMITTED	RECOMMENDED
DRAWN	CHECKED	APPROVED	
PROJECT MANAGER	DATE		

8/12/51

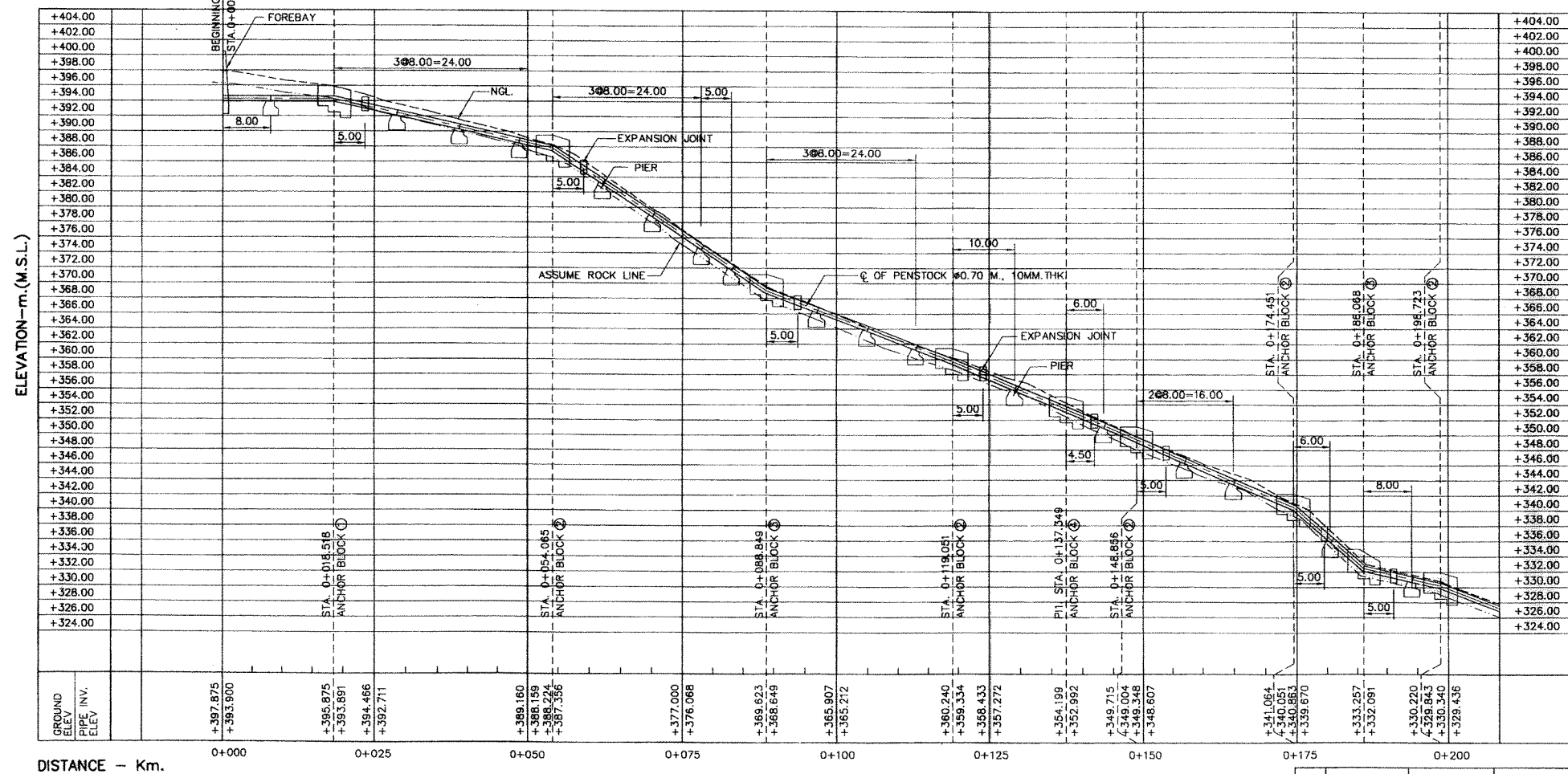
HPP-FB-03

SHEET NO.

11 OF 26



NO. OF CURVE	PI. Sta.	PI. TO PI. m.	COORDINATE OF PI.		ANGLE I	BEARING
			N	E		
BEGIN	0+000.000		1,816,650.215	465,919.235		
PI.1	0+137.349	137.349	1,816,539.694	465,837.690	36°-27'-30"	S 36°-25'-15" W
PI.2	0+313.469	176.120	1,816,487.846	465,669.374	22°-01'-16"	S 72°-52'-45" W
END	0+373.556	60.087	1,816,495.901	465,610.543		N 85°-05'-59" W

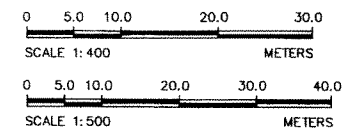


NOTES:

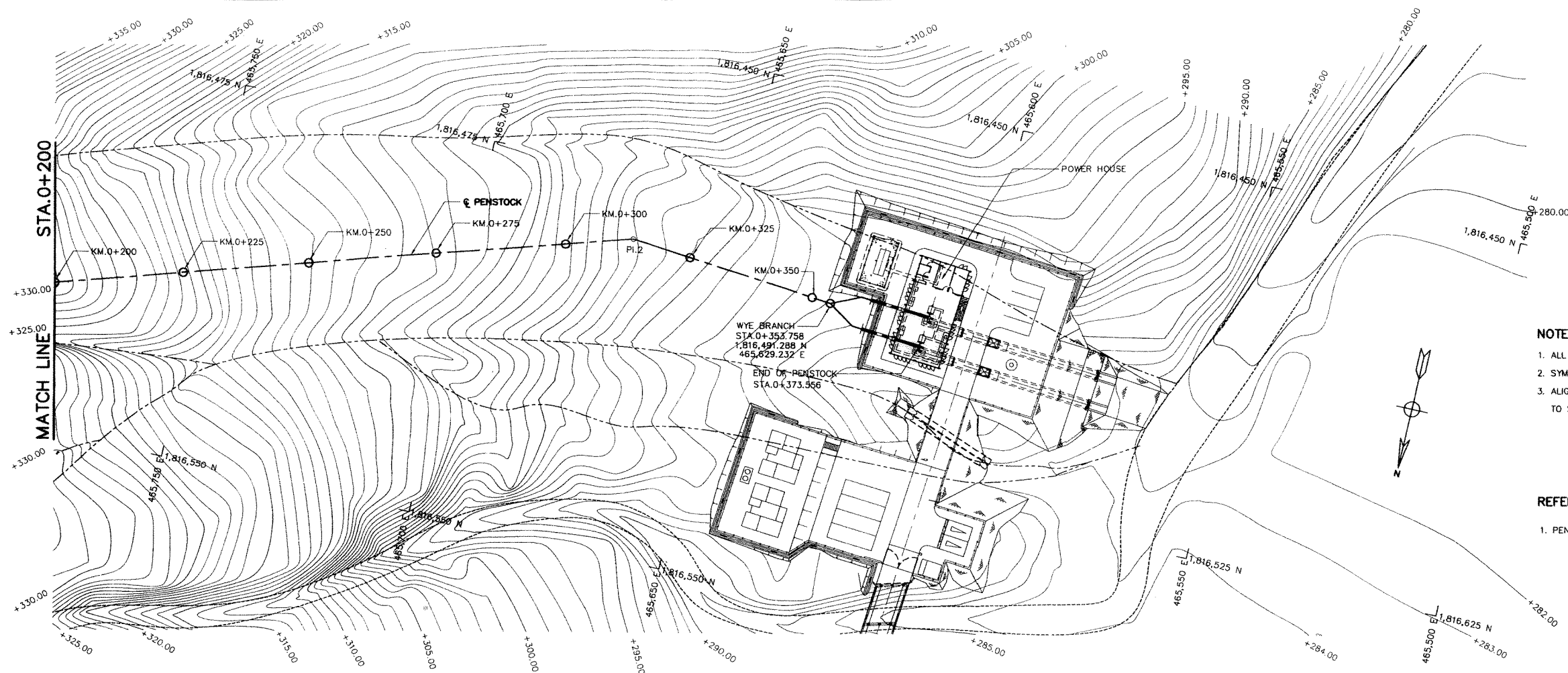
- ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
- SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HPP-GN-03
- ALIGNMENT OF PENSTOCK SHALL BE JUSTIFIED BY FIELD ENGINEER IN THE FIELD TO SUIT THE TOPOGRAPHY

REFERENCE DRAWINGS :

- PENSTOCK, PLAN AND PROFILE, STA 0+200.000 TO 0+373.556 HPP-PS-02



KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUI PA PU HYDROPOWER PROJECT			
ELECTRO - MECHANICAL EQUIPMENT PENSTOCK PLAN AND PROFILE, STA. 0+000.000 TO STA. 0+200.000			
MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	REVIEWED	SUBMITTED	
DRAWN	RECOMMENDED	APPROVED	
CHECKED	DATE	DRAWING NO.	SHEET NO.
PROJECT MANAGER		HPP-PS-01	12 OF 26



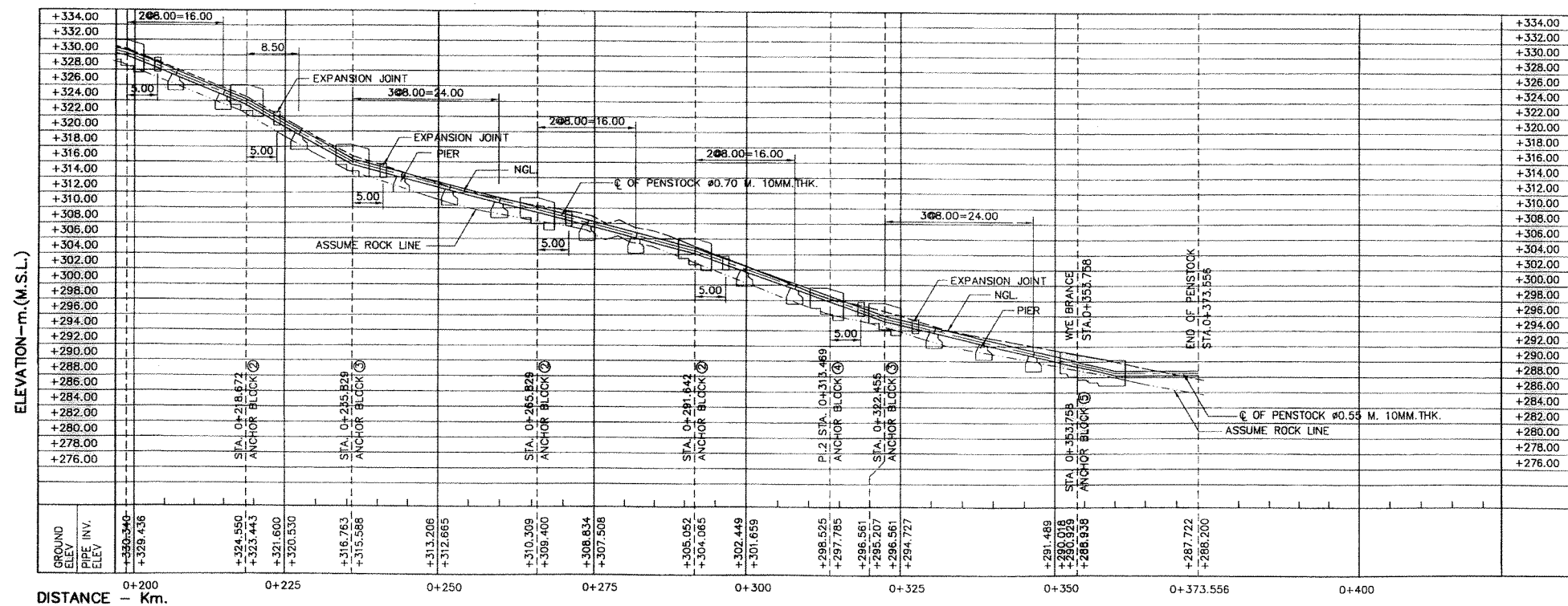
PLAN
SCALE 1:500

NOTES:

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

REFERENCE DRAWINGS :

1. PENSTOCK, PLAN AND PROFILE, STA 0+000.000 TO 0+200.000 HPP-PS-01

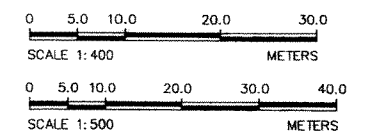


PROFILE

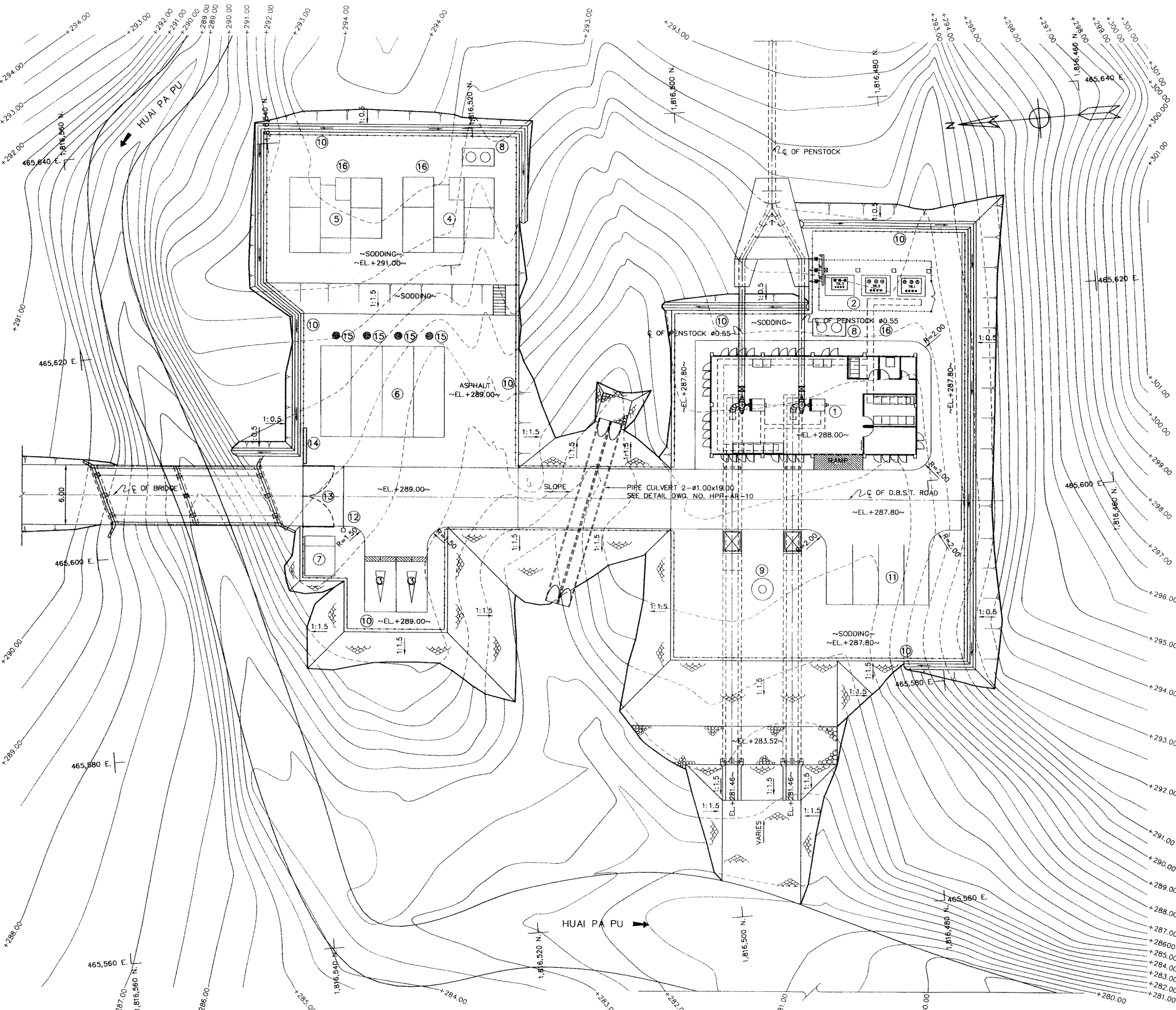
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:400

HORIZONTAL CURVE

NO. OF CURVE	PI. Sta.	PI. TO PI. m.	COORDINATE OF PI.		ANGLE I	BEARING
			N	E		
BEGIN	0+000.000					
PI.1	0+137.349	137.349	1,816,650.215	465,919.235	36°-27'-30"	S 36°-25'-15" W
PI.2	0+313.469	176.120	1,816,539.694	465,837.690	72°-52'-45"	S 72°-52'-45" W
END	0+373.556	60.087	1,816,487.846	465,669.374	22°-01'-16"	N 85°-05'-59" W
			1,816,495.901	465,610.543		



KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUA PA PU HYDROPOWER PROJECT	
ELECTRO - MECHANICAL EQUIPMENT PENSTOCK PLAN AND PROFILE, STA. 0+200.000 TO STA. 0+373.556	
Maha Nakorn Consultants Co., Ltd.	DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY
DESIGNED: 28.4651	REVIEWED: 28.4651
DRAWN: 28.4651	RECOMMENDED: 28.4651
CHECKED: 28.4651	APPROVED: 28.4651
PROJECT MANAGER	DRAWING NO. HPP-PS-02
DATE	SHEET NO. 13 OF 26



LEGENDS :

- ① POWERHOUSE
- ② SWITCHYARD
- ③ GARAGE
- ④ HOUSING GRADE 5-6 FOR 1 FAMILY
- ⑤ HOUSING GRADE 3-4 FOR 1 FAMILY
- ⑥ LABOUR HOUSING FOR 4 FAMILY
- ⑦ GUARD HOUSE
- ⑧ ELEVATED TANK
- ⑨ FLAG POLE
- ⑩ WIREMESH FENCE
- ⑪ PARKING AREA
- ⑫ MOVABLE STEEL BARRICADE
- ⑬ ENTRANCE GATE
- ⑭ NAME BOARD
- ⑮ STAINLESS STEEL WATER TANK 3.00 C.U.M.
- ⑯ SEPTIC TANK

NOTES :

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

REFERENCE DRAWINGS :

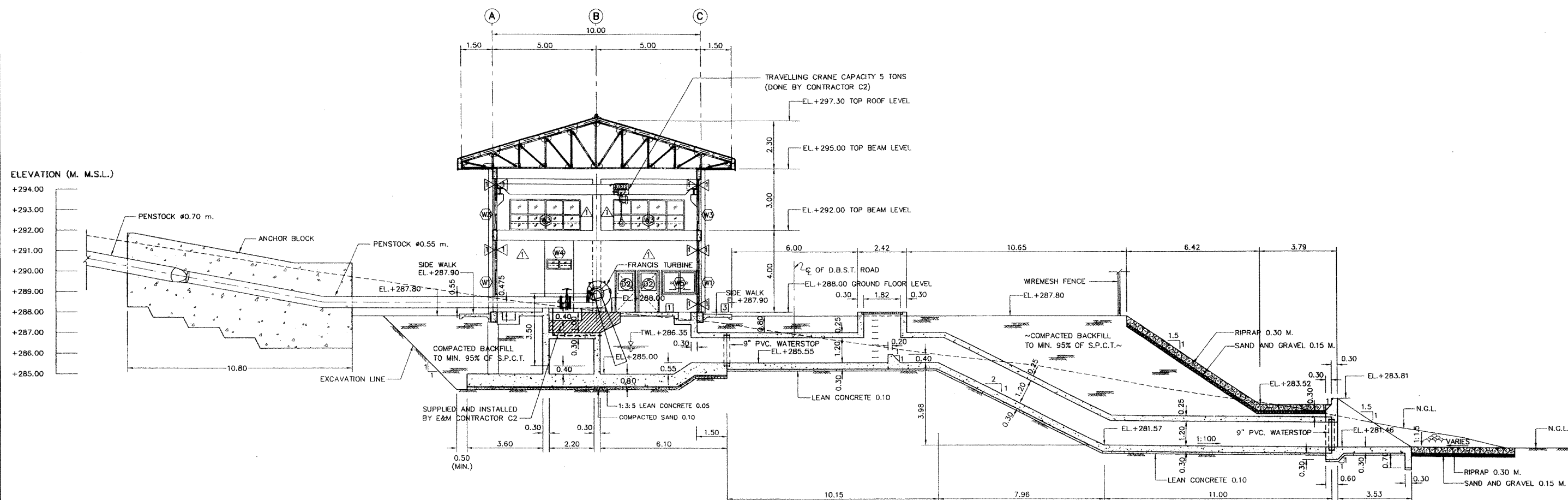
- 1. POWERHOUSE, PLAN AND SECTIONS HPP-PH-03
- 2. POWERHOUSE, ELEVATIONS HPP-PH-04



GENERAL LAYOUT
SCALE 1: 200

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED
		CONSULTANTS	DEDE	

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUI PA PU HYDROPOWER PROJECT	
ELECTRO - MECHANICAL EQUIPMENT POWERHOUSE GENERAL LAYOUT	
MAHA NAKORN CONSULTANTS CO., LTD.	DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY
DESIGNED P. 710.37853	REVIEWED
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
APPROVED	APPROVED
PROJECT MANAGER	DATE 8/12/51
DRAWING NO. HPP-PH-01	SHEET NO. 14 OF 26



CROSS SECTION

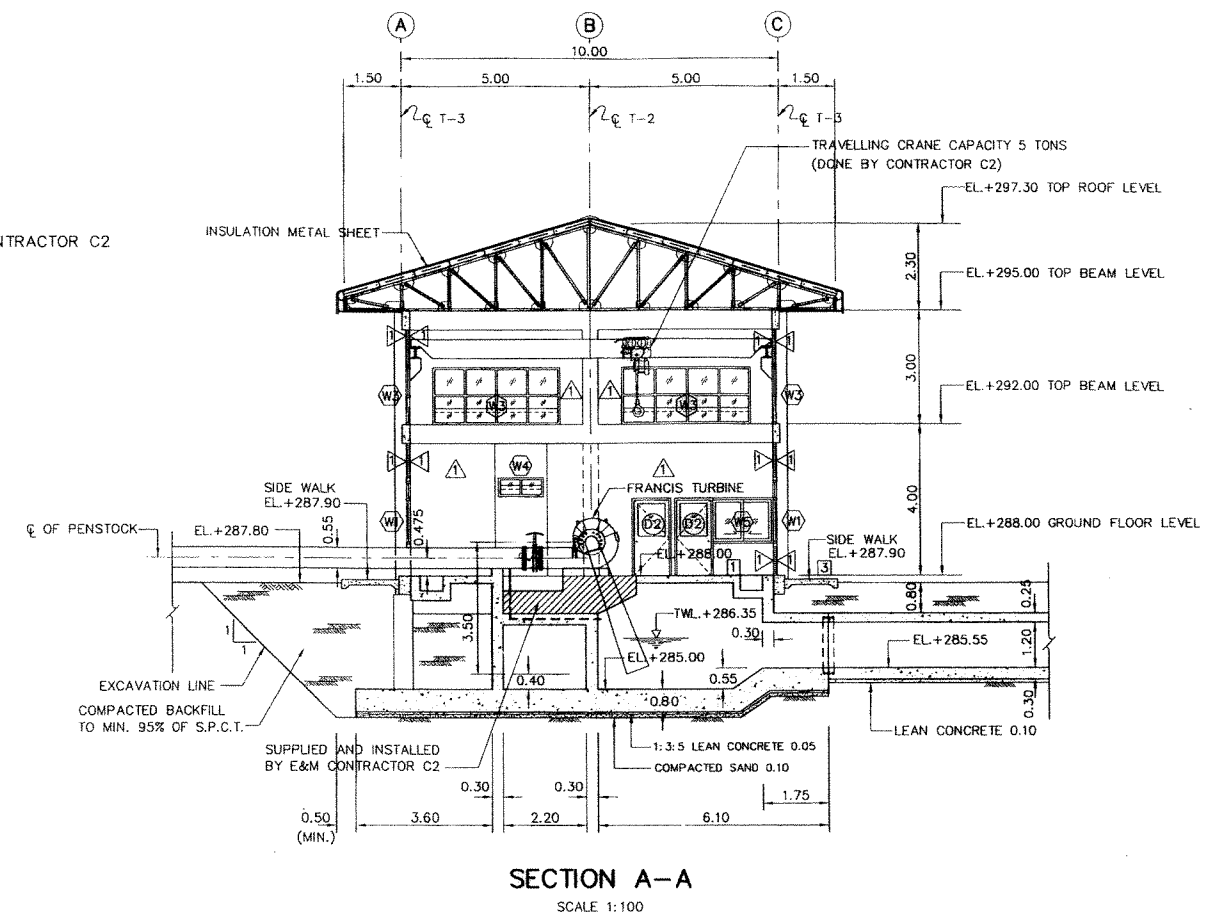
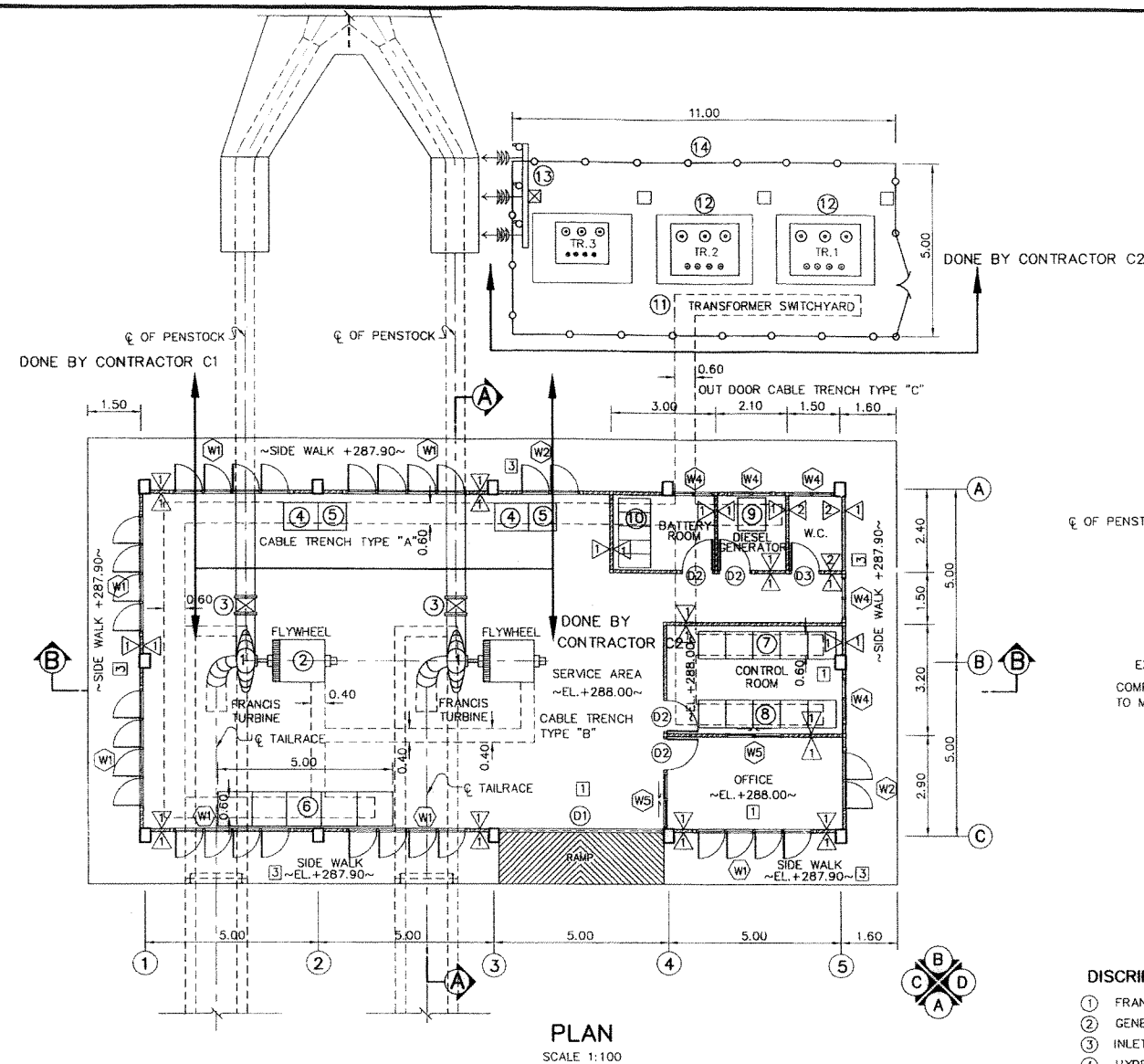
SCALE 1:100

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HPP-GN-03
3. TURBINE & GENERATOR FOUNDATIONS, TRENCH AND BLOCKOUT SIZES AND LOCATIONS ARE ONLY APPROXIMATE. THE ELECTRO-MECHANICAL CONTRACTOR IS REQUIRED TO SUBMIT THE SHOP DRAWINGS INDICATED ALL FINAL SIZES AND LOCATIONS TO FIELD ENGINEER.

0 1.0 2.0 4.0 6.0 8.0
SCALE 1:100 METERS

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUI PA PU HYDROPOWER PROJECT			
ELECTRO - MECHANICAL EQUIPMENT POWERHOUSE CROSS SECTION			
MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	NO. 37853	REVIEWED	NO. 4651
DRAWN		SUBMITTED	
CHECKED		RECOMMENDED	
NO.	DATE	REVISIONS	APPROVED
CONSULTANTS		DEDE	
PROJECT MANAGER		DATE	8/12/51
DRAWING NO.		HPP-PH-02	
SHEET NO.		15 OF 26	



DISCRPTION :

- | | |
|--|-------------------------------|
| ① FRANCIS TURBINE | ⑪ SWITCHYARD |
| ② GENERATOR | ⑫ MAIN TRANSFORMER |
| ③ INLET VALVE AND BYPASS VALVE | ⑬ TAKE OFF STRUCTURE |
| ④ HYDRAULIC UNIT | ⑭ TRANSFORMER FENCE SWICHYARD |
| ⑤ TURBINE-GOVERNOR BOARD | |
| ⑥ GENERATOR CONTROL & LV ELECTRICAL PANELS | |
| ⑦ 0.4 kV SWITCH GEAR CUBICLES | |
| ⑧ AC, DC BOARD AND BATTERY CHARGER | |
| ⑨ DIESEL ENGINE GENERATOR SET | |
| ⑩ BATTERY AND RACK | |

FLOOR FINISH SYMBOLS :

- ① COARSE FINISHED
- ② 8"x8" CERAMIC FLOOR TILES
- ③ COATED WITH EPOXY RESIN

WALL FINISH SYMBOLS :

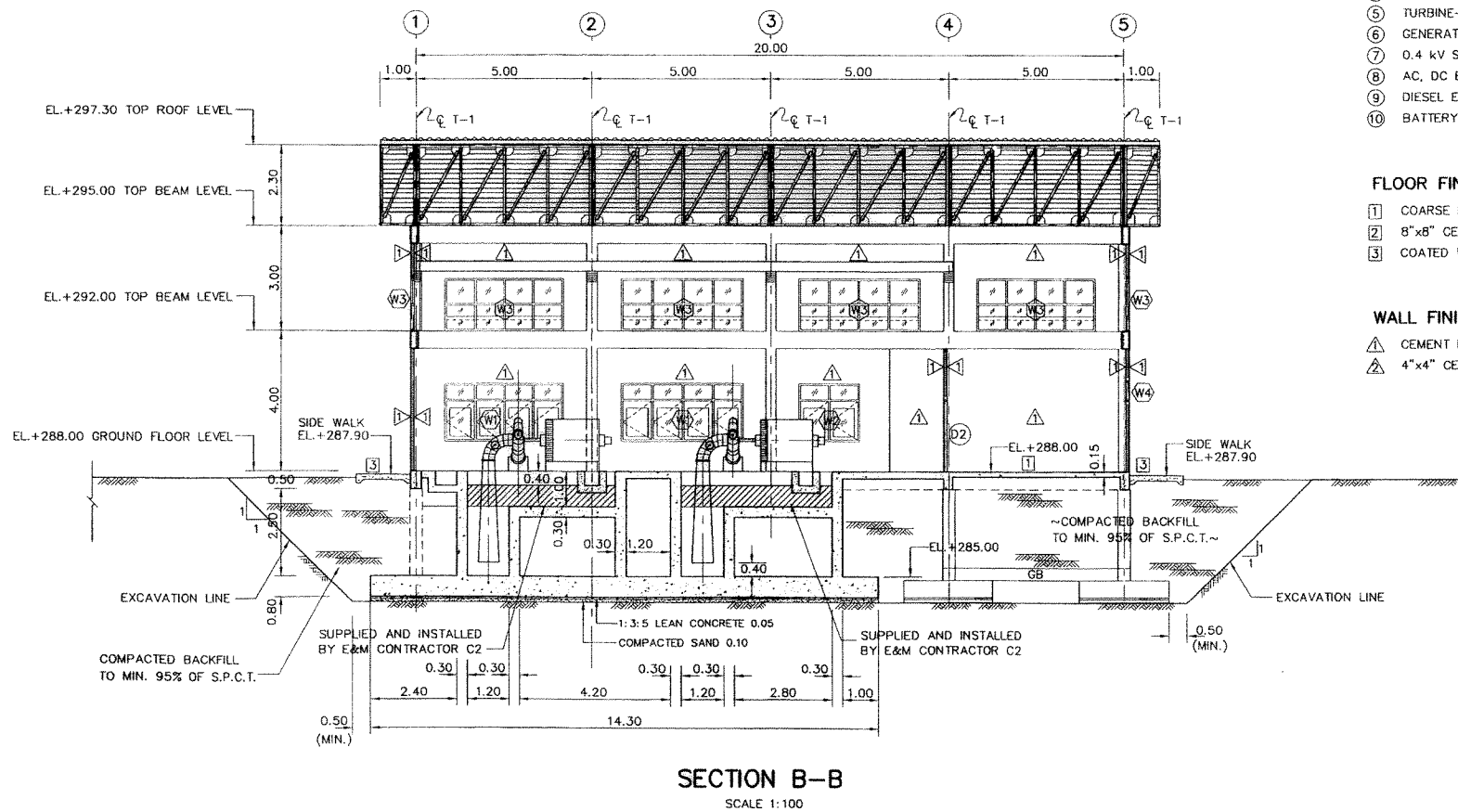
- △ CEMENT PLASTER
- △ 4"x4" CERAMIC FLOOR TILES

NOTES :

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

REFERENCE DRAWINGS :

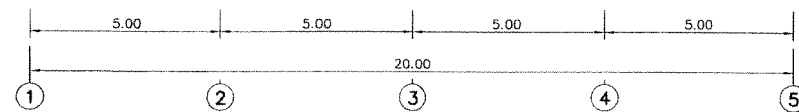
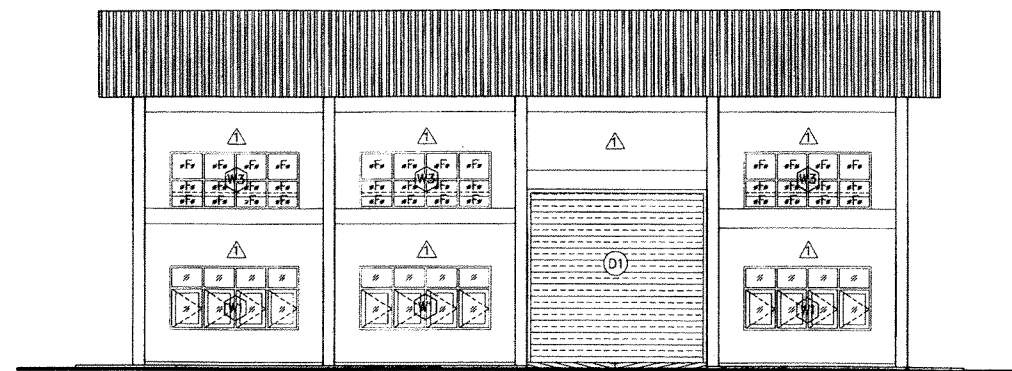
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|-------------------------------|-----------|
| 1. POWERHOUSE, GENERAL LAYOUT | HPP-PH-01 |
| 2. POWERHOUSE, ELEVATIONS | HPP-PH-04 |



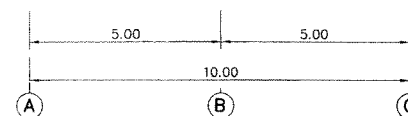
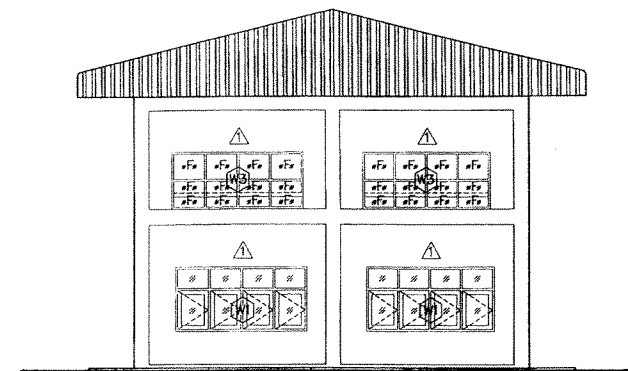
0 1.0 2.0 4.0 6.0 8.0
SCALE 1:100 METERS

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUAI PA PU HYDROPOWER PROJECT			
ELECTRO - MECHANICAL EQUIPMENT POWERHOUSE PLAN AND SECTIONS			
MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	REVIEWED	SUBMITTED	APPROVED
DRAWN	RECOMMENDED	APPROVED	
CHECKED	DATE	DATE	SHEET NO.
PROJECT MANAGER	8/12/51	HPP-PH-03	16 OF 26

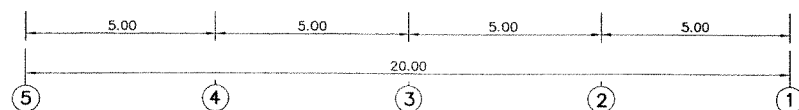
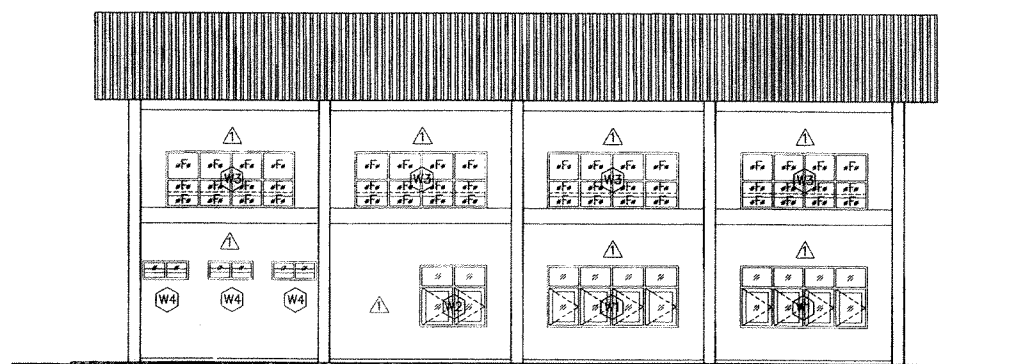
3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED



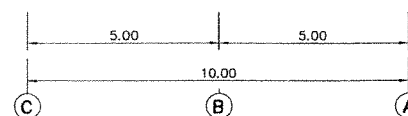
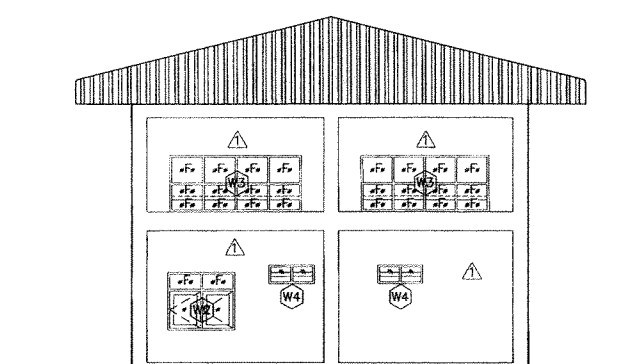
ELEVATION "A"
SCALE 1:100



ELEVATION "C"
SCALE 1:100



ELEVATION "B"
SCALE 1:100



ELEVATION "D"
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. HPP-GN-03

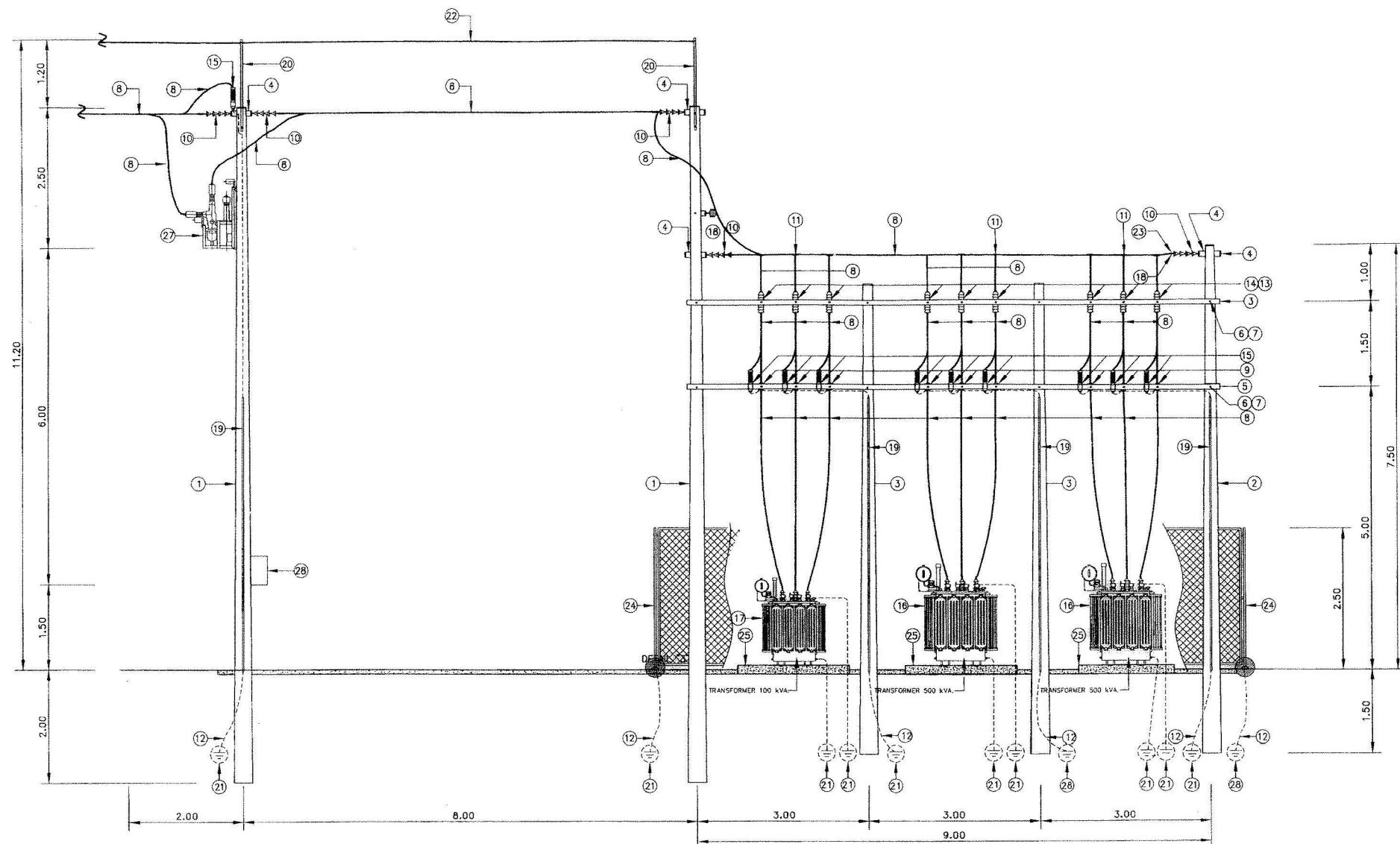
REFERENCE DRAWINGS :

1. POWERHOUSE, GENERAL LAY-OUT HPP-PH-01
2. POWERHOUSE, PLAN AND SECTIONS HPP-PH-03

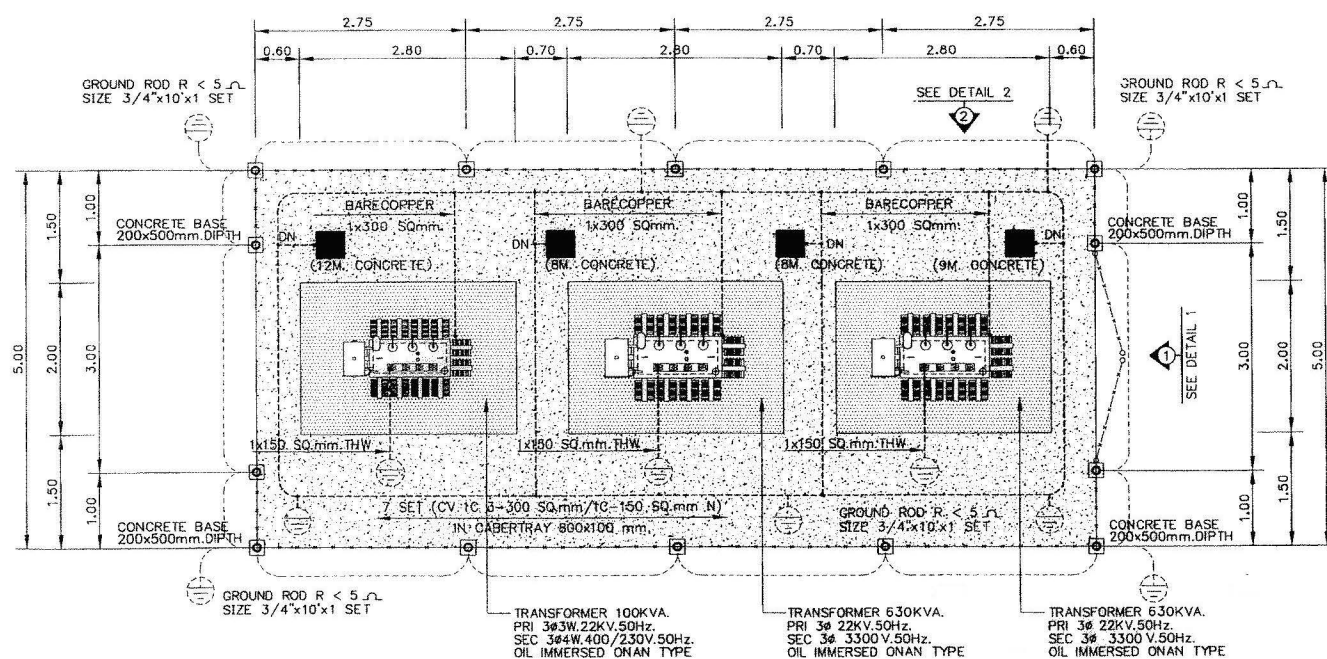


KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUI PA PU HYDROPOWER PROJECT			
ELECTRO — MECHANICAL EQUIPMENT POWERHOUSE ELEVATIONS			
MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	RE. 37953	RE. 4651	REVIEWED
DRAWN			SUBMITTED
CHECKED	RE. 4651		RECOMMENDED
APPROVED			APPROVED
CONSULTANTS	DEDE	DRAWING NO. HPP-PH-04	SHEET NO. 17 OF 26

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED



SECTION
SCALE 1:50



PLAN
SCALE 1:50

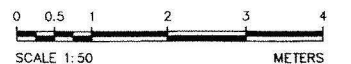
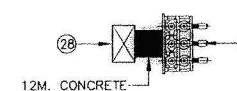
BILL OF MATERIAL	
ITEM	DESCRIPTION
1	POLE, CONCRETE 12 M. LONGS
2	POLE, CONCRETE 9 M. LONGS
3	POLE, CONCRETE 8 M. LONGS
4	CROSSARM, CONCRETE, H.T 120x120x2,000 mm. LONGS
5	BEAM, SPUN PRESTRESSED CONCRETE 100x100x3,200 mm.
6	BOLT MACHINE 5/8"x12" mm.
7	WASHER, SQUARE, FLAT 2 1/2" FOR 5/8" BOLT
8	ALL ALUMINIUM CONDUCTOR 185 SQ.mm. (ACSR)
9	LINE POST TYPE INSULATOR ANSI STANDARD 57-2L 22kV. (POWER ARC.)
10	INSULATOR SUSPENSION TYPE, EEI-NEMA CLASS 52-1 COMPLETE WITH PIN
11	SLEEVE COMPRESSION TYPE FOR AERIAL CABLE 185 SQ.mm
12	WIRE, STEEL STRANDED, 50/7 Sqmm.
13	DROPOUT FUSE CUTOFF 27 kV. 100 A. BASE
14	FUSE LINK TYPE K 27 kV.
15	LIGHTNING ARRESTER, 21 kV, 10 kA
16	TRANSFORMER SIZE 630 kVA
17	TRANSFORMER SIZE 100 kVA.
18	CLEVIS, THIMBLE DEADEND
19	PIPE, S'LOD # 20x4,000 mm COMPLETE WITH FIXING ACCESSORIES
20	ANGLE STEEL SIZE 100x50x5 mm. LONGS 2.25 m.
21	GROUND ROD 5/8"x10'
22	OVERHEAD GROUND WIRE 25 SQmm.
23	DEADEND CLAMP FOR AAC 185 SQmm.
24	FENCE
25	TRANSFORMER CONCRETE FOUNDATION
26	RECLOSER 27 kV
27	CONTROL CABINET

NOTES :

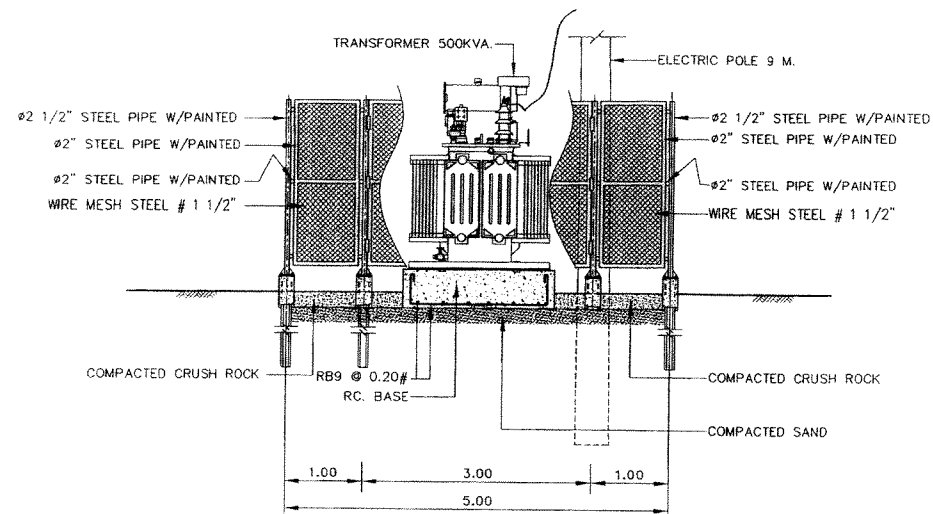
- ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
- SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HPP-CN-03
- THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONTRACTOR HAS TO SUBMITTED SHOP DRAWING TO FIELD ENGINEER FOR APPROVAL

REFERENCE DRAWING :

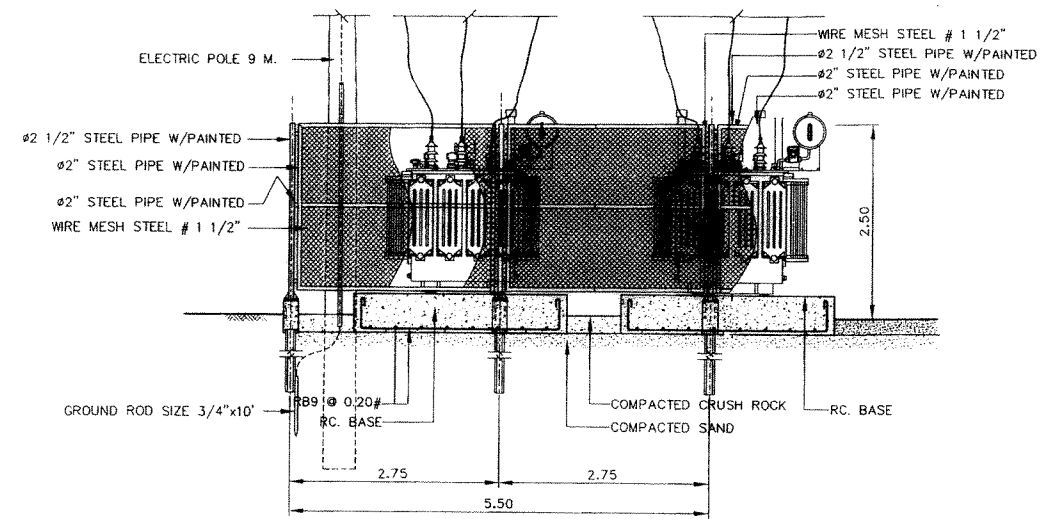
- POWERHOUSE, TRANSFORMER SWITCHYARD, DETAILS HPP-PH-06



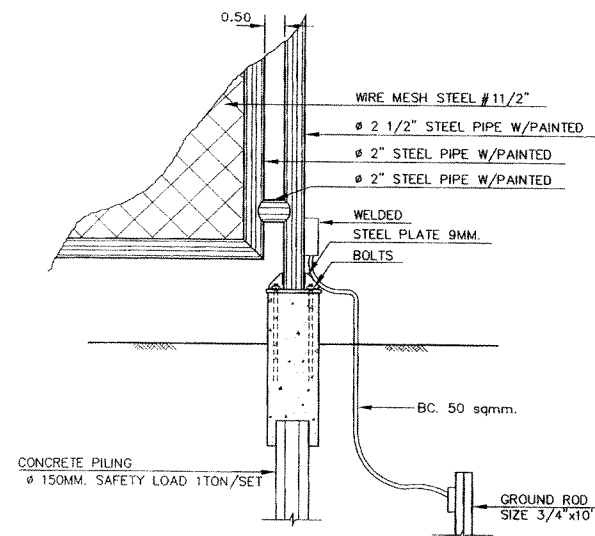
KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUAI PA PU HYDROPOWER PROJECT			
ELECTRO - MECHANICAL EQUIPMENT POWERHOUSE TRANSFORMER SWITCHYARD, PLAN AND SECTION			
WAHA NAKORN CONSULTANTS CO.,LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	20/12/51	SUBMITTED	20/12/51
DRAWN	20/12/51	RECOMMENDED	20/12/51
CHECKED	20/12/51	APPROVED	20/12/51
PROJECT MANAGER		DATE	
CONSULTANTS		DEDE	
DRAWING NO		SHEET NO.	
HPP-PH-05		18 OF 26	



DETAIL "1"
SCALE 1:50



DETAIL "2"
SCALE 1:50



DETAIL "3"
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. HPP-GN-03

REFERENCE DRAWING :

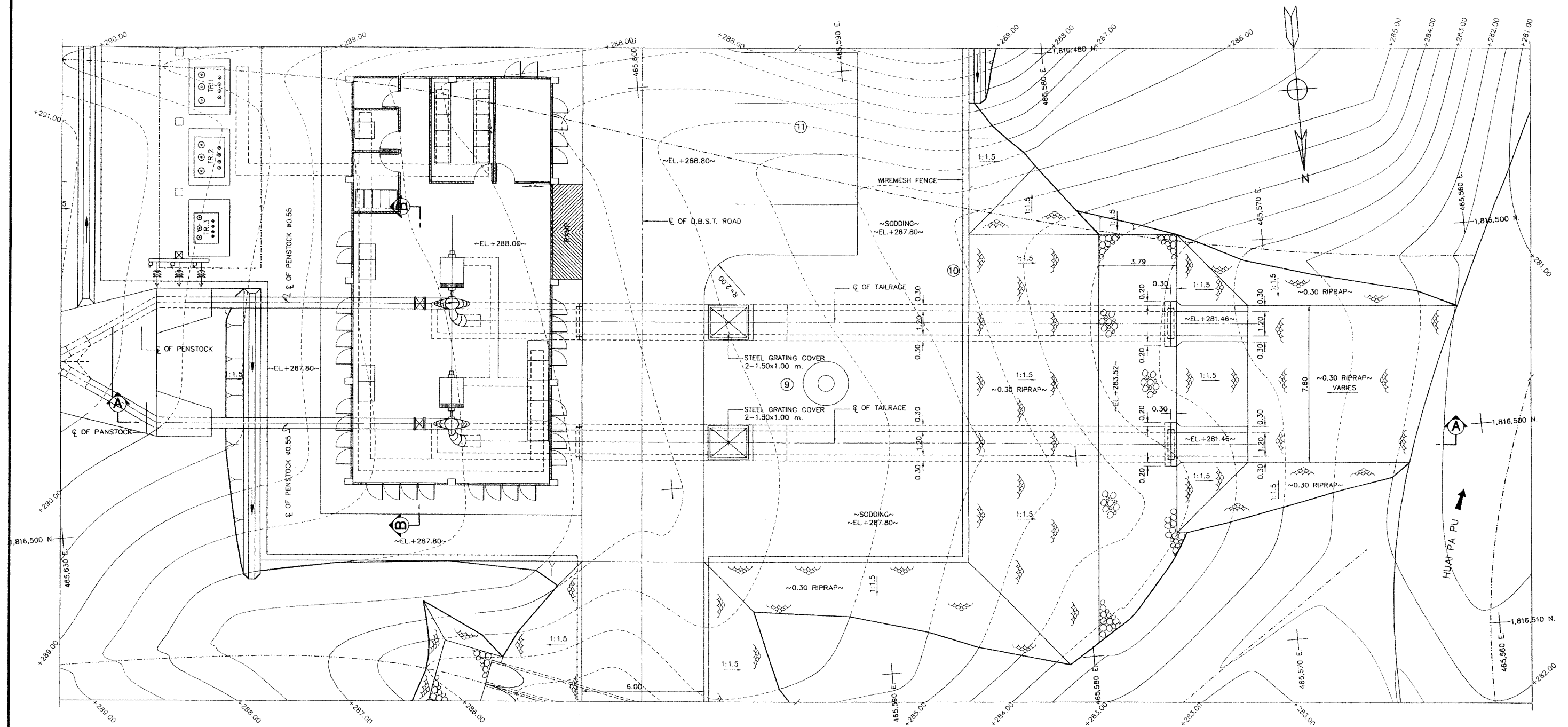
1. POWERHOUSE, TRANSFORMER SWITCHYARD, PLAN AND SECTION HPP-PH-05



KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUAI PA PU HYDROPOWER PROJECT			
ELECTRO - MECHANICAL EQUIPMENT POWERHOUSE TRANSFORMER SWITCHYARD, DETAILS			
MAHA NAKORN CONSULTANTS CO.,LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED		SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED		APPROVED	
PROJECT MANAGER		DRAWING NO. HPP-PH-06	
DATE		SHEET NO. 19 OF 26	

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED

\\FILES-SERVER\000783\FINAL\G2\TR\HPP-TR-01\7-12-2008



PLAN

SCALE 1:100

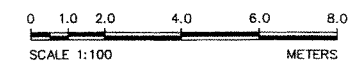
NOTES :

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

REFERENCE DRAWING :

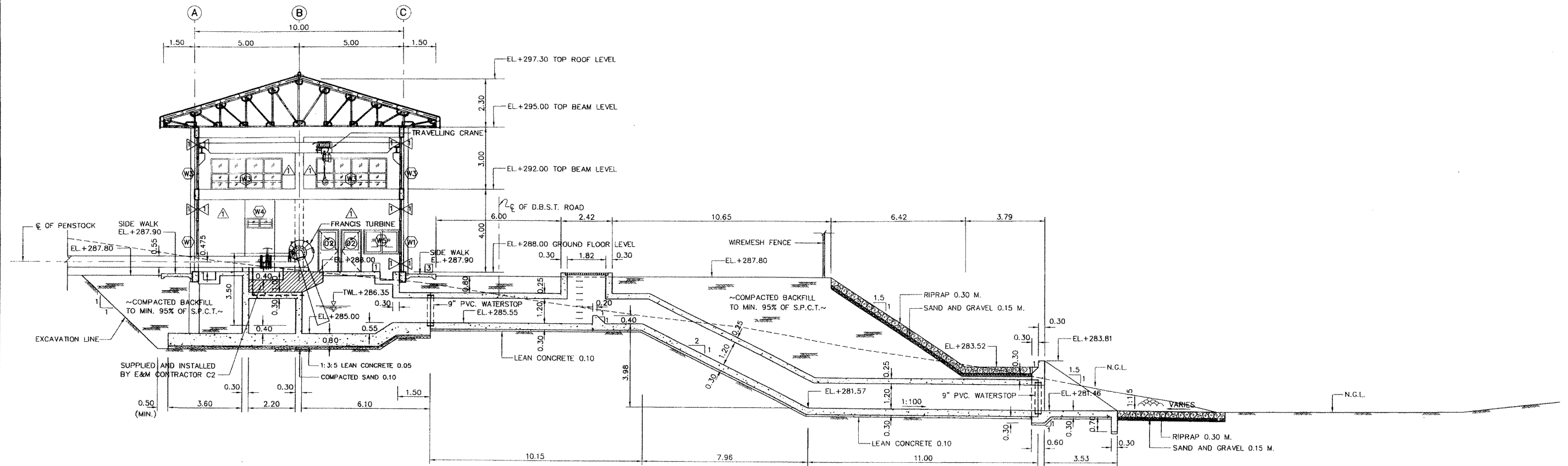
1. TAILRACE, SECTIONS AND DETAIL

HPP-TR-02

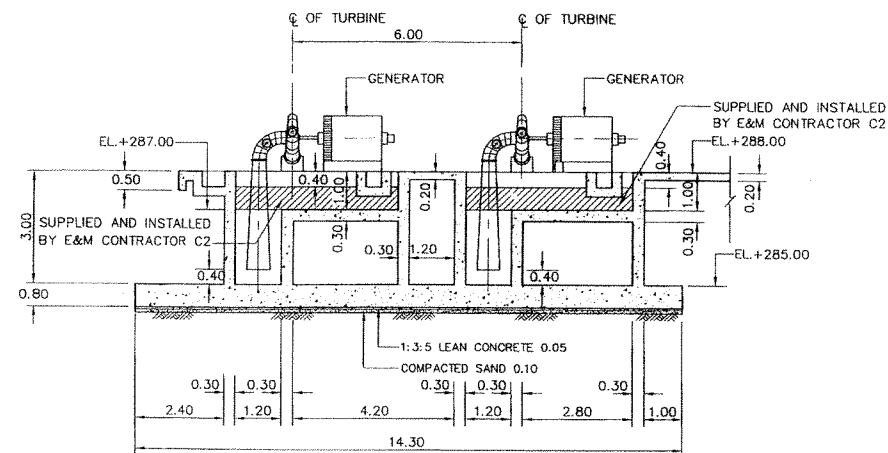


3					
2					
1					
NO.	DATE	REVISIONS	CHECKED	APPROVED	
			CONSULTANTS	DEDE	

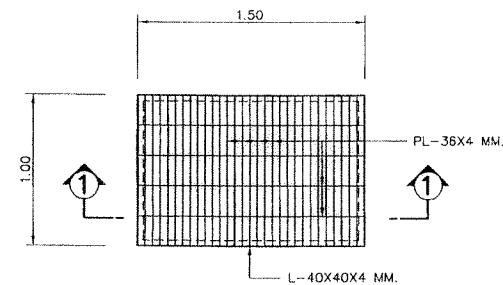
KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUI PA PU HYDROPOWER PROJECT	
ELECTRO - MECHANICAL EQUIPMENT TAILRACE PLAN	
MAHA NAKORN CONSULTANTS CO., LTD.	DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY
DESIGNED P. J. 201.37053	REVIEWED
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
PROJECT MANAGER	APPROVED
8/12/51	DRAWING NO. HPP-TR-01
DATE	SHEET NO. 20 OF 26



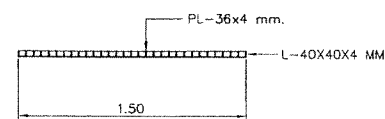
SECTION A-A
SCALE 1:100



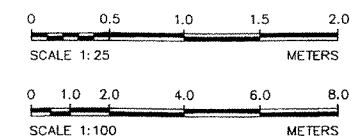
SECTION B-B
SCALE 1:100



DETAIL OF GRATING
SCALE 1:25



SECTION 1-1
SCALE 1:25



NOTES :

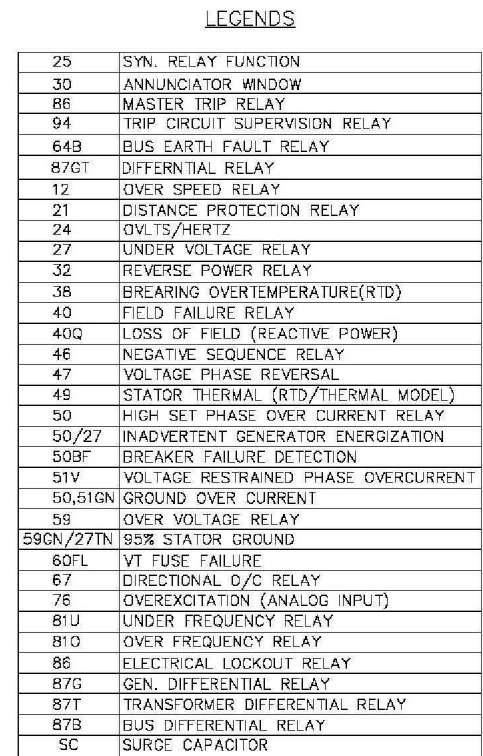
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HPP-GN-03

REFERENCE DRAWING :

1. TAILRACE, PLAN

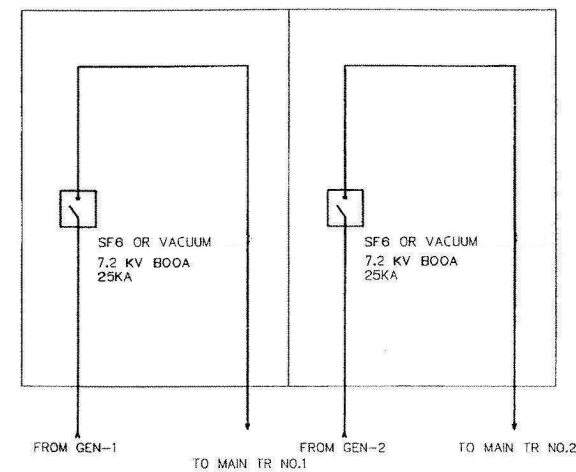
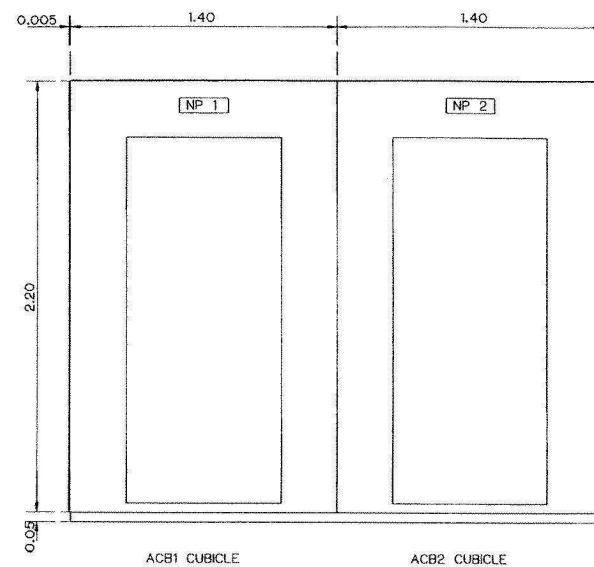
HPP-TR-01

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUAI PA PU HYDROPOWER PROJECT	
ELECTRO — MECHANICAL EQUIPMENT TAILRACE SECTIONS AND DETAIL	
MAHA NAKORN CONSULTANTS CO., LTD.	DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY
DESIGNED <i>P. J.</i> / 37053	REVIEWED <i>[Signature]</i>
DRAWN <i>[Signature]</i>	SUBMITTED <i>[Signature]</i>
CHECKED <i>[Signature]</i> 28/4/51	RECOMMENDED <i>[Signature]</i>
APPROVED <i>[Signature]</i>	APPROVED <i>[Signature]</i>
CONSULTANTS	DEDE
PROJECT MANAGER	DATE 8/12/51
DRAWING NO. HPP-TR-02	SHEET NO. 21 OF 26



2. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, IT SHALL BE
BE DESIGNED AND SPECIFIED LATER BY CONTRACTOR C2
AND SUBMITTED TO FIELD ENGINEER FOR APPROVAL

					MAHA NAKORN CONSULTANTS CO.,LTD.		DEVELOPMENT AND EFFICIENCY	
3					DESIGNED	21/01/741	REVIEWED	22
2					DRAWN	21/01/741	SUBMITTED	22
1					CHECKED	21/01/741	RECOMMENDED	22
NO.	DATE	REVISIONS	CHECKED	APPROVED			APPROVED	22
CONSULTANTS					PROJECT MANAGER		DRAWING NO.	SHEET NO.
DEDE					DATE		HPP-EM-01	22 OF 26



7.2 kV CIRCUIT BREAKER CUBICLE

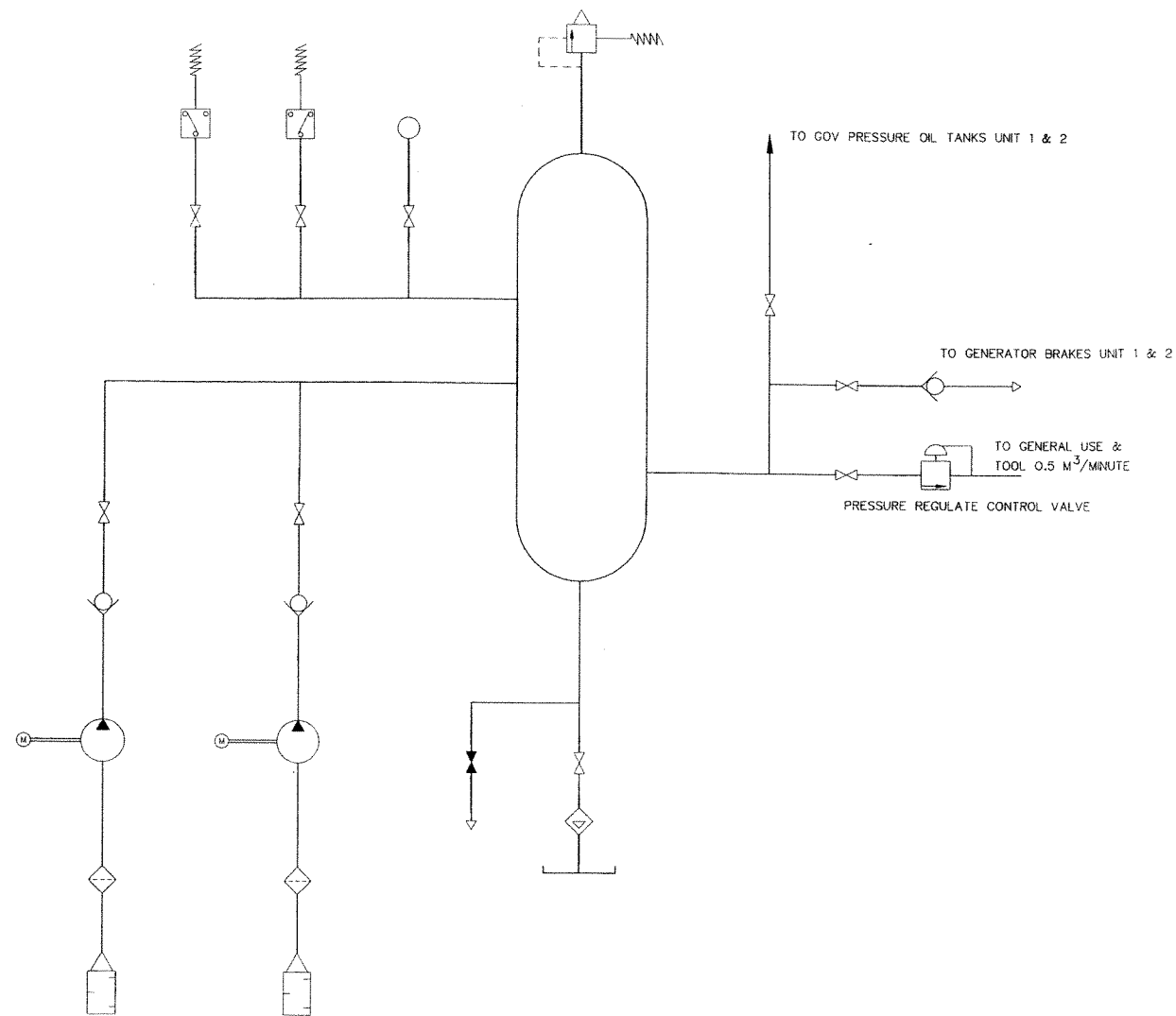
NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN
2. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, IT SHALL BE DESIGNED AND SPECIFIED LATER BY CONTRACTOR C2 AND SUBMITTED TO FIELD ENGINEER FOR APPROVAL

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED

CONSULTANTS DEDE PROJECT MANAGER

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUAI PA PU HYDROPOWER PROJECT	
ELECTRO - MECHANICAL EQUIPMENT 7.2 kV CIRCUIT BREAKER CUBICLE	
MAHA NAKORN CONSULTANTS CO.,LTD.	DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY
DESIGNED <i>[Signature]</i> 24/7/41	REVIEWED <i>[Signature]</i>
DRAWN <i>[Signature]</i>	SUBMITTED <i>[Signature]</i>
CHECKED <i>[Signature]</i> 24/7/41	RECOMMENDED <i>[Signature]</i>
APPROVED <i>[Signature]</i>	APPROVED <i>[Signature]</i>
PROJECT MANAGER	SHEET NO.
8/12/51	HPP-EM-03
DATE	24 OF 26



COMPRESSED AIR SYSTEM SCHEMATIC

LEGENDS :

- AUTOMATIC CONDENSATE TRAP
- FILTER OR STRAINER - MANUAL
- AUTOMATIC HAS ADDITIONAL DRAIN LINE AND VALVE
- VALVE-NORMALLY OPEN
- VALVE-NORMALLY CLOSED
- NEEDLE VALVE
- ORIFICE
- VALVE-THERMOSTATICALLY CONTROLLED
- VALVE-PRESSURE REGULATING
- VALVE-PRESSURE RELIEF (WATER)
- VALVE-SOLENOID OPERATED PRESSURE REDUCING
- VALVE-PRESSURE RELIEF (AIR)
- VALVE-SOLENOID OPERATED OIL PRESSURE ACTUATED

- VALVE-NON RETURN
- PRESSURE SWITCH
- AIR VENT
- HEAD EXCHANGER
- FLOW RELAY
- FLOW METER
- PRESSURE GAUGE
- RECEIVER
- PUMP OR COMPRESSOR
- SILENCER
- DIRECTION OF FLOW
- MOTORIZED VALVE

NOTES :

1. PIPING & FITTING TO WORK SHOP ROOM AND MACHINE HALL FOR UNIT 1 & UNIT 2 SHALL BE PROVIDED BY THE CONTRACTOR
2. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, IT SHALL BE BE DESIGNED AND SPECIFIED LATER BY CONTRACTOR C2 AND SUBMITTED TO FIELD ENGINEER FOR APPROVAL

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUAI PA PU HYDROPOWER PROJECT			
ELECTRO-MECHANICAL EQUIPMENT COMPRESS AIR SYSTEM SCHEMATIC DIAGRAM			
MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED <i>[Signature]</i> 20/12/2023		REVIEWED <i>[Signature]</i>	
DRAWN <i>[Signature]</i>		RECOMMENDED <i>[Signature]</i>	
CHECKED <i>[Signature]</i> 20/12/2023		APPROVED <i>[Signature]</i>	
PROJECT MANAGER		DRAWING NO. HPP-EM-05	
DATE		SHEET NO. 26 OF 26	

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED