



Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

AI KA PO HYDROPOWER PROJECT

TAMBON PHUKHAO THONG AMPHOE SUKHIRIN CHANGWAT NARATHIWAT

PART 1 : CIVIL WORKS AND TRANSMISSION LINE

PART 2 : ELECTRO-MECHANICAL EQUIPMENT

VOLUME 4

DRAWINGS

PCM P&C MANAGEMENT CO., LTD.



SPT CONSULTANTS CO., LTD.

PART 1 : CIVIL WORKS AND TRANSMISSION LINE

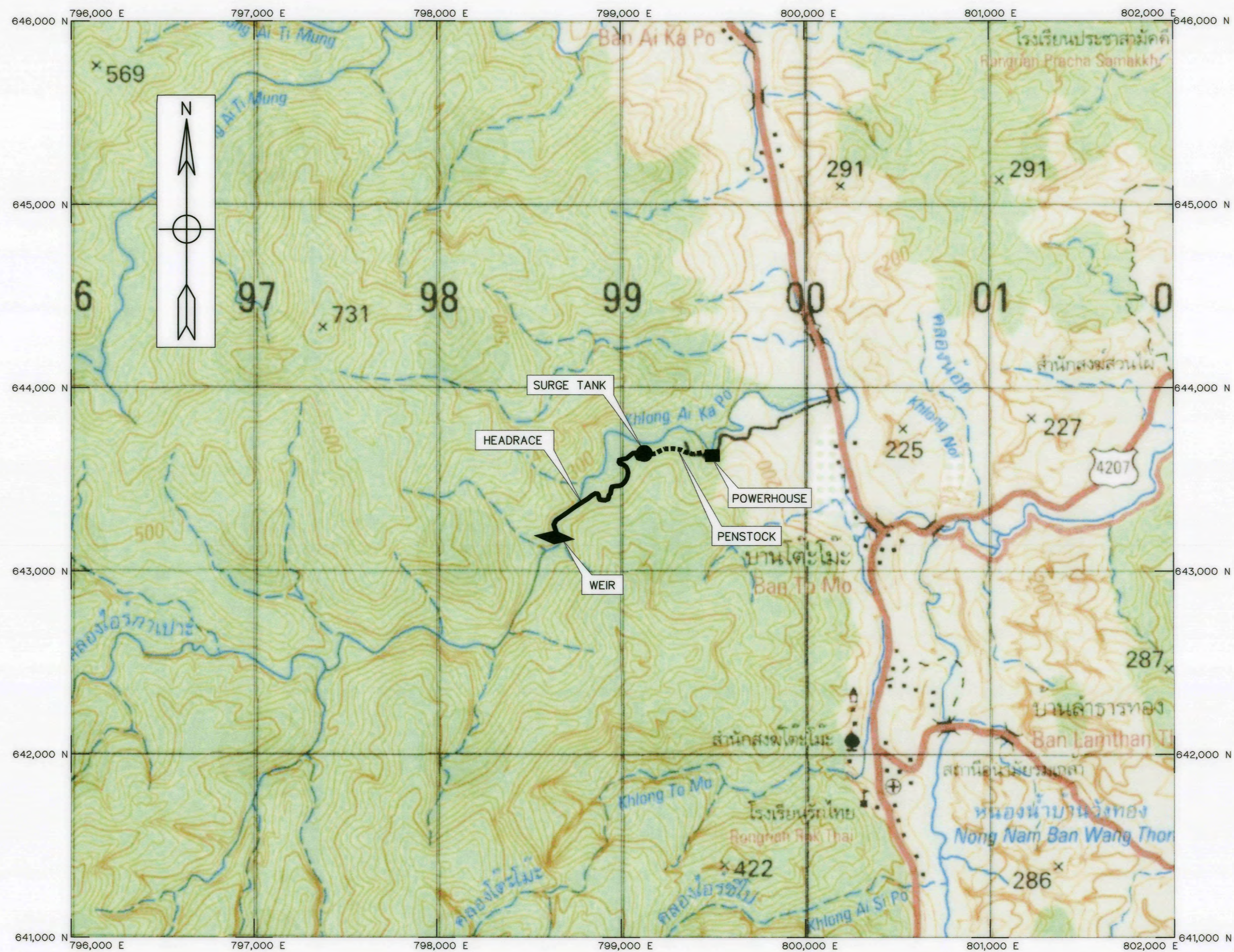
AI KA PO HYDROPOWER PROJECT

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SHEET NO.	DRAWING NO.	DRAWING DETAILS
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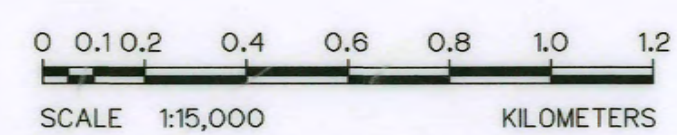
PROJECT AREA MAP
SCALE 1:15,000

LEGENDS :

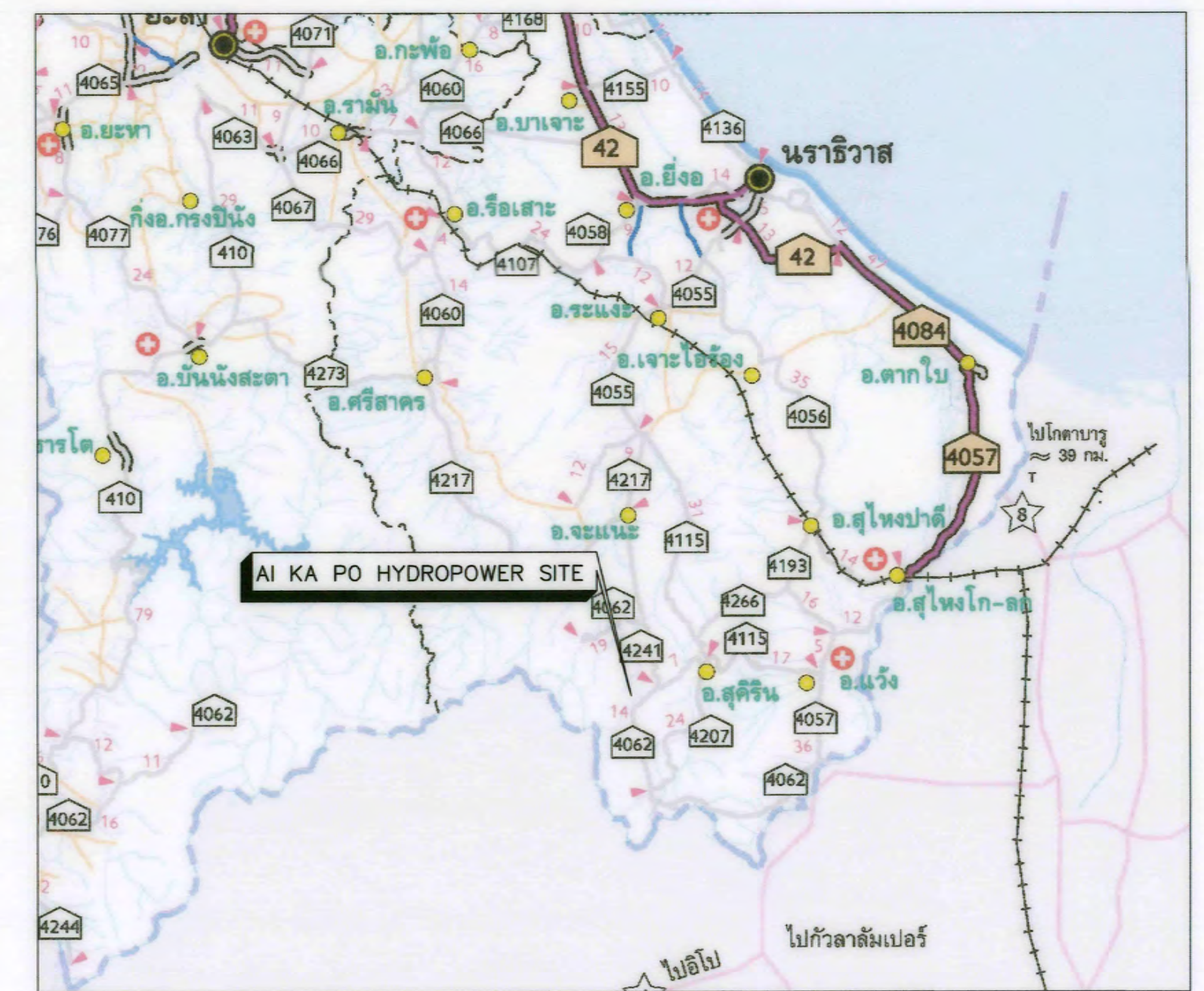
- STREAM
- WEIR
- HEADRACE
- SURGE TANK
- PENSTOCK
- POWERHOUSE

NOTES :

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



LOCATION MAP
NOT TO SCALE



AI KA PO HYDROPOWER SITE LOCATION
NOT TO SCALE

KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
AI KA PO HYDROPOWER PROJECT TAMBON PHUKHAO THONG AMPHOE SUKHIRIN CHANGWAT NARATHIWAT	
PART : 1 CIVIL WORKS AND TRANSMISSION LINE GENERAL LOCATION MAP AND PROJECT AREA MAP	
PCM P&C MANAGEMENT CO., LTD. SPT CONSULTANTS CO., LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED 28/10/2021	REVIEWED
DRAWN	SUBMITTED
CHECKED 28/10/2021	RECOMMENDED
APPROVED	APPROVED
PROJECT MANAGER	DRAWING NO. AKP-GN-01
DATE	SHEET NO. 1 OF 129

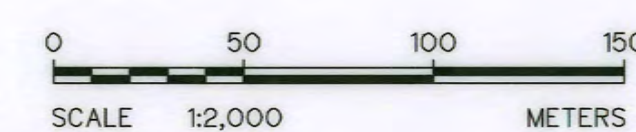


NO.	BENCH MARK	WGS 84 GRID CO-ORDINATE		ELEVATION (MSL.)	AZIMUTH	DISTANCE (m.)	REMARK
		NORTHING	EASTING				
1	GPS 01	643,950.751	800,140.755	142.190			หมุดดินแดนเลลมีอยู่บริเวณทางท่าสะพาน
					159°-29'-23"	63.712	Distance & Azimuth from GPS 01 to GPS 02
2	GPS 02	643,891.078	800,163.078	141.559			หมุดดินแดนเลลมีอยู่บริเวณคอนกรีตที่เชื่อมกับบริเวณหน้าป้ายจราจร
3	GPS 03	643,650.377	799,488.400	162.008			หมุดดินแดนเลลมีอยู่บริเวณหน้าบ่อมียาม
					264°-43'-35"	96.875	Distance & Azimuth from GPS 03 to GPS 04
4	GPS 04	643,639.030	799,392.192	169.018			หมุดดินแดนเลลมีอยู่บริเวณจุดรองรับท่อลงน้ำ
5	GPS 05	643,642.955	799,174.890	229.238			หมุดดินแดนเลลมีอยู่บริเวณคอนกรีตที่เชื่อมกับบริเวณอาคารคานแรงดัน
					270°-02'-44"	44.945	Distance & Azimuth from GPS 05 to GPS 06
6	GPS 06	643,642.282	799,129.950	230.934			หมุดดินแดนเลลมีอยู่บริเวณคอนกรีตที่เชื่อมกับบริเวณพื้นดิน
7	GPS 07	643,353.531	798,749.252	234.302			หมุดดินแดนเลลมีอยู่บริเวณหินบริเวณหน้าฝาย
					116°-20'-29"	22.375	Distance & Azimuth from GPS 07 to GPS 08
8	GPS 08	643,343.603	798,729.200	238.237			หมุดดินแดนเลลมีอยู่บริเวณขอบฝายฝั่งซ้ายที่ตลิ่งดินค

PROJECT MAP
SCALE 1:2,000

NOTES :

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



3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED
CONSULTANTS		DEDE		

KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY			
AI KA PO HYDROPOWER PROJECT TAMBON PHUKHAO THONG AMPHOE SUKHIRIN CHANGWAT NARATHIWAT			
PART : 1 CIVIL WORKS AND TRANSMISSION LINE GENERAL PROJECT MAP			
PCM P&C MANAGEMENT CO., LTD. SPT CONSULTANTS CO., LTD.	DESIGNED 11/10/20 20/074 20/074	REVIEWED 20/074	
	DRAWN 20/074	SUBMITTED 20/074	
	CHECKED 20/074	RECOMMENDED 20/074	
	APPROVED 20/074	APPROVED 20/074	
	28/10/2021	DRAWING NO. AKP-GN-02	SHEET NO. 2 OF 129
PROJECT MANAGER		DATE	

ABBREVIATIONS :

A	CROSS-SECTION AREA OF FLOW	MAX.	MAXIMUM
AC.	ASBESTOS CEMENT PIPE	M.S.L.	MEAN SEA LEVEL
AGG.	AGGREGATE	MISC.	MISCELLANEOUS
ALT.	ALTERNATIVE	N.	NORTH
APPROX.	APPROXIMATE	n.	MANNING'S ROUGHNESS COEFFICIENT
AZ.	AZIMUTH	N.F.	NEAR FACE
B.	BEGINNING OF SURVEY	NGL.	NATURAL GROUND LEVEL
BC.	BEGINNING OF CURVE	NO. OR #	NUMBER
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 HORIZONTAL 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
CL.	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	PVL.	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	r	HYDRAULIC RADIUS
	DEVELOPMENT AND EFFICIENCY	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	Vg.	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 :

	TYPICAL NORTH ARROW
	CENTER LINE
	PAVED ROAD
	DIRT ROAD, LATEITE ROAD OR TRACK
	VILLAGE
	CITY OR DISTRICT
	POND OR SWAMP
	CULVERT UNDER ROAD
	BRIDGE
	POLE
	TEST PIT
	EXISTING HAND AUGER
	EXISTING DRILL HOLES
	DRILL HOLES
	DEGREE, MINUTE, SECOND
	AT EQUAL DISTANCE BETWEEN CENTER TO CENTER
	B.M.
	STATION
	BC., EC., PC., PI., PT., PCV., PVT.
	WATER LEVEL
	PLAN OF RIPRAP
	PLAN OF SLOPE RIPRAP
	SECTION OF DUMPED RIPRAP
	SECTION OF HAND PLACED RIPRAP
	SECTION OF SAND
	SECTION OF GRAVEL OR COARSE AGGREGATE
	SECTION OF ROCK
	SECTION OF EARTH
	SECTION OF BACKFILL
	SECTION OF CONCRETE
	STEEL SECTION
	ELEVATION OR PLAN OF EARTH CUT OR FILL
	ELEVATION OR PLAN OF ROCK CUT
	ELEVATION OR PLAN OF SLOPE
	NATURAL GROUND LEVEL
	CONTOUR LINE
	RIVER, STREAM OR NATURAL DRAIN
	FLOW DIRECTION
	SLOPE DIRECTION
	SLOPE RATIO

GENERAL NOTES :

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

EXISTING GROUND SLOPE 1:S	EARTH		HARD ROCK	
	CUT 1:S	FILL 1:S	CUT 1:S	FILL 1:S
OVER 1:1	OVER 1:0.5 $\frac{2}{1}$	$\frac{1}{1}$	1:0	$\frac{1}{1}$
1:1 - 1:1.5	1:0.5	1	1:0	$\frac{1}{1}$
1:1.5 - 1:2	1:1	1:1	1:0	1:1
1:2 - 1:3	1:1	1:1.5	1:0	1:1.5
LOWER 1:3	1:1	1:2	1:0	1:2

$\frac{2}{1}$ = FILL SHOULD BE AVOIDED

$\frac{1}{1}$ = FOR DOUBTFUL CASES CONSULT FIELD ENGINEER

STRUCTURAL DESIGN NOTES :

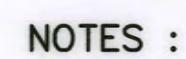
- THE ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE OF STANDARD CYLINDER (Ø0.15x0.30 m.) TEST AT AGE 28 DAYS SHALL BE AS THE FOLLOWING, UNLESS OTHERWISE SHOWN.

f'c (ksc)	DESCRIPTION
350	PRESTRESS CONCRETE
240	O&M ROAD
210	1. WEIR, INTAKE STRUCTURE, SEDIMENT TRAP
	2. POWERHOUSE, TAILRACE
	3. CROSS DRAINAGE STRUCTURE
	4. MANHOLE
	5. ANCHOR BLOCK, PIPE SUPPORT
140	LEAN CONCRETE

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

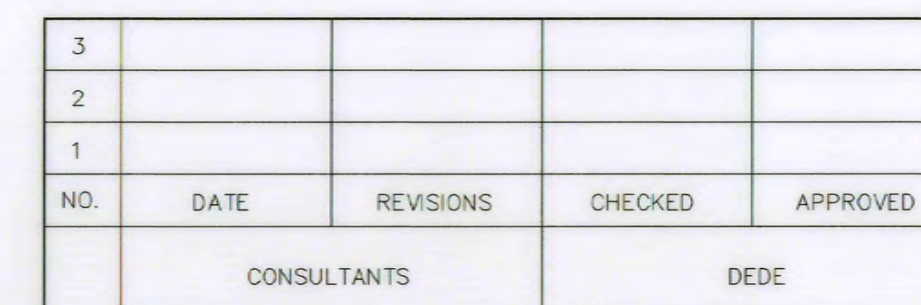
- WEIR, INTAKE AND SEDIMENT TRAP	$Q_a = 10 \text{ T/M}^2$
- HEADRACE	$Q_a = 5 \text{ T/M}^2$
- SURGE TANK	$Q_a = 20 \text{ T/M}^2$
- POWERHOUSE	$Q_a = 20 \text{ T/M}^2$
- PENSTOCK	$Q_a = 10 \text{ T/M}^2$
- RETAINING WALL, TAILRACE	$Q_a = 10 \text{ T/M}^2$
- OTHER STRUCTURES	$Q_a = 5 \text{ T/M}^2$

KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY			
AI KA PO HYDROPOWER PROJECT TAMBON PHUKHAO THONG AMPHOE SUKHIRIN CHANGWAT NARATHIWAT			
PART : 1 CIVIL WORKS AND TRANSMISSION LINE GENERAL SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES			
P&C MANAGEMENT CO., LTD. SPT CONSULTANTS CO., LTD.	DESIGNED <i>[Signature]</i> 28/9/2021 DRAWN <i>[Signature]</i> CHECKED <i>[Signature]</i> 28/9/2021 PROJECT MANAGER	REVIEWED <i>[Signature]</i> SUBMITTED <i>[Signature]</i> RECOMMENDED <i>[Signature]</i> APPROVED <i>[Signature]</i> 28/10/2021 DATE	SHEET NO. 3 OF 129

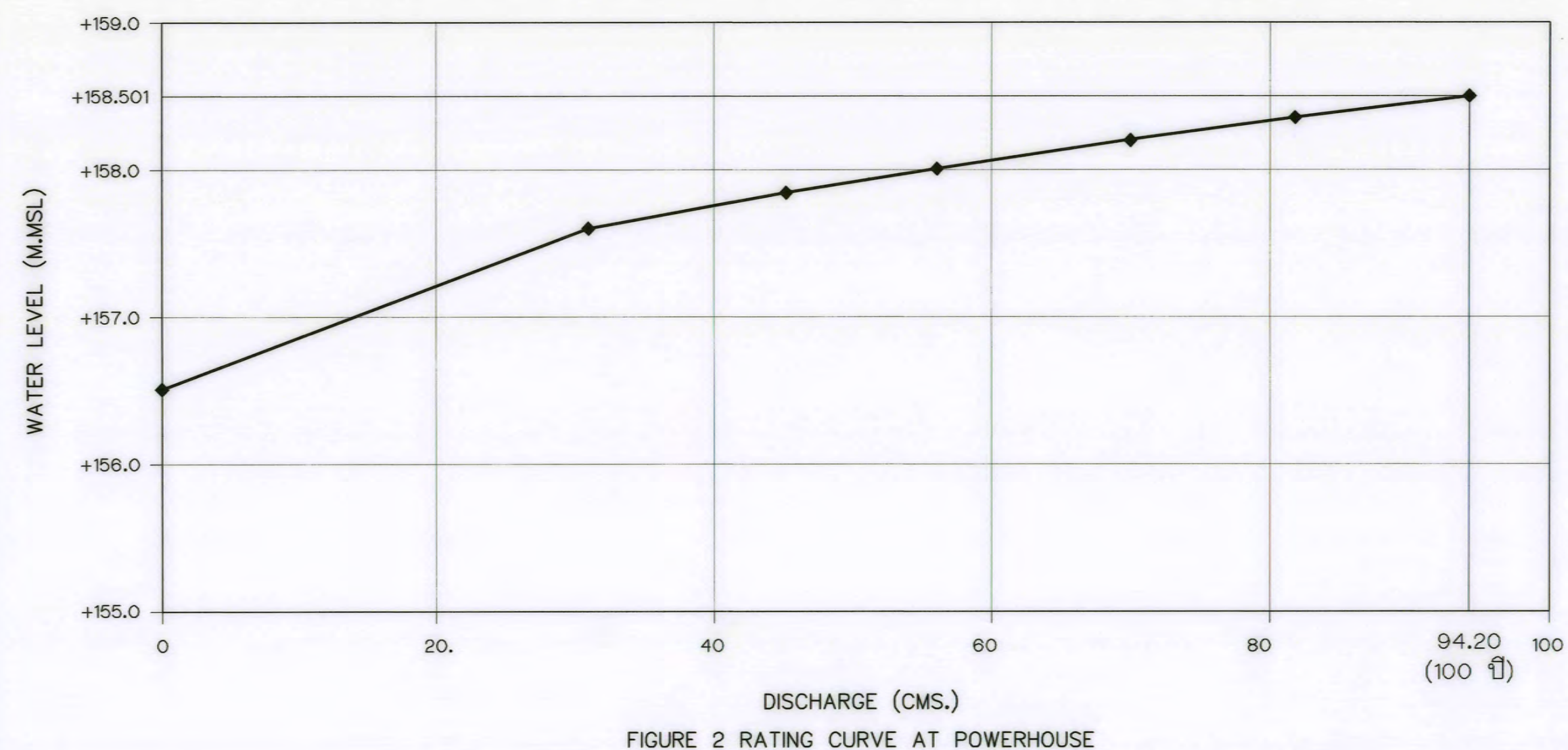
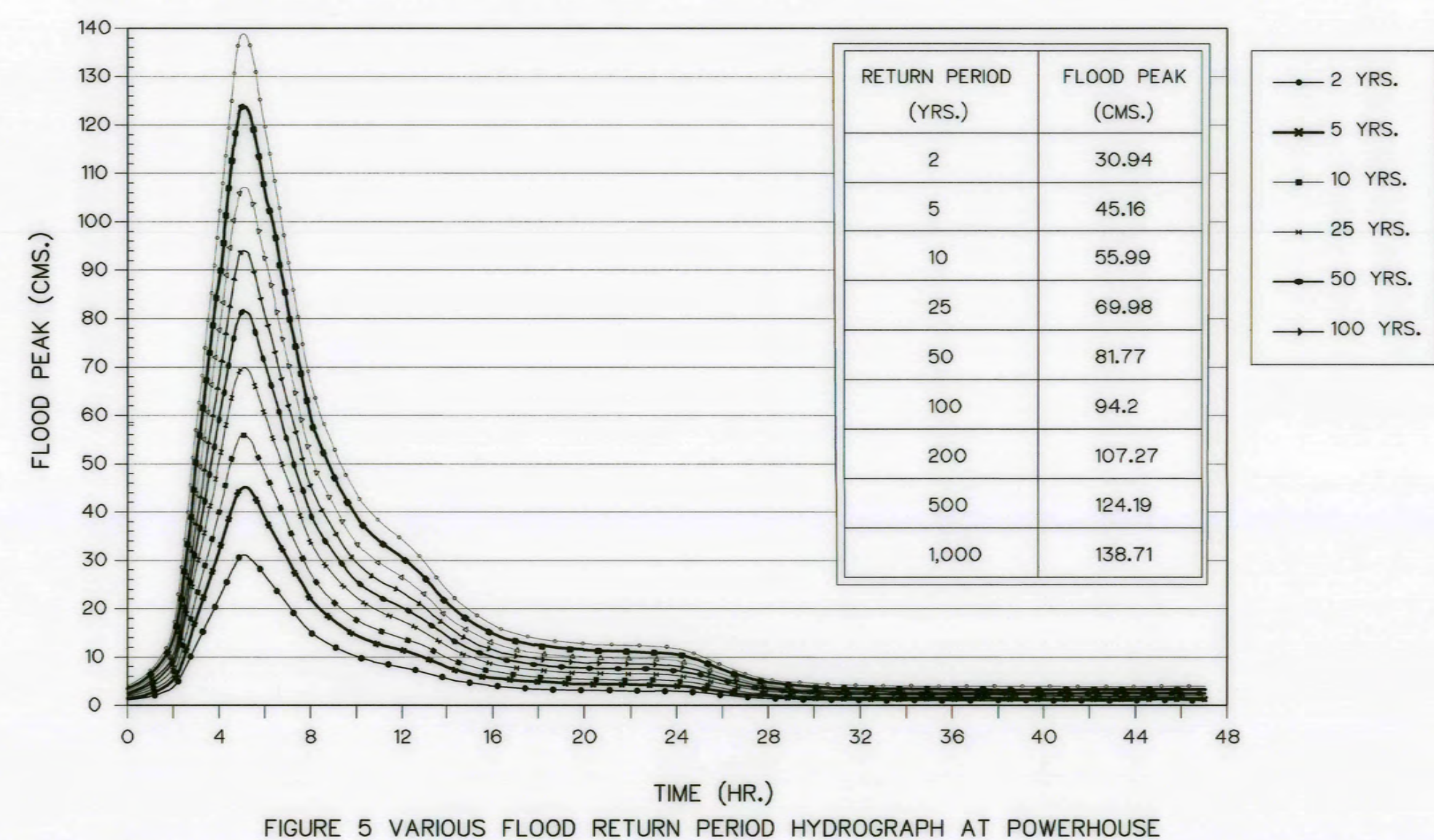
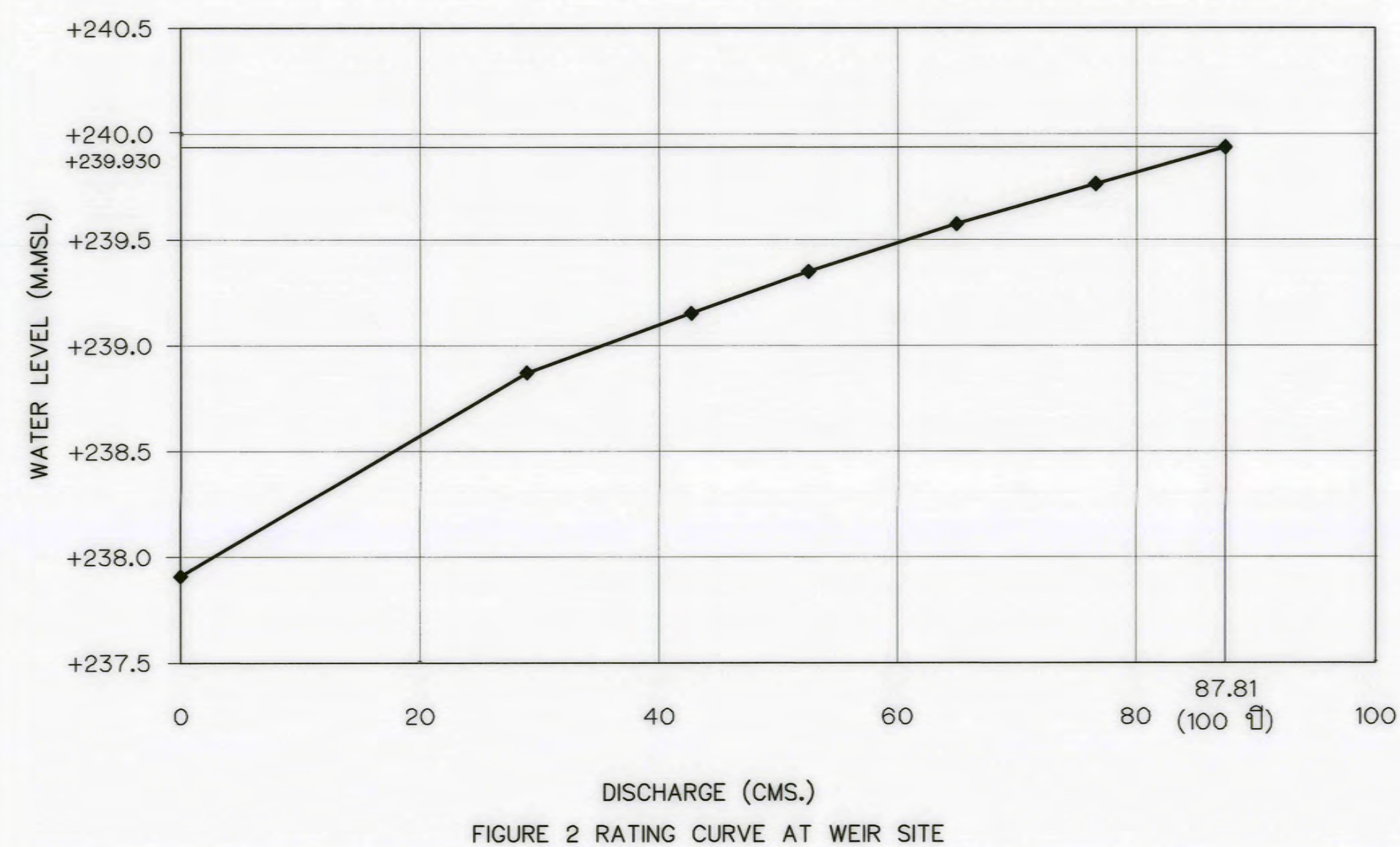
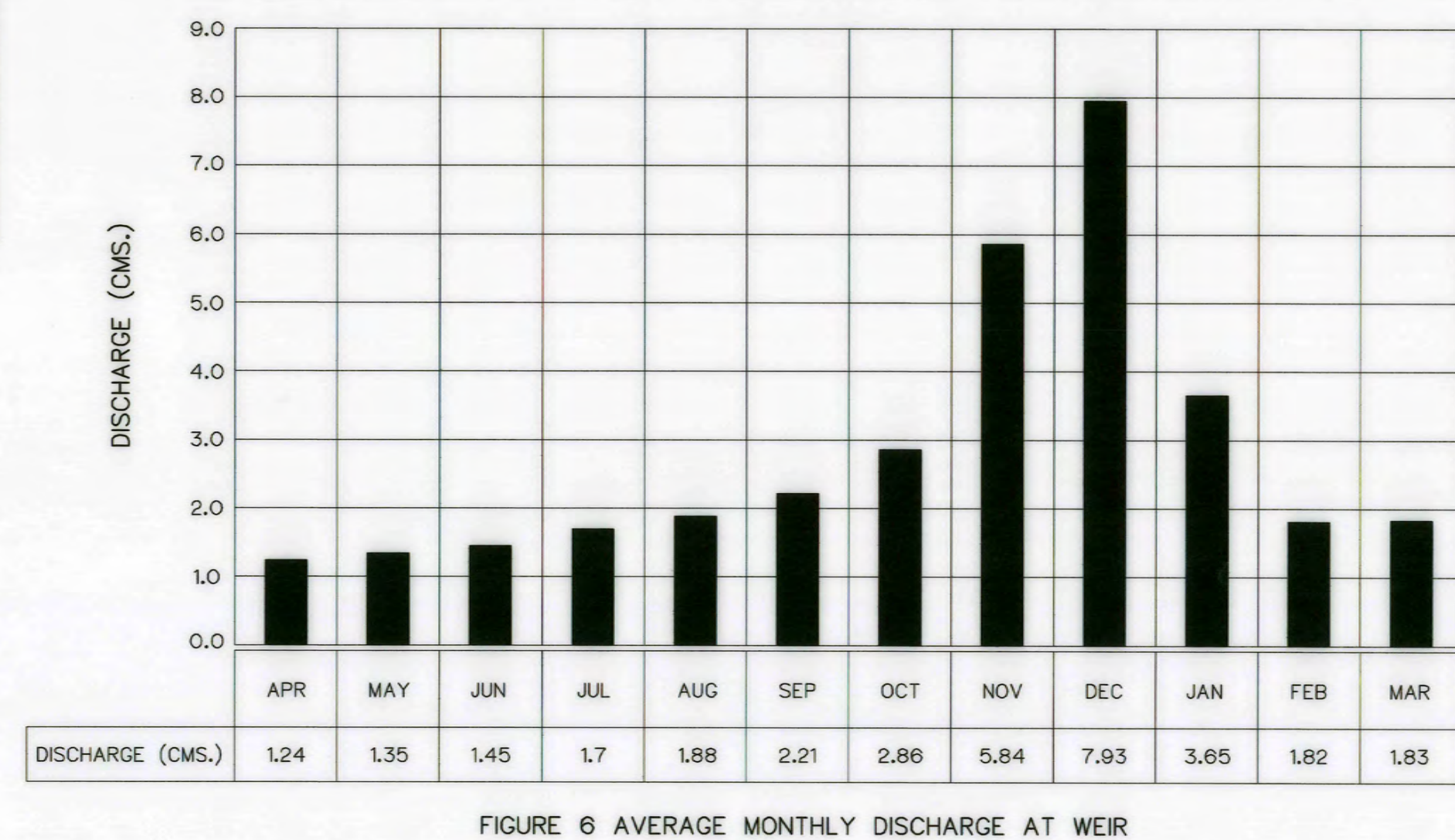
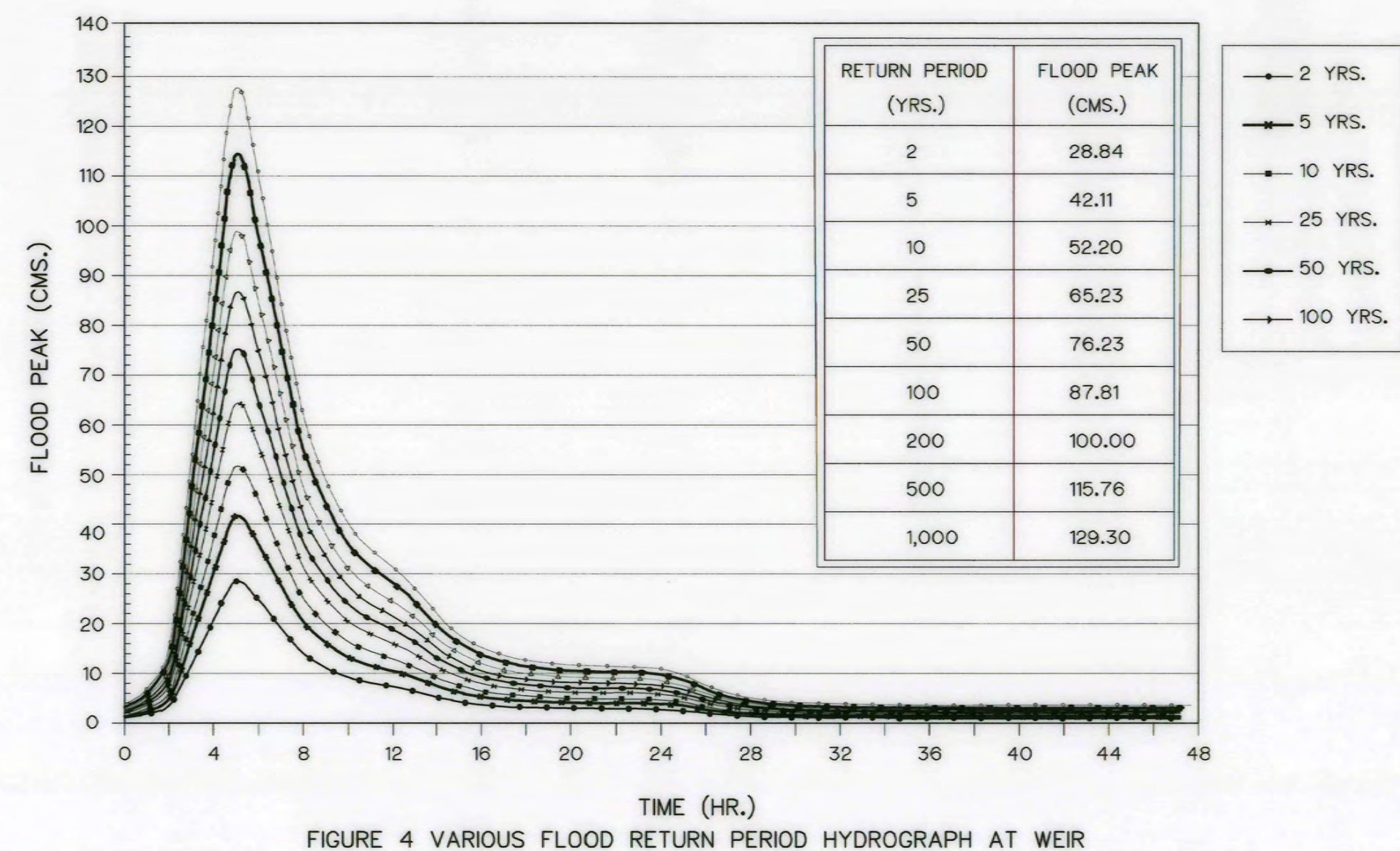
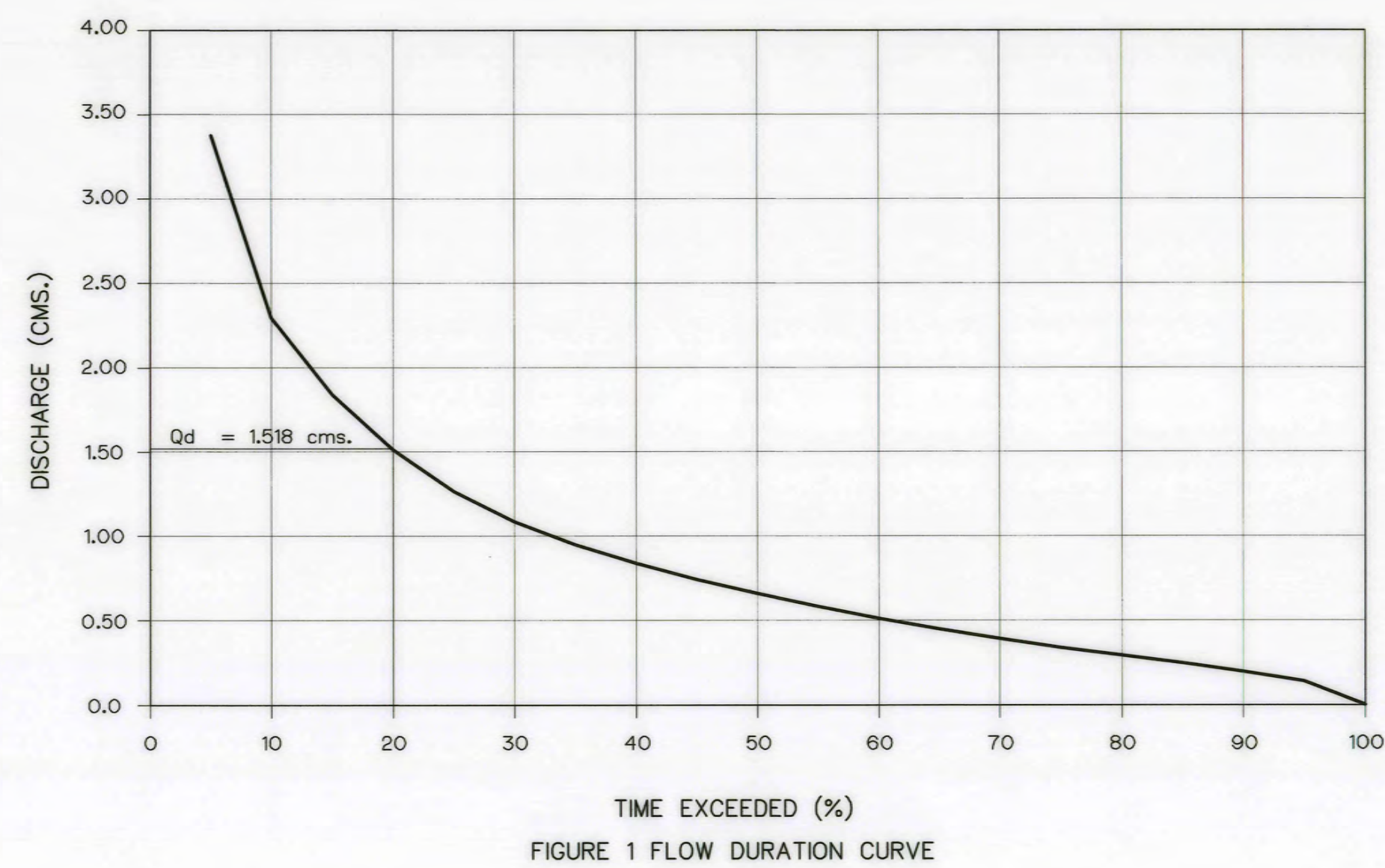


- ### PROFILE ALONG WATERWAY C

LOAD CASES	ALLOWABLE TENSILE STRESS
EXTREME WATER PRESSURE RESULTING FROM SLOWEN CLOSURE OF THE TABLE VALVE	1.00 x MINIMUM YIELD STRESS
EMERGENCY WATER PRESSURE AND ALL OTHER NORMAL LONGITUDINAL LOADS	0.75 x MINIMUM YIELD STRESS
NORMAL WATER PRESSURE AND ALL OTHER NORMAL LONGITUDINAL LOADS	0.60 x MINIMUM YIELD STRESS



 KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
AI KA PO HYDROPOWER PROJECT TAMBON PHUKHAO THONG AMPHOE SUKHIRIN CHANGWAT NARATHIWAT	
PART : 1 CIVIL WORKS AND TRANSMISSION LINE GENERAL POWER WATERWAY HYDRAULIC GRADE LINE	
 P&C MANAGEMENT CO., LTD. SPT CONSULTANTS CO., LTD.	 Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY
DESIGNED <i>Wan 28.129074</i> <i>Ch</i> 28.9.462	REVIEWED <i>DAB</i>
DRAWN <i>Ch</i>	SUBMITTED <i>Ch</i>
CHECKED <i>Ch</i> 28.8.231	APPROVED <i>Wan</i>
<i>Ch</i> PROJECT MANAGER DATE 28/10/2021	DRAWING NO. AKP-GN-04 SHEET NO. 4 OF 129



KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
AI KA PO HYDROPOWER PROJECT TAMBON PHUKHAO THONG AMPHOE SUKHIRIN CHANGWAT NARATHIWAT	
PART : 1 CIVIL WORKS AND TRANSMISSION LINE GENERAL DRAWING HYDROLOGICAL DATA	
DESIGNED: <i>[Signature]</i> 28.29074 DRAWN: <i>[Signature]</i> CHECKED: <i>[Signature]</i> 28.8231 PROJECT MANAGER: <i>[Signature]</i>	REVIEWED: <i>[Signature]</i> SUBMITTED: <i>[Signature]</i> RECOMMENDED: <i>[Signature]</i> APPROVED: <i>[Signature]</i> 28.10/2021 DATE: 28/10/2021
CONSULTANTS DEDE	DRAWING NO. AKP-GN-05 SHEET NO. 5 OF 129



- SYMBOL
- ⊗ BH-1 BORE HOLE (ROCK CORING)
 - △ DH-1 BORE HOLE (WASH BORING)

GEOTECHNICAL INVESTIGATION PLAN

SCALE 1:2,500

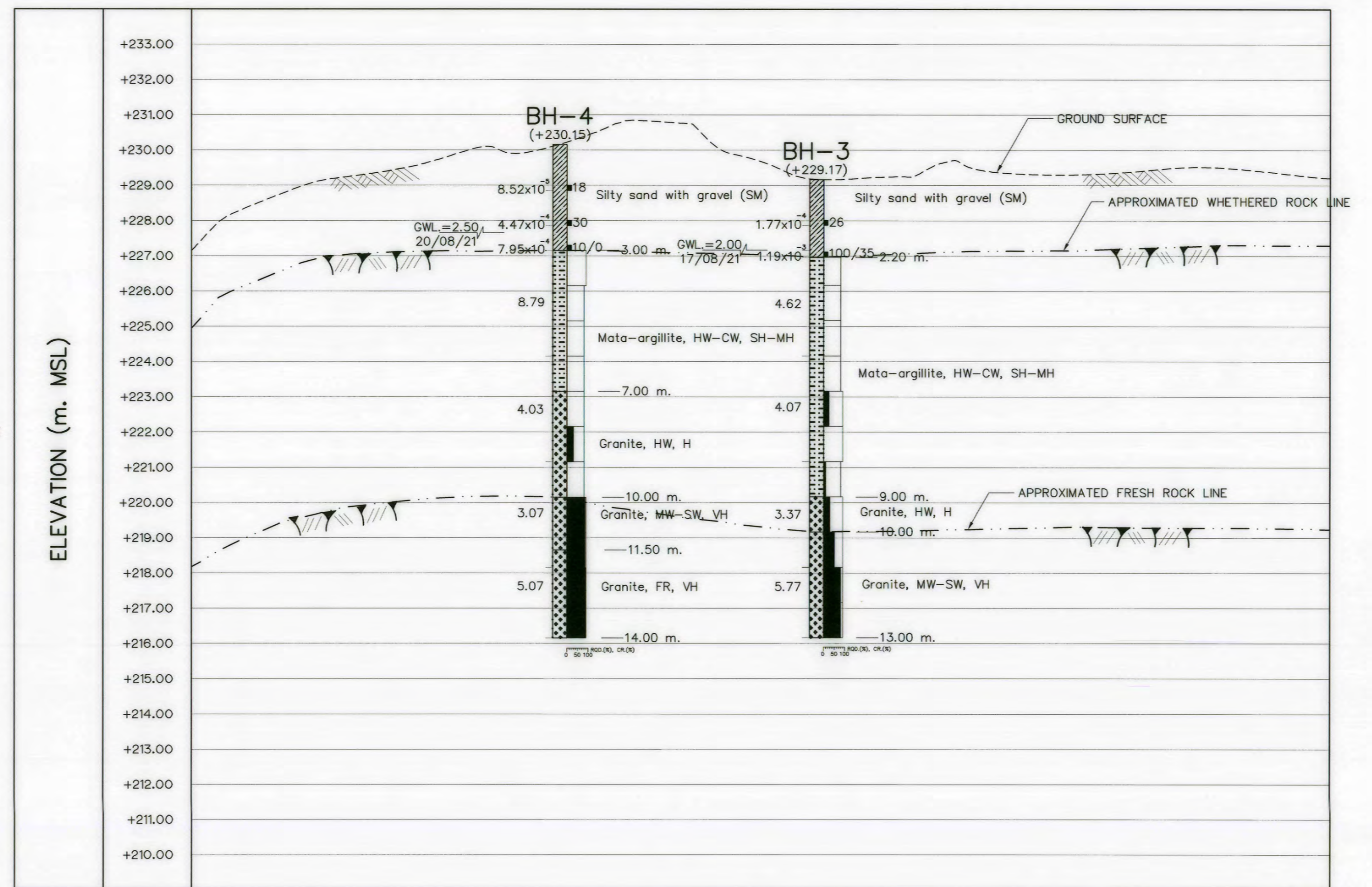
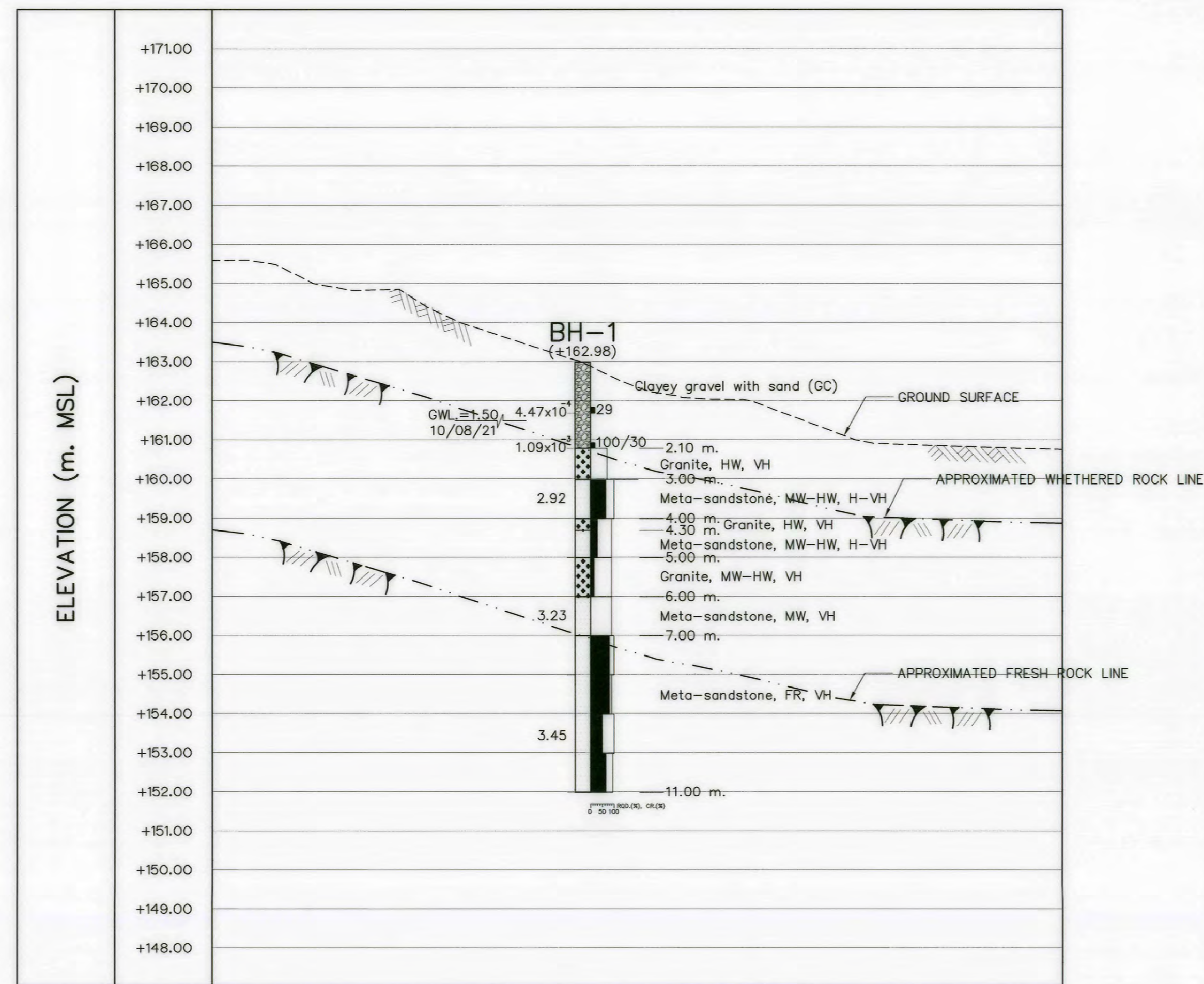
NO.	NAME	WGS 84 GRID CO-ORDINATE		DEPTH (METER)	REMARK
		NORTHING	EASTING		
1	BH-1	643,633.344	799,472.782	10	บริเวณโรงไฟฟ้า
2	BH-2	643,660.668	799,329.574	6	บริเวณท้ายลงน้ำ
3	BH-3	643,642.071	799,135.406	8	บริเวณอาคารลดแรงดัน (SURGE TANK)
4	BH-4	643,642.286	799,128.163	10	บริเวณอาคารลดแรงดัน (SURGE TANK)
5	BH-5	643,338.985	798,748.890	8	บริเวณท้ายเดิม ฐานยันขวา
6	BH-6	643,343.539	798,738.216	8	บริเวณท้ายเดิม กลางน้ำ
รวมความลึกงานเจาะสำรวจ				50	
7	DH-1	643,639.635	799,389.932	5	บริเวณท้ายลงน้ำ (PENSTOCK)
8	DH-2	643,657.779	799,217.254	5	บริเวณท้ายลงน้ำ (PENSTOCK)
9	DH-3	643,621.736	799,039.414	5	บริเวณท้ายขึ้นน้ำ (HEADRACE)
10	DH-4	643,484.633	798,981.940	5	บริเวณท้ายขึ้นน้ำ (HEADRACE)
11	DH-5	643,407.030	798,852.119	5	บริเวณท้ายขึ้นน้ำ (HEADRACE)

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

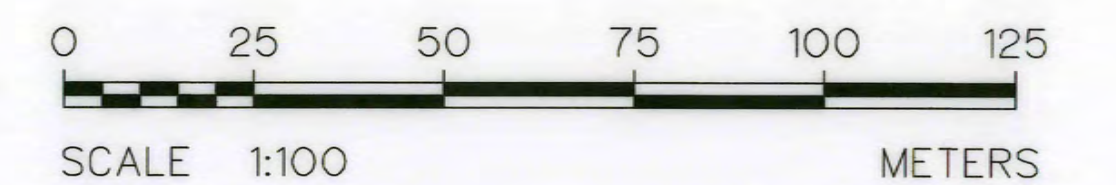
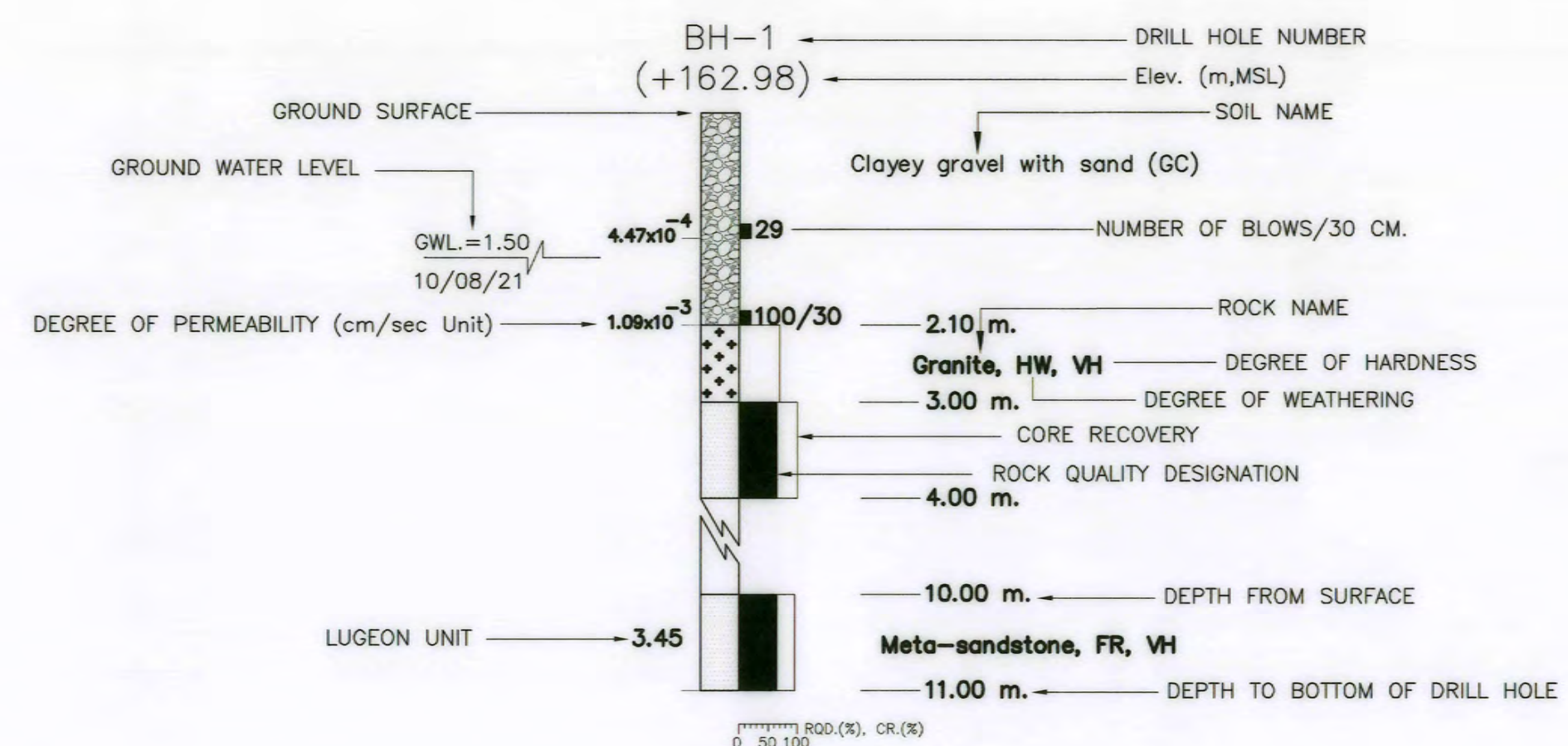
0 50 100 150 200
SCALE 1:2,500 METERS

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED
CONSULTANTS		DEDE		

KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY			
AI KA PO HYDROPOWER PROJECT TAMBON PHUKHAO THONG AMPHOE SUKHIRIN CHANGWAT NARATHIWAT			
PART : 1 CIVIL WORKS AND TRANSMISSION LINE GENERAL GEOTECHNICAL INVESTIGATION PLAN			
PCM P&C MANAGEMENT CO., LTD.	Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY		
SPT CONSULTANTS CO., LTD.	REVIEWED	SPT	
DESIGNED	28/10/2021	28.8969	SUBMITTED
DRAWN			RECOMMENDED
CHECKED		28.8231	APPROVED
PROJECT MANAGER		DATE	DRAWING NO.
			AKP-GN-06
			SHEET NO.
			6 OF 129



EXPLANATION



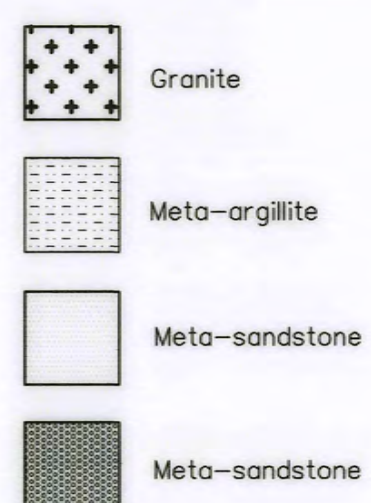
- NOTES :**
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS. UNLESS OTHERWISE SHOWN.
 2. SYMBOLE, ABBREVIATIONS AND CENERAL NOTES SEE DWG. NO. AKP-GN-03

LEGEND

SOIL SYMBOLS



ROCK SYMBOLS



DEGREE OF WEATHERING

FR. = FRESH ROCK
SW. = SLIGHTLY WEATHERED ROCK
MW. = MODERATELY WEATHERED ROCK
HW. = HIGHLY WEATHERED ROCK
CW. = COMPLETELY WEATHERED ROCK

DEGREE OF PERCENTAGE OF RQD.

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

DEGREE OF HARDNESS

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

DEGREE OF PERMEABILITY

< 1 LUGEON OR < 10⁻⁵ CM/SEC = IMPERVIOUS
1-5 LUGEON OR 10⁻⁵ - 5x10⁻⁴ CM/SEC SEMI-IMPERVIOUS
5-10 LUGEON OR 5x10⁻⁵ - 10⁻⁴ CM/SEC SEMI-PERVIOUS
10-50 LUGEON OR 10⁻⁴ - 5x10⁻⁴ CM/SEC RATHER-PERVIOUS
> 50 LUGEON OR > 5x10⁻⁴ CM/SEC = PERVIOUS

3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED
			CONSULTANTS	DEDE

KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
AI KA PO HYDROPOWER PROJECT TAMBON PHUKHAO THONG AMPHOE SUKHIRIN CHANGWAT NARATHIWAT	
PART : 1 CIVIL WORKS AND TRANSMISSION LINE GENERAL GEOLOGICAL SECTION A-A AND B-B	
DESIGNED 10/10/2021 28/10/2021	SUBMITTED 28/10/2021 28/10/2021
PROJECT MANAGER DATE	DRAWING NO. AKP-GN-07
SHEET NO. 7 OF 129	