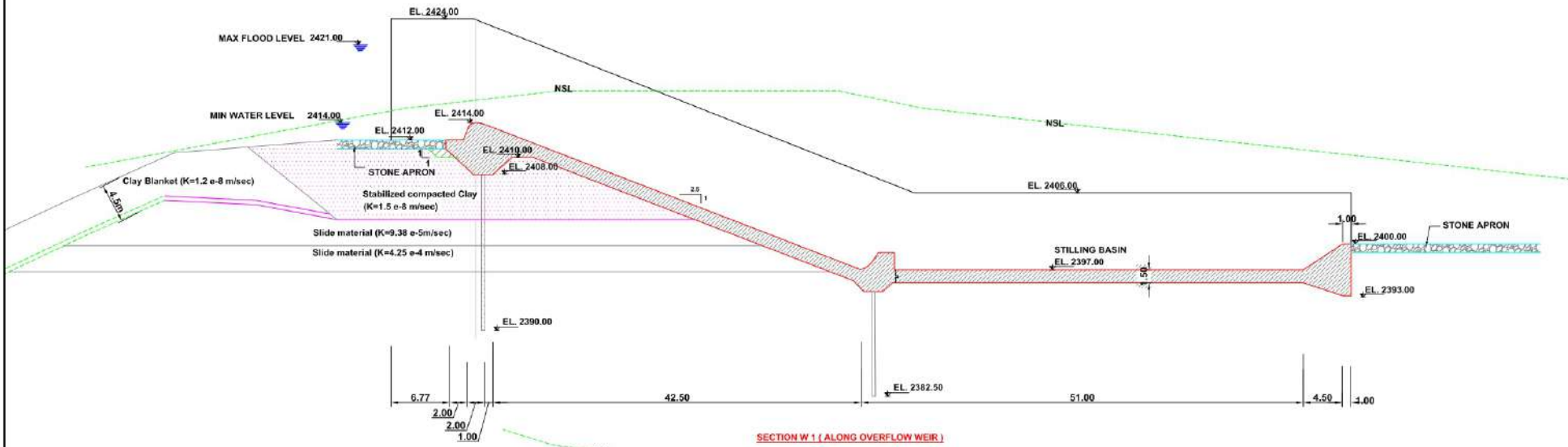
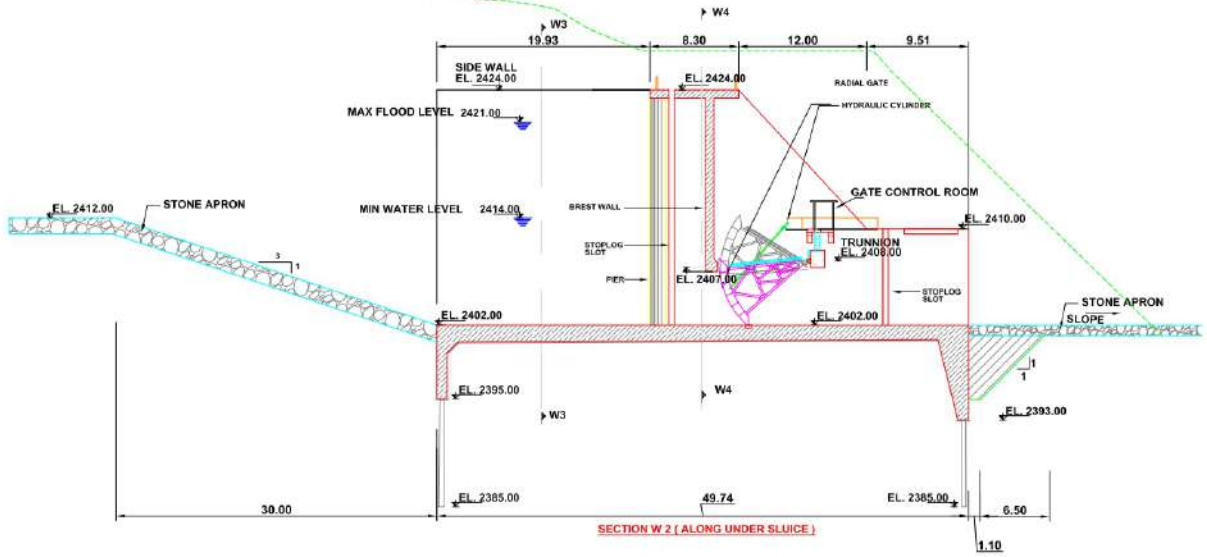


SECTION W 1 (ALONG OVERFLOW WEIR)



SECTION W 2 (ALONG UNDER SLUICE)

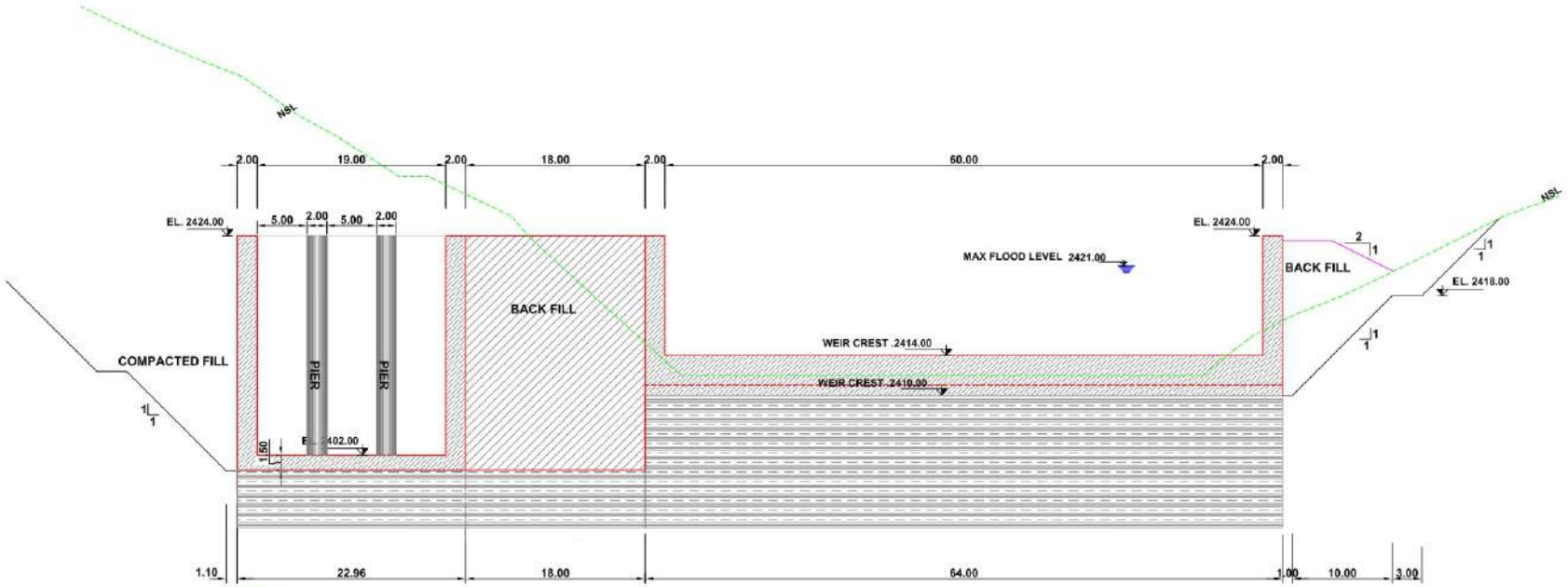
SCALE:

0 5 10 15 20 25 m

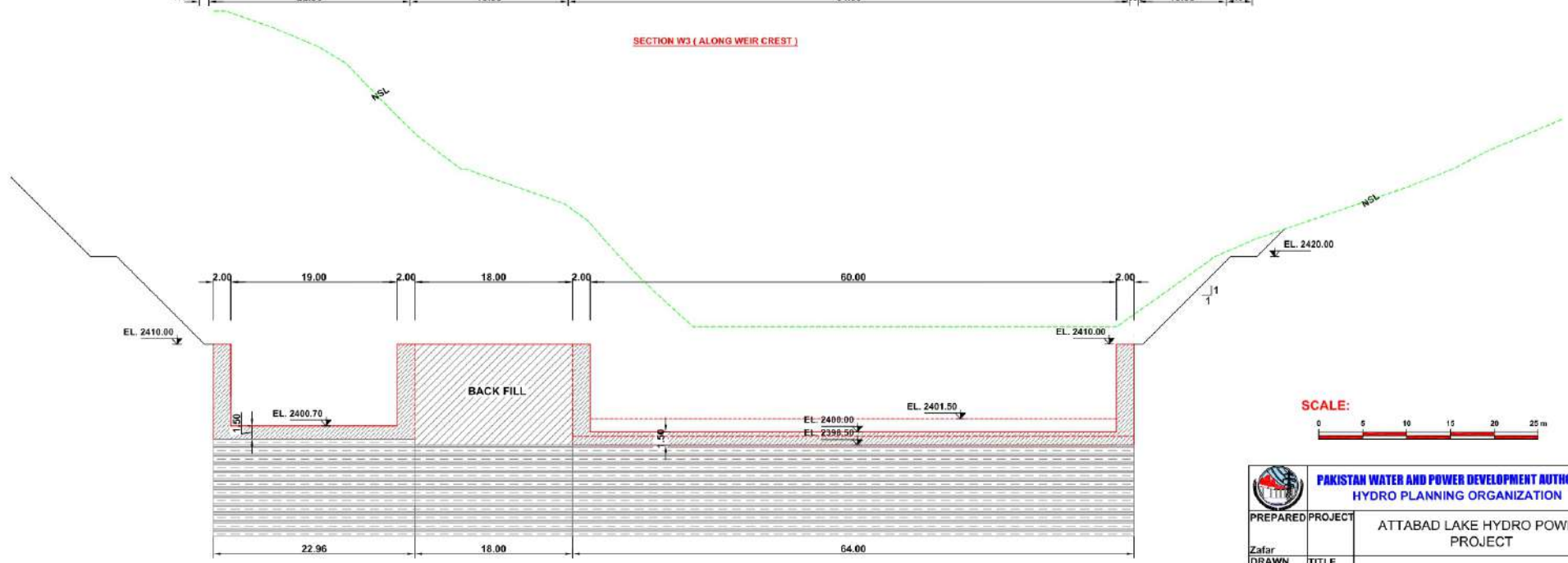
NOTES:

1. All dimensions are in meters.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	WEIR LONGITUDINAL SECTIONS			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-WR-410	REVISIONS	



SECTION W3 (ALONG WEIR CREST)



SECTION W4

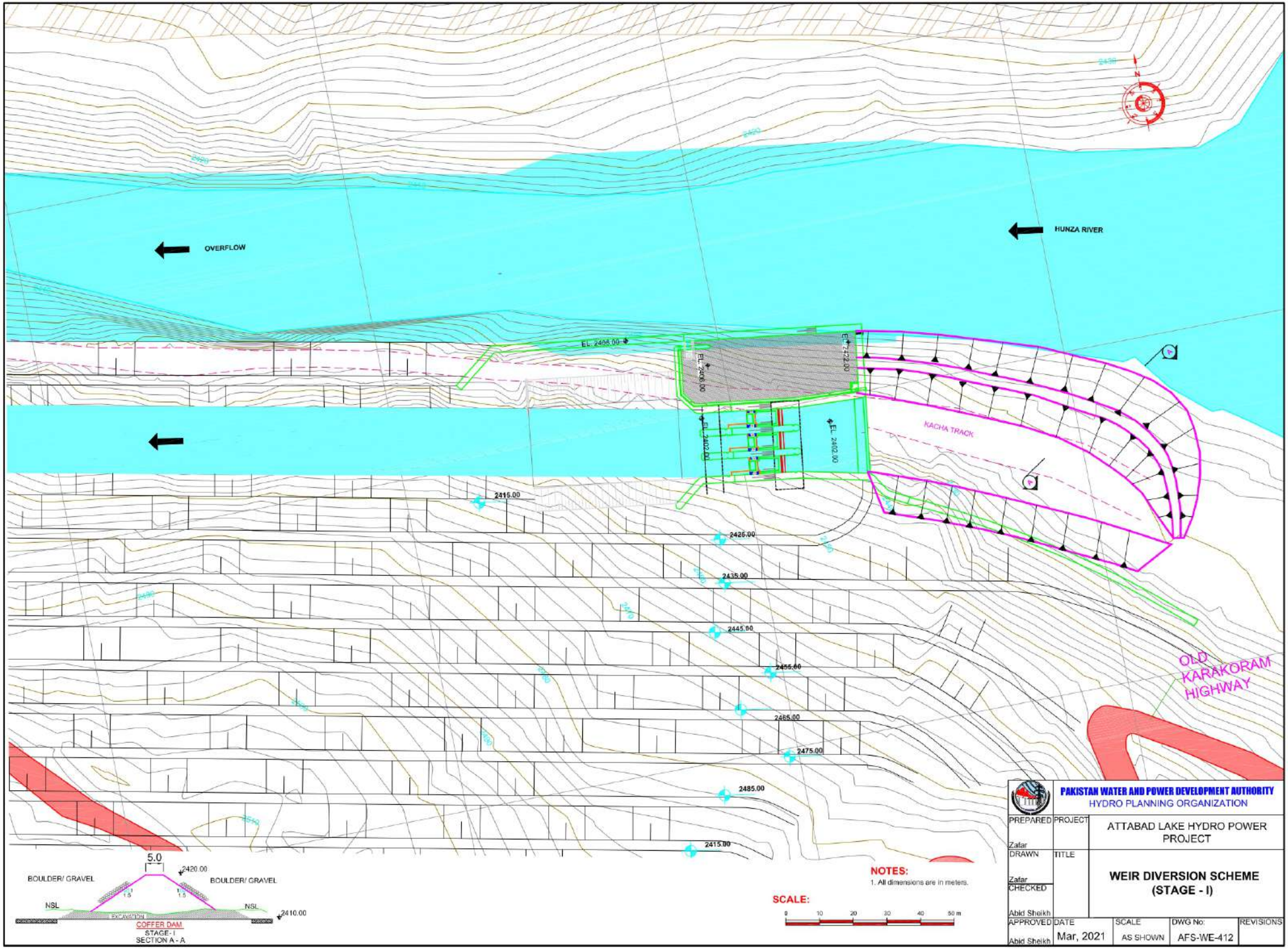
SCALE:

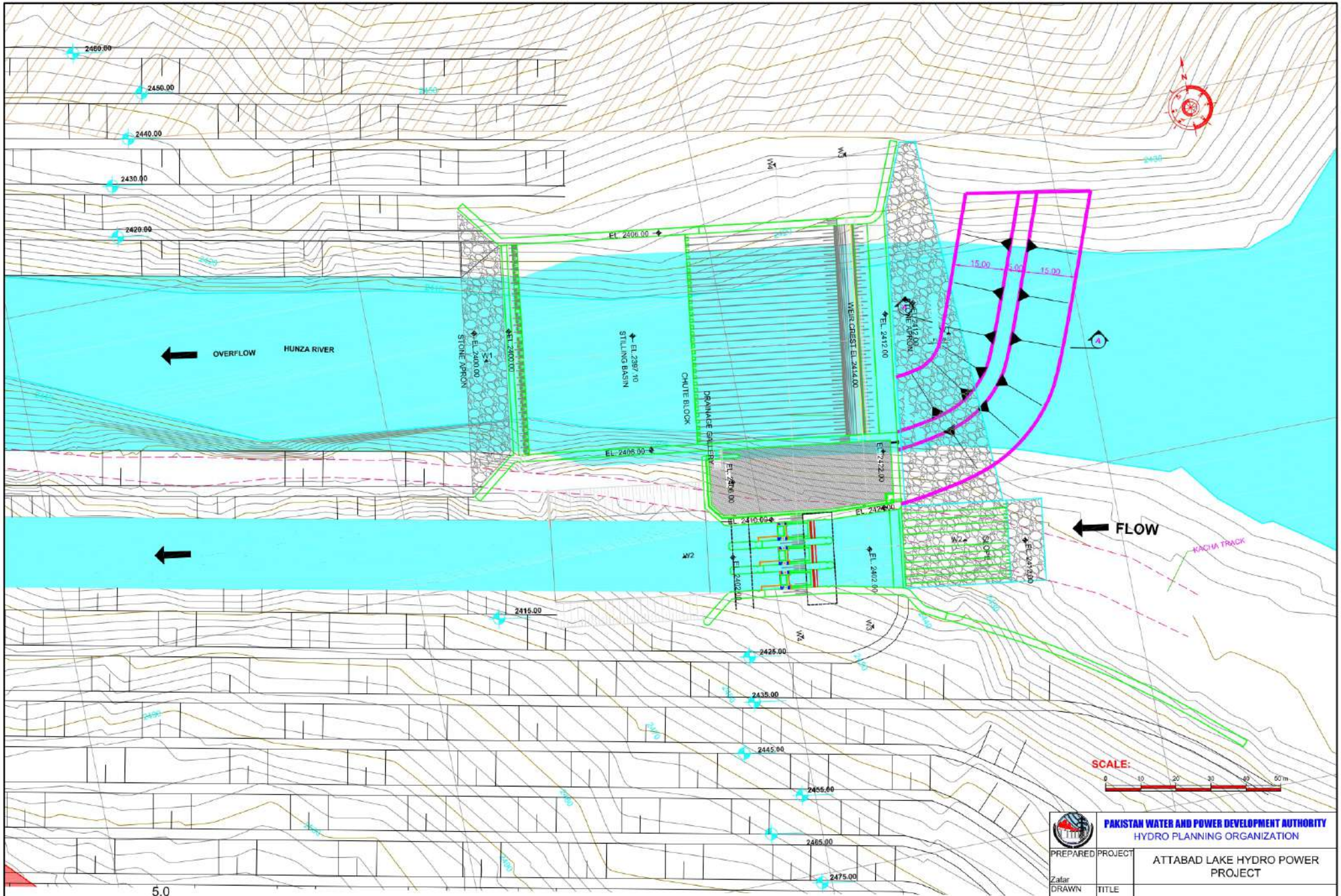
0 5 10 15 20 25 m

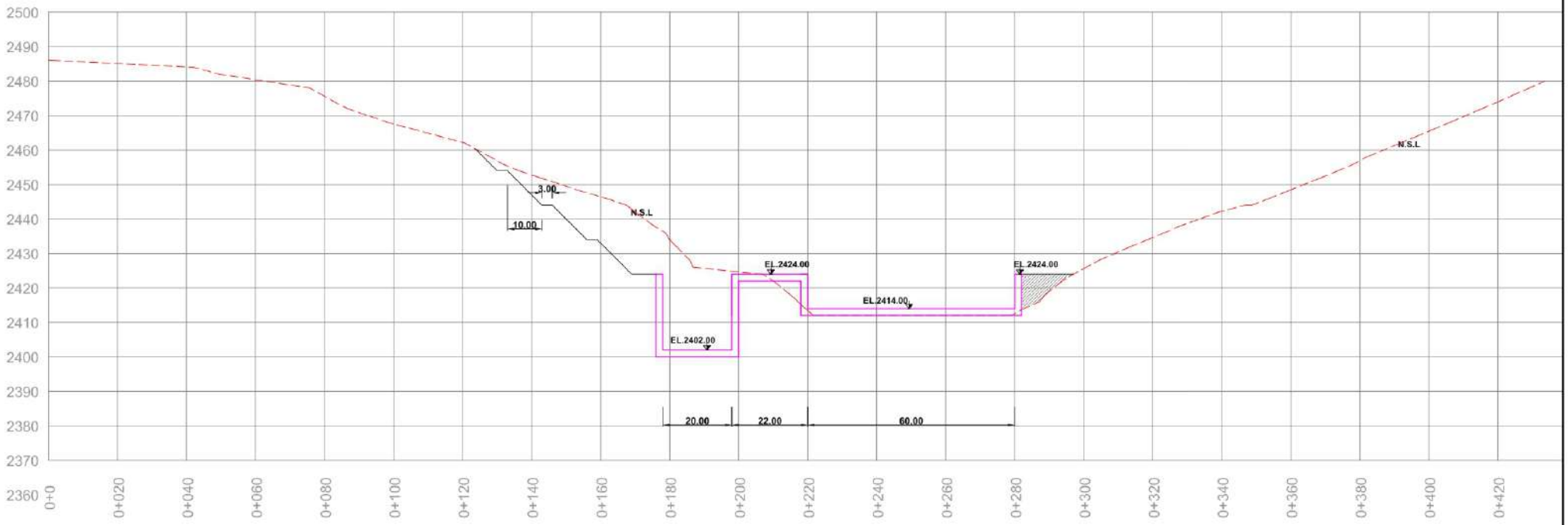
NOTES:

1. All dimensions are in meters.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	WEIR CROSS SECTIONS			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-WR-411	REVISIONS	


OVERFLOW
HUNZA RIVER
EL. 2406.00
EL. 2406.00
EL. 2423.00
EL. 2402.00
EL. 2402.00
KACHA TRACK
2415.00
2425.00
2435.00
2445.00
2455.00
2465.00
2475.00
2485.00
2415.00
OLD KARAKORAM HIGHWAY
5.0
2420.00
BOUNDER/ GRAVEL
BOUNDER/ GRAVEL
NSL
NSL
EXCAVATION
2410.00
COFFER DAM
STAGE- I
SECTION A - A
NOTES:
1. All dimensions are in meters.
SCALE:
0 10 20 30 40 50 m
PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION
PREPARED Zafar
PROJECT
ATTABAD LAKE HYDRO POWER PROJECT
DRAWN Zafar
TITLE
WEIR DIVERSION SCHEME (STAGE - I)
CHECKED Abid Sheikh
APPROVED Abid Sheikh
DATE Mar, 2021
SCALE AS SHOWN
DWG No: AFS-WE-412
REVISIONS


2460.00
2450.00
2440.00
2430.00
2420.00
OVERFLOW
HUNZA RIVER
STONE APRON
EL. 2400.00
W1
EL. 2400.00
STILLING BASIN
EL. 2397.10
CHUTE BLOCK
DRAINAGE GALLERY
EL. 2406.00
EL. 2406.00
EL. 2406.00
WEIR CREST EL 2414.00
EL. 2412.00
STONE APRON
EL. 2412.00
15.00
5.00
15.00
A
EL. 2412.00
EL. 2410.00
EL. 2402.00
W2
SLOPE
EL. 2413.00
EL. 2402.00
FLOW
KACHA TRACK
W3
W4
2415.00
2425.00
2435.00
2445.00
2455.00
2465.00
2475.00
SCALE:
0 10 20 30 40 50 m
5.0
2422.00
BOULDER/ GRAVEL
BOULDER/ GRAVEL
NSL
NSL
EXCAVATION
COFFER DAM
2410.00
STAGE- II
SECTION A - A
NOTES:
1. All dimensions are in meters.
PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION
PREPARED
Zafar
PROJECT
ATTABAD LAKE HYDRO POWER PROJECT
DRAWN
Zafar
TITLE
WEIR DIVERSION SCHEME (STAGE - II)
CHECKED
Abid Sheikh
APPROVED
Abid Sheikh
DATE
Mar, 2021
SCALE
AS SHOWN
DWG No:
AFS-WE-413
REVISIONS



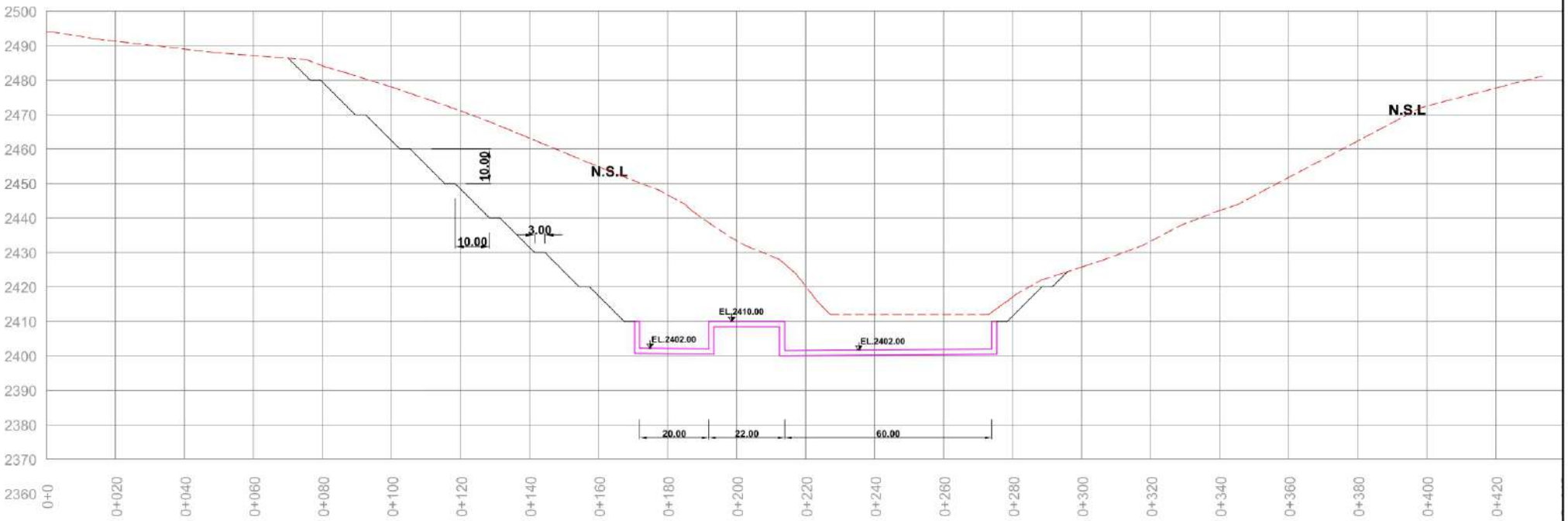
CROSS SECTION AT RD. 0+0

SCALE

0 12 24 36 48 60 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT
DRAWN Zafar	TITLE	CROSS SECTION AT RD. 0+0 FROM DOWNSTREAM OF WEIR SITE
CHECKED Abid Sheikh		
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN
	DWG No: AFS-WR- 414	REVISIONS



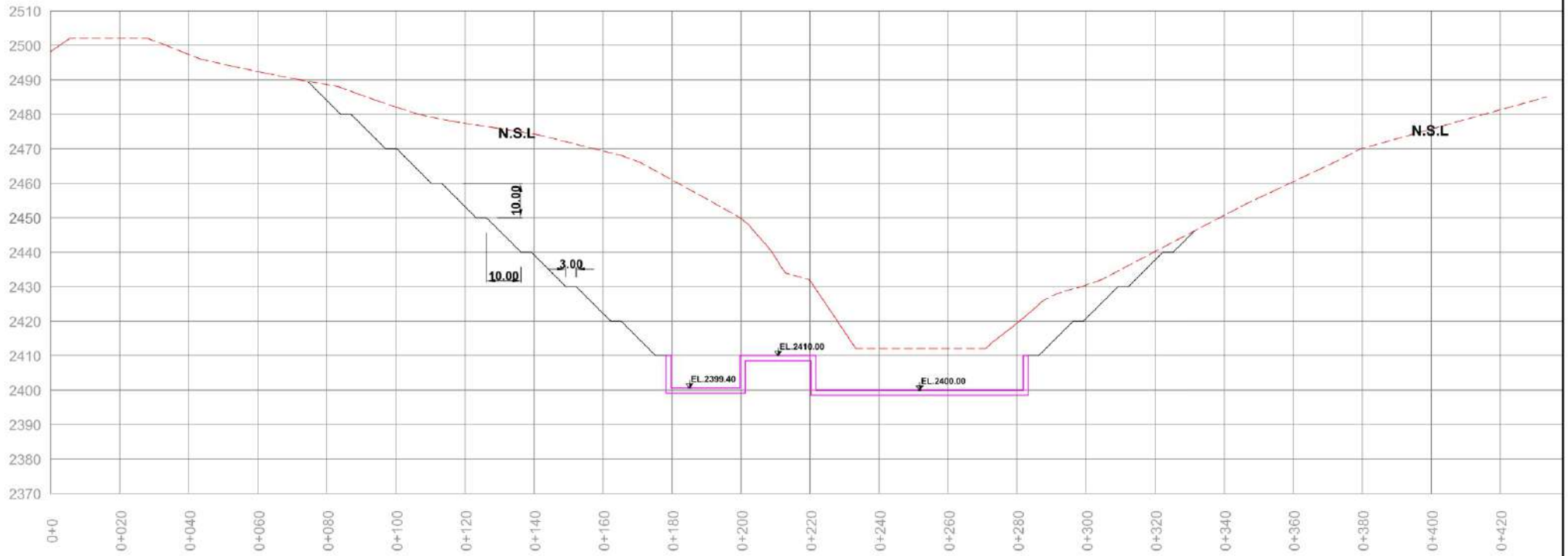
CROSS SECTION AT RD. 0+50

SCALE

0 12 24 36 48 60 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT
DRAWN Zafar	TITLE	CROSS SECTION AT RD. 0+50 FROM DOWNSTREAM OF WEIR SITE
CHECKED Abid Sheikh		
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN
	DWG No: AFS-WR- 415	REVISIONS

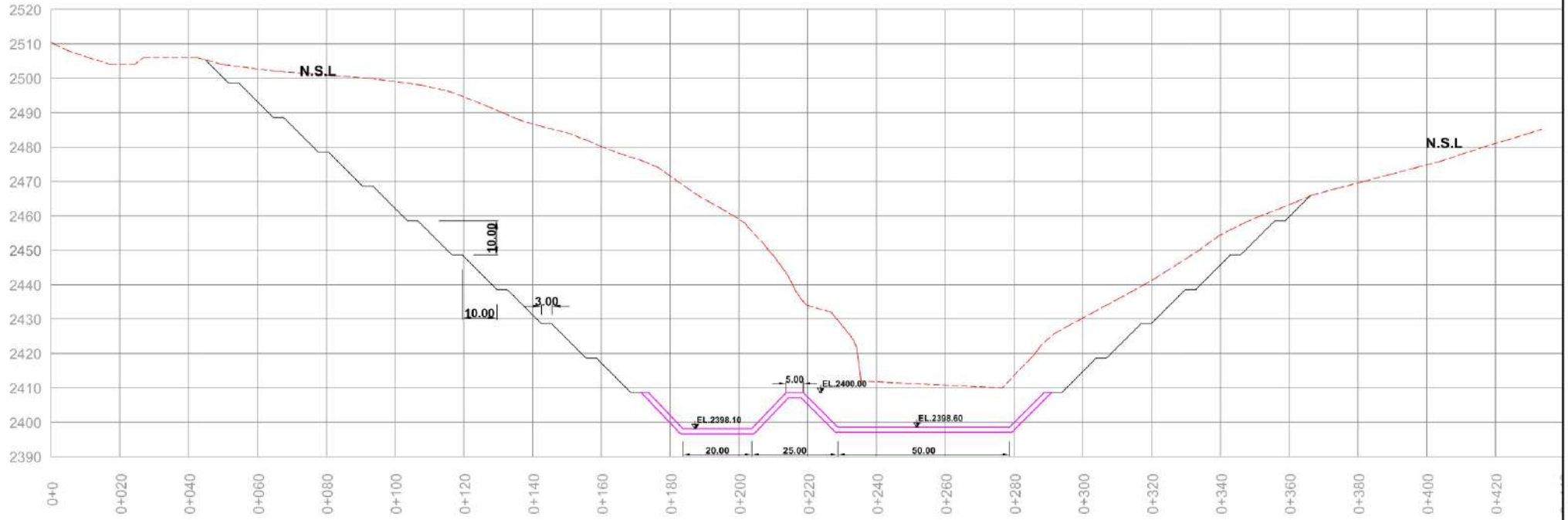


CROSS SECTION AT RD. 0+100

SCALE

0 12 24 36 48 60 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	CROSS SECTION AT RD. 0+100 FROM DOWNSTREAM OF WEIR SITE			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-WR- 416	REVISIONS	

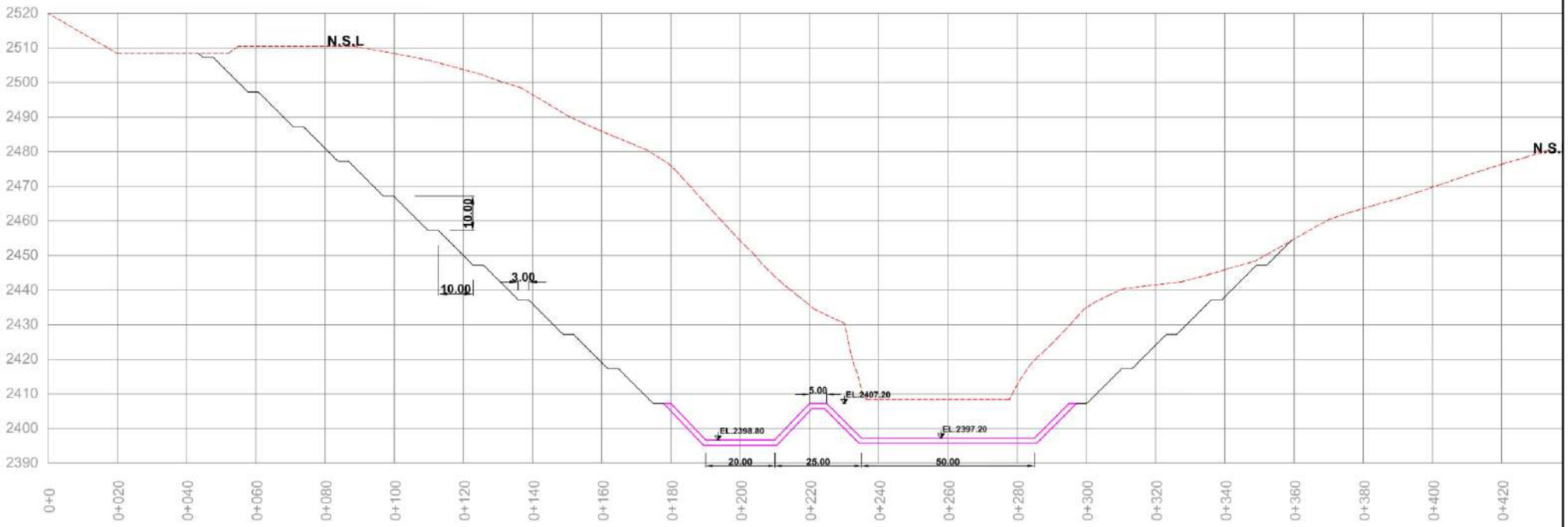


CROSS SECTION AT RD. 0+150

SCALE

0 12 24 36 48 60 m

	PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION				
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	CROSS SECTION AT RD. 0+150 FROM DOWNSTREAM OF WEIR SITE			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-WR- 417	REVISIONS	

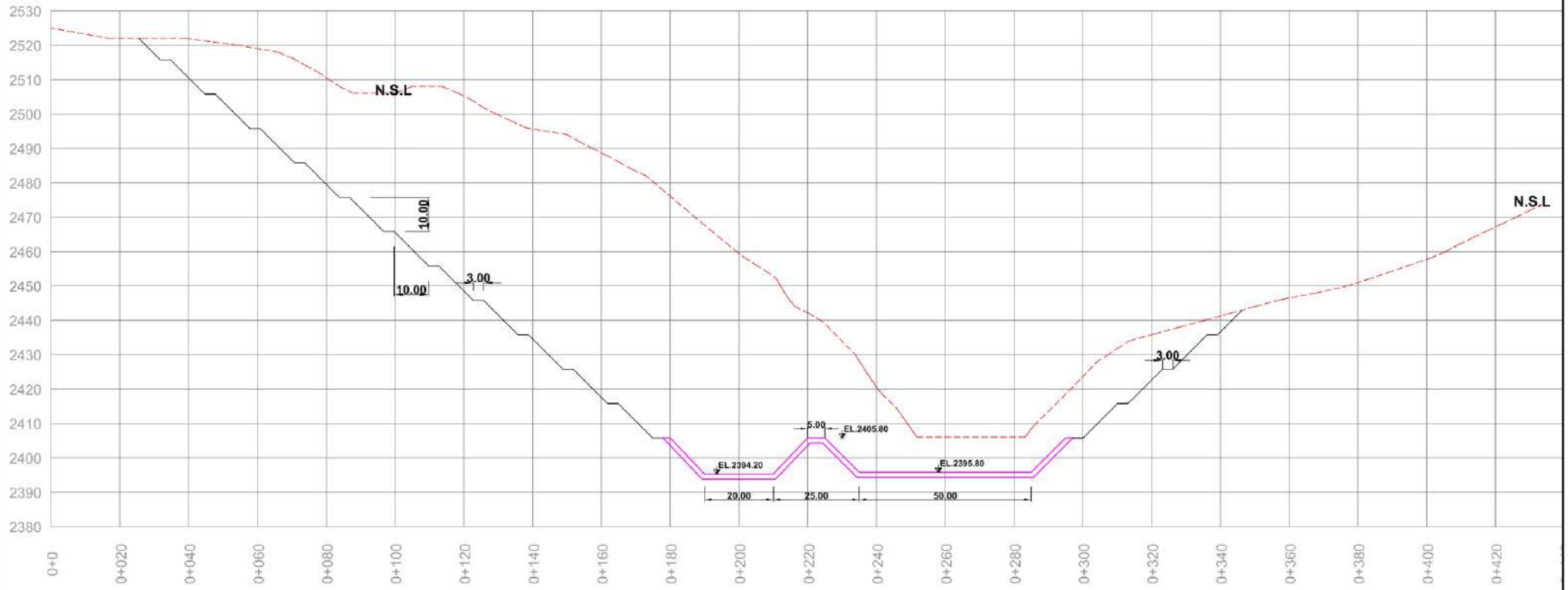


CROSS SECTION AT RD. 0+200

SCALE

0 12 24 36 48 60 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	CROSS SECTION AT RD. 0+200 FROM DOWNSTREAM OF WEIR SITE			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-WR- 418	REVISIONS	

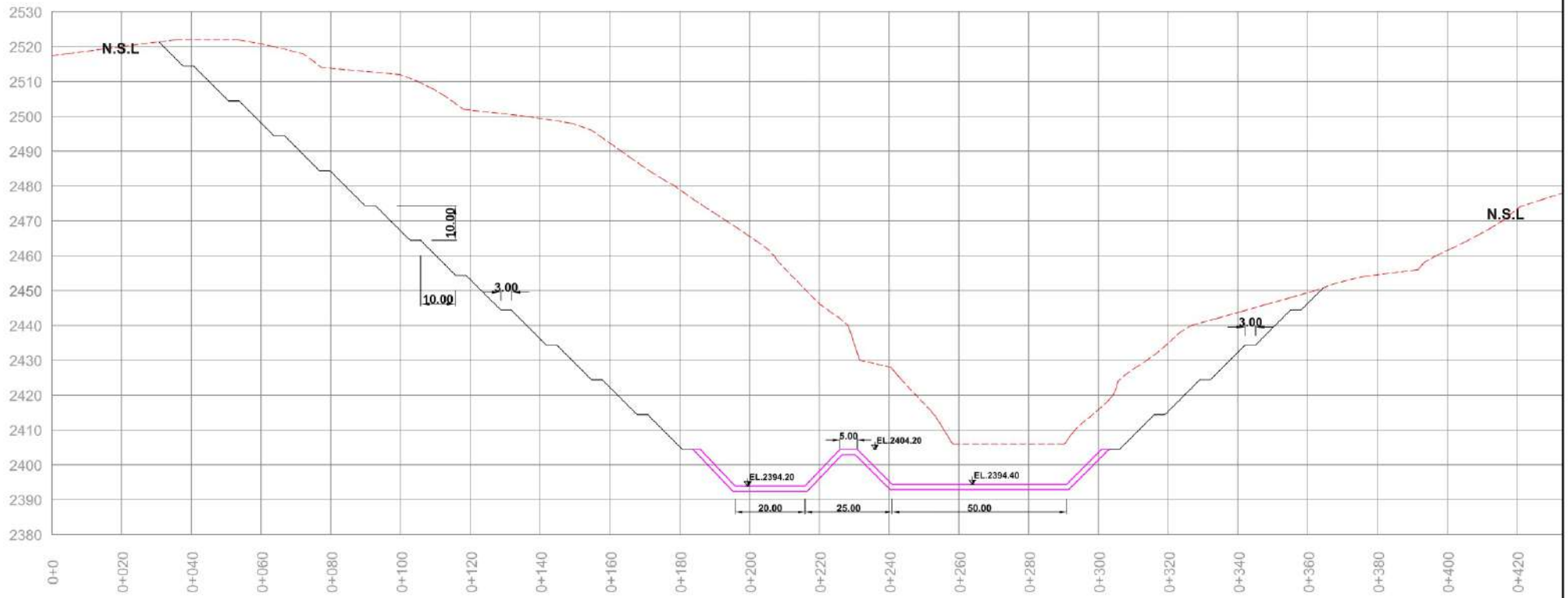


CROSS SECTION AT RD. 0+250

SCALE

0 12 24 36 48 60 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	CROSS SECTION AT RD. 0+250 FROM DOWNSTREAM OF WEIR SITE			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-WR- 419	REVISIONS	

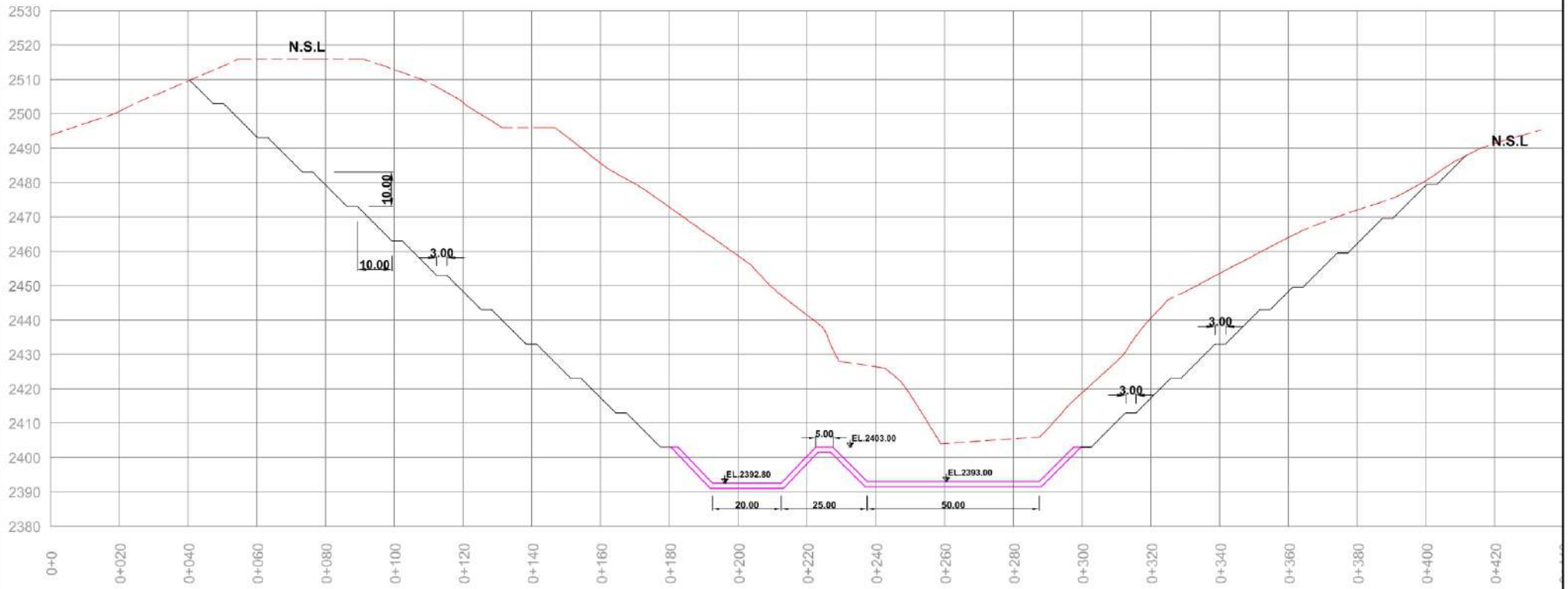


CROSS SECTION AT RD. 0+300

SCALE

0 12 24 36 48 60 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	CROSS SECTION AT RD. 0+300 FROM DOWNSTREAM OF WEIR SITE			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-WR- 420	REVISIONS	

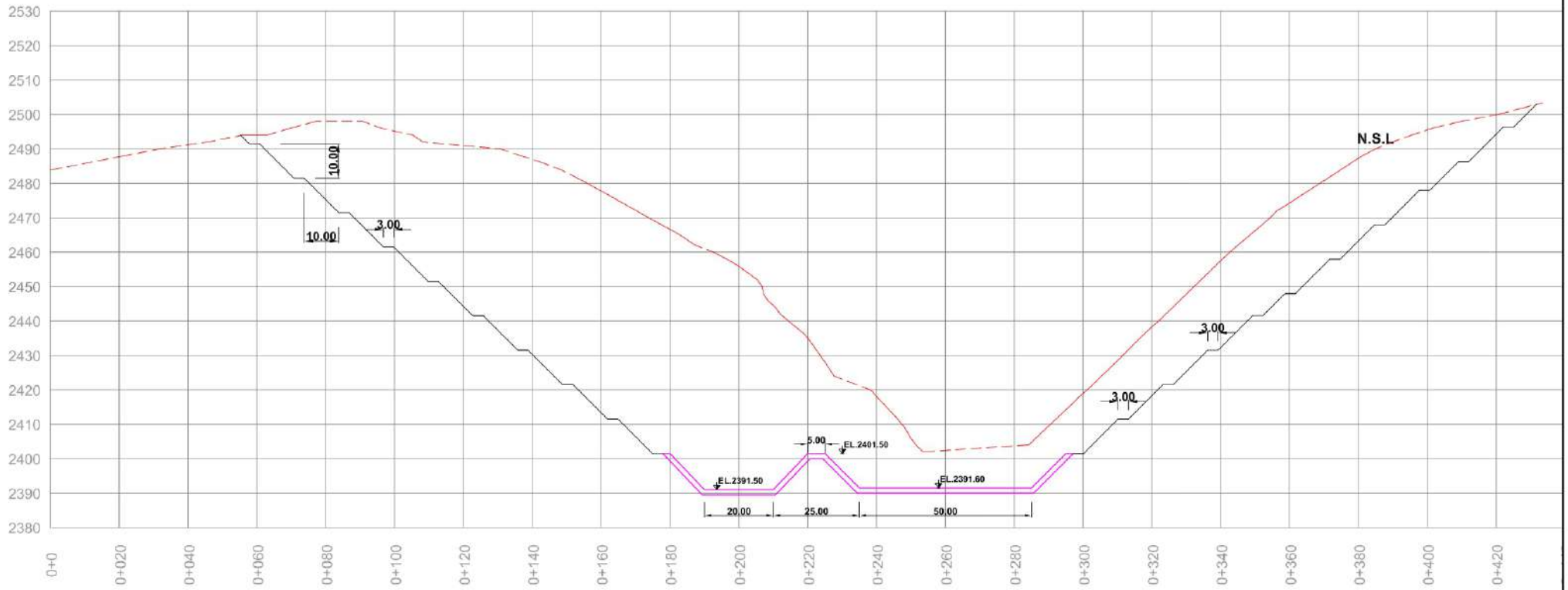


CROSS SECTION AT RD. 0+350

SCALE

0 12 24 36 48 60 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	CROSS SECTION AT RD. 0+350 FROM DOWNSTREAM OF WEIR SITE			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-WR- 421	REVISIONS	

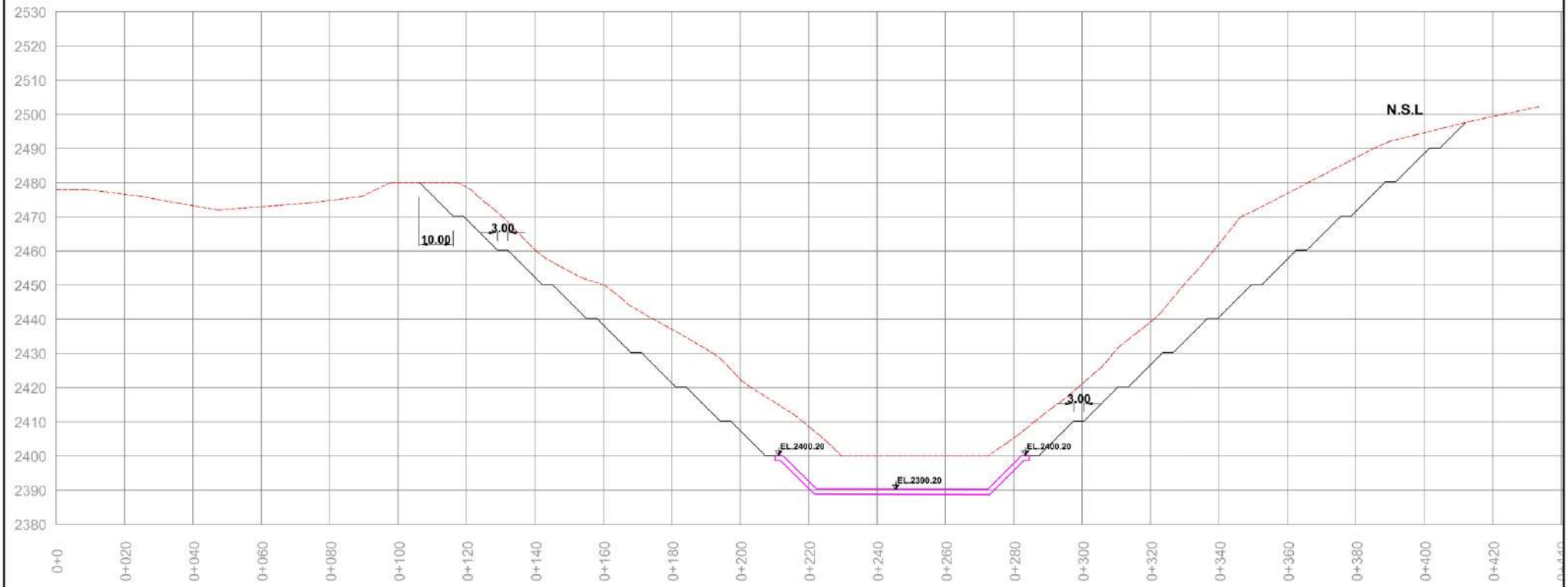


CROSS SECTION AT RD. 0+400

SCALE

0 12 24 36 48 60 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	CROSS SECTION AT RD. 0+400 FROM DOWNSTREAM OF WEIR SITE			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-WR- 422	REVISIONS	

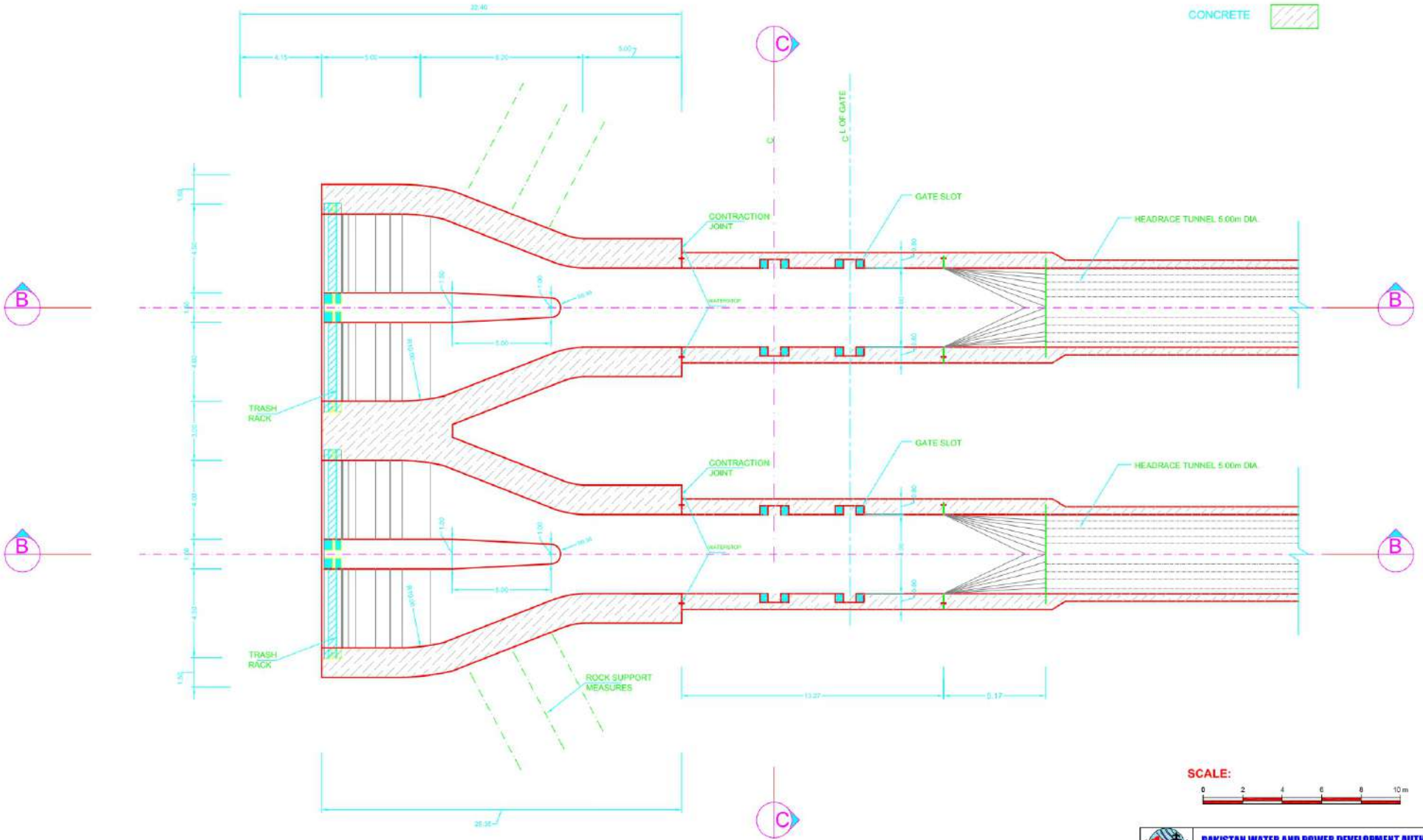


CROSS SECTION AT RD. 0+450

SCALE

0 12 24 36 48 60 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	CROSS SECTION AT RD. 0+450 FROM DOWNSTREAM OF WEIR SITE			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-WR- 423	REVISIONS	



PLAN

SECTION A - A

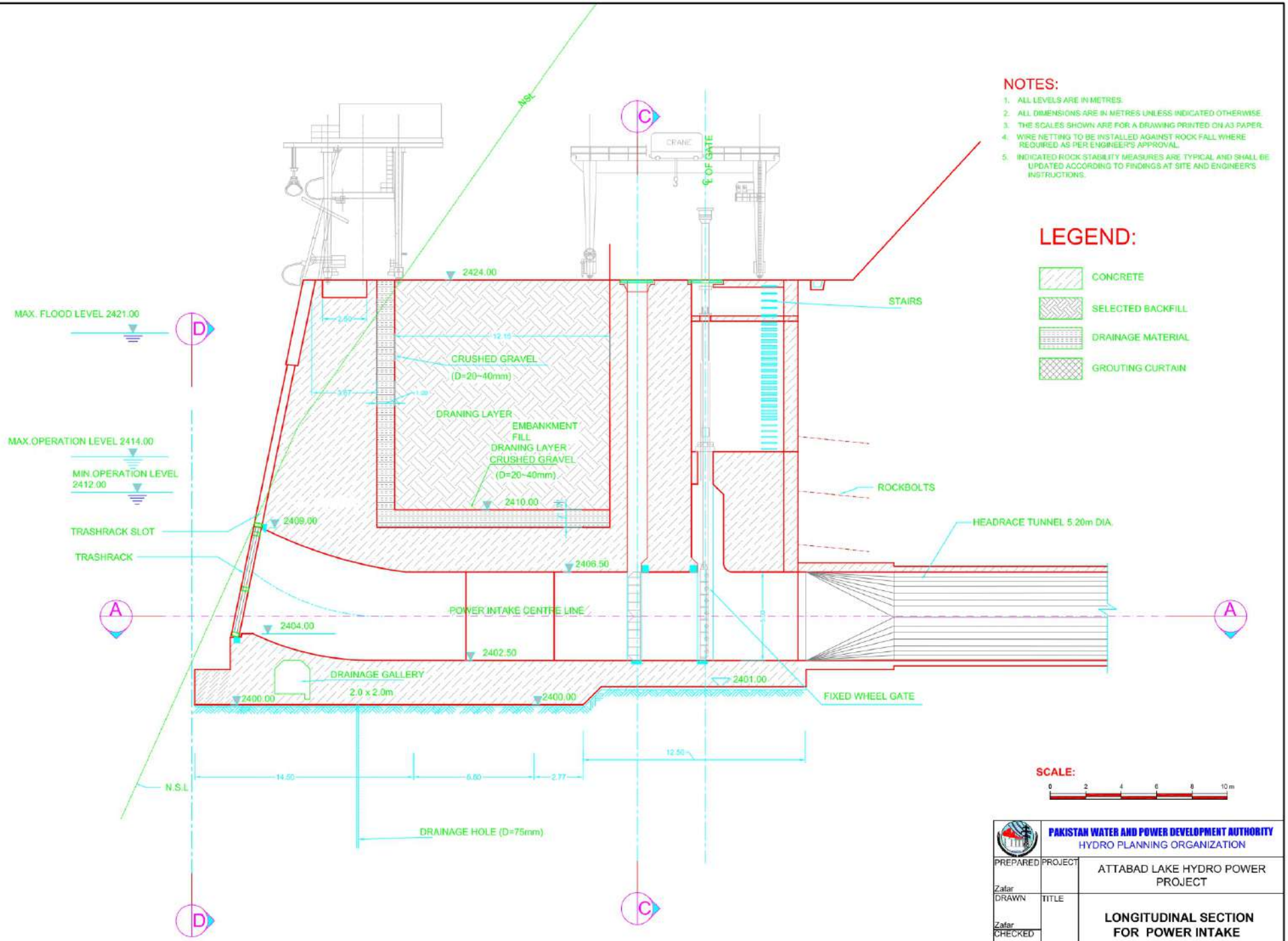
SCALE:

0 2 4 6 8 10 m

NOTES:

1. All dimensions are in meters.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	PLAN FOR POWER INTAKE			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-PI- 424	REVISIONS	



NOTES:

1. ALL LEVELS ARE IN METRES.
2. ALL DIMENSIONS ARE IN METRES UNLESS INDICATED OTHERWISE.
3. THE SCALES SHOWN ARE FOR A DRAWING PRINTED ON A3 PAPER.
4. WIRE NETTING TO BE INSTALLED AGAINST ROCK FALL WHERE REQUIRED AS PER ENGINEER'S APPROVAL.
5. INDICATED ROCK STABILITY MEASURES ARE TYPICAL AND SHALL BE UPDATED ACCORDING TO FINDINGS AT SITE AND ENGINEER'S INSTRUCTIONS.

LEGEND:

- CONCRETE
- SELECTED BACKFILL
- DRAINAGE MATERIAL
- GROUTING CURTAIN

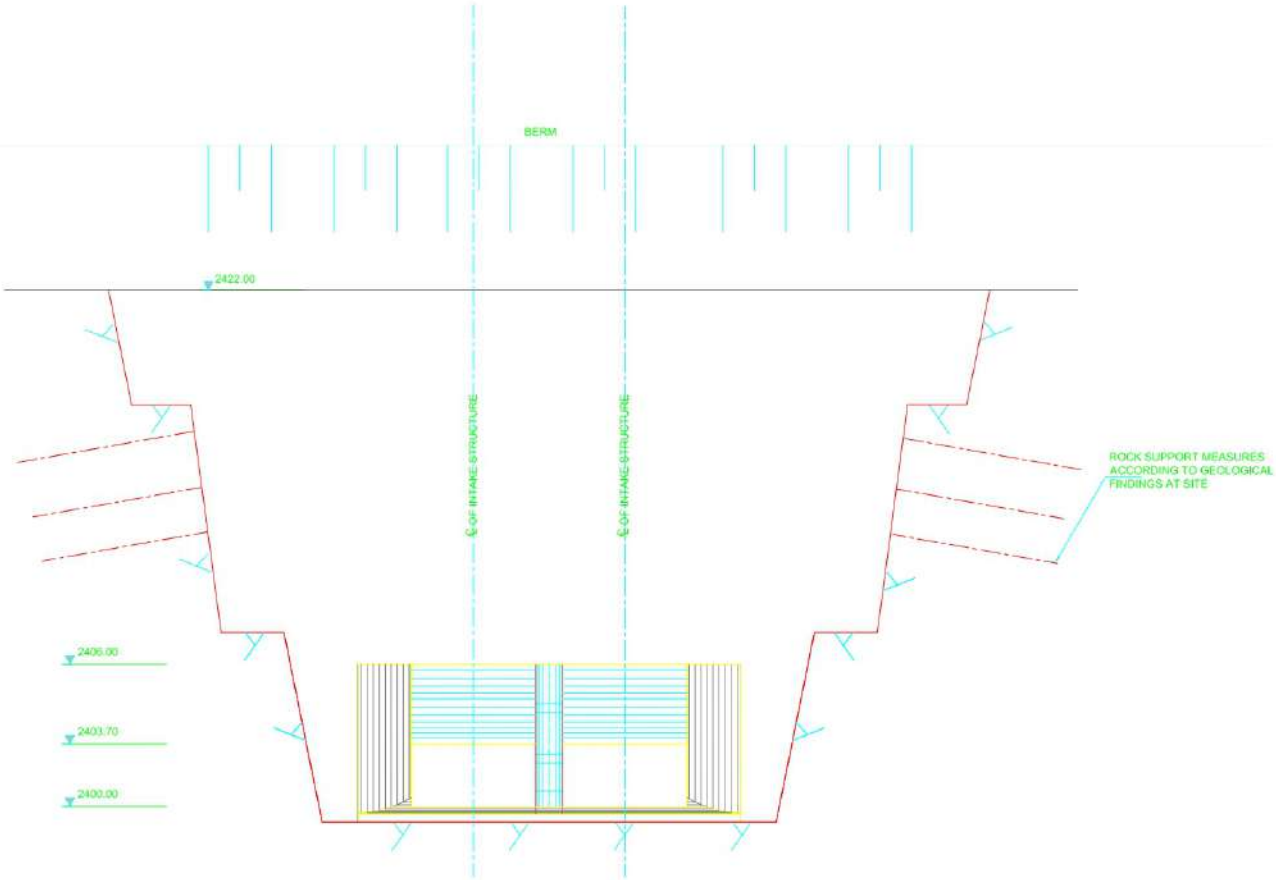
SCALE:

0 2 4 6 8 10 m

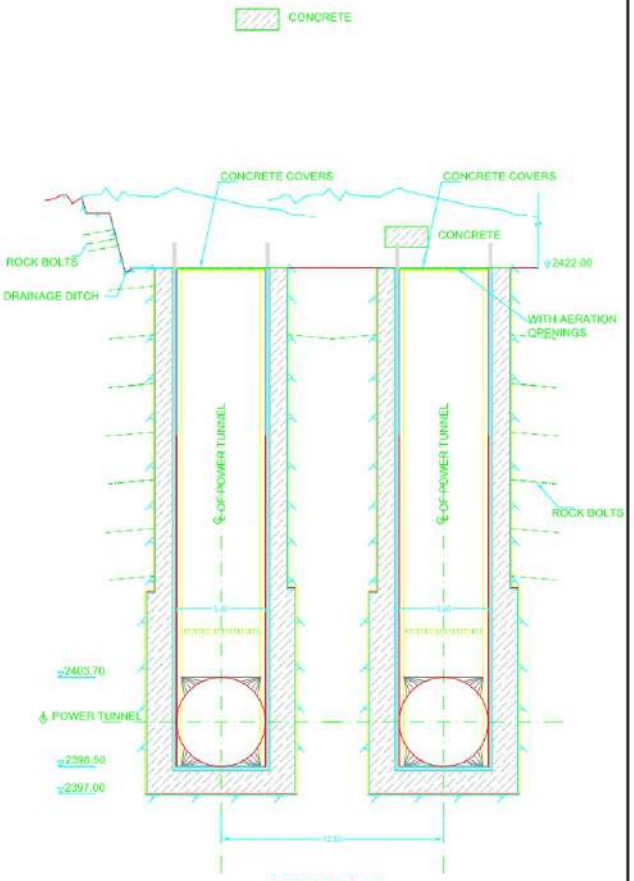
NOTES:
1. All dimensions are in meters.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT
DRAWN Zafar	TITLE	**LONGITUDINAL SECTION FOR POWER INTAKE**
CHECKED Abid Sheikh		
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN
	DWG No: AFS-PI- 425	REVISIONS



SECTION D - D



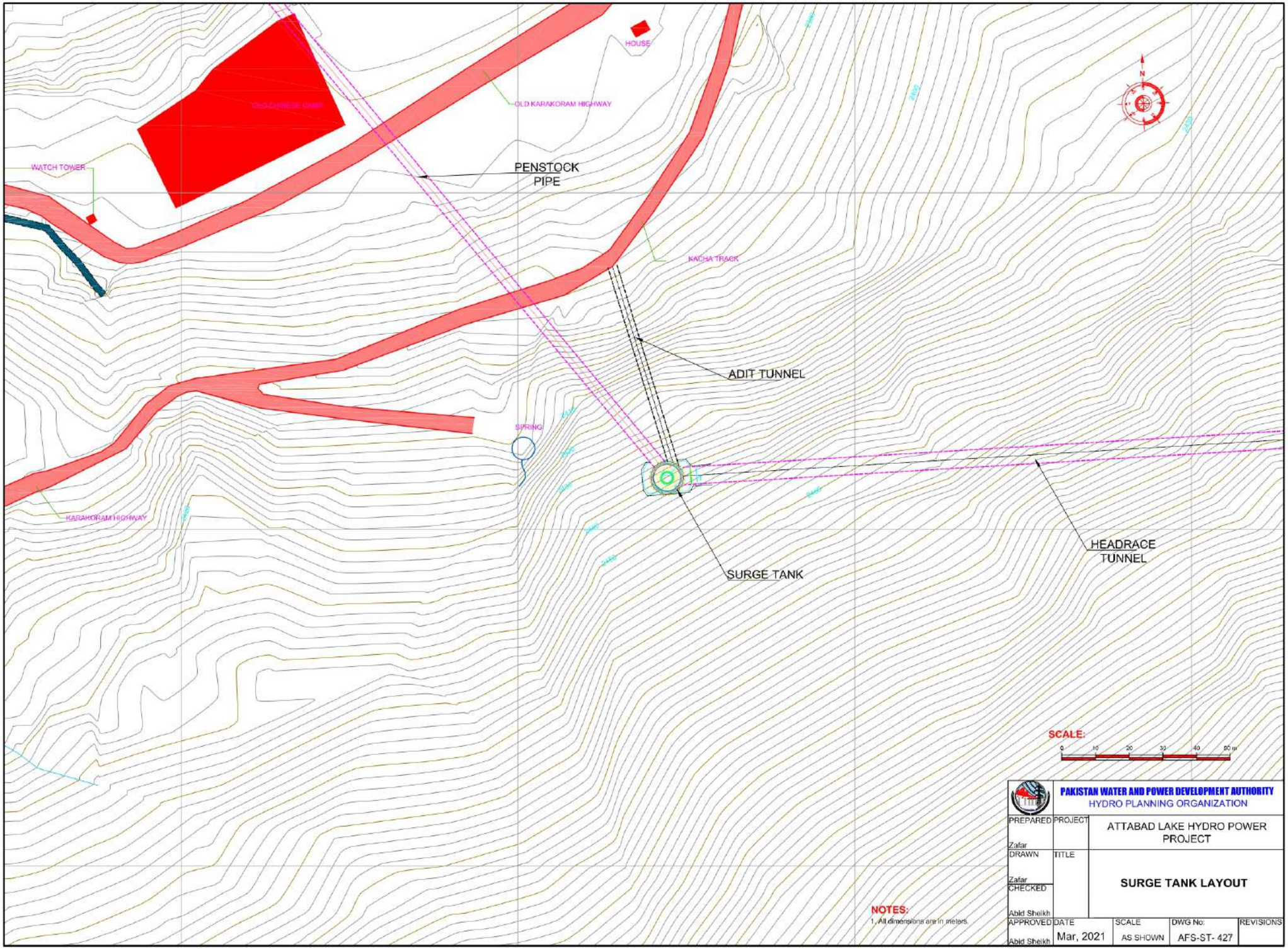
SECTION C - C

SCALE:

0 3 6 9 12 15 m

NOTES:
1. All dimensions are in meters.

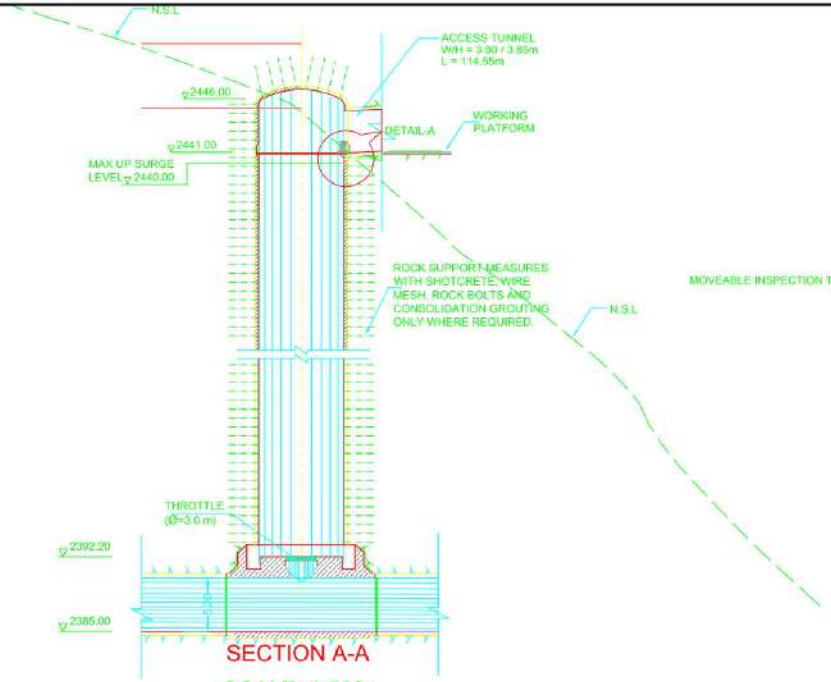
PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	**POWER INTAKE SECTIONS**			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-PI- 426	REVISIONS	



NOTES:
1. All dimensions are in meters.

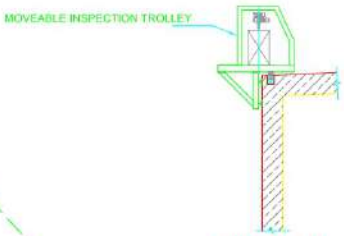
PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT
DRAWN Zafar	TITLE	SURGE TANK LAYOUT
CHECKED Abid Sheikh		
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN
	DWG No: AFS-ST- 427	REVISIONS

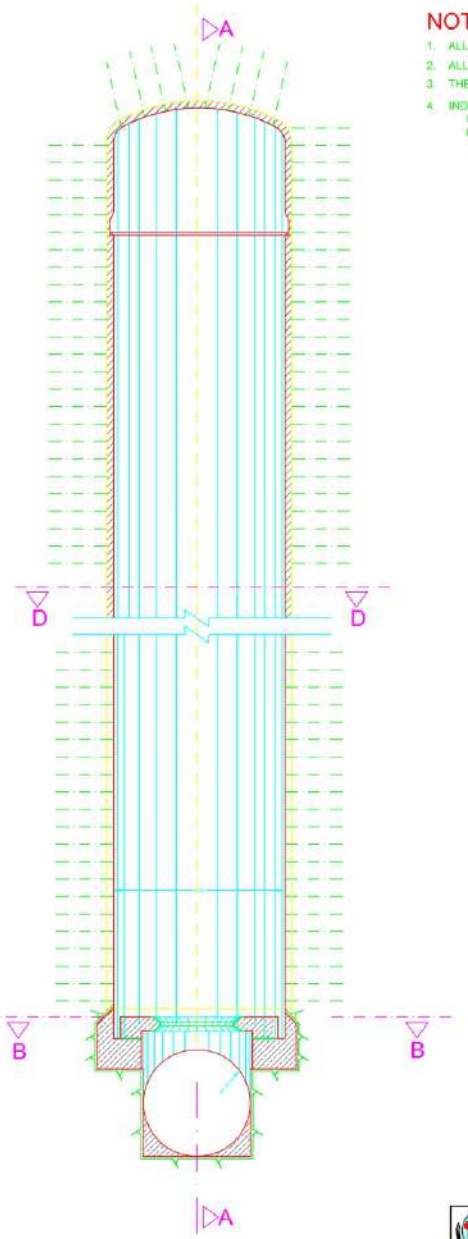


SECTION A-A

SCALE: 1:500



DETAIL A

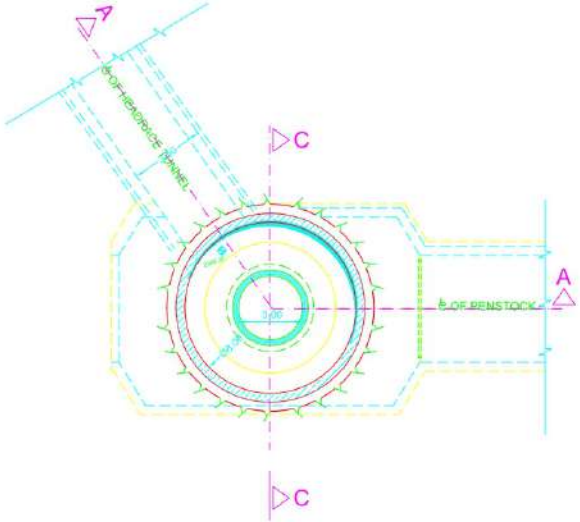


SECTION C-C

SCALE: 1:250

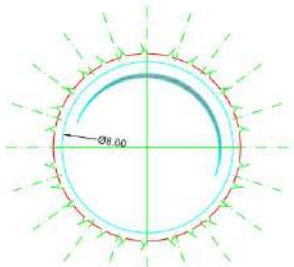
NOTES:

1. ALL LEVELS ARE IN METRES.
2. ALL DIMENSIONS ARE IN METRES UNLESS INDICATED OTHERWISE.
3. THE SCALES SHOWN ARE FOR A DRAWING PRINTED ON A3 PAPER.
4. INDICATED ROCK STABILITY MEASURES ARE TYPICAL AND SHALL BE UPDATED ACCORDING TO FINDINGS AT SITE AND ENGINEER'S INSTRUCTIONS.



SECTION B-B

SCALE: 1:250



SECTION D-D

SCALE: 1:250

SCALE:

0 2.5 5.0 7.5 10.0 12.50 m

SCALE:

0 5 10 15 20 25 m

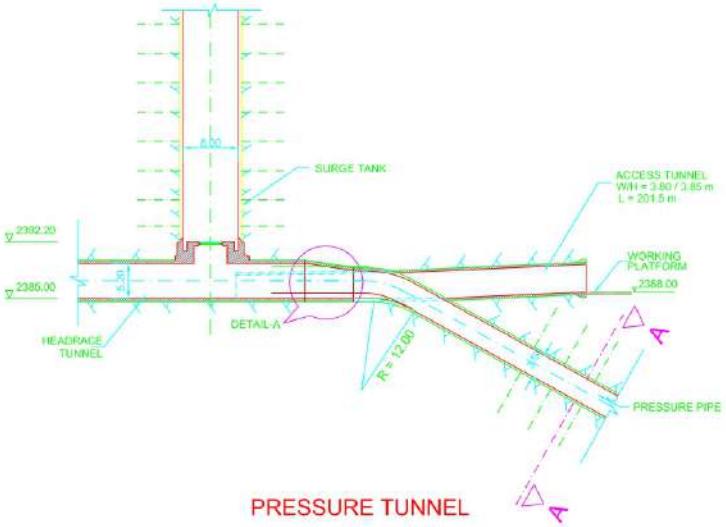
NOTES:

1. All dimensions are in meters.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	SURGE TANK PLAN AND SECTIONS			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-ST- 428	REVISIONS	

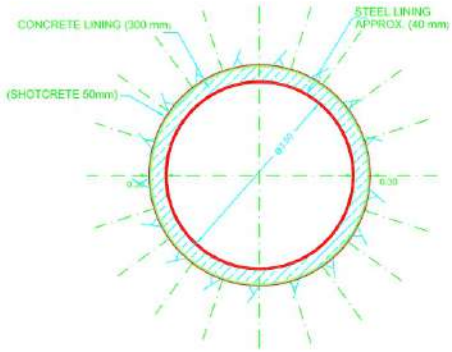
NOTES:

1. ALL LEVELS ARE IN METRES.
2. ALL DIMENSIONS ARE IN METRES UNLESS INDICATED OTHERWISE.
3. THE SCALES SHOWN ARE FOR A DRAWING PRINTED ON A3 PAPER.
4. INDICATED ROCK STABILITY MEASURES ARE TYPICAL AND SHALL BE UPDATED ACCORDING TO FINDINGS AT SITE AND ENGINEER'S INSTRUCTIONS.



PRESSURE TUNNEL

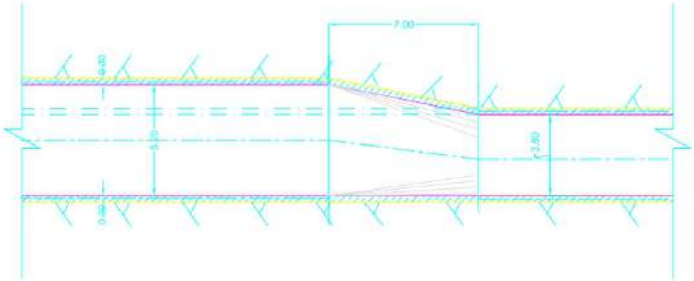
SCALE: 1:750



SECTION A-A

SCALE: 1:100

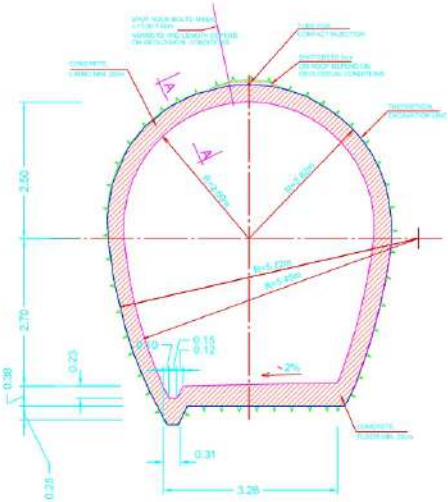
X -SECTION FOR PENSTOCK

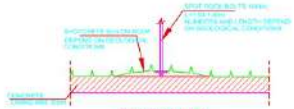


DETAIL A

SCALE: 1:250

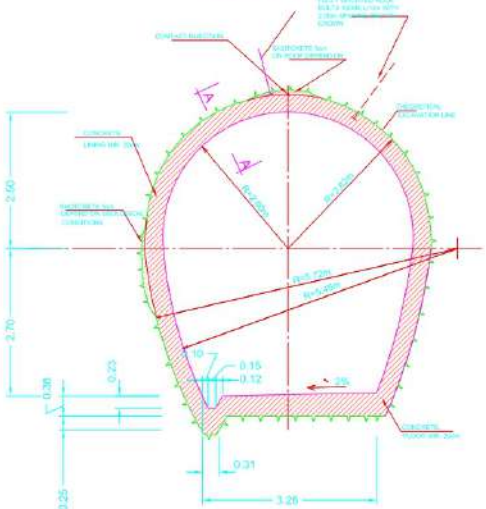
CONVENTIONAL HEADING
ROCK CLASS-I
VERY GOOD ROCK
(ACCORDING TO RMR)

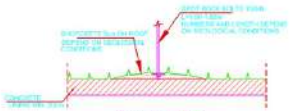




SECTION A-A

CONVENTIONAL HEADING
ROCK CLASS-II
VERY GOOD ROCK
(ACCORDING TO RMR)





SECTION A-A

CROSS SECTION
HEADRACE

SCALE: 1:100

SCALE 1:100

0 1 2 3 4 5

SCALE 1:250

0 2.5 5 7.5 10 12.5

NOTES:

1. All dimensions are in meters.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT
DRAWN Zafar	TITLE	**SURGE TANK SECTIONS**
CHECKED Abid Sheikh		
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN
	DWG No: AFS-ST- 429	REVISIONS

KARAKORAM HIGHWAY
PROTECTION WALL
ACCESS ROAD TO SARAT VILLAGE
BOULDERS AREA
WATCH TOWER
ANCHOR BLOCK
OLD CHINESE CAMP
PENSTOCK PIPE
SPRING
ADIT TUNNEL
OLD KARAKORAM HIGHWAY
KACHA TRACK
HOUSE
TP
HELIPAD
HUNZA RIVER
TREES AREA
SURGE TANK
HEADRACE TUNNEL

PLAN

2446.00
2441.00
2440.00
2392.20
2385.00
2382.55
2363.46
2354.80
2335.18
2330.78
2316.46
2313.63
2316.00
58.44
49.54
76.07
29.70
64.03
40.40
119.49
41.61

HEADRACE TUNNEL
PENSTOCK PIPE
ANCHOR BLOCK
TOP WALL LEVEL EL.2308.20
EL.2298.00

LONGITUDINAL PROFILE

SCALE: 0 20 40 60 80 100 m

NOTES:
1. All dimensions are in meters.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	**PENSTOCK PLAN AND LONGITUDINAL PROFILE**			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-ST- 430	REVISIONS	

4018100

4018000

4017900

481600

481700

481800

HUNZA RIVER

POWERHOUSE

HELIPAD

H

HELIPAD

H

PENSTOCK
PIPE

BOULDERS AREA

BOULDERS AREA

ACCESS ROAD TO
SARAT VILLAGE

ACCESS ROAD TO
SARAT VILLAGE

2300
2302
2304
2306
2308
2310
2312
2314
2316
2318
2320
2322
2324
2326
2328
2330
2332
2334
2336
2338
2340
2342
2344
2346
2348

N

NOTES:

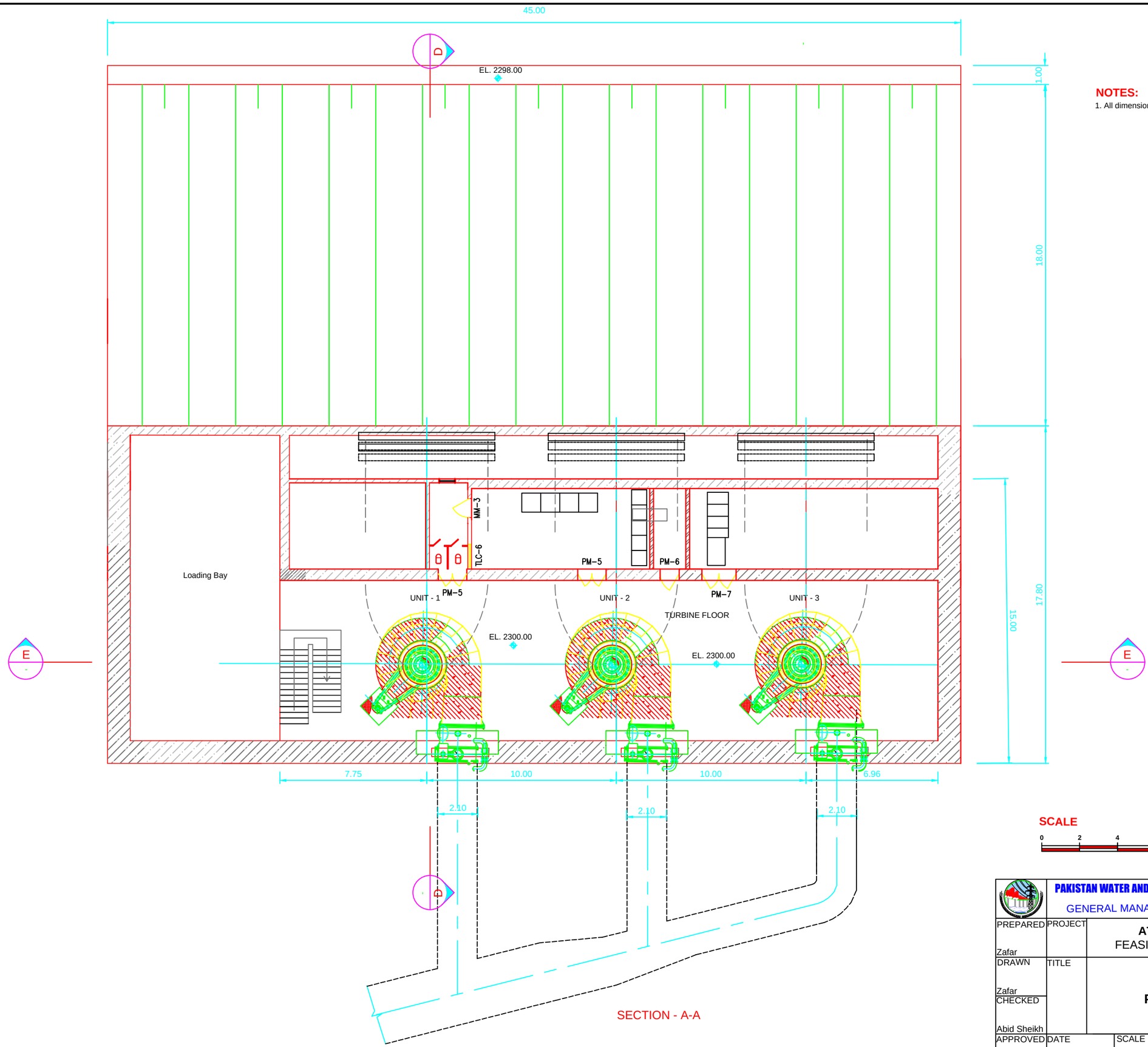
1. All dimensions are in meters.

SCALE:

0 10 20 30 40 50 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	**POWERHOUSE LAYOUT**			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS-PH - 431	REVISIONS	



SECTION - A-A

NOTES:

1. All dimensions are in meters.

SCALE

0 2 4 6 8 10 m

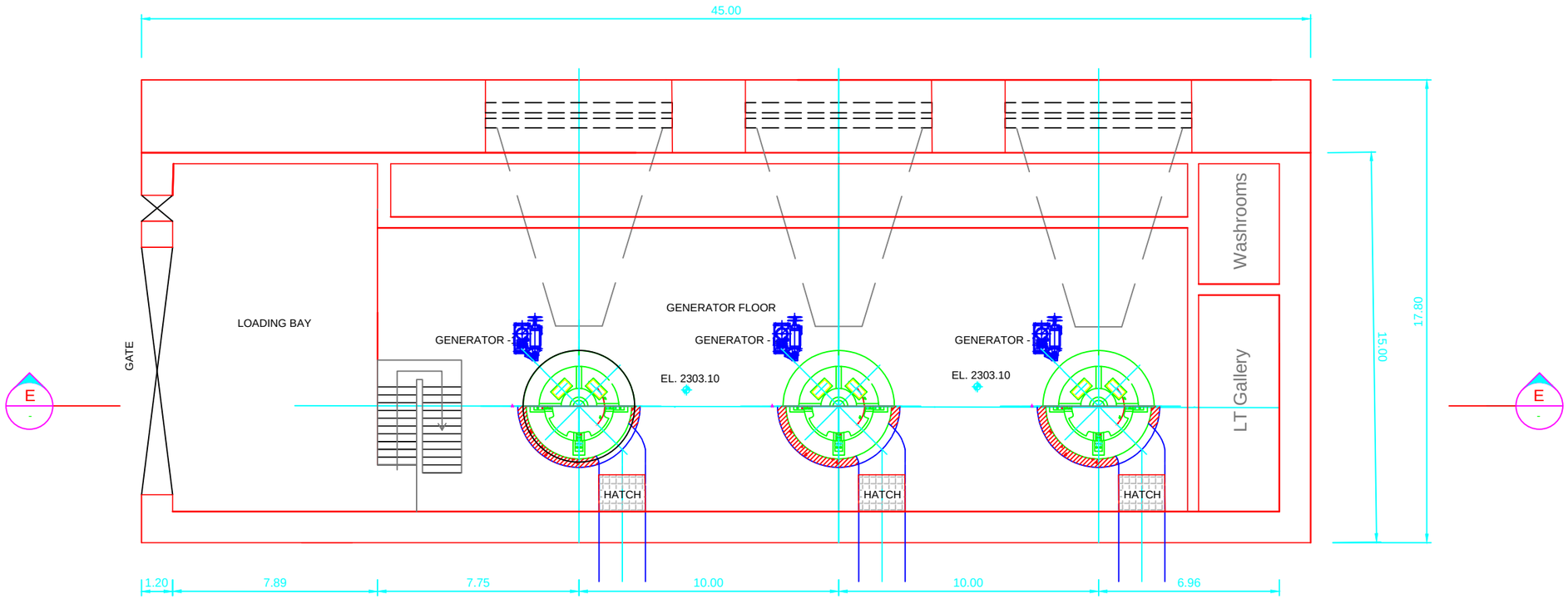
PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY

GENERAL MANAGER (HYDRO) PLANNING

PREPARED Zafar	PROJECT	**ATTABAD LAKE HPP** FEASIBILITY STUDY REPORT
DRAWN Zafar	TITLE	**PLAN FOR POWERHOUSE**
CHECKED Abid Sheikh		
APPROVED Abid Sheikh	DATE Jun, 2021	SCALE AS SHOWN / DWG No: AFS-PH-432 / REVISIONS

NOTES:

1. All dimensions are in meters.



SECTION - B-B

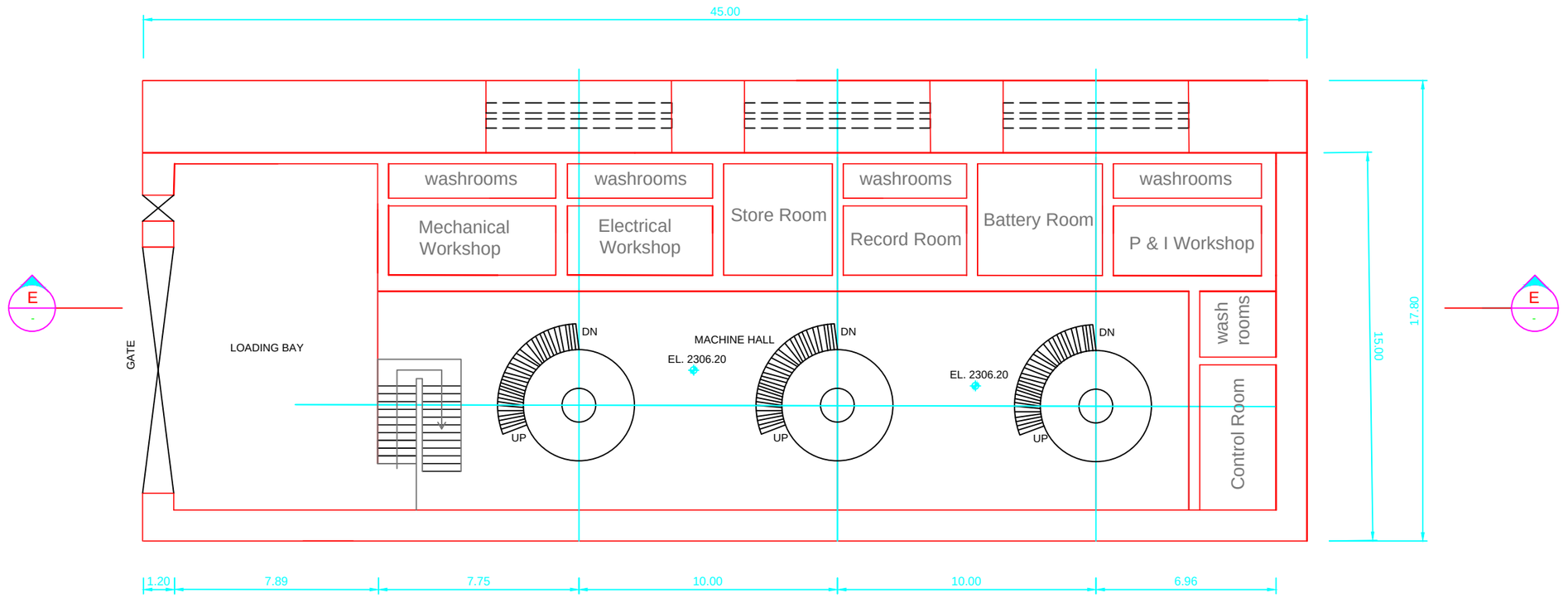
SCALE

0 2 4 6 8 10 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY GENERAL MANAGER (HYDRO) PLANNING					
PREPARED Zafar	PROJECT	ATTABAD LAKE HPP FEASIBILITY STUDY REPORT			
DRAWN Zafar	TITLE	GENERATOR FLOOR PLAN			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Jun, 2021	SCALE AS SHOWN	DWG No: AFS-PH-433	REVISIONS	

NOTES:

1. All dimensions are in meters.



SECTION - C-C

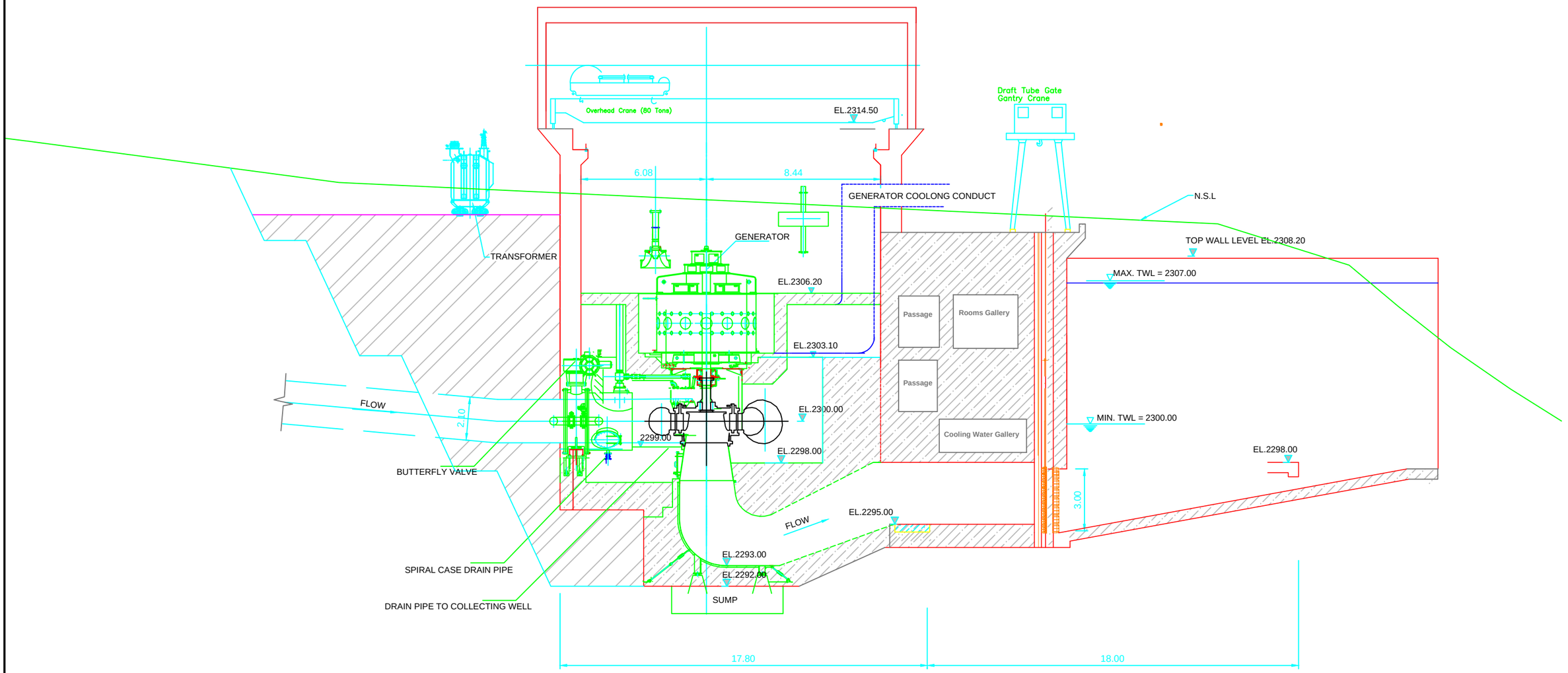
SCALE

0 2 4 6 8 10 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY GENERAL MANAGER (HYDRO) PLANNING				
PREPARED Zafar	PROJECT	**ATTABAD LAKE HPP** FEASIBILITY STUDY REPORT		
DRAWN Zafar	TITLE	**MACHINE HALL PLAN**		
CHECKED Abid Sheikh				
APPROVED Abid Sheikh	DATE Jun, 2021	SCALE AS SHOWN	DWG No: AFS-PH-434	REVISIONS

NOTES:

1. All dimensions are in meters.



SECTION D - D

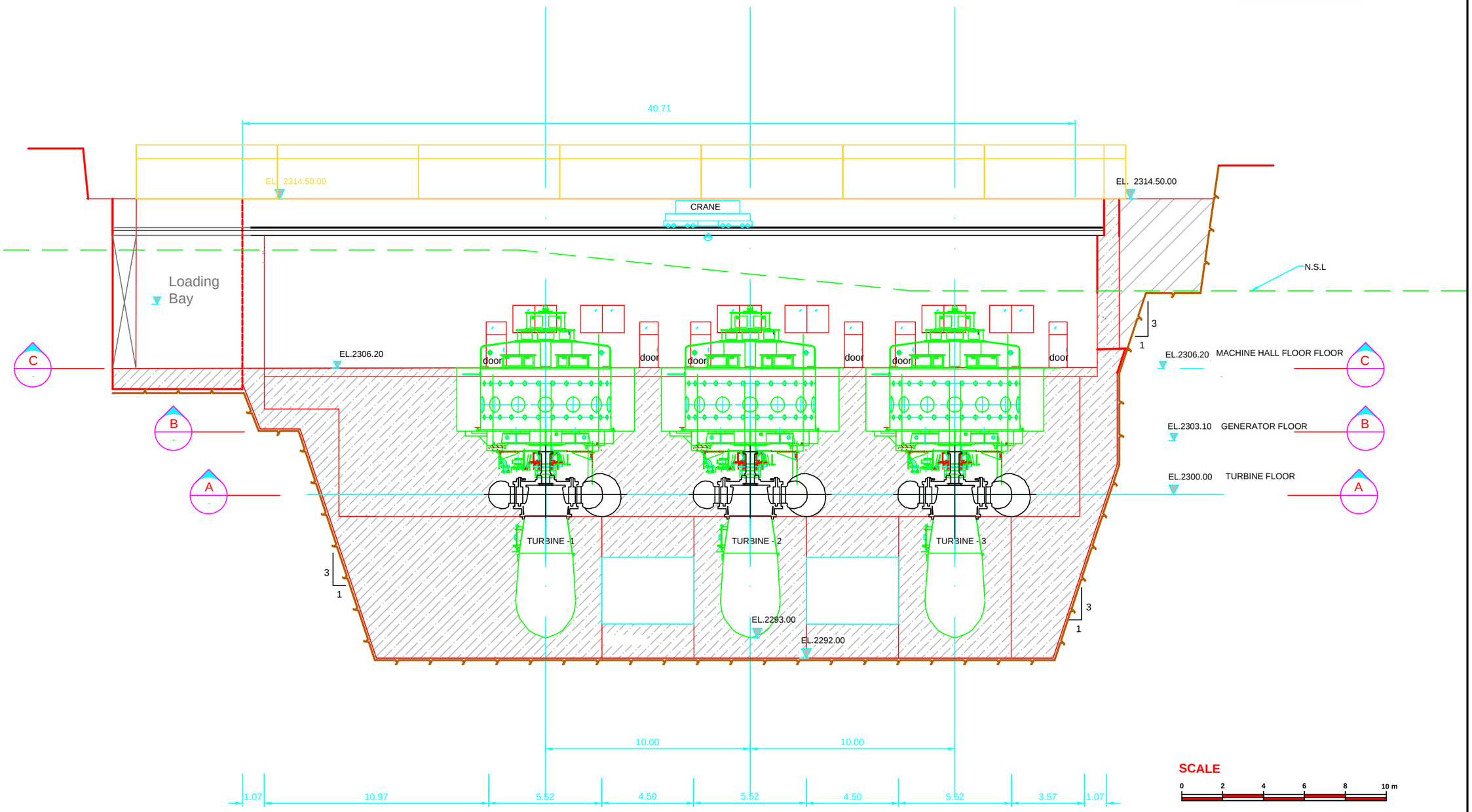
SCALE

0 2 4 6 8 10 m

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY GENERAL MANAGER (HYDRO) PLANNING					
PREPARED Zafar	PROJECT	ATTABAD LAKE HPP FEASIBILITY STUDY REPORT			
DRAWN Zafar	TITLE	CROSS SECTION FOR POWERHOUSE			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Jun, 2021	SCALE AS SHOWN	DWG No: AFS-PH-435	REVISIONS	

NOTES:

1. All dimensions are in meters.

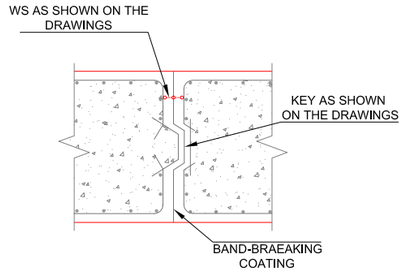


SECTION E - E

SCALE

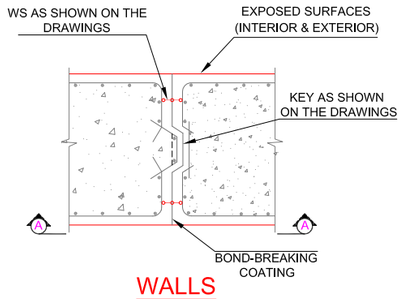
0 2 4 6 8 10 m

	PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY GENERAL MANAGER (HYDRO) PLANNING				
PREPARED Zafar	PROJECT	**ATTABAD LAKE HPP** FEASIBILITY STUDY REPORT			
DRAWN Zafar	TITLE	**LONGITUDINAL SECTION FOR POWERHOUSE**			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Jun, 2021	SCALE AS SHOWN	DWG No: AFS-PH-436	REVISIONS	



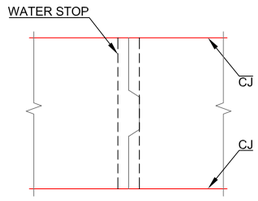
CONTRACTION JOINT (FLOOR)

(UNLESS OTHERWISE SHOWN)
REINFORCEMENT STOPS AT CONTRACTION JOINT

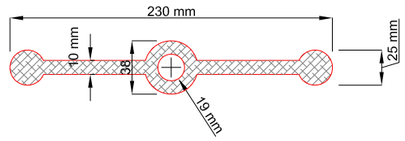


WALLS CONTRACTION JOINT

(UNLESS OTHERWISE SHOWN)



ELEVATION A-A

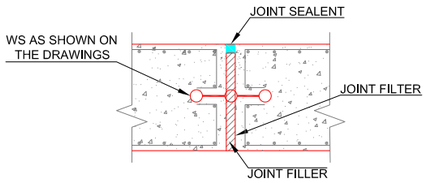


WATER STOP TYPE-A

(THREE-BULB PVC)

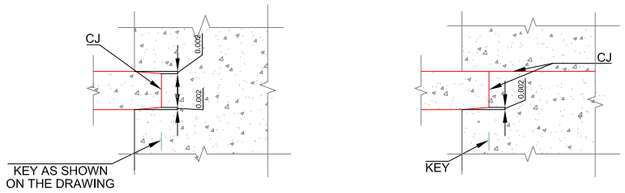
GENRAL NOTES FOR CONCRETE

1. CONCRETE ELEVATION AND DIMENSIONS ARE IN METER, UNLESS OTHERWISE NOTED.
2. PROVID TOOLED EDGES FOR ALL CONSTRUCTION, CONTRACTION AND EXPANSION JOINTS ON SURFACE WHERE WOOD FLOAT OR STEEL TROWEL FINISH IS REQUIRED.
3. CONCRETE SURFACES EXPOSED TO THE FLOW OF WATER MUST BE SMOOTH AND FREE FROM SPALLS, HONEYCOMBS AND OR POCKETS.
4. ALL CONSTRUCTION JOINTS, BOTH HORIZONTAL AND VERTICAL, SHALL BE TREATED BEFORE PLACEMENT OF FRESH CONCRETE.
5. WATER STOPS TO BE CONTINUOUS, JOINTS AT SPLICES AND CORNERS SHALL BE RECOMMENDED BY THE MANUFACTURER.
6. PROVIDED CONSTRUCTION JOINT TREATMENT TO ALL CONCRETE SURFACES RECEIVING ABONDED CONCRETE FINISH.
7. LIFT HEIGHT AND TIME BETWEEN PLACEMENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATIONS.
8. ALL WATER STOPS SHALL BE TYPE A UNLESS NOTED OTHERWISE ON THE DRAWINGS



EXPANSION JOINT

(UNLESS OTHERWISE SHOWN)

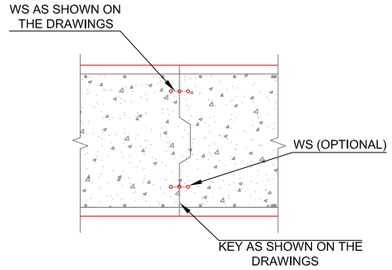


TYPICAL KEY DETAILS

A	B	C	D	E
0.75 TO 1.0	0.35	0.20 TO 0.35	0.05	0.10
1.0 TO 1.5	0.50	0.25 TO 0.50	0.05	0.10
1.5 TO 2.3	0.8	0.35 TO 0.75	0.075	0.15
2.3 TO 3.0	1.3	0.5 TO 0.85	0.15	0.30

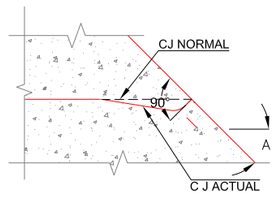
HORIZONTAL LIFT KEYS

(UNLESS OTHERWISE NOTED)

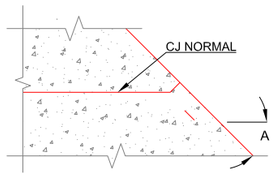


TYPICAL CONSTRUCTION JOINT

(REINFORCEMENT CONTINUOUS THROUGH JOINT)



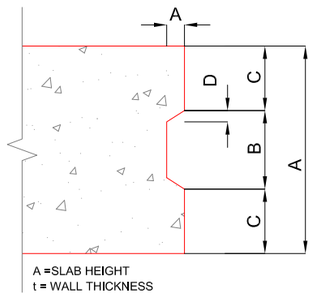
MASS CONCRETE



WALL

SPECIAL TREATMENT AT CONSTRUCTION JOINT

(TYPICAL FIELD DETAIL AT SLOPING SURFACE WHEN 'A' IS EQUAL TO OR LESS THAN 60°. OMIT SPECIAL TREATMENT WHEN 'A' IS MORE THAN 60°.)



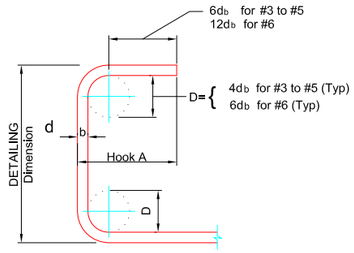
KEY DIMENSIONS

CLASS	STRENGTH	NOMINAL PROPORTION
CLASS A (P.C)	28 MPa	1 : 1 1/2 : 3
CLASS B (R.C.)	21 MPa	1 : 2 : 4
CLASS C (P.C.C.)	15 MPa	1 : 4 : 8
CLASS D (P.C.C.)	10 MPa	1 : 6 : 12

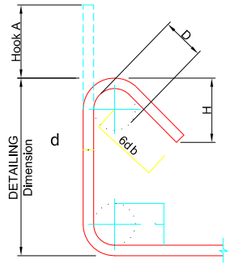
CONCRETE CLASSES

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

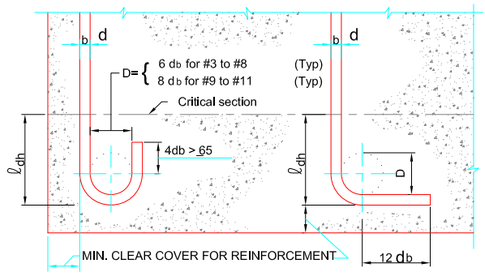
PREPARED: Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT		
DRAWN: Zafar	TITLE	**TYPICAL DETAILS OF CONCRETE JOINTS**		
CHECKED: Abid Sheikh				
APPROVED: Abid Sheikh	DATE: Mar, 2021	SCALE: AS SHOWN	DWG No: AFS- MIS - 437	REVISIONS



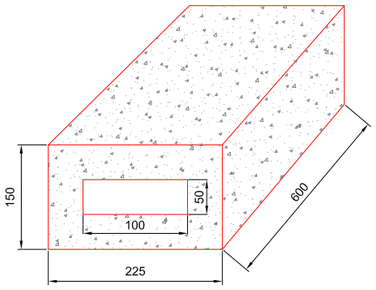
STIRRUP 90° HOOK



STIRRUP 135° HOOK



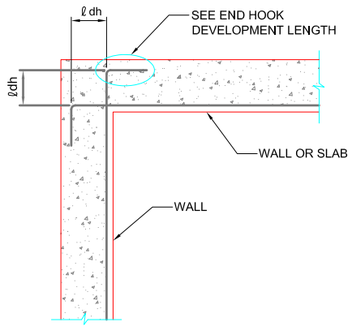
END HOOK DEVELOPMENT LENGTH



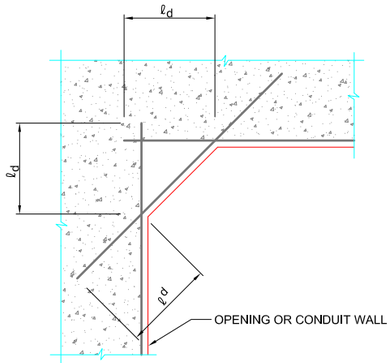
HOLLOW BLOCKS (PCC)
POWERHOUSE

NOTES:

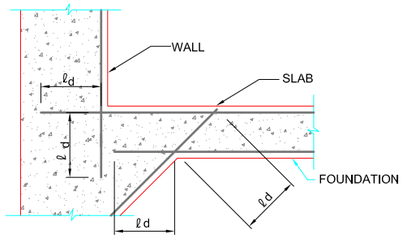
1. ALL DIMENSIONS AND LEVELS ARE IN METERS OR AS SPECIFIED ON DRAWING
2. REINFORCEMENT SHALL BE GRADE 40, DEFORMED BILLET STEEL IN ACCORDANCE WITH ASTM DESIGNATION : A 615
3. LAP LENGTH, SPLICING, ANCHORAGE AND OTHER DETAILS SHALL BE AS SHOWN ON DRAWINGS, JNG-MIS-001 TO JNG-MIS-003.
4. CONCRETE COVER TO REINFORCEMENT SHALL BE AS FOLLOWS:
   a)CAST AGAINST EARTH ROCK 75mm.
   b)EXPOSED TO WATER OR WEATHER 50mm.
   c)NOT EXPOSED TO WATER OR WEATHER 40mm.
5. PROVIDE TOOLED EDGES FOR ALL CONSTRUCTION, CONTRACTION AND EXPANSION JOINTS ON SURFACE WHERE WOODEN FLOAT OR STEEL TROWEL FINISH IS REQUIRED.
6. CONCRETE SURFACES EXPOSED TO THE FLOW OF WATER MUST BE SMOOTH AND FREE FROM SPALLS, HONEYCOMBS AND OR POCKETS.
7. WATER STOPS AT JOINTS IS TO BE CONTINUOUS.WATER STOP JOINTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.
8. ALL WATER STOPS SHALL BE TYPE A UNLESS OTHERWISE NOTED ON THE DRAWINGS.
9. LIFT HEIGHTS AND TIME BETWEEN PLACEMENT SHALL BE IN ACCORDANCE WITH THE RELEVANT TECHNICAL PROVISIONS OR AS DIRECTED BY THE ENGINEER.
10. BAR NOTATION:
    a)# 4 @ 200,INDICATES BAR No.4 PLACED AT 200mm CENTRE TO CENTRE.
    b)5 # 4, INDICATES 5, No. 4 BARS.
11. ALL EXPOSED EDGES OF THE CONCRETE ARE TO BE CHAMFERED 25mm x 25mm UNLESS OTHERWISE INDICATED ON THE DRAWING.



CASE 1

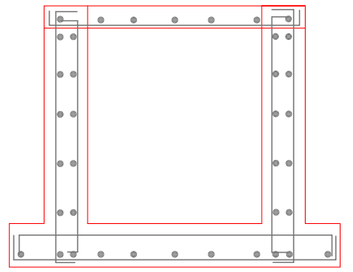


CASE 2



CASE 3

BAR DEVELOPMENT LENGTH, TYPICAL CASES

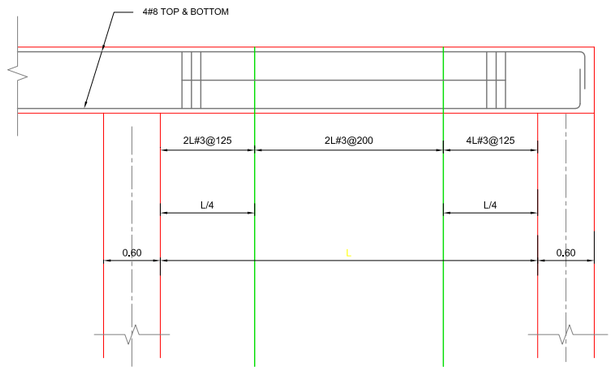


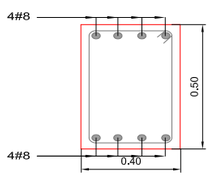
TAILRACE CHANNEL REINFORCEMENT DETAILS

TAILRACE CHANNEL REINFORCEMENT DETAILS

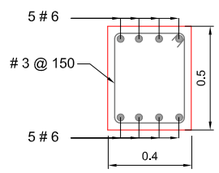
LEGENDS:

EF EACH FACE
T&B TOP AND BOTTOM.

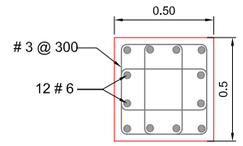




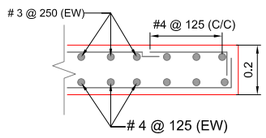
TOP BEAM, LINTEL BEAM, MID BEAM
POWERHOUSE



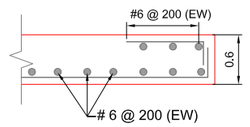
BEAM



COLUMN



TOP SLAB



FLOOR

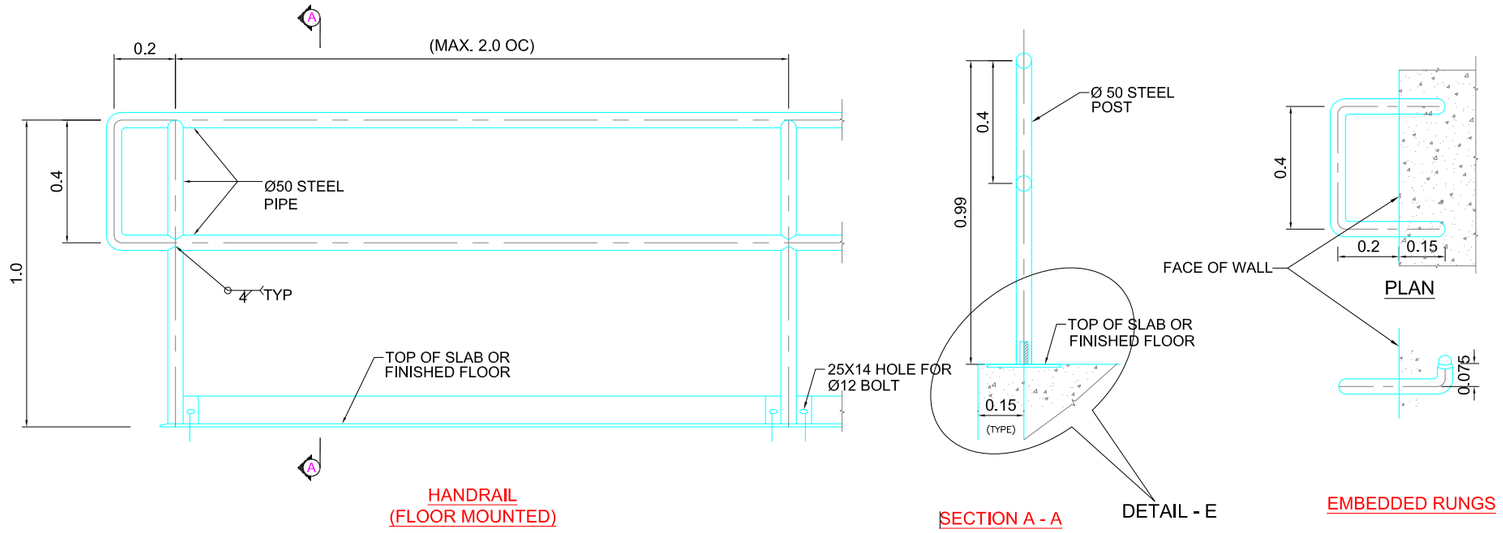
CONTROL ROOM REINFORCEMENT DETAILS

CONCRETE CLASSES

CLASS	STRENGTH	NOMINAL PROPORTION
CLASS A (P.C.C.)	28 MPa	1 : 1 1/2 : 3
CLASS B (R.C.)	21 MPa	1 : 2 : 4
CLASS C (P.C.C.)	15 MPa	1 : 4 : 8
CLASS D (P.C.C.)	10 MPa	1 : 4 : 8

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT		
DRAWN Zafar	TITLE	MISCELLANEOUS REINFORCEMENT DETAILS (SHEET 1 OF 2)		
CHECKED Abid Sheikh				
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE AS SHOWN	DWG No: AFS- MIS - 438	REVISIONS



HANDRAIL
(FLOOR MOUNTED)

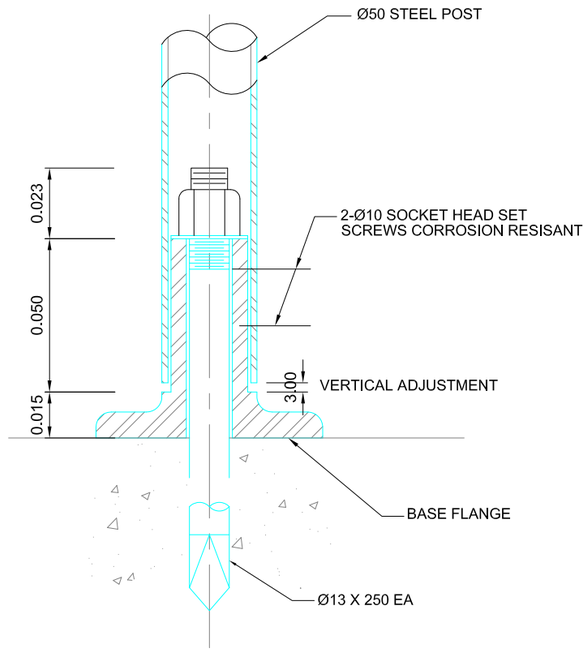
SECTION A - A

DETAIL - E

EMBEDDED RUNGS

NOTES

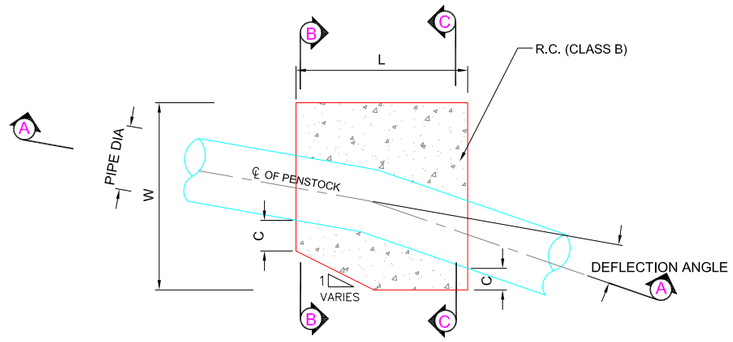
1. ALL DIMENSIONS ARE IN METERS



DETAIL 'E'

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

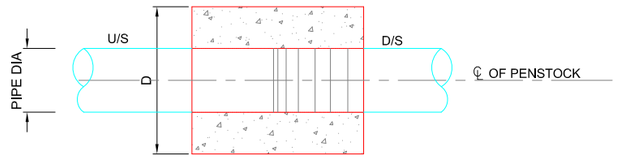
PREPARED: Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN: Zafar	TITLE	**MISCELLANEOUS REINFORCEMENT DETAILS (SHEET 2 OF 2)**			
CHECKED: Abid Sheikh					
APPROVED: Abid Sheikh	DATE: Mar, 2021	SCALE: N.T.S	DWG No: AFS-MIS - 439	REVISIONS	



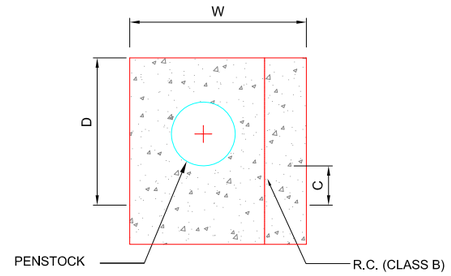
PLAN OF ANCHOR BLOCK
FOR HORIZONTAL BENDS

NOTES

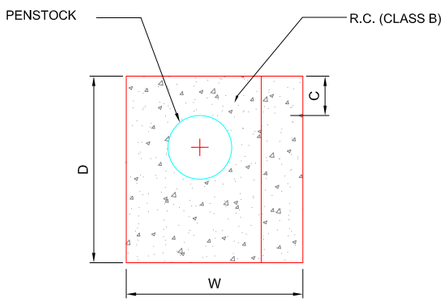
1. ALL DIMENSIONS ARE IN METERS.
2. ALL LEVELS ARE IN METER. (MASL)



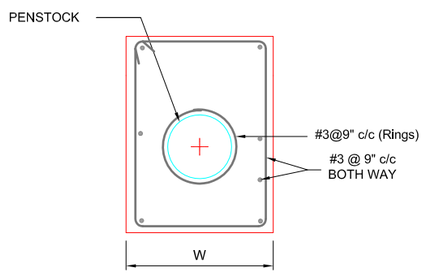
SECTION A - A
BURRIED PIPE



SECTION B - B

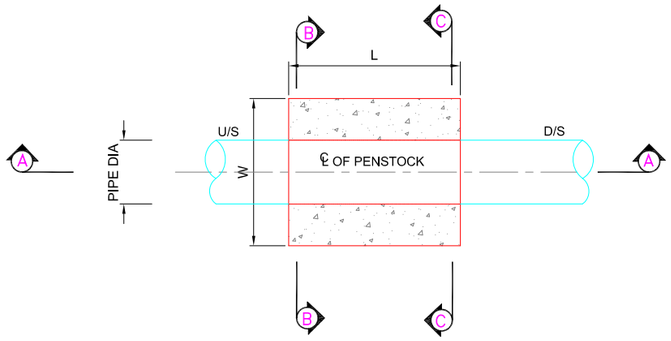


SECTION C - C

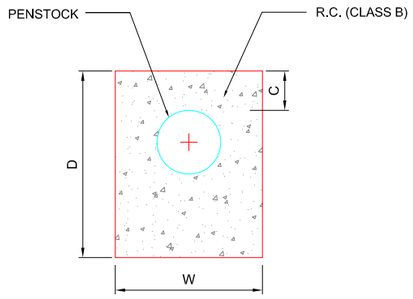


SECTION C - C
TYPICAL REINFORCEMENT

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	PENSTOCK DETAIL OF HORIZONTAL ANCHOR BLOCKS			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE N.T.S	DWG No: AFS- MIS - 440	REVISIONS	



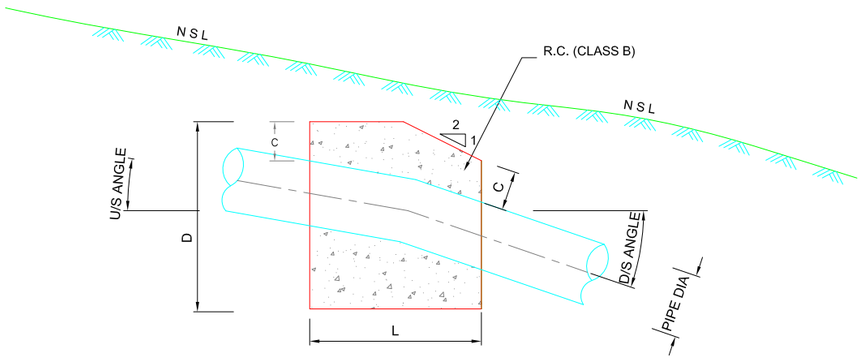
PLAN OF ANCHOR BLOCK
FOR VERTICAL BENDS



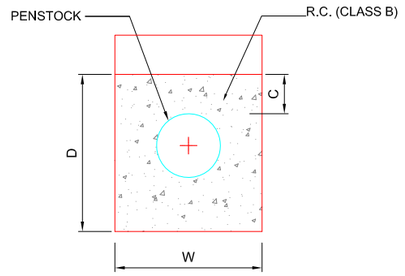
SECTION B - B

NOTES

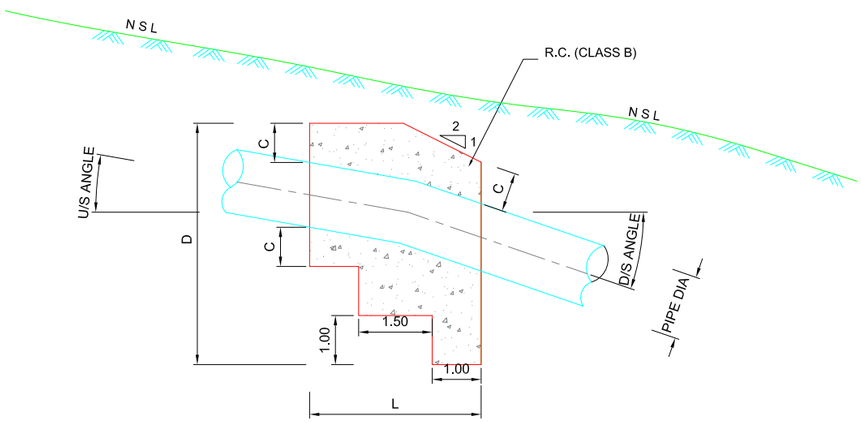
1. ALL DIMENSIONS ARE IN METERS.
2. ALL LEVELS ARE IN METER. (MASL)



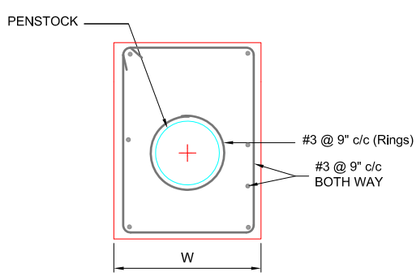
SECTION A - A
BURRIED PIPE
(FOR D/S ANGLE <25°)



SECTION C - C

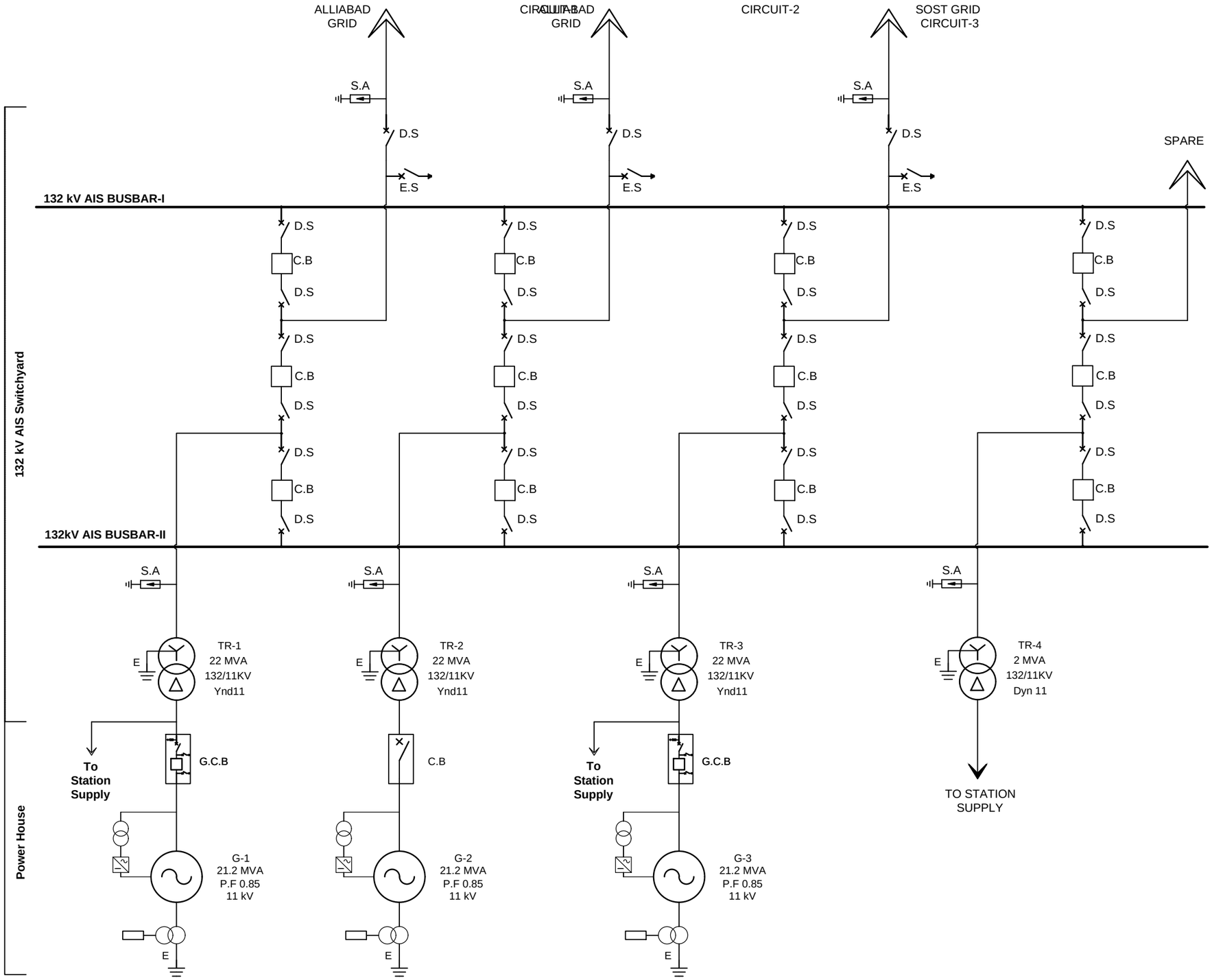


SECTION A - A
BURRIED PIPE
(FOR D/S ANGLE >25°)



SECTION C - C
TYPICAL REINFORCEMENT

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY HYDRO PLANNING ORGANIZATION					
PREPARED Zafar	PROJECT	ATTABAD LAKE HYDRO POWER PROJECT			
DRAWN Zafar	TITLE	PENSTOCK DETAIL OF VERTICAL ANCHOR BLOCKS			
CHECKED Abid Sheikh					
APPROVED Abid Sheikh	DATE Mar, 2021	SCALE N.T.S	DWG No: AFS- MIS - 441	REVISIONS	



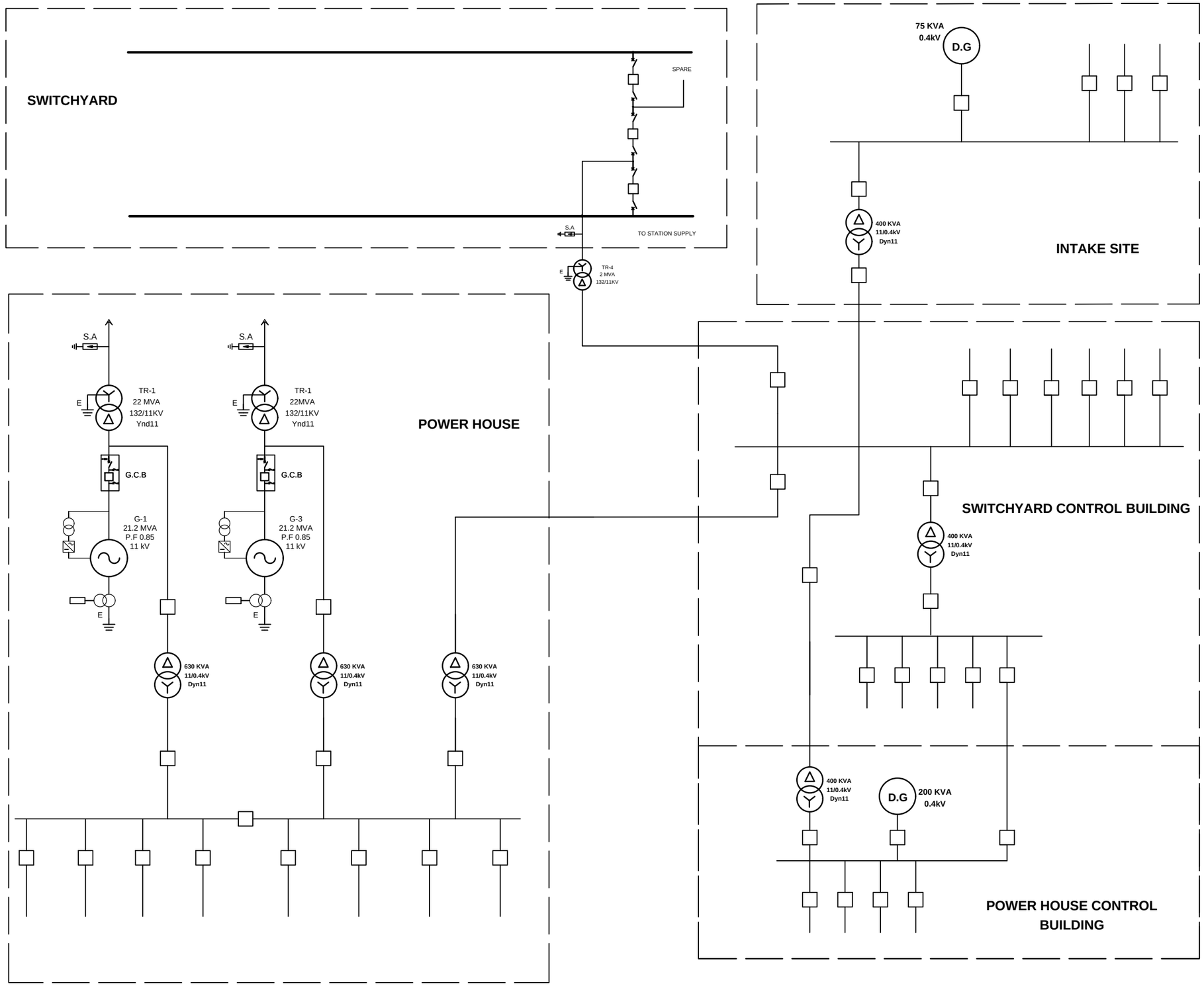
LEGEND:	
SYMBOL	DESCRIPTION
	3~ GENERATOR
	132 kV CIRCUIT BREAKER
	TRANSFORMER
	TRANSMISSION LINE
	SURGE ARRESTER
	EARTH/GROUND
	NEUTRAL GROUND RESISTOR
	EARTHING SWITCH
	DISCONNECTOR SWITCH
	11 kV GENERATOR C.B

NOTE:

- DRAWING SHOWS THE BASIC CONCEPT OF ELECTRICAL SYSTEM. FINAL DESIGN SHALL BE DEVELOPED BY ENGINEER/CONTRACTOR DURING FINAL DESIGN STAGE.
- FINAL RATINGS OF VARIOUS EQUIPMENT SHALL BE DETERMINED ON DETAILED DESIGN STAGE.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED: Bilal Nawaz	PROJECT: ATTABAD LAKE HPP FEASIBILITY STUDY REPORT			
DRAWN: M.Saad	TITLE: MAIN SINGLE LINE DIAGRAM			
CHECKED: Faiz Rasool				
APPROVED	DATE: Jun: 2021	SCALE: NTS	DWG No: ASF-EM-451	REVISIONS



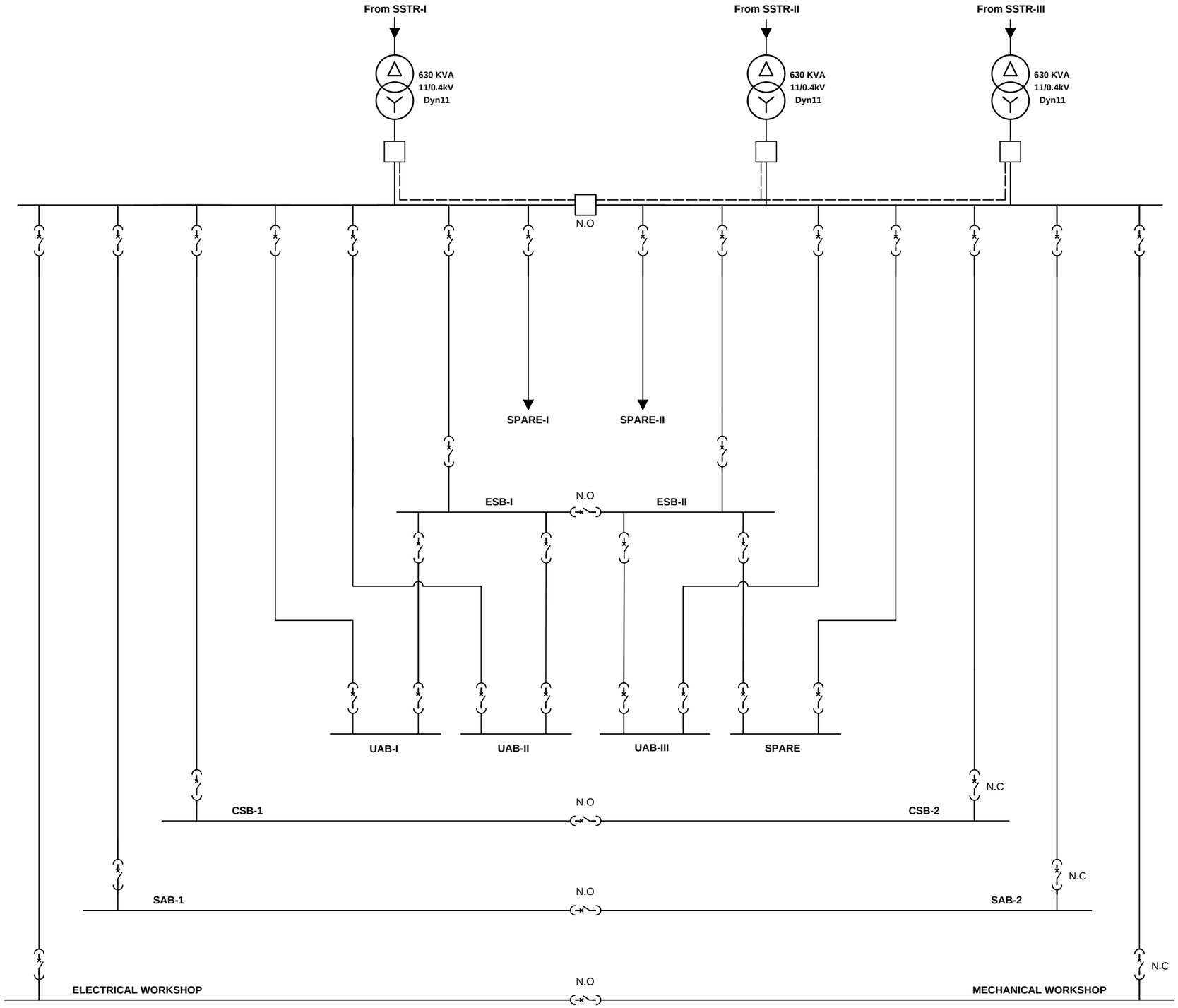
LEGEND:	
SYMBOL	DESCRIPTION
	MV CIRCUIT BREAKER
	LV CIRCUIT BREAKER
	TRANSFORMER
D.G	DIESEL GENERATOR
N.C	NORMALLY CLOSE
N.O	NORMALLY OPEN

NOTES:

- DRAWING SHOWS THE BASIC CONCEPT OF ELECTRICAL SYSTEM. FINAL DESIGN SHALL BE DEVELOPED BY ENGINEER/CONTRACTOR DURING FINAL DESIGN STAGE.
- FINAL RATINGS OF VARIOUS EQUIPMENT SHALL BE DETERMINED ON DETAILED DESIGN STAGE.
- THE NUMBER OF 11 kV & 400V SUPPLY SHALL BE DETERMINED BY THE ENGINEER/CONTRACTOR BASED ON THE AUXILIARY LOAD OF THE PLANT.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED: Bilal Nawaz	PROJECT	ATTABAD LAKE HPP FEASIBILITY STUDY REPORT			
DRAWN: M.Saad	TITLE	AC SUPPLY SYSTEM			
CHECKED: Faiz Rasool					
APPROVED: Abid Sheikh	DATE: Jun: 2021	SCALE: NTS	DWG No: ASF-EM-452	REVISIONS	



LEGEND:	
SYMBOL	DESCRIPTION
□ ■	MV CIRCUIT BREAKER
	LV CIRCUIT BREAKER
	TRANSFORMER
D.G	DIESEL GENERATOR
N.C	NORMALLY CLOSE
N.O	NORMALLY OPEN

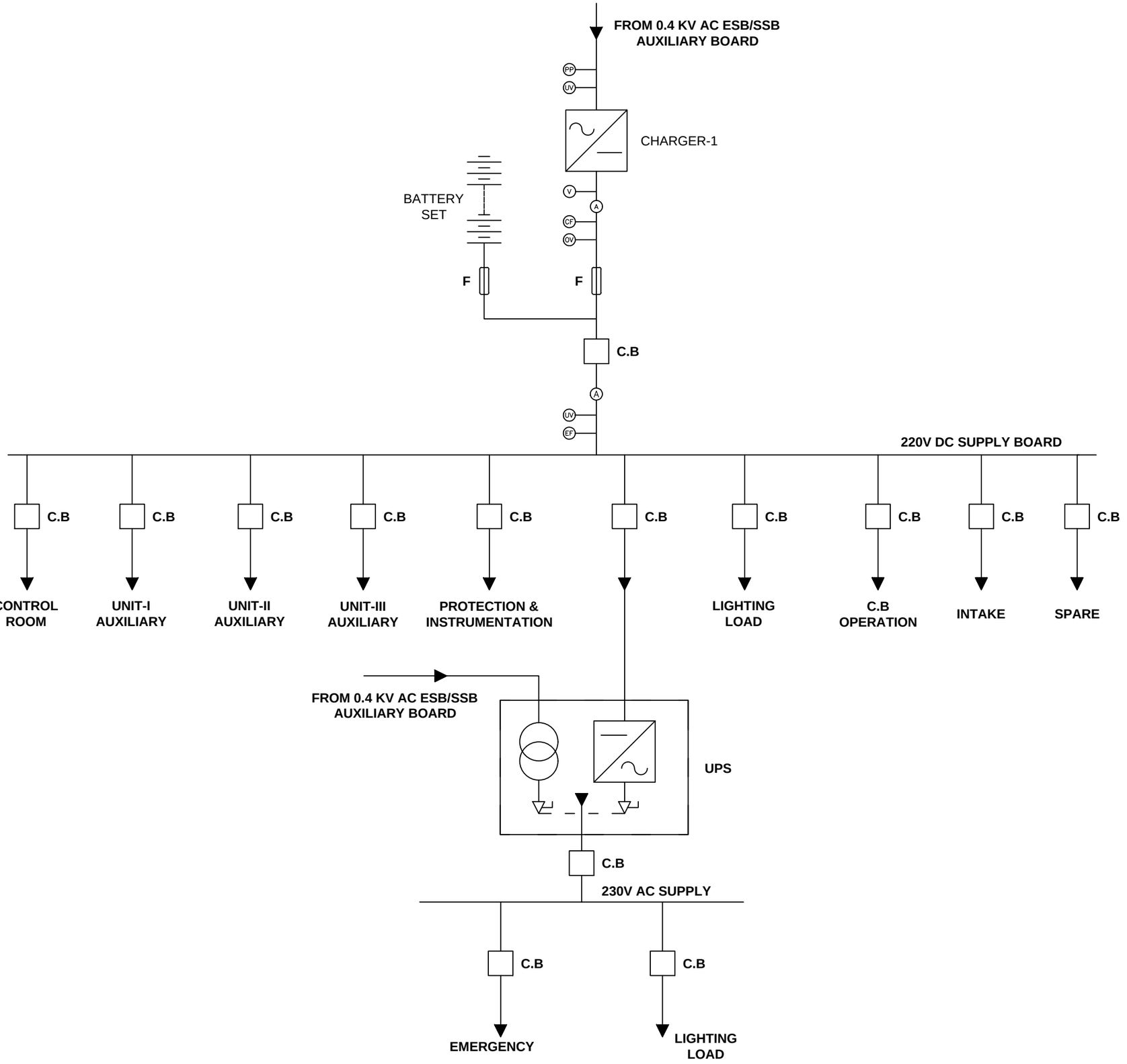
NOTES:

- DRAWING SHOWS THE BASIC CONCEPT OF ELECTRICAL SYSTEM. FINAL DESIGN SHALL BE DEVELOPED BY ENGINEER/CONTRACTOR DURING FINAL DESIGN STAGE.
- FINAL RATINGS OF VARIOUS EQUIPMENT SHALL BE DETERMINED ON DETAILED DESIGN STAGE.
- THE NUMBER OF 400V SUPPLY SHALL BE DETERMINED BY THE ENGINEER/CONTRACTOR BASED ON THE AUXILIARY LOAD OF THE PLANT.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY

HYDRO PLANNING ORGANIZATION

PREPARED: Bilal Nawaz	PROJECT	**ATTABAD LAKE HPP FEASIBILITY STUDY REPORT**		
DRAWN: M.Saad	TITLE	**AC LV SUPPLY SYSTEM**		
CHECKED: Faiz Rasool				
APPROVED: Abid Sheikh	DATE: Jun: 2021	SCALE: NTS	DWG No: ASF-EM-453	REVISIONS



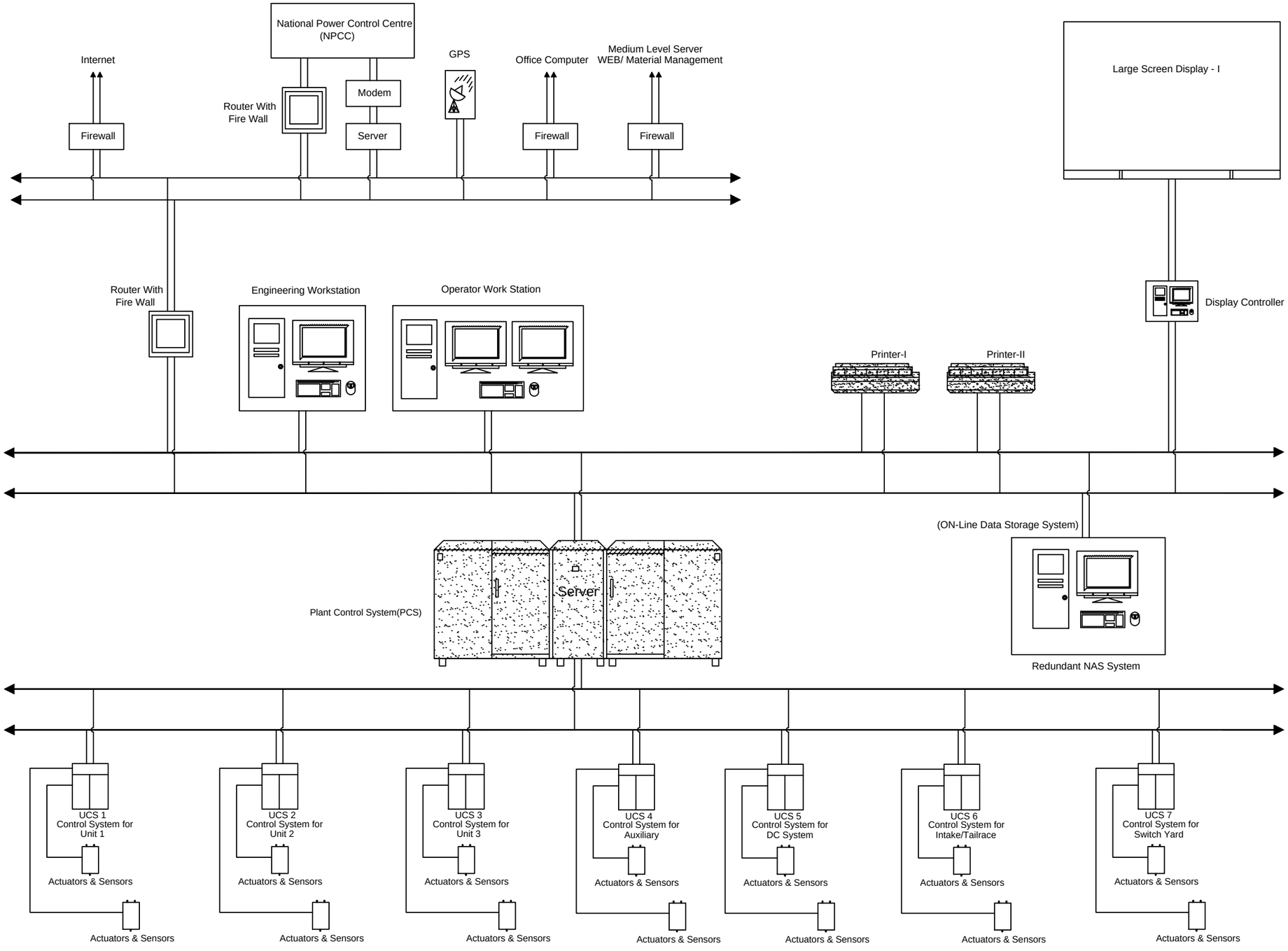
LEGEND:	
SYMBOL	DESCRIPTION
	AC/DC INVERTER
	UPS
	L.V BREAKER
	FUSE
	BATTERY
EF	EARTH FAULT RELAY
PP	PHASE FAILURE RELAY
UV	UNDER VOLTAGE RELAY
V	VOLTMETER
A	AMMETER
CF	CHARGER FAILURE RELAY
OV	OVER VOLTAGE RELAY
	Manual Bypass Switch

NOTES:

- DRAWING SHOWS THE BASIC CONCEPT OF ELECTRICAL SYSTEM. FINAL DESIGN SHALL BE DEVELOPED BY ENGINEER/CONTRACTOR DURING FINAL DESIGN STAGE.
- FINAL RATINGS OF VARIOUS EQUIPMENT SHALL BE DETERMINED ON DETAILED DESIGN STAGE.
- THE QUANTITY OF EQUIPMENT SHALL BE DETERMINED BY ENGINEER/ CONTRACTOR TO MEET THE PLANT DC LOAD.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED: Bilal Nawaz	PROJECT	ATTABAD LAKE HPP FEASIBILITY STUDY REPORT
DRAWN: M.Saad	TITLE	DC SUPPLY SYSTEM
CHECKED: Faiz Rasool		
APPROVED: Abid Sheikh	DATE: Jun: 2021	SCALE: NTS
	DWG No: ASF-EM-454	REVISIONS

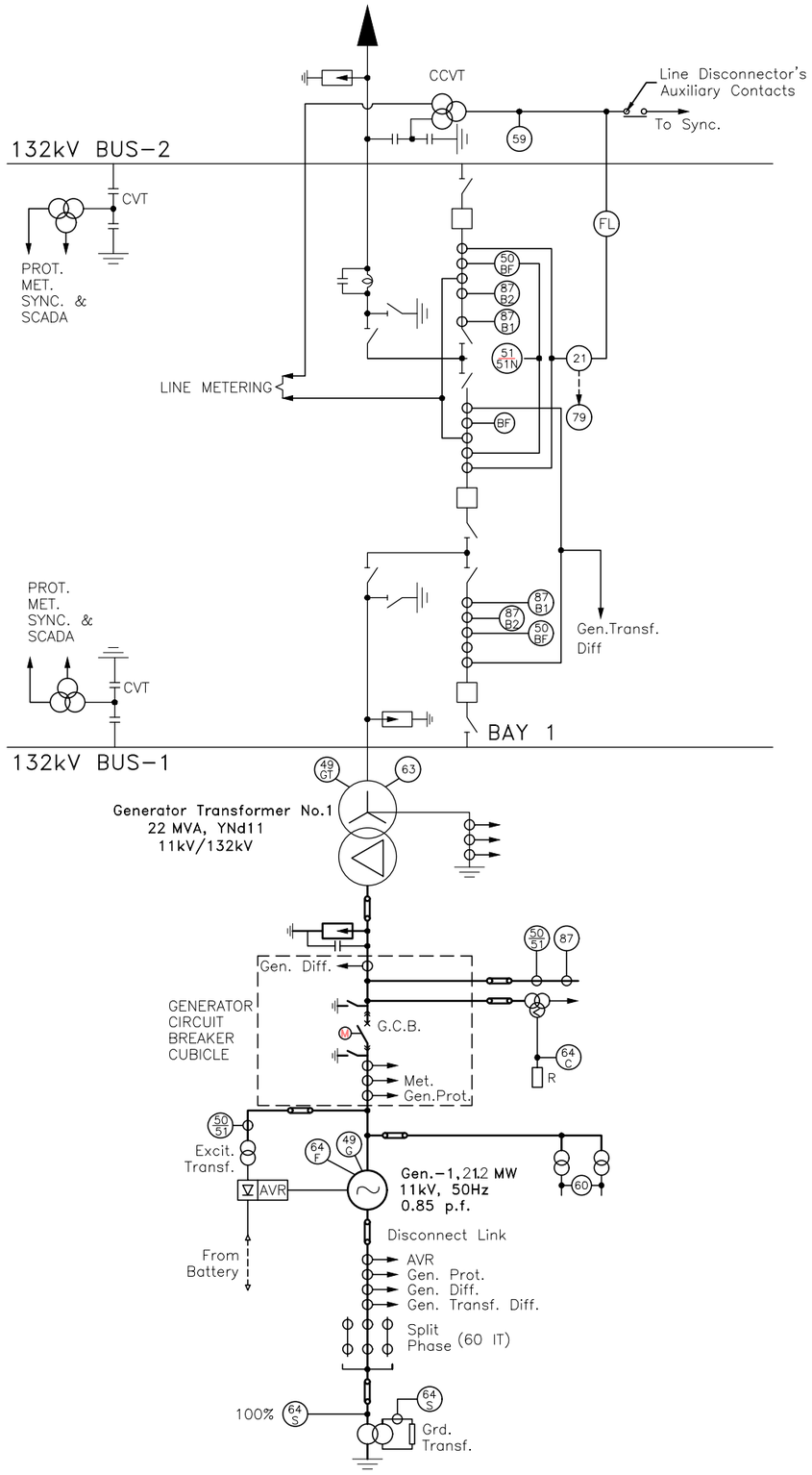


NOTES:

- DRAWING SHOWS THE BASIC CONCEPT OF ELECTRICAL PROTECTION SYSTEM. FINAL DESIGN & EQUIPMENT SHALL BE DETERMINED BY ENGINEER/ CONTRACTOR DURING FINAL DESIGN STAGE.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED Bilal Nawaz	PROJECT	**ATTABAD LAKE HPP FEASIBILITY STUDY REPORT**			
DRAWN M.Saad	TITLE	**PLANT CONTROL SYSTEM**			
CHECKED Faiz Rasool					
APPROVED Abid Sheikh	DATE Jun: 2021	SCALE NTS	DWG No: ASF-EM-455	REVISIONS	

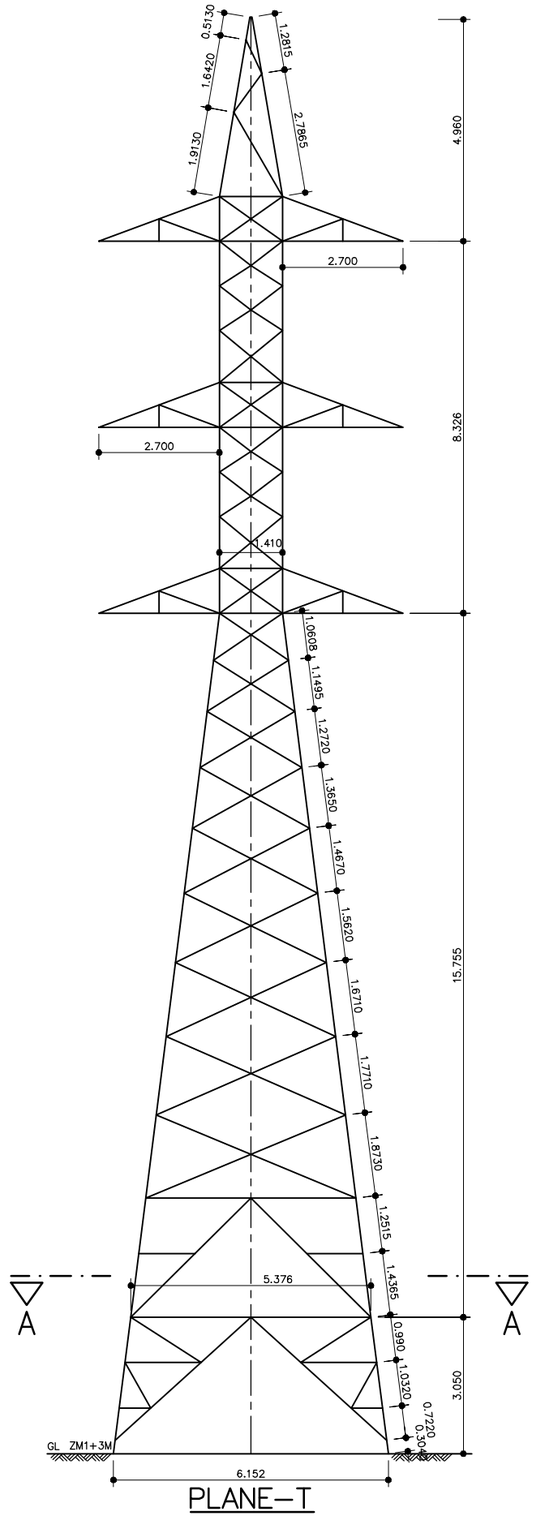


NOTES:

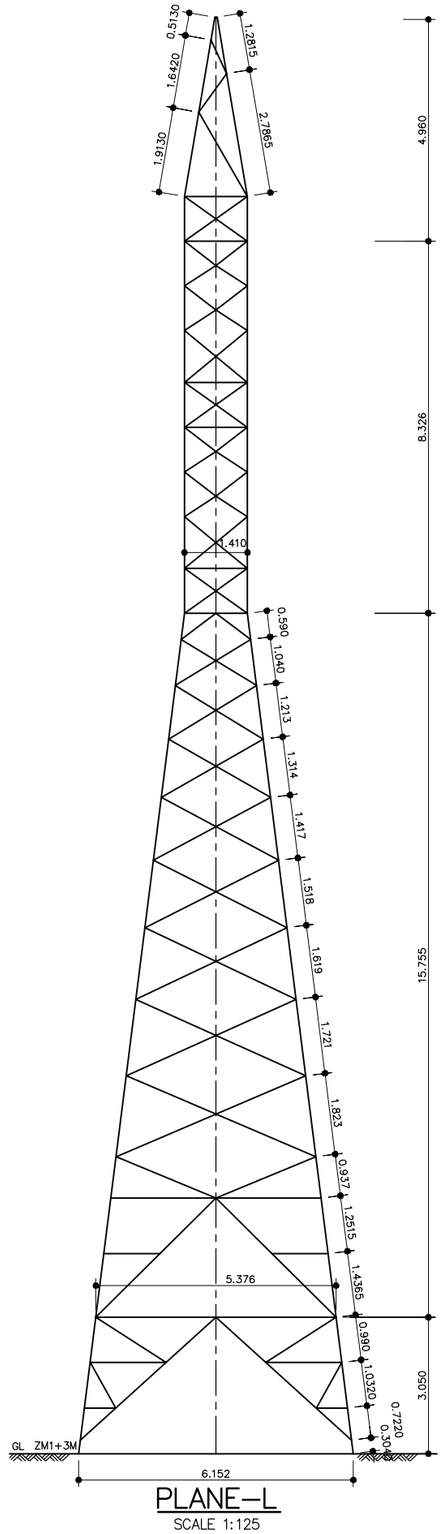
- DRAWING SHOWS THE BASIC CONCEPT OF ELECTRICAL PROTECTION SYSTEM. FINAL PROTECTION DESIGN EQUIPMENT RATINGS SHALL BE DETERMINED BY ENGINEER/ CONTRACTOR DURING FINAL DESIGN STAGE.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED: Bilal Nawaz	PROJECT	**ATTABAD LAKE HPP FEASIBILITY STUDY REPORT**			
DRAWN: M.Saad	TITLE	**PROTECTION SCHEMES**			
CHECKED: Faiz Rasool					
APPROVED: Abid Sheikh	DATE: Jun: 2021	SCALE: NTS	DWG No: ASF-EM-456	REVISIONS	

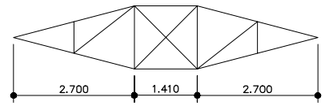


PLANE–T

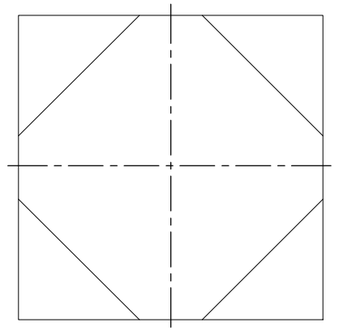


PLANE–L

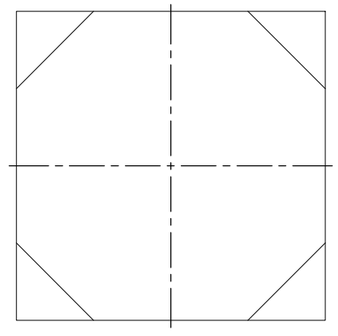
SCALE 1:125



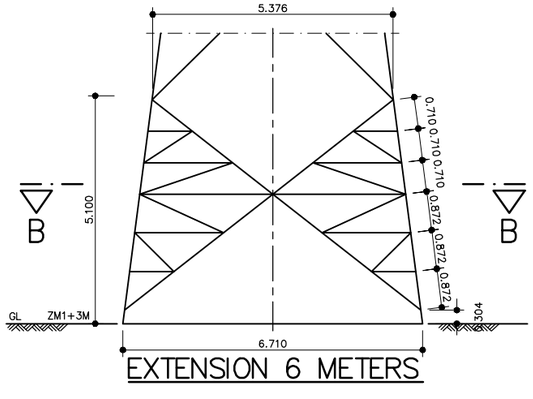
CROSS ARM



SECTION A–A



SECTION B–B



EXTENSION 6 METERS

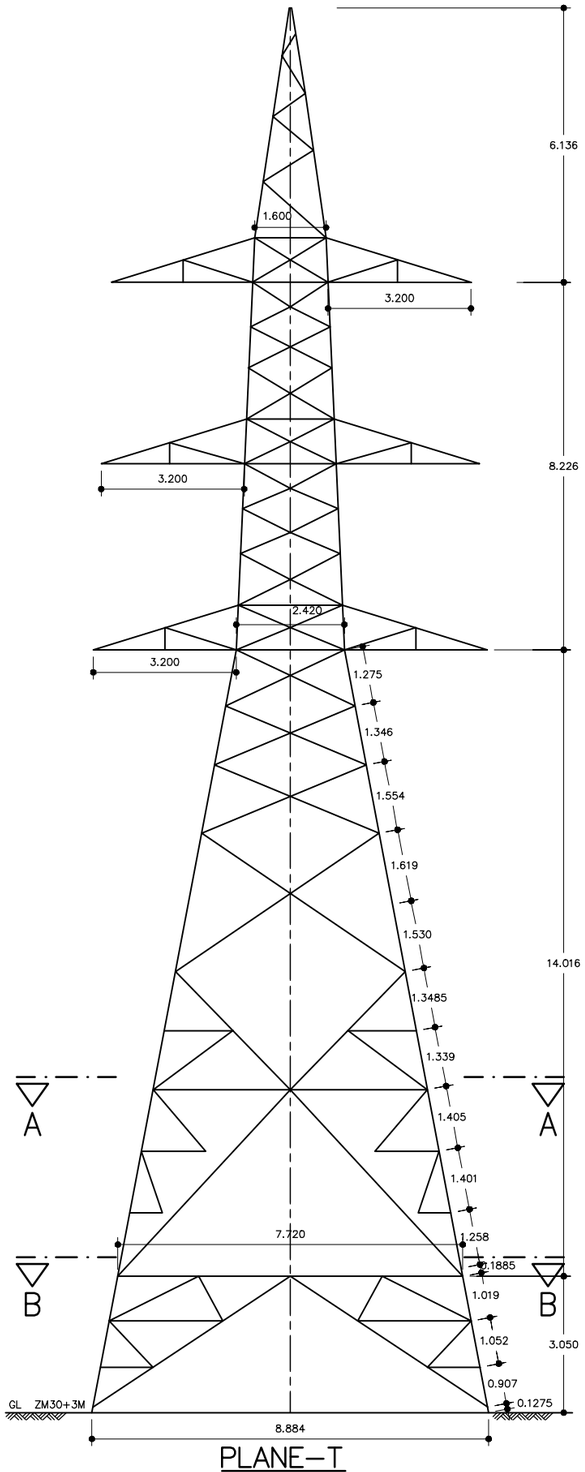
NOTES:

- FINAL TOWER DESIGN SHALL BE DETERMINED BY ENGINEER/ CONTRACTOR DURING FINAL DESIGN STAGE.
- ALL LENGTHS IN METER.

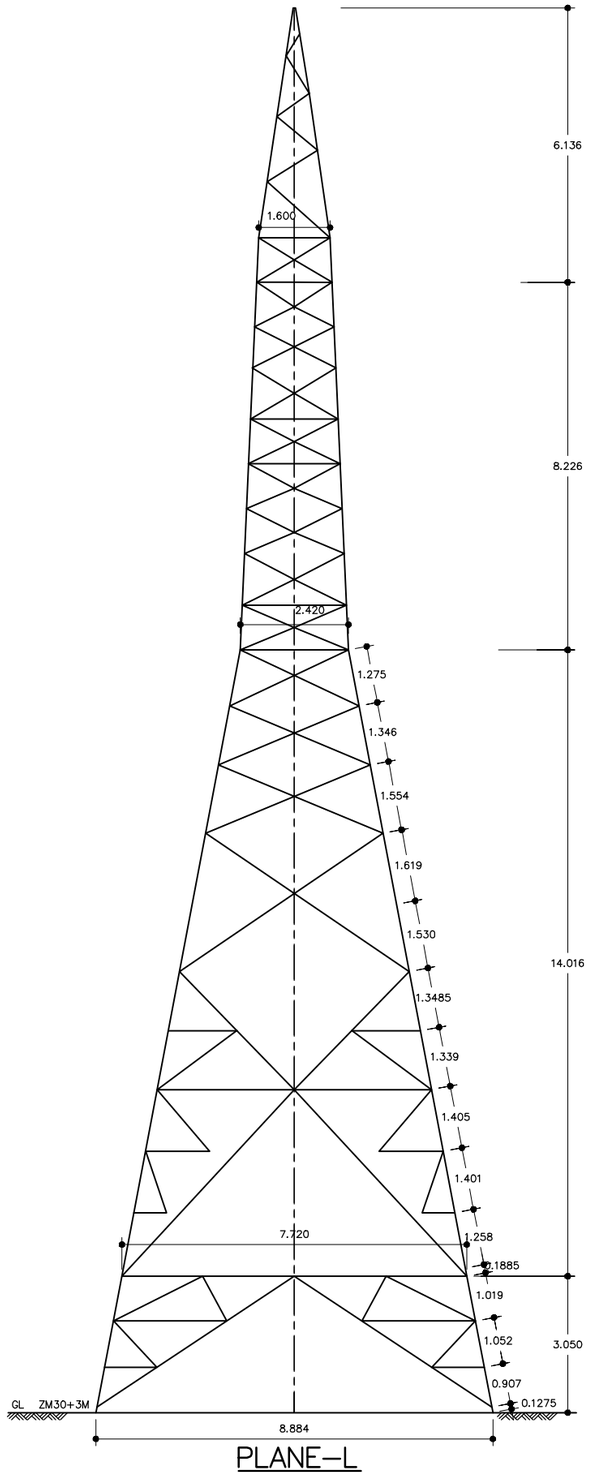
PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY

HYDRO PLANNING ORGANIZATION

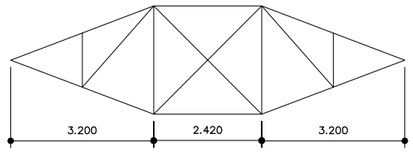
PREPARED Bilal Nawaz	PROJECT	**ATTABAD LAKE HPP FEASIBILITY STUDY REPORT**
DRAWN M.Saad	TITLE	**132kV-TRANSMISSION LINE TYPE-ZM 1**
CHECKED Faiz Rasool		
APPROVED Abid Sheikh	DATE Jun: 2021	SCALE NTS / DWG No: ASF-EM-457 / REVISIONS



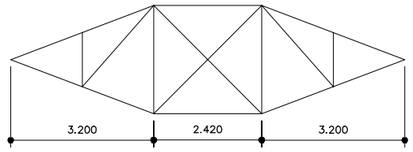
PLANE–T
SCALE 1:125



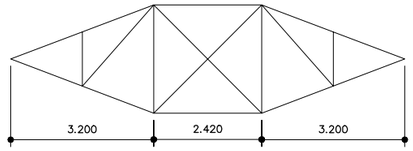
PLANE–L
SCALE 1:125



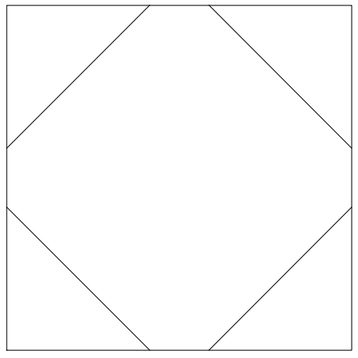
UPPER CROSS ARM
SCALE 1:125



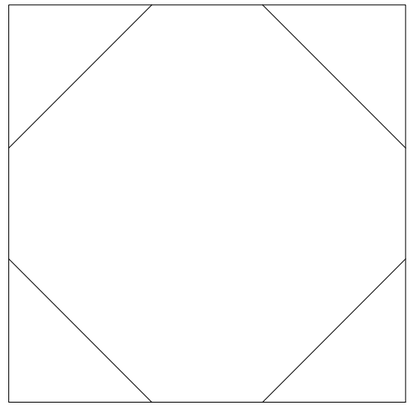
MIDDLE CROSS ARM
SCALE 1:125



LOWER CROSS ARM
SCALE 1:125



SECTION A–A
SCALE 1:125



SECTION B–B
SCALE 1:125

NOTES:
- FINAL TOWER DESIGN SHALL BE DETERMINED BY ENGINEER/ CONTRACTOR DURING FINAL DESIGN STAGE.
- All LENGTHS IN METER.

PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
HYDRO PLANNING ORGANIZATION

PREPARED Bilal Nawaz	PROJECT	ATTABAD LAKE HPP FEASIBILITY STUDY REPORT			
DRAWN M.Saad	TITLE	132kV-TRANSMISSION LINE TYPE-ZM 30			
CHECKED Faiz Rasool					
APPROVED Abid Sheikh	DATE Jun: 2021	SCALE NTS	DWG No: ASF-EM-458	REVISIONS	