



SAR Energy (Pvt) Ltd.

The Registrar

Ref No: _____

National Electric Power Regulatory Authority

Date: 24-57-17

NEPRA Tower Attaturk Avenue (East),

Sector G-5/1, Islamabad.

Subject: **Modification in Generation License for 1.3 MW Machai Canal Hydro Power Project by Sar Energy (Pvt) Ltd.**

Dear Sir/Madam,

Reference is made to NEPRA Generation license No. _IGSPL/34/2013 Dated Aug 26, 2013 for 1.3 MW Machai Canal Hydro Power Project at RD 72+472 of Machai Branch Canal in Tehsil Katlang District Mardan.

The project sponsor has carried out a detailed design and in the wake of the design the capacity of the captioned plant is increased to 1.72 MW gross installed capacity. The meeting of the panel of expert was convened by PEDO on December 5, 2016 at Peshawar and the POE approved the design and findings.

You are hereby requested to kindly modify our generation license to the enhanced installed capacity of 1.72 MW. We hereby undertake to deposit the fee that will be levied by The Authority for this modification.

We hereby further authorize following to submit and follow up this application:

Mr. Babar Mahmood

A&M Enterprises

House No.350, Street No.29,

I-8/2, Islamabad.

Thanking you in anticipation

Sincerely Yours

For Sar Energy (Pvt) Ltd.

CEO

SAR ENERGY (PVT) LTD.

H. NO. 107, NEW SHAMI ROAD, PESHAWAR CANTT. PAKISTAN.

PHONE: +92-91-561-3509 CELL: +92-300-959-2308,

Email: sar.energy@hotmail.com

The Text of the Proposed Modification in Generation License for Sar Energy (Pvt) Ltd Hydro Power Project

The Sar Energy (Pvt) Ltd. is requesting to change the gross installed capacity to 1.72 MW from originally requested 1.3 MW. Also, although location of plant remains same at Machai Branch Canal RD 72+472 but now the area falls under Tehsil Katlang after KPK government announced Katlang as Tehsil of District Mardan. Originally the Generation License states this as in Tehsil Takhat Bhai.

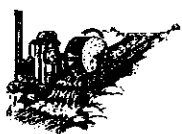
A Statement of the Reason in Support of the Modification in Generation License for Sar Energy (Pvt) Ltd., Hydro Power project

Sar Energy (Pvt) Ltd., carried out detail design for its Hydro Power Project located at Machai Branch Canal RD: 72+472. The detailed design resulted in its net head to increase to 5.38 m from 4.02 m. The design discharge has been revised to 38.92 m³/sec from 40 m³/sec. This increase in head resulted in increase of installed capacity to 1.72 MW as against originally of 1.3 MW given in the feasibility study of the report. These findings have been approved by Panel of Experts in a meeting convened by PEDO on December 26, 2016 at PEDO House in Peshawar.

In addition after Katlang being declared as Tehsil of District Mardan the project falls under Tehsil Katlang now. Originally at the time of obtaining the generation license it fell under Tehsil Takhat Bhai. The new address of the location will be Machai Branch Canal Near RD 72+472 Tehsil Katlang, District Mardan, Khyber Pukhtunkhwa.

A Statement of the Impact on the Tariff, Quality of Service and the performance by the Licensee of its Obligations under the License

The proposed increase in capacity will result in increase of annual energy from 7.36 GWh to 10.484 GWh. Moreover, this change will also result in increasing annual plant factor from originally proposed 65% to 70.28%, that ultimately will result in a lower tariff. There will be no significant difference in the quality of service and the performance of the licensee.



SAR Energy (Pvt) Ltd.

Ref No: _____

Date: 24-07-17

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National Electric Power Regulatory Authority

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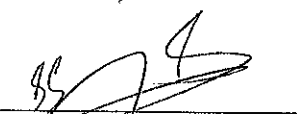
The project sponsor has carried out a detailed design and in the wake of the design the capacity of the captioned plant is increased to 1.72 MW gross installed capacity. The meeting of the panel of expert was convened by PEDO on December 5, 2016 at Peshawar and the POE approved the design and findings.

Following are the comparison of original and proposed modifications in the proposed hydro power plant.

Description	Original	Modification
Installed Capacity (MW)	1.33	1.72
Design Discharge (Comics)	40	38.92
Gross Head (meter)	4.22	5.554
Head Losses (meter)	0.20	0.2554
Net Head (meter)	4.02	5.30
Annual Energy (GWh)	7.36	10.484
Annual Plant Factor (%)	65%	70.28

The above data shows that the resultant modification will result in increased plant factor that will have the positive impact on the tariff. The reduced discharge will increase the %age of availability of time and hence stability of the plant will increase.

Sincerely Yours


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SAR ENERGY (PVT) LTD.

H. NO. 107, NEW SHAMI ROAD, PESHAWAR CANTT. PAKISTAN.

PHONE: +92-91-561-3509 CELL: +92-300-959-2308,

Email: sar.energy@hotmail.com

Details of Modified

Generation Facility/Hydel

Power Plant

(A) Company Information

(i)	Name of Applicant	Sar Energy (Pvt) Ltd.
(ii)	Registered Office	107, New Shami Road, Peshawar Cantt, Peshawar, Khyber Pukhtunkhwa
(iii)	Business Office	-do-

(B) Plant Type, Location, Tributary Etc.

(i)	Type of Generation Facility	Run of Canal Hydro Power Plant
(ii)	Plant Location	Machai Branch Canal, Near RD 72+472, Tehsil Katlang, District Mardan, Khyber Pukhtunkhwa.
(iii)	Stream/Canal/Tributary	Upper Swat Canal System
(iv)	Diversion Weir	12-m wide rectangular labyrinth weir/spillway adjacent to power house with elevation at top level of 910.958 m.a.s.l. discharging into main Machai canal
(v)	Power House	Machai Branch Canal, Tehsil Katlang, District Mardan, Khyber Pukhtunkhwa

(C) Discharge

(i)	Mean Monthly	25.31 m ³ /sec
(ii)	Total Annual Average Discharge	2,389,824 m ³ /year

(D) Main Structures

(i)	Design Discharge	38.92 m ³ /sec
(ii)	Maximum Discharge	44.28 m ³ /sec

(E) Spillway

(i)	Units	1
(ii)	Type	Labyrinth
(iii)	Sill Level	407.876 m.a.s.l.
(iv)	Design Pressure at Sill	2.58
(v)	Height	2.993 m
(vi)	Width	23.774 m

(F) Trash Racks

(i)	Width	6.83 m
(ii)	Height	7.00 m
(iii)	Inclination	74°
(iv)	Bar Discharge	40 mm

(G) Stop Logs

(a)	Intake	
(i)	Width	7.0 m
(ii)	Height	4.6 m
(b)	Draft Tube	

(i)	Width	7.0 m
(ii)	Height	5.15 m
(c)	Spillway Gates	
(i)	Width	Nil
(ii)	Height	Nil

(H) Headrace Canal

(i)	Water Level	410.970 m.a.s.l.
(ii)	Canal Bed Width	6.50 m
(iii)	Water head at F.S.L.	2.993 m
(iv)	Bed Slope	0.20%

(I) Power House

(i)	Power House Level	410.958 m.a.s.l.
(ii)	Machine Hall Length	15.00 m
(iii)	Machine Hall Height	5.65 m
(iv)	Machine Hall Width	8.44 m

(J) Tailrace Canal

(i)	Bed Level	403.279 m.a.s.l.
(ii)	Canal Bed Width	7.24 m
(iii)	Water head at F.S.L.	2.993 m
(iv)	Bed Slope	0.20%

(K) Nominal Head at Maximum Power Output

(i)	Headrace Water Level	410.958 m.a.s.l.
(ii)	Tailrace Water Level	405.377 m.a.s.l.
(iii)	Gross Head	5.58 m
(iv)	Head Loss	0.198 m
(v)	Net Head	5.38 m

(L) Hydro Mechanical Equipment

(i)	Horizontal Kaplan Units	1
(ii)	Unit Make & Model	CINK Hydro-Energy k.s.
(iii)	Rated Flow	38.92 m ³ /sec
(iv)	Capacity	1.72 MW
(v)	Vertical Shaft Speed	150 RPM
(vi)	Rated Head	5.38 m
(vii)	Runner Diameter	2.50 m

(M) Electrical Equipment (Generator & Transformer)

(i)	No. of Units	1
(ii)	Unit Make & Model	CINK Hydro-Energy k.s.
(iii)	Nominal Capacity	1.924 MVA
(iv)	Power Factor	0.90
(v)	Frequency	50 Hz
(vi)	Efficiency	95.50%

(vii)	Generator Voltage	6.3 kV
(viii)	Continuous Overload	10%
(ix)	Insulation Class	H
(x)	Excitation Voltage	Static, 400 V DC
(xi)	Connection	Y, Neutral Grounded through resistance
(xii)	Protection Class	IP 44

(N) Transformer

(i)	No. of Units	1
(ii)	Nominal Capacity	2.15 MVA
(iii)	Power Factor	0.90
(iv)	High Voltage Side	11 kV
(v)	Low Voltage Side	6.3 kV
(vi)	Frequency	50 Hz
(vii)	Temperature Rise	55-65 °C
(viii)	Vector Group	YNd11
(ix)	Impedance	9% (approx.)
(x)	Cooling Type	ONAF

(O) Power and Energy

(a)	Design Discharge	
(i)	Kaplan Turbine	38.92 m ³ /sec
(b)	Energy output	

(i)	Kaplan Turbine	1.72 MW
(c)	Estimated Energy	
(i)	Mean Annual Energy	10.59 GWh Gross/10.484 GWh (on contracted Capacity

(P) Other Plant Characteristics/Detail

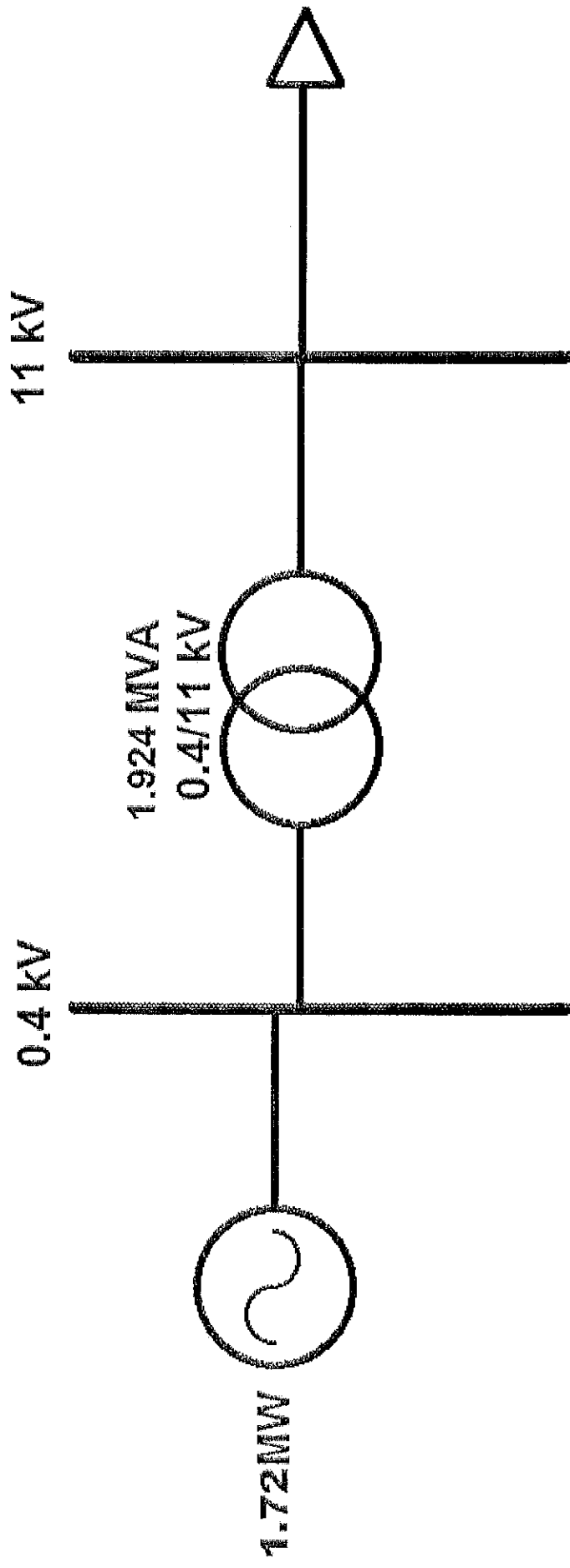
(i)	Automatic Generation Control	yes
(ii)	Ramping Rate	To be provided later
(iii)	Time required to Synchronize to Grid and loading the complex to full load	To be provided later
(iv)	Net Annual Generation	10.484 GWh
(v)	Plant factor	70.28%
(vi)	Mode of operation	Grid interconnection
(vii)	Length of interconnection	Grid interconnectivity load flow study under preparation and will be decided later
(viii)	Operation at Installed Capacity	160 day
(ix)	Expected Commissioning and Commercial Operation Date	December 31, 2019
(x)	Minimum Expected Life of Generation Facility from COD	30 Years

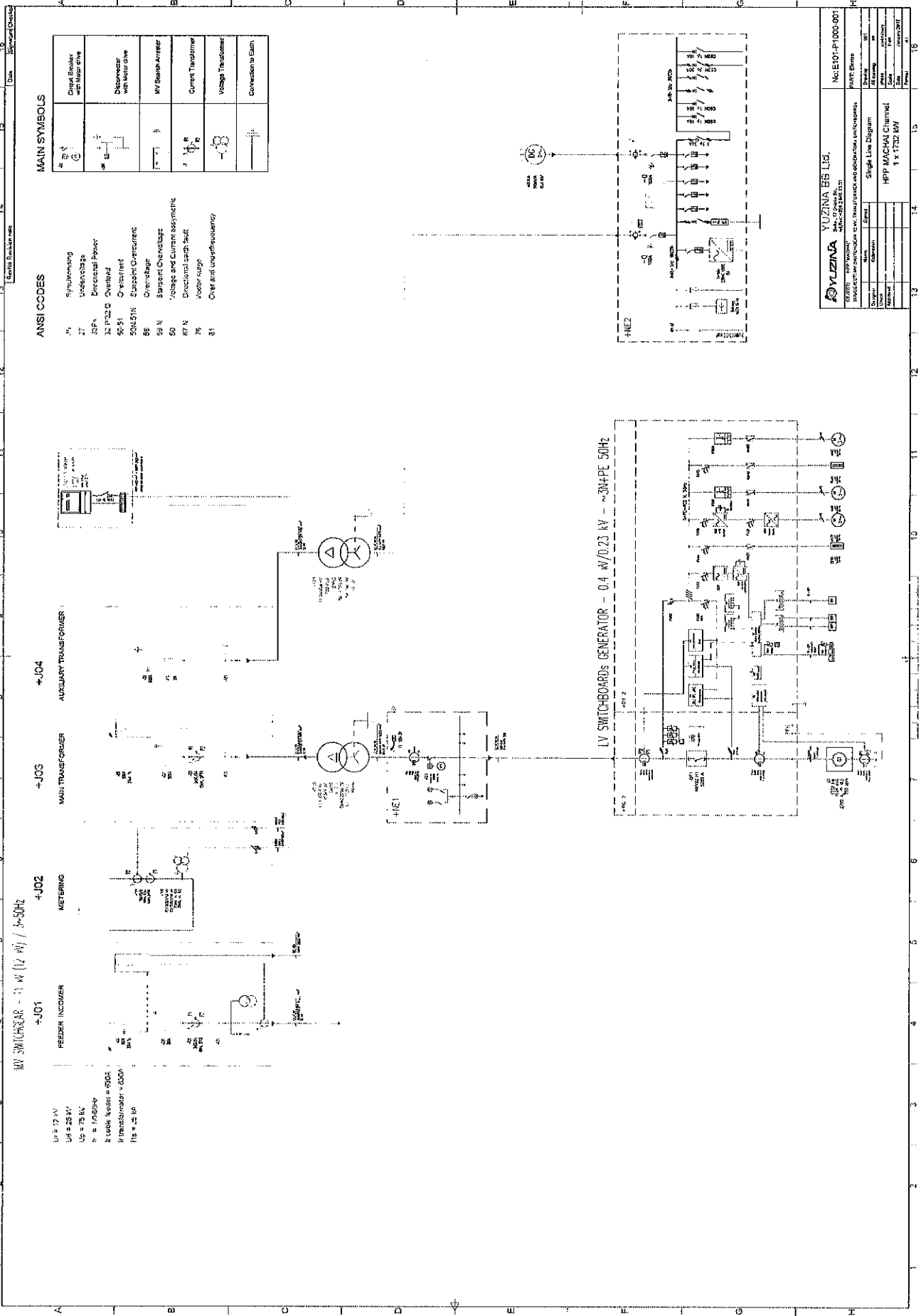
SCHEDULE-II

(1)	Installed Capacity of the Generation Facility	1.72 MW
(2)	De-rated Capacity at Mean Site Conditions	1.72 MW
(3)	Auxiliary Consumptions	0.0172 MW
(4)	Net Capacity of the Plant at Mean Site Conditions	1.7028 MW

Machai Canal HPP

Single Line Diagram





MAIN SYMBOLS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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YUZINA BS LTD.
 110 kV / 11 kV
 110 kV / 11 kV
 110 kV / 11 kV

Single Line Diagram
 HPP MACHAI Chemical
 1 x 1732 MW

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SAR Energy (Pvt) Ltd.

Ref No: _____

Board Resolution

Date: _____

Certified copy of the relevant extract from the minutes of the Meeting of Board of Directors of Sar Energy (Pvt) Ltd., held on January 06, 2016 at Peshawar.

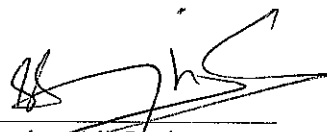
After discussion the Board passed the following Resolution:

“Resolved that in order to manage the Company’s Machai Canal Hydro Power Project located at RD 72+472, Tehsil Katlang, District Mardan, the following official be and are hereby authorized, jointly and severally, to file for modification of generation license with NEPRA for its proposed hydro power plant on behalf of the Company.

1. Name Mazhar Ali Qasim
2. Designation Chief Executive Officer

The said Mazhar Ali Qasim is hereby further authorized to submit application, negotiate and finalize the tariff, fulfill all requirements of NEPRA regarding the upfront tariff petition and generation license for the proposed hydro power project on behalf of the Company and for such purpose to execute contracts and other documents including application and other commitments as may be necessary.

Resolved further that NEPRA may rely on this Resolution until receipt of a certified copy of a resolution specifically pertaining to upfront tariff and generation license, revoking or modifying this Resolution.


Mazhar Ali Qasim
Chief Executive Officer

SAR ENERGY
(Pvt) Limited

Concept of Project

Machai Branch

Fall RD 72+472
(Head Across 2.527 m)

Adjacent
Powerhouse &
Spillway

Diversion
During Construction

Fall RD 74+085
(Head Across 2.627 m)

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Imagery © 2010 GeoEye

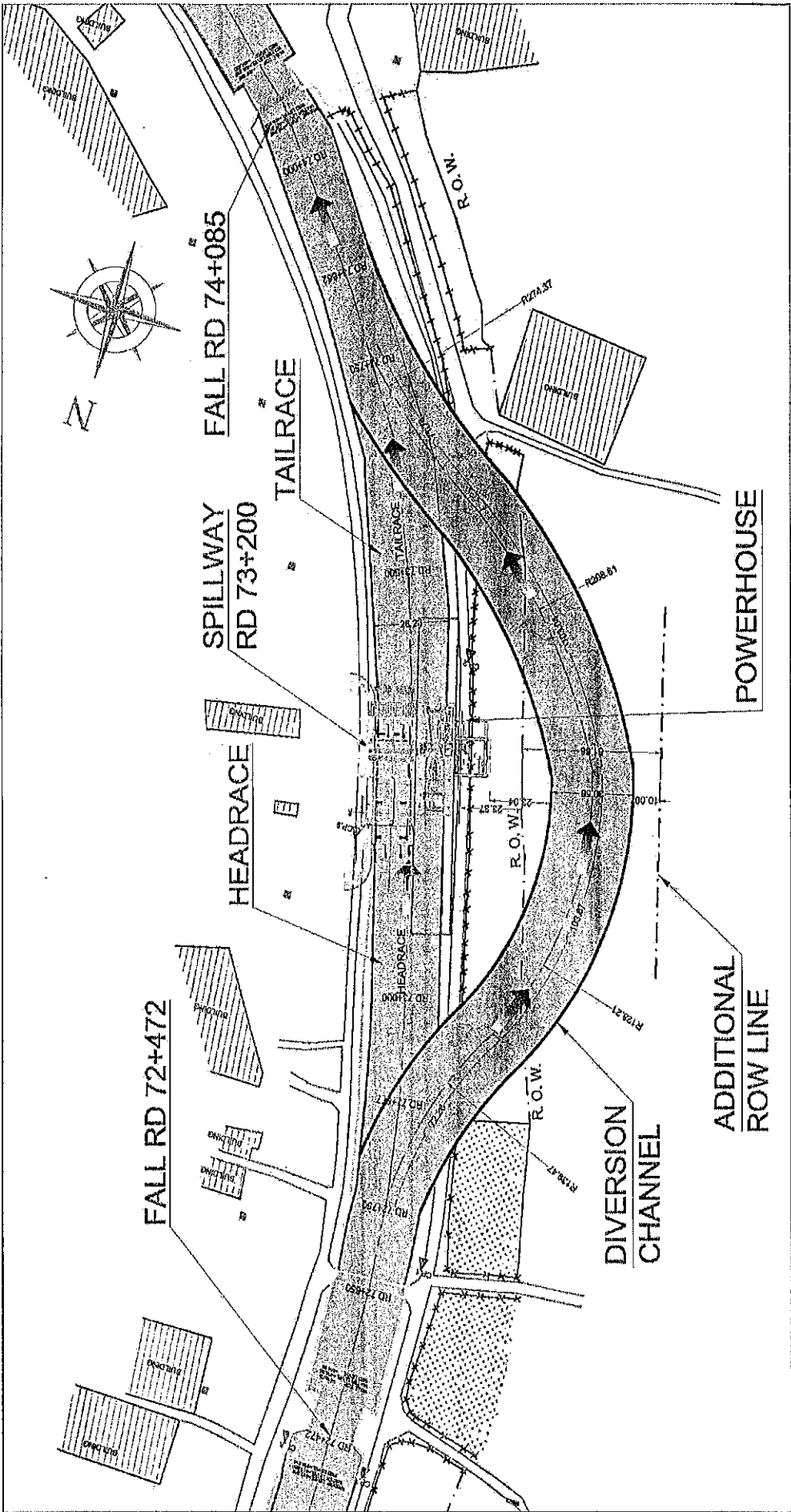
34°25'58.00"N 77°02'41.52"E elev: 4558 N

Imagery Date: May 28, 2009

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Eye alt: 2850.4

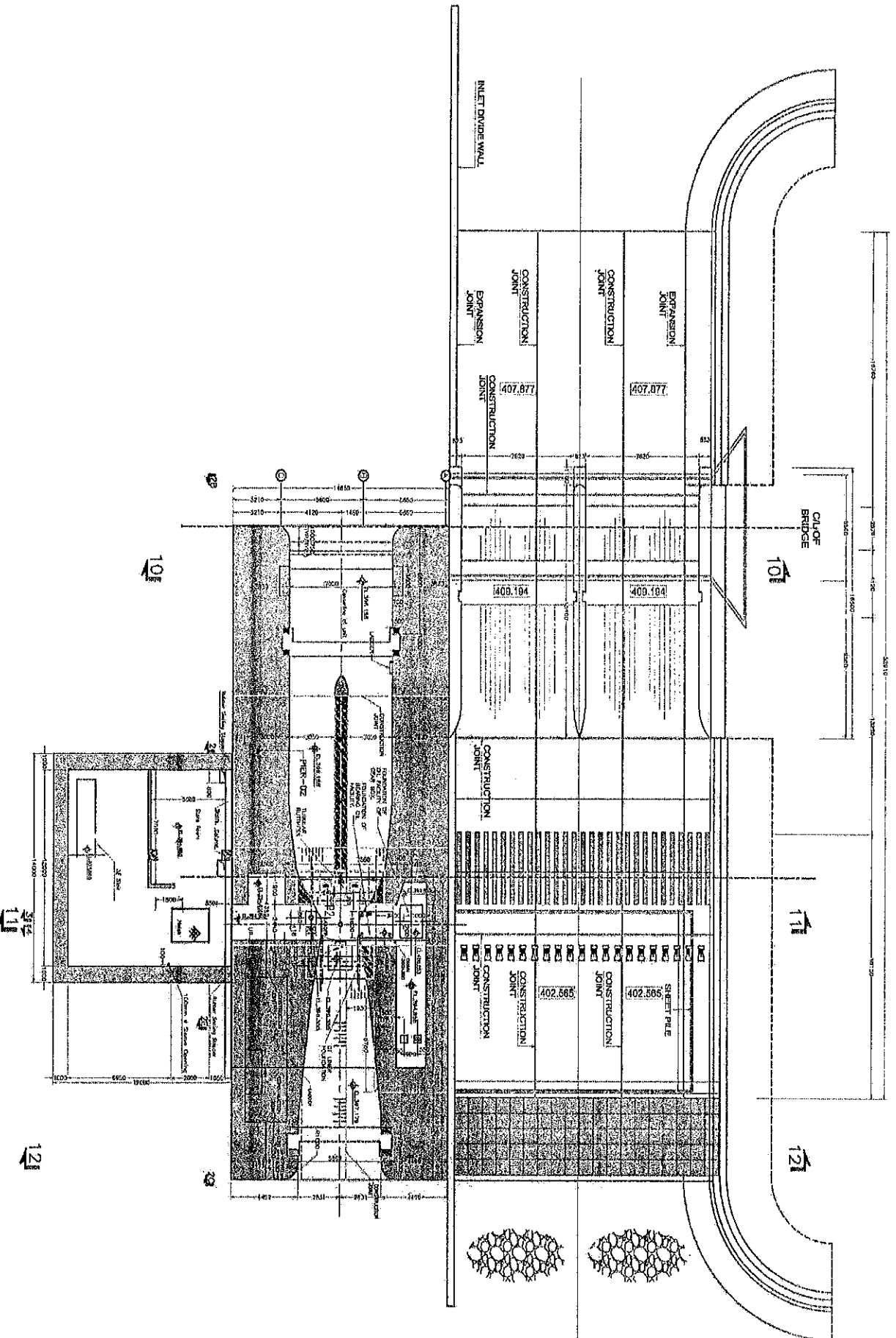
Proposed Project Layout



Machai III Hydropower Project

Powerhouse / Spillway Drawings

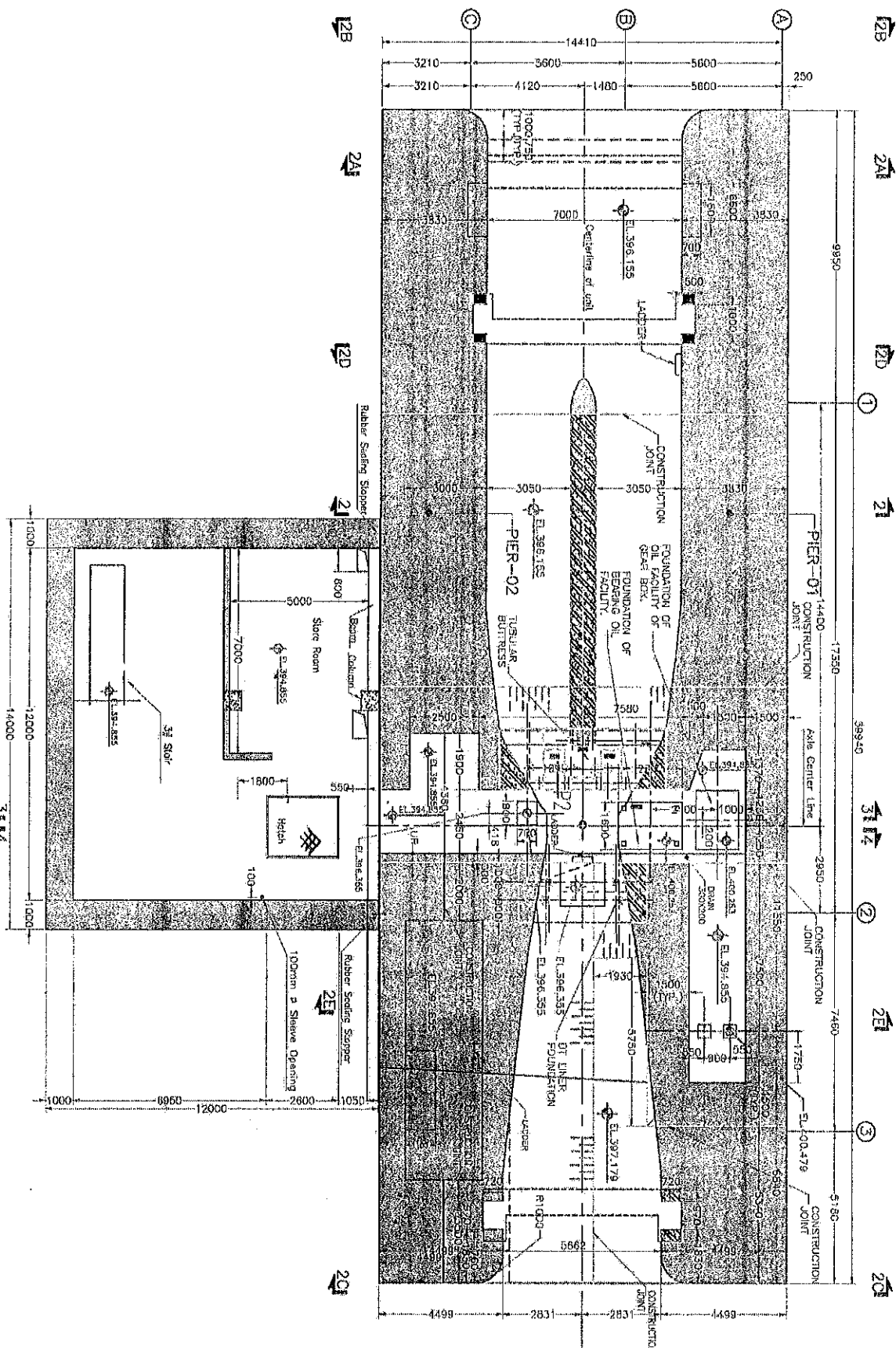
Combined Powerhouse & Spillway - Plan



POWERHOUSE/SPILLWAY PLAN

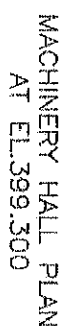
Proposed Powerhouse - Plan

NOTE-
1. ALL DIMENSIONS ARE IN MILLIMETERS, AND
ELEVATIONS IN METERS.

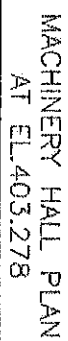


MACHINERY HALL PLAN AT
EL.397.179

NOTE:
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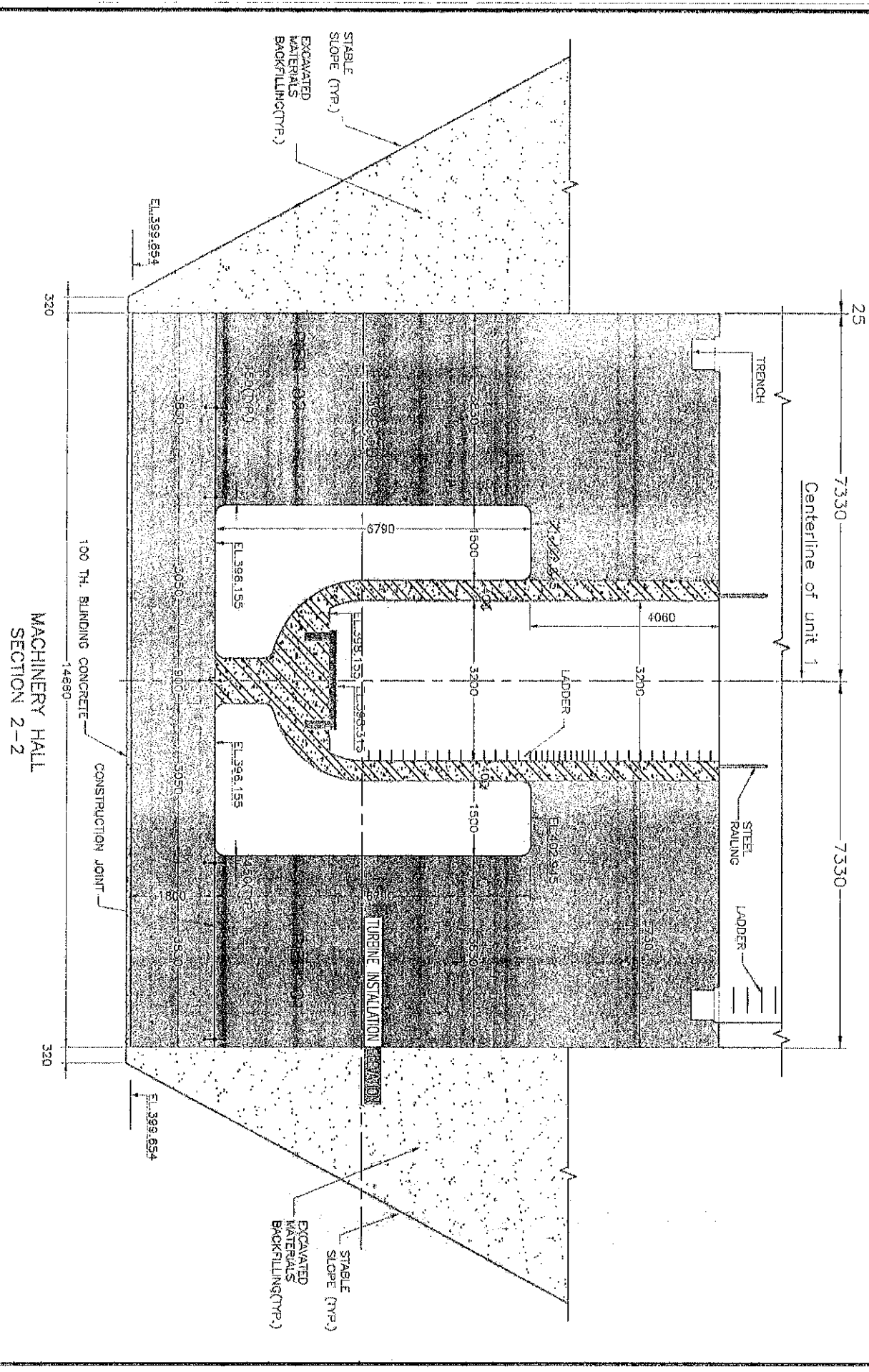


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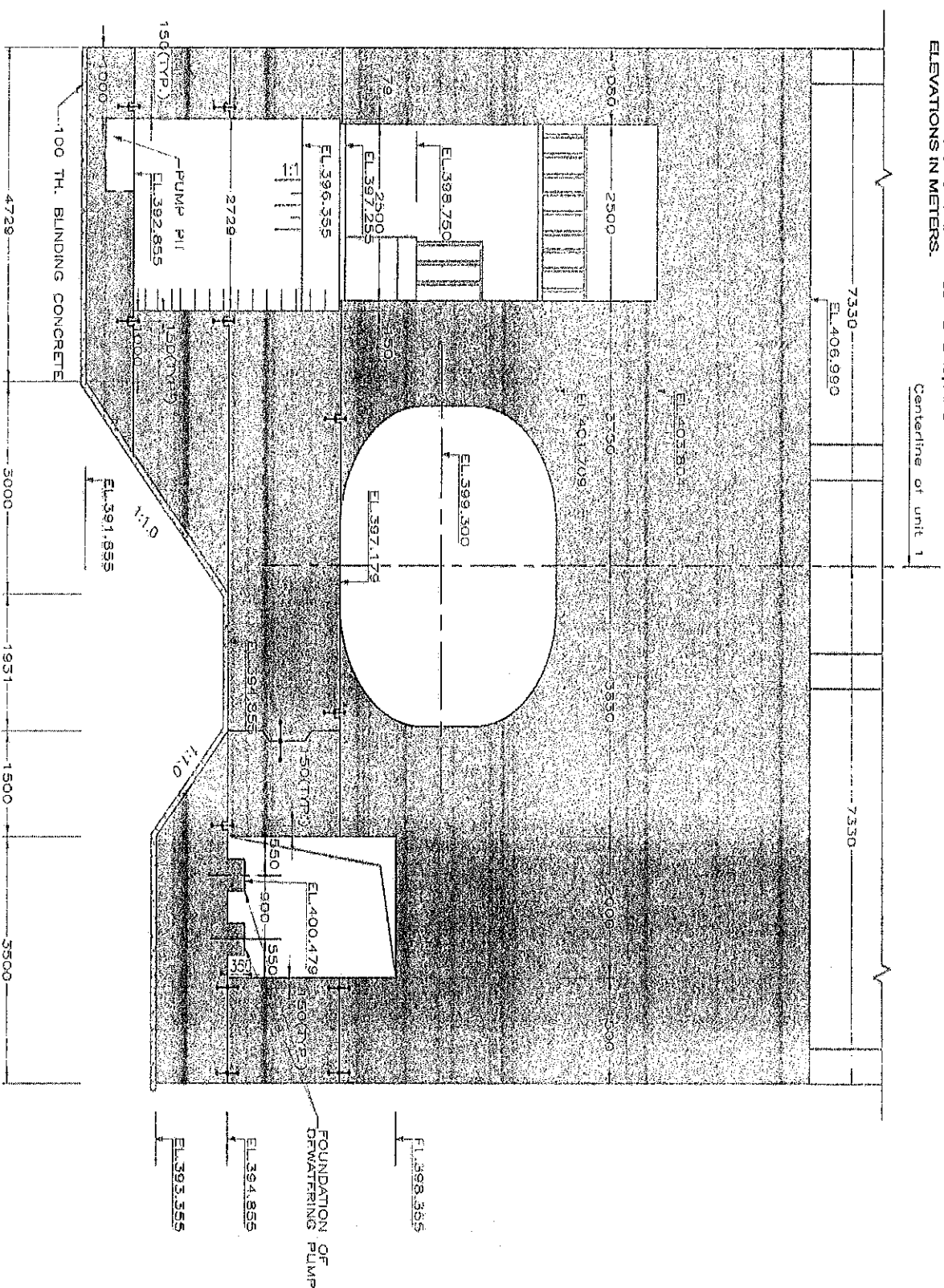
Proposed Powerhouse – Cross Section

1. ALL DIMENSIONS ARE IN MILLIMETERS, AND ELEVATIONS IN METERS.



Proposed Powerhouse - Cross Section

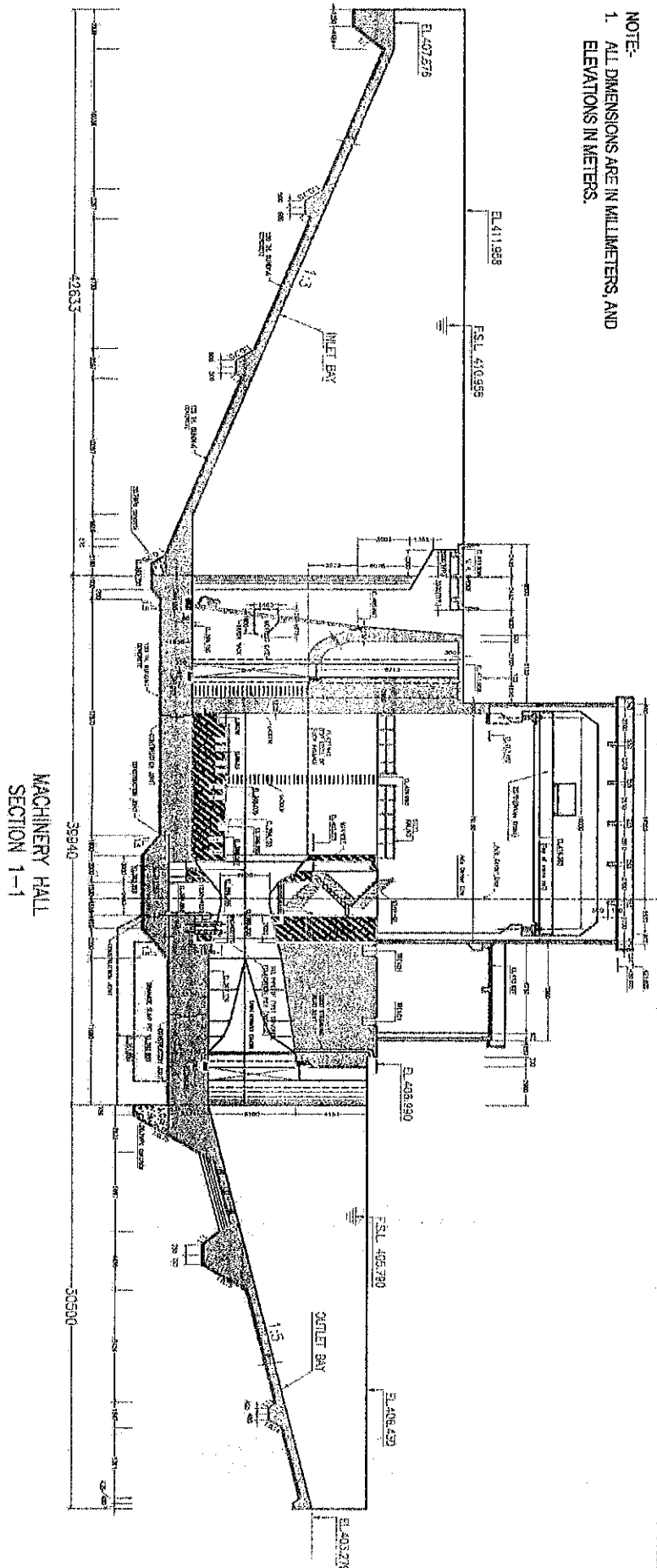
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MACHINERY HALL
SECTION 2E-2E

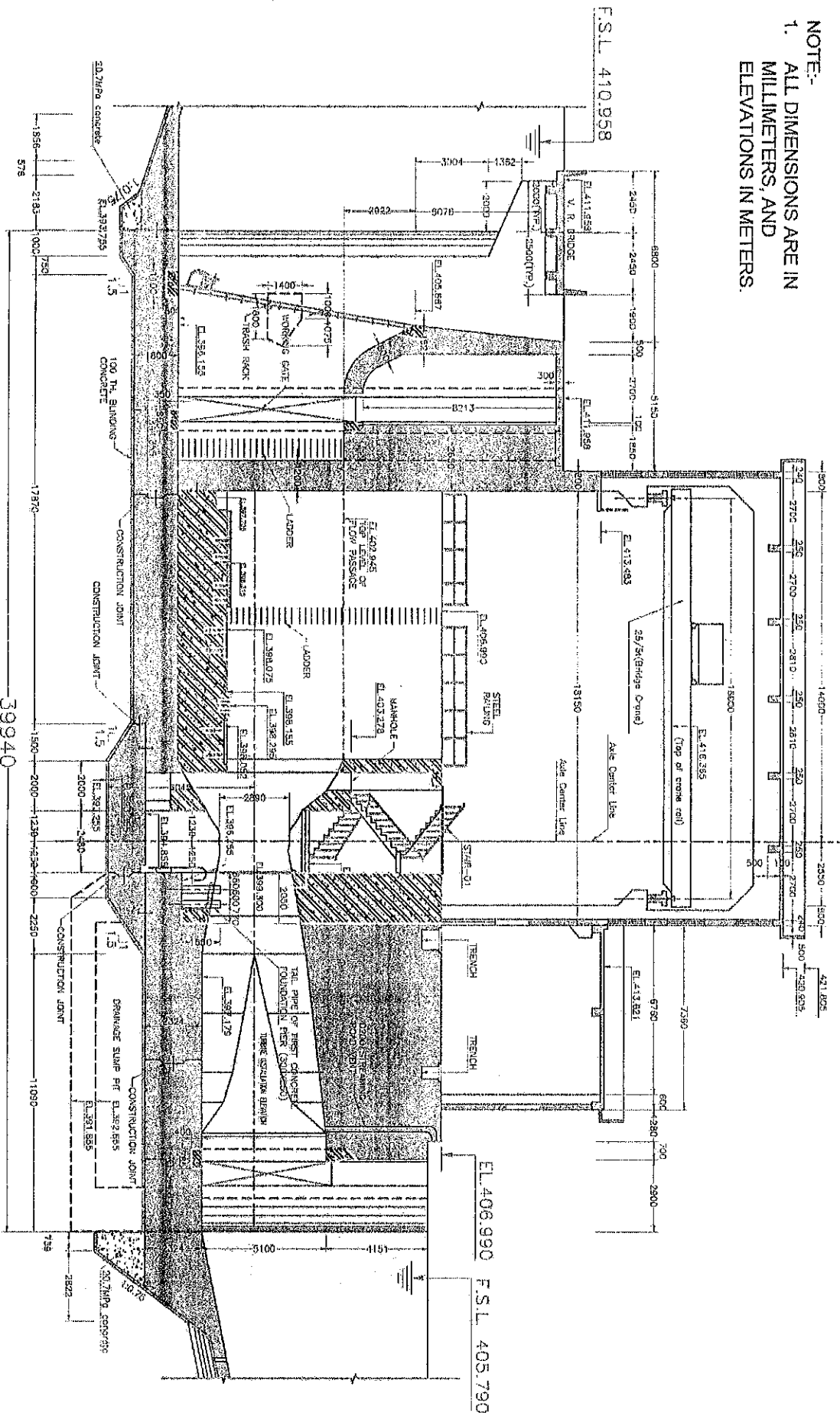
Proposed Powerhouse - Longitudinal Section

- NOTE:-
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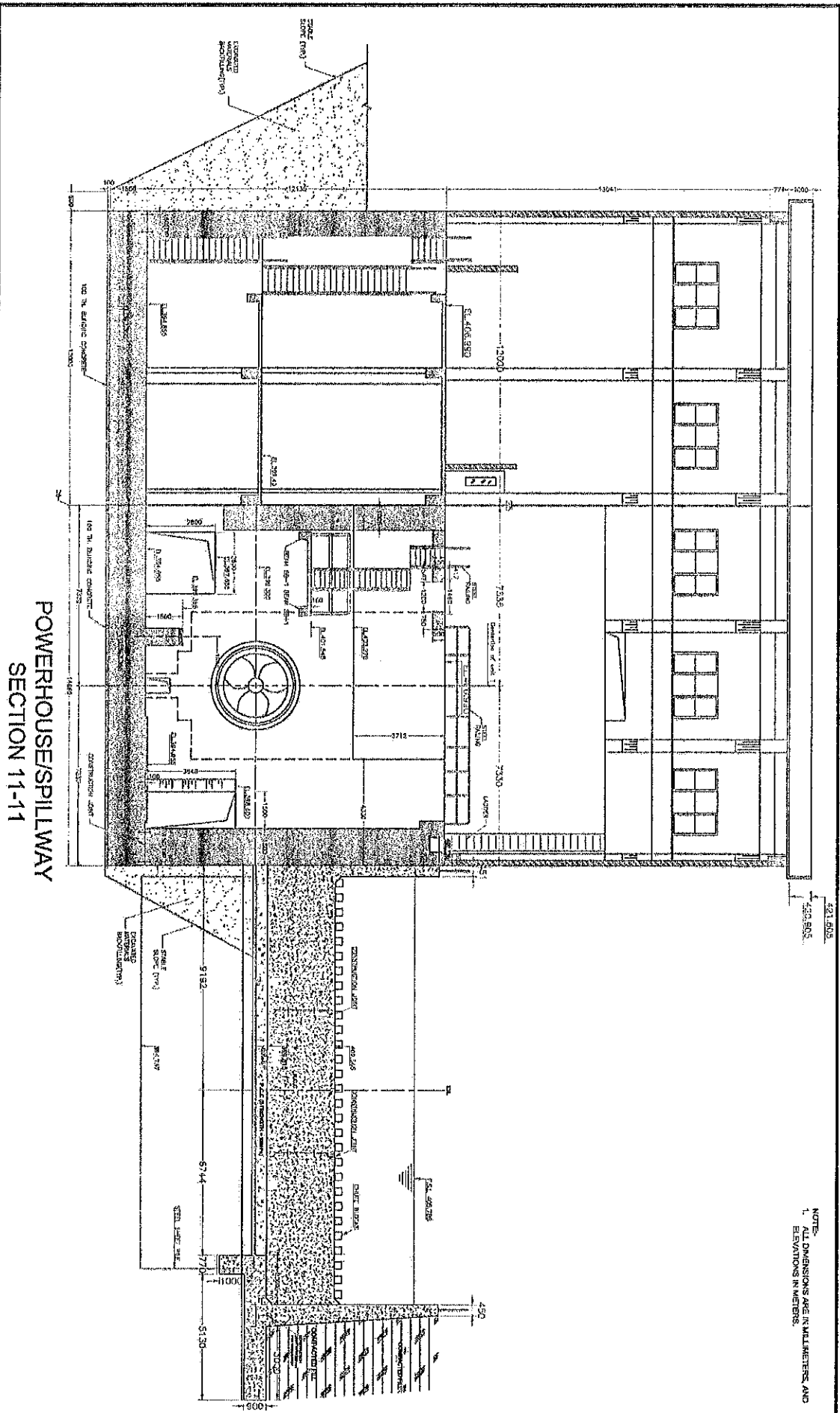


Proposed Powerhouse - Longitudinal Section

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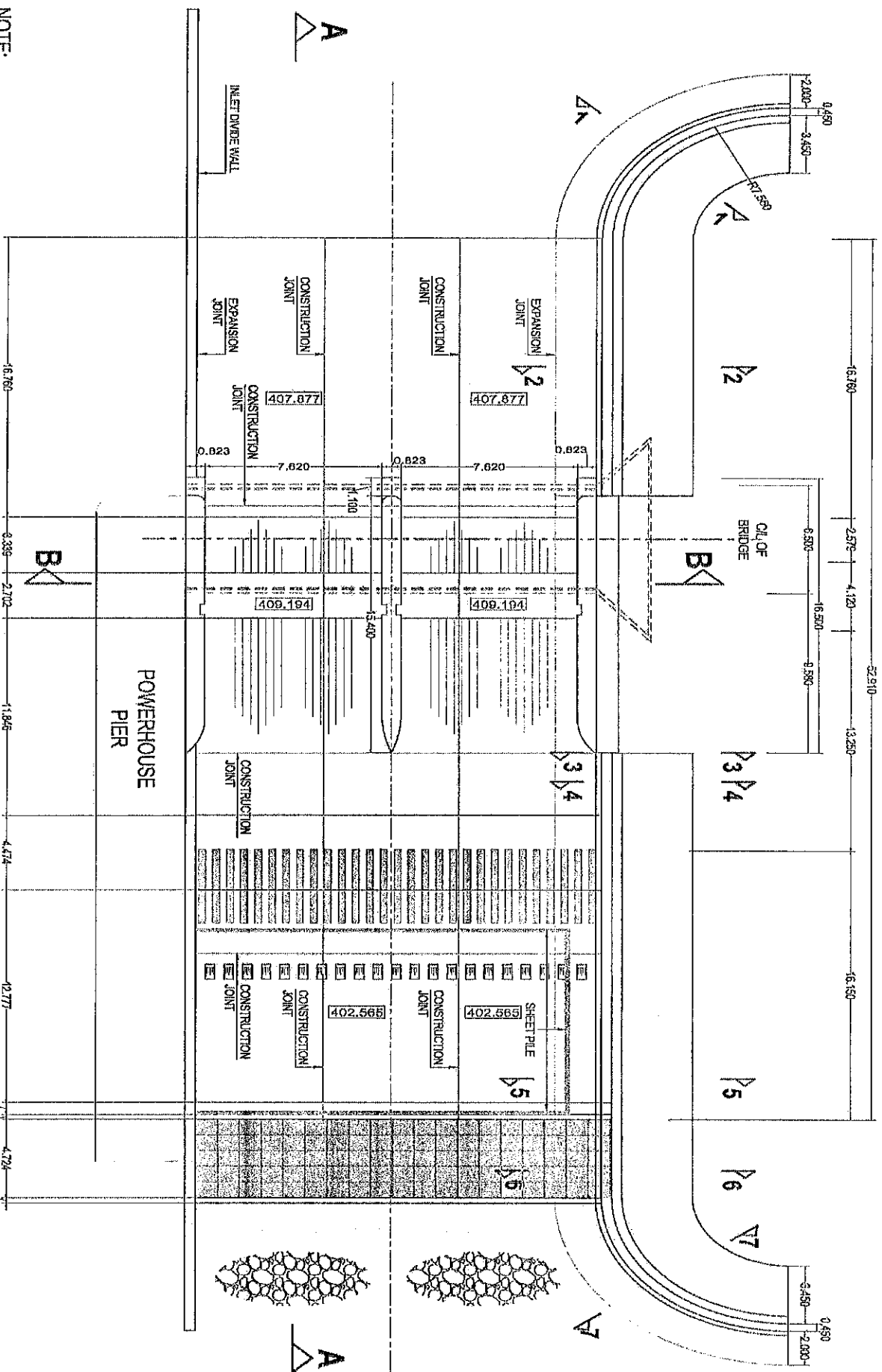
Proposed Powerhouse & Spillway - Cross Section



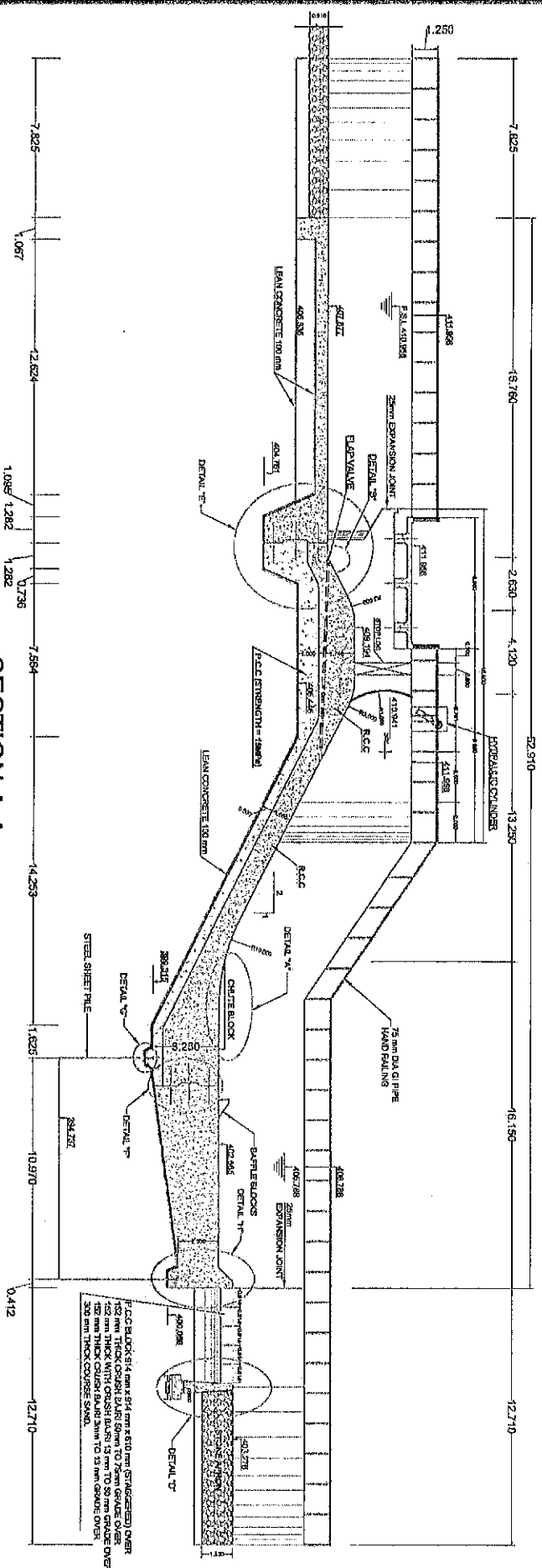
Proposed Spillway - Plan

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

SPILLWAY PLAN



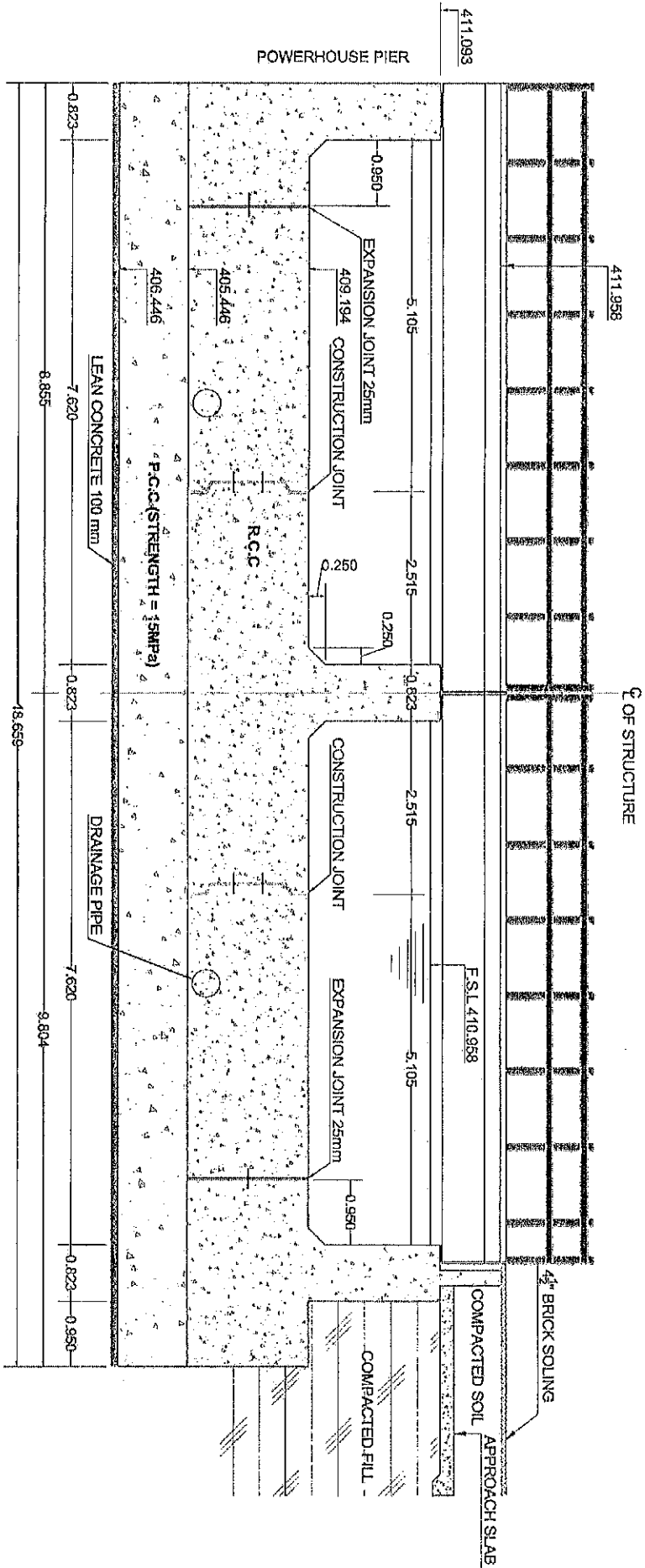
Proposed Spillway -- Longitudinal Section



NOTE:
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SECTION A-A

Proposed Spillway – Cross Section

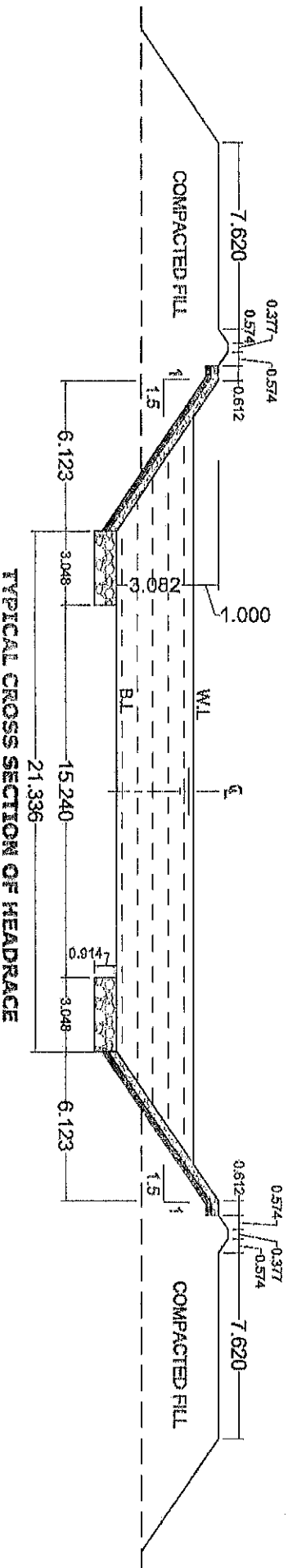


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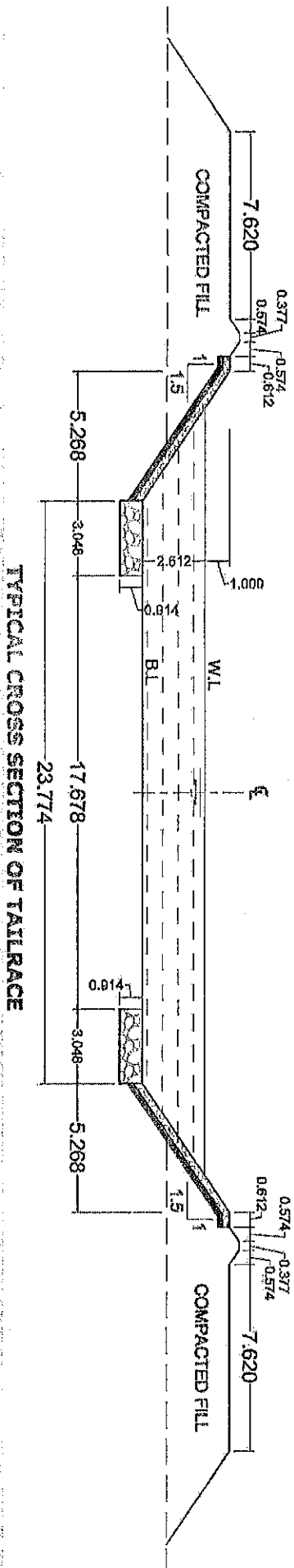
SECTION B-B

Proposed Headrace & Tailrace Channels

Typical Cross Sections



TYPICAL CROSS SECTION OF HEADRACE



TYPICAL CROSS SECTION OF TAILRACE

Proposed Powerhouse & Spillway – U/S 3D View

