



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

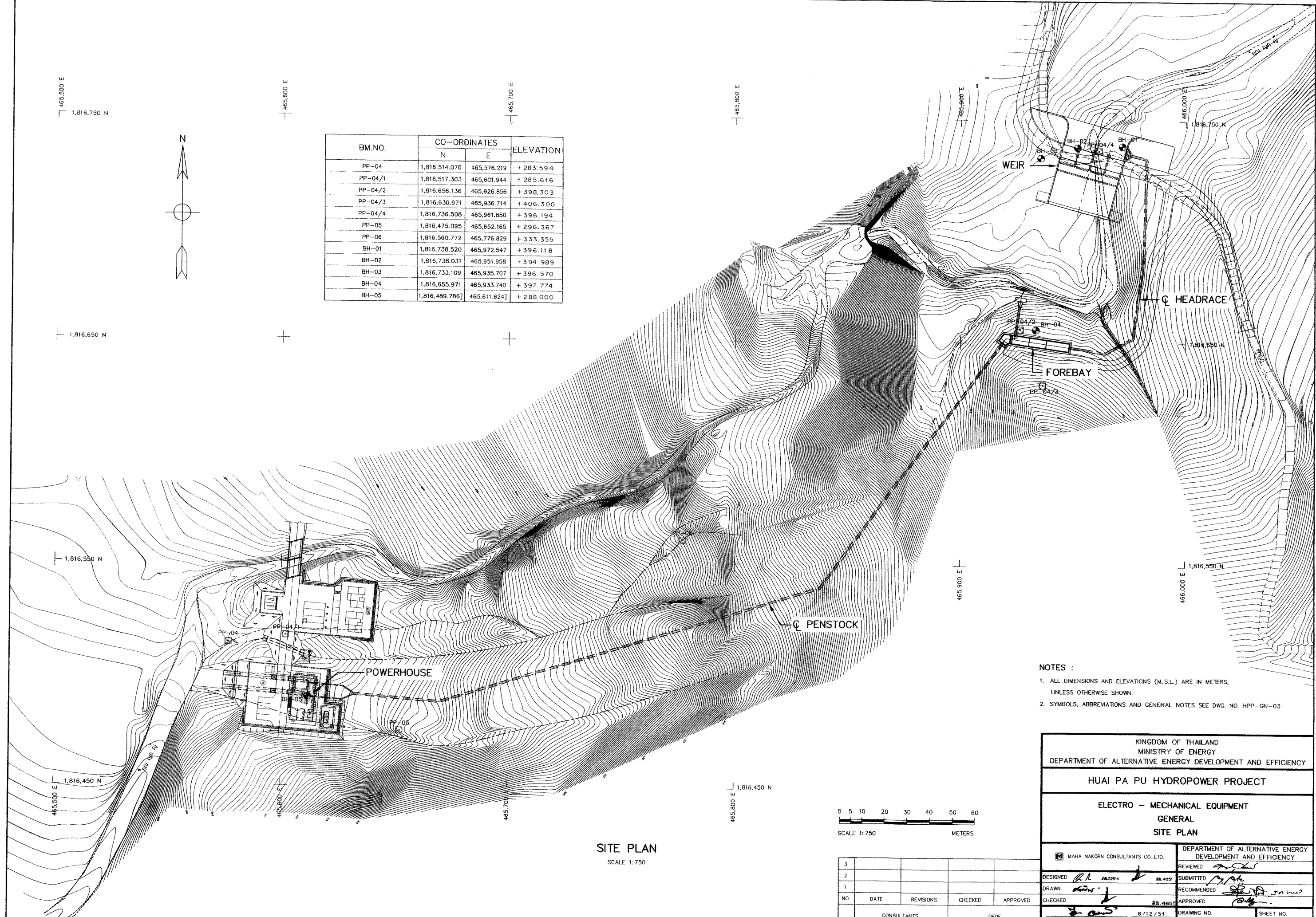


MAHA NAKORN CO.,LTD.

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



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

SITE PLAN
SCALE 1:750

- 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	

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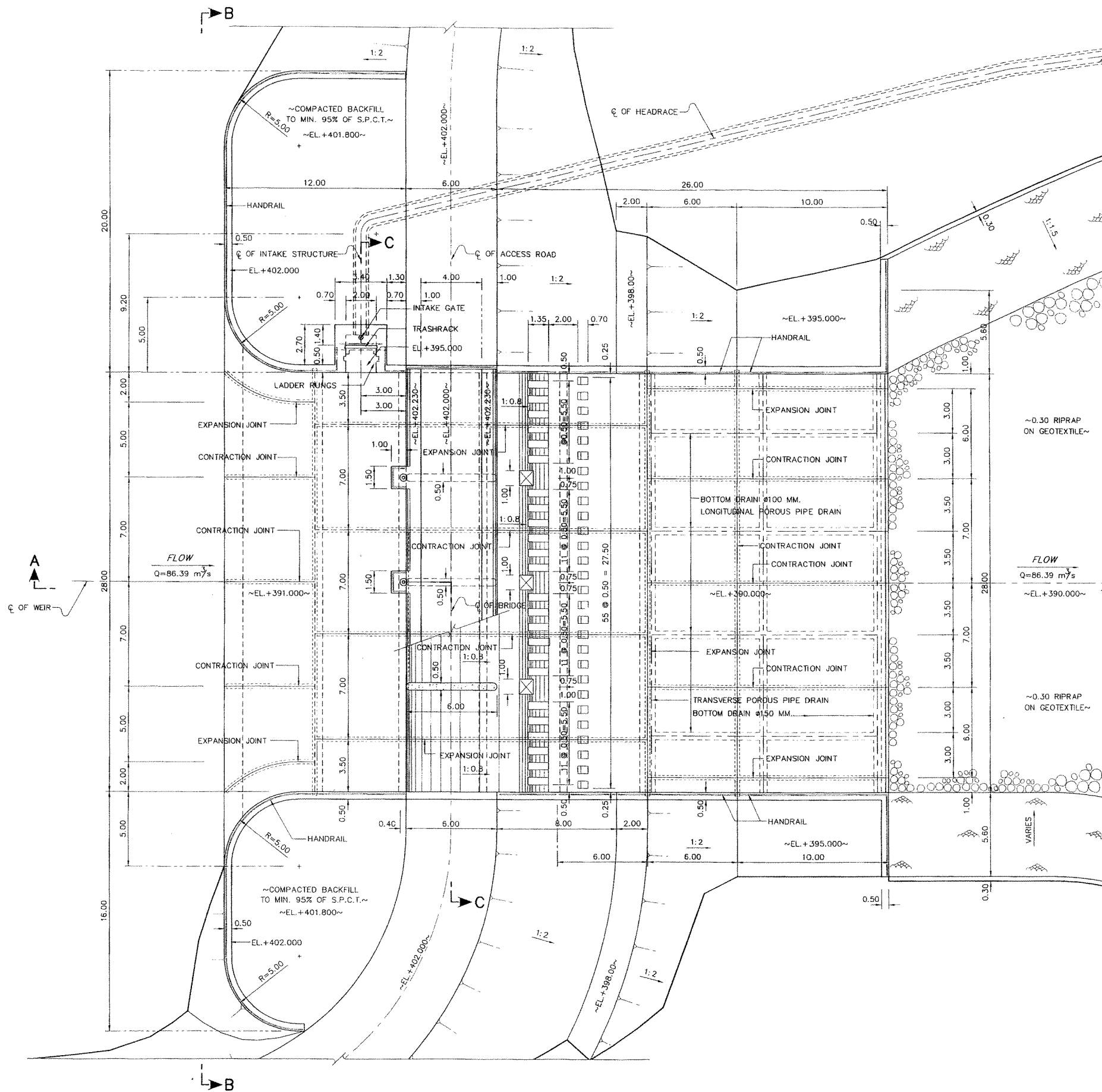
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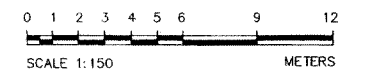
GENERAL PLAN
SCALE 1:150

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.)

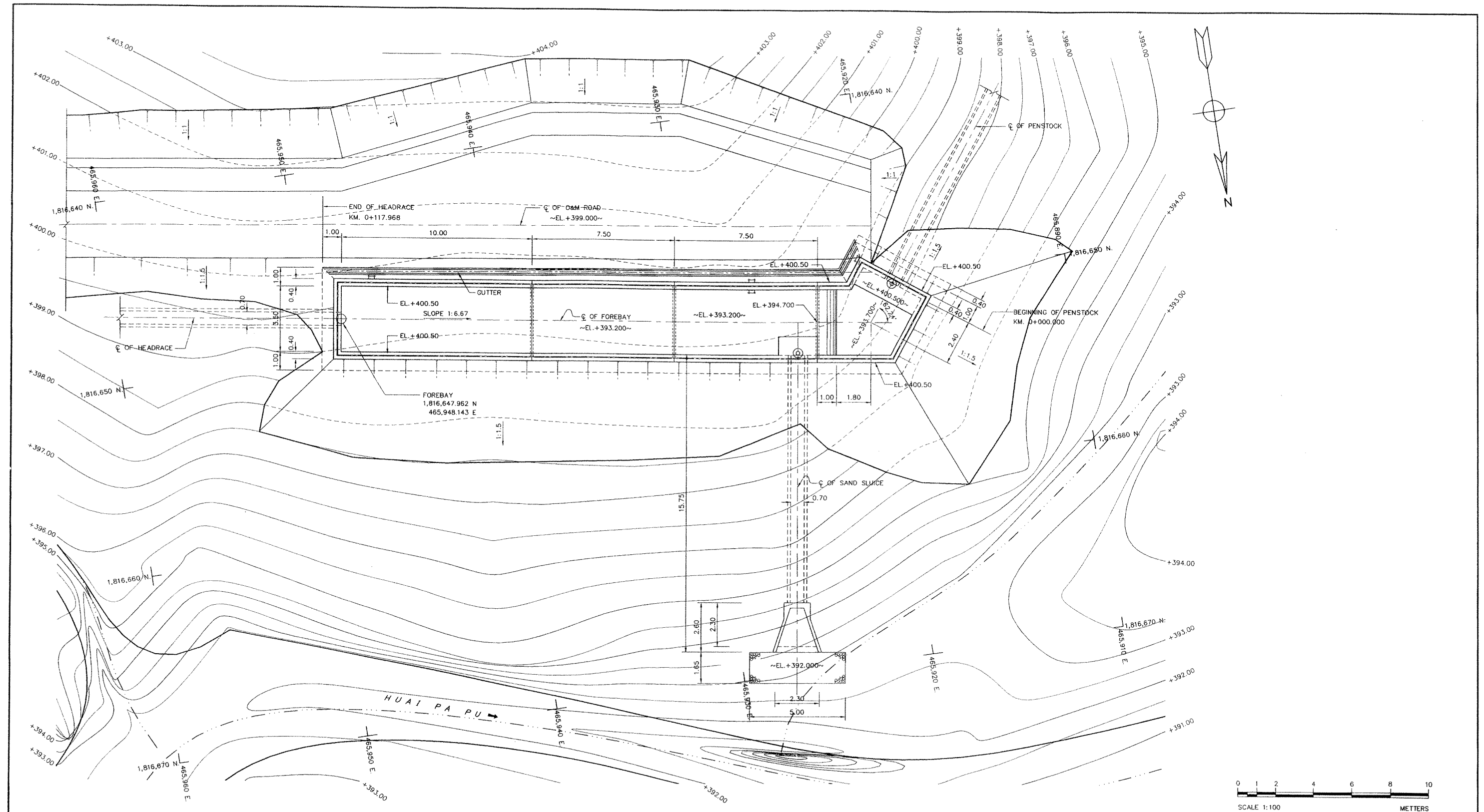
REFERENCE DRAWINGS :

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			SUBMITTED
CHECKED			RECOMMENDED
APPROVED			APPROVED
PROJECT MANAGER		DATE	
DRAWING NO. HPP-WE-01		SHEET NO. 6 OF 25	

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
CONSULTANTS		DEDE		



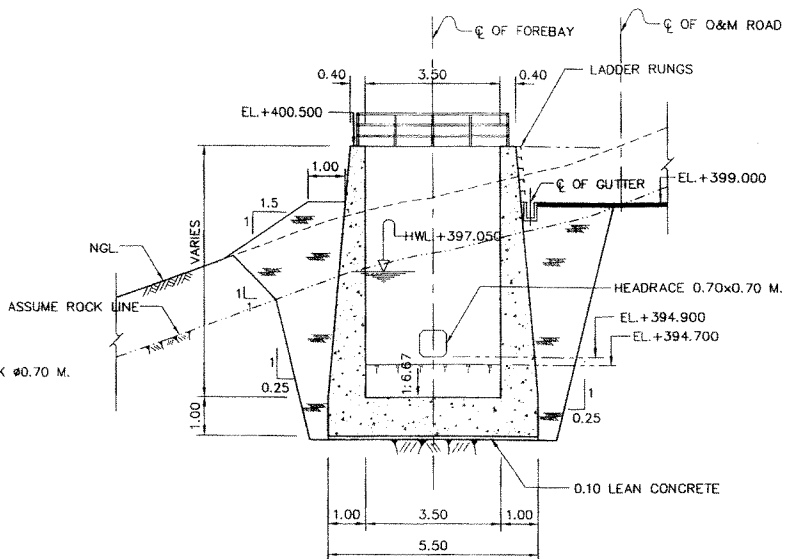
NOTES :

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 :

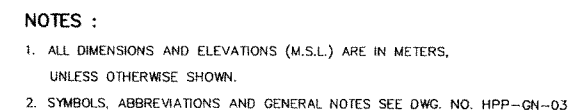
1. FOREBAY, PLAN AND SECTIONS A-A, B-B HPP-FB-02
2. FOREBAY, SECTIONS C-C, D-D, E-E, F-F, G-G HPP-FB-03

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	28.4651	REVIEWED	28.4651
DRAWN	28.4651	SUBMITTED	28.4651
CHECKED	28.4651	RECOMMENDED	28.4651
APPROVED	28.4651	APPROVED	28.4651
PROJECT MANAGER	8/12/51	DRAWING NO.	HPP-FB-01
DATE		SHEET NO.	9 OF 26



SECTION B-B

SCALE 1:100

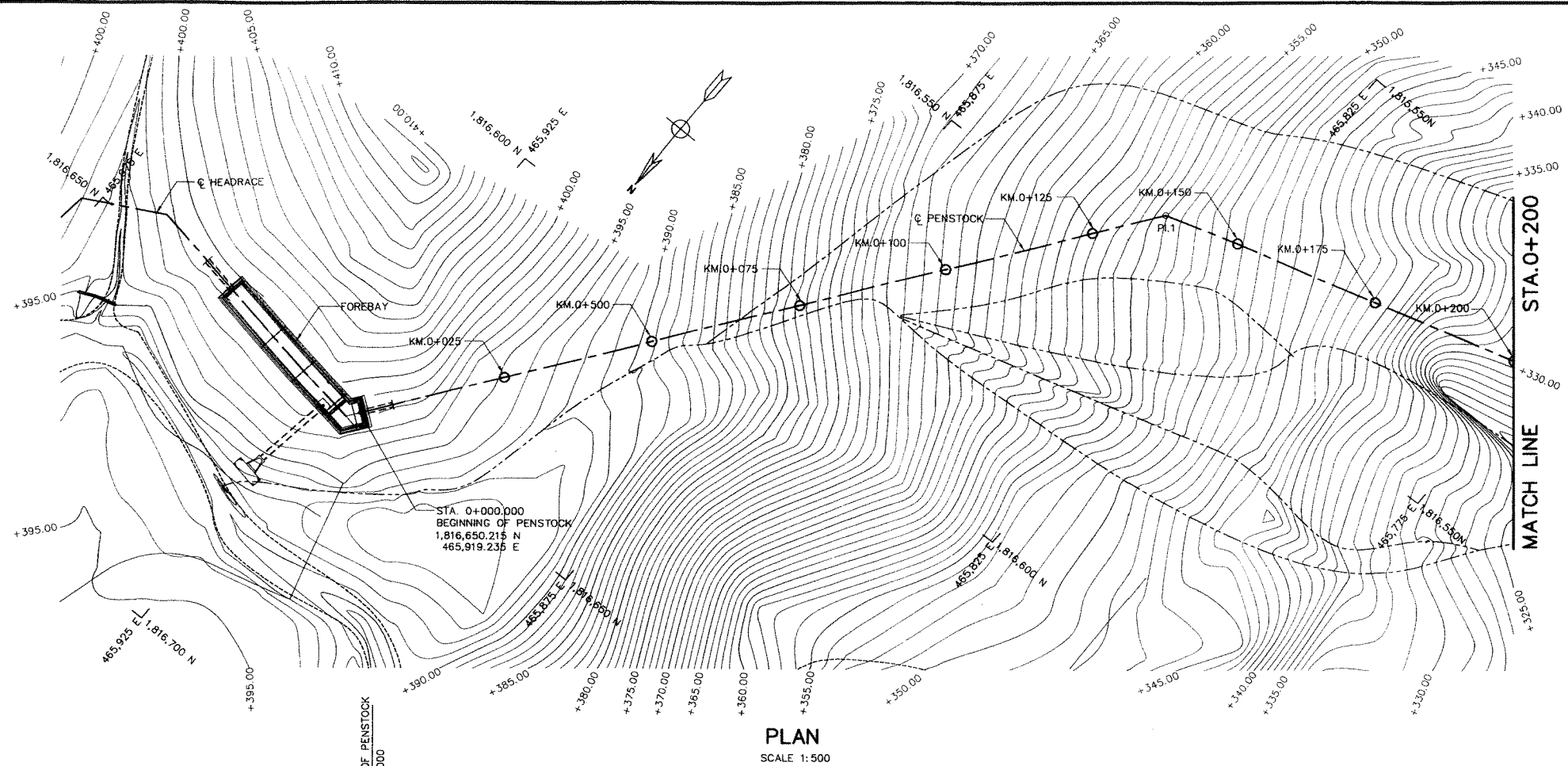


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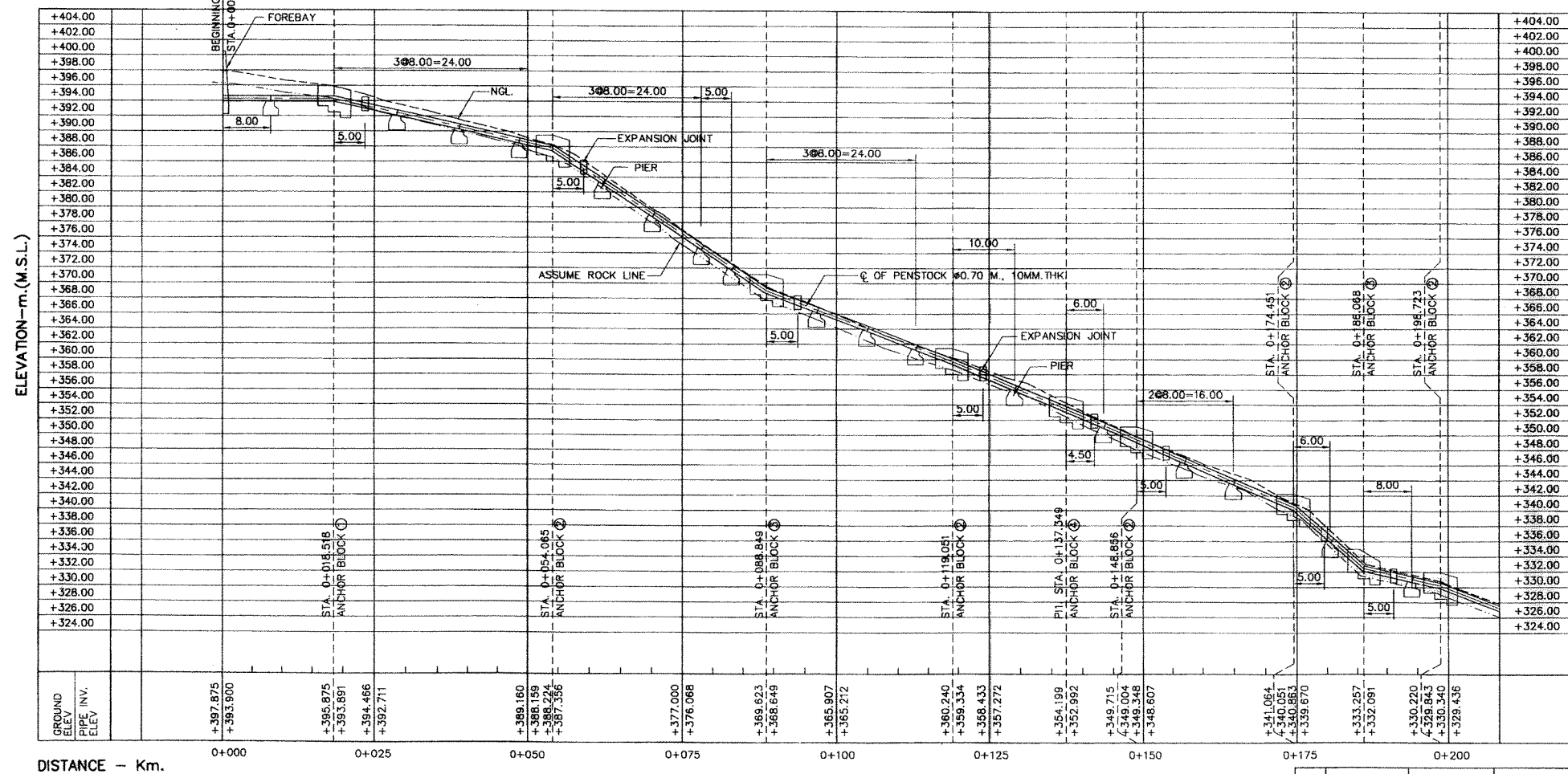
- | | |
|--|-----------|
| 1. FOREBAY, GENERAL LAY-OUT | HPP-FB-01 |
| 2. FOREBAY, SECTIONS C-C, D-D, E-E, F-F, G-G | HPP-FB-03 |



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. 40159	REVIEWED 
DRAWN 	SUBMITTED 
CHECKED 	RECOMMENDED 
DATE 8/12/51	APPROVED 
PROJECT MANAGER	DRAWING NO. HPP-FB-02
DATE	SHEET NO. 10 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

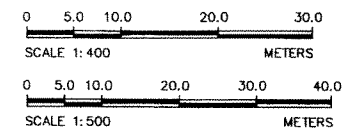


NOTES:

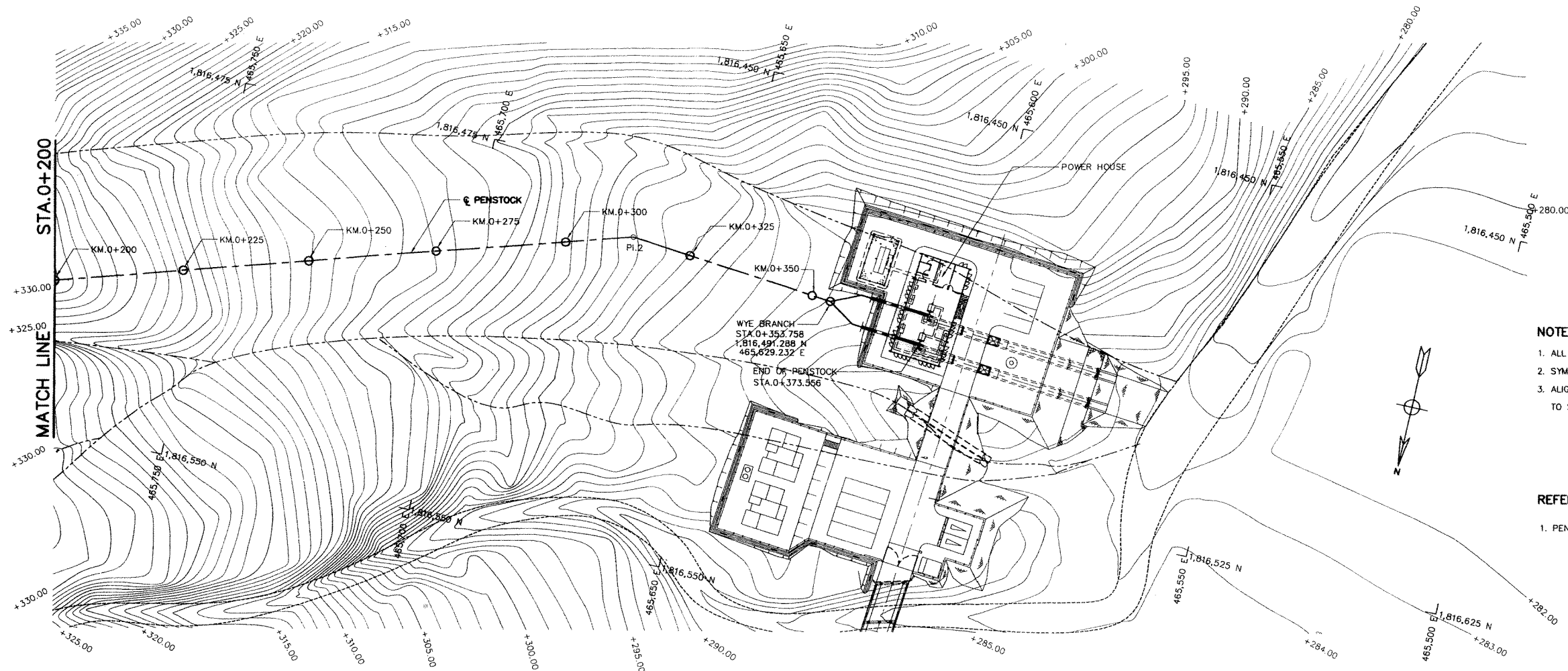
- ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
- SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HPP-GN-03
- ALIGNMENT OF PENSTOCK SHALL BE JUSTIFIED BY FIELD ENGINEER IN THE FIELD TO SUIT THE TOPOGRAPHY

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: <i>[Signature]</i> RL-48188	REVIEWED: <i>[Signature]</i> RL-4851
DRAWN: <i>[Signature]</i>	SUBMITTED: <i>[Signature]</i>
CHECKED: <i>[Signature]</i>	RECOMMENDED: <i>[Signature]</i>
APPROVED: <i>[Signature]</i>	APPROVED: <i>[Signature]</i>
PROJECT MANAGER	DRAWING NO. HPP-PS-01
DATE: 8/12/51	SHEET NO. 12 OF 26



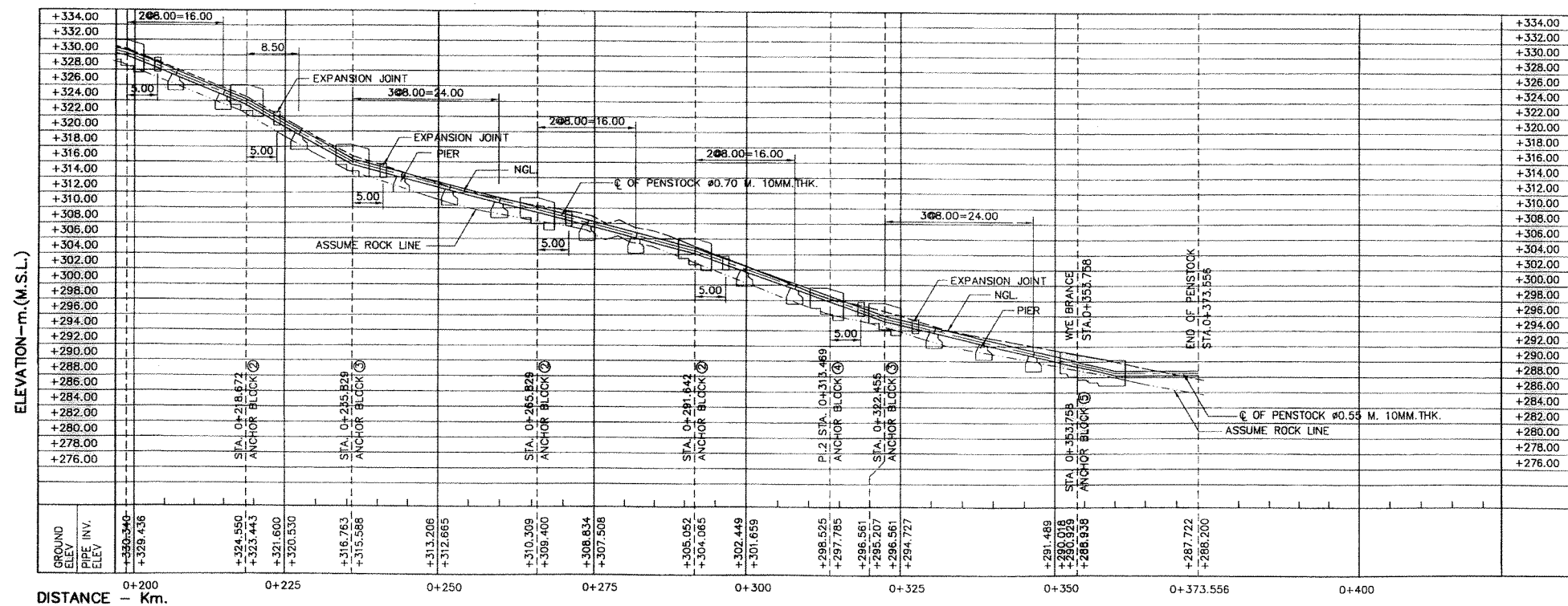
PLAN
SCALE 1:500

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

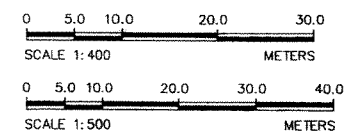


PROFILE

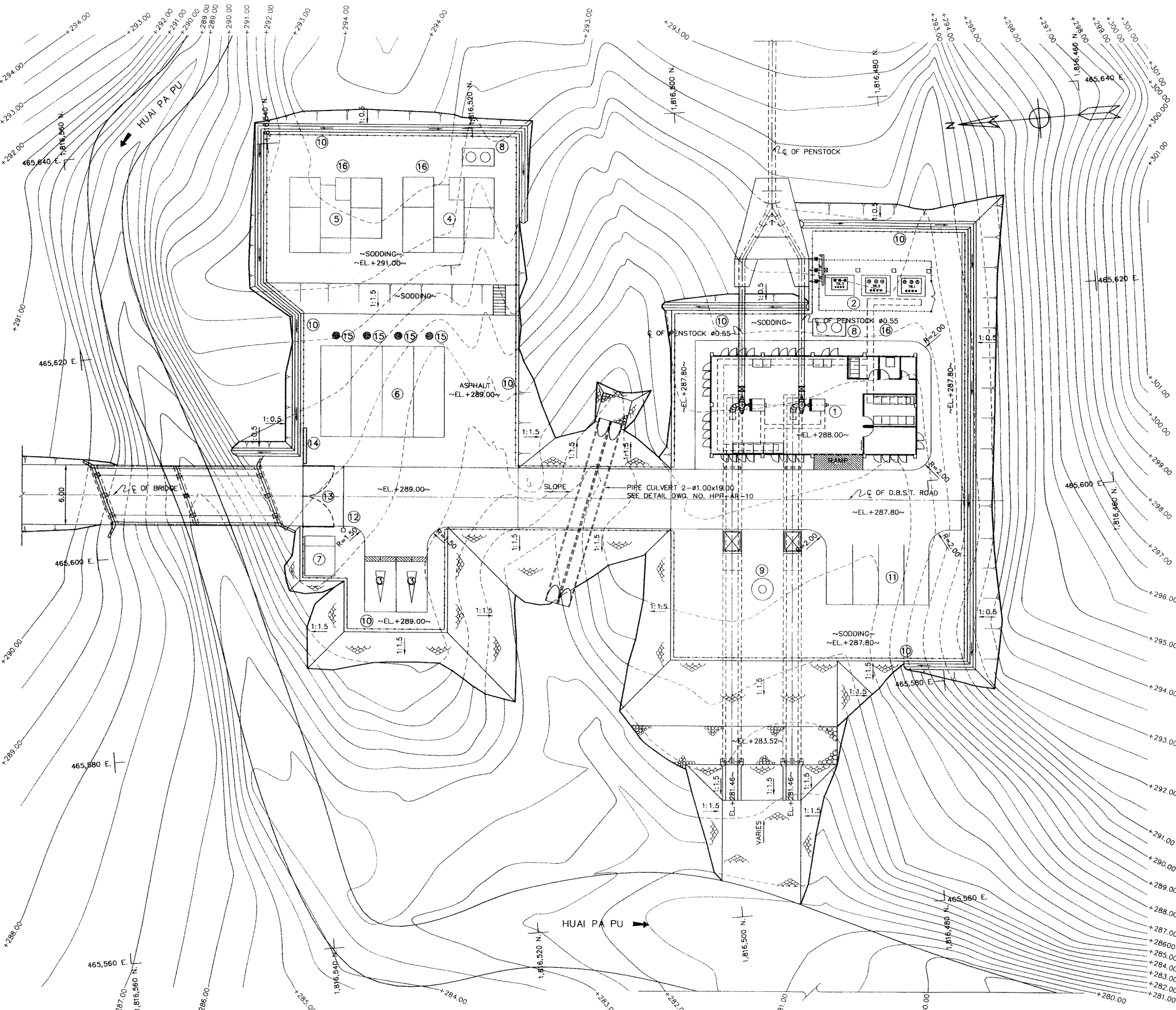
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:400

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			
HUI 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	REVIEWED	SUBMITTED	
DRAWN	RECOMMENDED	APPROVED	
CHECKED	DATE	DRAWING NO.	
CONSULTANTS	DEDE	HPP-PS-02	
PROJECT MANAGER		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

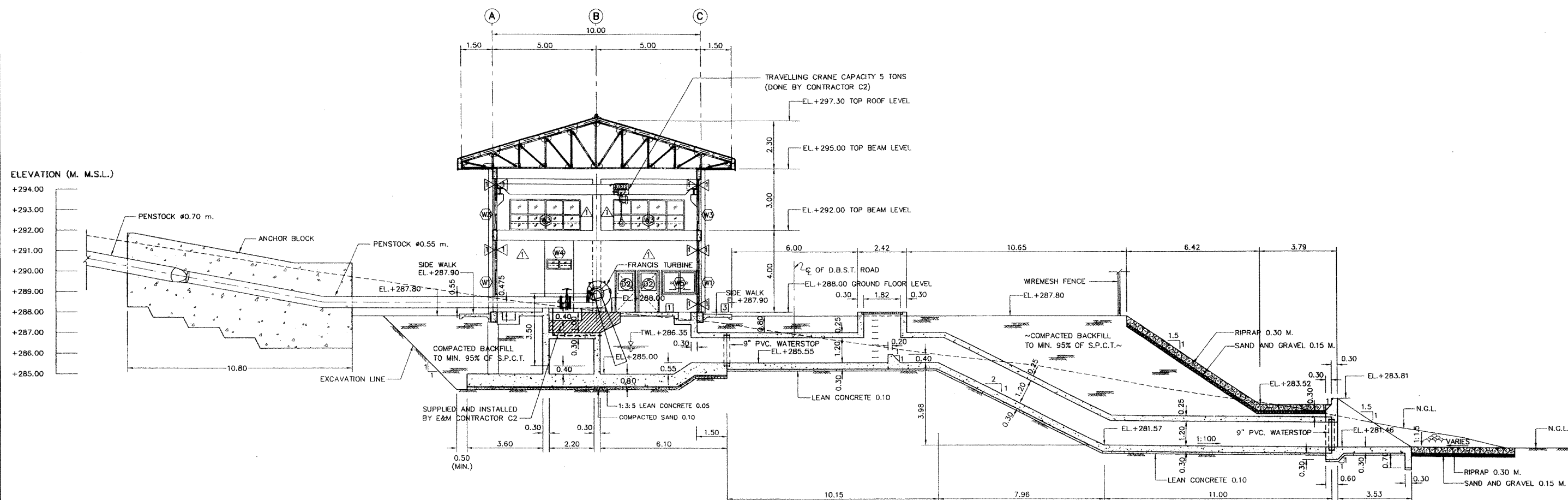
REFERENCE DRAWINGS :

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



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
CONSULTANTS	DEDE
PROJECT MANAGER	DATE 8/12/51
DRAWING NO. HPP-PH-01	SHEET NO. 14 OF 26

GENERAL LAYOUT
SCALE 1: 200



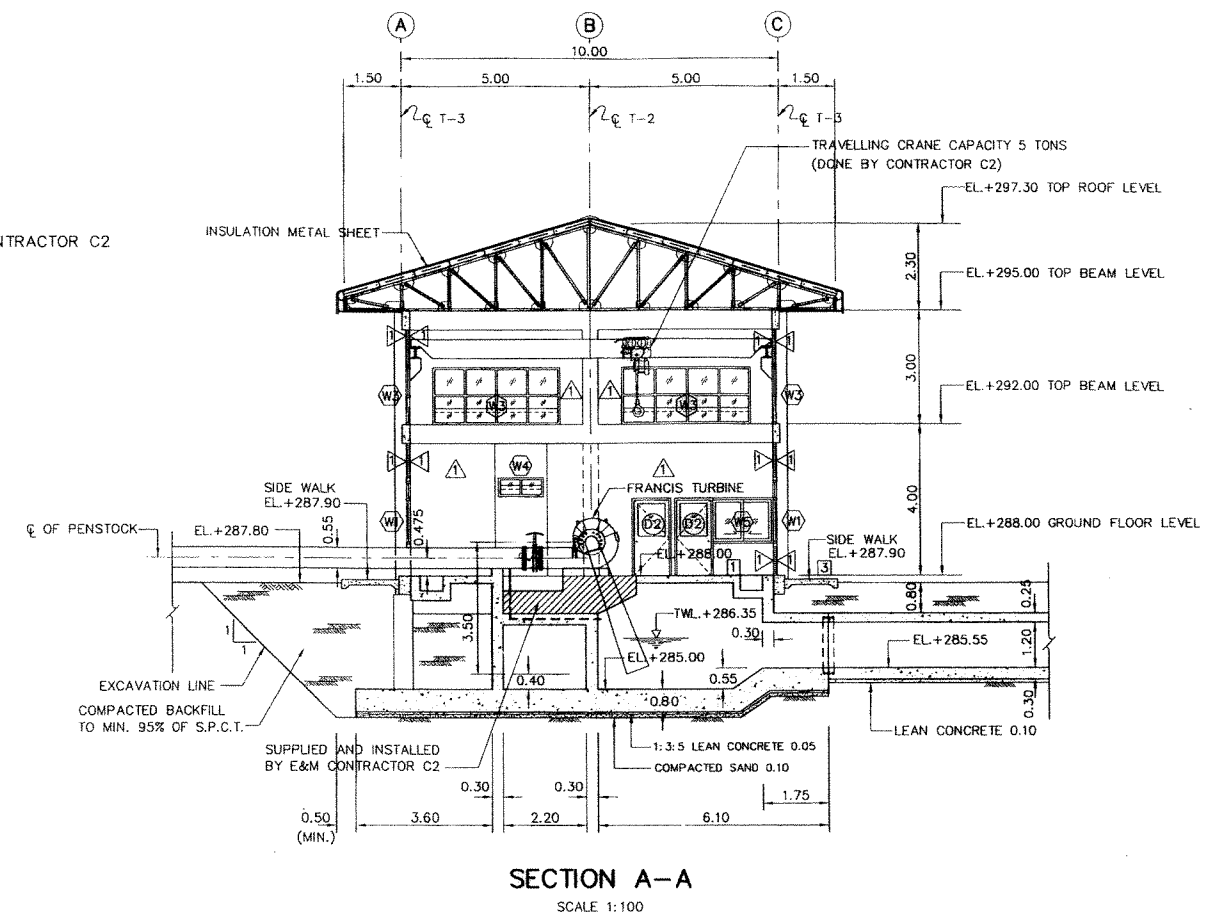
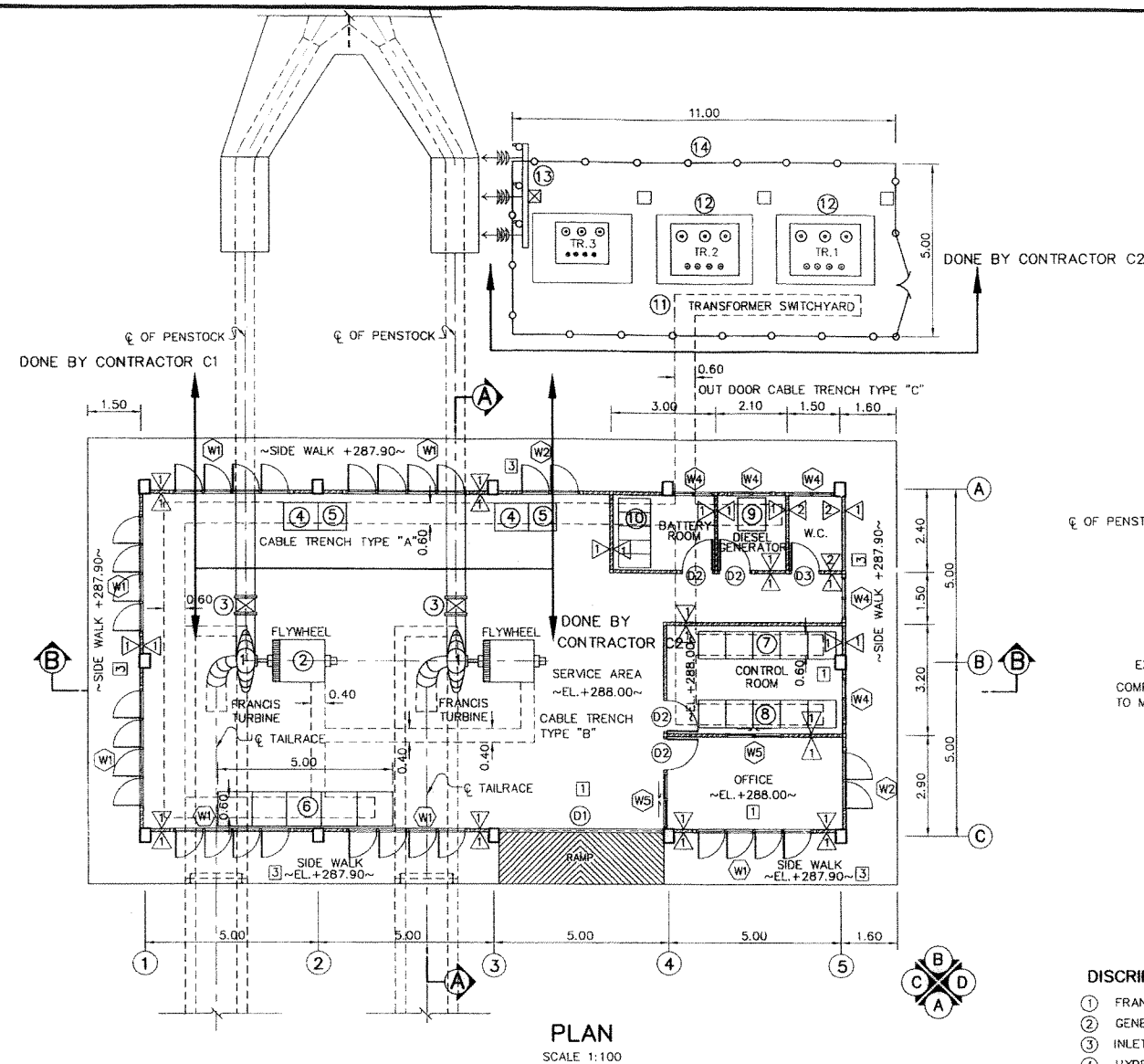
CROSS SECTION
SCALE 1:100

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	
APPROVED		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 :

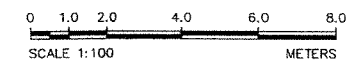
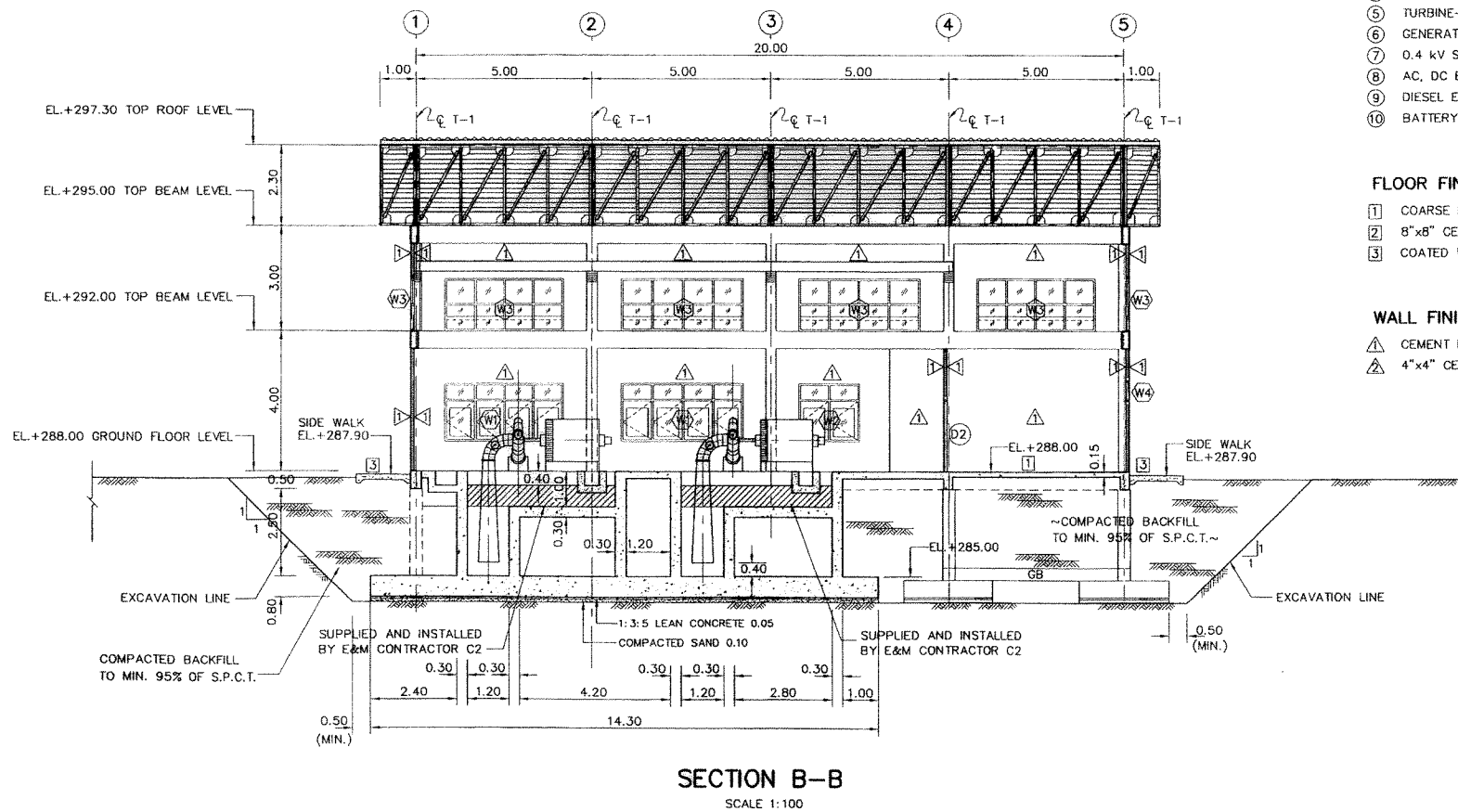
- △ CEMENT PLASTER
- △ 4"x4" CERAMIC FLOOR TILES

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

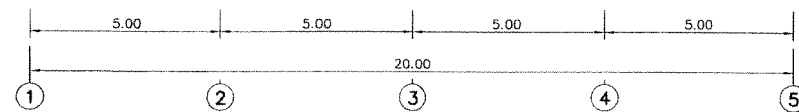
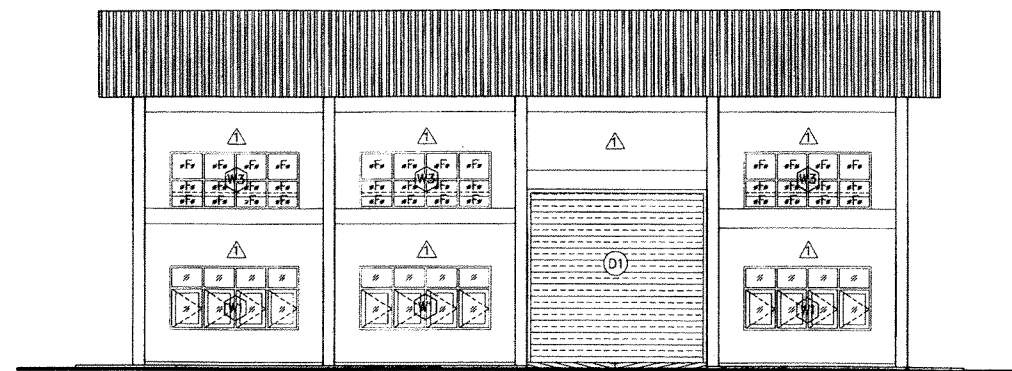
REFERENCE DRAWINGS :

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

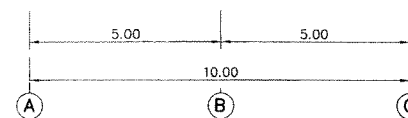
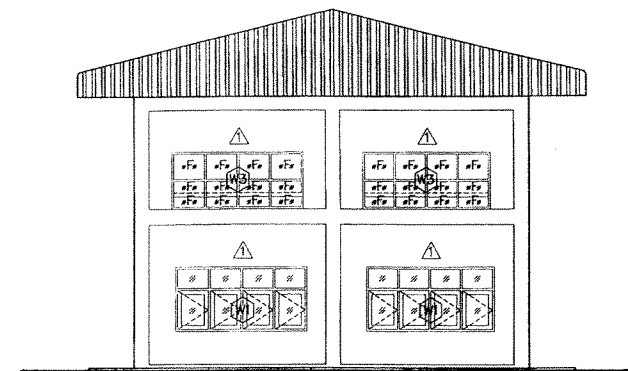


KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
HUAI PA PU HYDROPOWER PROJECT			
ELECTRO - MECHANICAL EQUIPMENT POWERHOUSE PLAN AND SECTIONS			
MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	REV. 37853	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	REV. 4651	RECOMMENDED	
APPROVED		APPROVED	
PROJECT MANAGER	8/12/51	DRAWING NO.	SHEET NO.
	DATE	HPP-PH-03	16 OF 26

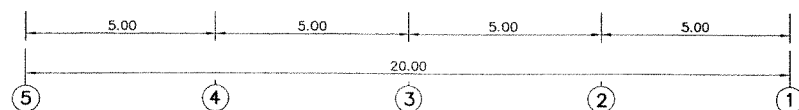
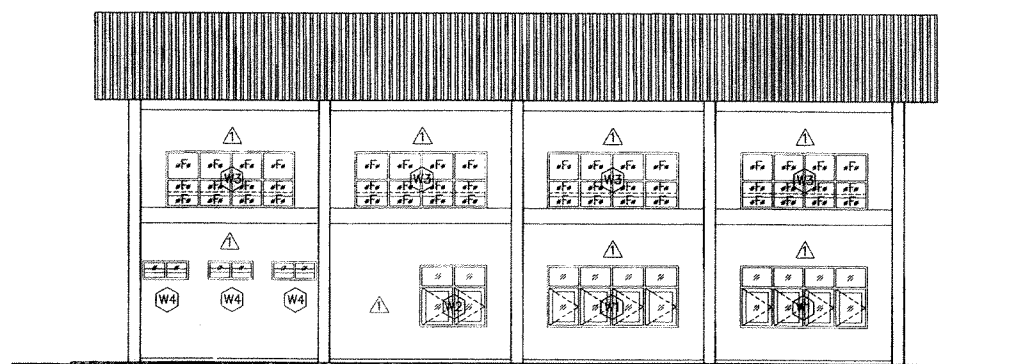
3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED



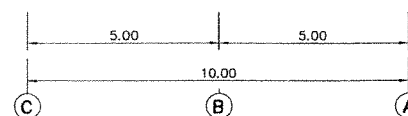
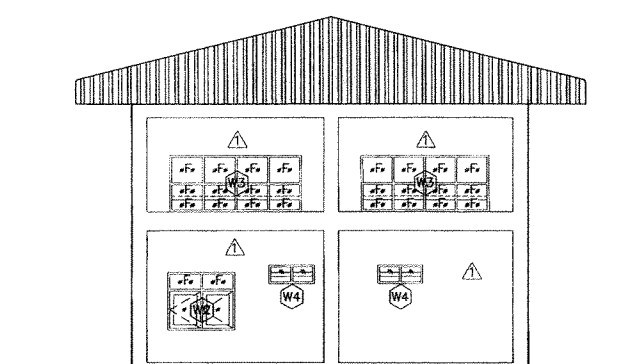
ELEVATION "A"
SCALE 1:100



ELEVATION "C"
SCALE 1:100



ELEVATION "B"
SCALE 1:100



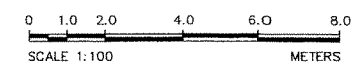
ELEVATION "D"
SCALE 1:100

NOTES :

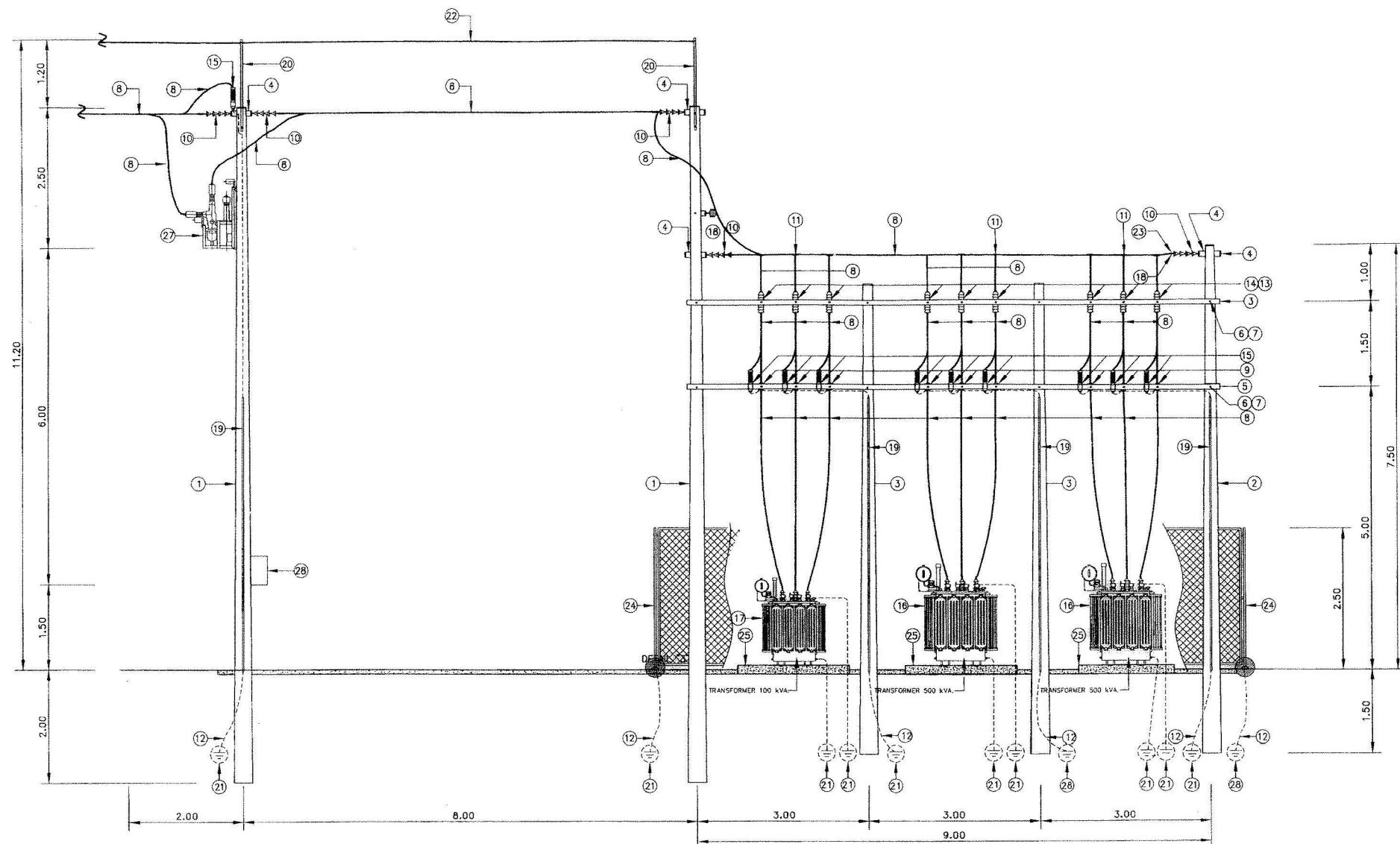
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HPP-GN-03

REFERENCE DRAWINGS :

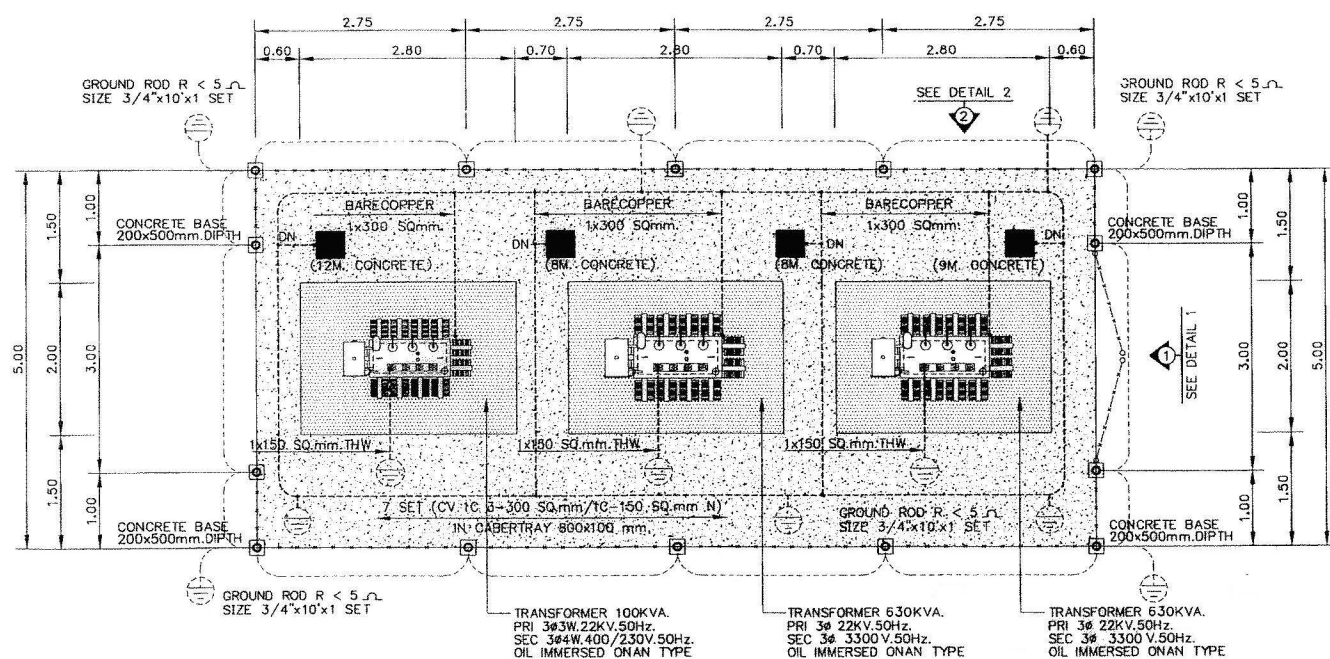
1. POWERHOUSE, GENERAL LAY-OUT HPP-PH-01
2. POWERHOUSE, PLAN AND SECTIONS HPP-PH-03



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



SECTION
SCALE 1:50



PLAN
SCALE 1:50

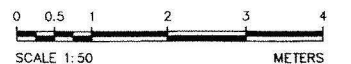
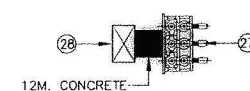
BILL OF MATERIAL	
ITEM	DESCRIPTION
1	POLE, CONCRETE 12 M. LONGS
2	POLE, CONCRETE 9 M. LONGS
3	POLE, CONCRETE 8 M. LONGS
4	CROSSARM, CONCRETE, H.T 120x120x2,000 mm. LONGS
5	BEAM, SPUN PRESTRESSED CONCRETE 100x100x3,200 mm.
6	BOLT MACHINE 5/8"x12" mm.
7	WASHER, SQUARE, FLAT 2 1/2" FOR 5/8" BOLT
8	ALL ALUMINIUM 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 SQ.mm.
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'LOAN # 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 SQ.mm.
23	DEADEND CLAMP FOR AAC 185 SQ.mm.
24	FENCE
25	TRANSFORMER CONCRETE FOUNDATION
26	RECLOSER 27 kV
27	CONTROL CABINET

NOTES :

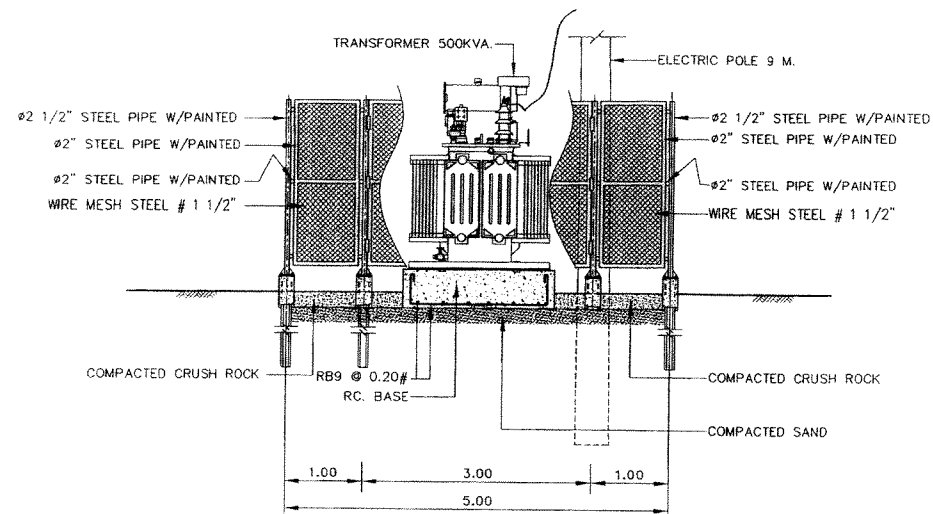
- ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
- SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HPP-CN-03
- THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONTRACTOR HAS TO SUBMIT SHOP DRAWING TO FIELD ENGINEER FOR APPROVAL

REFERENCE DRAWING :

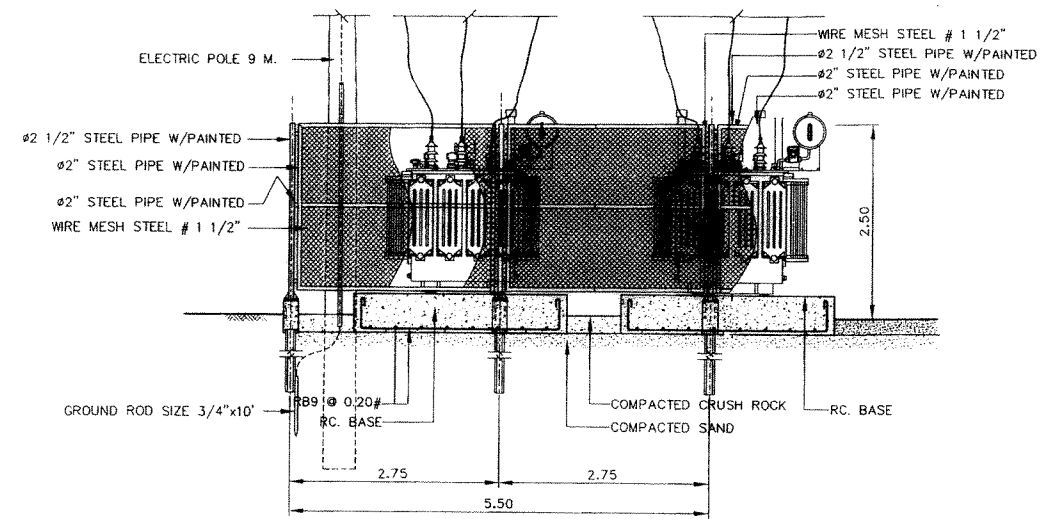
- POWERHOUSE, TRANSFORMER SWITCHYARD, DETAILS HPP-PH-06



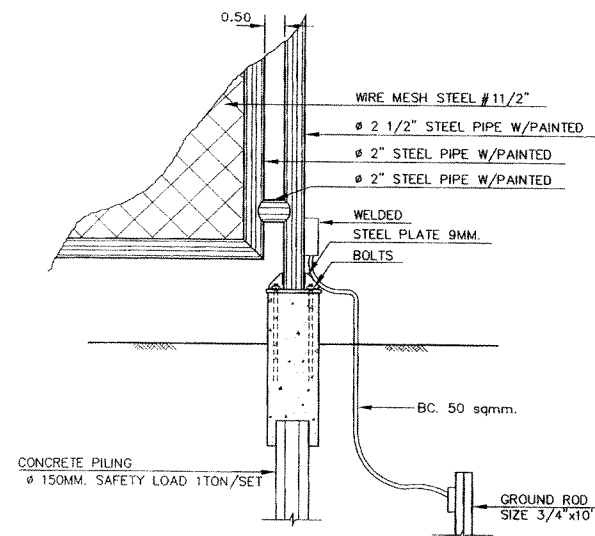
KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUAI PA PU HYDROPOWER PROJECT	
ELECTRO - MECHANICAL EQUIPMENT POWERHOUSE TRANSFORMER SWITCHYARD, PLAN AND SECTION	
WAHA NAKORN CONSULTANTS CO.,LTD.	
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY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

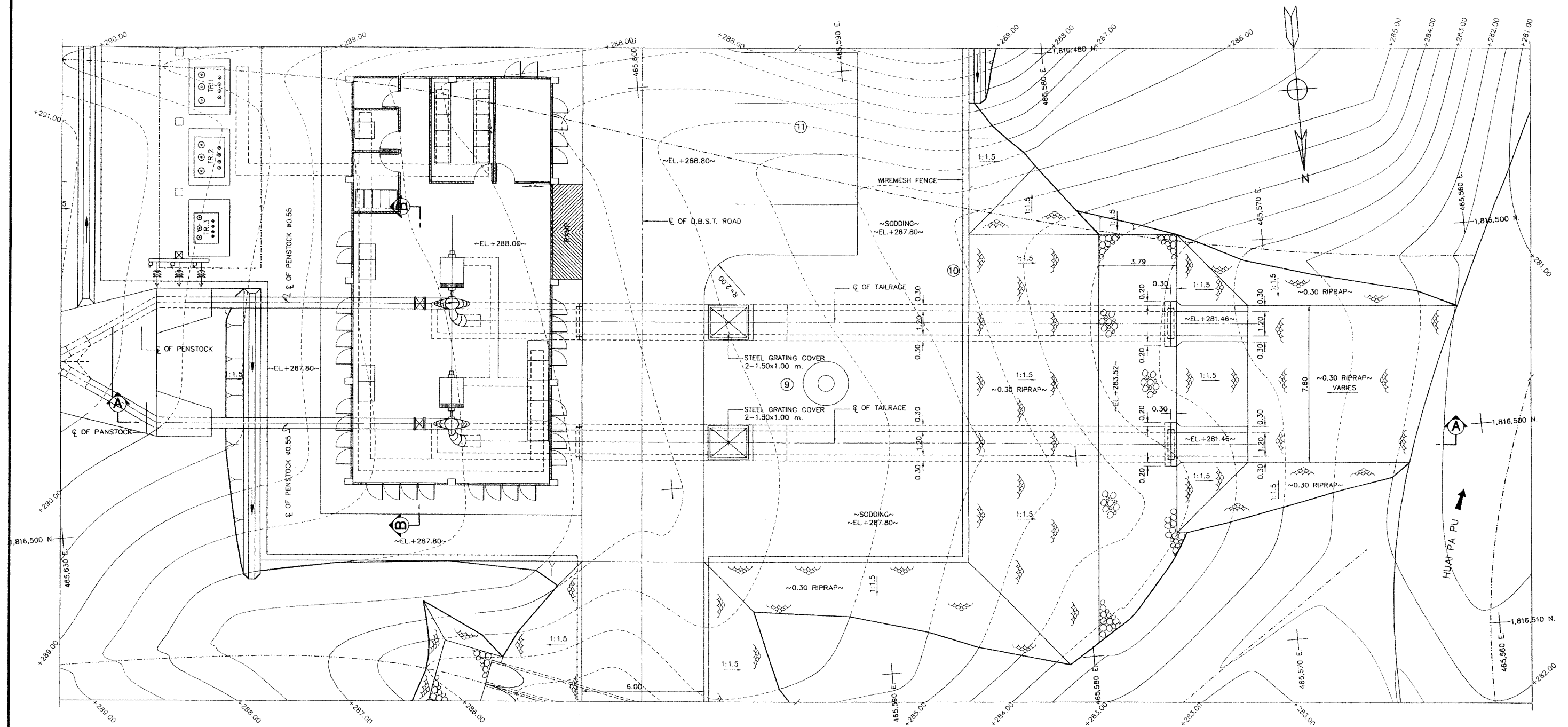
REFERENCE DRAWING :

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	
3		DESIGNED	REVIEWED
2		DRAWN	SUBMITTED
1		CHECKED	RECOMMENDED
NO.	DATE	REVISIONS	APPROVED
CONSULTANTS		DEDE	
PROJECT MANAGER		DATE	DRAWING NO. SHEET NO.
		8/12/51	HPP-PH-06 19 OF 26

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



PLAN
SCALE 1:100

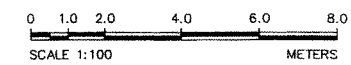
NOTES :

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 :

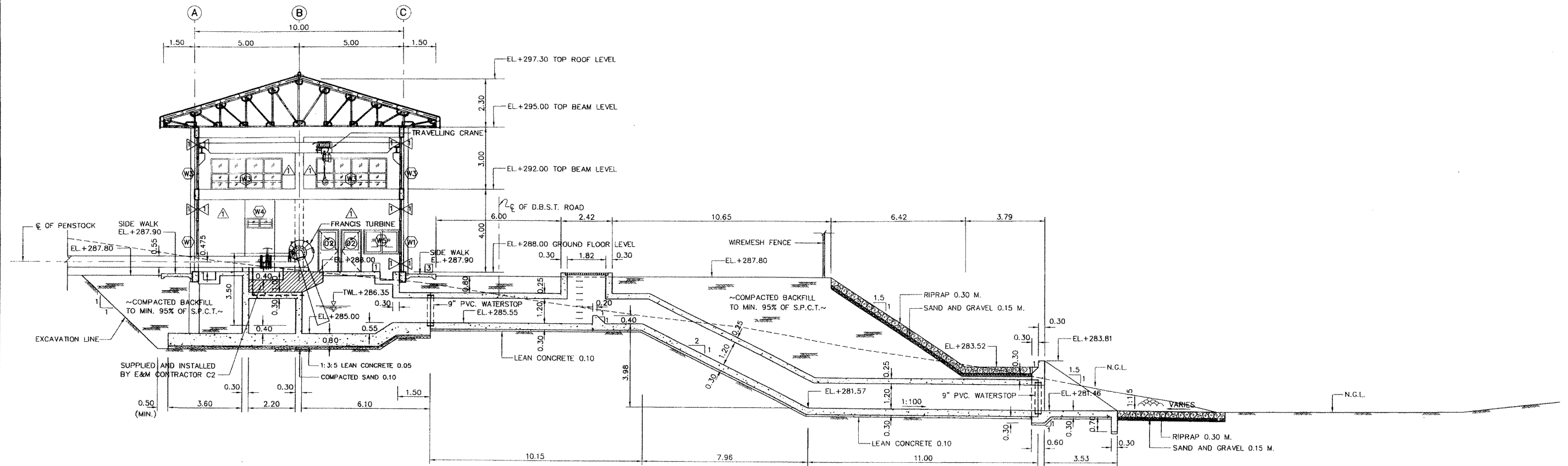
1. TAILRACE, SECTIONS AND DETAIL

HPP-TR-02

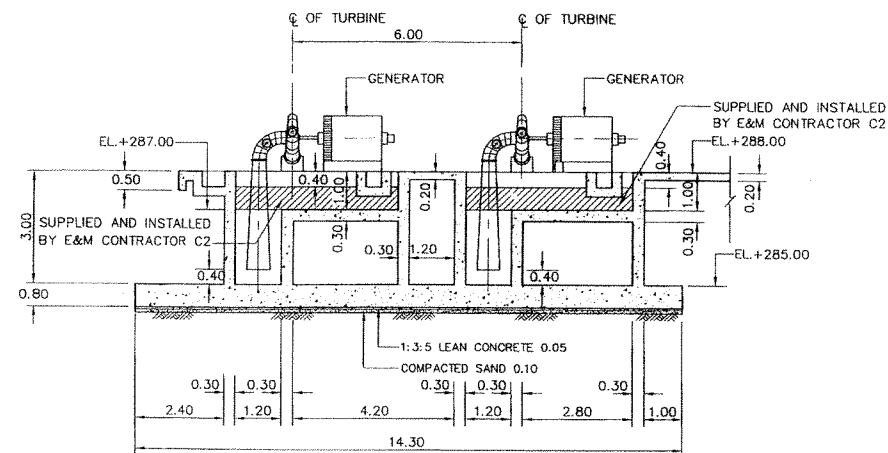


NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
CONSULTANTS		DEDE		

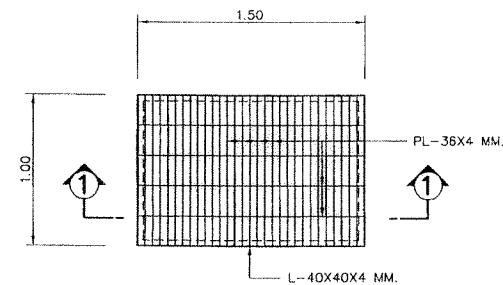
KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
HUI PA PU HYDROPOWER PROJECT	
ELECTRO - MECHANICAL EQUIPMENT TAILRACE PLAN	
MAHA NAKORN CONSULTANTS CO., LTD.	
DESIGNED P. J. 37053	REVIEWED
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
APPROVED	APPROVED
PROJECT MANAGER	DATE
8/12/51	
DRAWING NO. HPP-TR-01	SHEET NO. 20 OF 26



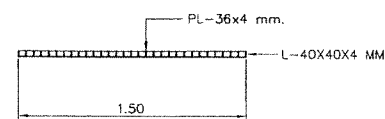
SECTION A-A
SCALE 1:100



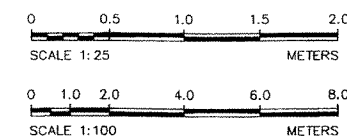
SECTION B-B
SCALE 1:100



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

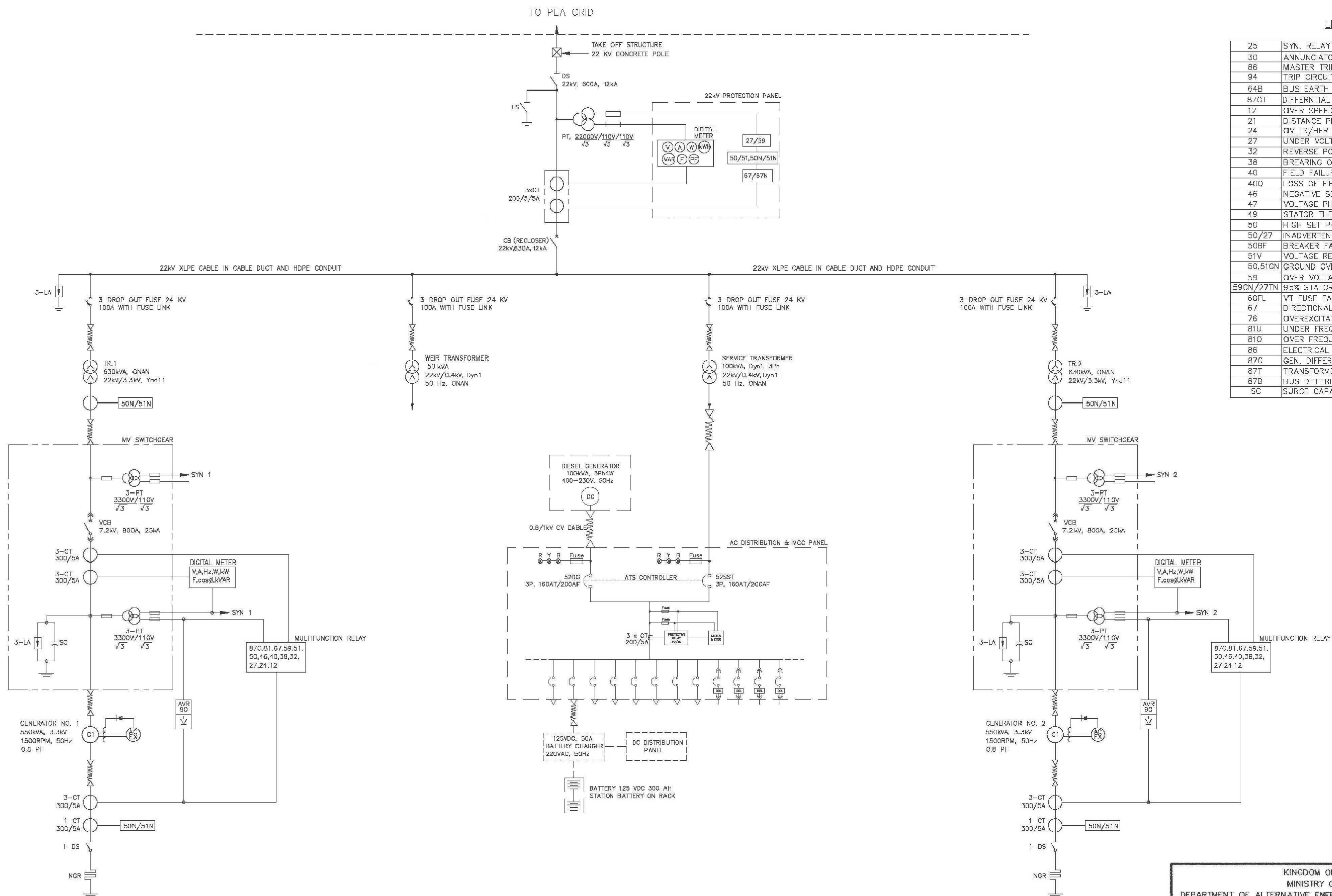
HPP-TR-01

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
DRAWING NO. HPP-TR-02	SHEET NO. 21 OF 26

TO PEA GRID

LEGENDS

25	SYN. RELAY FUNCTION
30	ANNUNCIATOR WINDOW
86	MASTER TRIP RELAY
94	TRIP CIRCUIT SUPERVISION RELAY
64B	BUS EARTH FAULT RELAY
87GT	DIFFERENTIAL RELAY
12	OVER SPEED RELAY
21	DISTANCE PROTECTION RELAY
24	OVLT/HERTZ
27	UNDER VOLTAGE RELAY
32	REVERSE POWER RELAY
38	BREARING OVERTEMPERATURE(RTD)
40	FIELD FAILURE RELAY
40Q	LOSS OF FIELD (REACTIVE POWER)
46	NEGATIVE SEQUENCE RELAY
47	VOLTAGE PHASE REVERSAL
49	STATOR THERMAL (RTD/THERMAL MODEL)
50	HIGH SET PHASE OVER CURRENT RELAY
50/27	INADVERTENT GENERATOR ENERGIZATION
50BF	BREAKER FAILURE DETECTION
51V	VOLTAGE RESTRAINED PHASE OVERCURRENT
50,51GN	GROUND OVER CURRENT
59	OVER VOLTAGE RELAY
59GN/27TN	95% STATOR GROUND
60FL	VT FUSE FAILURE
67	DIRECTIONAL O/C RELAY
76	OVEREXCITATION (ANALOG INPUT)
81U	UNDER FREQUENCY RELAY
81O	OVER FREQUENCY RELAY
86	ELECTRICAL LOCKOUT RELAY
87G	GEN. DIFFERENTIAL RELAY
87T	TRANSFORMER DIFFERENTIAL RELAY
87B	BUS DIFFERENTIAL RELAY
SC	SURGE CAPACITOR



NOTES

- ALL CURRENT TRANSFORMERS AND POTENTIAL TRANSFORMERS MUST BE EPOXY CAST RESIN.
POTENTIAL TRANSFORMER: FOR METERING — ACCURACY CLASS 0.5
: FOR PROTECTION — ACCURACY CLASS 3P
CURRENT TRANSFORMERS: FOR METERING — ACCURACY CLASS 0.5
: FOR PROTECTION — ACCURACY CLASS 5P10

- 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

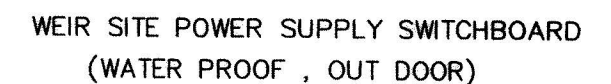
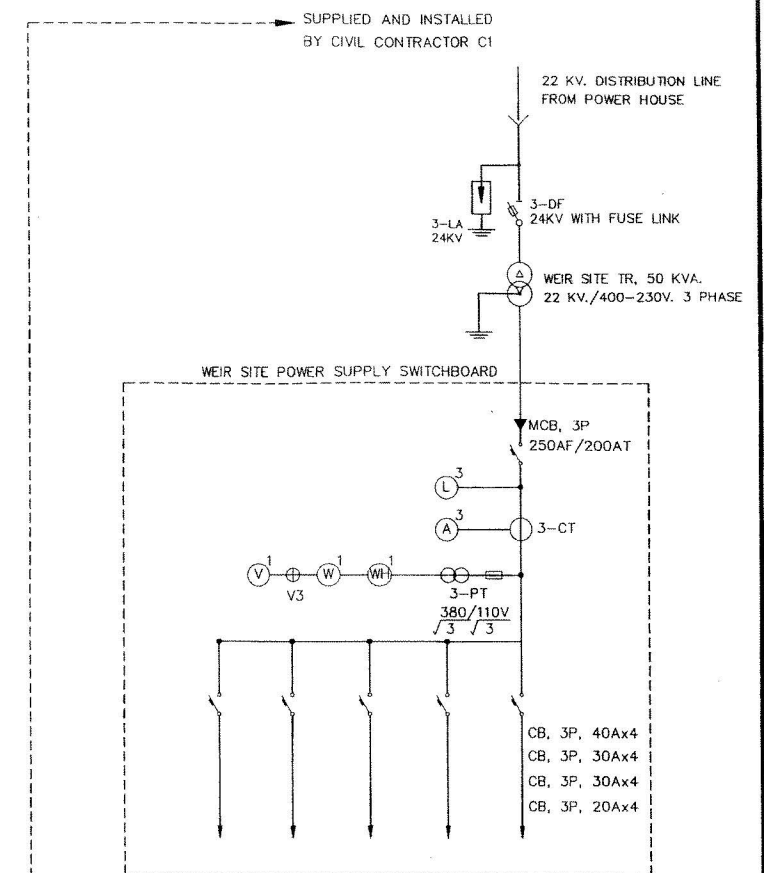
KINGDOM OF THAILAND
MINISTRY OF ENERGY
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY

HUA PA PU HYDROPOWER PROJECT

ELECTRO-MECHANICAL EQUIPMENT
MAIN POWER SINGLE LINE DIAGRAM

MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	2/12/51	SUBMITTED	2/12/51
DRAWN	2/12/51	RECOMMENDED	2/12/51
CHECKED	2/12/51	APPROVED	2/12/51
PROJECT MANAGER	DATE	DRAWING NO.	SHEET NO.
		HPP-EM-01	22 OF 26

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED



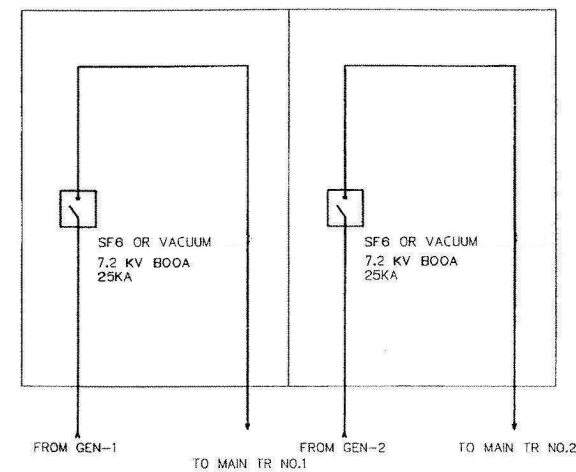
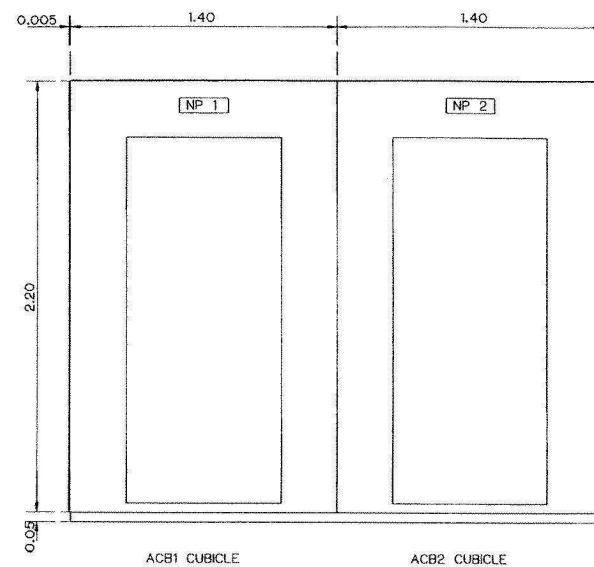
1. AC AMMETER
2. AC VOLTMETER
3. AC WATTMETER
4. WATT HOUR METER
5. UNDER VOLTAGE RELAY
6. AMMETER SELECTOR SWITCH
7. VOLTMETER SELECTOR SWITCH
8. DC AMMETER
9. DC VOLTMETER
10. DC AMMETER
11. DC UNDER VOLTAGE RELAY
12. DC GROUND FAULT RELAY
13. DC VOLTMETER SELECTOR SWITCH
14. TEST TERMINAL
15. MS1 } 3 PHASE MOTOR STARTER , TWO DIRECTIONS , FORWARD AND REVERSE
16. MS2 } WITH FORWARD AND REVERSE PUSH BUTTON , SUITABLE FOR
3 ϕ , 380 V. GATE MOTORS.

: POWER CABLE FROM WEIR SITE TRANSFORMER TO WEIR SITE
 POWER SUPPLY SWITCHBOARD, 24 KV. LIGHTNING ARRESTOR , WEIR TRANSFORMER
 AND 24 KV. DROP OUT FUSE MUST BE SUPPLIED AND INSTALLED BY CIVIL CONTRACTOR C1
 : CONNECTION AND WIRING BETWEEN GATE MOTORS AND WEIR SITE POWER SUPPLY
 SWITCHBOARD SHALL BE DONE BY CIVIL CONTRACTOR C1 (GATE MOTORS SHALL BE SUPPLIED
 BY CIVIL CONTRACTOR C1)

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE SHOWN
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

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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			
MAIN CONTROL SWITCH BOARD			
 MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED 	29/12/74	REVIEWED 	
DRAWN 		SUBMITTED 	
CHECKED 	29/12/74	RECOMMENDED 	
		APPROVED 	
PROJECT MANAGER		DRAWING NO.	SHEET NO.
8/12/51		HPP-EM-02	23 OF 26
DATE			



7.2 kV CIRCUIT BREAKER CUBICLE

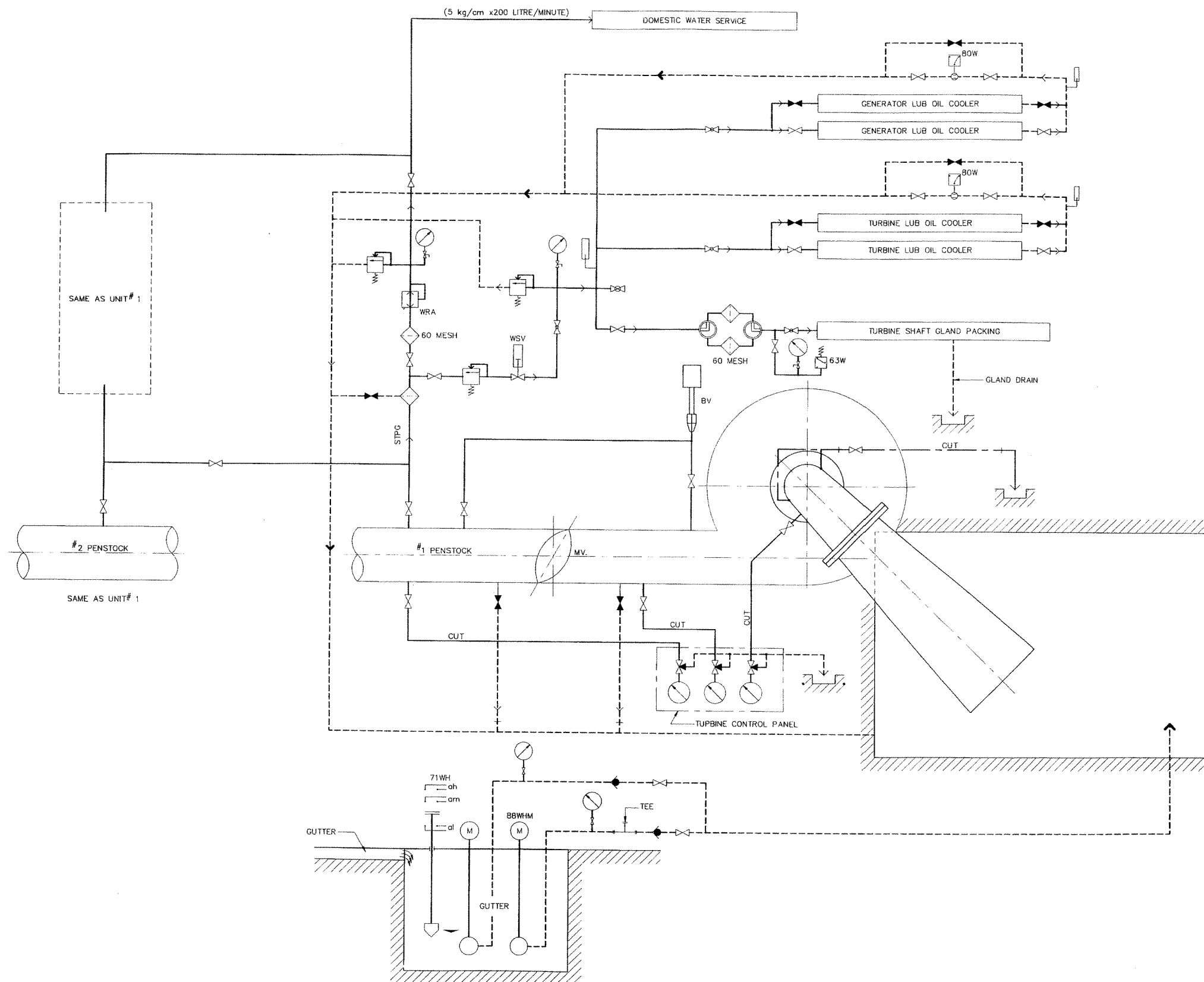
NOTES :

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

NO.	DATE	REVISIONS	CHECKED	APPROVED
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CONSULTANTS DEDE

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.
DATE 8/12/51	HPP-EM-03 24 OF 26



LEGENDS :

	WATER SUPPLY
	WATER DRAINAGE
	THERMOMETER
	STOP VALVE (NORMAL OPEN)
	STOP VALVE (NORMAL CLOSE)
	CHECK VALVE
	FLOW SIGHT
	THREE WAY COCK
	STRAINER
	PRESSURE GAUGE
	PRESSURE RELIEF VALVE
	LEVEL SWITCH FOR SUMP PIT
	PRESSURE SWITCH
	FLOW RELAY
	DRAINAGE PUMP MOTOR
	REDUCING VALVE
	AUTOMATIC REDUCING VALVE
	BY-PASS VALVE
	MAIN INLET VALVE
	CARBON STEEL PIPE
	STAINLESS STEEL PIPE
	COPPER TUBE
	COOLING WATER STOP VALVE
	GLOBE VALVE

NOTE :

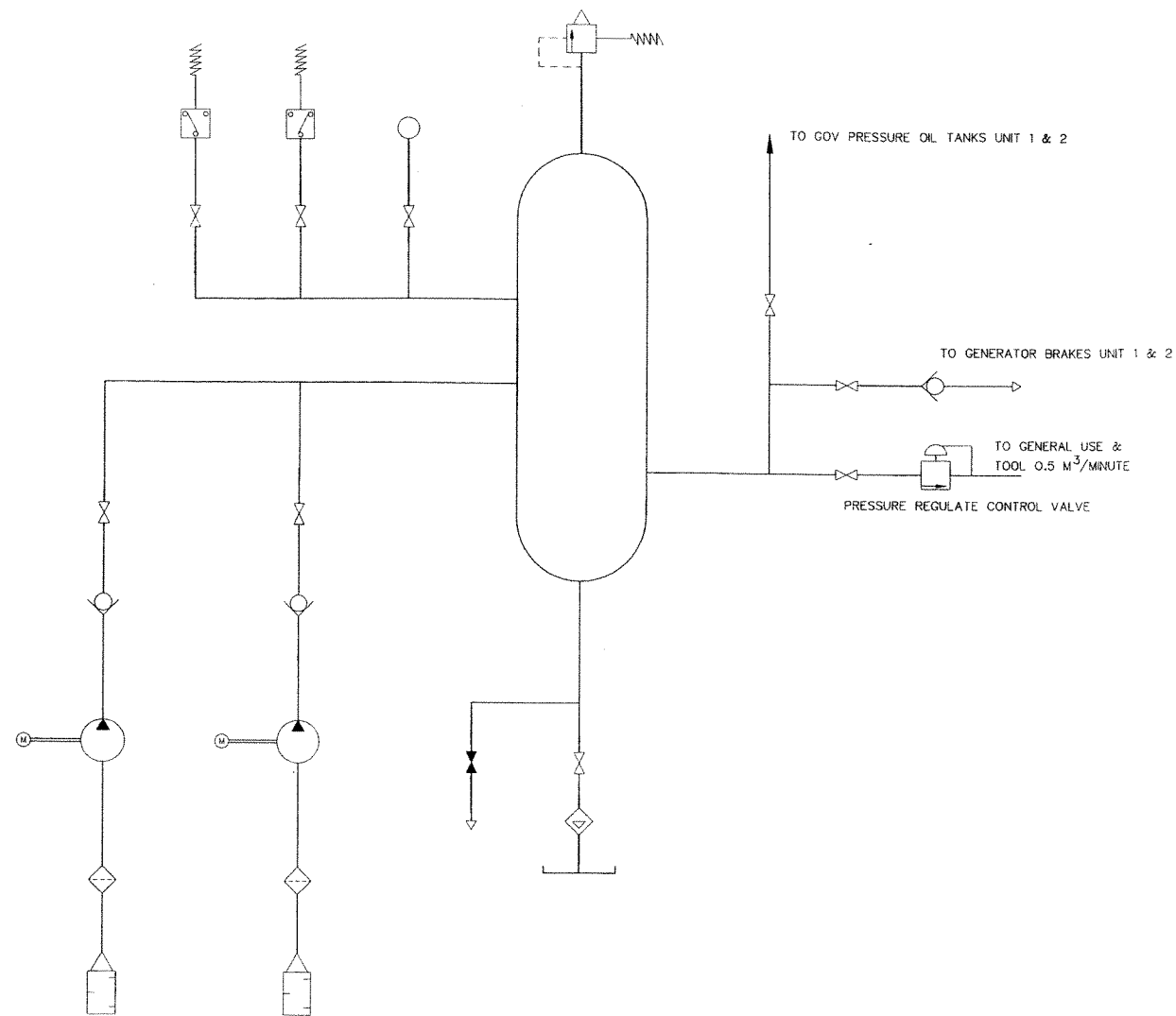
- THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, IT SHALL BE BE DESIGNED AND SPECIFIED LATER BY CONTRACTOR C2 AND SUBMITTED TO FIELD ENGINEER FOR APPROVAL

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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 WATER SUPPLY AND DRAINAGE SCHEMATIC DIAGRAM			
MAHA NAKORN CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	REVIEWED	SUBMITTED	RECOMMENDED
DRAWN	APPROVED	DATE	
PROJECT MANAGER		DATE	
DRAWING NO. HPP-EM-04		SHEET NO. 25 OF 26	



COMPRESSED AIR SYSTEM SCHEMATIC

LEGENDS :

	AUTOMATIC CONDENSATE TRAP		VALVE-NON RETURN
	FILTER OR STRAINER - MANUAL - AUTOMATIC HAS ADDITIONAL DRAIN LINE AND VALVE		PRESSURE SWITCH
	VALVE-NORMALLY OPEN		AIR VENT
	VALVE-NORMALLY CLOSED		HEAD EXCHANGER
	NEEDLE VALVE		FLOW RELAY
	ORIFICE		FLOW METER
	VALVE-THERMOSTATICALLY CONTROLLED		PRESSURE GAUGE
	VALVE-PRESSURE REGULATING		RECEIVER
	VALVE-PRESSURE RELIEF (WATER)		PUMP OR COMPRESSOR
	VALVE-SOLENOID OPERATED PRESSURE REDUCING		SILENCER
	VALVE-PRESSURE RELIEF (AIR)		DIRECTION OF FLOW
	VALVE-SOLENOID OPERATED OIL PRESSURE ACTUATED		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			
HUI 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	

NO.	DATE	REVISIONS	CHECKED	APPROVED
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CONSULTANTS			DEDE	