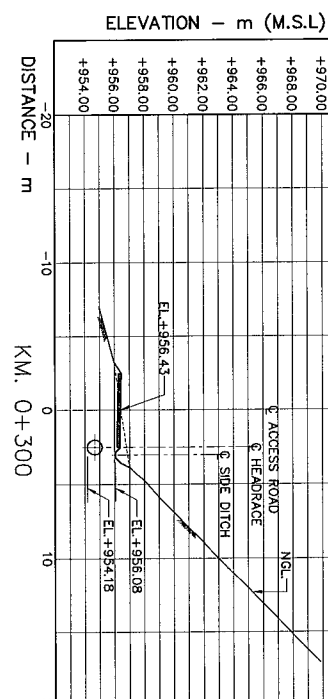
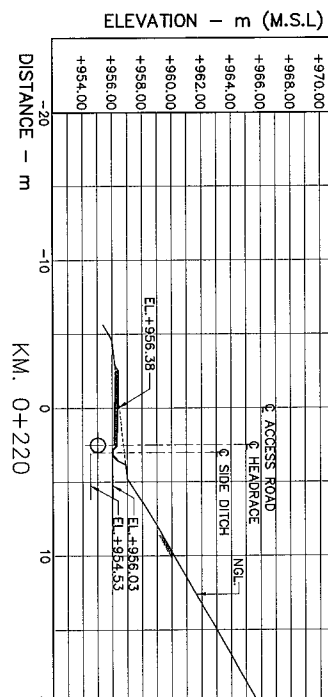
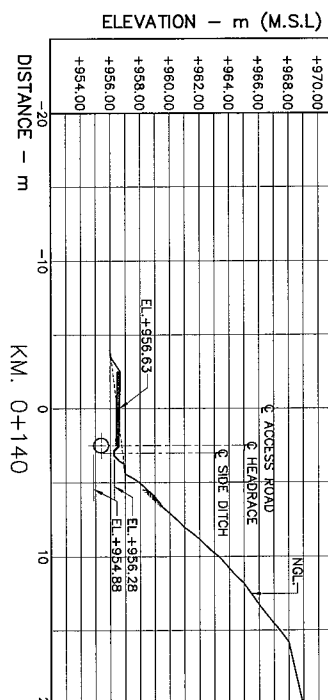
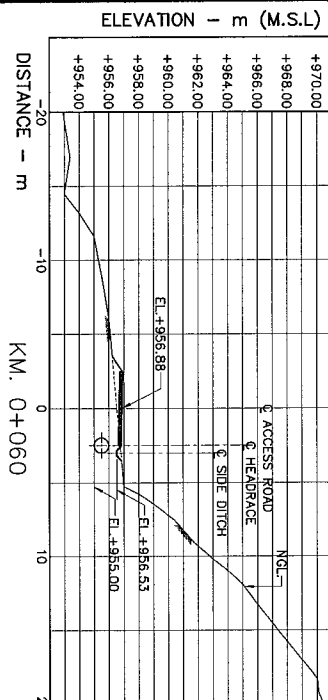
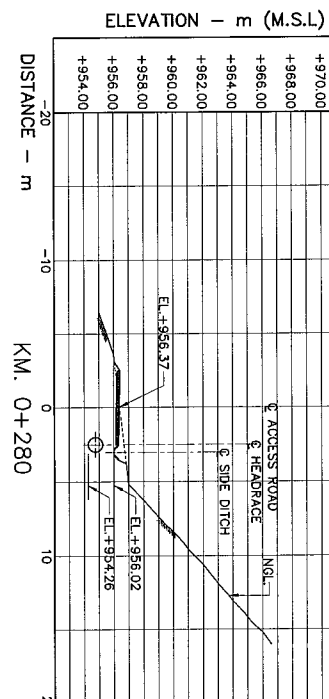
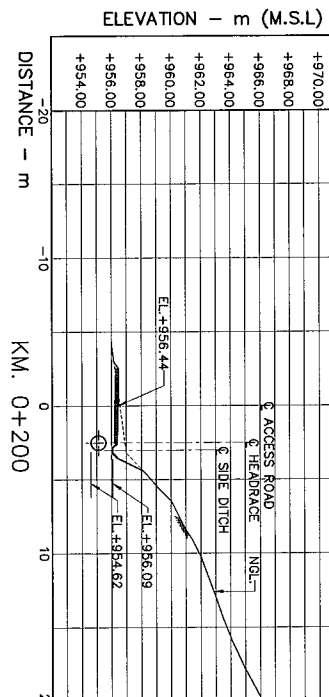
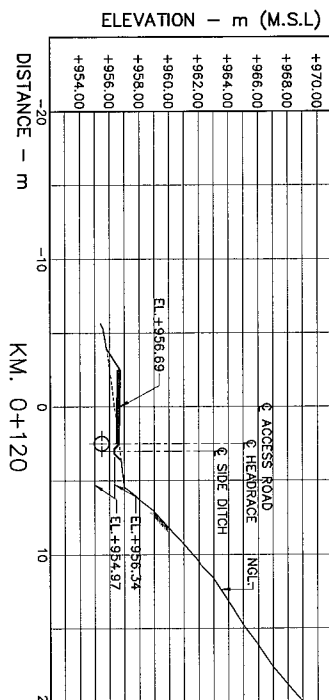
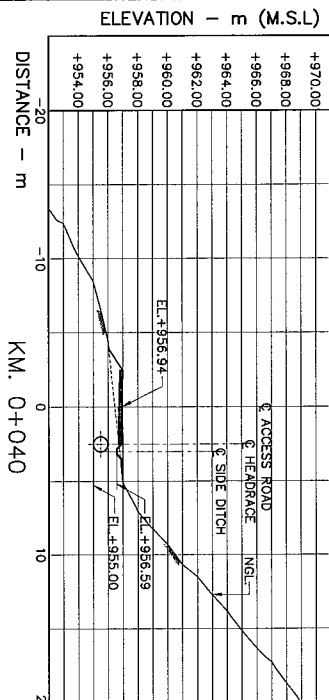
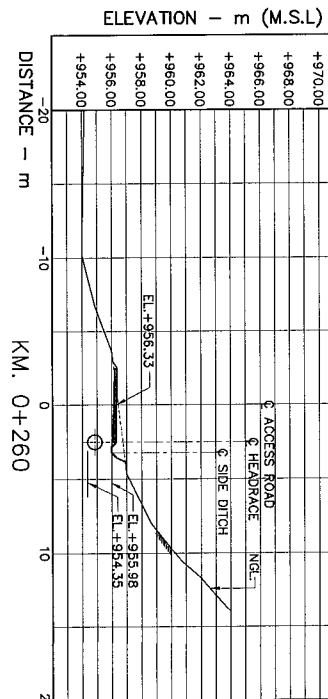
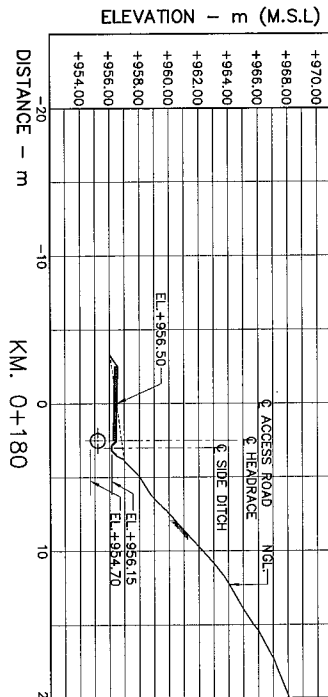
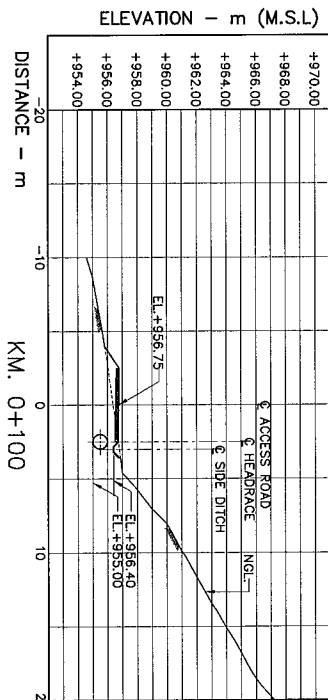
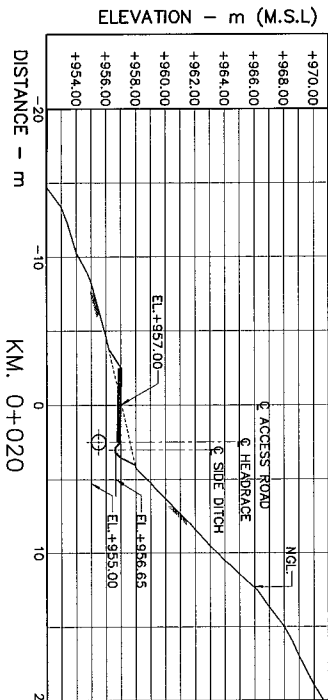
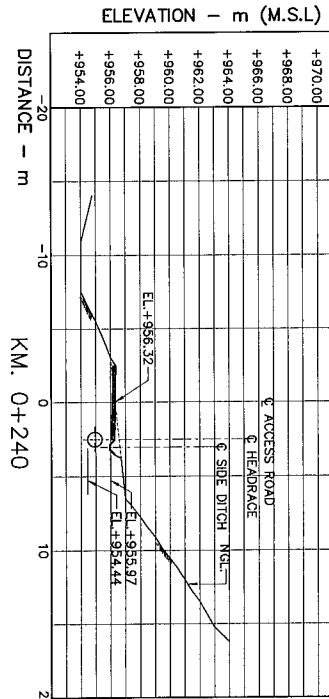
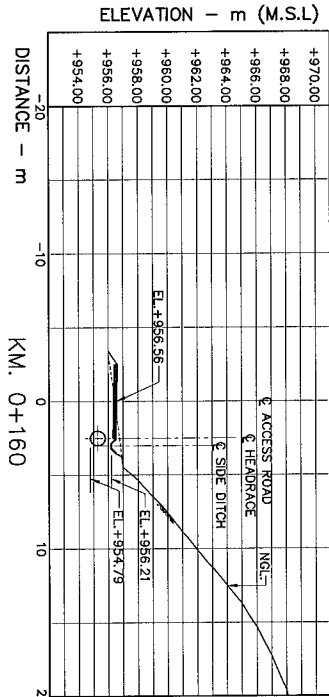
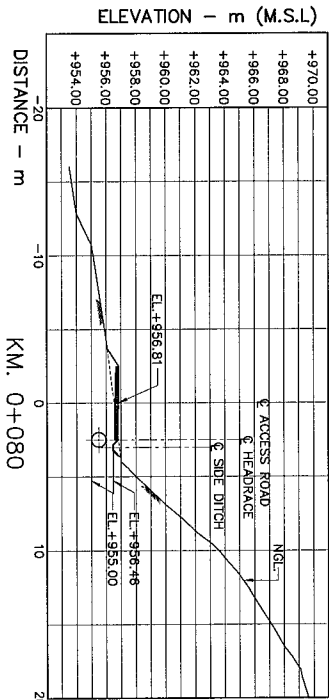
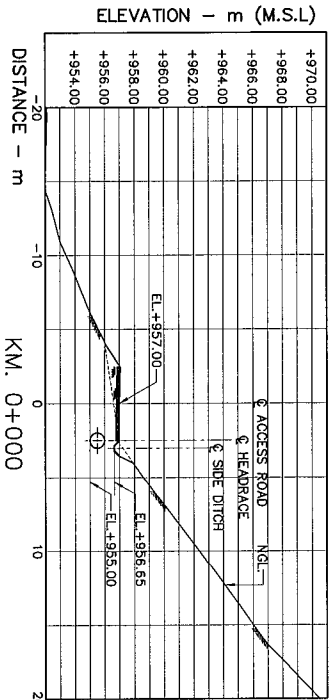




NOTES :

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

2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-CN-01

REFERENCE DRAWINGS :-

1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)

2. HEADRACE, TYPICAL SECTIONS

MT-HR-01 TO MT-HR-05

MT-HR-19

CROSS SECTIONS

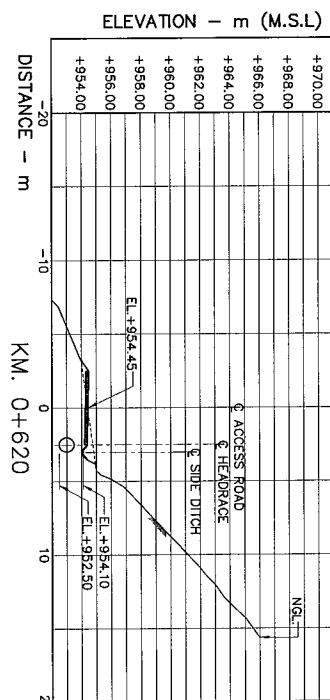
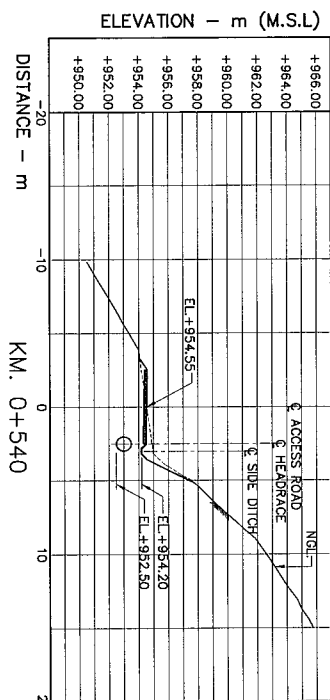
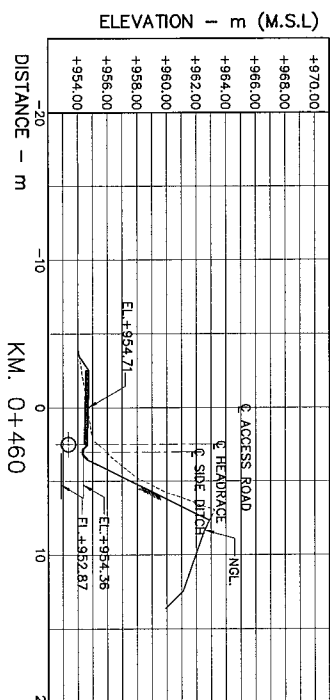
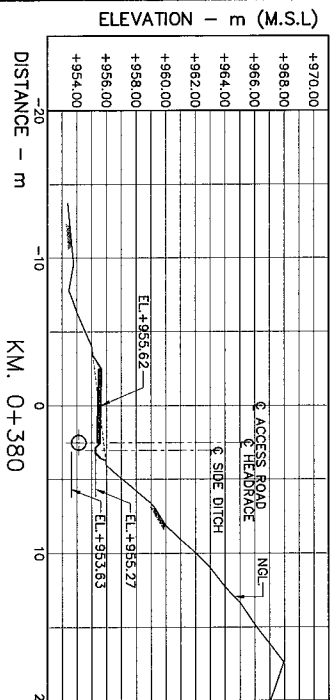
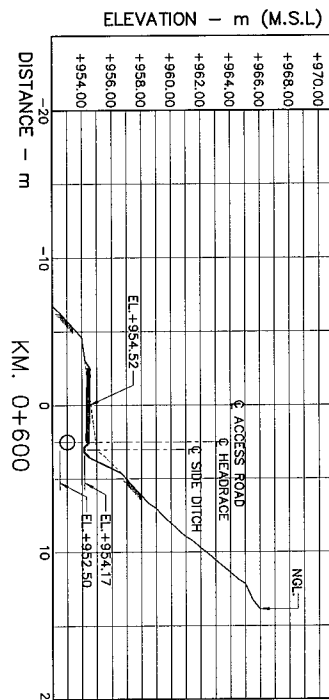
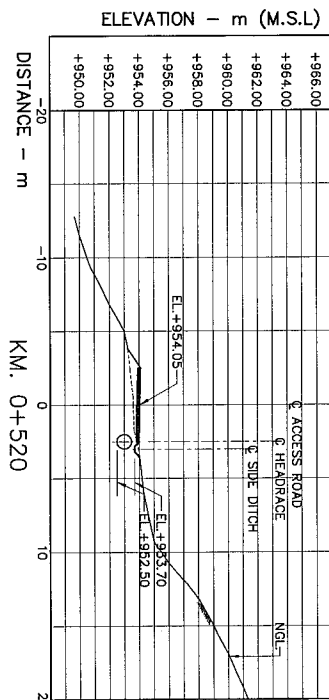
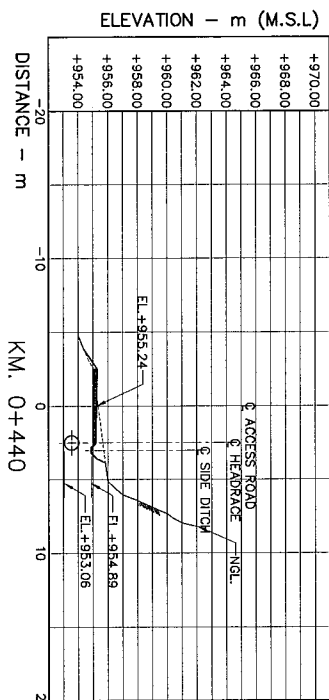
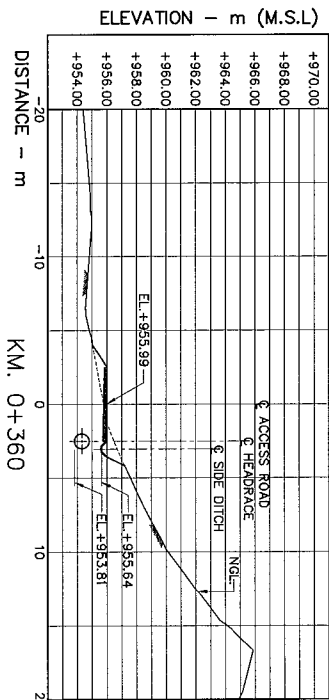
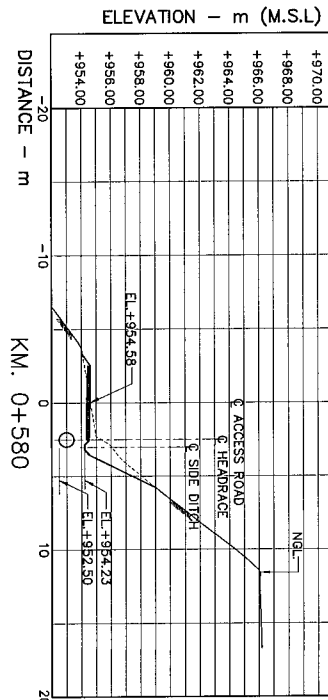
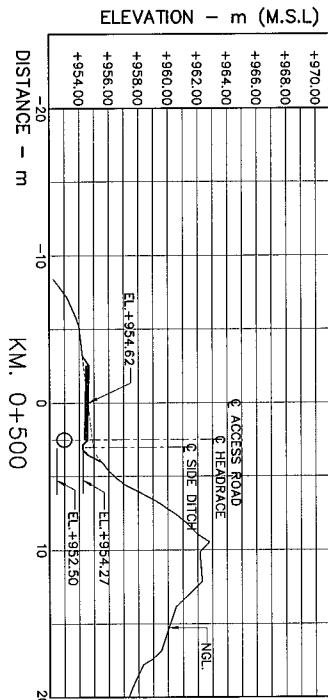
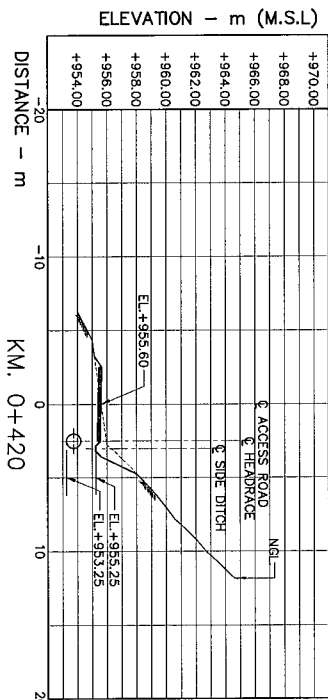
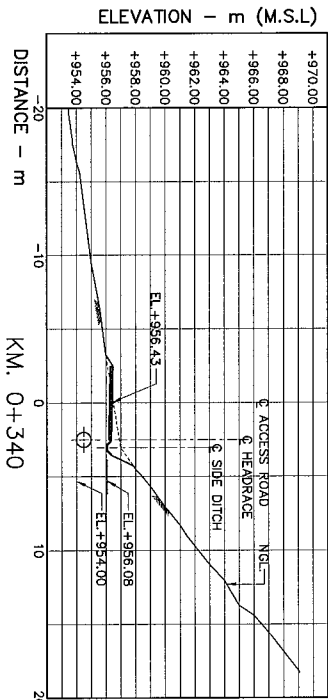
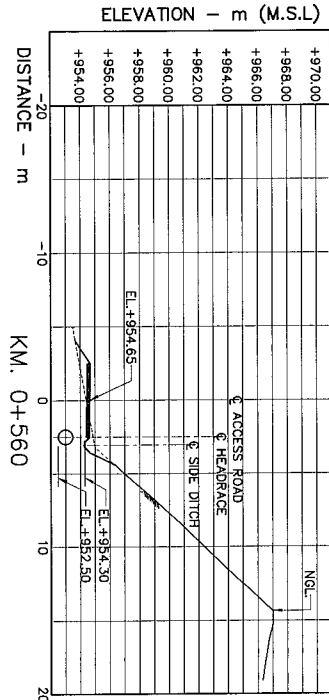
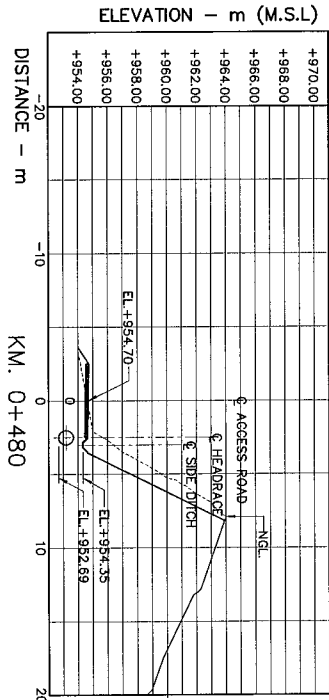
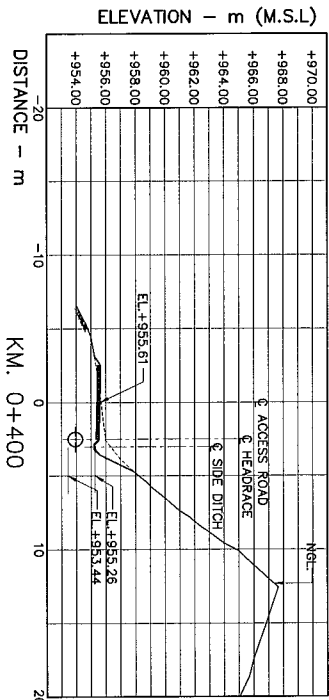
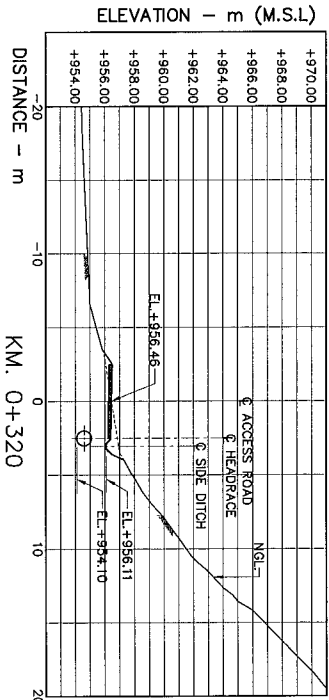
HORIZONTAL SCALE 1:250

VERTICAL SCALE 1:250



3					
2					
1					
NO.	DATE	REVISIONS	CHECKED	APPROVED	
CONSULTANTS					
DEDE					

KINGDOM OF THAILAND	
MINISTRY OF ENERGY	
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUEH HYDROPOWER PROJECT	
CIVIL WORKS	
HEADRACE	
CROSS SECTIONS, KM. 0+000 TO KM. 0+300	
PANYA CONSULTANTS CO.,LTD.	
DESIGNED	DR. NUL2514-nyed nula405
DRAWN	2013/06/13
CHECKED	27/06/13
PROJECT MANAGER	DATE
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
REVIEWED	SUBMITTED
APPROVED	RECOMMENDED
DRAWING NO.	SHEET NO.
MT-HR-08	19 OF 98



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-GN-01

REFERENCE DRAWINGS :-

1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)
2. HEADRACE, CROSS SECTIONS KM.0+000 TO KM.0+300
3. HEADRACE, CROSS SECTIONS KM.0+640 TO KM.0+940
4. HEADRACE, TYPICAL SECTIONS

MT-HR-01 TO MT-HR-05

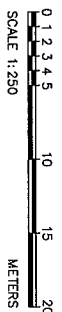
MT-HR-08

MT-HR-10

MT-HR-19

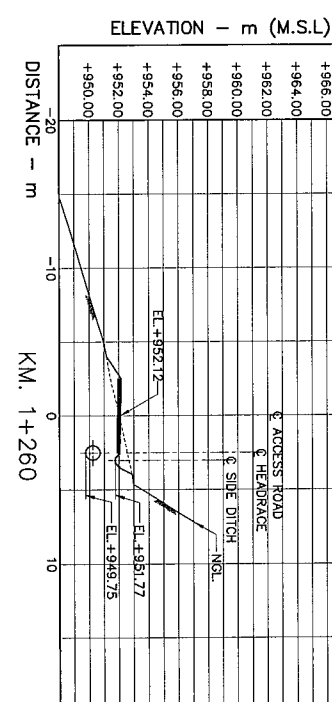
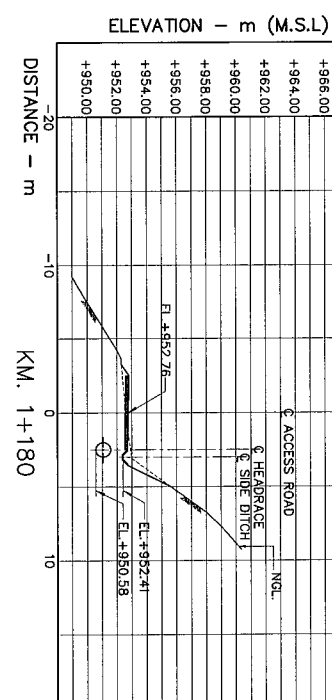
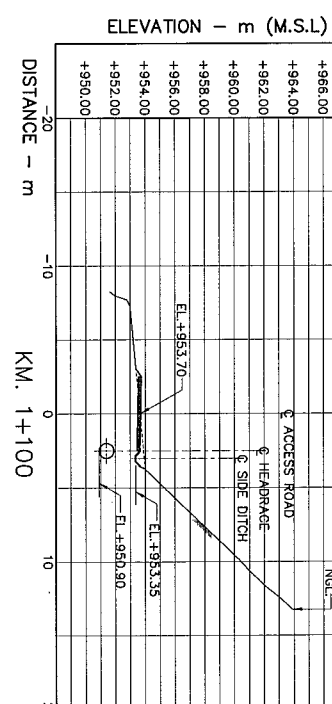
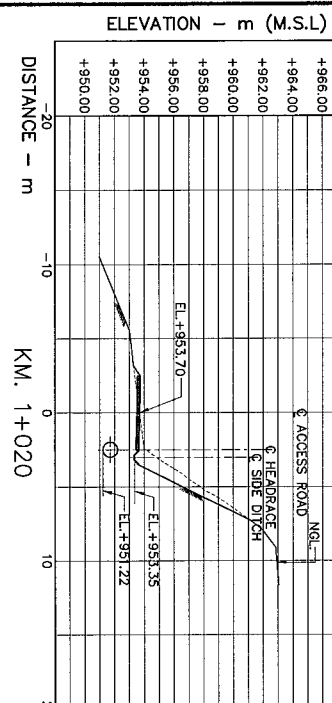
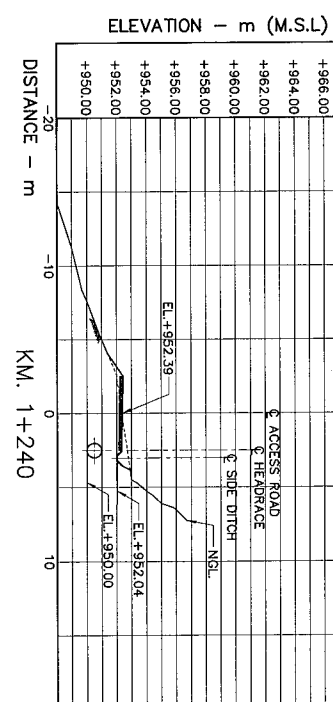
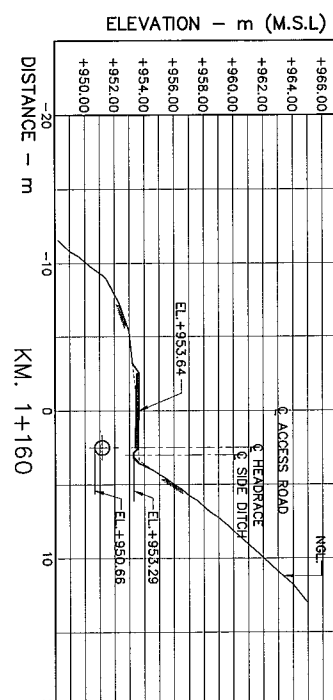
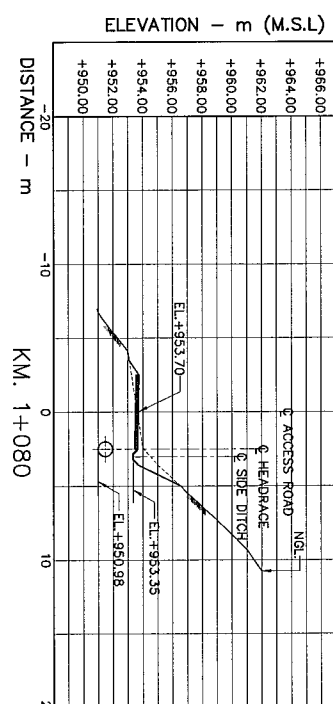
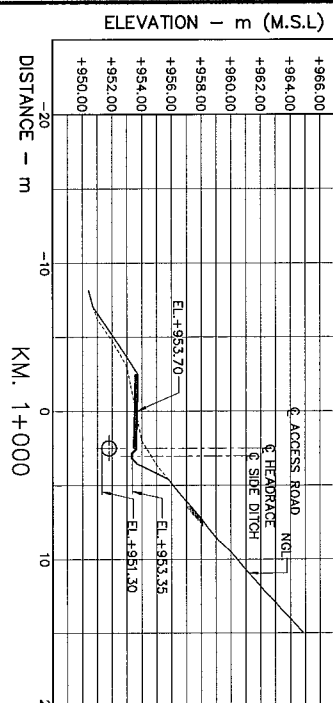
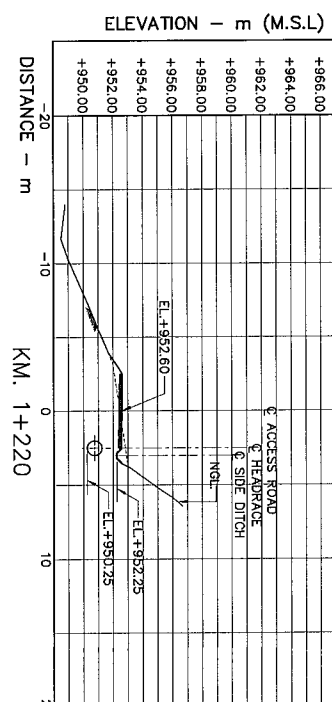
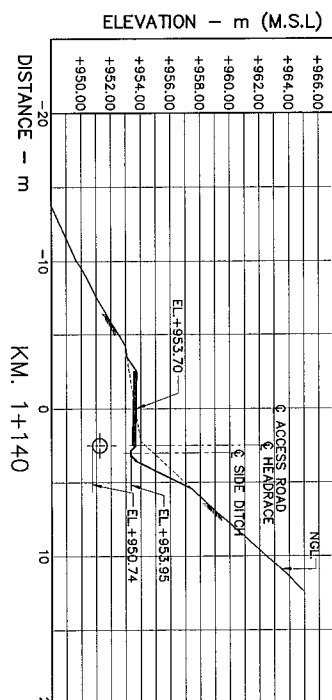
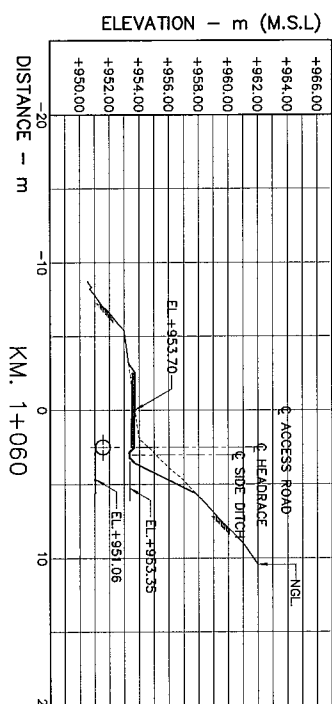
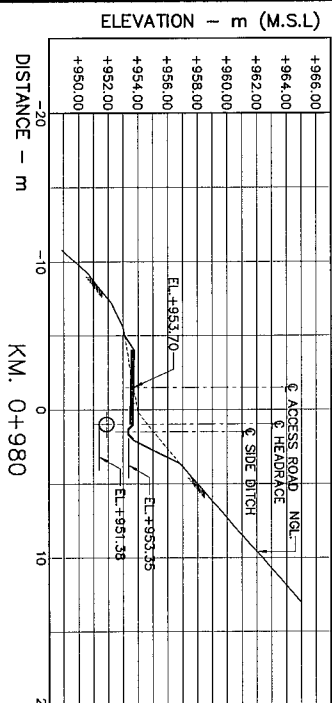
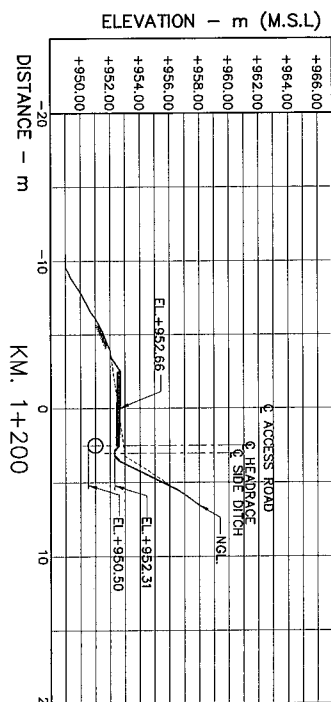
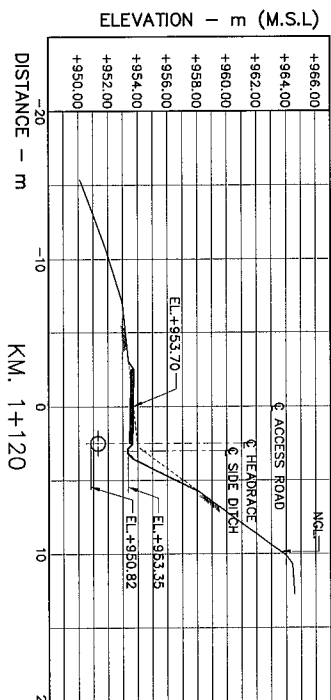
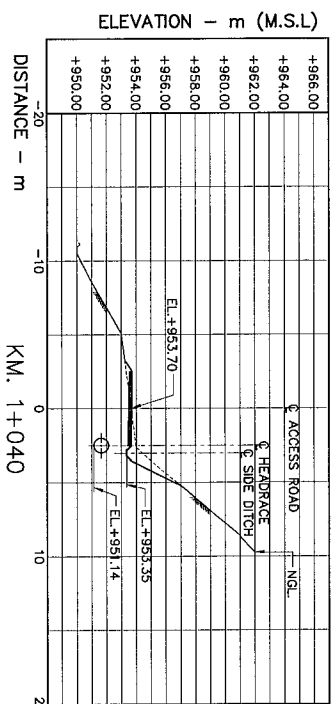
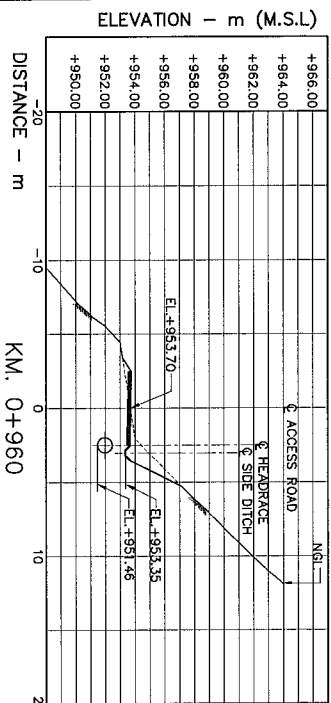
CROSS SECTIONS

HORIZONTAL SCALE 1:250
VERTICAL SCALE 1:250



3					
2					
1					
NO.	DATE	REVISIONS	CHECKED	APPROVED	DATE
CONSULTANTS					

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUEN HYDROPOWER PROJECT	
CIVIL WORKS HEADRACE	
CROSS SECTIONS, KM. 0+320 TO KM. 0+620	
PANYA CONSULTANTS CO., LTD.	
DESIGNED	REVIEWED
DRAWN	RECOMMENDED
CHECKED	APPROVED
PROJECT MANAGER	DATE
MT-HR-09	27/08/13
SHEET NO.	20 OF 98



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. M-T-CN-01

REFERENCE DRAWINGS :-

1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)	MT-HR-01 TO MT-HR-05
2. HEADRACE, CROSS SECTIONS KM.0+640 TO KM.0+940	MT-HR-10
3. HEADRACE, CROSS SECTIONS KM.1+280 TO KM.1+580	MT-HR-12
4. HEADRACE, TYPICAL SECTIONS	MT-HR-19

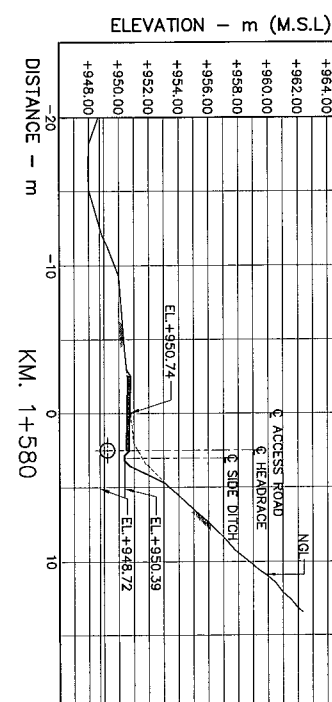
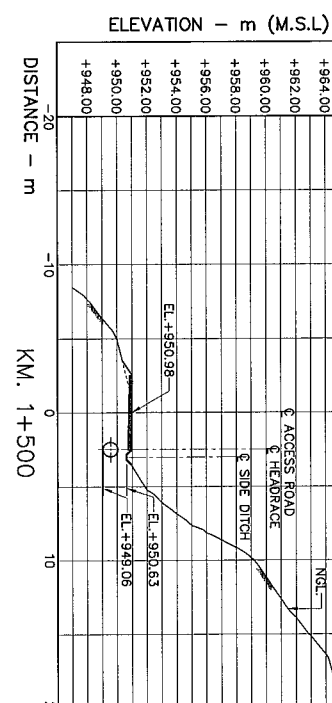
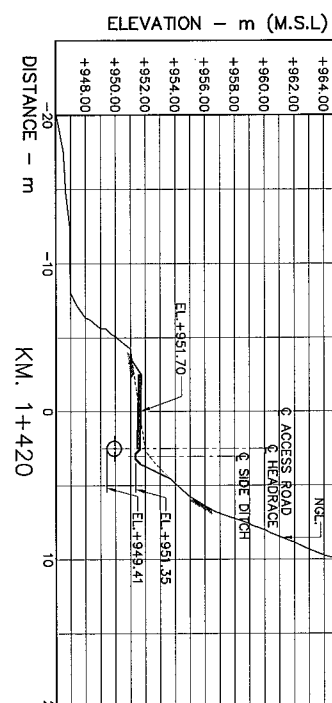
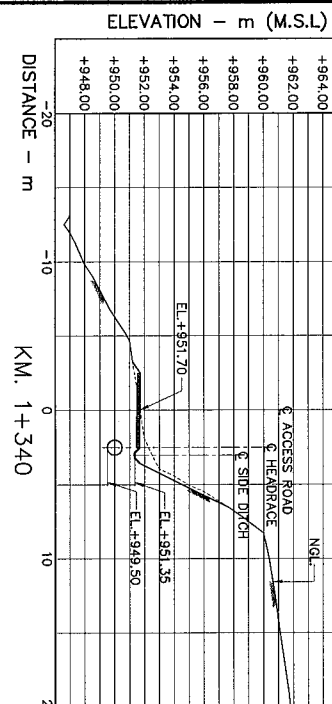
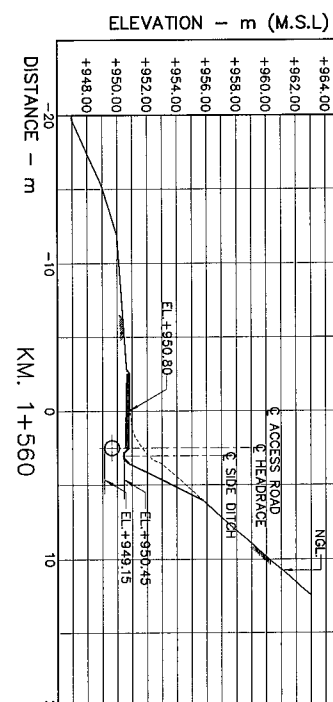
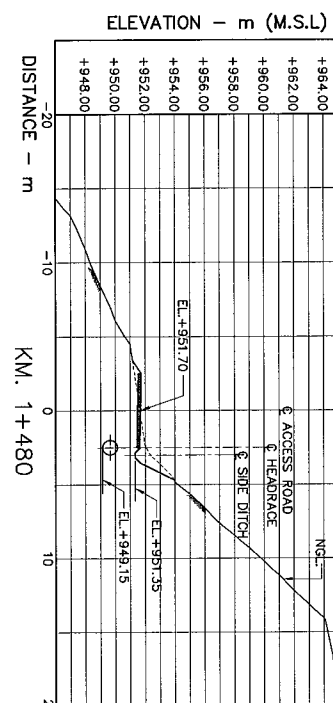
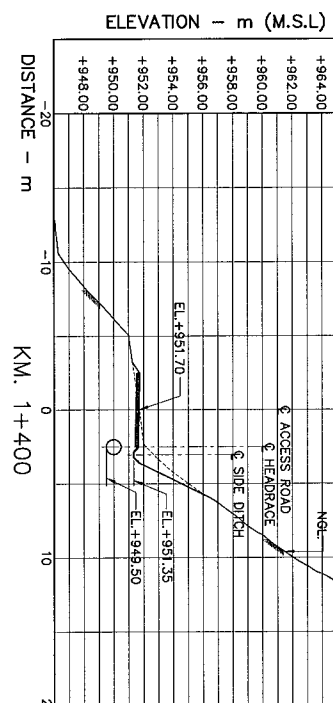
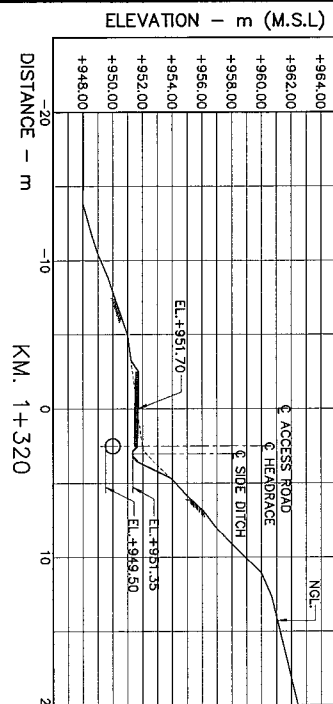
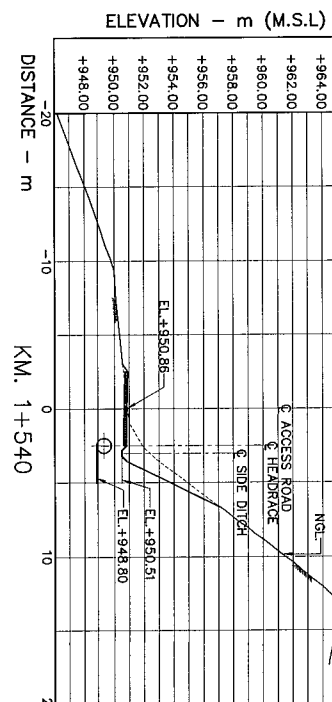
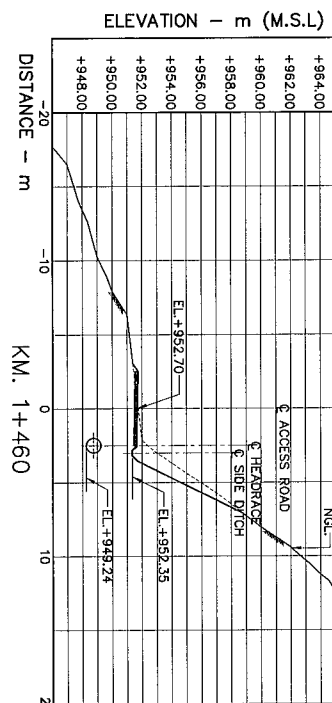
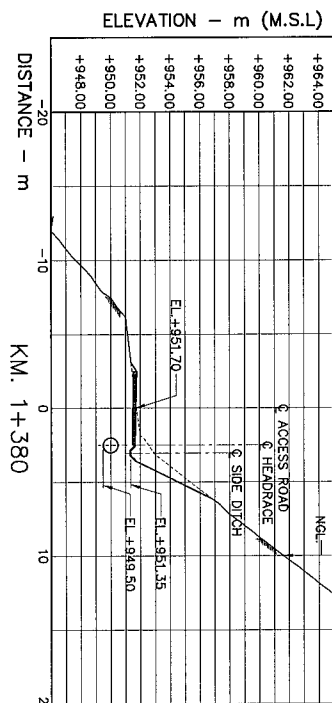
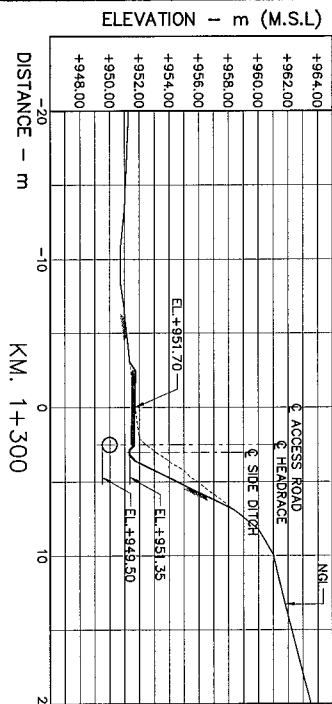
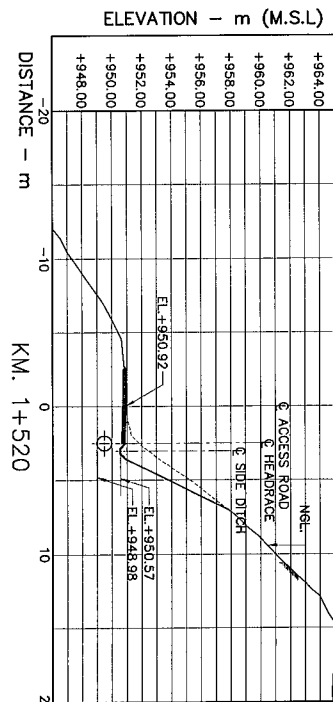
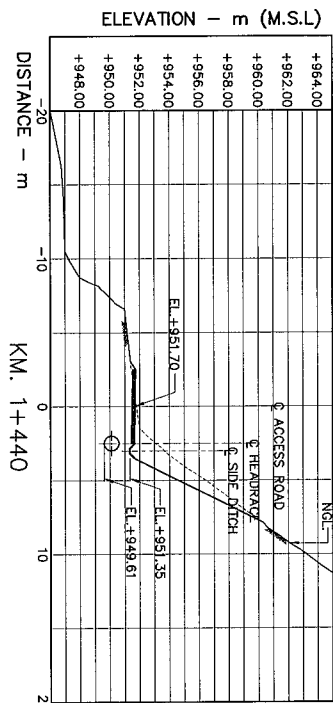
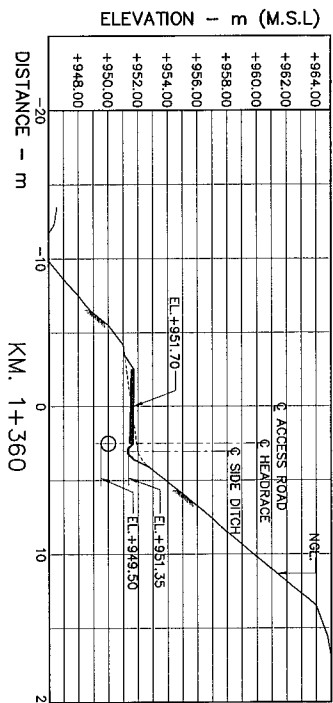
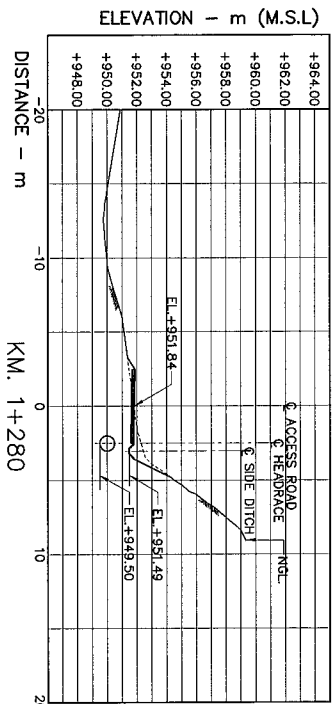
CROSS SECTIONS

HORIZONTAL SCALE 1:250
VERTICAL SCALE 1:250



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1			
NO.	DATE	REVISIONS	CHECKED
CONSULTANTS		DEDE	

KINGDOM OF THAILAND MINISTRY OF ENERGY	
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUEN HYDROPOWER PROJECT	
CIVIL WORKS	
HEADRACE	
GROSS SECTIONS, KM. 0+960 TO KM. 1+260	
PANYA CONSULTANTS CO.LTD.	
DESIGNED	27/05/75
DRAWN	27/05/75
CHECKED	27/05/75
PROJECT MANAGER	DATE
RECOMMENDED	APPROVED
DRAWING NO.	SHEET NO.



NOTES :

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

2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-HR-01

REFERENCE DRAWINGS :-

1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)

2. HEADRACE, CROSS SECTIONS KM.0+960 TO KM.1+280

3. HEADRACE, CROSS SECTIONS KM.1+580 TO KM.1+880

4. HEADRACE, TYPICAL SECTIONS

MT-HR-01 TO MT-HR-05

MT-HR-11

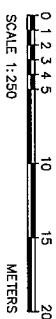
MT-HR-13

MT-HR-19

CROSS SECTIONS

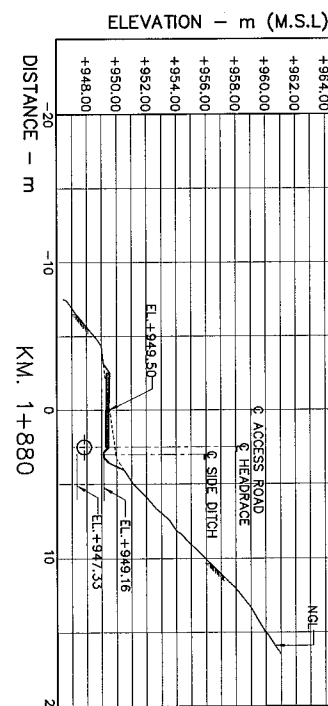
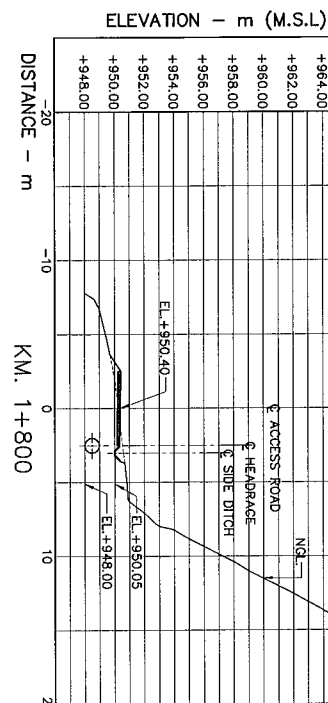
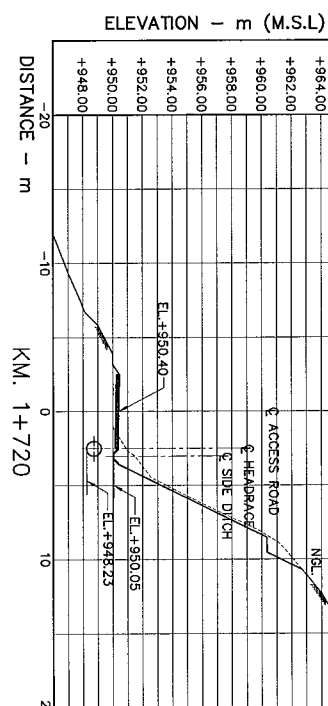
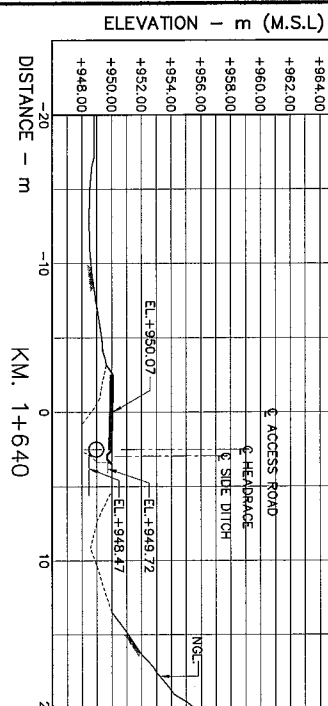
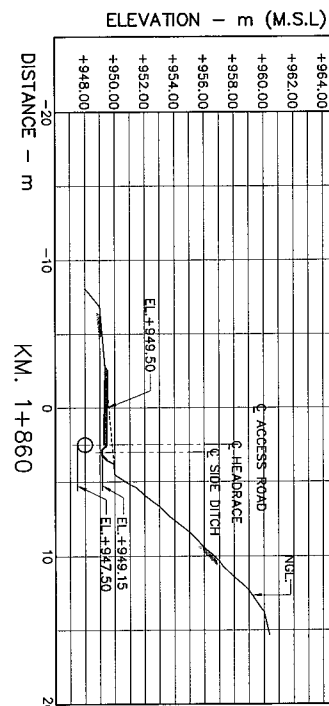
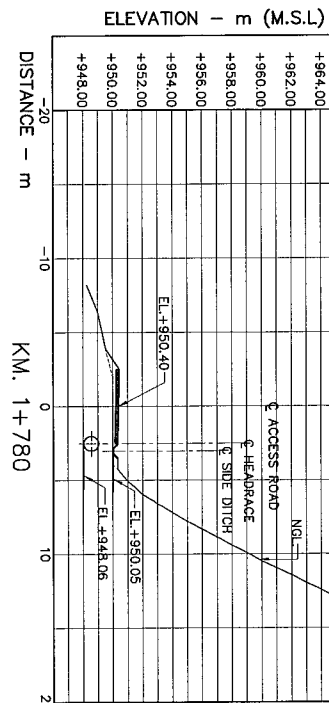
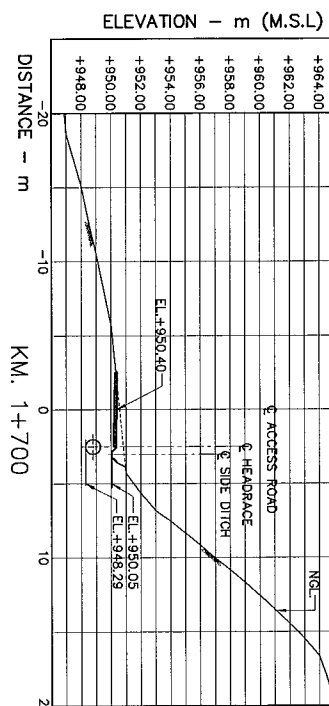
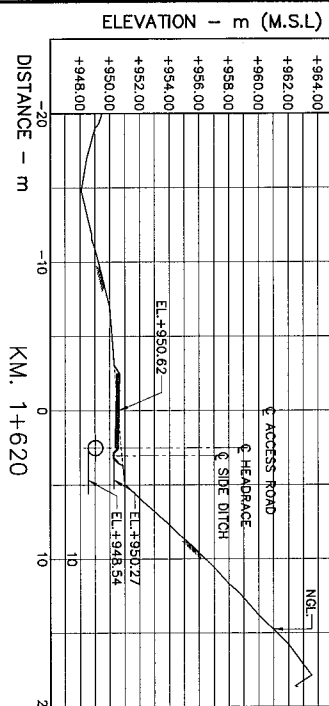
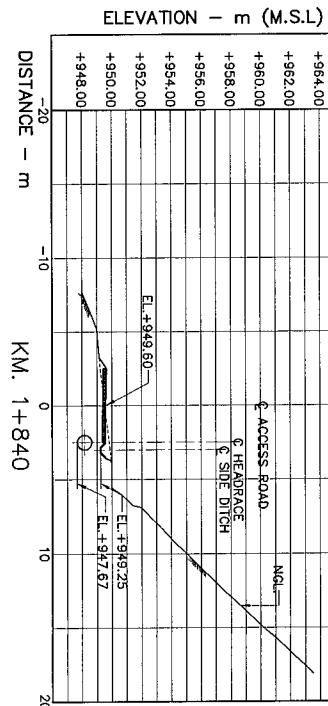
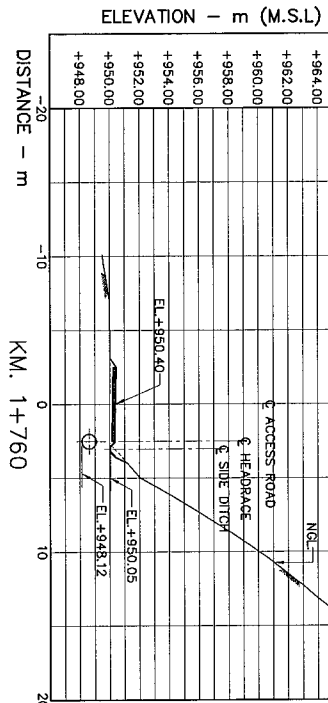
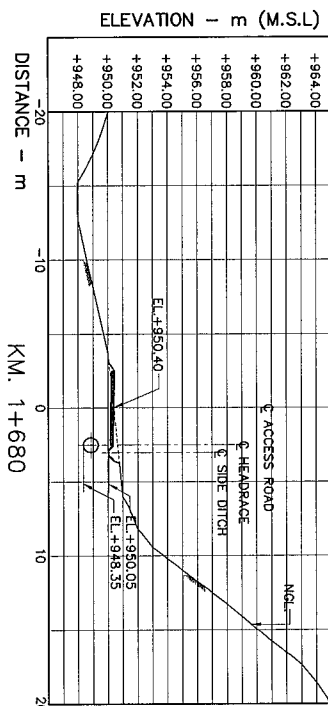
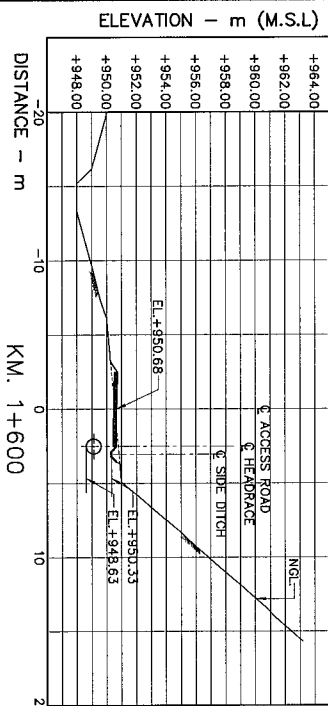
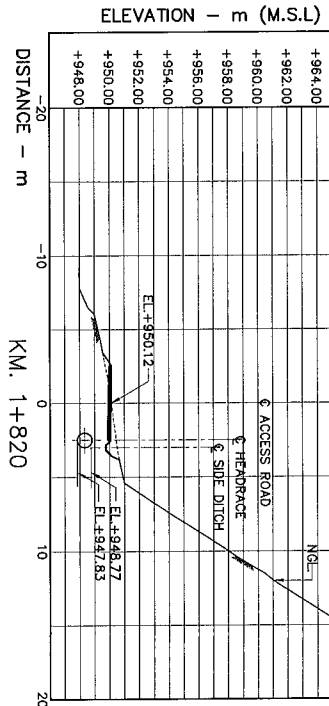
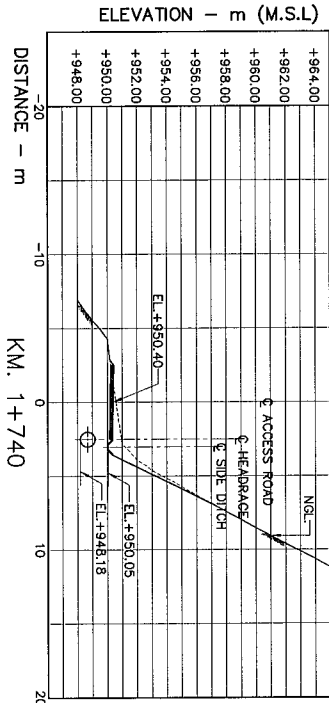
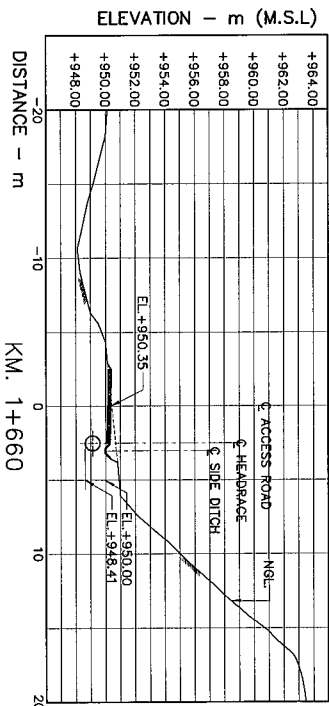
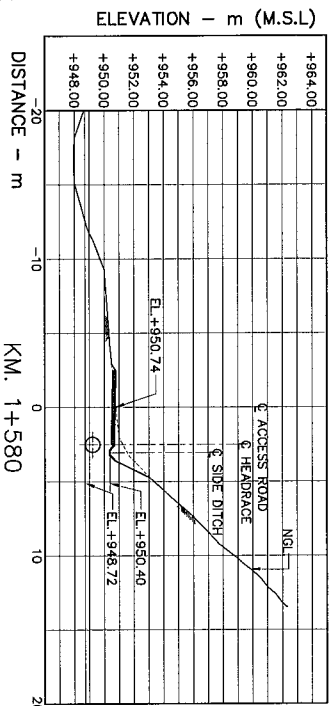
HORIZONTAL SCALE 1:250

VERTICAL SCALE 1:250



NO.	DATE	REVISIONS	CHECKED	APPROVED
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2				
3				

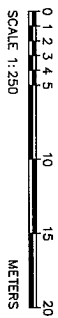
KINGDOM OF THAILAND	
MINISTRY OF ENERGY	
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUEN HYDROPOWER PROJECT	
CIVIL WORKS	
HEADRACE	
CROSS SECTIONS, KM. 1+280 TO KM. 1+580	
PANYA CONSULTANTS CO., LTD.	
DESIGNED	SUBMITTED
DRAWN	RECOMMENDED
CHECKED	DRAWING NO.
PROJECT MANAGER	SHEET NO.
DATE	
27/05/13	23 OF 98
MT-HR-12	



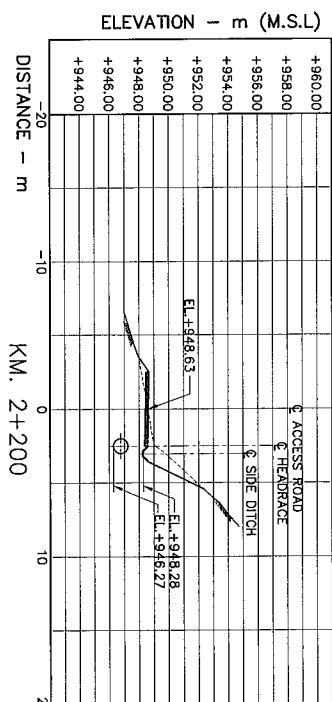
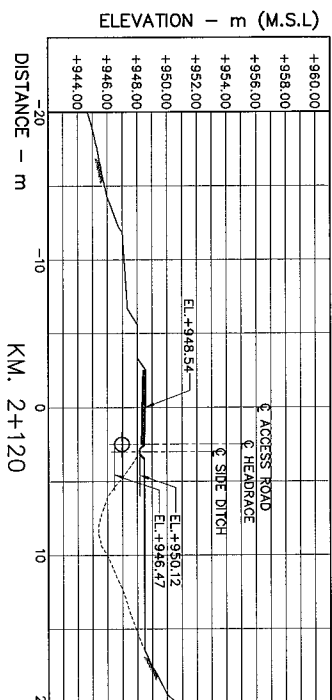
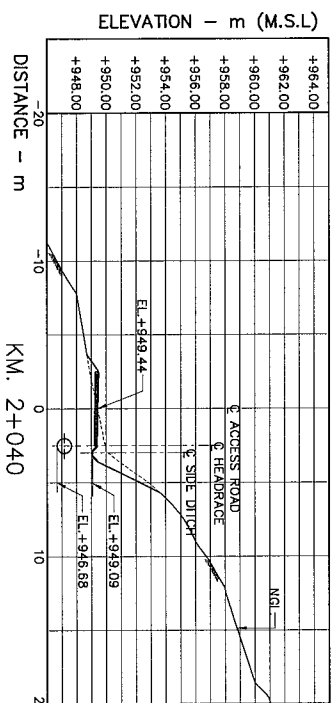
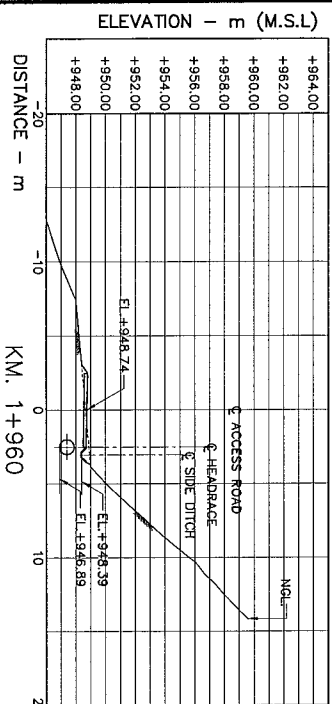
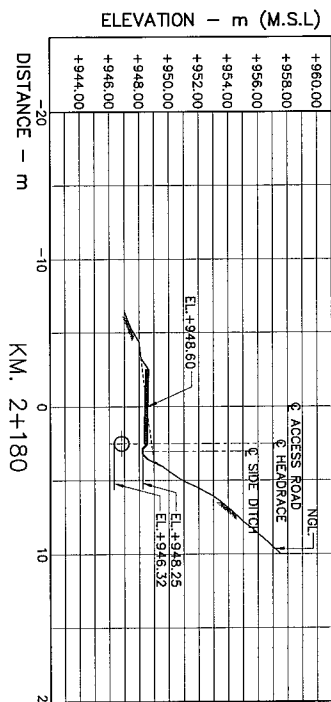
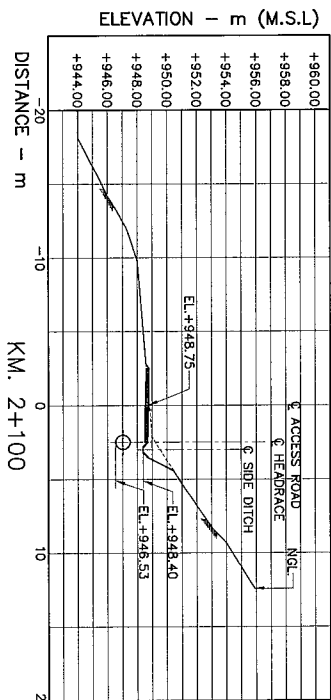
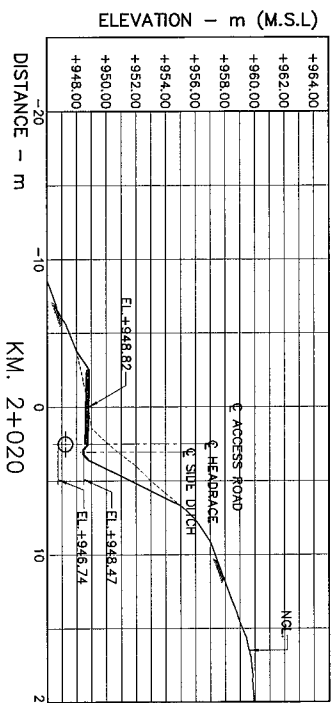
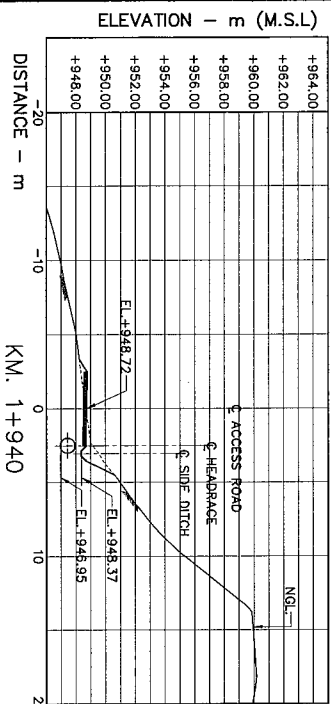
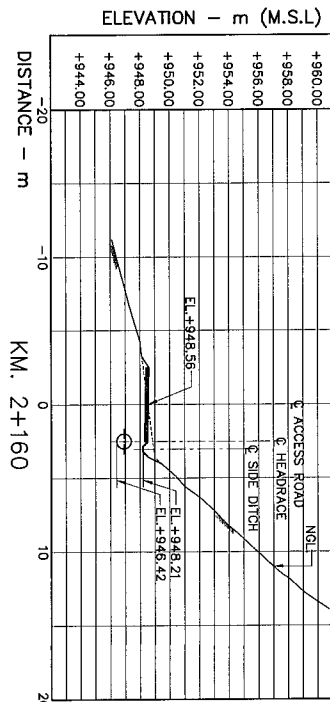
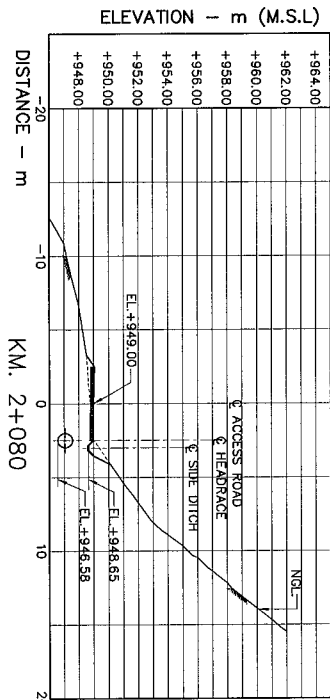
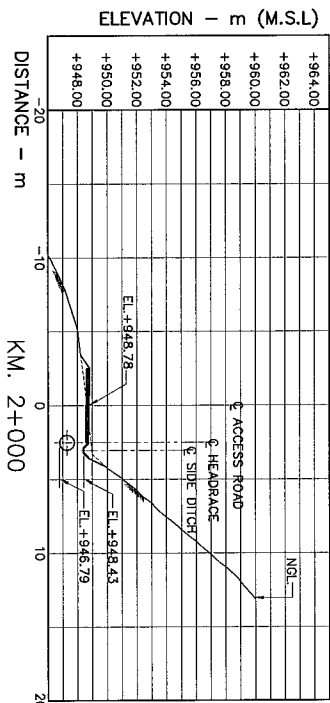
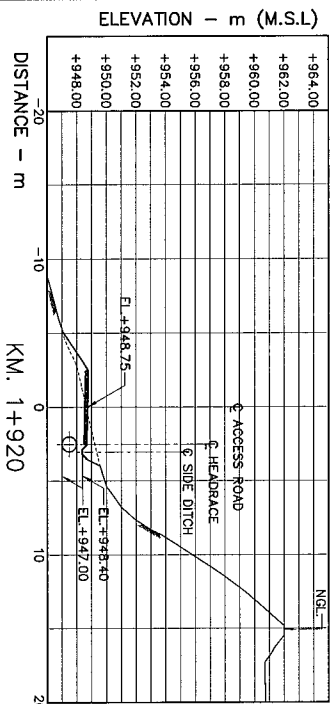
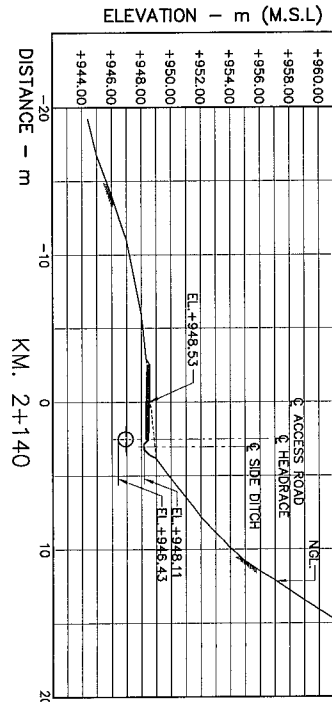
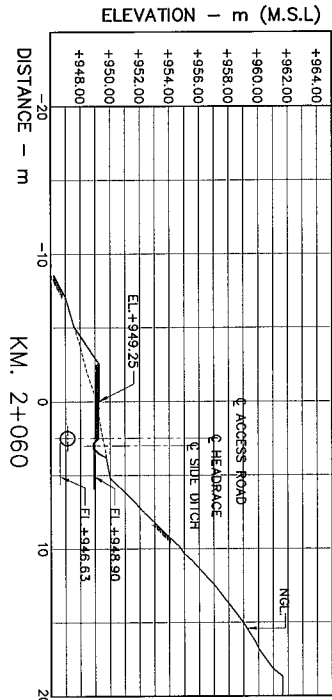
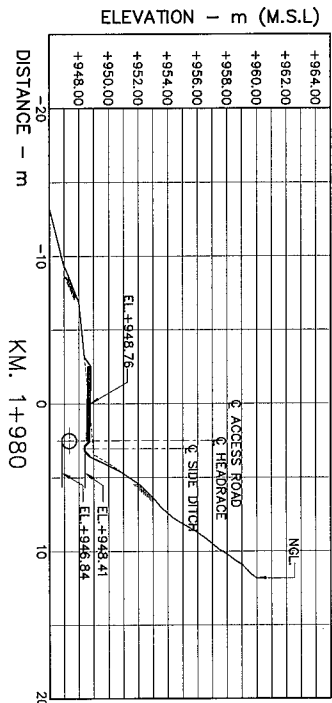
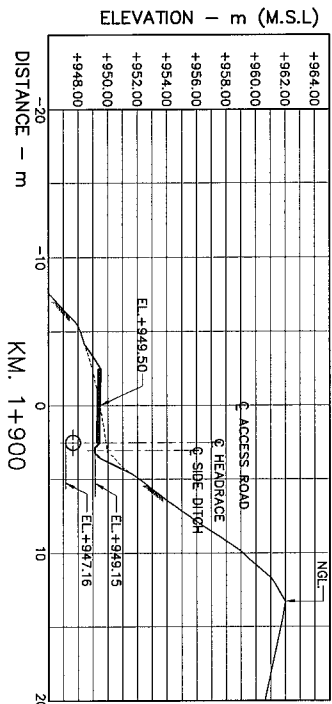
NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS.
UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-GN-01

REFERENCE DRAWINGS : -
1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)
2. HEADRACE, CROSS SECTIONS KM.1+280 TO KM.1+580
3. HEADRACE, CROSS SECTIONS KM.1+900 TO KM.2+220
4. HEADRACE, TYPICAL SECTIONS
MT-HR-01 TO MT-HR-05
MT-HR-12
MT-HR-14
MT-HR-19

CROSS SECTIONS
HORIZONTAL SCALE 1:250
VERTICAL SCALE 1:250



KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
MAE TUEN HYDROPOWER PROJECT			
CIVIL WORKS HEADRACE			
CROSS SECTIONS, KM. 1+580 TO KM. 1+880			
PAVIA CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED BY	REVIEWED BY	SUBMITTED BY	RECEIVED BY
DRAWN BY	RECOMMENDED BY	APPROVED BY	SHEET NO.
CHECKED BY	DATE	DATE	DATE
PROJECT MANAGER	DATE	DATE	DATE



NOTES :

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

2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-GN-01

REFERENCE DRAWINGS :-

1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5) MT-HR-01 TO MT-HR-05

2. HEADRACE, CROSS SECTIONS KM.1+980 TO KM.1+990 MT-HR-13

3. HEADRACE, CROSS SECTIONS KM.2+240 TO KM.2+520 MT-HR-15

4. HEADRACE, TYPICAL SECTIONS MT-HR-19

CROSS SECTIONS

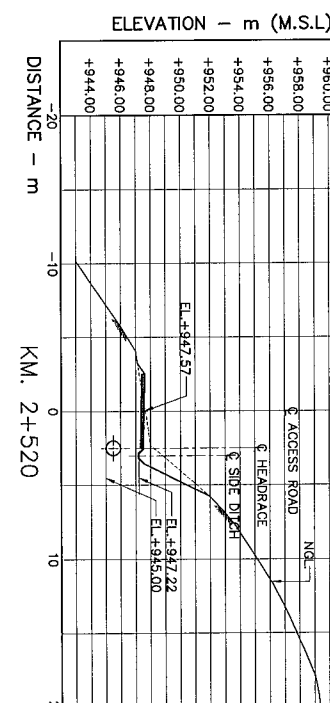
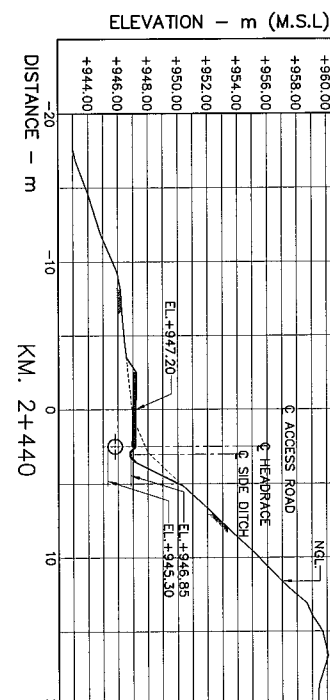
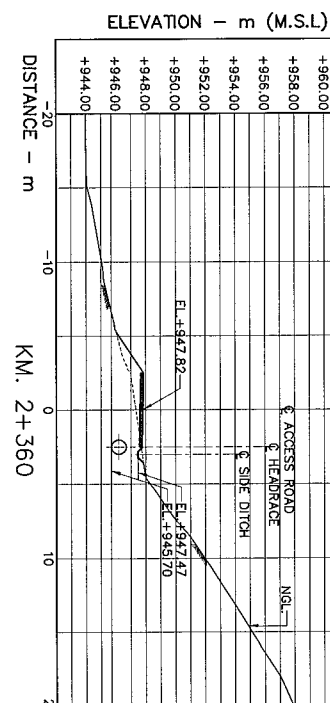
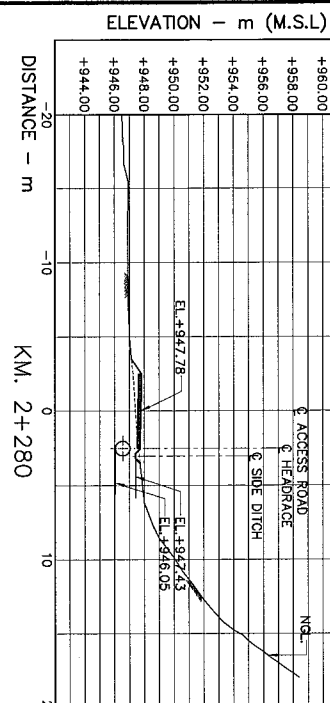
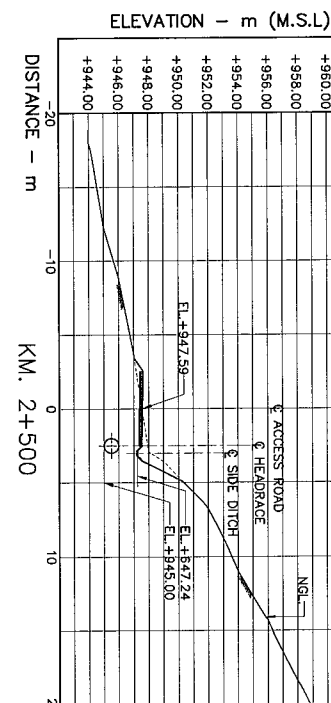
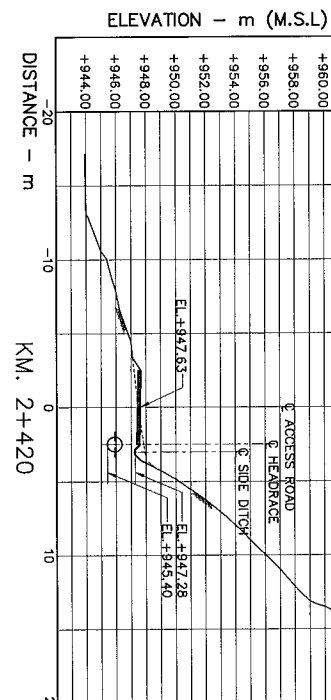
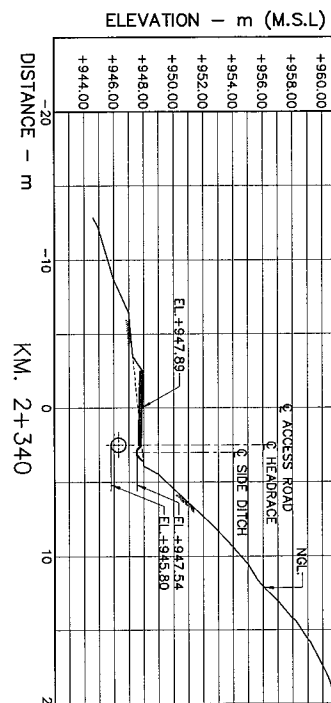
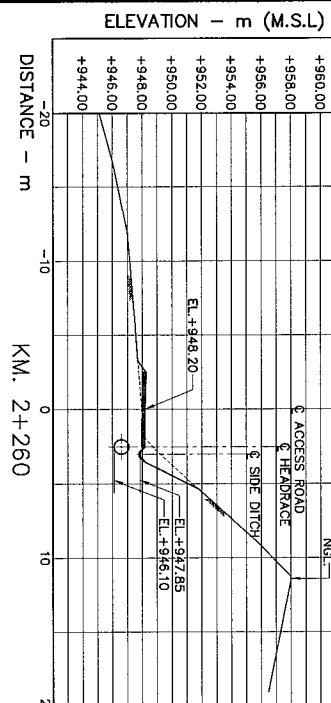
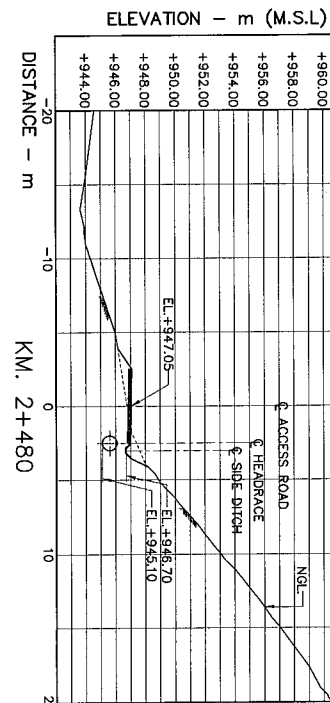
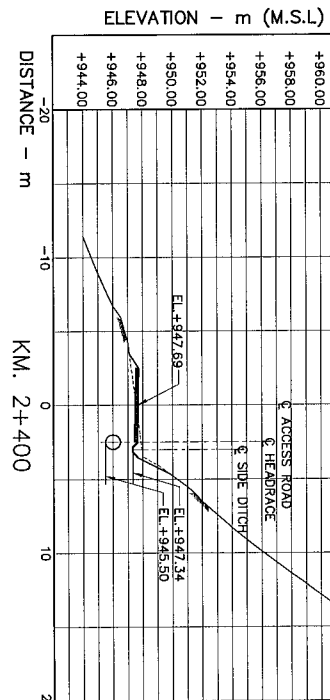
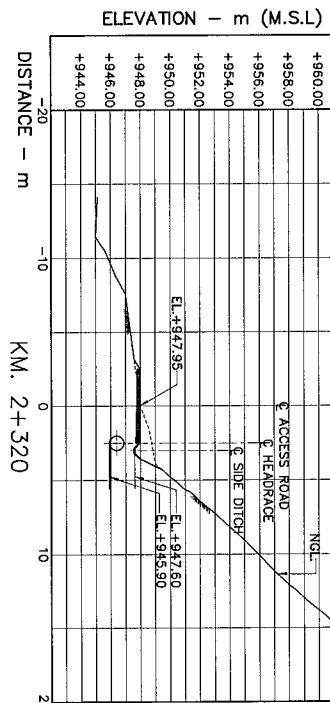
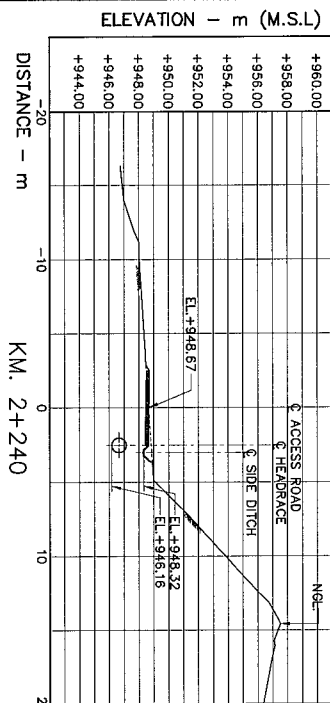
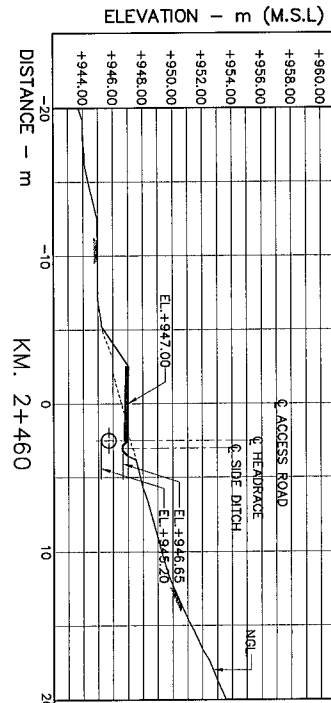
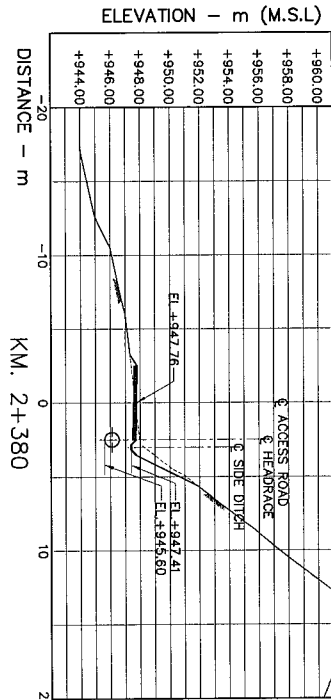
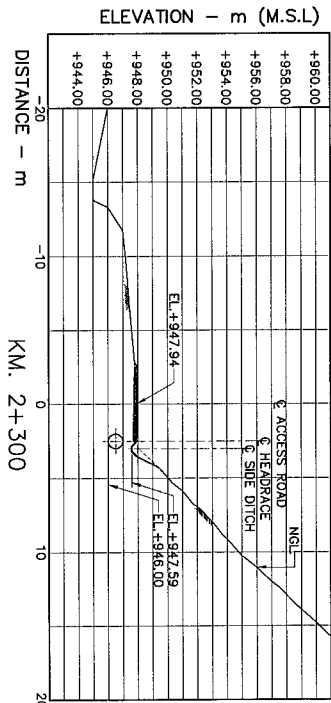
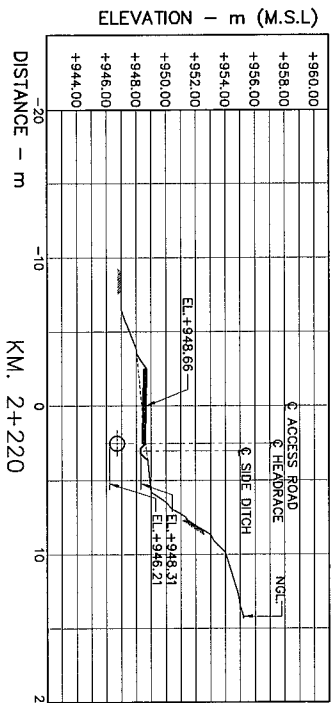
HORIZONTAL SCALE 1:250

VERTICAL SCALE 1:250



3					
2					
1					
NO.	DATE	REVISIONS	CHECKED	APPROVED	DATE

KINGDOM OF THAILAND	
MINISTRY OF ENERGY	
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUEN HYDROPOWER PROJECT	
CIVIL WORKS	
HEADRACE	
CROSS SECTIONS, KM. 1+900 TO KM. 2+220	
PANYA CONSULTANTS CO., LTD.	
DESIGNED 20/12/2014	
DRAWN 20/12/2014	
CHECKED 27/05/13	
PROJECT MANAGER	
DATE	
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
SUBMITTED 20/12/2014	
RECOMMENDED 20/12/2014	
APPROVED 20/12/2014	
DRAWING NO. MT-HR-14	
SHEET NO. 25 OF 98	



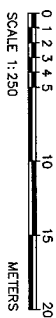
CROSS SECTIONS

HORIZONTAL SCALE 1:250
VERTICAL SCALE 1:250

- NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
 2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-QN-01

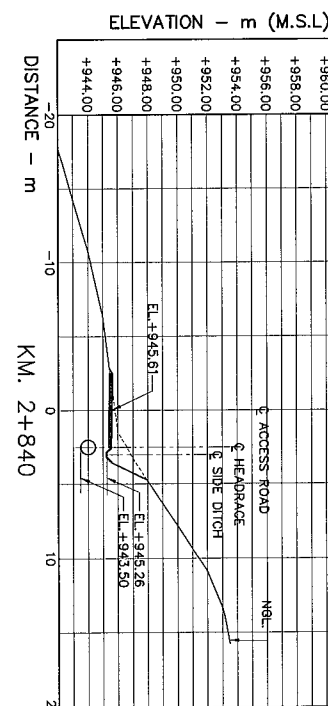
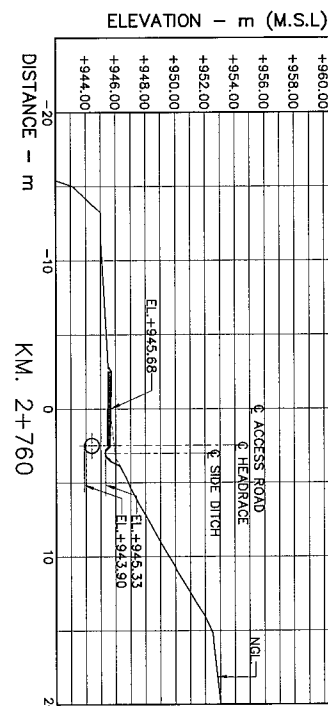
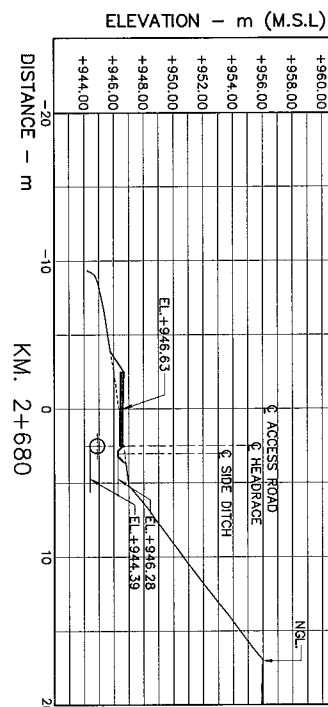
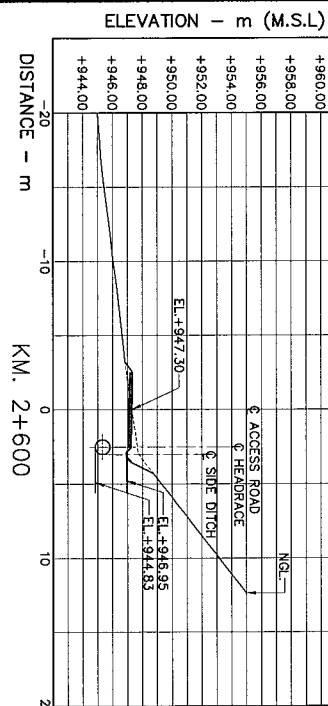
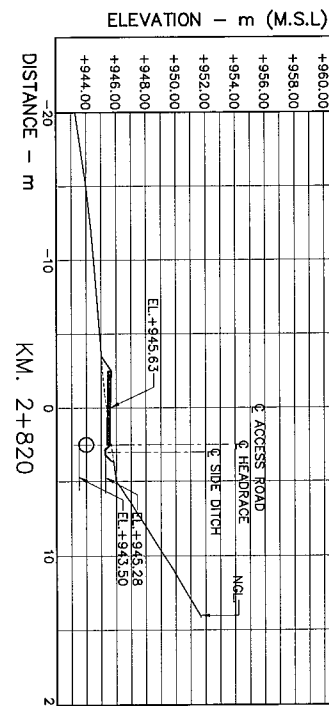
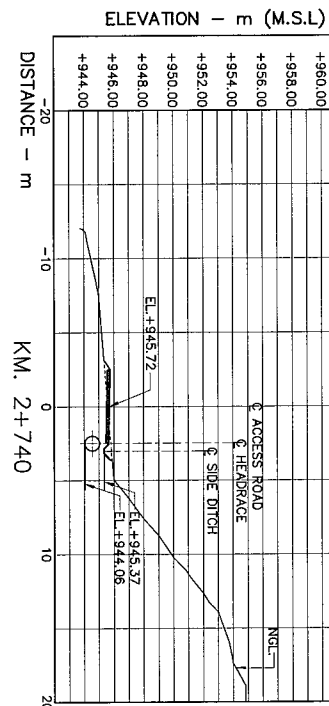
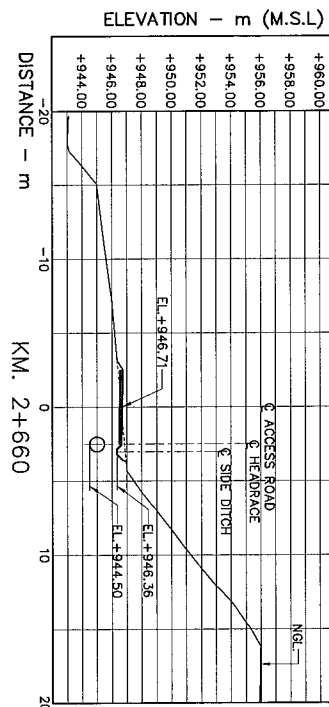
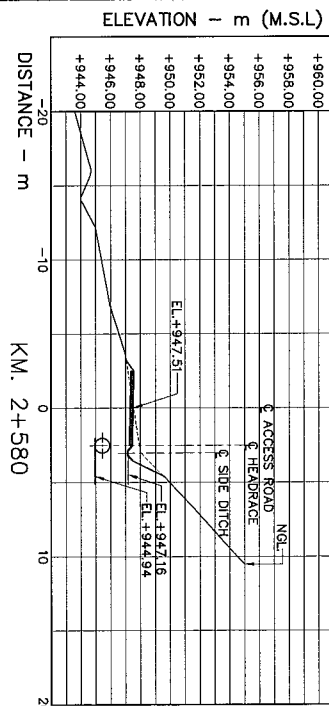
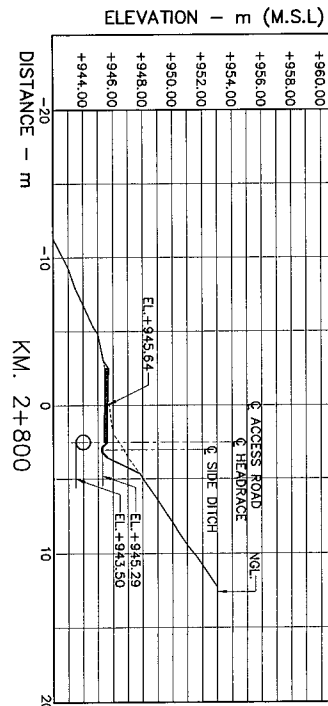
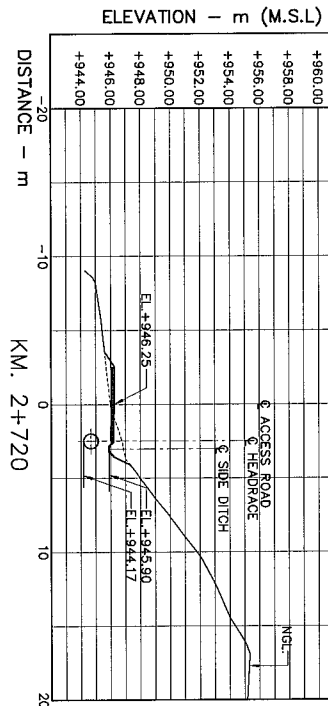
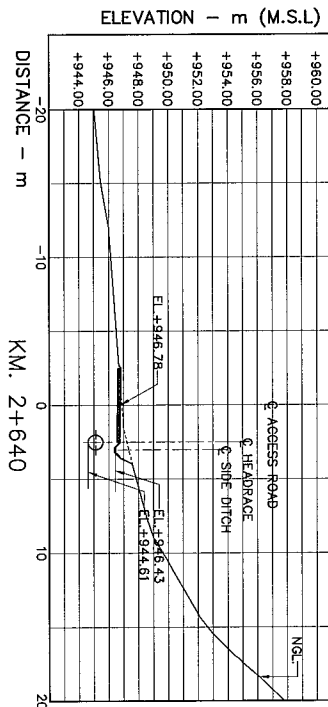
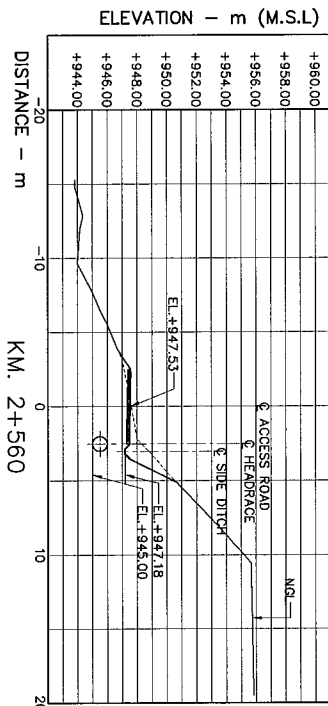
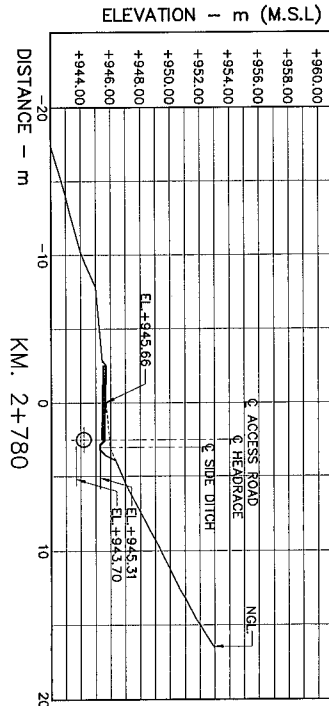
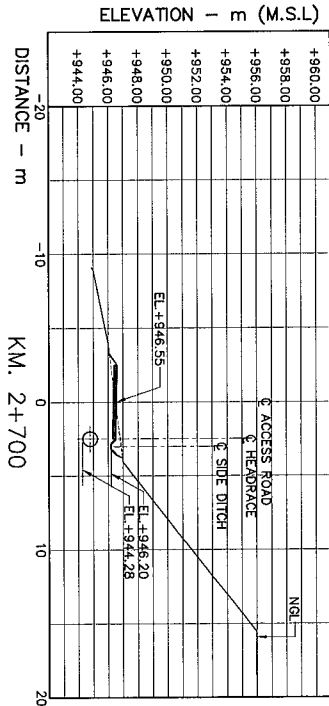
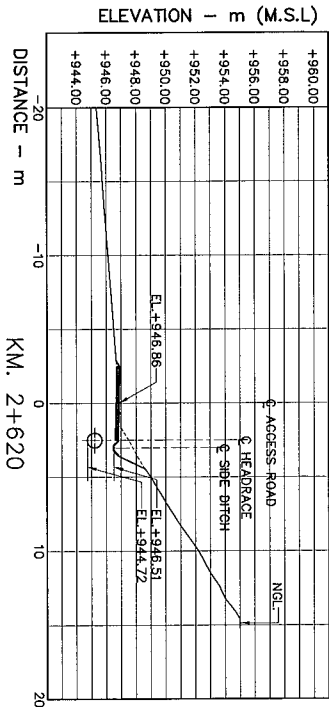
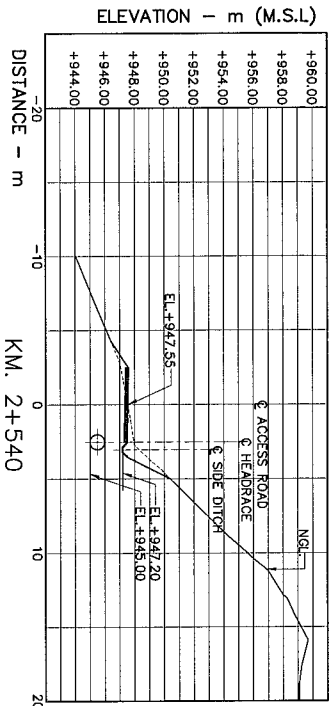
- REFERENCE DRAWINGS :-
1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)
 2. HEADRACE, CROSS SECTIONS KM.1+900 TO KM.2+220
 3. HEADRACE, CROSS SECTIONS KM.2+540 TO KM.2+840
 4. HEADRACE, TYPICAL SECTIONS

- MT-HR-01 TO MT-HR-05
MT-HR-10
MT-HR-12
MT-HR-19



NO.	DATE	REVISIONS	CHECKED	APPROVED
1				
2				
3				

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUEN HYDROPOWER PROJECT	
CIVIL WORKS HEADRACE	
CROSS SECTIONS, KM. 2+240 TO KM. 2+520	
PANYA CONSULTANTS CO., LTD.	
DESIGNED RUL223 27/05/15	SUBMITTED RUL3408
DRAWN P. Huan 08	RECOMMENDED P. Huan 27/05/15
CHECKED 08	APPROVED P. Huan 27/05/15
PROJECT MANAGER DATE	DRAWING NO. MT-HR-15
	SHEET NO. 26 OF 98



NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS.
UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-CN-01

REFERENCE DRAWINGS : -
1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)
2. HEADRACE, CROSS SECTIONS KM.2+240 TO KM.2+520
3. HEADRACE, CROSS SECTIONS KM.2+560 TO KM.3+160
4. HEADRACE, TYPICAL SECTIONS

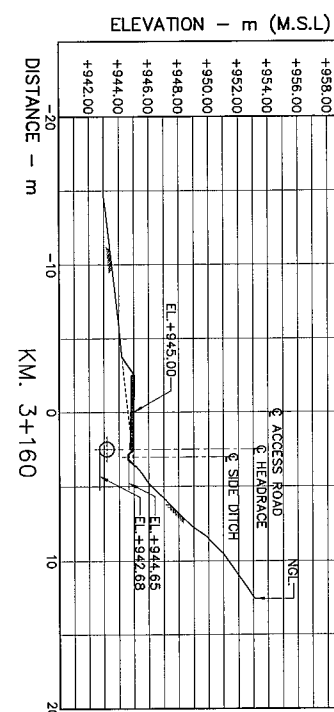
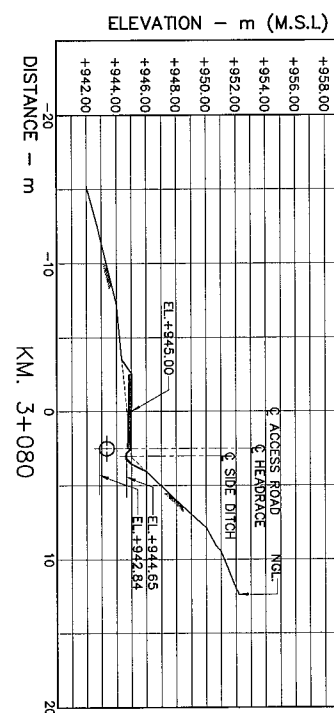
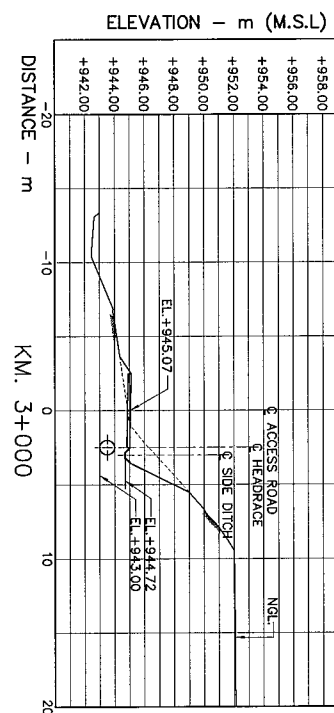
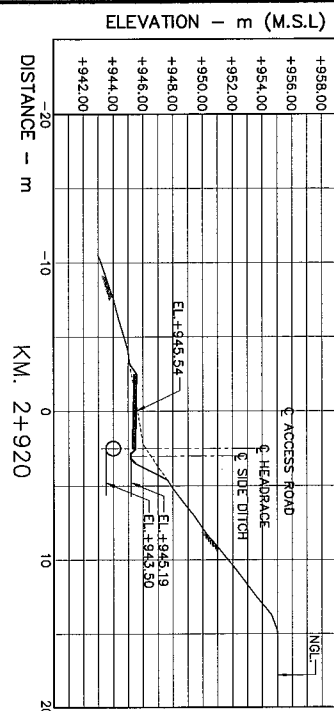
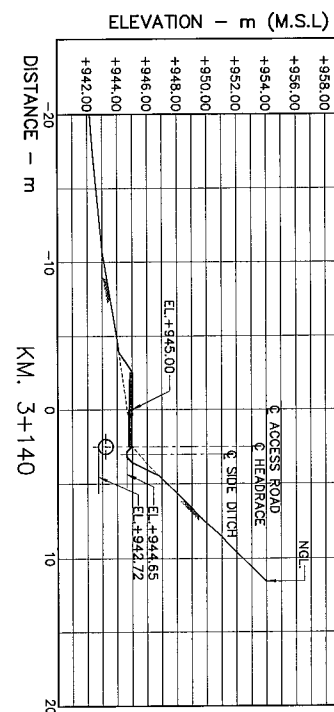
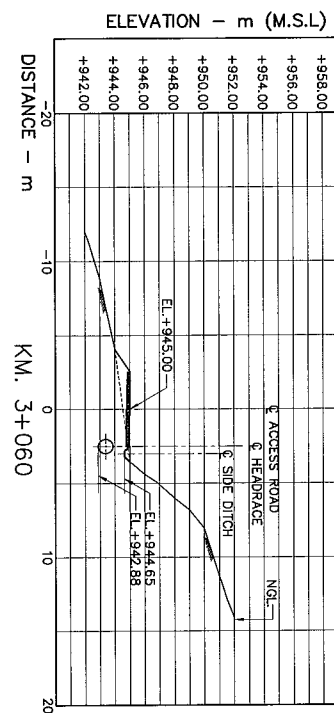
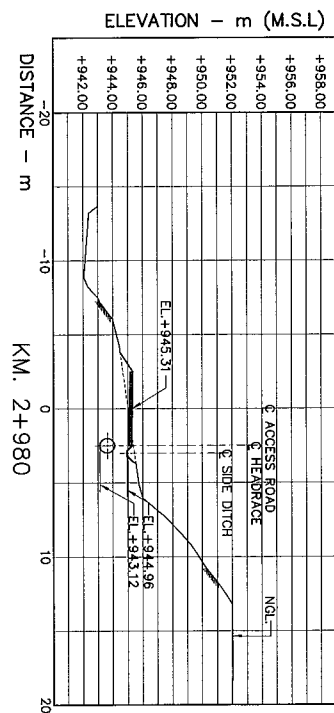
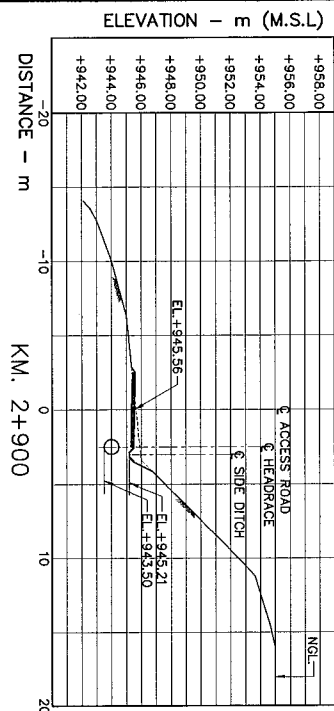
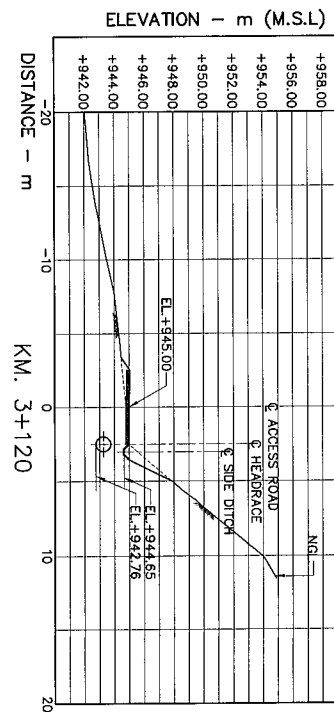
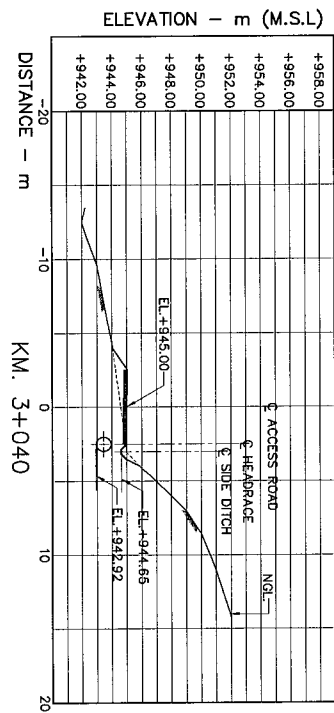
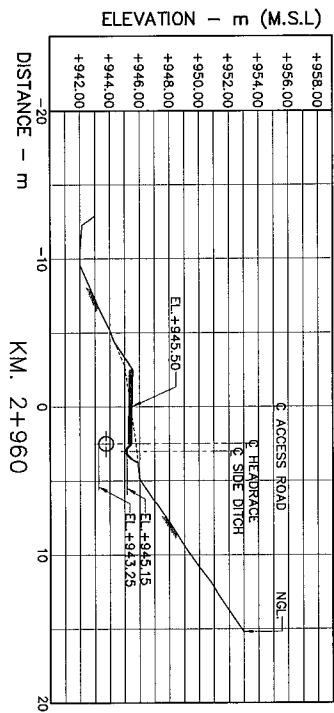
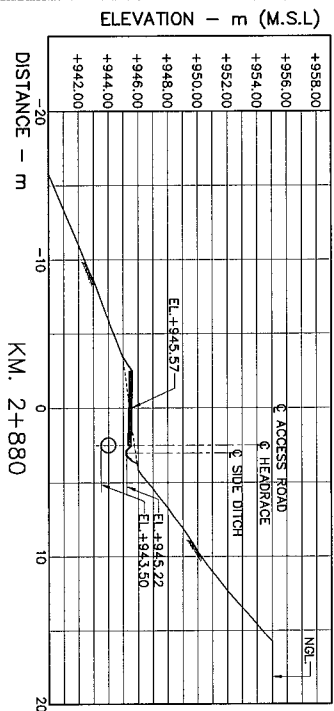
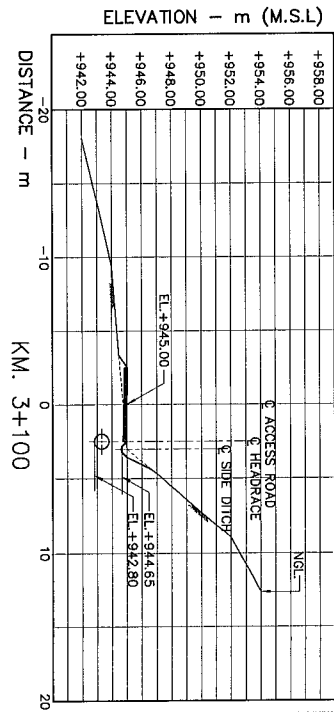
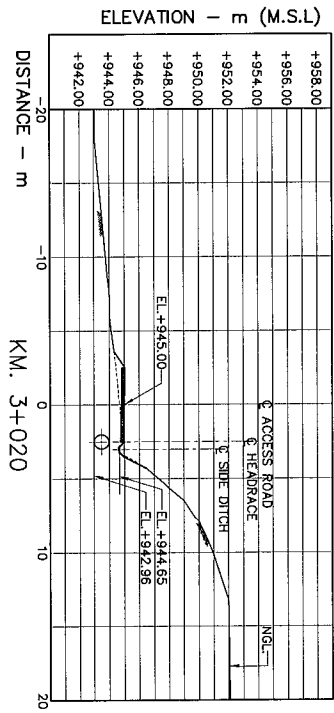
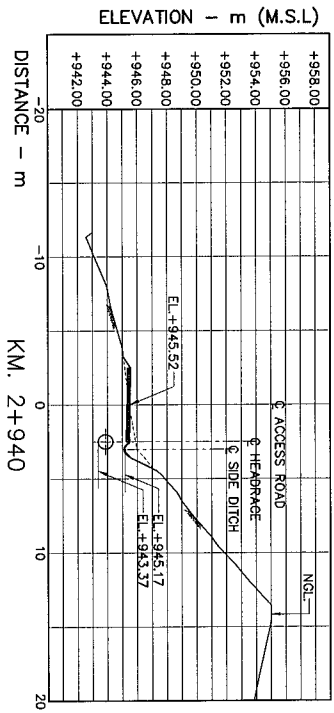
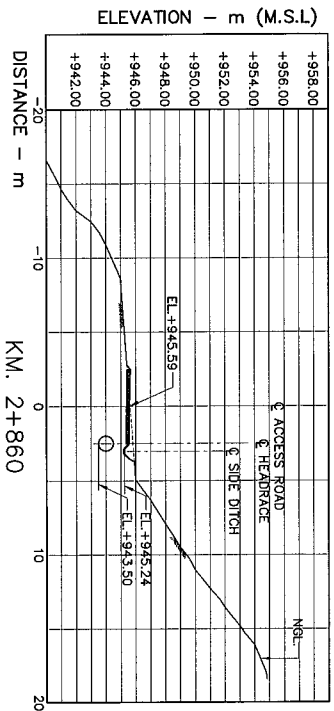
MT-HR-01 TO MT-HR-05
MT-HR-15
MT-HR-17
MT-HR-19

CROSS SECTIONS
HORIZONTAL SCALE 1:250
VERTICAL SCALE 1:250



NO.	DATE	REVISIONS	CHECKED	APPROVED
1				
2				
3				

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUEN HYDROPOWER PROJECT	
CIVIL WORKS HEADRACE	
CROSS SECTIONS, KM. 2+540 TO KM. 2+840	
PANYA CONSULTANTS CO., LTD.	
DESIGNED DRAWN CHECKED PROJECT MANAGER	SUBMITTED RECOMMENDED APPROVED SHEET NO.
27/06/13	27 OF 98



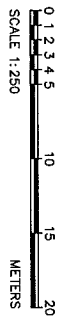
CROSS SECTIONS

HORIZONTAL SCALE 1:250
VERTICAL SCALE 1:250

- NOTES :
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
 2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-CN-01

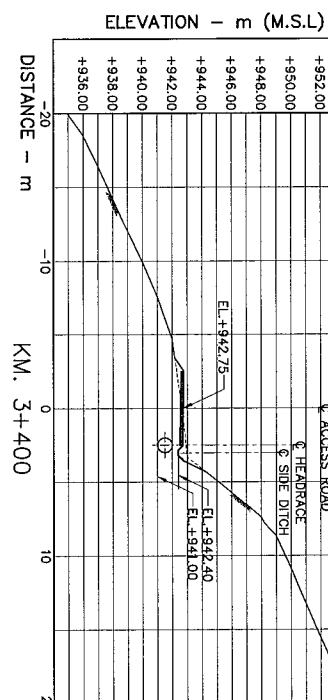
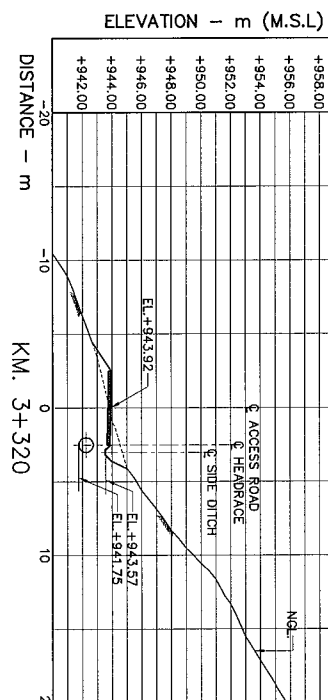
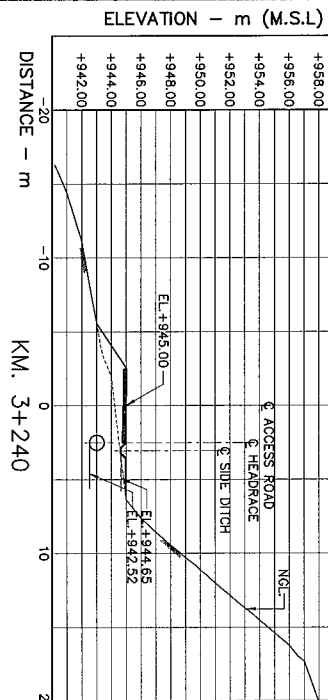
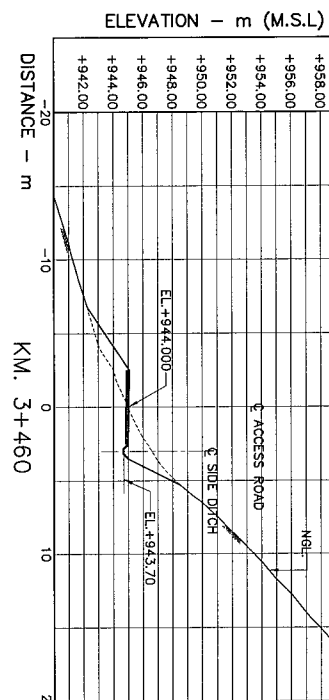
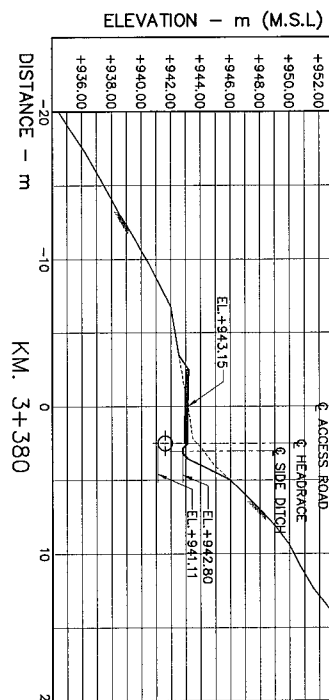
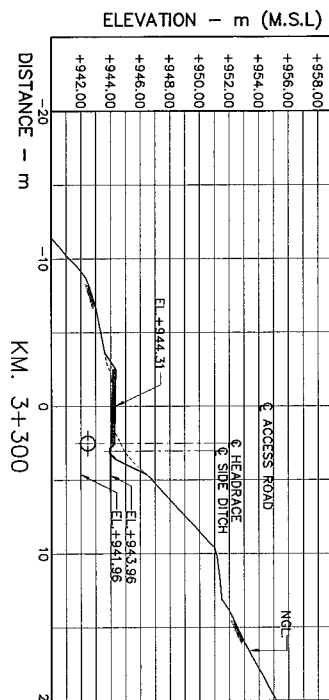
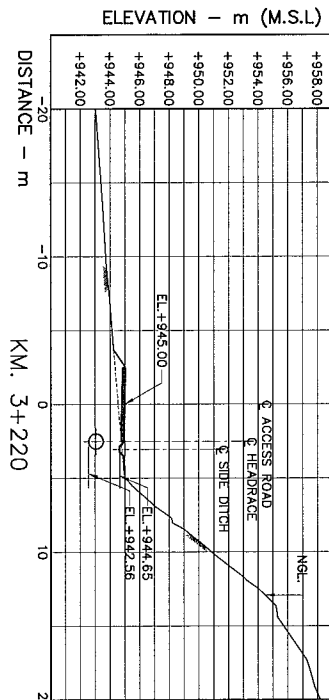
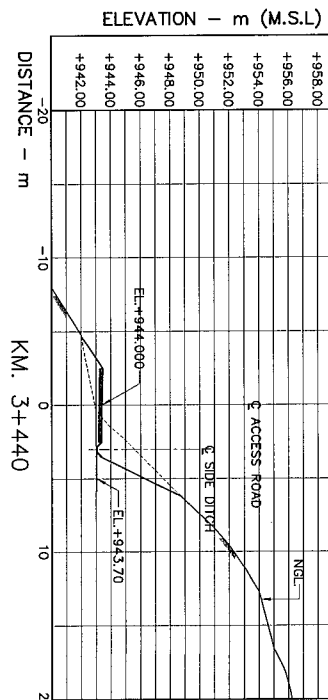
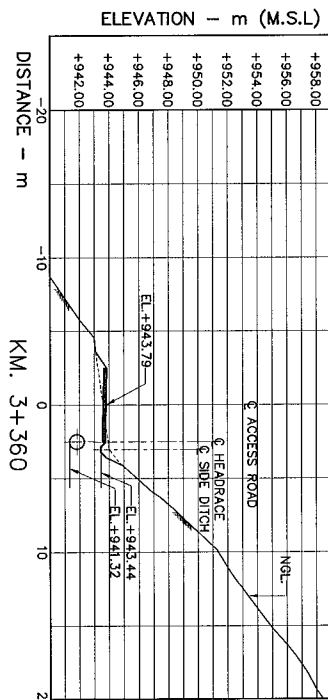
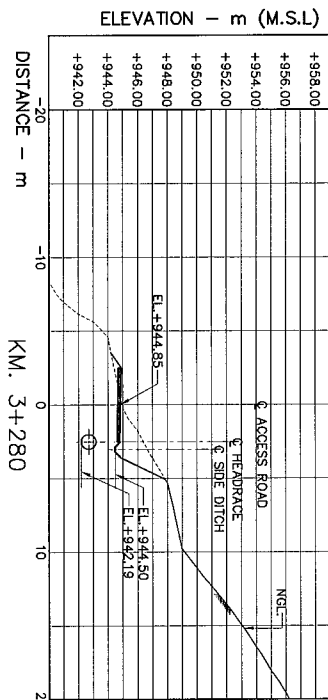
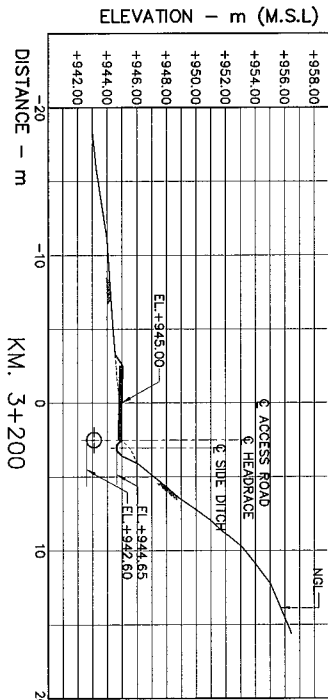
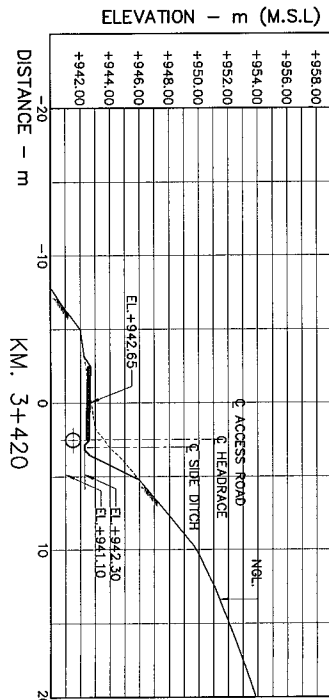
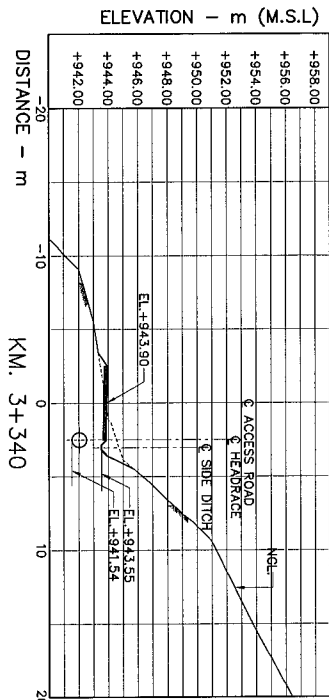
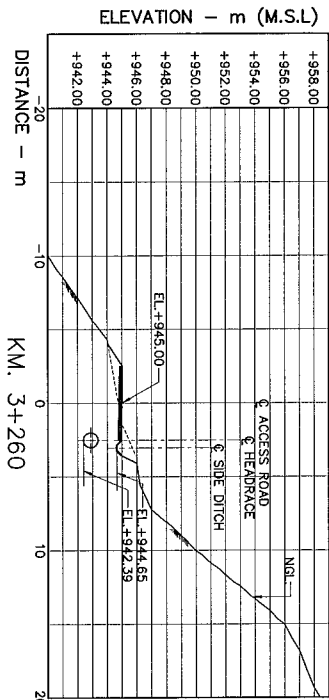
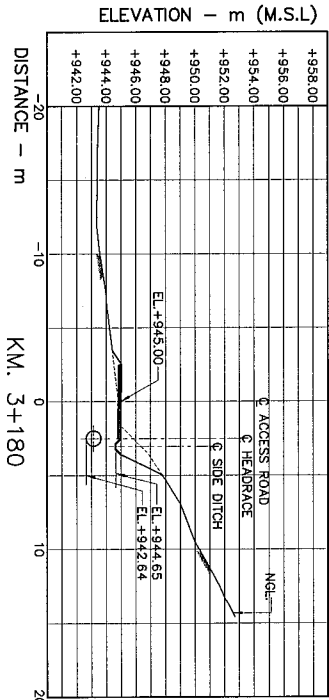
- REFERENCE DRAWINGS :-
1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)
 2. HEADRACE, CROSS SECTIONS KM.2+540 TO KM.2+840
 3. HEADRACE, CROSS SECTIONS KM.3+180 TO KM.3+460
 4. HEADRACE, TYPICAL SECTIONS

- MT-HR-01 TO MT-HR-05
MT-HR-16
MT-HR-18
MT-HR-19



3					
2					
1					
NO	DATE	REVISIONS	CHECKED	APPROVED	DATE
CONSULTANTS					

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUEN HYDROPOWER PROJECT	
CIVIL WORKS HEADRACE	
CROSS SECTIONS, KM. 2+860 TO KM. 3+160	
PANYA CONSULTANTS CO., LTD.	
DESIGNED RUSZSIT 27/06/13	SUBMITTED RUSZSIT 27/06/13
DRAWN RUSZSIT 27/06/13	RECOMMENDED RUSZSIT 27/06/13
CHECKED RUSZSIT 27/06/13	APPROVED RUSZSIT 27/06/13
PROJECT MANAGER	DATE
MT-HR-17	28 OF 98



NOTES :

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

2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-GN-01

REFERENCE DRAWINGS :-

1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)

2. HEADRACE, CROSS SECTIONS KM.2+860 TO KM.3+160

3. HEADRACE, TYPICAL SECTIONS

MT-HR-01 TO MT-HR-05

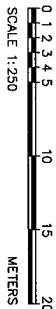
MT-HR-17

MT-HR-19

CROSS SECTIONS

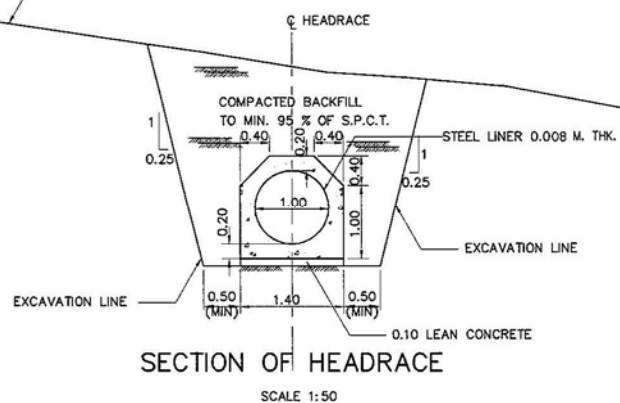
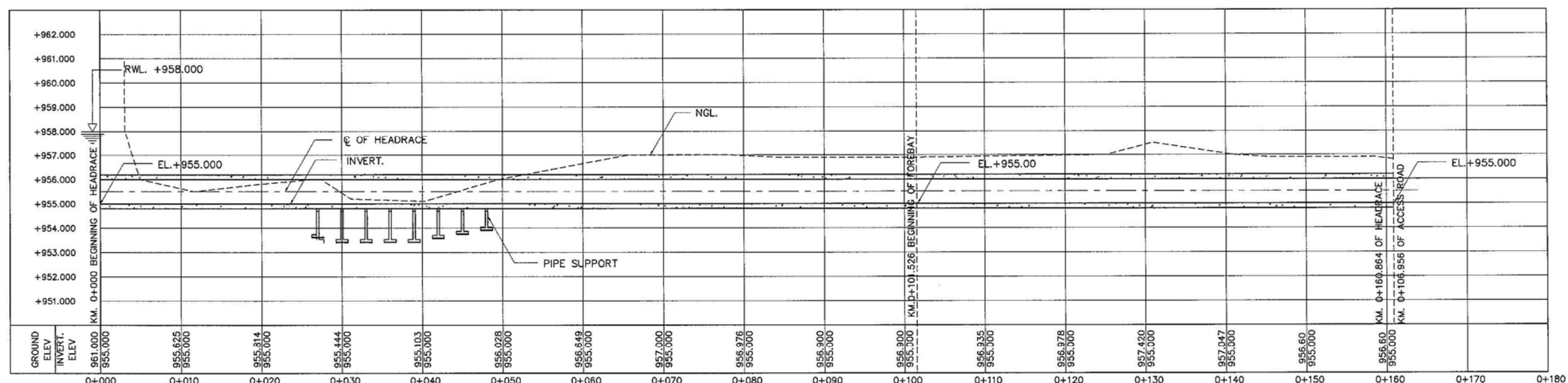
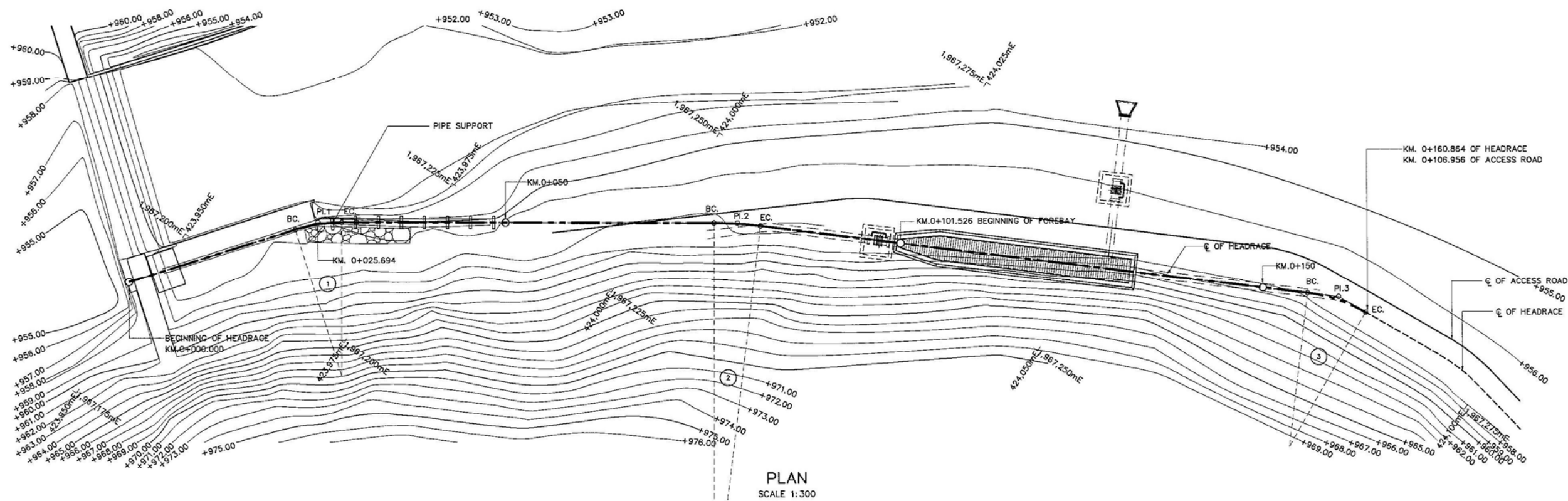
HORIZONTAL SCALE 1:250

VERTICAL SCALE 1:250



3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED
CONSULTANTS				
DEDE				

KINGDOM OF THAILAND			
MINISTRY OF ENERGY			
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
MAE TUEN HYDROPOWER PROJECT			
CIVIL WORKS			
HEADRACE			
CROSS SECTIONS, KM. 3+180 TO KM. 3+460			
DESIGNED		SUBMITTED	
DRAWN		RECOMMENDED	
CHECKED		APPROVED	
PROJECT MANAGER		SHEET NO.	
DATE		28 OF 98	



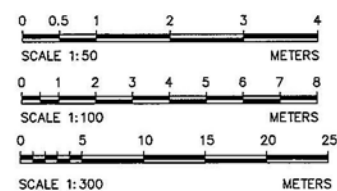
REFERENCE DRAWINGS :-

1. HEADRACE, PLAN & PROFILE (SHEET 1/5)
2. HEADRACE, ALIGNMENT DATA OF HEADRACE
3. HEADRACE, TYPICAL SECTIONS
4. HEADRACE, PIPE SUPPORT
5. HEADRACE, INTAKE, PLAN SECTIONS AND DETAILS
6. FOREBAY, PLAN AND SECTIONS

MT-HR-01
MT-HR-06
MT-HR-19
MT-HR-22
MT-HR-23
MT-FB-01

NOTES :

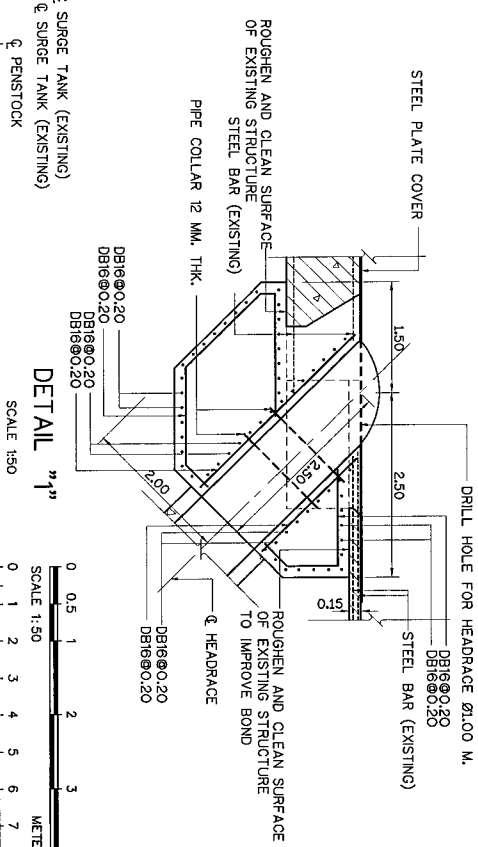
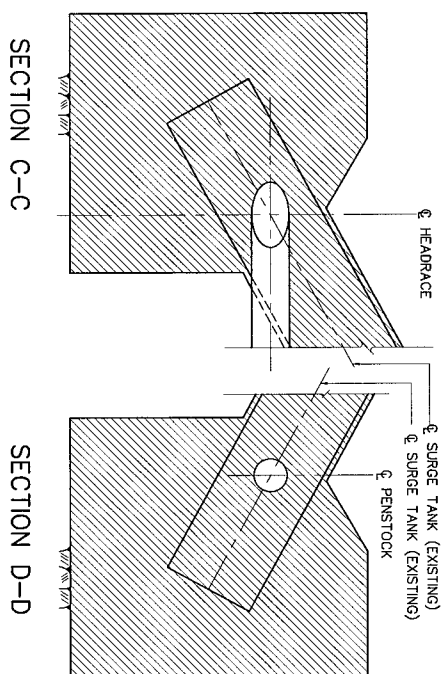
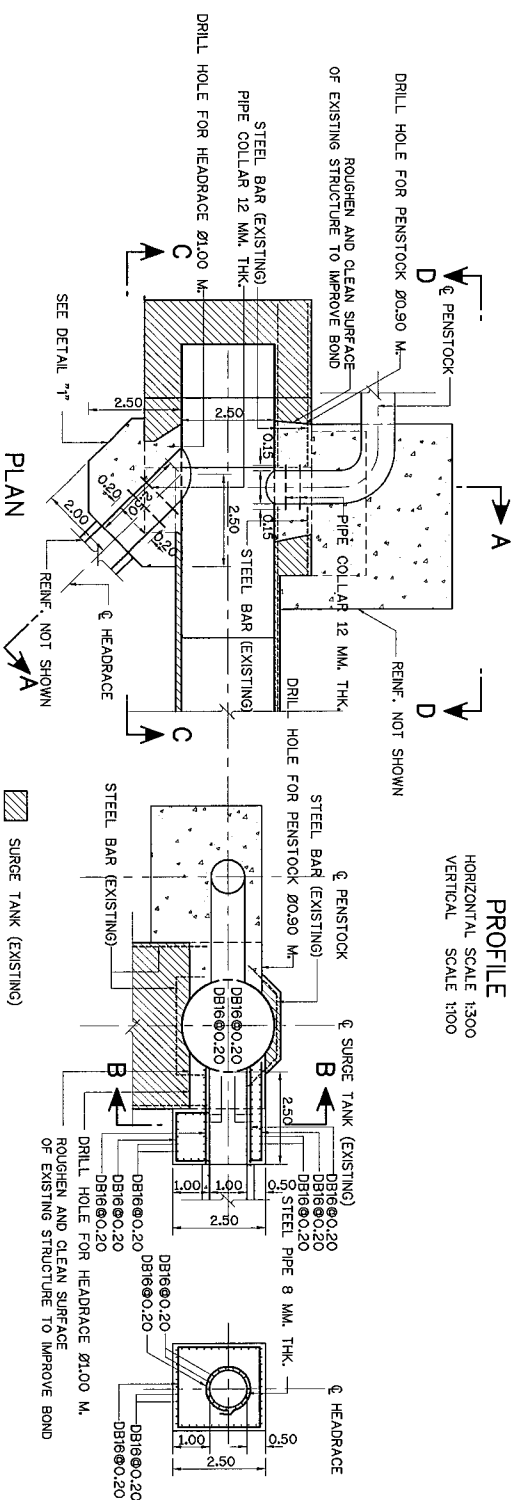
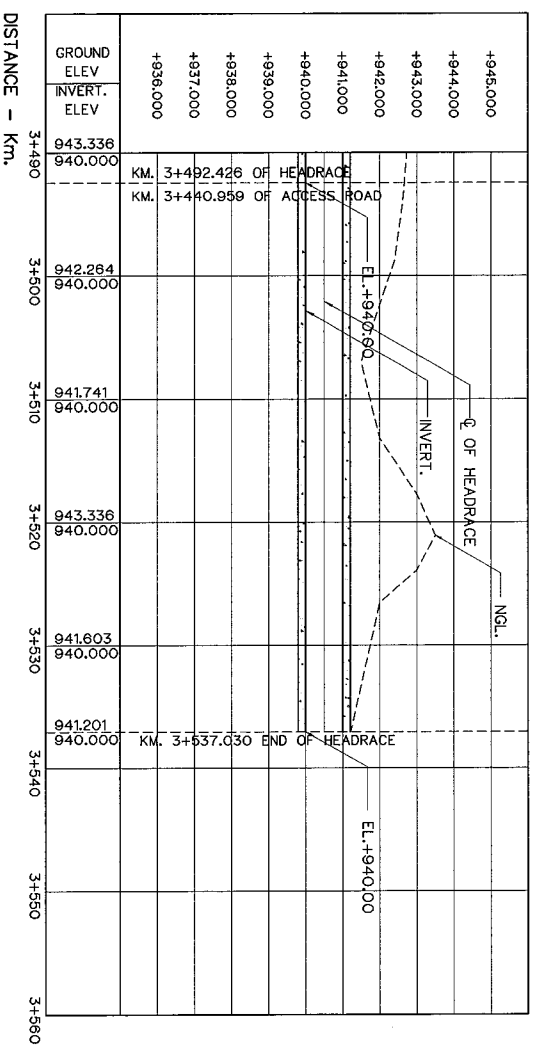
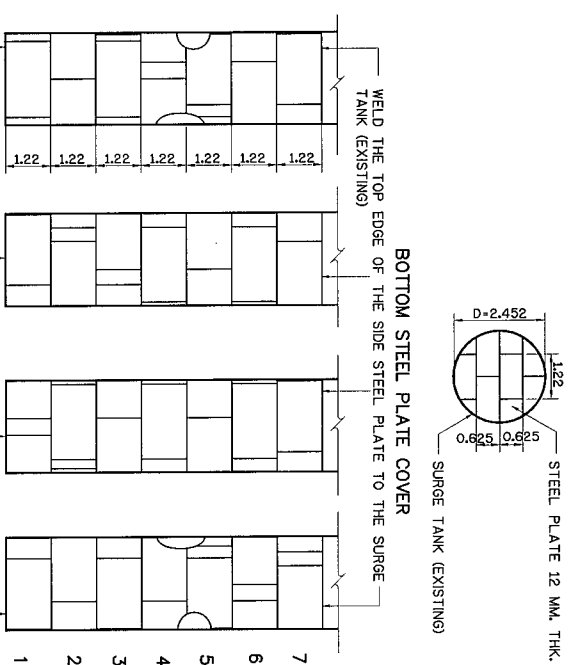
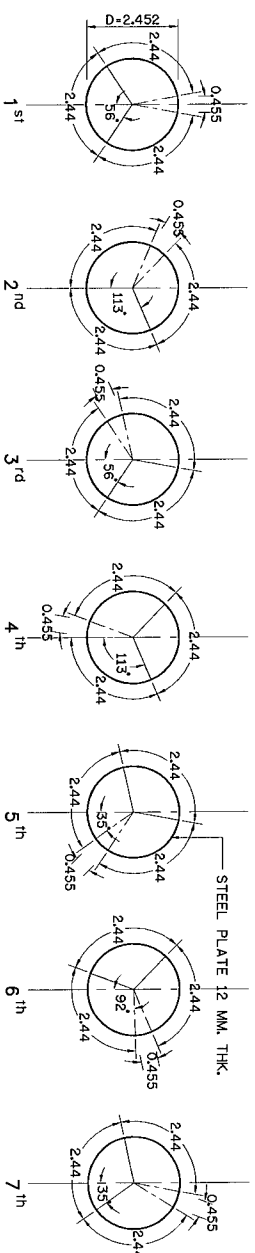
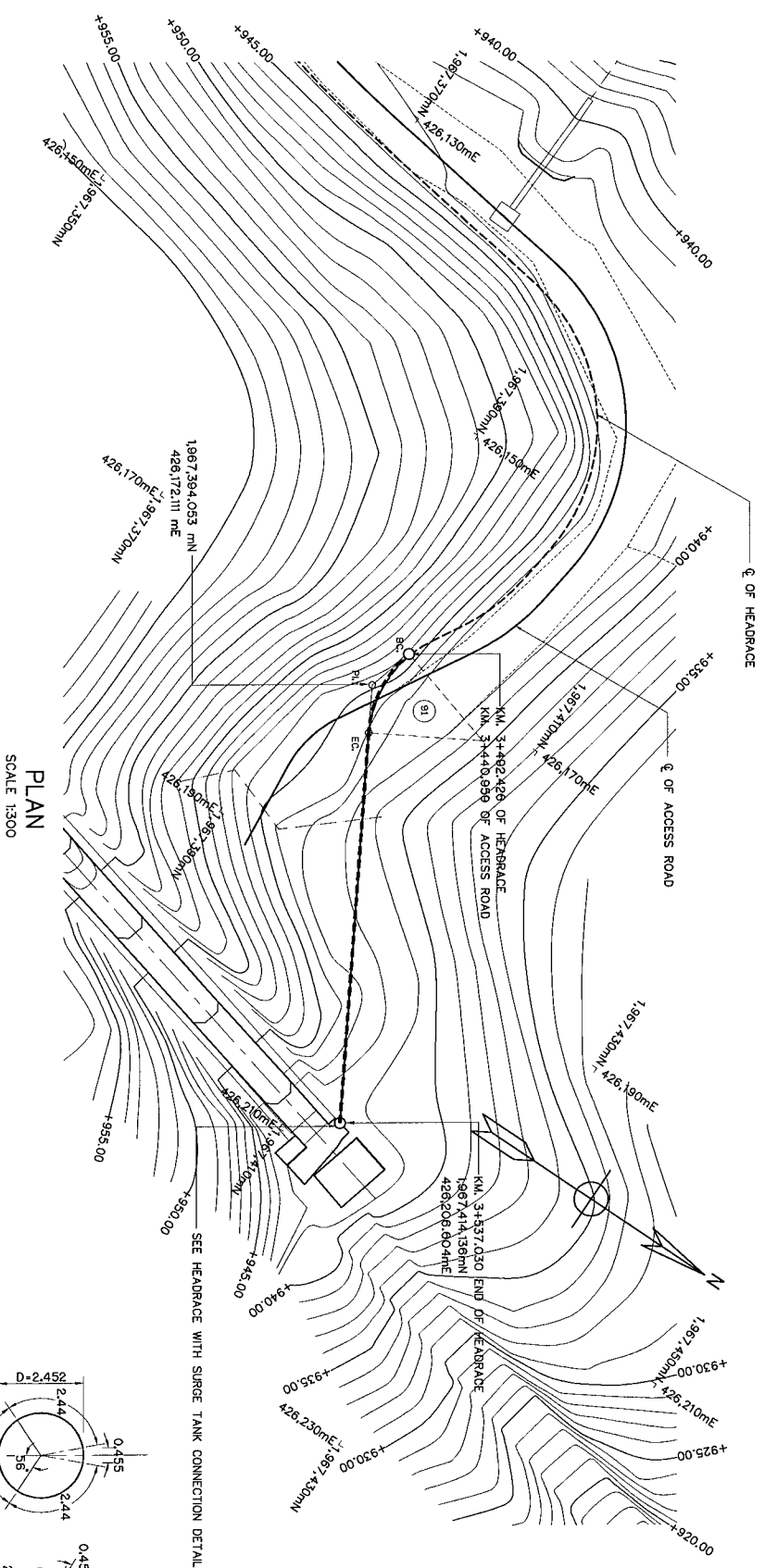
1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-GN-01.
3. ALLOWABLE BEARING CAPACITIES OF SOIL IS AT LEAST 5 TONS/M²



NO.	DATE	REVISIONS	CHECKED	APPROVED
3				
2				
1				

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY			
MAE TUEN HYDROPOWER PROJECT			
CIVIL WORKS HEADRACE			
BEGINNING, PLAN & PROFILE, KM. 0+000 TO KM. 0+160.864			
PANYA CONSULTANTS CO., LTD.		DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
DESIGNED	20.22514	20.8405	SUBMITTED
DRAWN			RECOMMENDED
CHECKED			APPROVED
PROJECT MANAGER	27/06/13	DATE	DRAWING NO. MT-HR-20
CONSULTANTS		DEDE	

SHEET NO.
31 OF 98



NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-GN-01.
3. THE CONTRACTOR SHALL CHECK THE SIZE OF THE SURGE TANK AND ADJUST THE SIZE OF PARTS OF THE STEEL PLATE COVER BEFORE CONNECTING THEM TO THE SURGE TANK.
4. TO DRILL CONCRETE OF THE SURGE TANK TO CONNECT IT TO THE HEADRACE AND THE PENSTOCK, THE CONTRACTOR SHALL EXAMINE THE CONDITIONS OF THE SURGE TANK. CONSTRUCTION SHALL BE CAREFULLY PLANNED AND COMPLETED TO PREVENT DAMAGE TO THE SURGE TANK.

REFERENCE DRAWINGS :-

1. HEADRACE, PLAN & PROFILE (SHEET 5/5)
2. HEADRACE, ALIGNMENT DATA OF HEADRACE

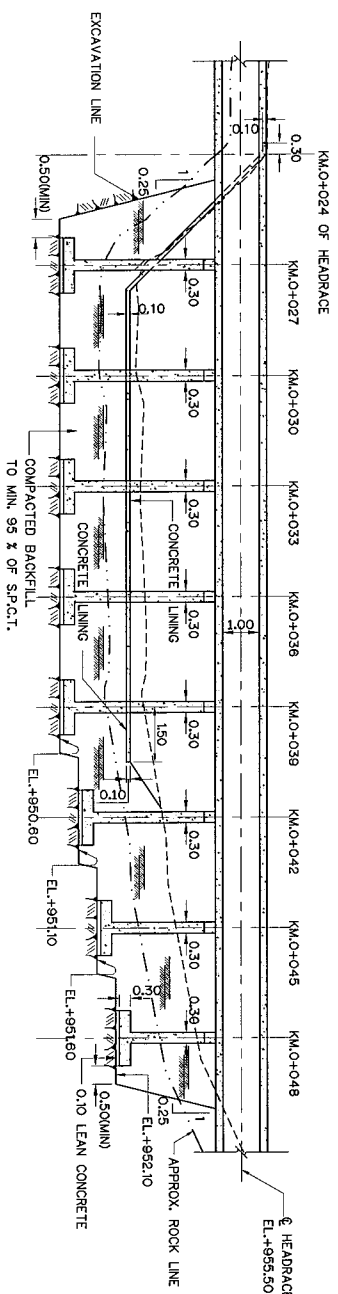
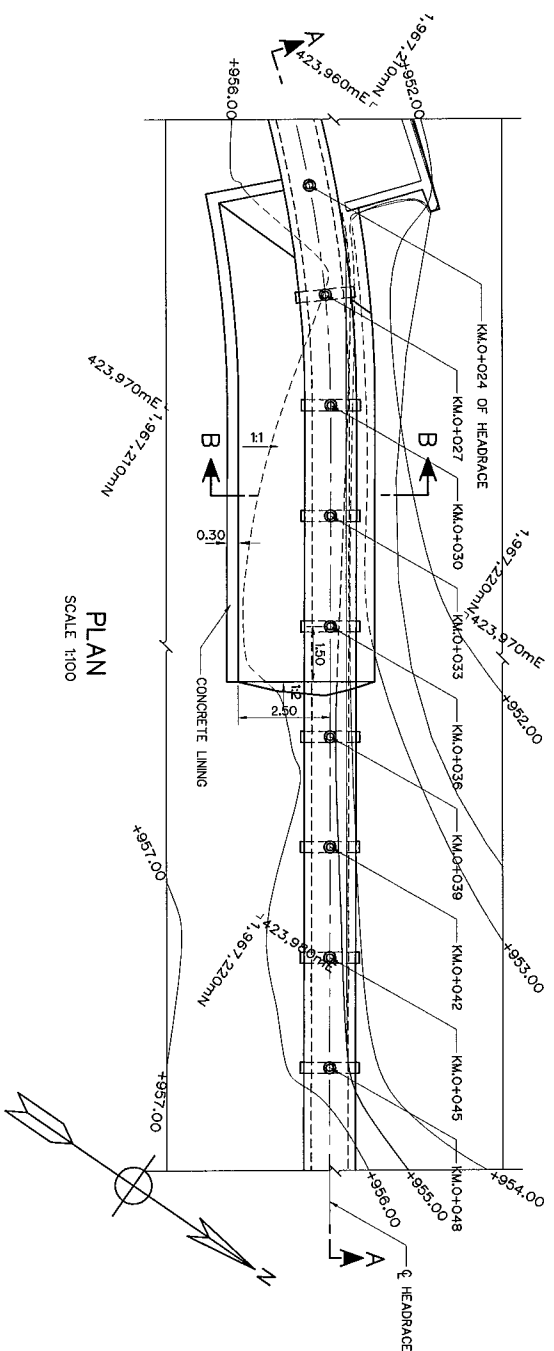
MT-HR-05
MT-HR-06

HEADRACE WITH SURGE TANK CONNECTION DETAIL

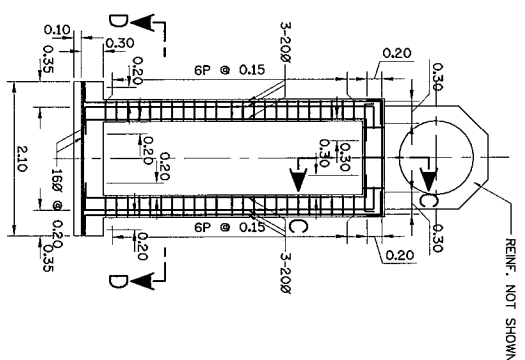
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3				
2				
1				
NO.	DATE	REVISIONS	CHECKED	APPROVED
CONSULTANTS			DEDE	

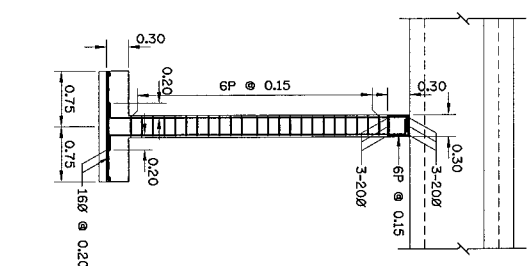
KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY AND EFFICIENCY	
MAE TUEN HYDROPOWER PROJECT	
CIVIL WORKS	
HEADRACE	
END. PLAN & PROFILE KM.3+492.426 TO KM.3+537.030	
PANYA CONSULTANTS CO.,LTD.	
DESIGNED <i>W. J. J.</i> <i>W. J. J.</i> <i>W. J. J.</i>	DRAWN <i>W. J. J.</i> <i>W. J. J.</i> <i>W. J. J.</i>
CHECKED <i>W. J. J.</i> <i>W. J. J.</i> <i>W. J. J.</i>	26.3.98
DATE 27/06/93	DRAWING NO. M-1-HR-21
PROJECT MANAGER	SHEET NO. 32 OF 98
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY REVIEWED <i>W. J. J.</i> <i>W. J. J.</i> <i>W. J. J.</i> SUBMITTED <i>W. J. J.</i> <i>W. J. J.</i> <i>W. J. J.</i> RECOMMENDED <i>W. J. J.</i> <i>W. J. J.</i> <i>W. J. J.</i> APPROVED <i>W. J. J.</i> <i>W. J. J.</i> <i>W. J. J.</i>	



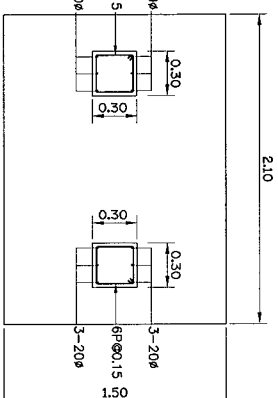
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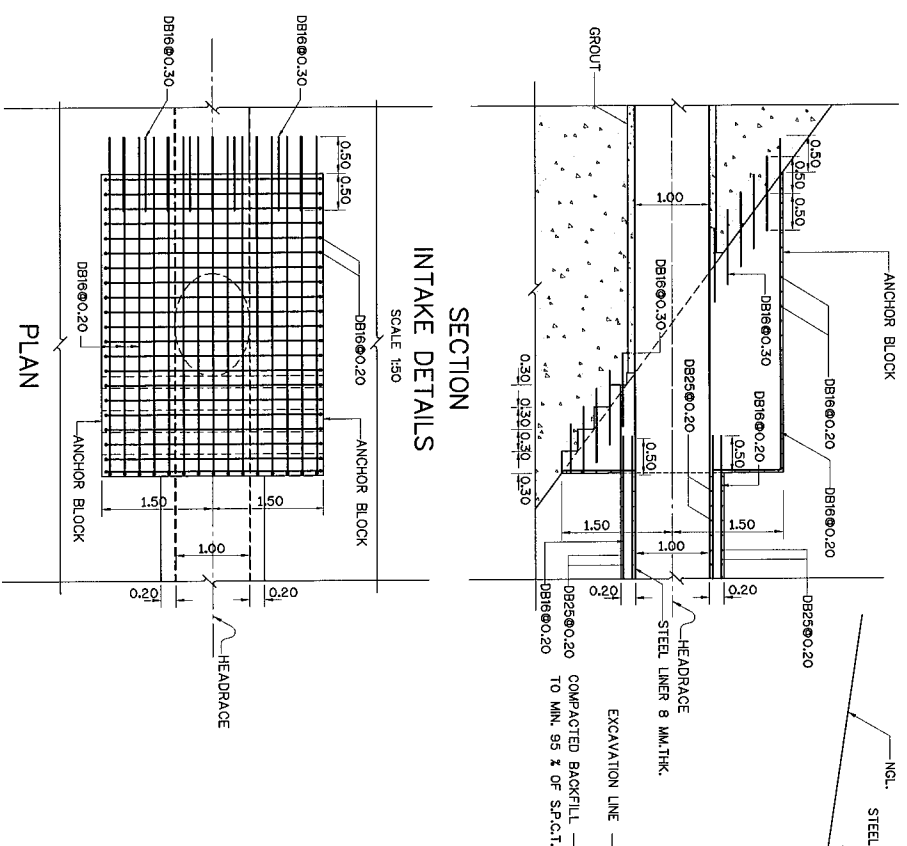
REINFORCEMENT DETAIL
SCALE 1:50



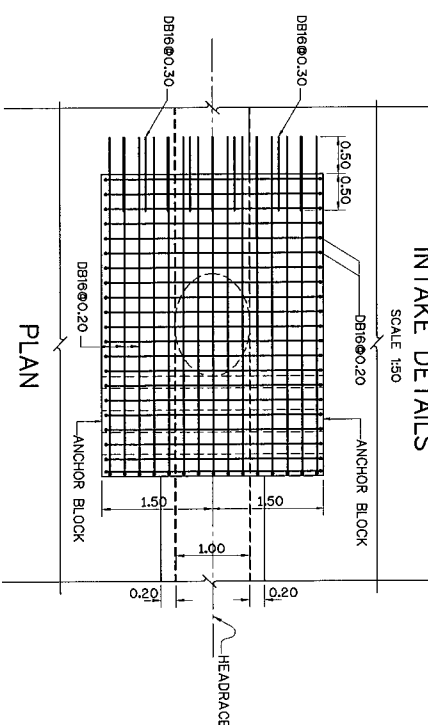
SECTION C-C
SCALE 1:25



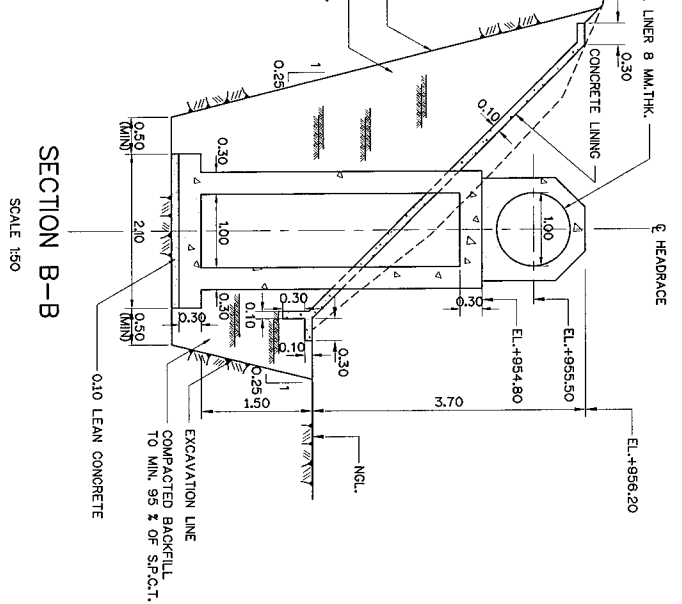
SECTION D-D
SCALE 1:25



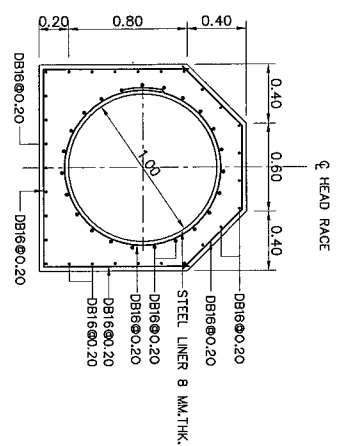
SECTION
INTAKE DETAILS
SCALE 1:50



PLAN
SCALE 1:50

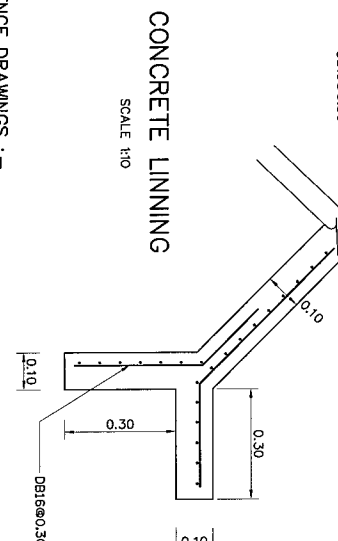
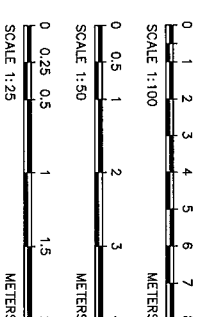


SECTION B-B
SCALE 1:50



SECTION E-E
SCALE 1:25

REINFORCEMENT DETAILS
SCALE 1:25



CONCRETE LINING
SCALE 1:10

REFERENCE DRAWINGS :-

1. HEADRACE, BEGINNING, PLAN & PROFILE KM+000 TO KM+160.864 MT-HR-20
2. HEADRACE, INTAKE, PLAN SECTIONS AND DETAILS MT-HR-22

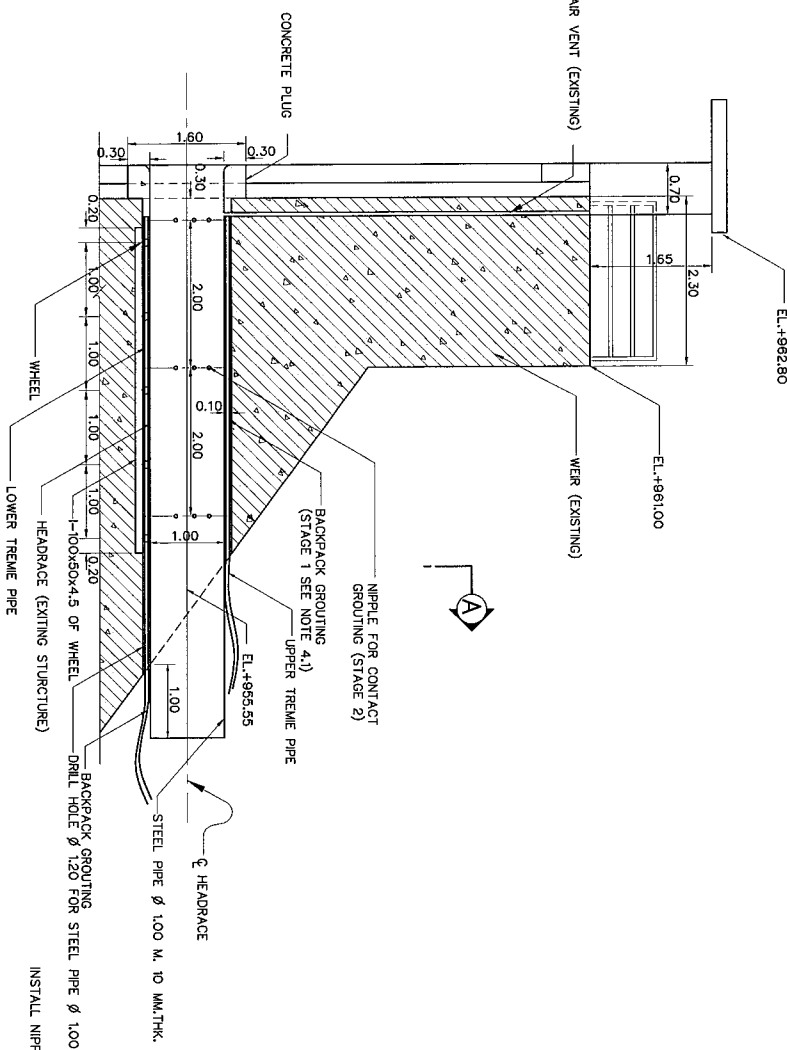
NOTES :

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS
2. REINFORCEMENT BARS ARE IN MILLIMETERS, UNLESS OTHERWISE SHOWN.
3. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-GN-01.

NO.	REVISIONS	CHECKED	DATE
1	10-11		
2	10-11		
3	10-11		

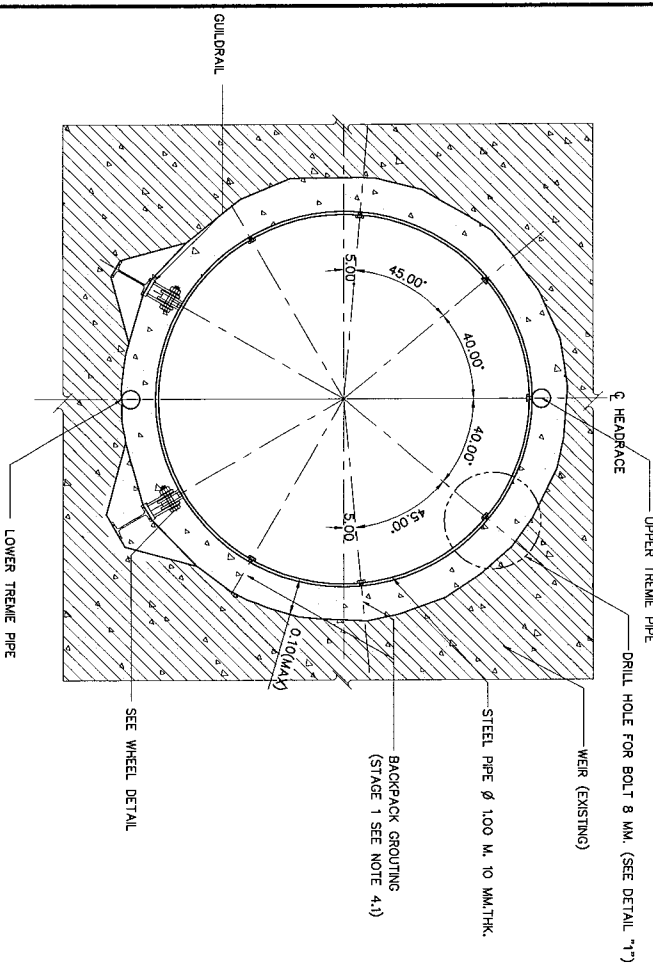
DESIGNED BY: <i>[Signature]</i>		REVIEWED BY: <i>[Signature]</i>
CHECKED BY: <i>[Signature]</i>		APPROVED BY: <i>[Signature]</i>
DATE: 27/08/13		DRAWING NO: MT-HR-22
PROJECT MANAGER: <i>[Signature]</i>		SHEET NO: 33 OF 98

DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	CIVIL WORKS
MAE TUN HYDROPOWER PROJECT	HEADRACE
	PIPE SUPPORT



WEIR SECTION

SCALE 1:50

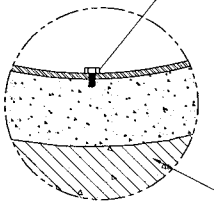


SECTION A-A (STAGE 1)

SCALE 1:10

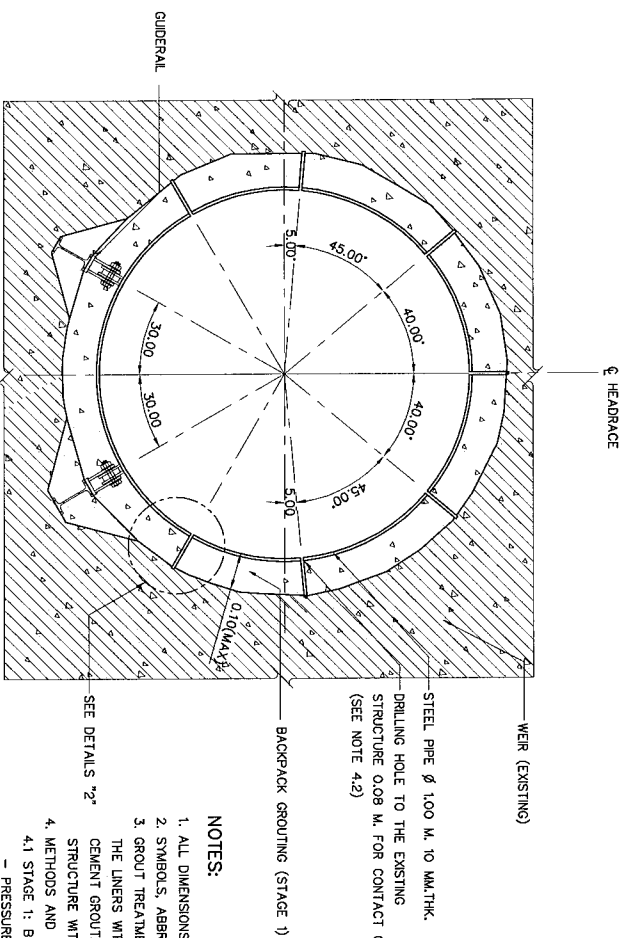
STAGE 1: BACKPACK GROUTING

DILL. HOLE FOR BOLT 8 MM.



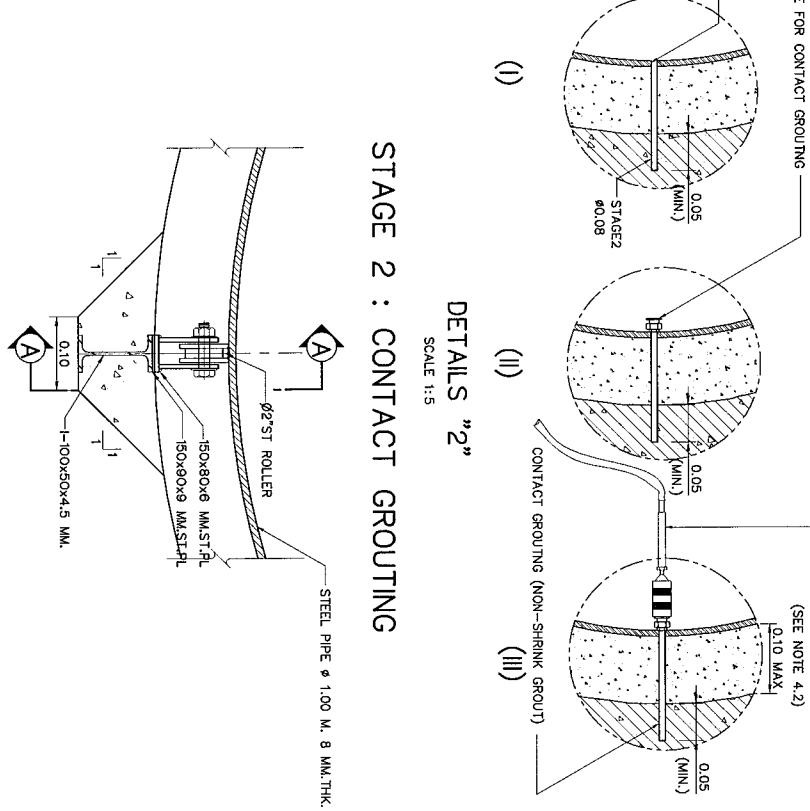
DETAIL "1"

SCALE 1:15



SECTION A-A (STAGE 2)

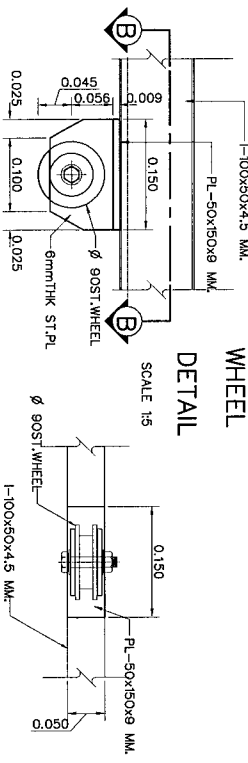
SCALE 1:10



DETAILS "2"

SCALE 1:15

STAGE 2 : CONTACT GROUTING



WHEEL DETAIL

SCALE 1:5

WHEEL SECTION A-A

SCALE 1:5

WHEEL SECTION B-B

SCALE 1:5

WHEEL DETAILS

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS (M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DWG. NO. MT-GN-01
3. GROUT TREATMENT FOR LINER ANNULAR SPACE CONSISTS OF BACKPACK GROUTING THE SPACE BEHIND THE LINERS WITH SAND-CEMENT MIXTURE GROUT. THE FINAL STEP IS CONTACT GROUTING WITH NON-SHRINK CEMENT GROUT. CONTACT GROUTING IS THE INJECTION OF NEAT CEMENT GROUT AT THE CONTACT OF A CONCRETE STRUCTURE WITH AN ADJACENT SURFACE. CONTACT GROUTING FILLS THE VOID AT THE CONTACT THAT RESULTS FROM SHRINKAGE.
4. METHODS AND MATERIALS

4.1 STAGE 1: BACKPACK GROUTING

- PRESSURE GROUTING FOR BACKPACKING BEHIND STEEL RING LINERS SHOULD BE ACCOMPLISHED AS QUICKLY AS POSSIBLE AFTER LINER PLACEMENT.
- THE GROUT SHALL BE APPLIED THROUGH TREMIE PIPE INSTALLED AT THE CROWN AND INVERT OF THE LINER. STEEL SECTIONS OF PIPE OR TUBING FABRICATED TO FIT THE ANNULAR GAP CAN BE USED AS TREMIE PIPE FOR THE LOW PRESSURE PLACEMENT OF GROUT. THE MAXIMUM PRESSURE SHALL NOT BE LARGER THAN 2.1 KSC (30 PS). - A NON-SHRINK SAND-CEMENT MIXTURE IS NORMALLY REQUIRED FOR GROUTING OF LARGE SPACE BEHIND THE LINER. APPROPRIATE SIZE OF FINE AGGREGATE AND/OR ADDITIVES CAN ALSO BE ADDED TO THIS GROUT. THE MIXED PROPORTION SHALL BE PROPOSED BY THE CONTRACTOR TO SUIT THE SIZE OF THE TREMIE PIPE AND GROUT PUMP TO BE USED. THE FINAL STRENGTH OF THE GROUT SHALL NOT BE LESS THAN 210 KSC (3,000 PS) AT 28 DAYS.
- THE INJECTION MUST BEGIN AT THE FARTHEST END OF THE LINER, AND FROM THE INVERT AND MOVE UP AND DISPLACE UPWARD AS GROUTING PROCEEDS. AS EACH STEP IS BEING FILLED, THE GROUT IS STEP OUTWARD TO THE PORTAL. HOLES DRILLED ABOVE THE INJECTION POINTS FOR LATER USED AS CONTACT GROUTING PROVIDE VENTING AS WELL AS DETERMINE THE PROGRESS OF GROUTING.
- BACKPACK GROUTING FROM THE CROWN CONTACT AREA REQUIRES THAT PRESSURE BE MAINTAINED UNTIL HARDENING OF THE GROUT OCCURS TO ENSURE INTIMATE CONTACT OF THE GROUT WITH THE CROWNS. CLOSELY MONITORED LOW TO MODERATE PUMPING PRESSURES MUST BE USED TO INJECT THE GROUT.

4.2 STAGE 2 : CONTACT GROUTING

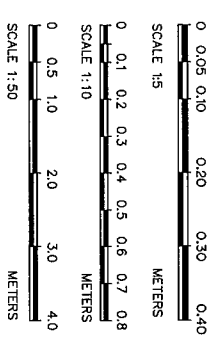
- CONTACT GROUTING MUST BE DONE THROUGH THE LINER. TO ACCOMPLISH GROUTING AFTER STEEL LINER HAS BEEN INSTALLED, IMBEDDED PIPES OR FORMED HOLES SHALL BE PROVIDED THROUGH THE LINER. IT IS USUALLY DONE THROUGH PIPE NIPPLES EMBEDDED IN THE HOLE DRILLED THROUGH THE LINER. THE GROUT HOLES SHALL LOCATED AT THE CROWN AND SECTION ABOVE THE SPRING LINE AT AN ANGLE AND SPACE AT LENGTH ALONG THE LINER AS INDICATED IN THE THIS DRAWING.
- CONTACT GROUT MUST BE DONE AFTER THE BACKPACK GROUT HAS HARDENED.
- EXPANSIVE CEMENT OR NON-SHRINK GROUTS SHALL BE USED. THE MIXED DESIGN OF THE GROUT SHALL BE IN ACCORDING TO THE RECOMMENDATION OF THE MANUFACTURER OF THE NON-SHRINK ADMIXTURE.
- THE GROUT HOLES MUST BE THOROUGHLY WASHED BEFORE THE GROUTING OPERATION.
- GROUTING PRESSURES MAY VARY BUT THE HIGHEST SAFE PRESSURE NOT MORE THAN 7 KSC (100 PS) SHOULD BE USED.

5. GROUTING EQUIPMENT

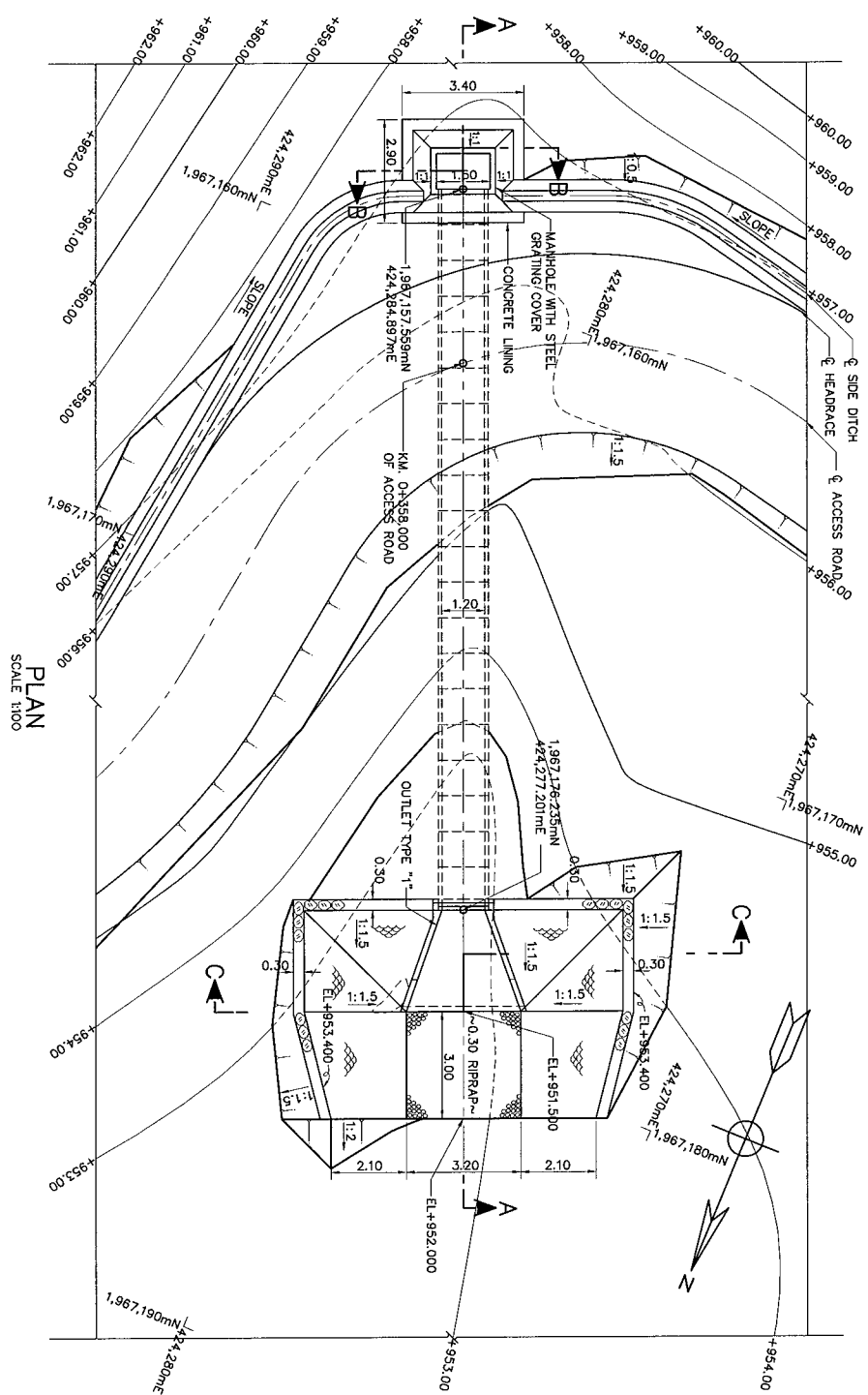
STANDARD DRILLING AND GROUTING EQUIPMENT SHOULD BE OF THE ELECTRIC OR AIR-POWERED TYPE NORMALLY USED FOR UNDERGROUND WORK. THE EQUIPMENT SHOULD BE SUFFICIENTLY DURABLE, COMPACT, AND LIGHT FOR EASY TRANSPORT. COMMUNICATION FACILITIES ARE FREQUENTLY NECESSARY BETWEEN THE GROUT HEADER AND GROUT PUMP. GROUTING EQUIPMENT AND MATERIAL SHALL BE ON THE WORK SITE BEFORE THE COMPLETION OF LINER INSTALLATION. THE EQUIPMENT AND GROUTING PRESSURE GAGES SHALL BE APPROVED BY THE ENGINEER.

REFERENCE DRAWINGS :-

1. HEADRACE, BEGINNING, PLAN & PROFILE KM.0+000 TO KM.0+160.864 MT-HR-20
2. HEADRACE, PIPE SUPPORT MT-HR-22

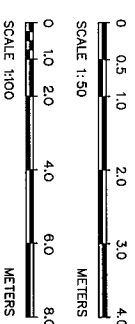


KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUEN HYDROPOWER PROJECT	
CIVIL WORKS HEADRACE	
INTAKE, PLAN SECTIONS AND DETAILS	
PANYA CONSULTANTS CO., LTD.	
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
SUBMITTED	
REVIEWED	
RECOMMENDED	
APPROVED	
DRAWING NO. MT-HR-23	
SHEET NO. 34 OF 98	

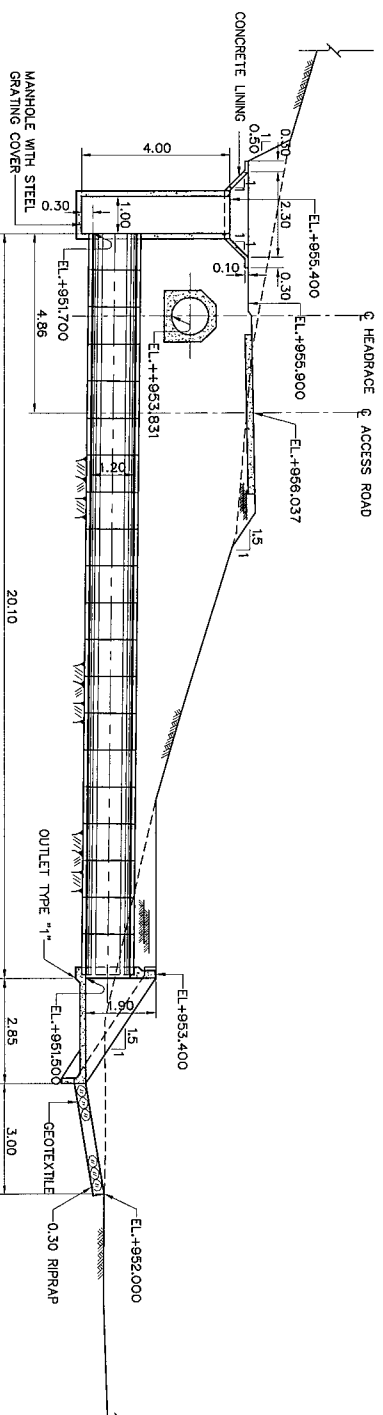


NOTES :-

1. ALL DIMENSIONS AND ELEVATIONS (ABOVE M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DRAWING NO. M/CN-01
3. ALLOWABLE BEARING CAPACITIES OF SOIL IS AT LEAST 5 TONS/M.²
4. CLASS 3 TONGUE AND GROOVE TYPE OF RCP PIPE WILL BE USED.
5. DRESSING OF GROUND TO SUIT THE STRUCTURE TO BE DETERMINED IN THE FIELD.
6. STRUCTURE TO BE CONNECTED TO EXISTING AND/OR DESIGNED DRAINAGE CHANNELS OR DITCHES (UPSTREAM AND DOWNSTREAM) AS DIRECTED.
7. THE CONTRACTOR SHALL REMOVE EXISTING DRAIN CULVERTS AND CONSTRUCT NEW DRAIN CULVERTS AS DETAIL IN THE DRAWING.

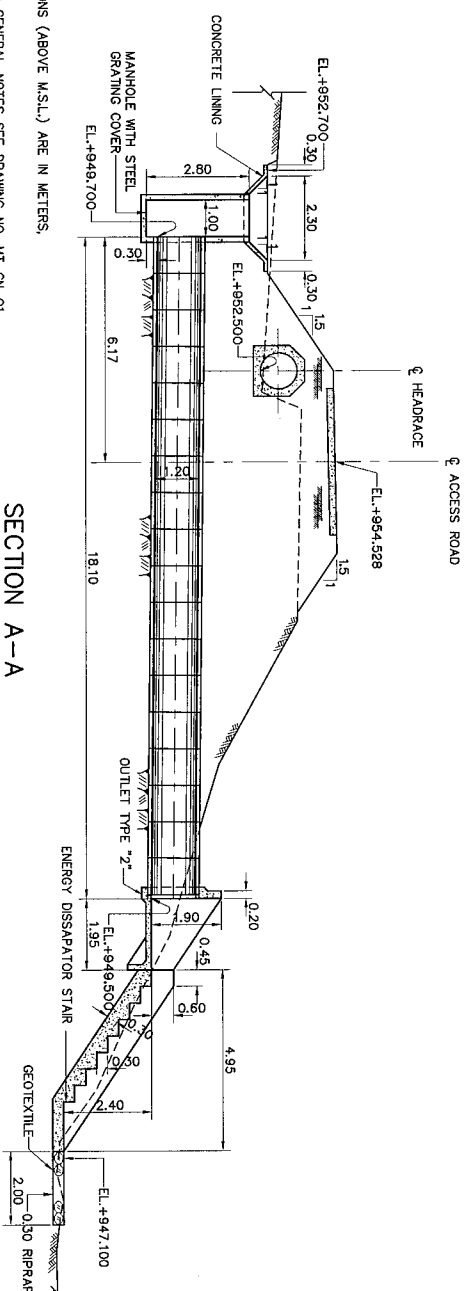
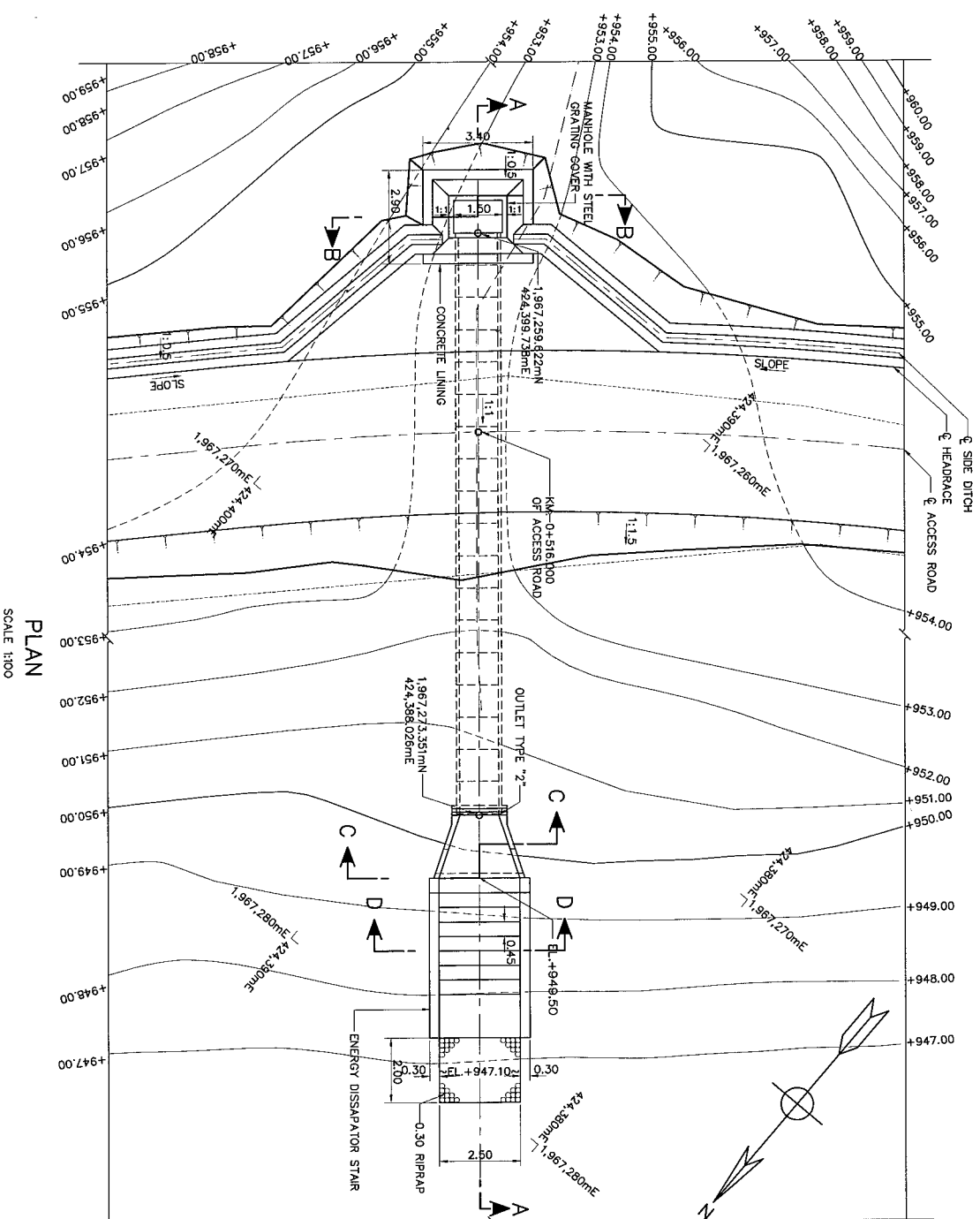


SECTION A-A
SCALE 1:100



- REFERENCE DRAWINGS :-**
1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)
 2. HEADRACE, TYPICAL SECTIONS
 3. HEADRACE, STANDARD REINFORCED AND INSTALLATION CONCRETE PIPE
 4. HEADRACE, MANHOLE DETAILS
 5. HEADRACE, INLET AND OUTLET TRANSITIONS
- | | | |
|----------|----|----------|
| MT-HR-01 | TO | MT-HR-05 |
| MT-HR-19 | | |
| MT-HR-40 | | |
| MT-HR-41 | | |
| MT-HR-42 | | |

[illegible]

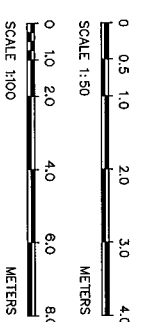
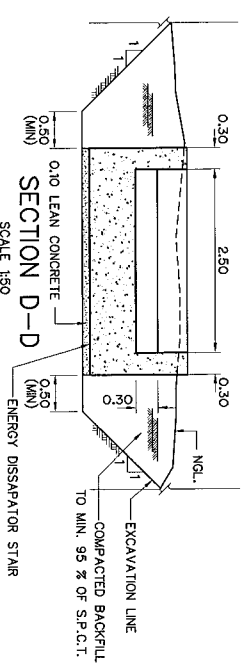
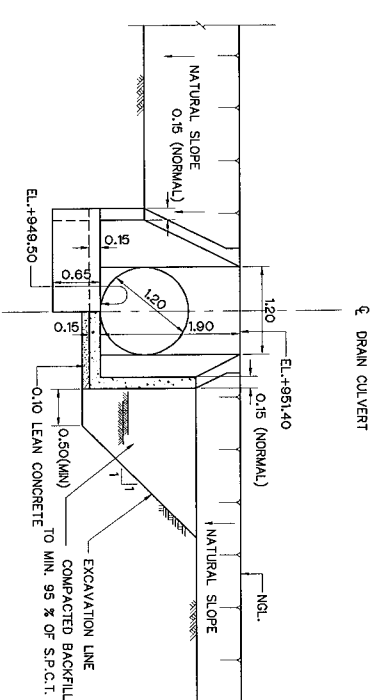
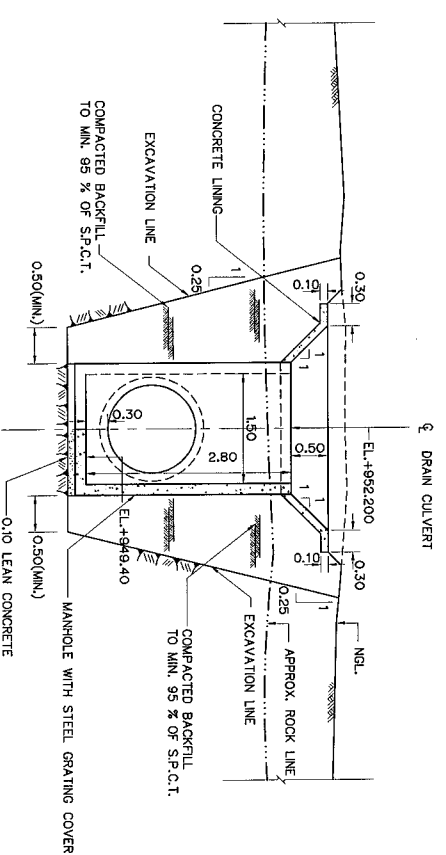


- NOTES :-**
1. ALL DIMENSIONS AND ELEVATIONS (ABOVE M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
 2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DRAWING NO. MT-CO-01
 3. ALLOWABLE BEARING CAPACITIES OF SOIL IS AT LEAST 5 TONS/M²
 4. CLASS 3 TOLUQUE AND GROOVE TYPE OF R.C. PIPE WILL BE USED.
 5. DRESSING OF GROUND TO SUIT THE STRUCTURE TO BE DETERMINED IN THE FIELD.
 6. STRUCTURE TO BE CONNECTED TO EXISTING AND, OR DESIGNED DRAINAGE CHANNELS OR DITCHES (UPSTREAM AND DOWNSIDE) AS DIRECTED.
 7. THE CONTRACTOR SHALL REMOVE EXISTING DRAIN CULVERTS AND CONSTRUCT NEW DRAIN CULVERTS AS DETAILED IN THE DRAWING.

REFERENCE DRAWINGS :-

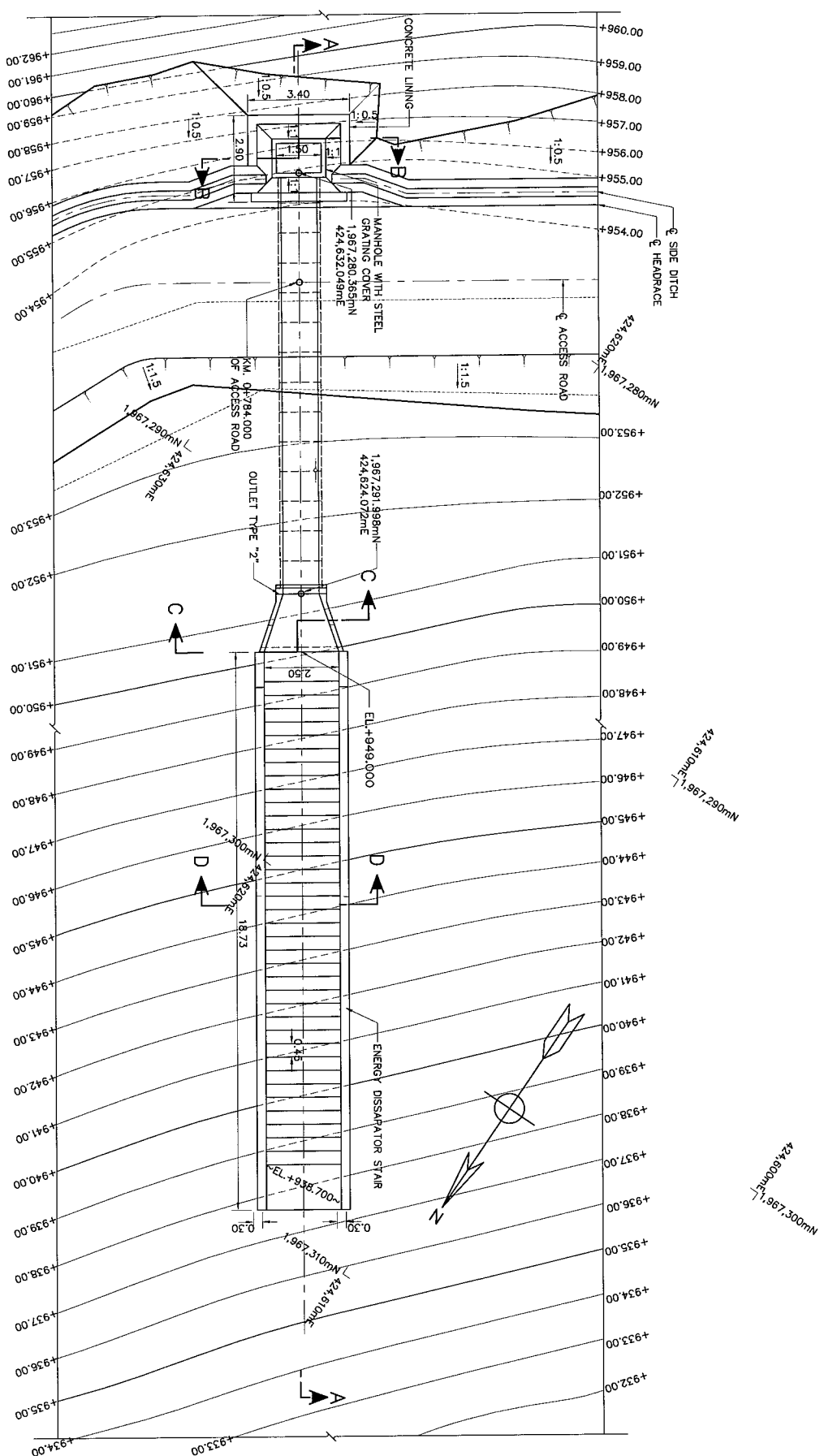
1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)
2. HEADRACE, TYPICAL SECTIONS
3. HEADRACE, STANDARD REINFORCED AND INSTALLATION CONCRETE PIPE
4. HEADRACE, MANHOLE DETAILS
5. HEADRACE, INLET AND OUTLET TRANSITIONS

- MT-HR-01 TO MT-HR-05
MT-HR-19
MT-HR-40
MT-HR-41
MT-HR-42

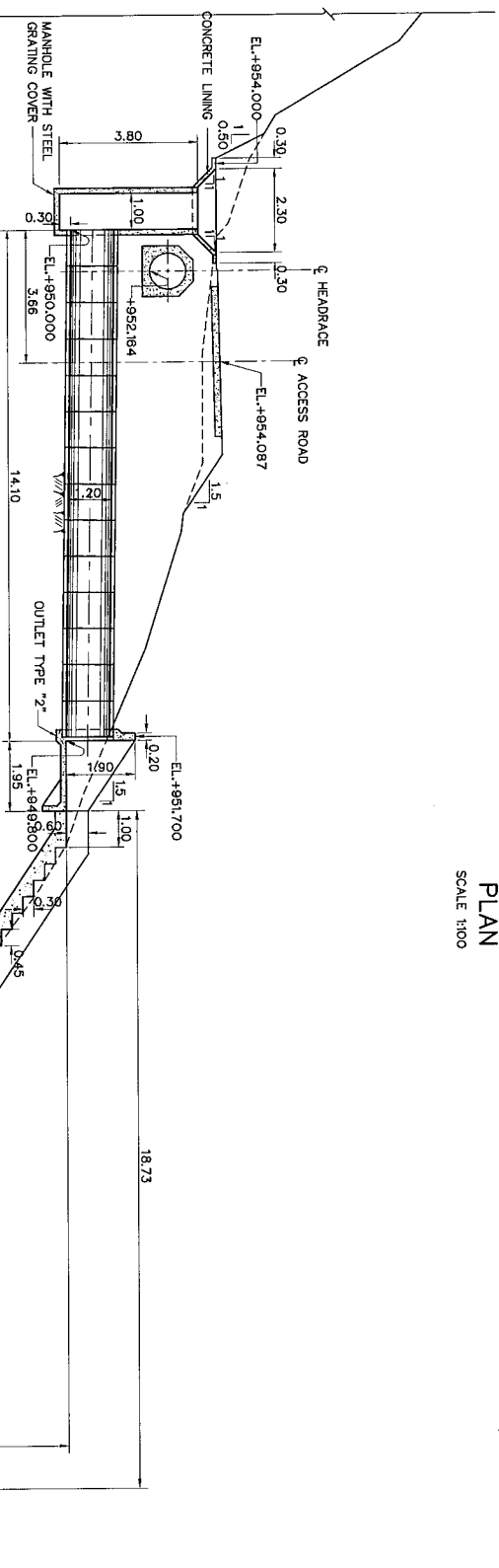


3					DESIGNED	<i>[Signature]</i>	7/12/2014	2014.05	SUBMITTED	<i>[Signature]</i>	
2					DRAWN	<i>[Signature]</i>			RECOMMENDED	<i>P. Hwang</i>	
1					CHECKED	<i>[Signature]</i>	21/06/13		APPROVED	<i>[Signature]</i>	
NO.	DATE	REVISIONS	CHECKED	APPROVED							
CONSULTANTS				DECE					DRAWING NO.	MT-HR-25	SHEET NO.
									PROJECT MANAGER	DATE	36 OF 98

KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY					
MAE TUEN HYDROPOWER PROJECT					
CIVIL WORKS					
HEADRAVE					
DRAIN CULVERT, KM. 0+516.000					
DESIGNED		PANYA CONSULTANTS CO., LTD.			
DRAWN	<i>[Signature]</i>	RJL22314	<i>[Signature]</i>	RJL/A05	
CHECKED	<i>[Signature]</i>			RJL3838	
PROJECT MANAGER	<i>[Signature]</i>			27/06/13	
DATE					
DRAWING NO.	RECOMMENDED P. 10-8				
MT-HR-25	<i>[Signature]</i>				
SHEET NO.	APPROVED <i>[Signature]</i>				
36 OF 98	<i>Tanaka</i>				
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY					



PLAN
SCALE 1:100



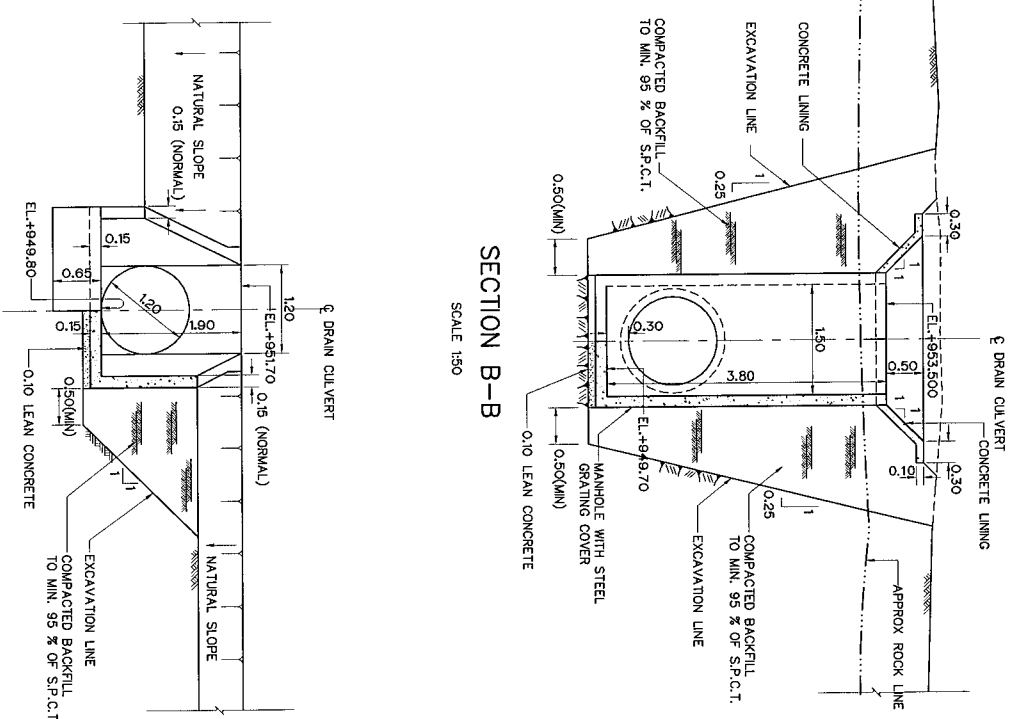
SECTION A-A

NOTES :-

1. ALL DIMENSIONS AND ELEVATIONS (ABOVE M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DRAWING NO. MT-CN-01
3. ALLOWABLE BEARING CAPACITY OF SOIL IS AT LEAST 5 TONS/M²
4. CLASS 3 TOLUENE AND GROOVE TYPE OF RC. PIPE WILL BE USED.
5. DRESSING OF GROUND TO SUIT THE STRUCTURE TO BE DETERMINED IN THE FIELD.
6. STRUCTURE TO BE CONNECTED TO EXISTING AND/OR DESIGNED DRAINAGE CHANNELS OR DITCHES (UPSTREAM AND DOWNSTREAM) AS DIRECTED.
7. THE CONTRACTOR SHALL REMOVE EXISTING DRAIN CULTIVARS AND CONSTRUCT NEW DRAIN CULTIVARS AS DETAILED IN THE DRAWING.

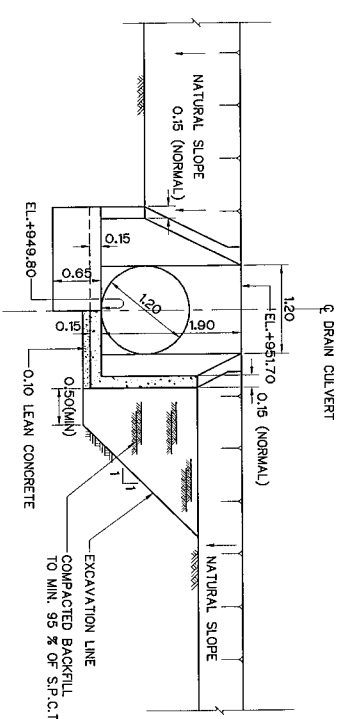
REFERENCE DRAWINGS :-

- | | |
|---|------------------------|
| 1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5) | M-T-HR-01 TO M-T-HR-05 |
| 2. HEADRACE, TYPICAL SECTIONS | M-T-HR-19 |
| 3. HEADRACE, STANDARD REINFORCED AND INSTALLATION CONCRETE PIPE | M-T-HR-40 |
| 4. HEADRACE, MANHOLE DETAILS | M-T-HR-41 |
| 5. HEADRACE, INLET AND OUTLET TRANSITIONS | M-T-HR-42 |



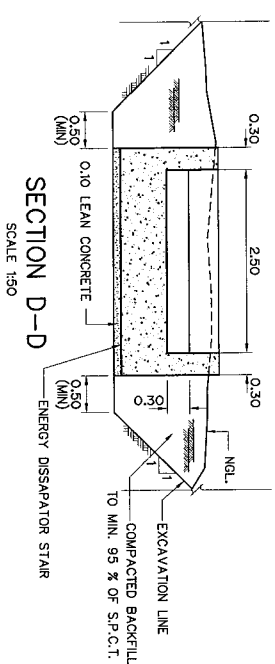
SECTION B-B

SCALE 1:50



SECTION C-C

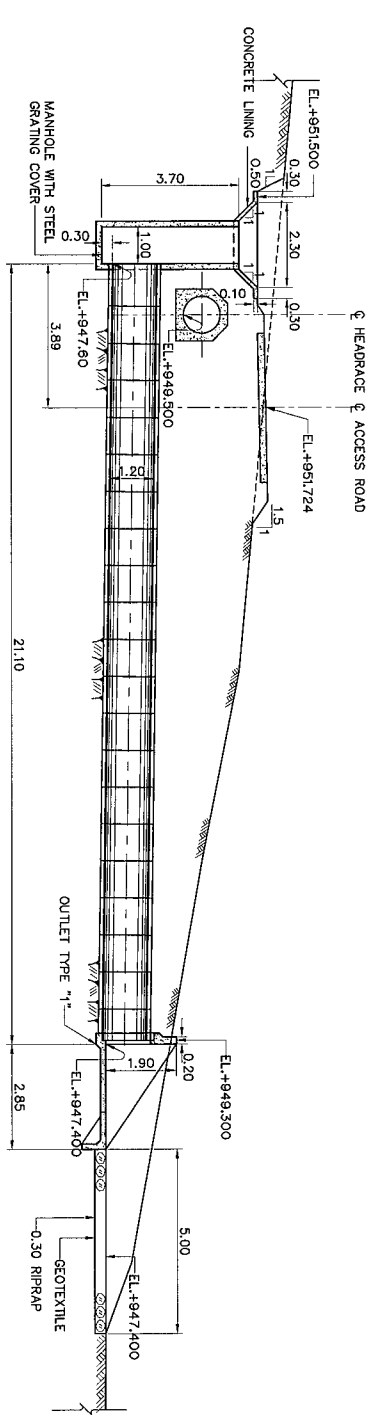
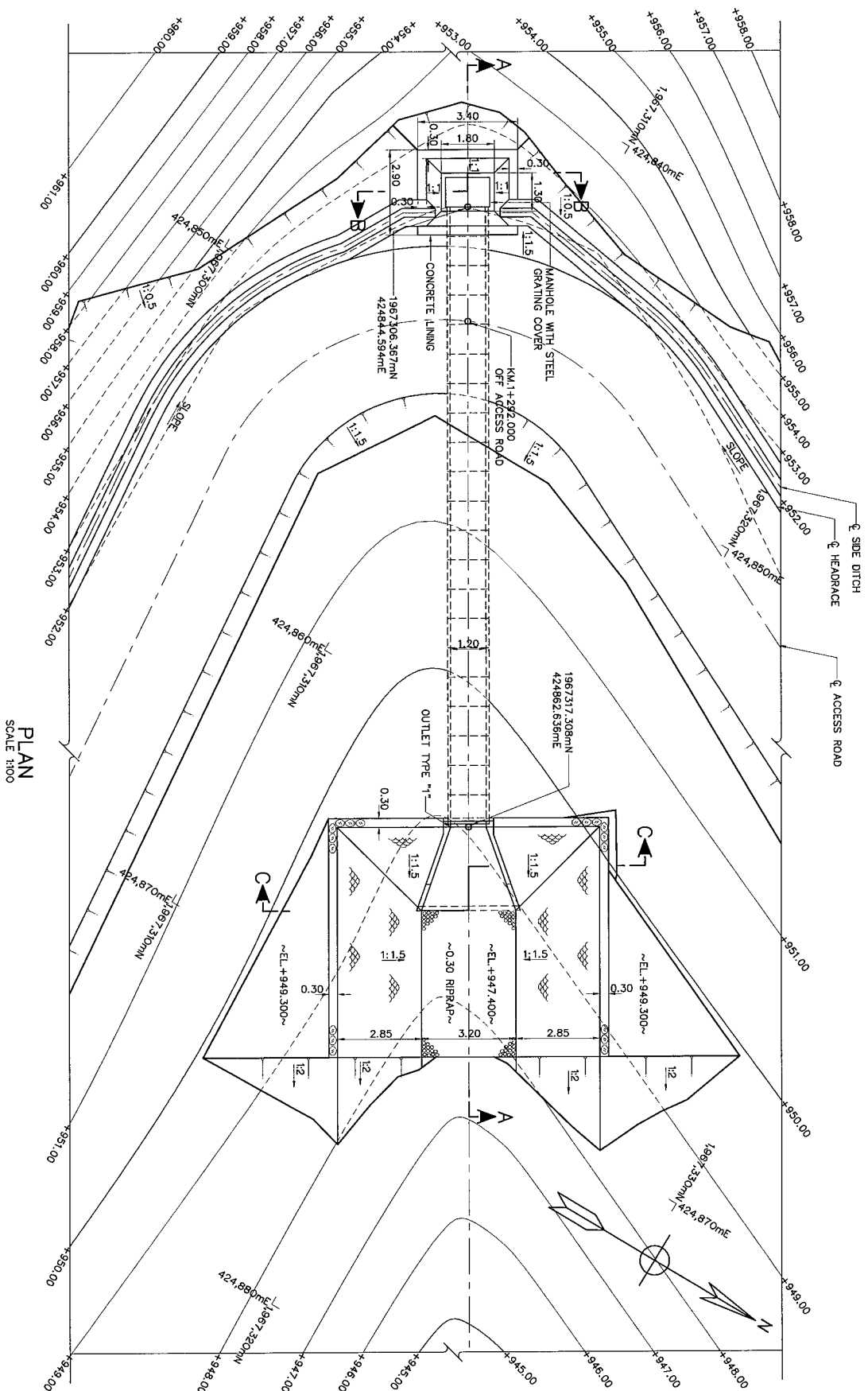
SCALE 1:50



SECTION D-D

SCALE 1:50

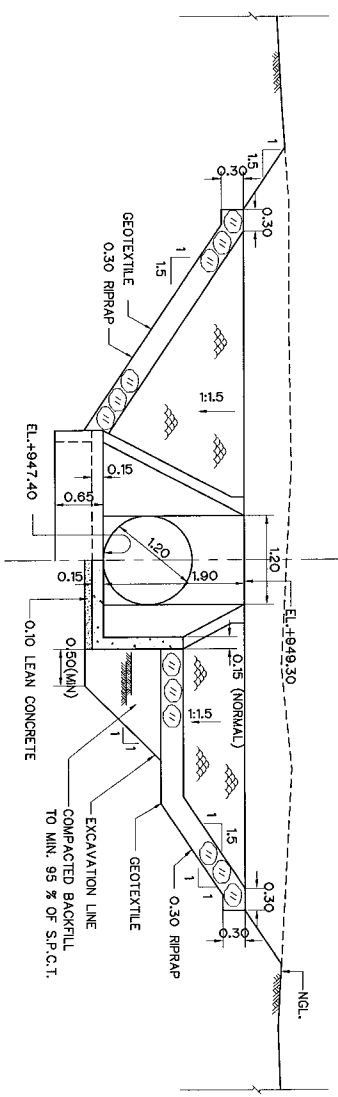
KINGDOM OF THAILAND MINISTRY OF ENERGY DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUEN HYDROPOWER PROJECT	
CIVIL WORKS HEADRACE	
DRAIN CULVERT, KM. 0+784.000	
3	0 0.5 1.0 2.0 3.0 4.0
2	SCALE 1:50 METERS
1	0 1.0 2.0 4.0 6.0 8.0
NO.	SCALE 1:100 METERS
DATE	REVISIONS
CONSULTANTS	CHECKED
DEDC	APPROVED
NO PANYA CONSULTANTS CO.,LTD.	
DESIGNED	SUBMITTED
DRAWN	RECOMMENDED
CHECKED	APPROVED
PROJECT MANAGER	DRAWING NO.
DATE	SHEET NO.
27/06/13	37 of 98
MT-HR-26	



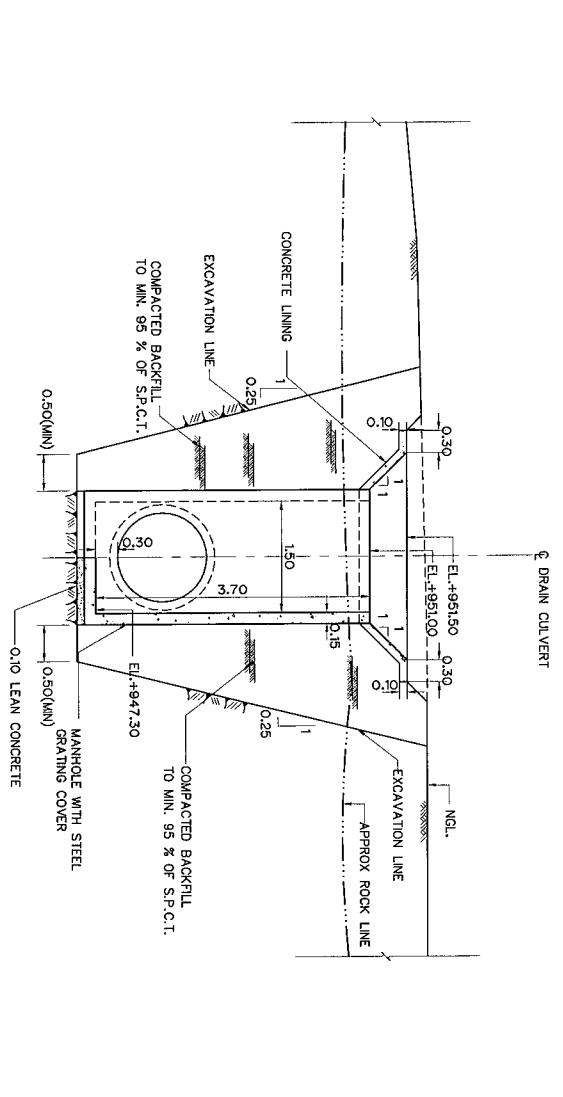
SECTION A-A
SCALE 1:100

- NOTES :-**
1. ALL DIMENSIONS AND ELEVATIONS (ABOVE M.S.L.) ARE IN METERS, UNLESS OTHERWISE SHOWN.
 2. SYMBOLS, ABBREVIATIONS AND GENERAL NOTES SEE DRAWING NO. MT-GN-01
 3. ALLOWABLE BEARING CAPACITIES OF SOIL IS AT LEAST 5 TONS/M²
 4. CLASS 3 TONGUE AND GROOVE TYPE OF R.C. PIPE WILL BE USED.
 5. DRESSING OF GROUND TO SUIT THE STRUCTURE TO BE DETERMINED IN THE FIELD.
 6. STRUCTURE TO BE CONNECTED TO EXISTING AND/OR DESIGNED DRAINAGE CHANNELS OR DITCHES (UPSTREAM AND DOWNSTREAM) AS DIRECTED.
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- REFERENCE DRAWINGS :-**
- 1. HEADRACE, PLAN & PROFILE (SHEET 1/5) TO (SHEET 5/5)
 - 2. HEADRACE, TYPICAL SECTIONS
 - 3. HEADRACE, STANDARD REINFORCED AND INSTALLATION CONCRETE PIPE
 - 4. HEADRACE, MANHOLE DETAILS
 - 5. HEADRACE, INLET AND OUTLET TRANSITIONS

SECTION C-C
SCALE 1:50



SECTION B-B
SCALE 1:50



3					
2					
1					
NO.	DATE	REVISIONS	CHECKED	APPROVED	CONSULTANTS

DESIGNED <i>MT</i> 27/03/14		SUBMITTED <i>MT</i> 20/04/05		REVIEWED <i>MT</i> 20/04/05	
DRAWN <i>MT</i> 27/03/14		RECOMMENDED <i>MT</i> 20/04/05		APPROVED <i>MT</i> 20/04/05	
CHECKED <i>MT</i> 27/03/14		APPROVED <i>MT</i> 20/04/05		SHEET NO. 38 OF 38	
PROJECT MANAGER <i>MT</i> 27/03/14		DATE 27/03/14		DRAWING NO. MT-HR-27	

KINGDOM OF THAILAND	
MINISTRY OF ENERGY	
DEPARTMENT OF ALTERNATIVE ENERGY DEVELOPMENT AND EFFICIENCY	
MAE TUN HYDROPOWER PROJECT	
CIVIL WORKS	
HEADRACE	
DRAIN CULVERT, KM. 1+292.000	