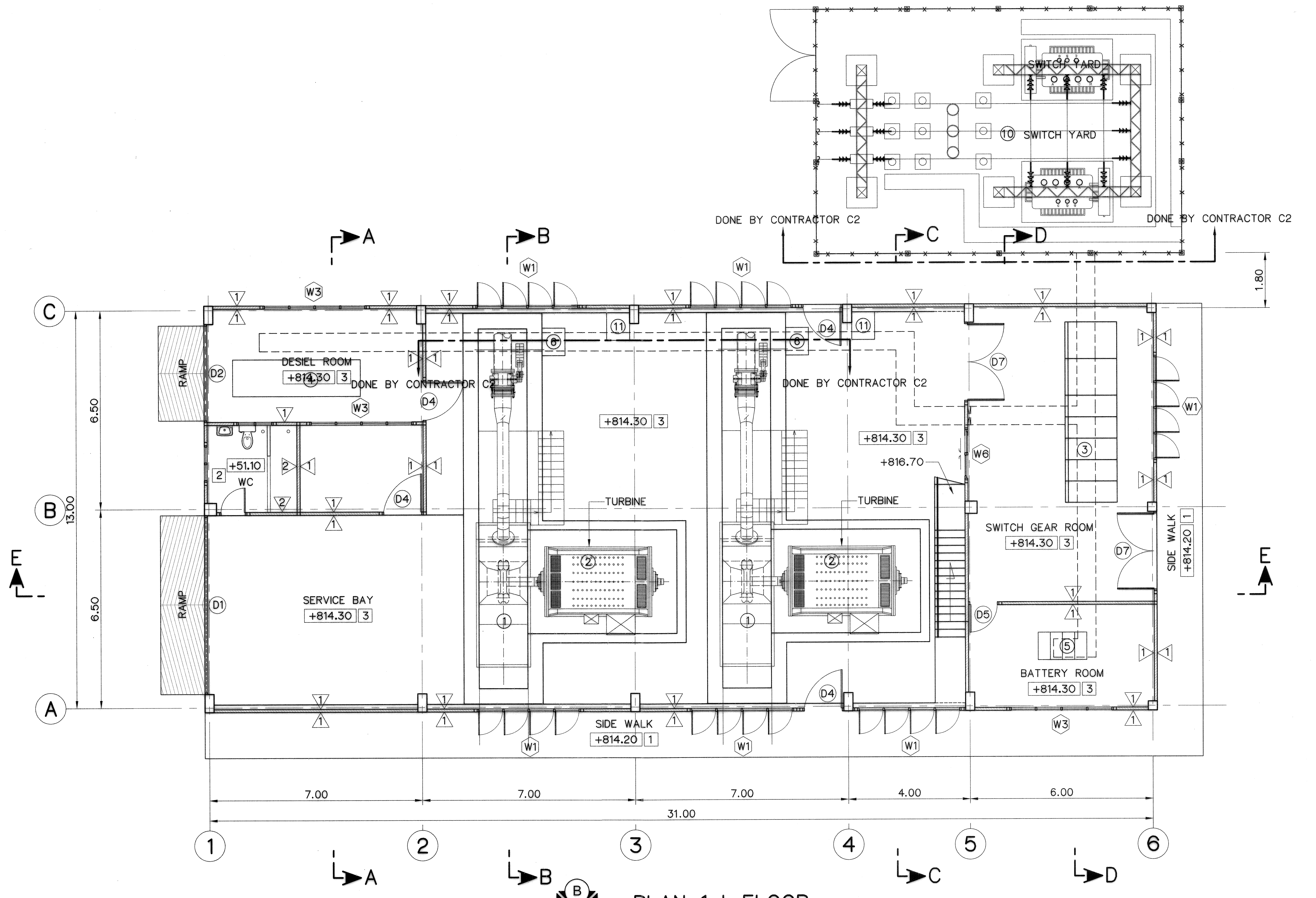
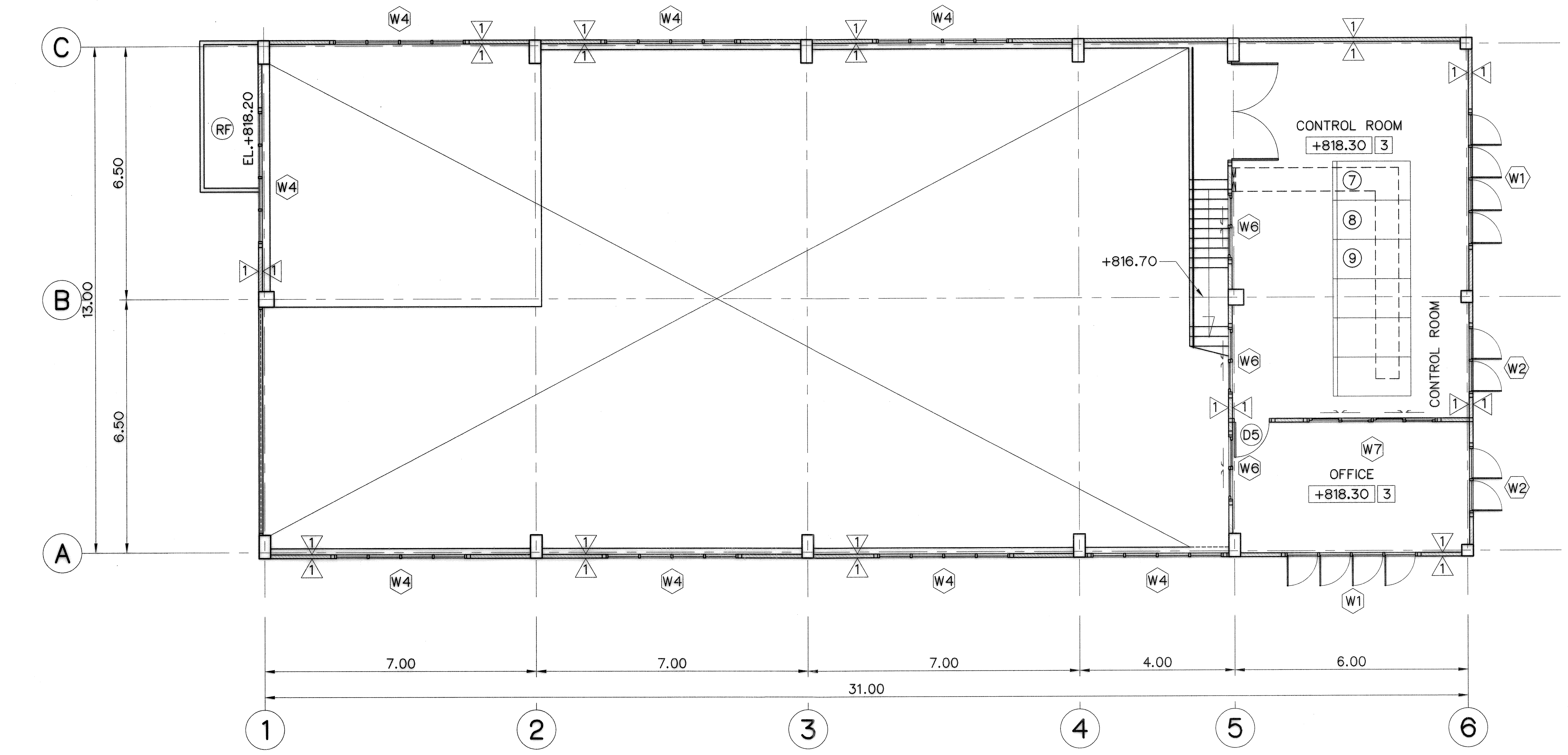


PLAN 1st FLOOR

SCALE 1:100



PLAN 2nd FLOOR

SCALE 1:100

DESCRIPTIONS :

① HORIZONTAL SHAFT KAPLAN TURBINE
② GENERATOR
③ SWITCH GEAR CUBICLES
④ DIESEL GENERATOR SET
⑤ BATTERY AND RACK
⑥ OIL PRESSURE TANK
⑦ AC AND DC SWITCHBOARD AND
⑧ BATTERY CHAGER CUBICLE
⑨ MAIN CONTROL SWITCHBOARD
⑩ SWITCHYARD
⑪ NEUTRAL GROUNDING CUBICLE

FLOOR FINISH SYMBOLS :

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

WALL FINISH SYMBOLS :

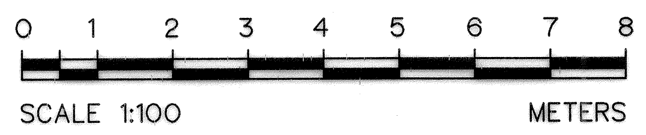
△1 CEMENT PLASTER
△2 8"x8" CERAMIC WALL TILES
△3 GLASS BLOCK

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH-GN-03
3. CONTRACT C1 OF INCLUDE PENSTOCK BEYOND POWERHOUSE WALL 1.00 M. (INCLUDE FLANGE)

REFERENCE DRAWINGS :

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



KINGDOM OF THAILAND
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Energy Development and Efficiency
MINISTRY OF ENERGY

MAE HAT HYDROPOWER PROJECT

ELECTRO-MECHANICAL EQUIPMENT
POWERHOUSE
PLAN 1st FLOOR AND PLAN 2nd FLOOR

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

P&C MANAGEMENT CO.,LTD.

DESIGNED	ภย.64624		สย.6226
DRAWN			
CHECKED			สย.6226
PROJECT MANAGER		DATE	08/03/2559

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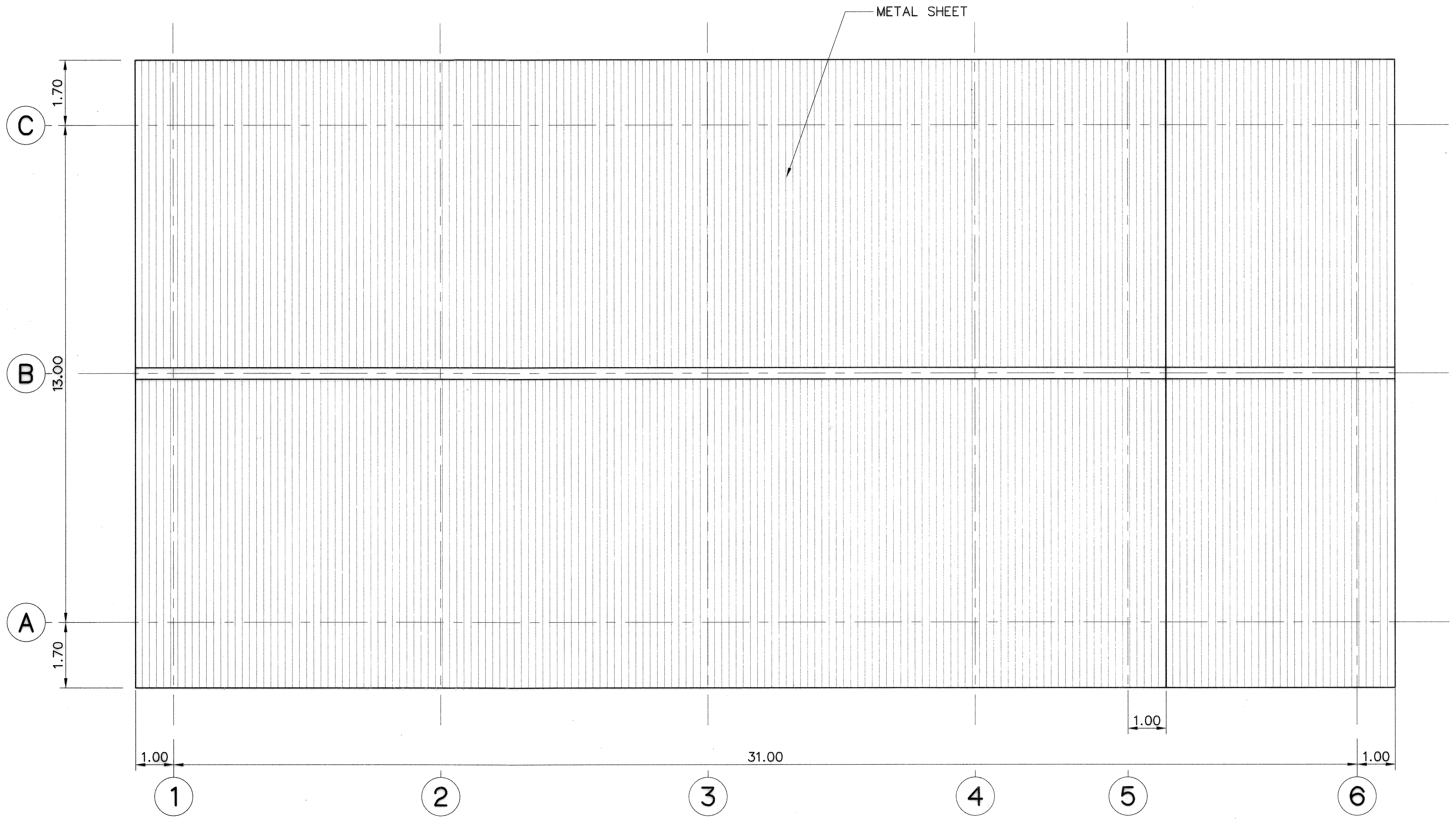
Energy Development and Efficiency
MINISTRY OF ENERGY

REVIEWED	
SUBMITTED	Chait
RECOMMENDED	
APPROVED	P. Hansell

DRAWING NO.	SHEET NO.
MH-PH-02	35 OF 51



ROOF 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. MH-GN-03

REFERENCE DRAWINGS :

1. POWERHOUSE, GENERAL LAY-OUT	MH-PH-01
2. POWERHOUSE, PLAN 1st FLOOR AND PLAN 2nd FLOOR	MH-PH-02
3. POWERHOUSE, ELEVATIONS	MH-PH-04

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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MAE HAT HYDROPOWER PROJECT

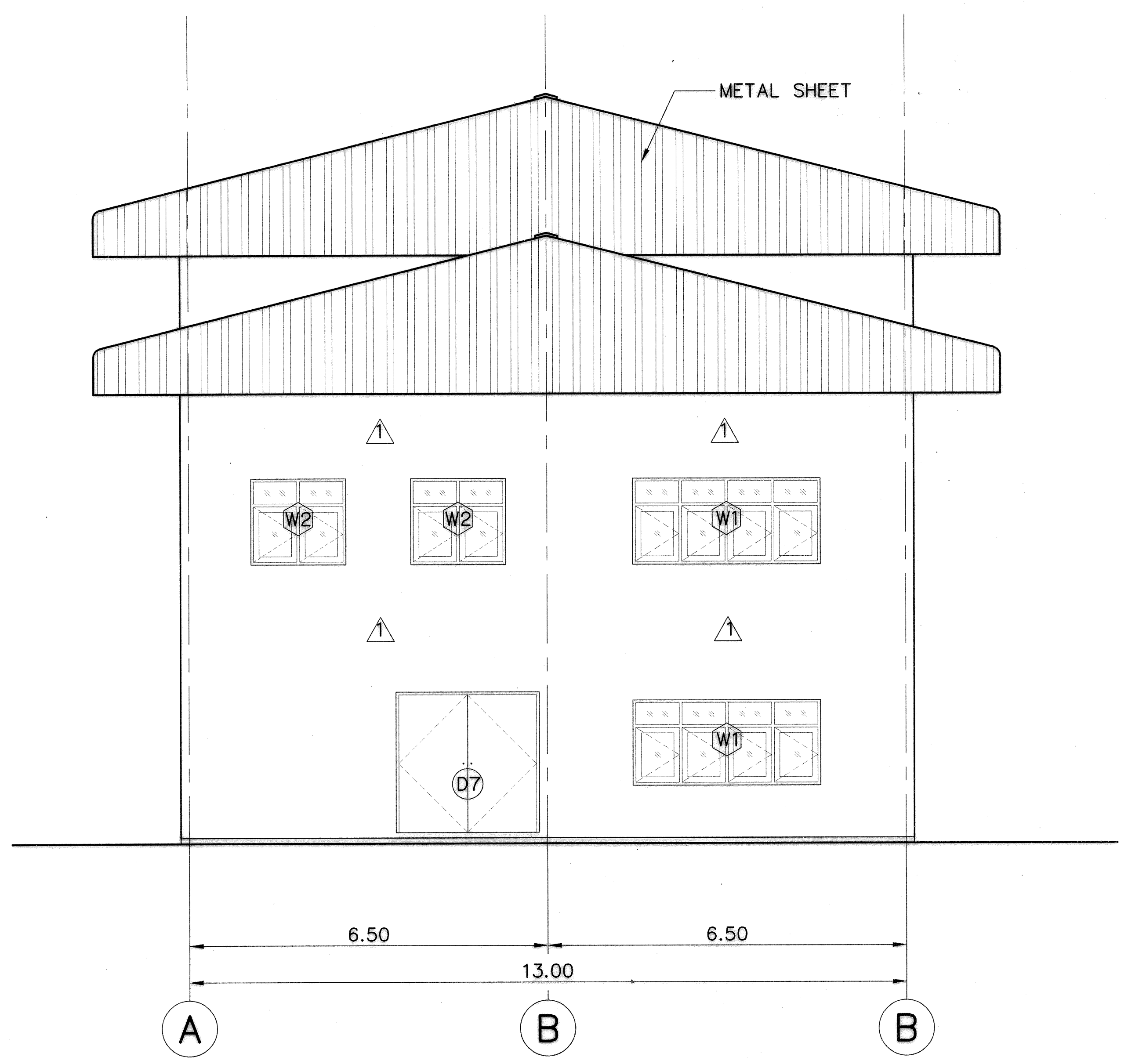
ELECTRO–MECHANICAL EQUIPMENT
POWERHOUSE
ROOF PLAN

P&C MANAGEMENT CO.,LTD.

Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

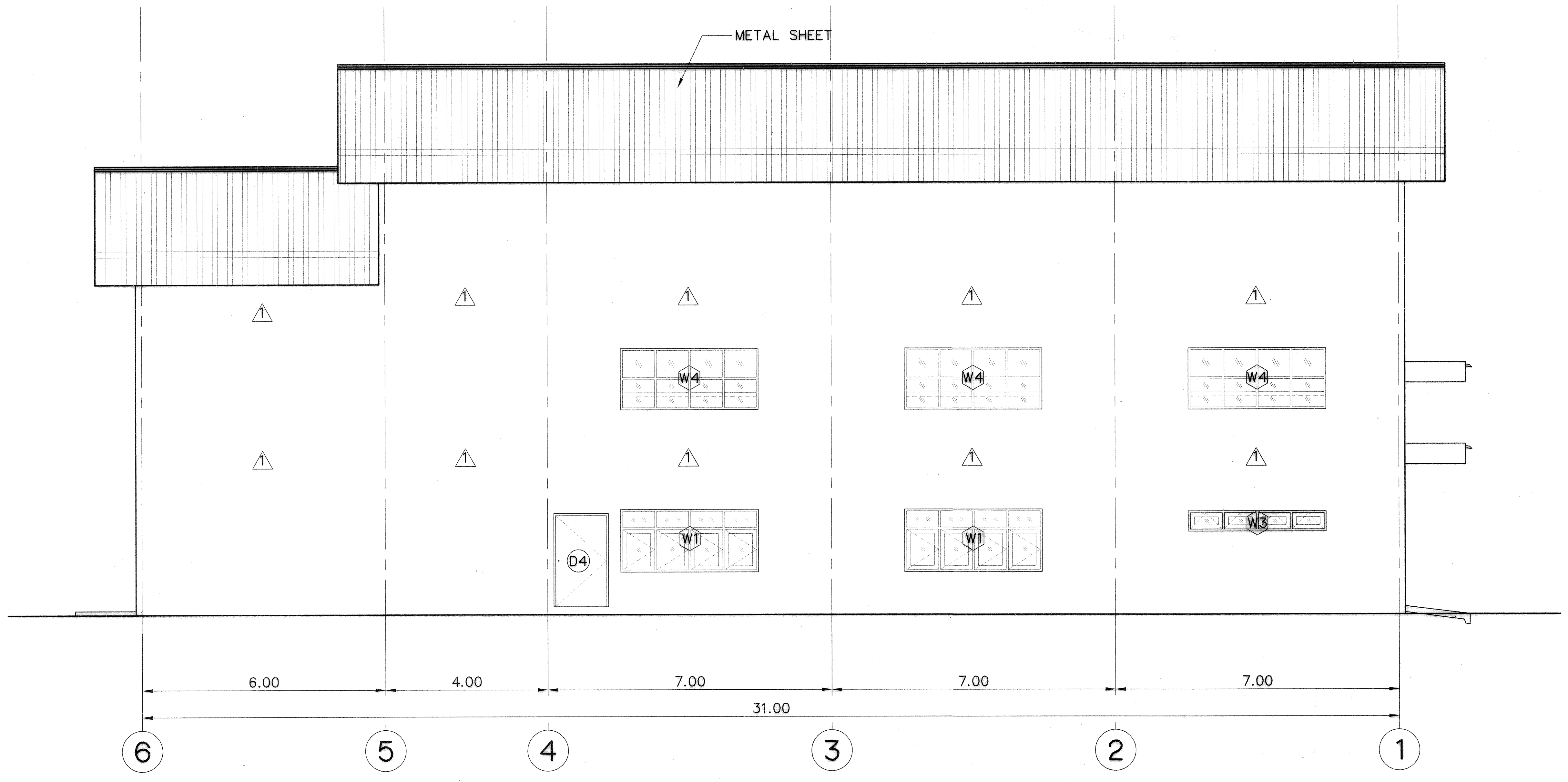
DESIGNED ภย.64624 สย.6226	REVIEWED
DRAWN	SUBMITTED Chanit
CHECKED สย.6226	RECOMMENDED
08/03/2559 PROJECT MANAGER DATE	APPROVED P.Hansell

DRAWING NO.	SHEET NO.
MH-PH-03	36 OF 51



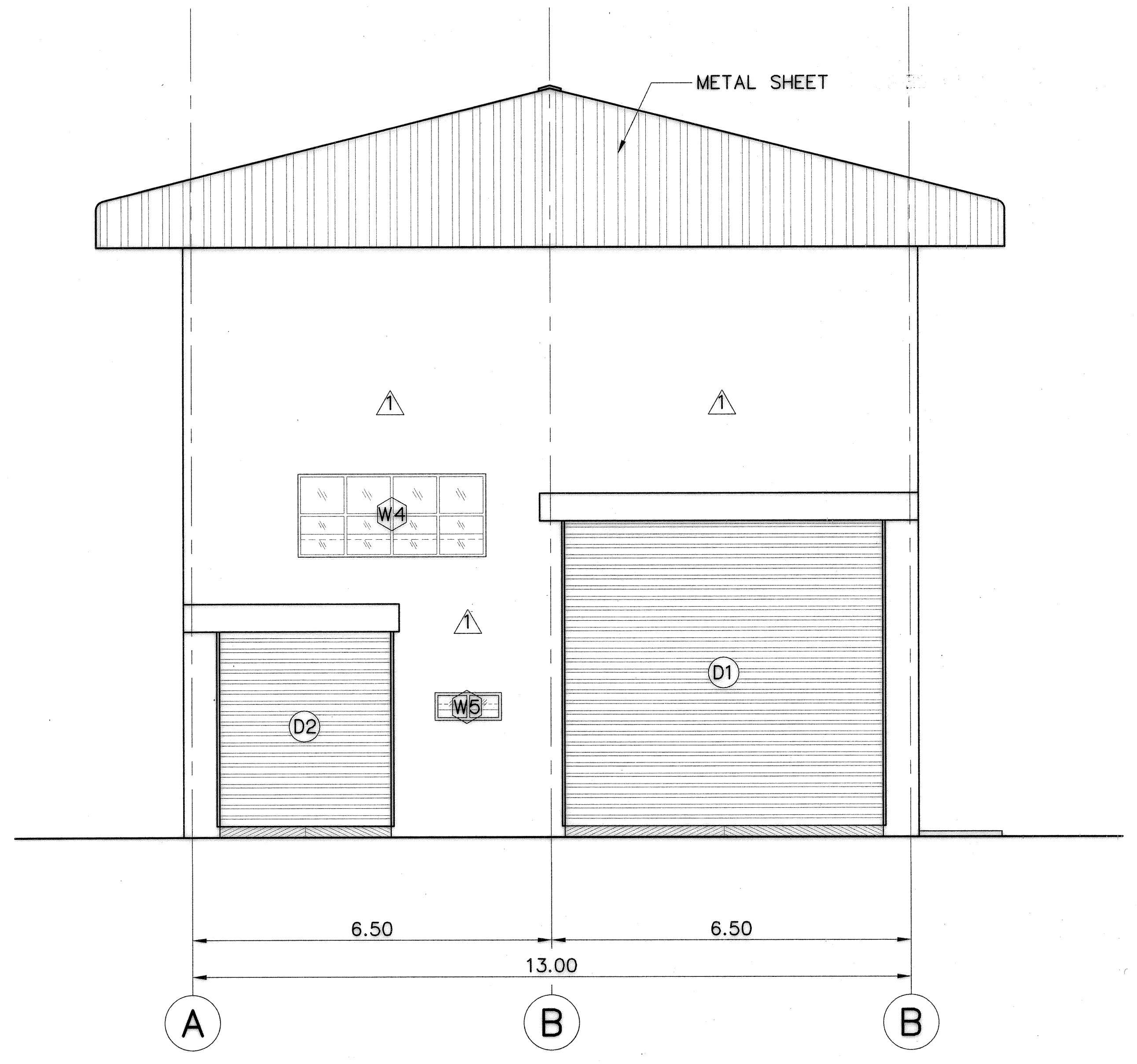
ELEVATION "A"

SCALE 1:100



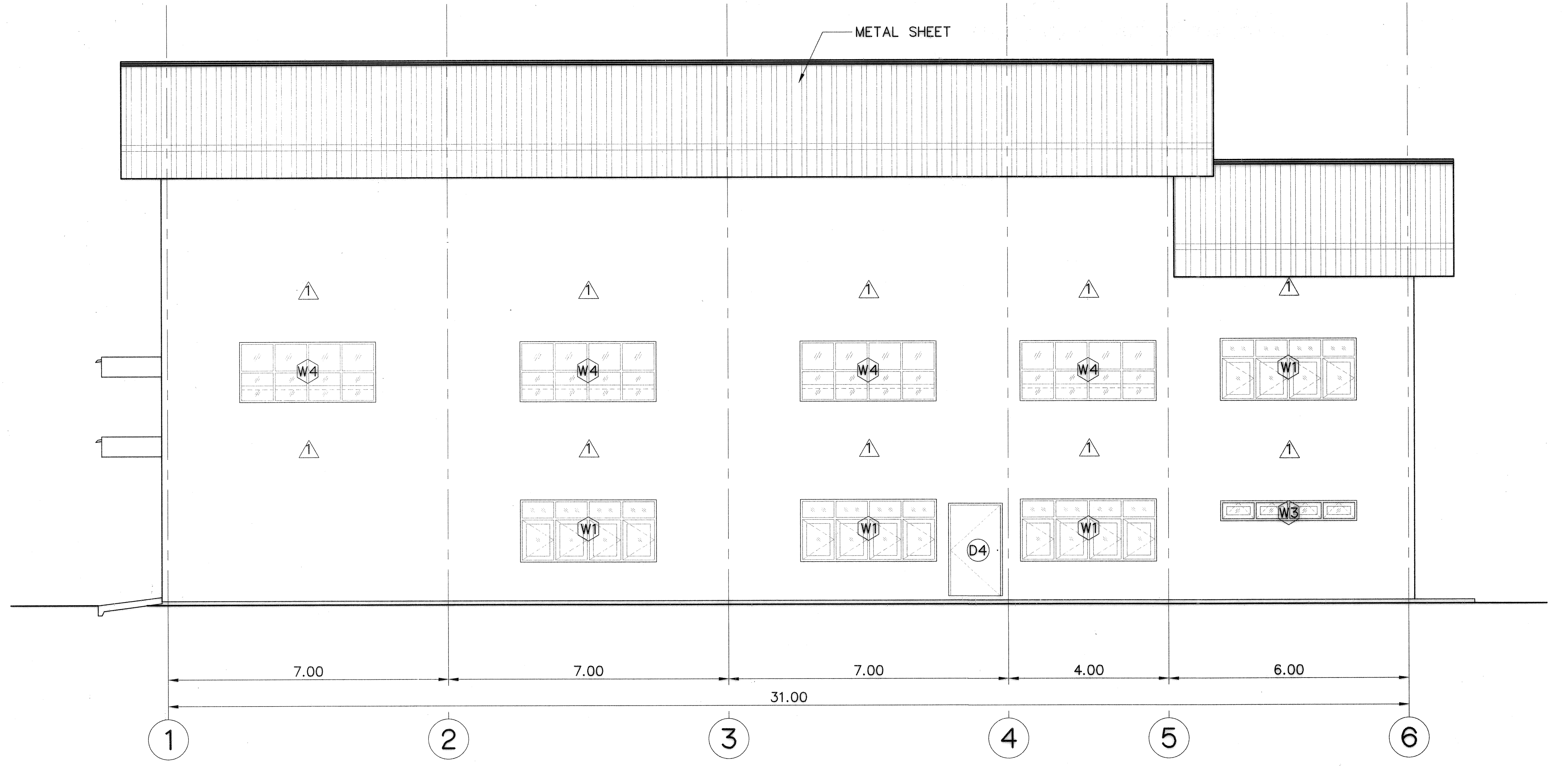
ELEVATION "B"

SCALE 1:100



ELEVATION "C"

SCALE 1:100



ELEVATION "D"

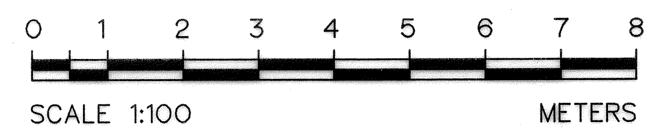
SCALE 1:100

UNLESS OTHERWISE SHOWN.

2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. NMH-GN-03

REFERENCE DRAWINGS :

1. POWERHOUSE, PLAN 1st FLOOR AND PLAN 2nd FLOOR	NMH-PH-02
2. POWERHOUSE, SECTIONS (SHEET 1/2)	NMH-PH-05
3. POWERHOUSE, SECTIONS (SHEET 2/2)	NMH-PH-06



NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

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MAE HAT HYDROPOWER PROJECT

ELECTRO–MECHANICAL EQUIPMENT
POWERHOUSE
ELEVATIONS

P&C MANAGEMENT CO.,LTD.

DESIGNED ภย.64624 สย.6226
DRAWN
CHECKED สย.6226
PROJECT MANAGER
08/03/2559
DATE

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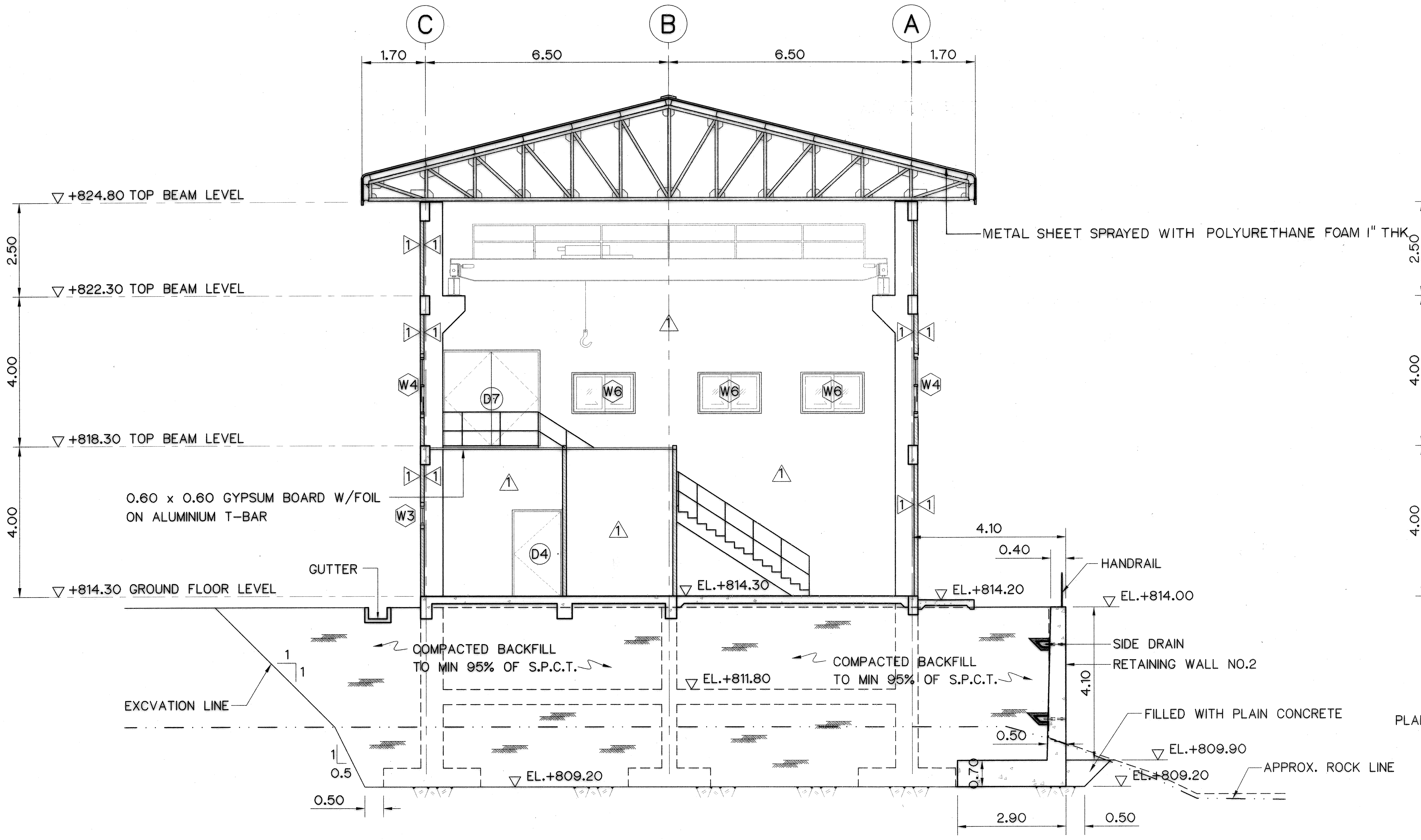
MINISTRY OF ENERGY

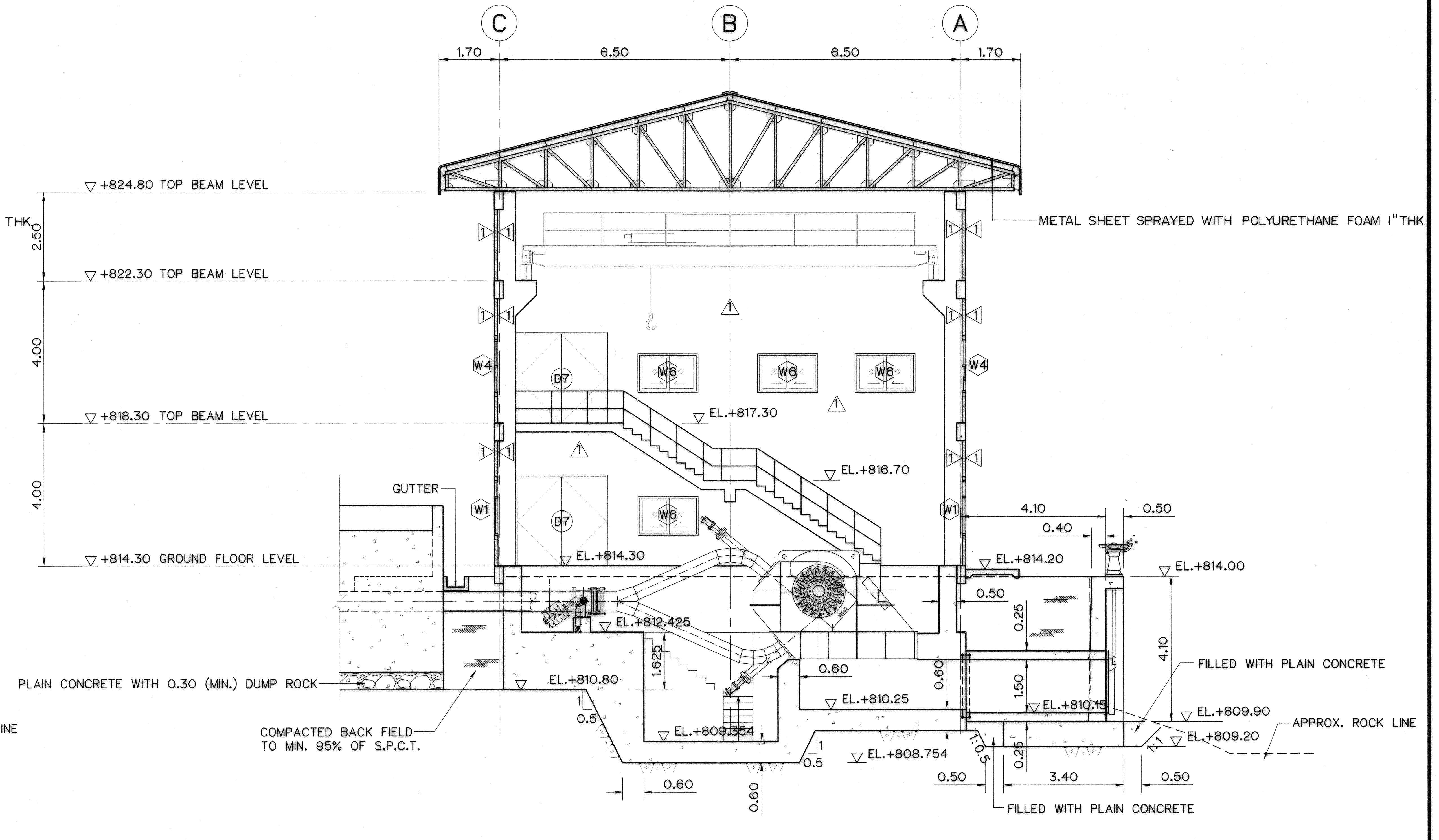
REVIEWED
SUBMITTED Chanit
RECOMMENDED
APPROVED P. Hansell

DRAWING NO. MH–PH–04
SHEET NO. 37 OF 51



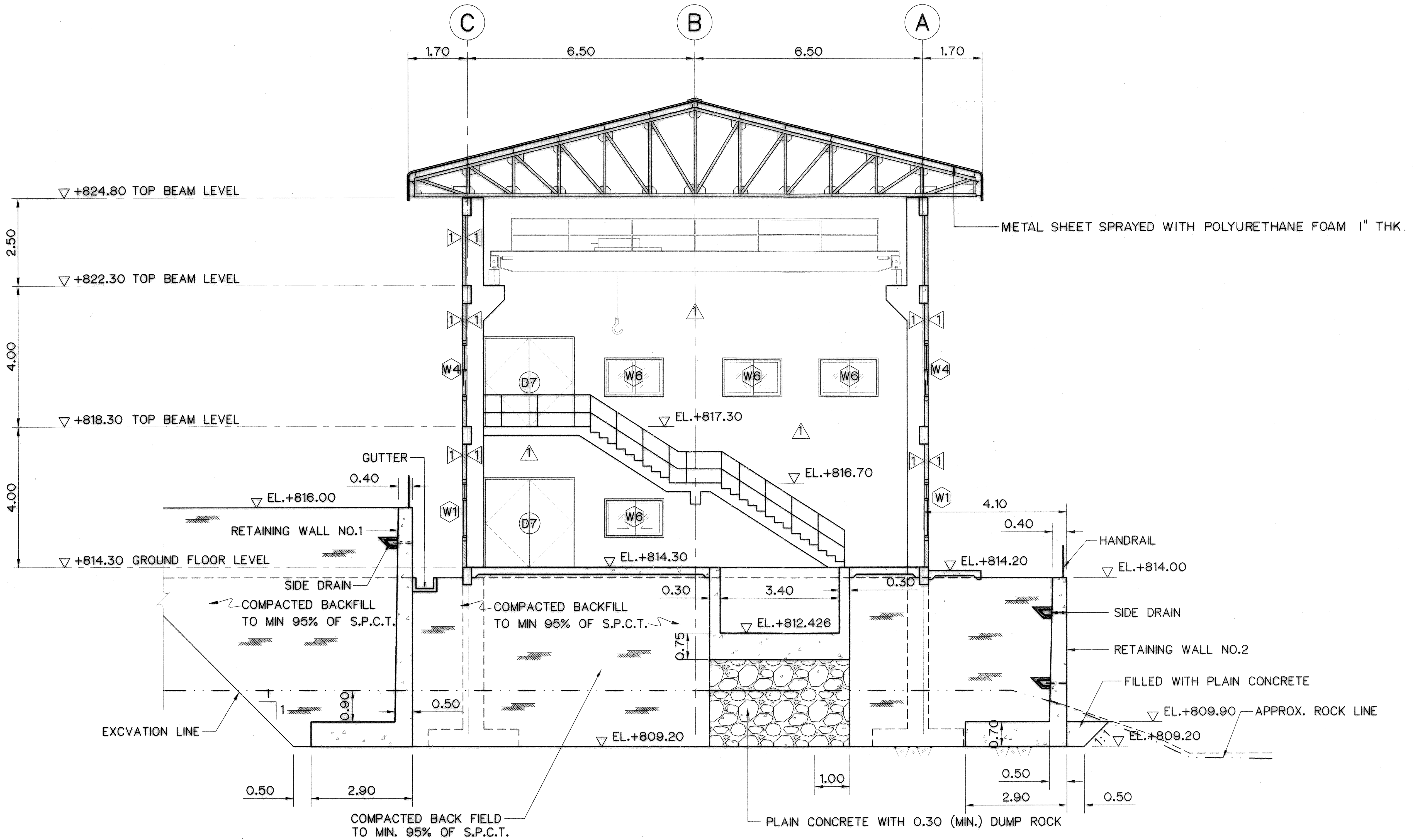
SECTION A–A

SCALE 1:100



SECTION B–B

SCALE 1:100



SECTION C–C

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. MH-GN-03

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

REFERENCE DRAWINGS :

1. PLAN 1st FLOOR AND PLAN 2nd FLOOR	MH-PH-02
2. ELEVATIONS	MH-PH-04

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MAE HAT HYDROPOWER PROJECT

ELECTRO–MECHANICAL EQUIPMENT
POWERHOUSE
SECTIONS (SHEET 1/2)

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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1				
	CONSULTANTS		DEDE	

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DRAWN
CHECKED สย.6226

PROJECT MANAGER
DATE 08/03/2559

Department of Alternative
Energy Development and Efficiency
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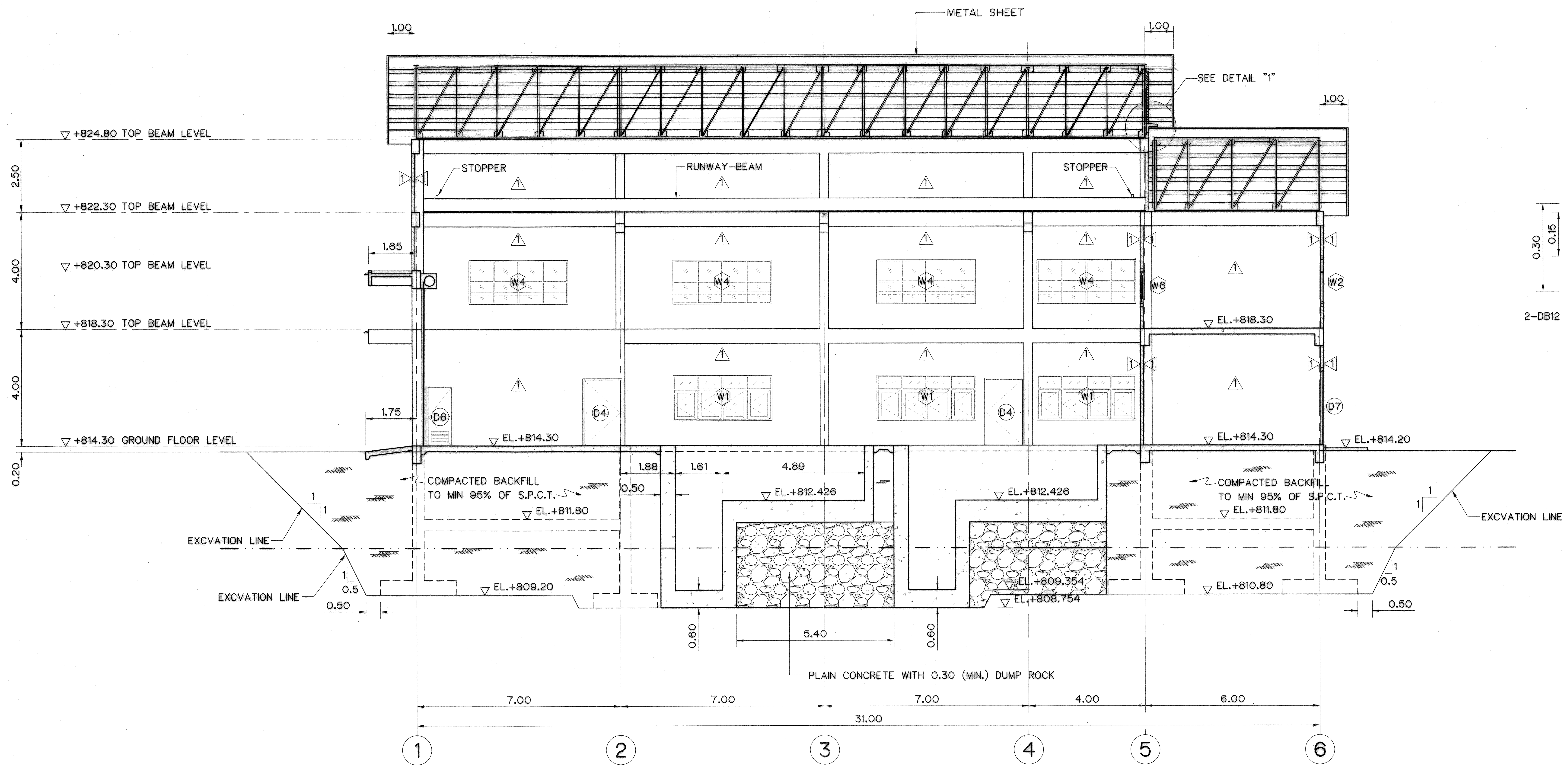
REVIEWED
SUBMITTED Chait
RECOMMENDED
APPROVED P. Hansit

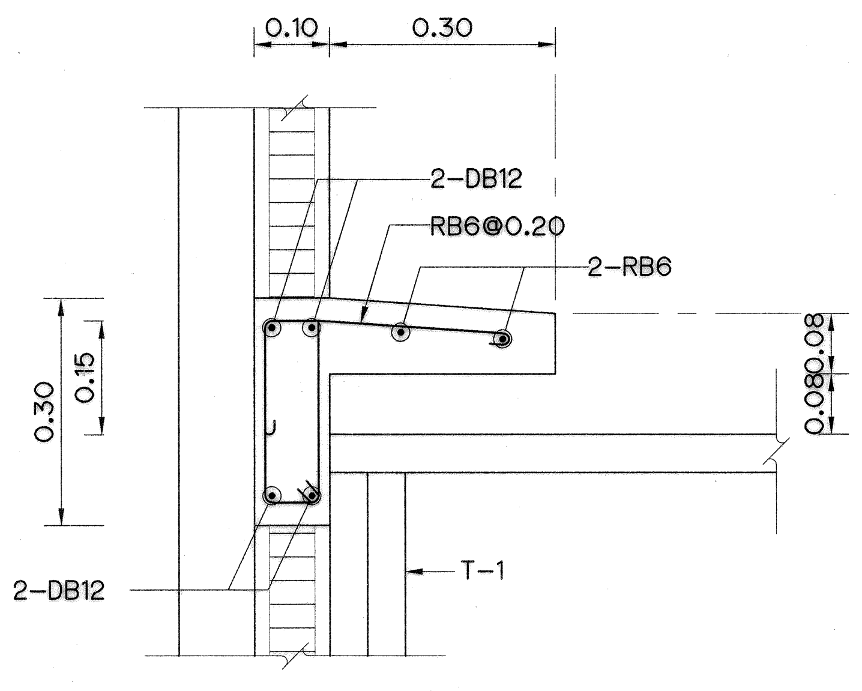
DRAWING NO. MH-PH-05

SHEET NO. 38 OF 51



SECTION E–E

SCALE 1:100



DETAIL "1"

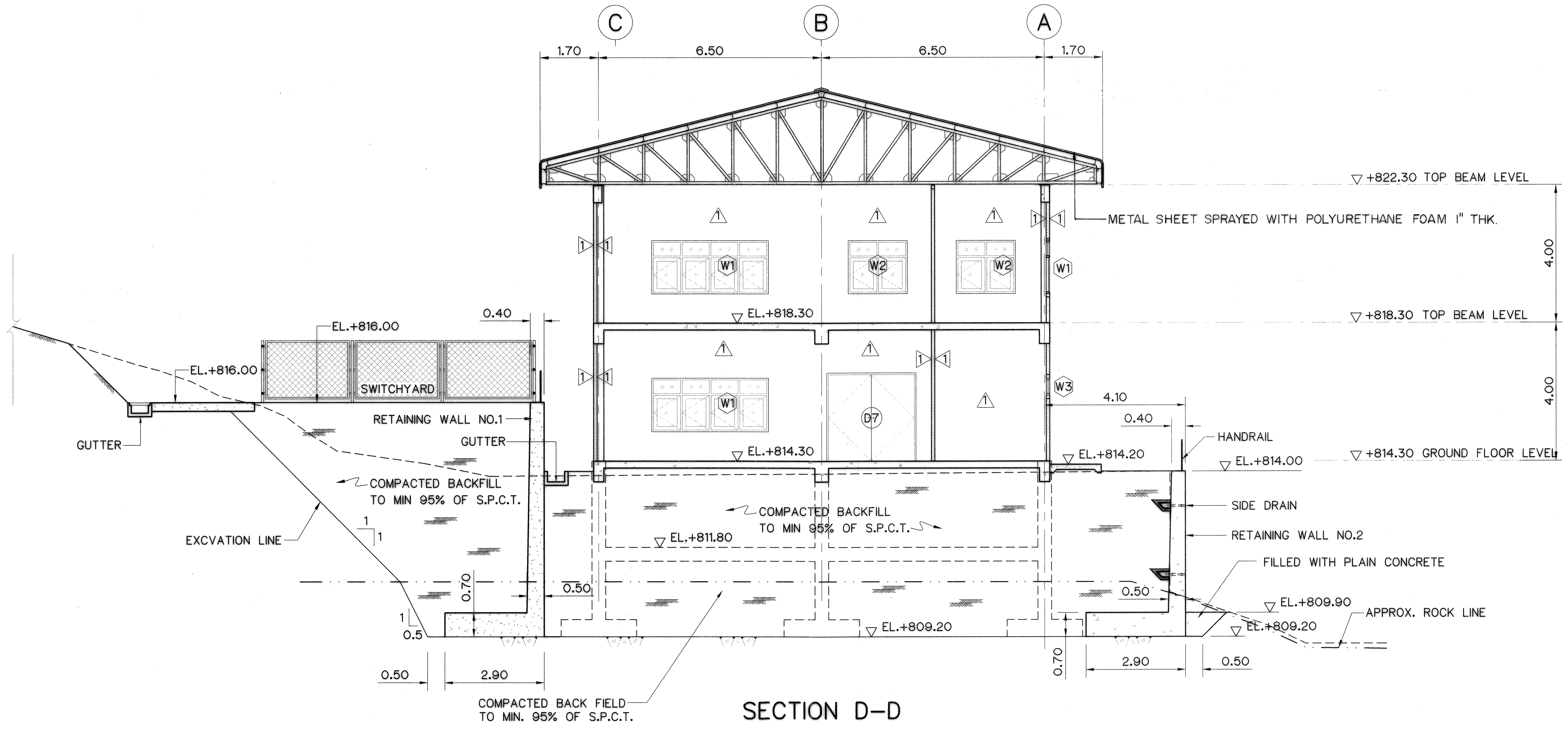
SCALE 1:10

NOTES :

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

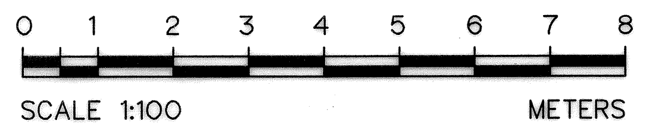
REFERENCE DRAWINGS :

1. PLAN 1st FLOOR AND PLAN 2nd FLOOR	MH-PH-02
2. ELEVATIONS	MH-PH-04



SECTION D–D

SCALE 1:100



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MAE HAT HYDROPOWER PROJECT

ELECTRO–MECHANICAL EQUIPMENT
POWERHOUSE
SECTIONS (SHEET 2/2)

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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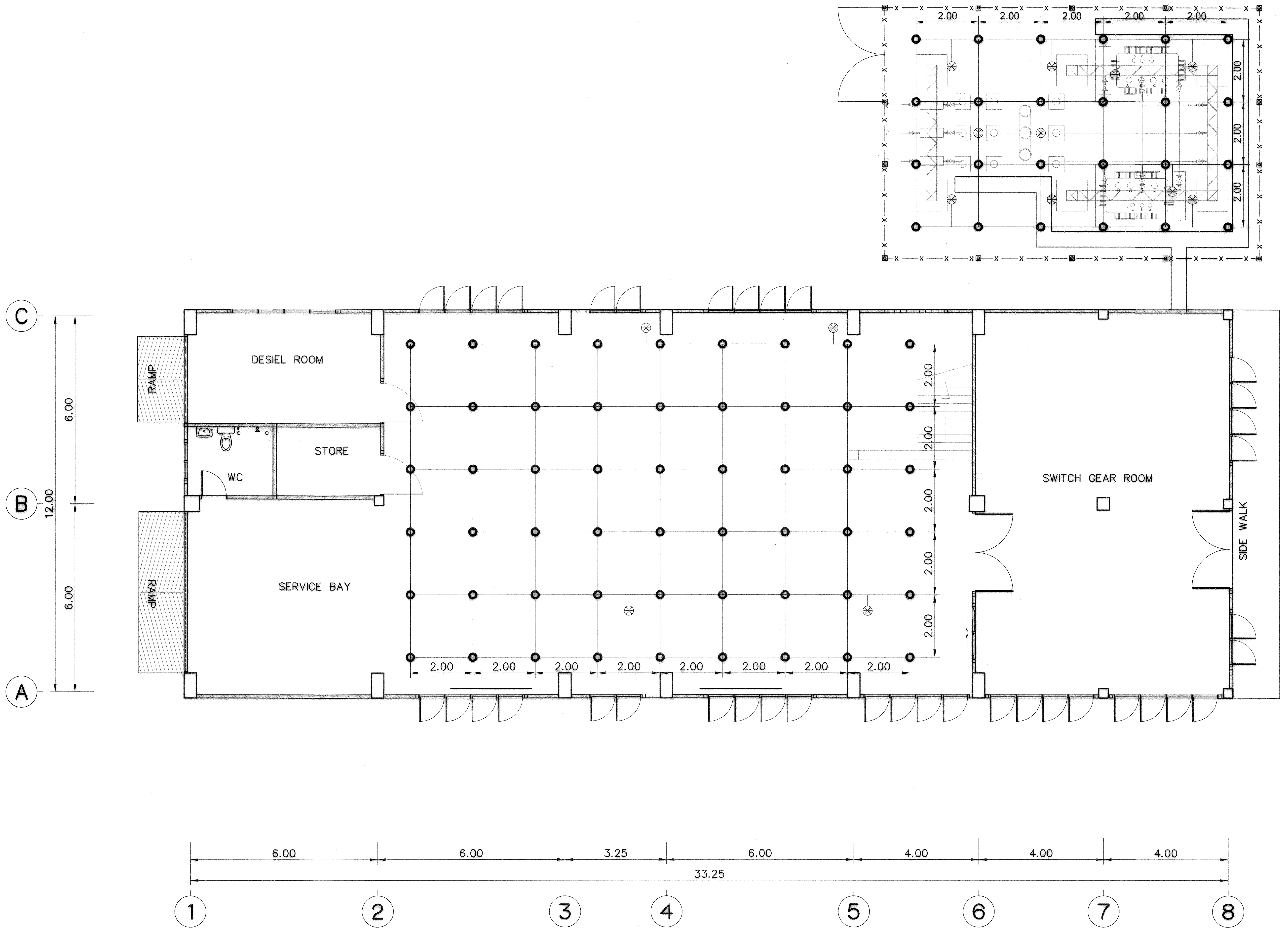
DRAWN
CHECKED สย.6226
PROJECT MANAGER
DATE 08/03/2559

Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

REVIEWED
SUBMITTED Chanit
RECOMMENDED
APPROVED P. Hansell.

DRAWING NO. MH-PH-06
SHEET NO. 39 OF 51



PLAN 1st FLOOR

SCALE 1:100

LEGENDS :

●	GROUND ROD
⊗	GROUND POINT FOR POWER PLANT EQUIPMENT GROUNDING
—	BARE CUPPER CONDUCTOR

NOTE

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

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MINISTRY OF ENERGY

MAE HAT HYDROPOWER PROJECT

ELECTRO–MECHANICAL EQUIPMENT
POWERHOUSE
GROUNDING SYSTEMS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

P&C MANAGEMENT CO.,LTD.

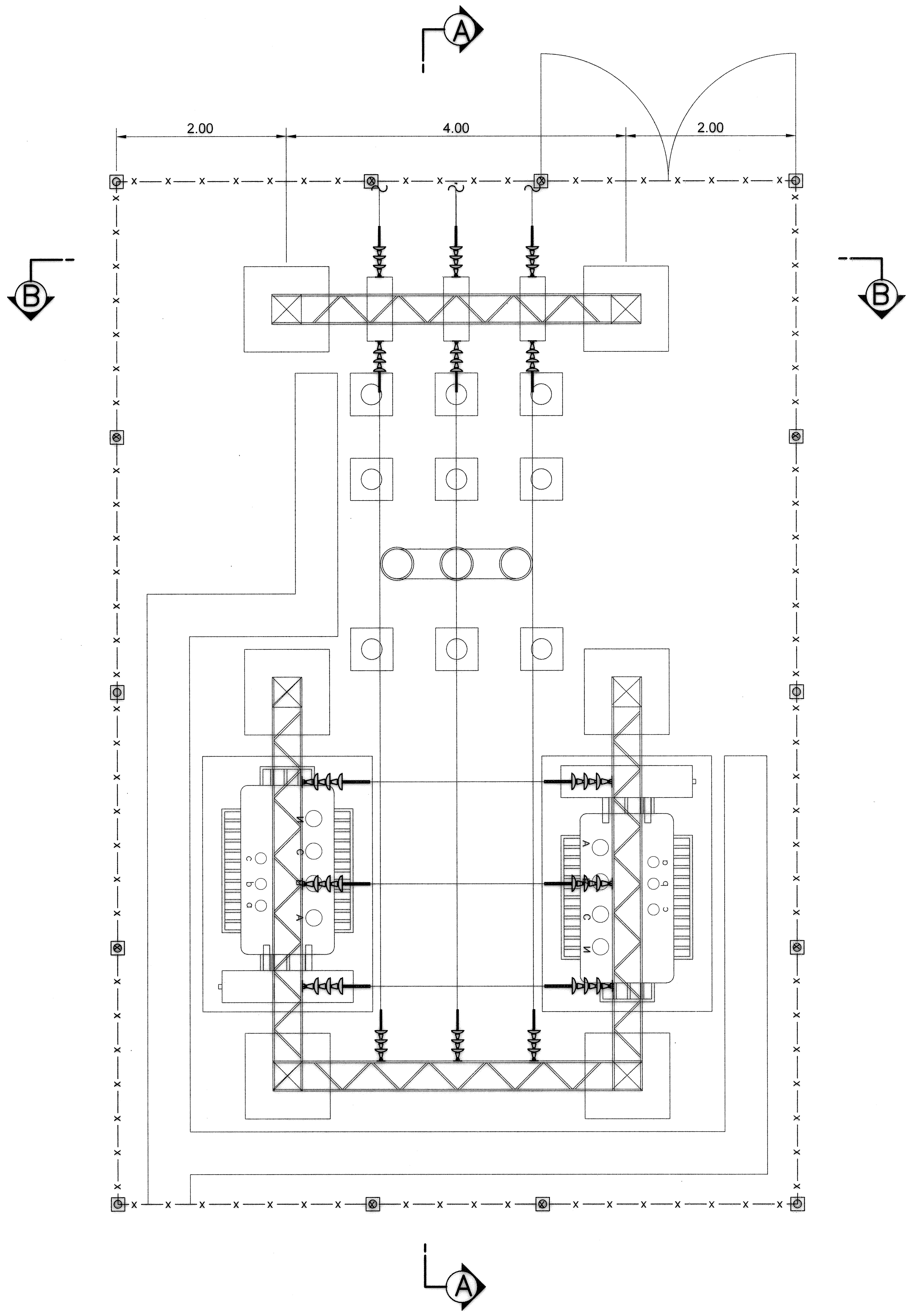
DESIGNED วฟก.604
DRAWN
CHECKED วฟก.604
PROJECT MANAGER
DATE 08/03/2551

Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

REVIEWED
SUBMITTED Chaiut
RECOMMENDED
APPROVED P. Hansell.

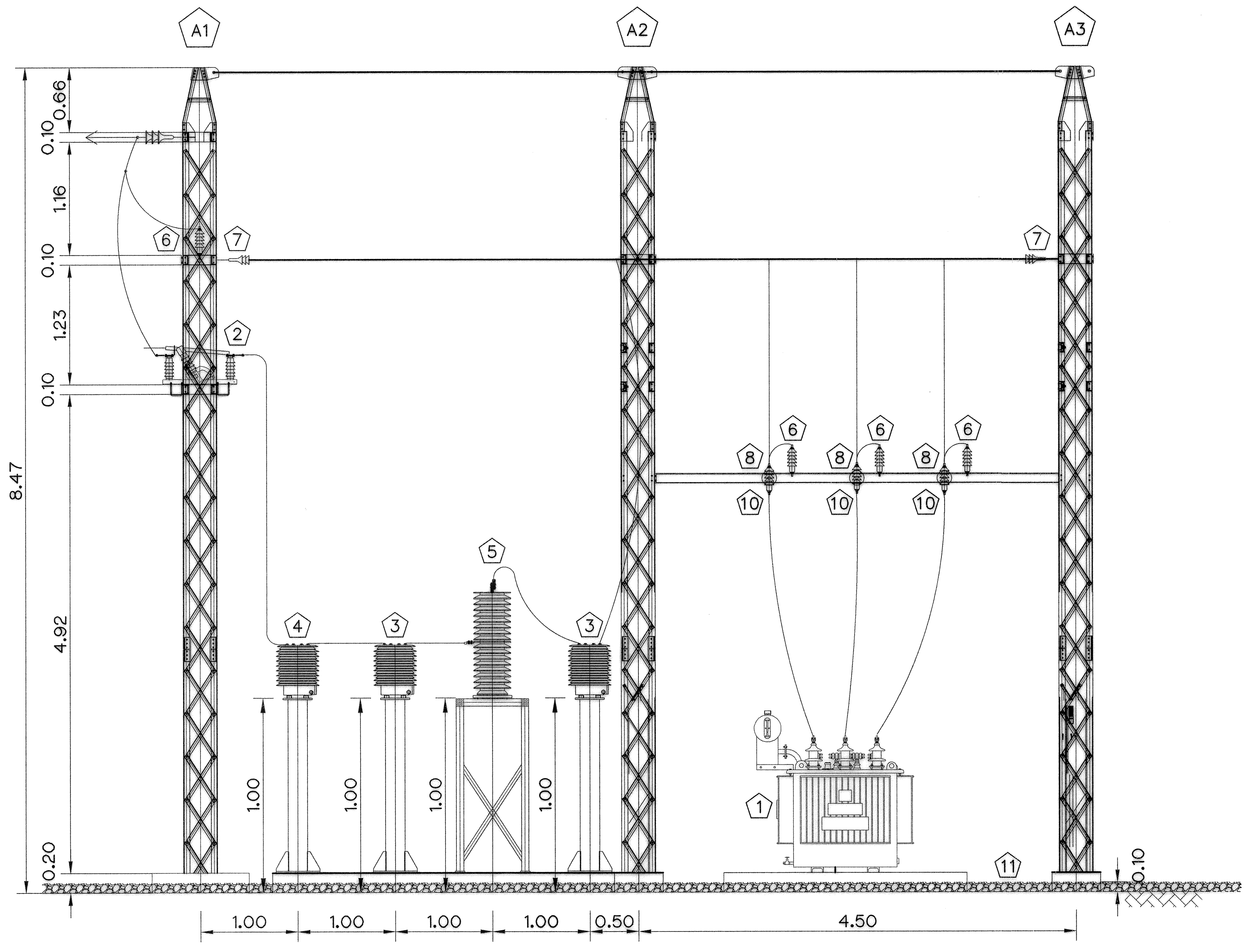
DRAWING NO. MH-PH-07

SHEET NO. 40 OF 51



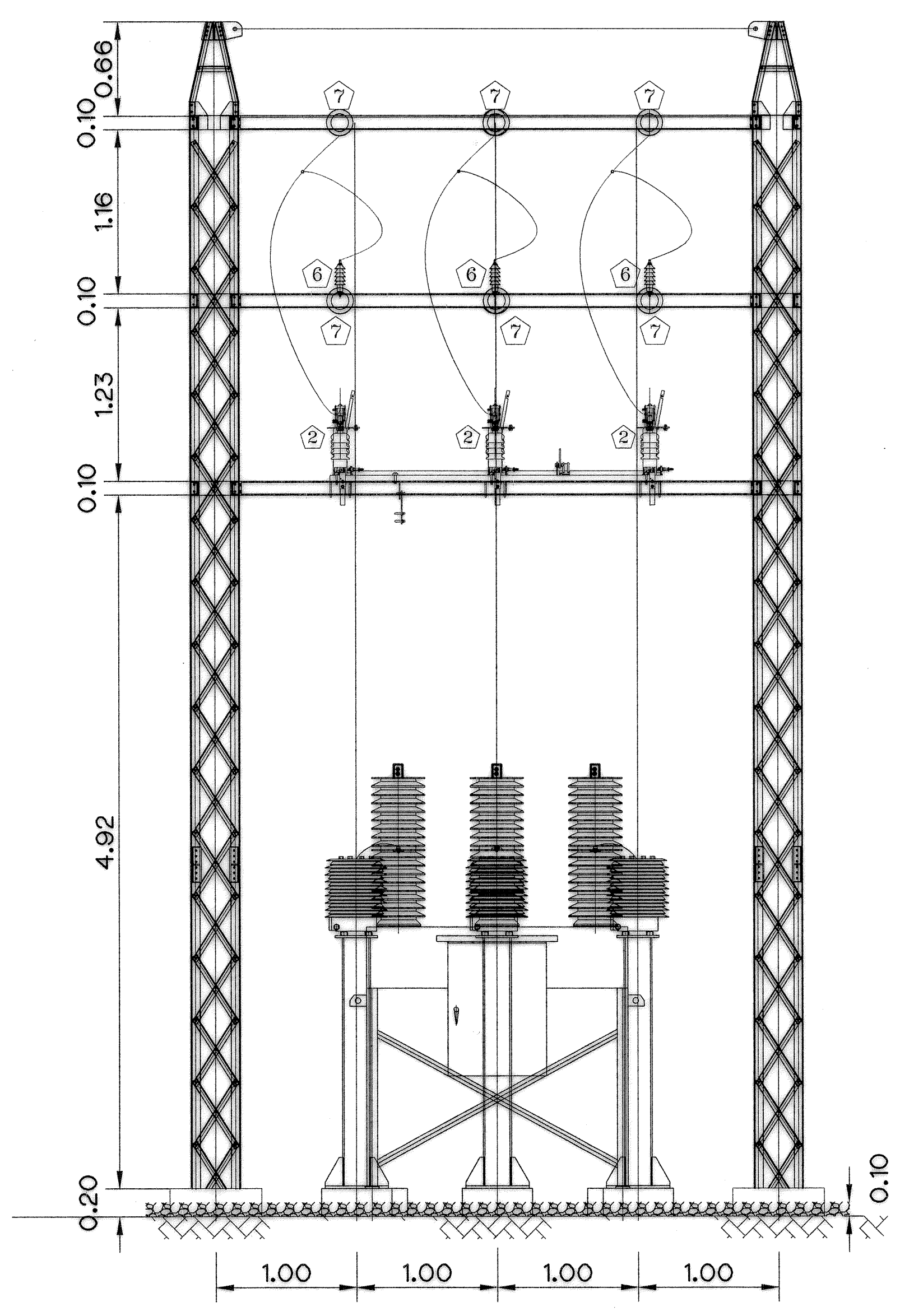
SWITCHYARD PLAN LAYOUT

SCALE 1:50



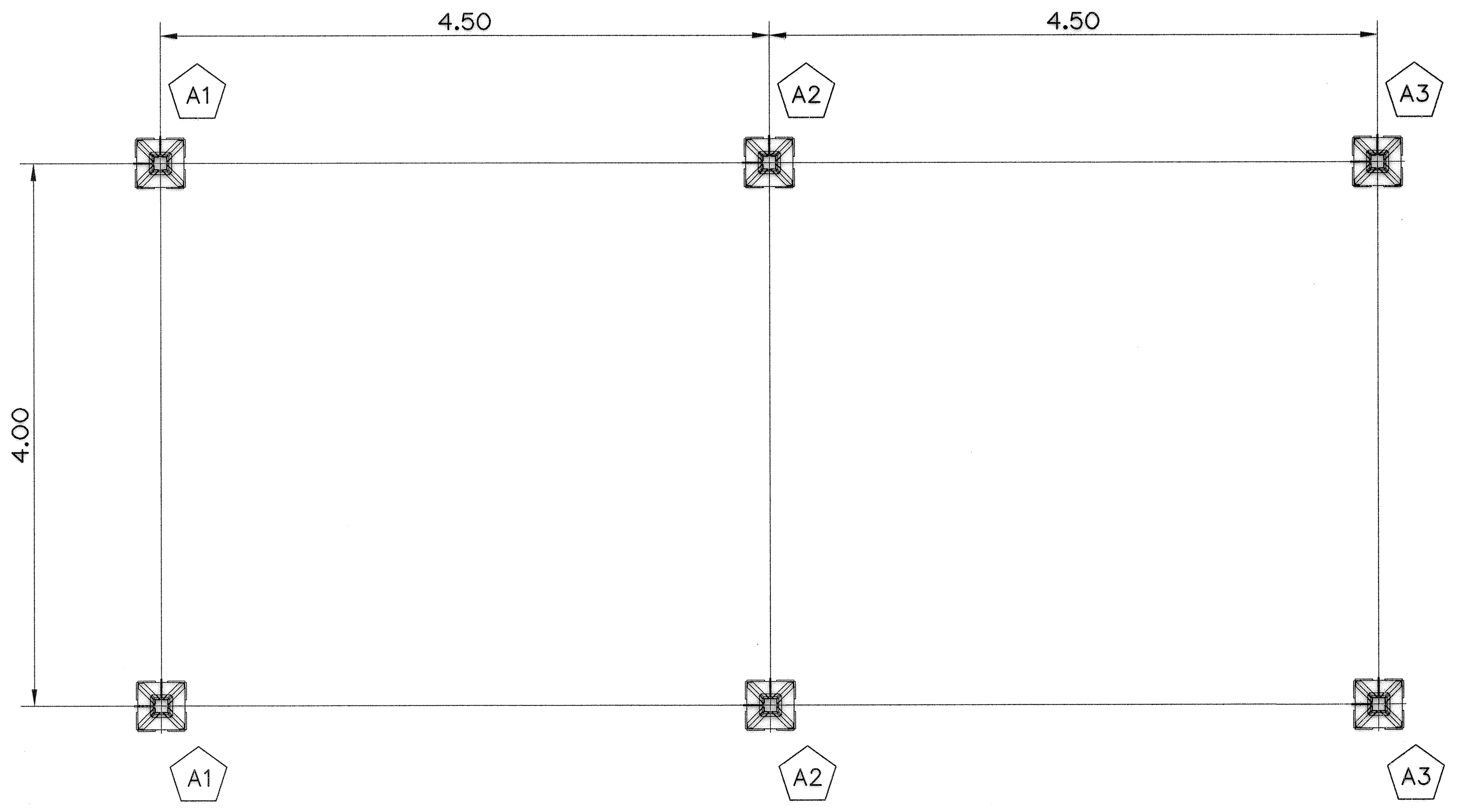
SECTION A–A

SCALE 1:50



SECTION B–B

SCALE 1:50



OVERHEAD GROUND WIRE PLAN

SCALE 1:50

ITEM.	DESCRIPTION	Q'TY.	REMARK.
1	MAIN TRANSFORMER 22000/3300 V.	2	
2	DISCONNECTING SWITCH	1	
3	OUTDOOR CURRENT TRANSFORMERS RATIO	6	
4	OUTDOOR VOLTGE TRANSFORMER RATIO	3	
5	SF6 CIRCUIT–BREAKER	1	
6	SURGE ARRESTERS	9	
7	SUSPENSION INSULATORS	45	
8	LINE POST INSULATORS	6	
9	LINE GROUND SWITCH	2	
10	22 KV. DROP OUT FUSE	6	
11	GRAVEL	1	

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MAE HAT HYDROPOWER PROJECT

ELECTRO–MECHANICAL EQUIPMENT
POWERHOUSE
SWITCHYARD PLAN LAYOUT SECTIONS AND GROUND SYSTEM

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED
	CONSULTANTS		DEDE	

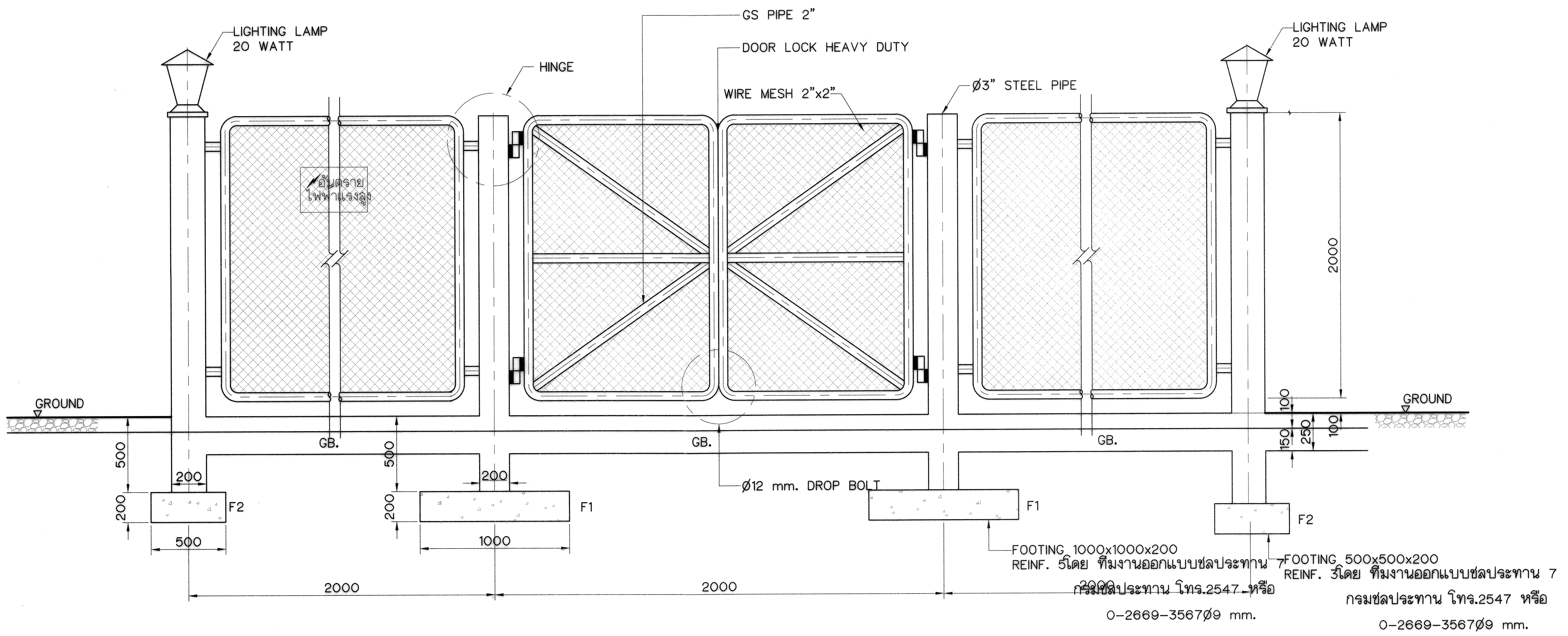
P&C MANAGEMENT CO.,LTD.

DESIGNED วฟก.604
DRAWN
CHECKED วฟก.604
PROJECT MANAGER DATE 08/03/2559

Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

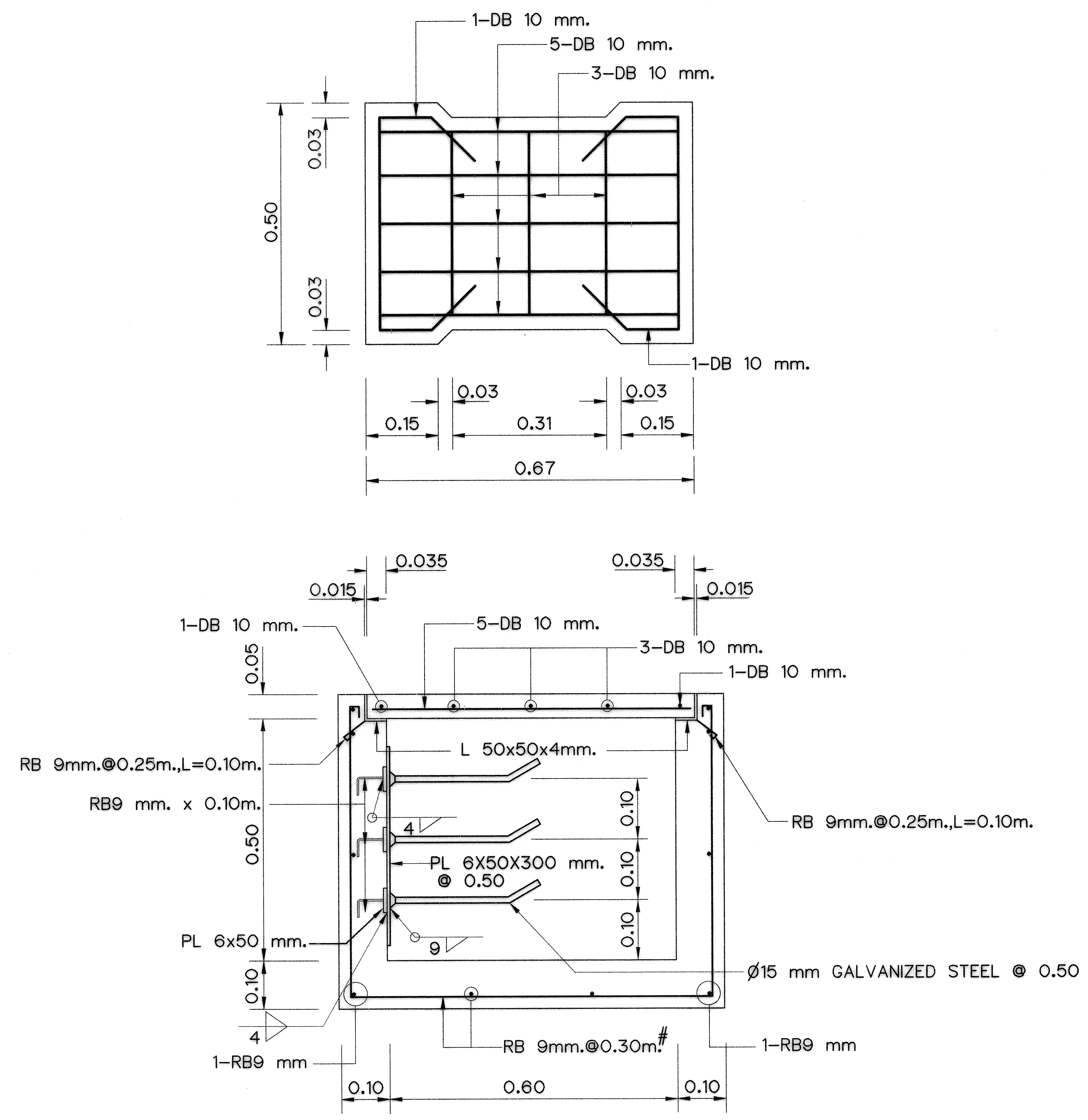
REVIEWED
SUBMITTED Chait
RECOMMENDED
APPROVED P. Hansell.

DRAWING NO. MH–PH–08
SHEET NO. 41 OF 51



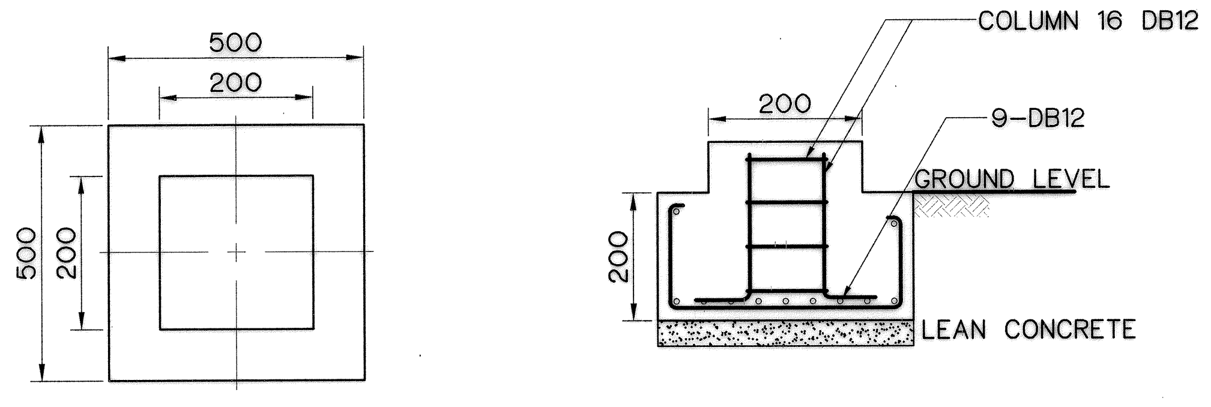
FENCE DETAIL

NOT TO SCALE



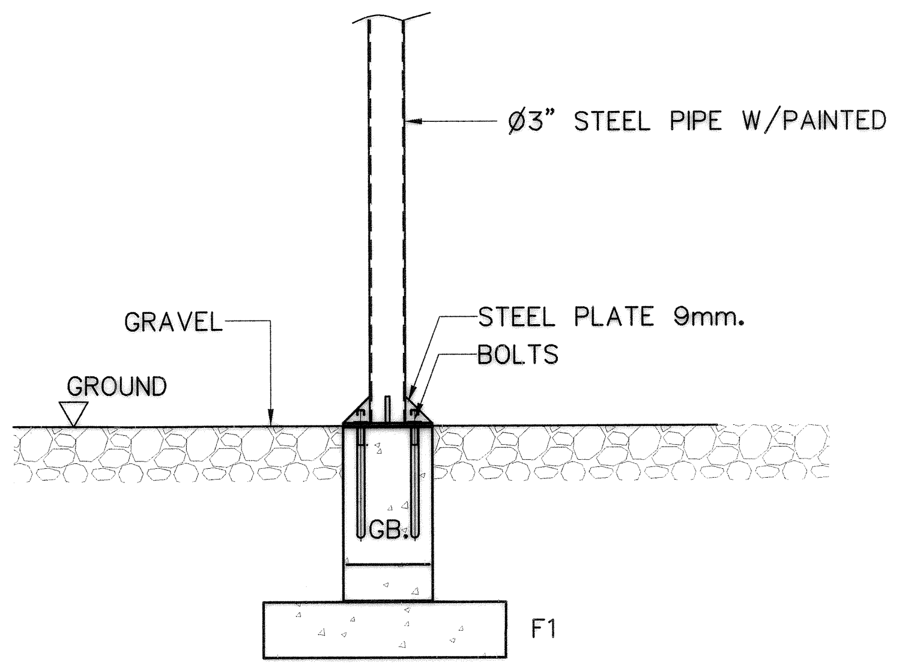
DETAIL CABLE TRENCH IN SWITCHYARD

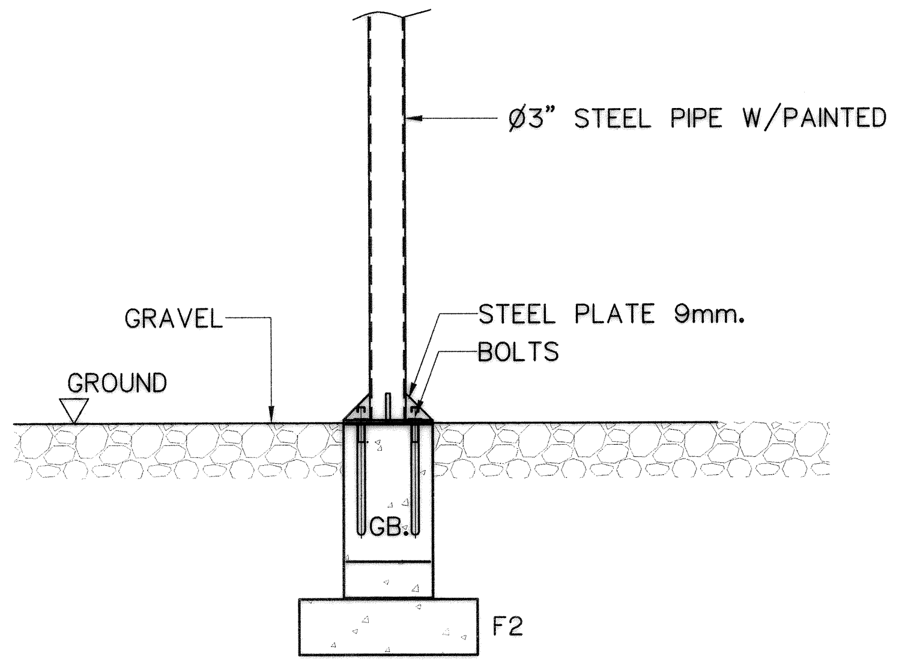
SCALE 1:10

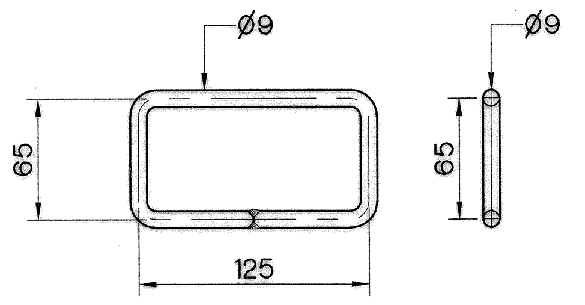


DETAIL COLUMN F2

NOT TO SCALE

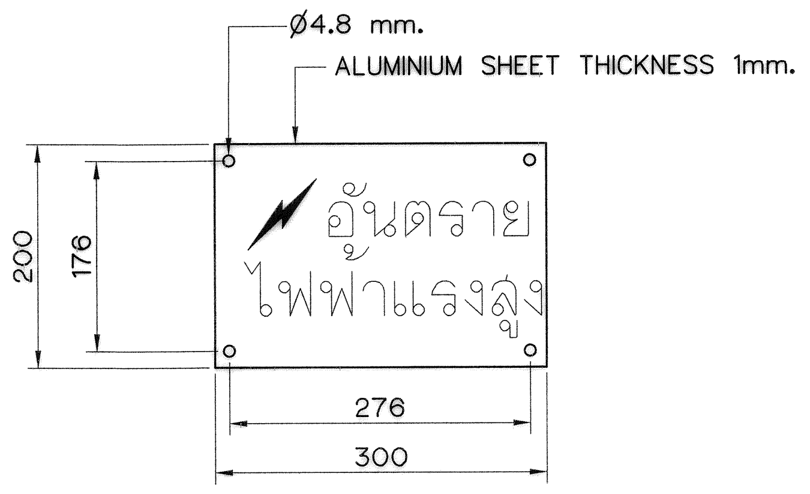






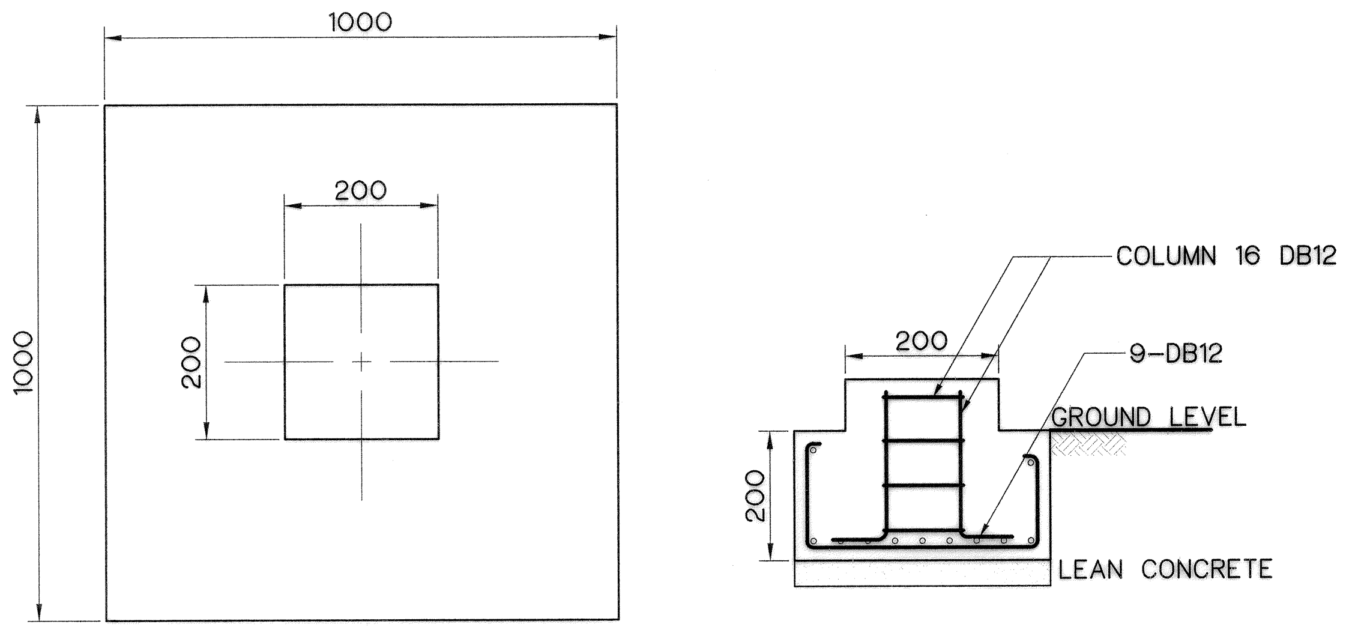
DETAIL "A"

NOT TO SCALE



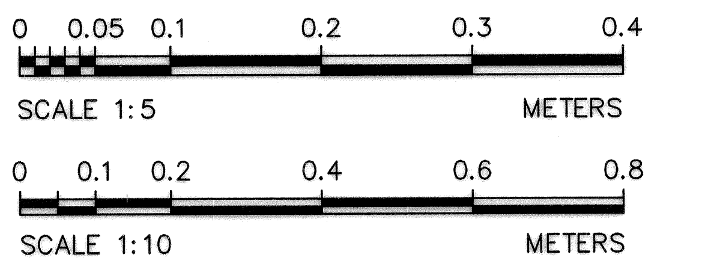
WARNING SIGN

NOT TO SCALE



DETAIL COLUMN F1

NOT TO SCALE



NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. HMP-GN-03
3. THE TRANSFORMER YARD WILL BE ACCORDING TO PEA STANDARD.

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MAE HAT HYDROPOWER PROJECT

ELECTRO-MECHANICAL EQUIPMENT
POWERHOUSE
SWITCHYARD FENCE AND CABLE TRENCH

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS	DEDE

P&C MANAGEMENT CO.,LTD.

DESIGNED ภย.64624 ลย.6226
DRAWN
CHECKED ลย.6226
PROJECT MANAGER
DATE 08/03/2559

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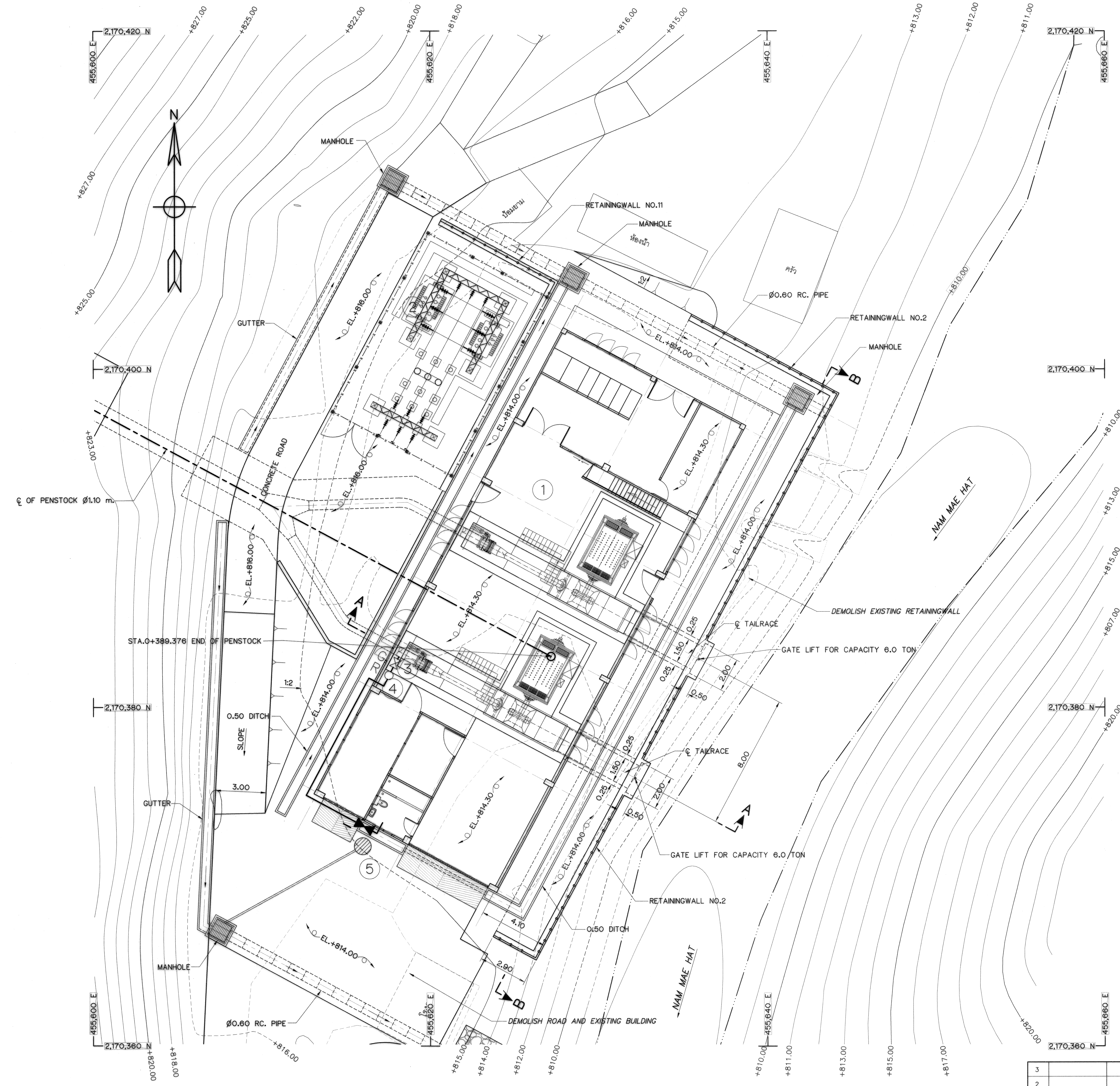
Energy Development and Efficiency
MINISTRY OF ENERGY

REVIEWED
SUBMITTED Chant
RECOMMENDED
APPROVED P.Hansell

DRAWING NO. MH-PH-09

SHEET NO. 42 OF 51



PLAN

SCALE 1:125

LISTS :

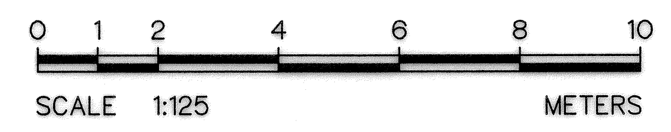
- ① POWER HOUSE
- ② SWITCHYARD
- ③ GATE VALVE Ø3/4"
- ④ PRESSURE REDUCING VALVE
- ⑤ SEPTICK TANK

NOTES :

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

REFERENCE DRAWINGS :

1. TAILRACE, SECTION AND DETAILS	MH-TR-02



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MAE HAT HYDROPOWER PROJECT

ELECTRO–MECHANICAL EQUIPMENT
TAILRACE
PLAN

NO.	DATE	REVISIONS	CHECKED	APPROVED
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DRAWN	
CHECKED	สย.6226
PROJECT MANAGER	DATE 08/03/2559

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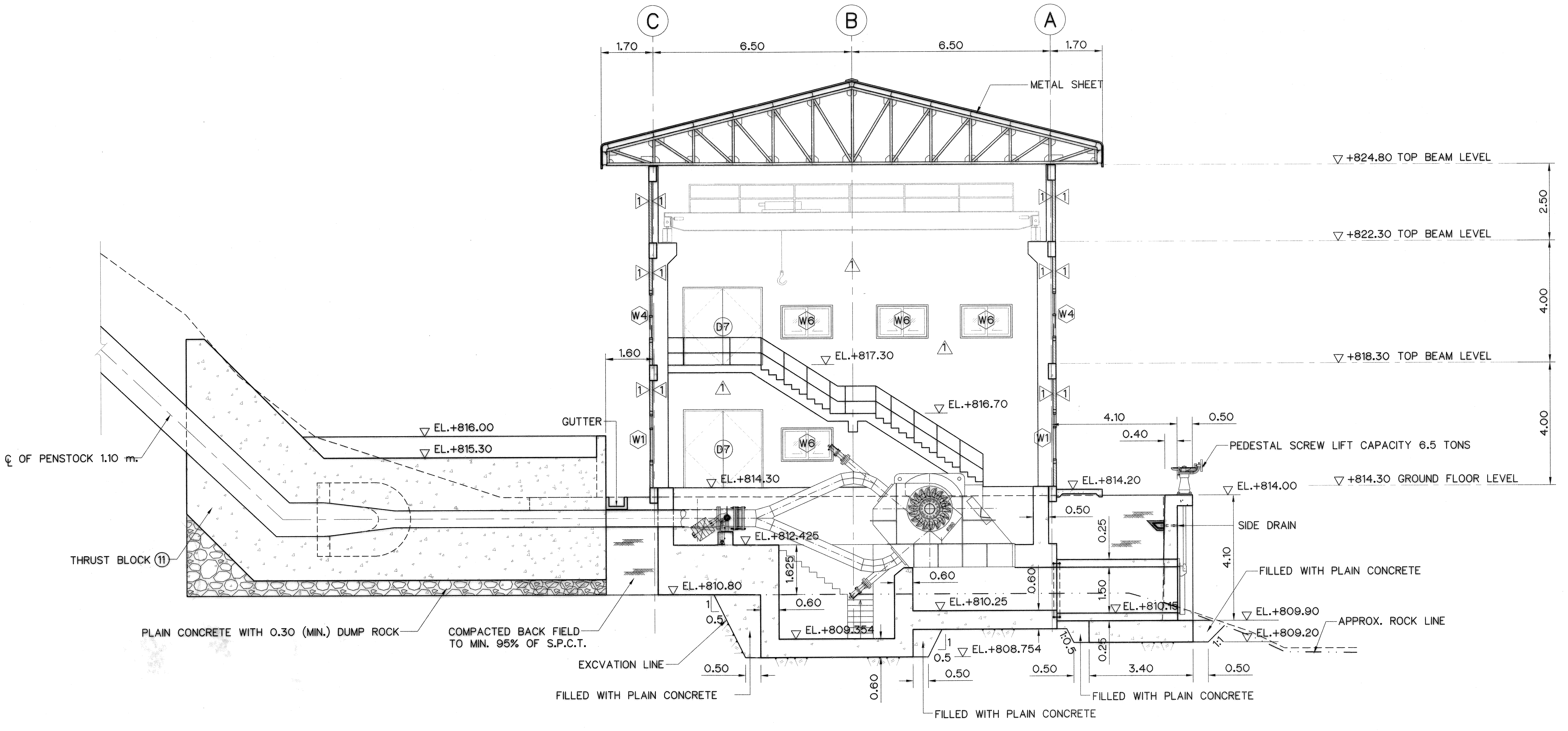
Energy Development and Efficiency
MINISTRY OF ENERGY

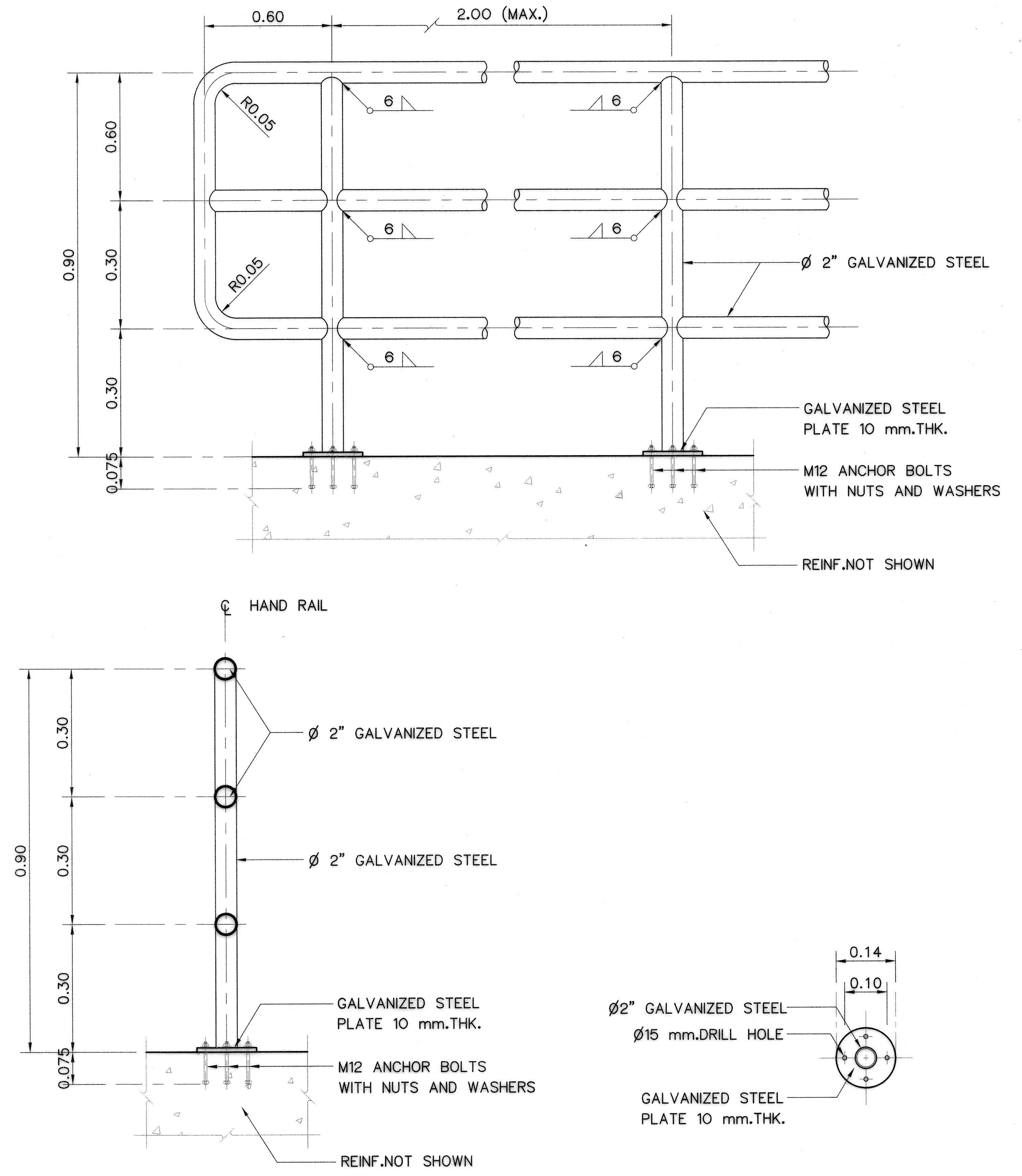
REVIEWED	
SUBMITTED	Chait
RECOMMENDED	
APPROVED	P. Hanzell

DRAWING NO.	SHEET NO.
MH-TR-01	43 OF 51



SECTION A–A

SCALE 1:100



DETAIL OF HANDRAIL

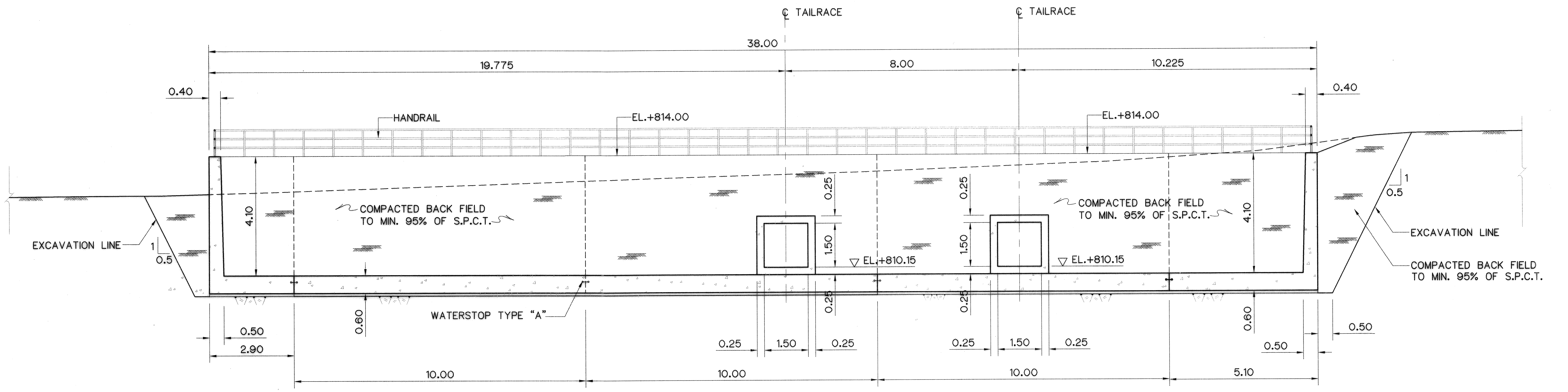
SCALE 1:20

NOTES :

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

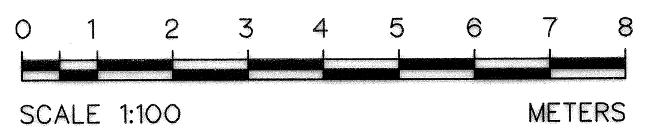
REFERENCE DRAWINGS :

1. TAILRACE PLAN	NMH-TR-01



SECTION B–B

SCALE 1:100



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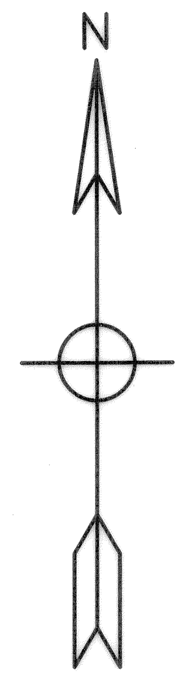
NO.	DATE	REVISIONS	CHECKED	APPROVED
	CONSULTANTS		DEDE	

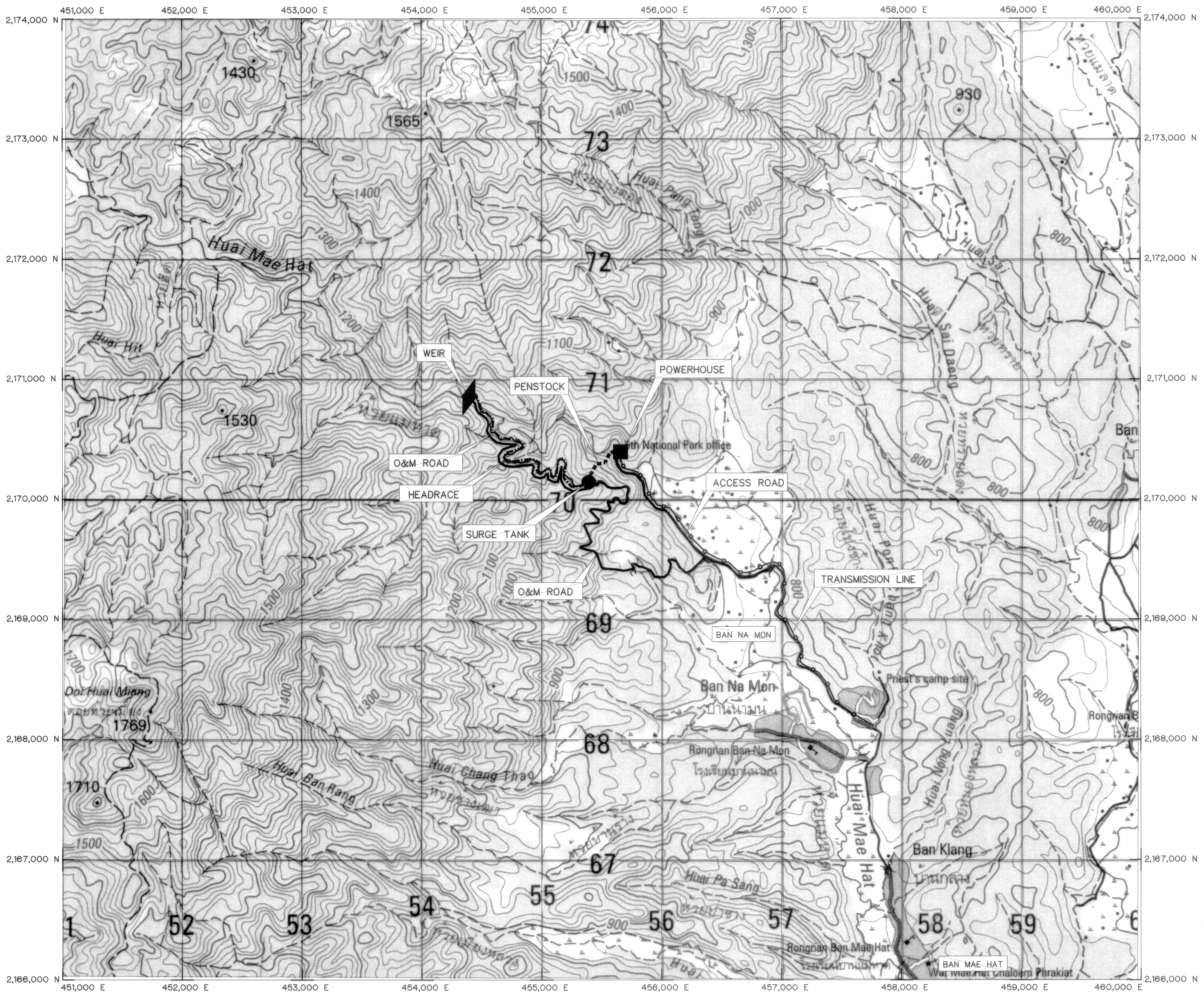
KINGDOM OF THAILAND
Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

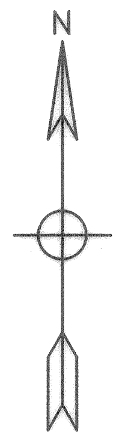
MAE HAT HYDROPOWER PROJECT

ELECTRO–MECHANICAL EQUIPMENT
TAILRACE
SECTIONS

P&C MANAGEMENT CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED ภย.64624 สย.6226	SUBMITTED
DRAWN	RECOMMENDED
CHECKED สย.6226	APPROVED P. Hansell.
PROJECT MANAGER — DATE 08/03/2559	DRAWING NO. MH-TR-02 — SHEET NO. 44 OF 51

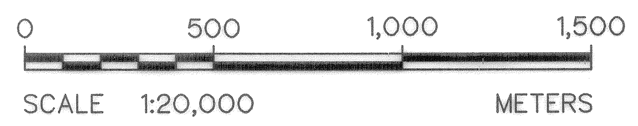






PROJECT AREA MAP

SCALE 1:20,000



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. THE POLE OF TRANSMISSION LINE IS PRESTRESSED CONCRETE WITH 12.00 METERS HIGH

LEGENDS :

〰	STREAM
◆	WEIR
—·—	HEADRACE
●	SURGE TANK
------	PENSTOCK
■	POWERHOUSE
━	ACCESS ROAD
-o-o-	TRANSMISSION LINE

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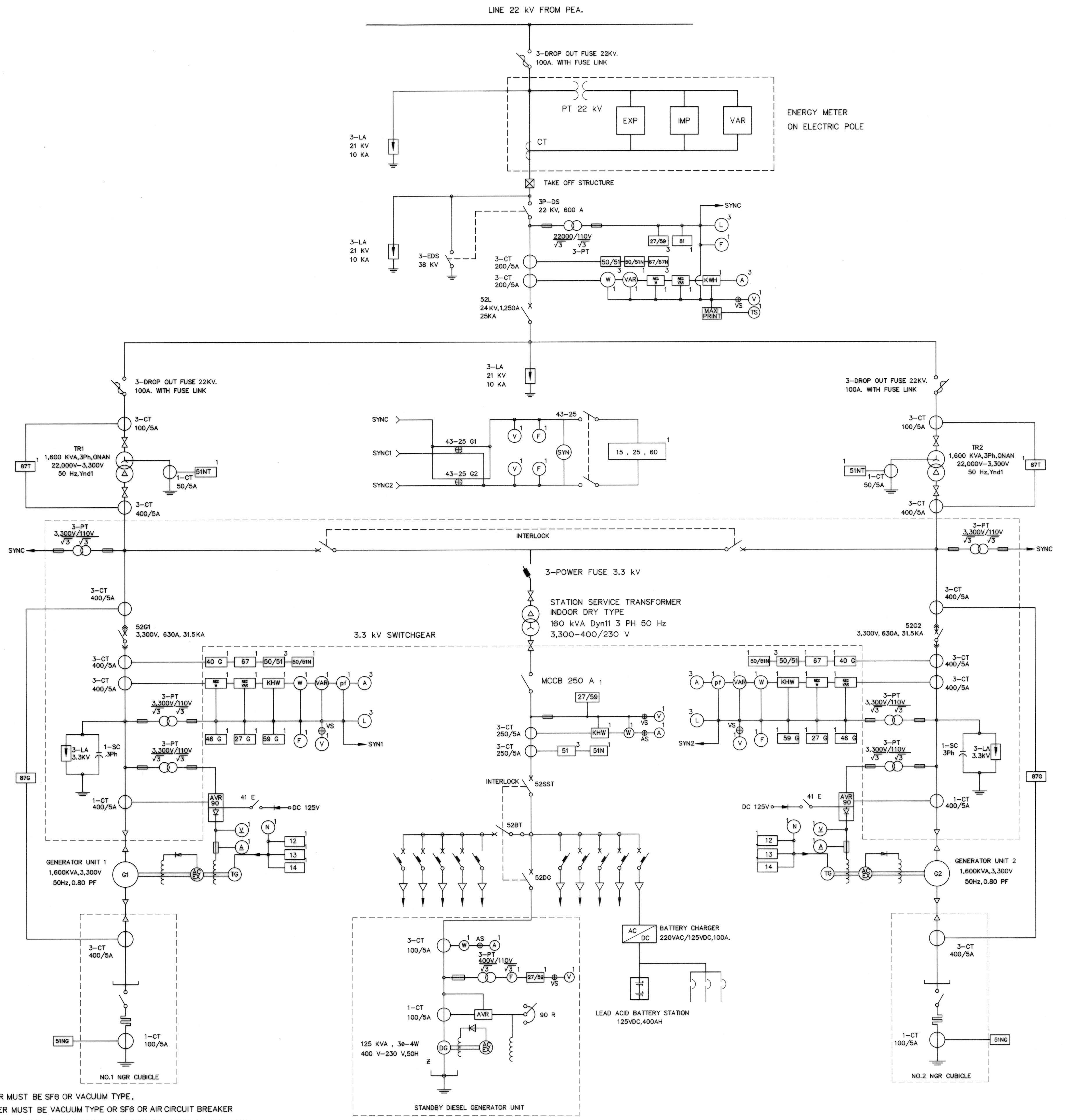
MINISTRY OF ENERGY

MAE HAT HYDROPOWER PROJECT

ELECTRO–MECHANICAL EQUIPMENT
TRANSMISSION LINE
GENERAL PLAN

P&C MANAGEMENT CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED ภย.64624 สย.6226	REVIEWED
DRAWN	SUBMITTED Chait
CHECKED สย.6226	RECOMMENDED
PROJECT MANAGER DATE 08/03/2559	APPROVED P. Hansell.
DRAWING NO. MH-TS-01	SHEET NO. 45 OF 51



LEGEND :

12	OVERSPEED RELAY
13	SYNCRONOUS SPEED RELAY
14	UNDERSPEED RELAY
15	SPEED OR FREQUENCY MATCHING RELAY
25	SYNCHRONING RELAY
27	UNDERVOLTAGE RELAY
32	REVERSE POWER RELAY
40	FIELD RELAY
46	REVERSE PHASE RELAY
50	INSTANTANEOUS OVERCURRENT
51	TIME OVERCURRENT RELAY
59	OVERVOLTAGE RELAY
60	VOLTAGE OR CURRENT BALANCE RELAY
64	GROUND PROTECTIVE RELAY
67	DIRECTIONAL OVERCURRENT RELAY
81	FREQUENCY RELAY
87	DEFFERENTIAL PROTECTIVE RELAY
⊕	SELECTOR SWITCH
REC W	WATT RECORDER
REC VAR	VAR RECORDER
kwh	KELOWATT HOUR METER
3-CT	3-PHASE POTENTIAL TRANSFORMER
3-CT	3-PHASE CURRENT TRANSFORMER
SYNC	SYNCRONISING SIGNAL
	CONTROL FUSE
⊗	LAMP
SYM	SYNCHRONOSCOPE

43	MANUAL TRANSFER SWITCH
L	INDICATING LAMP
F	FREQUENCY METER
V	VOLT. METER
A	AMP. METER
W	WATT. METER
VAR	VAR METER
pf	POWER FACTOR METER
N	RPN. SPEED METER
V̲	DC. VOLT METER
A	DC. AMP. METER
TG	TACHO-GENERATOR
AC EX	AC. EXCITOR
G1	GENERATOR NO.1
3P-DF	3-PHASE DROP-OUT FUSE
3P-DS	3-PHASE DISCONNECTING SWITCH
3-LA	3-PHASE LIGHTNING ARRESTER
3P-PF	3-PHASE POWER FUSE
	CIRCUIT BREAKER
VCB OR ACB	VACUUM CIRCUIT BREAKER OR AIR CIRCUIT BREAKER (DRAW OUT TYPE)

NOTES :

1. 22 KV CIRCUIT BREAKER MUST BE SF6 OR VACUUM TYPE,
   3.3 KV CIRCUIT BREAKER MUST BE VACUUM TYPE OR SF6 OR AIR CIRCUIT BREAKER
2. 3.3 KV CURRENT TRANSFORMER AND POTENTIAL TRANFORMER MUST BE DRY TYPE
3. 22 KV CURRENT TRANSFORMER AND POTENTIAL TRANFORMER MUST BE EPOXY RESIN MOLD
4. ALL POTENTIAL TRANSFORMER : ACCURACY CLASS 0.5
5. ALL CURRENT TRANSFORMER : FOR METERING ACCURACY CLASS 0.5
   : FOR RELAY ACCURACY CLASS 5P 20
6. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, IT SHALL BE DESIGNED AND SPECIFIED BY CONTRACTOR FOR SUBMITTED TO FIELD ENGINEER APPROVAL LATER
7. ACCORDING TO PEA'S REGULATION ON THE POWER NETWORK SYSTEM INTERCONNECTION CODE

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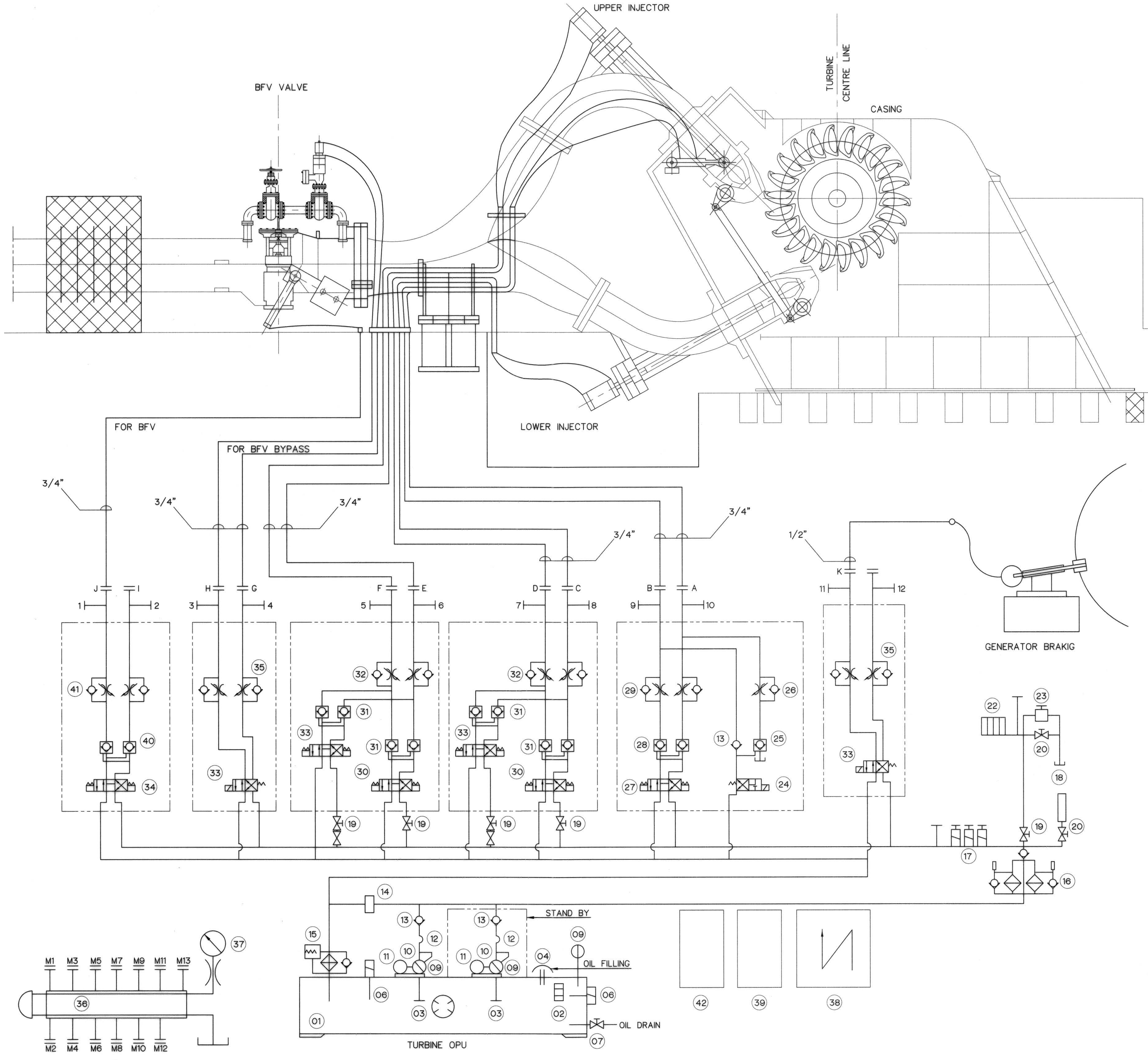
Energy Development and Efficiency
MINISTRY OF ENERGY

MAE HAT HYDROPOWER PROJECT

ELECTRO-MECHANICAL EQUIPMENT

MAIN POWER SINGLE LINE DIAGRAM

P&C MANAGEMENT CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
	REVIEWED
DESIGNED วฟก.604	SUBMITTED Chonit
DRAWN	RECOMMENDED
CHECKED วฟก.604	APPROVED P. Hansell.
PROJECT MANAGER 08/03/2559 DATE	DRAWING NO. MH-EM-01
	SHEET NO. 46 OF 51



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

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 BY CONTRACTOR FOR SUBMITTED TO FIELD ENGINEER APPROVAL LATER

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	–
01	05	TEMPERATURE GAUGE	–	–
01	06	OIL LEVEL SENSOR	–	–
01	07	GATE VALVE	–	–
01	08	RTD	–	–
02	09	VARIABLE DISPLACEMENT PUMP	23 LPM	–
02	10	FLEXIBLE DRIVE COUPLING	–	–
02	11	ELECTRIC MOTOR 3 PHASE	3.7 kW (5 hp) 1500 RPM B5 50 Hz 400v IP 55 Closs F Insulation	–
02	12	FLEXIBLEHOSE	–	–
02	13	INLINE TYPE CHECK VALVE	–	–
01	14	PILOT OPERATED RELIEF VALVE	–	–
01	15	RETURN LINE FILTER	–	–
01	16	OUPLEX PRESSURE LINE FILLTER	–	–
02	17	PRESSURE SWITCH	–	–
01	18	PRESSURE TRANSDUCER	–	–
01	19	SHUT OFF VALVE	3/4" Gosket mounted type	–
01	20	SHUT OFF VALVE	1/2" Gosket mounted type	–
01	21	SHUT OFF VALVE	3/4" Gosket mounted type	–
04	22	ACCUMULATOR (PISTON TYPE)	2 x 55 Ltrs	–
01	23	DIRET TYPE RELIEF VALVE	–	–
01	24	PILOT-OPERATED CHECK VALVE	–	–
01	25	MODULAR PILOT OPERATED CHECK VALVE	–	–
01	26	MODULAR THROTTLE & CHECK VALVE	–	–
01	27	SOLENOID OPERATED DIRECTION CONTROL VALVE	–	–
01	28	MODULAR PILOT OPERATED CHECK VALVE	–	–
01	29	MODULAR THROTTLE & CHECK VALVE	–	–
02	30	PROPOTIONAL VALVE	Diff P<5bar, command + 10 VDC	–
04	31	MODULAR PILOT OPERATED CHECK VALVE	–	–
03	32	MODULAR THROTTLE & CHECK VALVE	–	–
04	33	DIRECTION CONTROL CHECK VALVE	220V D.C	–
01	34	DIRECTION CONTROL CHECK VALVE	220V D.C	–
02	35	MODULAR THROTTLE & CHECK VALVE	–	–
01	36	MULTISTATION PRESSURE GAUGE ISOLATOR	SPECIAL	–
01	37	PRESSURE GAUGE	100 mm dia (4*) 0-210 bars FB mounting glycerine filled	–
01	38	TERMINAL BOX	Retail make	–
01-each	39	ACCUMULATOR CHARGING KIT	–	–
01	40	MODULAR PILOT OPERATED CHECK VALVE	–	–
01	41	MODULAR THROTTLE & CHECK VALVE	–	–

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MINISTRY OF ENERGY

MAE HAT HYDROPOWER PROJECT

ELECTRO-MECHANICAL EQUIPMENT
OIL PUMPING UNIT DIAGRAM
(UNIT 1 AND 2) DETAIL

P&C MANAGEMENT CO.,LTD.

DESIGNED		สก.1950
DRAWN		
CHECKED		สก.1950
PROJECT MANAGER		DATE 08/03/2559

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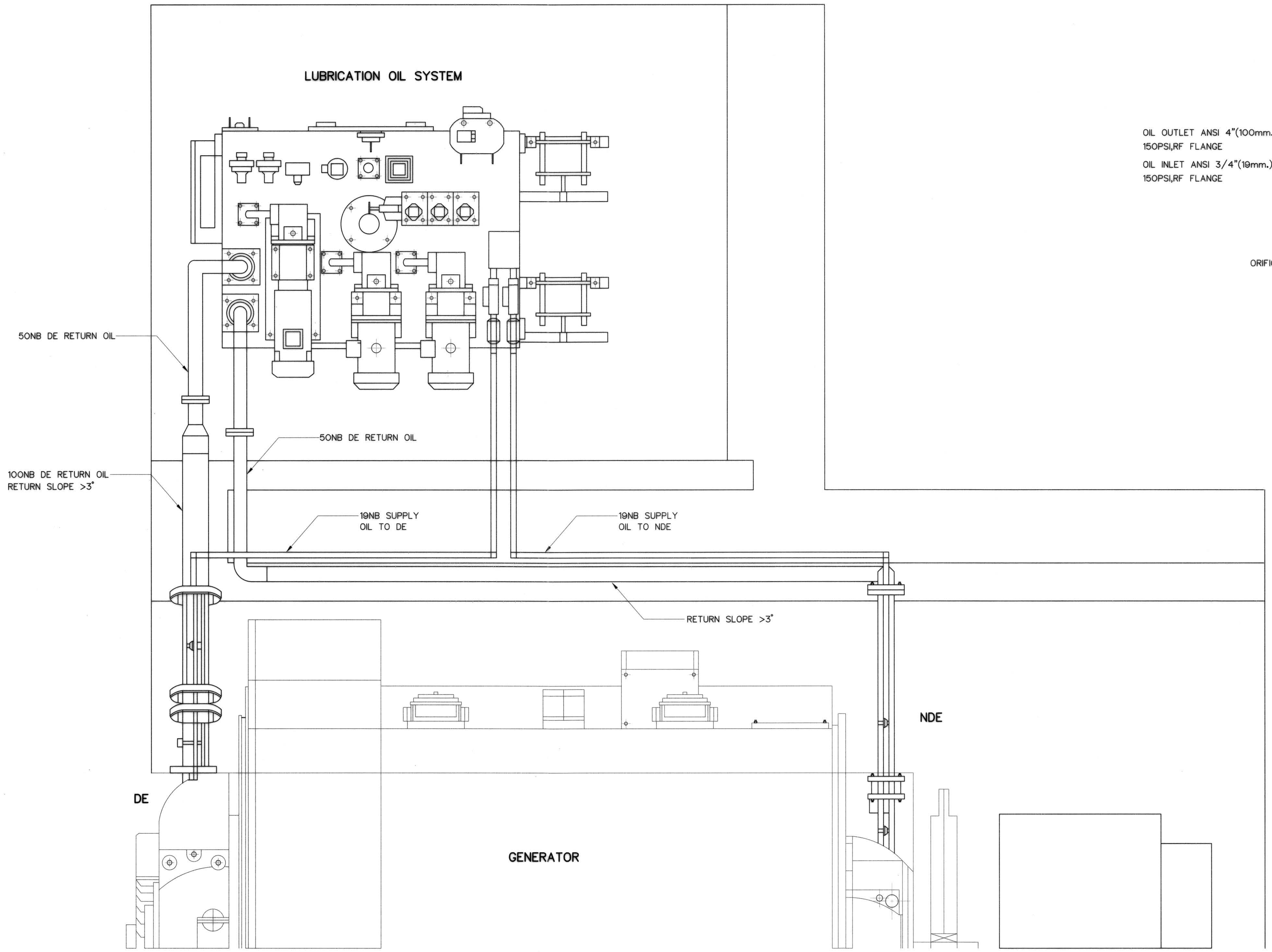
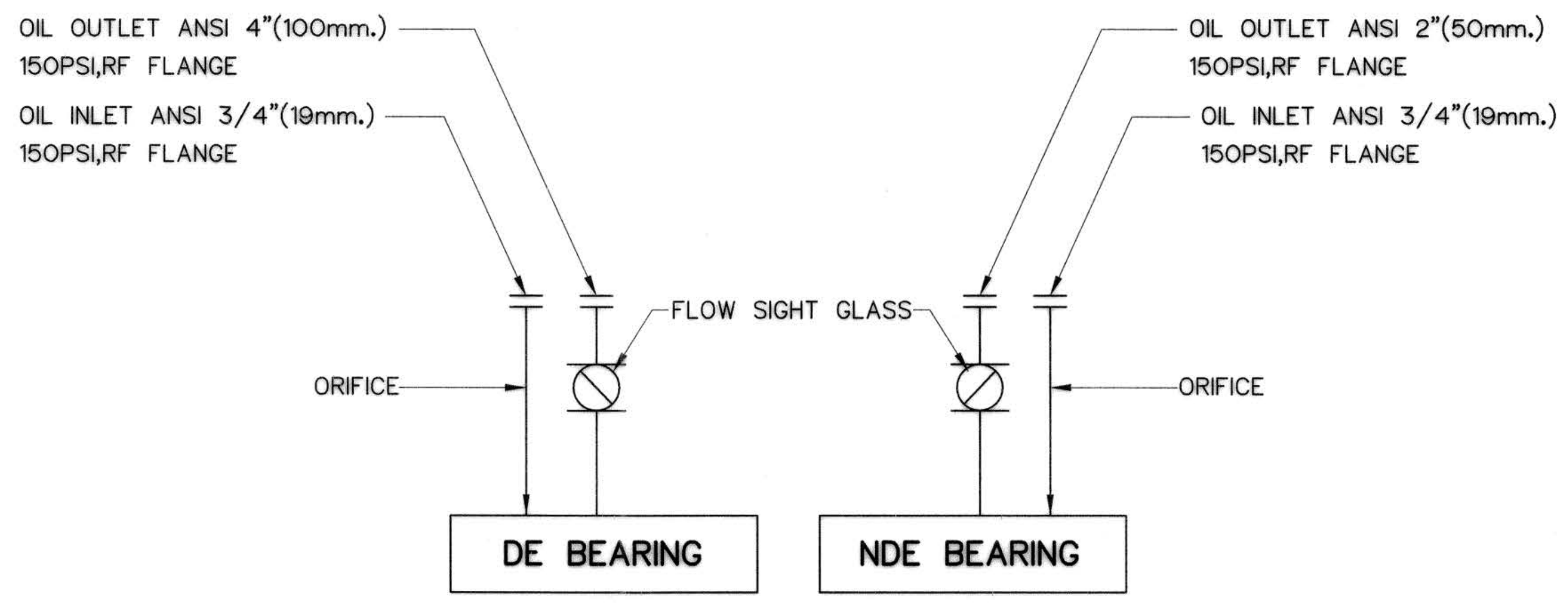
RECOMMENDED
APPROVED P. Hanvell.

DRAWING NO. MH-EM-02
SHEET NO. 47 OF 51





PIPING FOR LUB.OIL

NOTE

1. ALL DIMENSION ARE IN MILLIMETER UNLESS OTHERWISE SHOW.
2. 3° MINIMUM SLOPE REQUIRED ON OIL OUTLET (RETURN) PIPING FROM BEARING TO TANK TO ENSURE GRAVITY FLOW OF OIL BACK TO TANK.
3. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, IT SHALL BE
   DESIGNED AND SPECIFIED BY CONTRACTOR FOR SUBMITTED TO
   FIELD ENGINEER APPROVAL LATER

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	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
Department of Alternative
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MINISTRY OF ENERGY

MAE HAT HYDROPOWER PROJECT

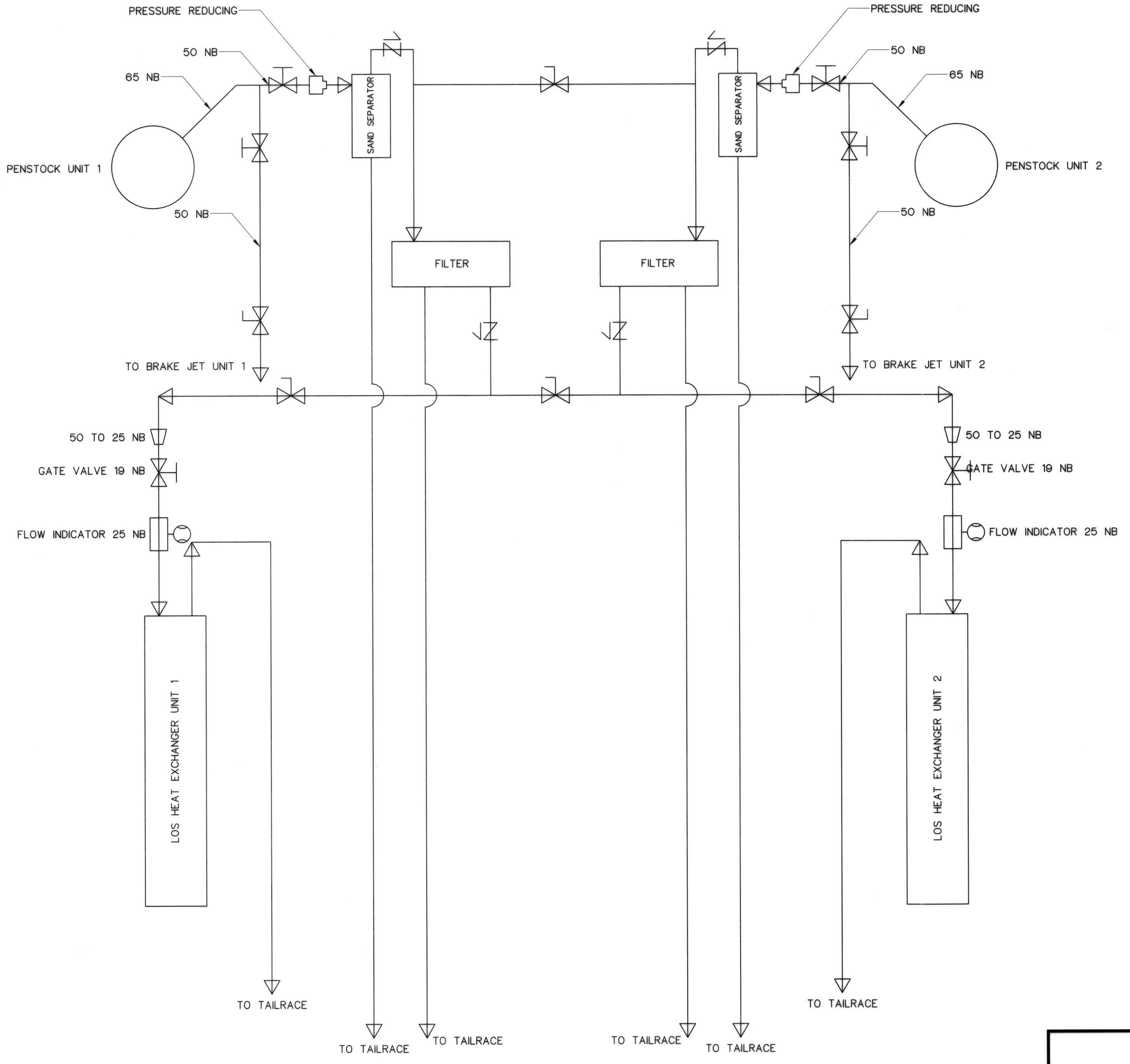
ELECTRO–MECHANICAL EQUIPMENT
PIPE LINE OF LUBRICATION OIL SYSTEM
(UNIT 1 AND 2) DETAIL

P&C MANAGEMENT CO.,LTD.

DESIGNED ส.ค.1950
DRAWN
CHECKED ส.ค.1950
PROJECT MANAGER 08/03/2551 DATE

Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY
REVIEWED
SUBMITTED Chow
RECOMMENDED
APPROVED P. Hawell.

DRAWING NO. MH–EM–03
SHEET NO. 48 OF 51



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 BY CONTRACTOR FOR SUBMITTED TO FIELD ENGINEER APPROVAL LATER

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MAE HAT HYDROPOWER PROJECT

ELECTRO-MECHANICAL EQUIPMENT
COOLING WATER DIAGRAM
(UNIT 1 AND 2) DETAIL

P&C MANAGEMENT CO.,LTD.

Department of Alternative
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MINISTRY OF ENERGY

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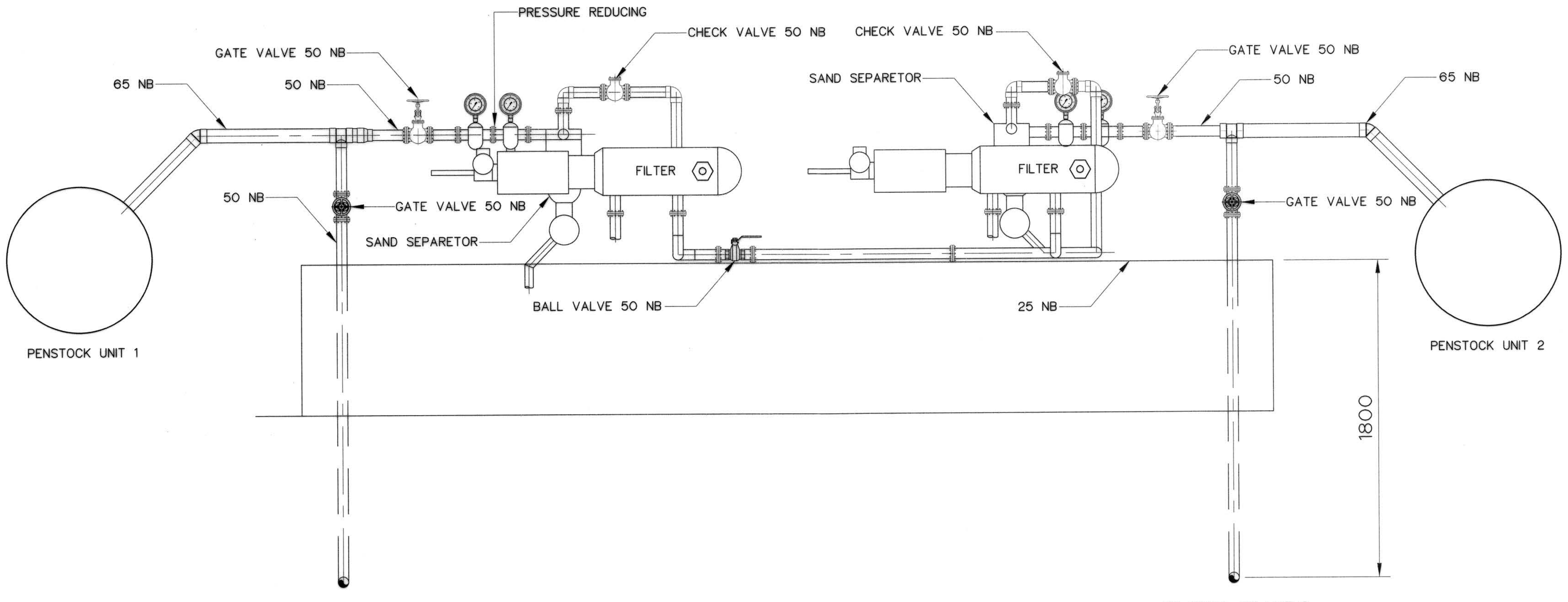
RECOMMENDED
APPROVED P. Hansell.

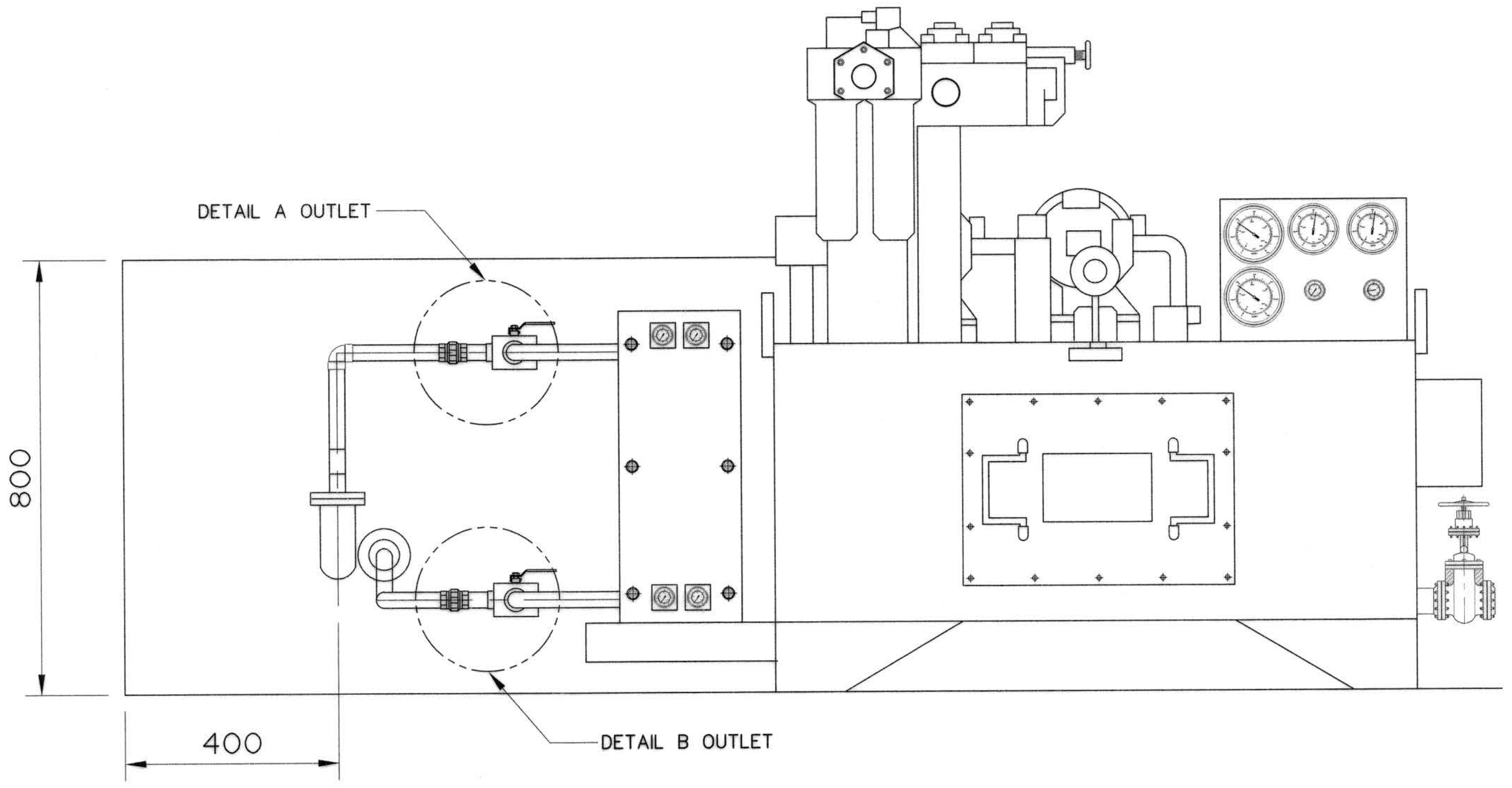
PROJECT MANAGER
DATE 08/03/2559

DRAWING NO. MH-EM-04
SHEET NO. 49 OF 51



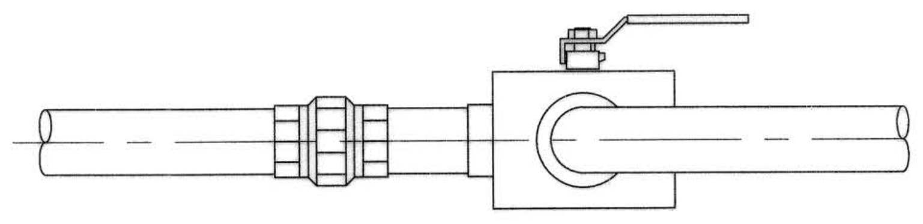
SECTION A–A

DETAILS WATER FROM PENSTOCK TO FILTER

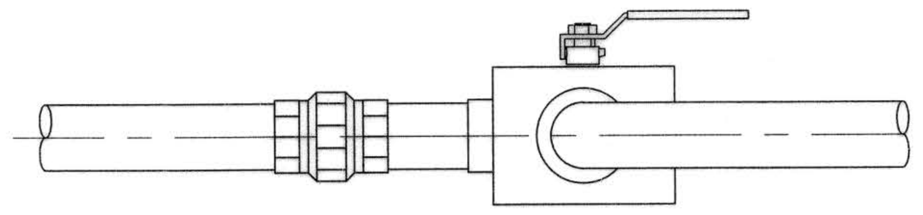


SECTION C–C

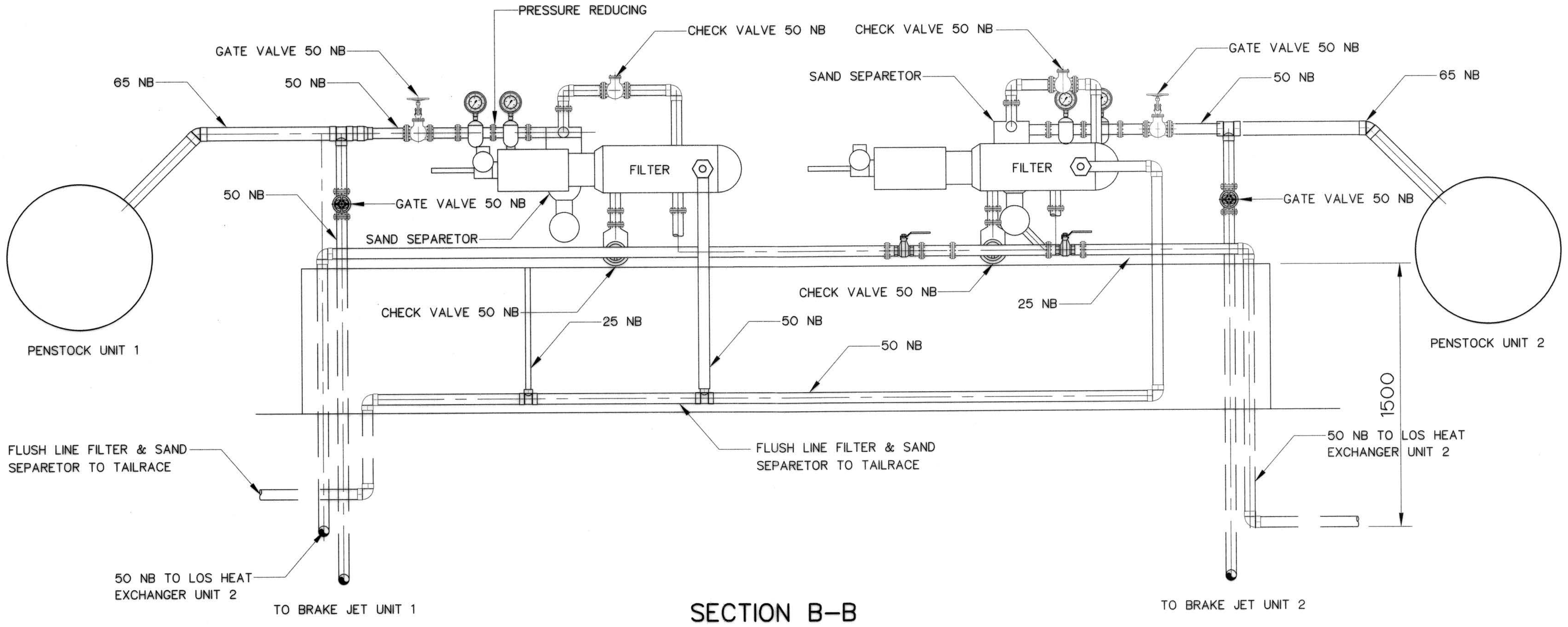
WATER INLET & OUTLET LOS HEAT EXCHANGER



DETAIL A



DETAIL B



SECTION B–B

DETAILS WATER FROM FILTER TO LOS HEAT EXCHANGER

NOTE :

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

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MINISTRY OF ENERGY

MAE HAT HYDROPOWER PROJECT

ELECTRO–MECHANICAL EQUIPMENT
COOLING WATER SYSTEM SECTION
(UNIT 1 AND 2) DETAIL

P&C MANAGEMENT CO.,LTD.
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CHECKED ลก.1950
08/03/2559
PROJECT MANAGER DATE

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Energy Development and Efficiency
MINISTRY OF ENERGY
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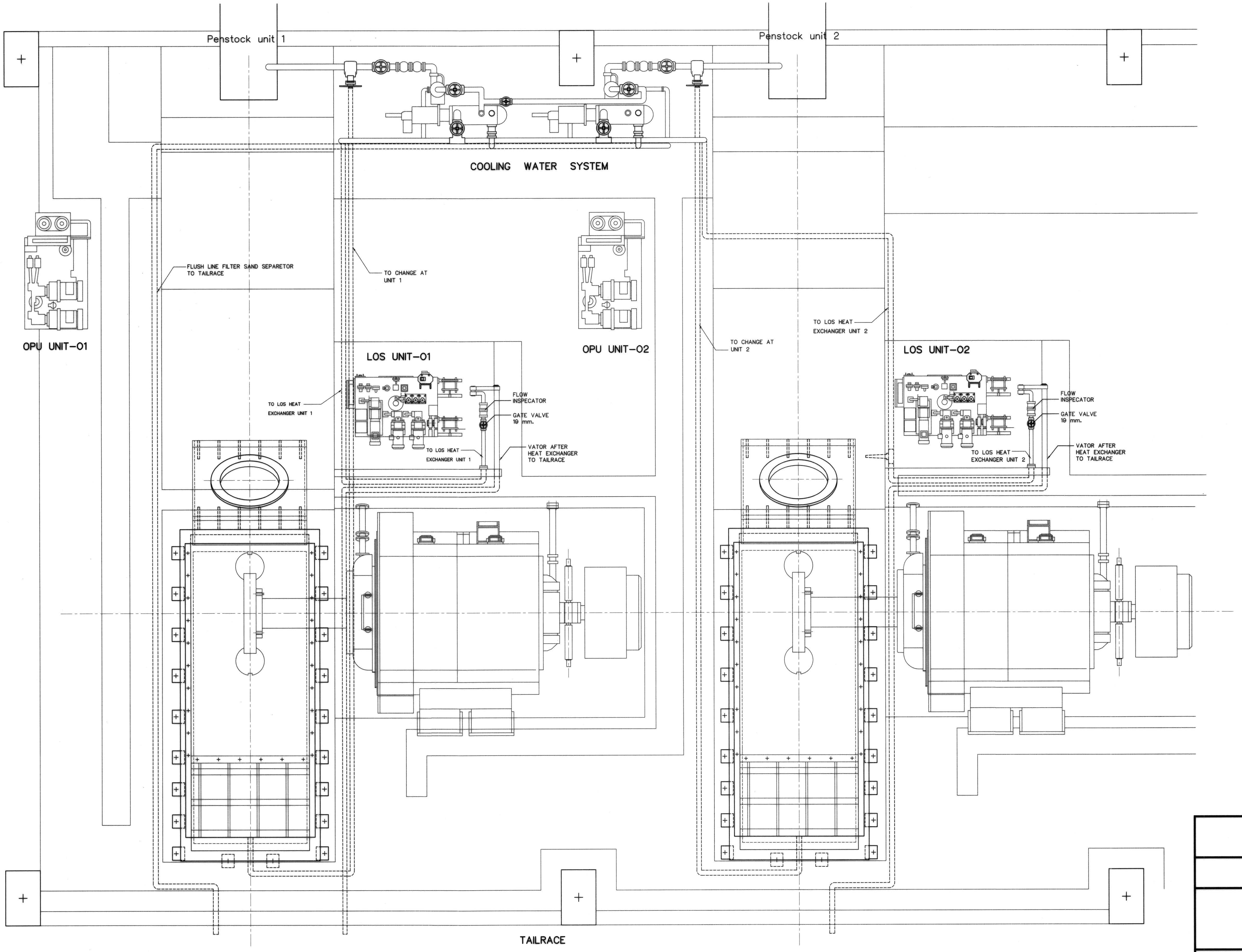
RECOMMENDED
APPROVED P. Hansell
DRAWING NO. MH–EM–05
SHEET NO. 50 OF 51


Penstock unit 1
Penstock unit 2
COOLING WATER SYSTEM
OPU UNIT-01
OPU UNIT-02
FLUSH LINE FILTER SAND SEPARETOR TO TAILRACE
TO CHANGE AT UNIT 1
TO CHANGE AT UNIT 2
TO LOS HEAT EXCHANGER UNIT 2
LOS UNIT-01
LOS UNIT-02
TO LOS HEAT EXCHANGER UNIT 1
FLOW INSPECATOR
GATE VALVE 19 mm.
TO LOS HEAT EXCHANGER UNIT 1
VATOR AFTER HEAT EXCHANGER TO TAILRACE
TO LOS HEAT EXCHANGER UNIT 2
FLOW INSPECATOR
GATE VALVE 19 mm.
VATOR AFTER HEAT EXCHANGER TO TAILRACE
TAILRACE

NOTE :

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

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Department of Alternative
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MINISTRY OF ENERGY

MAE HAT HYDROPOWER PROJECT

ELECTRO–MECHANICAL EQUIPMENT
PLAN PIPE LINE OF COOLING WATER SYSTEM (UNIT 1 AND 2) DETAIL

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DATE 08/03/2559

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APPROVED P. Hansell

DRAWING NO. MH–EM–06
SHEET NO. 51 OF 51