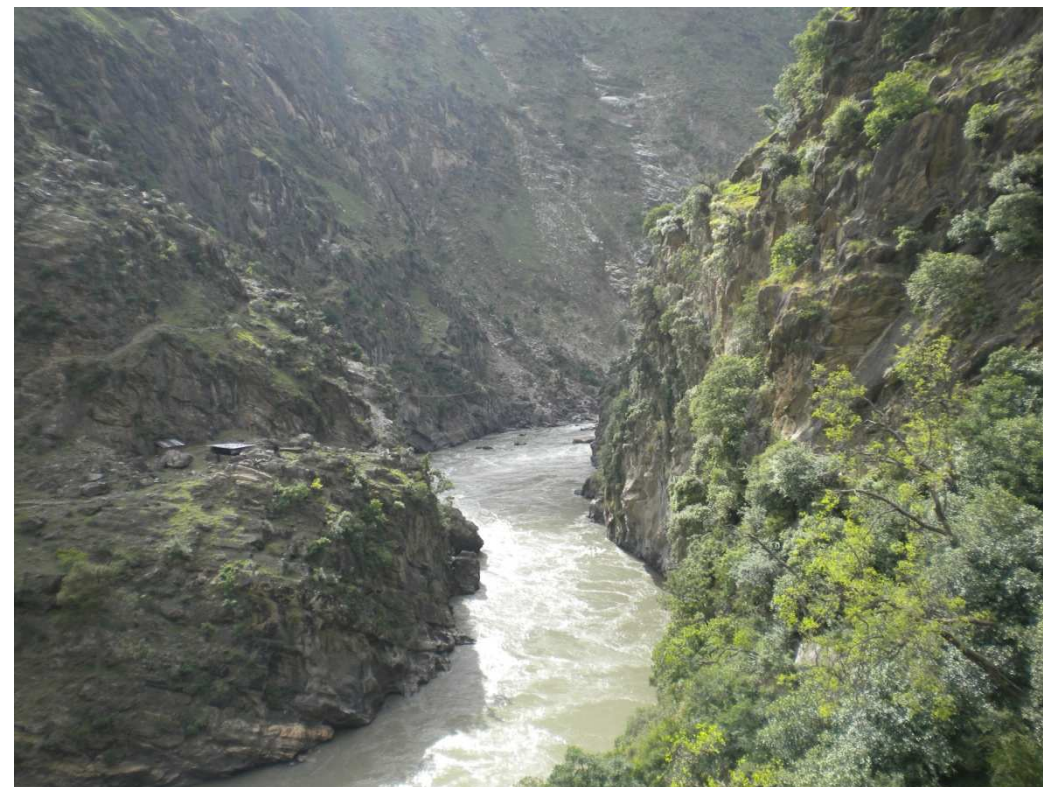




GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

**RATLE HYDRO ELECTRIC PROJECT
KISHTWAR DISTRICT, JAMMU & KASHMIR | INDIA**



TENDER DRAWINGS

PACKAGE-1(B)

December 2011



Innovation by experience





RATLE HYDRO ELECTRIC PROJECT (4X205MW+30MW)



S.No.	DRAWINGS No.	TITLE	REVISION	STATUS
00 GENERAL				
1.	71.2133.00.001	PROJECT LOCATION MAP GENERAL ARRANGEMENT PLAN	0	DRAFT-TENDER
2.	71.2133.00.002	CATCHMENT AREA MAP GENERAL LAYOUT PLAN	0	DRAFT-TENDER
3.	71.2133.00.003	PROJECT AREA GENERAL LAYOUT PLAN	0	DRAFT-TENDER
4.	71.2133.00.004	PROJECT AREA SECTION PLAN PACKAGE (IB)	0	DRAFT-TENDER
5.	71.2133.00.005	PROJECT AREA SECTION (UMF-1)	0	DRAFT-TENDER
6.	71.2133.00.006	PROJECT AREA SECTION (UMF-2)	0	DRAFT-TENDER
7.	71.2133.00.007	PROJECT AREA SECTION (UMF-3)	0	DRAFT-TENDER
8.	71.2133.00.008	PROJECT AREA SECTION (UMF-4)	0	DRAFT-TENDER
9.	71.2133.00.009	RATLE HEAD POWER HOUSE GENERAL ARRANGEMENT BRO EYE VIEW	0	DRAFT-TENDER
01. INFRASTRUCTURE WORKS				
10	71.2133.01.001	INFRASTRUCTURE WORKS GENERAL ARRANGEMENT ROADS AND BRIDGE PLAN	0	DRAFT-TENDER
11.	71.2133.01.002	INFRASTRUCTURE WORKS CONSTRUCTION FACILITIES PLAN	0	DRAFT-TENDER
07. PRESSURE SHAFT				
12.	71.2133.07.101	PRESSURE SHAFT EXCAVATION, SUPPORT AND LINING WORKS TYPICAL SECTIONS	0	DRAFT-TENDER
13.	71.2133.07.102	PRESSURE TUNNEL PRESSURE TUNNEL TYPICAL SECTIONS	0	DRAFT-TENDER
14.	71.2133.07.103	INSTRUMENTATION TUNNEL TYPICAL DETAILS SECTIONS	0	DRAFT-TENDER
08. POWERHOUSE COMPLEX AND ASSOCIATED TUNNELS				
15.	71.2133.08.001	POWER HOUSE CAVERN GENERAL ARRANGEMENT PLAN	0	DRAFT-TENDER
16.	71.2133.08.002	POWER HOUSE MAIN ACCESS TUNNEL MAIN ACCESS TUNNEL & LOG/DUMPLIN SECTION	0	DRAFT-TENDER
17.	71.2133.08.003	POWER HOUSE TUNNEL MAIN ACCESS TUNNEL PLAN SECTIONS & DETAIL PLAN & SECTION	0	DRAFT-TENDER
21.	71.2133.08.007	POWER HOUSE COMPLEX ADJUSTABLE TUNNEL TO TRANSFORMER HALL TOP PLAN & SECTION	0	DRAFT-TENDER
22.	71.2133.08.008	POWER HOUSE COMPLEX ADT TO SURGE & GATE CAVERNS TOP PLAN & SECTION	0	DRAFT-TENDER
23.	71.2133.08.009	POWER HOUSE COMPLEX GENERAL LAYOUT PLAN	0	DRAFT-TENDER
24.	71.2133.08.010	POWER HOUSE COMPLEX DRAINAGE GALLERY TYPICAL SECTIONS & DETAIL	0	DRAFT-TENDER
25.	71.2133.08.011	POWER HOUSE COMPLEX GENERAL ARRANGEMENT	0	DRAFT-TENDER

S.No.	DRAWINGS No.	TITLE	REVISION	STATUS
08. POWERHOUSE COMPLEX AND ASSOCIATED TUNNELS				
26.	71.2133.08.012	POWER HOUSE COMPLEX GENERAL ARRANGEMENT MAIN PLAN EL. 908.75m	0	DRAFT-TENDER
27.	71.2133.08.013	POWER HOUSE COMPLEX GENERAL ARRANGEMENT CENTRE LINE TURBINE	0	DRAFT-TENDER
28.	71.2133.08.014	POWER HOUSE COMPLEX GENERAL ARRANGEMENT TURBINE FLOOR	0	DRAFT-TENDER
29.	71.2133.08.015	POWER HOUSE COMPLEX ERECTION BAY OPERATING FLOOR TRANSFORMER BAY, OFFICE	0	DRAFT-TENDER
30	71.2133.08.016	POWER HOUSE COMPLEX GENERAL ARRANGEMENT PLAN AT EL. 934.60m & PART BAY TRANSFORMER BAY & CONTROL ROOM AT EL. 937.20m	0	DRAFT-TENDER
31.	71.2133.08.17	POWER HOUSE COMPLEX CONTROL ROOM AT EL. 937.20m	0	DRAFT-TENDER
32.	71.2133.08.018	POWER HOUSE COMPLEX CABLE & VENTILATION TUNNEL INVERTS & HVAC FLOOR AT EL. 942.50m	0	DRAFT-TENDER
33.	71.2133.08.021	POWER HOUSE COMPLEX GENERAL ARRANGEMENT LONGITUDINAL SECTION BETWEEN D & C LINE	0	DRAFT-TENDER
34.	71.2133.08.022	POWER HOUSE COMPLEX SECTION 2-2 LONGITUDINAL SECTION BETWEEN C LINE	0	DRAFT-TENDER
35.	71.2133.08.023	POWER HOUSE COMPLEX SECTION 3-3 TRANSVERSE SECTION	0	DRAFT-TENDER
36.	71.2133.08.024	POWER HOUSE COMPLEX GENERAL ARRANGEMENT SECTION NEAR CRD2	0	DRAFT-TENDER
37.	71.2133.08.025	POWER HOUSE COMPLEX GENERAL ARRANGEMENT SECTION 5-5 & 6-6 SECTION OF TRANSFORMER BAY & L-SECTION AT DIS OF B-LINE	0	DRAFT-TENDER
38.	71.2133.08.028	POWER HOUSE COMPLEX GENERAL ARRANGEMENT SECTION TRANSVERSE SECTION	0	DRAFT-TENDER
39.	71.2133.08.030	POWER HOUSE COMPLEX SECTION TRANSVERSE SECTION 3D VIEW	0	DRAFT-TENDER
40	71.2133.08.101	POWER HOUSE A TRANSFORMER CAVERNS, ROCK SUPPORT DETAILS	0	DRAFT-TENDER
41.	71.2133.08.102	POWER HOUSE COMPLEX MAIN ACCESS/CONNECTING TUNNELS TUNNEL EXCAVATION & ROCK SUPPORT DETAILS SECTION	0	DRAFT-TENDER
42.	71.2133.08.103	POWER HOUSE COMPLEX TUNNEL EXCAVATION & ROCK SUPPORT DETAILS SECTIONS	0	DRAFT-TENDER
43.	71.2133.08.104	POWER HOUSE COMPLEX TYPICAL INSTRUMENTATION SCHEME	0	DRAFT-TENDER

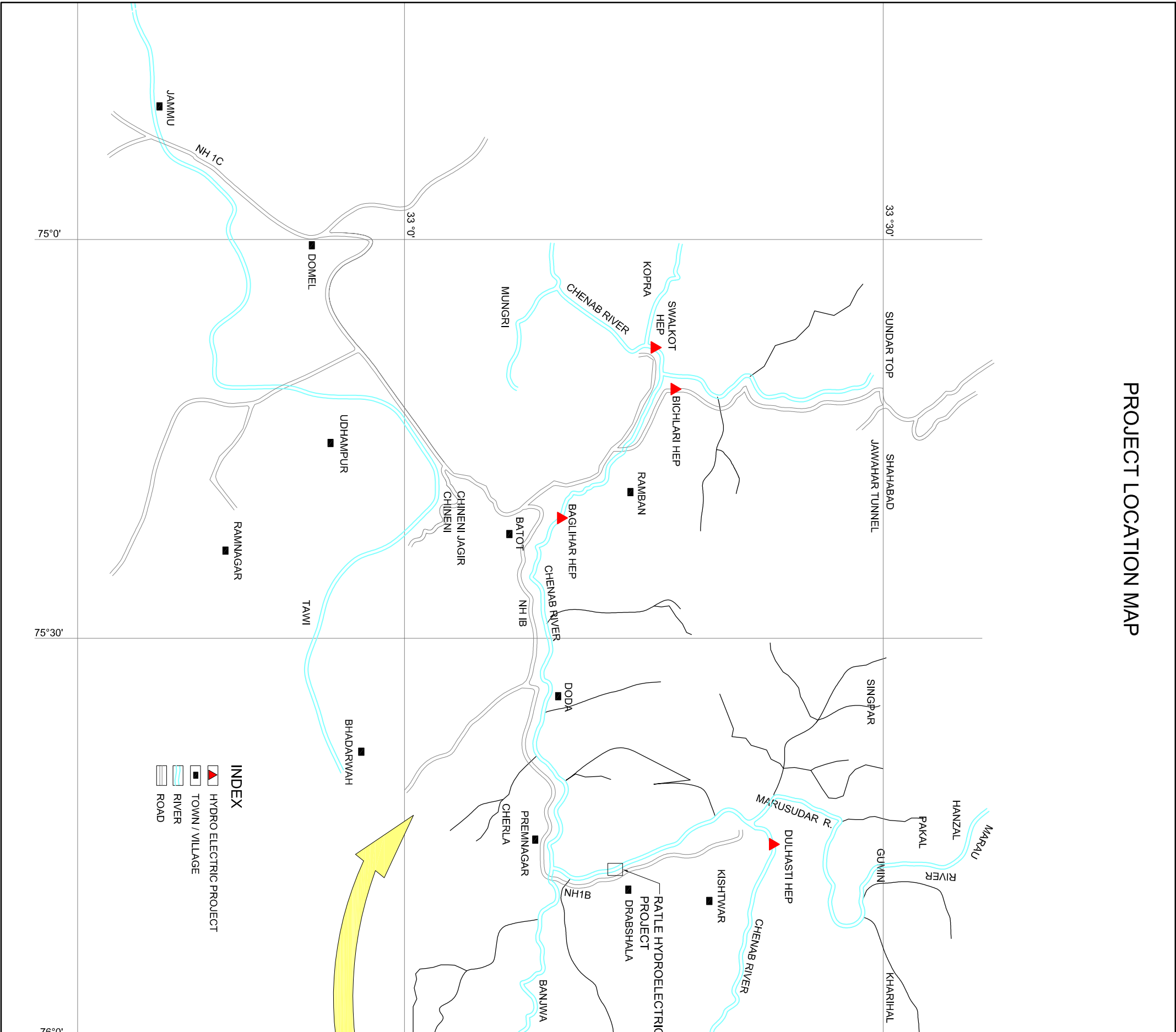
S.No.	DRAWINGS No.	TITLE	REVISION	STATUS
09. DOWNSTREAM SURGE CAVERN AND TAIL RACE TUNNEL				
44.	71.2133.09.001	SURGE CAVERN GENERAL ARRANGEMENT PLAN AT EL. 986.90m	0	DRAFT-TENDER
45.	71.2133.09.002	SURGE CAVERN GENERAL ARRANGEMENT PLAN AT OFFICE FLOOR (EL. 912.1m AMSL)	0	DRAFT-TENDER
46.	71.2133.09.003	SURGE CAVERN GENERAL ARRANGEMENT PLAN AT GATE OPERATION DECK	0	DRAFT-TENDER
47.	71.2133.09.004	SURGE CAVERN GENERAL ARRANGEMENT SECTION H-1 SECTION ALONG GATE PERS	0	DRAFT-TENDER
48.	71.2133.09.005	SURGE CAVERN GENERAL ARRANGEMENT L-SECTION ALONG CENTERLINE OF ORIFICE	0	DRAFT-TENDER
49.	71.2133.09.051	TAIL RACE OUTFALL GENERAL ARRANGEMENT PLAN	0	DRAFT-TENDER
50.	71.2133.09.052	TAIL RACE OUTFALL GENERAL ARRANGEMENT CROSS-SECTION AND DETAILS	0	DRAFT-TENDER
51.	71.2133.09.101	SURGE CHAMBER EXCAVATION & ROCK SUPPORT DETAILS	0	DRAFT-TENDER
52.	71.2133.09.102	TAIL RACE TUNNEL TUNNEL EXCAVATION & ROCK SUPPORT SECTIONS	0	DRAFT-TENDER
53.	71.2133.09.103	TAIL RACE TUNNEL TUNNEL EXCAVATION & ROCK SUPPORT SECTIONS	0	DRAFT-TENDER
10 POTHEAD YARD				
54.	71.2133.10.001	POTHEAD YARD GENERAL ARRANGEMENT PLAN AND SECTION	0	DRAFT-TENDER
11. ADDITIONAL POWER HOUSE BAY				
55.	71.2133.11.001	ADDITION POWER HOUSE BAY GENERAL ARRANGEMENT LONGITUDINAL SECTION	0	DRAFT-TENDER
56.	71.2133.11.002	ADDITION POWER HOUSE BAY TUNNEL EXCAVATION & ROCK SUPPORT SECTIONS	0	DRAFT-TENDER
57.	71.2133.11.003	ADDITIONAL POWER HOUSE TUNNEL EXCAVATION AND ROCK SUPPORT SECTIONS	0	DRAFT-TENDER
58.	71.2133.11.101	ADDITIONAL POWER HOUSE EXCAVATION AND ROCK SUPPORT SECTIONS	0	DRAFT-TENDER
59.	71.2133.11.102	ADDITIONAL POWER HOUSE EXCAVATION AND ROCK SUPPORT SECTIONS	0	DRAFT-TENDER
GEOLOGY				
60.	71.2133.00.000	PROJECT AREA GEOLOGICAL PLAN	0	DRAFT-TENDER
61.	71.2133.00.001	INVESTIGATION PLAN OF PROJECT AREA	0	DRAFT-TENDER
62.	71.2133.05.000	WATER CONDUCTOR SYSTEM-1 SECTION 1-1	0	DRAFT-TENDER
63.	71.2133.05.001	WATER CONDUCTOR SYSTEM-2 GEOLOGICAL SECTION	0	DRAFT-TENDER
64.	71.2133.05.002	WATER CONDUCTOR SYSTEM-3 GEOLOGICAL SECTION	0	DRAFT-TENDER
65.	71.2133.05.003	WATER CONDUCTOR SYSTEM-4 GEOLOGICAL SECTION	0	DRAFT-TENDER
66.	71.2133.08.000	POWER HOUSE COMPLEX TAIL RACE TUNNELS GEOLOGICAL PLAN	0	DRAFT-TENDER
67.	71.2133.08.001	ADDITIONAL POWER HOUSE TAIL RACE TUNNELS GEOLOGICAL SECTION	0	DRAFT-TENDER

S.No.	DRAWINGS No.	TITLE	REVISION	STATUS
GEOLOGY				
68.	71.2133.08.802	POWER HOUSE COMPLEX TAIL RACE TUNNELS GEOLOGICAL SECTION	0	DRAFT-TENDER
69.	71.2133.08.805	POWER HOUSE COMPLEX TAIL RACE TUNNELS GEOLOGICAL SECTION	0	DRAFT-TENDER
HYDRO MECHANICAL				
70.	71.2133.08.501	SURGE CAVERN TAIL RACE OUTFALL GENERAL ARRANGEMENT PLAN SECTION AND DETAILS	0	DRAFT-TENDER
71.	71.2133.09.501	SURGE CAVERN TAIL RACE OUTFALL GENERAL ARRANGEMENT PLAN AT GATE OPERATION DECK	0	DRAFT-TENDER
72.	71.2133.11.503	ADDITIONAL UNIT TAIL RACE OUTFALL GENERAL ARRANGEMENT PLAN SECTION AND DETAILS	0	DRAFT-TENDER

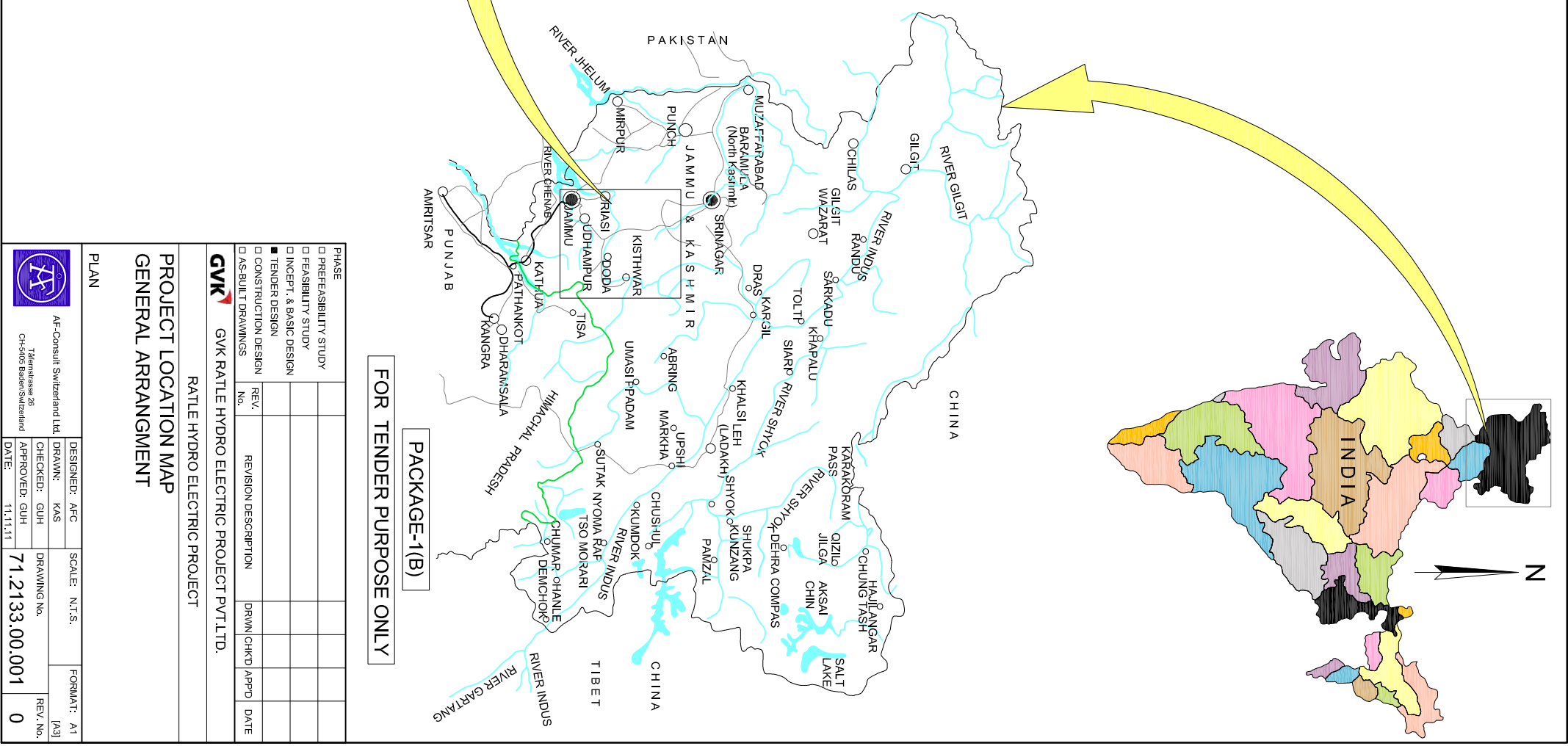
CIVIL DRAWINGS



PROJECT LOCATION MAP



- INDEX**
- HYDRO ELECTRIC PROJECT
 - TOWN / VILLAGE
 - RIVER
 - ROAD



PACKAGE-1(B)
FOR TENDER PURPOSE ONLY

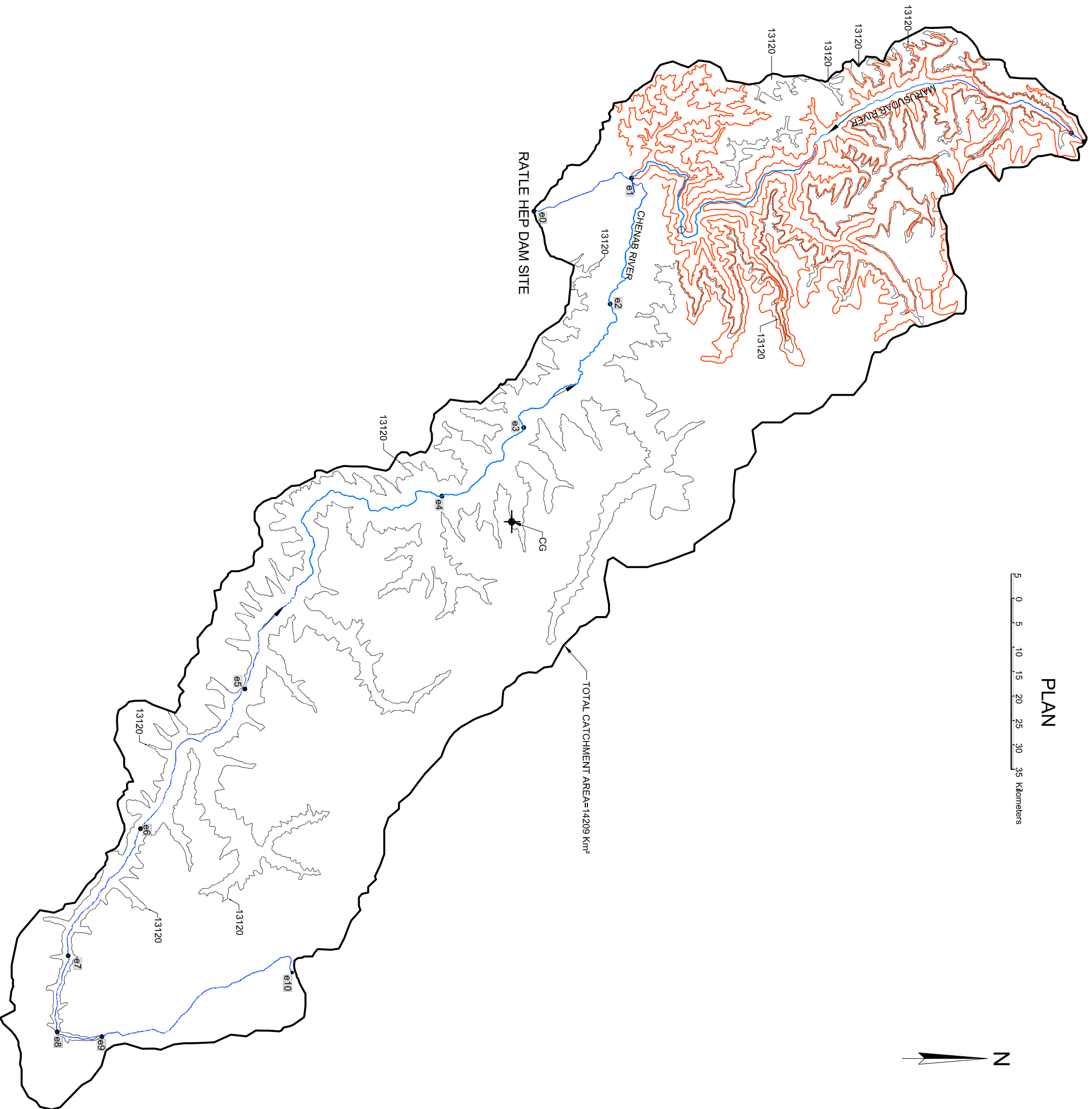
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<input type="checkbox"/> INCEPT. & BASIC DESIGN					
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<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT.LTD.

PROJECT LOCATION MAP GENERAL ARRANGMENT		PLAN	
DESIGNER: AFC	SCALE: N.T.S.	FORMAT: A1	
DRAWN: KAS		[A3]	
CHECKED: GUH		REV. No.	
APPROVED: GUH			
DATE: 11.11.11			

PLAN

5 0 5 10 15 20 25 30 35 Kilometers



NOTE:
1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL ON THE TOPOSHEET.

SOURCE:

1. TOPOSHEET - N143 7, 11, 12, 15 & 16. ARMY MAP SERVICE (LU), CORPS OF ENGINEERS, U.S. ARMY, WASHINGTON, D.C. (1954)
2. CATCHMENT AREA OF RATLE H.E.P. INTAKE =14209 SQ. KM.

LEGEND:

- CATCHMENT BOUNDARY
- RIVER / STREAM
- PERMANENT SNOWLINE
- CONTOURS

PACKAGE - 1(B)

FOR TENDER PURPOSE ONLY

PHASE				
<input type="checkbox"/> PREFEASIBILITY STUDY				
<input type="checkbox"/> FEASIBILITY STUDY				
<input type="checkbox"/> INCEPT. & BASIC DESIGN				
<input checked="" type="checkbox"/> TENDER DESIGN				
<input type="checkbox"/> CONSTRUCTION DESIGN				
<input type="checkbox"/> AS-BUILT DRAWINGS				
	REV. NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD. DATE

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT.LTD.
RATLE HYDRO ELECTRIC PROJECT

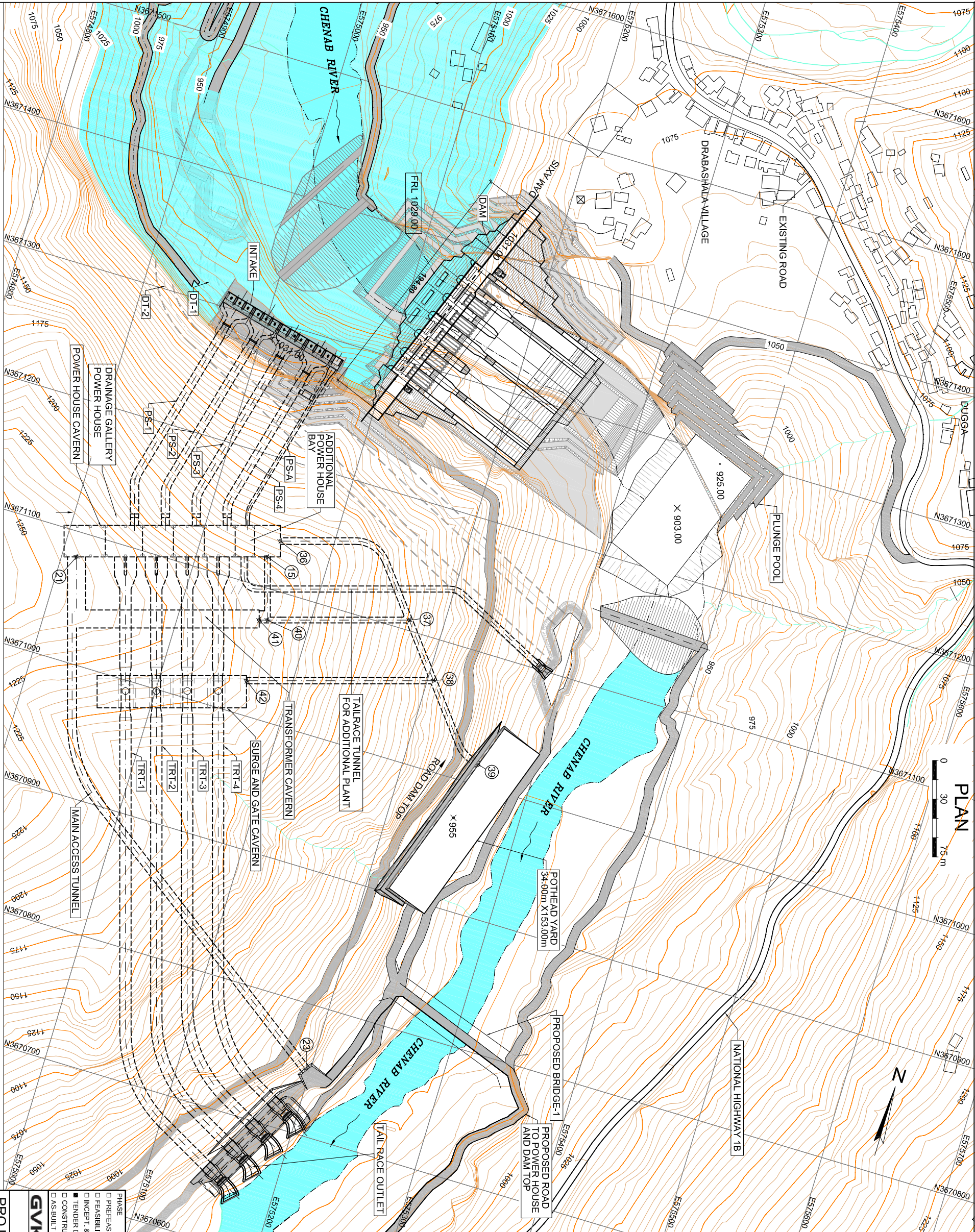
CATCHMENT AREA MAP GENERAL LAYOUT

PLAN

DESIGNER: MAP	SCALE: 1:400000	FORMAT: A1
DRAWN: ASP	[1300000]	[A3]
CHECKED: GUH	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.00.002	0
DATE: 11-11-11		



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Triesenstrasse 28
CH-9400 Sarganserland



S.NO	DESCRIPTION	LEVEL IN m	S.NO	DESCRIPTION	INVERT LEVEL IN m
1	(15)	943.20	6	(38)	951.73
2	(21)	926.00	7	(39)	955.00
3	(23)	960.00	8	(40)	943.20
4	(36)	943.20	9	(41)	943.20
5	(37)	949.43	10	(42)	948.00

S.NO	DESCRIPTION	START-END	LENGTH IN m	SIZE (m)
1	MAIN ACCESS TUNNEL	21 to 23	457.00	7.0 D-SHAPE
2	ADIT TO PH TOP / VENTILATION TUNNEL	36 to 39	282.75	5.0 D-SHAPE
3	ADIT TO TRANSFORMER HALL TOP / CABLE TUNNEL	37 to 41	116.67	4.5 D-SHAPE
4	ADIT TO SURGE CAVERN TOP	38 to 42	145.00	5.0 D-SHAPE
5	FIRE ESCAPE	15 to 40	49.30	4.5 D-SHAPE

MKD.	LENGTH IN m	SIZE (m)	MKD.	LENGTH IN m	SIZE (m)
PS-1	210.30	6.80 Ø	TRT-1	378.80	8.70 Ø
PS-2	197.18	6.80 Ø	TRT-2	353.86	8.70 Ø
PS-3	184.02	6.80 Ø	TRT-3	334.06	8.70 Ø
PS-4	171.85	6.80 Ø	TRT-4	314.40	8.70 Ø
PS-A	182.00	3.00Ø	TRT-A	270.92	4.70 Ø

PROJECT AREA GENERAL LAYOUT

PLAN

AF-Consult Switzerland Ltd.
Ch-3400 Basel-Stadt, Switzerland

DESIGNED: PRAMUJI SCALE: 1:1500
DRAWN: SAR 1:3000
CHECKED: GUH
APPROVED: GUH
DATE: 11.11.11

FORMAT: A1 [A3]

REV. No. 0

FOR TENDER PURPOSE ONLY

PACKAGE - (1/B)

PHASE

- PRE-FEASIBILITY STUDY
- FEASIBILITY STUDY
- INCEPT. & BASIC DESIGN
- TENDER DESIGN
- CONSTRUCTION DESIGN
- AS-BUILT DRAWINGS

REV.

REV.	REVISION DESCRIPTION	DRWN	CHKD	APPD.	DATE

GVK GVK RATEL HYDRO ELECTRIC PROJECT PVT. LTD.
RATEL HYDRO ELECTRIC PROJECT

DAM

- MAX. WIDTH OF 1 BLOCK : 17.75m
- HEIGHT OF DEEPEST BLOCK : 133.00m
- BASE WIDTH OF DAM FOR DEEPEST BLOCK : 154.65m
- LENGTH OF DAM TOP : 194.80m
- FULL RESERVOIR LEVEL : 1029.00m
- MINIMUM DRAW DOWN LEVEL : 1014.00m

POWER HOUSE CAVERN

- SIZE : 168.0(L) X 24.5(W) X 49.0(H)

TRANSFORMER CAVERN

- SIZE : 127.0(L) X 14.3(W) X 22.0(H)

SURGE & GATE CAVERN

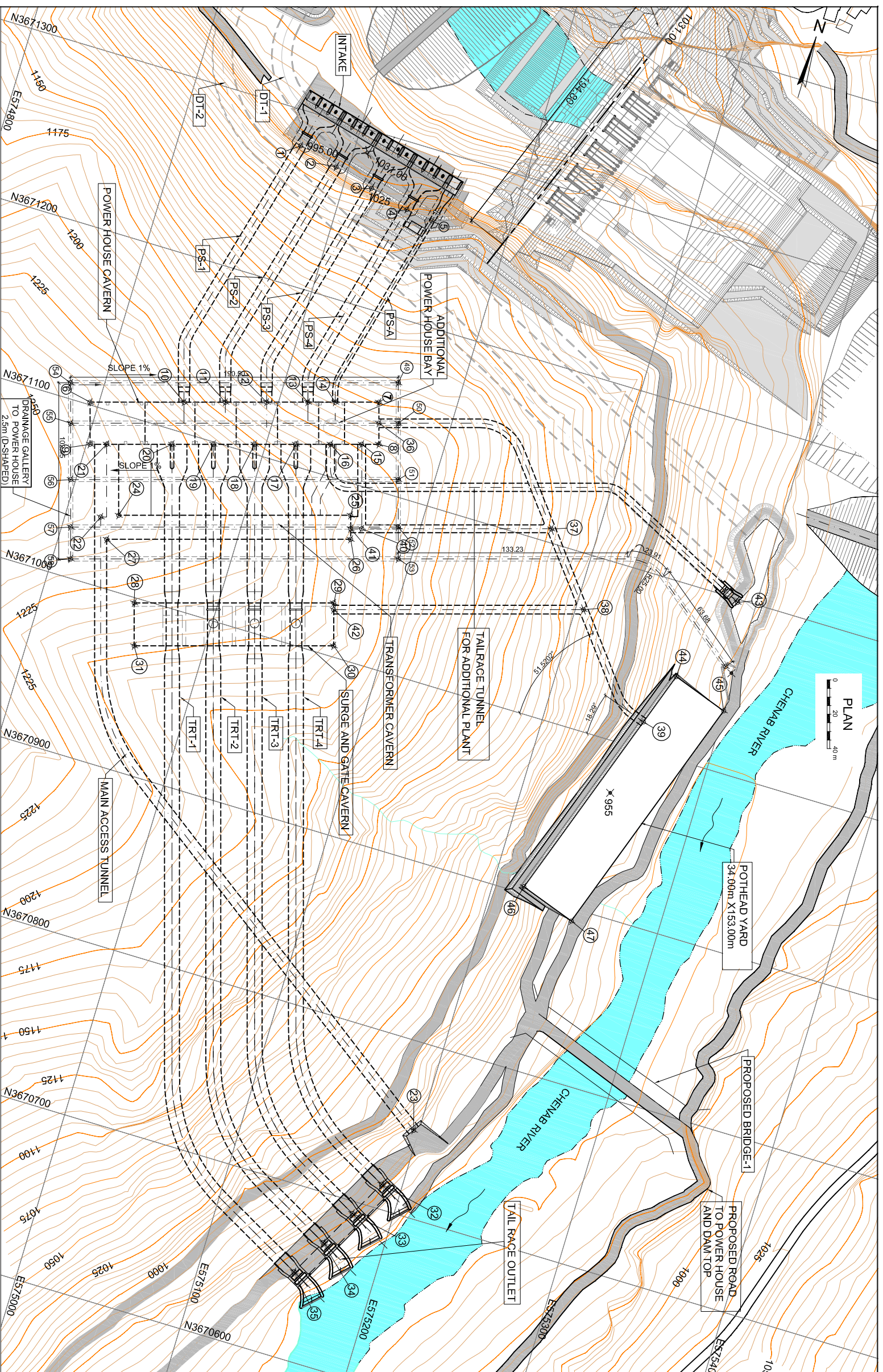
- SIZE : 116.0(L) X 24.0(W) X 45.4(H)

LEGEND:

- TRT : TAILRACE TUNNEL
- PS : PRESSURE SHAFT
- PS-A : PRESSURE SHAFT AUXILIARY
- DT : DIVERSION TUNNEL

NOTES:

1.) ALL DIMENSIONS AND LEVELS ARE IN m UNLESS OTHERWISE INDICATED.



CO-ORDINATES

DESCRIPTION	EASTING	NORTHING	DESCRIPTION	EASTING	NORTHING
1	574969.572	3671279.687	27	574927.292	3671027.883
2	574992.830	3671273.766	28	574953.249	3670997.041
3	575016.088	3671267.844	29	575004.357	3671030.373
4	575039.346	3671261.922	30	575071.541	3671006.428
5	575065.187	3671259.697	31	574960.433	3670973.096
6	574895.071	3671101.530	32	575188.198	3670714.257
7	575055.986	3671149.805	33	575176.920	3670693.136
8	575063.026	3671128.336	34	575165.441	3670671.995
9	574902.111	3671078.064	35	575154.063	3670650.864
10	574947.464	3671117.248	36	575059.506	3671138.071
11	574970.482	3671124.145	37	575173.136	3671108.057
12	574993.440	3671131.041	38	575204.623	3671068.355
13	575016.428	3671137.937	39	575256.755	3671015.750
14	575033.447	3671142.506	40	575067.571	3671076.387
15	575053.447	3671123.465	41	575061.391	3671026.614
16	575036.082	3671118.255	42	575065.485	3671098.172
17	575016.926	3671112.508	43	575289.175	3671046.531
18	574993.938	3671105.612	44	575267.482	3671035.343
19	574970.929	3671098.709	45	575293.588	3670892.748
20	574947.962	3671091.819	46	575243.914	3670882.748
21	574918.107	3671082.882	47	575217.789	3670903.942
22	574920.204	3671039.329			
23	575197.082	3670749.784			
24	574929.974	3671043.304			
25	575059.135	3671082.052			
26	575063.158	3671068.643			

PACKAGE - (1B)

FOR TENDER PURPOSE ONLY

NOTES:
1.) ALL DIMENSIONS AND LEVELS ARE IN m UNLESS OTHERWISE INDICATED.

LEGEND:
TRT : TAIL RACE TUNNEL
PS : PRESSURE SHAFT
PS-A : PRESSURE SHAFT AUXILIARY
DT : DIVERSION TUNNEL

DAM
MAX. WIDTH OF 1 BLOCK : 17.75m
HEIGHT OF DEEPEST BLOCK : 133.00m
BASE WIDTH OF DAM FOR DEEPEST BLOCK : 154.65m
LENGTH OF DAM TOP : 194.80m
FULL RESERVOIR LEVEL : 1029.00m
MINIMUM DRAW DOWN LEVEL : 1014.00m

POWER HOUSE CAVERN
SIZE : 168.0(L) X 24.5(W) X 49.0(H)

TRANSFORMER CAVERN
SIZE : 127.0(L) X 14.3(W) X 22.0(H)

SURGE & GATE CAVERN
SIZE : 116.0(L) X 24.0(W) X 45.4(H)

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATELE HYDRO ELECTRIC PROJECT PVT. LTD.

RATLE HYDRO ELECTRIC PROJECT

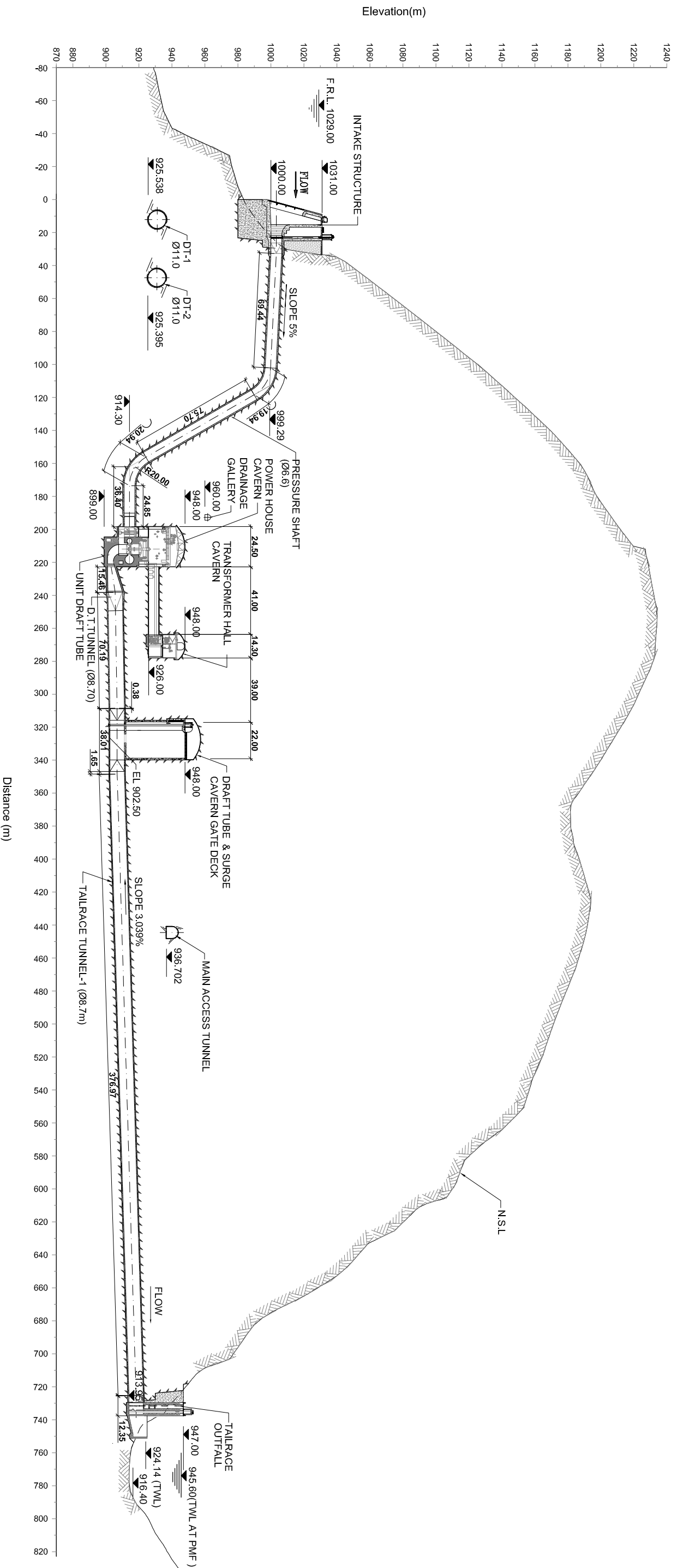
PROJECT AREA SETOUT

PLAN-PACKAGE (1B)

DESIGNER: PRANJUN	SCALE: 1:1500	FORMAT: A1
DRAWN: DPR/SAR	1:3000	[A3]
CHECKED: GUH	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.00.004	0
DATE: 11.11.11		

AF-Consult Switzerland Ltd.
Tilgnerstrasse 28
CH-3600 Baden/Schweiz

L-SECTION UNIT-1



PACKAGE-1(B)
FOR TENDER PURPOSE ONLY

REFERENCE DRAWINGS:
71.2133.00.003 PROJECT AREA
GENERAL LAYOUT - PLAN

NOTES :
1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

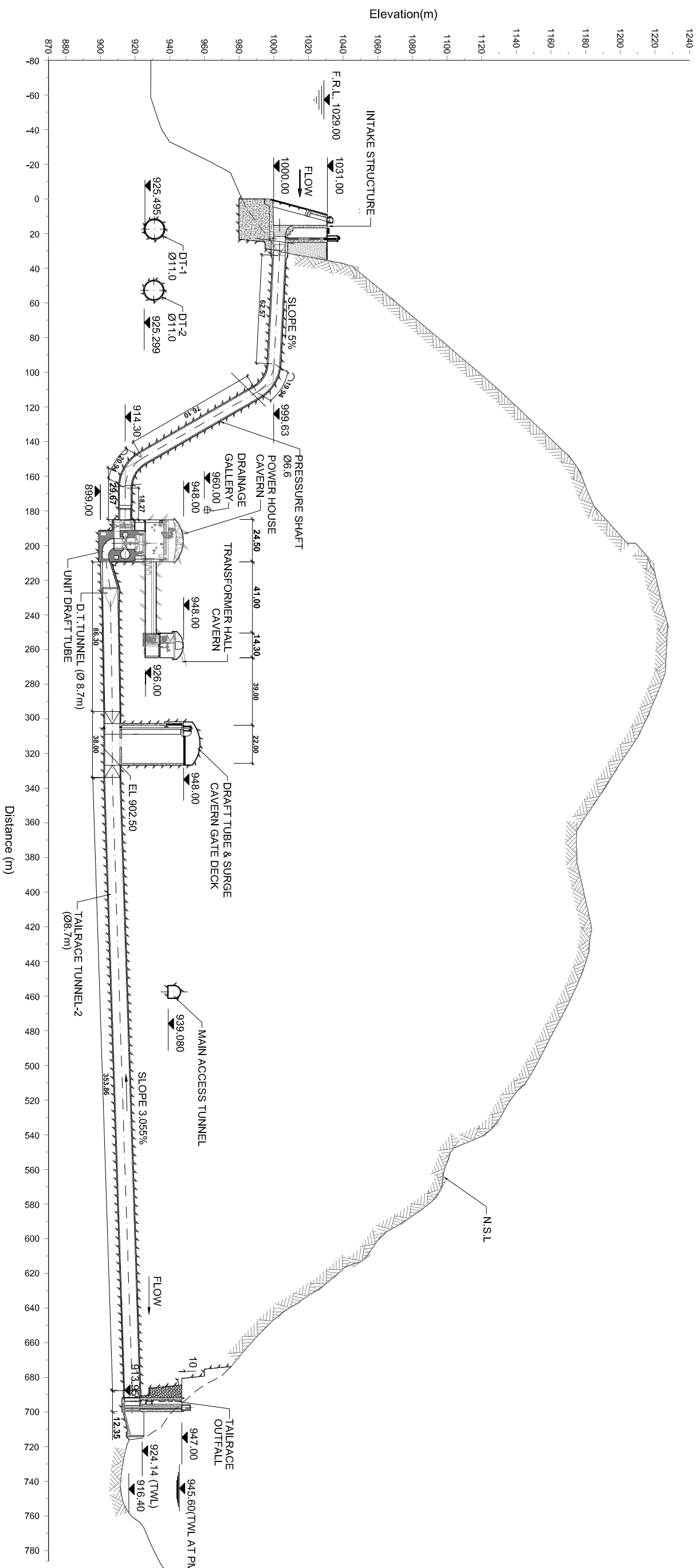
RATLE HYDRO ELECTRIC PROJECT

PROJECT AREA		L-SECTION (UNIT-1)	
SECTION			
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DRAWN: DPR/SAR	CHECKED: GUH	DRAWING No. [A3]	REV. No.
APPROVED: GUH	DATE: 28.11.11	71.2133.00.005	0



AF-Consult Switzerland Ltd.
Tillegasse 28
CH-5400 Baden/Schweiz

L-SECTION UNIT-2



PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

REFERENCE DRAWINGS:

71.2133.00.003 PROJECT AREA
GENERAL LAYOUT - PLAN

NOTES :

1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input checked="" type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

PROJECT AREA
L-SECTION (UNIT-2)

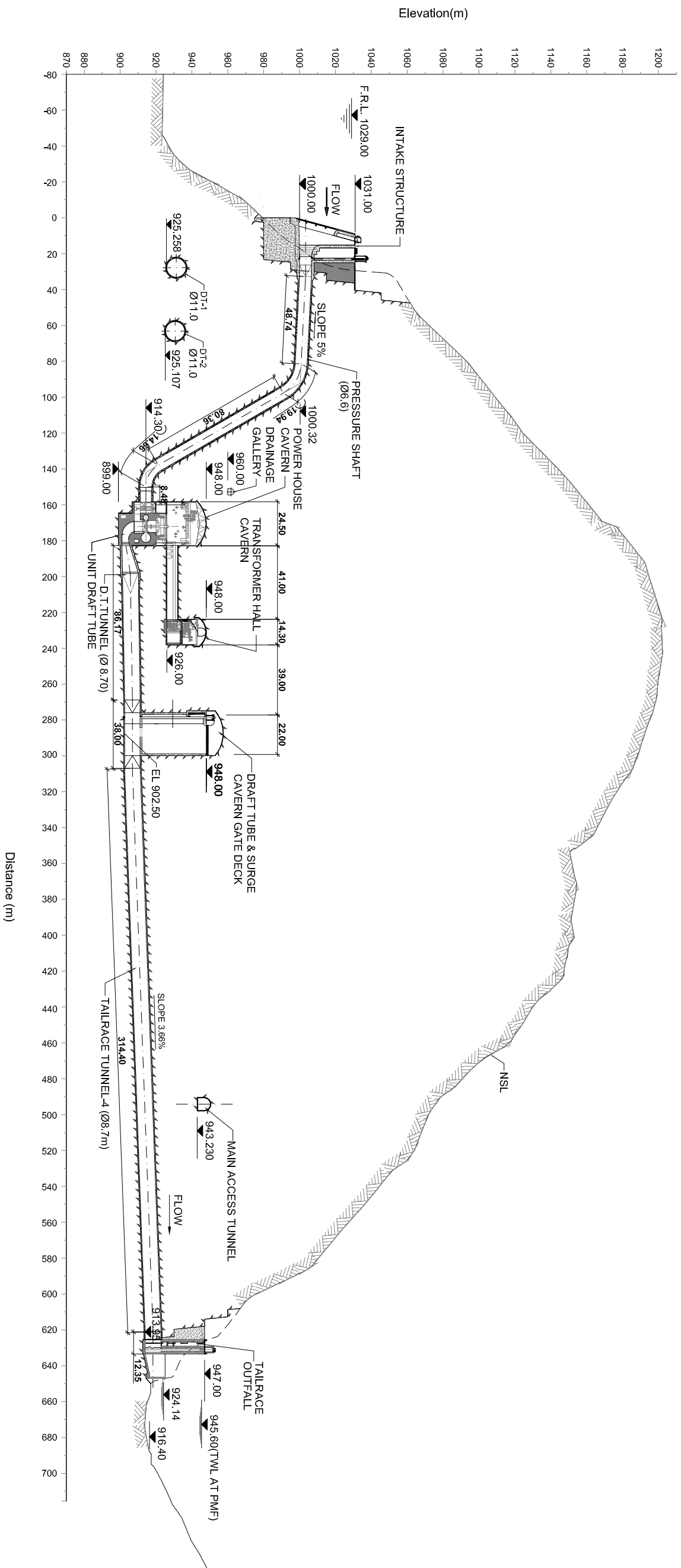
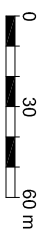
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DESIGNED: PRJ	SCALE: 1:1250	FORMAT: A1
AF-Consult Switzerland Ltd.		[A3]
CHECKED: GUH	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.00.006	0
DATE: 28.11.11		



AF-Consult Switzerland Ltd.
Tilferstrasse 26
CH-3400 Baden, Switzerland

L-SECTION UNIT-4



PACKAGE-1(B)
FOR TENDER PURPOSE ONLY

REFERENCE DRAWINGS:

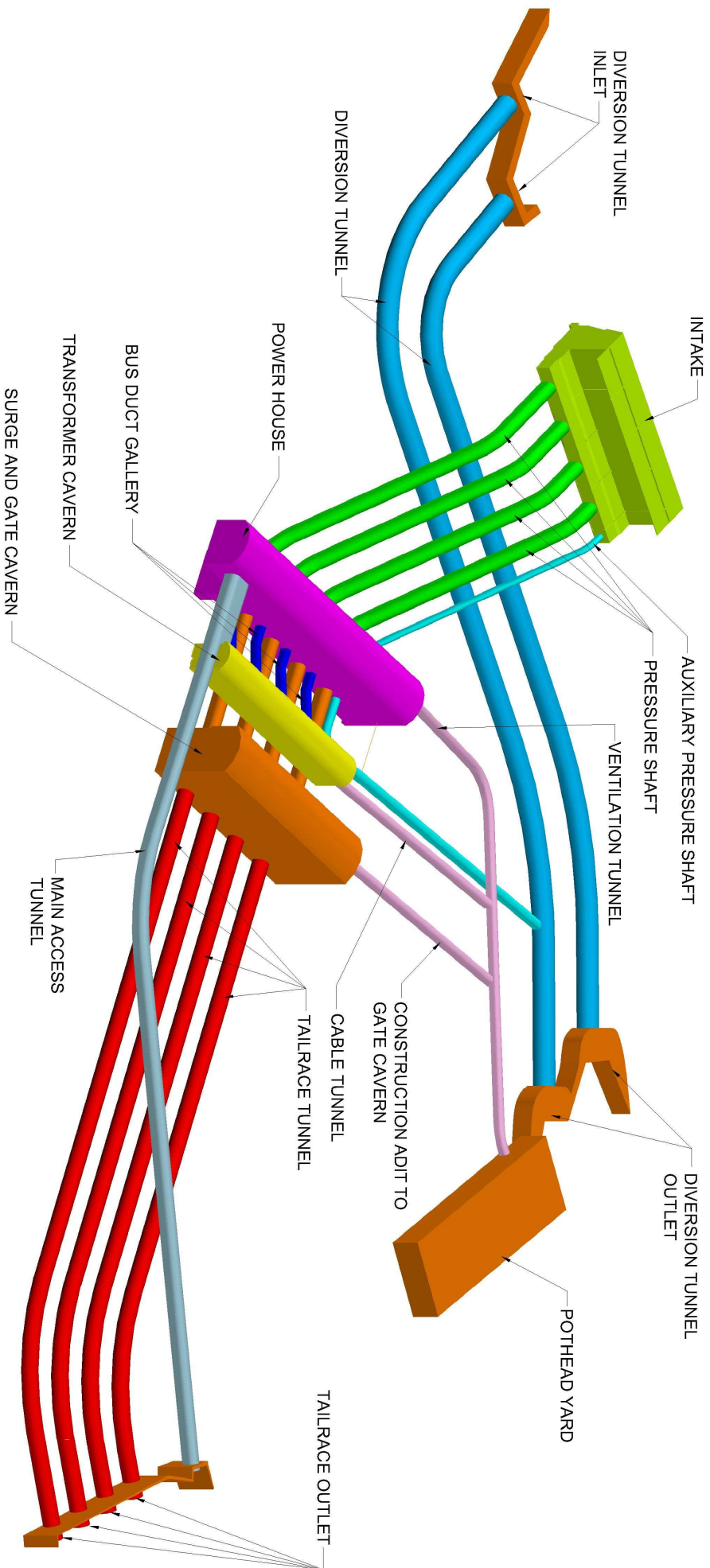
- 71.2133.00.003 PROJECT AREA GENERAL LAYOUT - PLAN

NOTES :

- 1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

<p>PHASE</p> <p><input type="checkbox"/> PRE-FEASIBILITY STUDY</p> <p><input type="checkbox"/> FEASIBILITY STUDY</p> <p><input type="checkbox"/> INCEPT. & BASIC DESIGN</p> <p><input checked="" type="checkbox"/> TENDER DESIGN</p> <p><input type="checkbox"/> CONSTRUCTION DESIGN</p> <p><input type="checkbox"/> AS-BUILT DRAWINGS</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV.</th> <th>REVISION DESCRIPTION</th> <th>DRWN/CHKD</th> <th>APPD.</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE										
REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE												
<p>GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.</p> <p>RATLE HYDRO ELECTRIC PROJECT</p>																
<p>PROJECT AREA</p> <p>L-SECTION (UNIT-4)</p>																
<p>SECTION</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DESIGNED: PRU</td> <td>SCALE: 1:1250</td> <td>FORMAT: A1</td> </tr> <tr> <td>DRAWN: DPR/SAR</td> <td>1:2500</td> <td>[A3]</td> </tr> <tr> <td>CHECKED: GUH</td> <td>DRAWING No.</td> <td>REV. No.</td> </tr> <tr> <td>APPROVED: GUH</td> <td>71.2133.00.008</td> <td>0</td> </tr> <tr> <td>DATE: 28.11.11</td> <td> </td> <td> </td> </tr> </table>	DESIGNED: PRU	SCALE: 1:1250	FORMAT: A1	DRAWN: DPR/SAR	1:2500	[A3]	CHECKED: GUH	DRAWING No.	REV. No.	APPROVED: GUH	71.2133.00.008	0	DATE: 28.11.11		
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CHECKED: GUH	DRAWING No.	REV. No.														
APPROVED: GUH	71.2133.00.008	0														
DATE: 28.11.11																
<p>A-F-Consult Switzerland Ltd. Tägerstrasse 26 CH-3000 Bern Switzerland</p>																

BIRD EYE VIEW PROJECT GENERAL ARRANGEMENT



PACKAGE - (1B)
FOR TENDER PURPOSE ONLY

PHASE		DATE	
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<input type="checkbox"/>	FEASIBILITY STUDY		
<input type="checkbox"/>	CONCEPT & BASIC DESIGN		
<input checked="" type="checkbox"/>	TENDER DESIGN		
<input type="checkbox"/>	CONSTRUCTION DESIGN		
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REV	REVISION DESCRIPTION	DRAWN (G/KD/APP)	DATE

RATLE HYDRO ELECTRIC PROJECT

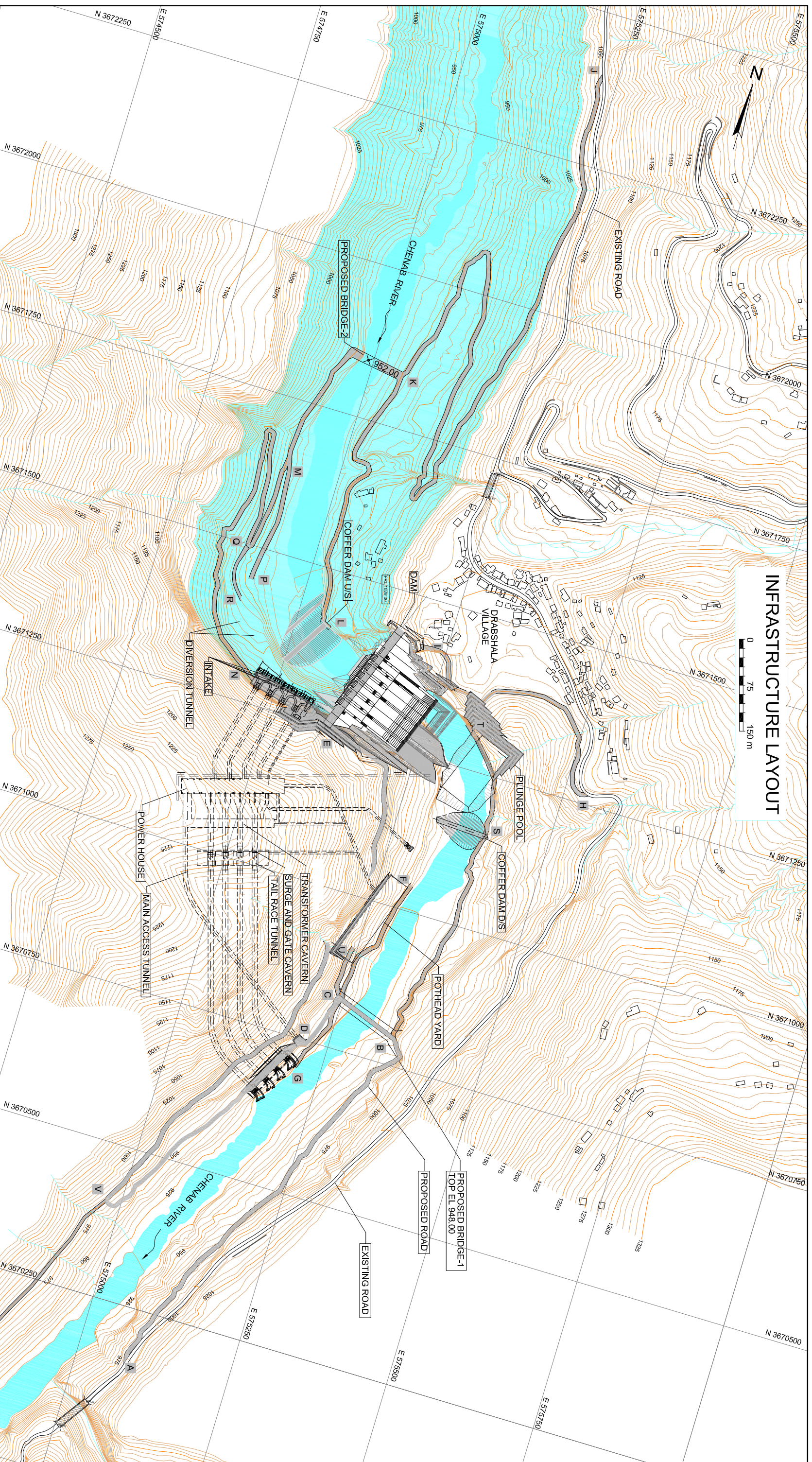
RATLE HEP
PROJECT GENERAL ARRANGEMENT

BIRD EYE VIEW

DESIGNED: SSS	SCALE: NTS	FORMAT: A1
AT-Consult India Pvt.Ltd		
DATE: 01.08.17		
71.2133.00.009		
0		



AT-Consult India Pvt.Ltd
71.2133.00.009
01.08.17



INFRASTRUCTURE LAYOUT

PROPOSED ROAD DETAILS

NAME	DESCRIPTION	LENGTH(m)	TYPE
A - B	ROAD TO OFFSET POINT OF NH-1(B) TO BRIDGE-1	720.00	P
C - D	ROAD TO MAIN ACCESS TUNNEL (MAT)	100.00	P
D - E	ROAD TO DAM TOP	1410.00	P
C - F	ROAD TO DIVERSION TUNNEL OUTLET	230.00	T
H - I	ROAD TO DAM LEFT BANK	435.00	T
J - K	ROAD TO OFFSET POINT OF NH-1(B) TO BRIDGE-2	1710.00	T
K - L	ROAD TO US COFFERDAM	460.00	T
K - P	ROAD TO DIVERSION TUNNEL INLET	450.00	T
M - N	ROAD TO TUNNEL INTAKE	910.00	T

NAME	SPAN	DECK LEVEL	DESCRIPTION	TYPE
BRIDGE-1	110m	948m amsl	700m D/S OF DAM AXIS	P
BRIDGE-2	85m	952 m amsl	570m U/S OF DAM AXIS	T

PROPOSED BRIDGE DETAILS

NAME	SPAN	DECK LEVEL	DESCRIPTION	TYPE
Q - R			ROAD TO DIVERSION TUNNEL GATES	T
B - S			ROAD TO DIS COFFERDAM	T
C - G			ROAD TO TAIL RACE TUNNELS OUTLET	T
S - T			ROAD TO DAM BOTTOM	T
C - U			ROAD TO POTHEAD YARD	P
V - W			ROAD TO DUMPING SITE	T

LEGEND

- T TEMPORARY
- P PERMANENT

PACKAGE 1(B)

FOR TENDER PURPOSE ONLY

PHASE	DESCRIPTION	DATE
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INFRASTRUCTURE WORKS GENERAL ARRANGEMENT

ROADS AND BRIDGE PLAN

DESIGNER: PRU	SCALE: 1:3000	FORMAT: A1
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APPROVED: COA	DATE: 07/06/11	REV. No. 0

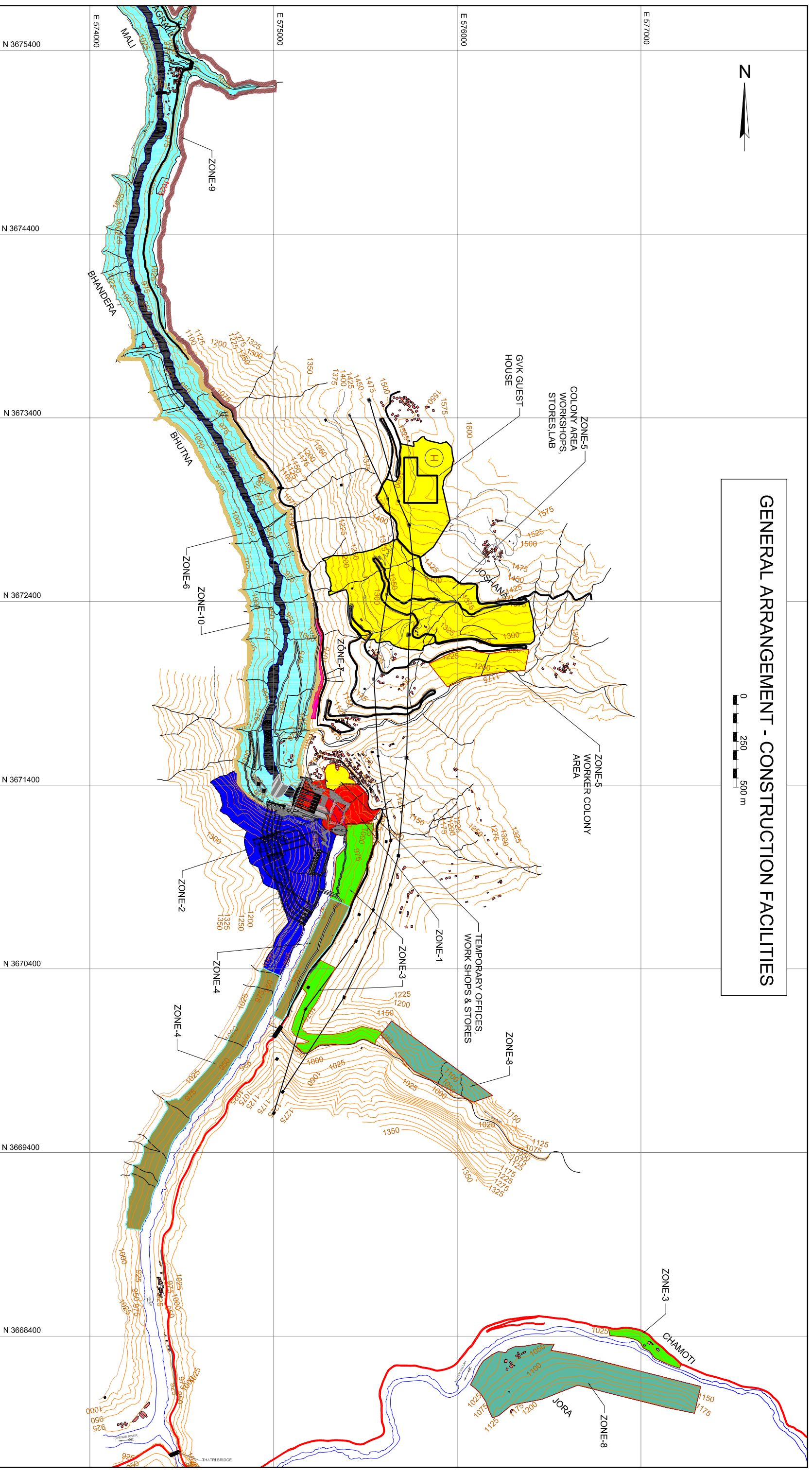


GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
 INFRASTRUCTURE WORKS
 GENERAL ARRANGEMENT

AFC-Consult India Pvt. Ltd.,
 Tiraniasara 28
 Ch-5400 Baramulla, Jammu & Kashmir



GENERAL ARRANGEMENT - CONSTRUCTION FACILITIES



PROJECT COMPONENT & INFRASTRUCTURE WORKS	PROPOSED AREA IN Ha.	LEGEND	PROJECT COMPONENT & INFRASTRUCTURE WORKS	PROPOSED AREA IN Ha.	LEGEND
1. ZONE-1 (DAM COMPLEX)	9.87		6. ZONE-6 (RESERVOIR AREA)	252.35	
2. ZONE-2 (P.H. COMPLEX)	30.51		7. ZONE-7 (APPROACH ROAD FROM US)	2.18	
3. ZONE-3 (CRUSHING & BATCHING PLANT)	52.10		8. ZONE-8 (QUARRY AREA)	36.03	
4. ZONE-4 (DUMPING AREA)	34.22		9. ZONE-9 (RE ALIGNMENT OF NH1B)	9.64	
5. ZONE-5 (COLONY AREA)	78.02		10. ZONE-10 (AREA FOR RESERVOIR RIM STABILITY)	34.51	
TOTAL AREA				539.43	

PHASE	STATUS	DATE
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<input type="checkbox"/> INCEPT. & BASIC DESIGN		
<input checked="" type="checkbox"/> TENDER DESIGN		
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GVK RATILE HYDRO ELECTRIC PROJECT PVT LTD.

RATILE HYDRO ELECTRIC PROJECT

INFRASTRUCTURE WORKS

GENERAL ARRANGEMENT

CONSTRUCTION FACILITIES

PLAN

DESIGNED: PRU	SCALE: 1:2500	FORMAT: A1
DRAWN: SAR	1:5000	[A3]
CHECKED: GUH	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.01.002	0
DATE: 11.11.11		

FOR TENDER PURPOSE ONLY

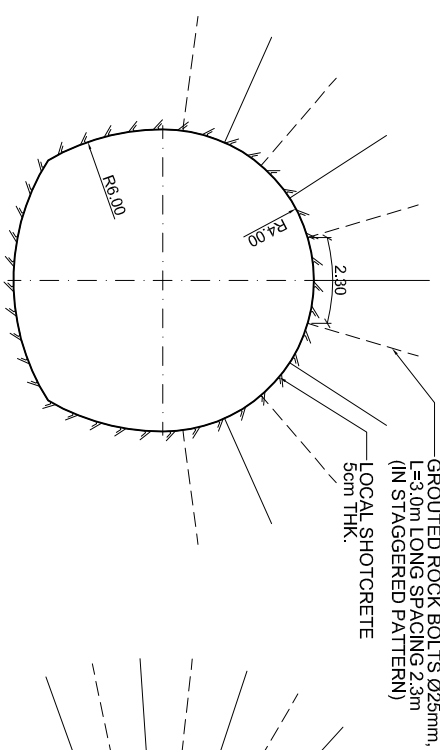
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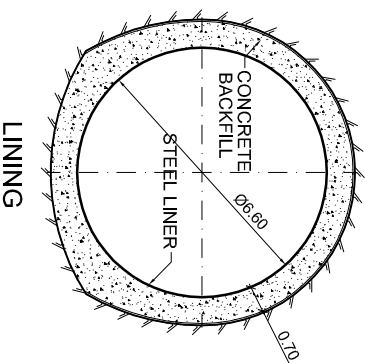
AF-Consult Switzerland Ltd.
Tilgnerstrasse 28
CH-5405 Baden/Schweiz

ROCK SUPPORT CLASS I

(Q= 10-40)



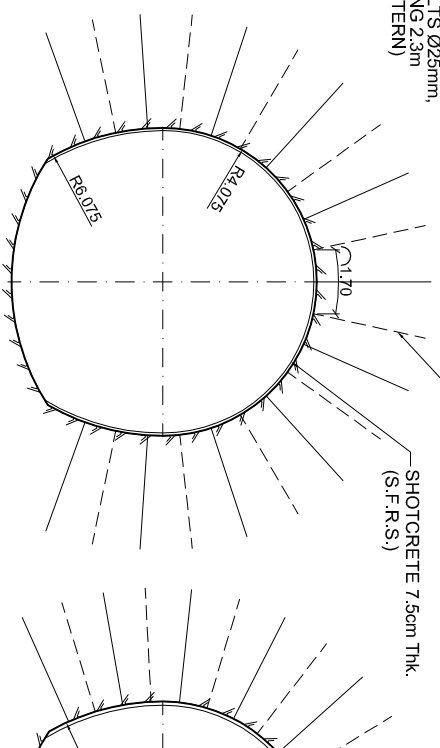
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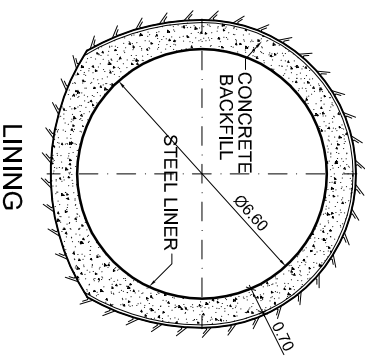
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ROCK SUPPORT CLASS II

(Q= 1-10)



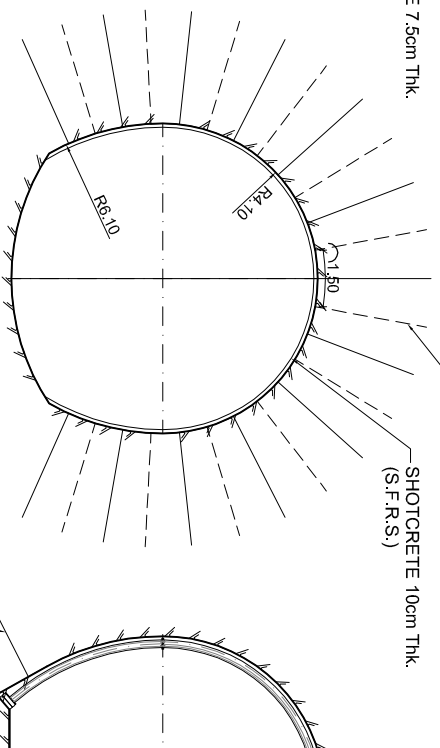
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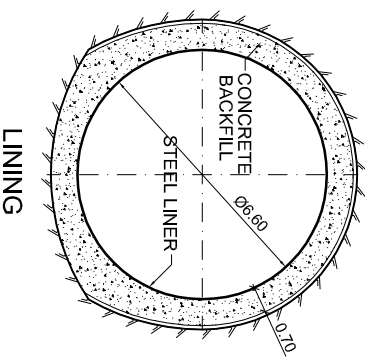
LINING

ROCK SUPPORT CLASS III

(Q= 0.4-1.0)



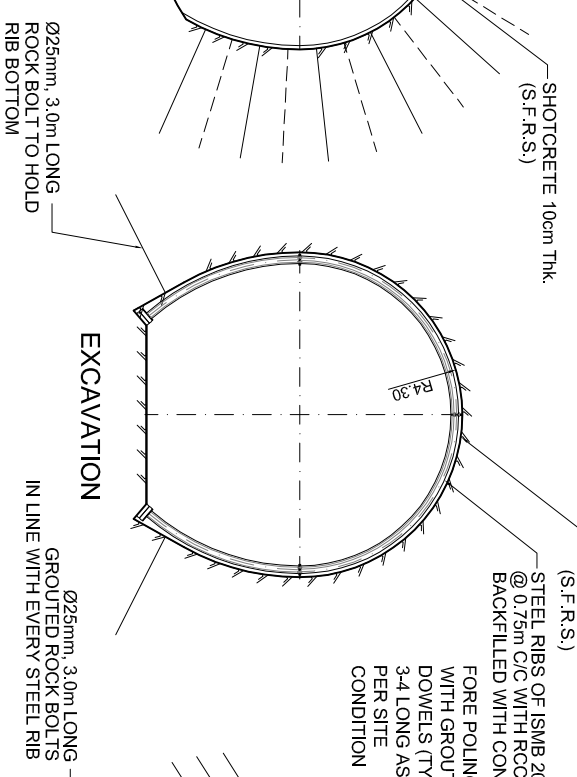
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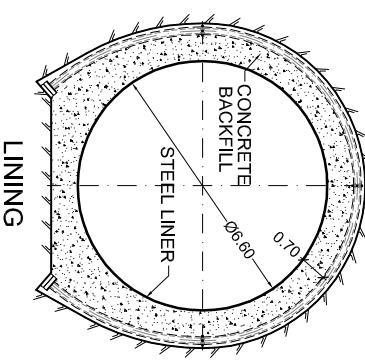
LINING

ROCK SUPPORT CLASS IV

(Q= 0.1 - 0.4)



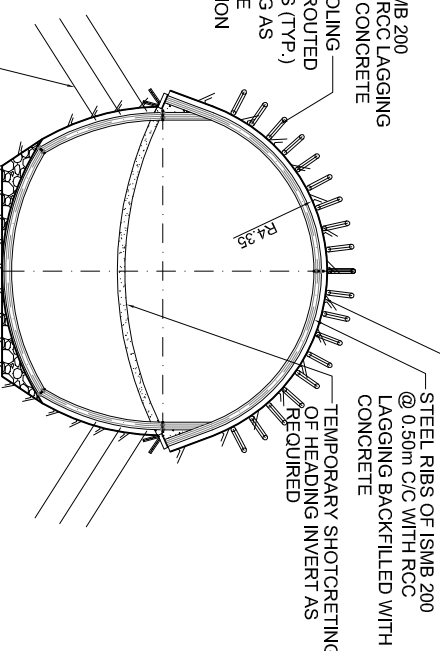
EXCAVATION



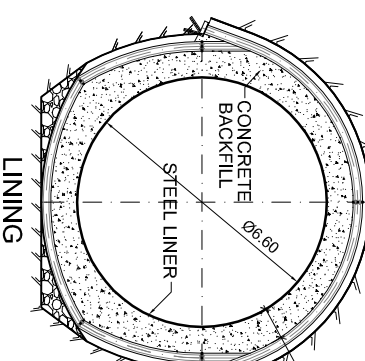
LINING

ROCK SUPPORT CLASS V

(Q= 0.01-0.1)



EXCAVATION



LINING

NOTES:

1. ALL DIMENSIONS ARE IN METERS EXCEPT SHOWN OTHERWISE.
2. SUPPORT MEASURES INDICATED ARE TYPICAL. MINOR MODIFICATION/RELOCATIONS OF THE ACTUAL SUPPORT MEASURES SHALL BE DECIDED ON SITE IN ACCORDANCE WITH GROUND CONDITIONS ENCOUNTERED.
3. ADDITIONAL ROCK BOLTS, SHOTCRETE OR WELDED STEEL FABRIC MIGHT BE REQUIRED FOR ANY TYPICAL SECTIONS IN ORDER TO IMPROVE/GUARANTTEE THE LOCAL ROCK STABILITY. BEFORE SHOTCRETE PLACING, ALL WATER INFLOWS SHALL BE DRAINED PROPERLY.
4. THE LENGTH & DIRECTION OF ROCK BOLTS MAY BE ALTERED IN CONSULTATION WITH THE GEOLOGIST & ENGINEER-IN-CHARGE.
5. FORE POLING IS RECOMMENDED ONLY IF STAND-UP TIME IS LOW AND HIGH SQUEEZING GROUND CONDITION IS ENCOUNTERED.
6. FOR ROCK MASS QUALITY, Q > 40, NO SUPPORT SHALL BE GIVEN EXCEPT LOCAL SHOTCRETING AND SPOT BOLTING.

FOR TENDER PURPOSE ONLY

PACKAGE-1(B)

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK	GVK RATEL HYDRO ELECTRIC PROJECT PVT. LTD.
RATEL HYDRO ELECTRIC PROJECT	

PRESSURE SHAFT EXCAVATION, SUPPORTS AND LINING WORKS

TYPICAL CROSS SECTIONS

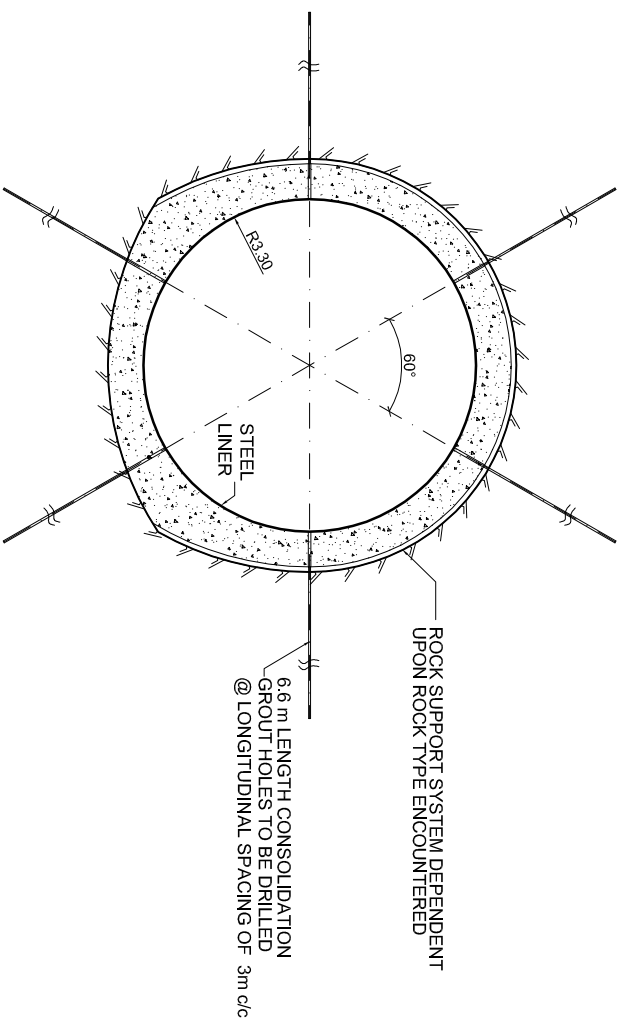
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APPROVED: GUH	71.2133.07.101	0
DATE: 18.11.11		



AF-Consult Switzerland Ltd.
Tägermatten 26
CH-4600 Bräunlingen

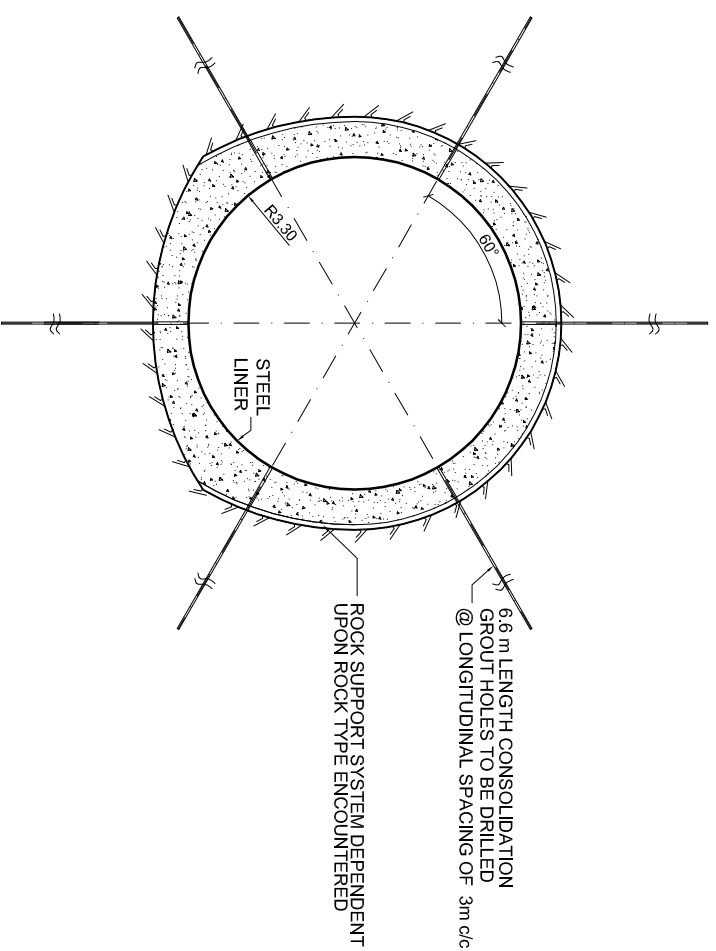
CONSOLIDATION GROUTING DETAIL

(TYPE -1)



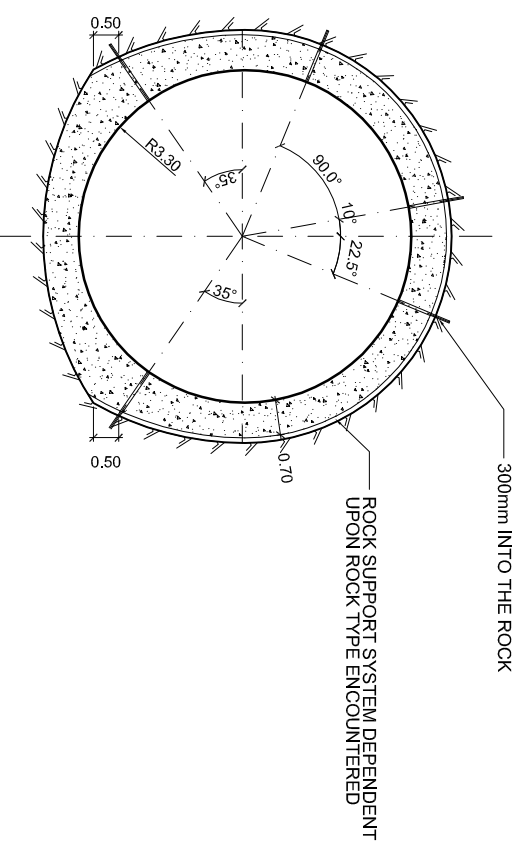
CONSOLIDATION GROUTING DETAIL

(TYPE -2)



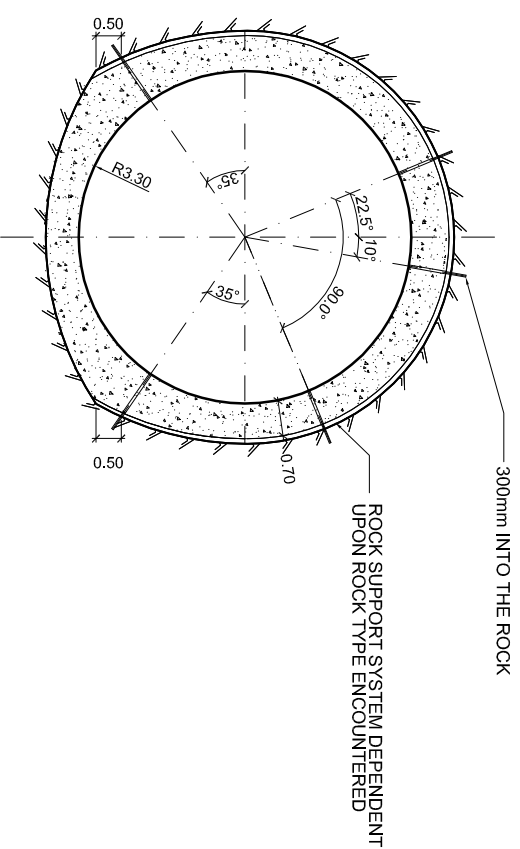
CONTACT GROUTING DETAIL

(TYPE -1)



CONTACT GROUTING DETAIL

(TYPE -2)



NOTES:

1. ALL DIMENSIONS ARE IN METERS EXCEPT SHOWN OTHERWISE.
2. FORE POLING IS RECOMMENDED ONLY IF STAND-UP TIME IS LOW AND HIGH SQUEEZING GROUND CONDITION IS ENCOUNTERED.

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

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GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

RATLE HYDRO ELECTRIC PROJECT

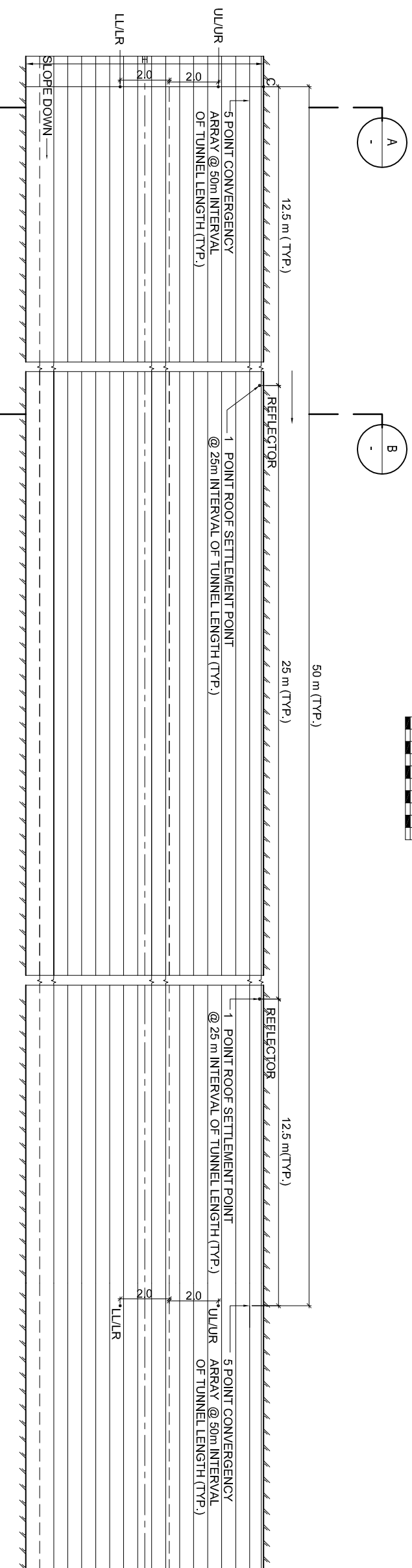
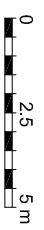
PRESSURE SHAFT

GROUTING DETAILS

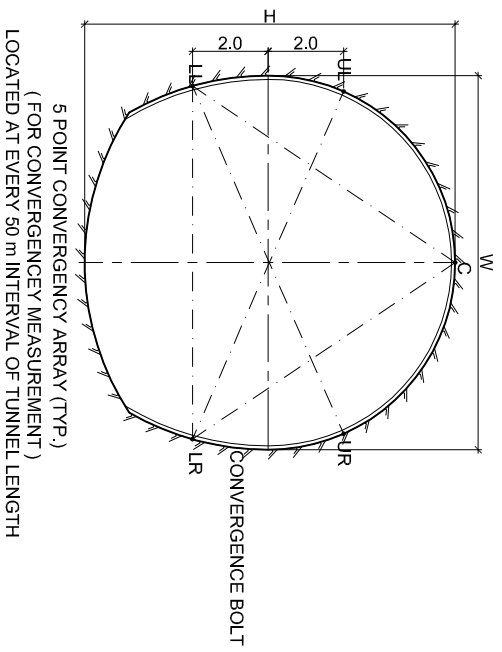
TYPICAL SECTIONS

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AF-Consult Switzerland Ltd.	DRAWN: RAS	[1:150]
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CH-3400 Baden, Switzerland	APPROVED: GUH	REV. No.
DATE: 18.11.11	71.2133.07.102	0

L-SECTION OF TUNNEL

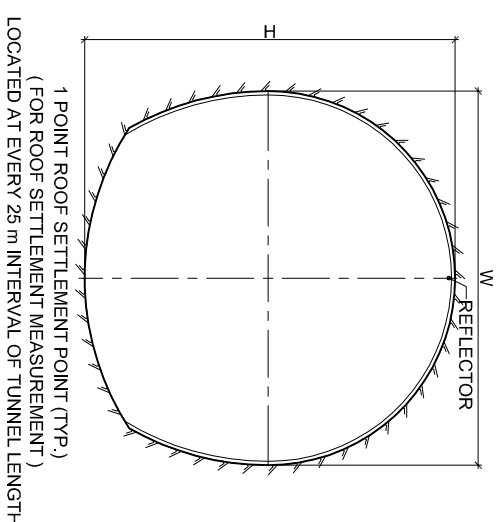
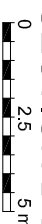


SECTION A-A



5 POINT CONVERGENCY ARRAY (TYP.)
(FOR CONVERGENCY MEASUREMENT)
LOCATED AT EVERY 50 m INTERVAL OF TUNNEL LENGTH

SECTION B-B



1 POINT ROOF SETTLEMENT POINT (TYP.)
(FOR ROOF SETTLEMENT MEASUREMENT)
LOCATED AT EVERY 25 m INTERVAL OF TUNNEL LENGTH

LEGEND:-
C = CROWN
UL = UPPER LEFT
UR = UPPER RIGHT
LL = LOWER LEFT
LR = LOWER RIGHT

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

- NOTES:**
1. ALL DIMENSIONS ARE IN METERS EXCEPT SHOWN OTHERWISE.

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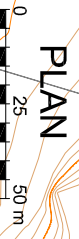
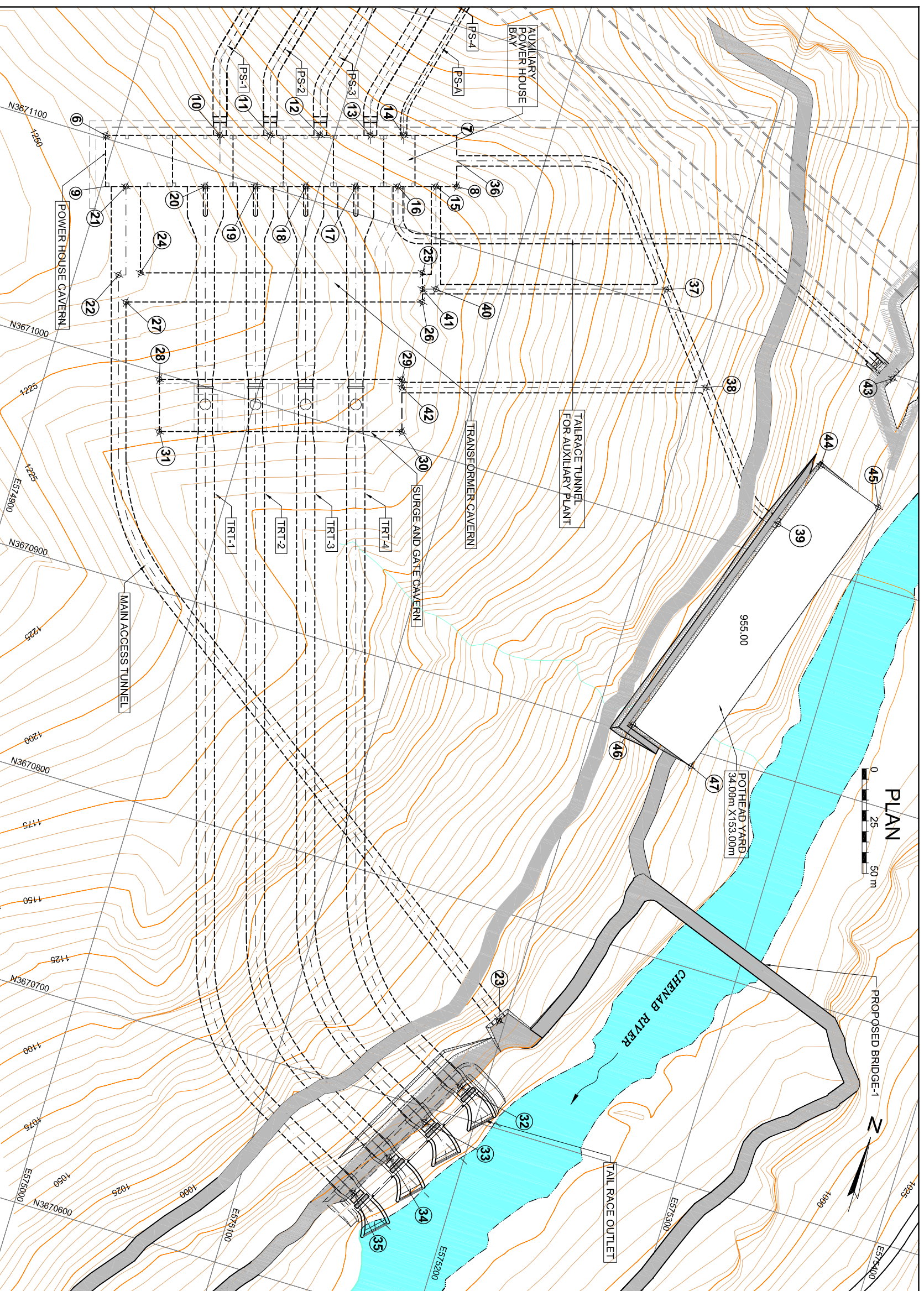
REV. No.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

**TUNNEL INSTRUMENTATION
TYPICAL DETAILS**

DESIGNED	CHECKED	APPROVED	DATE	SCALE	FORMAT	REV. No.
AF-Consult Switzerland Ltd. Tilberstrasse 26 CH-3400 Baden/Schweizland	KAS	RAE	18.11.11	1:100 [1:200]	A1 [A3]	0

71.2133.07.103



LENGTH OF TRT & PS

MKD.	LENGTH IN m	SIZE (m)	MKD.	LENGTH IN m	SIZE (m)
PS-1	211	6.80 Ø	TRT-1	378.60	8.70 Ø
PS-2	198	6.80 Ø	TRT-2	353.86	8.70 Ø
PS-3	184	6.80 Ø	TRT-3	334.00	8.70 Ø
PS-4	172	6.80 Ø	TRT-4	314.40	8.70 Ø
PS-A	162	3.500	TRT-A	292.00	4.70 Ø

- LEGEND:**
- TRT : TAIL RACE TUNNEL
 - PS : PRESSURE SHAFT
 - PS-A : PRESSURE SHAFT AUXILIARY
 - DT : DIVERSION TUNNEL
- NOTES :**
1. ALL DIMENSIONS AND LEVELS ARE IN m UNLESS OTHERWISE INDICATED.
 2. FOR REFERENCE OF COORDINATES REFER DWG.NO. 71.2133.00104

PACKAGE - 1(B)
FOR TENDER PURPOSE ONLY

PHASE	DATE	REVISION DESCRIPTION	DRWN/CHKD/APPD	DATE
<input type="checkbox"/> PRE-FEASIBILITY STUDY <input type="checkbox"/> FEASIBILITY STUDY <input type="checkbox"/> INCEPT. & BASIC DESIGN <input checked="" type="checkbox"/> TENDER DESIGN <input type="checkbox"/> CONSTRUCTION DESIGN <input type="checkbox"/> AS-BUILT DRAWINGS				

REV. NO. **REVISION DESCRIPTION** **DRWN/CHKD/APPD** **DATE**

POWER HOUSE CAVERN
GENERAL ARRANGEMENT

PLAN

SCALE: 1:11000

FORMATT: A

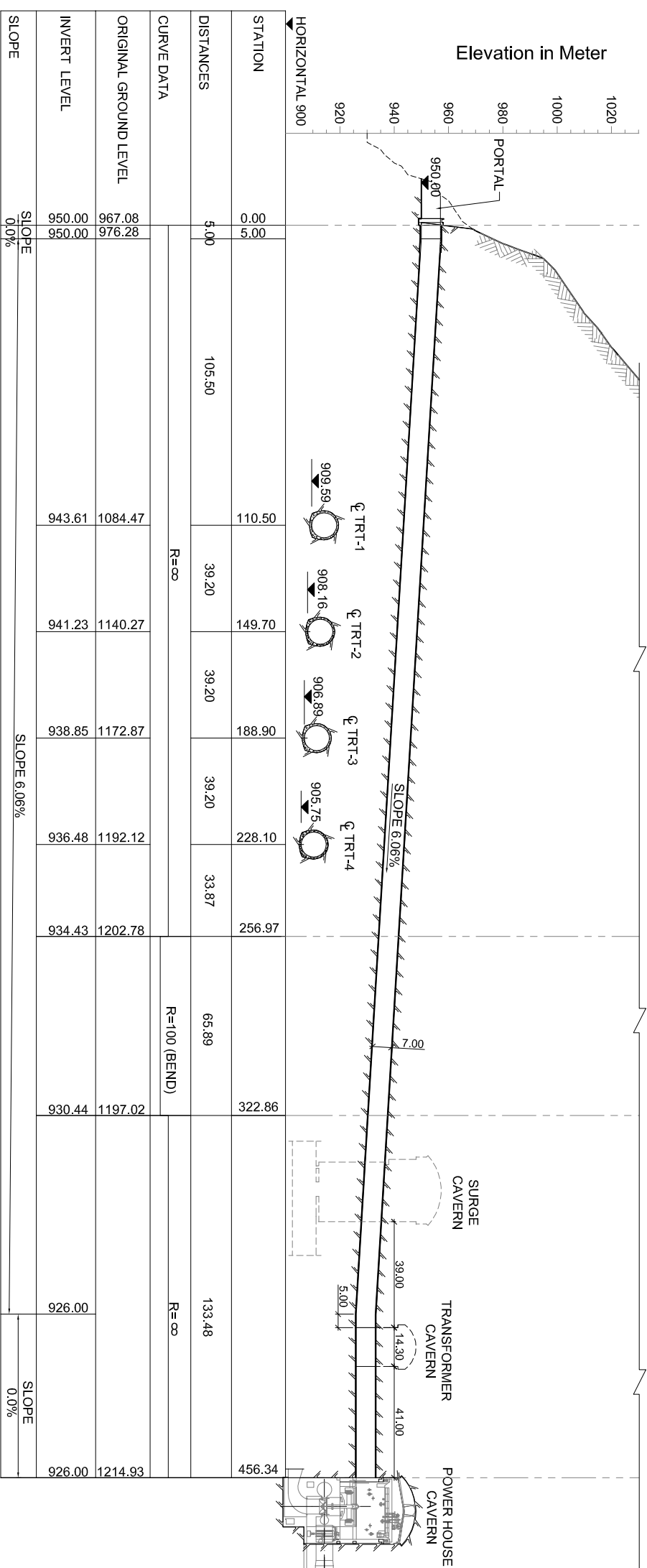
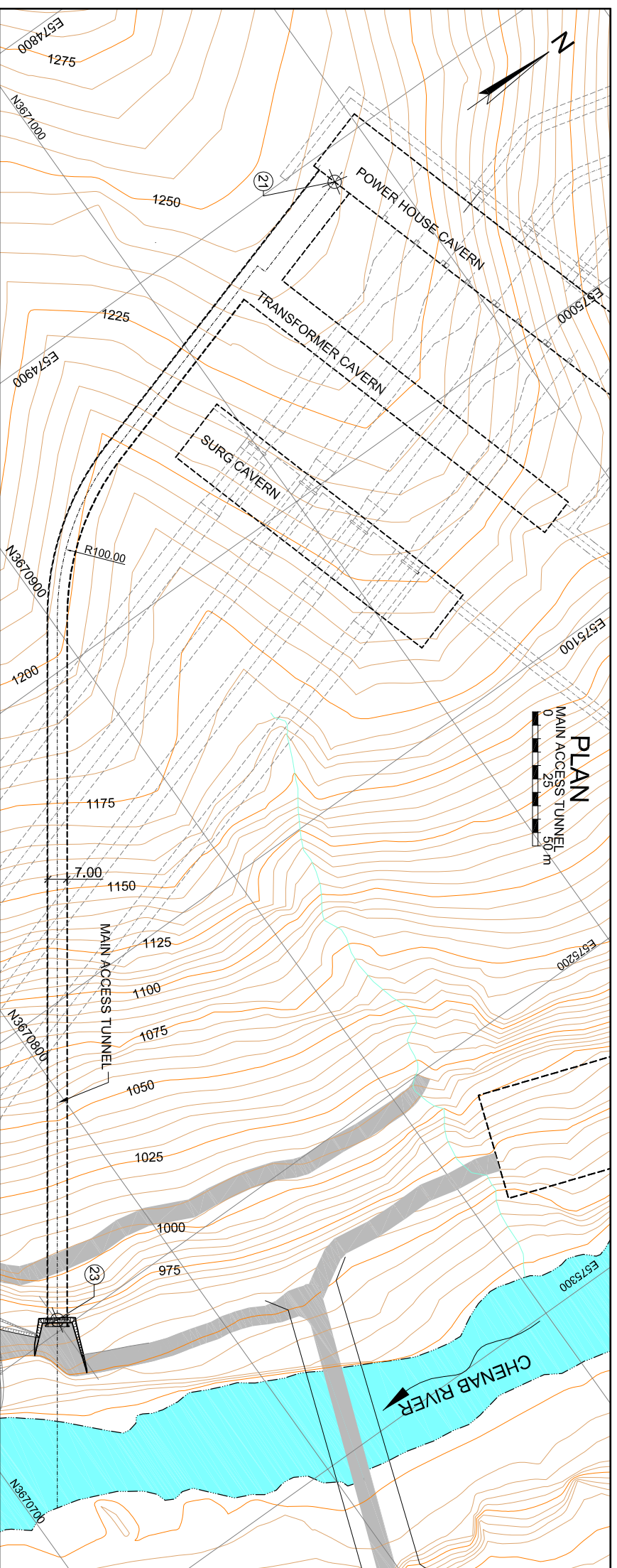
DATE: 14.12.11

71.2133.08.001

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AF-Consult Switzerland Ltd.
Tilferstrasse 26
CH-3400 Bideren, Switzerland



- NOTES :
1. ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

REFERENCE DRAWINGS:
 71.2133.08.004 POWER HOUSE
 MAIN ACCESS TUNNEL
 PLAN, SECTIONS & DETAIL

PACKAGE - (1B)
 FOR TENDER PURPOSE ONLY

PHASE	DESIGNED	CHECKED	APPROVED	DATE
PRE-FEASIBILITY STUDY				
FEASIBILITY STUDY				
CONCEPT. & BASIC DESIGN				
TENDER DESIGN				
CONSTRUCTION DESIGN				
AS-BUILT DRAWINGS				

POWER HOUSE
 MAIN ACCESS TUNNEL

DESIGNED	CHECKED	APPROVED	DATE
RAE	SSE	GUH	14.12.11

SCALE	FORMAT
1:1000	A

REVISION	DATE
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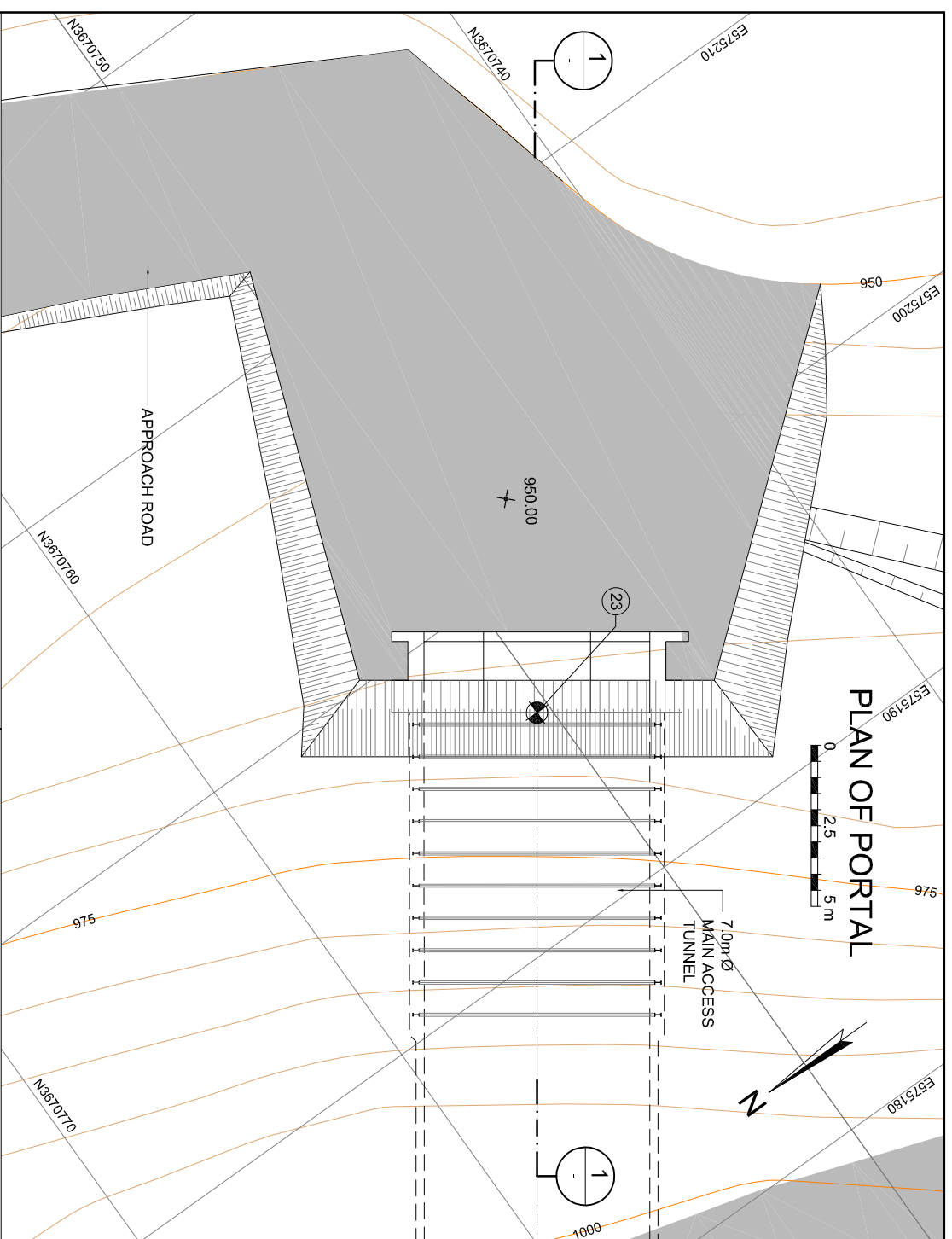
DESIGNER	CHECKER	APPROVER
JOHIRAK	SSE	GUH

DRAWING NO.	DATE
71.2133.08.002	14.12.11

PROJECT
RATLE HYDRO ELECTRIC PROJECT

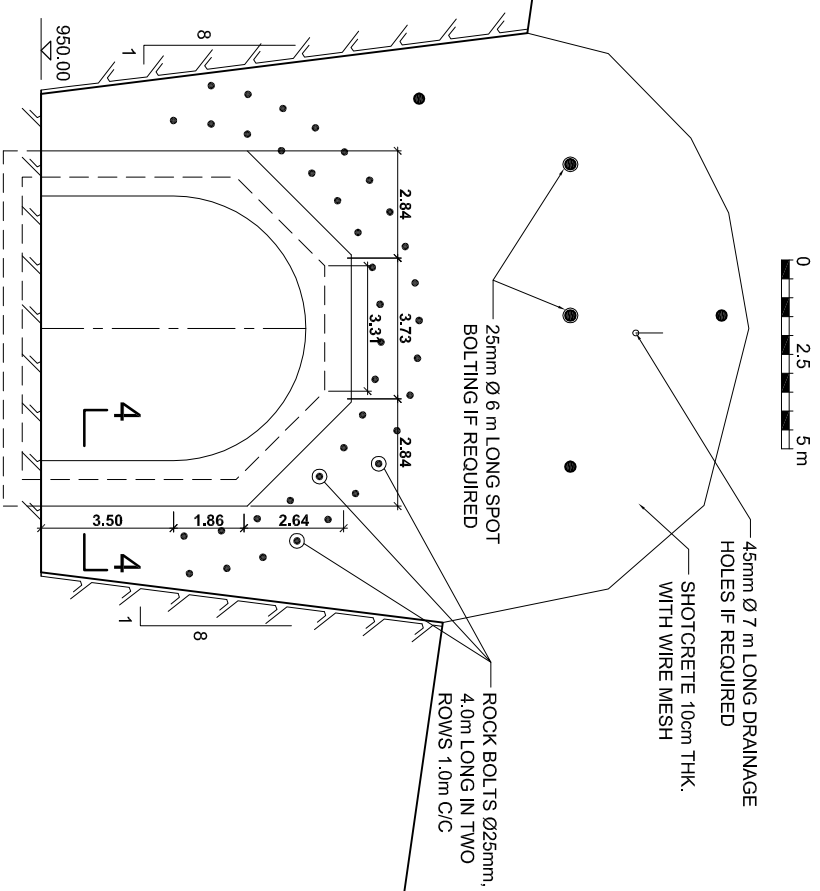
COMPANY
GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

LOGO

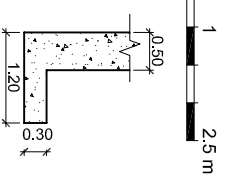


PLAN OF PORTAL

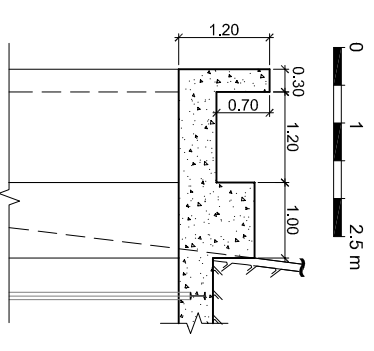
VIEW 3-3



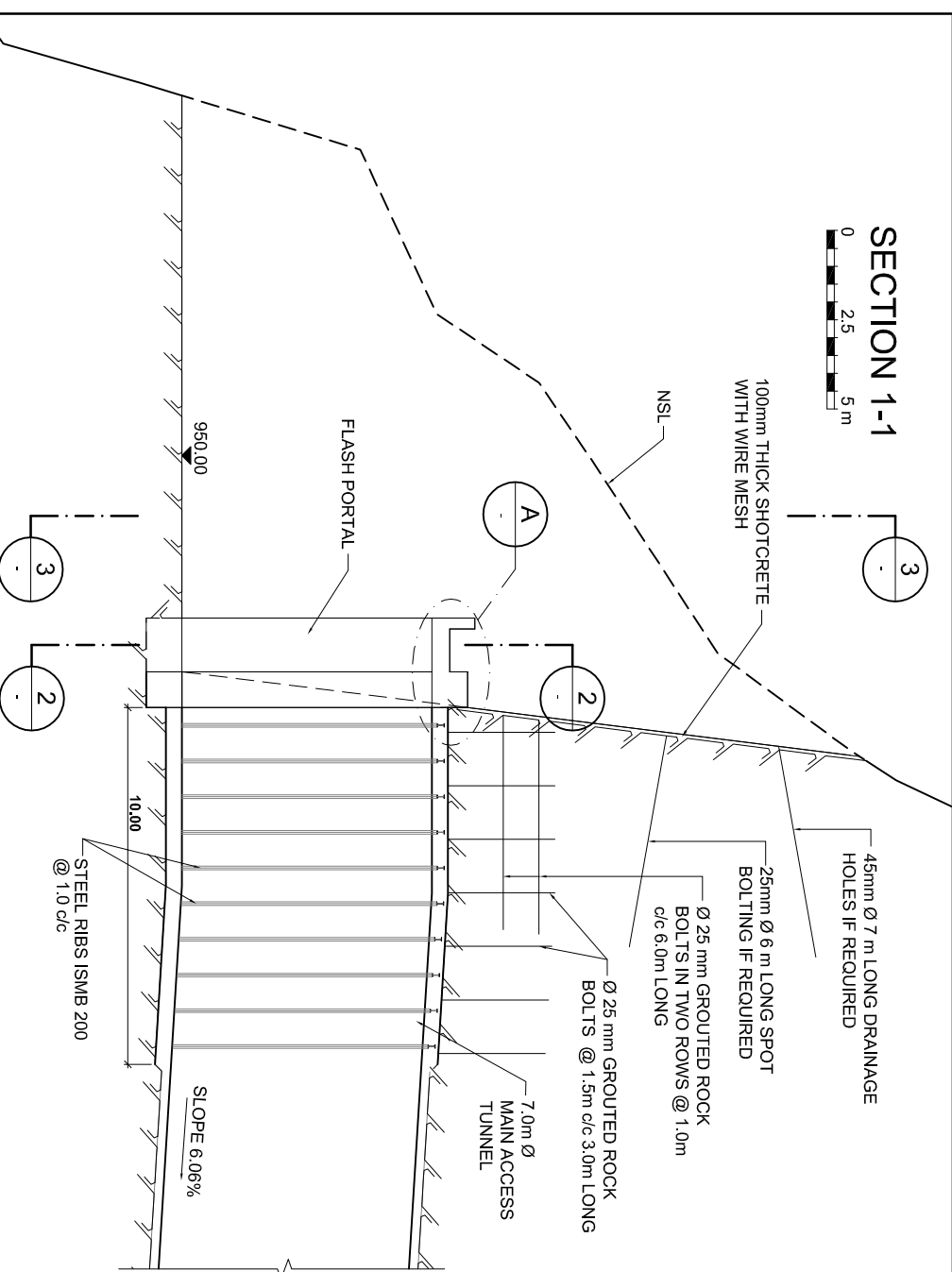
SECTION 4-4



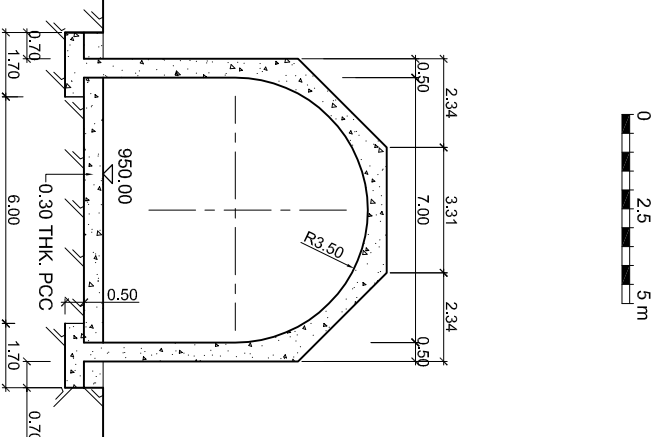
DETAIL - A



SECTION 1-1



SECTION 2-2



NOTES:
1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

REFERENCE DRAWINGS:
71.2133.08.003 POWER HOUSE MAIN ACCESS TUNNEL
PLAN & LONGITUDINAL SECTION

PACKAGE - (1B)
FOR TENDER PURPOSE ONLY

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> INCEPT. & BASIC DESIGN					
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<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

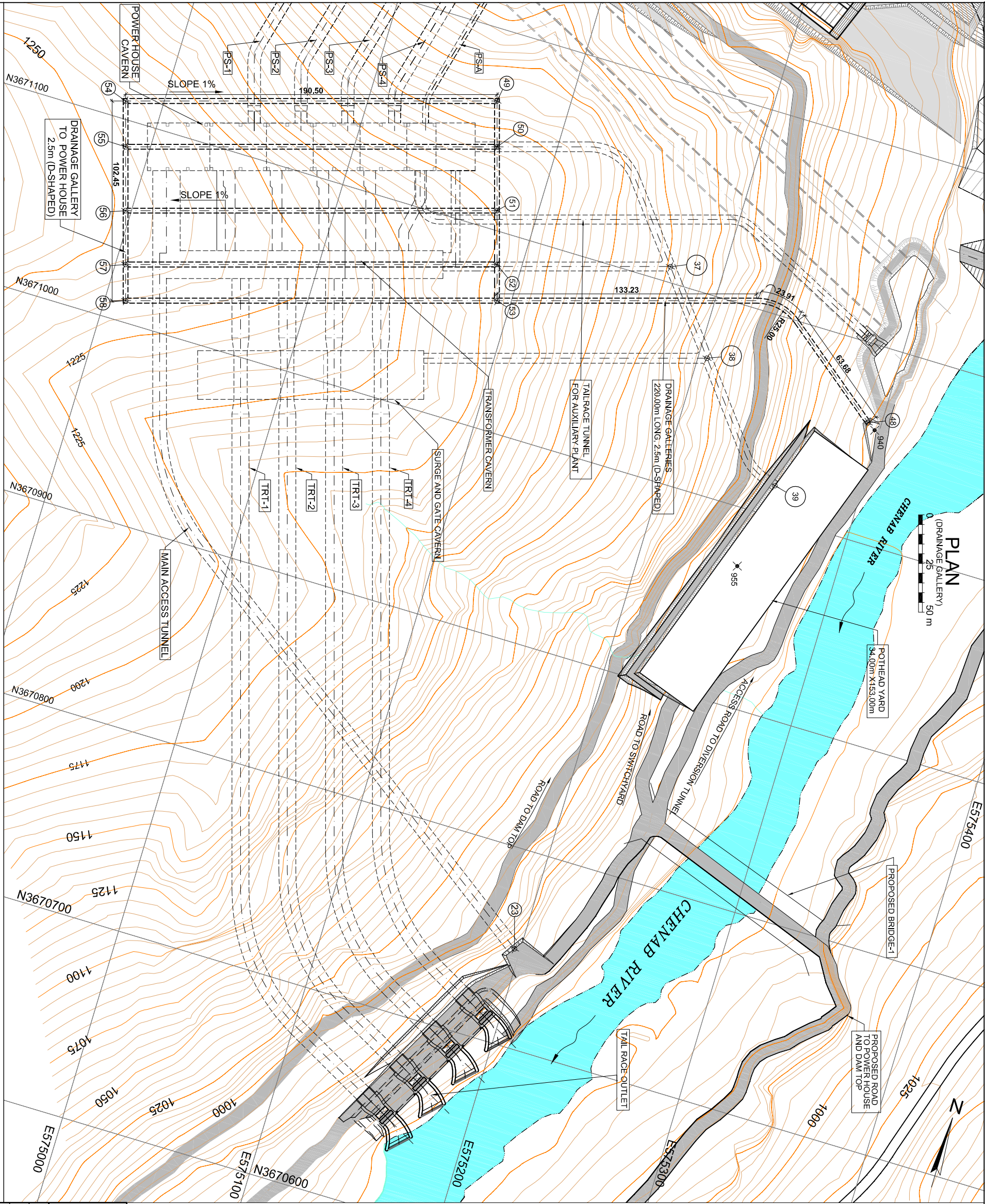
POWER HOUSE
MAIN ACCESS TUNNEL

PLAN SECTIONS & DETAIL

DESIGNED: RAE	SCALE: 1:1500	FORMAT: A1
DRAWN: JOH	1:3000	[A3]
CHECKED: SSE	DRAWING NO.	REV. NO.
APPROVED: GUH	71.2133.08.003	0
DATE: 14.12.11		



AF-Consult Switzerland Ltd.
Tilgnerstrasse 28
CH-5400 Baden/Schweiz



SCHEDULE OF TUNNEL LEVELS

S.NO	DESCRIPTION	LEVEL IN m	S.NO	DESCRIPTION	INVERT LEVEL IN m
1	(15)	943.20	6	(38)	951.73
2	(21)	926.00	7	(39)	955.00
3	(23)	950.00	8	(40)	943.20
4	(36)	943.20	9	(41)	943.20
5	(37)	949.43	10	(42)	948.00

SCHEDULE OF ADITS

S.NO	DESCRIPTION	START-END	LENGTH IN m	SIZE (m)
1	MAIN ACCESS TUNNEL	21 to 23	457.00	7.0 D-SHAPE
2	ADIT TO PH TOP / VENTILATION TUNNEL	36 to 39	282.75	5.0 D-SHAPE
3	ADIT TO TRANSFORMER HALL TOP / CABLE TUNNEL	37 to 41	117.09	4.5 D-SHAPE
4	ADIT TO SURGE CAVERN TOP	38 to 42	145.00	5.0 D-SHAPE
5	FIRE ESCAPE	15 to 40	49.30	4.5 D-SHAPE

LENGTH OF TRT

MKD	LENGTH IN m	SIZE (m)
PS-1	210.30	6.60 Ø
PS-2	197.18	6.60 Ø
PS-3	184.02	6.60 Ø
PS-4	171.85	6.60 Ø
PS-A	182.00	3.00Ø

POWER HOUSE COMPLEX GENERAL LAYOUT

PHASE	DATE	BY	CHKD	APPD
<input type="checkbox"/> PRE-FEASIBILITY STUDY				
<input type="checkbox"/> FEASIBILITY STUDY				
<input type="checkbox"/> INCEPT. & BASIC DESIGN				
<input type="checkbox"/> TENDER DESIGN				
<input type="checkbox"/> CONSTRUCTION DESIGN				
<input type="checkbox"/> AS-BUILT DRAWINGS				

POWER HOUSE COMPLEX GENERAL LAYOUT

FOR TENDER PURPOSE ONLY

PACKAGE - 1(B)

NOTES:
1.) ALL DIMENSIONS AND LEVELS ARE IN m UNLESS OTHERWISE INDICATED.

REFERENCE:
71.2133.08.010 POWER HOUSE COMPLEX DRAINAGE GALLERY SECTION & DETAILS

LEGEND:
TRT : TAILRACE TUNNEL
PS : PRESSURE SHAFT
PS-A : PRESSURE SHAFT AUXILIARY
DT : DIVERSION TUNNEL

DATE: 11.11.11

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

POWER HOUSE COMPLEX GENERAL LAYOUT

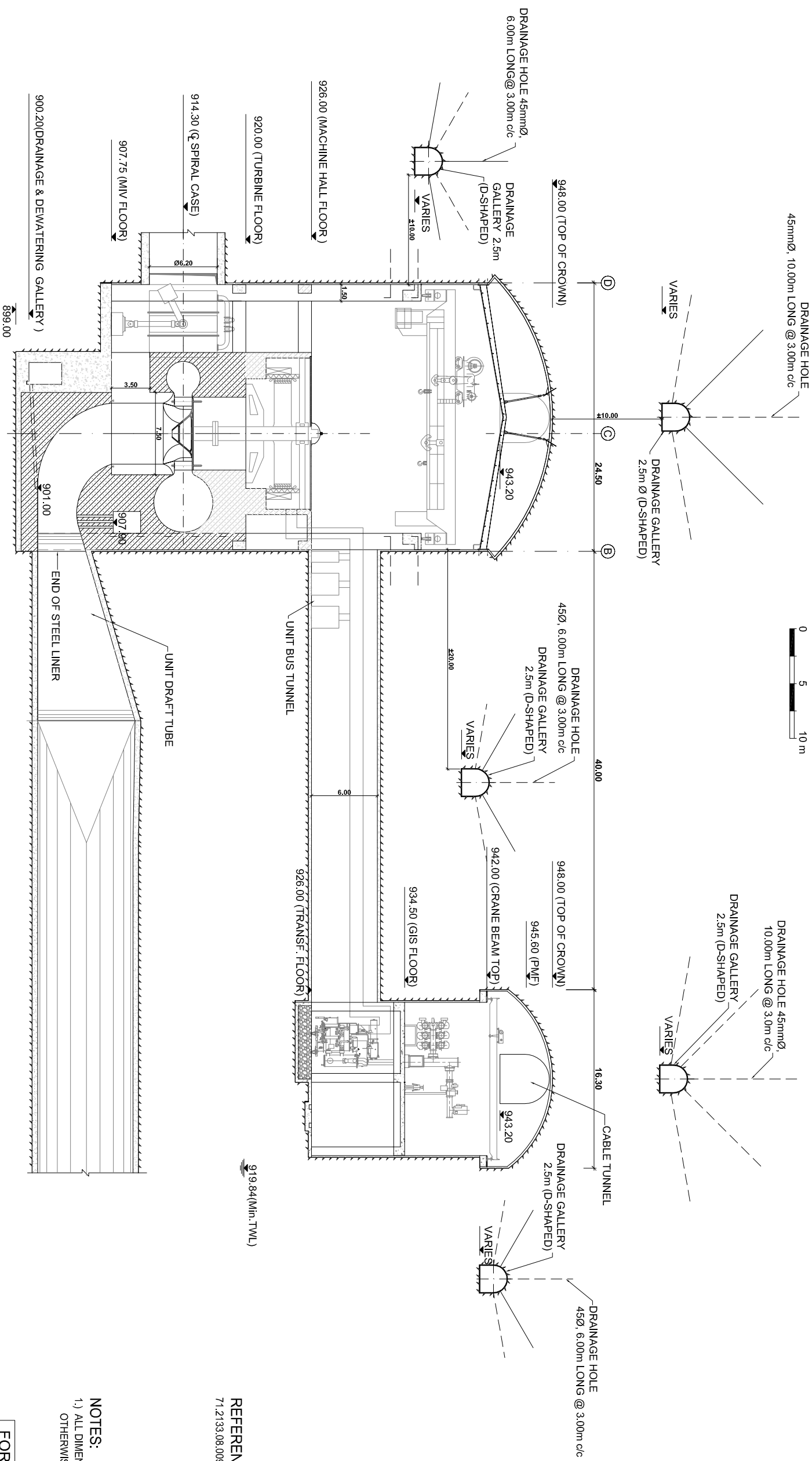
DESIGNER: SSE
DRAWN: SAR
CHECKED: SSE
APPROVED: GUH

SCALE: 1:1500
DRAWING No. 71.2133.08.009

FORMAT: A1
REV. No. 0

AF-Consult Switzerland Ltd.
Tilmanstrasse 28
CH-3400 Basel-Stadt, Switzerland

TYPICAL SECTION OF DRAINAGE SYSTEM



REFERENCE:
71.2133.08.009 POWER HOUSE COMPLEX
DRAINAGE GALLERY
PLAN

NOTES:
1.) ALL DIMENSIONS AND LEVELS ARE IN m UNLESS
OTHERWISE INDICATED.

PACKAGE - 1(B)

FOR TENDER PURPOSE ONLY

PHASE	DESIGNED	CHECKED	APPROVED	DATE
<input type="checkbox"/> PREFEASIBILITY STUDY				
<input type="checkbox"/> FEASIBILITY STUDY				
<input type="checkbox"/> INCEPT. & BASIC DESIGN				
<input checked="" type="checkbox"/> TENDER DESIGN				
<input type="checkbox"/> CONSTRUCTION DESIGN				
<input type="checkbox"/> AS-BUILT DRAWINGS				

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

**POWER HOUSE COMPLEX
DRAINAGE GALLERY**

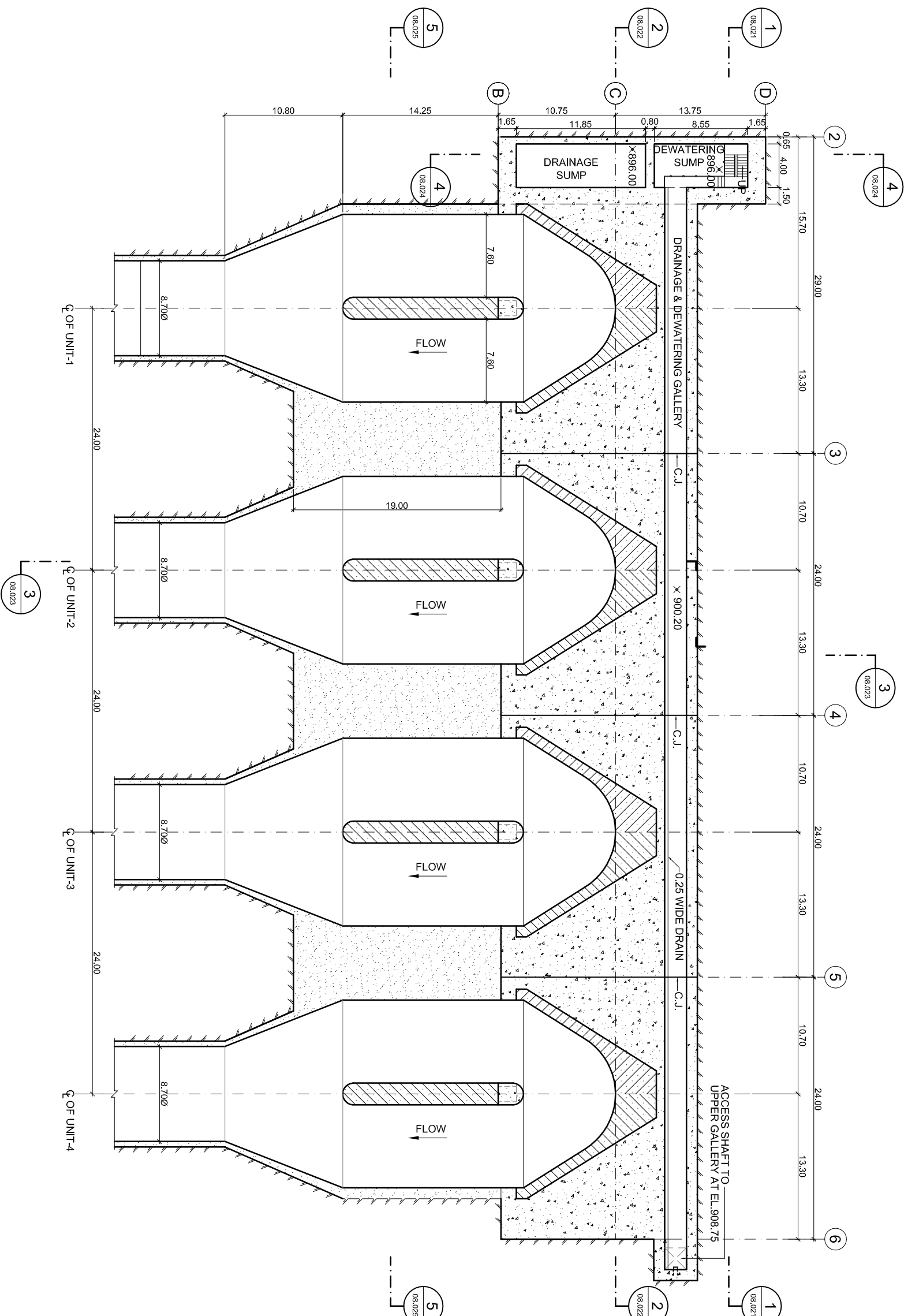
TYPICAL SECTION & DETAIL

DESIGNED: SSE	SCALE: 1:150	FORMAT: A1
DRAWN: SAR	1:300	[A3]
CHECKED: SSE	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.08.010	0
DATE: 05/12/11		



AF-Consult Switzerland Ltd.
Tillegasse 28
CH-3600 Baden, Switzerland

PLAN AT EL 901.00
(DRAFT TUBE INVERT LEVEL)



LEGEND:

- FIRST STAGE CONCRETE
- SECOND STAGE CONCRETE
- TAILRACE LINING CONCRETE
- ROCK LINE

REFERENCE DRAWINGS :

- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

NOTE :

1. ALL DIMENSIONS AND LEVELS ARE IN METER.

PACKAGE - 1(B)

FOR TENDER PURPOSE ONLY

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
<input type="checkbox"/> PREFEASIBILITY STUDY					
<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATILE HYDRO ELECTRIC PROJECT PVT. LTD.
RATILE HYDRO ELECTRIC PROJECT

POWER HOUSE COMPLEX
GENERAL ARRANGEMENT
DRAFT TUBE INVERT

PLAN AT EL. 902.00m

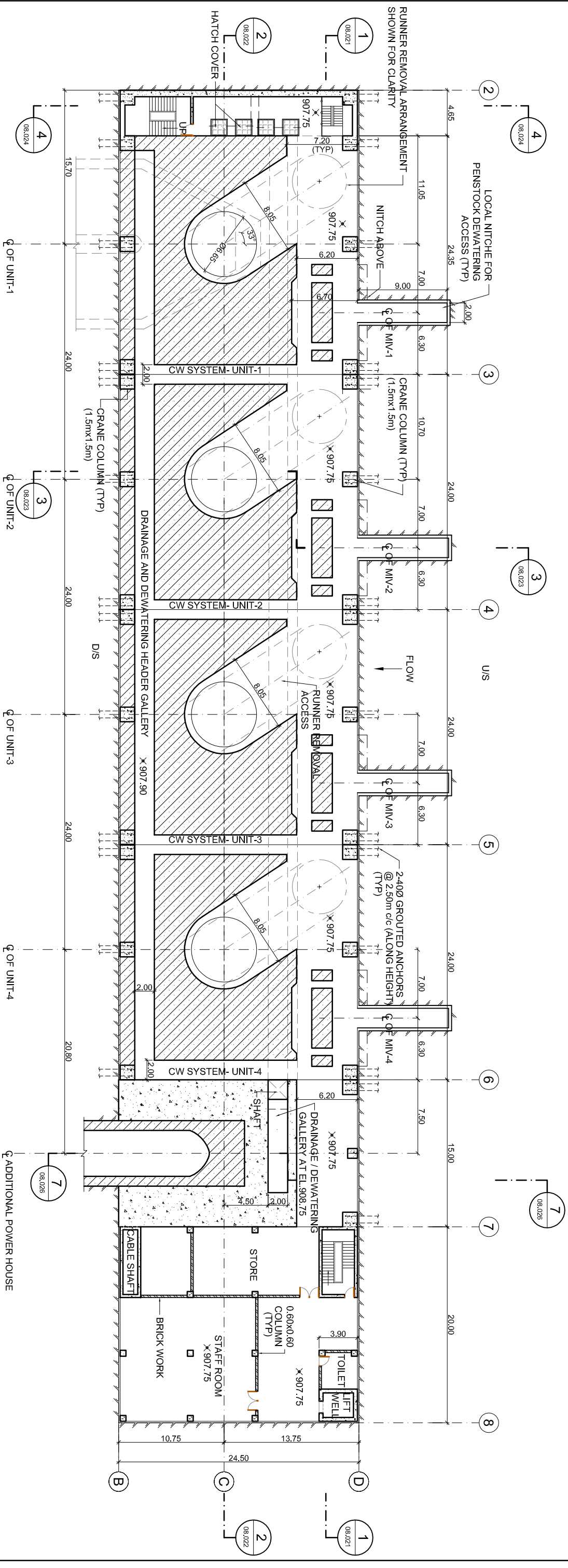
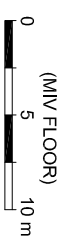
DESIGNED: SSE	SCALE: 1:200	FORMAT: A1
DRAWN: MEH	1:400	[A3]
CHECKED: KPV	DRAWING No.	REV. No.
APPROVED: SMR	71.2133.08.011	0
DATE: 13.12.11		



AF-Consult Switzerland Ltd.
Tilkenstrasse 26
CH-5400 Baden, Switzerland

PLAN AT EL 907.75

(SHOWING ADDITIONAL UNIT IN POWER HOUSE DT INVERT AT HIGHER LEVEL FOR CLARITY)
(MIV FLOOR)



NOTE :
1. ALL DIMENSIONS AND LEVELS ARE IN METER.

LEGEND:

- FIRST STAGE CONCRETE
- SECOND STAGE CONCRETE
- ROCK LINE
- CONTRACTION JOINT

REFERENCE DRAWINGS :

- 71.2133.08.011
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

PACKAGE - 1(B)

FOR TENDER PURPOSE ONLY

PHASE	REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
<input type="checkbox"/> PREFEASIBILITY STUDY					
<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

POWER HOUSE COMPLEX
GENERAL ARRANGEMENT
MIV FLOOR

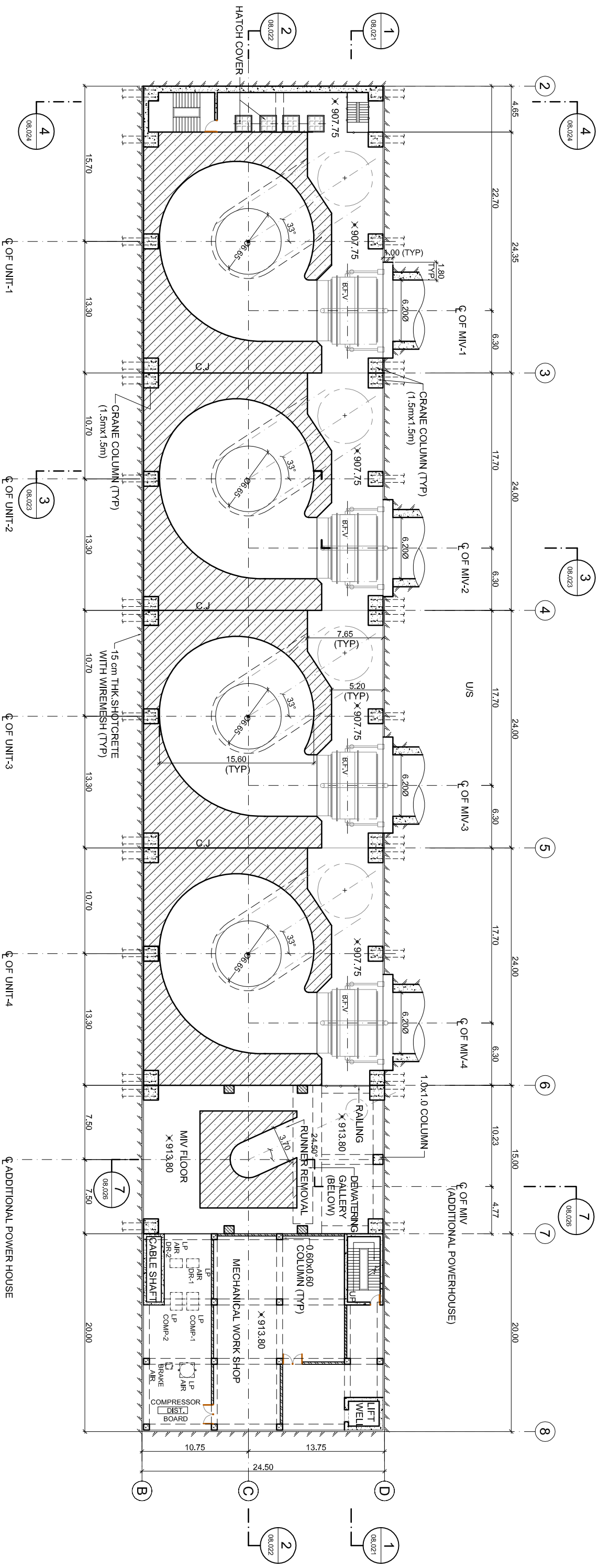
PLAN AT EL.907.75

DESIGNED: RAC	SCALE: 1:200	FORMAT: A1
DRAWN: MEH	1:400	[A3]
CHECKED: SSE	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.08.012	0
DATE: 13/12/11		



AF-Consult Switzerland Ltd.
Telferrasse 26
CH-5400 Baden, Switzerland

PLAN AT EL 914.30
(SECTIONAL PLAN AT CENTER LINE OF SPIRALCASE)



NOTE :
1. ALL DIMENSIONS AND LEVELS ARE IN METERS.

LEGEND:

- FIRST STAGE CONCRETE
- SECOND STAGE CONCRETE
- ROCK LINE
- CONTRACTION JOINT

REFERENCE DRAWINGS :

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

PACKAGE - 1(B)
FOR TENDER PURPOSE ONLY

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
<input type="checkbox"/> PREFEASIBILITY STUDY					
<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

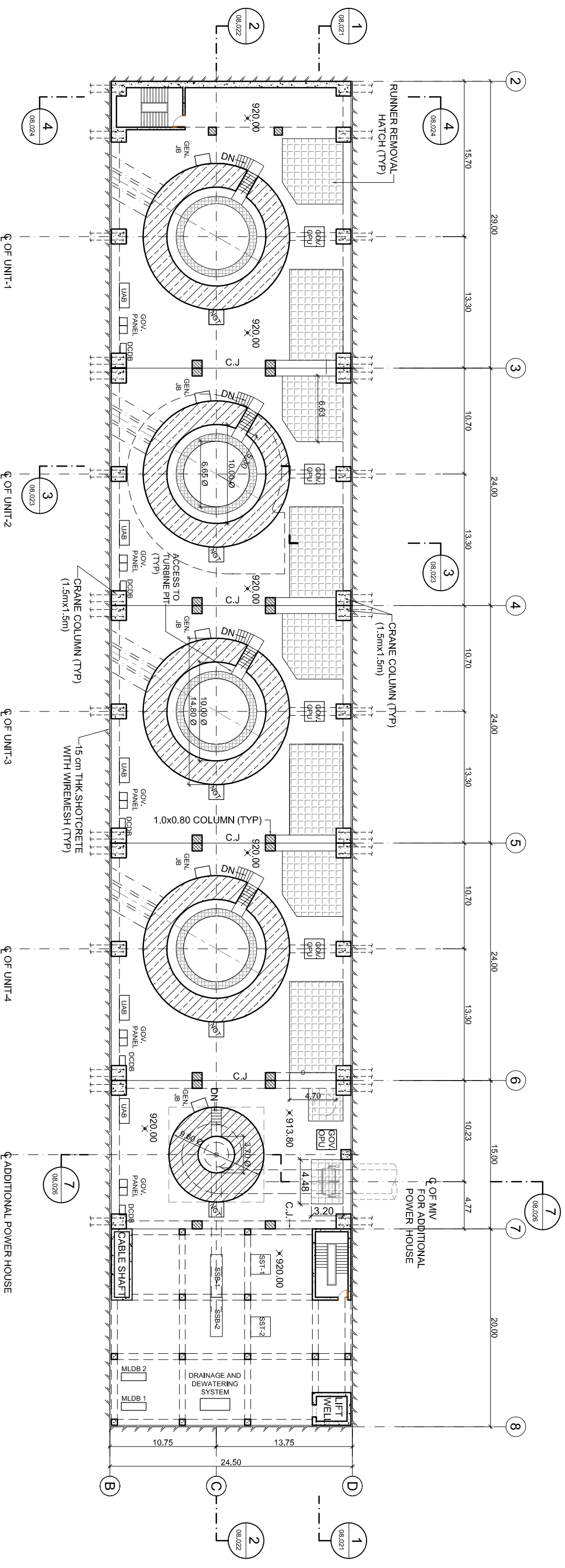
GVK GVK RATTLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATTLE HYDRO ELECTRIC PROJECT

POWER HOUSE COMPLEX
GENERAL ARRANGEMENT
CENTRE LINE TURBINE
PLAN AT EL.914.30m

DESIGNED: RAC	SCALE: 1:200	FORMAT: A1
DRAWN: MEH	CHECKED: SSE	DRAWING No. [A3]
APPROVED: GUH	DATE: 13.12.11	REV. No. 0

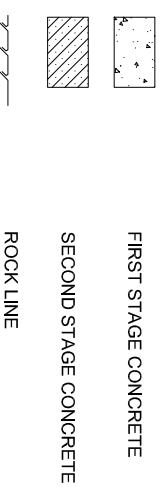
AF-Consult Switzerland Ltd.
Tillegasse 28
CH-3600 Baden, Switzerland

PLAN AT EL. 920.00
(TURBINE HALL FLOOR)



NOTE :
1. ALL DIMENSIONS AND LEVELS ARE IN METERS.

LEGEND:



REFERENCE DRAWINGS :

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

PACKAGE - 1(B)
FOR TENDER PURPOSE ONLY

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
<input type="checkbox"/> PRE-FEASIBILITY STUDY					
<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

POWER HOUSE COMPLEX
GENERAL ARRANGEMENT
TURBINE FLOOR
PLAN AT EL. 920.00

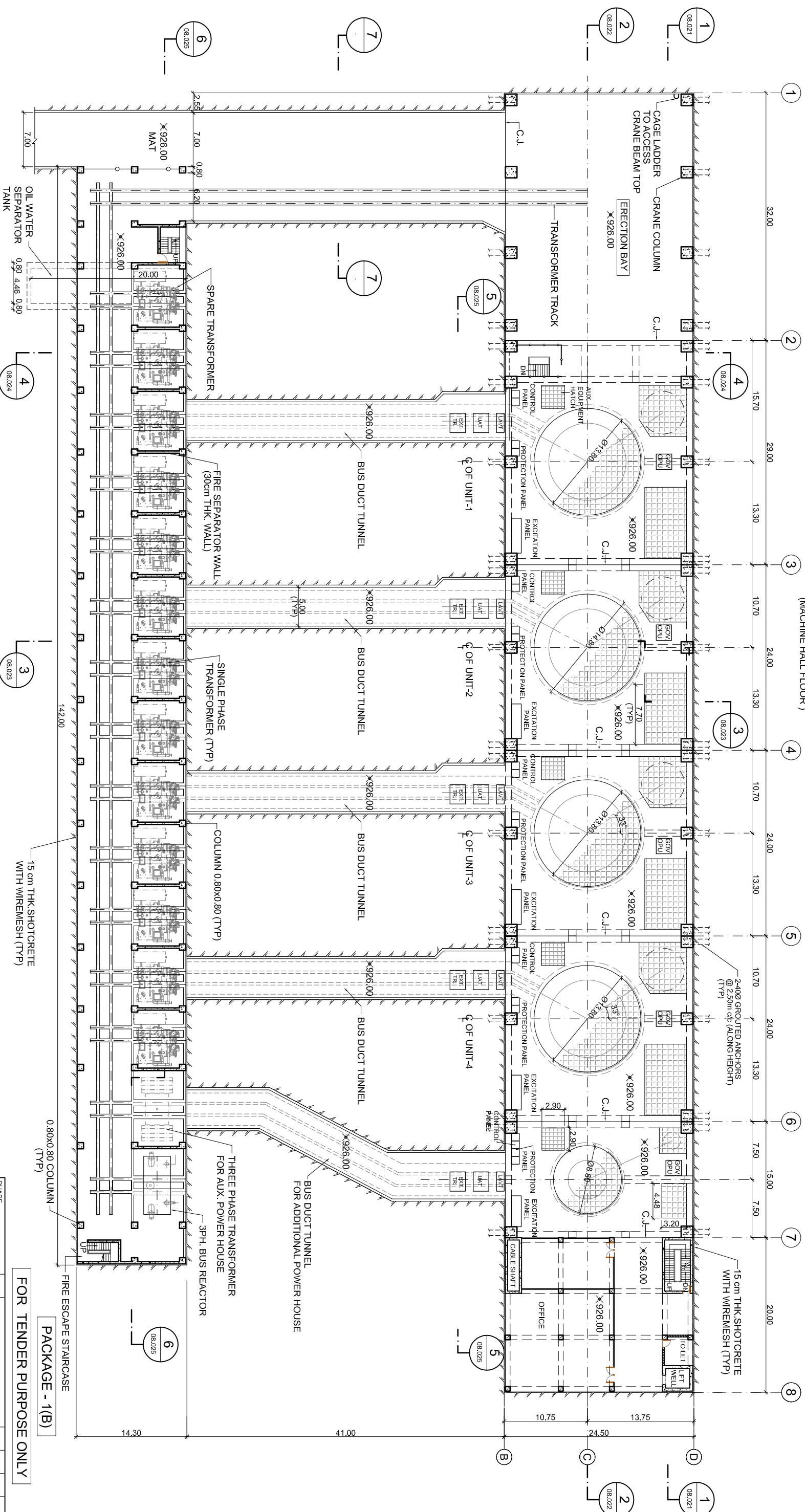
DESIGNED: RAC	SCALE: 1:200	FORMAT: A1
DRAWN: MEH	CHECKED: SSE	DRAWING No.
APPROVED: GUH	DATE: 13.12.11	REV. No. 0

AF-Consult Switzerland Ltd.
Telferstrasse 26
CH-5400 Baden, Switzerland

PLAN AT EL 926.00

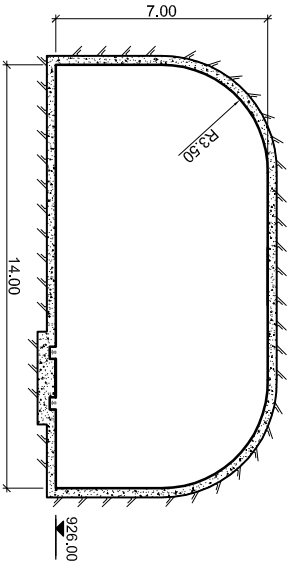
0 5 12.5 m

(MACHINE HALL FLOOR)



SECTION 7-7

0 3 6 m



NOTE:
1. ALL DIMENSIONS AND LEVELS ARE IN METERS.

LEGEND:

- FIRST STAGE CONCRETE
- ROCK LINE
- CONTRACTION JOINT

REFERENCE DRAWINGS:

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

FOR TENDER PURPOSE ONLY

PACKAGE - 1(B)

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
<input type="checkbox"/> PRE-FEASIBILITY STUDY					
<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> CONCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

RATLE HYDRO ELECTRIC PROJECT

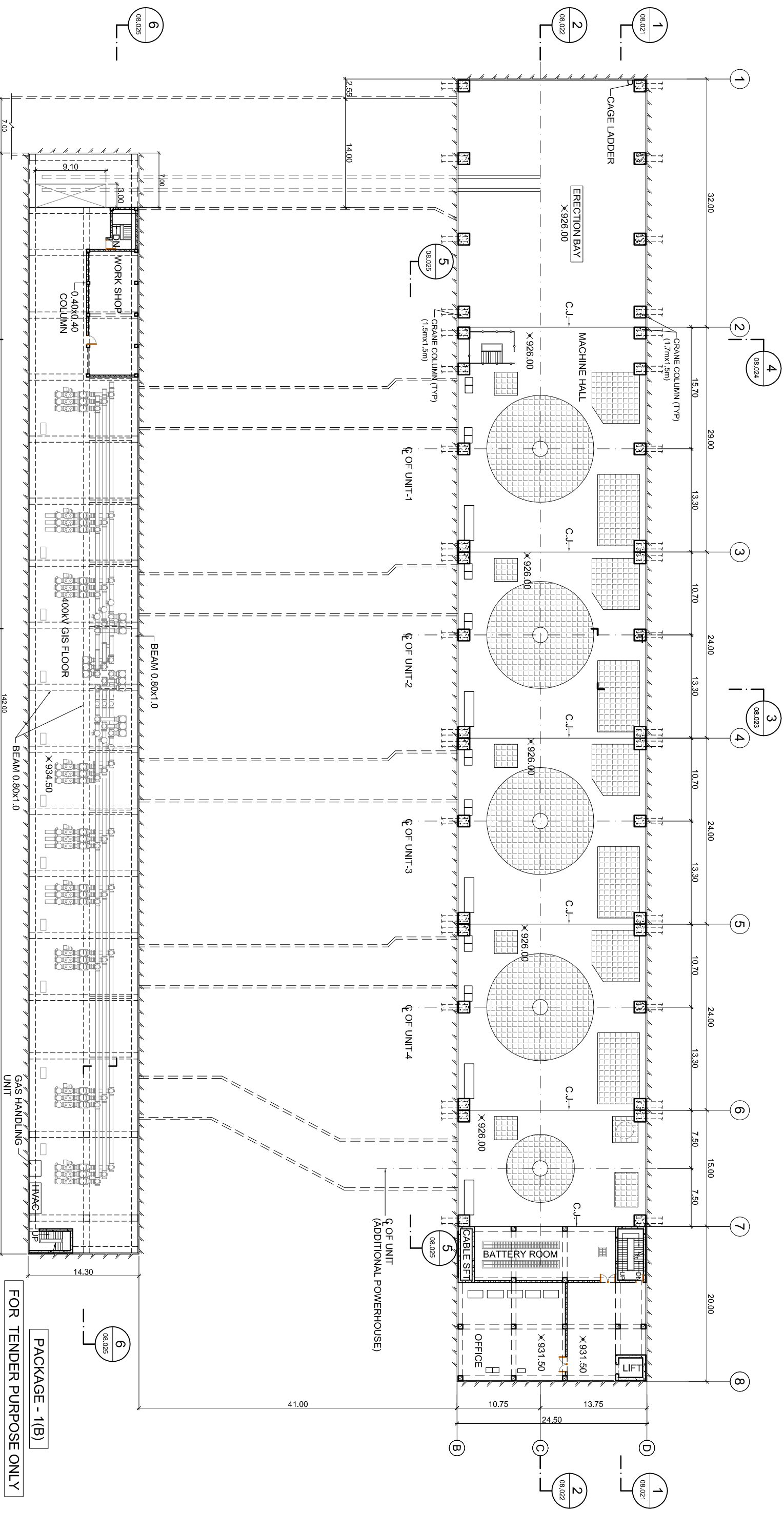
**POWER HOUSE COMPLEX
GENERAL ARRANGEMENT
(MACHINE HALL FLOOR)**

PLAN AT EL.926.00m

DESIGNER: RAC	SCALE: 1:125, 1:250	FORMAT: A1
AP-Consult Switzerland Ltd.	DRAWN: MEH (1:250, 1:500)	CHECKED: SSE
Thürmentenstrasse 26 CH-5400 Baden, Switzerland	DRAWING No.	APPROVED: GUH
DATE: 13.12.11	71.2133.08.015	REV. No. 0

PLAN AT EL 934.50

(GIS FLOOR)



LEGEND:

- FIRST STAGE CONCRETE
- ROCK LINE
- CONTRACTION JOINT

REFERENCE DRAWINGS :

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

NOTE :
1. ALL DIMENSIONS AND LEVELS ARE IN METER.

FOR TENDER PURPOSE ONLY

PACKAGE - 1(B)

PHASE	REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

RATLE HYDRO ELECTRIC PROJECT

POWER HOUSE COMPLEX
GENERAL ARRANGEMENT
GIS FLOOR

PLAN AT EL.934.50m

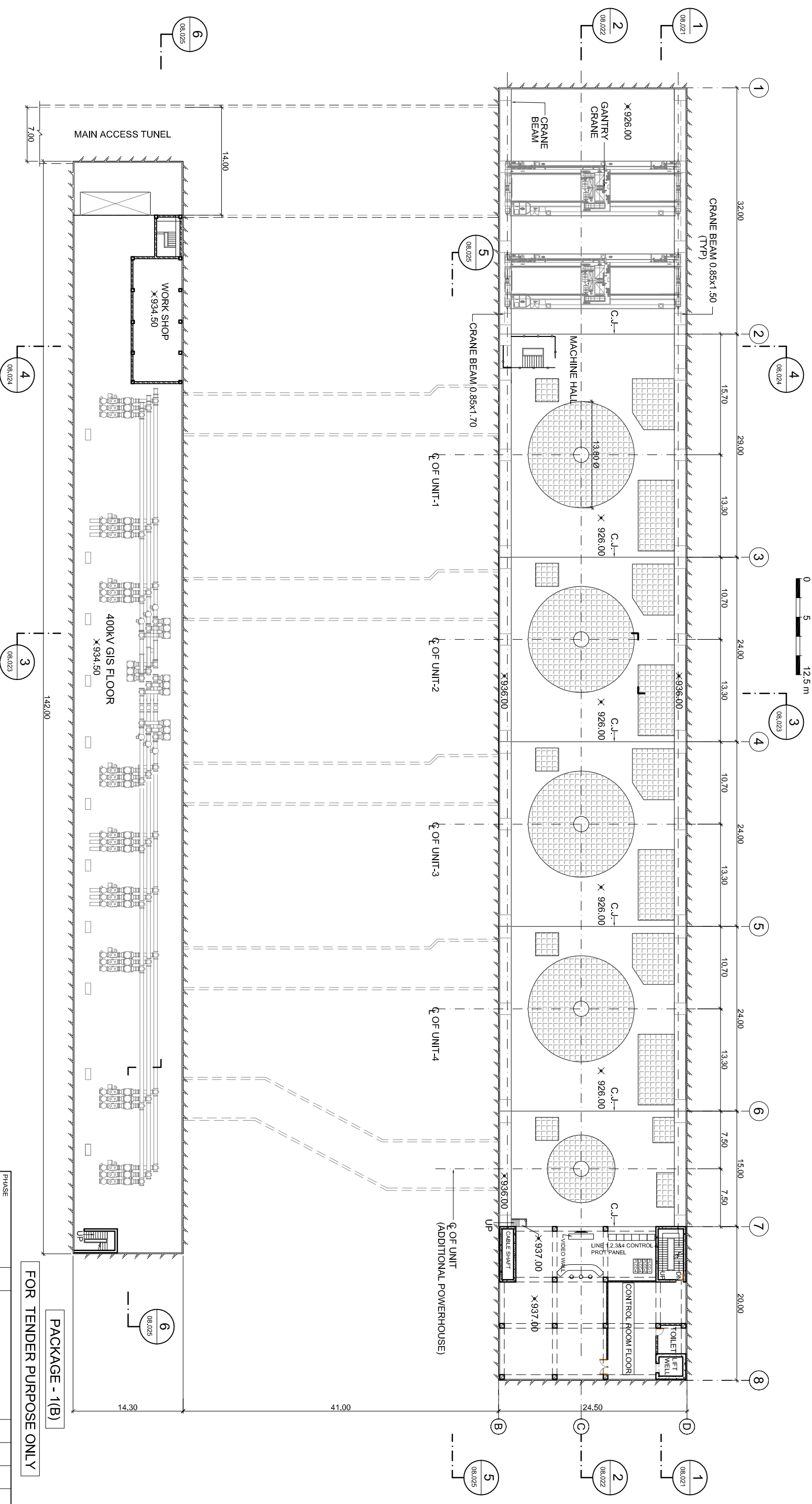
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APPROVED: GUH	DATE: 13.12.11	REV. No. 0



AF Consult Switzerland Ltd.
Telferrasse 26
Châbles Bâle/Schweiz

PLAN AT EL 937.00

(CONTROL ROOM FLOOR)



NOTES :
1. ALL DIMENSIONS AND LEVELS ARE IN METERS.

LEGEND:

- FIRST STAGE CONCRETE
- ROCK LINE
- CONTRACTION JOINT

REFERENCE DRAWINGS :

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

FOR TENDER PURPOSE ONLY

PACKAGE - 1(B)

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

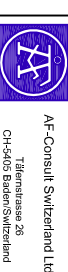
GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

RATLE HYDRO ELECTRIC PROJECT

POWER HOUSE COMPLEX
GENERAL ARRANGEMENT
(CONTROL ROOM FLOOR)

PLAN AT EL.937.00m

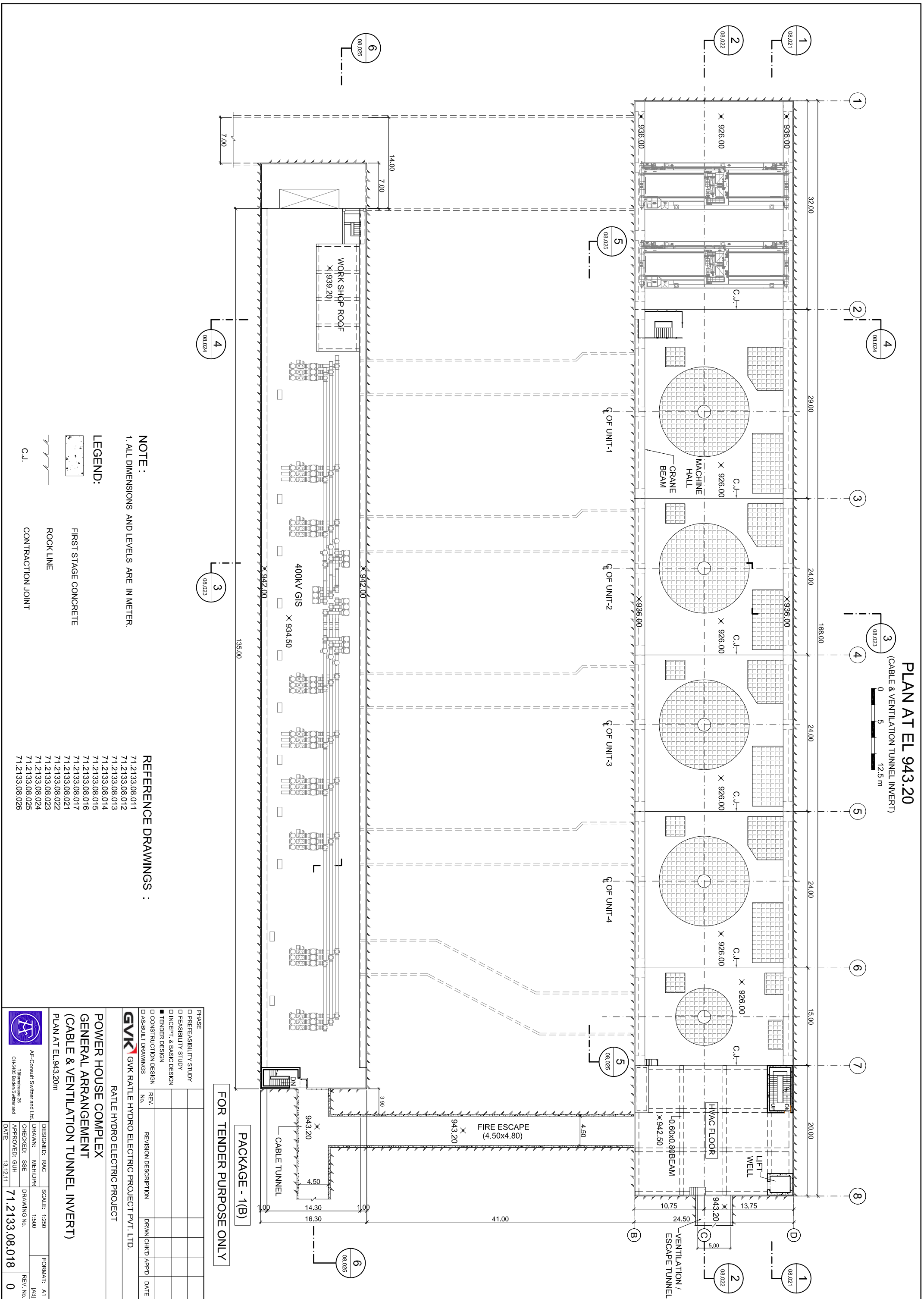
DESIGNED: SSE	SCALE: 1:250	FORMAT: A1
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CHECKED: KPV	DRAWING No.	REV. No.
APPROVED: SMR	71.2133.08.017	0
DATE: 13.12.11		



AF-Consult Switzerland Ltd.
Tillmattstrasse 26
CH-5400 Baden, Switzerland

PLAN AT EL 943.20

(CABLE & VENTILATION TUNNEL INVERT)



NOTE :
1. ALL DIMENSIONS AND LEVELS ARE IN METER.

LEGEND:

- FIRST STAGE CONCRETE
- ROCK LINE
- CONTRACTION JOINT
- C.J.

REFERENCE DRAWINGS :

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

FOR TENDER PURPOSE ONLY

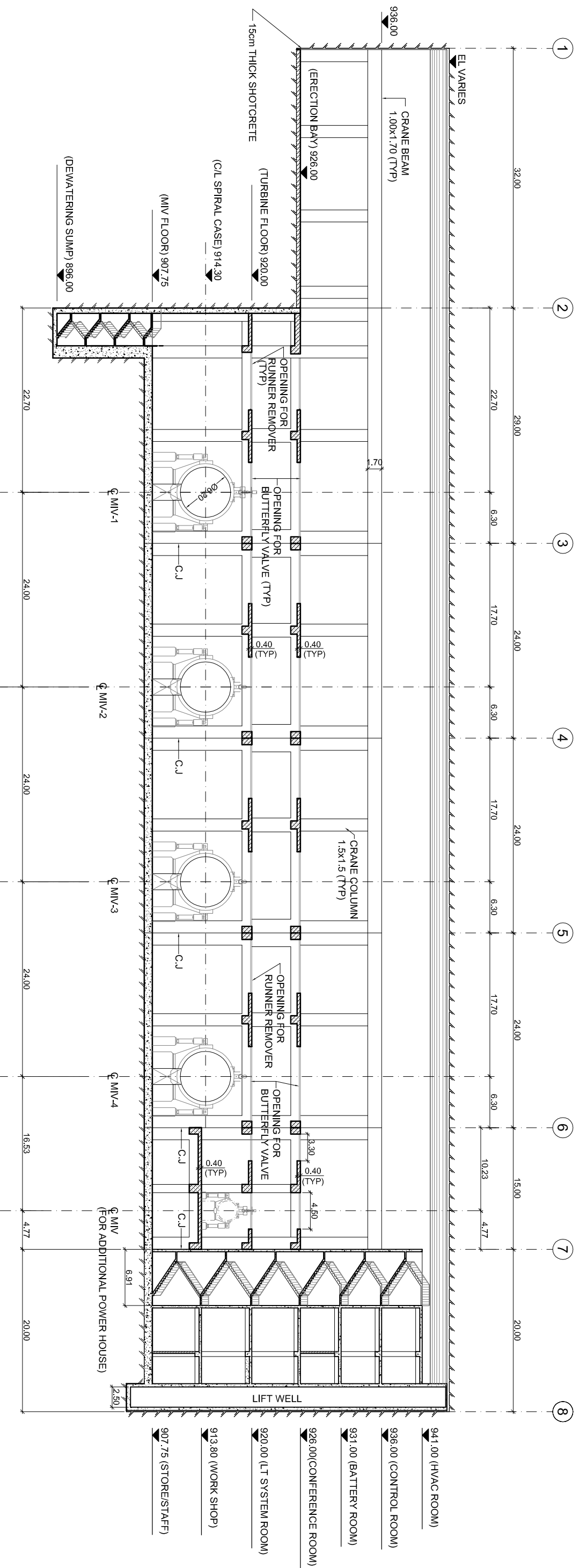
PHASE	REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK RATILE HYDRO ELECTRIC PROJECT

POWER HOUSE COMPLEX
GENERAL ARRANGEMENT
(CABLE & VENTILATION TUNNEL INVERT)
PLAN AT EL.943.20m

DESIGNER: RAC	SCALE: 1:250	FORMAT: A1
AF-Consult Switzerland Ltd.	DRAWN: MEH/DPR	1:500
Tilkenstrasse 26	CHECKED: SSE	DRAWING No.
CH-5400 Birmensdorf	APPROVED: GUH	71.2133.08.018
DATE: 13.12.11		REV. No. 0

SECTION 1-1



PACKAGE - 1(B)
FOR TENDER PURPOSE ONLY

NOTES :
1. ALL DIMENSIONS AND LEVELS ARE IN METER.

LEGEND:

- FIRST STAGE CONCRETE
- SECOND STAGE CONCRETE
- ROCK LINE
- CONTRACTION JOINT

REFERENCE DRAWINGS :

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

PHASE	DESIGNED	CHECKED	APPROVED	DATE
<input type="checkbox"/> PRE-FEASIBILITY STUDY				
<input type="checkbox"/> FEASIBILITY STUDY				
<input type="checkbox"/> INCEPT. & BASIC DESIGN				
<input type="checkbox"/> TENDER DESIGN				
<input type="checkbox"/> CONSTRUCTION DESIGN				
<input type="checkbox"/> AS-BUILT DRAWINGS				

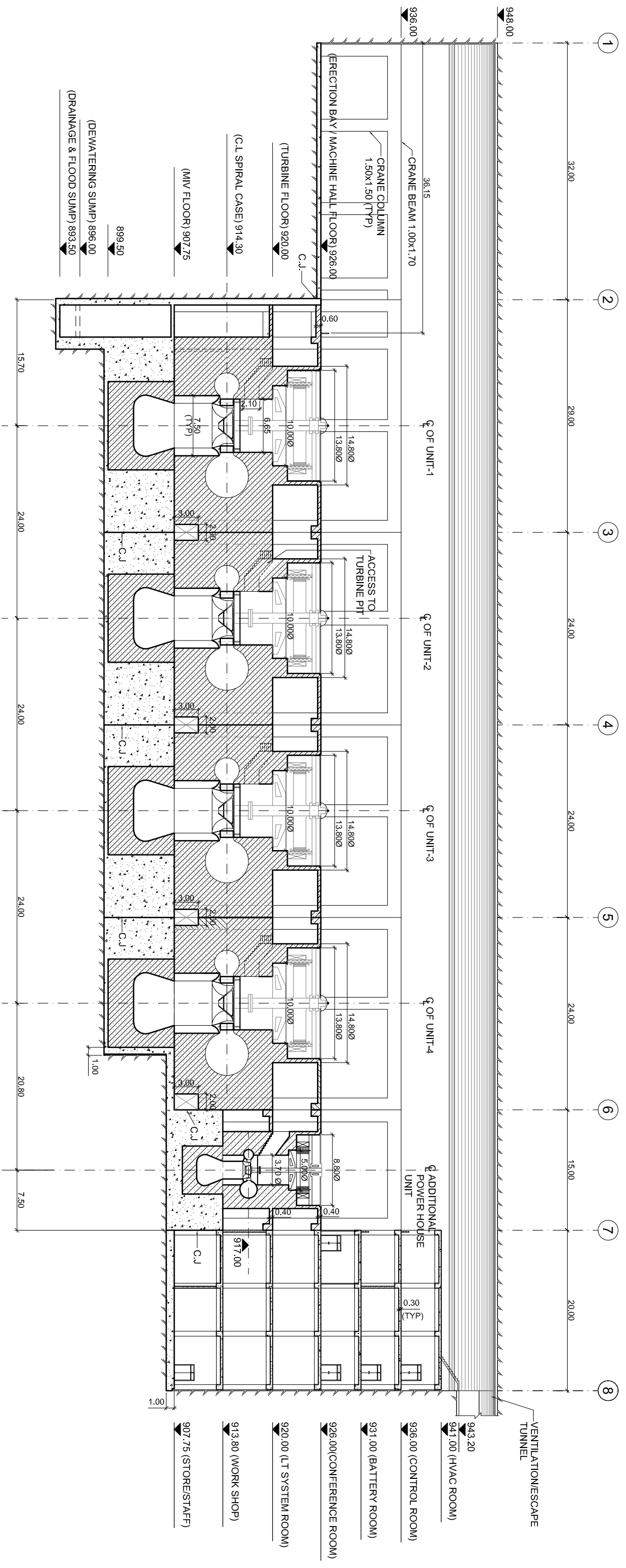
REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE

GVK GVK RATTLE HYDRO ELECTRIC PROJECT PVT. LTD.	
RATTLE HYDRO ELECTRIC PROJECT	
POWER HOUSE COMPLEX	
GENERAL ARRANGEMENT	
SECTION 1-1	
LONGITUDINAL SECTION	

DESIGNED: SSE	SCALE: 1:250	FORMAT: A1
DRAWN: MEHDPR	CHECKED: KPV	DRAWING No. [1500]
APPROVED: SMR	DATE: 13.12.11	REV. No. 0

AF-Consult Switzerland Ltd. Türlimattstrasse 28 CH-3400 Baden, Switzerland	71.2133.08.021
--	----------------

SECTION 2-2



NOTES:
1. ALL DIMENSIONS AND LEVELS ARE IN METERS.

LEGEND:

- FIRST STAGE CONCRETE
- SECOND STAGE CONCRETE
- ROCK LINE
- CONTRACTION JOINT
- C.J.

REFERENCE DRAWINGS :

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

FOR TENDER PURPOSE ONLY

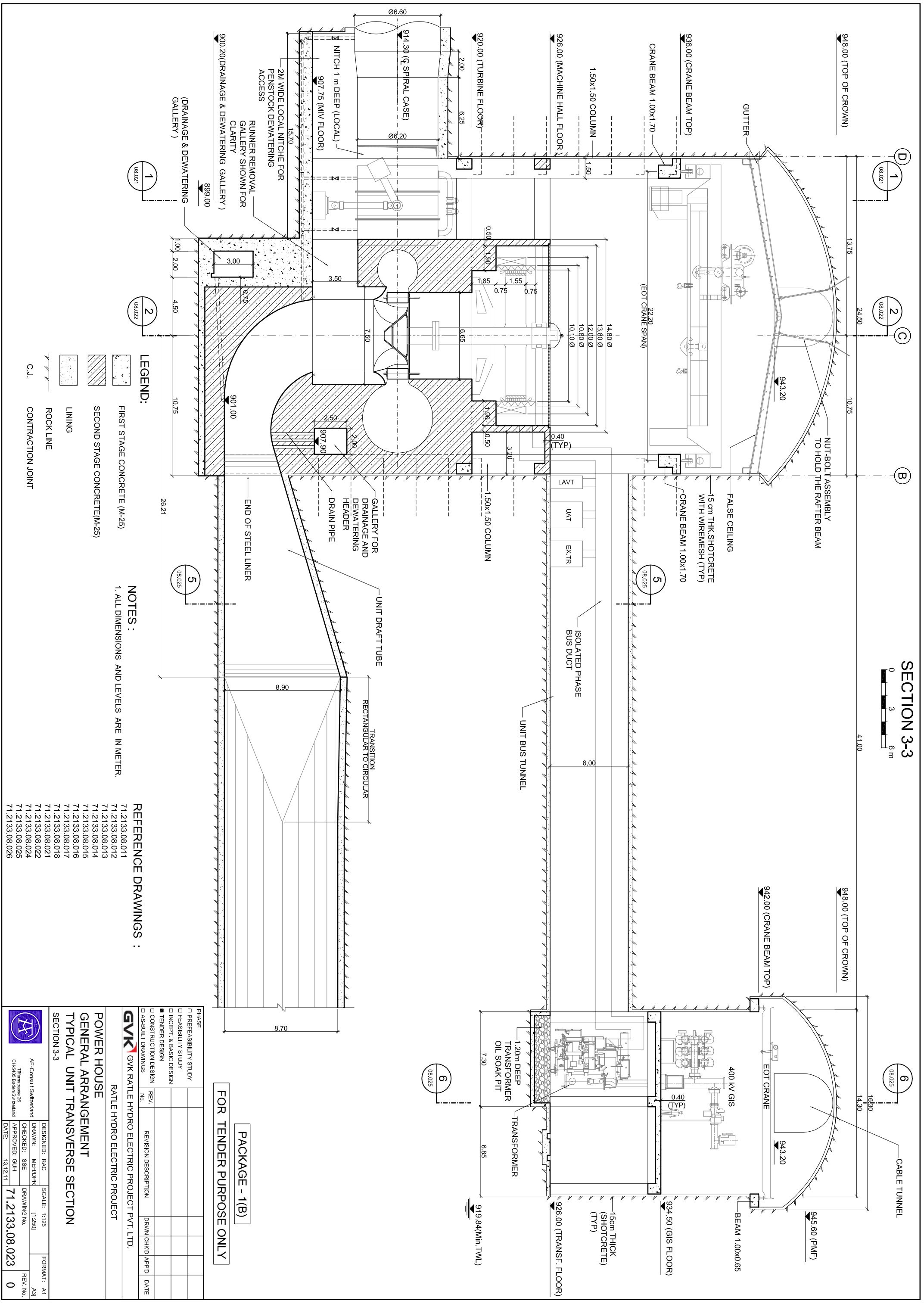
PACKAGE - 1(B)

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
<input type="checkbox"/> PRE-FEASIBILITY STUDY					
<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.		
RATLE HYDRO ELECTRIC PROJECT		
POWER HOUSE COMPLEX		
GENERAL ARRANGEMENT		
SECTION 2-2		
LONGITUDINAL SECTION ALONG GRID - C		
DESIGNED: SSE	SCALE: 1:250	FORMAT: A1
DRAWN: MEH/DPR	CHECKED: KPV	DRAWING No. [A3]
APPROVED: SMR	DATE: 13.12.11	REV. No. 0

AF-Consult Switzerland Ltd.
Tillegensasse 28
CH-5400 Baden, Switzerland

SECTION 3-3



LEGEND:

- FIRST STAGE CONCRETE (M-25)
- SECOND STAGE CONCRETE (M-25)
- LINING
- ROCK LINE
- CONTRACTION JOINT
- C.I.

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METER.

REFERENCE DRAWINGS:

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.024
- 71.2133.08.025
- 71.2133.08.026

FOR TENDER PURPOSE ONLY

PACKAGE - (1B)

PHASE	REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK RATTLE HYDRO ELECTRIC PROJECT PVT. LTD.

RATTLE HYDRO ELECTRIC PROJECT

POWER HOUSE
GENERAL ARRANGEMENT
TYPICAL UNIT TRANSVERSE SECTION

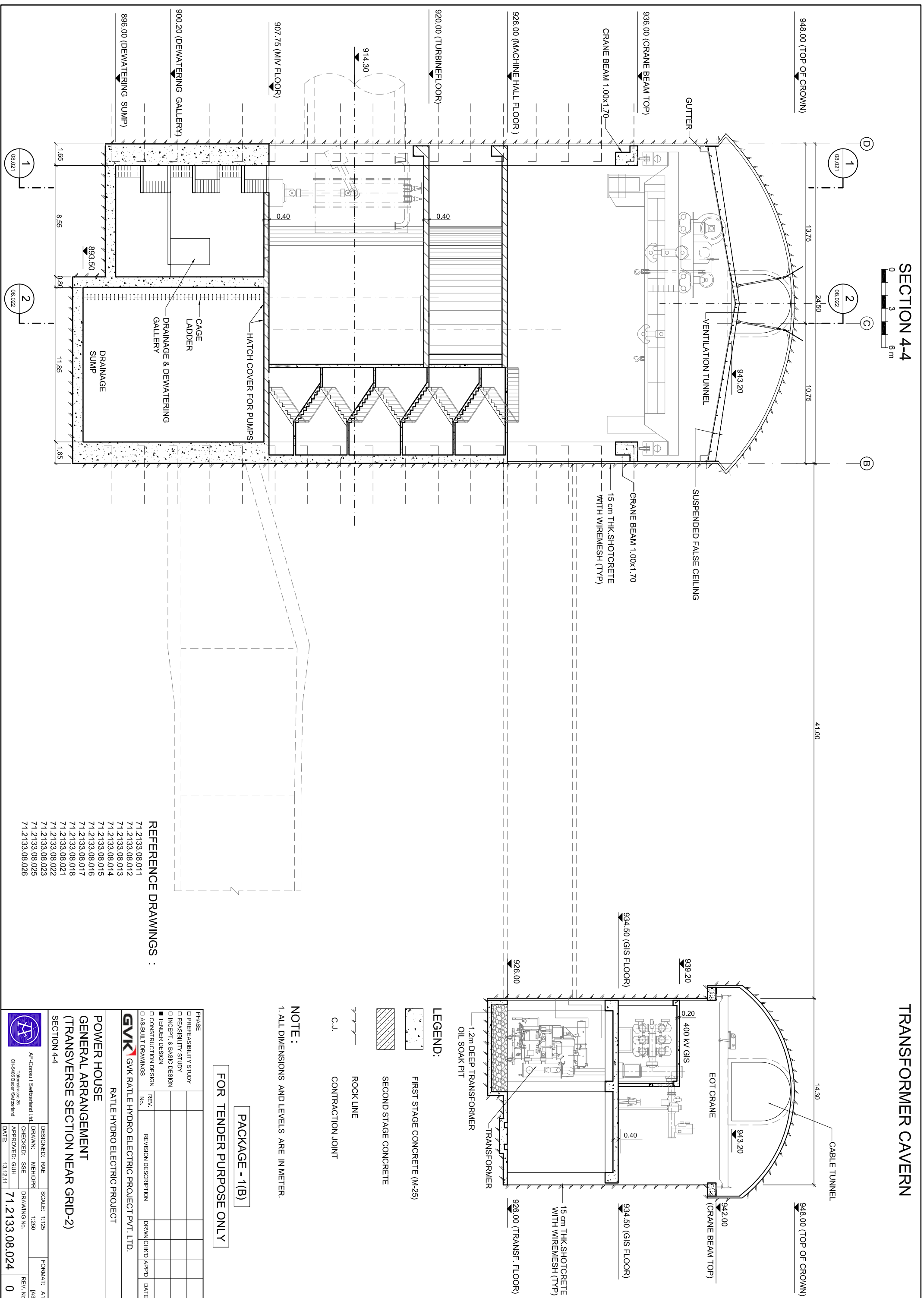
SECTION 3-3

DESIGNER: RAC	SCALE: 1:125	FORMAT: A1
AF-Consult Switzerland	DRAWN: MEH/DR	[1:250]
Tüfenenstrasse 28	CHECKED: SSE	DRAWING No.
CH-5400 Baselstadt	APPROVED: GUH	REV. No.
DATE: 13.12.11		71.2133.08.023
		0

SECTION 4-4



TRANSFORMER CAVERN



REFERENCE DRAWINGS :

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.025
- 71.2133.08.026

LEGEND:

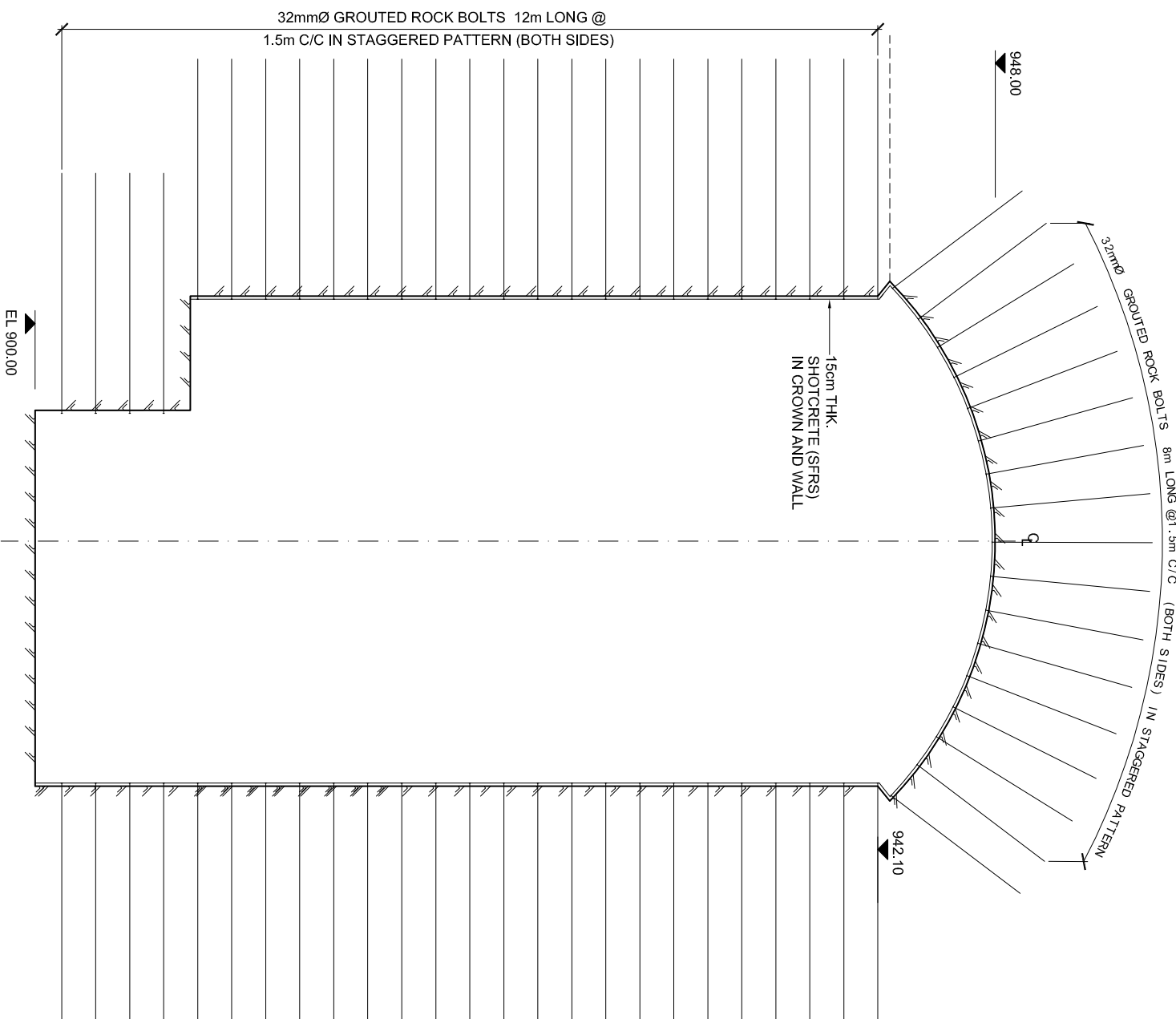
- FIRST STAGE CONCRETE (M-25)
- SECOND STAGE CONCRETE
- ROCK LINE
- C.J. CONTRACTION JOINT

NOTE :
1. ALL DIMENSIONS AND LEVELS ARE IN METER.

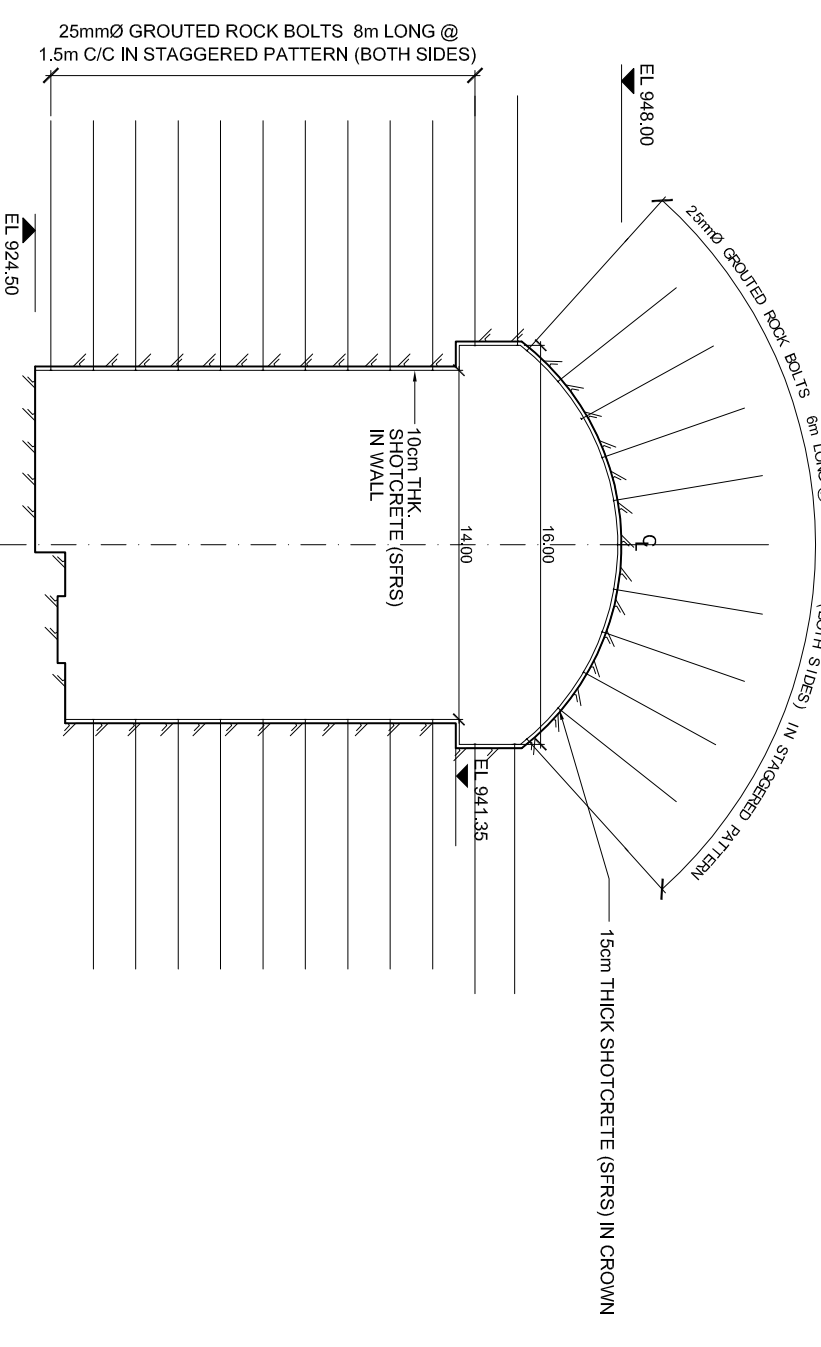
PACKAGE - 1(B)
FOR TENDER PURPOSE ONLY

PHASE	<input type="checkbox"/> PRE-FEASIBILITY STUDY			
	<input type="checkbox"/> FEASIBILITY STUDY			
	<input type="checkbox"/> INCEPT. & BASIC DESIGN			
	<input type="checkbox"/> TENDER DESIGN			
	<input type="checkbox"/> CONSTRUCTION DESIGN			
	<input type="checkbox"/> AS-BUILT DRAWINGS			
REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
<p>GVK GVK RATEL HYDRO ELECTRIC PROJECT PVT. LTD.</p> <p>RATEL HYDRO ELECTRIC PROJECT</p> <p>POWER HOUSE</p> <p>GENERAL ARRANGEMENT</p> <p>(TRANSVERSE SECTION NEAR GRID-2)</p> <p>SECTION 4-4</p>				
DESIGNER: RAE	SCALE: 1:125	FORMAT: A1		
AF-Consult Switzerland Ltd.	DRAWN: MEHDPR	CHECKED: SSE	DRAWING No.	REV. No.
Thalwilstrasse 26	13250	13.12.11	71.2133.08.024	0
Chächas Baden Switzerland	APPROVED: GUH	DATE:		

POWER HOUSE CAVERN



TRANSFORMER HALL CAVERN



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS EXCEPT SHOWN OTHERWISE.
2. ROCK SUPPORTS ARE SUGGESTED ASSUMING FAIR QUALITY ROCK MASS.
3. SUPPORTS MAY VARY WITH ACTUAL GROUND CONDITION ENCOUNTERED AND CONSTRUCTION METHODOLOGY.
4. DRAINAGE HOLE Ø50mm MIN. WITH PERFORATED PVC PIPE WRAPPED WITH GEOTEXTILE AT GRID SPACING 4.0x4.0 & 10'-15m LONG IS TO BE PROVIDED WHEREVER REQUIRED.

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

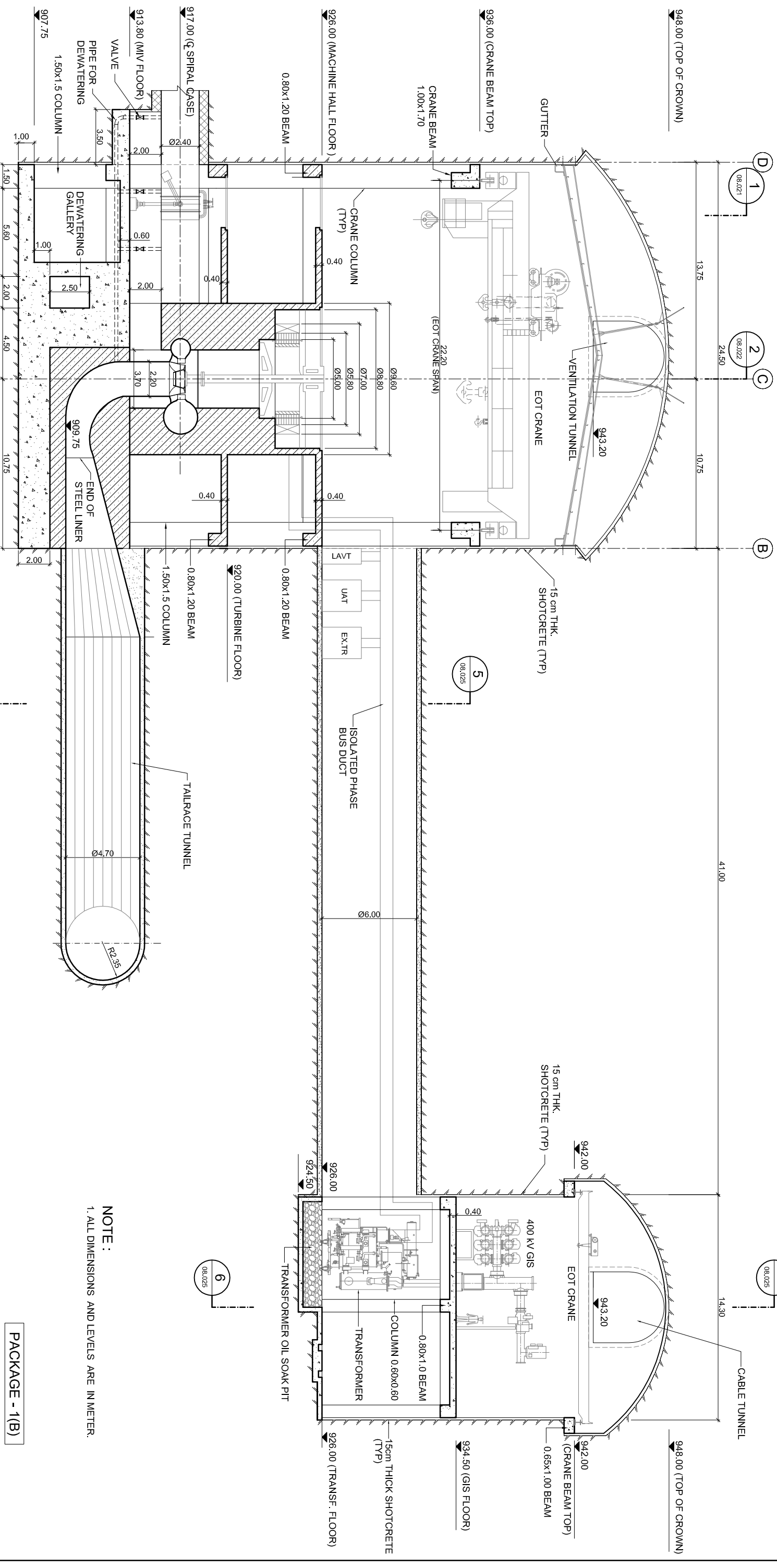
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<input type="checkbox"/> AS-BUILT DRAWINGS				

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
 RATLE HYDRO ELECTRIC PROJECT
POWER HOUSE & TRANSFORMER CAVERNS
ROCK SUPPORT DETAILS

DESIGNED	CHECKED	APPROVED	DATE	SCALE	FORMAT
AF-Consult Switzerland Ltd.	KAS	RAE	18.11.11	1:300	A1
Ch-4000 Baden/Schweizland	RAE	GVK			[A3]
					REV. No.
					0

TRANSVERSE SECTION OF 30MW UNIT ADDITIONAL PLANT

(SECTION 7-7) 6 m



LEGEND:

- FIRST STAGE CONCRETE
- SECOND STAGE CONCRETE
- BACKFILL CONCRETE
- TAILRACE LINING CONCRETE
- ROCK LINE
- CONTRACTION JOINT

REFERENCE DRAWINGS :

- 71.2133.08.011
- 71.2133.08.012
- 71.2133.08.013
- 71.2133.08.014
- 71.2133.08.015
- 71.2133.08.016
- 71.2133.08.017
- 71.2133.08.018
- 71.2133.08.021
- 71.2133.08.022
- 71.2133.08.023
- 71.2133.08.024
- 71.2133.08.025

NOTE :
1. ALL DIMENSIONS AND LEVELS ARE IN METER.

FOR TENDER PURPOSE ONLY

PACKAGE - (1/B)

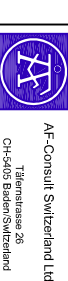
PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATEL HYDRO ELECTRIC PROJECT PVT. LTD.
RATEL HYDRO ELECTRIC PROJECT

**POWER HOUSE COMPLEX
GENERAL ARRANGEMENT
SECTION**

TYPICAL 30MW UNIT TRANSVERSE SECTION

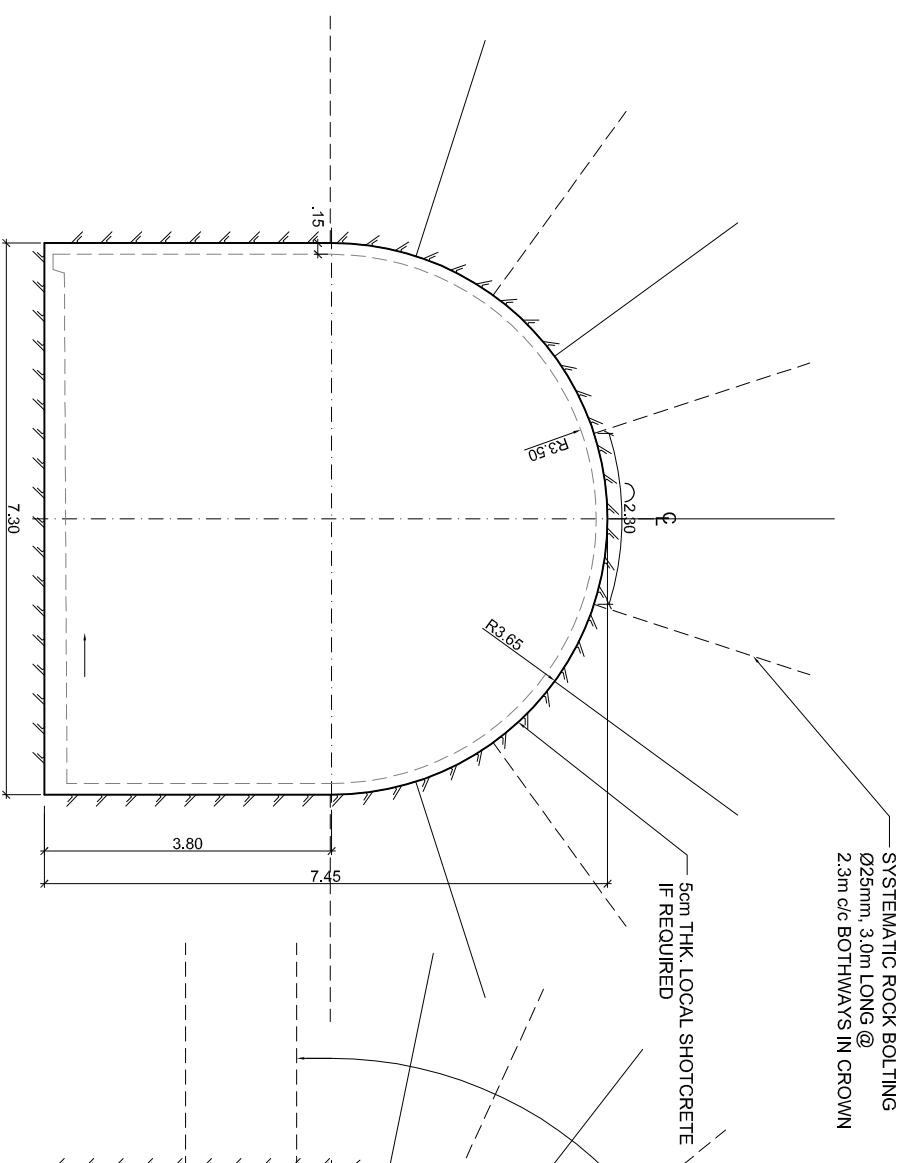
DESIGNED: SSE	SCALE: 1:125	FORMAT: A1
DRAWN: SAR	CHECKED: SSE	DRAWING No. [A3]
APPROVED: GUH	DATE: 13.12.11	REV. No. 0



AF-Consult Switzerland Ltd.
Tägermatten 26
CH-3600 Solothurn, Switzerland

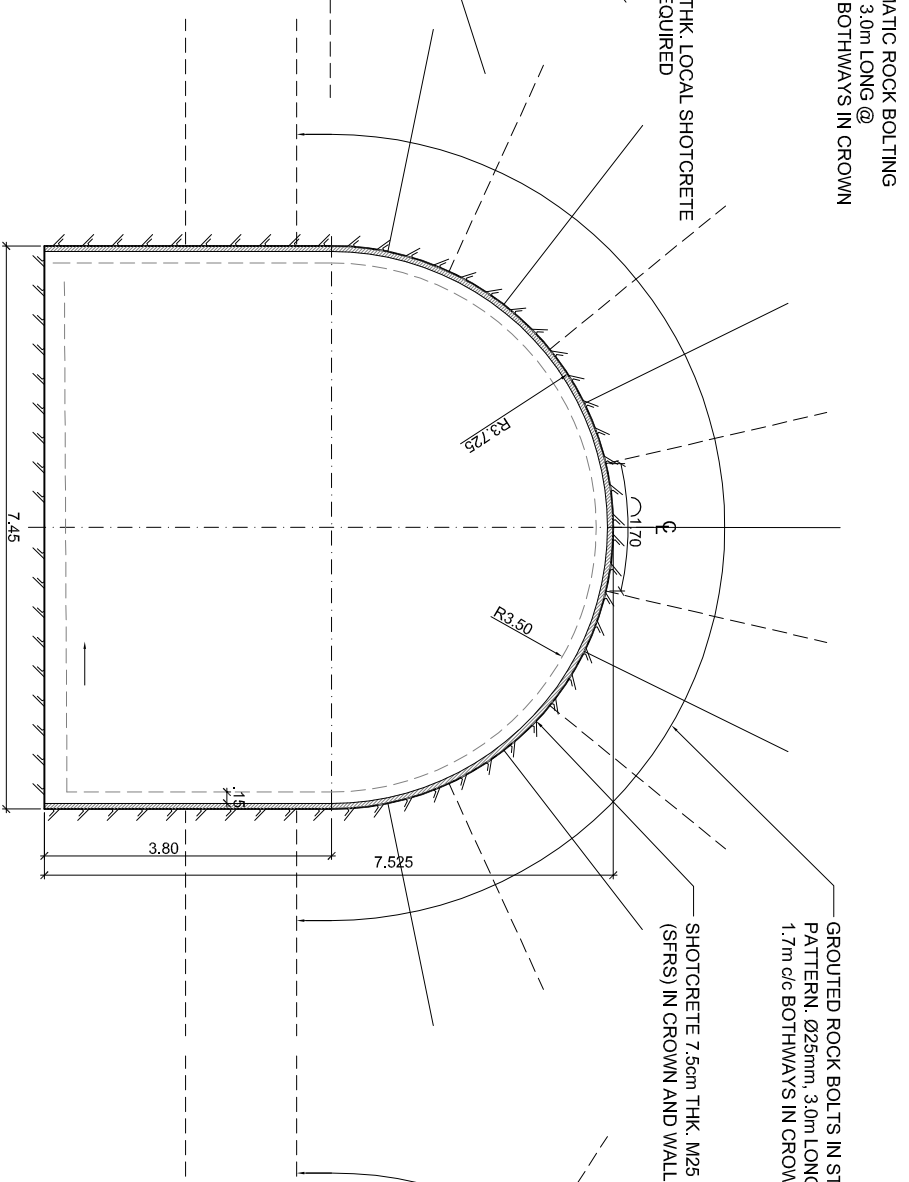
ROCK SUPPORT CLASS I

(Q = 10.0 - 40)



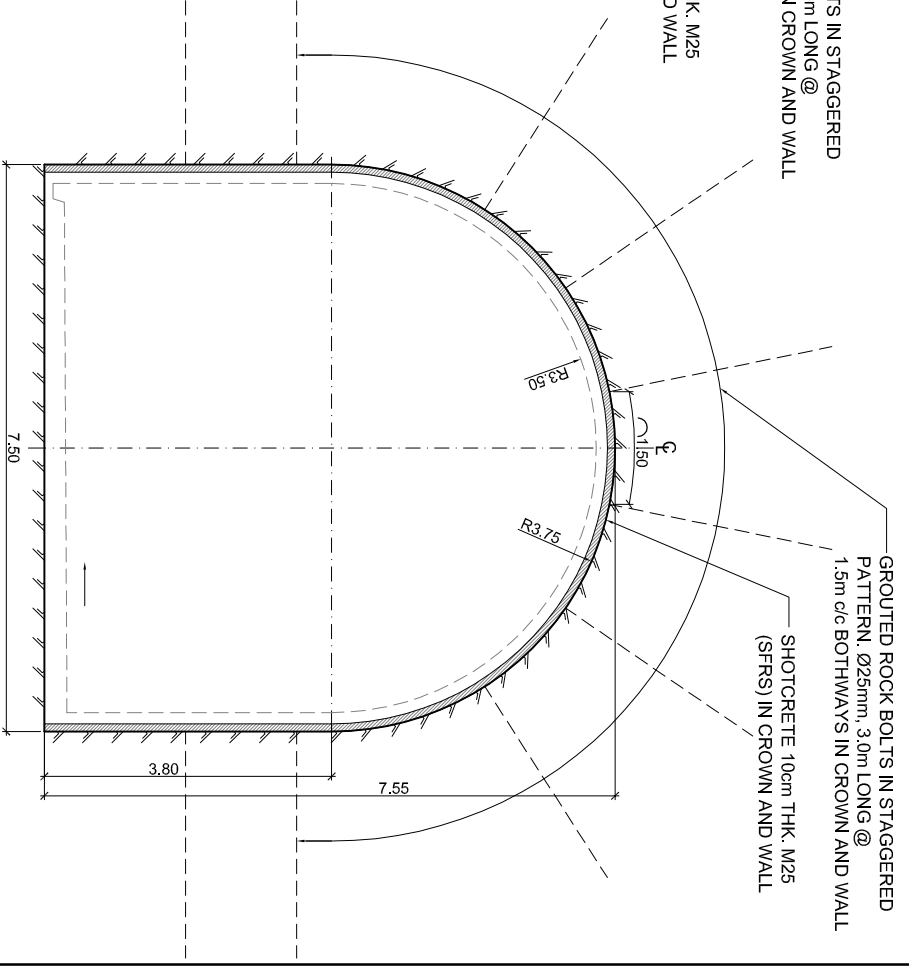
ROCK SUPPORT CLASS II

(Q = 1.0 - 10)



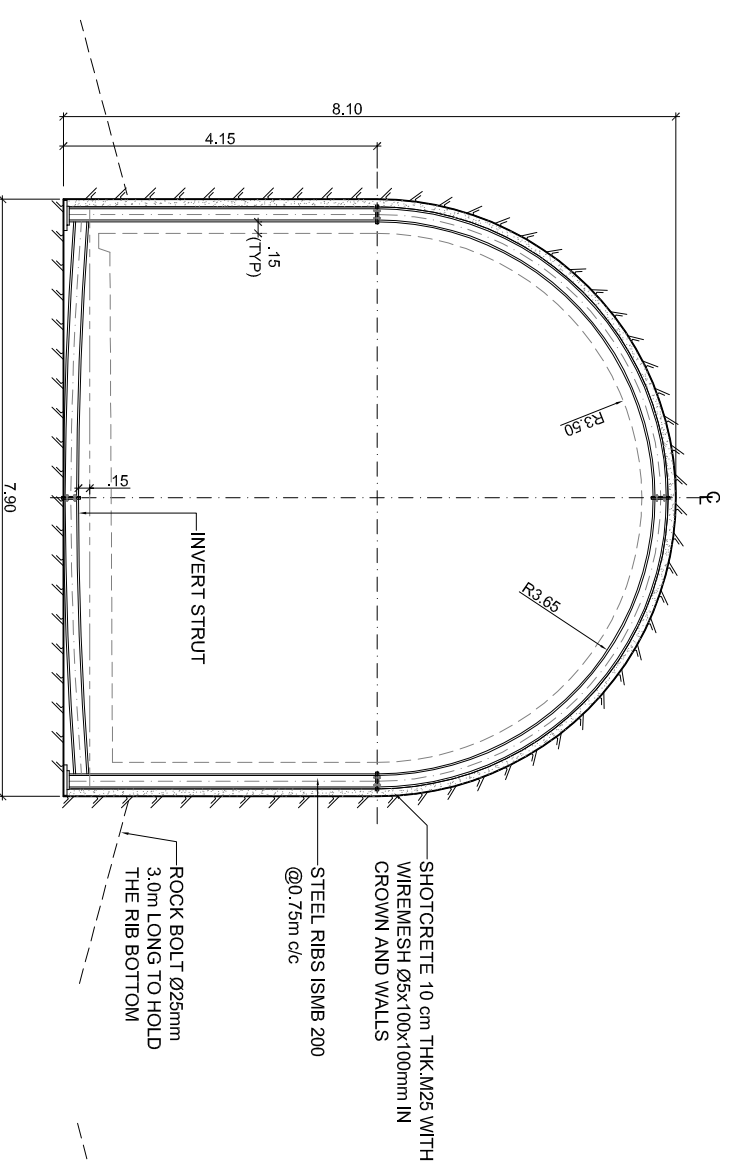
ROCK SUPPORT CLASS III

(Q = 0.4 - 1.0)



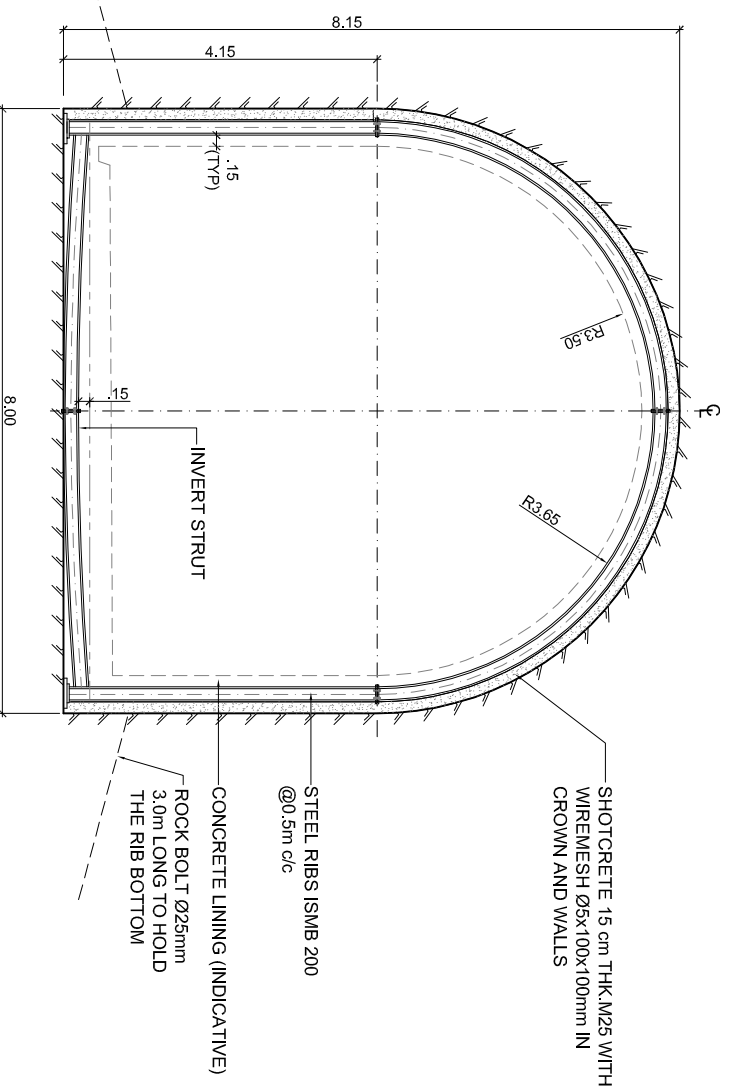
ROCK SUPPORT CLASS IV

(Q = 0.1 - 0.4)



ROCK SUPPORT CLASS V

(Q = 0.01 - 0.1)



NOTES:

1. ALL DIMENSIONS ARE IN METERS EXCEPT SHOWN OTHERWISE.
2. THE SUPPORT MEASURES INDICATED ARE TYPICAL. ADDITIONAL ROCK BOLTS, SHOTCRETE OR WELDED WIRE MESH MIGHT BE REQUIRED FOR ANY TYPICAL SECTIONS IN ORDER TO IMPROVE/GUARANTEE THE LOCAL ROCK STABILITY.
3. BEFORE SHOTCRETE PLACING, ALL WATER INFLOWS SHALL BE DRAINED PROPERLY.
4. DRAINAGE HOLE Ø 45mm WITH PERFORATED PVC PIPE WRAPPED WITH GEOTEXTILE WHERE REQUIRED, SPACING AND PROVISION OF DRAINAGE HOLES DECIDED ACCORDING TO WATER INFLOW.
5. CONCRETE LINING SHOWN AS INDICATIVE ONLY.
6. FORE POLING IS RECOMMENDED ONLY IF STAND-UP TIME IS LOW AND HIGH SQUEEZING GROUND CONDITION IS ENCOUNTERED.
7. FOR ROCK MASS QUALITY, Q > 40, NO SUPPORT SHALL BE GIVEN EXCEPT LOCAL SHOTCRETING AND SPOT BOLTING.

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> CONCEPT & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

MAIN ACCESS TUNNEL EXCAVATION, SUPPORTS AND LINING WORKS

TYPICAL SECTIONS

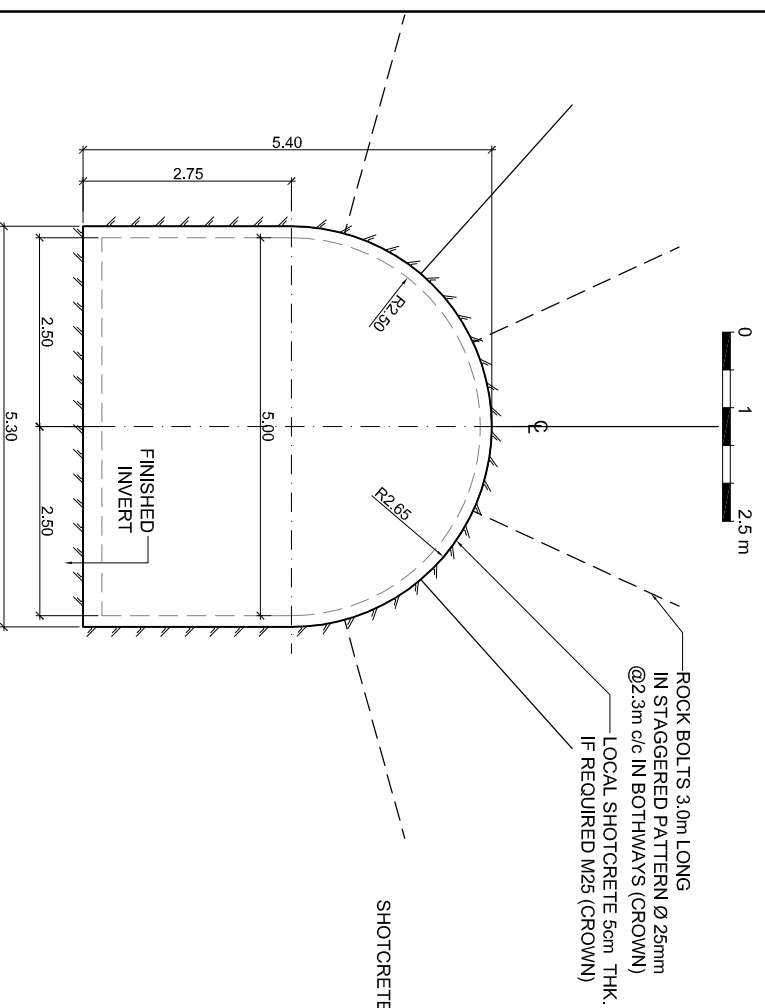
DESIGNED: RAR	SCALE: 1:50	FORMAT: A1
DRAWN: KAS	(1:100)	(A3)
CHECKED: RAE	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.08.102	0
DATE: 18.11.11		



AF Consult Switzerland
Tägermatten 28
CH-3600 Birmensdorf

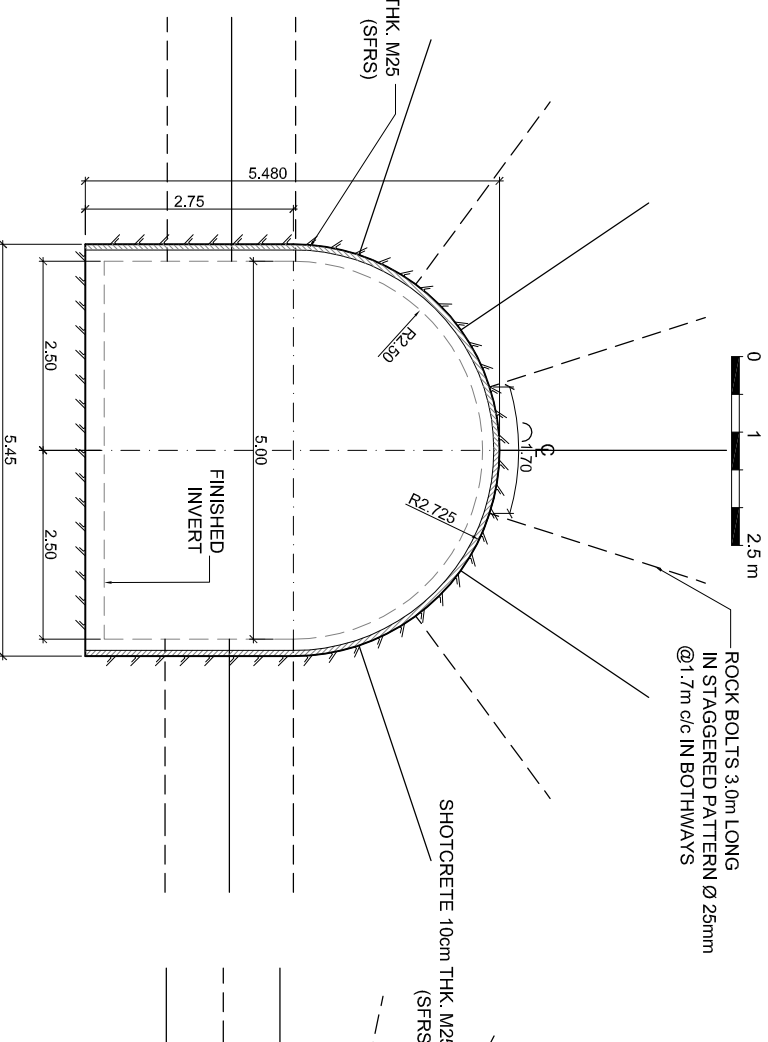
ROCK SUPPORT CLASS I

(Q=10.0 - 40.0)



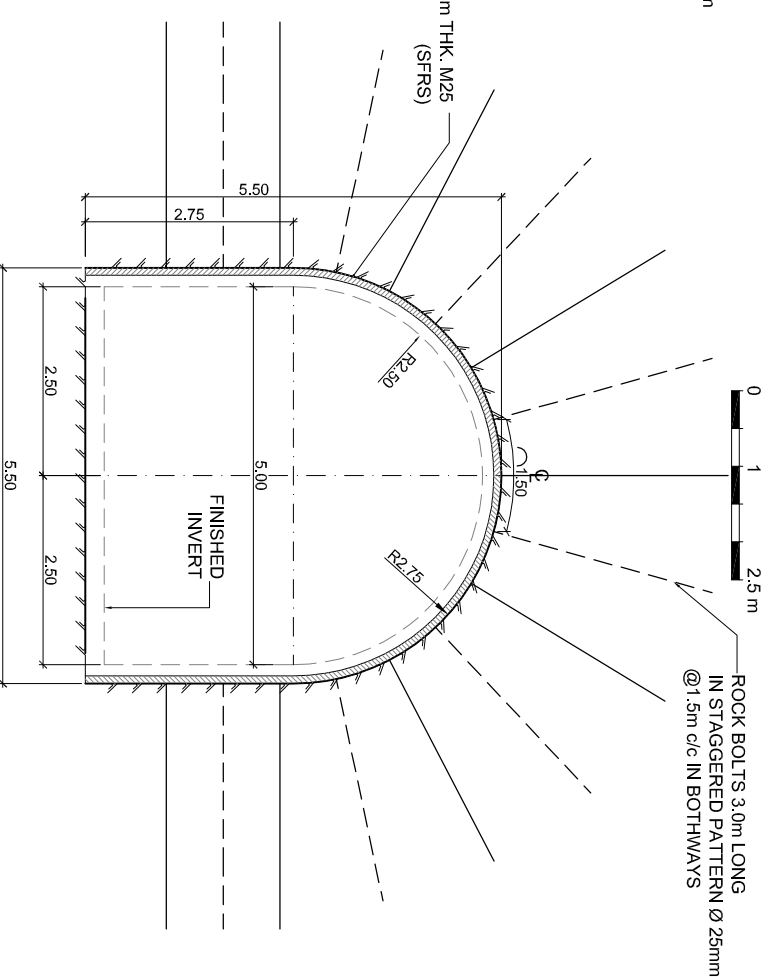
ROCK SUPPORT CLASS II

(Q=1.0 - 10.0)



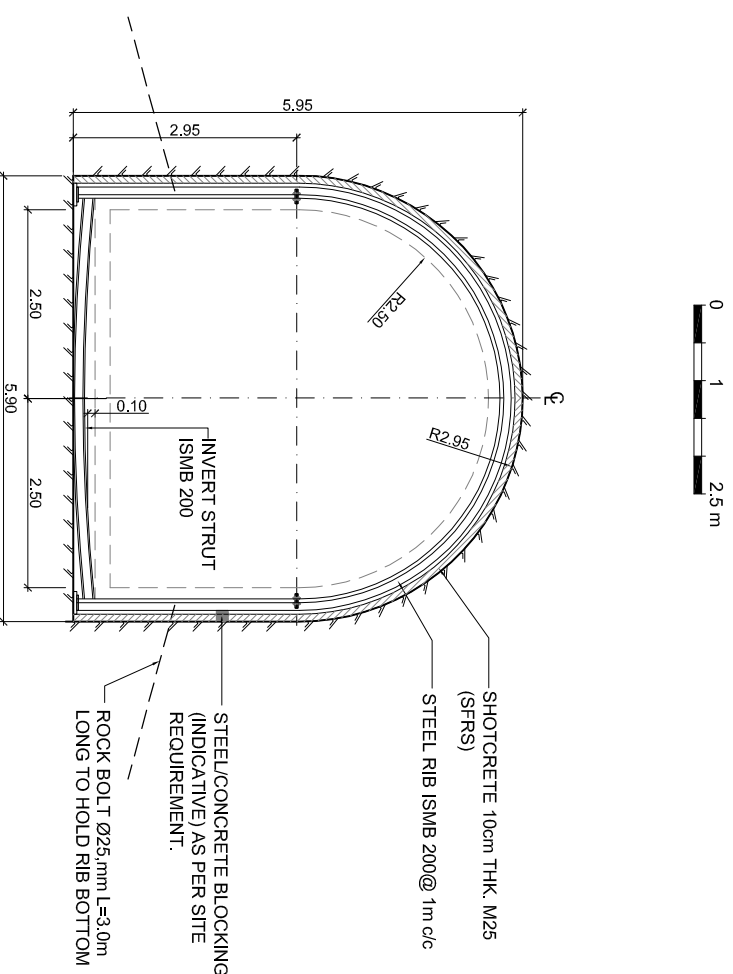
ROCK SUPPORT CLASS III

(Q=0.4 - 1.0)



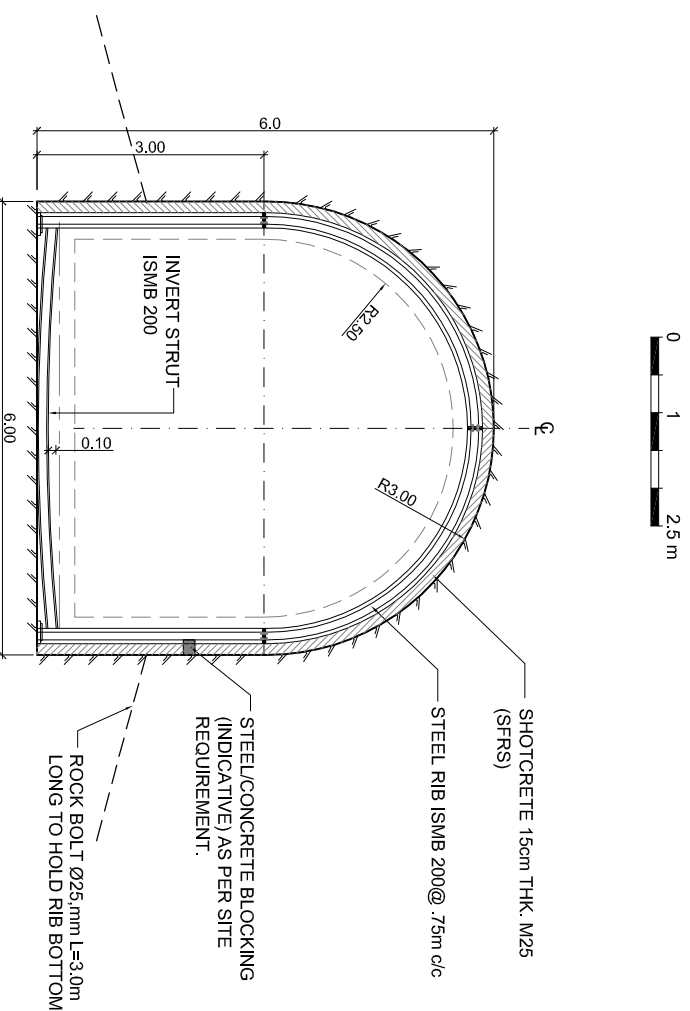
ROCK SUPPORT CLASS IV

(Q=0.1 - 0.4)



ROCK SUPPORT CLASS V

(Q=0.01 - 0.1)



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS EXCEPT SHOWN OTHERWISE.
2. THE SUPPORT MEASURES INDICATED ARE TYPICAL. MINOR MODIFICATION/RELOCATIONS OF THE ACTUAL SUPPORT MEASURES SHALL BE DECIDED ON SITE IN ACCORDANCE WITH THE CONDITIONS ENCOUNTERED.
3. ADDITIONAL ROCK BOLTS, SHOTCRETE AND WELDED WIREMESH MIGHT BE REQUIRED FOR ANY TYPICAL SECTIONS IN ORDER TO IMPROVE/GUARANTEE THE LOCAL ROCK STABILITY.
4. BEFORE SHOTCRETE PLACING, ALL WATER INFLOWS SHALL BE DRAINED PROPERLY.
5. TEMPORARY SHORT DRAINAGE HOLE Ø 45mm WITH PERFORATED PVC PIPE WRAPPED WITH TEXTILE TO BE PROVIDED ACCORDING TO WATER IN FLOW.
6. WOODEN / CONCRETE BLOCKING MAY BE PROVIDED BEHIND STEEL RIBS AS REQUIRED IN ADDITION TO SHOTCRETE BLOCKING.
7. FORE POLING IS RECOMMENDED ONLY IF STAND-UP TIME IS LOW AND HIGH SQUEEZING GROUND CONDITION IS ENCOUNTERED.
8. FOR ROCK MASS QUALITY, Q > 40, NO SUPPORT SHALL BE GIVEN EXCEPT LOCAL SHOTCRETING AND SPOT BOLTING.

FOR TENDER PURPOSE ONLY

PACKAGE-1(B)

PHASE	NO.	REVISION DESCRIPTION	DRWN	CHKD	APPD	DATE
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<input type="checkbox"/> FEASIBILITY STUDY						
<input type="checkbox"/> INCEPT. & BASIC DESIGN						
<input type="checkbox"/> TENDER DESIGN						
<input type="checkbox"/> CONSTRUCTION DESIGN						
<input type="checkbox"/> AS-BUILT DRAWINGS						

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

CABLE & VENTILATION TUNNEL EXCAVATION & ROCK SUPPORT DETAILS

TYPICAL SECTIONS

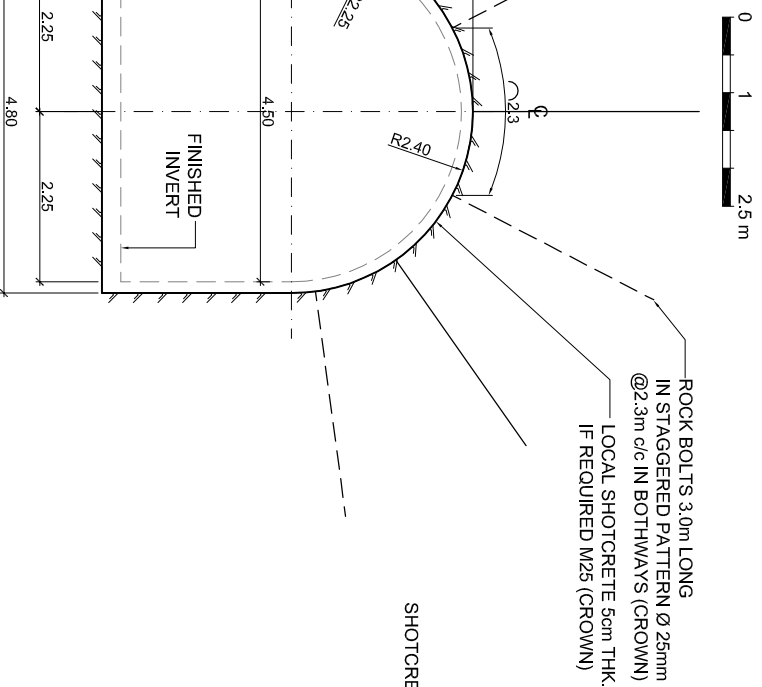
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AF-Consult Switzerland Ltd.	1:50	A1
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CHECKED: RAE	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.08.103	0
DATE: 18.11.11		



Thimistrasse 26
CH-5400 Baden, Switzerland

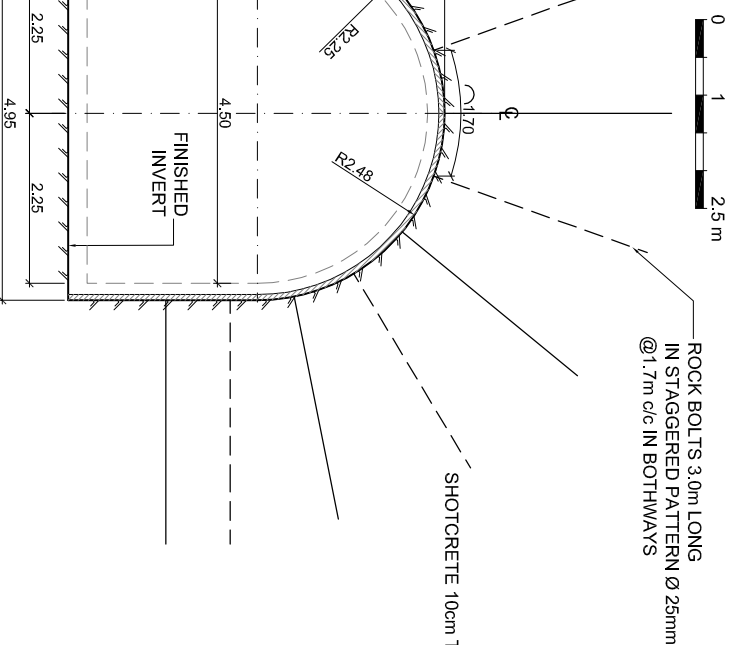
ROCK SUPPORT CLASS I

(Q=10.0 - 40.0)



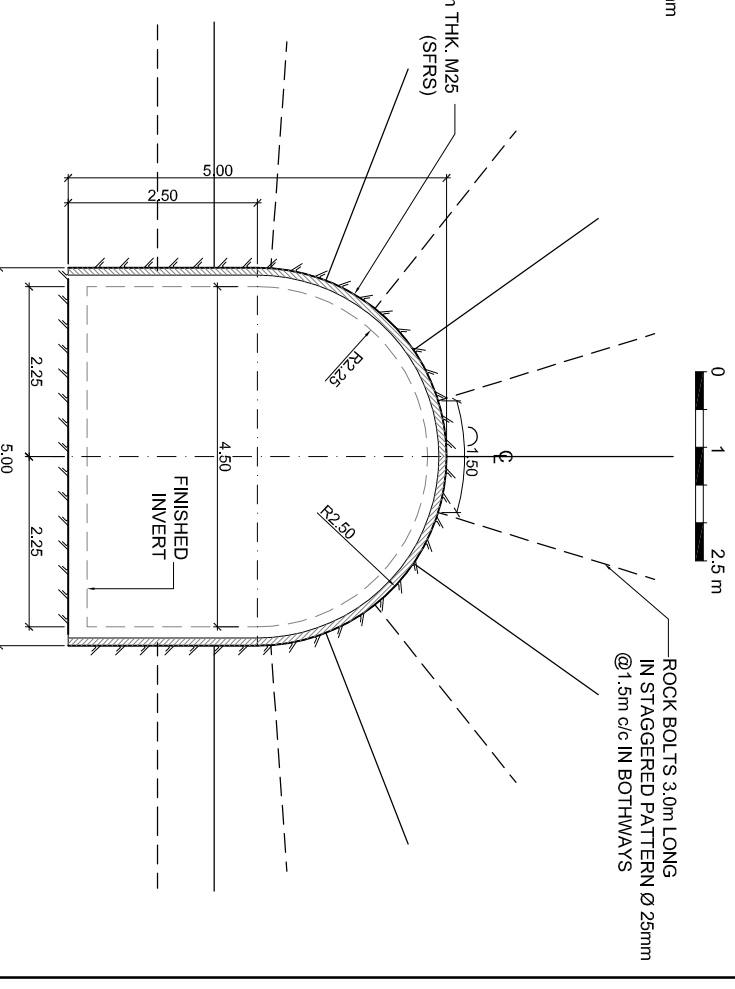
ROCK SUPPORT CLASS II

(Q=1.0 - 10.0)



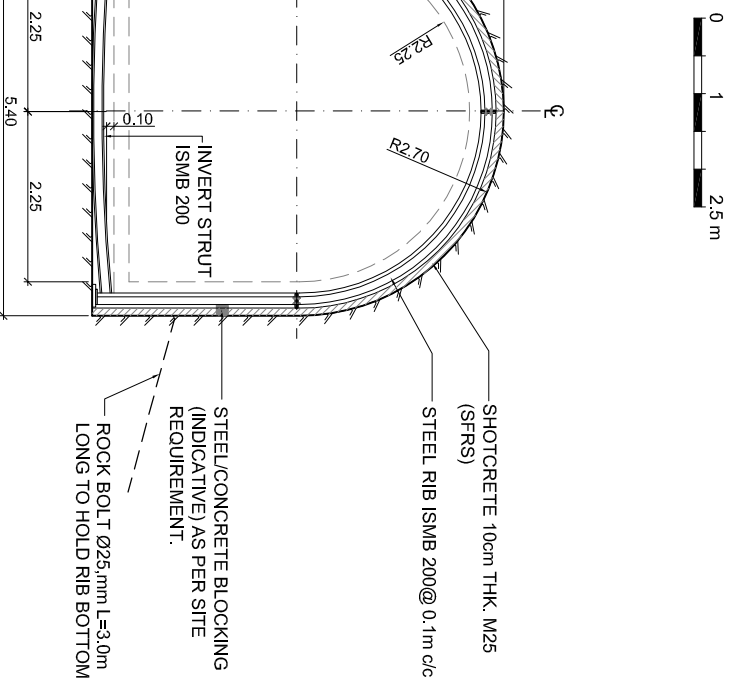
ROCK SUPPORT CLASS III

(Q=0.4 - 1.0)



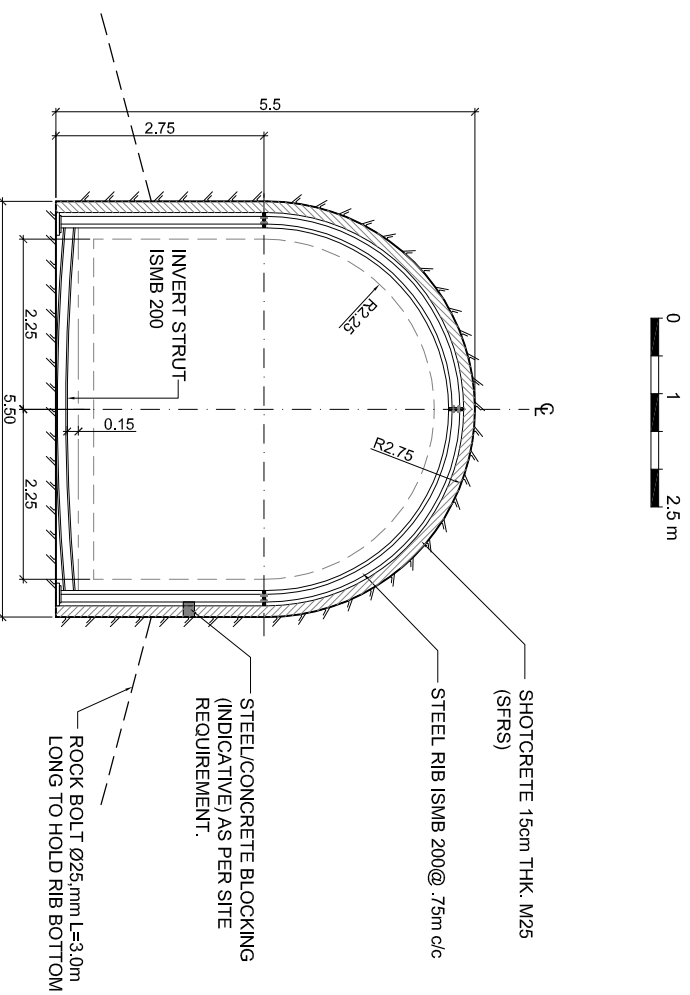
ROCK SUPPORT CLASS IV

(Q=0.1 - 0.4)



ROCK SUPPORT CLASS V

(Q=0.01 - 0.1)



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS EXCEPT SHOWN OTHERWISE
2. THE SUPPORT MEASURES INDICATED ARE TYPICAL. MINOR MODIFICATION/RELOCATIONS OF THE ACTUAL SUPPORT MEASURES SHALL BE DECIDED ON SITE IN ACCORDANCE WITH THE CONDITIONS ENCOUNTERED.
3. ADDITIONAL ROCK BOLTS, SHOTCRETE AND WELDED WIREMESH MIGHT BE REQUIRED FOR ANY TYPICAL SECTIONS IN ORDER TO IMPROVE/GUARANTEE THE LOCAL ROCK STABILITY.
4. BEFORE SHOTCRETE PLACING, ALL WATER INFLOWS SHALL BE DRAINED PROPERLY.
5. TEMPORARY SHORT DRAINAGE HOLE Ø 45mm WITH PERFORATED PVC PIPE WRAPPED WITH TEXTILE TO BE PROVIDED ACCORDING TO WATER IN FLOW.
6. WOODEN / CONCRETE BLOCKING MAY BE PROVIDED BEHIND STEEL RIBS AS REQUIRED IN ADDITION TO SHOTCRETE BLOCKING.
7. FORE POLING IS RECOMMENDED ONLY IF STAND-UP TIME IS LOW AND HIGH SQUEEZING GROUND CONDITION IS ENCOUNTERED.
8. FOR ROCK MASS QUALITY, Q > 40, NO SUPPORT SHALL BE GIVEN EXCEPT LOCAL SHOTCRETING AND SPOT BOLTING.

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

PHASE	REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> FEASIBILITY STUDY					
<input type="checkbox"/> INCEPT. & BASIC DESIGN					
<input type="checkbox"/> TENDER DESIGN					
<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

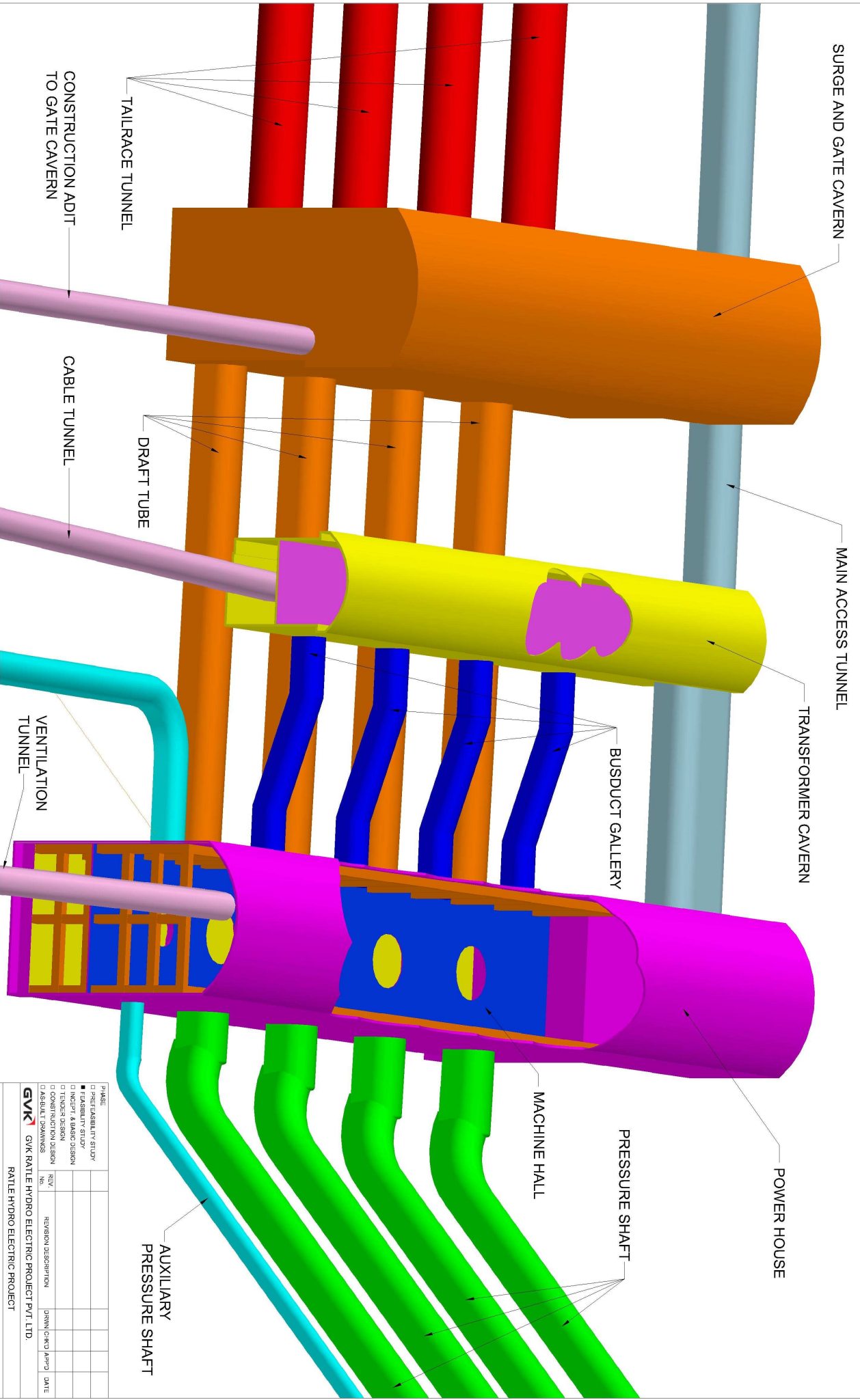
ADIT TO SURGE CAVERN TOP
EXCAVATION & ROCK SUPPORT DETAILS

TYPICAL SECTIONS

DESIGNED:	SCALE:	FORMAT:
AF-Consult Switzerland Ltd.	1:50	A1
DRAWN: RAS	1:100	A3
CHECKED: RAE		
APPROVED: GUH	71.2133.08.104	
DATE: 18.11.11		0



AF-Consult Switzerland Ltd.
Tägermatten 25
CH-5400 Baden/Schweiz



PHASE		DESIGNED	DATE	SCALE	NO.	FORWART	DATE
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<input type="checkbox"/>	CONSTRUCTION DESIGN						
<input type="checkbox"/>	AS-BUILT DRAWINGS						
	REV	REVISION DESCRIPTION	DATE	BY	CHKD	APPD	DATE
	1						

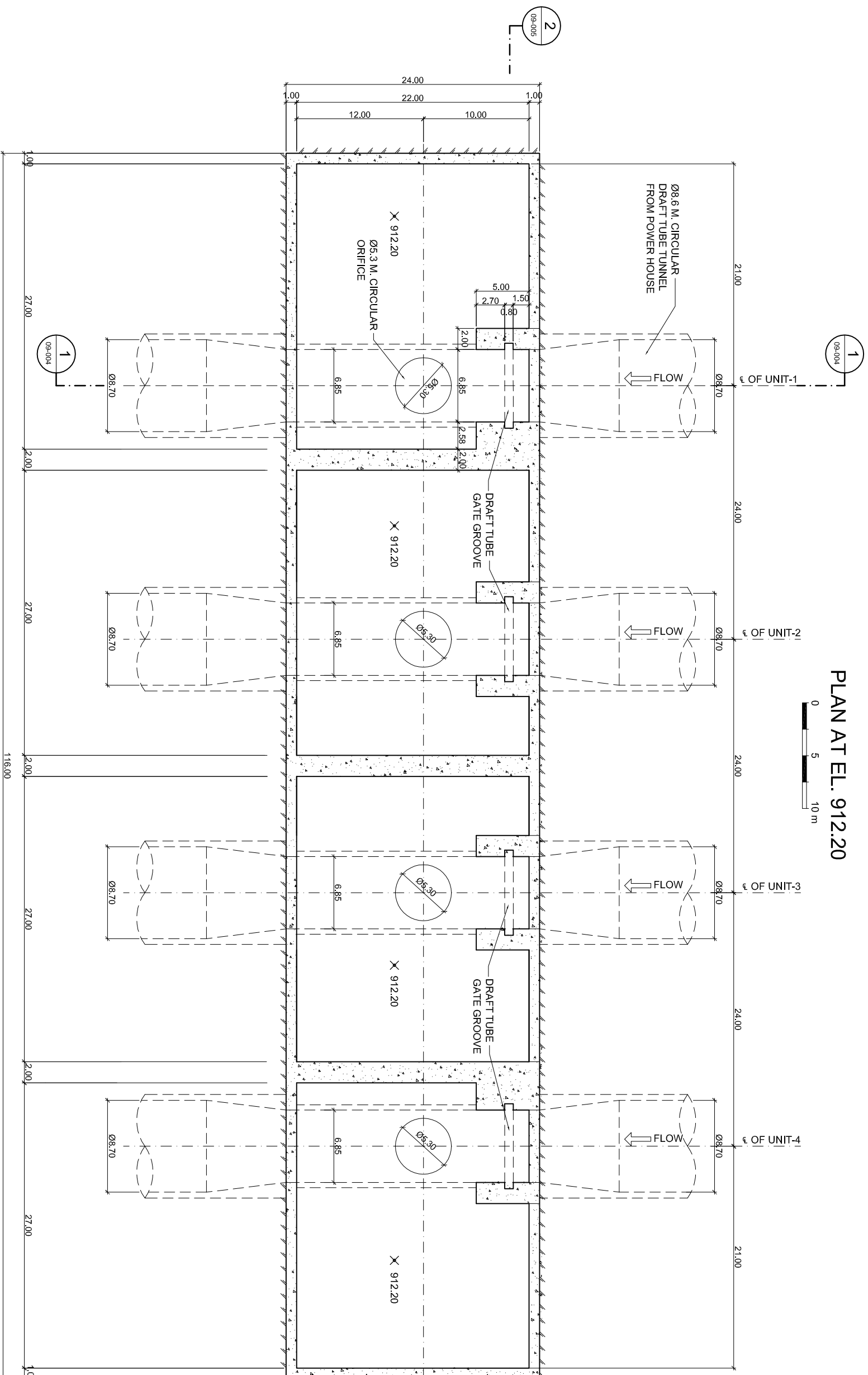
POWER HOUSE COMPLEX
3D VIEW

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

At-Compt. Field Pvt. Ltd.
T. 2133080300
Chand. Khand. Khand.
DATE: 29/03/11

DESIGNED	SSS	SCALE	NIS	FORWART	A1
DRAWN	MEH	DRAWING NO.		REV.	0
CHECKED	SSS				
DATE	29/03/11				

PLAN AT EL. 912.20



LEGEND:

- FIRST STAGE CONCRETE
- ROCK LINE

REFERENCE DRAWINGS:

- 71.2133.09.001 SURGE CAVERN GENERAL ARRANGEMENT - PLAN AT EL. 906.85M
- 71.2133.09.003 SURGE CAVERN GENERAL ARRANGEMENT - PLAN AT EL. 948.00M
- 71.2133.09.004 SURGE CAVERN GENERAL ARRANGEMENT - SECTION 1-1
- 71.2133.09.005 SURGE CAVERN GENERAL ARRANGEMENT - SECTION 2-2

NOTES:

- 1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

PACKAGE - (1B)

FOR TENDER PURPOSE ONLY

PHASE			
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<input type="checkbox"/> AS-BUILT DRAWINGS			

REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE

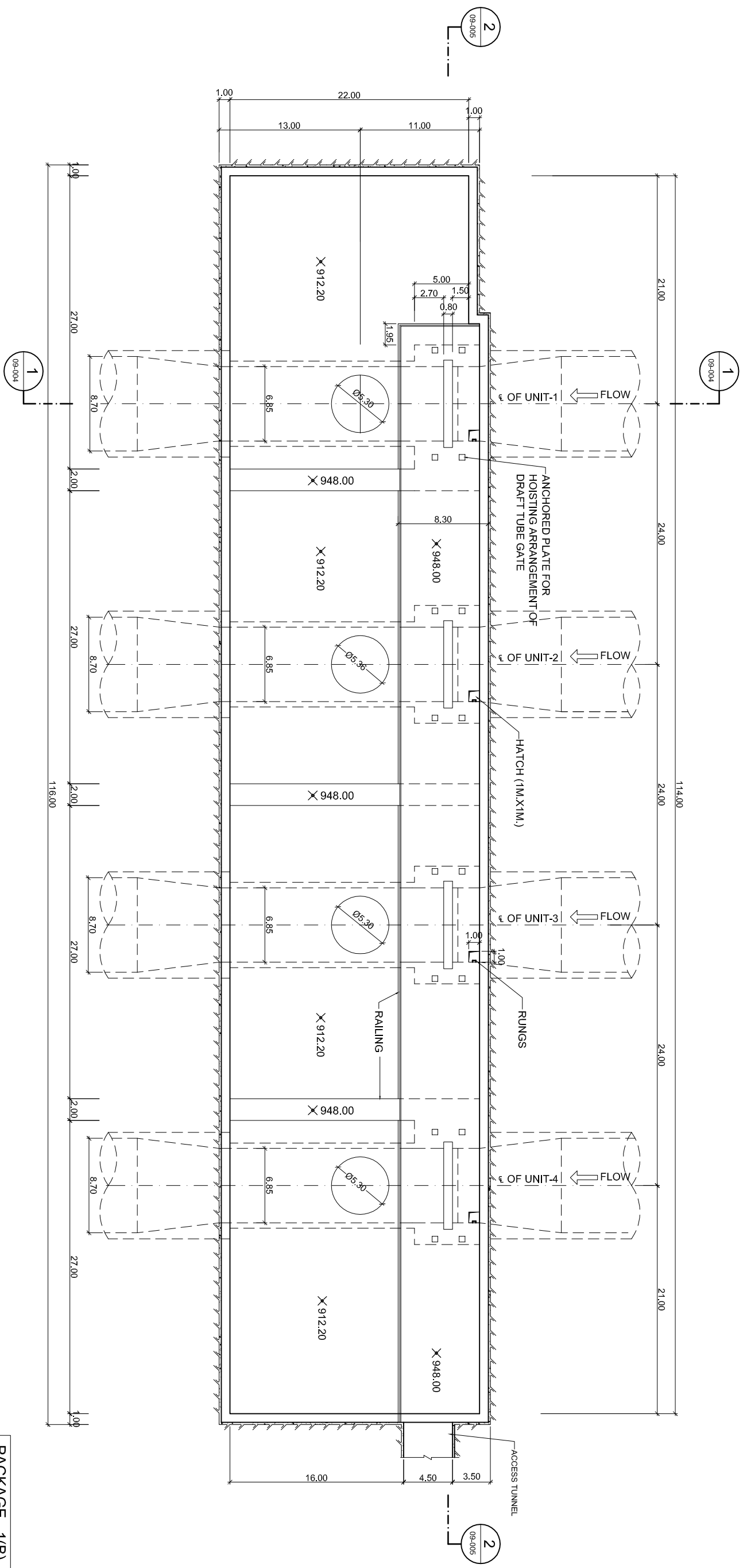
GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

SURGE CAVERN
GENERAL ARRANGEMENT
PLAN AT EL. 912.20m
PLAN AT ORIFICE FLOOR

DESIGNED: HAS	SCALE: 1:200	FORMAT: A1
DRAWN: JOH/SAR	[1:400]	[A3]
CHECKED: SSE	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.09.002	0
DATE: 14.12.11		



PLAN AT EL. 948.00



- LEGEND:**
- FIRST STAGE CONCRETE
 - ROCK LINE

- REFERENCE DRAWINGS:**
- 71.2133.09.001 SURGE CAVERN GENERAL ARRANGEMENT - PLAN AT EL. 906.85M
 - 71.2133.09.002 SURGE CAVERN GENERAL ARRANGEMENT - PLAN AT EL. 912.20M
 - 71.2133.09.004 SURGE CAVERN GENERAL ARRANGEMENT - SECTION 1-1
 - 71.2133.09.005 SURGE CAVERN GENERAL ARRANGEMENT - SECTION 2-2

NOTES:
1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

PACKAGE - 1(B)
FOR TENDER PURPOSE ONLY

PHASE	DATE	REV.	DESCRIPTION	DRWN/CHKD	APPD.	DATE
<input type="checkbox"/> PREFEASIBILITY STUDY						
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<input type="checkbox"/> TENDER DESIGN						
<input type="checkbox"/> CONSTRUCTION DESIGN						
<input type="checkbox"/> AS-BUILT DRAWINGS						

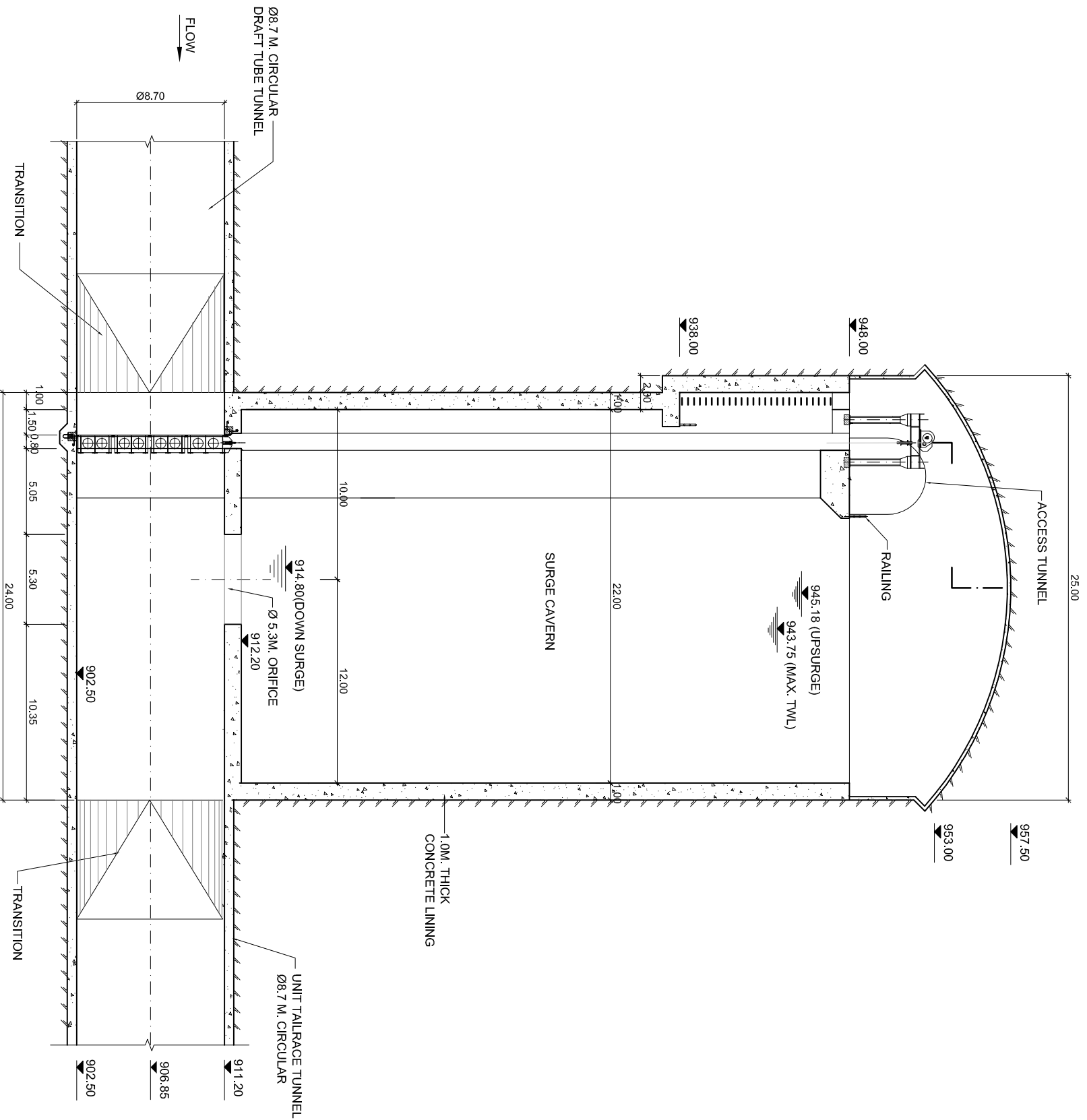
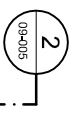
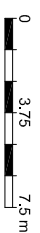
GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

SURGE CAVERN
GENERAL ARRANGEMENT
PLAN AT EL. 948.00m
PLAN AT GATE OPERATION DECK

DESIGNED: SSE	SCALE: 1:200	FORMAT: A1
DRAWN: JOH/SAR	[1:400]	[A3]
CHECKED: SSE	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.09.003	0
DATE: 14.12.11		



SECTION 1-1



REFERENCE DRAWINGS:

- 71.2133.09.001 SURGE CAVERN GENERAL ARRANGEMENT - PLAN AT EL. 906.85M
- 71.2133.09.002 SURGE CAVERN GENERAL ARRANGEMENT - PLAN AT EL. 912.20M
- 71.2133.09.003 SURGE CAVERN GENERAL ARRANGEMENT - PLAN AT EL. 948.00M
- 71.2133.09.005 SURGE CAVERN GENERAL ARRANGEMENT - SECTION 2-2

LEGEND:

- FIRST STAGE CONCRETE (M-25)
- BLOCK OUT CONCRETE (M-35)
- ROCK LINE

NOTES:

1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

PACKAGE - 1(B)
FOR TENDER PURPOSE ONLY

PHASE	DESIGNED	SCALE	FORMAT		
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<input type="checkbox"/> TENDER DESIGN	SSE				
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<input type="checkbox"/> AS-BUILT DRAWINGS					
REV.	REVISION DESCRIPTION	DRWN	CHKD	APPD.	DATE

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

SURGE CAVERN GENERAL ARRANGEMENT SECTION 1-1

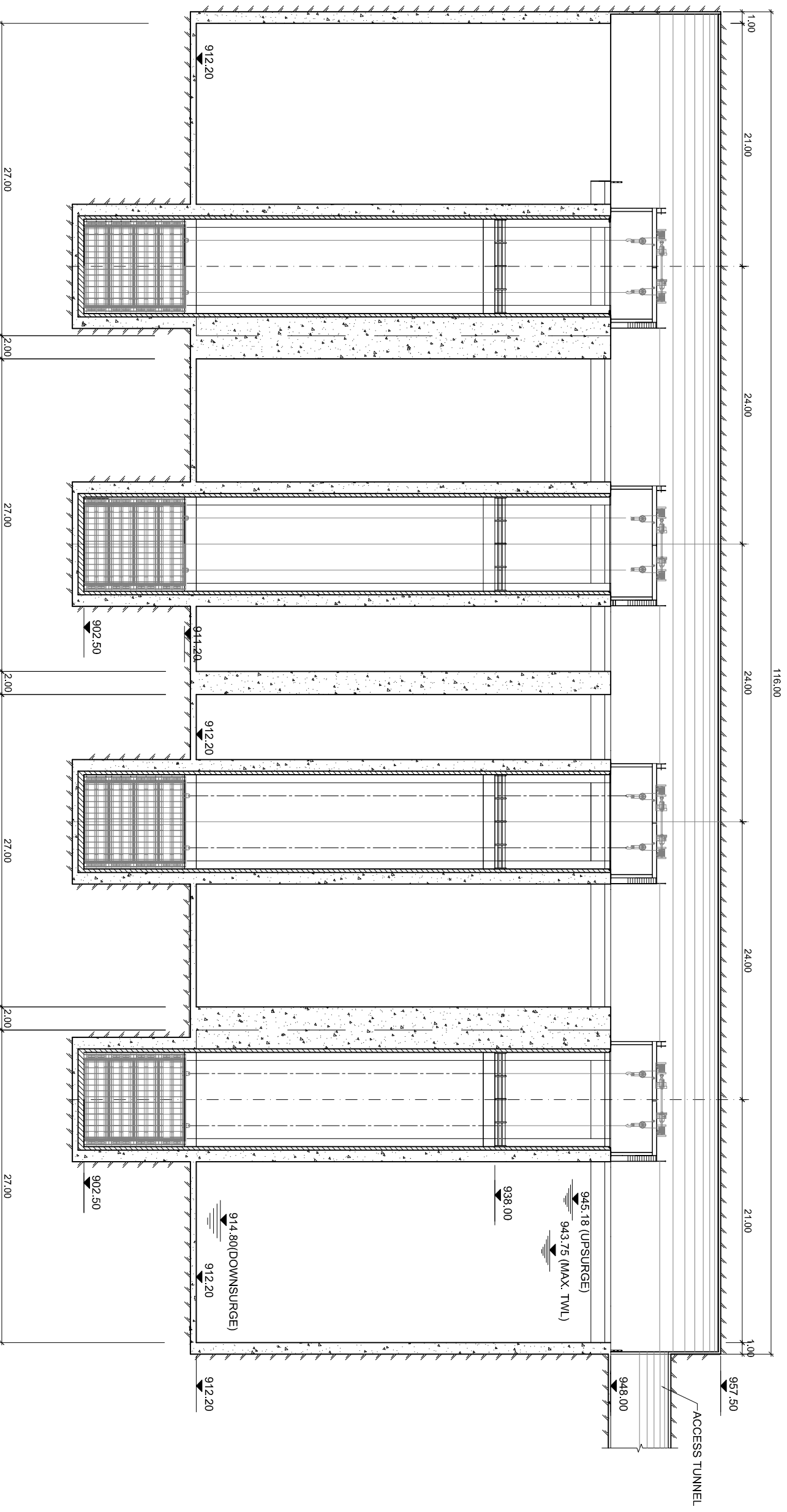
CROSS SECTION ALONG GATE PIERS

DESIGNED: HAS	SCALE: 1:150	FORMAT: A1
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CHECKED: SSE	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.09.004	0
DATE: 14.12.11		



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SECTION 2-2



PACKAGE - 1(B)

FOR TENDER PURPOSE ONLY

LEGEND:

- FIRST STAGE CONCRETE (M-25)
- BLOCK OUT CONCRETE (M-35)
- ROCK LINE

REFERENCE DRAWINGS:

- 71.2133.09.001 SURGE/D.T. GATE CAVERN GENERAL ARRANGEMENT - PLAN AT EL. 906.85
- 71.2133.09.002 SURGE/D.T. GATE CAVERN GENERAL ARRANGEMENT - PLAN AT EL. 912.20
- 71.2133.09.003 SURGE/D.T. GATE CAVERN GENERAL ARRANGEMENT - PLAN AT EL. 948.00
- 71.2133.09.004 SURGE/D.T. GATE CAVERN GENERAL ARRANGEMENT - SECTION 1-1

NOTES:

1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

PHASE	DESIGNED	SCALE	FORMAT
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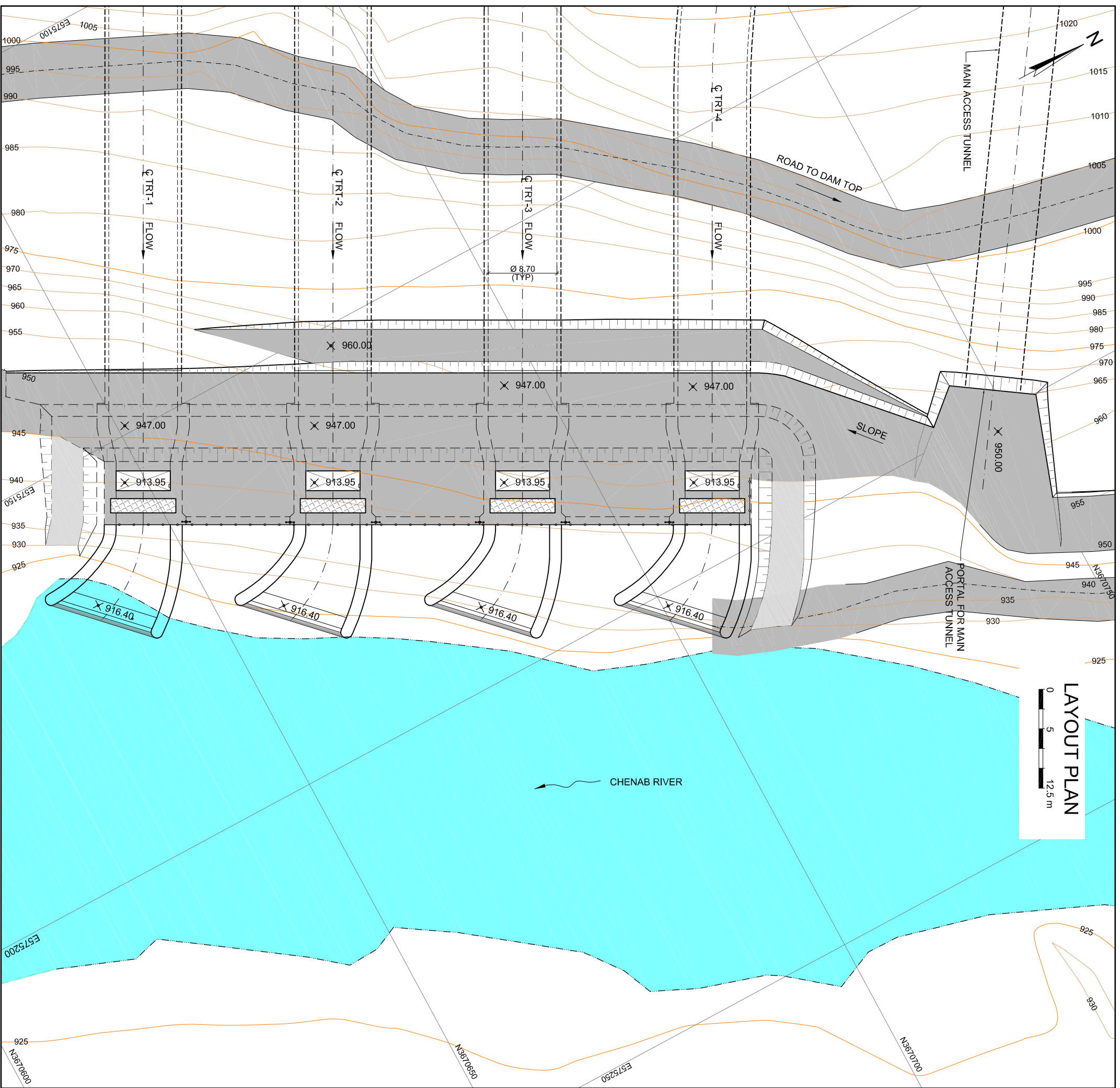
REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.	
RATLE HYDRO ELECTRIC PROJECT	
SURGE/D.T. CAVERN	
GENERAL ARRANGEMENT	
SECTION 2-2	
LONGITUDINAL SECTION THROUGH DRAFT TUBE GATE	

DESIGNED: HAS	SCALE: 1:200	FORMAT: A1
DRAWN: JOH/SAR	[1:400]	[A3]
CHECKED: SME	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.09.005	0
DATE: 14.12.11		



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LAYOUT PLAN
0 5 12.5 m

REFERENCE DRAWINGS:
71.2133.00.003 PROJECT AREA
GENERAL ARRANGEMENT - PLAN
71.2133.09.052 TAILRACE OUTLET
GENERAL ARRANGEMENT
PLAN, ELEVATION AND SECTION

NOTE:
1. ALL DIMENSIONS AND LEVELS ARE IN METERS EXCEPT SHOWN OTHERWISE.

PACKAGE - 1(B)
FOR TENDER PURPOSE ONLY

PHASE	REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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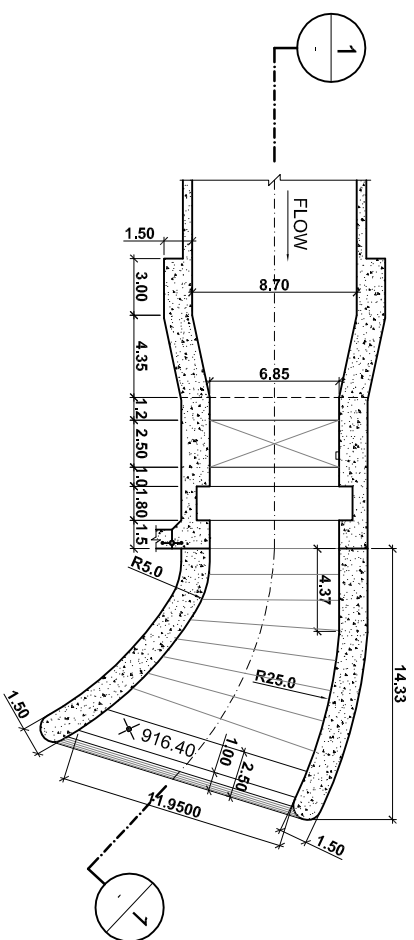
GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

TAILRACE OUTLET GENERAL ARRANGEMENT		PLAN	
DESIGNER: PRJ	SCALE: 1:250	FORMAT: A1	REV. No.
DRAWN: DPR/SAR	DRAWING No. [1500]	[A3]	0
CHECKED: PRJ	APPROVED: SMR		
DATE: 09/12/11	71.2133.09.051		

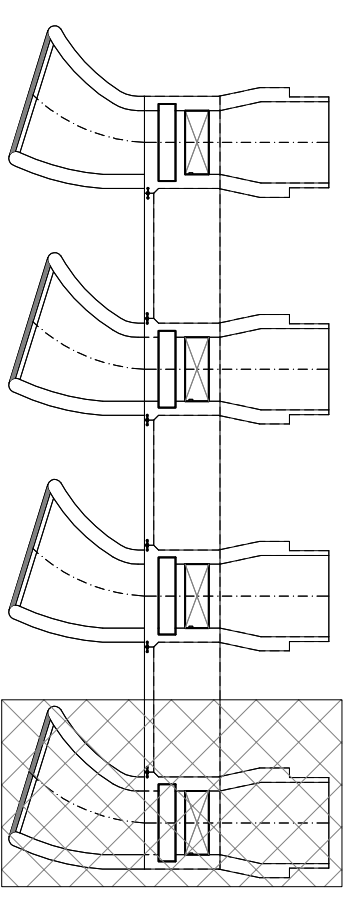
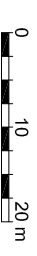


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CH-5400 Baden, Switzerland

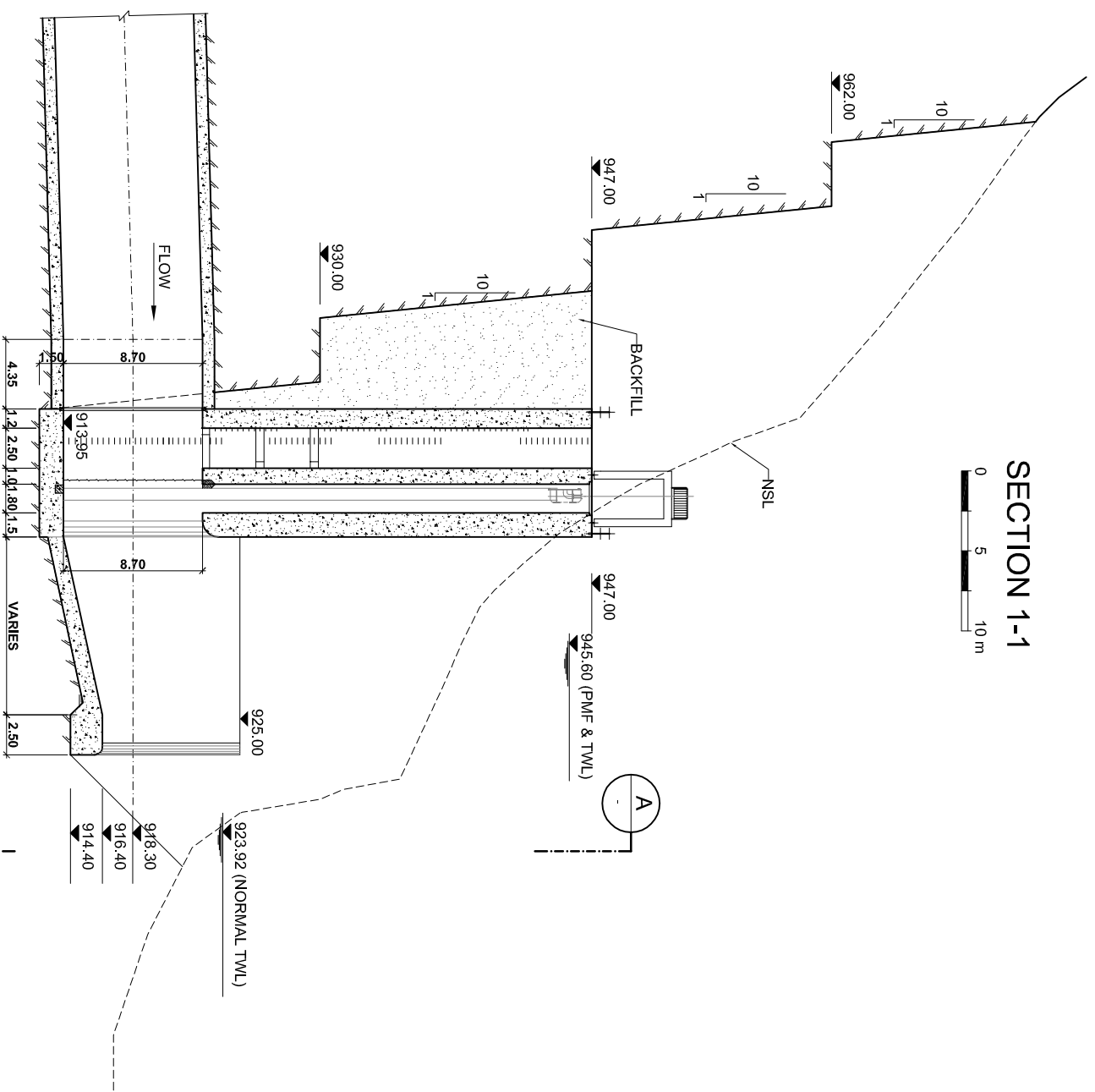
PLAN OF OUTFALL AT EL 918.30



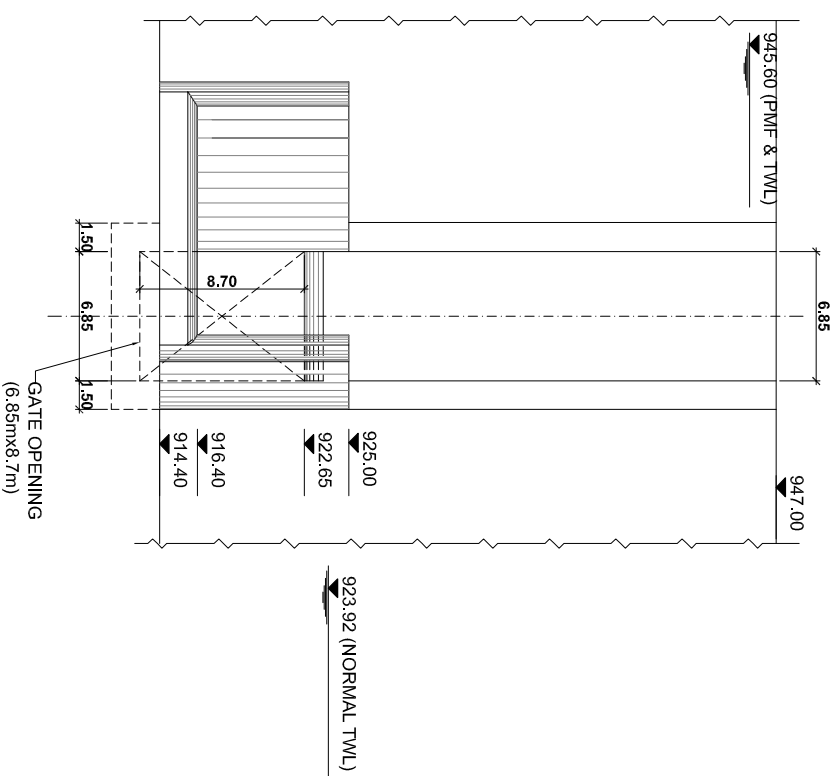
KEY PLAN



SECTION 1-1



VIEW A-A



REFERENCE DRAWINGS:

- 71.2133.00.003 PROJECT AREA
- 71.2133.00.003 GENERAL ARRANGEMENT - PLAN
- 71.2133.09.051 TAILRACE OUTLET
- 71.2133.09.051 GENERAL ARRANGEMENT
- 71.2133.09.052 PLAN

NOTE:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS EXCEPT SHOWN OTHERWISE.

PACKAGE - 1(B)

FOR TENDER PURPOSE ONLY

PHASE	REV.	REVISION DESCRIPTION	DRWN	CHKD	APPD.	DATE
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<input type="checkbox"/> AS-BUILT DRAWINGS						

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

RATLE HYDRO ELECTRIC PROJECT

TAILRACE OUTLET GENERAL ARRANGEMENT

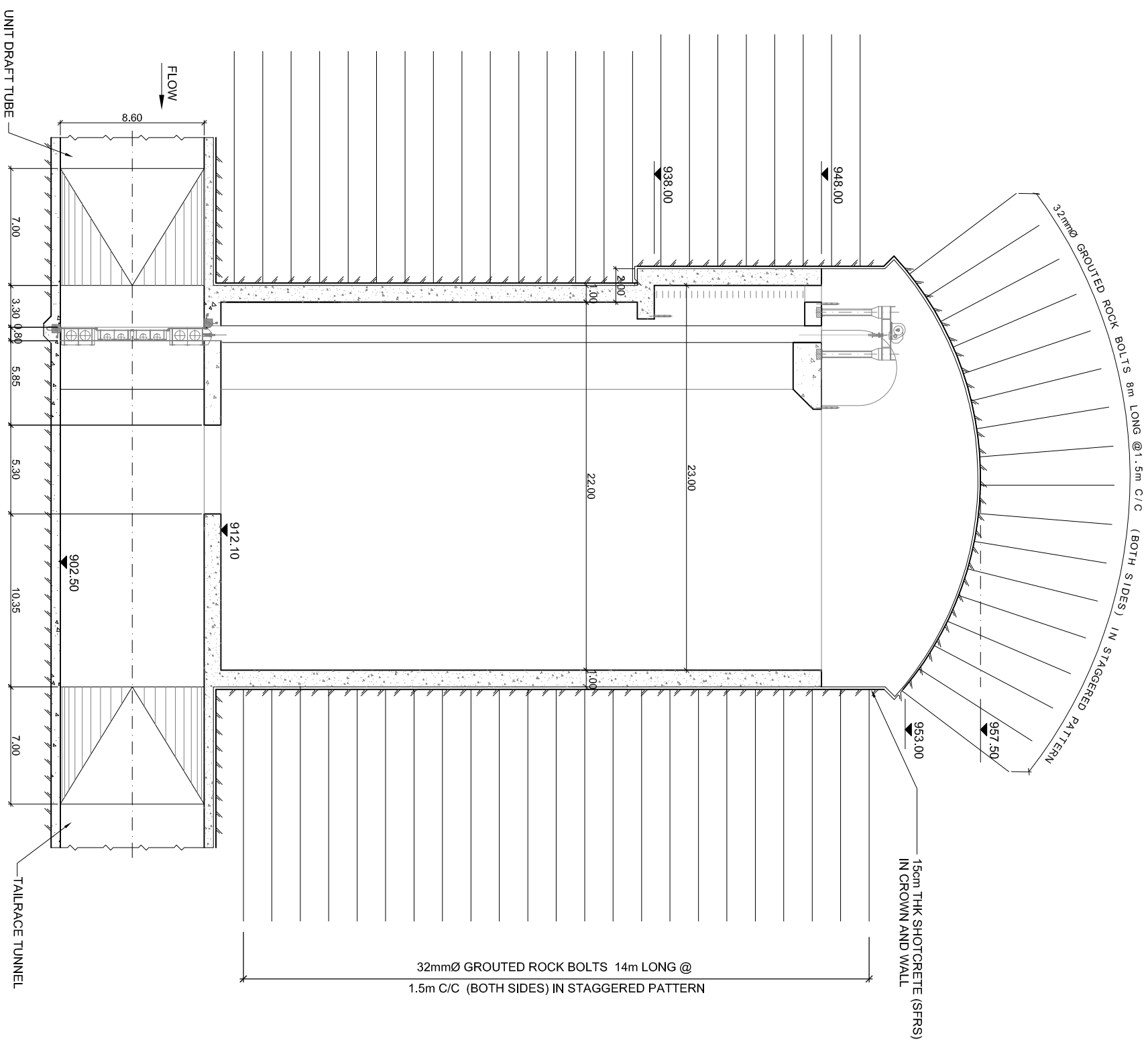
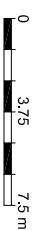
PLAN, ELEVATION AND SECTION

DESIGNED: PRJ	SCALE: 1:200	FORMAT: A1
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CHECKED: HAS	APPROVED: SMR	DATE: 09/12/11
71.2133.09.052		0



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CH-3603 Birmensdorf

SURGE & GATE CAVERN



- NOTES:**
1. ALL DIMENSIONS AND LEVELS ARE IN METERS EXCEPT SHOWN OTHERWISE.
 2. ROCK SUPPORTS ARE SUGGESTED ASSUMING FAIR QUALITY ROCK MASS.
 3. SUPPORTS MAY VARY WITH ACTUAL GROUND CONDITION ENCOUNTERED AND CONSTRUCTION METHODOLOGY.
 4. DRAINAGE HOLE Ø50mm MIN. WITH PERFORATED PVC PIPE WRAPPED WITH GEOTEXTILE AT GRID SPACING 4.0x4.0 & 10-15m LONG IS TO BE PROVIDED WHEREVER REQUIRED.

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

PHASE	REV.	REVISION DESCRIPTION	DRWN	CHKD	APPD.	DATE
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<input type="checkbox"/> FEASIBILITY STUDY						
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<input type="checkbox"/> AS-BUILT DRAWINGS						

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

RATLE HYDRO ELECTRIC PROJECT

SURGE & GATE CAVERN

ROCK SUPPORT DETAILS

TYPICAL SECTION

DESIGNED: RAR	SCALE: 1:150	FORMAT: A1
DRAWN: KAS	[1:300]	[A3]
CHECKED: RAE	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.09.101	0
DATE: 14.12.11		



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ROCK SUPPORT CLASS I

(Q= 10-40)



ROCK SUPPORT CLASS II

(Q= 1-10)



ROCK SUPPORT CLASS III

(Q= 0.4-1.0)



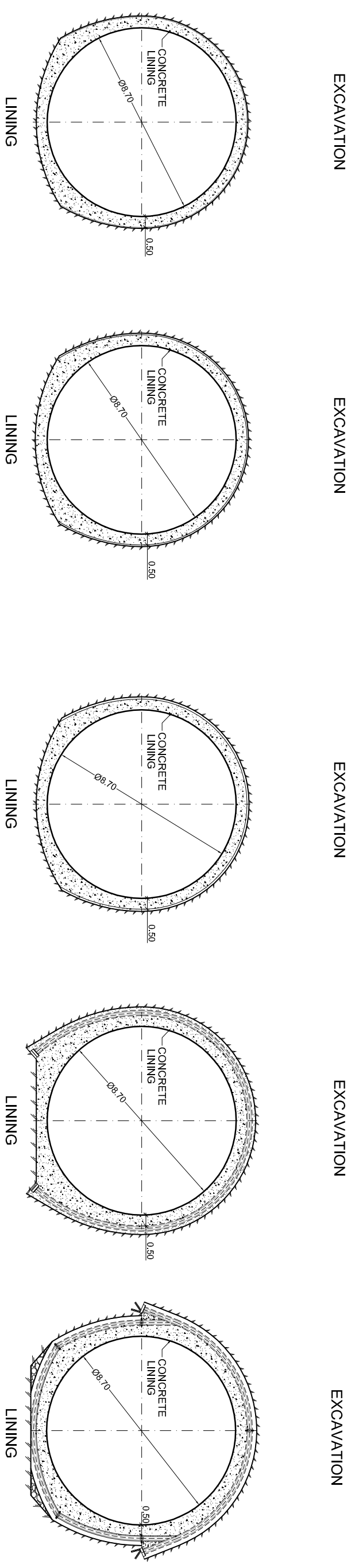
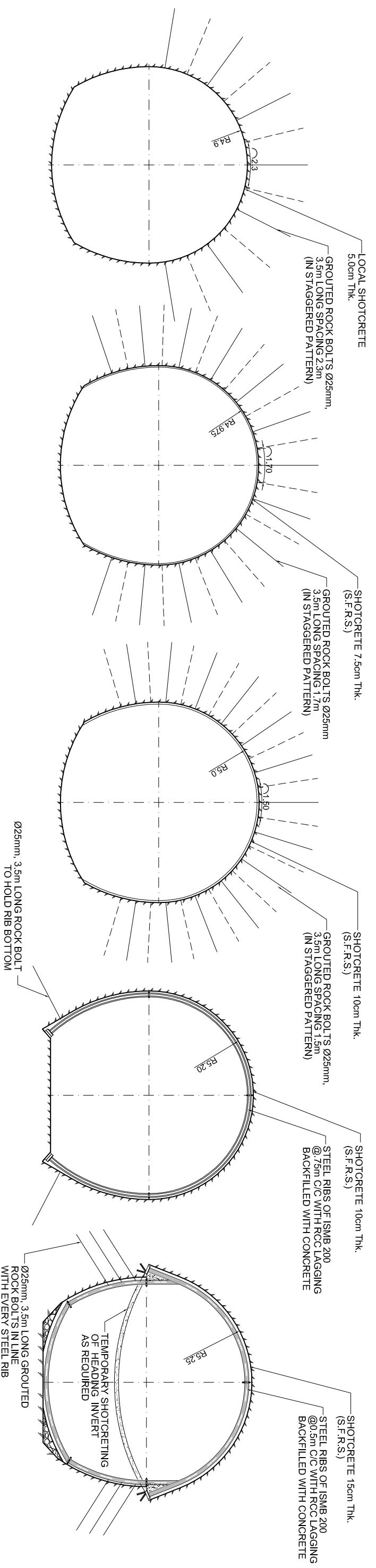
ROCK SUPPORT CLASS IV

(Q= 0.1-0.4)



ROCK SUPPORT CLASS V

(Q= 0.01-0.1)



PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

- NOTES:**
1. ALL DIMENSIONS ARE IN METERS EXCEPT SHOWN OTHERWISE.
 2. SUPPORT MEASURES INDICATED ARE TYPICAL. MINOR MODIFICATION/ RELOCATIONS OF THE ACTUAL SUPPORT MEASURES SHALL BE DECIDED ON SITE IN ACCORDANCE WITH GROUND CONDITIONS ENCOUNTERED.
 3. ADDITIONAL ROCK BOLTS, SHOTCRETE OR WELDED STEEL FABRIC MIGHT BE REQUIRED FOR ANY TYPICAL SECTIONS IN ORDER TO IMPROVE/GUARANTEE THE LOCAL ROCK STABILITY. BEFORE SHOTCRETE PLACING, ALL WATER INFLOWS SHALL BE DRAINED.
 4. SHOTCRETING SHALL BE DONE TRUE TO THE THICKNESS SHOWN IN THE DRAWING AS PER RELEVANT CODES.
 5. THE LENGTH & DIRECTION OF ROCK BOLTS MAY BE ALTERED IN CONSULTATION WITH THE GEOLOGIST & ENGINEER-IN-CHARGE.
 6. ROCK BOLTING SHALL BE DONE AS PER TECHNICAL SPECIFICATION. ALL ROCK BOLTS SHALL BE 25mm Ø SOLID BAR GROUDED OVER THEIR ENTIRE LENGTH WITH MINIMUM LOAD CAPACITY OF 100KN.
 7. FORE POLING IS RECOMMENDED ONLY IF STAND-UP TIME IS LOW AND HIGH SQUEEZING GROUND CONDITION IS ENCOUNTERED.
 8. FOR ROCK MASS QUALITY, Q > 40, NO SUPPORT SHALL BE GIVEN EXCEPT LOCAL SHOTCRETING AND SPOT BOLTING.

PHASE	DESIGN	DATE
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<input type="checkbox"/> FEASIBILITY STUDY		
<input type="checkbox"/> CONCEPT & BASIC DESIGN		
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<input type="checkbox"/> CONSTRUCTION DESIGN		
<input type="checkbox"/> AS-BUILT DRAWINGS		

REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE

TAILRACE TUNNEL EXCAVATION, SUPPORT AND LINING DETAILS

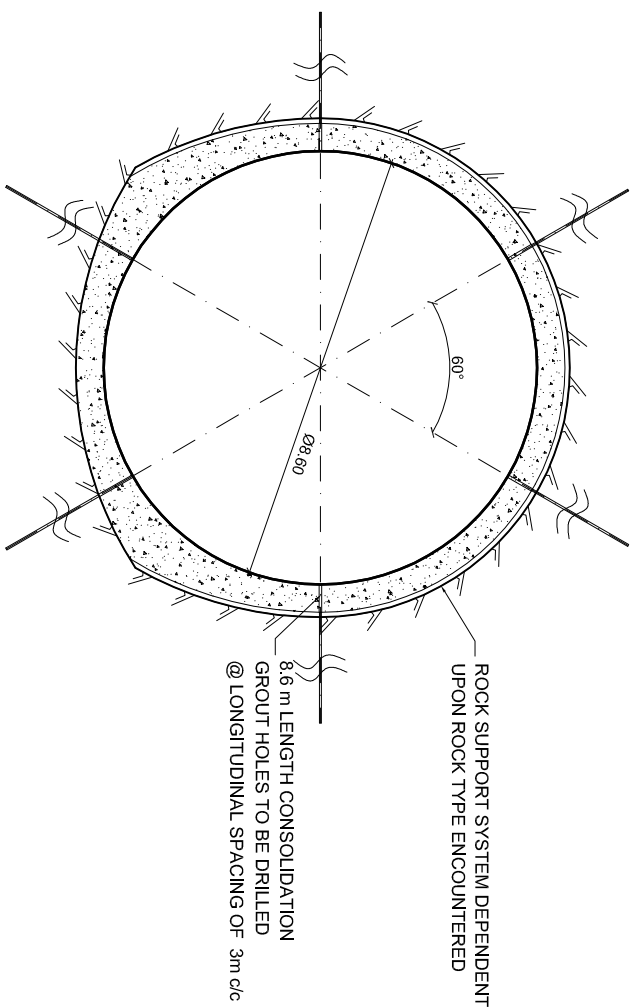
TYPICAL SECTIONS

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DRAWN: KAS	(1:200)	[A3]
CHECKED: RAE	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.09.102	0
DATE: 14.12.11		

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
 Ratle Hydro Electric Project
 AF-Consult Switzerland Ltd.
 Thimrose 28
 CH-3400 Baden, Switzerland

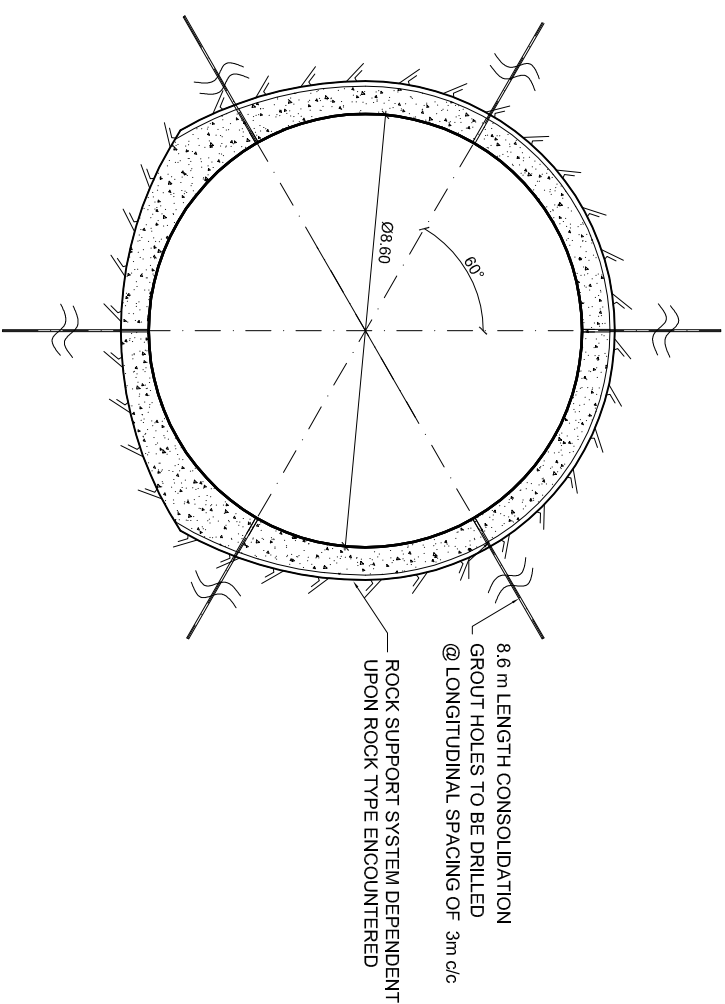
CONSOLIDATION GROUTING DETAIL

(TYPE -1)



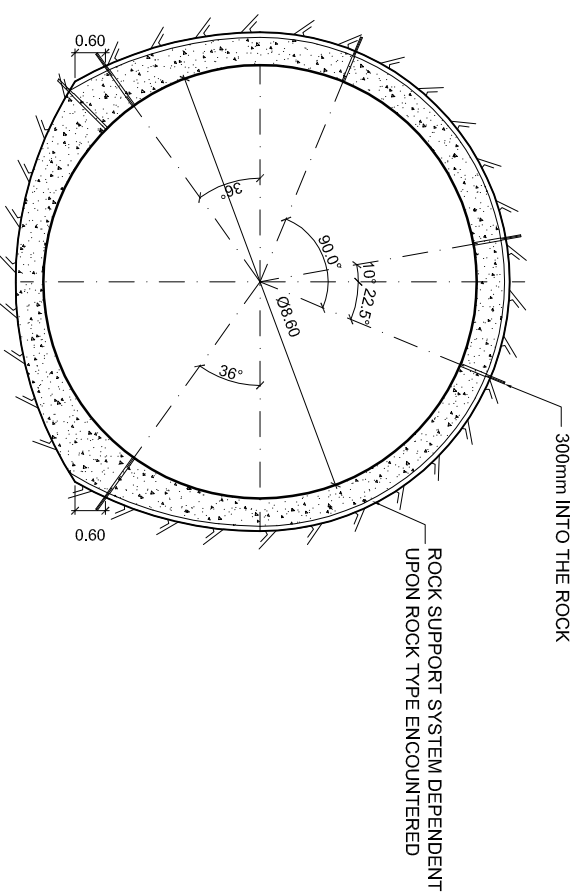
CONSOLIDATION GROUTING DETAIL

(TYPE -2)



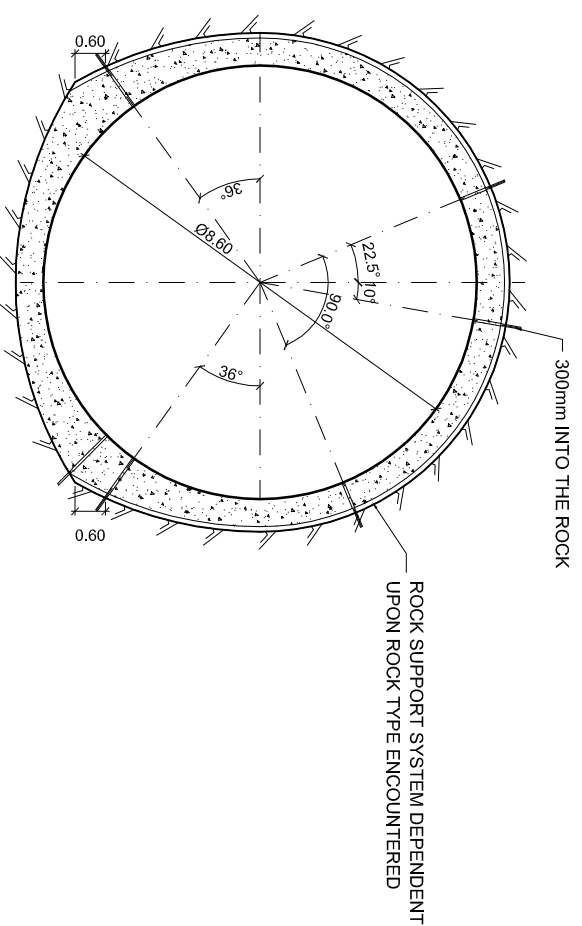
CONTACT GROUTING DETAIL

(TYPE -1)



CONTACT GROUTING DETAIL

(TYPE -2)



NOTES:

1. ALL DIMENSIONS ARE IN METERS EXCEPT SHOWN OTHERWISE.
2. CONTACT GROUTING SHOULD BE DONE AFTER THE CONCRETE LINING HAS GAINED STRENGTH TO WITH STAND THE PRESSURE AND SHRINKAGE. IF ANY, HAS TAKEN PLACE.
3. CONSOLIDATION GROUTING SHALL ALWAYS BE DONE AFTER THE BACKFILL GROUTING IS COMPLETED IN A LENGTH OF AT LEAST 60m AHEAD OF THE POINT OF GROUTING.
4. SPACING OF GROUT PLANES WILL DEPEND UPON THE STRUCTURAL FORMATION OF ROCK AND TRAVEL OF GROUT AT THE SPECIFIED PRESSURE. THE EXACT SPACING SHOULD ALSO BE ADJUSTED IN THE FIELD TO SUIT THE LENGTH OF THE SHUTTER USED FOR CONCRETING.
5. CONTACT GROUTING WOULD NOT GENERALLY BE NECESSARY WHERE CONSOLIDATION GROUTING HAD BEEN DONE. HOWEVER, IT SHOULD BE DECIDED BY ACTUAL CONTACT GROUTING IN JUMP HOLES AFTER CONSOLIDATION GROUTING.
6. FOR CONTACT GROUTING THE MAXIMUM PRESSURE RECOMMENDED IS 5kg/cm². FOR CONSOLIDATION GROUTING A MAXIMUM PRESSURE OF 7kg/cm² IS NORMALLY RECOMMENDED BUT THIS MAY BE INCREASED UP TO 20kg/cm² IN SPECIAL CASES PROVIDED THAT THERE IS ADEQUATE COVER AND JOINTS IN THE ROCK ARE NOT LIKELY TO OPEN UP.
7. THE USUAL NOMINAL SIZE OF HOLES IN UNDERGROUND WORKS IS 35 TO 40mm. THE USUAL SIZE OF PIPES EMBEDDED IN CONCRETE LINING FOR DRILLING HOLES IS 50mm INTERNAL DIA.
8. FORE POLING IS RECOMMENDED ONLY IF STAND-UP TIME IS LOW AND HIGH SQUEEZING GROUND CONDITION IS ENCOUNTERED.

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

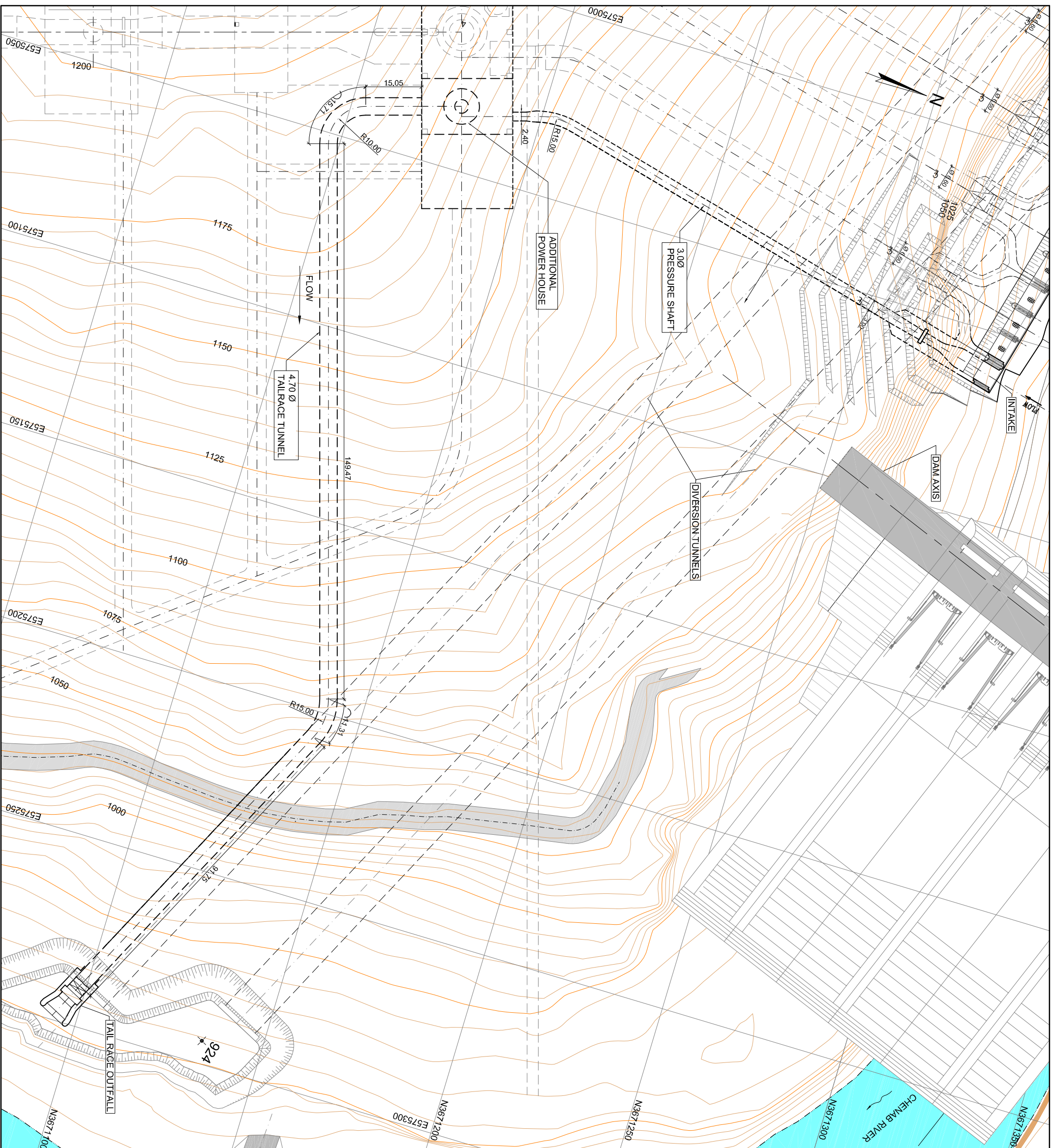
TAILRACE TUNNEL GROUTING DETAILS

TYPICAL SECTIONS

DESIGNED:	SCALE:	FORMAT:
AF-Consult Switzerland Ltd.	1:75	A1
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CHECKED: RAE	DRAWING NO.	REV. No.
APPROVED: GUH	71.2133.09.103	0
DATE: 14.12.11		



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Tägermatten 28
CH-3600 Baden/Schweiz



NOTES :
 1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

REFERENCE DRAWINGS
 71.2133.00.003 PROJECT AREA GENERAL LAYOUT PLAN

PACKAGE - 1(B)
FOR TENDER PURPOSE ONLY

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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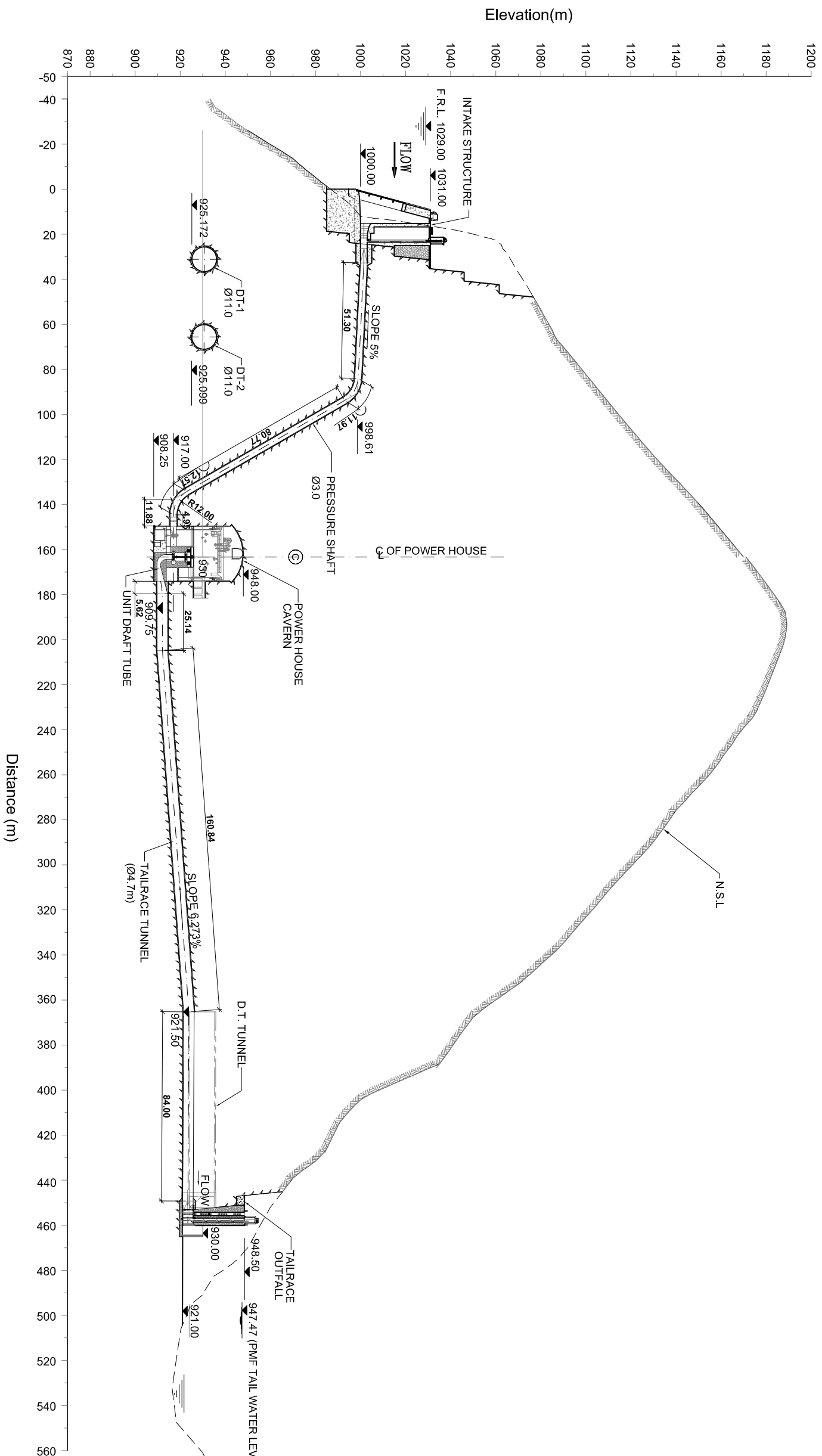
GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
 RATLE HYDRO ELECTRIC PROJECT

**ADDITIONAL PLANT
 GENERAL ARRANGEMENT**

DESIGNED: PRJ	SCALE: 1:300	FORMAT: A1
DRAWN: RKS/SAN	1:1000	[A3]
CHECKED: PRJ	DRAWING No.	REV. No.
APPROVED: SMR	71.2133.11.001	0
DATE: 09/12/11		

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 CH-3600 Baden Switzerland

L-SECTION



NOTES:
 1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.

PACKAGE - (1/B)

FOR TENDER PURPOSE ONLY

PHASE	DESIGNED	CHECKED	APPROVED	DATE
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<input type="checkbox"/> AS-BUILT DRAWINGS				

REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
 RATLE HYDRO ELECTRIC PROJECT
 ADDITIONAL PLANT
 GENERAL ARRANGEMENT

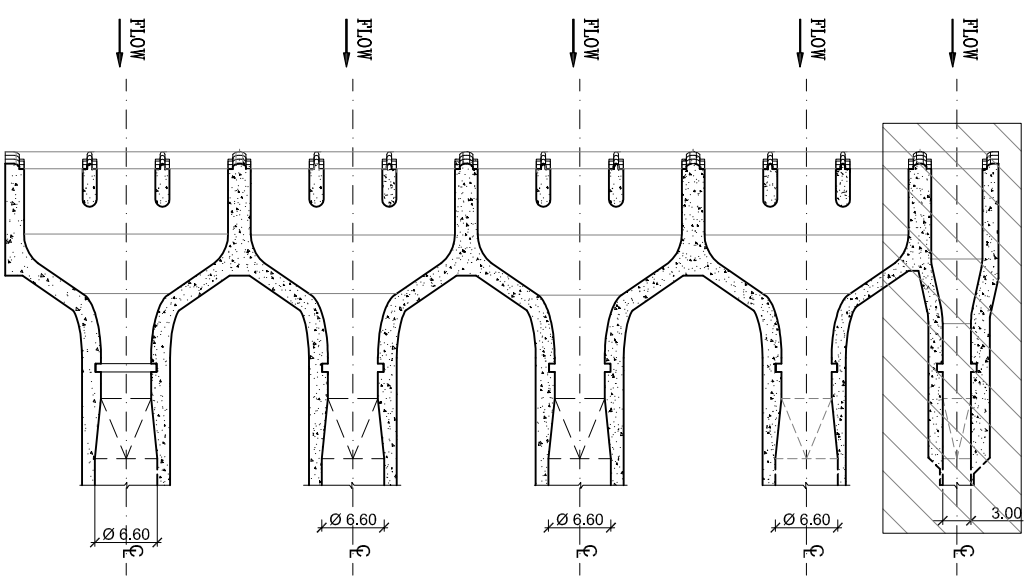
LONGITUDINAL SECTION

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APPROVED: GUH	71.2133.11.002	0
DATE: 09/12/11		

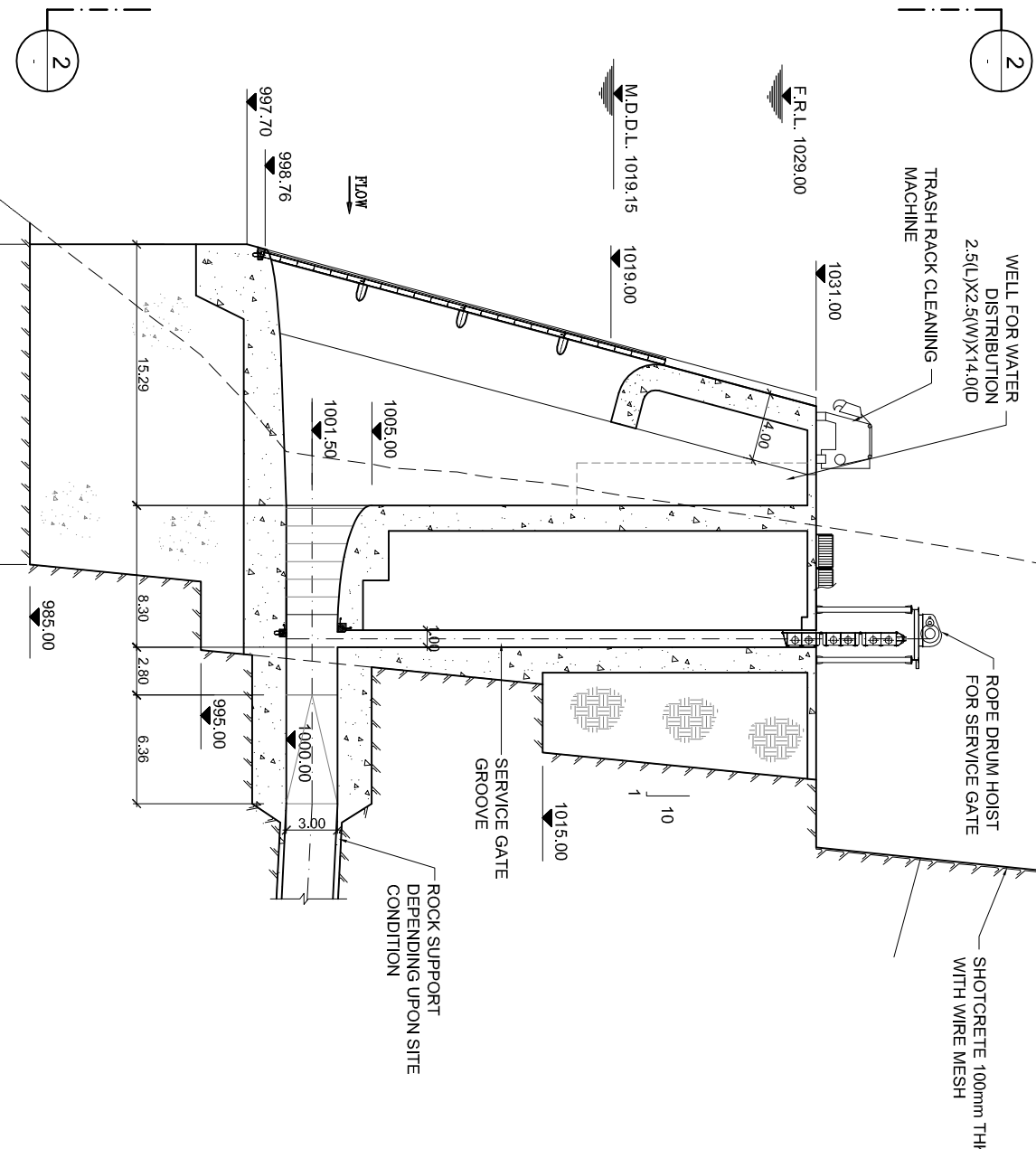
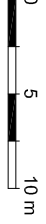


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 CH-3400 Baden, Switzerland

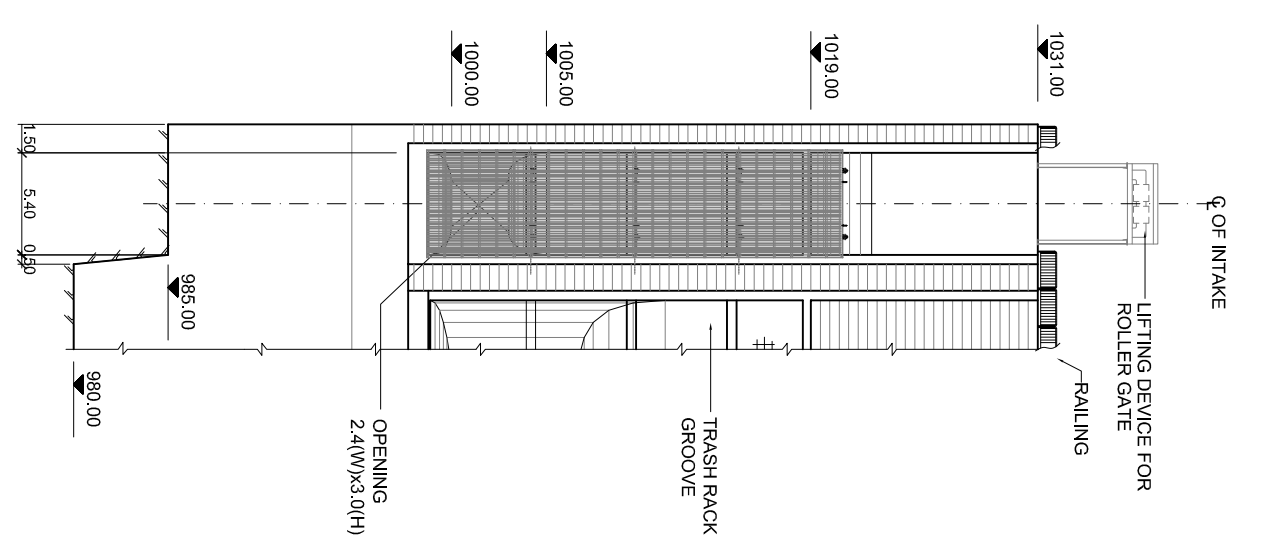
INTAKE KEY PLAN



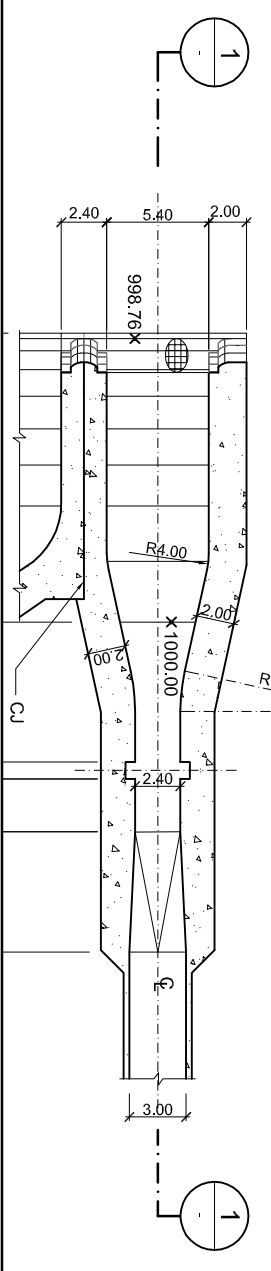
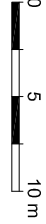
SECTION 1-1



VIEW 2-2



PLAN



LEGEND:

- STRUCTURAL CONCRETE - M25
- MASS CONCRETE - M10
- COMPACTED BACKFILL

- NOTES :**
- 1.) ALL DIMENSIONS AND LEVELS ARE IN METER UNLESS OTHERWISE INDICATED.
 - 2.) DRAIN HOLES (45mm Ø 7 M. LONG) WITH DRAIN (300X300mm) SHALL BE GIVEN ON THE SLOPE OF INTAKE DEPENDING UPON THE SITE CONDITION ENCOUNTERED.

PACKAGE - 1(A)

FOR TENDER PURPOSE ONLY

PHASE	DESIGNED:	SCALE:	FORMATT:
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<input type="checkbox"/> AS-BUILT DRAWINGS			
REV.	REVISION DESCRIPTION	DRWN/CHKD	APPD. DATE

GVK GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

RATLE HYDRO ELECTRIC PROJECT

ADDITIONAL PLAN
INTAKE ARRANGEMENT

PLAN AND SECTIONS

DESIGNER: PRJ	SCALE: 1:200, 1:300	FORMATT: A1
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APPROVED: GUH	DATE: 28/11/11	REV. No. 0

AF-Consult India Pvt. Ltd. T. 020-26088888
Ch-360 Baramshiwarli

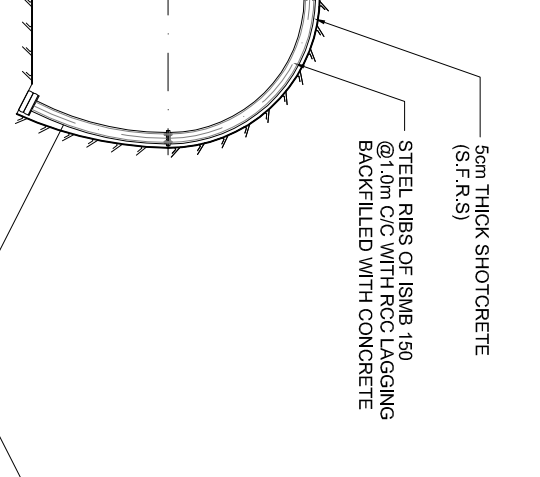
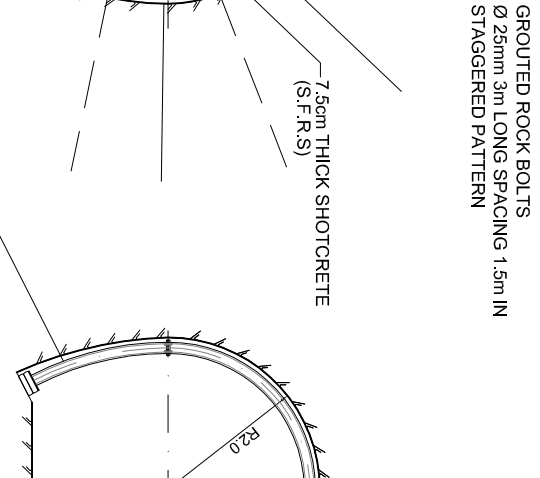
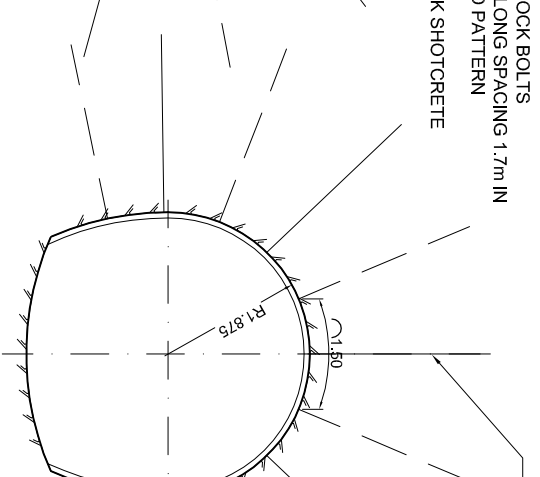
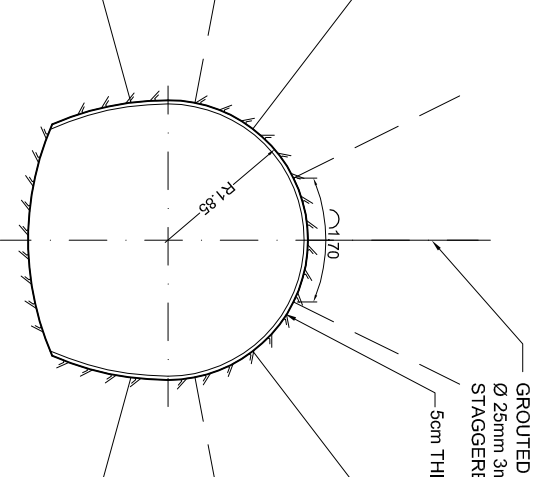
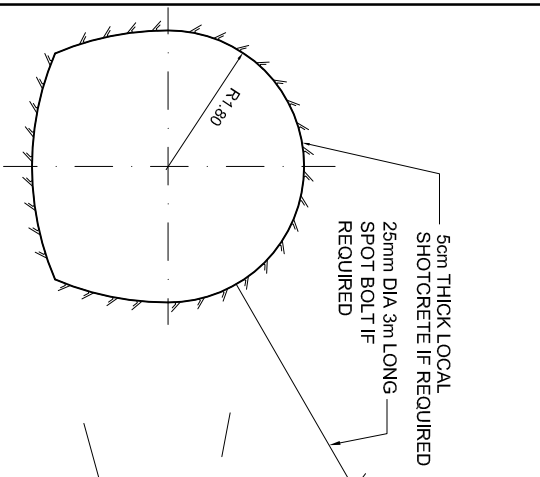
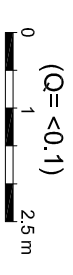
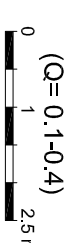
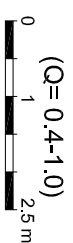
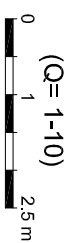
ROCK SUPPORT CLASS I

ROCK SUPPORT CLASS II

ROCK SUPPORT CLASS III

ROCK SUPPORT CLASS IV

ROCK SUPPORT CLASS V



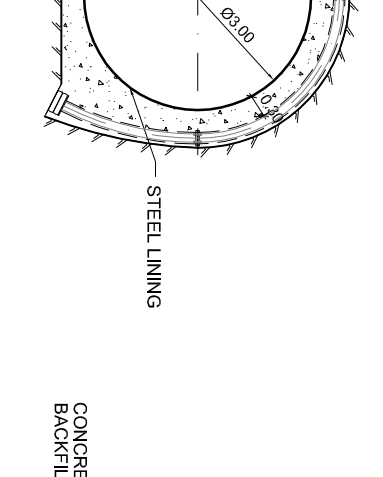
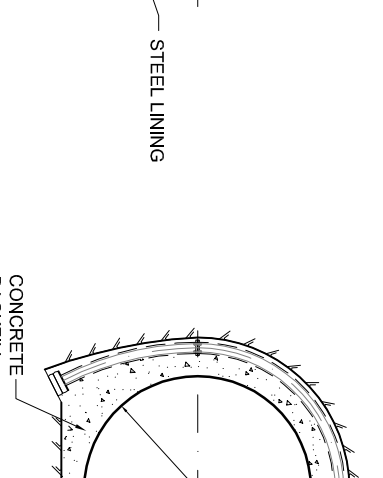
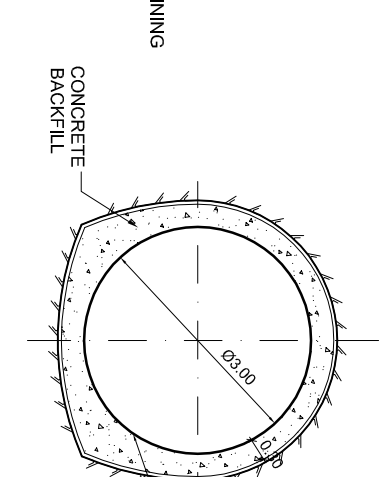
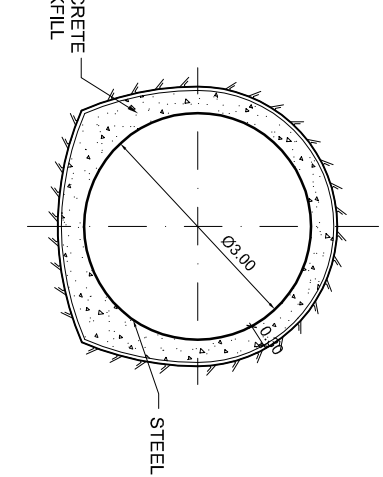
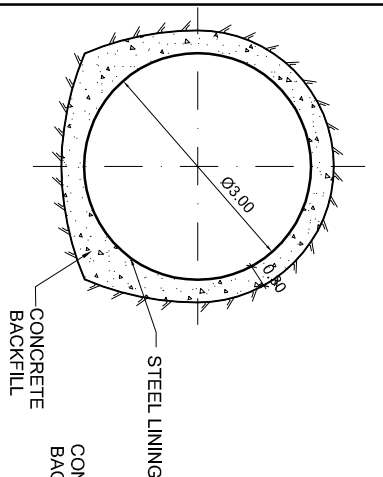
EXCAVATION

EXCAVATION

EXCAVATION

EXCAVATION

EXCAVATION



LINING

LINING

LINING

LINING

LINING

- NOTES:**
1. ALL DIMENSIONS ARE IN METERS EXCEPT SHOWN OTHERWISE.
 2. SUPPORT MEASURES INDICATED ARE TYPICAL. MINOR MODIFICATION/RELOCATIONS OF THE ACTUAL SUPPORT MEASURES SHALL BE DECIDED ON SITE IN ACCORDANCE WITH GROUND CONDITIONS ENCOUNTERED.
 3. ADDITIONAL ROCK BOLTS, SHOTCRETE OR WELDED STEEL FABRIC MIGHT BE REQUIRED FOR ANY TYPICAL SECTIONS IN ORDER TO IMPROVE/GUARANTEE THE LOCAL ROCK STABILITY, BEFORE SHOTCRETE PLACING. ALL WATER INFLOWS SHALL BE DRAINED PROPERLY.
 4. SHOTCRETING SHALL BE DONE TRUE TO THE THICKNESS SHOWN IN THE DRAWING AS PER RELEVANT CODES.
 5. THE LENGTH & DIRECTION OF ROCK BOLTS MAY BE ALTERED IN CONSULTATION WITH THE GEOLOGIST & ENGINEER-IN-CHARGE.
 6. ROCK BOLTING SHALL BE DONE AS PER TECHNICAL SPECIFICATION. ALL ROCK BOLTS SHALL BE 25mm Ø SOLID BAR GROUTED OVER THEIR ENTIRE LENGTH WITH MIN. LOAD CAPACITY OF 100KN.
 7. STEEL RIB SHALL BE PROVIDED AT INVERT FOR ROCK MASS QUALITY, Q < 0.1 IF REQUIRED.

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

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GVK GVK RATTLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATTLE HYDRO ELECTRIC PROJECT

ADDITIONAL PRESSURE TUNNEL EXCAVATION, SUPPORT AND LINING DETAILS

TYPICAL SECTIONS

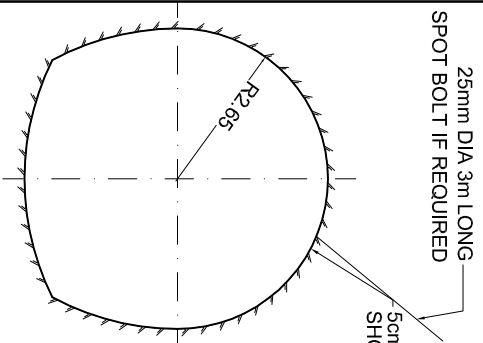
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APPROVED: GUH	71.2133.11.101	0
DATE: 18.11.11		



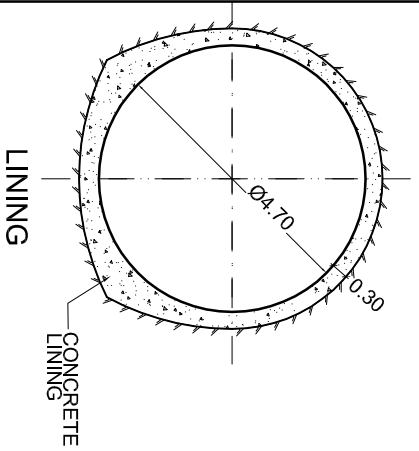
AF-Consult Switzerland Ltd.
Thimmesstrasse 28
CH-3000 Berner Schindlerland

ROCK SUPPORT CLASS I

(Q= 10-100)



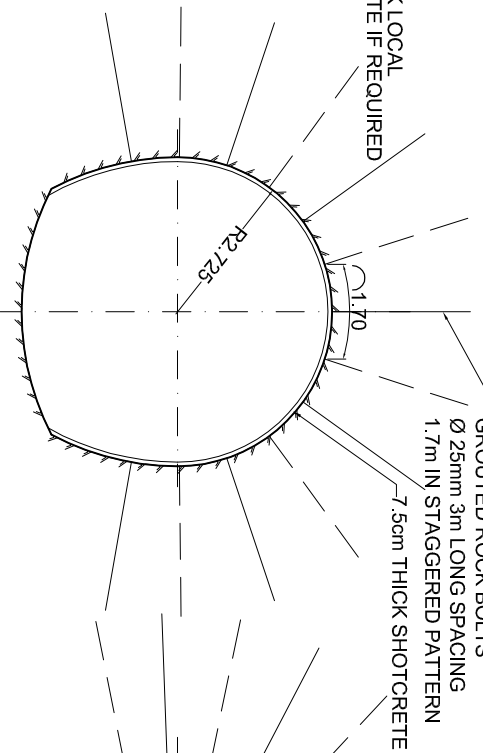
EXCAVATION



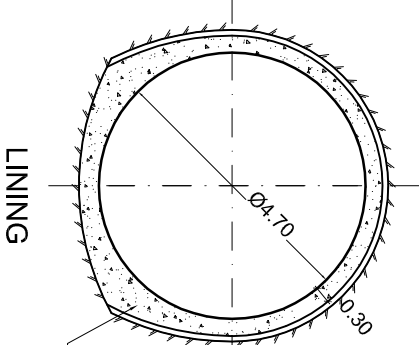
LINING

ROCK SUPPORT CLASS II

(Q= 1-10)



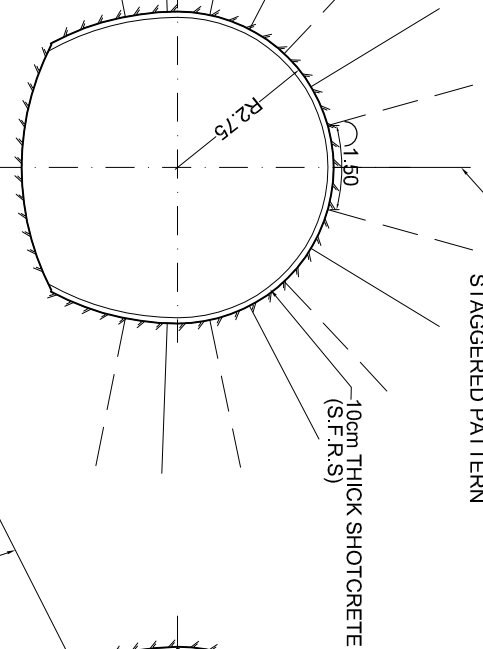
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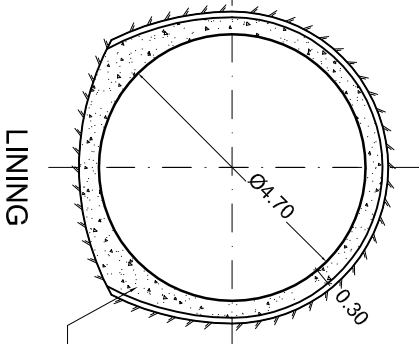
LINING

ROCK SUPPORT CLASS III

(Q= 0.4-1.0)



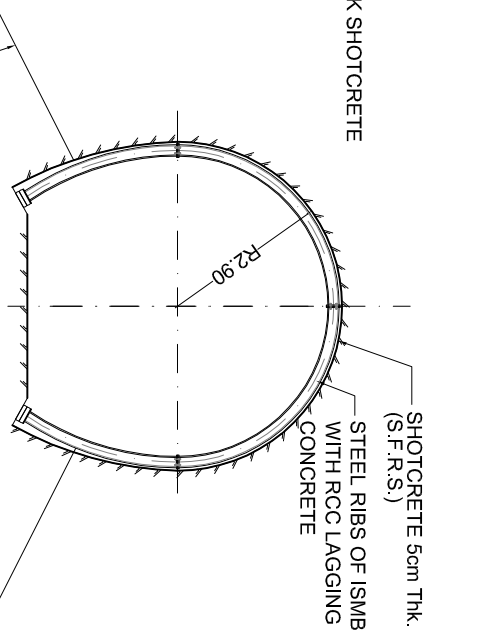
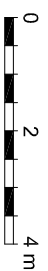
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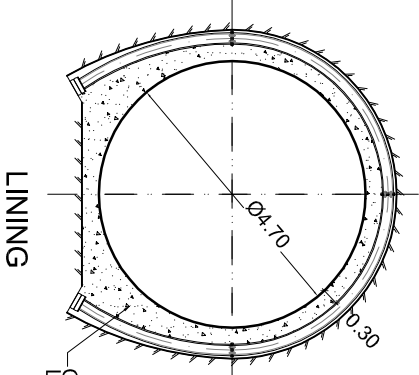
LINING

ROCK SUPPORT CLASS IV

(Q= 0.1-0.4)



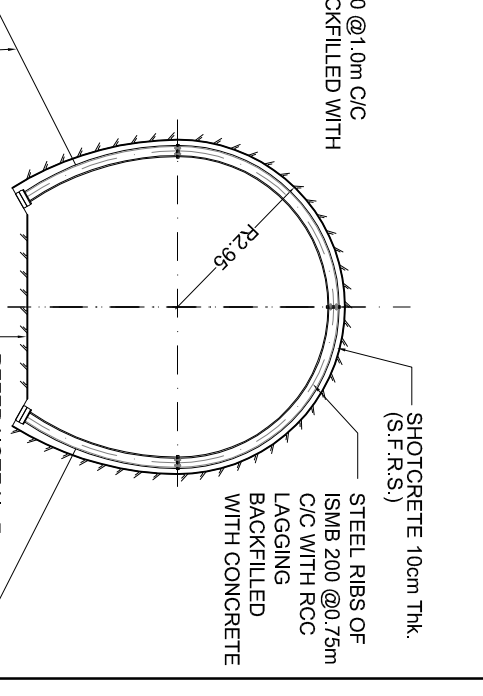
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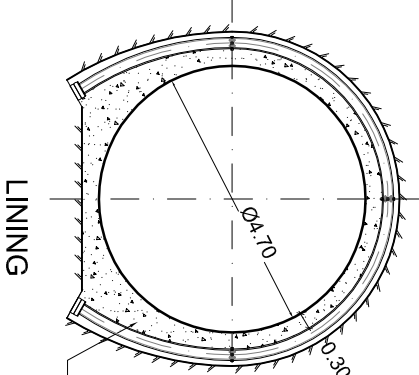
LINING

ROCK SUPPORT CLASS V

(Q= 0.01-0.1)



EXCAVATION



LINING

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

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<input type="checkbox"/> AS-BUILT DRAWINGS					
REV.	REVISION DESCRIPTION	DRWN	CHKD	APPD.	DATE

GVK GVK RATTLE HYDRO ELECTRIC PROJECT PVT. LTD.

RATTLE HYDRO ELECTRIC PROJECT

ADDITIONAL TAIL RACE TUNNEL
EXCAVATION, SUPPORT AND LINING DETAILS

TYPICAL SECTIONS

DESIGNED	SCALE	FORMAT
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CHECKED: RAE	DRAWING No.	REV. No.
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DATE: 18.11.11		

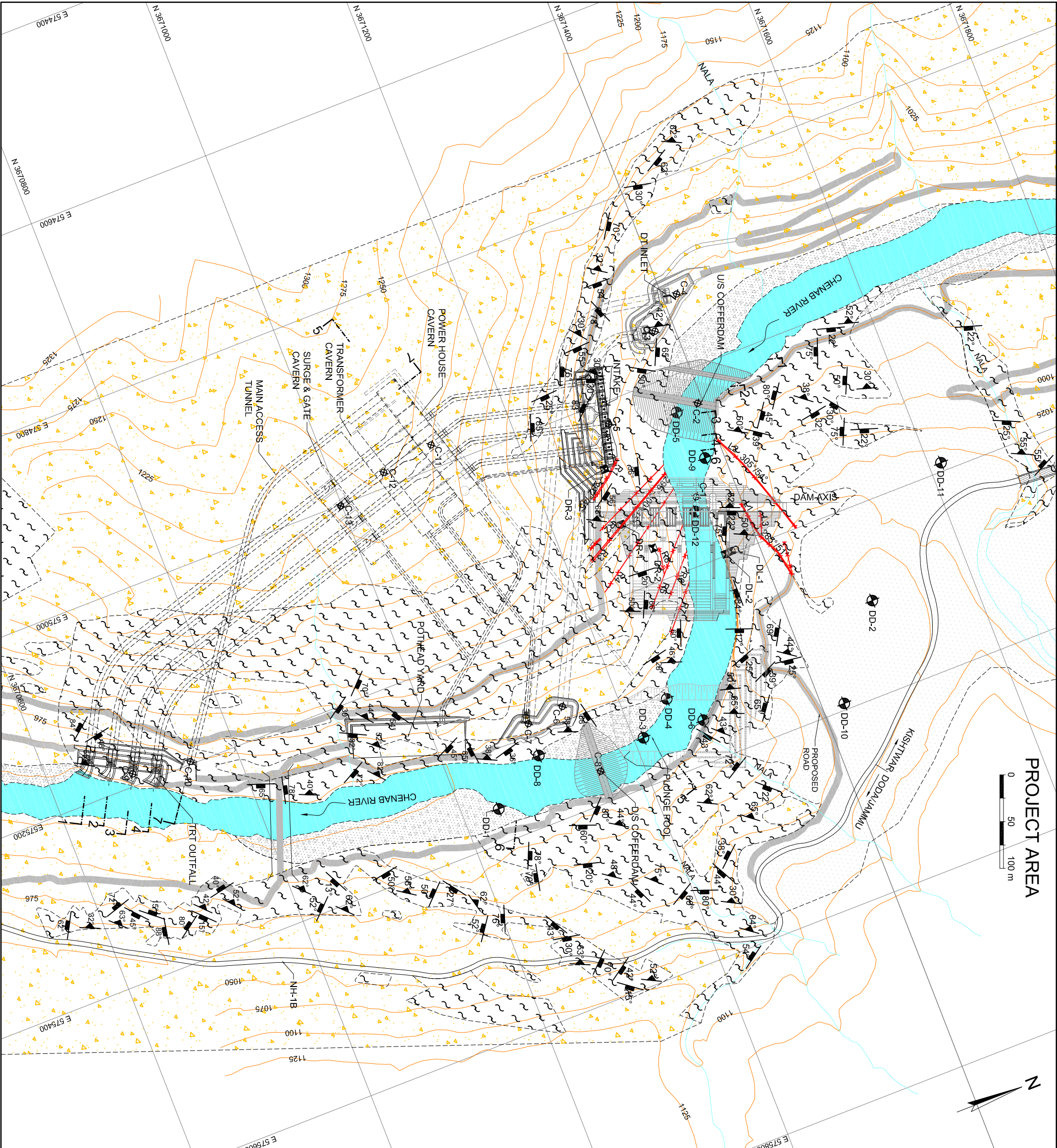


A/E-Cconsult Switzerland Ltd.
Tillereisen 28
CH-5600 Birmensdorf

- NOTES:**
1. ALL DIMENSIONS ARE IN METERS EXCEPT SHOWN OTHERWISE.
 2. SUPPORT MEASURES INDICATED ARE TYPICAL. MINOR MODIFICATION/RELOCATIONS OF THE ACTUAL SUPPORT MEASURES SHALL BE DECIDED ON SITE IN ACCORDANCE WITH GROUND CONDITIONS ENCOUNTERED.
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GEOLOGICAL DRAWINGS

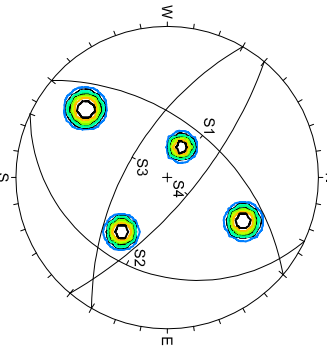




PROJECT AREA



STEREOGRAPHIC PROJECTION OF AVERAGE DISCONTINUITY DATA COLLECTED FROM PROJECT AREA



CO-ORDINATES & LEVELS OF PROJECT COMPONENTS

POINTS	EASTING	NORTHING	LEVEL (m)	REMARK
C-1	575129.84	3671356.10	1031.00	DAM TOP
C-2	575037.22	3671393.82	950.00	UIS COFFERDAM TOP
C-3	574949.02	3671379.37	926.00	DT - 1 INVERT
C-4	574920.31	3671415.23	926.00	DT - 2 INVERT
C-5	575023.61	3671297.41	1000.00	INTAKE INVERT
C-6	575286.71	3671141.47	924.00	DT-1 OUTFALL INVERT
C-7	575290.54	3671101.02	924.00	DT-2 OUTFALL INVERT
C-8	575365.98	3671154.54	935.00	DIS COFFERDAM TOP
C-9	575187.13	3670687.56	947.00	TRT OUTFALL GATE OPERATION
C-10	575197.08	3670749.78	950.00	MAT PORTAL INVERT
C-11	574973.34	3671112.29	948.00	POWER HOUSE CROWN
C-12	574984.29	3671054.45	948.00	TRANSFORMER HALL CROWN
C-13	575001.02	3670998.67	957.50	SURGE & GATE CROWN

LEGEND :

- RIVER BORNE MATERIAL
- COLLUVIUM / SLOPE WASH
- TERRACE DEPOSITS
- GNEISS / MICA SCHIST (WITH TOURMALINE GRANITE/ QUARTZO-FELDSPATHIC ROCK)
- MAIN FOLIATION
- JOINT (S)
- SHEAR ZONE < 10 CM
- SHEAR ZONE (10 to 200 CM)
- INFERRED CONTACTS
- COMPLETED DRILL HOLE
- EXPLORATORY DRIFT

NOTES :
1. ALL DIMENSIONS ARE IN METER EXCEPT SHOWN OTHERWISE.

PACKAGE-1(B)
FOR TENDER PURPOSE ONLY

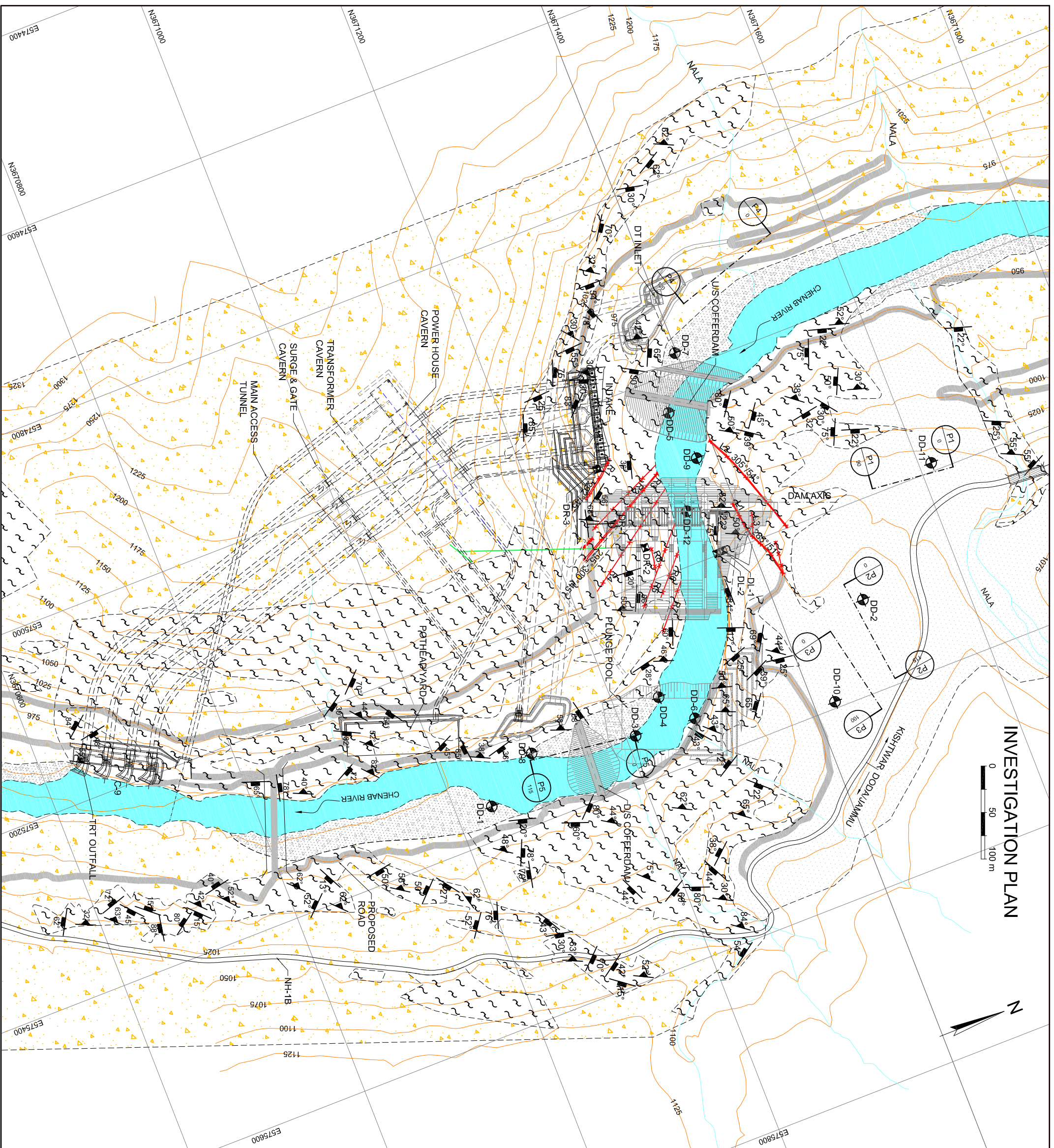
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PROJECT AREA GEOLOGICAL PLAN

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

DESIGNED: RAN	SCALE: 1:27000	FORMAT: A1
DRAWN: RAK	DRAWING NO. 71.2133.00.800	REV. No. 0
CHECKED: RAN/GHU	APPROVED: GUH	
DATE: 13.12.11		

AF-Consult Switzerland Ltd.
Tilmanstrasse 28
CH-5400 Basel-Stadt



INVESTIGATION PLAN



DETAILS OF COMPLETED DRILL HOLES:

Drill hole No	Location	Collar Elevation (m)	Total Depth (m)	Overburden Depth (m)
DD-1	Left Bank	929.35	43.0	8.50
DD-2	Left Bank	1068.88	52.0	15.00
DD-3	Right Bank	927.16	32.2	16.00
DD-4	Right Bank	927.37	40.3	21.25
DD-5	Right Bank	927.67	25.0	22.00
DD-6	Plunge Pool Area	927.13	17.5	0.00
DD-7	Right Bank/DT Inlet	922.00	5.0	5.00
DD-8	DT Outfall	927.60	25.0	6.00
DD-9	U/S Dam Axis	927.13	24.5	6.00
DD-10	Left Bank Terrace	1058.84	55.0	39.00
DD-11	Left Bank Terrace	1060.10	35.3	18.50
DD-12	Dam Axis	927.18	41.9	9.40

DETAILS OF EXPLORATORY DRIFTS:

S.N.	Location	Elevation	Straight Length -m	U/S X-cut	D/S X-cut
DL-1	Left Bank ~32m d/s of Dam axis	994.993	32.0	23.0	-
DL-2	Left Bank ~35m d/s of Dam axis	971.680	25.0	46.0	-
DR-1	Right Bank ~5m d/s of Dam axis	987.826	29.0	14.5	15.5
DR-2	Right Bank ~29m d/s of Dam axis	966.653	42.0	28.0	-
DR-3	Intake Area	995.002	41.0	15.0	15.0
PHD	Power House	966.653	188.0	223.0	-

DETAILS OF SEISMIC REFRACTION PROFILES:

S.N.	S-Line	Location	Inferred Bed Rock Level
1	P-1	Terrace area in Drabshala Village	El. 1048 & 1065m
2	P-2	Terrace area in Drabshala Village	El. 1043 & 1057m
3	P-3	Terrace area in Drabshala Village	El. 1043 & 1057m
4	P-4	Diversion Tunnel Inlet area	El. 936 & 949m
5	P-5	D/S coffer dam area	El. 913 & 919m

LEGEND :

- DRILL HOLE (COMPLETED)
- EXPLORATORY DRIFT -DAM SITE & INTAKE (COMPLETED)
- EXPLORATORY DRIFT -POWER HOUSE (IN PROGRESS)
- EXPLORATORY DRIFT - POWER HOUSE (PROPOSED)
- SEISMIC PROFILE

NOTES :

1. ALL DIMENSIONS ARE IN METER EXCEPT SHOWN OTHERWISE.
2. FOR GEOLOGICAL DETAILS / LEGEND REFER DWG. 71.2133.00.800.

PHASE	NO.	DESCRIPTION	DATE
PRE-FEASIBILITY STUDY			
FEASIBILITY STUDY			
INCEPT. & BASIC DESIGN			
TENDER DESIGN			
CONSTRUCTION DESIGN			
AS-BUILT DRAWINGS			

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

INVESTIGATION PLAN OF PROJECT AREA

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

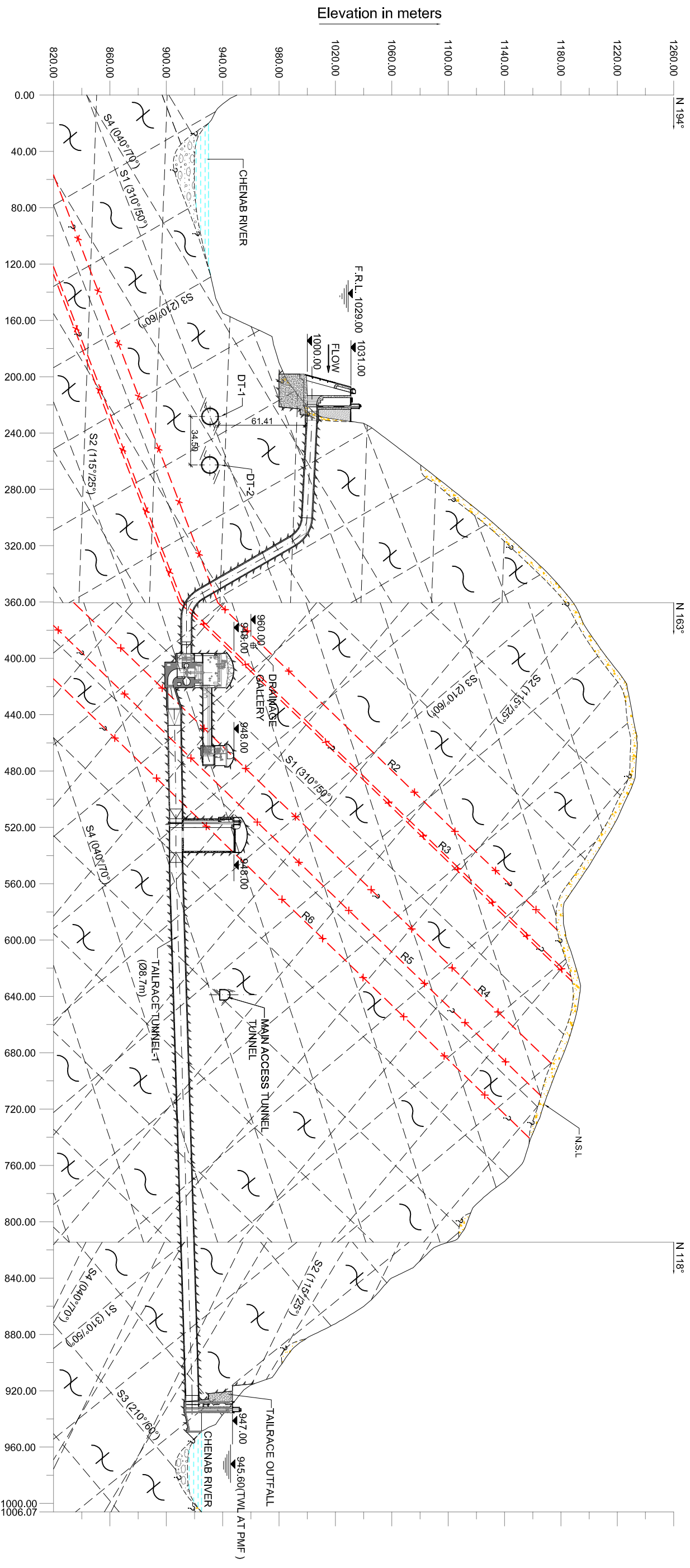
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71.2133.00.801

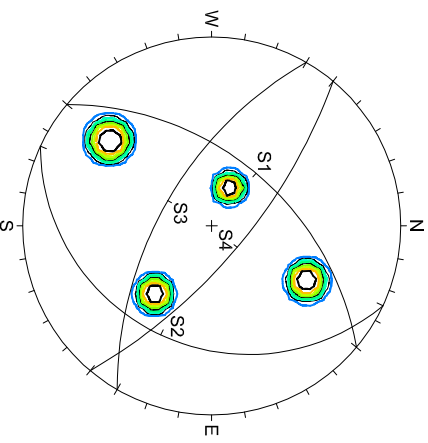
AF-Consult Switzerland Ltd.
 Tilmannstrasse 28
 CH-3600 Baden/Schweiz

SECTION 1-1

(SECTION ALONG WATER CONDUCTOR SYSTEM-1)



STEREOGRAPHIC PROJECTION OF AVERAGE DISCONTINUITY DATA COLLECTED FROM PROJECT AREA



- LEGEND :**
- RIVER BORNE MATERIAL
 - COLLUVIUM / SLOPE WASH
 - GNEISS / MICA SCHIST (WITH TOURMALINE GRANITE/QUARTZOFELDSPATHIC ROCK)
 - TRACES JOINTS
 - SHEAR ZONE <10 CM
 - SHEAR ZONE (10 to 200 CM)
 - INFERRED CONTACTS

REFERENCE DRAWINGS :

71.2133.00.800 PROJECT AREA GEOLOGICAL PLAN

NOTES :

1. ALL DIMENSIONS ARE IN METER EXCEPT SHOWN OTHERWISE.
2. APPARENT DIP & DIRECTION ARE PLOTTED ON SECTION PLOTTED JOINT/ FOLIATION SPACING NOT TO SCALE & ARE SCHEMATIC.
3. SHEAR ZONE TRACES ARE PROJECTED CONSIDERING AVERAGE STRIKE OF 040-220 AND ARE SCHEMATICALLY SHOWN.

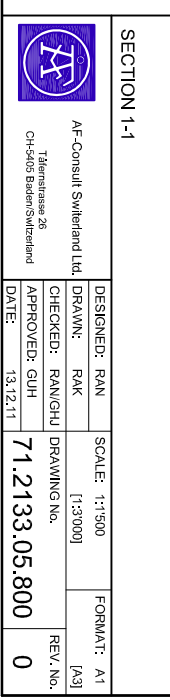
PACKAGE-1(B)
FOR TENDER PURPOSE ONLY

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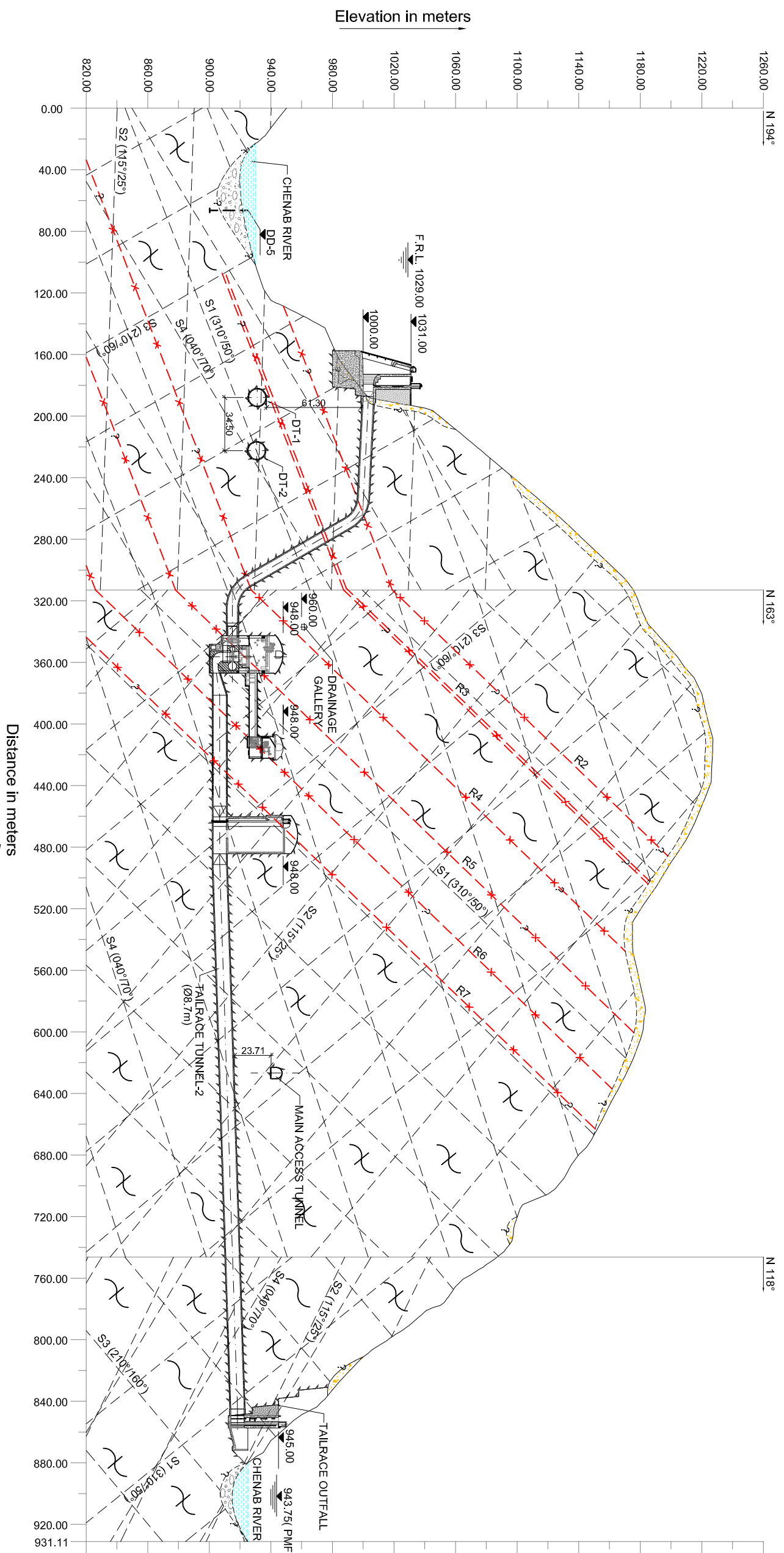
GWK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
WATER CONDUCTOR SYSTEM-1
GEOLOGICAL SECTION

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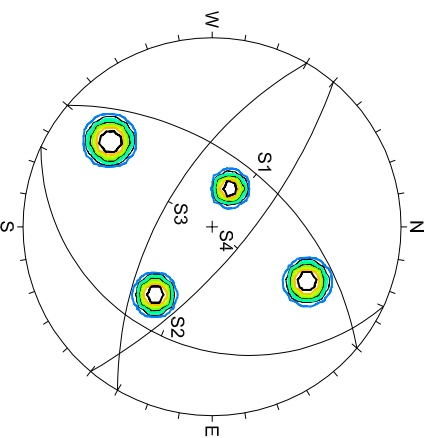


SECTION 2-2

(SECTION ALONG WATER CONDUCTOR SYSTEM-2)



STEREOGRAPHIC PROJECTION OF AVERAGE DISCONTINUITY DATA COLLECTED FROM PROJECT AREA



- LEGEND :**
- RIVER BORNE MATERIAL
 - COLLUVIUM / SLOPE WASH
 - GNEISS / MICA SCHIST (WITH TOURMALINE GRANITE/ QUARTZO-FELDSPATHIC ROCK)
 - TRACES JOINTS
 - SHEAR ZONE <10 CM
 - SHEAR ZONE (10 to 200 CM)
 - INFERRED CONTACTS

REFERENCE DRAWINGS :

71.2133.00.800 PROJECT AREA GEOLOGICAL PLAN

NOTES :

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3. SHEAR ZONE TRACES ARE PROJECTED CONSIDERING AVERAGE STRIKE OF 040-220 AND ARE SCHEMATICALLY SHOWN.

DETAILS OF COMPLETED DRILL HOLES:

Drill hole No	Location	Collar Elevation (m)	Total Depth (m)	Overburden Depth (m)
DD-5	Right Bank	927.67	25.00	22.00

PACKAGE-1(B)
FOR TENDER PURPOSE ONLY

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GVK RATTLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATTLE HYDRO ELECTRIC PROJECT
WATER CONDUCTOR SYSTEM-2
GEOLOGICAL SECTION

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DATE: 13.12.11	71.2133.05.801	0



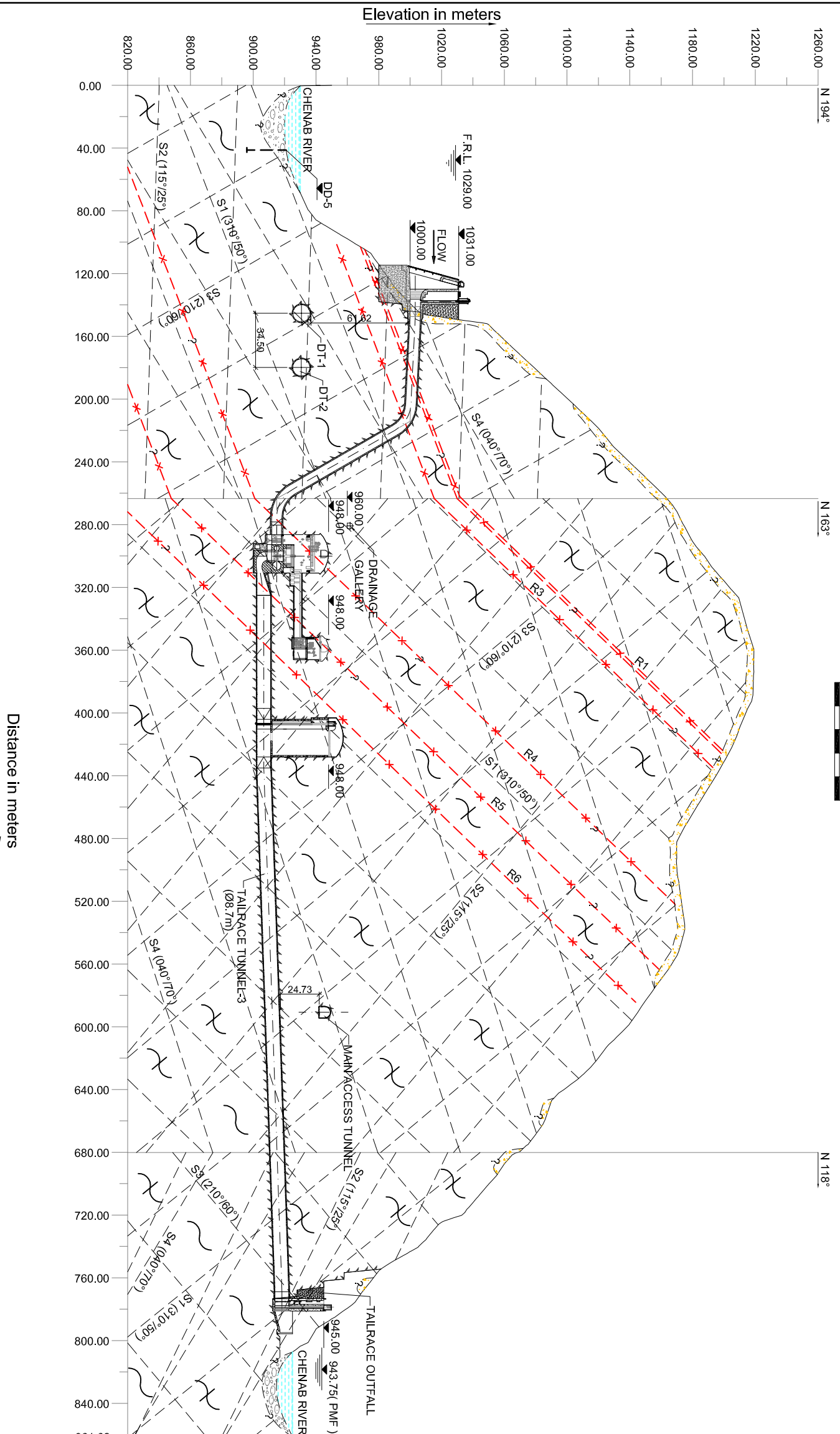
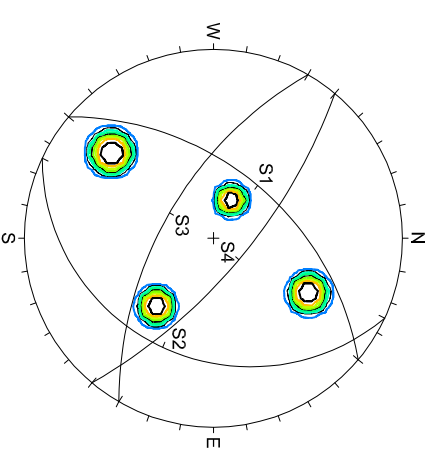
AF-Consult Switzerland Ltd.
Thimistrasse 26
CH-9400 Birmensdorf/Schweiz

SECTION 3-3

(SECTION ALONG WATER CONDUCTOR SYSTEM-3)



STEREOGRAPHIC PROJECTION OF AVERAGE DISCONTINUITY DATA COLLECTED FROM PROJECT AREA



- LEGEND :**
- RIVER BORNE MATERIAL
 - COLLUVIUM / SLOPE WASH
 - GNEISS / MICA SCHIST (WITH TOURMALINE GRANITE/ QUARTZO-FELDSPATHIC ROCK)
 - TRACES JOINTS
 - SHEAR ZONE <10 CM
 - SHEAR ZONE (10 to 200 CM)
 - INFERRED CONTACTS

REFERENCE DRAWINGS :
71.2133.00.800 PROJECT AREA GEOLOGICAL PLAN

- NOTES :**
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FOR TENDER PURPOSE ONLY

PACKAGE-1(B)

DETAILS OF COMPLETED DRILL HOLES:

Drill hole No	Location	Collar Elevation (m)	Total Depth (m)	Overburden Depth (m)
DD-5	Right Bank	927.67	25.00	22.00

WATER CONDUCTOR SYSTEM-3 GEOLOGICAL SECTION

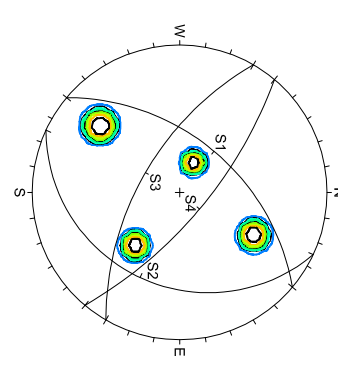
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No.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE								
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SECTION 3-3

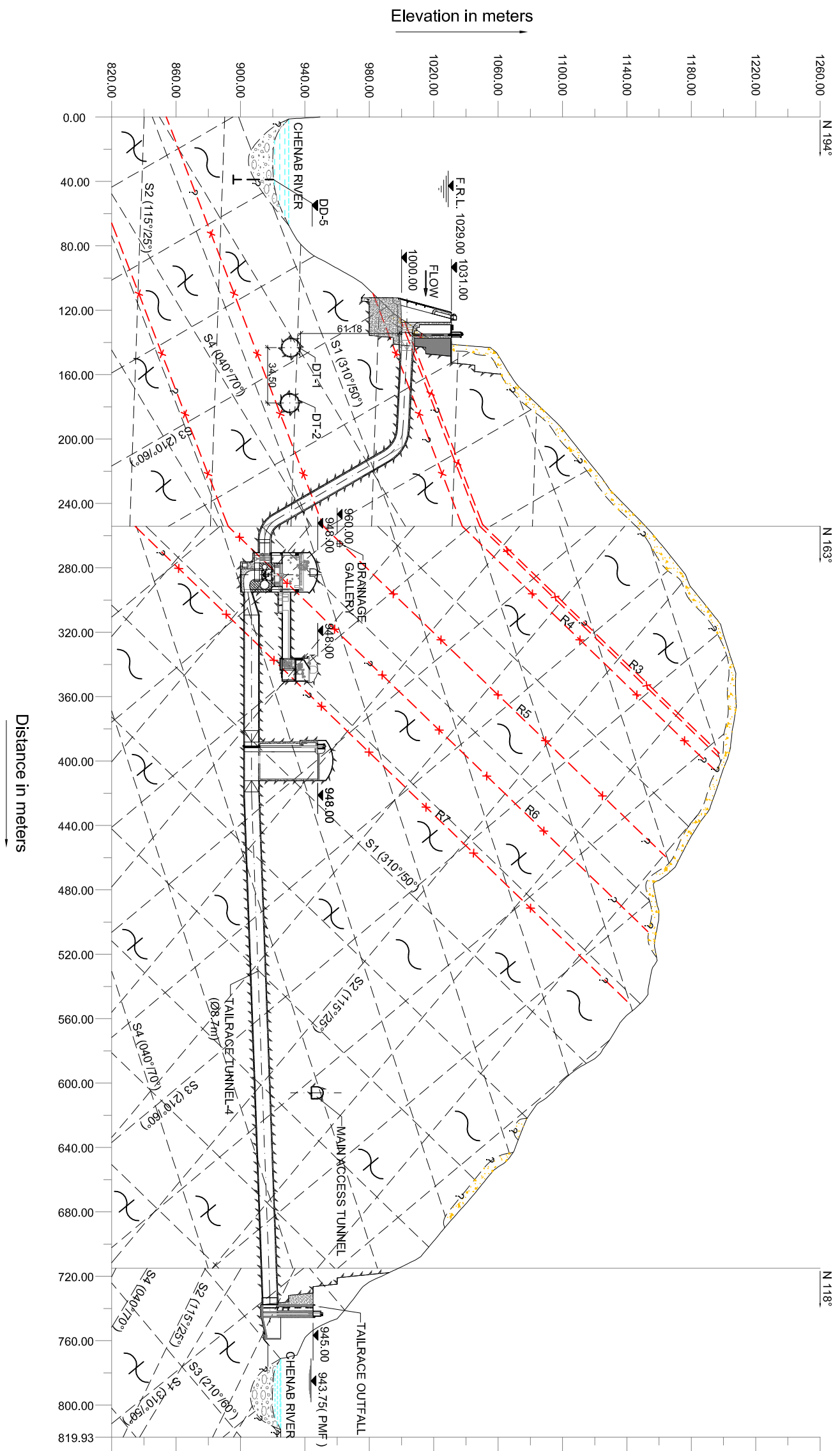
AFC-Consult Switzerland Ltd.
Tägermatten 28
CH-3400 Baden, Switzerland

71.2133.05.802

STEREOGRAPHIC PROJECTION OF AVERAGE DISCONTINUITY DATA COLLECTED FROM PROJECT AREA



SECTION 4-4
(SECTION ALONG WATER CONDUCTOR SYSTEM-4)



DETAILS OF COMPLETED DRILL HOLES:

Drill hole No	Location	Collar Elevation (m)	Total Depth (m)	Overburden Depth (m)
DD-5	Right Bank	927.67	25.00	22.00

- LEGEND :**
- RIVER BORNE MATERIAL
 - COLLUVIUM / SLOPE WASH
 - GNEISS / MICA SCHIST (WITH TOURMALINE GRANITE/ QUARTZO-FELDSPATHIC ROCK)
 - TRACES JOINTS
 - SHEAR ZONE < 10 CM
 - SHEAR ZONE (10 to 200 CM)
 - INFERRED CONTACTS

REFERENCE DRAWINGS :

71.2133.00.800 PROJECT AREA GEOLOGICAL PLAN

NOTES :

1. ALL DIMENSIONS ARE IN METER EXCEPT SHOWN OTHERWISE.
2. APPARENT DIP & DIRECTION ARE PLOTTED ON SECTION PLOTTED JOINT/FOLIATION SPACING NOT TO SCALE & ARE SCHEMATIC.
3. SHEAR ZONE TRACES ARE PROJECTED CONSIDERING AVERAGE STRIKE OF 040-220 AND ARE SCHEMATICALLY SHOWN.

FOR TENDER PURPOSE ONLY

PACKAGE-1(B)

PHASE	DESIGNED	CHECKED	APPROVED	DATE
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<input type="checkbox"/> FEASIBILITY STUDY				
<input type="checkbox"/> INCEPT. & BASIC DESIGN				
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<input type="checkbox"/> AS-BUILT DRAWINGS				

REV.	REVISION DESCRIPTION	DRWN	CHKD	APPD	DATE

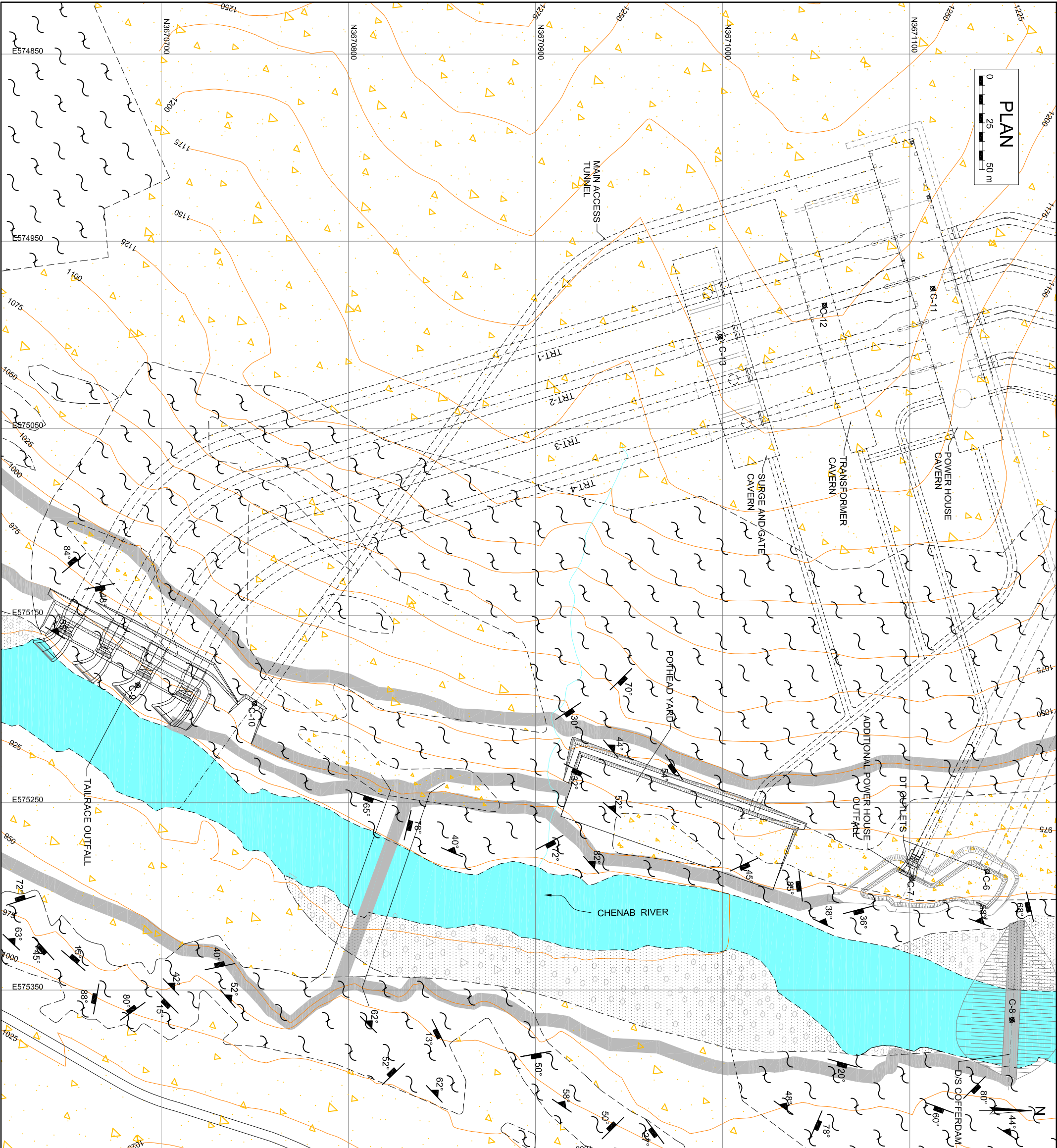
SECTION 4-4

WATER CONDUCTOR SYSTEM-4
GEOLOGICAL SECTION

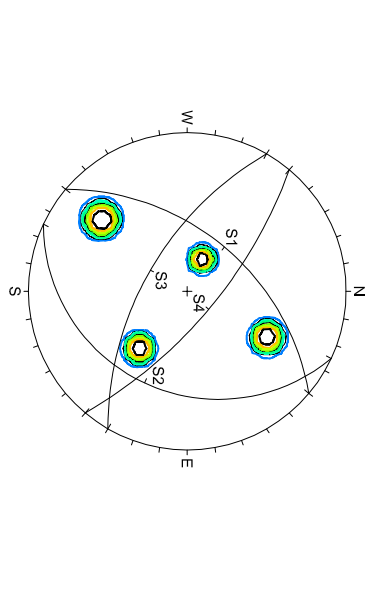
RATLE HYDRO ELECTRIC PROJECT
GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

DESIGNED: RAN	SCALE: 1:1500	FORMAT: A1
DRAWN: RAK	[1:3000]	[A3]
CHECKED: RAN/GHJ	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.05.803	0
DATE: 13.12.11		

AF-Consult Switzerland Ltd.
Tägermatten 25
CH-5400 Baden, Switzerland



STEREOGRAPHIC PROJECTION OF AVERAGE DISCONTINUITY DATA COLLECTED FROM PROJECT AREA



CO-ORDINATES & LEVELS OF PROJECT COMPONENTS

POINTS	EASTING	NORTHING	LEVEL (m)	REMARK
C-6	575286.71	3671141.47	924.00	DT-1 OUTFALL INVERT
C-7	575290.54	3671101.02	924.00	DT-2 OUTFALL INVERT
C-8	575365.98	3671154.54	935.00	D/S COFFERDAM TOP
C-9	575187.13	3670687.56	947.00	TRT OUTFALL GATE OPERATION
C-10	575197.08	3670749.78	950.00	MAT PORTAL INVERT
C-11	574975.34	3671112.29	948.00	POWER HOUSE CROWN
C-12	574984.29	3671054.45	948.00	TRANSFORMER HALL CROWN
C-13	575001.02	3670998.67	957.50	SURGE & GATE CROWN

LEGEND :

- RIVER BORNE MATERIAL
- COLLUVIUM / SLOPE WASH
- GNEISS / MICA SCHIST (WITH TOURMALINE GRANITE) / QUARTZITE-FELSPATHIC ROCK
- MAIN FOLIATION
- JOINT (S)
- INFERRED CONTACTS

REFERENCE DRAWINGS :

71.2133.00.800 PROJECT AREA GEOLOGICAL PLAN

NOTES :

1. ALL DIMENSIONS ARE IN METER EXCEPT SHOWN OTHERWISE.

PACKAGE-1(B)

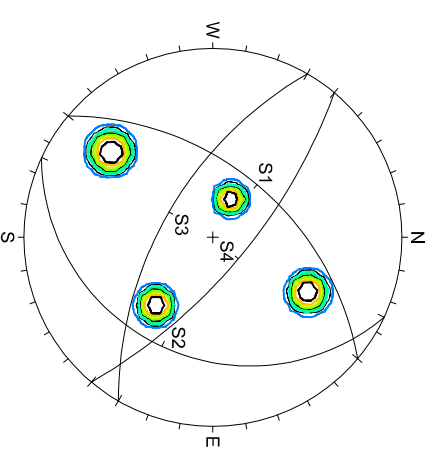
FOR TENDER PURPOSE ONLY

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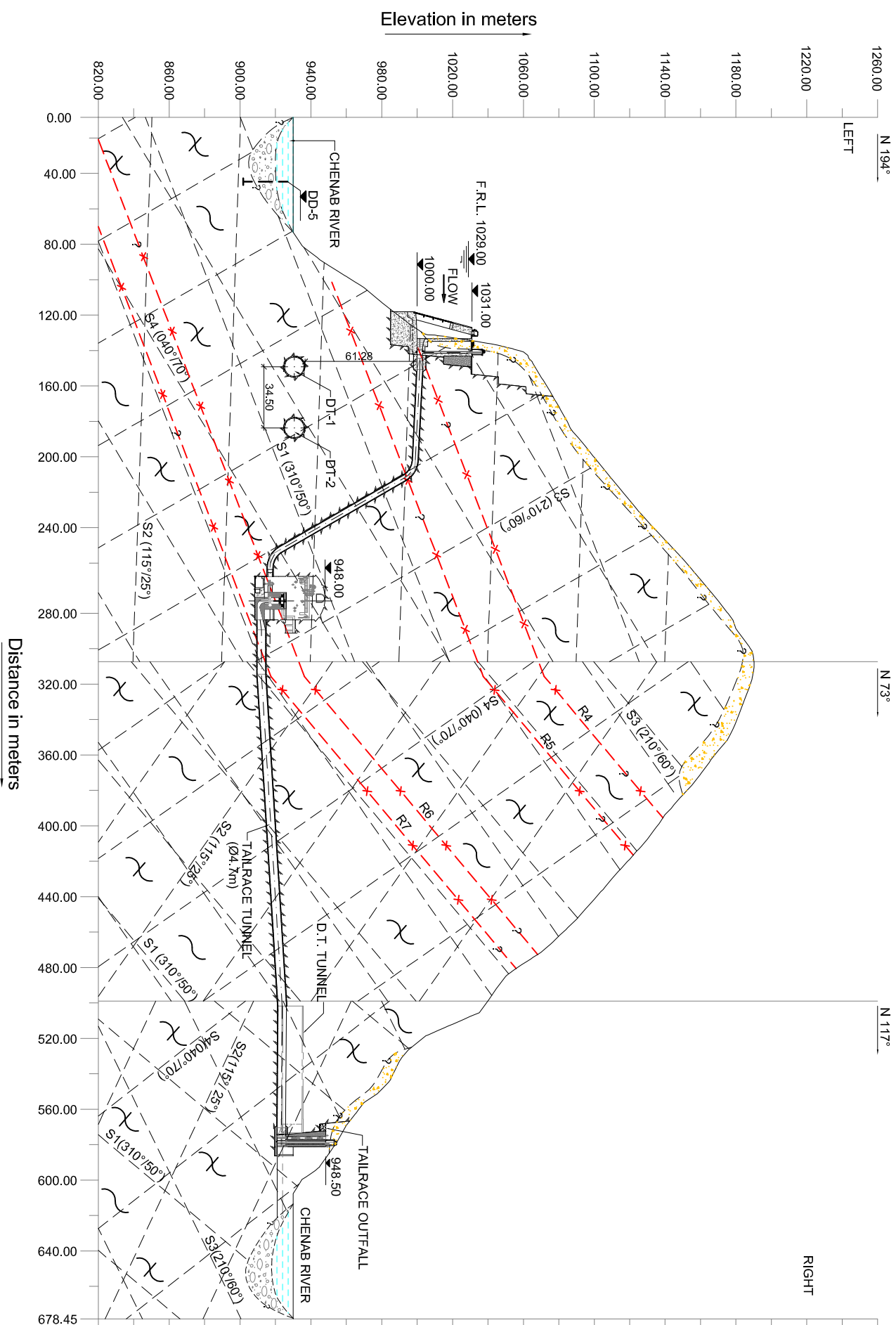
GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
 RATLE HYDRO ELECTRIC PROJECT
 POWER HOUSE COMPLEX & TAILRACE TUNNELS
 GEOLOGICAL PLAN

	DESIGNER: RAN	SCALE: 1:1000	FORMAT: A1
AF-Consult Switzerland Ltd. Thalstrasse 26 CH-3400 Baden, Switzerland	DRAWN: RAK	DATE: 13.12.11	REV. No. 0
	CHECKED: RAN/GHU	DRAWING No. 71.2133.08.800	
	APPROVED: GUH		

STEREOGRAPHIC PROJECTION OF AVERAGE DISCONTINUITY DATA COLLECTED FROM PROJECT AREA



SECTION 6-6
(SECTION ALONG ADDITIONAL POWER HOUSE)



LEGEND :

- RIVER BORNE MATERIAL
- COLLUVIUM / SLOPE WASH
- GNEISS / MICA SCHIST (WITH TOURMALINE GRANITE/ QUARTZO-FELDSPATHIC ROCK)
- TRACES JOINTS
- SHEAR ZONE <10 CM
- SHEAR ZONE (10 to 200 CM)
- INFERRED CONTACTS

REFERENCE DRAWINGS :

71.2133.00.800 PROJECT AREA GEOLOGICAL PLAN

NOTES :

1. ALL DIMENSIONS ARE IN METER EXCEPT SHOWN OTHERWISE.
2. APPARENT DIP & DIRECTION ARE PLOTTED ON SECTION PLOTTED JOINT/FOLIATION SPACING NOT TO SCALE & ARE SCHEMATIC.
3. SHEAR ZONE TRACES ARE PROJECTED CONSIDERING AVERAGE STRIKE OF 040-220 AND ARE SCHEMATICALLY SHOWN.

FOR TENDER PURPOSE ONLY

PACKAGE-1(B)

DETAILS OF COMPLETED DRILL HOLES:

Drill hole No	Location	Collar Elevation (m)	Total Depth (m)	Overburden Depth (m)
DD-5	Right Bank	927.67	25.00	22.00

SECTION 6-6

WATER CONDUCTOR SYSTEM
ADDITIONAL POWER HOUSE
GEOLOGICAL SECTION

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<input type="checkbox"/> CONSTRUCTION DESIGN					
<input type="checkbox"/> AS-BUILT DRAWINGS					

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.

RATLE HYDRO ELECTRIC PROJECT

WATER CONDUCTOR SYSTEM

ADDITIONAL POWER HOUSE

GEOLOGICAL SECTION

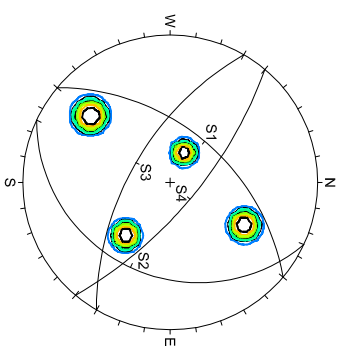
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AF-Consult Switzerland Ltd.	1:1500	A1
DRAWN: RAK	[1:3000]	[A3]
CHECKED: RAN/GHU	DRAWING No.	REV. No.
APPROVED: GUH	71.2133.08.801	0
DATE: 13.12.11		

SECTION 5-5

(GROSS SECTION POWER HOUSE CAVERN)



STEREOGRAPHIC PROJECTION OF AVERAGE DISCONTINUITY DATA COLLECTED FROM PROJECT AREA



LEGEND :

- RIVER BORNE MATERIAL
- COLLUVIUM / SLOPE WASH
- GNEISS / MICA SCHIST (WITH TOURMALINE GRANITE/ QUARTZO-FELDSPATHIC ROCK)
- TRACES JOINTS
- SHEAR ZONE <10 CM
- SHEAR ZONE (10 to 200 CM)
- INFERRED CONTACTS

REFERENCE DRAWINGS :

71.2133.00.800 PROJECT AREA GEOLOGICAL PLAN

NOTES :

1. ALL DIMENSIONS ARE IN METER EXCEPT SHOWN OTHERWISE.
2. APPARENT DIP & DIRECTION ARE PLOTTED ON SECTION PLOTTED JOINT/FOLIATION SPACING NOT TO SCALE & ARE SCHEMATIC.
3. SHEAR ZONE TRACES ARE PROJECTED CONSIDERING AVERAGE STRIKE OF 040-220 AND ARE SCHEMATICALLY SHOWN.

PACKAGE-1(B)

FOR TENDER PURPOSE ONLY

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GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
 RATLE HYDRO ELECTRIC PROJECT
 POWER HOUSE CAVERN
 GEOLOGICAL SECTION

SECTION 5-5	DESIGNED: RAN	SCALE: 1:1250	FORMAT: A1
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	CHECKED: RAN/GHU	APPROVED: GUH	REV. No. 0
	DATE: 13.12.11	71.2133.08.802	



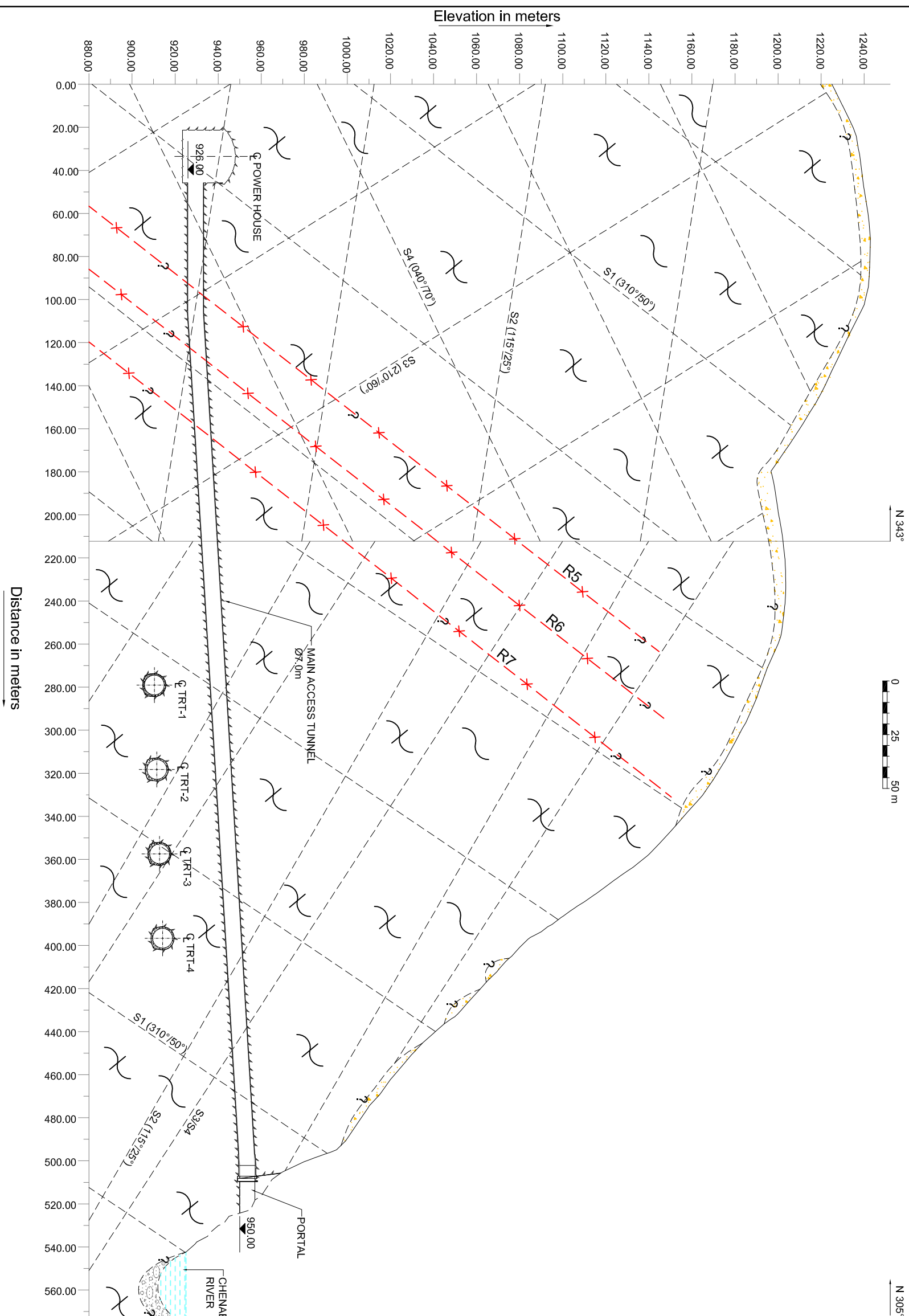
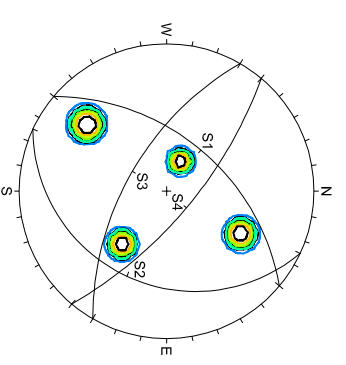
AF-Consult Switzerland Ltd.
 Tüfenstrasse 26
 CH-3400 Baden, Switzerland

SECTION 7-7

(SECTION ALONG MAIN ACCESS TUNNEL)



STEREOGRAPHIC PROJECTION OF AVERAGE DISCONTINUITY DATA COLLECTED FROM PROJECT AREA



- LEGEND :**
- RIVER BORNE MATERIAL
 - COLLUVIUM / SLOPE WASH
 - GNEISS / MICA SCHIST (WITH TOURMALINE GRANITE/ QUARTZO-FELDSPATHIC ROCK)
 - TRACES OF JOINTS
 - SHEAR ZONE < 10 CM
 - SHEAR ZONE (10 TO 200 CM)
 - INFERRED CONTACTS

REFERENCE DRAWINGS :
71.2133.08.800 PROJECT AREA GEOLOGICAL PLAN

- NOTES :**
1. ALL DIMENSIONS ARE IN METER EXCEPT SHOWN OTHERWISE.
 2. APPARENT DIP & DIRECTION ARE PLOTTED ON SECTION PLOTTED JOINT/FOLIATION SPACING NOT TO SCALE & ARE SCHEMATIC.
 3. SHEAR ZONE TRACES ARE PROJECTED CONSIDERING AVERAGE STRIKE OF 040-220 AND ARE SCHEMATICALLY SHOWN.

FOR TENDER PURPOSE ONLY

PHASE	DESIGNED	CHECKED	APPROVED	DATE
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GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT
MAIN ACCESS TUNNEL
GEOLOGICAL SECTION

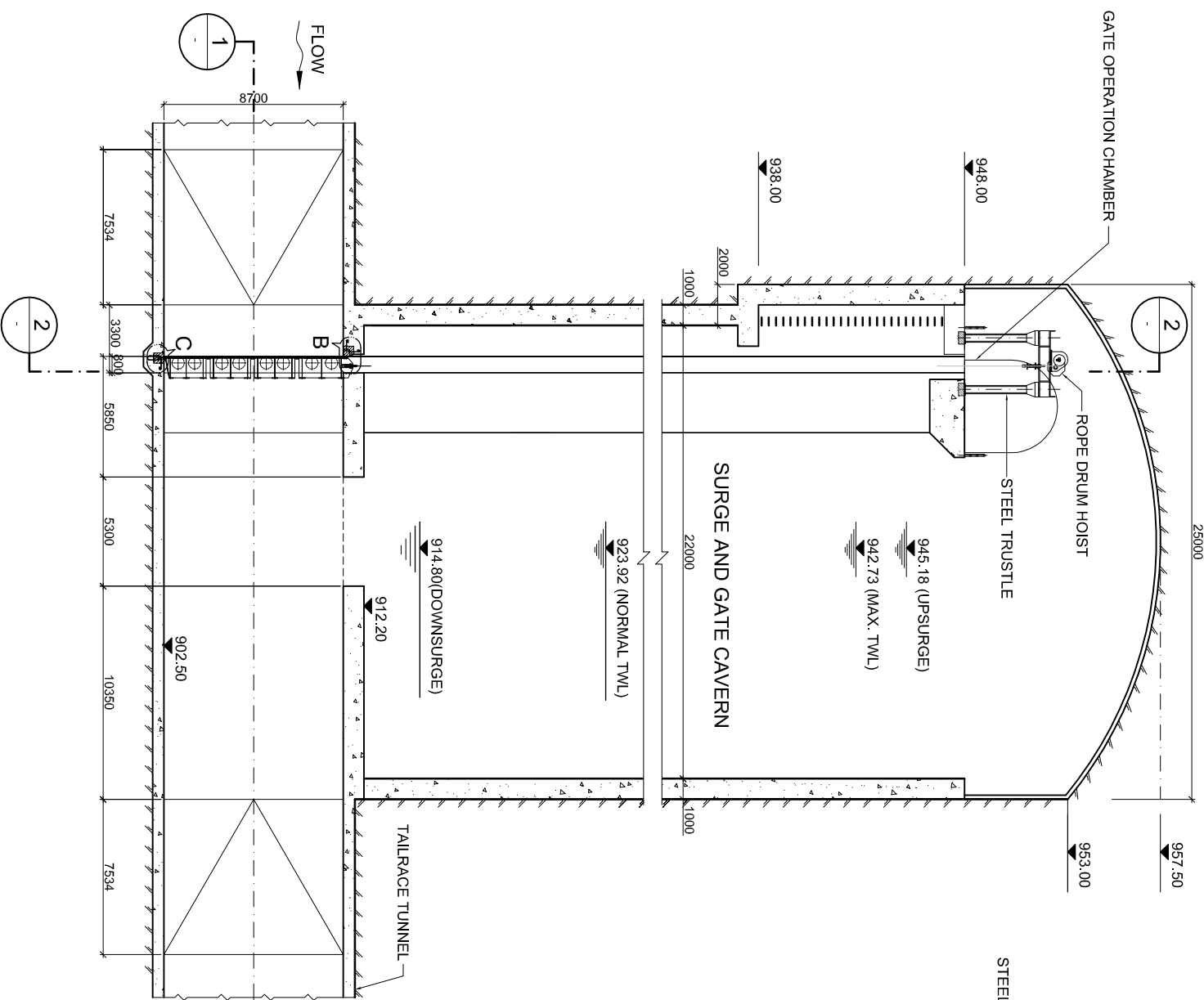
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APPROVED: GUH		
DATE: 13.12.11		
PROJECT NO: 71.2133.08.805		REV. No: 0



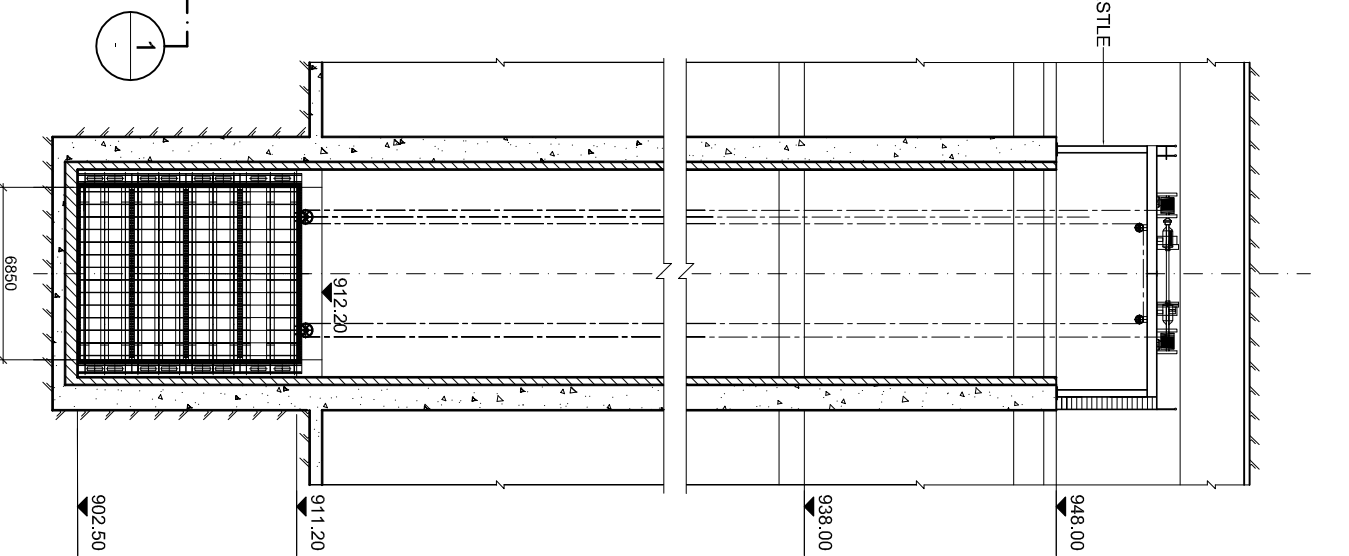
HYDRO-MECHANICAL DRAWINGS



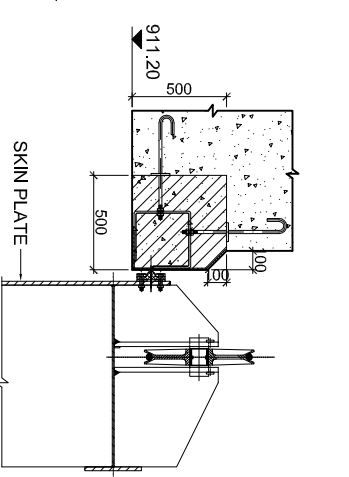
SECTIONAL ELEVATION



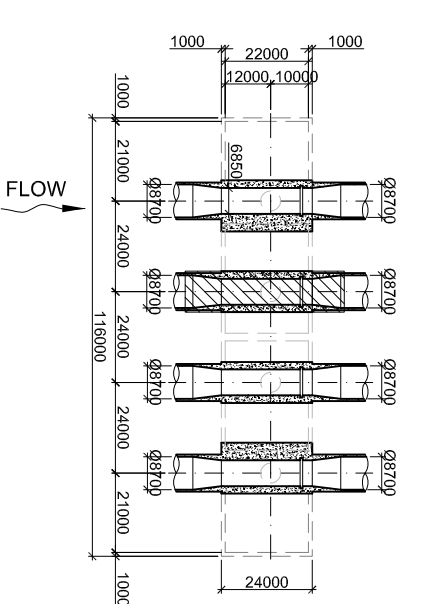
SECTION 2-2



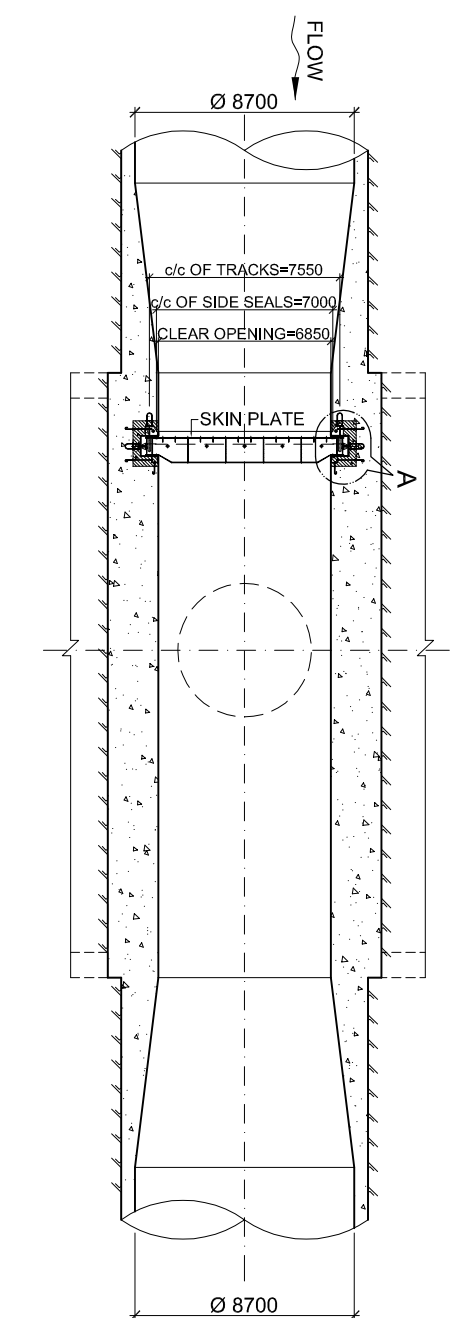
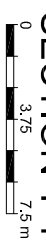
DETAIL-B



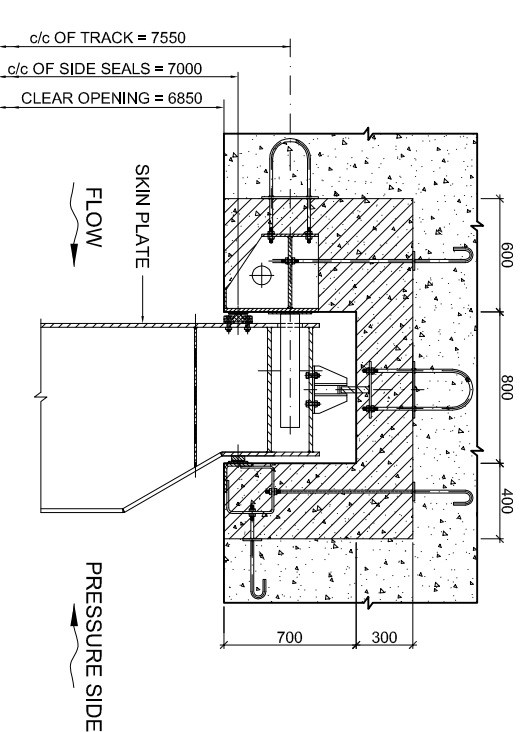
SURGE CAVERN KEY PLAN



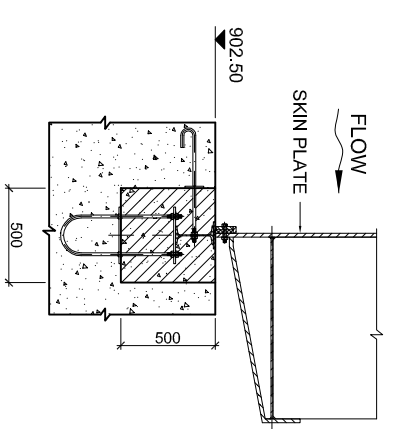
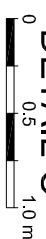
SECTION 1-1



DETAIL-A



DETAIL-C



REFERENCE DRAWINGS:

- 71.2133.08.001 SURGE CAVERN GENERAL LAYOUT - PLAN AT EL. 906.80M
- 71.2133.08.002 SURGE CAVERN GENERAL LAYOUT - PLAN AT EL. 939.00M
- 71.2133.08.003 SURGE CAVERN GENERAL LAYOUT - PLAN AT EL. 949.00M
- 71.2133.08.004 SURGE CAVERN GENERAL LAYOUT - SECTION 1-1

LEGEND:

- FIRST STAGE CONCRETE
- SECOND STAGE CONCRETE

NOTES:

- 1.) ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS.
- 2.) NO. OF GATES = 4
- 3.) THE GATE SHALL BE CLOSED UNDER NO FLOW CONDITIONS BY GRAVITY AND RAISED UNDER BALANCED HEAD CONDITIONS ACHIEVED BY CRACK OPENING OF GATE BY 100mm APPROX.
- 4.) THE GATE SHALL BE DESIGNED FOR 21.42m CORRESPONDING TO NORMAL T.W.L. 923.92 AND CHECKED FOR 42.88m HEAD CORRESPONDING TO MAXIMUM UPSURGE EL. 945.18m

PACKAGE - 1(B)

FOR TENDER PURPOSE ONLY

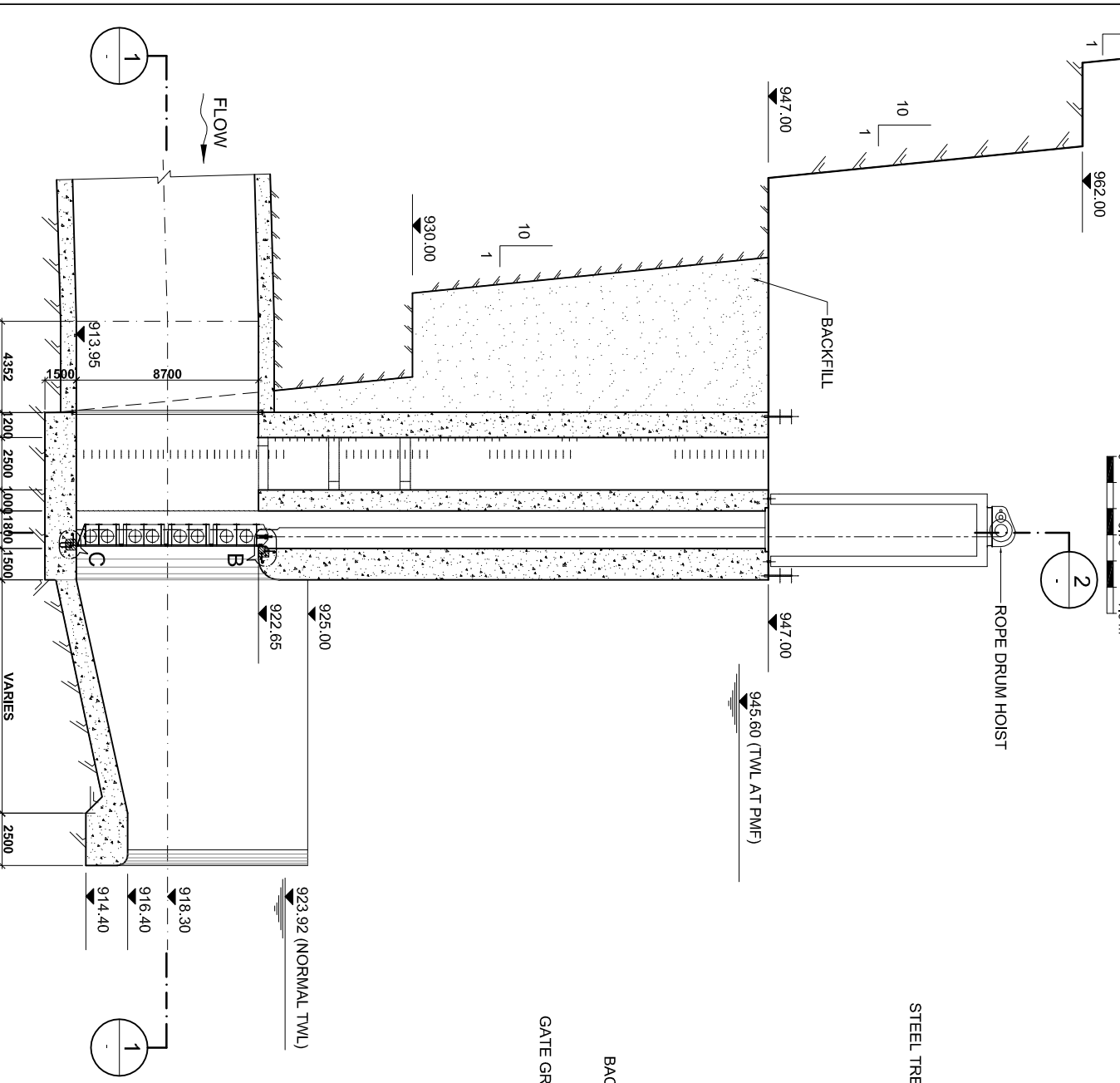
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REV.	REVISION DESCRIPTION	DRWN	CHKD	APPD.	DATE

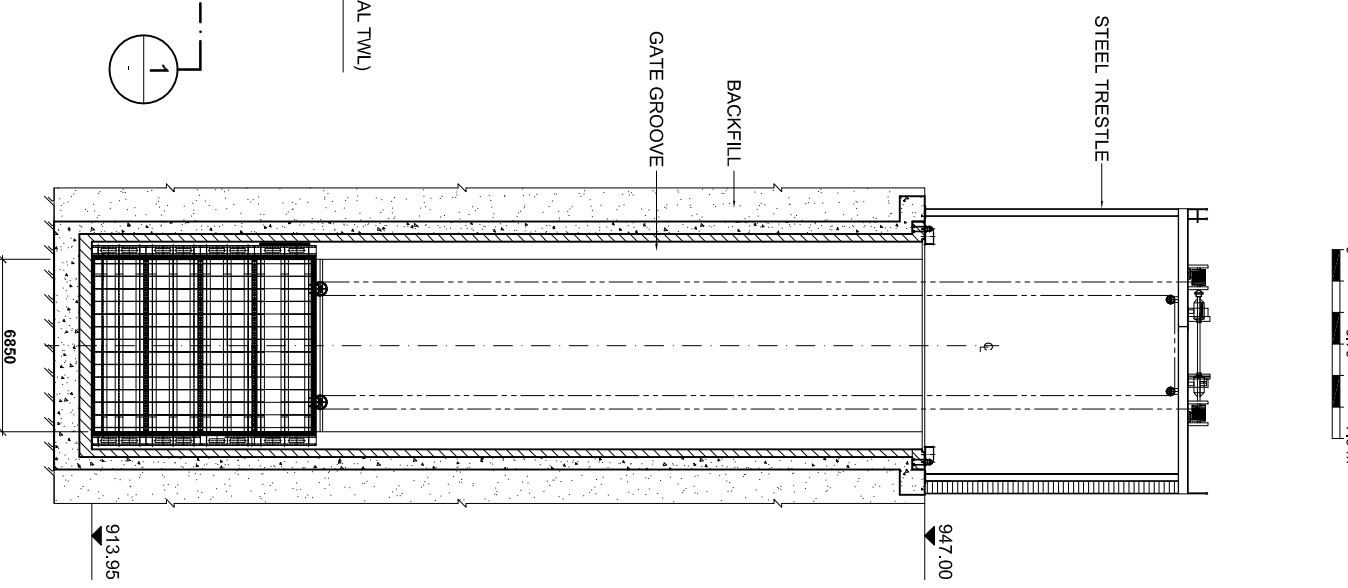
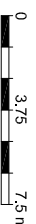
GVK GVK RATEL HYDRO ELECTRIC PROJECT PVT. LTD.		RATEL HYDRO ELECTRIC PROJECT	
SURGE CAVERN			
6850mm x 8700mm FIXED WHEEL GATE			
GENERAL ARRANGEMENT			
PLAN - SECTIONS AND DETAILS			
DESIGNER: MJH	SCALE: 1:150, 1:20	FORMAT: A1	
DRAWN: DPR	(1:300, 1:40)		
CHECKED: GUH	DRAWING No.		
APPROVED: AKM	71.2133.06.501	REV. No.	0
DATE: 27/09/11			

AF-Coleman Switzerland Ltd.		Tilkenstrasse 26	
CH-5400 Baden, Switzerland			

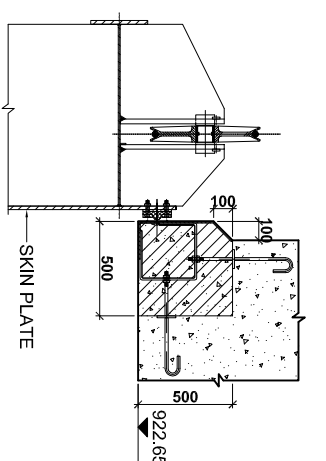
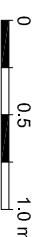
SECTIONAL ELEVATION OF TAILRACE OUTFALL



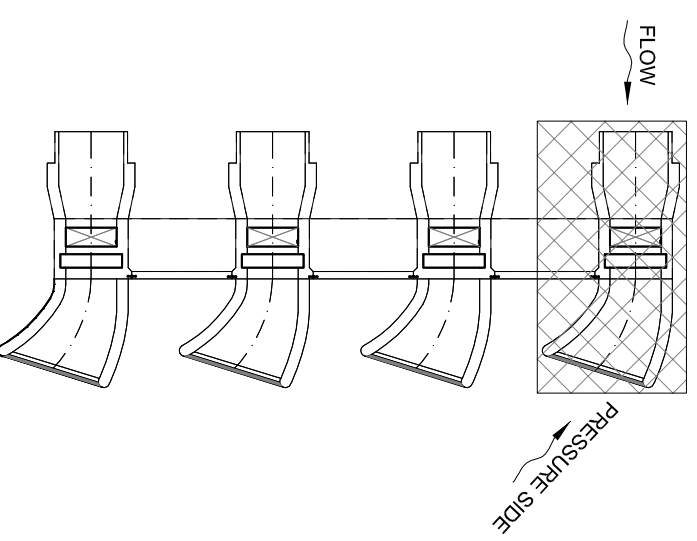
SECTION 2-2



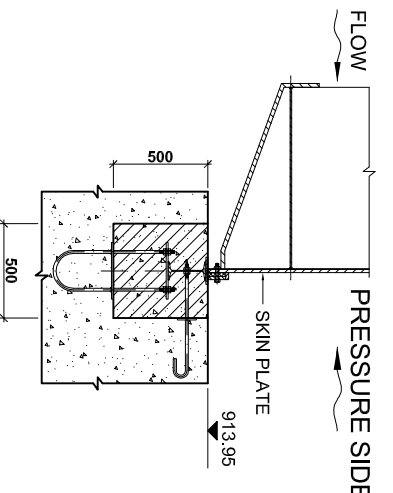
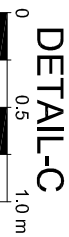
DETAIL-B



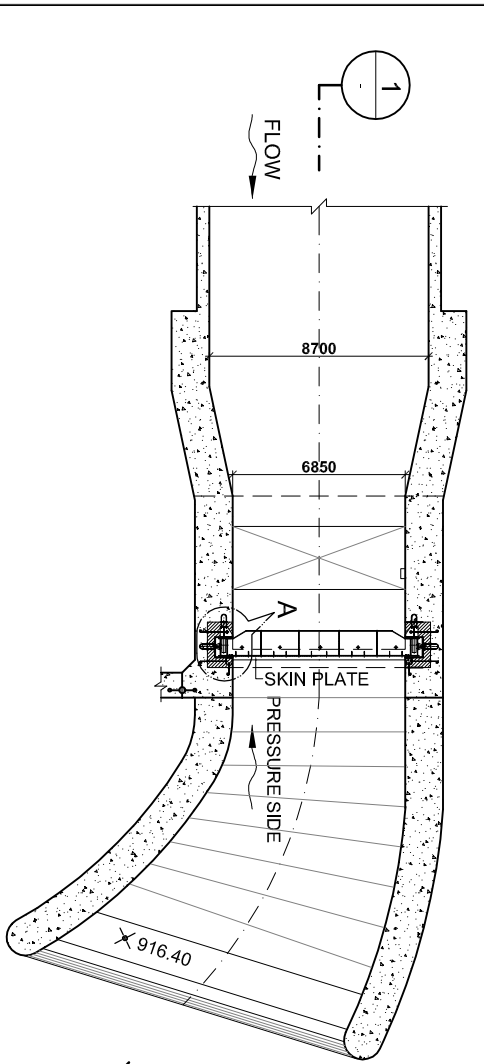
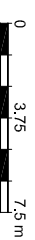
TAILRACE OUTLET KEY PLAN



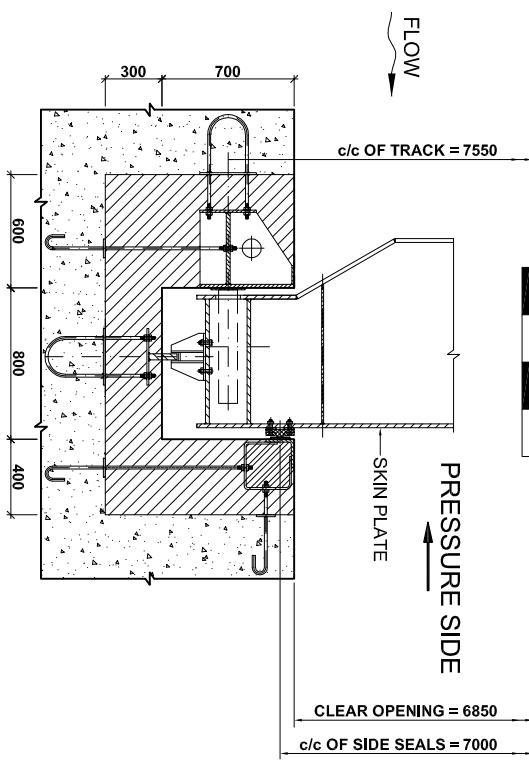
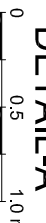
DETAIL-C



SECTION 1-1



DETAIL-A



REFERENCE DRAWINGS:
7.1.2133.09.001 TAILRACE OUTLET
GENERAL ARRANGEMENT - PLAN, ELEVATION AND SECTION

LEGEND:
FIRST STAGE CONCRETE
SECOND STAGE CONCRETE

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS.
2. NO. OF OPENINGS = 4
3. NO. OF GATES = 4
4. DESIGN HEAD = 31.65m CORRESPONDING TO PROBABLE MAX. TWL 945.60m.
5. THE GATE WILL BE CLOSED UNDER NO FLOW CONDITIONS BY GRAVITY AND RAISED UNDER BALANCED HEAD CONDITIONS ACHIEVED BY CRACK OPENING OF GATE BY 100mm APPROX.

FOR TENDER PURPOSE ONLY

PACKAGE - 1(B)

PHASE	NO.	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> FEASIBILITY STUDY					
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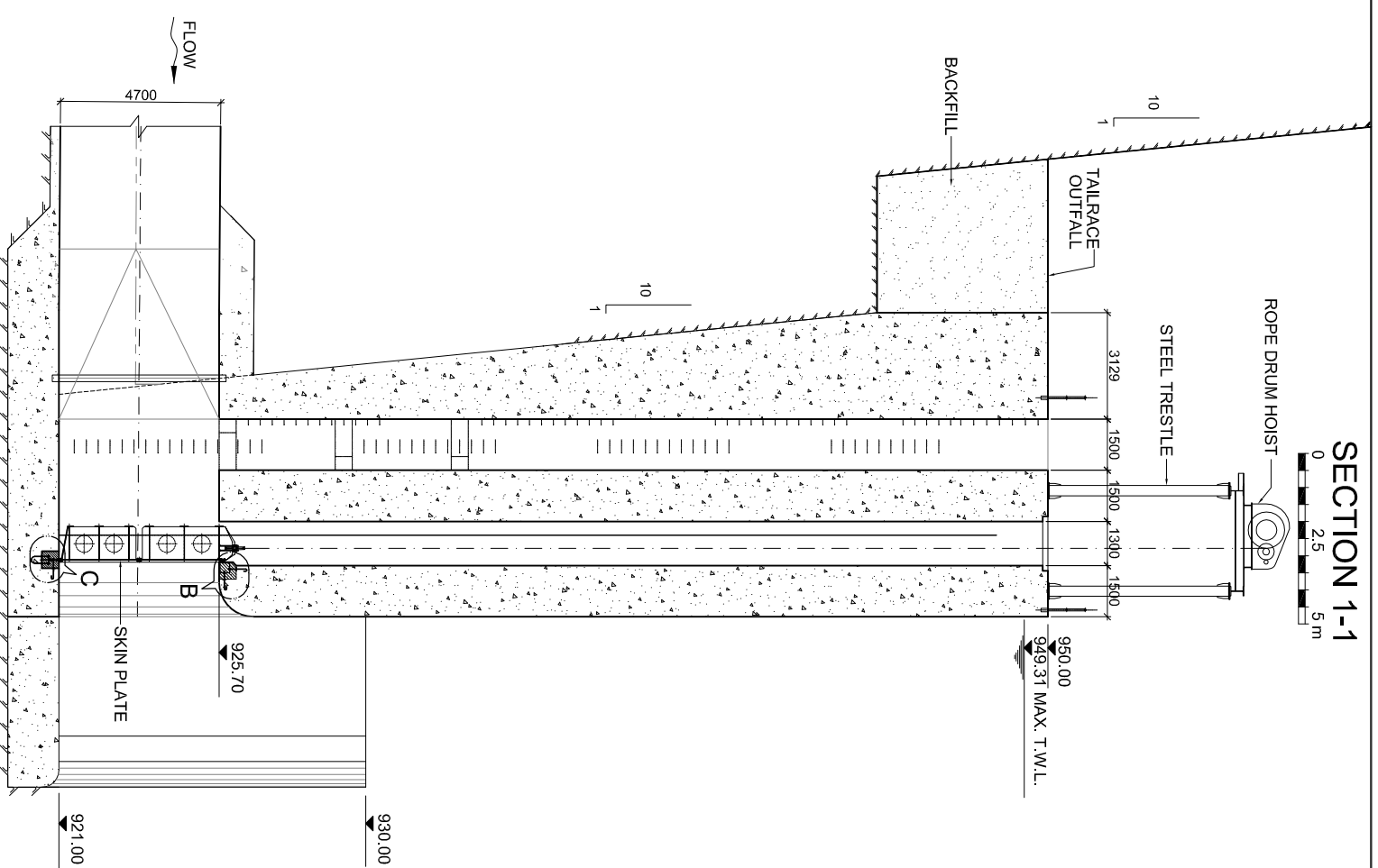
GVK GVK RATEL HYDRO ELECTRIC PROJECT PVT. LTD.
RATEL HYDRO ELECTRIC PROJECT

TAILRACE
6850mm x 8700mm FIXED WHEEL GATE
GENERAL ARRANGEMENT
PLAN, SECTIONS AND DETAILS

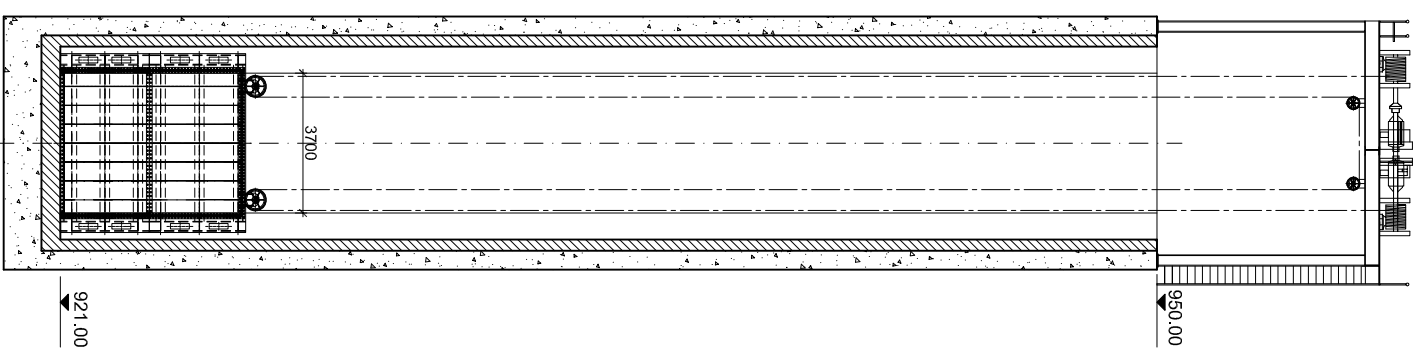
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CHECKED:	APPROVED:	DATE:
GUH	KAM	27.05.11
71.2133.09.501 0		



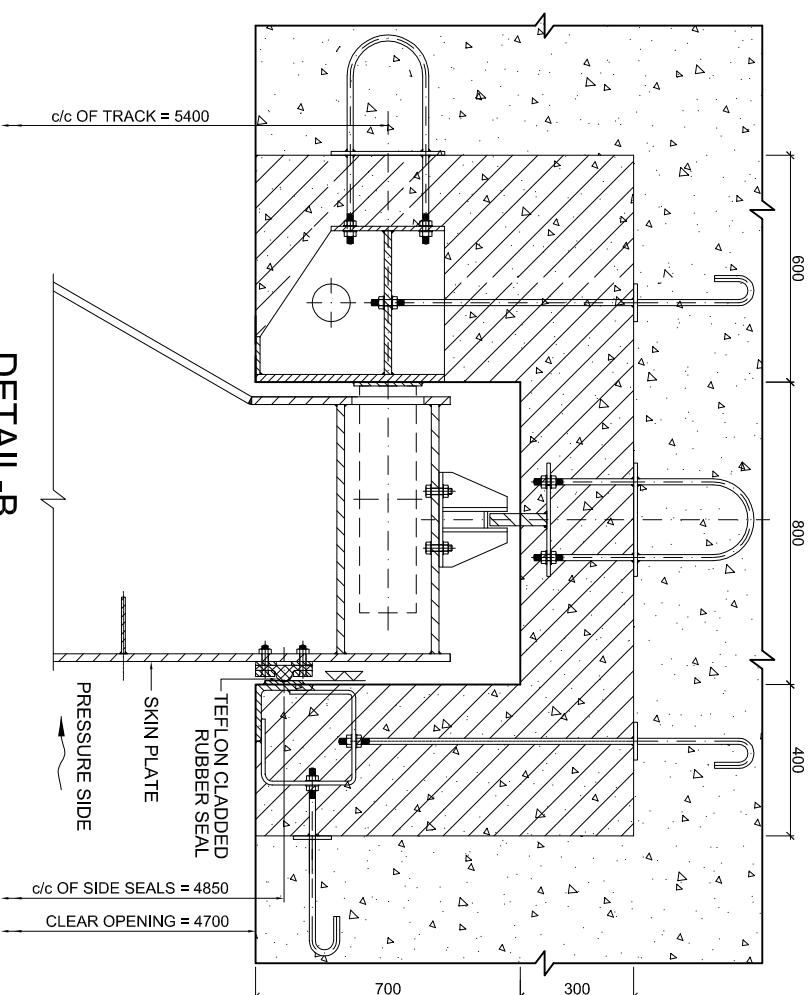
SECTION 1-1
0 2.5 5m



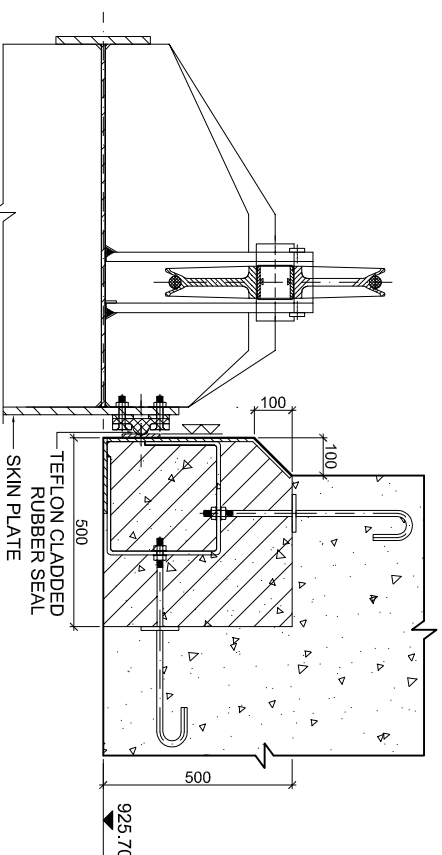
SECTION 2-2
0 2.5 5m



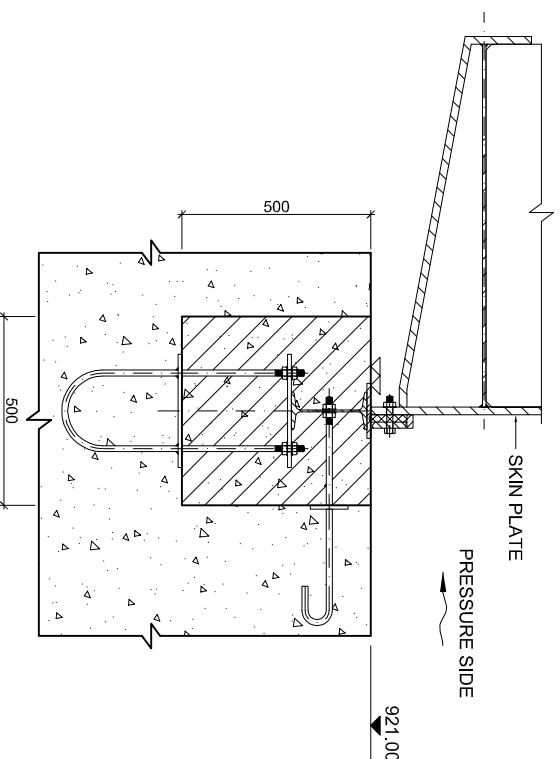
DETAIL-A
0 0.25 0.5m



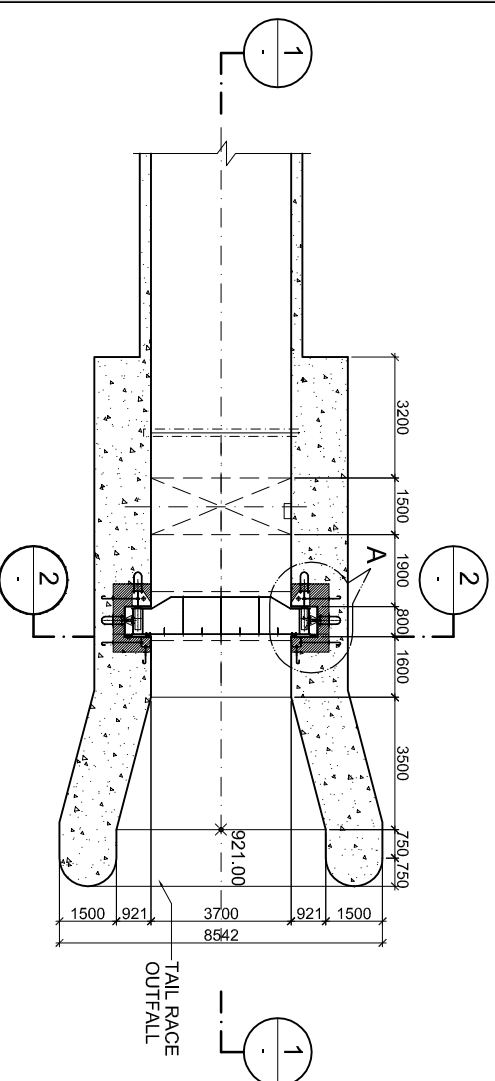
DETAIL-B
0 0.25 0.5m



DETAIL-C
0 0.25 0.5m



SECTIONAL PLAN
0 2.5 5m



REFERENCE DRAWINGS:
71.2133.11.003 ADDITIONAL UNIT - GENERAL ARRANGEMENT
71.2133.11.004 ADDITIONAL UNIT - GENERAL ARRANGEMENT
LONGITUDINAL SECTION

LEGEND:

FIRST STAGE CONCRETE

SECOND STAGE CONCRETE

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS.
2. NO. OF GATES = 1
3. DESIGN HEAD = 28.31m
4. THE GATE SHALL BE CLOSED UNDER NO FLOW CONDITIONS BY GRAVITY AND GRAVITY AND RAISED UNDER BALANCED HEAD CONDITIONS ACHIEVED BY CRACK OPENING OF GATE BY 75mm TO 100mm.

PACKAGE - 1(B)

FOR TENDER PURPOSE ONLY

PHASE	DESIGNER	DATE	REVISION DESCRIPTION	DRWN/CHKD	APPD.	DATE
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<input type="checkbox"/> FEASIBILITY STUDY						
<input type="checkbox"/> INCEPT. & BASIC DESIGN						
<input type="checkbox"/> TENDER DESIGN						
<input type="checkbox"/> CONSTRUCTION DESIGN						
<input type="checkbox"/> AS-BUILT DRAWINGS						

GVK RATLE HYDRO ELECTRIC PROJECT PVT. LTD.
RATLE HYDRO ELECTRIC PROJECT

ADDITIONAL UNIT (TAILRACE OUTLET)
3700mm x 4700mm FIXED WHEEL GATE
GENERAL ARRANGEMENT

PLAN, SECTIONS AND DETAILS

DESIGNER	SCALE	FORMAT	REV. No.
AF-Consult Switzerland Ltd. Tilkenstrasse 28 CH-5400 Baden, Switzerland	1:100	A1	0
DRAWN: DFR	[1:200]	[A3]	
CHECKED: GUH			
APPROVED: AKM	71.2133.11.503		
DATE: 27/09/11			