Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

MAE HAT HYDROPOWER PROJECT

WIANG HAENG DISTRICT CHIANG MAI PROVINCE

CONTRACT C1

CIVIL WORKS AND TRANSMISSION LINE

VOLUME 4

P&C MANAGEMENT CO.,LTD.

MAE HAT HYDROPOWER PROJECT

CONTRACT C1 : LIST OF DRAWINGS

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7	MH-GN-07	GEOLOGICAL, PROFILE (1/2)
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23	MH-WE-10	GATE-LIFT PEDESTAL AND HAND WHEEL
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30	MH-HR-06	TYPICAL SECTIONS
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34	MH-HR-10	DRAIN CULVERT STA. 0+413.534 PLAN AND SECTION
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36	MH-HR-12	DRAIN CULVERT STA. 0+515.748 PLAN AND SECTION
37	MH-HR-13	DRAIN CULVERT STA. 0+515.748 REINFORCEMENT DETAILS
38	MH-HR-14	DRAIN CULVERT STA. 0+651.663 PLAN AND SECTION
39	MH-HR-15	DRAIN CULVERT STA. 0+651.663 REINFORCEMENT DETAILS
40	MH-HR-16	DRAIN CULVERT STA. 0+948.448 PLAN AND SECTION
41	MH-HR-17	DRAIN CULVERT STA. 0+948.448 REINFORCEMENT DETAILS
42	MH-HR-18	DRAIN CULVERT STA. 1+320.961 PLAN AND SECTION
43	MH-HR-19	DRAIN CULVERT STA. 1+320.961 REINFORCEMENT DETAILS
44	MH-HR-20	DRAIN CULVERT STA. 1+508.437 PLAN AND SECTION
45	MH-HR-21	DRAIN CULVERT STA. 1+508.437 REINFORCEMENT DETAILS
46	MH-HR-22	DRAIN CULVERT STA. 1+903.095 PLAN AND SECTION
47	MH-HR-23	DRAIN CULVERT STA. 1+903.095 REINFORCEMENT DETAILS
48	MH-HR-24	DRAIN CULVERT STA. 1+944.718 PLAN AND SECTION
49	MH-HR-25	DRAIN CULVERT STA. 1+944.718 REINFORCEMENT DETAILS

SHEET NO.	DRAWING NO.	DRAWING DETAILS
		O&M ROAD
50	MH-OM-01	O&M ROAD PART 2 PLAN AND PROFILE, STA. 0+000 TO STA. 0+600
51	MH-OM-02	O&M ROAD PART 2 PLAN AND PROFILE, STA. 0+600 TO STA. 1+200
52	MH-OM-03	O&M ROAD PART 2 PLAN AND PROFILE, STA. 1+200 TO STA. 1+800
53	MH-OM-04	O&M ROAD PART 2 PLAN AND PROFILE, STA. 1+800 TO STA. 2+400
54	MH-OM-05	O&M ROAD PART 2 PLAN AND PROFILE, STA. 2+400 TO STA. 3+000
55	MH-OM-06	O&M ROAD PART 2 PLAN AND PROFILE, STA. 3+000 TO STA. 3+600
56	MH-OM-07	O&M ROAD PART 2 PLAN AND PROFILE, STA. 3+600 TO STA. 4+149.212
57	MH-OM-08	O&M ROAD PART 2 HORIZONTAL CURVE
58	MH-OM-09	O&M ROAD PART 3 PLAN AND PROFILE, STA. 0+000 TO STA. 0+182.719
59	MH-OM-10	TYPICAL SECTION AND DETAILS
60	MH-OM-11	DRAIN CULVERT, PLAN AND SECTION
61	MH-OM-12	DRAIN CULVERT REINFORCEMENT DETAILS
		SURGE TANK
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64	MH-ST-03	LADDER RUNG DETAILS
65	MH-ST-04	PLATFORM DETAILS
66	MH-ST-05	RING GRIDER AND HANDRAIL
67	MH-ST-06	REINFORCEMENT DETAILS
68	MH-ST-07	EMERGENCY VALVE CHAMBER PLAN SECTIONS AND DETAILS
69	MH-ST-08	EMERGENCY VALVE CHAMBER REINFORCEMENT DETAILS
70	MH-ST-09	SEDIMENT VALVE CHAMBER PLAN SECTIONS AND DETAILS
71	MH-ST-10	SEDIMENT VALVE CHAMBER REINFORCEMENT DETAILS
72	MH-ST-11	PLAN, SEDIMENT STA. 0+000 TO STA. 0+272.800
73	MH-ST-12	SEDIMENT OUTLET PLAN SECTION AND DETAILS
		PENSTOCK
74	MH-PS-01	PLAN AND PROFILE, STA. 0+000 TO STA. 0+387.659
75	MH-PS-02	THRUST BLOCK PLAN, SECTIONS REINFORCEMENT DETAILS 1/4
76	MH-PS-03	THRUST BLOCK PLAN, SECTIONS REINFORCEMENT DETAILS 2/4
77	MH-PS-04	THRUST BLOCK PLAN, SECTIONS REINFORCEMENT DETAILS 3/4
78	MH-PS-05	THRUST BLOCK PLAN, SECTIONS REINFORCEMENT DETAILS 4/4
79	MH-PS-06	PIPE SUPPORT SECTIONS AND DETAILS
80	MH-PS-07	WYE, PLAN, SECTIONS AND DETAILS
81	MH-PS-08	EXPANSION JOINT, PLAN, SECTIONS AND DETAILS
82	MH-PS-09	BEND DETAILS
83	MH-PS-10	WELDING DETAILS
		POWERHOUSE
84	MH-PH-01	GENERAL LAYOUT
85	MH-PH-02	PLAN 1st FLOOR AND PLAN 2nd FLOOR
86	MH-PH-03	ROOF PLAN
87	MH-PH-04	ELEVATIONS
88	MH-PH-05	SECTIONS (SHEET 1/2)
89	MH-PH-06	SECTIONS (SHEET 2/2)
90	MH-PH-07	DETAILS OF TOILET, SEPTIC AND SEEPAGE TANK
91	MH-PH-08	DETAIL OF DOORS, WINDOWS AND NAME PLATE
92	MH-PH-09	PLAN OF FOOTING AND DETAILS
93	MH-PH-10	PLAN OF SLAB AND DETAILS (1/2)
94	MH-PH-11	PLAN OF SLAB AND DETAILS (2/2)
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SHEET NO.	DRAWING NO.	DRAWING DETAILS
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99	MH-PH-16	TRUSS T2 AND DETAILS
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112	MH-TS-01	GENERAL PLAN
113	MH-TS-02	PLAN AND PROFILE, STA. 0+000 TO 0+600
114	MH-TS-03	PLAN AND PROFILE, STA. 0+600 TO 1+200
115	MH-TS-04	PLAN AND PROFILE, STA. 1+200 TO 1+800
116	MH-TS-05	PLAN AND PROFILE, STA. 1+800 TO 2+400
117	MH-TS-06	PLAN AND PROFILE, STA. 2+400 TO 3+000
118	MH-TS-07	PLAN AND PROFILE, STA. 3+000 TO 3+600
119	MH-TS-08	PLAN AND PROFILE, STA. 3+600 TO 4+200
120	MH-TS-09	PLAN AND PROFILE, STA. 4+200 TO 4+800
121	MH-TS-10	PLAN AND PROFILE, STA. 4+800 TO 5+400
122	MH-TS-11	PLAN AND PROFILE, STA. 5+400 TO 6+000
123	MH-TS-12	PLAN AND PROFILE, STA. 6+000 TO 6+600
124	MH-TS-13	PLAN AND PROFILE, STA. 6+600 TO 7+200
125	MH-TS-14	PLAN AND PROFILE, STA. 7+200 TO 7+800
126	MH-TS-15	PLAN AND PROFILE, STA. 7+800 TO 8+086
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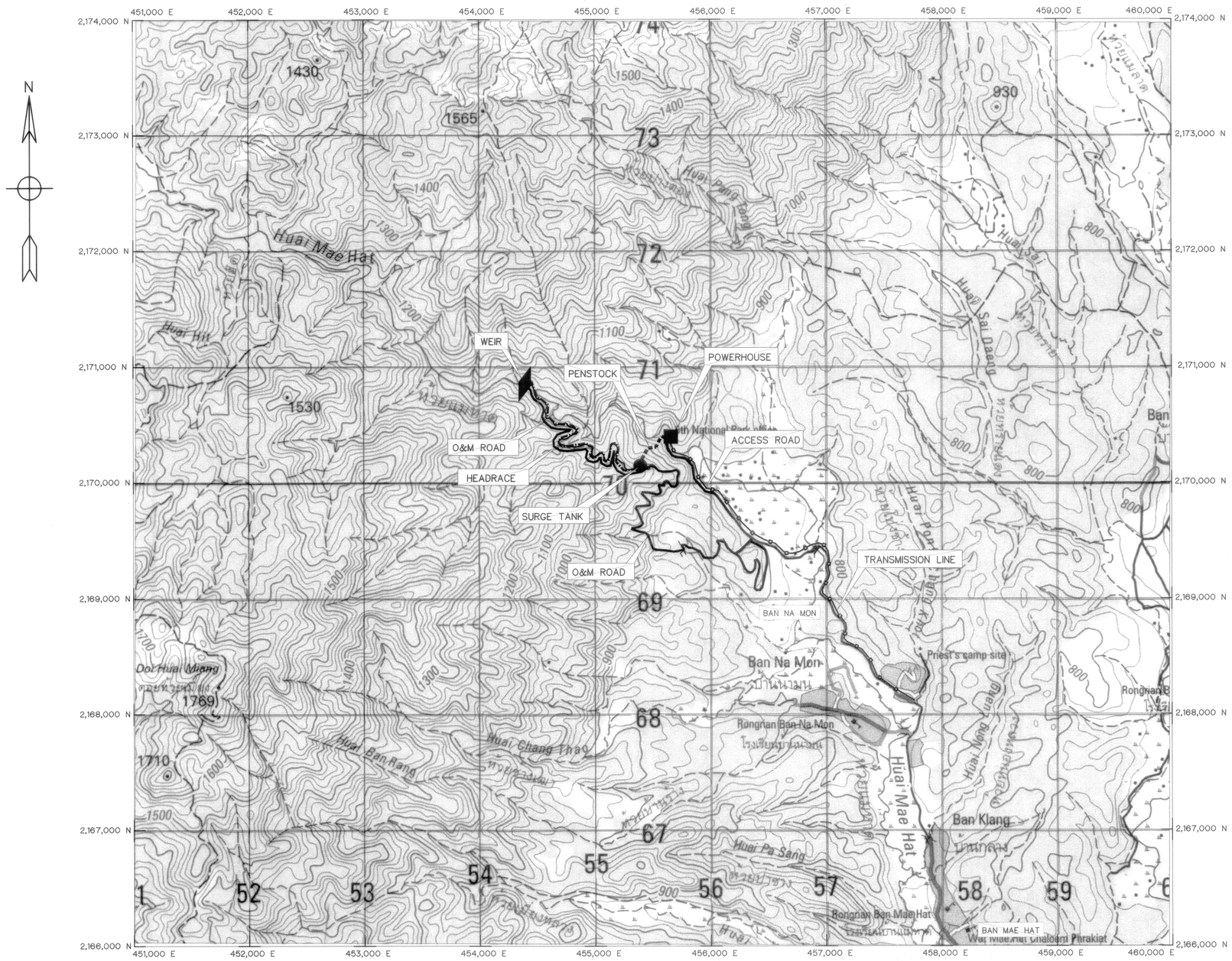
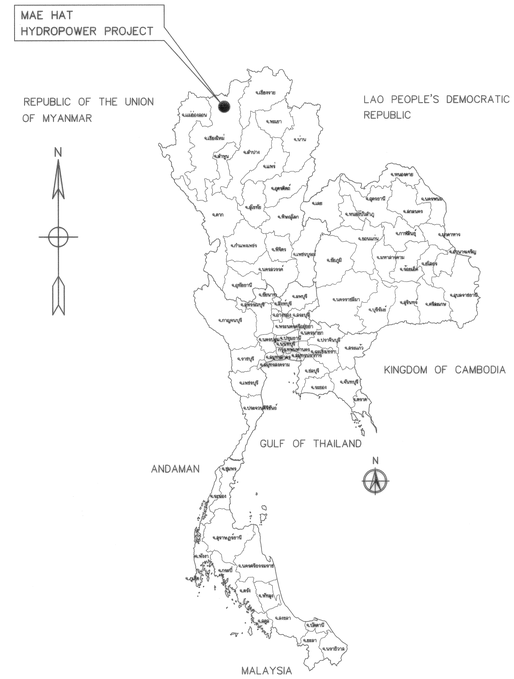
128	MH-TS-17	POLE TYPE "C" AND "D"
129	MH-TS-18	POLE TYPE "E"
130	MH-TS-19	TYPE OF ANCHOR GUY



PROJECT AREA MAP

SCALE 1:20,000



LOCATION MAP

NOT TO SCALE

LEGENDS :

- STREAM
- WEIR
- HEADRACE
- SURGE TANK
- PENSTOCK
- POWERHOUSE
- ACCESS ROAD / O&M ROAD
- TRANSMISSION LINE

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

0 500 1,000 1,500

SCALE 1:20,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
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CONSULTANTS | DEDE

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
GENERAL DRAWING
PROJECT LOCATION MAP

P&C MANAGEMENT CO.,LTD.

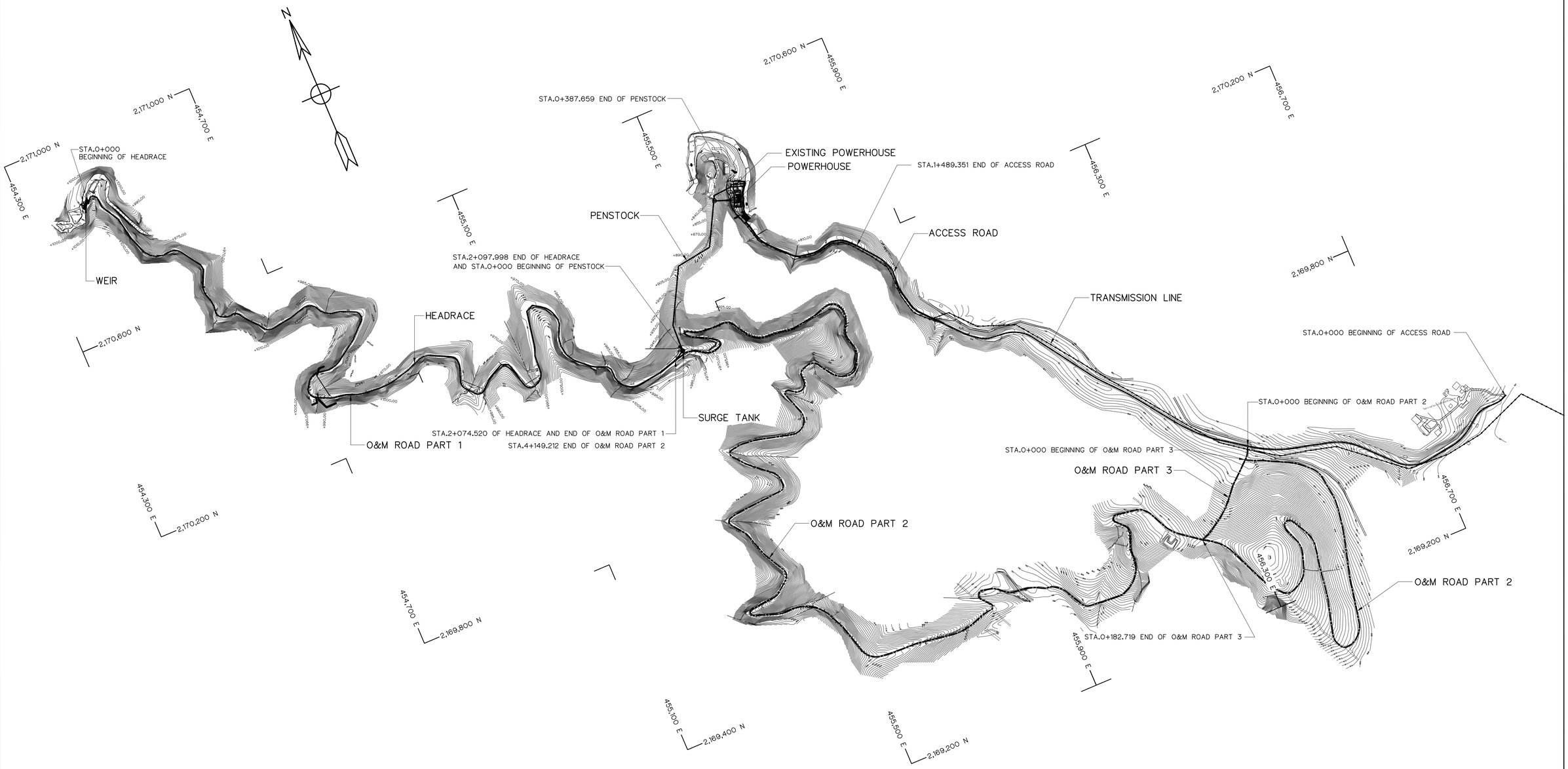
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิชิต.64624	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	สมิต.6226	RECOMMENDED	
CHECKED	สมิต.6226	APPROVED	

PROJECT MANAGER — 08/03/2559 DATE

DRAWING NO. MH-GN-01

SHEET NO. 1 OF 130



PROJECT LAYOUT

SCALE 1:4,000

NOTES :

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

0 50 100 150 200 250 300
SCALE 1:4,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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KINGDOM OF THAILAND
Department of Alternative Energy Development and Efficiency
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MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
GENERAL DRAWING
PROJECT LAYOUT

P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วสิ.64624	สิ.6226	REVIEWED
DRAWN			SUBMITTED
CHECKED		สิ.6226	RECOMMENDED
PROJECT MANAGER	08/03/2559 DATE		APPROVED

DRAWING NO. MH-GN-02
SHEET NO. 2 OF 130

ABBREVIATIONS :

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

SYMBOLS :

N	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
	HAND AUGER
	EXISTING DRILL HOLES
	DRILL HOLES
° ′ ″	DEGREE, MINUTE, SECOND
@	AT EQUAL DISTANCE BETWEEN CENTER TO CENTER
	B.M.
KM.1+000	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
1:5 1:5	ELEVATION OR PLAN OF SLOPE
	NATURAL GROUND LEVEL
25.00	CONTOUR LINE
	RIVER, STREAM OR NATURAL DRAIN
FLOW	FLOW DIRECTION
1:5	SLOPE DIRECTION
1 2	SLOPE RATIO

GENERAL NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS UNLESS OTHERWISE SHOWN.
2. 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.
3. 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 AMBIGUTY BETWEEN OR IN ANY OF THE DRAWINGS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO CORRECT AND/OR ADJUST THE RELEVENT DRAWINGS TO OBTAIN FIELD ENGINEER APPROVAL
4. ADDITIONAL SYMBOLS, IF REQUIRED, ARE DEFINED IN THE RESPECTIVE DRAWINGS.
5. THE SPECIFICATIONS AND THE QUANTITIES OF MATERIALS ARE SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
6. ALL PLAIN CONCRETE CORNERS ARE TO BE CHEMFERED 2 cm. UNLESS OTHERWISE SHOWN.

STRUCTURAL DESIGN NOTES :

1. THE ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE OF STANDARD CYLINDER (Ø0.15x0.30 m.) TEST AT AGE 28 DAYS SHALL BE AS THE FOLLOWING, UNLESS OTHERWISE SHOWN.

fc' (ksc)	DESCRIPTION
350	PRESTRESS CONCRETE
210	1. WEIR
	2. SURGE TANK
	3. POWERHOUSE
	4. TAILRACE
	5. MANHOLE
	6. ANCHOR BLOCK, PIPE SUPPORT
	7. HEADRACE
	8. BOX CULVERT
140	LEAN CONCRETE

2. UNLESS OTHERWISE SHOWN, THE FOLLOWING CLEAR COVER OF CONCRETE OVER OF THE REINFORCEMENT SHALL BE USED :
   - FACE EXPOSED TO SCOUR 5.0 cm.
   - FACE EXPOSED TO EARTH OR WEATHER 5.0 cm.
   - FACE UNEXPOSED TO EARTH OR WEATHER 3.0 cm.
3. THE REINFORCEMENT LAP SPLICES SHALL NOT BE LESS THAN 50 DIAMETERS OF BIGGER THAN BAR WITH HOOKS, UNLESS OTHERWISE SHOWN.
4. EMBEDDED METALWORK SHALL BE SECURELY FASTENED IN POSITION BEFORE PLACING CONCRETE.
5. ALL CONSTRUCTION JOINT SHOULD BE TREATED AS DIRECTED IN ORDER TO ASSURE THE BEST BOND.
6. A 5 cm. (MIN.) LAYER OF LEAN CONCRETE (1:3:5 BY VOLUME) SHOULD BE PLACED BELOW CONCRETE STRUCTURES.
7. THE STRUCTURES SHOULD BE PLACED ON UNDISTURBED SOILS OR COMPACTED FILL AND BACKFILL AROUND THE STRUCTURES SHOULD BE COMPACTED.
8. THE FOUNDATION ELEVATIONS ARE SUBJECT TO CHANGE AS DIRECTED ACCORDING TO THE SOIL CONDITIONS.
9. ALL SIZES OF REINFORCING BARS AND STRUCTURAL STEELS ARE IN MILLIMETERS.
10. ALL STRUCTURAL STEELS ARE THOSE OF T.I.S. DESIGNATION Fe24.
11. REINFORCED STEEL BARS SHALL BE CONFORM TO T.I.S. AS FOLLOW :
    - DEFORMED BARS (SD30) – T.I.S. 24–2548
    - ROUND BARS (SR24) – T.I.S. 20–2543
12. ALLOWABLE BEARING CAPACITY OF FOUNDATION SHALL NOT BE LESS THAN AS FOLLOW :
    - INTAKE Q_a = 15 T/M.^{2}
    - HEADRACE Q_a = 15 T/M.^{2}
    - SURGE TANK Q_a = 20 T/M.^{2}
    - POWERHOUSE Q_a = 20 T/M.^{2}
    - PENSTOCK Q_a = 20 T/M.^{2}

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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CIVIL WORKS AND TRANSMISSION LINE
GENERAL DRAWING
SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES

P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	สมิต.64624	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	สมิต.6226	RECOMMENDED	
PROJECT MANAGER	07/08/2559 DATE	APPROVED	

DRAWING NO. MH–GN–03

SHEET NO. 3 OF 130

FIGURE 1 RELATIONSHIP BETWEEN MEAN ANNUAL RUNOFF AND CATCHMENT AREA

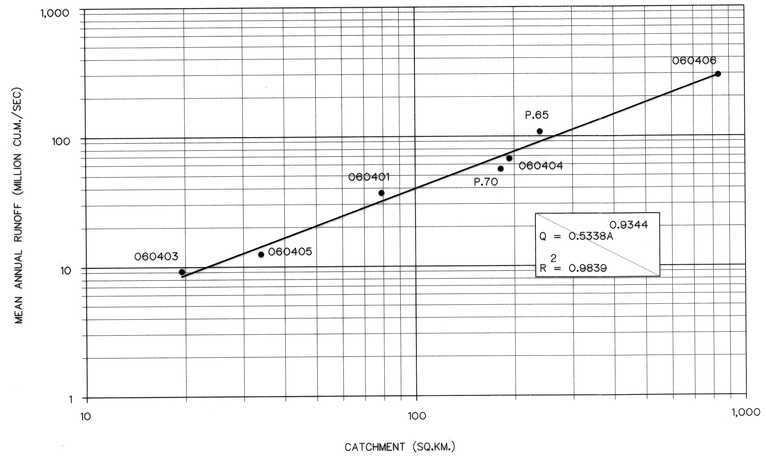


FIGURE 2 RELATIONSHIP BETWEEN ELEVATION AND DISCHARGE AT POWERHOUSE

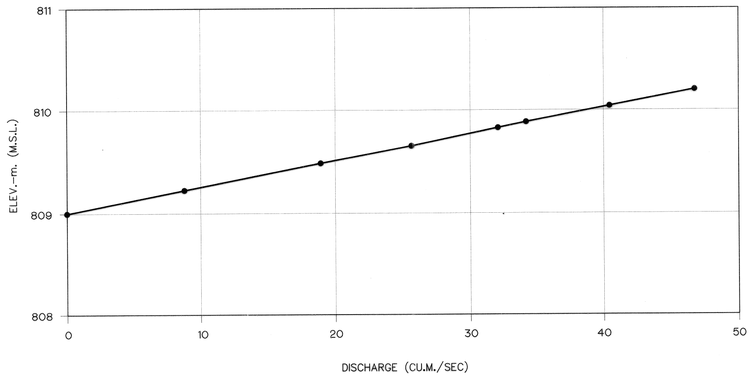


FIGURE 3 RELATIONSHIP BETWEEN ELEVATION AND DISCHARGE AT WEIR

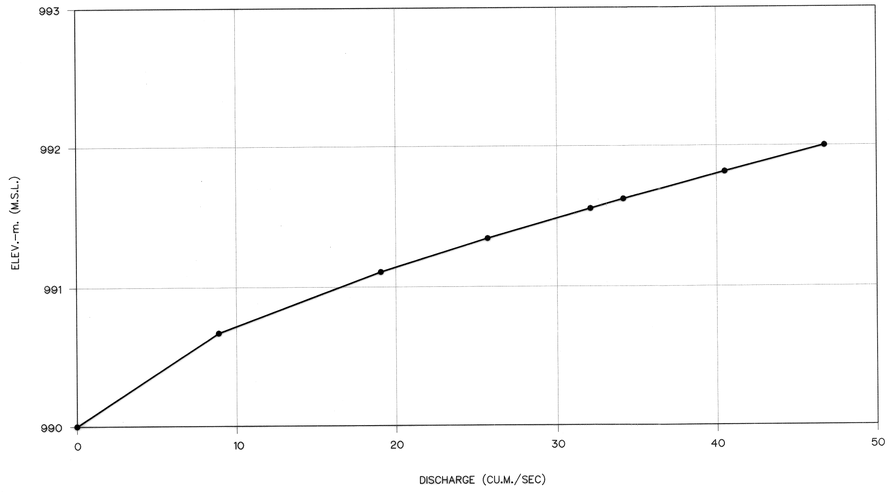
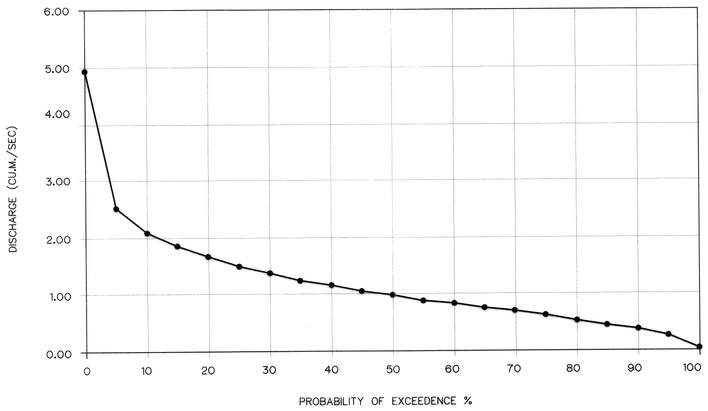


FIGURE 4 FLOW DURATION CURVE



NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
GENERAL DRAWING
PROJECT INFORMATION HYDROLOGY DATA

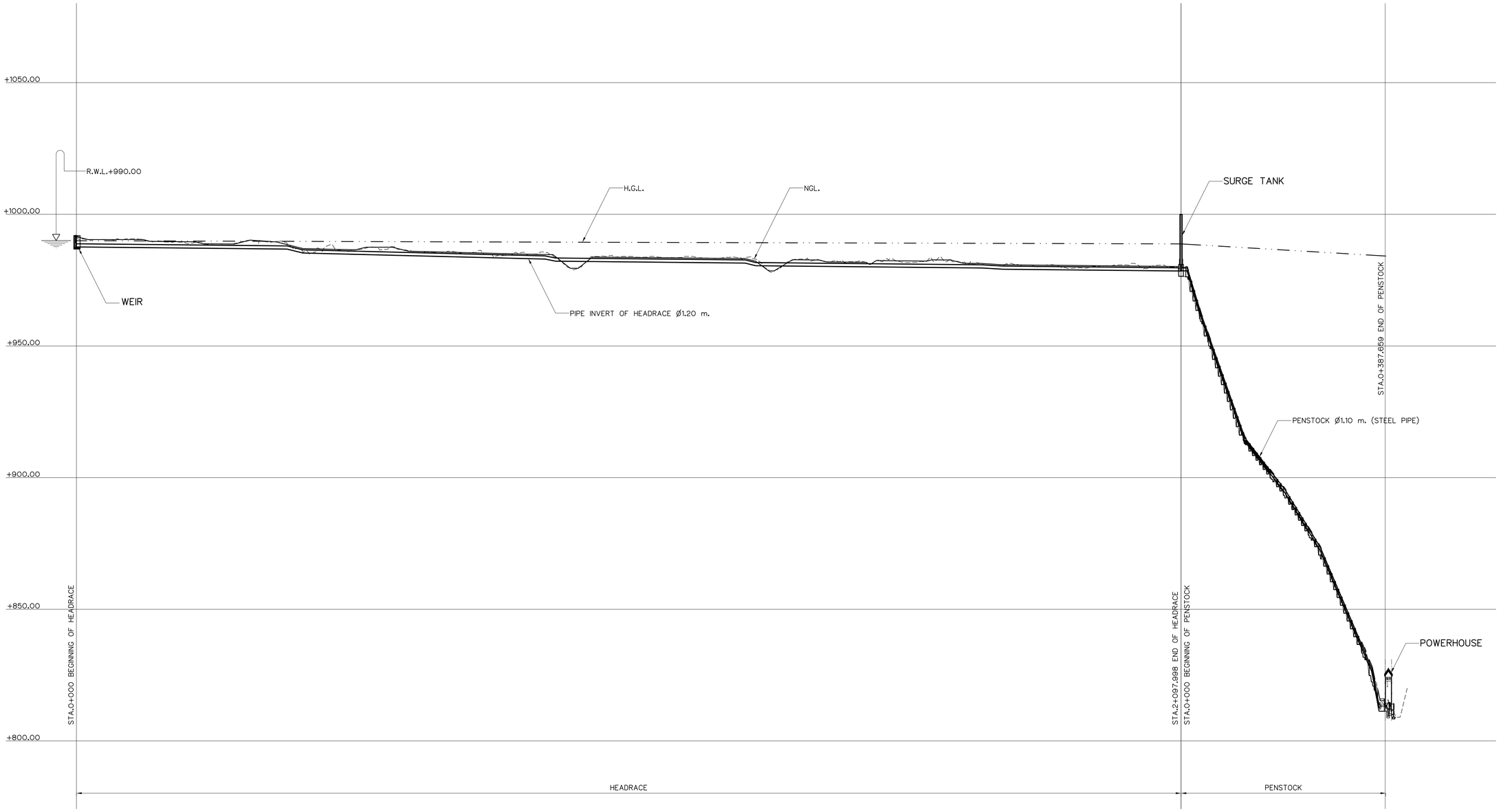
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED วิชัย 64624 ศิริ 6226
DRAWN
CHECKED ศิริ 6226
PROJECT MANAGER 01 03 2559 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED P. Hanwongse

DRAWING NO. MH-GN-04
SHEET NO. 4 OF 130



PROFILE ALONG HEADRACE

VERTICAL SCALE 1:800
HORIZONTAL SCALE 1:4,000

NOTES :

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

0 10 20 30 40 50 60
SCALE 1:800 METERS

0 50 100 200 300
SCALE 1:4,000 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
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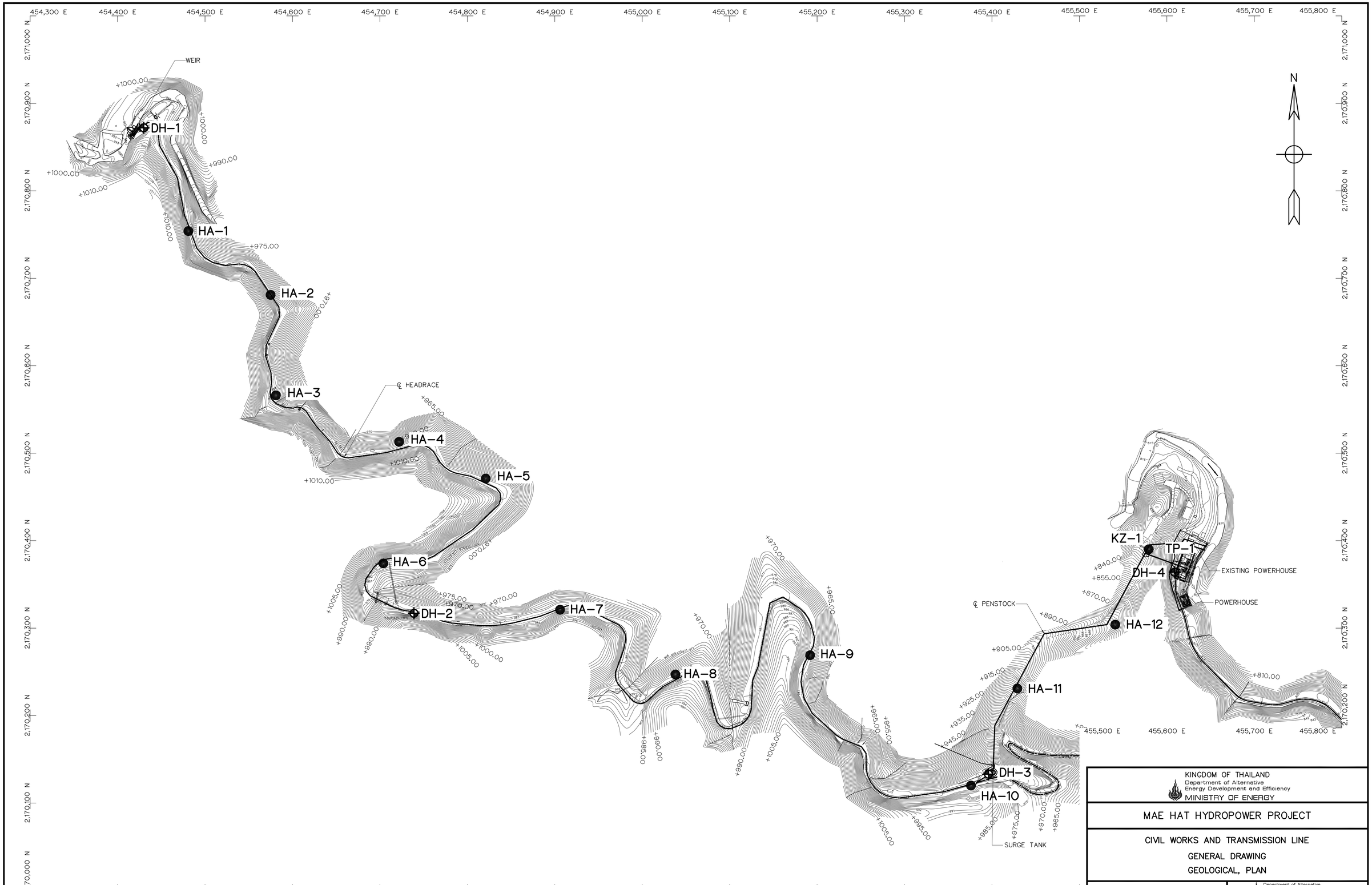
MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
GENERAL DRAWING
POWER WATERWAY HYDRAULIC ARRANGEMENT

P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	ส.ต.64624 ส.ต. ส.ต.6226
DRAWN	
CHECKED	ส.ต. ส.ต.6226
REVIEWED	
SUBMITTED	
RECOMMENDED	
APPROVED	P. Hamull.
PROJECT MANAGER	DATE 08/03/2559
DRAWING NO.	MH-GN-05
SHEET NO.	5 OF 130



PLAN

SCALE 1:2,000

0 25 50 75 100 125 150

SCALE 1:2,000 METERS

NOTES :

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

NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

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MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
GENERAL DRAWING
GEOLOGICAL, PLAN

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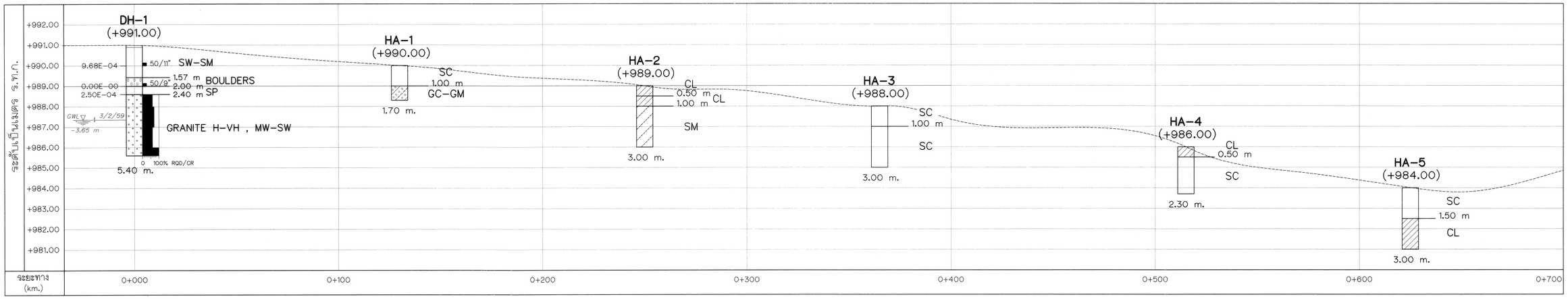
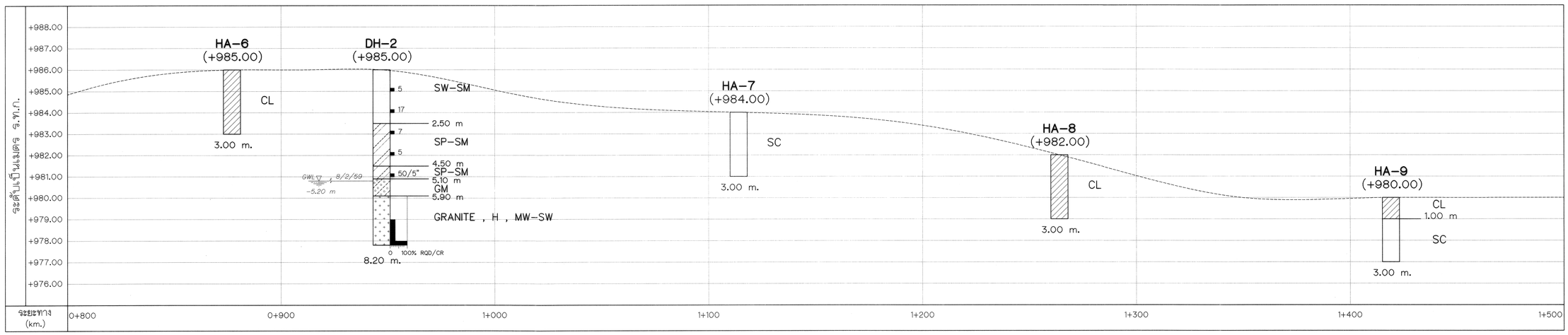
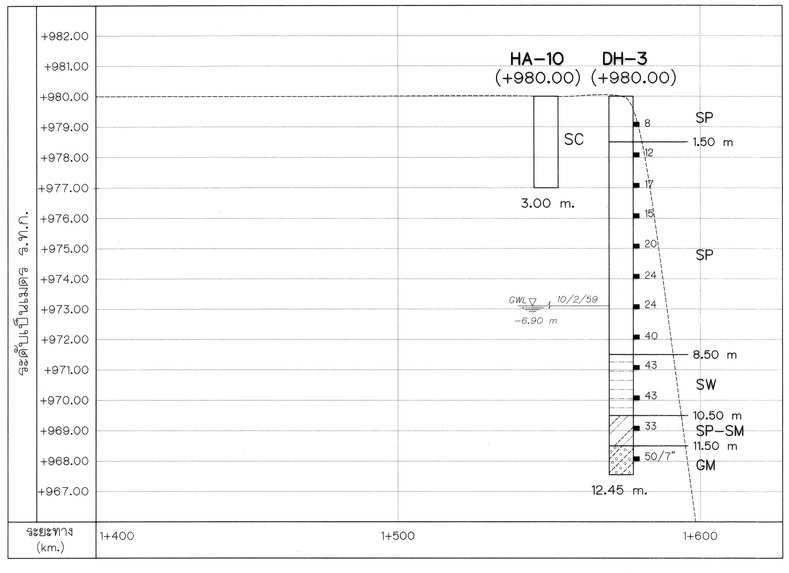
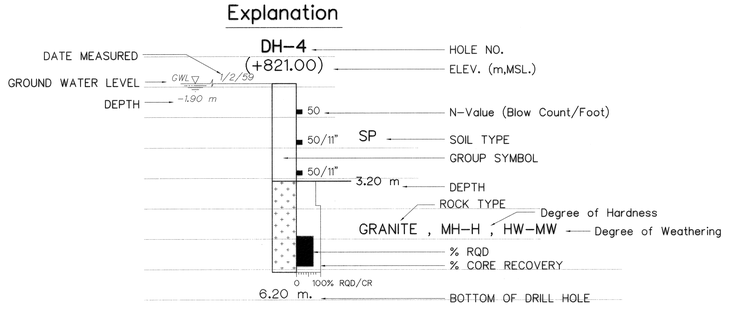
DESIGNED	วิชิ.64624	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วิชิ.6226	RECOMMENDED	
PROJECT MANAGER		APPROVED	
	08/03/2559 DATE	DRAWING NO.	MH-GN-06
		SHEET NO.	6 OF 130







Explanation



Degree of Weathering

F = Fresh Rock
SW = Slightly Weathered Rock
MW = Moderately Weathered Rock
HW = Highly Weathered Rock
CW = Completely Weathered Rock

Degree of Hardness

VS = Very Soft Rock
S = Soft Rock
MH = Medium Hard Rock
H = Hard Rock
VH = Very Hard Rock

% RQD

< 25% = Very Poor Rock
25-50% = Poor Rock
50-75% = Fair Rock
75-90% = Good Rock
90-100% = Very Good Rock

Degree of Permeability

1 = < 1 Lugeon or $<10^{-5}$ cm/sec = Impervious
2 = 1-5 Lugeon or 10^{-5} - $5x10^{-5}$ cm/sec = Semi - Impervious
3 = 5-10 Lugeon or $5x10^{-5}$ - 10^{-4} cm/sec = Semi - Pervious
4 = 10-50 Lugeon or 10^{-4} - $5x10^{-4}$ cm/sec = Rather - Pervious
5 = > 50 Lugeon or $>5x10^{-4}$ cm/sec = Pervious

Legend

CL = Lean Clay with Sand
SC = Clayey Sand
SP = Poorly Graded Sand
GRANITE

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

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

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
GENERAL DRAWING
GEOLOGICAL, PROFILE (1/2)

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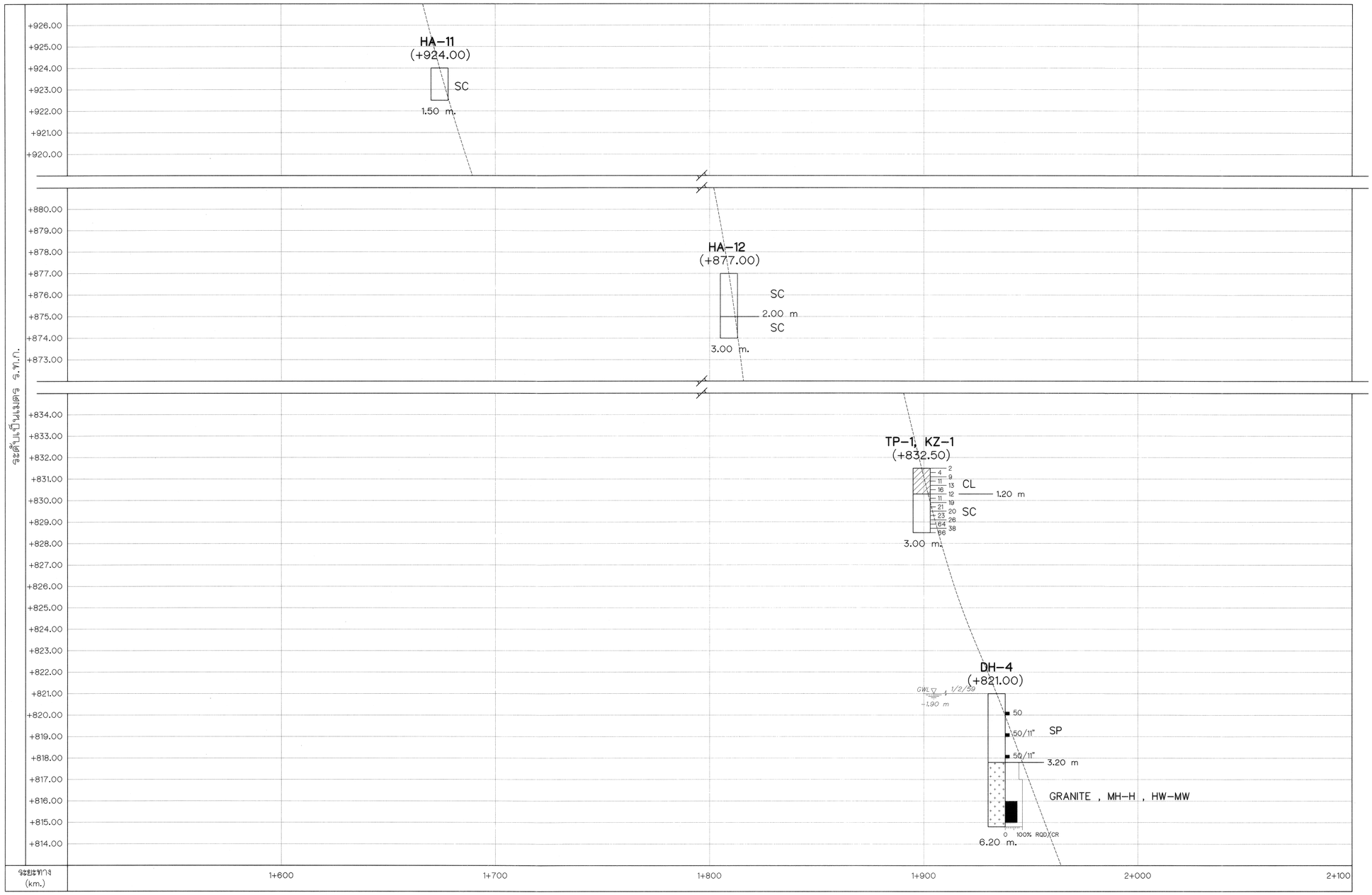
MINISTRY OF ENERGY

DESIGNED	วิชิต.64624	วิชิต.6226	REVIEWED
DRAWN			SUBMITTED
CHECKED		วิชิต.6226	RECOMMENDED
PROJECT MANAGER		02/03/2559 DATE	APPROVED

DRAWING NO. MH-GN-07

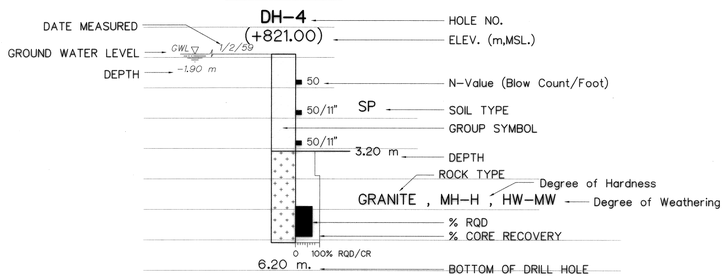
SHEET NO. 7 OF 130



Legend

- CL = Lean Clay with Sand
- SC = Clayey Sand
- SP = Poorly Graded Sand
- GRANITE

Explanation



Degree of Weathering

F	= Fresh Rock
SW	= Slightly Weathered Rock
MW	= Moderately Weathered Rock
HW	= Highly Weathered Rock
CW	= Completely Weathered Rock

Degree of Hardness

VS	= Very Soft Rock
S	= Soft Rock
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H	= Hard Rock
VH	= Very Hard Rock

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< 25%	=	Very Poor Rock
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75–90%	=	Good Rock
90–100%	=	Very Good Rock

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2 = 1–5 Lugeon or 10^{-5} – 5×10^{-5} cm/sec = Semi – Impervious

3 = 5–10 Lugeon or 5×10^{-5} – 10^{-4} cm/sec = Semi – Pervious

4 = 10–50 Lugeon or 10^{-4} – 5×10^{-4} cm/sec = Rather – Pervious

5 = > 50 Lugeon or $>5\times10^{-4}$ cm/sec = Pervious

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

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

NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
GENERAL DRAWING
GEOLOGICAL, PROFILE (2/2)

P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

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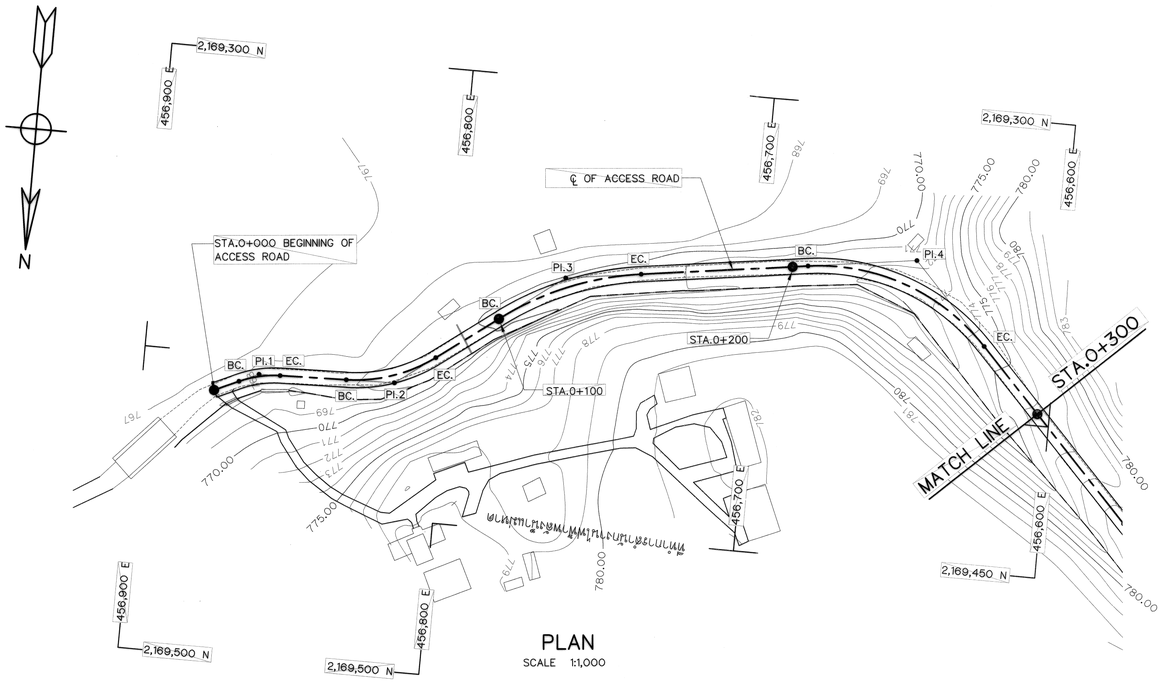
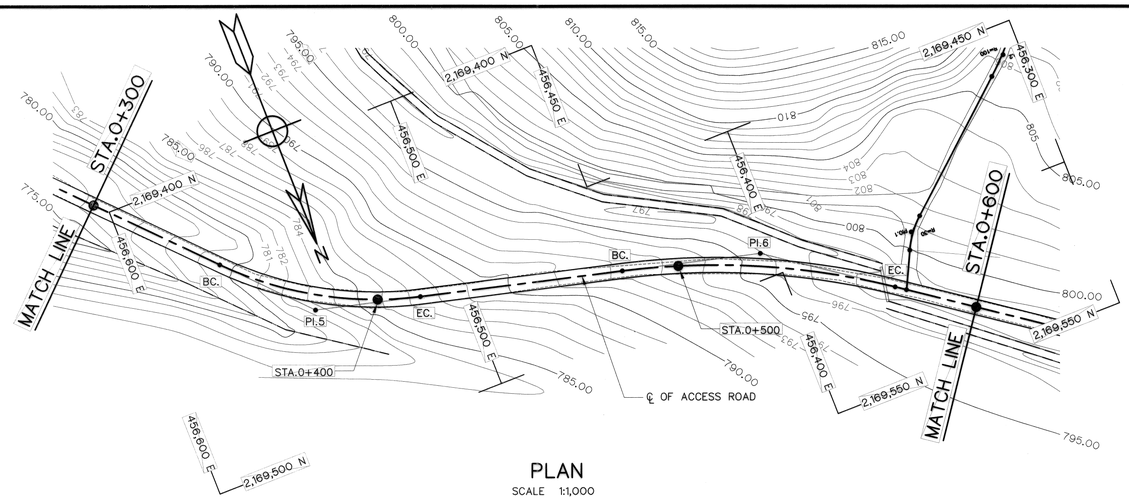
DRAWN
CHECKED นิติ.6226
PROJECT MANAGER 08/03/2559 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED P. Hansuti

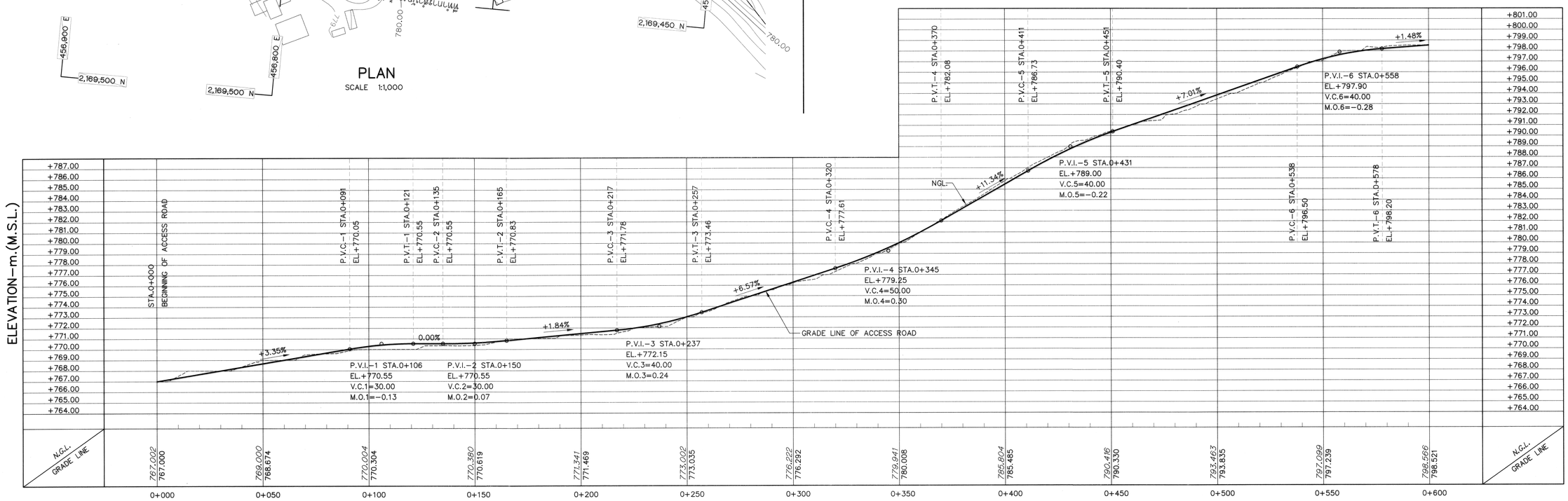
DRAWING NO. MH-GN-08
SHEET NO. 8 OF 130



PLAN
SCALE 1:1,000



PLAN
SCALE 1:1,000



PROFILE
VERTICAL SCALE 1:200
HORIZONTAL SCALE 1:1,000

HORIZONTAL CURVE OF O&M ROAD PART 1

NO. PI.	COORDINATE N	COORDINATE E	PI. – PI. (m)	DEFLECTION ANGLE (△) (° – ' – ")	TL. (m)	R (m)	LC. (m)	BC. STA. (km)	PI. STA. (km)	EC. STA. (km)	BEARING (N/S ° – ' – " E/W)
BEG.	2,169,412.613	456,875.924	–	–	–	–	–	–		–	–
1	2,169,406.079	456,861.589	15.754	22°–58'–49.03"	7.000	34.436	13.812	0+008.754	0+015.754	0+022.566	S65°–29'–46.13"W
2	2,169,404.884	456,816.660	44.945	35°–00'–27.36"	16.000	50.734	30.998	0+044.511	0+060.511	0+075.509	S88°–28'–35.16"W
3	2,169,365.374	456,763.326	66.374	28°–31'–20.24"	25.000	98.358	48.963	0+100.883	0+125.883	0+149.846	S53°–28'–07.80"W
4	2,169,349.179	456,648.222	116.238	54°–41'–02.03"	36.000	69.624	66.450	0+205.084	0+241.084	0+271.534	S81°–59'–28.04"W
5	2,169,455.067	456,548.351	145.556	32°–29'–19.88"	35.000	120.123	68.114	0+346.090	0+381.090	0+414.204	N43°–19'–29.93"W
6	2,169,491.390	456,404.658	148.213	21°–11'–18.44"	46.000	245.936	90.949	0+481.417	0+527.417	0+572.366	N75°–48'–49.81"W

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS UNLESS OTHERWISE SHOWN.
2. SYMBOL, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH-GN-03
3. THE CONTRACTOR HAS TO SUBMITED SURVEYING AND ROAD ALIGNMENT FOR APPROVAL.

REFERENCE DRAWINGS :

1. ACCESS ROAD PLAN AND PROFILE, STA. 0+600 TO STA. 1+200	MH-AR-02
2. ACCESS ROAD TYPICAL SECTIONS, STOPPING AND PASSING PLACES	MH-AR-04
3. ACCESS ROAD TYPICAL SECTION AND DETAILS	MH-AR-05

0 5 10 15
SCALE 1:200 METERS

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

NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
ACCESS ROAD
PLAN AND PROFILE, STA. 0+000 TO STA. 0+600

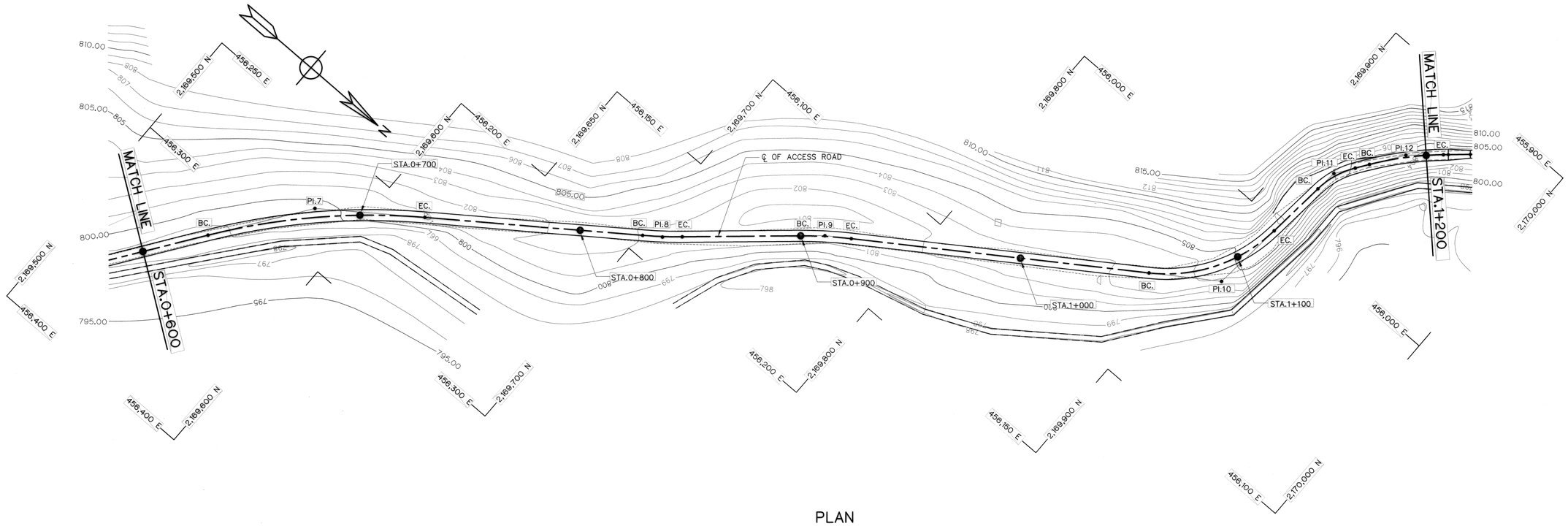
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED สมิต.64624 สมิต.6226
DRAWN
CHECKED สมิต.6226
PROJECT MANAGER 01/03/2564 DATE

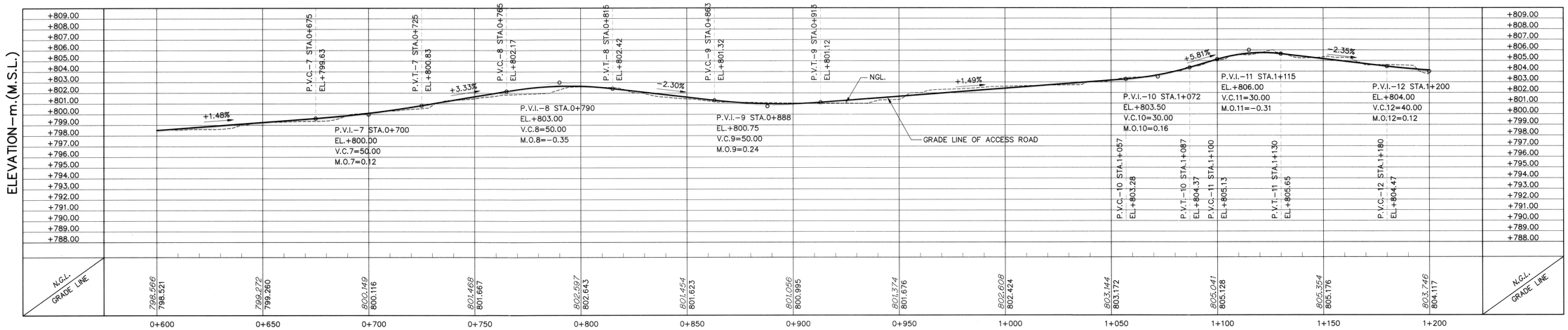
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. MH-AR-01
SHEET NO. 9 OF 130



PLAN

SCALE 1:1,000



PROFILE

VERTICAL SCALE 1:200

HORIZONTAL SCALE 1:1,000

HORIZONTAL CURVE OF O&M ROAD PART 1

NO. PI.	COORDINATE N	COORDINATE E	PI. – PI. (m)	DEFLECTION ANGLE (△) (° – ' – ")	TL. (m)	R (m)	LC. (m)	BC. STA. (km)	PI. STA. (km)	EC. STA. (km)	BEARING (N/S ° – ' – " E/W)
7	2,169,580.540	456,279.094	153.994	18°–37'–54.99"	50.000	304.799	99.117	0+630.359	0+680.359	0+729.477	N54°–37'–31.37"W
8	2,169,708.299	456,186.294	157.906	05°–08'–18.84"	9.000	200.568	17.988	0+828.382	0+837.382	0+846.370	N35°–59'–36.38"W
9	2,169,763.715	456,137.897	73.574	06°–56'–51.31"	12.000	197.682	23.971	0+898.945	0+910.945	0+922.915	N41°–07'–55.23"W
10	2,169,913.214	456,036.357	180.722	50°–16'–22.20"	33.000	70.331	61.710	1+058.637	1+091.637	1+120.347	N34°–11'–03.91"W
11	2,169,920.015	455,966.274	70.412	29°–32'–13.19"	10.000	37.933	19.555	1+147.760	1+157.760	1+167.315	N84°–27'–26.11"W
12	2,169,939.358	455,938.731	33.657	13°–22'–53.30"	17.000	144.916	33.845	1+173.971	1+190.971	1+207.817	N54°–55'–12.93"W

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS UNLESS OTHERWISE SHOWN.
2. SYMBOL, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH–GN–03
3. THE CONTRACTOR HAS TO SUBMITED SURVEYING AND ROAD ALIGNMENT FOR APPROVAL.

0 5 10 15
SCALE 1:200 METERS

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

REFERENCE DRAWINGS :

1.	ACCESS ROAD PLAN AND PROFILE, STA. 0+000 TO STA. 0+600	MH–AR–01
2.	ACCESS ROAD PLAN AND PROFILE, STA. 1+200 TO STA. 1+489.351	MH–AR–03
3.	ACCESS ROAD TYPICAL SECTIONS, STOPPING AND PASSING PLACES	MH–AR–04
4.	ACCESS ROAD TYPICAL SECTION AND DETAILS	MH–AR–05

NO.	DATE	REVISIONS	CHECKED	APPROVED
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	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
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MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
ACCESS ROAD
PLAN AND PROFILE, STA. 0+600 TO STA. 1+200

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MINISTRY OF ENERGY

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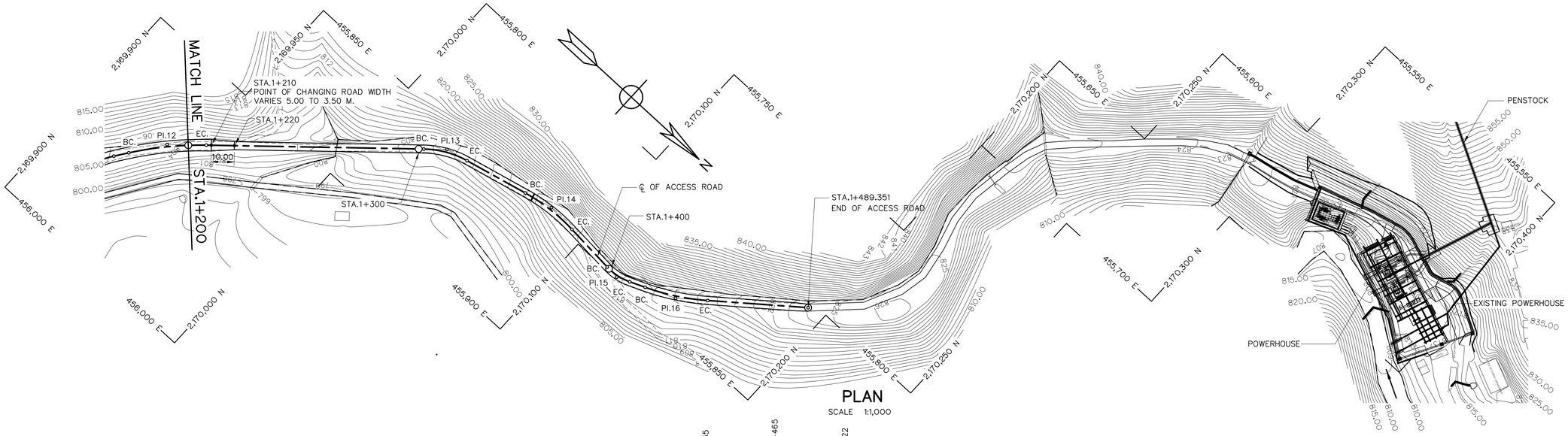
DESIGNED	วิชัย.64624	วิชัย.6226	SUBMITTED
DRAWN			RECOMMENDED
CHECKED	วิชัย.6226		APPROVED P. Hongsamut

PROJECT MANAGER 08/03/2564 DATE

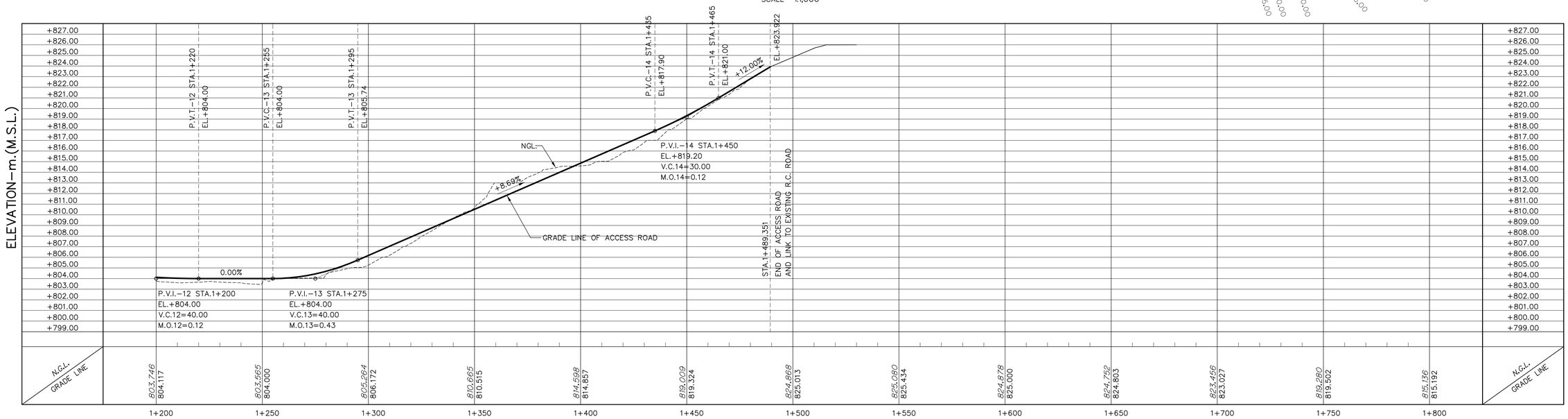
DRAWING NO. MH–AR–02

SHEET NO. 10 OF 130



PLAN

SCALE 1:1,000



PROFILE

VERTICAL SCALE 1:200
HORIZONTAL SCALE 1:1,000

HORIZONTAL CURVE OF ACCESS ROAD

NO. PI.	COORDINATE N	COORDINATE E	PI. – PI. (m)	DEFLECTION ANGLE (△) (° – ' – ")	TL. (m)	R (m)	LC. (m)	BC. STA. (km)	PI. STA. (km)	EC. STA. (km)	BEARING (N/S ° – ' – " E/W)
12	2,169,939.358	455,938.731	33.657	13°–22'–53.30"	17.000	144.916	33.845	1+173.971	1+190.971	1+207.817	N54°–55'–12.93"W
13	2,170,030.243	455,858.213	121.422	28°–02'–49.52"	10.000	40.038	19.599	1+302.238	1+312.238	1+321.837	N41°–32'–19.63"W
14	2,170,080.717	455,846.103	51.906	17°–45'–55.66"	13.000	83.180	25.791	1+350.744	1+363.744	1+376.535	N13°–29'–30.11"W
15	2,170,121.999	455,849.188	41.397	27°–04'–27.96"	6.000	24.920	11.776	1+398.932	1+404.932	1+410.708	N04°–16'–25.55"E
16	2,170,147.010	455,838.674	27.131	15°–41'–23.12"	14.000	101.611	27.825	1+417.839	1+431.839	1+445.664	N22°–48'–02.41"W
END	2,170,192.163	455,802.770	57.688						1+489.351		

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS UNLESS OTHERWISE SHOWN.
2. SYMBOL, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH–GN–03
3. THE CONTRACTOR HAS TO SUBMITED SURVEYING AND ROAD ALIGNMENT FOR APPROVAL.

0 5 10 15
SCALE 1:200 METERS

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

REFERENCE DRAWINGS :

1. ACCESS ROAD, PLAN AND PROFILE, STA. 0+600 TO STA. 1+200	MH–AR–02
2. ACCESS ROAD, TYPICAL SECTIONS, STOPPING AND PASSING PLACES	MH–AR–04
3. ACCESS ROAD, TYPICAL SECTION AND DETAILS	MH–AR–05

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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	CONSULTANTS		DEDE	

KINGDOM OF THAILAND
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MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
ACCESS ROAD
PLAN AND PROFILE, STA. 1+200 TO STA. 1+489.351

P&C MANAGEMENT CO.,LTD.

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MINISTRY OF ENERGY

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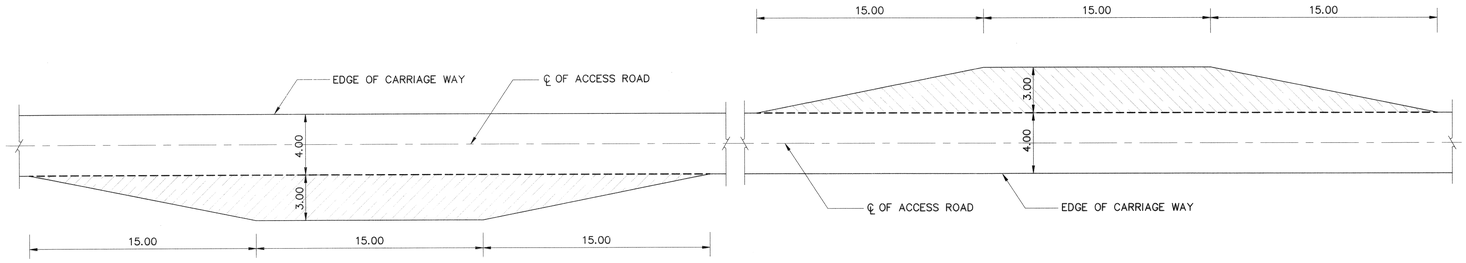
SUBMITTED
DRAWN
RECOMMENDED
CHECKED ฐย.6226
APPROVED

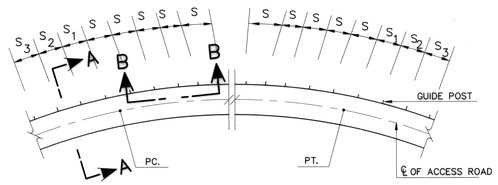
PROJECT MANAGER 08/03/2559 DATE

DRAWING NO. MH–AR–03
SHEET NO. 11 OF 130



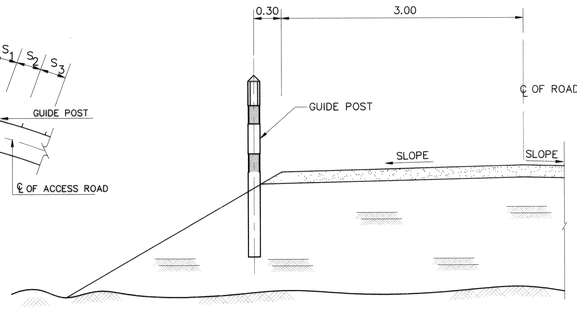
PLAN SHOWING DETAIL OF STOPPING AND PASSING PLACES IN GENERAL

NOT TO SCALE



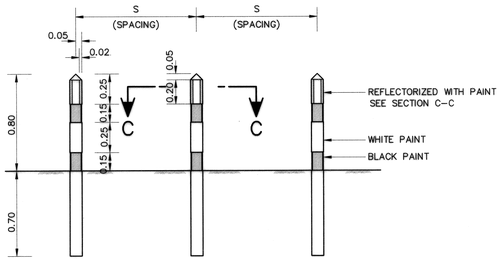
PLAN

NOT TO SCALE



SECTION A–A

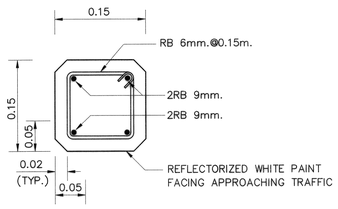
NOT TO SCALE



SECTION B–B

NOT TO SCALE

GUIDE POSTS



SECTION C–C

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. CLEARING AND GRUBBING METHOD SHALL CONFORM TO THE REQUIREMENTS AS SPECIFILED IN THE TECHNICAL SPECIFICATIONS
3. SIDE DITCH SHALL BE PROVIDES FOR ROAD IN CUT SECTION AND IN FILL SECTION WHERE HEIGHT OF FILL FROM CARRIAGE WAY EDGE TO EXISTING GROUND LINE IS LESS THAN 0.50 METERS
4. ACCESS ROAD ALIGNMENT MAY BE RE–ADJUSTED TO SUIT THE FIELD CONDITIONS, BUT UNDER THE APPROVAL OF FIELD ENGINEERS
5. THE FIELD ENGINEER MAY ORDER SIDE SLOPE IN DIFFERENCE FROM TYPICALLY SHOWN IN THIS DRAWING
6. RC. PIPES ARE GROOVE AND TONGUE TYPE WHICH SPECIFIED IN THE TECHNICAL SPECIFICATIONS LOCATION AND SIZE OF RC. PIPE CULVERTS AS SHOWN IN PLAN AND PROFILE, MAY BE RE–ADJUSTED BY FIELD ENGINEER TO FIT WITH THE TERRAIN.
7. ALL RC. PIPE CULVERTS SHALL BE INSTALLED IN MANUFACTURED LENGTH WITHOUT FIELD CUTTINGS.
8. INVERT ELEVATIONS OF RC. PIPE CULVERTS WILL BE SET ON SITE, THE LENGTH SHOWN IN PLAN AND PROFILE SHEETS MAY BE VARIED TO SUIT FIELD CONDITIONS
9. EMBANKMENT SHALL BE CONSTRUCTED OF MATERIAL WITH AC. OR VALUE NOT LESS THAN 4%
10. THE MATERIAL FOR LATERITE CRUSHE STONE SHALL HAVE AC. OR VALUE NOT LESS THAN 15% AND ITS PHYSICAL PROPERTIES AS FOLLOWS
    - LIQUID LIMIT (LL) NOT GREATER THAN 34%
    - PLASTIC INDEX (P1) IN RANGE OF 5 TO 11
    - PERCENTAGE OF WEAR NOT GREATER THAN 50%

    AND OTHER PROPERTIES AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS
11. LOCATION OF STOPPING AND PASSING PLACES SHALL BE INDICATED ON PLAN AND PROFILE DRAWING OR AS DIRECTED BY FIELD ENGINEER
12. THE PAVEMENT OF ACCESS ROAD IS DOUBLE SURFACE THEATMENT. PLAN AND PROFILE DRAWING OR AS DIRECTED BY THE CONTRACTOR AND APPROVAL BY FIELD ENGINEER

TABLE

SPACING OF GUIDE POSTS				
RADIUS M.	S M.	S1 M.	S2 M.	S3 M.
15 – 74	4	8	12	24
75 – 99	6	12	18	36
LARGER THAN 100	NO GUIDE POSTS INSTALLED			

REFERENCE DRAWING :

1. ACCESS ROAD, PLAN AND PROFILE STA.0+000 TO STA.0+630.673 MH–AR–01 TO AR–02

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
ACCESS ROAD
TYPICAL SECTIONS, STOPPING AND PASSING PLACES

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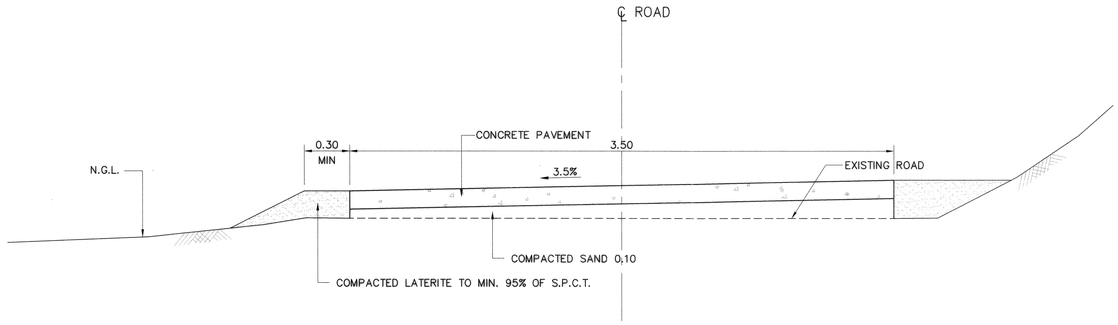
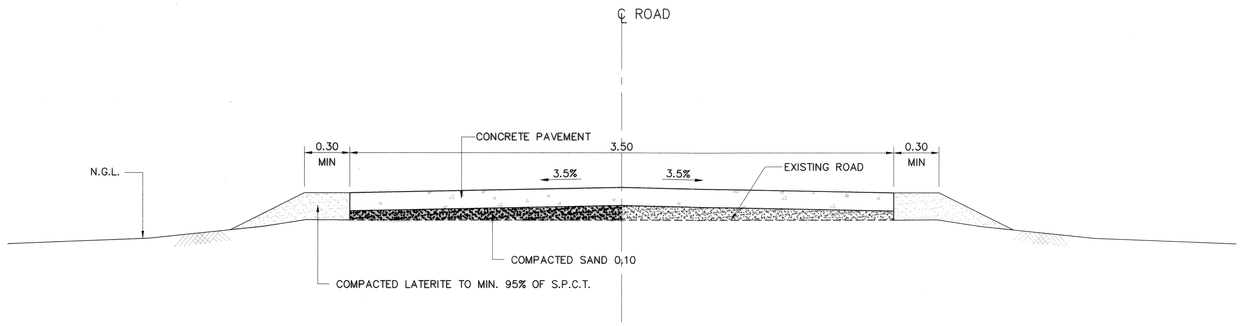
CHECKED	RECOMMENDED
PROJECT MANAGER	APPROVED
DATE 01/03/2564	DRAWING NO. MH–AR–04
	SHEET NO. 12 OF 130



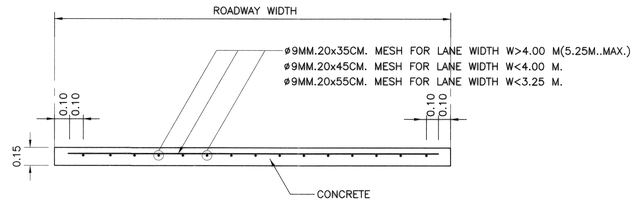
TYPICAL SECTION FOR HILLSIDE

NOT TO SCALE



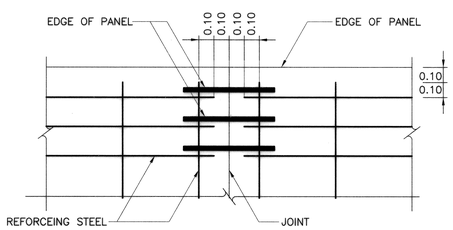
TYPICAL SECTION FOR FLAT AREA

NOT TO SCALE



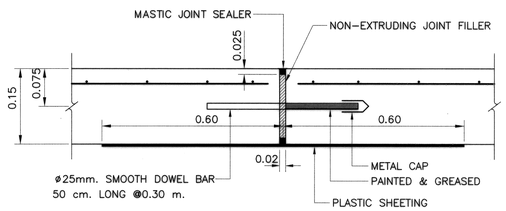
REINFORCEMENT DETAIL OF CONCRETE PAVEMENT CROSS-SECTION

NOT TO SCALE



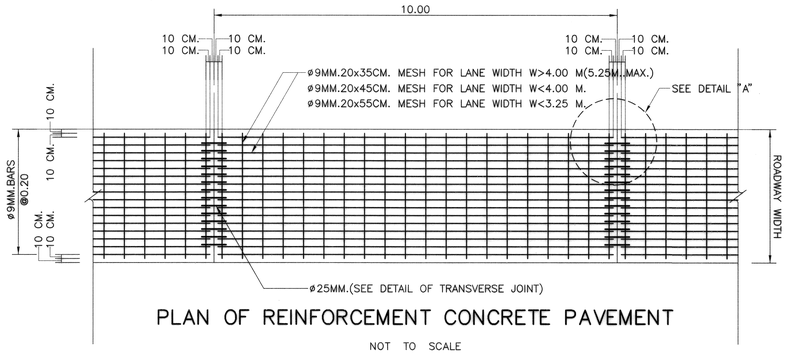
DETAIL "A"

NOT TO SCALE



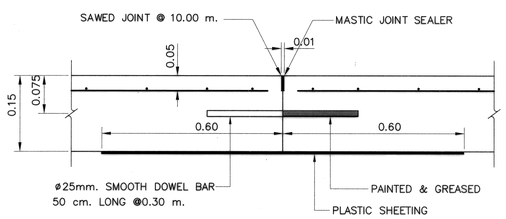
DETAIL OF EXPANSION JOINT

NOT TO SCALE



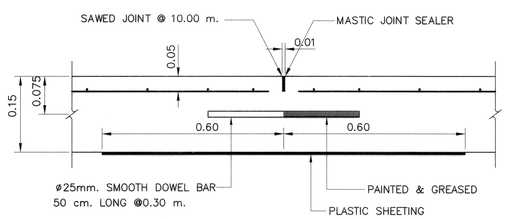
PLAN OF REINFORCEMENT CONCRETE PAVEMENT

NOT TO SCALE



DETAIL OF CONSTRUCTION JOINT

NOT TO SCALE



DETAIL OF CONTRACTION JOINT

NOT TO SCALE

REFERENCE DRAWING :

1. ACCESS ROAD, PLAN AND PROFILE STA.0+000 TO STA.1+489.351 MH-AR-01 TO AR-03

NOTES 1 :

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. EXPANSION JOINT SHALL BE CONSTRUCTED AT THE INTERVAL OF 90 METERS.
3. MASTIC JOINT SEALER SHALL BE OF THE HOT POURED ELASTIC TYPE CONFORMING TO TIS.479.
4. JOINT FILLER SHALL CONFORM TO THE AASHTO M.213-74 OR ASTM.D1751-73 SPECIFICATION.
5. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 300 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS.
6. REINFORCING STEEL SHALL CONFORM TIS.20 GRADE SR 24 FOR ROUND BARS AND TIS.24 GRADE SD 30 FOR DEFORMED BAR.
7. PLASTIC SHEET USED IN CONSTRUCTION SHALL HAVE THE FOLLOWING REQUIREMENTS :
   - 7.1 THICKNESS OF 0.07 MM. WITH A TOLERANCE OF NOT MORE THAN 7 % SHALL BE REQUIRED.
   - 7.2 WIDTH SHALL NOT BE LESS THAN 1.20 M.
   - 7.3 IT SHALL BE COLOURLESS,TRANSPARENT AND WATERPROOF, FREE FROM POROUS AREA, TURN AREA AND BLISTERING AREA WHICH ARE VISIBLE BY NAKED EYE. EDGE SHALL BE STRAIGHT.
   - 7.4 CONTINUOUS LENGTH SHALL BE REQUIREMENT TO THE WIDTH OF TRAFFIC LANES. CONNECTION ALLOWED AT LONGITUDINAL JOINTS WITH NOT LESS. THAN 20 CM. OVERLAPPING SHALL BE REQUIRED.

NO.	DATE	REVISIONS	CHECKED	APPROVED
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MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
ACCESS ROAD
TYPICAL SECTION AND DETAILS

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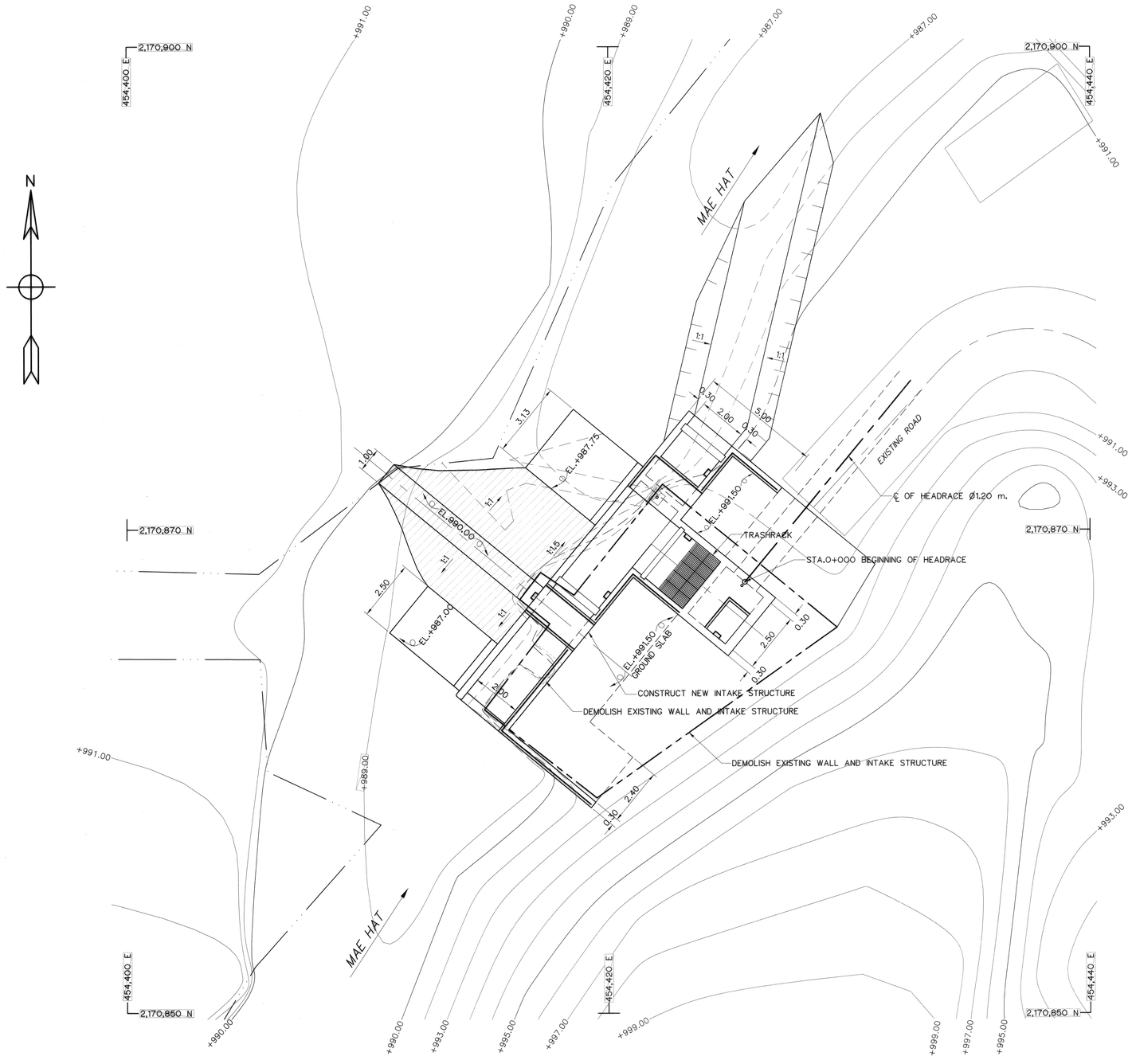
PROJECT MANAGER 05/07/2564 DATE	APPROVED
DRAWING NO. MH-AR-05	SHEET NO. 13 OF 130



GENERAL LAY-OUT

SCALE 1:100

LEGEND :

WEIR REHABILITATION

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. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 210 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. WEIR SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY NOT LESS THAN 10 TON/M.^{2}
7. VERTICLE GATES WITH OUTSIDE-SCREW RISING STEM SHALL BE MOTOR AND HAND OPERATED, SEE DETAIL TABLE

REFERENCE DRAWINGS :

1. WEIR, PLAN AND SECTIONS MH-WE-02

0 1 2 3 4 5 6 7 8

SCALE 1:100 METERS

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
WEIR
GENERAL LAYOUT PLAN

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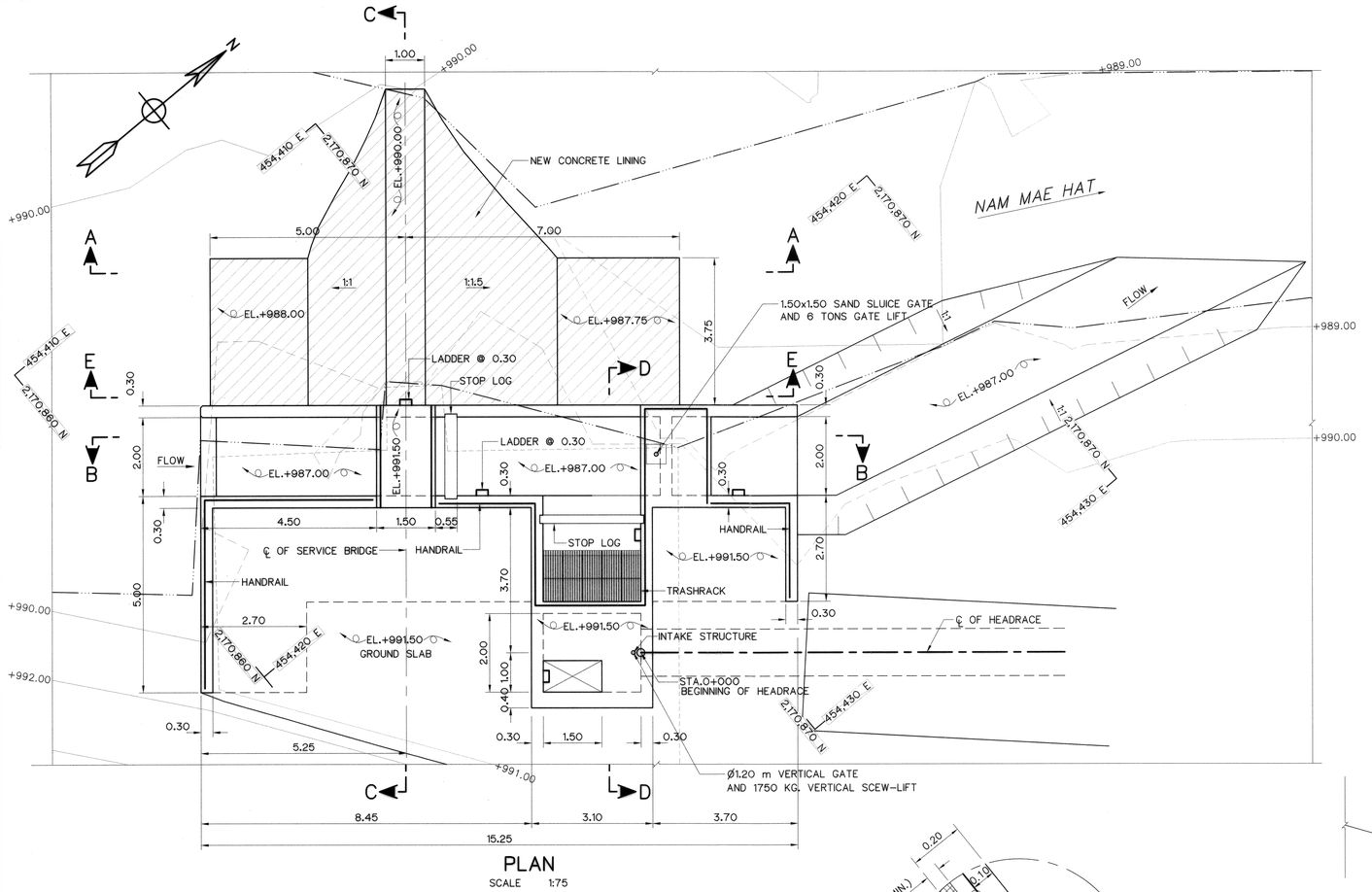
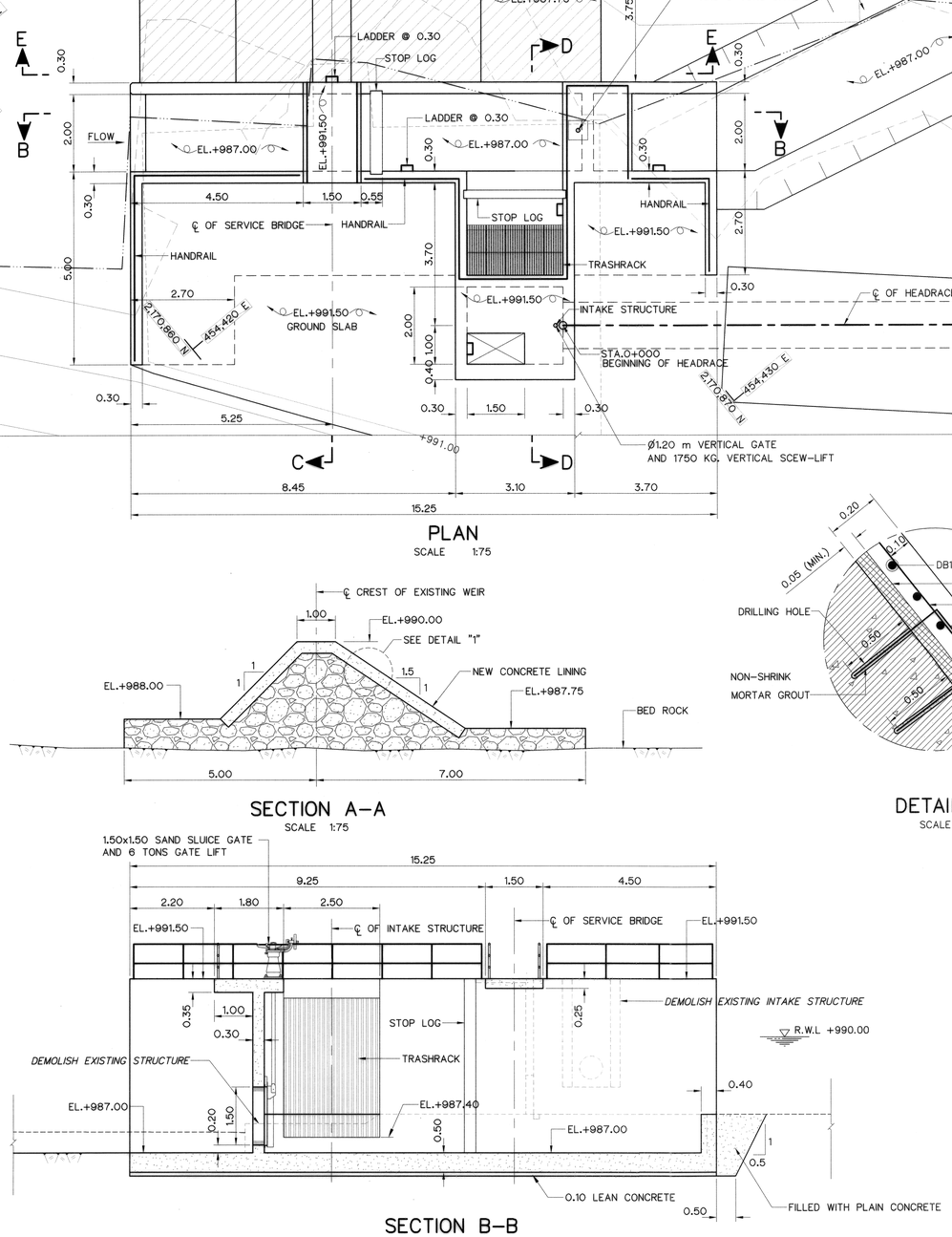
CHECKED ณ.6226	RECOMMENDED
PROJECT MANAGER 01/05/64 DATE	APPROVED
DRAWING NO. MH-WE-01	SHEET NO. 14 OF 130



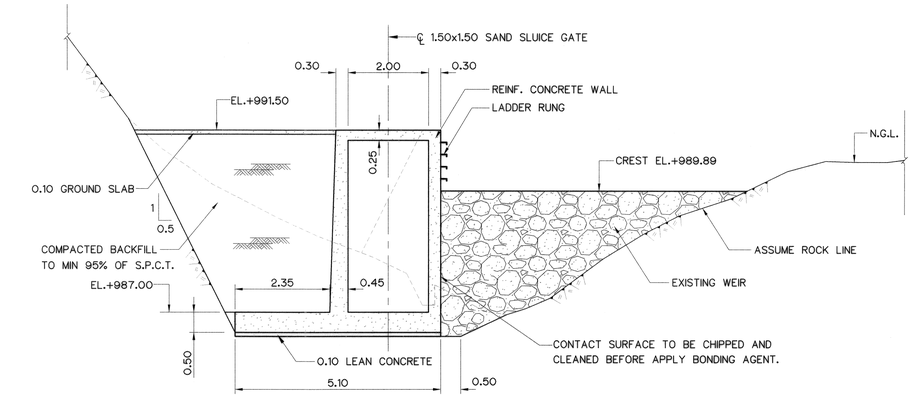
PLAN
SCALE 1:75

SECTION A–A
SCALE 1:75

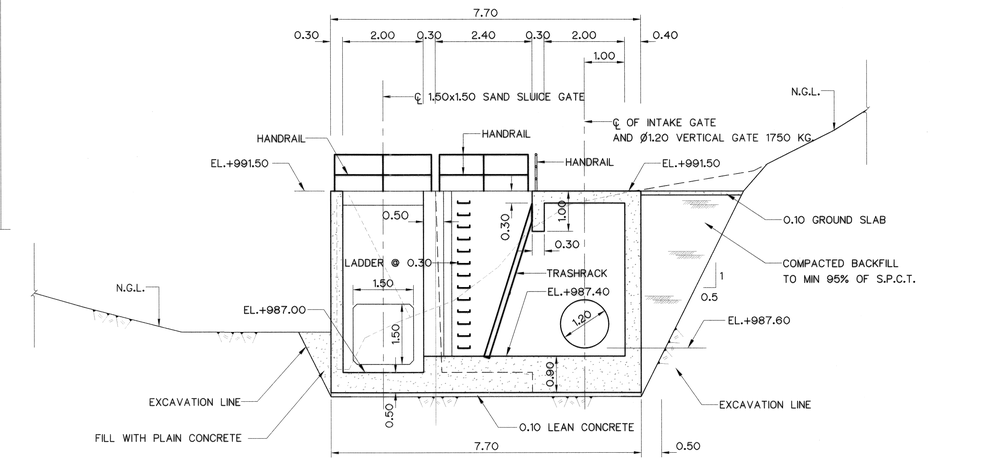
DETAIL "1"
SCALE 1:10



SECTION B–B
SCALE 1:75



SECTION C–C
SCALE 1:75



SECTION D–D
SCALE 1:75

STEP OF LINING :
1. CONCRETE REMOVAL TECHNIQUES USED SHOULD BE EFFECTIVE, FAST, SAFE, ECONOMICAL AND ENVIRONMENTALLY FRIENDLY. THE EXISTING CONCRETE SURFACE MUST BE DRY, CLEAN, ROUGH AND FREE OF DUST SO THAT THE POURED CONCRETE WILL STICK TO THE OLD CONCRETE
2. THE REPAIRED SURFACE SHOULD BE CLEANED THOROUGHLY BY WET SAND BLASTING OR DRY SAND BLASTING OR SHOT BLASTING OR OTHER EQUIVALENT METHOD. FINALLY, IT SHOULD BE CLEANED BY WIND OR WATER USING PRESSURE.
3. A HOLE IS DRILLED TO INSTALL DOWEL BAR FIXED BY NON-SHRINK CEMENT GROUT AND INSTALL REINFORCED CONCRETE SO THAT THE POURED CONCRETE CAN REMAIN AND STICK TO THE OLD CONCRETE.
4. BEFORE POURING CONCRETE, APPLY MORTAR TO A THIN CONCRETE SURFACE NOT EXCEEDING 3 MM AND USE EPOXY RESIN BONDING AGENT, ASTM C881, TYPE II OR TYPE V.

REFERENCE DRAWINGS :

1.	WEIR REINFORCEMENT DETAILS (1/2)	MH-WE-03
2.	WEIR REINFORCEMENT DETAILS (2/2)	MH-WE-04
3.	WEIR MISCELLANEOUS DETAILS	MH-WE-05
4.	WEIR 1.50x1.50 VERTICAL GATE	MH-WE-06 TO WE-07
5.	WEIR DIA. 1.20 VERTICAL GATE	MH-WE-08

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. CONCRETE OF WEIR STRUCTURE TO BE MIN. 28 DAYS STANDARD CYLINDER COMPRESSIVE STRENGTH OF 210 KSC.
4. SPACING OF HANDRAIL CAN BE ADJUSTED IN THE FIELD TO FIT WITH THE STRUCTURE BY CONTRACTOR AND APPROVED BY ENGINEER.
5. WEIR SHALL BE PLACED ON BED ROCK FOUNDATION, OTHER MATERIALS SHALL BE REMOVED AND BACKFILLED WITH LEAN CONCRETE AND THE LEAN CONCRETE SHALL HAVE THE COMPRESSIVE STRENGTH OF 140 KSC. FOR STANDARD CYLINDER AT 28 DAYS.
6. ALLOWABLE BEARING CAPACITY NOT LESS THAN 10 TON/sq.m.

NO.	DATE	REVISIONS	CHECKED	APPROVED
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MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
WEIR
PLAN AND SECTIONS

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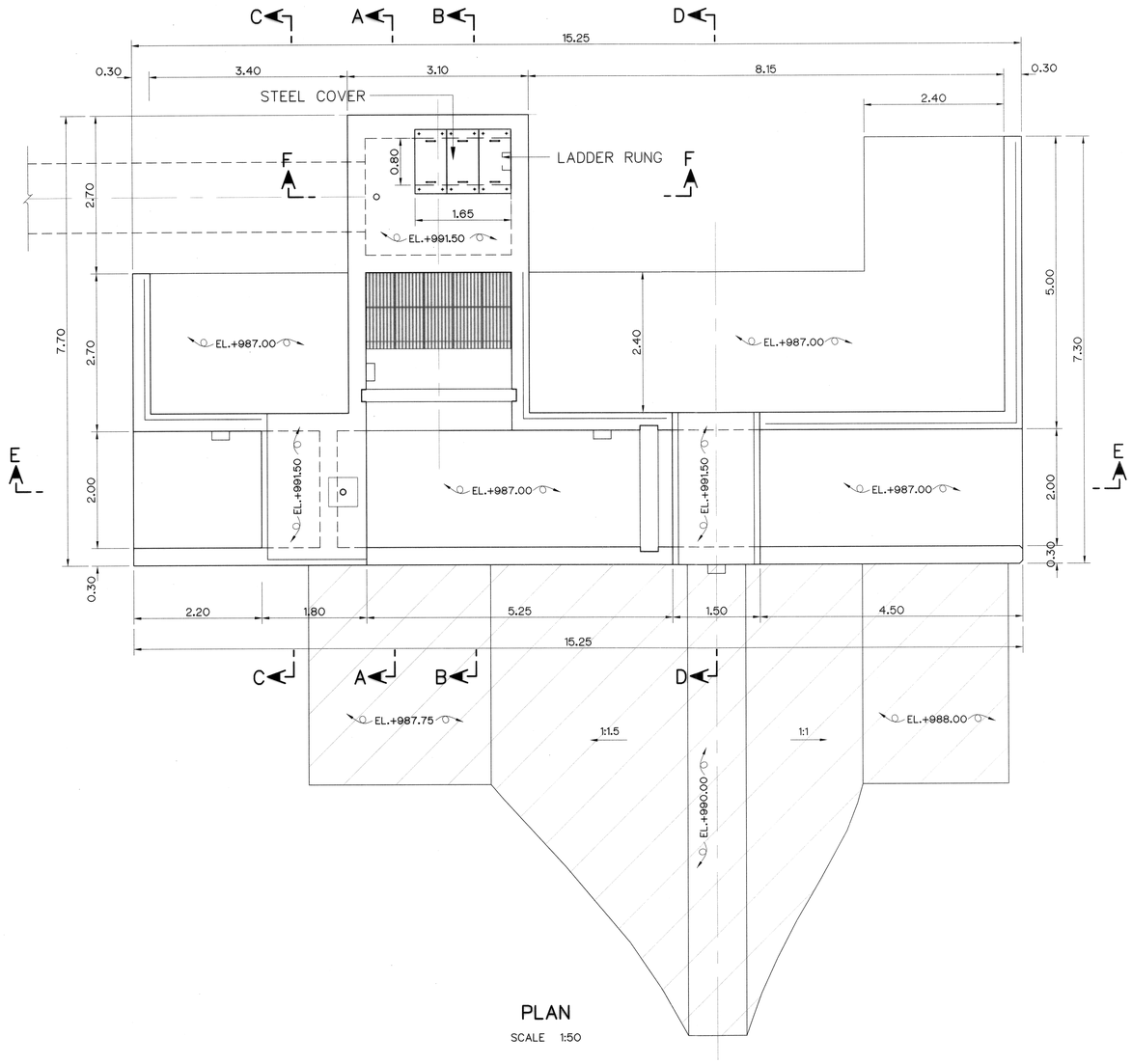
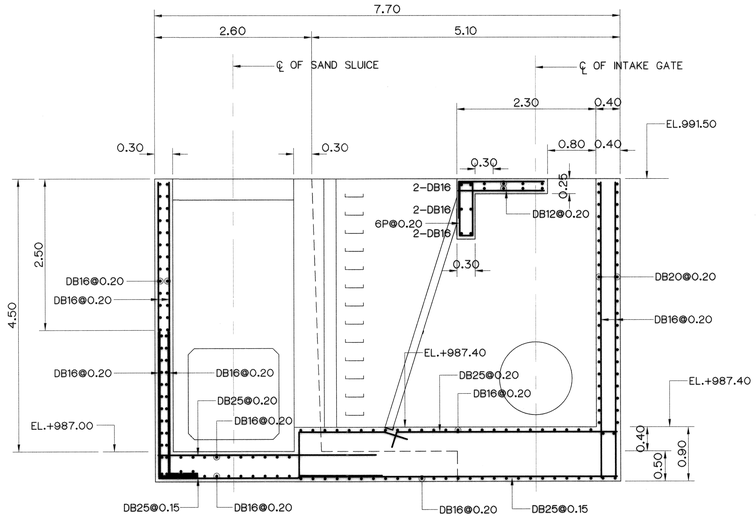
CHECKED อ.ว. 2B.6226	RECOMMENDED
PROJECT MANAGER 02/03/2559 DATE	APPROVED
DRAWING NO. MH-WE-02	SHEET NO. 15 OF 130



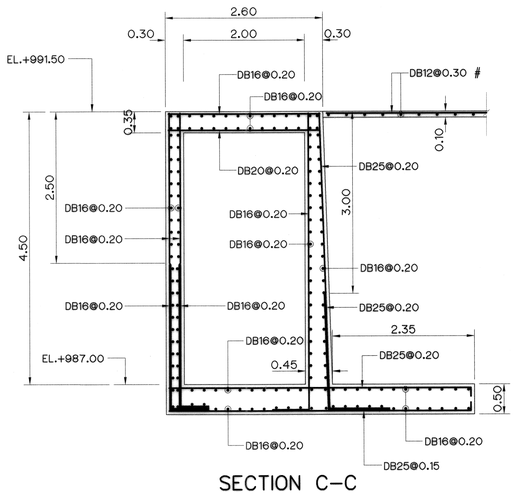
PLAN

SCALE 1:50



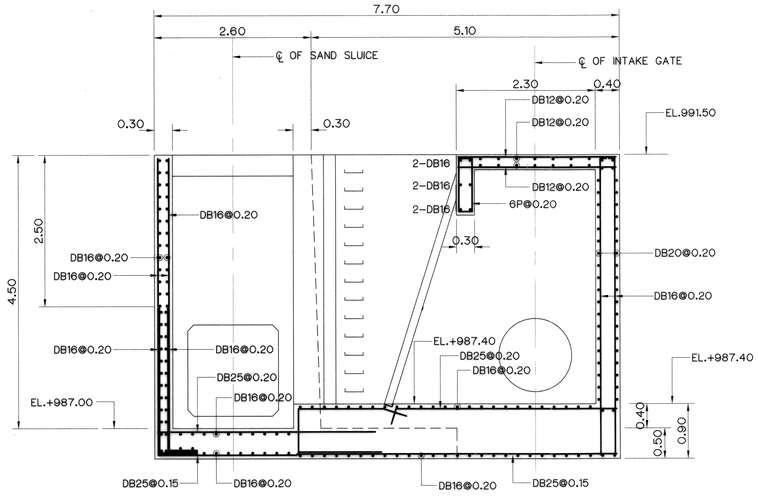
SECTION B–B

SCALE 1:50



SECTION C–C

SCALE 1:50



SECTION A–A

SCALE 1:50

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH–GN–03
3. CONCRETE DESIGN BASED ON THE COMPRESSIVE STRENGTH OF 210 KSC, STANDARD CYLINDER Ø0.15x0.30 m. TEST AT AGE 28 DAYS. UNLESS OTHERWISE INDICATED IN SPECIFIC DRAWINGS.
4. ULTIMATE TENSILE STRESSES OF REINFORCING STEEL, CONFORM TO THE REQUIREMENT OF THAI INDUSTRIAL STANDARD DESIGNATION SR24 FOR STRUCTURAL GRADE PLAIN ROUND BAR AND SD30 FOR INTERMEDIATE GRADE DEFORMED BAR.

REFERENCE DRAWINGS :

1. WEIR GENERAL LAY–OUT	MH–WE–01
2. WEIR REINFORCEMENT DETAILS (SHEET 2/2)	MH–WE–04
3. STEEL COVER	MH–ST–07

0 0.5 1 2 3 4

SCALE 1:50 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE

WEIR

REINFORCEMENT DETAILS (SHEET 1/2)

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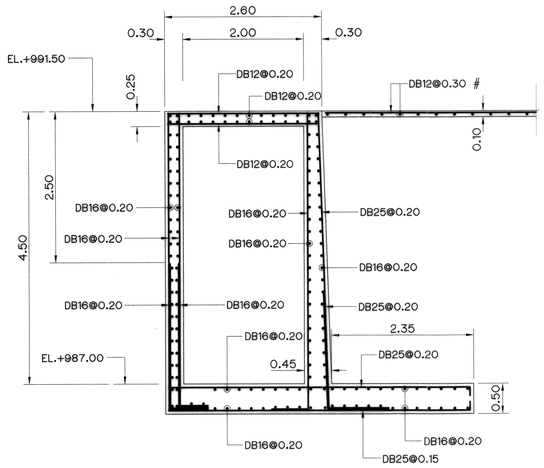
PROJECT MANAGER	APPROVED
DATE	

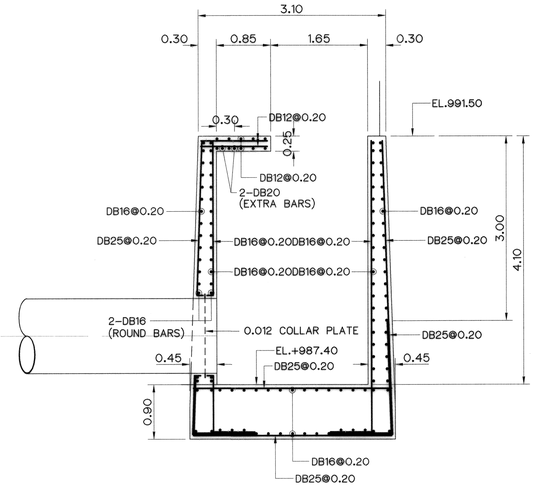
DRAWING NO. MH–WE–03

SHEET NO. 16 OF 130



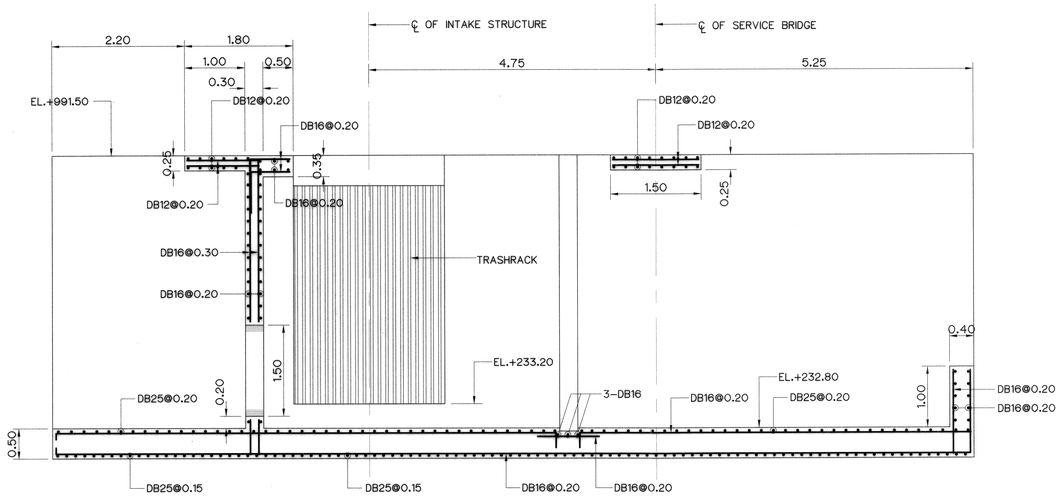
SECTION D–D

SCALE 1:50



SECTION F–F

SCALE 1:50



SECTION E–E

SCALE 1:50

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH–GN–03
3. CONCRETE DESIGN BASED ON THE COMPRESSIVE STRENGTH OF 210 KSC, STANDARD CYLINDER Ø0.15x0.30 m. TEST AT AGE 28 DAYS. UNLESS OTHERWISE INDICATED IN SPECIFIC DRAWINGS.
4. ULTIMATE TENSILE STRESSES OF REINFORCING STEEL, CONFORM TO THE REQUIREMENT OF THAI INDUSTRIAL STANDARD DESIGNATION SR24 FOR STRUCTURAL GRADE PLAIN ROUND BAR AND SD30 FOR INTERMEDIATE GRADE DEFORMED BAR.

REFERENCE DRAWINGS :

1.	WEIR GENERAL LAY–OUT	MH–WE–01
2.	WEIR REINFORCEMENT DETAILS (SHEET 1/2)	MH–WE–03

0 0.5 1 2 3 4

SCALE 1:50 METERS

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MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
WEIR
REINFORCEMENT DETAILS (SHEET 2/2)

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

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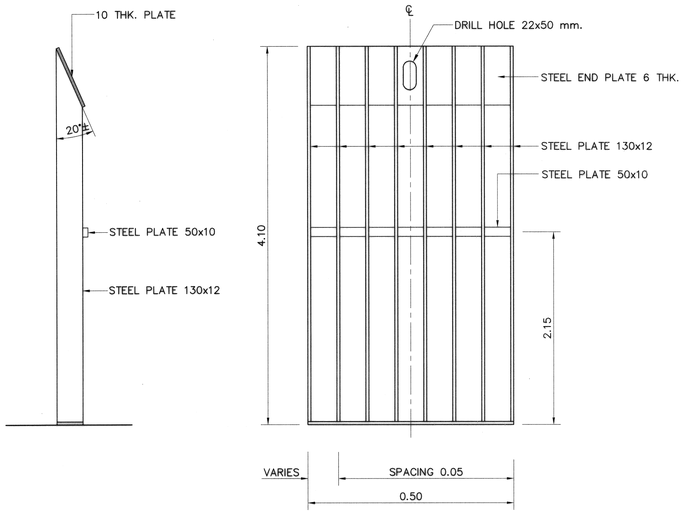
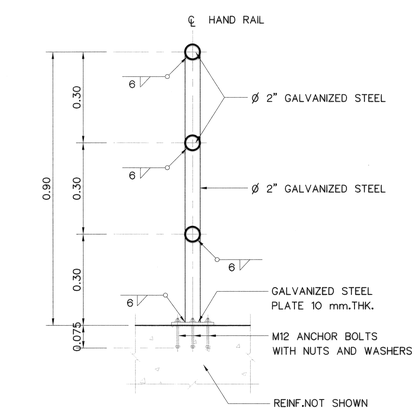
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

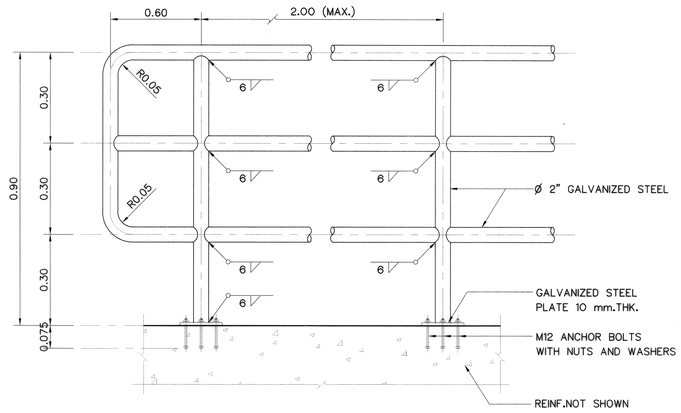
DRAWING NO. MH–WE–04
SHEET NO. 17 OF 130



TRASHRACK DETAILS

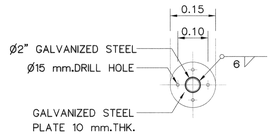
NOT TO SCALE

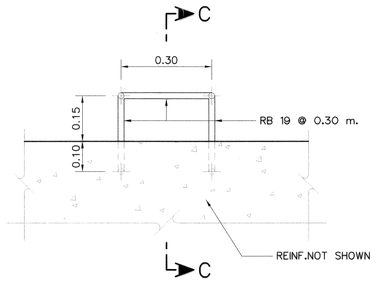




DETAIL OF HANDRAIL

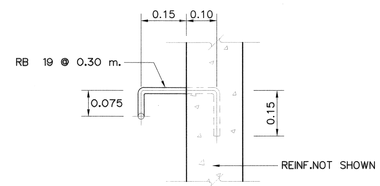
SCALE 1:20





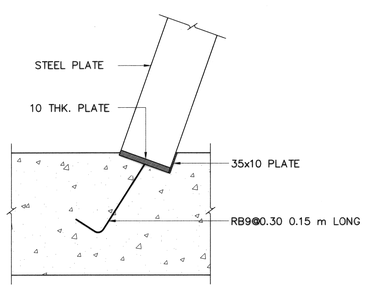
DETAIL OF LADDER RUNG

SCALE 1:20



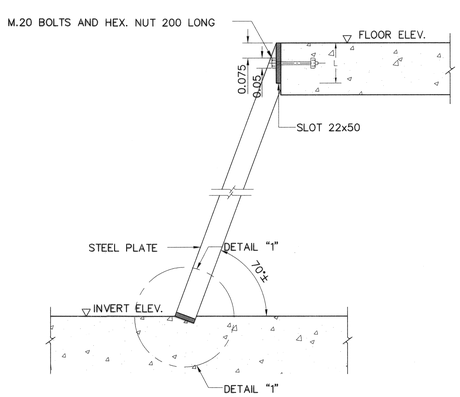
SECTION C – C

SCALE 1:20



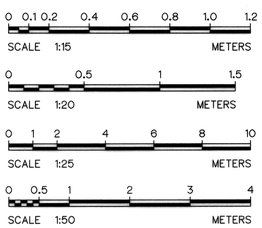
DETAIL "1"

NOT TO SCALE



TRASHRACK INSTALLATION

NOT TO SCALE



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METER.UNLESS OTHERWISE SHOWN
2. FOR GENERAL NOTES SEE DWG. NO MH-GN-03

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

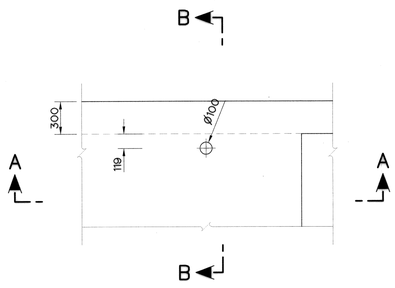
MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
WEIR
MISCELLANEOUS DETAILS

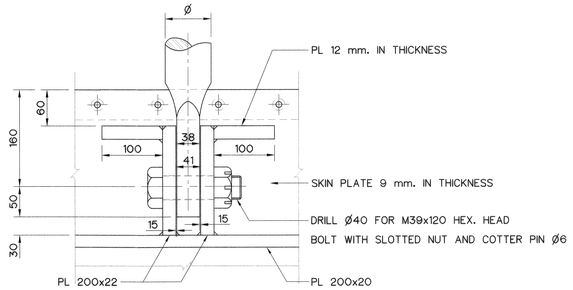
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วิศ.64624	วิศ.6226	REVIEWED
DRAWN			SUBMITTED
CHECKED		วิศ.6226	RECOMMENDED
PROJECT MANAGER		01/03/2559 DATE	APPROVED
			DRAWING NO. MH-WE-05
			SHEET NO. 18 OF 130



PLAN
NOT TO SCALE



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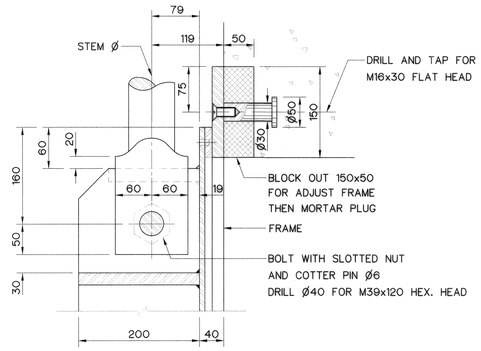

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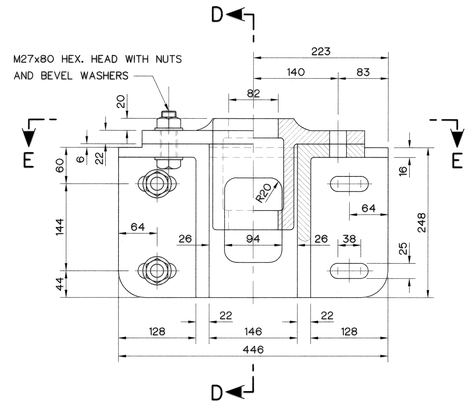
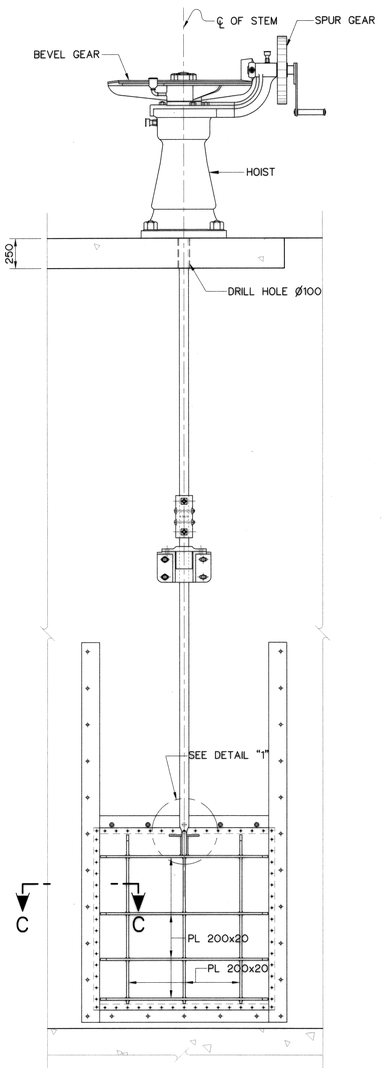


STEM GUIDE
NOT TO SCALE



SECTION A–A
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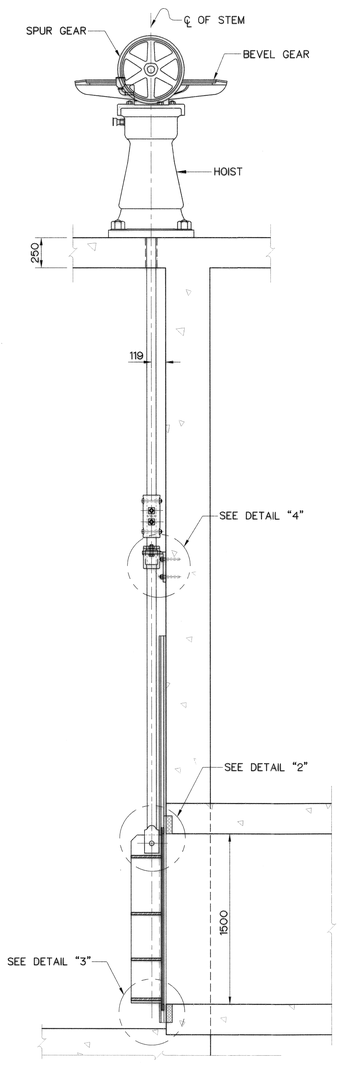
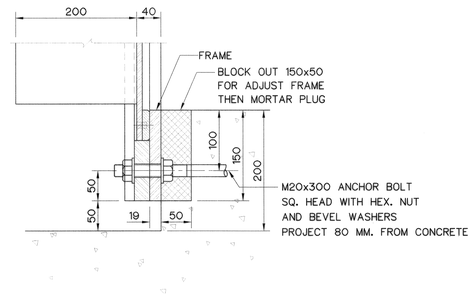
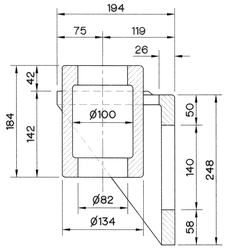


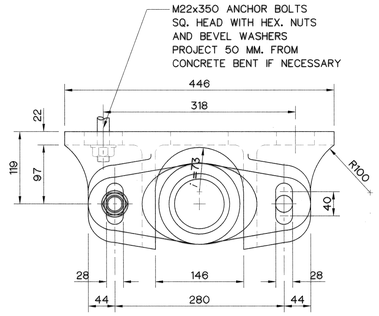
SECTION B–B
NOT TO SCALE



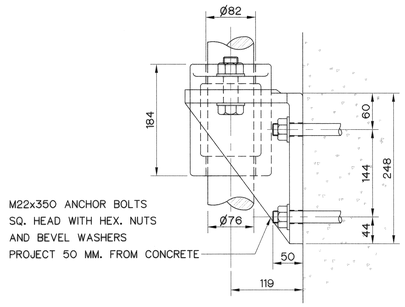
DETAIL "3"
SCALE 1:5



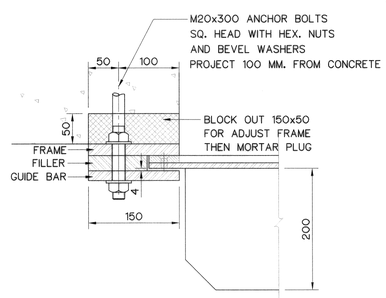
SECTION D–D
SCALE 1:5



SECTION E–E
SCALE 1:5



DETAIL "4"
SCALE 1:5



SECTION C–C
SCALE 1:5

NOTE :

1. ALL DIMENSIONS ARE IN MILLIMETERS, AND ELEVATION ARE IN METERS UNLESS OTHERWISE SHOWN.
2. ALL WELDING WILL BE 6 MILLIMETERS, UNLESS OTHERWISE SHOWN.
3. ALL BOLTS AND NUTS USE ASTM A325.
4. ALL STRUCTURAL STEELS ARE JIS G 3101 SS400
5. ALL STAINLESS STEELS PLATES ARE JIS G 4304 SUS 304.
6. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONTRACTOR HAS TO SUBMITTED SHOP DRAWING TO FIELD ENGINEER FOR APPROVAL

REFERENCE DWGS :

1. WEIR SECTIONS	MH–WE–02
2. 1.50x1.50 m. VERTICAL GATE (GATE DATAIL)	MH–WE–07
3. PEDESTAL SCREW LIFT CAPACITY 6.5 TONS	MH–WE–09

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

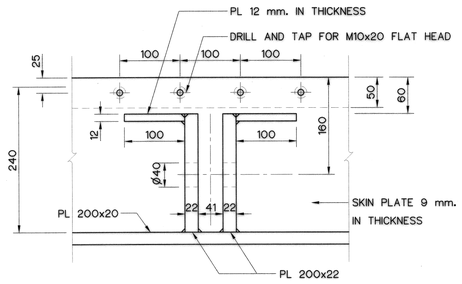
CIVIL WORKS AND TRANSMISSION LINE
WEIR
1.50x1.50 m. VERTICAL GATE (GATE INSTALLATION)

P&C MANAGEMENT CO.,LTD.

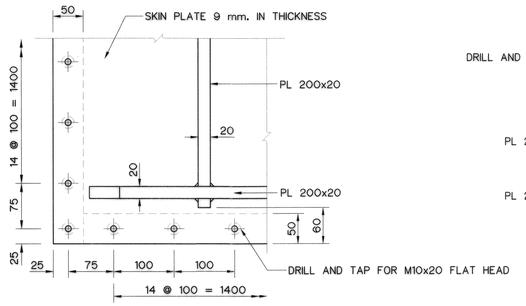
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิชิต.64624	วิชิต.6226	REVIEWED
DRAWN			SUBMITTED
CHECKED		วิชิต.6226	RECOMMENDED
PROJECT MANAGER		05/03/2559 DATE	APPROVED P. Hanstad

DRAWING NO. MH–WE–06
SHEET NO. 19 OF 130



DETAIL "1"
NOT TO SCALE



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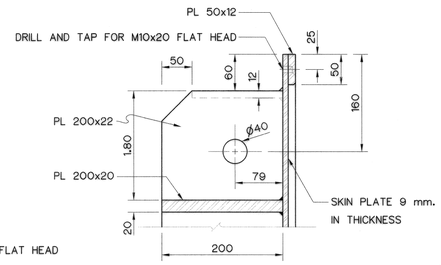

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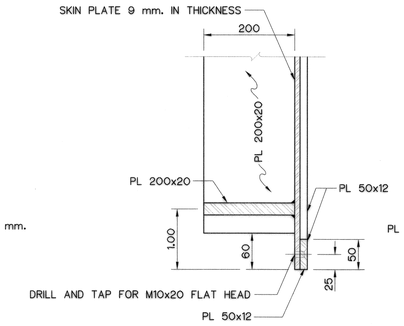

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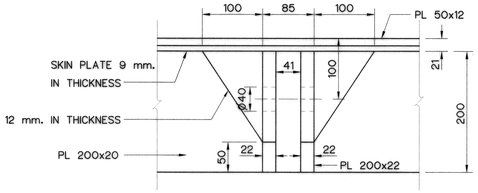

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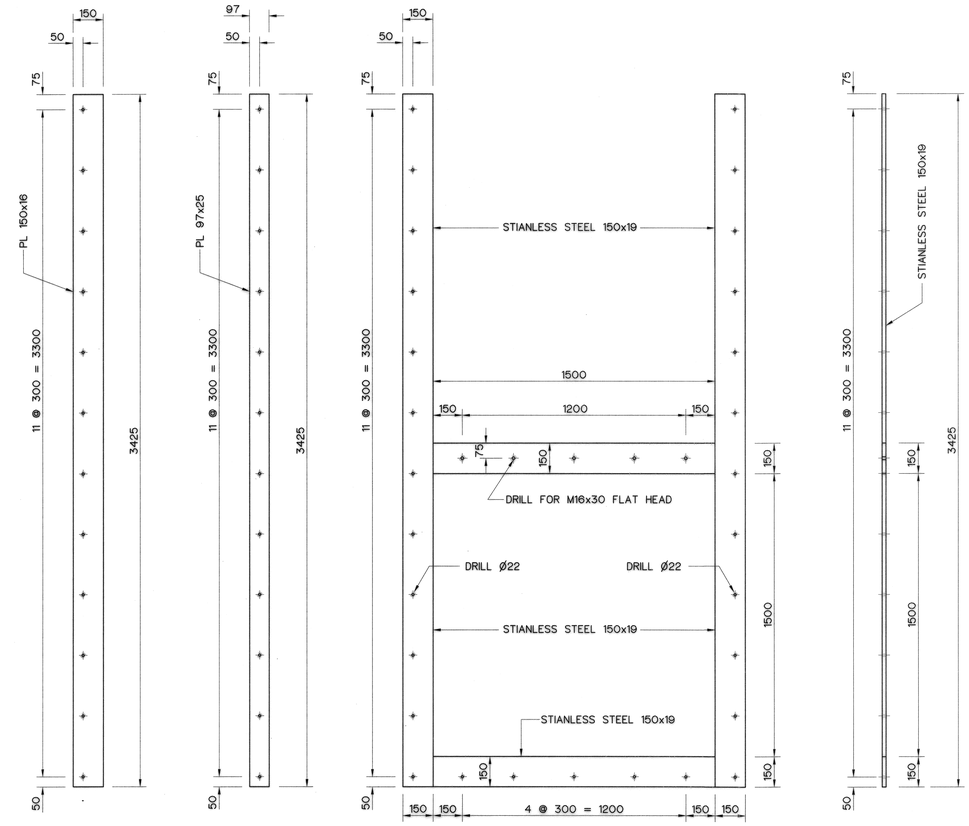
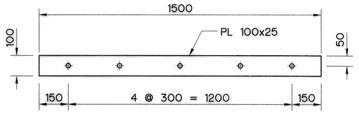


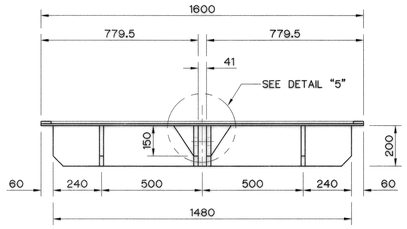
GUIDE BAR
NOT TO SCALE

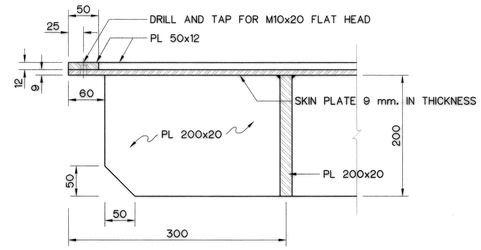
FILLER
NOT TO SCALE

FRAME
NOT TO SCALE

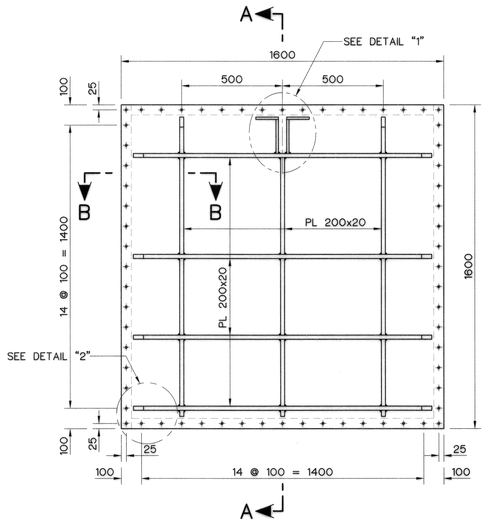


BOTTOM BAR
NOT TO SCALE

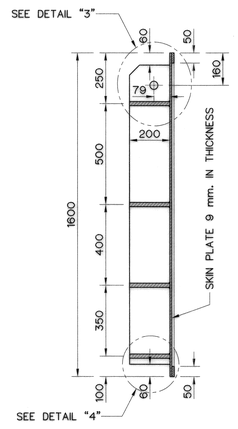




SECTION B–B
NOT TO SCALE



GATE LEAF
NOT TO SCALE



SECTION A–A
NOT TO SCALE

NOTE :

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
2. ALL WELDING WILL BE 6 MILLIMETERS, UNLESS OTHERWISE SHOWN.
3. ALL BOLTS AND NUTS USE ASTM A325.
4. ALL STRUCTURAL STEELS ARE JIS G 3101 SS400
5. ALL STAINLESS STEELS PLATES ARE JIS G 4304 SUS 304.
6. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONTRACTOR HAS TO SUBMITTED SHOP DRAWING TO FIELD ENGINEER FOR APPROVAL

REFERENCE DWGS :

1. 1.50x1.50 m. VERTICAL GATE (GATE INSTALLATION)	MH-WE-06
2. PEDESTAL SCREW LIFT CAPACITY 6.5 TONS	MH-WE-09

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

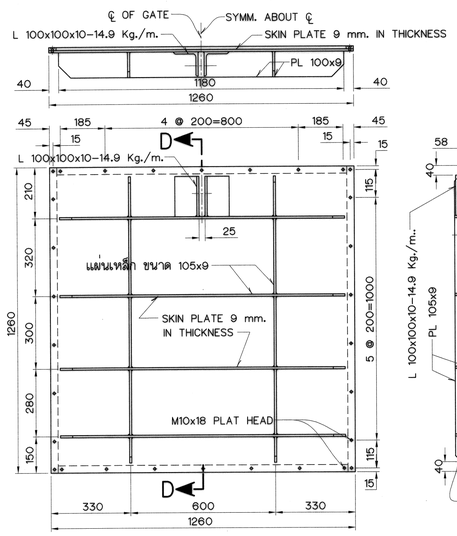
CIVIL WORKS AND TRANSMISSION LINE
WEIR
1.50x1.50 m. VERTICAL GATE (GATE DETAIL)

P&C MANAGEMENT CO.,LTD.

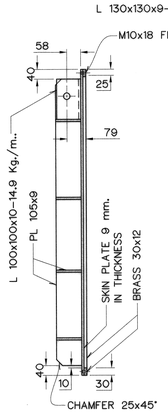
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วิ.64624	วิ.6226	REVIEWED
DRAWN			SUBMITTED
CHECKED		วิ.6226	RECOMMENDED
PROJECT MANAGER		08/03/2564 DATE	APPROVED

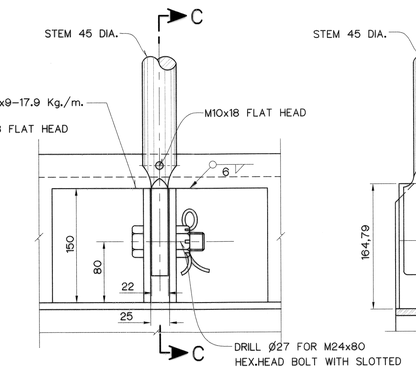
DRAWING NO. MH-WE-07
SHEET NO. 20 OF 130



GATE LEAF
NOT TO SCALE



SECTION D–D
NOT TO SCALE



DETAIL "4"
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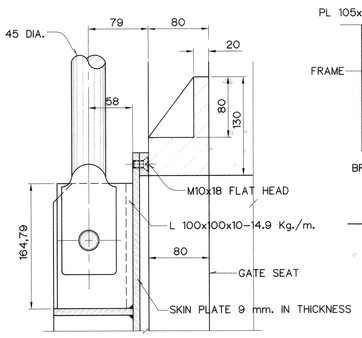
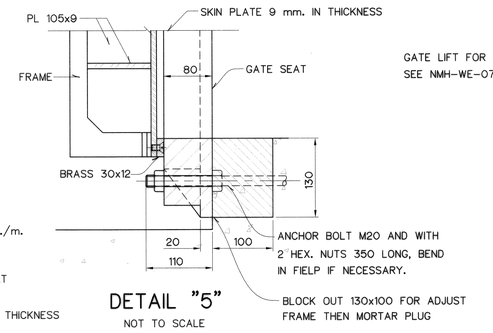


SECTION C–C
NOT TO SCALE



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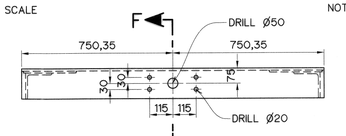
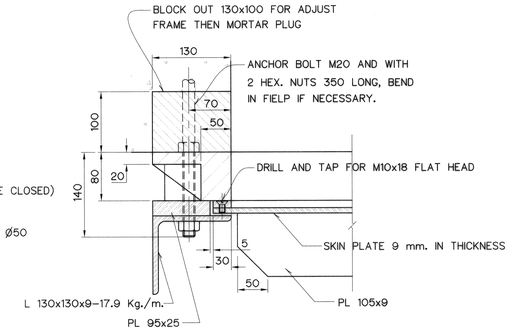
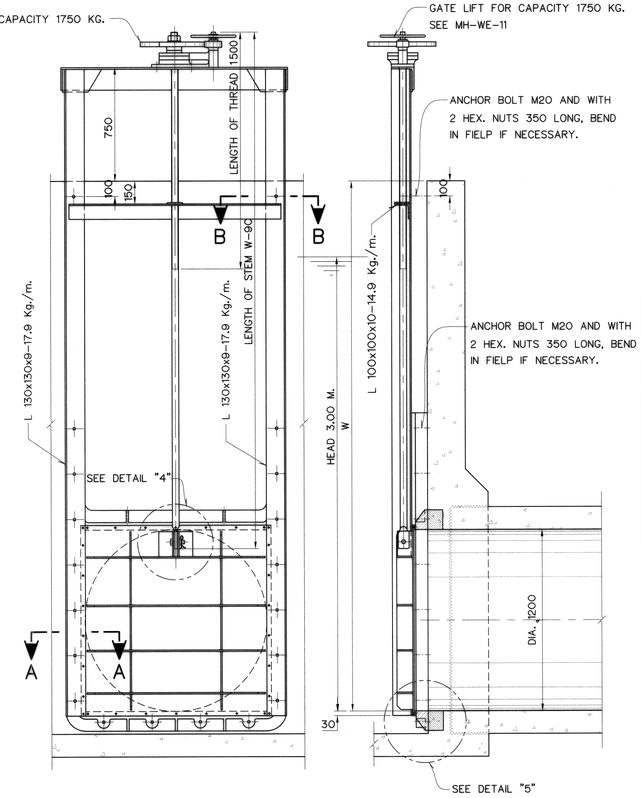
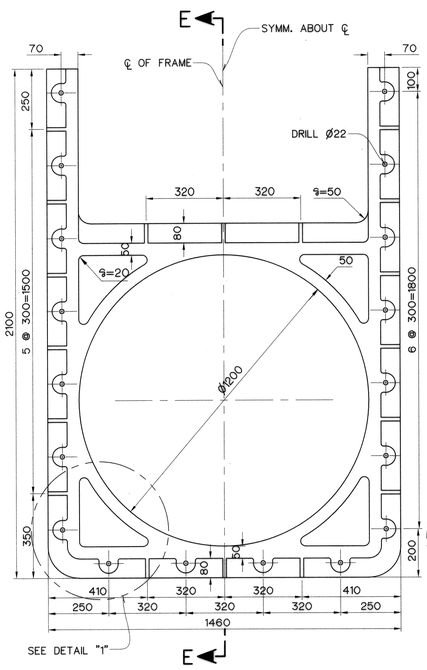




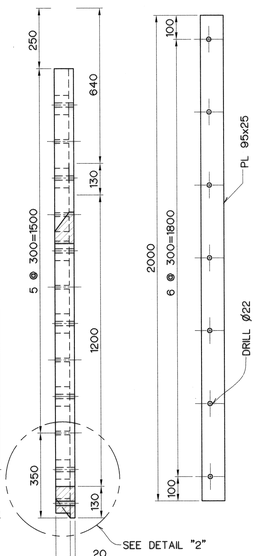
SECTION A–A
NOT TO SCALE



ASSEMBLY
NOT TO SCALE

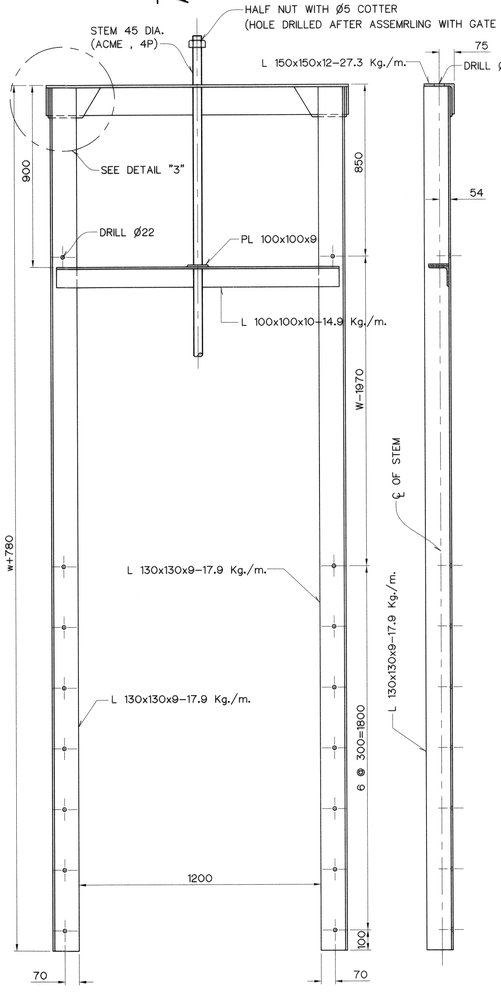


GATE SEAT
NOT TO SCALE



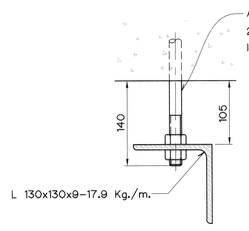
SECTION E–E
NOT TO SCALE

FILLER
NOT TO SCALE

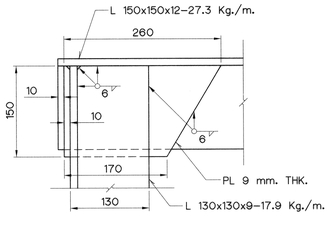


FRAME
NOT TO SCALE

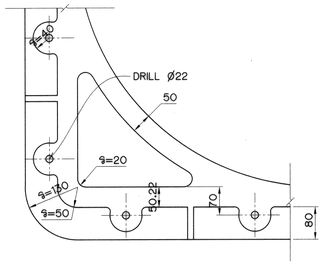
SECTION F–F
NOT TO SCALE



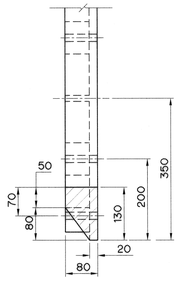
SECTION B–B
NOT TO SCALE



DETAIL "3"
NOT TO SCALE



DETAIL "1"
NOT TO SCALE



DETAIL "2"
NOT TO SCALE

NOTE :
1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
2. ALL WELDING WILL BE 6 MILLIMETERS, UNLESS OTHERWISE SHOWN.
3. ALL BOLTS AND NUTS USE ASTM A325.
4. ALL STRUCTURAL STEELS ARE JIS G 3101 SS400
5. ALL STAINLESS STEELS PLATES ARE JIS G 4304 SUS 304.

REFERENCE DWGS :
1. GATE–LIFT PEDESTAL AND HAND WHEEL MH–WE–10
2. VERTICAL SCREW–LIFT CAPACITY 1,750 KG. MH–WE–11

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
WEIR
DIA. 1.20 m. VERTICAL GATE

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS — DEDE

P&C MANAGEMENT CO.,LTD.

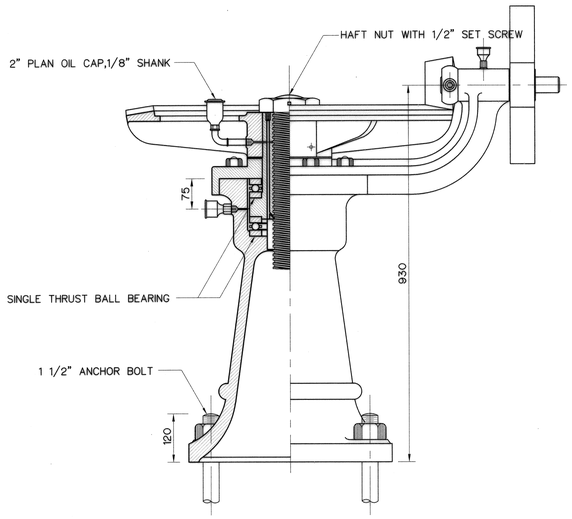
Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	วิชิต.64624	สิน.6226	REVIEWED
DRAWN			SUBMITTED
CHECKED		สิน.6226	RECOMMENDED
			APPROVED

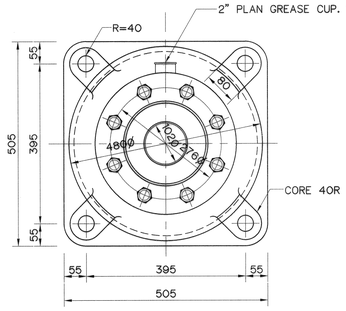
PROJECT MANAGER — 01/03/2559 DATE

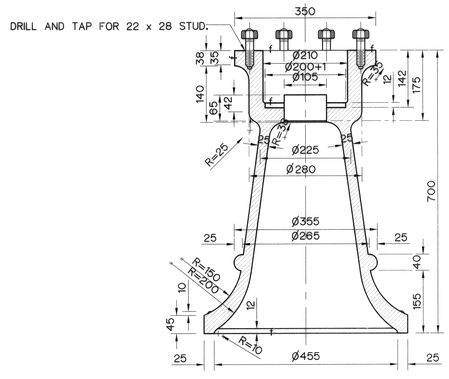
DRAWING NO. MH–WE–08

SHEET NO. 21 OF 130

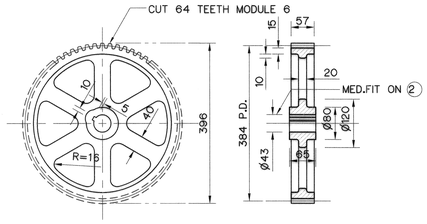


ASSEMBLY
SCALE 1 : 7.5

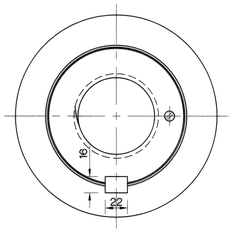


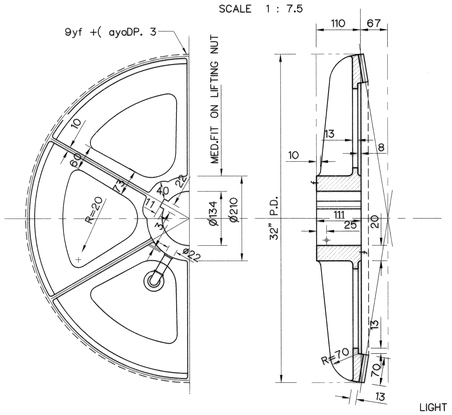


PEDESTAL
CAST IRON
SCALE 1 : 7.5

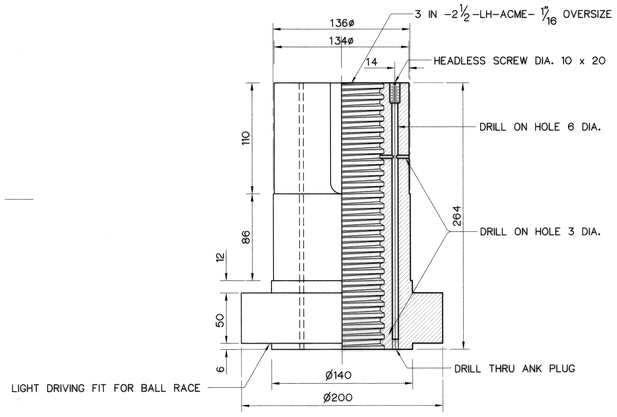


SPUR GEAR
SCALE 1 : 7.5

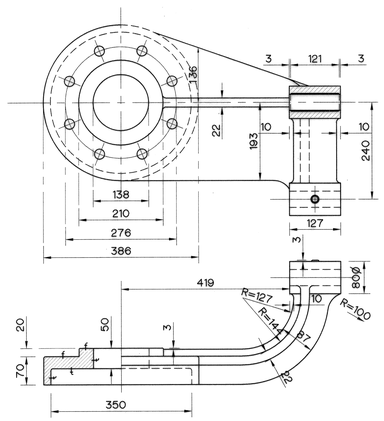




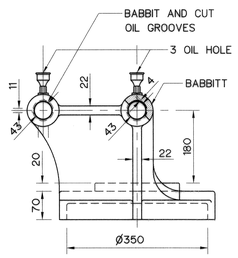
BEVEL GEAR
CAST IRON
SCALE 1 : 7.5

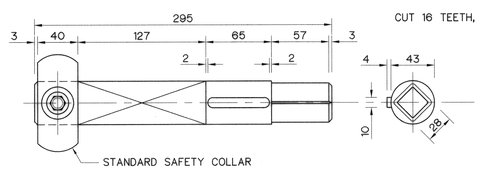


LIFTING NUT
PHOSPHOR BRONZE
SCALE 1 : 3

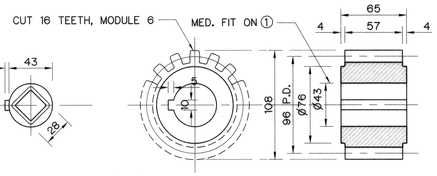


GAP AND BEARING
CAST IRON
SCALE 1:7.5

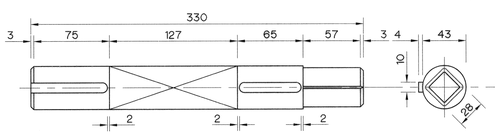




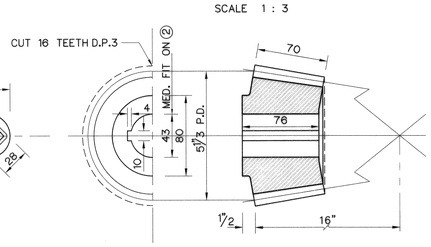
BEVEL PINION SHAFT
COLD ROLLED STEEL
SCALE 1 : 3



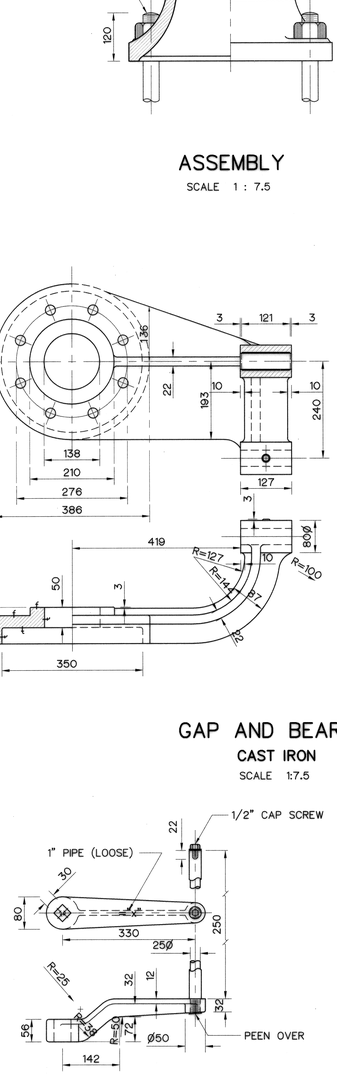
SPUR PINION
CAST IRON
SCALE 1 : 3



BEVEL GEAR SHAFT
COLD ROLLED STEEL
SCALE 1 : 3



BEVEL PINION
CAST IRON
SCALE 1 : 3



CRANK ARM
CAST IRON
SCALE 1 : 7.5

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.
2. THIS DRAWING IS DESIGNED FOR GUIDE LINE ONLY, THE CONTRACTOR HAS TO SUBMITTED SHOP DRAWING TO FIELD ENGINEER FOR APPROVAL

0 0.05 0.1 0.2 0.25
SCALE 1:3 METERS

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

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
WEIR
PEDESTAL SCREW LIFT CAPACITY 6.5 TONS

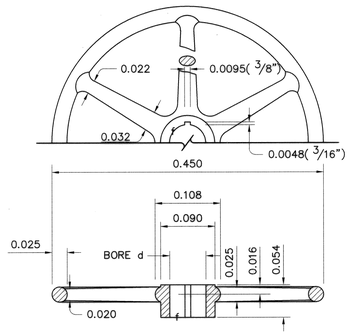
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

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

DESIGNED an.1950
DRAWN
CHECKED an.1950
PROJECT MANAGER 01/03/2559 DATE

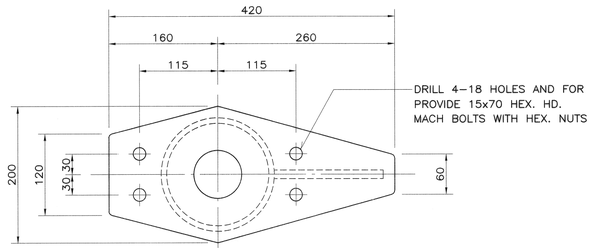
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED P. Hanwill

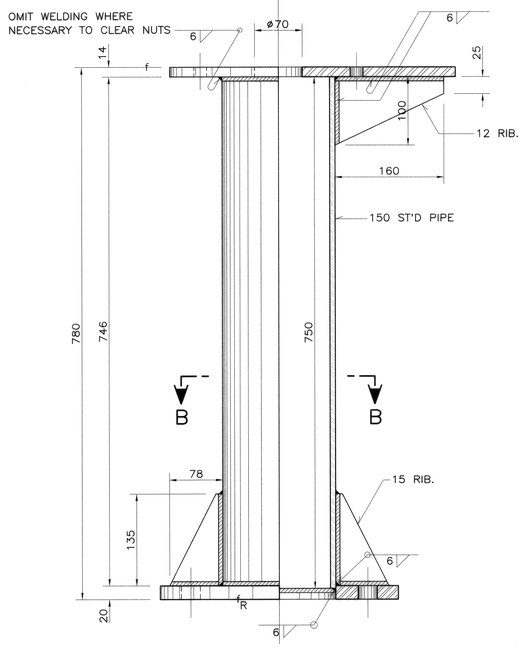
DRAWING NO. MH-WE-09
SHEET NO. 22 OF 130



45–CM. DIA. HAND WHEEL

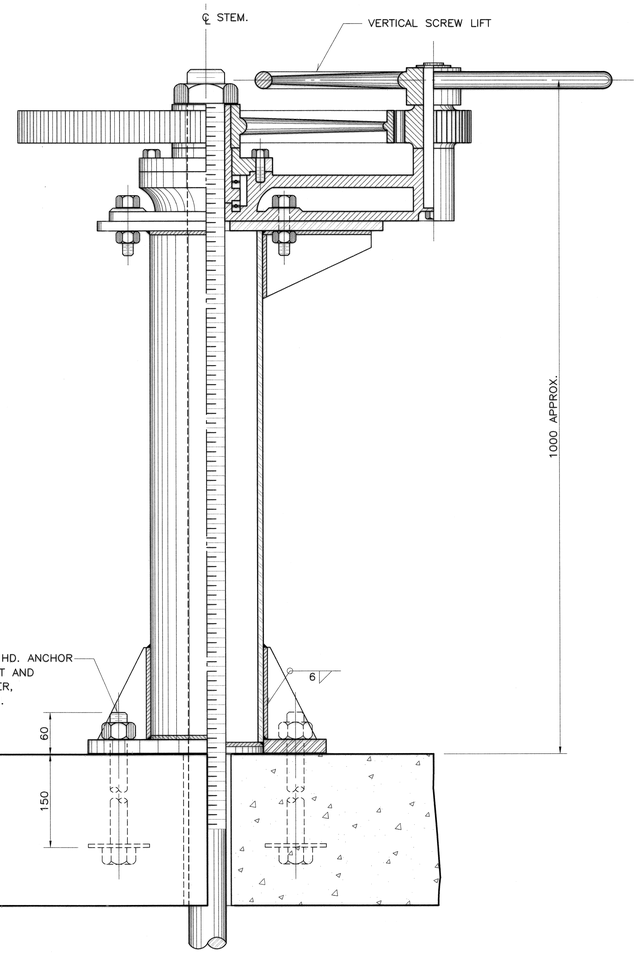
NOT TO SCALE





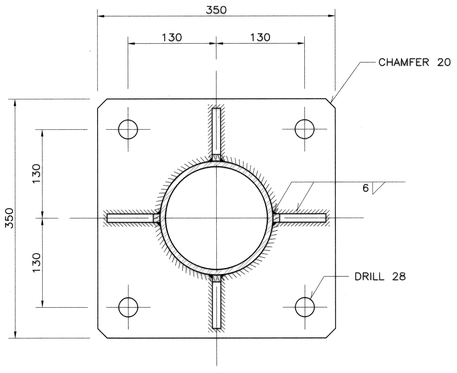
PEDESTAL

NOT TO SCALE



INSTALLATION

NOT TO SCALE



SECTION B–B

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SHOWN.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE

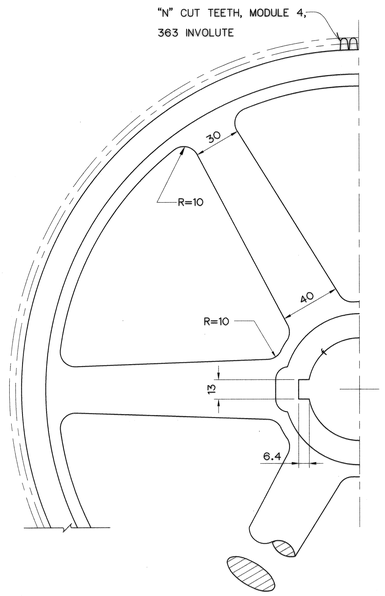
WEIR

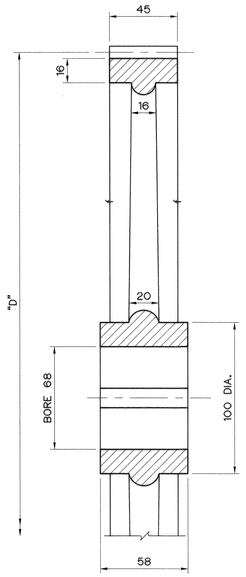
GATE–LIFT PEDESTAL AND HAND WHEEL

P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED		พ.ศ.1950	SUBMITTED
DRAWN			RECOMMENDED
CHECKED		พ.ศ.1950	APPROVED P. Hanpattanakit
PROJECT MANAGER		08/03/2554 DATE	DRAWING NO. MH–WE–10
			SHEET NO. 23 OF 130



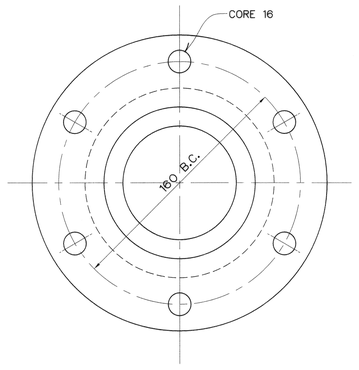


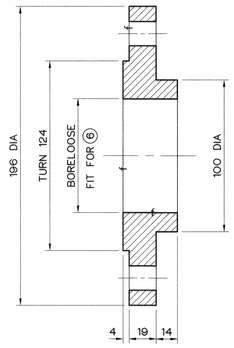
1

SPUR GEAR

CAST IRON

NOT TO SCALE



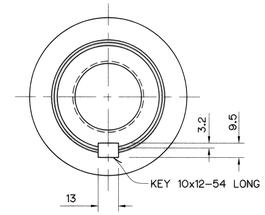


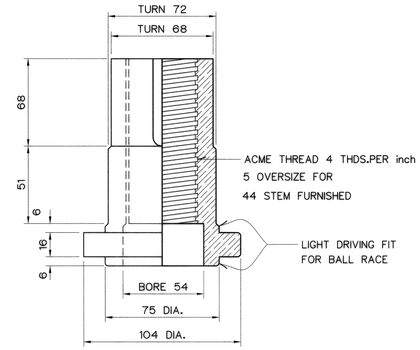
4

COVER PLATE

CAST IRON

NOT TO SCALE



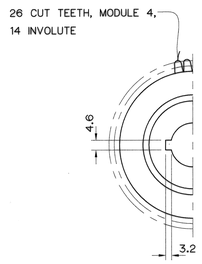


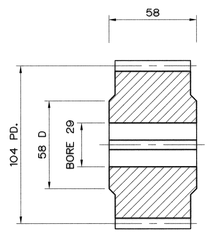
6

LIFTING NUT

BRONZE

NOT TO SCALE



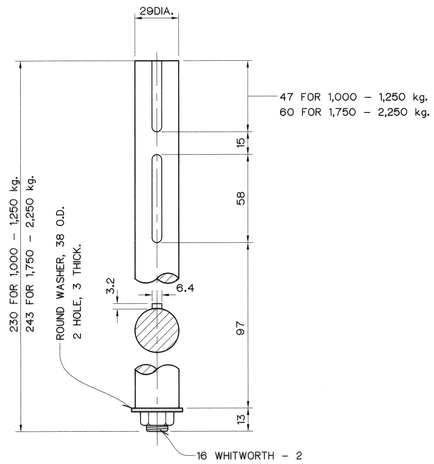


2

PINION

CAST IRON

NOT TO SCALE

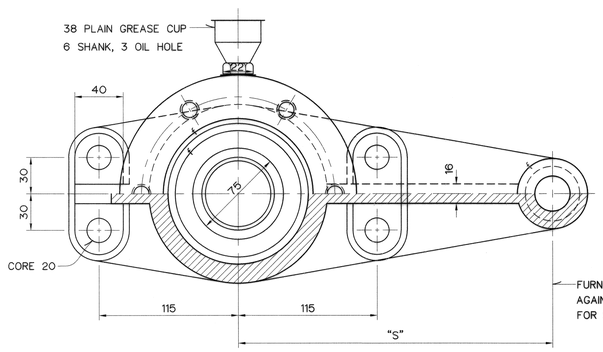


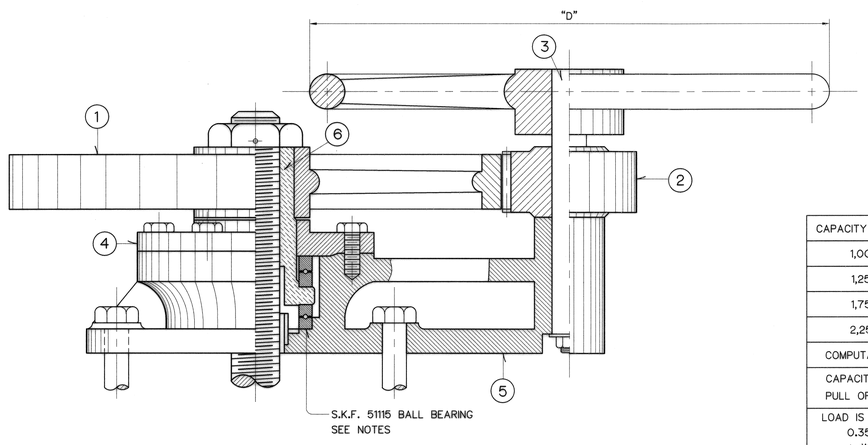
3

PINION SHAFT

MILD STEEL

NOT TO SCALE



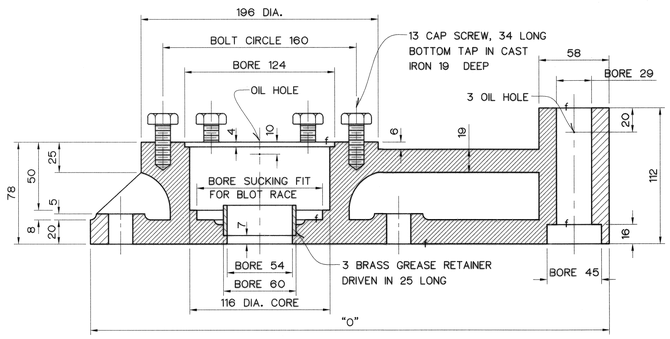


ASSEMBLY

NOT TO SCALE

CAPACITY (Kg.)	"N"	"D"	"S"	"O"	"D1"
1,000	104	416	260	429	300
1,250	104	416	260	429	380
1,750	130	520	312	481	450
2,250	143	572	338	502	530

COMPUTATION NO. SCREW LIFT I
CAPACITY IS BASED ON A HANDWHEEL PULL OF 9 KG. (4.5 KG.PER HAND)
LOAD IS EQUAL TO 0.35xWATER PRESSUREON GATE LEAL + WEIGHT OF GATE AND STEM.



5

BASE

CAST IRON

NOT TO SCALE

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT AS SHOWN
2. SINGLE – THRUST BALL BEARING S.K.F. 51115
   DYNAMIC CAPACITY = 8150 LBS. (3,700 kg.)
   BORE = 75
   OUTSIDE DIAMETER = 100
   HEIGHT = 19

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE

WEIR

VERTICAL SCREW–LIFT CAPACITY 1,750 KG.

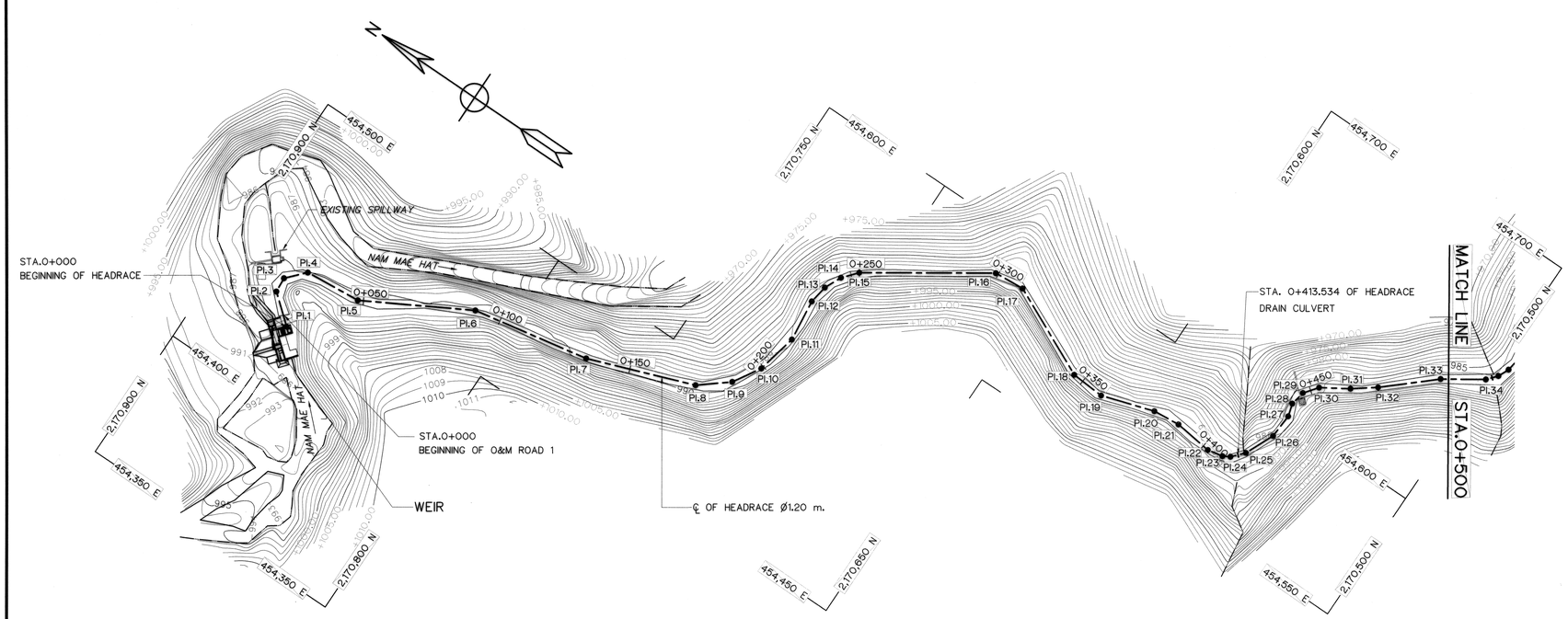
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

DESIGNED	20.1.1950	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	20.1.1950	RECOMMENDED	
PROJECT MANAGER	08/03/2559 DATE	APPROVED	

DRAWING NO. MH–WE–11

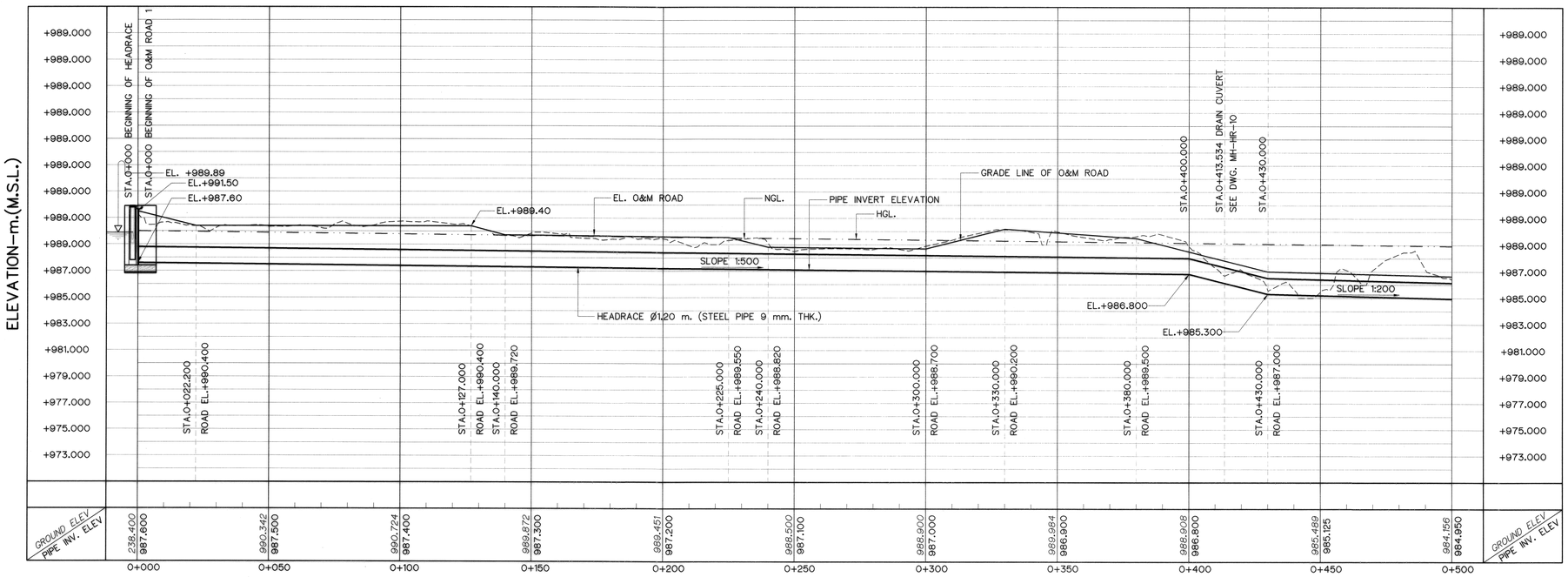
SHEET NO. 24 OF 130



PLAN
SCALE 1:1,000

HORIZONTAL CURVE OF HEADRACE

NO. PI.	COORDINATE OF PI. N	COORDINATE OF PI. E	PI. TO PI. (m)	DEFLECTION ANGLE (△) (° – ' – ")	PI. STA. (km)	BEARING (N/S ° – ' – " E/W)
PI.1	2,170,867.819	454,425.669	–	–	0+000.000	–
PI.2	2,170,877.907	454,433.994	13.080	46°– 31'– 52.45"	0+013.080	N39°– 31'– 50.67"E
PI.3	2,170,878.285	454,439.485	5.504	46°– 31'– 16.39"	0+018.584	N86°–03'– 43.11" E
PI.4	2,170,872.294	454,446.004	8.854	42°–23'–59.62"	0+027.438	S47°–25'–00.50"E
PI.5	2,170,851.801	454,447.803	20.572	24°–07'–25.33"	0+048.010	S05°– 01'– 00.88"E
PI.6	2,170,814.728	454,468.472	42.445	18°– 20'–24.28"	0+090.455	S29°– 08'– 26.21" E
PI.7	2,170,772.085	454,476.607	43.412	09°–40'– 44.25"	0+133.867	S 10°– 48'– 01.93" E
PI.8	2,170,734.171	454,490.767	40.472	18°– 58'– 23.23"	0+174.339	S20°– 28'– 46.18" E
PI.9	2,170,723.948	454,499.18	13.240	18°– 58'– 40.45"	0+187.579	S39°– 27'– 09.41" E
PI.10	2,170,717.952	454,508.938	11.453	18°– 58'– 31.33"	0+199.032	S58°– 25'–49.86"E
PI.11	2,170,714.653	454,523.704	15.130	18°– 58'– 17.92"	0+214.162	S77°–24'– 21.18" E
PI.12	2,170,716.366	454,539.03	15.421	15°– 37'–28.60"	0+229.583	N83°–37'–20.90"E
PI.13	2,170,715.276	454,545.725	6.783	15°– 37'– 31.44"	0+236.366	S80°– 45'– 10.50" E
PI.14	2,170,712.423	454,551.879	6.783	15°– 37'– 31.01"	0+243.149	S65°–07'–39.06"E
PI.15	2,170,708.018	454,557.037	6.783	15°– 37'–46.92"	0+249.932	S49°–30'–08.05"E
PI.16	2,170,667.236	454,584.413	49.118	29°–25'–38.79"	0+299.050	S33°–52'– 21.13" E
PI.17	2,170,656.186	454,585.272	11.083	29°–25'– 21.49"	0+310.133	S04°–26'–42.34"E
PI.18	2,170,623.496	454,570.044	36.063	21°– 20'– 46.15"	0+346.196	S24°– 58'– 39.15" W
PI.19	2,170,611.316	454,569.271	12.205	21°– 20'– 19.48"	0+358.401	S03°–37'–53.00"W
PI.20	2,170,592.314	454,575.338	19.947	12°– 18'– 50.46"	0+378.348	S 17°– 42'–26.48"E
PI.21	2,170,582.474	454,576.267	9.884	12°– 18'– 36.45"	0+388.232	S05°– 23'–36.03"E
PI.22	2,170,568.617	454,574.586	13.959	18°– 19'– 10.00"	0+402.191	S06°–55'–00.42"W
PI.23	2,170,563.034	454,575.712	5.695	18°– 17'– 44.64"	0+407.886	S 11°– 24'–09.58"E
PI.24	2,170,560.511	454,577.151	2.905	18°– 19'– 32.19"	0+410.791	S29°– 41'– 54.21" E
PI.25	2,170,556.701	454,581.386	5.697	18°– 18'– 34.69"	0+416.488	S48°– 01'– 26.41" E
PI.26	2,170,552.072	454,591.948	11.532	19°– 53'–35.36"	0+428.020	S66°–20'– 01.10" E
PI.27	2,170,551.489	454,600.788	8.859	19°– 53'–48.43"	0+436.879	S86°– 13'– 36.46"E
PI.28	2,170,552.826	454,605.413	4.814	26°–44'– 14.37"	0+441.693	N73°– 52'– 35.11" E
PI.29	2,170,551.839	454,610.68	5.359	26°–43'–29.80"	0+447.052	S79°–23'– 10.52" E
PI.30	2,170,548.088	454,615.597	6.184	20°–35'–47.83"	0+453.236	S52°– 39'–40.72"E
PI.31	2,170,538.542	454,621.577	11.264	04°–50'–22.73"	0+464.500	S32°–03'–52.89"E
PI.32	2,170,530.56	454,627.571	9.982	04°–50'– 16.61"	0+474.482	S36°–54'– 15.61" E
PI.33	2,170,513.681	454,642.632	22.622	08°– 01'– 33.31"	0+497.104	S 41°– 44'–32.22" E



PROFILE
VERTICAL SCALE 1:200
HORIZONTAL SCALE 1:1,000

SCALE 1:200 METERS (0 5 10 15)

SCALE 1:1,000 METERS (0 10 20 40 60 80)

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 ALIGNMENT OF THE HEADRACE AND RELATED STRUCTURES SHALL BE CHECK AND CORRECTED BY THE CONTRACTOR TO SUIT THE FIELD CONDITIONS AND SHALL BE SUBMITTED TO DEDE'S FIELD ENGINEER FOR APPROVAL
4. REMOVE ALL EXISTING HEADRACE
5. DEMOLISH ALL EXISTING CONCRETE PAVEMENT
6. ALIGNMENT OF NEW O&M ROAD CONFORM TO EXISTING O&M ROAD

REFERENCE DRAWINGS :

1. HEADRACE PLAN AND PROFILE, STA. 0+500 TO STA. 1+000	MH–HR–02
2. HEADRACE TYPICAL SECTIONS	MH–HR–06
3. DRAIN CULVERT STA. 0+413.534	MH–HR–10

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
PLAN AND PROFILE, STA. 0+000 TO STA. 0+500

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

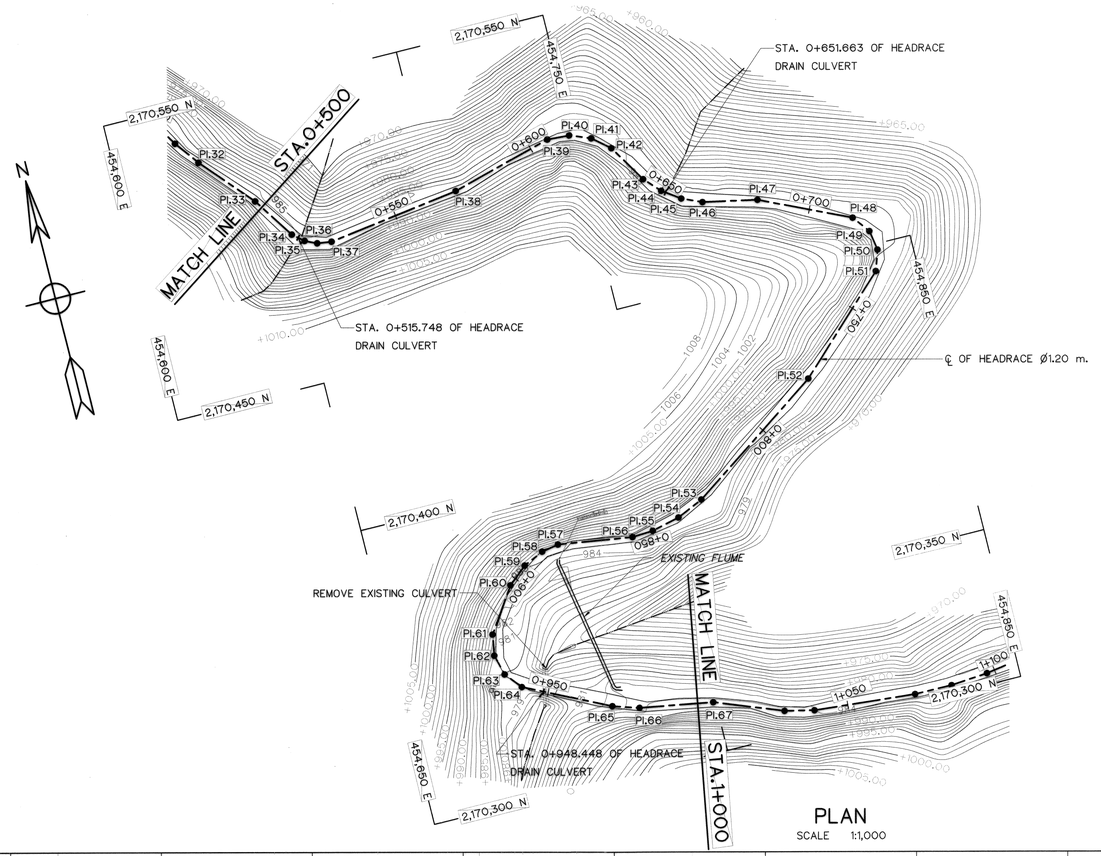
CONSULTANTS: P&C MANAGEMENT CO.,LTD.

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

DESIGNED	วิศ.64624	วิศ.6226	REVIEWED
DRAWN			SUBMITTED
CHECKED		วิศ.6226	RECOMMENDED
PROJECT MANAGER	08/03/2559 DATE		APPROVED

DRAWING NO. MH–HR–01

SHEET NO. 25 OF 130



PLAN

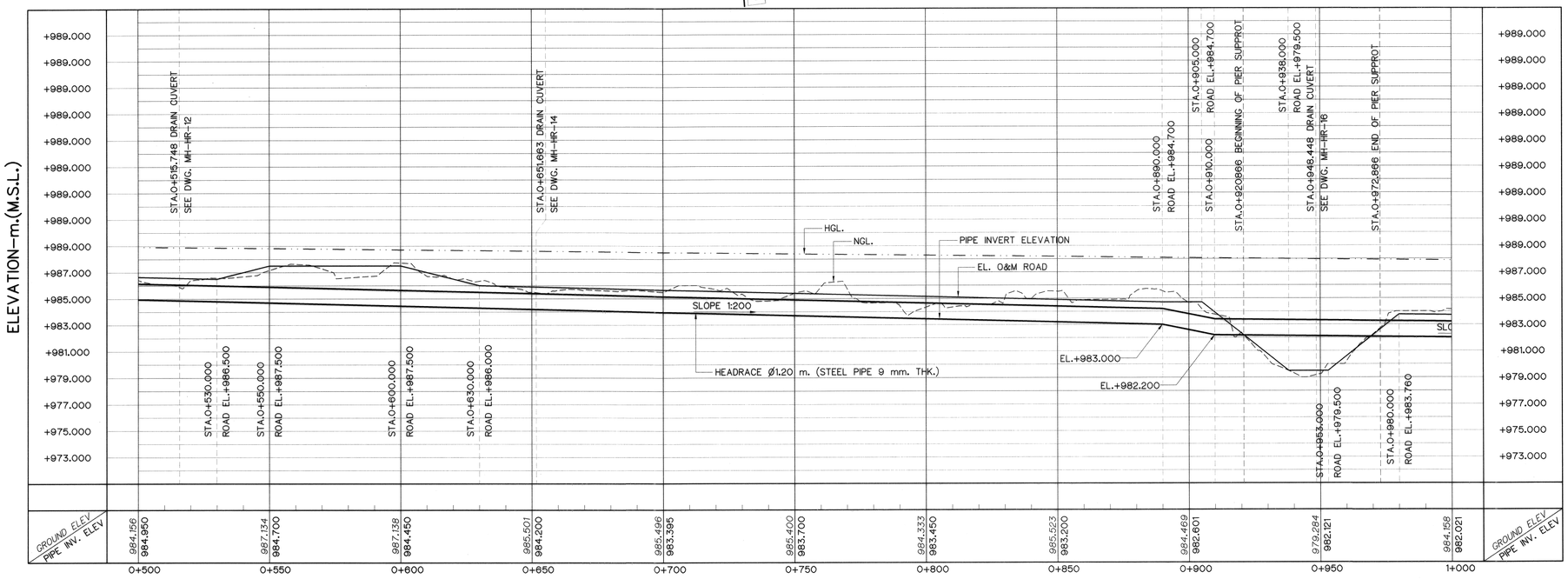
SCALE 1:1,000

HORIZONTAL CURVE OF HEADRACE

NO. PI.	COORDINATE OF PI. N	COORDINATE OF PI. E	PI. TO PI. (m)	DEFLECTION ANGLE (△) (° – ' – ")	PI. STA. (km)	BEARING (N/S ° – ' – " E/W)
PI.34	2,170,500.109	454,651.689	16.317	16°– 02'– 40.12"	0+513.421	S 33°– 42'– 58.91" E
PI.35	2,170,497.005	454,655.357	4.805	16°– 04'– 33.25"	0+518.226	S 49°– 45'– 39.03"E
PI.36	2,170,495.297	454,659.164	4.173	16°– 01'– 35.07"	0+522.399	S 65°– 50'– 12.28" E
PI.37	2,170,494.617	454,663.92	4.804	16°– 03'– 49.30"	0+527.203	S 81°– 51'– 47.35"E
PI.38	2,170,500.736	454,707.866	44.370	07°– 11'– 54.12"	0+571.573	N 82°– 04'–23.36"E
PI.39	2,170,509.8	454,741.4	34.737	18°– 22'– 45.40"	0+606.310	N 74°– 52'–29.24"E
PI.40	2,170,509.382	454,748.752	7.364	18°– 22'– 52.27"	0+613.674	S 86°– 44'–45.37"E
PI.41	2,170,506.667	454,755.597	7.364	18°– 23'– 04.28"	0+621.038	S 68°– 21'– 53.09"E
PI.42	2,170,501.932	454,761.236	7.363	18°– 22'– 46.67"	0+628.401	S 49°– 58'– 48.82"E
PI.43	2,170,489.434	454,768.925	14.674	11°– 38'– 35.97"	0+643.075	S 31°– 36'– 02.14"E
PI.44	2,170,484.257	454,773.794	7.107	11°– 38'– 21.21"	0+650.182	S 43°– 14'– 38.11" E
PI.45	2,170,480.169	454,779.607	7.107	11°– 38'– 34.94"	0+657.289	S 54°– 52'– 59.32"E
PI.46	2,170,477.338	454,786.126	7.107	11°– 38'– 30.64"	0+664.396	S 66°– 31'– 34.27"E
PI.47	2,170,473.613	454,803.907	18.167	12°– 52'– 11.55"	0+682.563	S 78°– 10'– 04.91"E
PI.48	2,170,60.22	454,833.023	32.049	27°– 54 08.10"	0+714.612	S 65°– 17'– 53.36"E
PI.49	2,170,454.595	454,837.323	7.080	27°–53'– 48.38"	0+721.692	S 37°– 23'– 45.25"E
PI.50	2,170,448.033	454,838.421	6.653	27°–54'– 02.92"	0+728.345	S 09°– 29'–56.88"E
PI.51	2,170,441.315	454,836.186	7.080	27°–53'– 58.13"	0+735.425	S 18°– 24'–06.05"W
PI.52	2,170,412.358	454,805.883	41.914	09°–30'– 38.88"	0+777.339	S 46°– 18'– 04.18"W
PI.53	2,170,382.448	454,761.852	53.229	10°– 29'– 43.01"	0+830.568	S 55°– 48'–43.06"W
PI.54	2,170,378.6	454,753.083	9.576	10°– 30'–04.45"	0+840.144	S 66°– 18'– 26.07"W
PI.55	2,170,376.415	454,743.761	9.575	10°– 29'– 26.93"	0+849.719	S 76°– 48'–30.52"W
PI.56	2,170,376.084	454,736.744	7.025	11°– 02'– 19.47"	0+856.744	S 87°– 17'–57.46"W
PI.57	2,170,379.678	454,712.222	24.784	19°– 09'–59.05"	0+881.528	N 81°– 39'–43.07"W
PI.58	2,170,378.604	454,706.607	5.717	13°– 12'– 52.75"	0+887.245	S 79°– 10'– 17.88"W
PI.59	2,170,375.602	454,699.878	7.368	15°– 54'– 52.30"	0+894.613	S 65°– 57'– 25.12"W
PI.60	2,170,370.425	454,693.699	8.061	15°– 55'– 19.41"	0+902.674	S 50°– 02'–32.82"W
PI.61	2,170,356.087	454,683.984	17.319	24°– 33 03.60"	0+919.993	S 34°– 07'– 13.41"W
PI.62	2,170,349.147	454,682.814	7.038	24°–32'– 43.36"	0+927.031	S 09°– 34'– 09.81"W
PI.63	2,170,342.347	454,684.633	7.039	24°–33'– 53.48"	0+934.070	S 14°– 58'–33.54"E
PI.64	2,170,336.919	454,689.114	7.039	24°–32'– 46.68"	0+941.109	S 39°– 32'–27.03"E
PI.65	2,170,323.544	454,716.643	30.606	08°–04'– 02.82"	0+971.715	S 64°– 05'– 13.71" E
PI.66	2,170,320.775	454,725.244	9.036	08°–03'– 34.47"	0+980.751	S 72°– 09'– 16.53" E

TABLE OF PIER DIMENSIONS

PIER NO.	STA.	N.G.L.	FOOTING ELEV.	PIPE INVERT ELEV.	NOTE
1	0+920.866	+982.176	+980.176	+982.176	
2	0+927.866	+980.848	+978.848	+982.165	
3	0+934.866	+979.762	+977.762	+982.151	
4	0+942.366	+979.000	+977.000	+982.136	
5	0+946.366	+979.078	+977.078	+982.128	
6	0+953.366	+978.000	+976.000	+982.114	
7	0+960.366	+978.326	+976.326	+982.100	
8	0+967.366	+982.000	+980.000	+982.086	
9	0+972.866	+982.718	+980.718	+982.075	



PROFILE

VERTICAL SCALE 1:200

HORIZONTAL SCALE 1:1,000

0 5 10 15

SCALE 1:200 METERS

0 10 20 40 60 80

SCALE 1:1,000 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS. UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH–GN–03
3. THE ALIGNMENT OF THE HEADRACE AND RELATED STRUCTURES SHALL BE CHECK AND CORRECTED BY THE CONTRACTOR TO SUIT THE FIELD CONDITIONS AND SHALL BE SUBMITTED TO DEDE'S FIELD ENGINEER FOR APPROVAL
4. REMOVE ALL EXISTING HEADRACE
5. DEMOLISH ALL EXISTING CONCRETE PAVEMENT
6. ALIGNMENT OF NEW O&M ROAD CONFORM TO EXISTING O&M ROAD

REFERENCE DRAWINGS :

1. HEADRACE PLAN AND PROFILE, STA. 0+000 TO STA. 0+500	MH–HR–01
2. HEADRACE PLAN AND PROFILE, STA. 1+000 TO STA. 1+500	MH–HR–03
3. HEADRACE TYPICAL SECTIONS	MH–HR–06
4. HEADRACE CONCRETE PIER	MH–HR–07
5. DRAIN CULVERT STA. 0+515.748 PLAN AND SECTION	MH–HR–12
6. DRAIN CULVERT STA. 0+651.663 PLAN AND SECTION	MH–HR–14
7. DRAIN CULVERT STA. 0+948.448 PLAN AND SECTION	MH–HR–16

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS DEDE

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE

HEADRACE

PLAN AND PROFILE, STA. 0+500 TO STA. 1+000

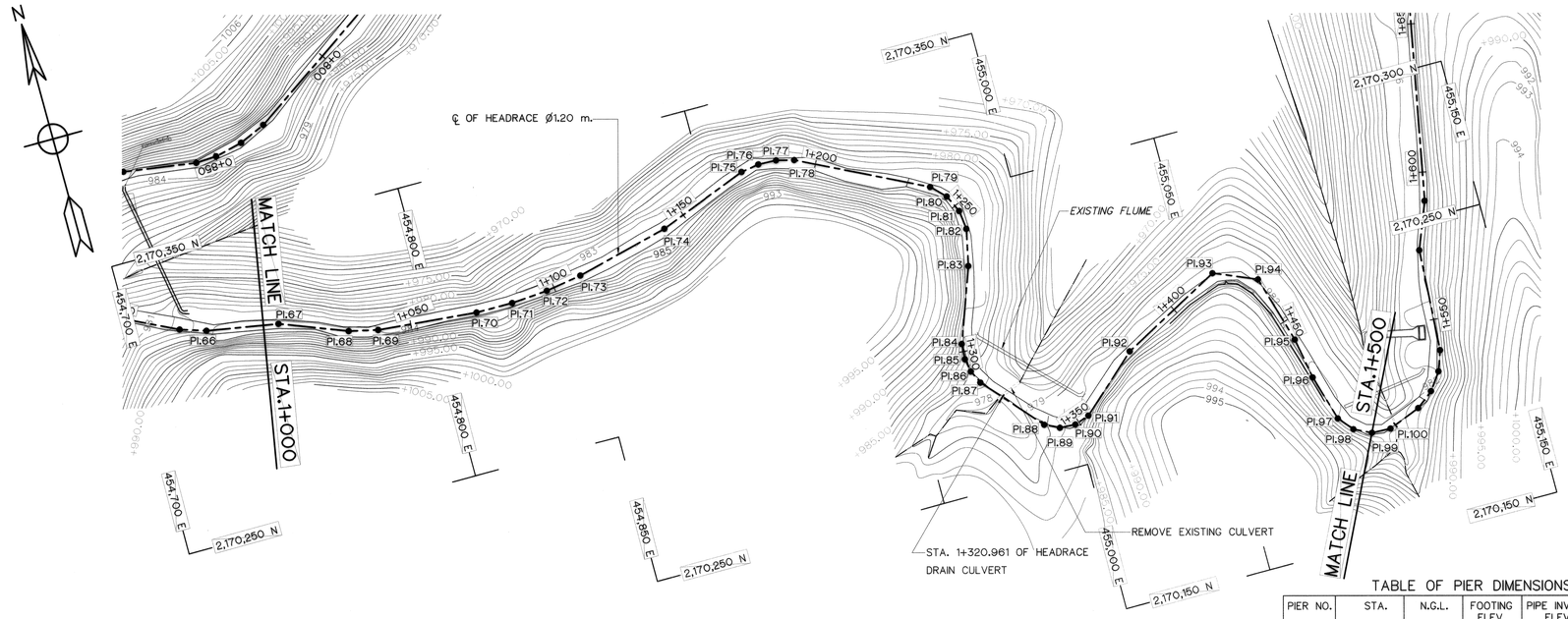
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วิชัย.64624	REVIEWED	
DRAWN		SUBMITTED	วิชัย.6226
CHECKED	วิชัย.6226	RECOMMENDED	
PROJECT MANAGER	08/03/2564 DATE	APPROVED	P. Homsuk

DRAWING NO. MH–HR–02

SHEET NO. 26 OF 130



PLAN

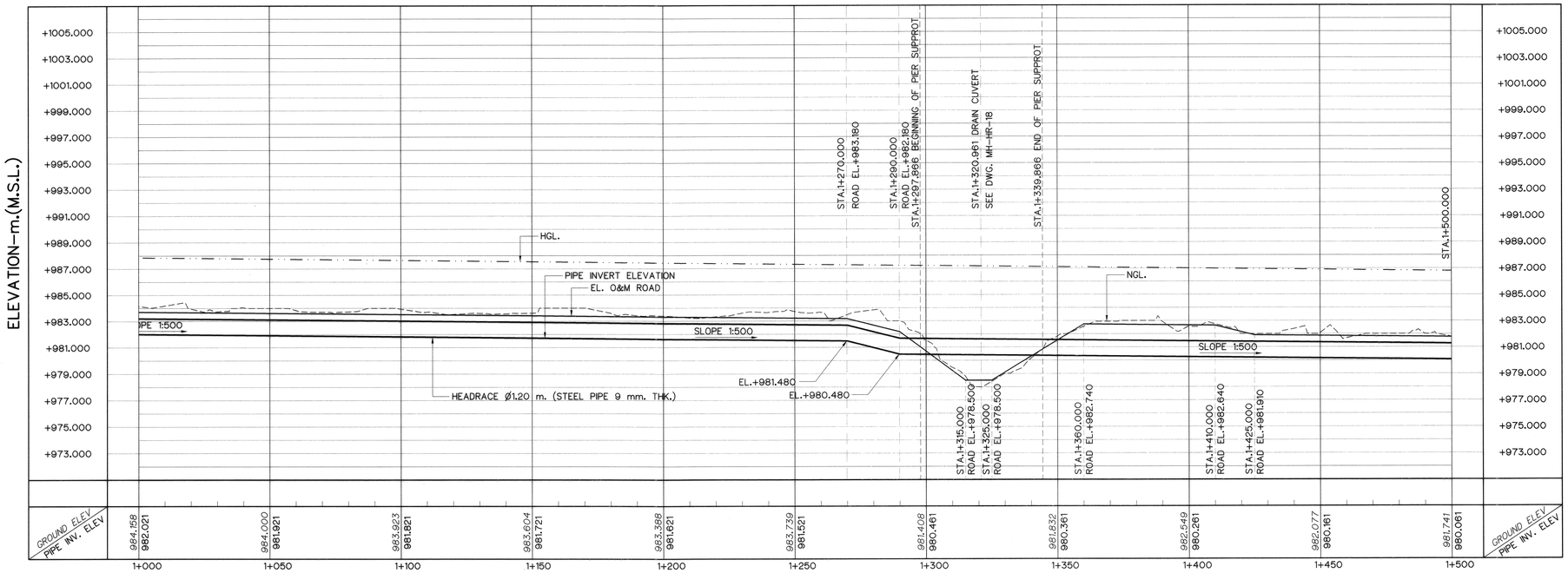
SCALE 1:1,000

HORIZONTAL CURVE OF HEADRACE

NO. PI.	COORDINATE OF PI. N	COORDINATE OF PI. E	PI. TO PI. (m)	DEFLECTION ANGLE (△) (° – ' – ")	PI. STA. (km)	BEARING (N/S ° – ' – " E/W)
PI.67	2,170,316.623	454,749.317	24.428	11°– 14'– 32.42"	1+005.179	S 80°– 12'– 51.00" E
PI.68	2,170,308.086	454,771.524	23.791	07°– 59'– 45.65"	1+028.970	S 68°– 58'– 18.57" E
PI.69	2,170,305.842	454,781.219	9.951	07°– 59'– 28.88"	1+038.921	S 76°– 58'– 04.22"E
PI.70	2,170,302.884	454,814.754	33.665	04°– 43'– 35.23"	1+072.586	S 84°– 57'– 33.10" E
PI.71	2,170,302.816	454,827.148	12.394	04°– 43'– 45.73"	1+084.980	S 89°– 41'– 08.33"E
PI.72	2,170,303.77	454,839.504	12.393	04°– 43'– 35.66"	1+097.373	N 85°– 35'–05.94"E
PI.73	2,170,305.739	454,851.74	12.393	04°– 43'– 37.41"	1+109.766	N 80°– 51'– 30.28"E
PI.74	2,170,313.49	454,883.134	32.337	07°– 25'– 28.92"	1+142.103	N 76°– 07'–52.88"E
PI.75	2,170,325.209	454,913.202	32.271	11°– 54'– 27.63"	1+174.374	N 68°– 42'–23.96"E
PI.76	2,170,326.211	454,919.264	6.144	11°– 54'– 50.82"	1+180.518	N 80°– 36'– 51.59" E
PI.77	2,170,325.94	454,925.401	6.143	11°– 54'– 04.89"	1+186.661	S 87°– 28'– 17.59" E
PI.78	2,170,324.409	454,931.351	6.144	11°– 54'– 21.35"	1+192.805	S 75°– 34'– 12.70" E
PI.79	2,170,303.738	454,973.11	46.595	18°– 56'– 28.89"	1+239.400	S 63°– 39'– 51.35" E
PI.80	2,170,299.167	454,977.637	6.433	18°– 56'– 19.11"	1+245.833	S 44°– 43'–22.46"E
PI.81	2,170,293.375	454,980.435	6.432	18°– 55'– 39.70"	1+252.265	S 25°– 47'–03.35"E
PI.82	2,170,286.988	454,981.203	6.433	18°– 56'– 23.13"	1+258.698	S 06°– 51'– 23.65"E
PI.83	2,170,274.81	454,978.596	12.454	07°– 47'– 01.82"	1+271.152	S 12°– 04'–59.48"W
PI.84	2,170,250.141	454,969.682	26.230	15°– 19'– 10.24"	1+297.382	S 19°– 52'–01.30"W
PI.85	2,170,245.225	454,969.291	4.932	15°– 17'– 57.14"	1+302.314	S 04°– 32'–51.06"W
PI.86	2,170,240.38	454,970.211	4.932	15°– 18'– 52.43"	1+307.246	S 10°– 45'–06.08"E
PI.87	2,170,235.95	454,972.378	4.932	15°– 18'– 40.28"	1+312.178	S 26°– 03'– 58.51" E
PI.88	2,170,216.627	454,989.4	25.751	22°– 41'– 47.22"	1+337.929	S 41°– 22'–38.79"E
PI.89	2,170,214.295	454,994.197	5.334	22°– 41'– 27.10"	1+343.263	S 64°– 04'–26.01" E
PI.90	2,170,213.994	454,999.522	5.334	22°– 41'– 09.63"	1+348.597	S 86°– 45'– 53.11" E
PI.91	2,170,215.77	455,004.551	5.333	22°– 42'– 04.18"	1+353.930	N 70°– 32'–57.26"E
PI.92	2,170,233.018	455,023.605	25.701	13°– 53'– 54.04"	1+379.631	N 47°– 50'–53.08"E
PI.93	2,170,251.123	455,057.295	38.247	50°– 58'– 33.96"	1+417.878	N 61°– 44'–47.13" E
PI.94	2,170,245.153	455,071.551	15.456	50°– 58'– 09.21"	1+433.334	S 67°– 16'– 38.91" E
PI.95	2,170,222.4	455,078.208	23.707	05°– 56'– 49.32"	1+457.041	S 16°– 18'– 29.71" E
PI.96	2,170,208.628	455,080.726	14.000	05°– 56'–54.90"	1+471.041	S 10°– 21'– 40.38"E
PI.97	2,170,193.061	455,085.281	16.220	23°– 48'– 09.62"	1+487.261	S 16°– 18'– 35.28"E
PI.98	2,170,188.18	455,089.393	6.382	23°– 48'– 58.64"	1+493.643	S 40°– 06'–44.90"E
PI.99	2,170,185.375	455,095.126	6.382	23°– 48'– 31.00"	1+500.025	S 63°– 55'–43.54"E

TABLE OF PIER DIMENSIONS

PIER NO.	STA.	N.G.L.	FOOTING ELEV.	PIPE INVERT ELEV.	NOTE
10	1+297.866	+981.496	+979.496	+980.456	
11	1+303.866	+981.000	+980.000	+980.454	
12	1+305.866	+979.677	+977.677	+980.454	
13	1+310.866	+979.115	+977.115	+980.434	
14	1+314.866	+978.000	+976.000	+980.426	
15	1+321.866	+978.332	+976.332	+980.412	
16	1+328.866	+979.000	+977.000	+980.398	
17	1+334.366	+980.000	+978.000	+980.383	
18	1+339.866	+980.908	+978.908	+980.372	



PROFILE

VERTICAL SCALE 1:200

HORIZONTAL SCALE 1:1,000

0 5 10 15

SCALE 1:200 METERS

0 10 20 40 60 80

SCALE 1:1,000 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS. UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH–GN–03
3. THE ALIGNMENT OF THE HEADRACE AND RELATED STRUCTURES SHALL BE CHECK AND CORRECTED BY THE CONTRACTOR TO SUIT THE FIELD CONDITIONS AND SHALL BE SUBMITTED TO DEDE'S FIELD ENGINEER FOR APPROVAL
4. REMOVE ALL EXISTING HEADRACE
5. DEMOLISH ALL EXISTING CONCRETE PAVEMENT
6. ALIGNMENT OF NEW O&M ROAD CONFORM TO EXISTING O&M ROAD

REFERENCE DRAWINGS :

1. HEADRACE PLAN AND PROFILE, STA. 0+500 TO STA. 1+000	MH–HR–02
2. HEADRACE PLAN AND PROFILE, STA. 1+500 TO STA. 2+000	MH–HR–04
3. HEADRACE TYPICAL SECTIONS	MH–HR–06
4. HEADRACE CONCRETE PIER	MH–HR–07
5. DRAIN CULVERT STA. 1+320.961 PLAN AND SECTION	MH–HR–18

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
PLAN AND PROFILE, STA. 1+000 TO STA. 1+500

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

P&C MANAGEMENT CO.,LTD.

DESIGNED วิ.64624 สิ.6226

DRAWN

CHECKED สิ.6226

PROJECT MANAGER 08/03/2559 DATE

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

REVIEWED

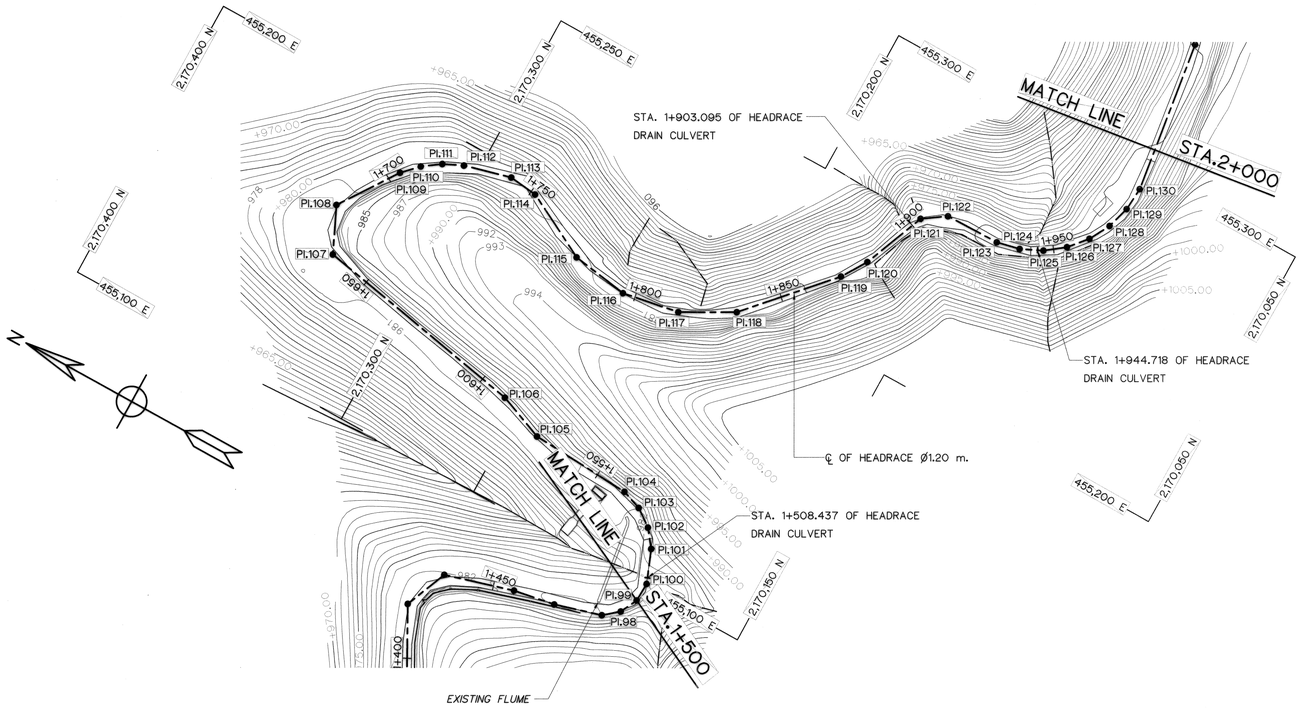
SUBMITTED

RECOMMENDED

APPROVED

DRAWING NO. MH–HR–03

SHEET NO. 27 OF 130

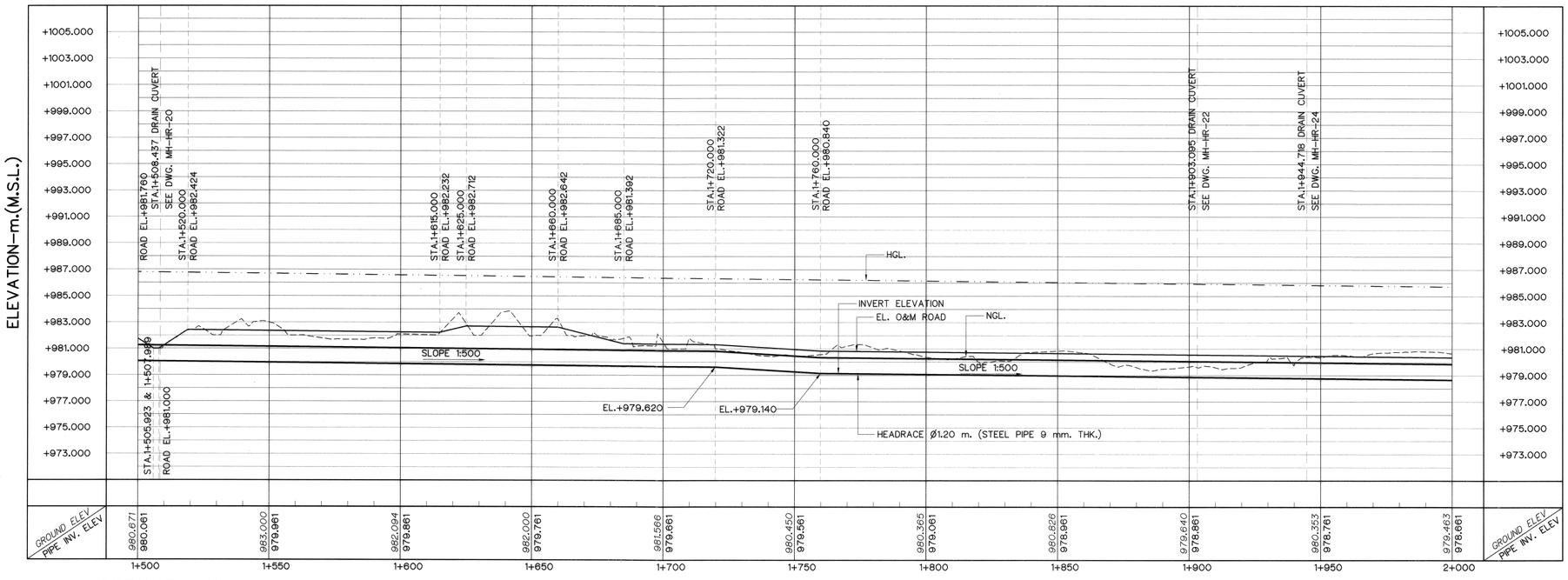


PLAN

SCALE 1:1,000

HORIZONTAL CURVE OF HEADRACE

NO. PI.	COORDINATE OF PI. N	COORDINATE OF PI. E	PI. TO PI. (m)	DEFLECTION ANGLE (△) (° – ' – ")	PI. STA. (km)	BEARING (N/S ° – ' – " E/W)
PI.99	2,170,185.375	455,095.126	6.382	23°– 48'– 31.00"	1+500.025	S 63°– 55'– 43.54"E
PI.100	2,170,185.123	455,101.504	6.383	23°– 49'– 08.09"	1+506.408	S 87°– 44'– 14.55" E
PI.101	2,170,189.397	455,112.323	11.633	16°– 18'– 11.51"	1+518.041	N 68°– 26'–37.36"E
PI.102	2,170,193.775	455,117.955	7.133	16°– 18'– 48.07"	1+525.174	N 52°– 08'–25.85" E
PI.103	2,170,199.558	455,122.13	7.133	16°– 17'– 59.23"	1+532.307	N 35°– 49'–37.78"E
PI.104	2,170,206.28	455,124.514	7.132	16°– 18'– 52.54"	1+539.439	N 19°– 31'– 38.55"E
PI.105	2,170,240.467	455,126.433	34.241	18°– 00'– 29.41"	1+573.680	N 03°– 12'– 46.01" E
PI.106	2,170,255.999	455,132.464	16.662	10°– 36'– 15.96"	1+590.342	N 21°– 13'– 15.42" E
PI.107	2,170,328.709	455,146.093	73.976	54°– 38'– 09.48"	1+664.318	N 10°– 36'–59.45"E
PI.108	2,170,335.562	455,160.96	16.370	58°– 51'– 33.34"	1+680.688	N 65°– 15'–08.94"E
PI.109	2,170,322.353	455,180.461	23.553	10°– 15'– 27.60"	1+704.241	S 55°– 53'– 17.72" E
PI.110	2,170,317.321	455,185.605	7.196	10°– 15'– 34.34"	1+711.437	S 45°– 37'– 50.12" E
PI.111	2,170,311.454	455,189.77	7.195	10°– 15'– 32.11"	1+718.632	S 35°– 22'– 15.78" E
PI.112	2,170,304.938	455,192.824	7.196	10°– 15'– 29.55"	1+725.828	S 25°– 06'–43.67"E
PI.113	2,170,289.332	455,196.963	16.146	21°– 08'– 06.42"	1+741.974	S 14°– 51'– 14.13" E
PI.114	2,170,279.738	455,195.907	9.652	21°– 08'– 00.36"	1+751.626	S 06°– 16'– 52.29"W
PI.115	2,170,257.676	455,184.464	24.853	18°– 48'– 38.80"	1+776.479	S 27°– 24'–52.65"W
PI.116	2,170,238.549	455,181.57	19.345	18°– 48'– 17.45"	1+795.824	S 08°– 36'– 13.84" W
PI.117	2,170,219.51	455,184.996	19.345	18°– 48'– 26.24"	1+815.169	S 10°– 12'–03.60"E
PI.118	2,170,202.592	455,194.377	19.345	18°– 48'– 34.04"	1+834.514	S 29°– 00'–29.84"E
PI.119	2,170,178.136	455,221.365	36.420	10°– 03'– 24.90"	1+870.934	S 47°– 49'–03.87"E
PI.120	2,170,172.859	455,229.769	9.923	10°– 03'– 38.63"	1+880.857	S 57°– 52'– 28.78"E
PI.121	2,170,164.34	455,250.786	22.678	33°– 30'– 53.33"	1+903.535	S 67°– 56'– 07.41" E
PI.122	2,170,156.839	455,255.926	9.093	33°– 31'– 01.46"	1+912.628	S 34°– 25'– 14.08" E
PI.123	2,170,138.577	455,256.214	18.264	12°– 08'– 14.59"	1+930.892	S 00°– 54'– 12.62" E
PI.124	2,170,130.892	455,257.994	7.888	12°– 08'– 02.21"	1+938.780	S 13°– 02'– 27.21" E
PI.125	2,170,123.752	455,261.35	7.889	12°– 07'– 45.78"	1+946.669	S 25°– 10'– 29.42" E
PI.126	2,170,117.477	455,266.131	7.889	12°– 08'– 16.13"	1+954.558	S 37°– 18'– 15.20" E
PI.127	2,170,112.348	455,272.124	7.888	12°– 08'– 05.01"	1+962.446	S 49°– 26'– 31.33" E
PI.128	2,170,108.593	455,279.062	7.889	12°– 07'– 53.97"	1+970.335	S 61°– 34'–36.34"E
PI.129	2,170,106.38	455,286.634	7.889	12°– 08'– 26.75"	1+978.224	S 73°– 42'– 30.31" E
PI.130	2,170,105.809	455,294.502	7.889	12°– 07'– 46.00"	1+986.113	S 85°– 50'–57.06"E



PROFILE

VERTICAL SCALE 1:200

HORIZONTAL SCALE 1:1,000

0 5 10 15
SCALE 1:200 METERS

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

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS. UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH-GN-03
3. THE ALIGNMENT OF THE HEADRACE AND RELATED STRUCTURES SHALL BE CHECK AND CORRECTED BY THE CONTRACTOR TO SUIT THE FIELD CONDITIONS AND SHALL BE SUBMITTED TO DEDE'S FIELD ENGINEER FOR APPROVAL
4. REMOVE ALL EXISTING HEADRACE
5. DEMOLISH ALL EXISTING CONCRETE PAVEMENT
6. ALIGNMENT OF NEW O&M ROAD CONFORM TO EXISTING O&M ROAD

REFERENCE DRAWINGS :

1. HEADRACE PLAN AND PROFILE, STA. 1+000 TO STA. 1+500	MH-HR-03
2. HEADRACE PLAN AND PROFILE, STA. 2+500 TO STA.2+097.998	MH-HR-03
3. HEADRACE TYPICAL SECTIONS	MH-HR-05
4. HEADRACE CONCRETE PIER	MH-HR-06
5. DRAIN CULVERT STA. 1+508.437 PLAN AND SECTION	MH-HR-20
6. DRAIN CULVERT STA. 1+903.095 PLAN AND SECTION	MH-HR-22
7. DRAIN CULVERT STA. 1+944.718 PLAN AND SECTION	MH-HR-24

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

MAE HAT HYDROPOWER PROJECT

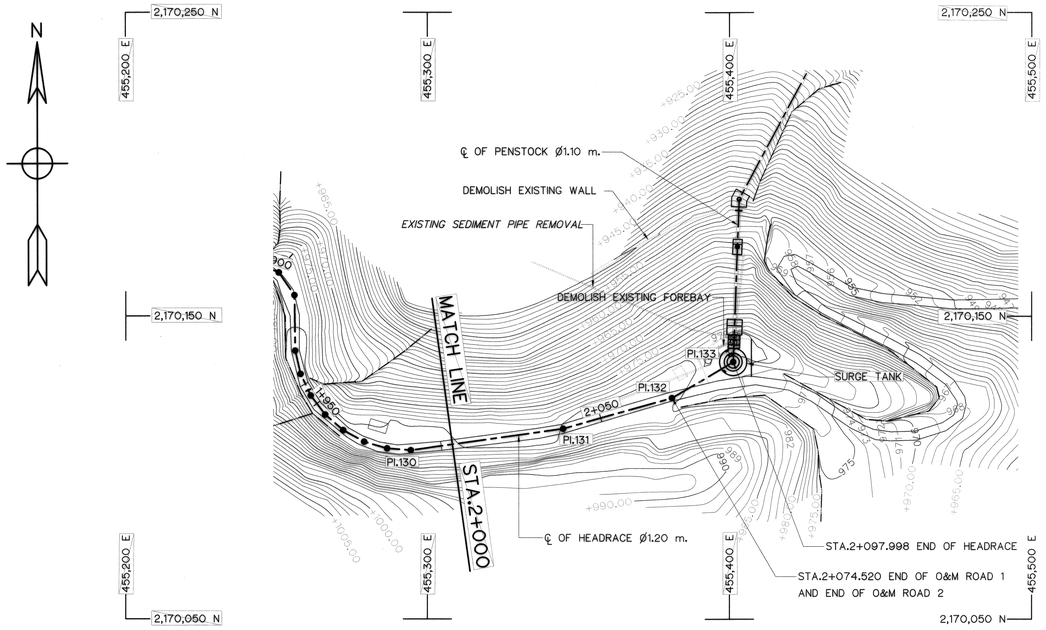
CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
PLAN AND PROFILE, STA. 1+500 TO STA. 2+000

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

CONSULTANTS: P&C MANAGEMENT CO.,LTD.

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

REVIEWED			
DESIGNED	วิชัย 64624	สมชัย 6226	SUBMITTED
DRAWN			RECOMMENDED
CHECKED	สมชัย 6226		APPROVED
PROJECT MANAGER	08/03/2559 DATE		DRAWING NO. MH-HR-04
			SHEET NO. 28 OF 130

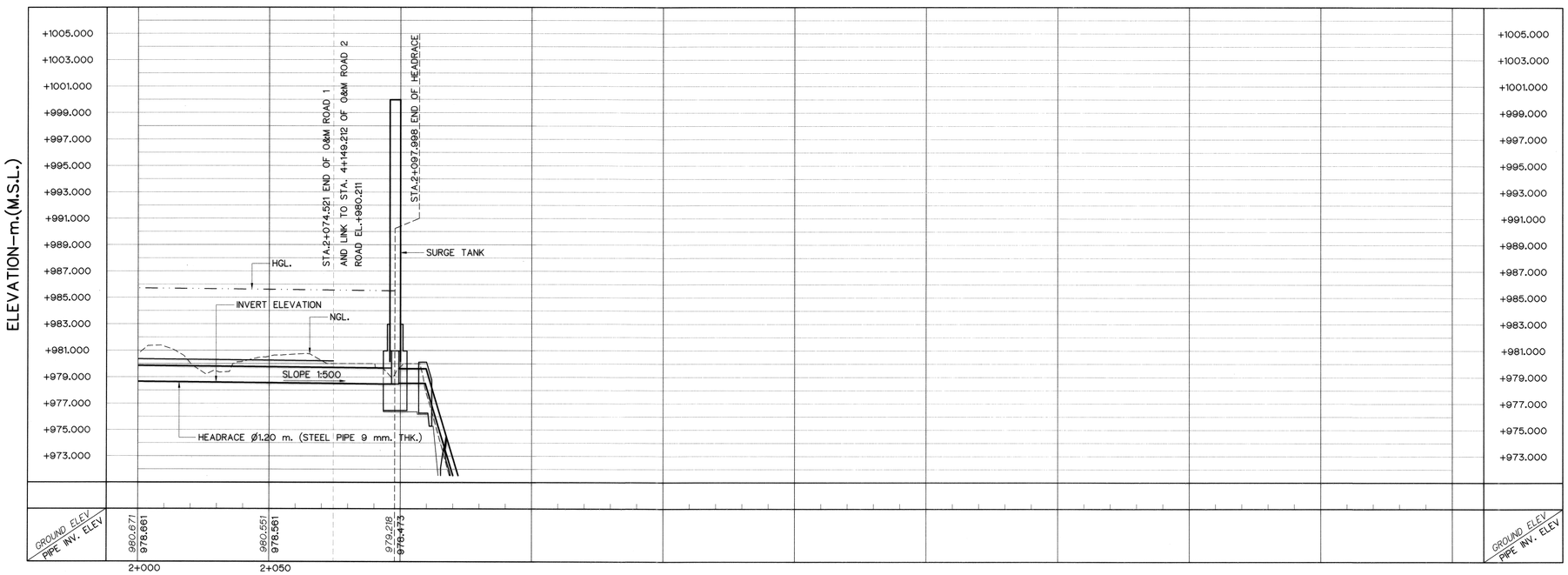


PLAN

SCALE 1:1,000

HORIZONTAL CURVE OF HEADRACE

NO. PI.	COORDINATE OF PI.		PI. TO PI.	DEFLECTION ANGLE (△)	PI. STA.	BEARING
	N	E	(m)	(° – ' – ")	(km)	(N/S ° – ' – " E/W)
PI.131	2,170,112.885	455,344.987	50.978	07°– 44'– 34.96"	2+037.091	N 82°– 01'– 16.95" E
PI.132	2,170,123.027	455,381.016	37.429	14°– 48'– 01.96"	2+074.520	N 74°– 16'– 41.99" E
END	2,170,134.951	455,401.241	23.478		2+097.998	



PROFILE

VERTICAL SCALE 1:200

HORIZONTAL SCALE 1:1,000

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS. UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH–GN–03
3. THE ALIGNMENT OF THE HEADRACE AND RELATED STRUCTURES SHALL BE CHECK AND CORRECTED BY THE CONTRACTOR TO SUIT THE FIELD CONDITIONS AND SHALL BE SUBMITTED TO DEDE'S FIELD ENGINEER FOR APPROVAL
4. REMOVE ALL EXISTING HEADRACE
5. DEMOLISH ALL EXISTING CONCRETE PAVEMENT
6. ALIGNMENT OF NEW O&M ROAD CONFORM TO EXISTING O&M ROAD

REFERENCE DRAWINGS :

1. HEADRACE PLAN AND PROFILE, STA. 2+000 TO STA. 2+500 MH–HR–04
2. HEADRACE TYPICAL SECTIONS MH–HR–06
3. HEADRACE CONCRETE PIER MH–HR–07

0 5 10 15

SCALE 1:200 METERS

0 10 20 40 60 80

SCALE 1:1,000 METERS

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
PLAN AND PROFILE, STA. 2+000 TO STA. 2+097.998

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

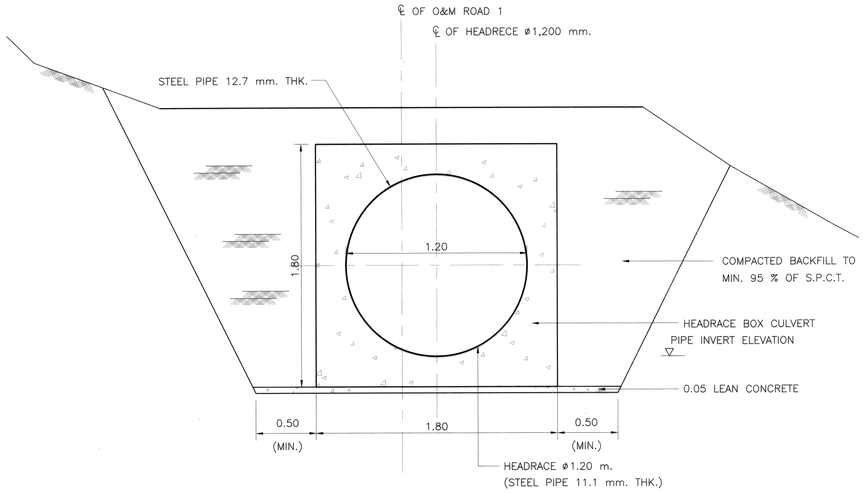
CONSULTANTS | DEDE

P&C MANAGEMENT CO.,LTD.

DESIGNED วิ.64624 สิ.6226
DRAWN
CHECKED สิ.6226
PROJECT MANAGER 08/03/2564 DATE

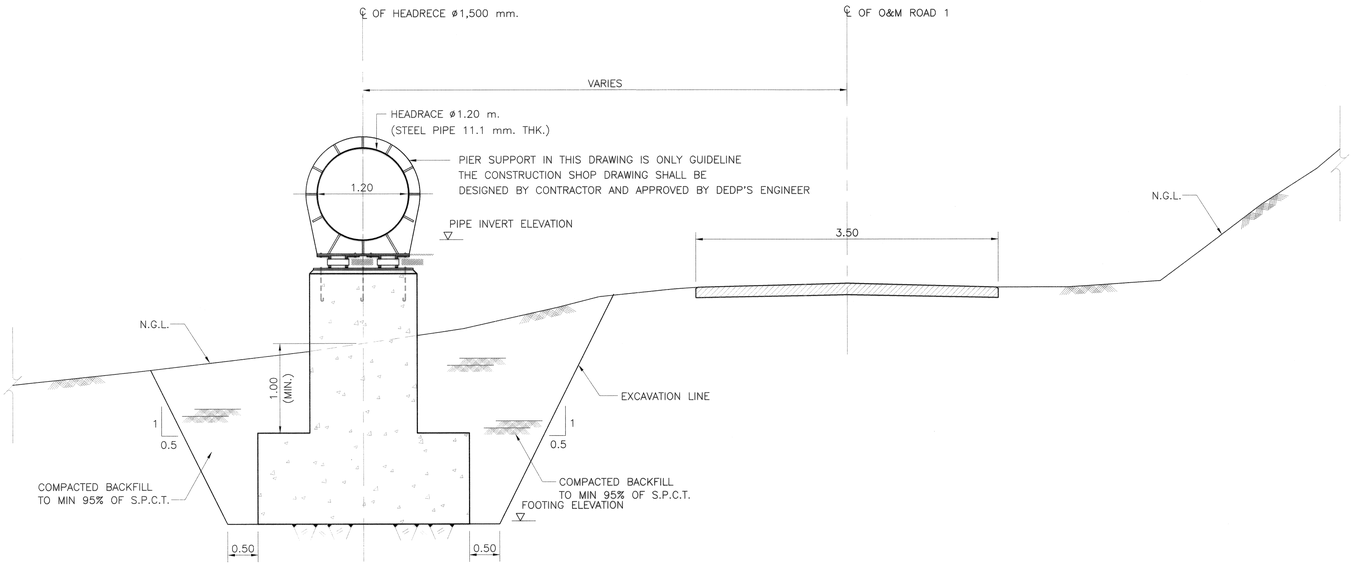
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

DRAWING NO. MH–HR–05
SHEET NO. 29 OF 130



EARTH EXCAVATION

NOT TO SCALE

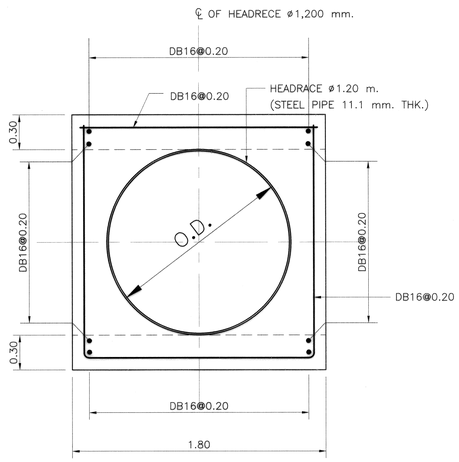


CONCRETE PIER

SCALE 1:50

TYPICAL SECTIONS OF HEADRACE

SCALE 1:50



HEADRACE BOX CULVERT REINFORCEMENT DETAIL

NOT TO SCALE

TABLE OF HEADRACE SUPPORT

STA TO STA	TYPE OF HEADRACE SUPPORT
0+000 – 0+921	EARTH EXCAVATION
0+921 – 0+973	PIER
0+973 – 1+298	EARTH EXCAVATION
1+298 – 1+344.5	PIER
1+344.5 – 2+097.998	EARTH EXCAVATION

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. CONCRETE DESIGN BASED ON THE COMPRESSIVE STRENGTH OF 210 KSC, STANDARD CYLINDER Ø0.15x0.30 m. TEST AT AGE 28 DAYS. UNLESS OTHERWISE INDICATED IN SPECIFIC DRAWINGS.
4. ULTIMATE TENSILE STRESSES OF REINFORCING STEEL, CONFORM TO THE REQUIREMENT OF THAI INDUSTRIAL STANDARD DESIGNATION SR24 FOR STRUCTURAL GRADE PLAIN ROUND BAR AND SD30 FOR INTERMEDIATE GRADE DEFORMED BAR.

REFERENCE DRAWINGS :

1. HEADRACE PIER DIMENSIONS MH-HR-07

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
TYPICAL SECTIONS

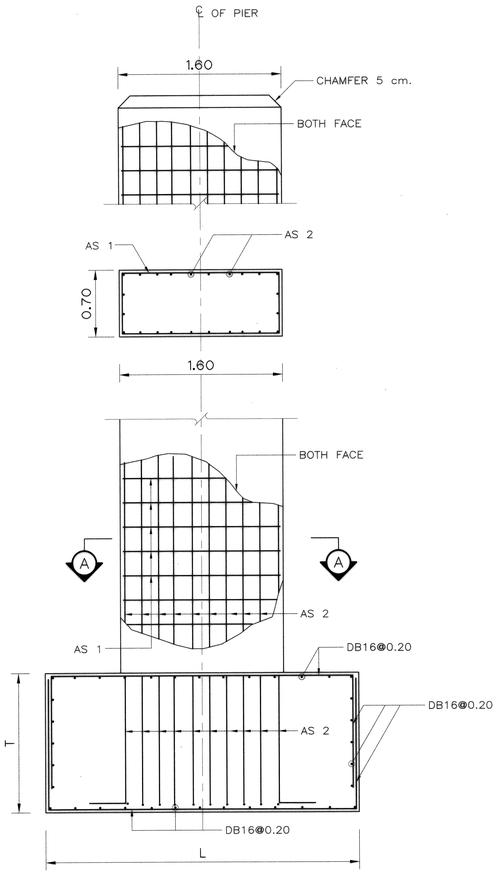
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED วิชิต.64624 วิชิต.6226
DRAWN
CHECKED วิชิต.6226
PROJECT MANAGER 08/03/2564 DATE

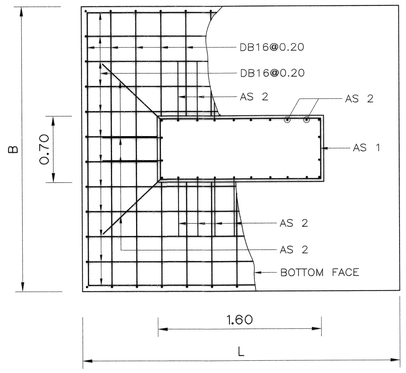
REVIEWED
SUBMITTED
RECOMMENDED
APPROVED P. Hanpatt

DRAWING NO. MH-HR-06
SHEET NO. 30 OF 130



RC. PIER DETAILS

SCALE 1:30

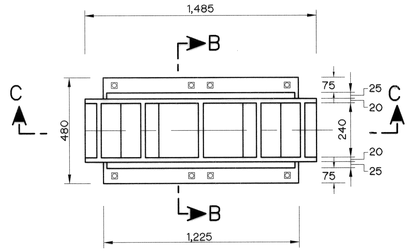


SECTION A–A

SCALE 1:30

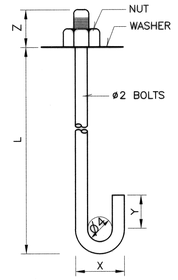
PIER DATA

H	BXL	T	AS 1	AS 2
H < 1	1.80x1.80	0.60	DB16@0.20	DB16@0.20
1 < H ≤ 2	2.00x2.00	0.60	DB16@0.20	DB16@0.20
2 < H ≤ 3	2.40x2.20	0.80	DB16@0.20	DB16@0.15
3 < H ≤ 4	2.60x2.60	0.80	DB16@0.20	DB16@0.15
4 < H ≤ 5	3.00x2.80	1.00	DB16@0.20	DB20@0.20
5 < H ≤ 6	3.00x3.00	1.00	DB16@0.20	DB20@0.15



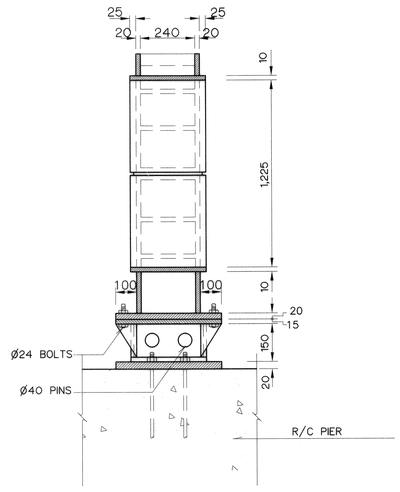
PLAN

NOT TO SCALE



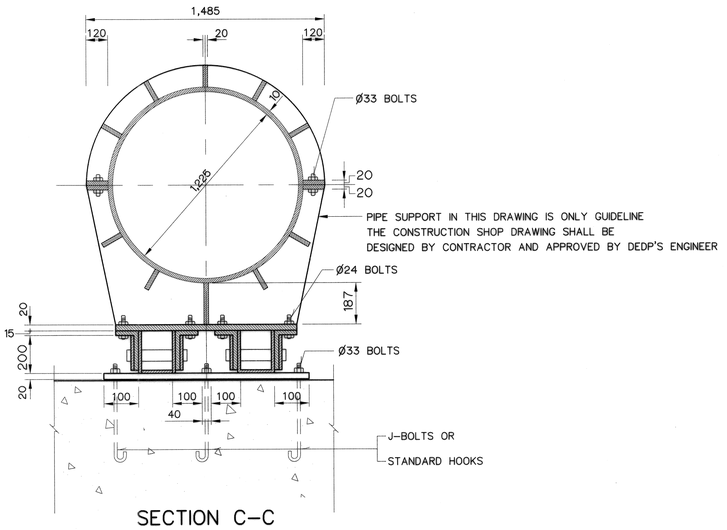
HOOKED BOLT

NOT TO SCALE



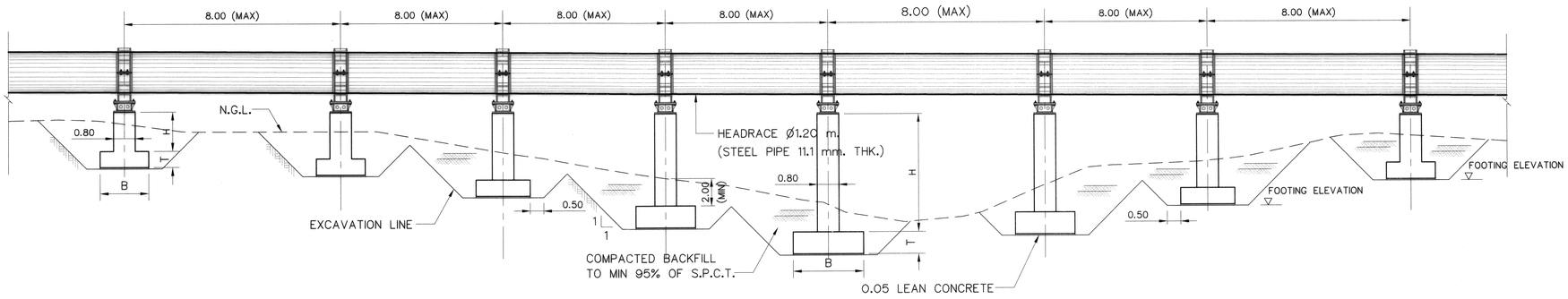
SECTION B–B

NOT TO SCALE



SECTION C–C

NOT TO SCALE



PROFILE OF CONCRETE PIER

NOT TO SCALE

NOTES :

1. DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, DIMENSIONS OF PIPE SUPPORT ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH–GN–03
3. CONCRETE DESIGN BASED ON THE COMPRESSIVE STRENGTH OF 210 KSC, STANDARD CYLINDER Ø0.15x0.30 m. TEST AT AGE 28 DAYS. UNLESS OTHERWISE INDICATED IN SPECIFIC DRAWINGS.
4. ULTIMATE TENSILE STRESSES OF REINFORCING STEEL, CONFORM TO THE REQUIREMENT OF THAI INDUSTRIAL STANDARD DESIGNATION SR24 FOR STRUCTURAL GRADE PLAIN ROUND BAR AND SD30 FOR INTERMEDIATE GRADE DEFORMED BAR.
4. ALLOWABLE BEARING CAPACITY NOT LESS THAN 15 TON/sq m.

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

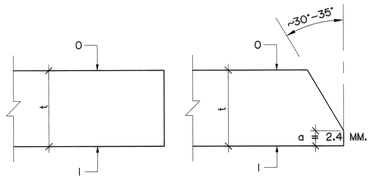
MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
CONCRETE PIER

P&C MANAGEMENT CO.,LTD.

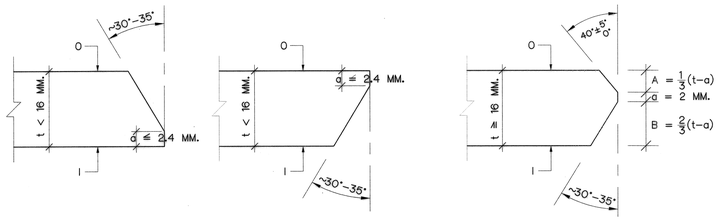
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วิชิต 64624 วิ 25.6226	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วิ 25.6226	RECOMMENDED	
PROJECT MANAGER	08/03/2559 DATE	APPROVED	
		DRAWING NO.	MH–HR–07
		SHEET NO.	31 OF 130



PIPE END DIMENSIONS

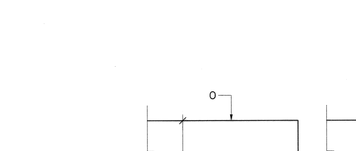
NOT TO SCALE



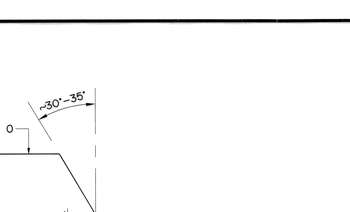
PIPE END DIMENSIONS

FOR D ≥ 800 MM.

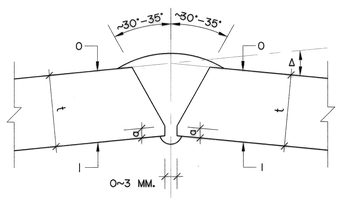
NOT TO SCALE



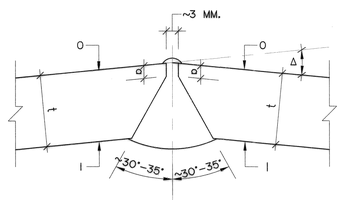
COUPLING



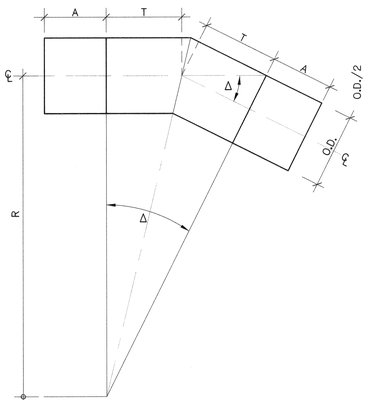
BUTT WELDED



OUTSIDE WELD FOR BEND



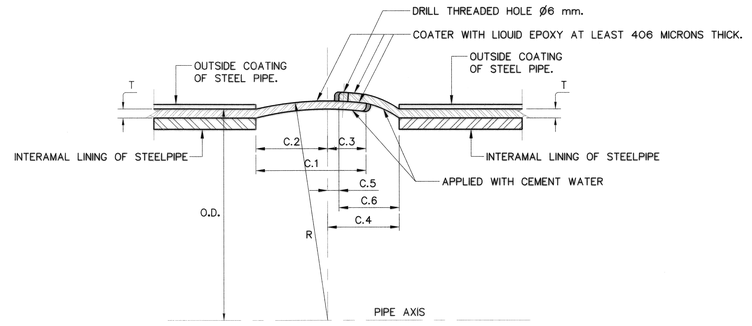
INSIDE WELD FOR BEND



PIPE BEND DETAILED

DIMENSIONS FOR PIPE CONNECTING

NOT TO SCALE



SURFACED SLEEVE WELDED JOINT

NOT TO SCALE

DIMENSIONS IN MILLIMETERS

NOMINAL DIAMETER	OUTSIDE DIA. OD.	THICKNESS t	R	C.1 (C.2 + C.3)	C.2	C.3	C.4 (C.5 + C.6)	C.5	C.6
1,200	1219.2	11.1	641	316	197	119	224	25	199

NOTE :

1. TOLERANE OUTSIDE CIRCUMFERENCE OF SPIGOT SHALL BE $\pm\frac{8}{0}$ mm.
2. TOLERANE OUTSIDE CIRCUMFERENCE OF SOCKET SHALL BE $\pm\frac{8}{0}$ mm.
3. IN CASE OF THE PIPE TO BE COATED INSIDE WITH LIQUID EPOXY THE COATING SHALL EXTEND TO PIPE ENDS.
4. ALL DIMENSIONS IN MILLIMETER, UNLESS OTHERWISE SHOWN.
5. SYMBOLS

   t = PIPE THICKESS
   O.D. = OUTSIDE DIAMETER
   O = OUTSIDE FACE
   I = INSIDE FACE

6. △ SHALL BE LESS THAN 22.5 DEGREE

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
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1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
JOINT DETAILS FOR STEEL PIPE

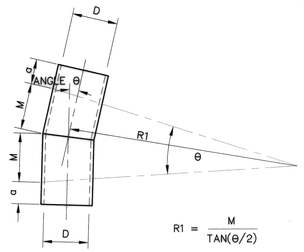
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

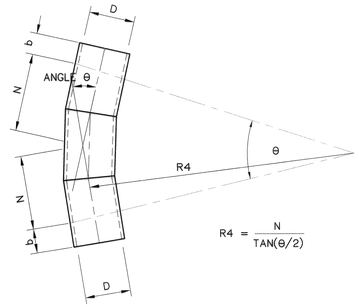
DESIGNED ก.ย.64624
DRAWN
CHECKED ก.ย.6226
PROJECT MANAGER 01/09/2564 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

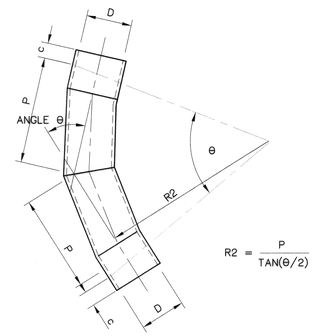
DRAWING NO. MH-HR-08
SHEET NO. 32 OF 130



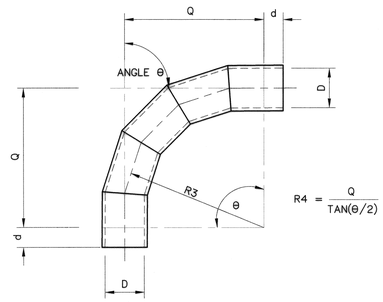
2–PIECE ELBOW
NOT TO SCALE



3–PIECE ELBOW
NOT TO SCALE



4–PIECE ELBOW
NOT TO SCALE



5–PIECE ELBOW
NOT TO SCALE

D	ELBOW							
	2–PIECE θ = 11.25°		3–PIECE θ = 22.25°		4–PIECE θ = 45°		5–PIECE θ = 45°	
	M	a	N	b	P	c	Q	d
150	100	250	175	225	275	225	375	250
200	100	250	200	225	300	225	450	250
250	100	250	225	200	350	225	500	250
300	125	275	250	275	400	275	575	300
400	150	350	300	325	500	325	700	350
500	175	350	350	325	550	325	825	350
600	200	350	400	350	650	350	650	350
700	225	400	450	400	725	400	950	375
800	225	475	500	450	800	450	1075	425
900	250	450	525	450	850	425	1175	475
1,000	250	525	550	500	875	500	1250	450
1,200	275	400	575	400	950	375	1300	525
1,500	300	475	675	475	1050	450	1375	400
1,800	325	450	700	425	1150	425	1575	550

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
FITTINGS FOR STEEL PIPE

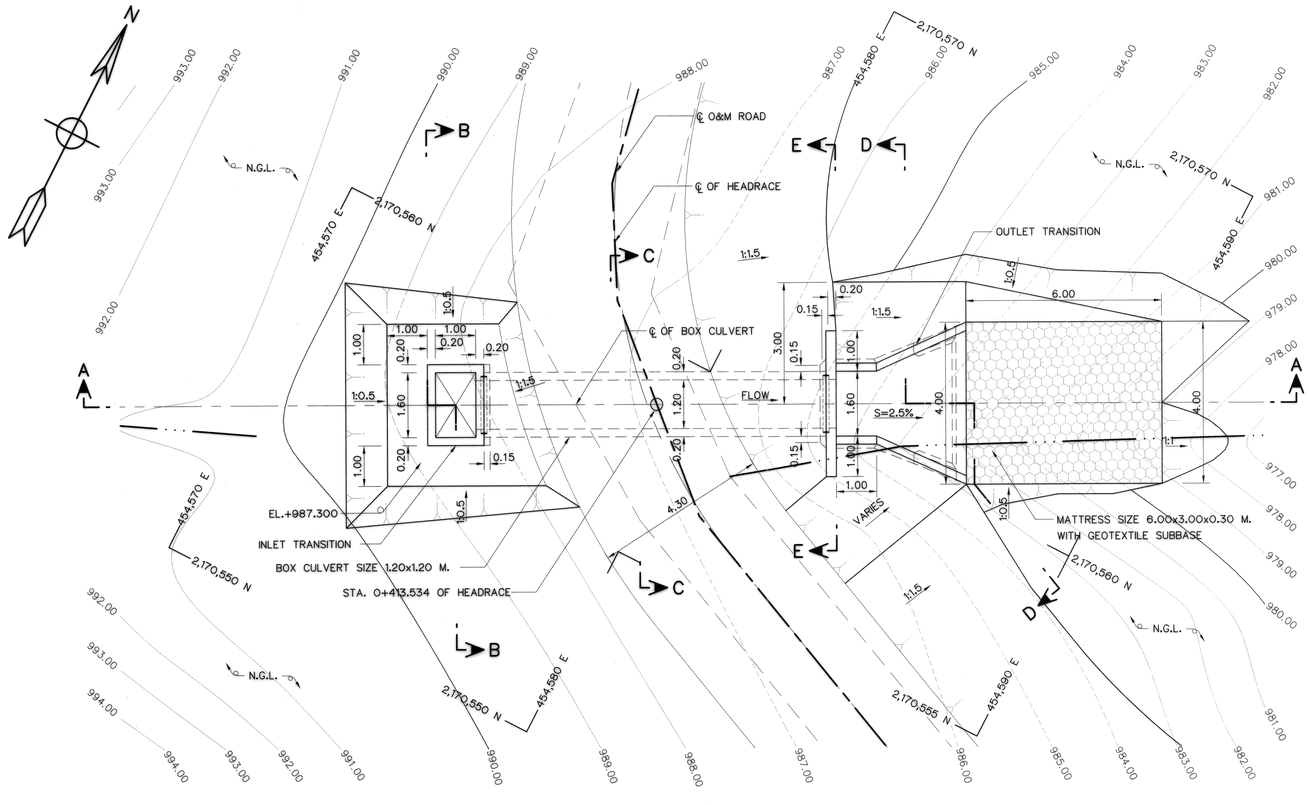
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

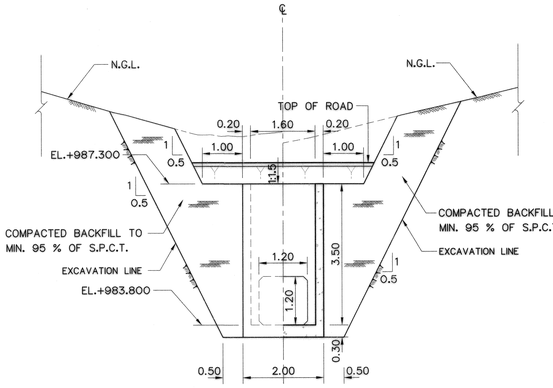
DESIGNED 25.6.4624 25.6.226
DRAWN
CHECKED 25.6.226
PROJECT MANAGER 08/08/2559 DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED

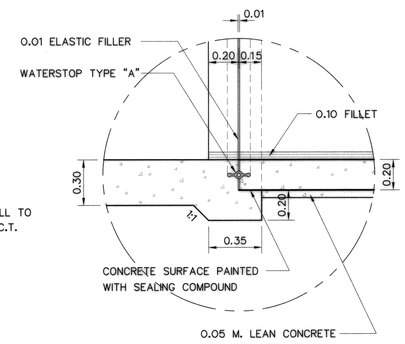
DRAWING NO. MH–HR–09
SHEET NO. 33 OF 130



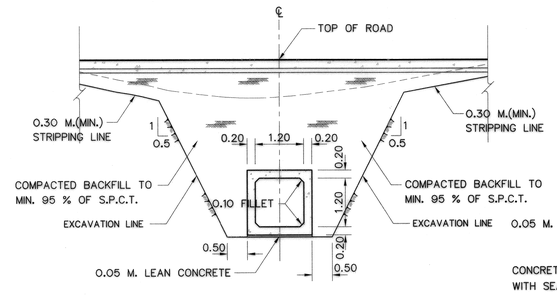
PLAN
SCALE 1:75



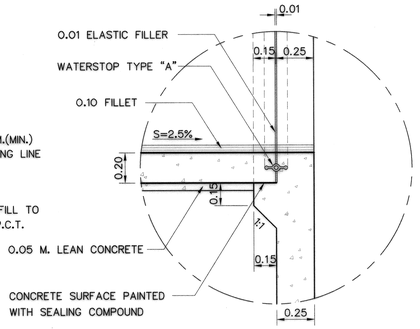
SECTION B–B
SCALE 1:75



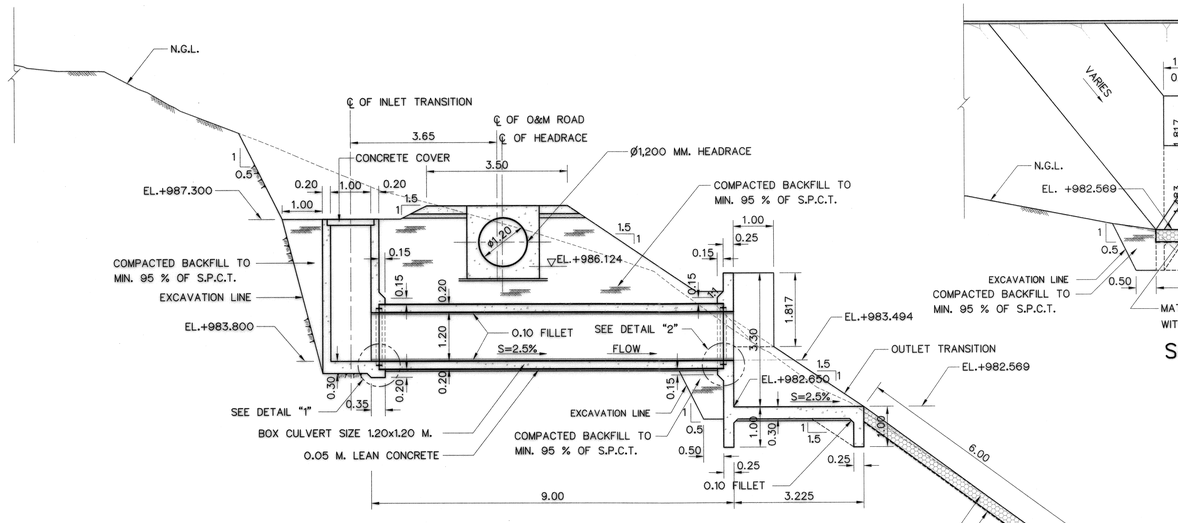
DETAIL "1"
SCALE 1:20



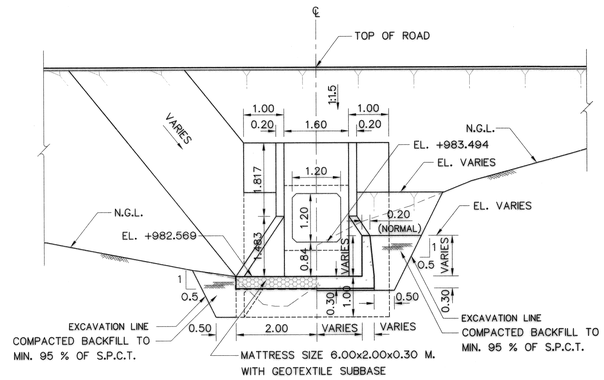
SECTION C–C
SCALE 1:75



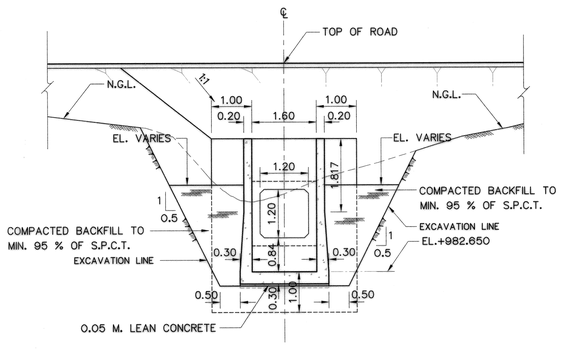
DETAIL "2"
SCALE 1:20



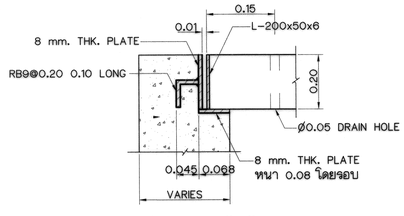
SECTION A–A
SCALE 1:75



SECTION D–D
SCALE 1:75



SECTION E–E
SCALE 1:75



DETAIL "2"
NOT TO SCALE

NOTES :

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

REFERENCE DRAWING :

1. HEADRACE PLAN AND PROFILE, STA. 0+000 TO STA. 0+500	MH-HR-01
2. DRAIN CULVERT STA. 0+413.534, REINFORCEMENT DETAILS	MH-HR-11

0 0.5 1.0 1.5
SCALE 1:20 METERS

0 0.5 1 2 3 4 5 6
SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
DRAIN CULVERT STA. 0+413.534 , PLAN AND SECTION

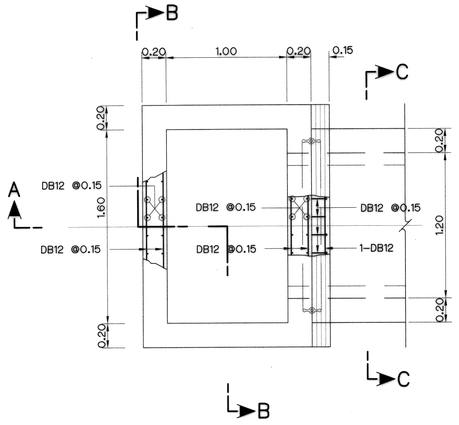
P&C MANAGEMENT CO.,LTD.

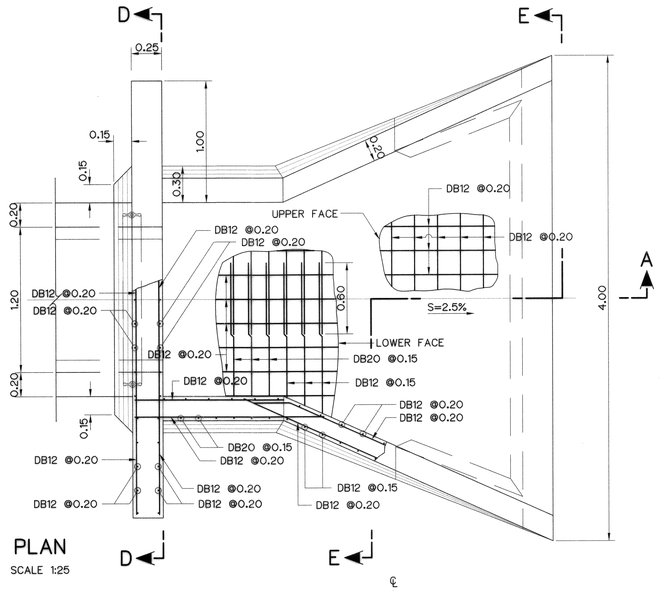
Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วิชัย.64624	วิชัย.6226	REVIEWED
DRAWN			SUBMITTED
CHECKED	วิชัย.6226		RECOMMENDED
PROJECT MANAGER	01/03/2559 DATE		APPROVED

DRAWING NO. MH-HR-10

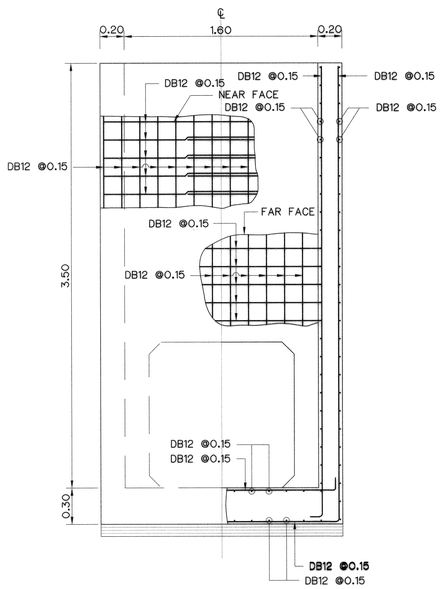
SHEET NO. 34 OF 130





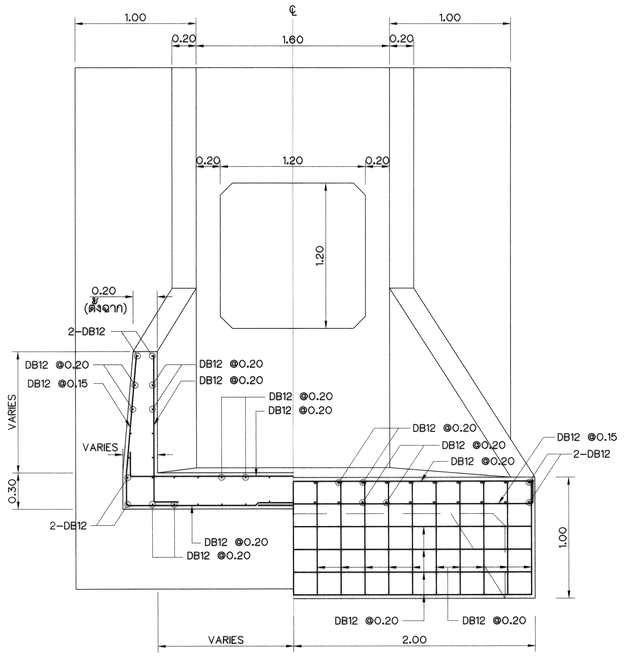
PLAN

SCALE 1:25



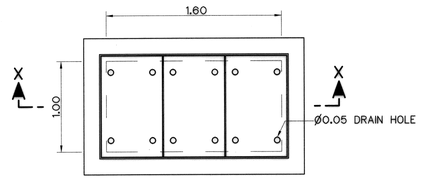
SECTION B–B

SCALE 1:25



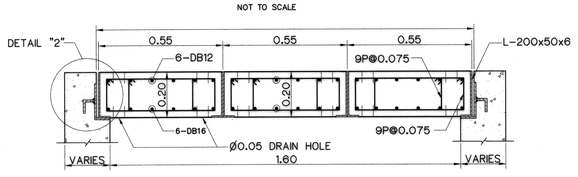
SECTION E–E

SCALE 1:25



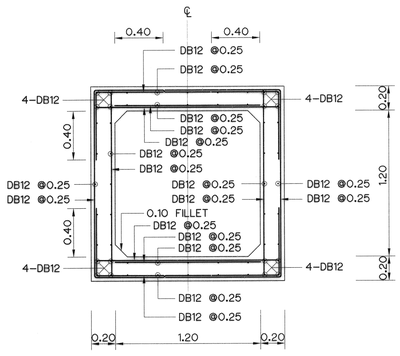
CONCRETE COVER

NOT TO SCALE



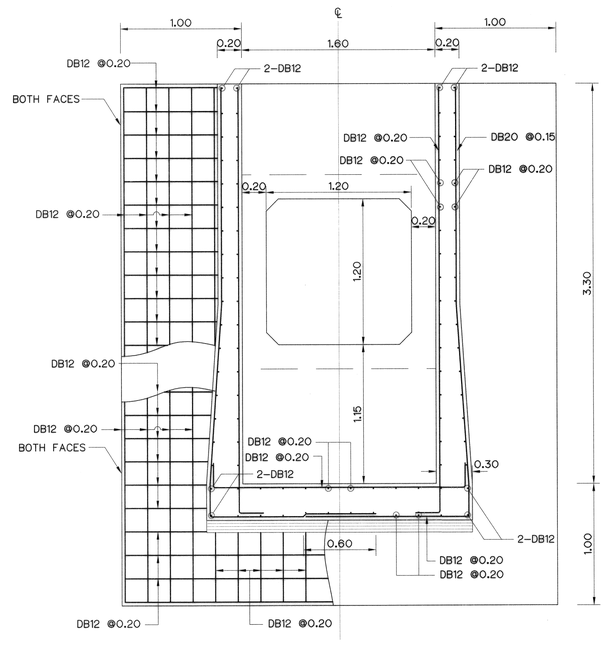
SECTION X–X

NOT TO SCALE



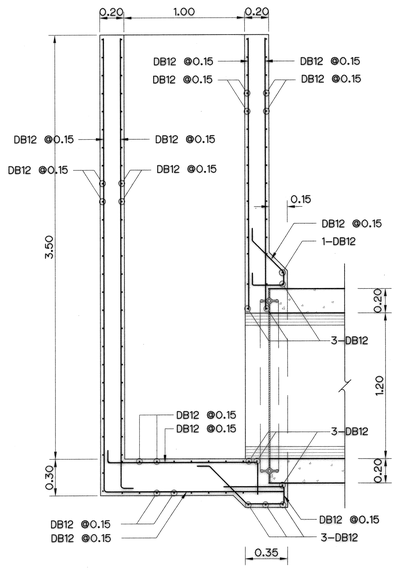
SECTION C–C

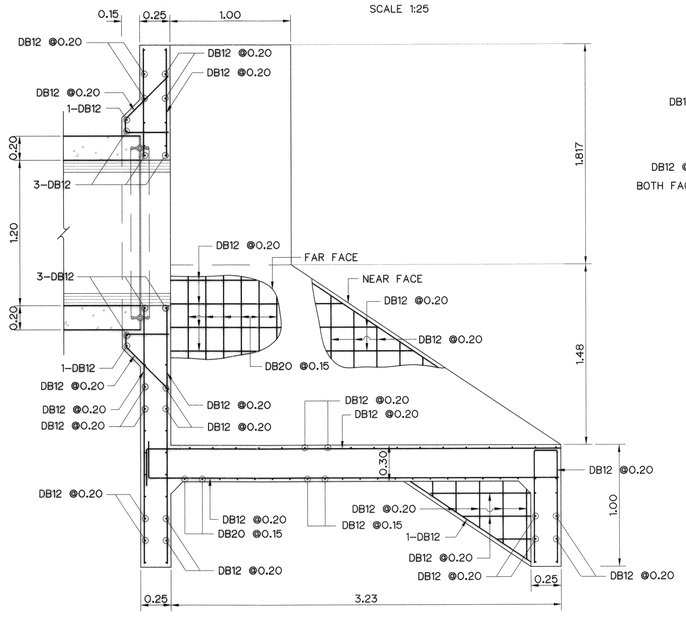
SCALE 1:25



SECTION D–D

SCALE 1:25





SECTION A–A

SCALE 1:25

0 0.5 1.0 1.5 2.0

SCALE 1:25 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. NMH-GN-03
3. CONCRETE DESIGN BASED ON THE COMPRESSIVE STRENGTH OF 210 KSC, STANDARD CYLINDER Ø0.15x0.30 m. TEST AT AGE 28 DAYS. UNLESS OTHERWISE INDICATED IN SPECIFIC DRAWINGS.
4. ULTIMATE TENSILE STRESSES OF REINFORCING STEEL, CONFORM TO THE REQUIREMENT OF THAI INDUSTRIAL STANDARD DESIGNATION SR24 FOR STRUCTURAL GRADE PLAIN ROUND BAR AND SD30 FOR INTERMEDIATE GRADE DEFORMED BAR.

REFERENCE DRAWINGS :

1. DRAIN CULVERT STA. 0+413.534, PLAN AND SECTION NMH-HR-10

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
DRAIN CULVERT STA. 0+413.534 REINFORCEMENT DETAILS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

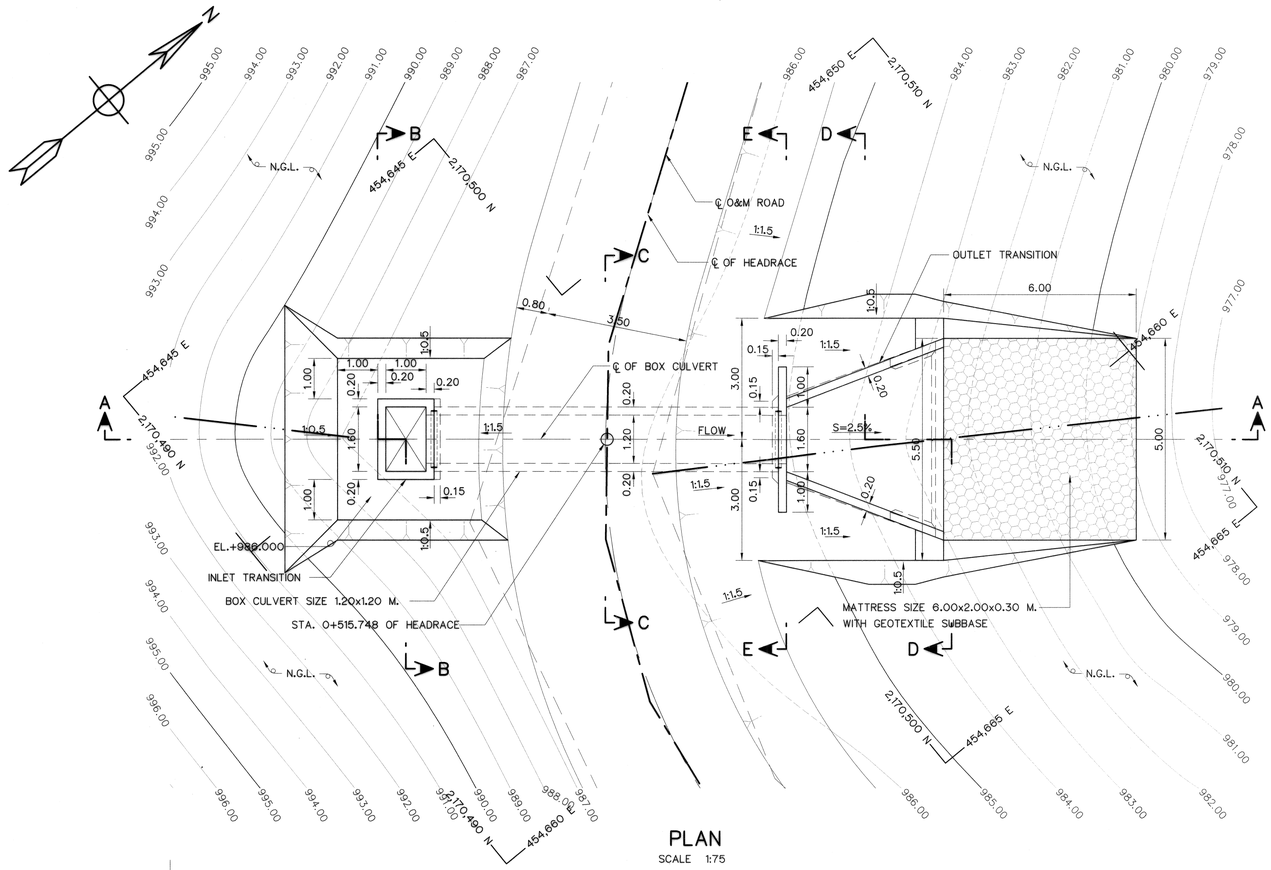
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency
MINISTRY OF ENERGY

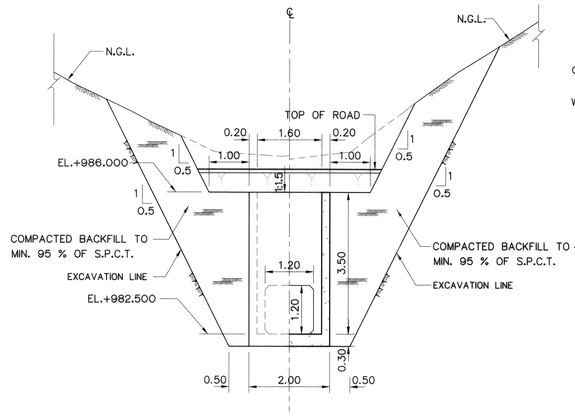
DESIGNED	สม.64624	REVIEWED	
DRAWN		SUBMITTED	สม.6226
CHECKED	สม.6226	RECOMMENDED	
PROJECT MANAGER	07/08/2564 DATE	APPROVED	

DRAWING NO. MH-HR-11

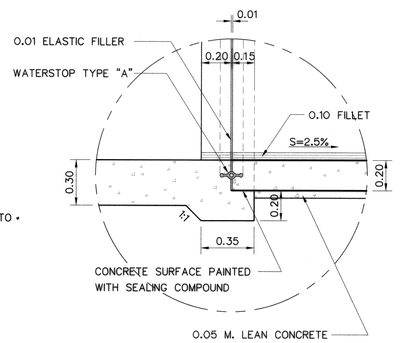
SHEET NO. 35 OF 130



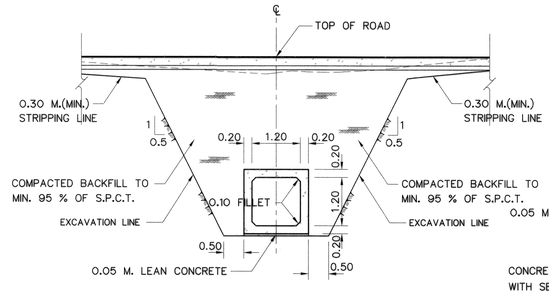
PLAN
SCALE 1:75



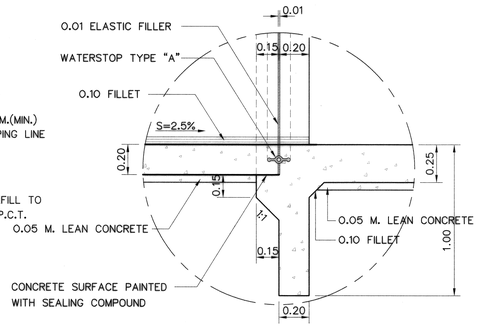
SECTION B–B
SCALE 1:75



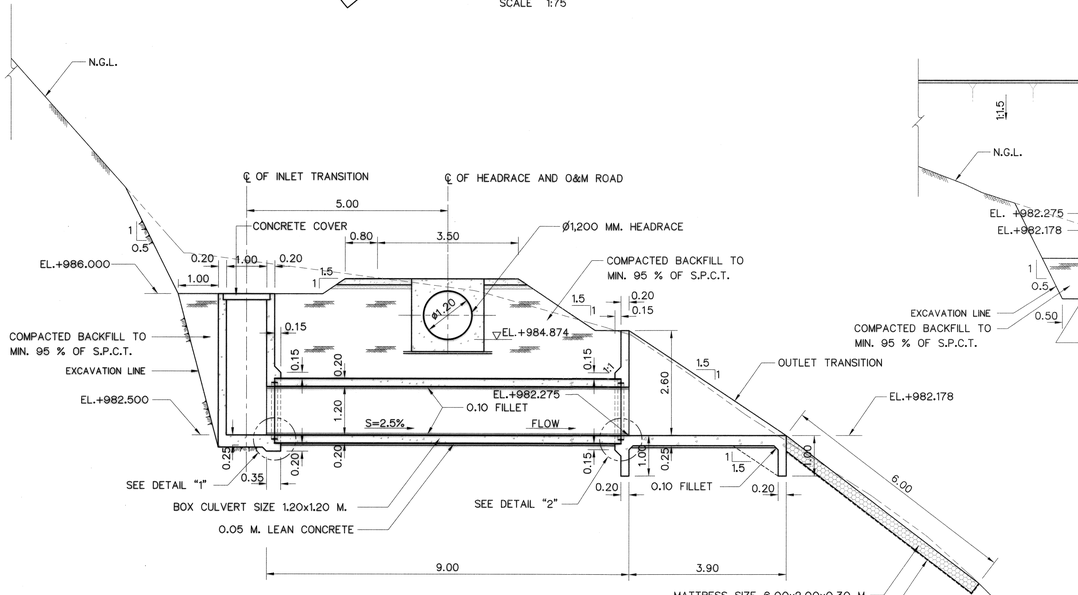
DETAIL "1"
SCALE 1:20



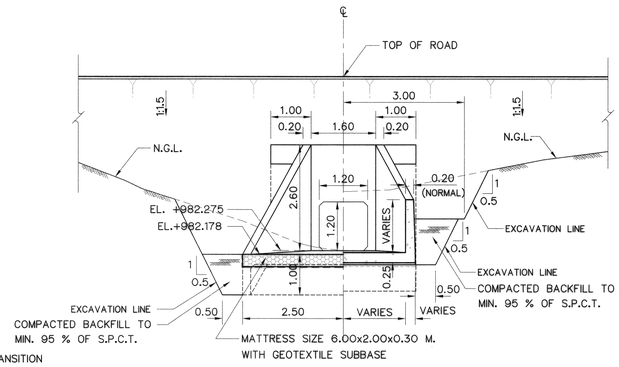
SECTION C–C
SCALE 1:75



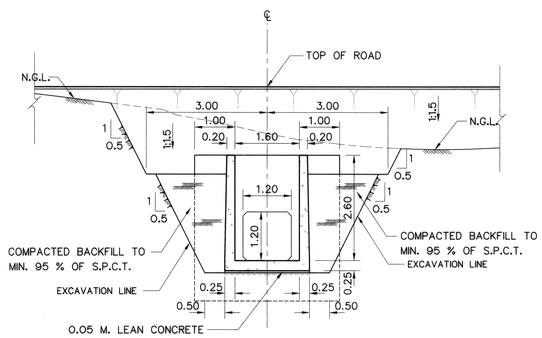
DETAIL "2"
SCALE 1:20



SECTION A–A
SCALE 1:75



SECTION D–D
SCALE 1:75



SECTION E–E
SCALE 1:75

NOTES :

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

REFERENCE DRAWING :

1. HEADRACE PLAN AND PROFILE, STA. 0+500 TO STA. 1+000	MH-HR-02
2. DRAIN CULVERT STA. 0+515.748, REINFORCEMENT DETAILS	MH-HR-13

0 0.5 1.0 1.5
SCALE 1:20 METERS

0 0.5 1 2 3 4 5 6
SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

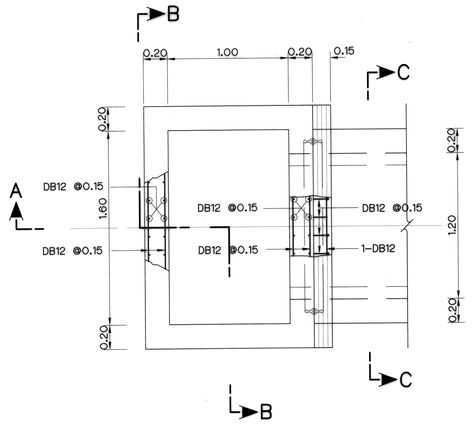
MAE HAT HYDROPOWER PROJECT

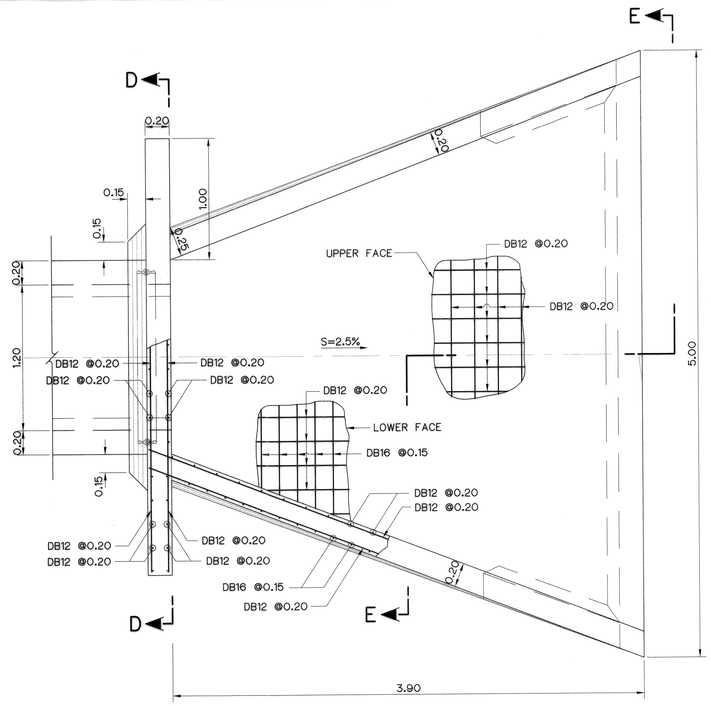
CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
DRAIN CULVERT STA. 0+515.748 , PLAN AND SECTION

P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

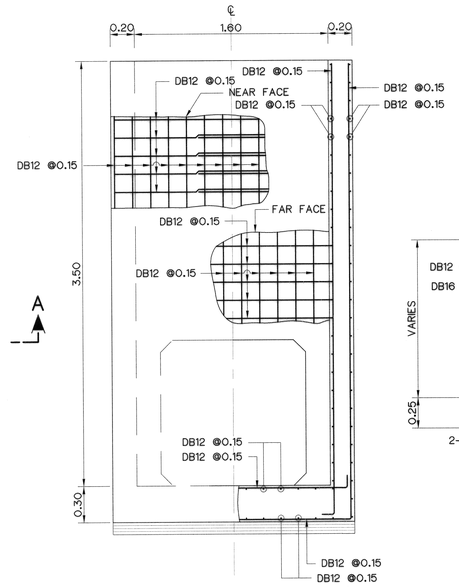
DESIGNED	สิริ.64624	REVIEWED	
DRAWN	สิริ.6226	SUBMITTED	
CHECKED	สิริ.6226	RECOMMENDED	
PROJECT MANAGER	06/03/2559 DATE	APPROVED	
		DRAWING NO.	MH-HR-12
		SHEET NO.	36 OF 130





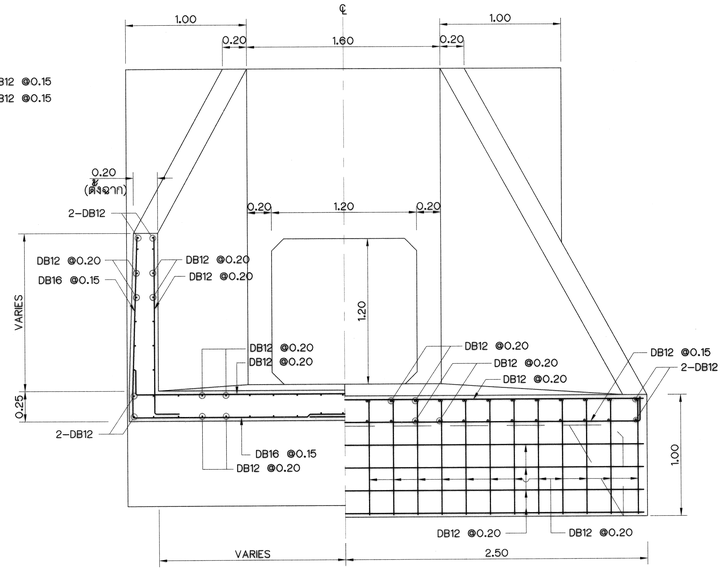
PLAN

SCALE 1:25



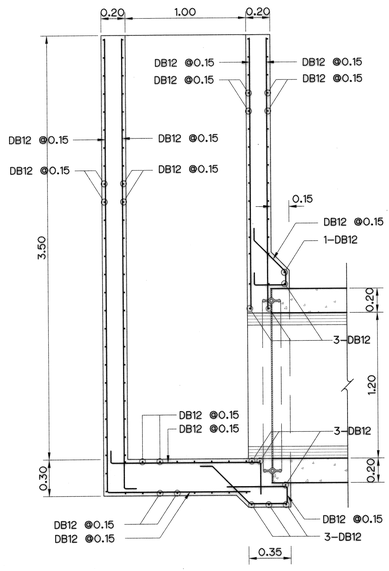
SECTION B-B

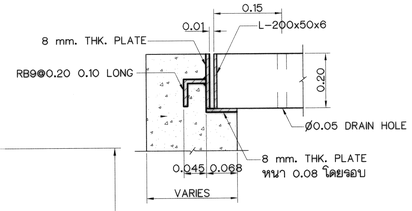
SCALE 1:25



SECTION E-E

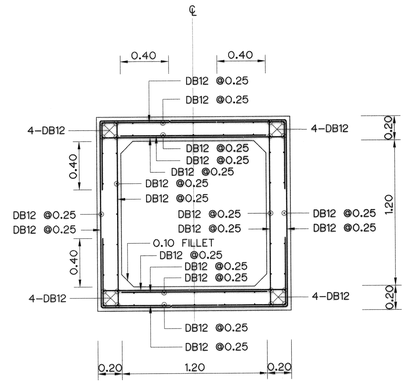
SCALE 1:25





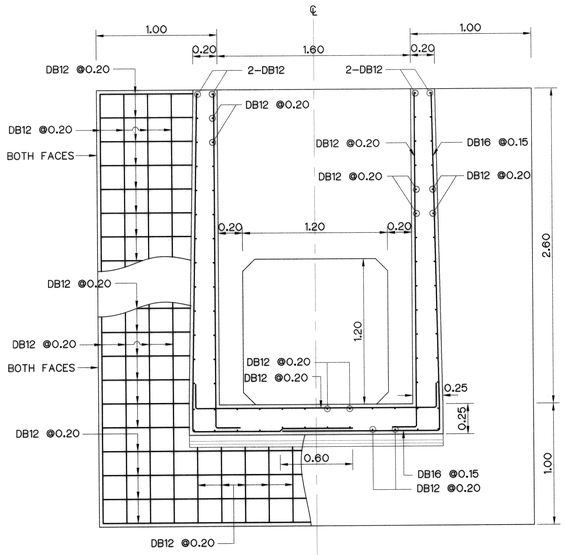
DETAIL "2"

NOT TO SCALE



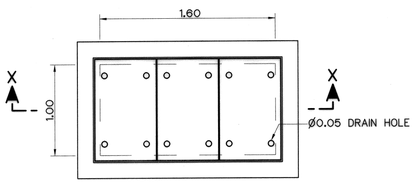
SECTION C-C

SCALE 1:25



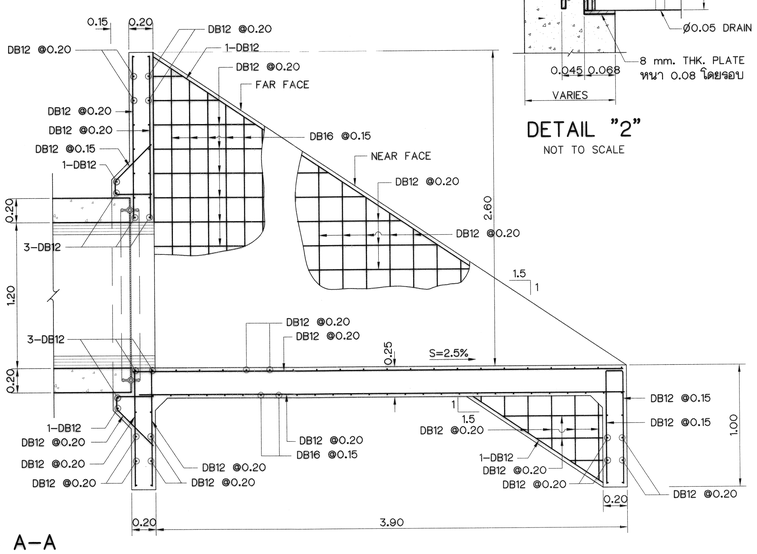
SECTION D-D

SCALE 1:25



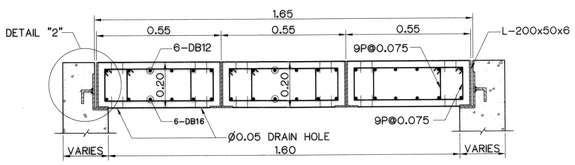
CONCRETE COVER

NOT TO SCALE



SECTION A-A

SCALE 1:25



SECTION X-X

NOT TO SCALE

0.0 0.5 1.0 1.5 2.0

SCALE 1:25 METERS

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH-GN-03
3. CONCRETE DESIGN BASED ON THE COMPRESSIVE STRENGTH OF 210 KSC, STANDARD CYLINDER Ø0.15x0.30 m. TEST AT AGE 28 DAYS. UNLESS OTHERWISE INDICATED IN SPECIFIC DRAWINGS.
4. ULTIMATE TENSILE STRESSES OF REINFORCING STEEL, CONFORM TO THE REQUIREMENT OF THAI INDUSTRIAL STANDARD DESIGNATION SR24 FOR STRUCTURAL GRADE PLAIN ROUND BAR AND SD30 FOR INTERMEDIATE GRADE DEFORMED BAR.

REFERENCE DRAWINGS :

1. DRAIN CULVERT STA. 0+515.748, PLAN AND SECTION MH-HR-12

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
DRAIN CULVERT STA. 0+515.748 REINFORCEMENT DETAILS

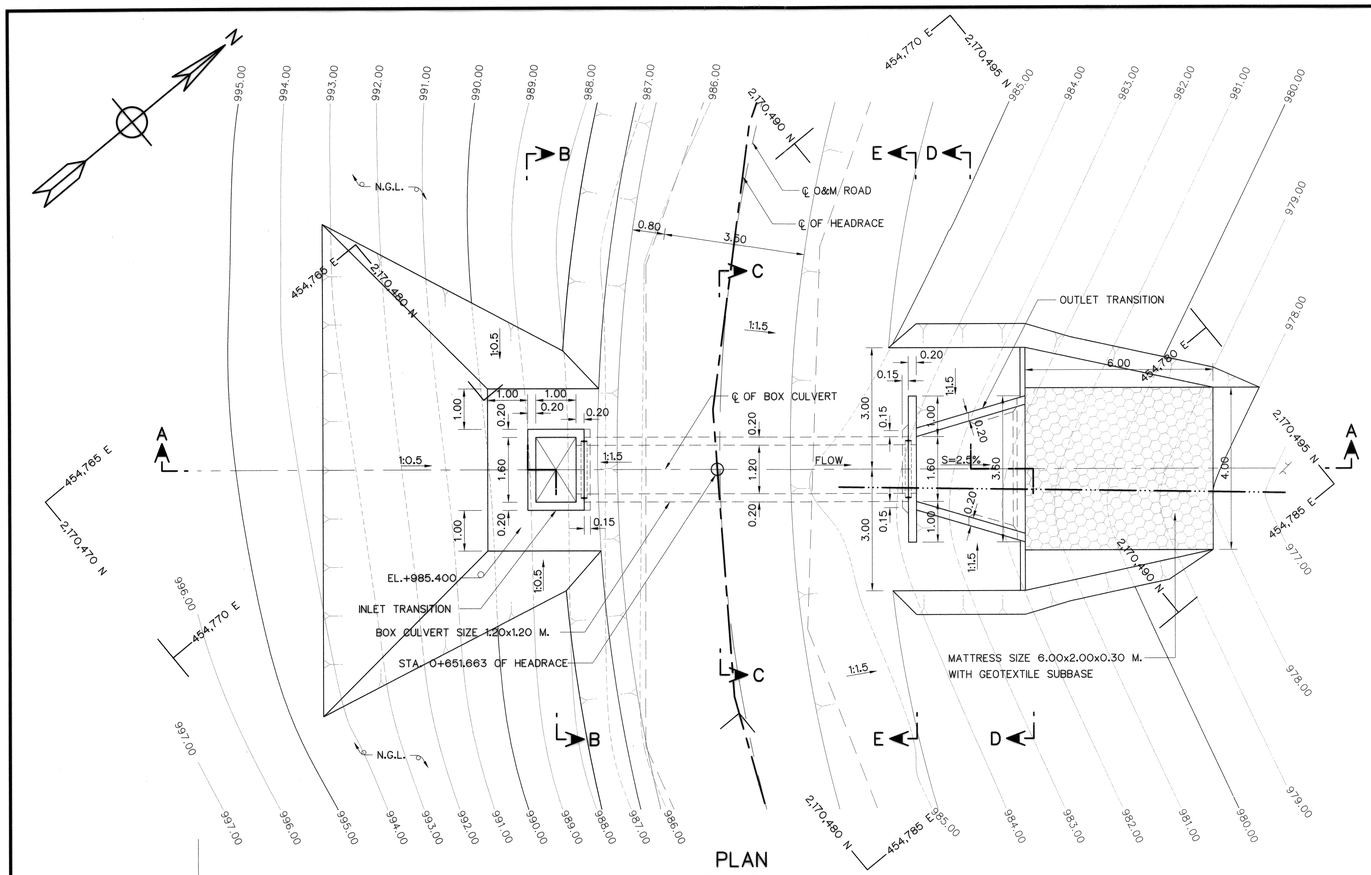
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

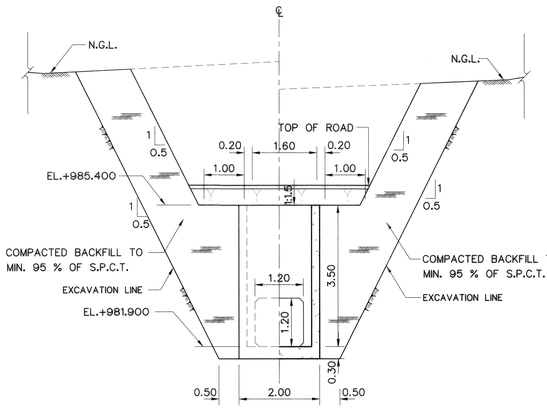
DESIGNED	วิศ.64624	REVIEWED	
DRAWN		SUBMITTED	
CHECKED	วิศ.6226	RECOMMENDED	
PROJECT MANAGER	08/03/2564 DATE	APPROVED	

DRAWING NO. MH-HR-13

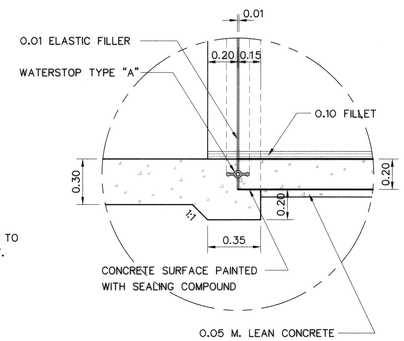
SHEET NO. 37 OF 130



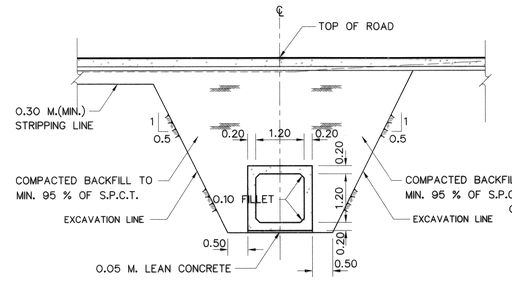
PLAN
SCALE 1:75



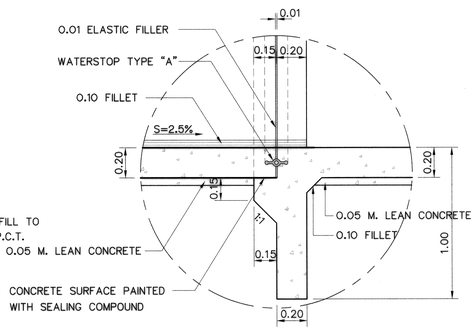
SECTION B–B
SCALE 1:75



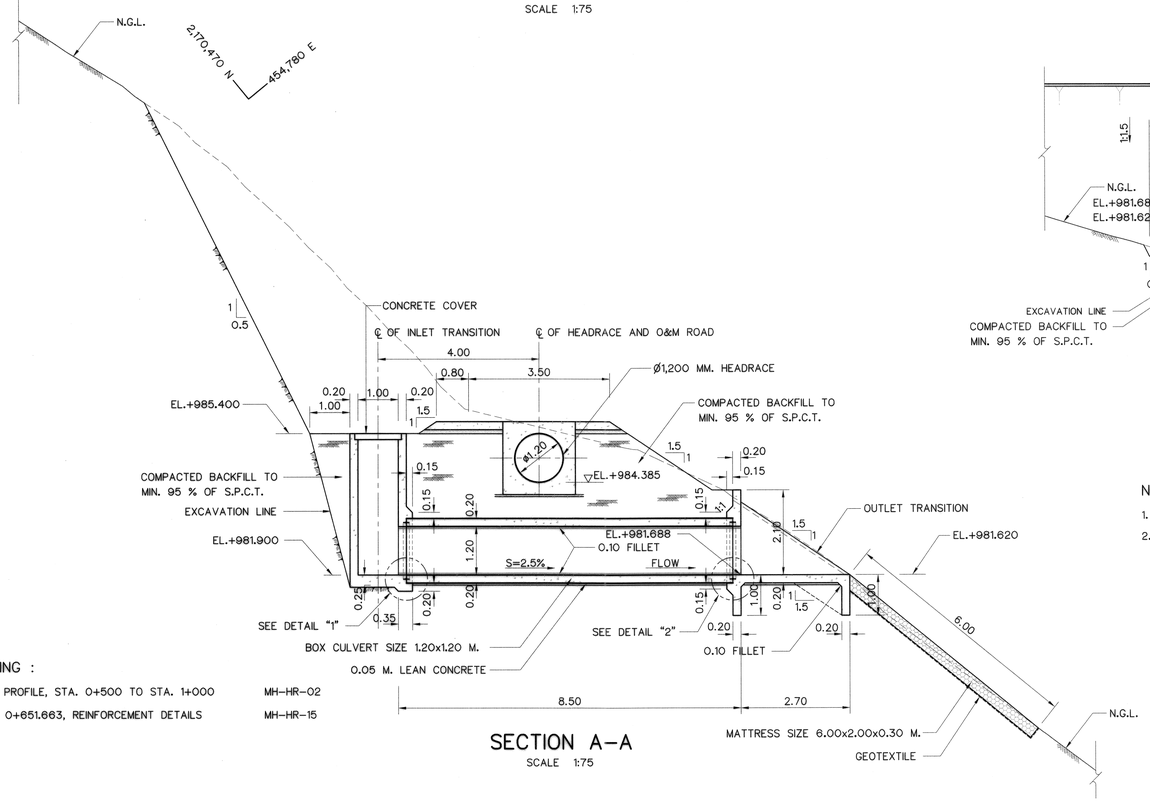
DETAIL "1"
SCALE 1:20



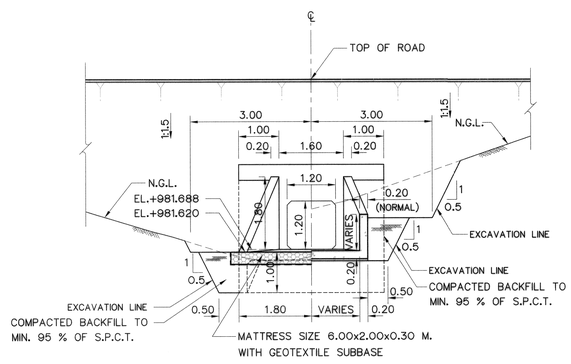
SECTION C–C
SCALE 1:75



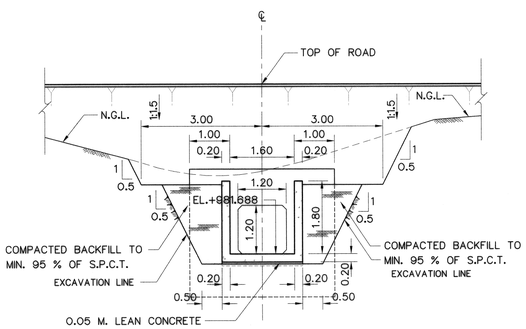
DETAIL "2"
SCALE 1:20



SECTION A–A
SCALE 1:75



SECTION D–D
SCALE 1:75



SECTION E–E
SCALE 1:75

REFERENCE DRAWING :

1. HEADRACE PLAN AND PROFILE, STA. 0+500 TO STA. 1+000 MH-HR-02
2. DRAIN CULVERT STA. 0+651.663, REINFORCEMENT DETAILS MH-HR-15

NOTES :

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

0 0.5 1.0 1.5
SCALE 1:20 METERS

0 0.5 1 2 3 4 5 6
SCALE 1:75 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

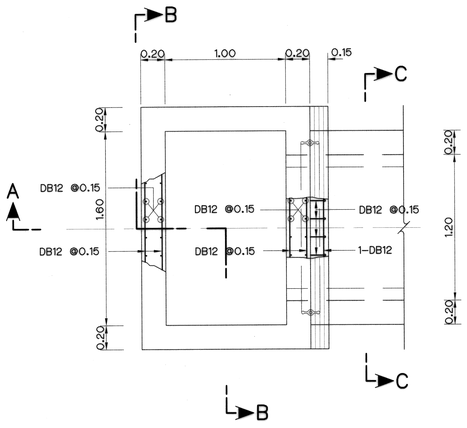
CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
DRAIN CULVERT STA. 0+651.663 , PLAN AND SECTION

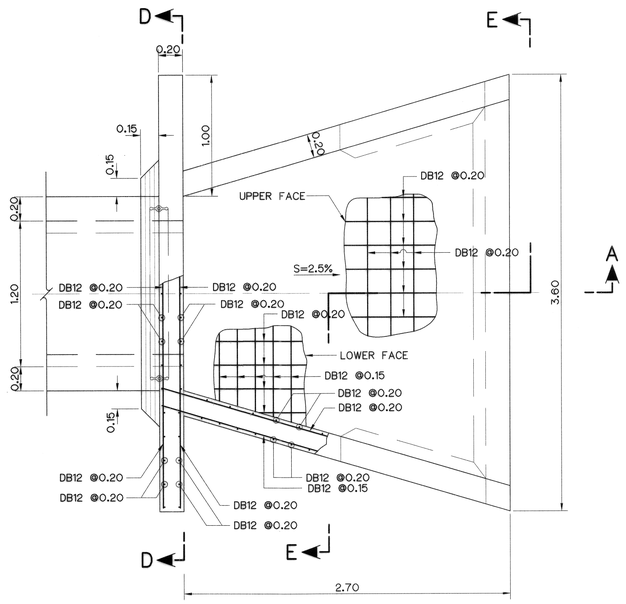
P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

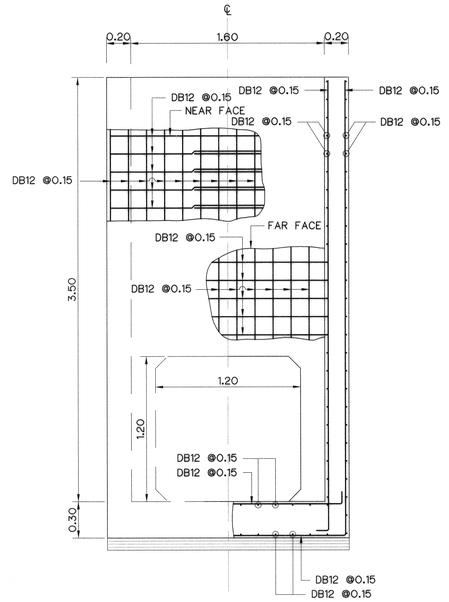
DESIGNED	วิศ.64624	วิศ.6226	REVIEWED
DRAWN			SUBMITTED
CHECKED		วิศ.6226	RECOMMENDED
PROJECT MANAGER	01/03/2564 DATE		APPROVED

DRAWING NO. MH-HR-14
SHEET NO. 38 OF 130

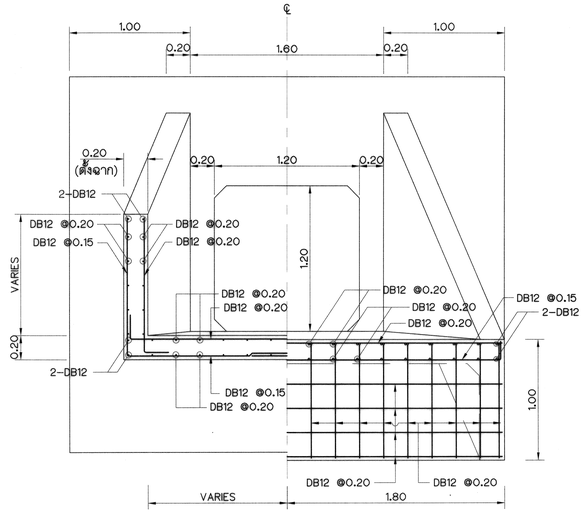




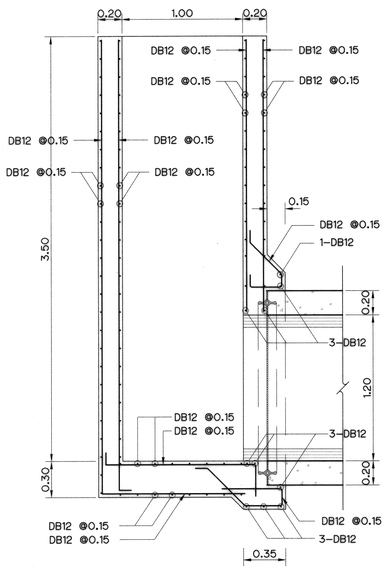
PLAN
SCALE 1:25



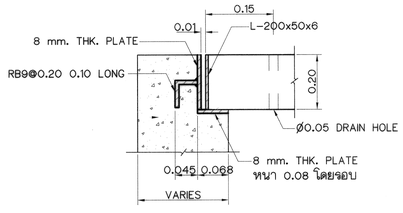
SECTION B–B
SCALE 1:25



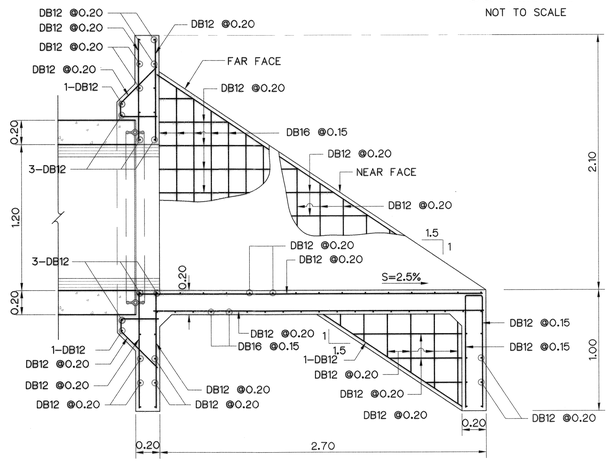
SECTION E–E
SCALE 1:25



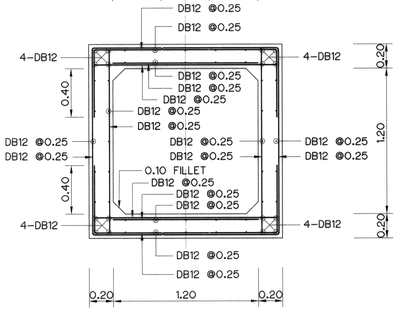
CONCRETE COVER
NOT TO SCALE



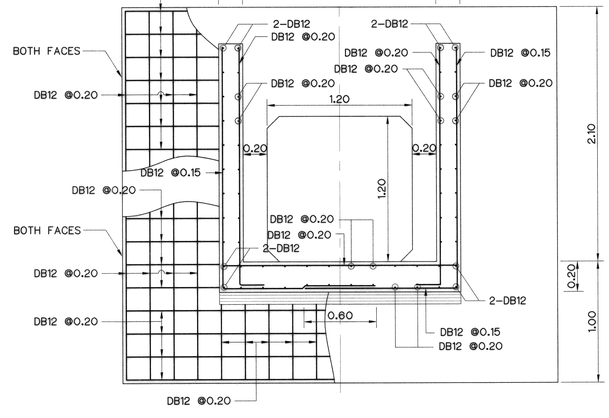
DETAIL "2"
NOT TO SCALE



SECTION A–A
SCALE 1:25



SECTION C–C
SCALE 1:25



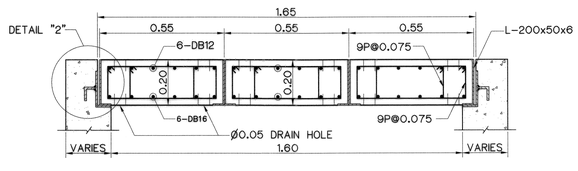
SECTION D–D
SCALE 1:25

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MH-GN-03
3. CONCRETE DESIGN BASED ON THE COMPRESSIVE STRENGTH OF 210 KSC, STANDARD CYLINDER Ø0.15x0.30 m. TEST AT AGE 28 DAYS. UNLESS OTHERWISE INDICATED IN SPECIFIC DRAWINGS.
4. ULTIMATE TENSILE STRESSES OF REINFORCING STEEL, CONFORM TO THE REQUIREMENT OF THAI INDUSTRIAL STANDARD DESIGNATION SR24 FOR STRUCTURAL GRADE PLAIN ROUND BAR AND SD30 FOR INTERMEDIATE GRADE DEFORMED BAR.

REFERENCE DRAWINGS :

1. DRAIN CULVERT STA. 0+651.663, PLAN AND SECTION — MH-HR-14



SECTION X–X
NOT TO SCALE

0 0.5 1.0 1.5 2.0
SCALE 1:25 METERS

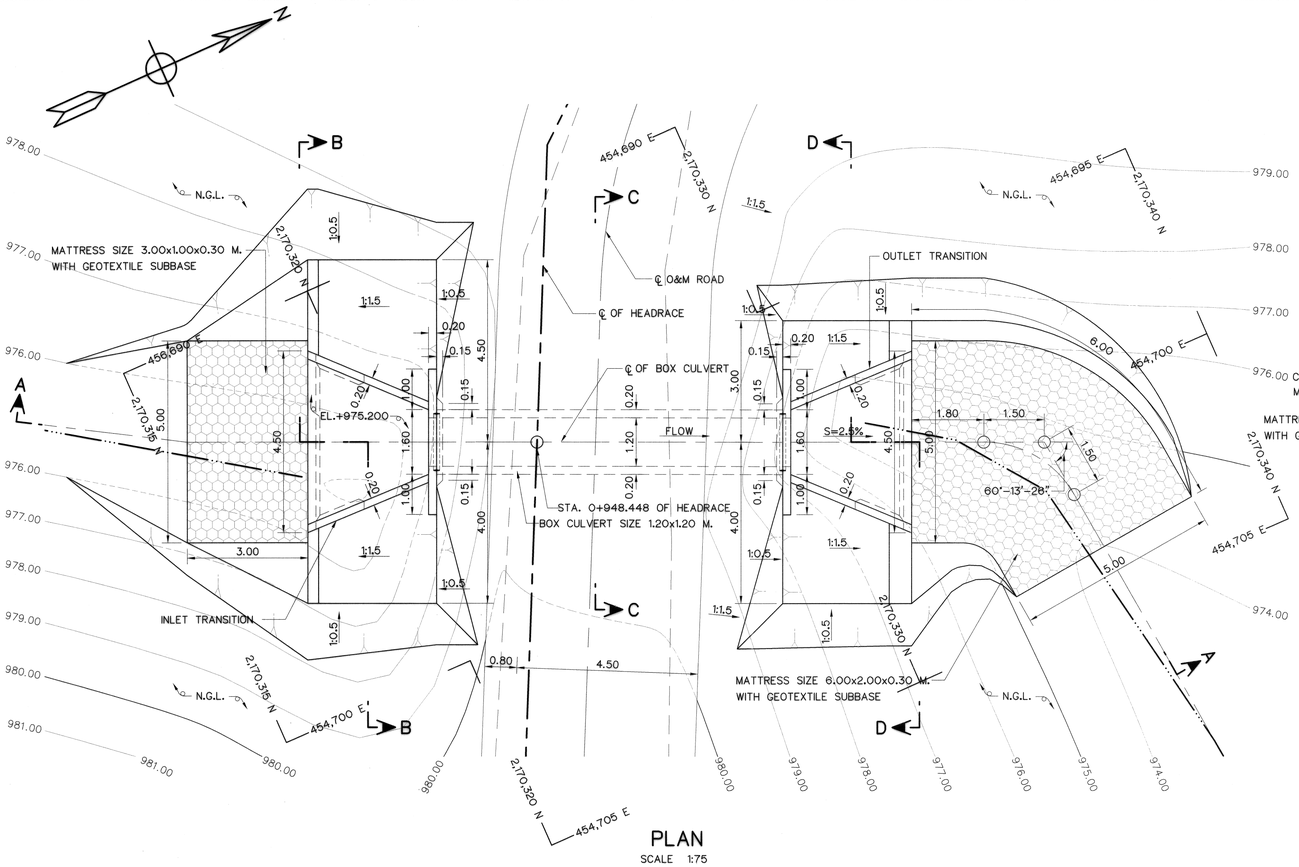
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
		CONSULTANTS	DEDE	

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

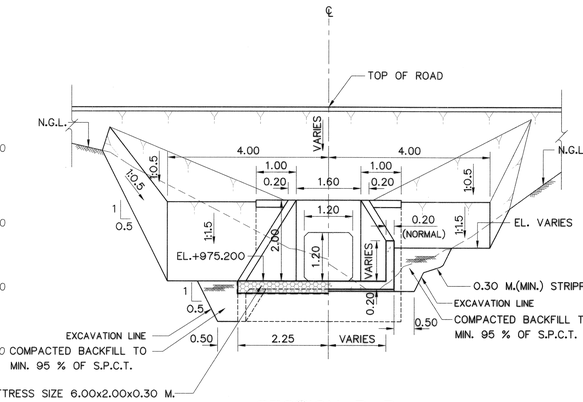
MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
DRAIN CULVERT STA. 0+651.663 REINFORCEMENT DETAILS

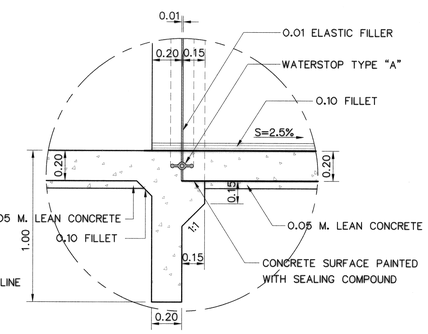
P&C MANAGEMENT CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED พ.ย.64624	REVIEWED
DRAWN	SUBMITTED
CHECKED	RECOMMENDED
PROJECT MANAGER	APPROVED
DATE	DRAWING NO. MH-HR-15
	SHEET NO. 39 OF 130



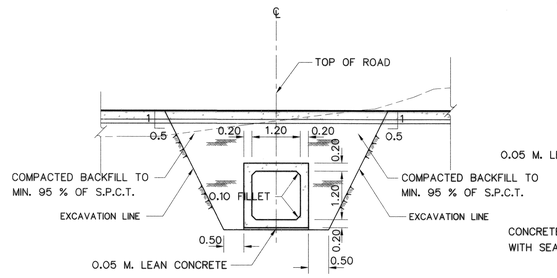
PLAN
SCALE 1:75



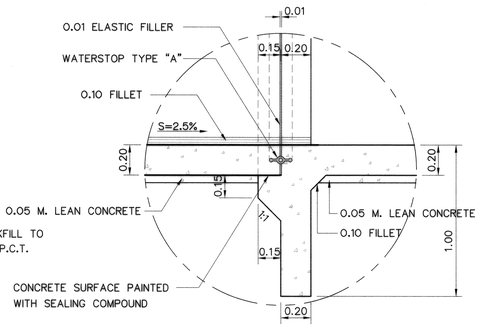
SECTION B–B
SCALE 1:75



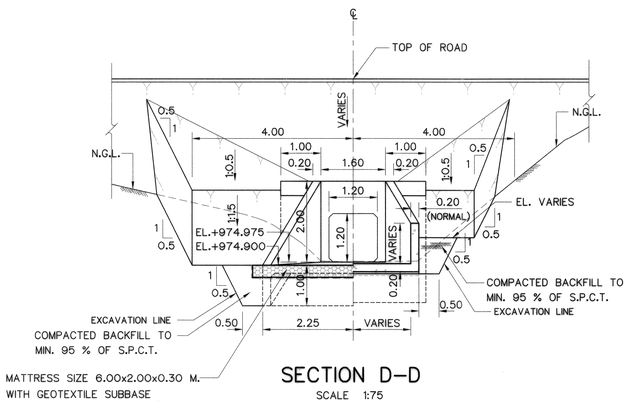
DETAIL "1"
SCALE 1:20



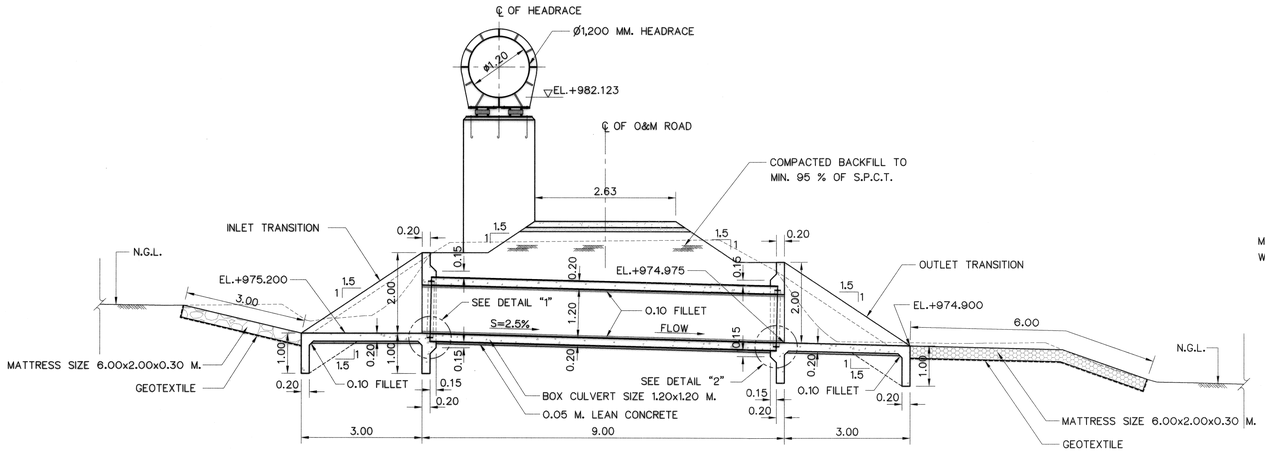
SECTION C–C
SCALE 1:75



DETAIL "2"
SCALE 1:20



SECTION D–D
SCALE 1:75



SECTION A–A
SCALE 1:75

NOTES :

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

REFERENCE DRAWING :

1. HEADRACE PLAN AND PROFILE, STA. 0+500 TO STA. 1+000	MH-HR-02
2. DRAIN CULVERT STA. 0+948.448, REINFORCEMENT DETAILS	MH-HR-17

0 0.5 1.0 1.5
SCALE 1:20 METERS

0 0.5 1 2 3 4 5 6
SCALE 1:75 METERS

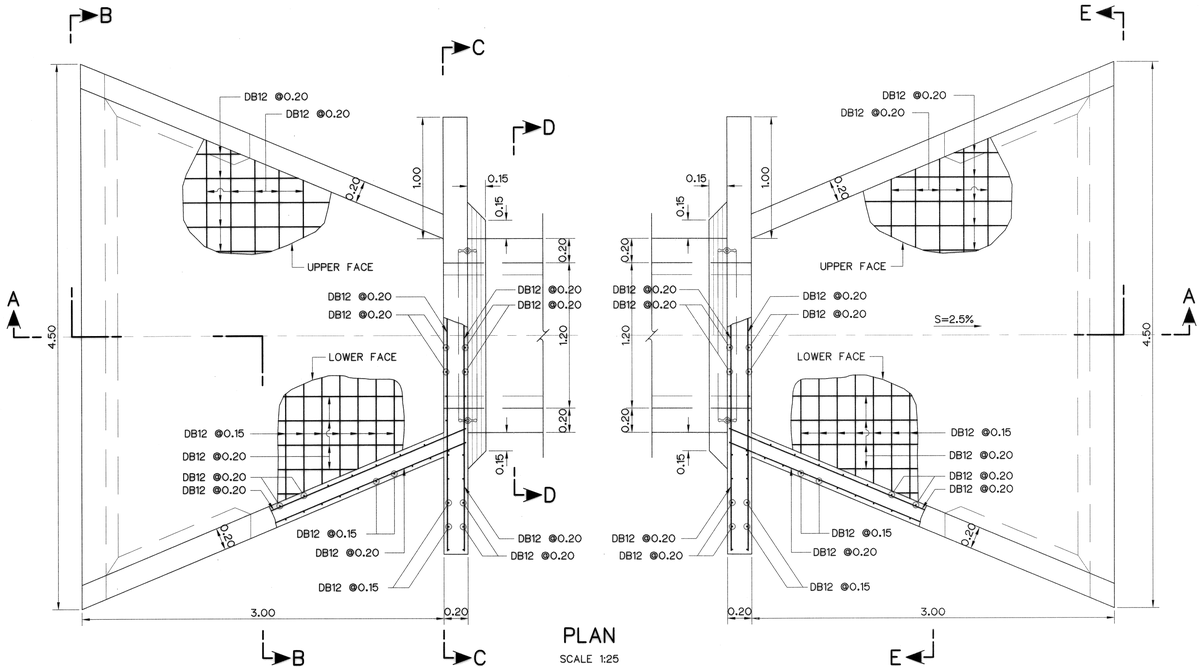
NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

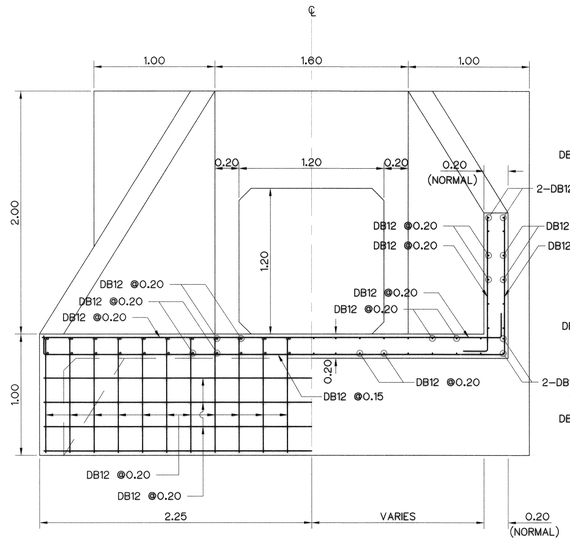
CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
DRAIN CULVERT STA. 0+948.448 , PLAN AND SECTION

P&C MANAGEMENT CO.,LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED กิ่ง.64624 สิ.6226	REVIEWED
DRAWN	SUBMITTED
CHECKED สิ.6226	RECOMMENDED
PROJECT MANAGER	APPROVED P. Hansaff
08/08/2559 DATE	DRAWING NO. MH-HR-16
	SHEET NO. 40 OF 130



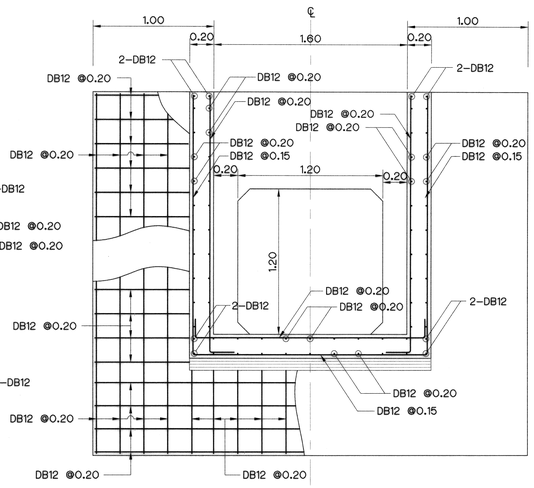
PLAN

SCALE 1:25



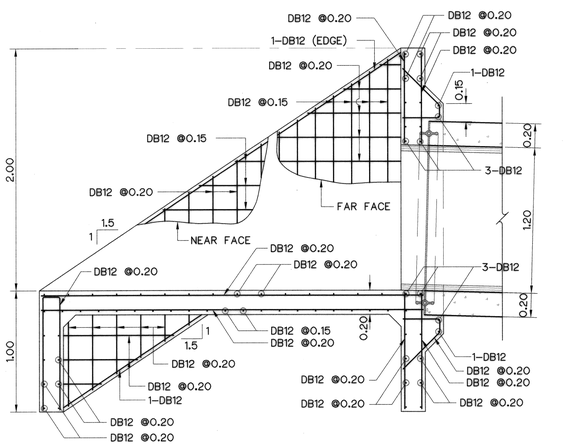
SECTION B–B

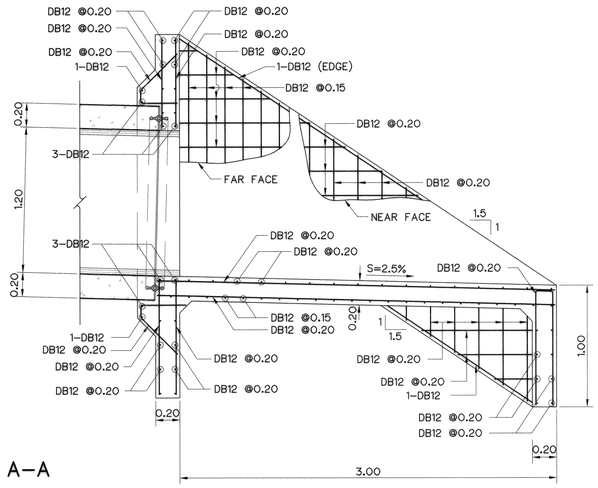
SCALE 1:25



SECTION C–C

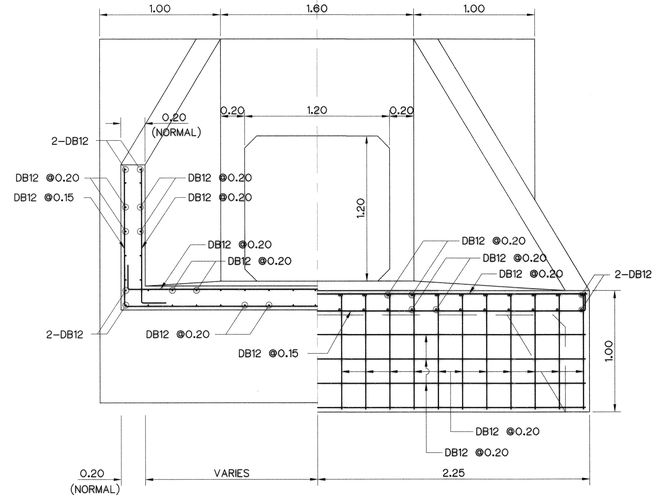
SCALE 1:25





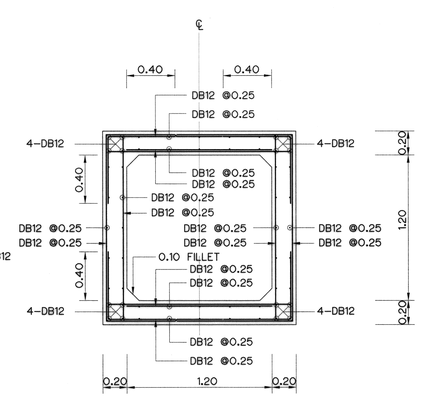
SECTION A–A

SCALE 1:25



SECTION E–E

SCALE 1:25



SECTION D–D

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. MH-GN-03
3. CONCRETE DESIGN BASED ON THE COMPRESSIVE STRENGTH OF 210 KSC, STANDARD CYLINDER Ø0.15x0.30 m. TEST AT AGE 28 DAYS. UNLESS OTHERWISE INDICATED IN SPECIFIC DRAWINGS.
4. ULTIMATE TENSILE STRESSES OF REINFORCING STEEL, CONFORM TO THE REQUIREMENT OF THAI INDUSTRIAL STANDARD DESIGNATION SR24 FOR STRUCTURAL GRADE PLAIN ROUND BAR AND SD30 FOR INTERMEDIATE GRADE DEFORMED BAR.

REFERENCE DRAWINGS :

1. DRAIN CULVERT STA. 0+948.448, PLAN AND SECTION MH-HR-16

0 0.5 1.0 1.5 2.0

SCALE 1:25 METERS

NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				
	CONSULTANTS		DEDE	

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

MAE HAT HYDROPOWER PROJECT

CIVIL WORKS AND TRANSMISSION LINE
HEADRACE
DRAIN CULVERT STA. 0+948.448 REINFORCEMENT DETAILS

P&C MANAGEMENT CO.,LTD.

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY

DESIGNED	วิ.64624	อ.ท.	สย.6226
DRAWN			
CHECKED		อ.ท.	สย.6226
PROJECT MANAGER		08/03/2564	DATE

REVIEWED
SUBMITTED
RECOMMENDED
APPROVED P. Hanwell

DRAWING NO. MH-HR-17

SHEET NO. 41 OF 130