



Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI BONG 2 MICRO-HYDROPOWER PROJECT
AMPHOE MUEANG CHANGWAT PHETCHABUN
TAT MOK NATIONAL PARK

CONTRACT C2

ELECTRO – MECHANICAL EQUIPMENT

VOLUME 4

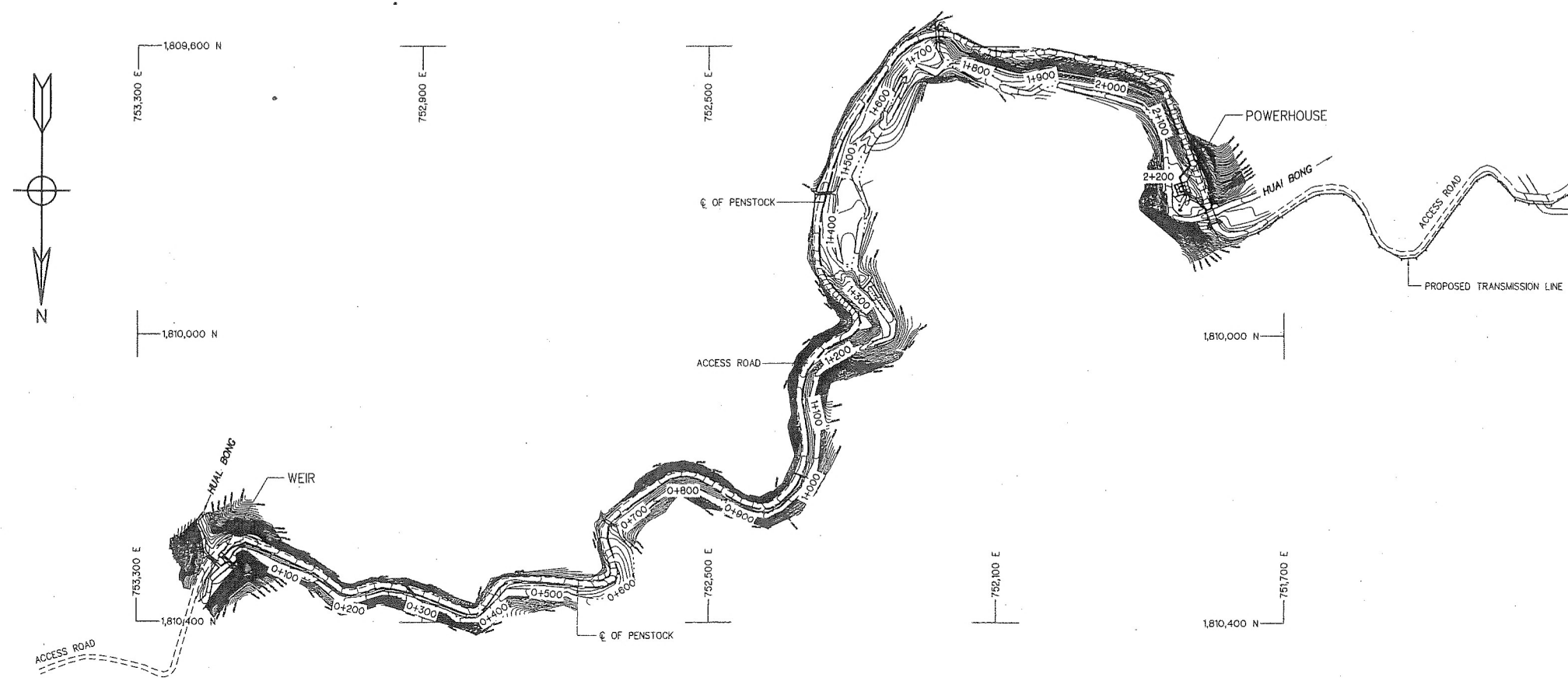
DRAWINGS



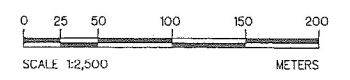
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.

HUAI BONG 2 MICRO-HYDROPOWER PROJECT
CONTACT C2 : LIST OF DRAWINGS

SHEET NO.	DRAWING NO.	DRAWING DETAIL
GENERAL		
1	HBG-GN-01	LOCATION MAP AND PROJECT AREA MAP
2	HBG-GN-02	PROJECT AREA MAP
3	HBG-GN-03	PLAN AND SECTIONS
ELECTRO-MECHANICAL EQUIPMENT		
4	HBG-EM-01	GENERAL TURBINE LAY-OUT
5	HBG-EM-02	SINGLE LINE DIAGRAM
6	HBG-EM-03	GENERAL ARRANGEMENT
7	HBG-EM-04	VIEW A
8	HBG-EM-05	RUNNER & SHAFT
9	HBG-EM-06	FLYWHEEL & SHAFT
10	HBG-EM-07	NOZZLE
11	HBG-EM-08	HYDRAULIC SYSTEM

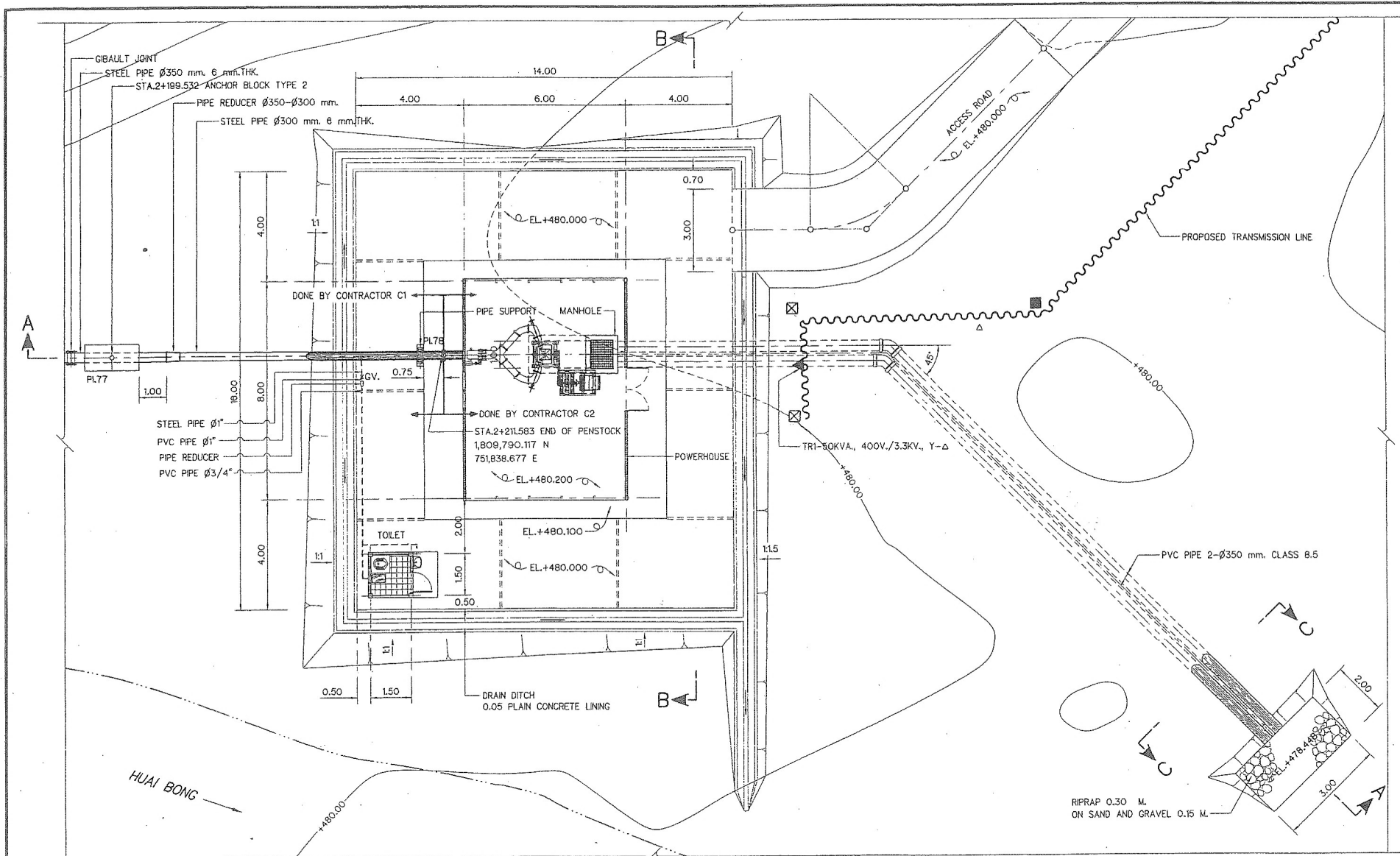


PROJECT MAP
SCALE 1:2,500



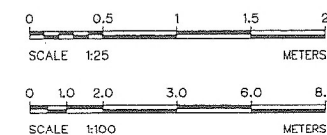
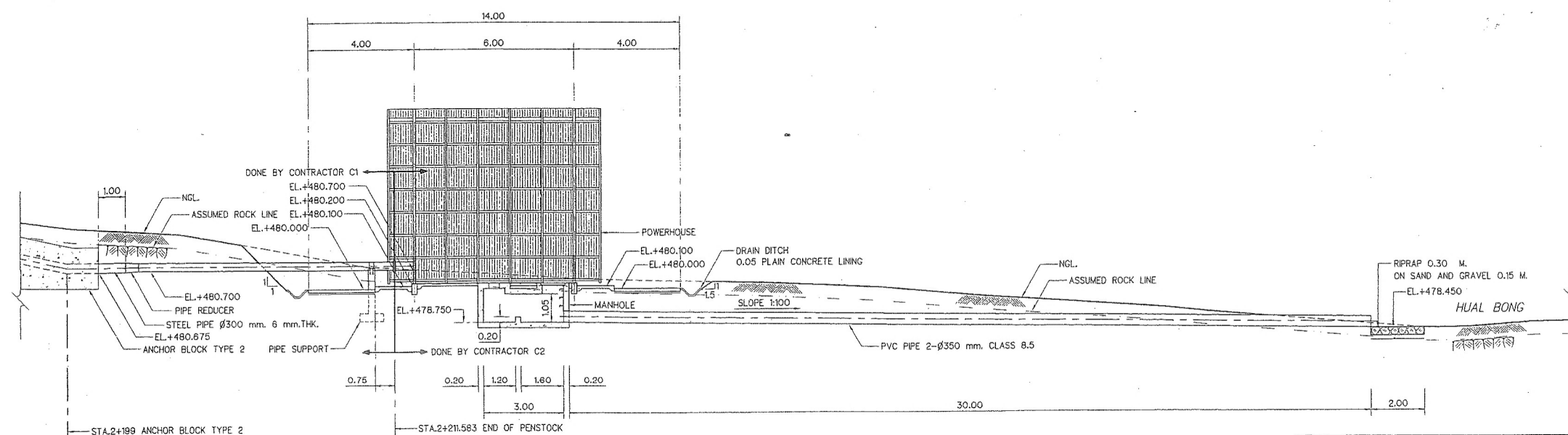
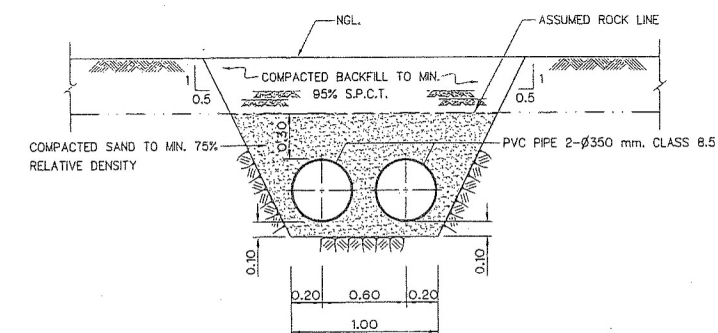
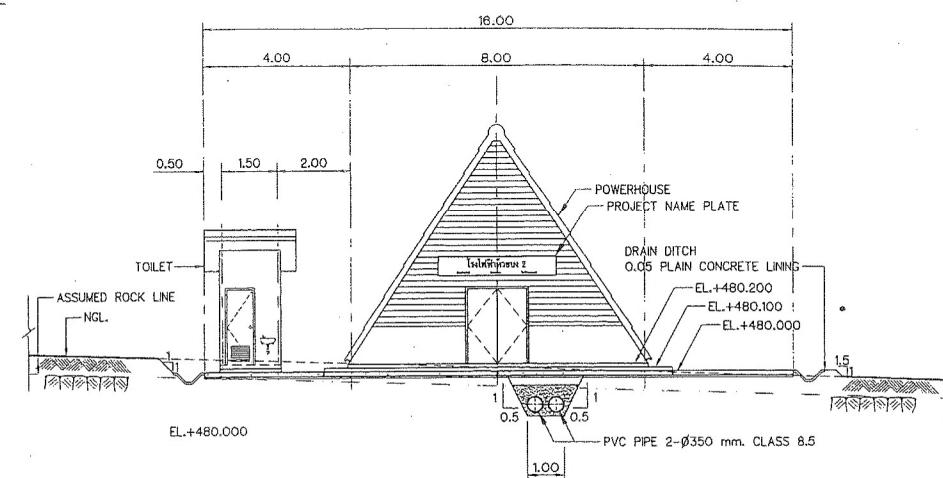
NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS. UNLESS OTHERWISE SHOWN.

KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
HUAI BONG 2 MICRO-HYDROPOWER PROJECT TAT MOK NATIONAL PARK	
ELECTRO - MECHANICAL EQUIPMENT GENERAL PROJECT MAP	
FRONTIER ENGINEERING CONSULTANTS CO., LTD. Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
3	REVIEWED
2	SUBMITTED
1	RECOMMENDED
NO.	APPROVED
DATE	DATE
REVISIONS	DATE
CHECKED	DATE
APPROVED	DATE
CONSULTANTS	DEDE
PROJECT MANAGER	DATE
DRAWING NO.	SHEET NO.
HBG-GN-02	2 OF 11

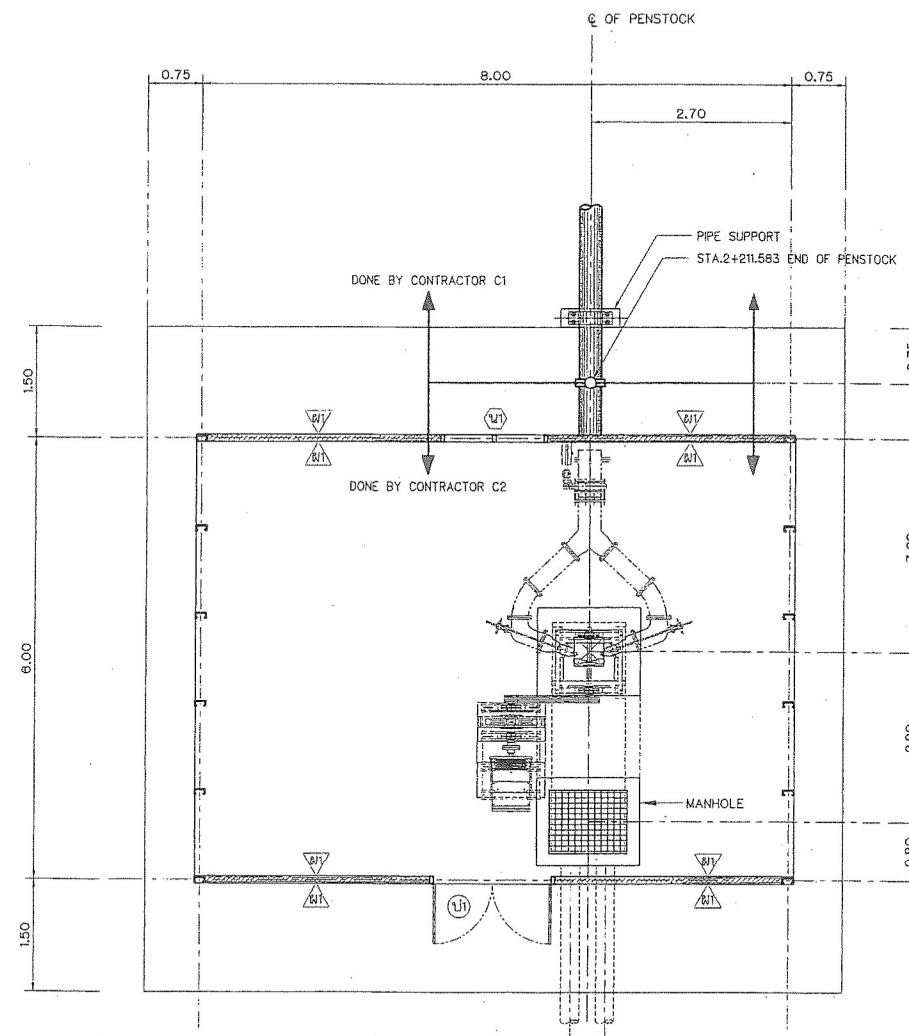


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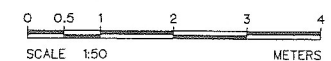
KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY			
HUAI BONG 2 MICRO-HYDROPOWER PROJECT TAT MOK NATIONAL PARK			
ELECTRO - MECHANICAL EQUIPMENT GENERAL PLAN AND SECTIONS			
FRONTIER ENGINEERING CONSULTANTS CO., LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
REVIEWED	DESIGNED	REVIEWED	DESIGNED
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NO.	DATE	REVISIONS	CHECKED
CONSULTANTS		DEDE	
PROJECT MANAGER		DATE	
DRAWING NO.		SHEET NO.	
HBG-CN-03		3 of 11	



TURBINE LAY-OUT
SCALE 1:50

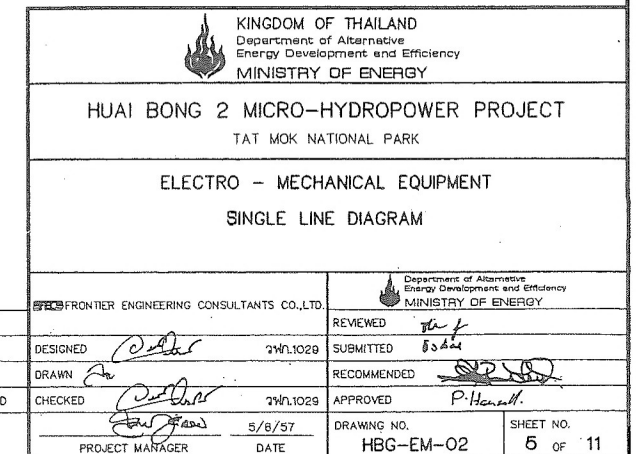
NOTE :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. TURBINE & GENERATOR FOUNDATION, BLOCKOUT SIZES AND LOCATIONS ARE ONLY APPROXIMATE, ELECTRO-MECHANICAL CONTRACTOR IS REQUIRED TO SUBMIT THE SHOP DRAWINGS INDICATED ALL FINAL SIZES AND LOCATIONS TO FIELD ENGINEER.

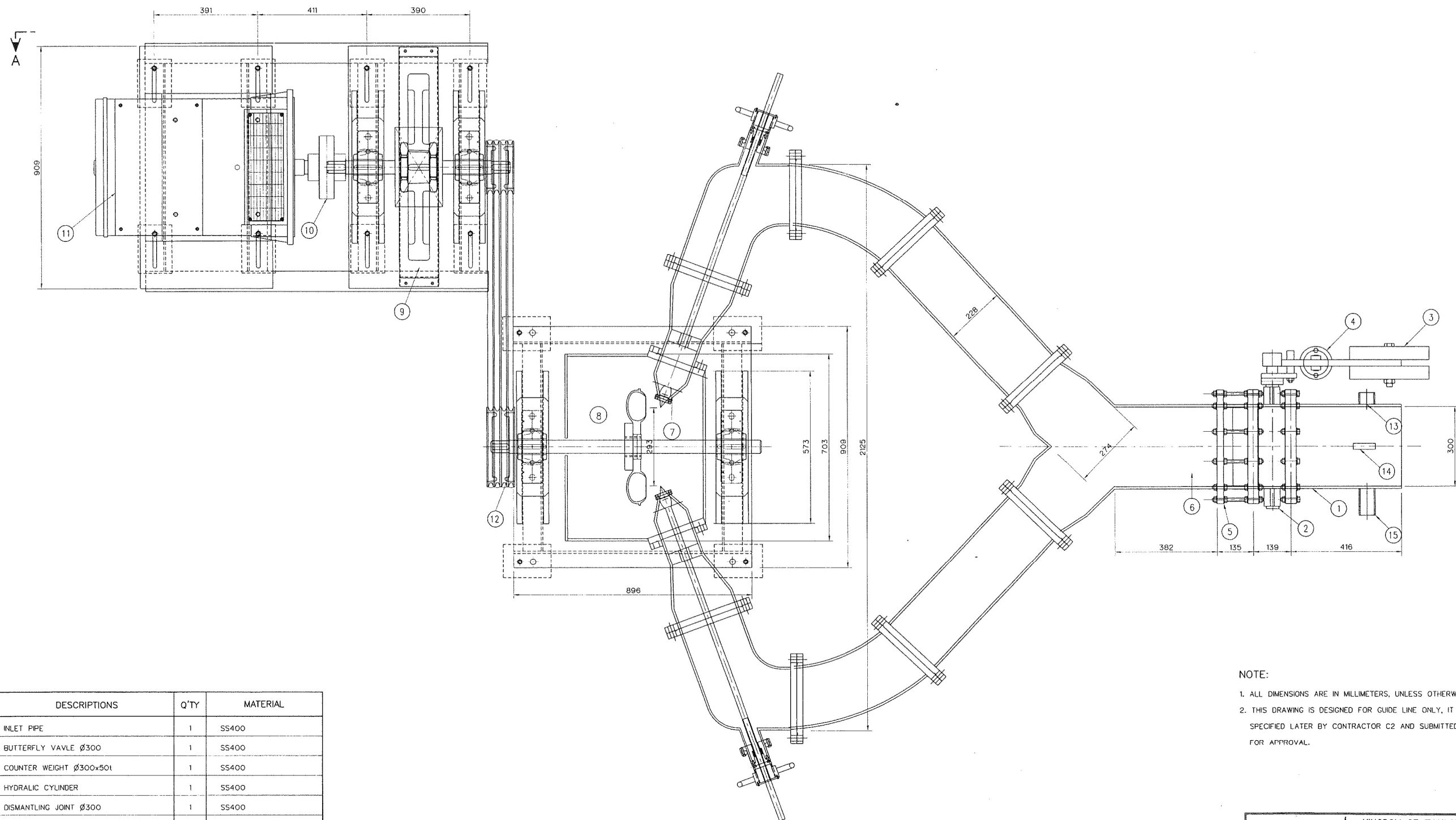


KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
HUAI BONG 2 MICRO-HYDROPOWER PROJECT TAT MOK NATIONAL PARK	
ELECTRO - MECHANICAL EQUIPMENT GENERAL TURBINE LAY-OUT	
FRONTIER ENGINEERING CONSULTANTS CO.,LTD. DESIGNED <i>[Signature]</i> 2/12/57 DRAWN <i>[Signature]</i> CHECKED <i>[Signature]</i> 5/8/57 PROJECT MANAGER	MINISTRY OF ENERGY REVIEWED <i>[Signature]</i> SUBMITTED <i>[Signature]</i> RECOMMENDED <i>[Signature]</i> APPROVED <i>[Signature]</i> DRAWING NO. HBG-EM-01 SHEET NO. 4 OF 11

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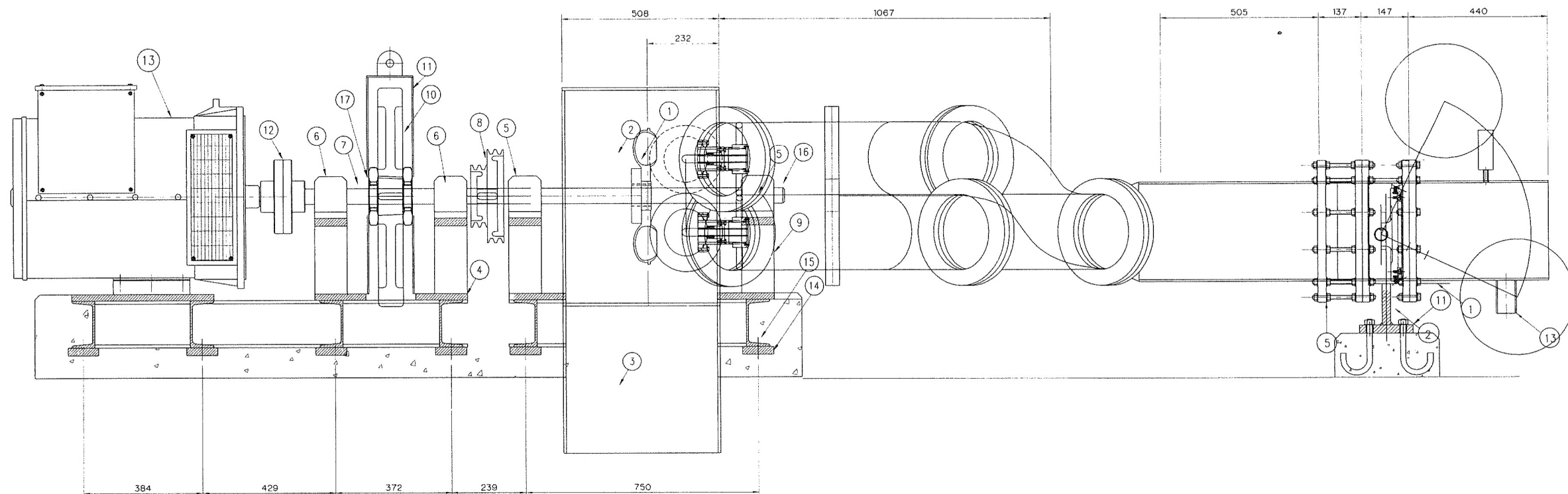
NOTE:

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

NO.	DESCRIPTIONS	Q'TY	MATERIAL
1	INLET PIPE	1	SS400
2	BUTTERFLY VAVLE Ø300	1	SS400
3	COUNTER WEIGHT Ø300x501	1	SS400
4	HYDRALIC CYLINDER	1	SS400
5	DISMANTLING JOINT Ø300	1	SS400
6	BIFERCATION	1	SS400
7	NOZZLE	2	ASTM-A743CA6NM
8	TURGO TURBINE	1	SS400
9	FLYWHEEL	1	SS41
10	FLEXIBLE COUPLING	1	JIS B-1452
11	GENERATOR 30 KW., 37.5 KVA.	1	400V,50Hz
12	PULLEY 1:1.5	1	SS400
13	PRESSURE RELEASE VALVE Ø125 mm	1	SS400
14	PRESSURE GAUGE	1	0-25 Bar
15	DRAINAGE PIPE	1	SS400

GENERAL ARRANGEMENT
NOT TO SCALE

 KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
HUAI BONG 2 MICRO-HYDROPOWER PROJECT TAT MOK NATIONAL PARK	
ELECTRO - MECHANICAL EQUIPMENT GENERAL ARRANGEMENT	
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	
DESIGNED <i>[Signature]</i> RL2197 DRAWN <i>[Signature]</i> CHECKED <i>[Signature]</i> RL2197 PROJECT MANAGER	REVIEWED <i>[Signature]</i> SUBMITTED <i>[Signature]</i> RECOMMENDED <i>[Signature]</i> APPROVED <i>[Signature]</i> DATE 5/8/57
NO. DATE REVISIONS CHECKED APPROVED CONSULTANTS DEDE	DRAWING NO. HBG-EM-03 SHEET NO. 6 OF 11



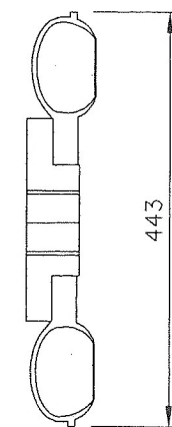
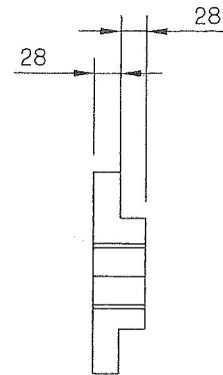
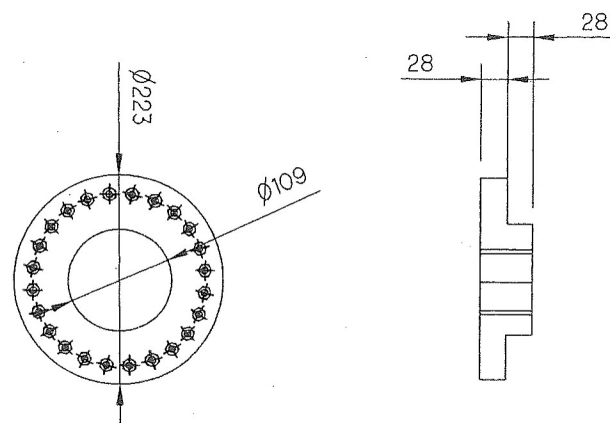
VIEW A
NOT TO SCALE

NO.	DESCRIPTIONS	Q'TY	MATERIAL
1	RUNNER	1	ASTM-A743 CA6NM
2	CASING	1	SS400
3	DRAFT TUBE	1	SS400
4	PLATE	1	SS400
5	SPHERICAL ROLLER BEARING	2	SKF or Equal
6	SPHERICAL ROLLER BEARING	2	SKF or Equal
7	FLYWHEEL SHAFT	1	S45C
8	PULLEY 1:1.5	4	STEEL
9	BEARING SUPPORT	4	SS400
10	FLYWHEEL	1	SS400
11	GUARD FLYWHEEL	1	SS400
12	FLEXIBLE COUPLING	1	JIS B-1452
13	GENERATOR	1	380V,50Hz
14	PLATE 25t	1 SET	SS400
15	CHANNEL 150x75x6.5x10 mm	1 SET	JIS G3192
16	SHAFT RUNNER	1	S45C
17	FLYWHEEL LOCKRING	2	SS400

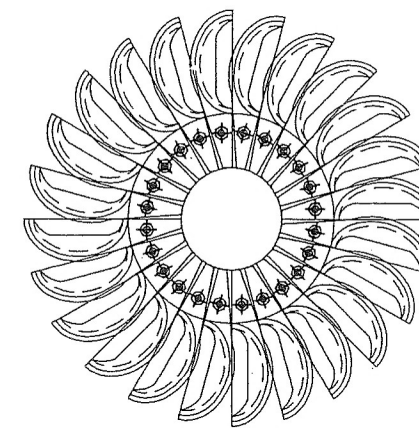
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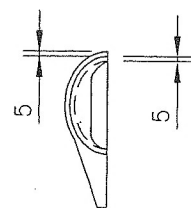
 KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
HUAI BONG 2 MICRO-HYDROPOWER PROJECT TAT MOK NATIONAL PARK	
ELECTRO - MECHANICAL EQUIPMENT VIEW A	
FRONTIER ENGINEERING CONSULTANTS CO.,LTD.	
DESIGNED	REVIEWED
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CONSULTANTS	DEDE
DRAWING NO. HBG-EM-04	SHEET NO. 7 OF 11



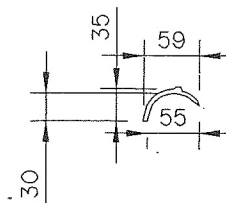
RUNNER



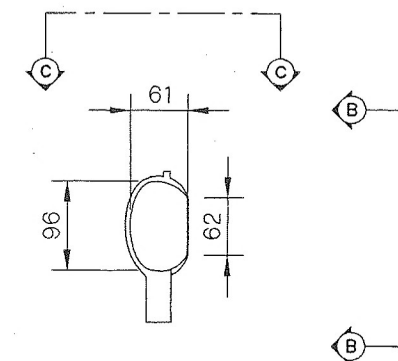
RUNNER



VIEW B



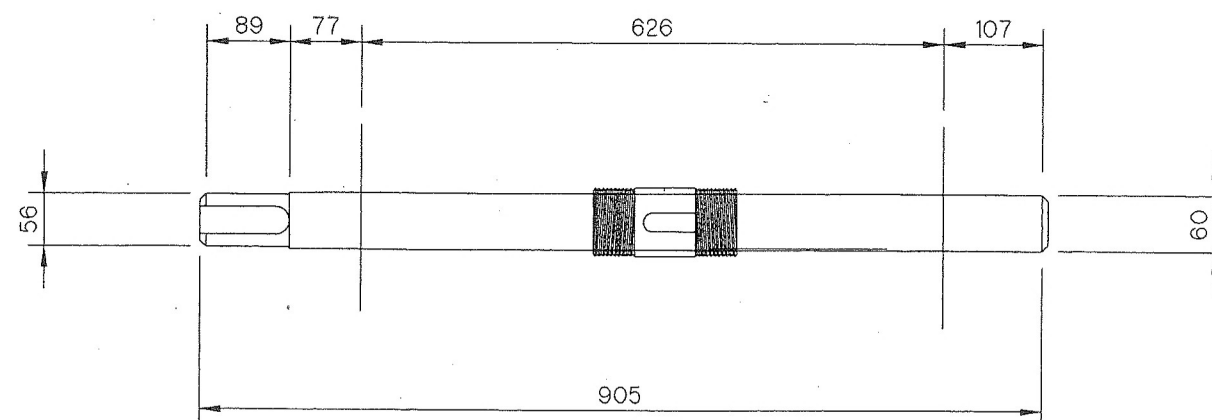
VIEW C



BUCKET

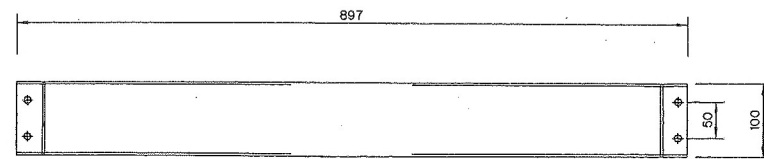
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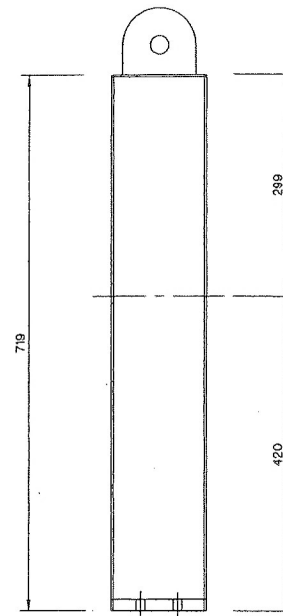


RUNNER SHAFT

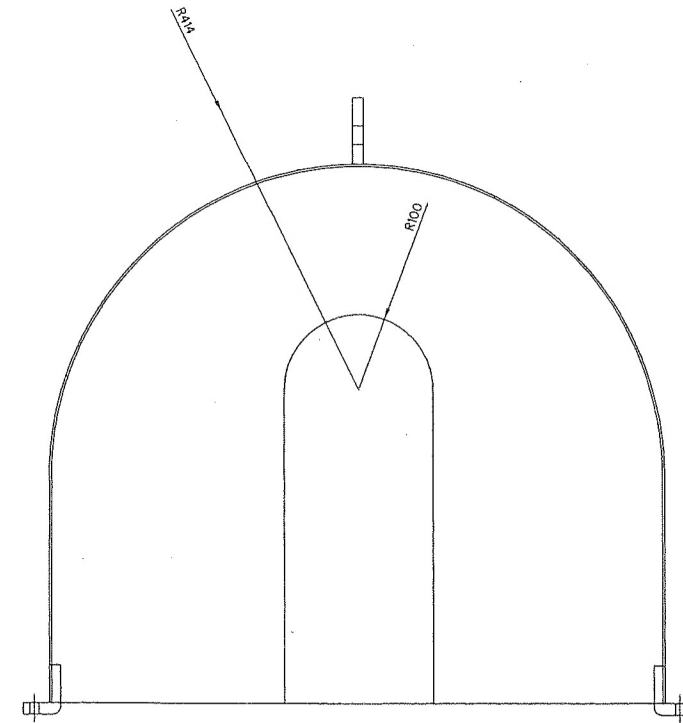
KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
HUAI BONG 2 MICRO-HYDROPOWER PROJECT TAT MOK NATIONAL PARK	
ELECTRO - MECHANICAL EQUIPMENT RUNNER & SHAFT	
FRONTIER ENGINEERING CONSULTANTS CO., LTD.	
DESIGNED	REVIEWED
DRAWN	RECOMMENDED
CHECKED	APPROVED
DATE	DATE
CONSULTANTS	DEDE
PROJECT MANAGER	DATE
DRAWING NO.	SHEET NO.
HBG-EM-05	8 OF 11



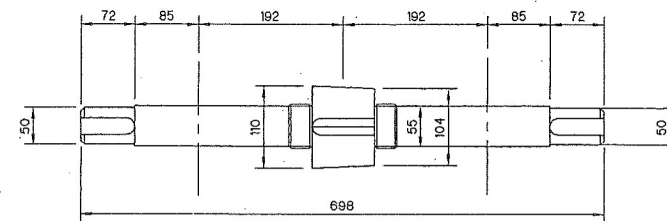
FLYWHEEL GUARD



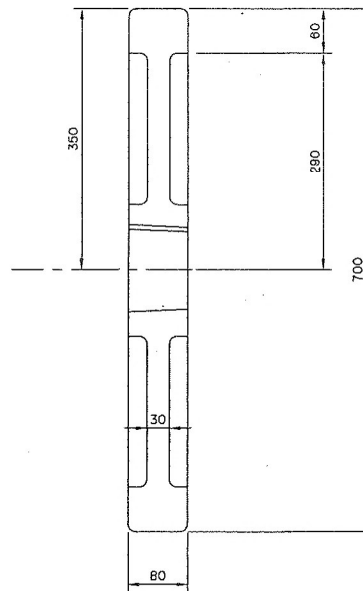
FLYWHEEL GUARD



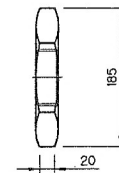
FLYWHEEL GUARD



FLYWHEEL SHAFT



FLYWHEEL



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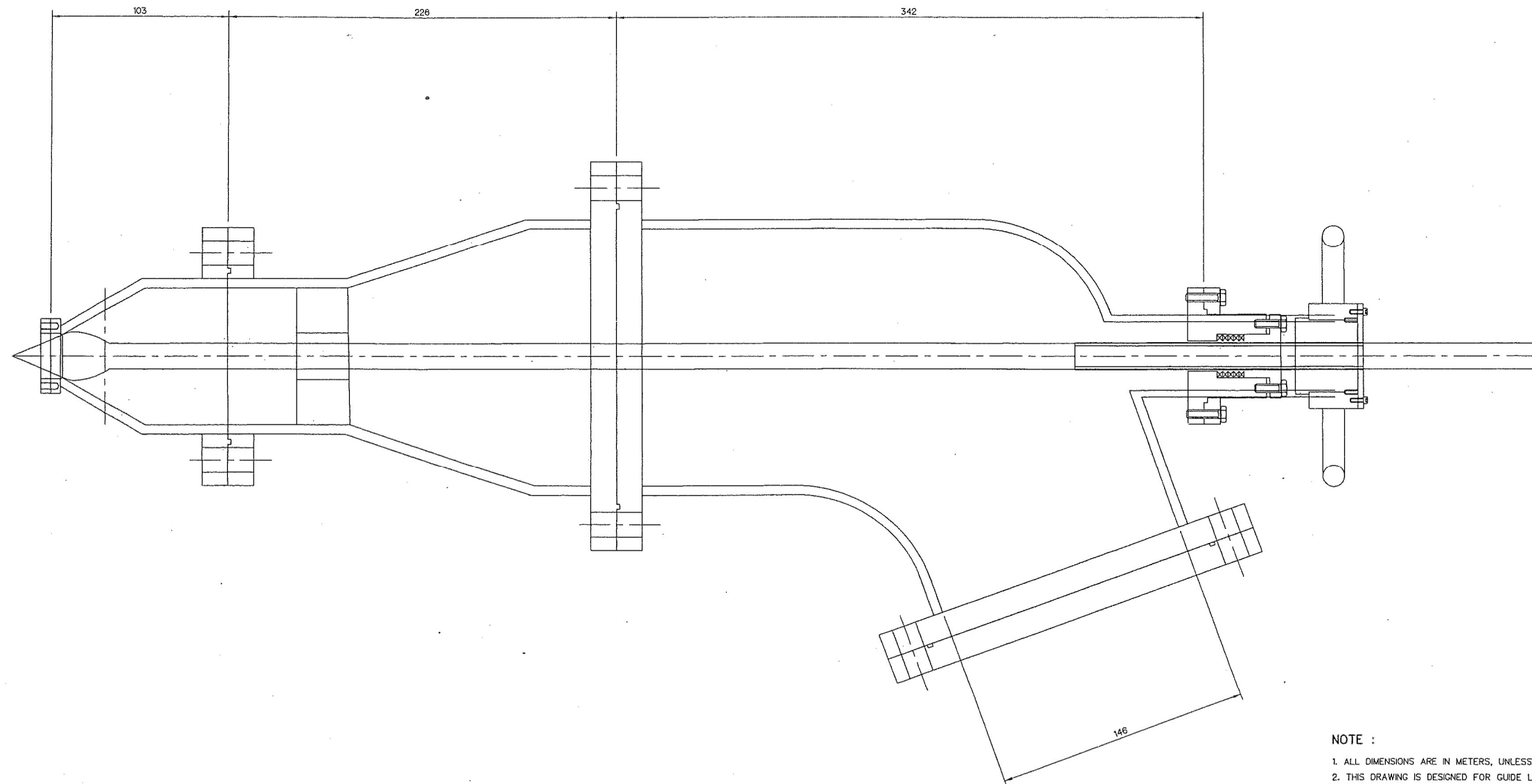


KINGDOM OF THAILAND
Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

HUAI BONG 2 MICRO-HYDROPOWER PROJECT
TAT MOK NATIONAL PARK

ELECTRO - MECHANICAL EQUIPMENT
FLYWHEEL & SHAFT

FRONTIER ENGINEERING CONSULTANTS CO.,LTD.		Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY	
3		REVIEWED	REVIEWED
2		DESIGNED	SUBMITTED
1		DRAWN	RECOMMENDED
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CONSULTANTS		DEDE	
PROJECT MANAGER		DATE	
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HBC-EM-06		9 OF 11	



NOZZLE & NEDDLE VALVE

NOTE :

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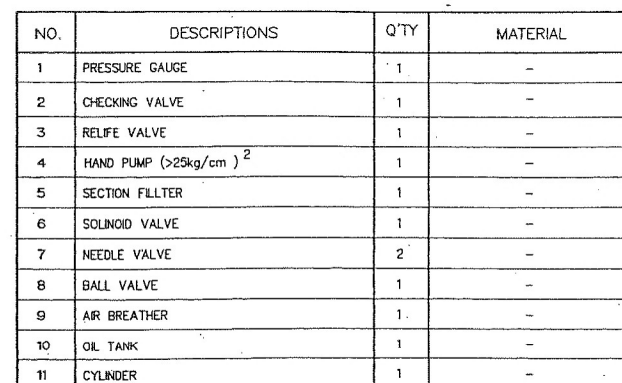
HUAI BONG 2 MICRO-HYDROPOWER PROJECT
TAT MOK NATIONAL PARK

ELECTRO - MECHANICAL EQUIPMENT
GENERAL ARRANGEMENT

FRONTIER ENGINEERING CONSULTANTS CO., LTD.

Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY

3					DESIGNED	sinw 11704e	2/12/17	REVIEWED	sinw
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1					CHECKED	sinw 11704e	2/12/17	RECOMMENDED	sinw
NO.	DATE	REVISIONS	CHECKED	APPROVED	CHECKED	sinw 11704e	2/12/17	APPROVED	P. Kauri
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SCALE 1:5 MILLIMETERS

 KINGDOM OF THAILAND Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY																	
HUAI BONG 2 MICRO-HYDROPOWER PROJECT TAT MOK NATIONAL PARK																	
ELECTRO - MECHANICAL EQUIPMENT HYDRAULIC SYSTEM																	
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 FRONTIER ENGINEERING CONSULTANTS CO., LTD.	 Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY																
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