Tender Drawings,

Volume-5, Section-7

SPECIFICATION DRAWINGS

LOWER ARUN HEP (669 MW)

INDEX FOR DRAWINGS		
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3	Access Route of Project Area	LAHEP-GEN-S03
II	**TAIL RACE OUTFALL POND**	
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2	Tail Race Outfall Pond-Layout Plan and Section (Sheet 2 of 2)	LAHEP-OFA3-S02
3	Tail Race Outfall Pond-Excavation Details (Sheet 1 of 3)	LAHEP-OFA3-S03
4	Tail Race Outfall Pond-Excavation Details (Sheet 2 of 3)	LAHEP-OFA3-S04
5	Tail Race Outfall Pond-Excavation Details (Sheet 3 of 3)	LAHEP-OFA3-S05
7	Tail Race Outfall Pond-Pattern Reinforcement Details (Sheet 1 of 2)	LAHEP-OFA3-S07
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III	**INTAKE STRUCTURE**	
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8	Head Race Tunnel – Excavation and Support Details –Extremely Poor Rock (Sheet 3 of 4)	LAHEP-HT-S08
9	Head Race Tunnel – Excavation and Support Details –Extremely Poor Rock (Sheet 4 of 4)	LAHEP-HT-S09
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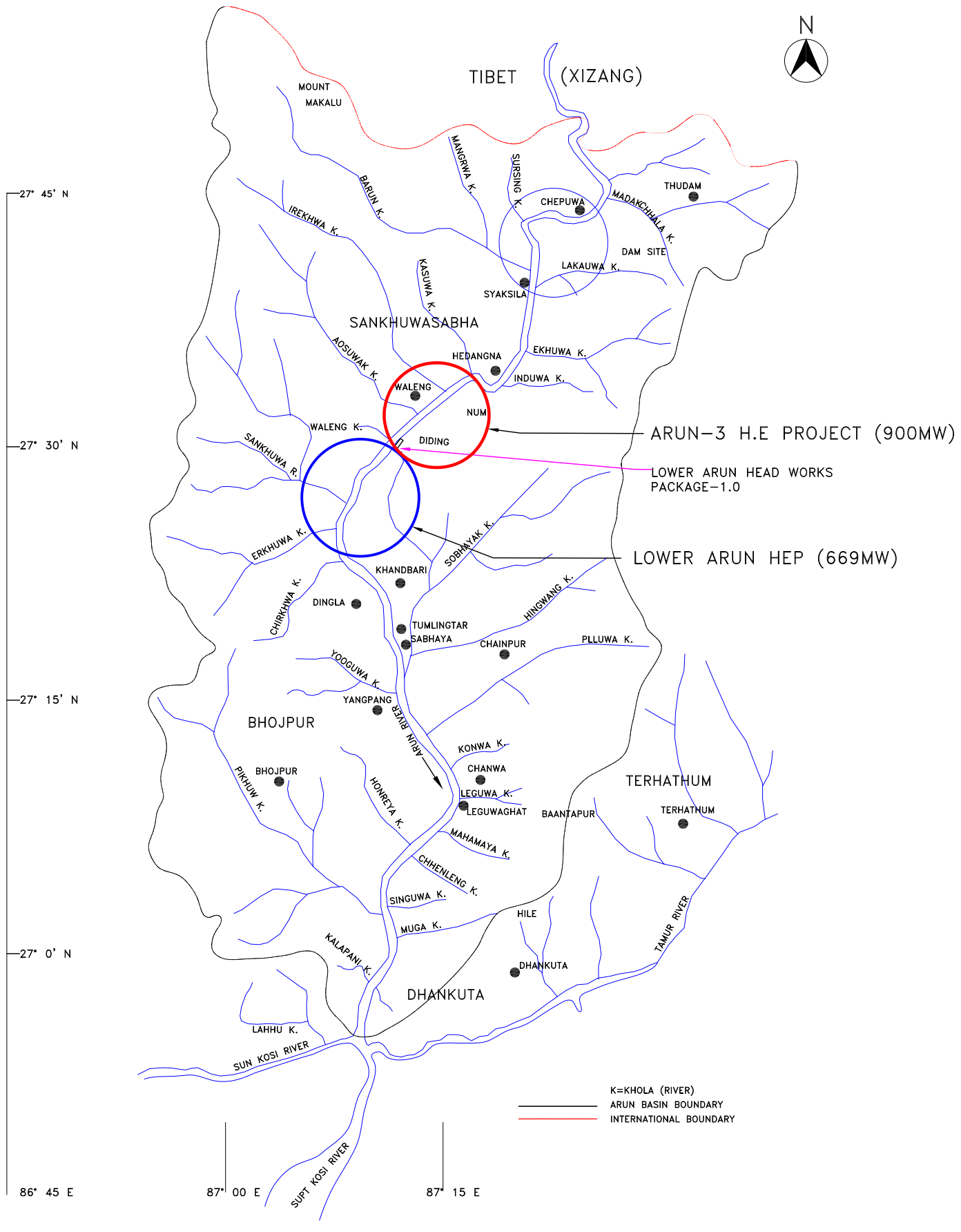
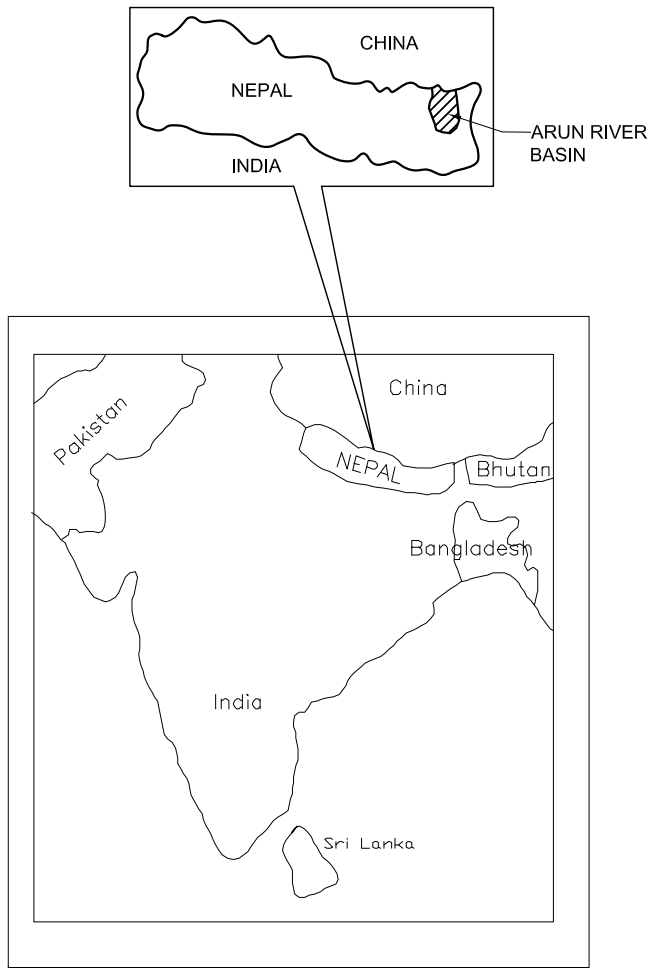
13	Head Race Tunnel - Lining Details (Typical Cross Sections Rock Class I To V)	LAHEP-HT-S13

VICINITY MAP



ARUN RIVER BASIN



SPECIFICATION DRAWING NOT TO BE USED FOR CONSTRUCTION

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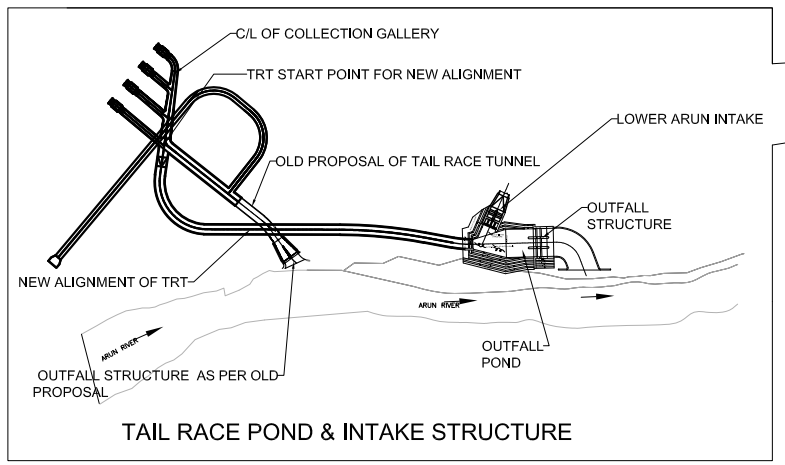
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

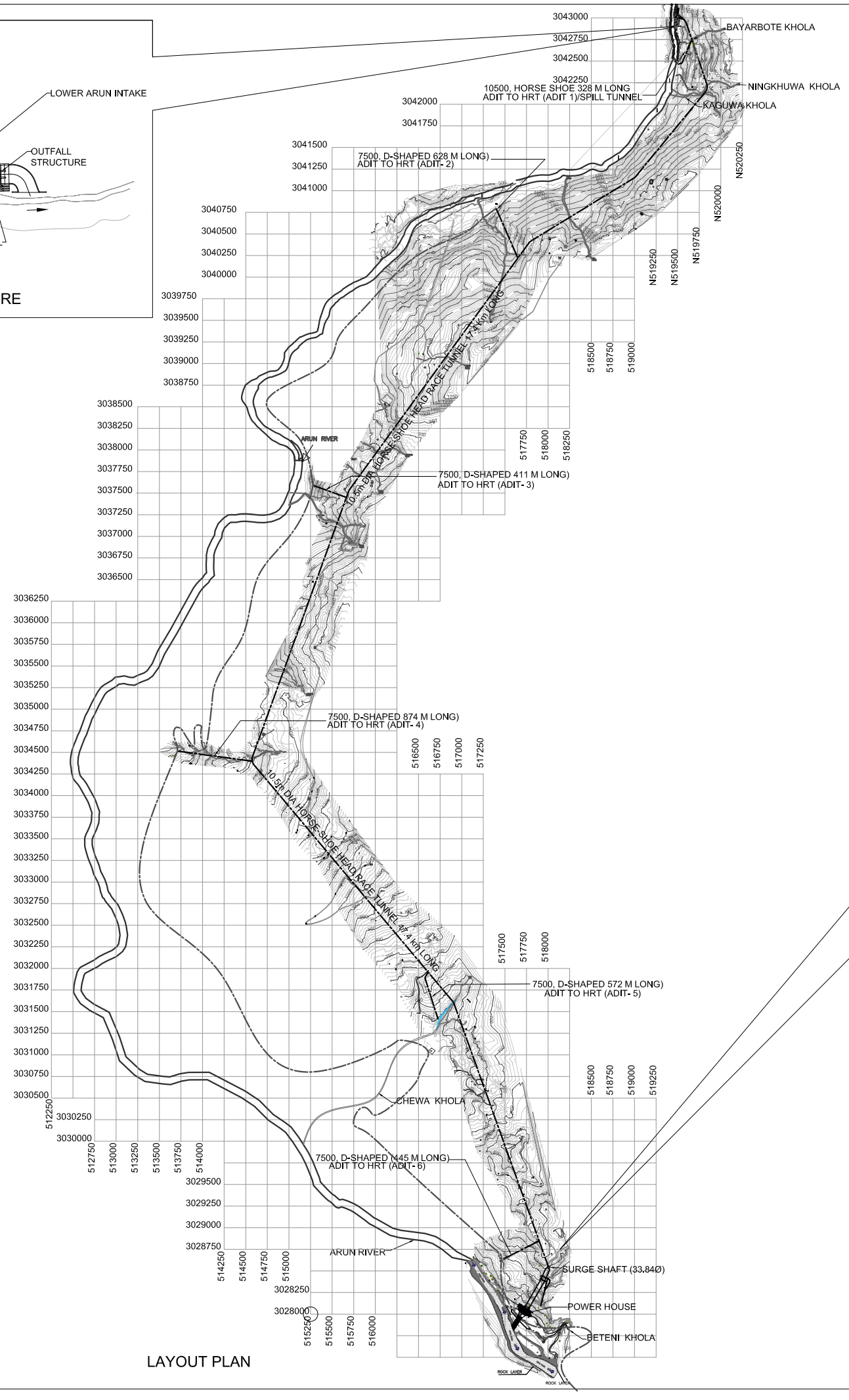
PROJECT AREA LOCATION MAP

अभिकल्पित DSGN.	परिक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO. LAHEP-GEN-S01 | JANUARY, 2023



TAIL RACE POND & INTAKE STRUCTURE

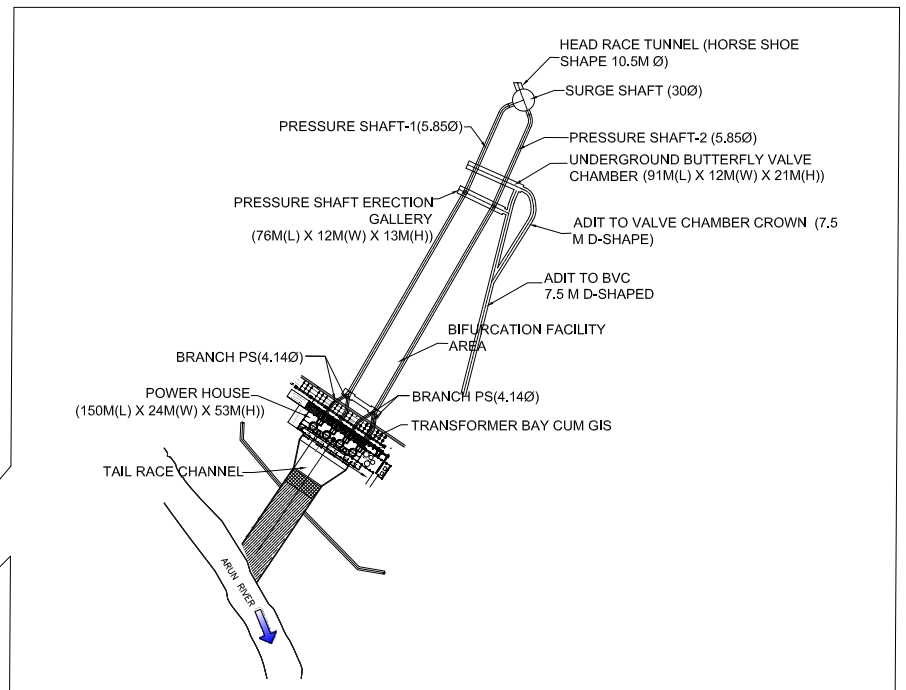


LAYOUT PLAN

N

NOTE:-

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION IS TO BE SCALED OUT, ONLY WRITTEN DIMENSIONS SHALL BE TAKEN AS CORRECT.



POWER HOUSE COMPLEX

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

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LOWER ARUN H. E. PROJECT NEPAL (669 MW)

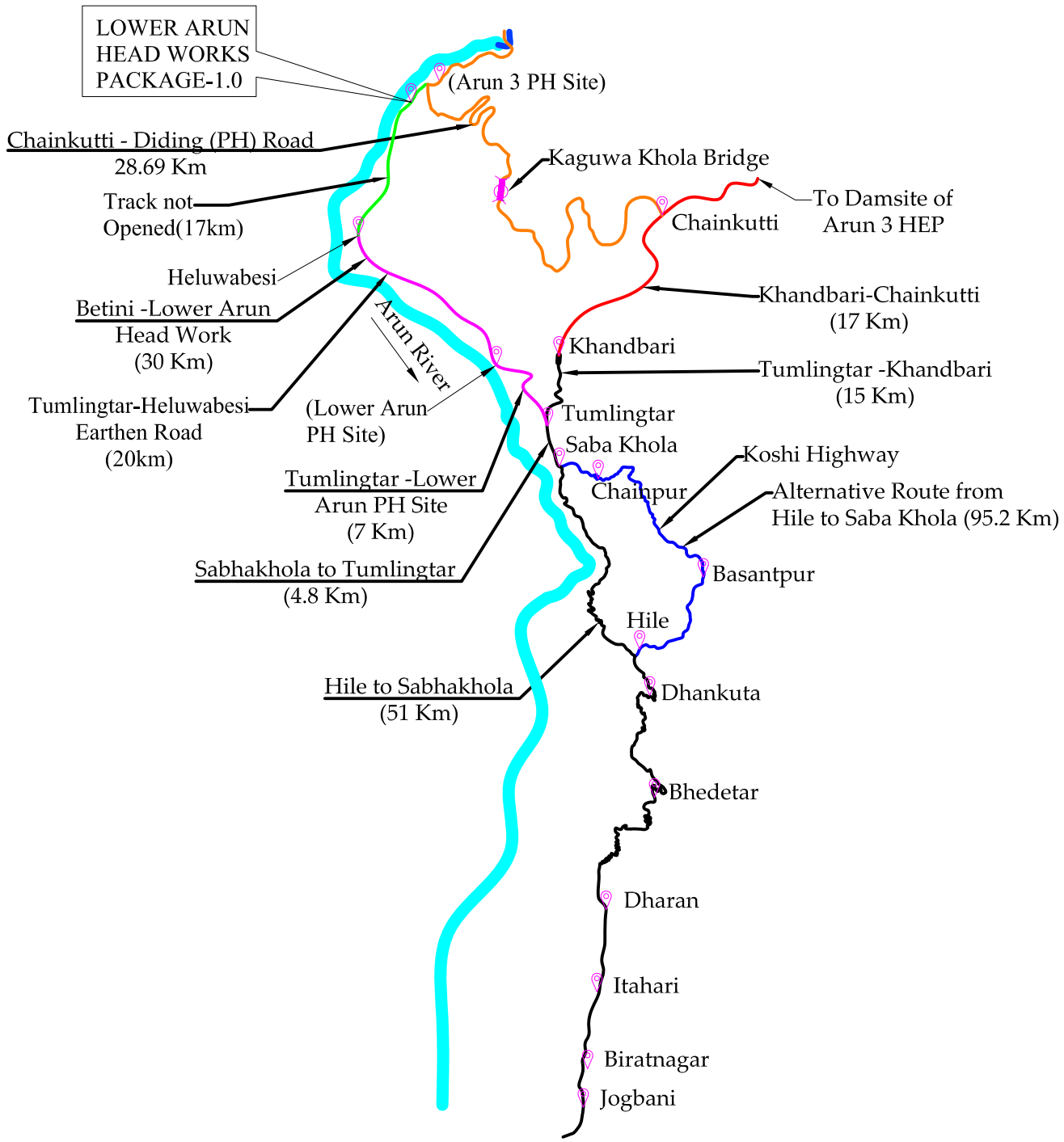
GENERAL LAYOUT PLAN OF PROJECT

अभिकल्पित DSGN.	संविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO. LAHEP-GEN-S02 | JANUARY, 2023

NOTE :-

1. NO DIMENSION SHALL BE SCALED OUT, ONLY WRITTEN DIMENSION ARE TO BE CORRECT



Legends :-	
	Location
	Black top road (Koshi Highway)
	Gravel road (Koshi Highway)
	Project access roads constructed by SAPDC
	Alternative Route
	Earthen Road(Kachha Road)
	Track not Opned
	Arun River
	Bridges

S.N	From	To	Distance between two Stations (km)	Approx. Distance From Jogbani (Km)
1	Jogbani	Biratnagar	7.6	7.6
2	Biratnagar	Itahari	24.6	32.2
3	Itahari	Dharan	15.7	47.9
4	Dharan	Hile	67.3	115.2
5	Hile	Sabhakhola	51	166.2
6	Sabhakhola	Tumlingtar	4.8	171
7	Tumlingtar	Khandbari	15	186
8	Khandbari	Chainkutti	17	203
9	Chainkutti	Lower Arun Headworks	29	232

SPECIFICATION DRAWING NOT TO BE USED FOR CONSTRUCTION

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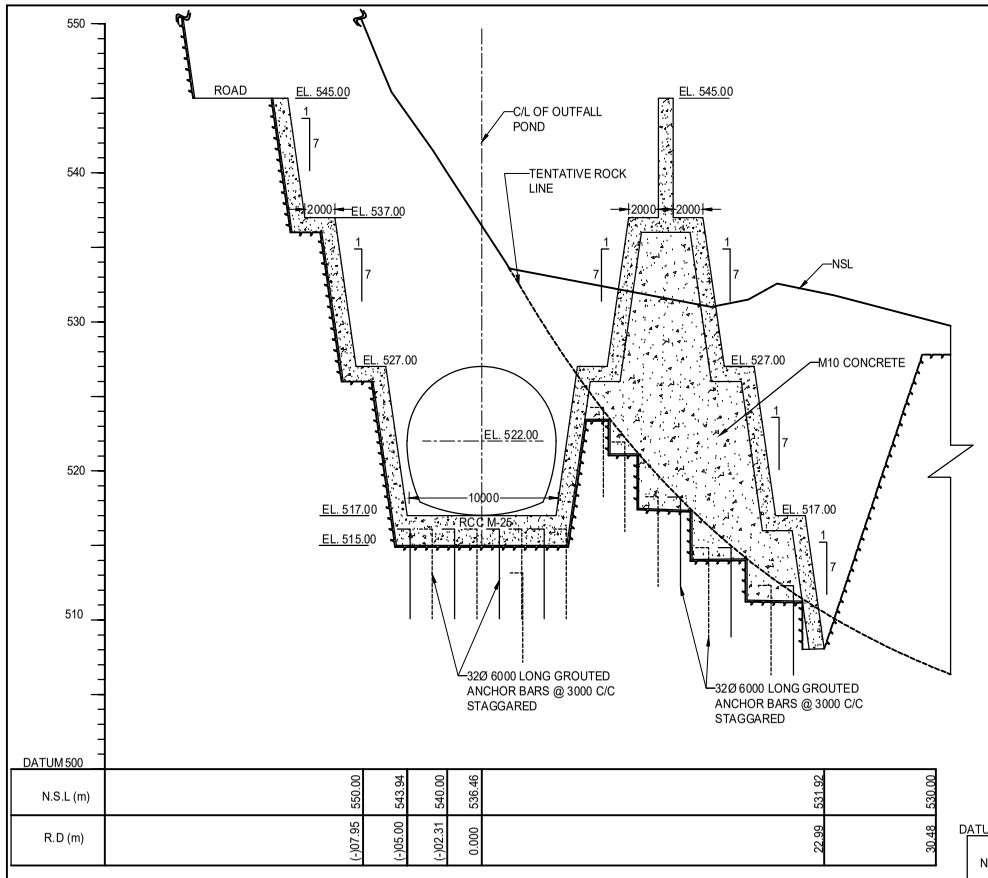
लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

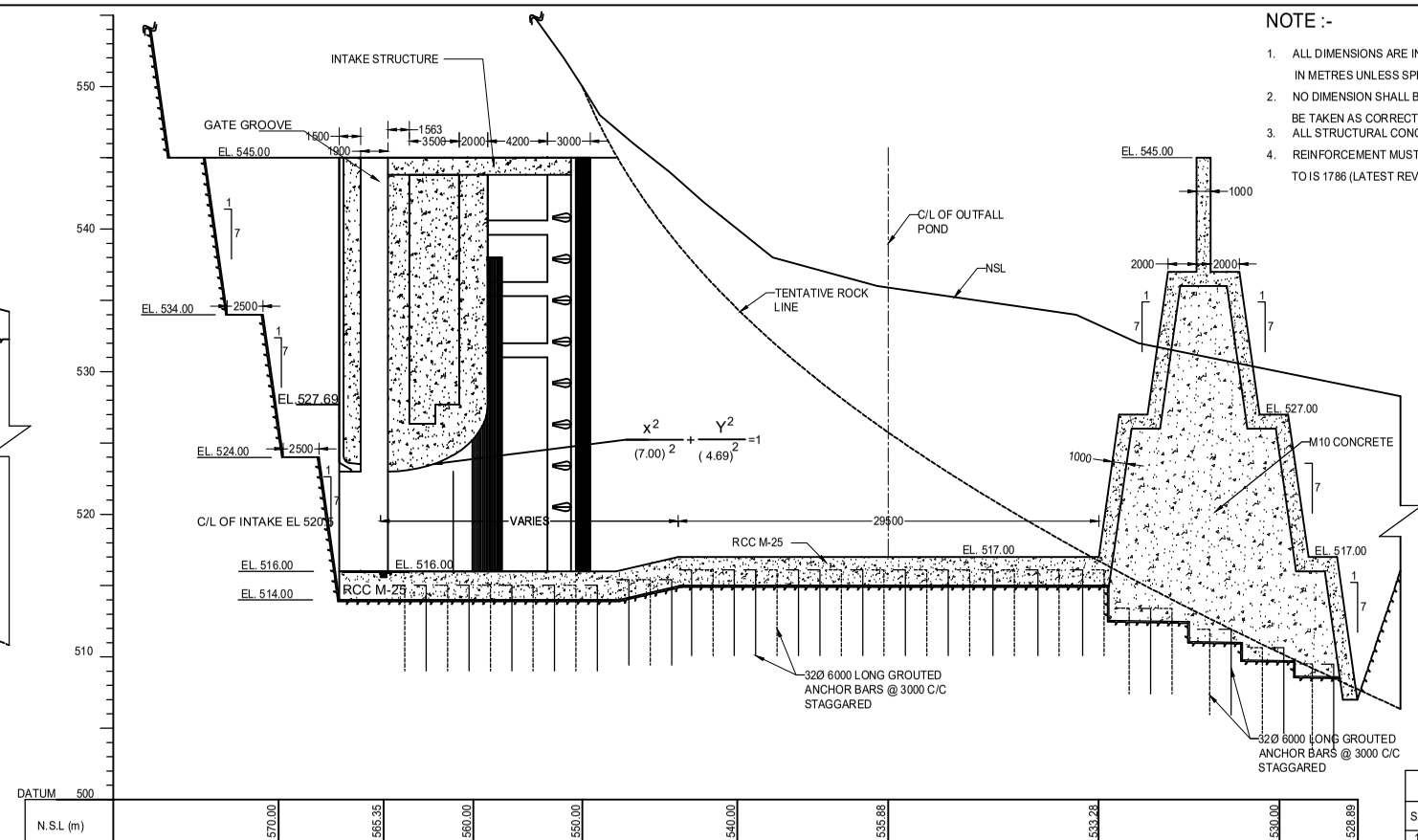
ACCESS ROUTE OF PROJECT AREA

अभिकल्पित DSGN.	सविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO. LAHEP-GEN-S03 | JANUARY, 2023



SECTION 1-1
(AT STA. 0.00)



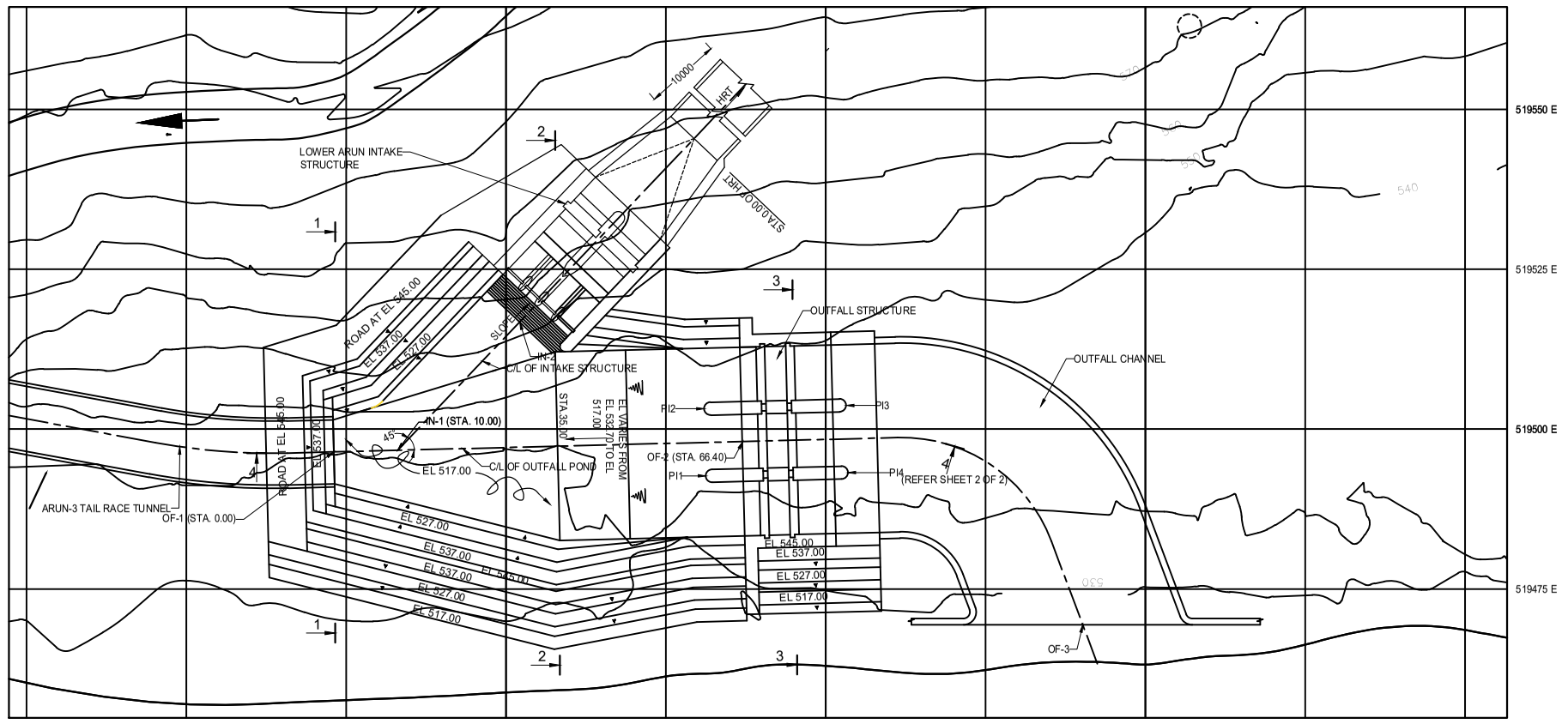
SECTION 2-2
(AT STA. 35.00)

NOTE :-

1. ALL DIMENSIONS ARE IN MILLIMETRES, ELEVATIONS AND STATIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
2. NO DIMENSION SHALL BE SCALED OUT, ONLY WRITTEN DIMENSIONS TO BE TAKEN AS CORRECT.
3. ALL STRUCTURAL CONCRETE SHALL BE OF GRADE M25A40 CONFORMING TO IS: 456-2000.
4. REINFORCEMENT MUST BE HYSD BAR, Fe-500 (COLD-TWISTED) CONFORMING TO IS 1786 (LATEST REVISION).

CO-ORDINATES OF POINTS ALONG THE TAILRACE OUTFALL POND

S.N	POINTS	CO-ORDINATES	
		EASTING	NORTHING
1	OF-1	519496.442	3043026.939
2	IN-1	519496.695	3043016.942
3	IN-2	519516.7507	3042997.8759
4	OF-2	519498.058	3042963.0594
5	OF-3	519469.3911	3042909.8057



LAYOUT PLAN OF TAIL RACE OUTFALL POND

CONNECTED DRAWINGS :-

1. TAIL RACE OUTFALL POND-LAYOUT PLAN AND SECTIONS (SHEET 2 OF 2) LAHEP-OFA3-S02

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 1 OF 2

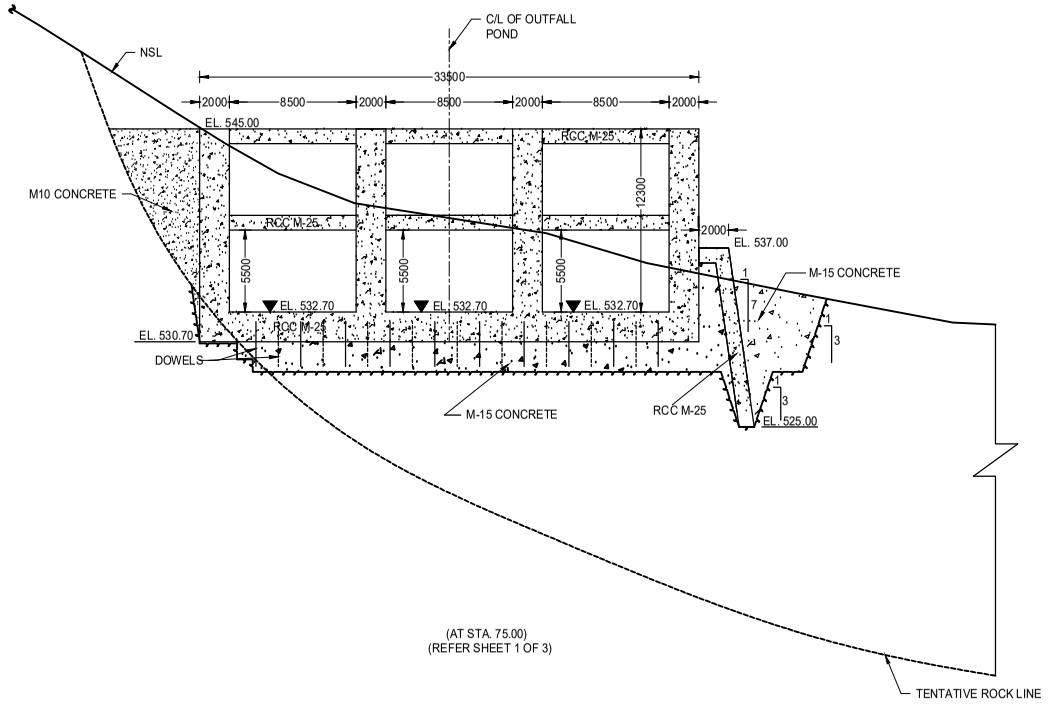
एसजेवीएन लिमिटेड
SJVN LIMITED

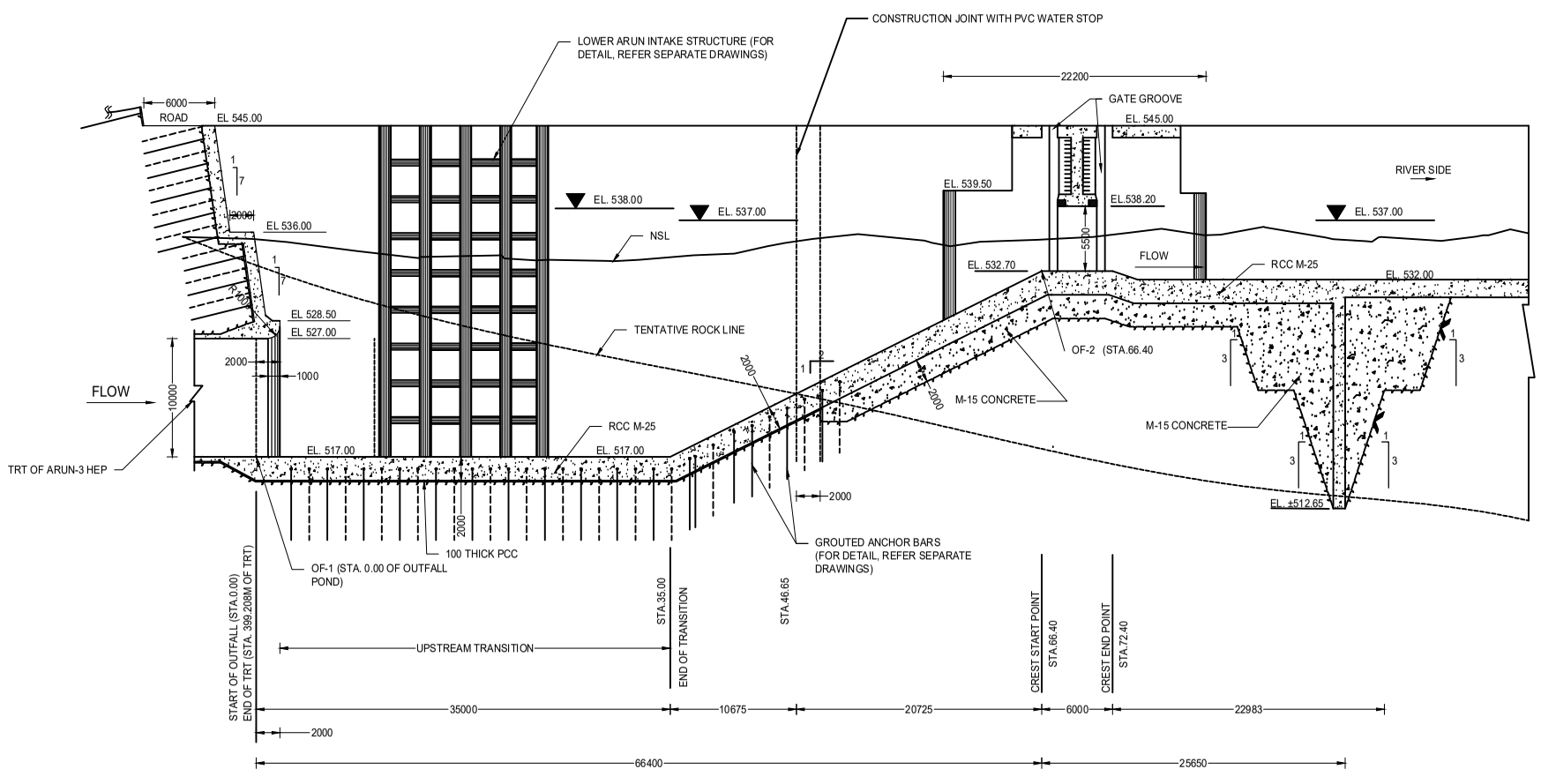
लोअर अरुण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

TAIL RACE OUTFALL POND
LAYOUT PLAN AND SECTION

अभिकल्पित DSGN.	गविवित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	परीक्षित SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-OFA3-S01 | JANUARY,2023





SECTION 4-4

(LONGITUDINAL SECTION THROUGH OUTFALL POND)
(REFER SHEET 1 OF 3)

CONNECTED DRAWINGS :-

1. TAIL RACE OUTFALL POND-LAYOUT PLAN AND SECTIONS .....LAHEP-OFA3-S01 (SHEET 1 OF 2)

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 2 OF 2

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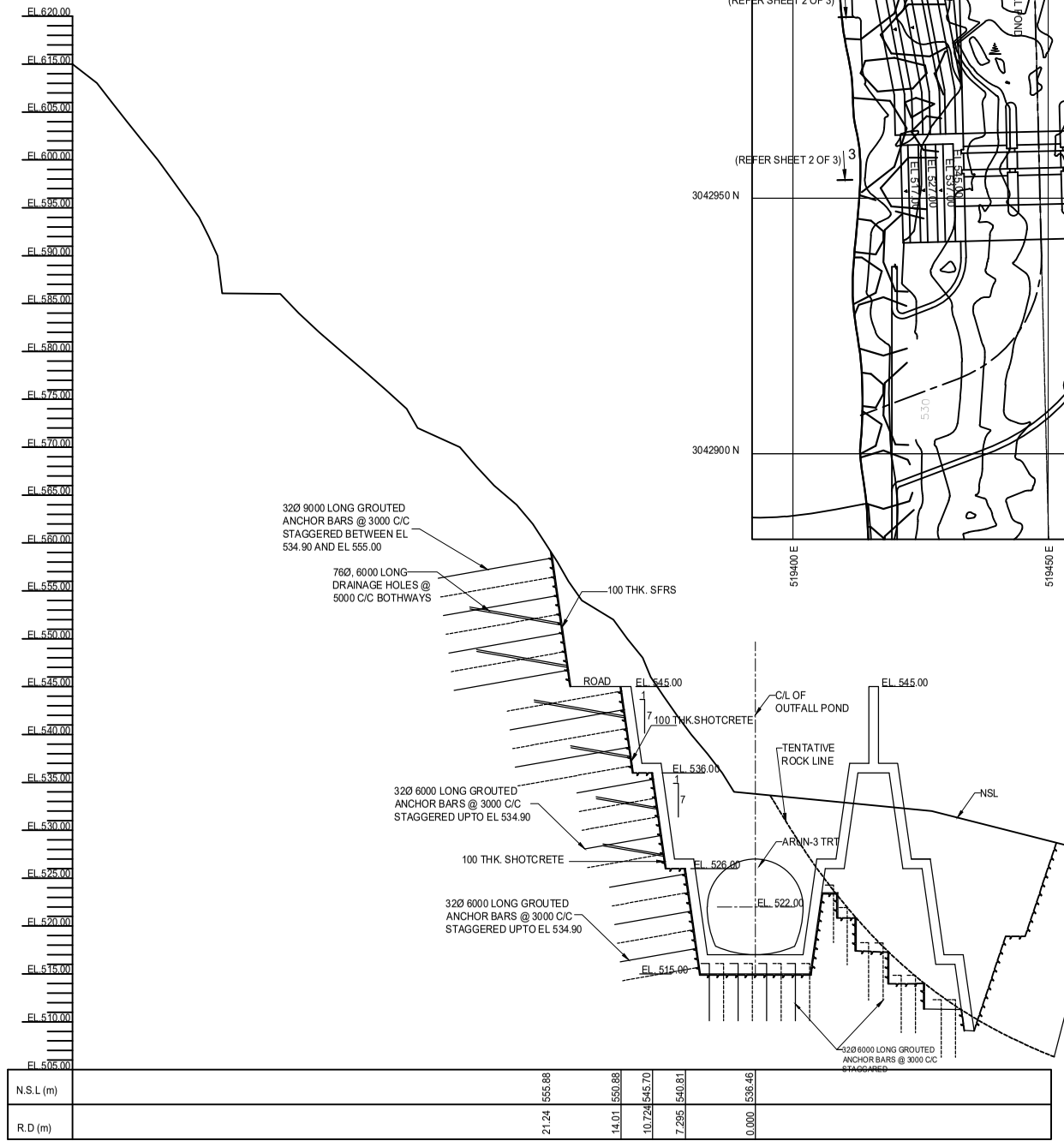
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

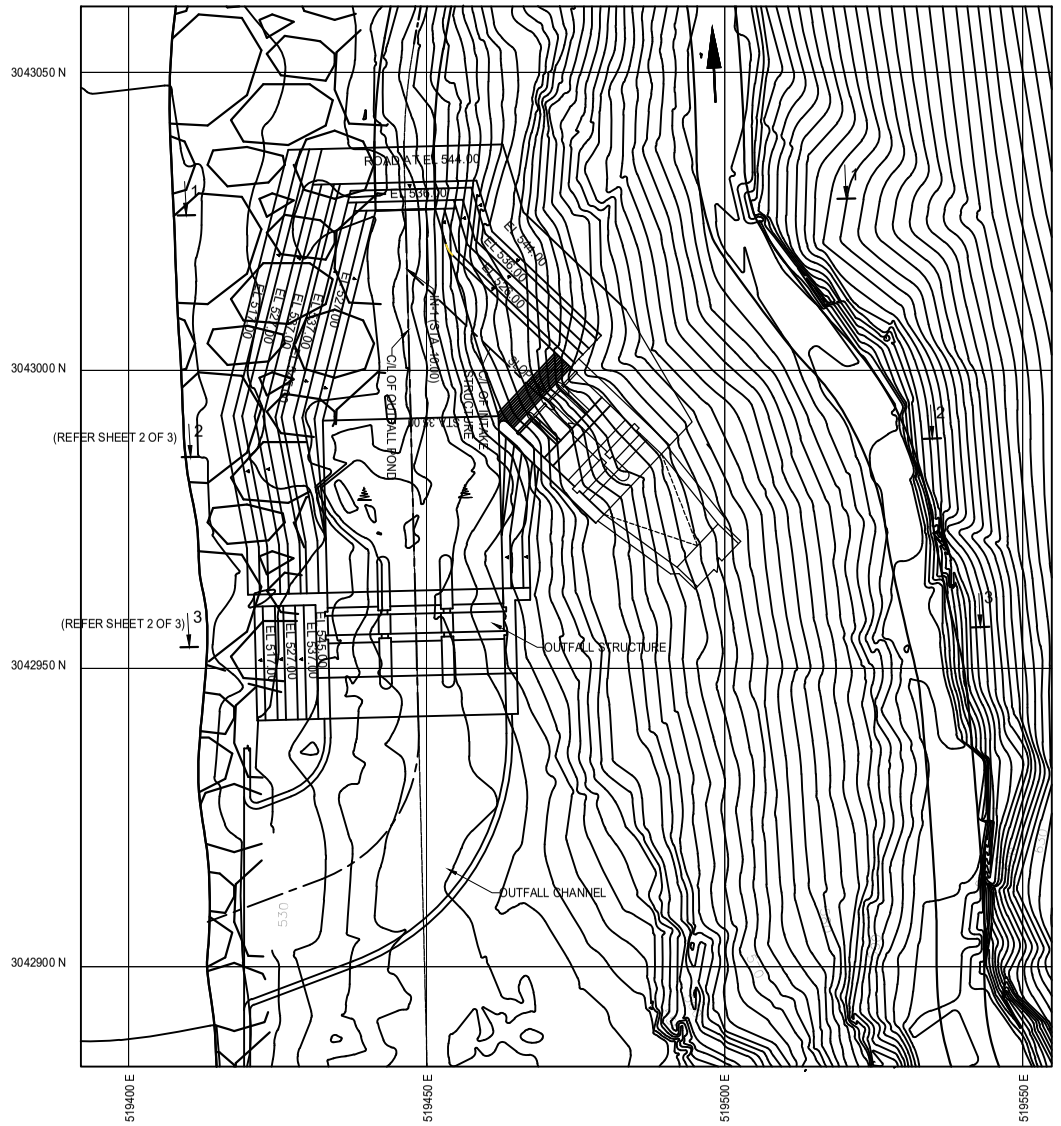
TAIL RACE OUTFALL POND
LAYOUT PLAN AND SECTION

अभिकल्पित DSGN.	परिक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-OFA3-S02 | JANUARY, 2023



SECTION 1-1
(REFER SHEET 1 OF 3)



KEY PLAN

NOTE :-

1. ALL DIMENSIONS ARE IN MILLIMETRES, ELEVATIONS AND STATIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
2. NO DIMENSION SHALL BE SCALED OUT, ONLY WRITTEN DIMENSIONS TO BE TAKEN AS CORRECT.
3. LENGTH AND SPACING OF GROUTED ANCHOR BARS MAY BE MODIFIED TO SUIT ACTUAL SITE CONDITION AS DECIDED BY ENGINEER.
4. CONTROLLED BLASTING TECHNIQUE SHALL BE USED AT THE BOUNDARIES OF EXCAVATION IN ROCK IN ORDER TO OBTAIN A SMOOTH SURFACE AND TO MINIMIZE OVERBREAK. ALTERNATIVELY, 1.0M BARK MAY BE LEFT TO BE BLASTED LAST OF ALL.
5. DRESSED SLOPE ANGLE SHALL BE STRICTLY ADHERED TO.
6. SFRS SHALL BE APPLIED IMMEDIATELY AFTER EXCAVATION IS COMPLETE FOLLOWED BY INSTALLATION OF ROCK ANCHORS.
7. HEIGHT OF BENCH IN ROCK TO BE BLASTED AT ANY TIME SHALL NOT EXCEED 3.00M IN ANY CASE.
8. BENCH AT A GIVEN ELEVATION SHALL BE COMPLETED IN THE ENTIRE LENGTH OF OUTFALL BEFORE PROCEEDING DOWN AS FAR AS POSSIBLE.
13. MINIMUM SLOPE OF DRAINAGE HOLES SHALL BE 1:10 (DIPPING TOWARDS EXCAVATION).
14. DRAINAGE HOLES SHALL BE DRILLED ONLY AFTER PROVIDING THE ROCK SUPPORT SYSTEM.
15. IF COLLAPSING OF HOLES IS OBSERVED DUE TO UNFAVORABLE ROCK CONDITIONS, PERFORATED PVC PIPE SHALL BE PROVIDED IN THE HOLES.

CONNECTED DRAWINGS :-

1. TAIL RACE OUTFALL POND-EXCAVATION DETAILS (SHEET 2 OF 3 & 3 OF 3) .....LAHEP-OFA3-S04 & S05

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 1 OF 3

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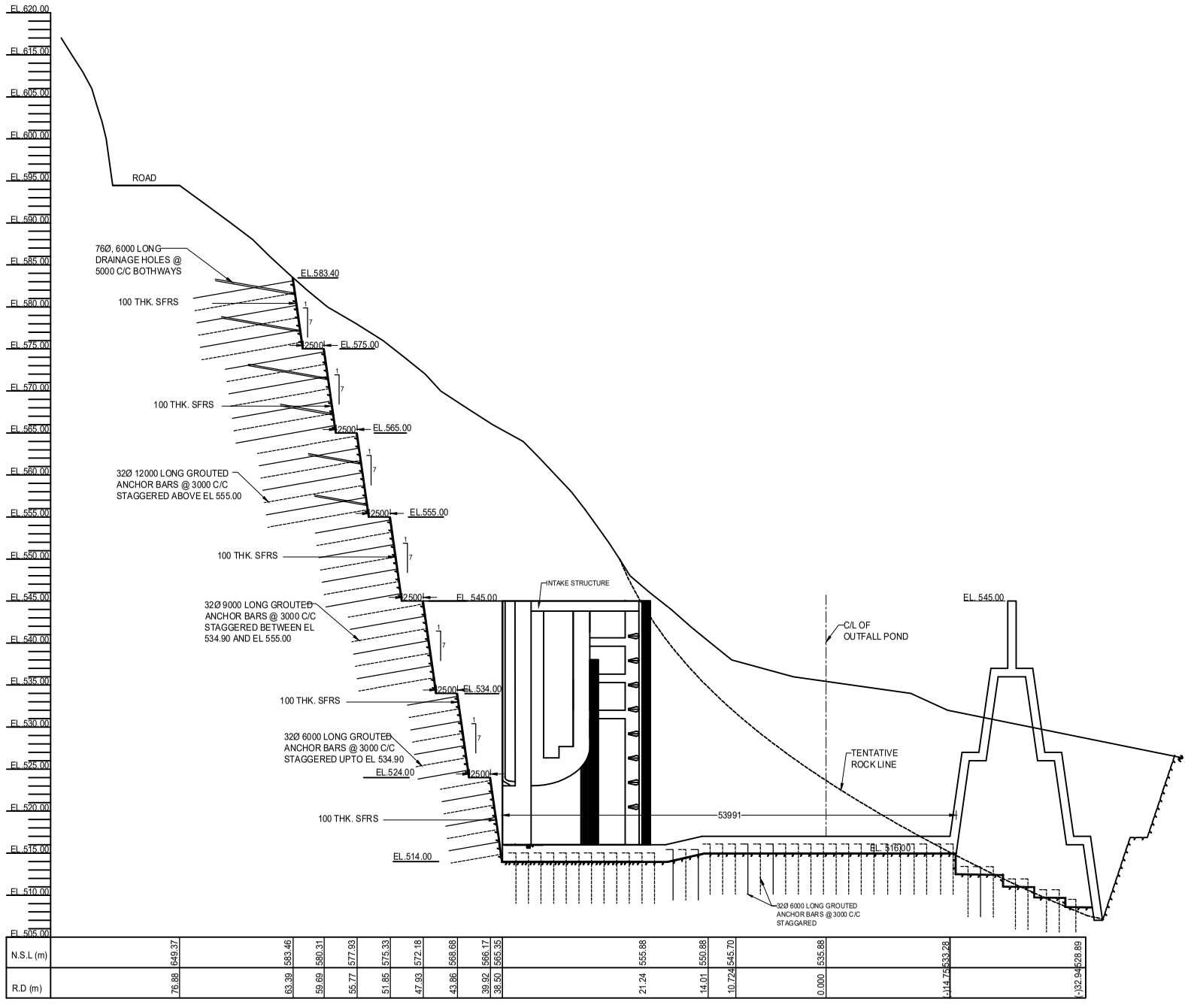
लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

TAIL RACE OUTFALL POND
EXCAVATION DETAILS

अभिकल्पित DSGN.	गयिवित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-OFA3-S03 | JANUARY, 2023



SECTION 2-2
(REFER SHEET 1 OF 3)

CONNECTED DRAWINGS :-

1. TAIL RACE OUTFALL POND-EXCAVATION DETAILS (SHEET 1 OF 2 & 3 OF 3) .....LAHEP-OFA3-S03 & S05

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 2 OF 3

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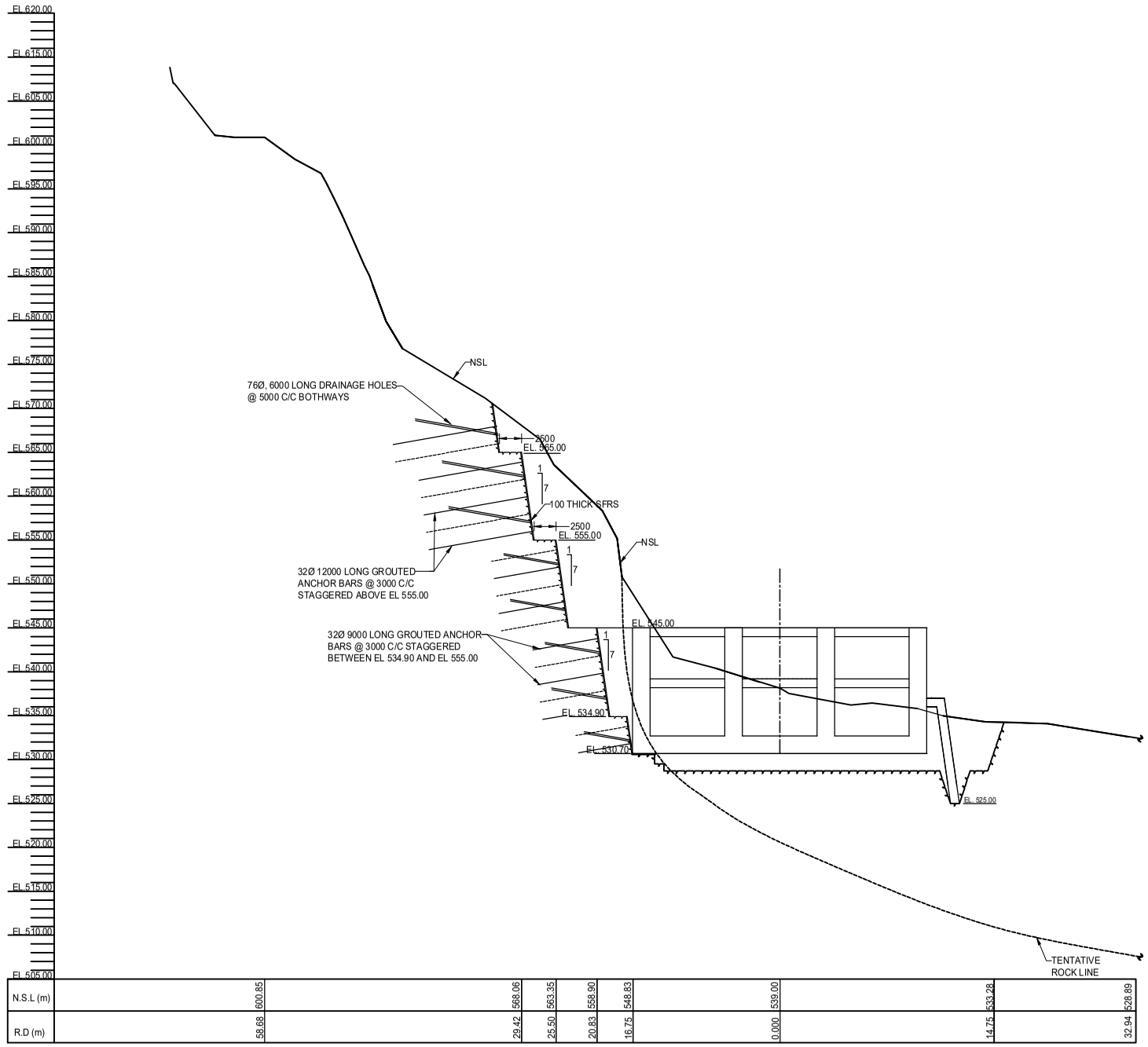
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

TAIL RACE OUTFALL POND
EXCAVATION DETAILS

अभिकल्पित DSGN.	गविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	पस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-OFA3-S04 | JANUARY, 2023



SECTION 3-3
(REFER SHEET 1 OF 3)

CONNECTED DRAWINGS :-

1. TAIL RACE OUTFALL POND-EXCAVATION DETAILS .....LAHEP-OFA3-S03&S04 (SHEET 1 OF 3 & 2 OF 3)

SPECIFICATION DRAWING
FOR DETAILED PROJECT REPORT ONLY

SHEET 3 OF 3

एसजेवीएन लिमिटेड
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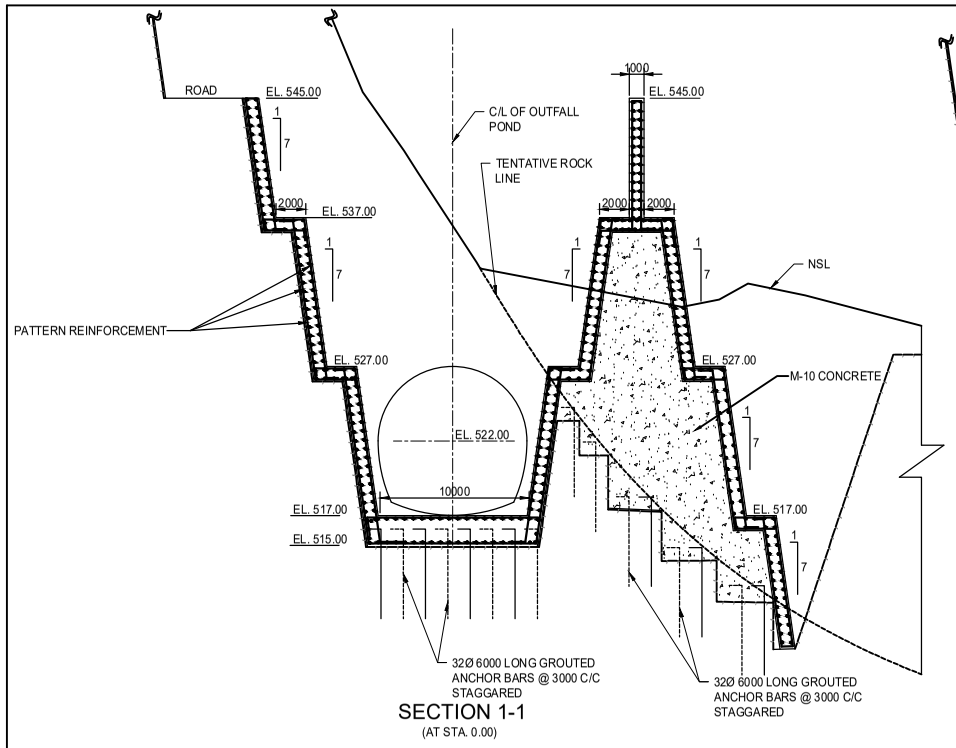
लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

TAIL RACE OUTFALL POND EXCAVATION DETAILS

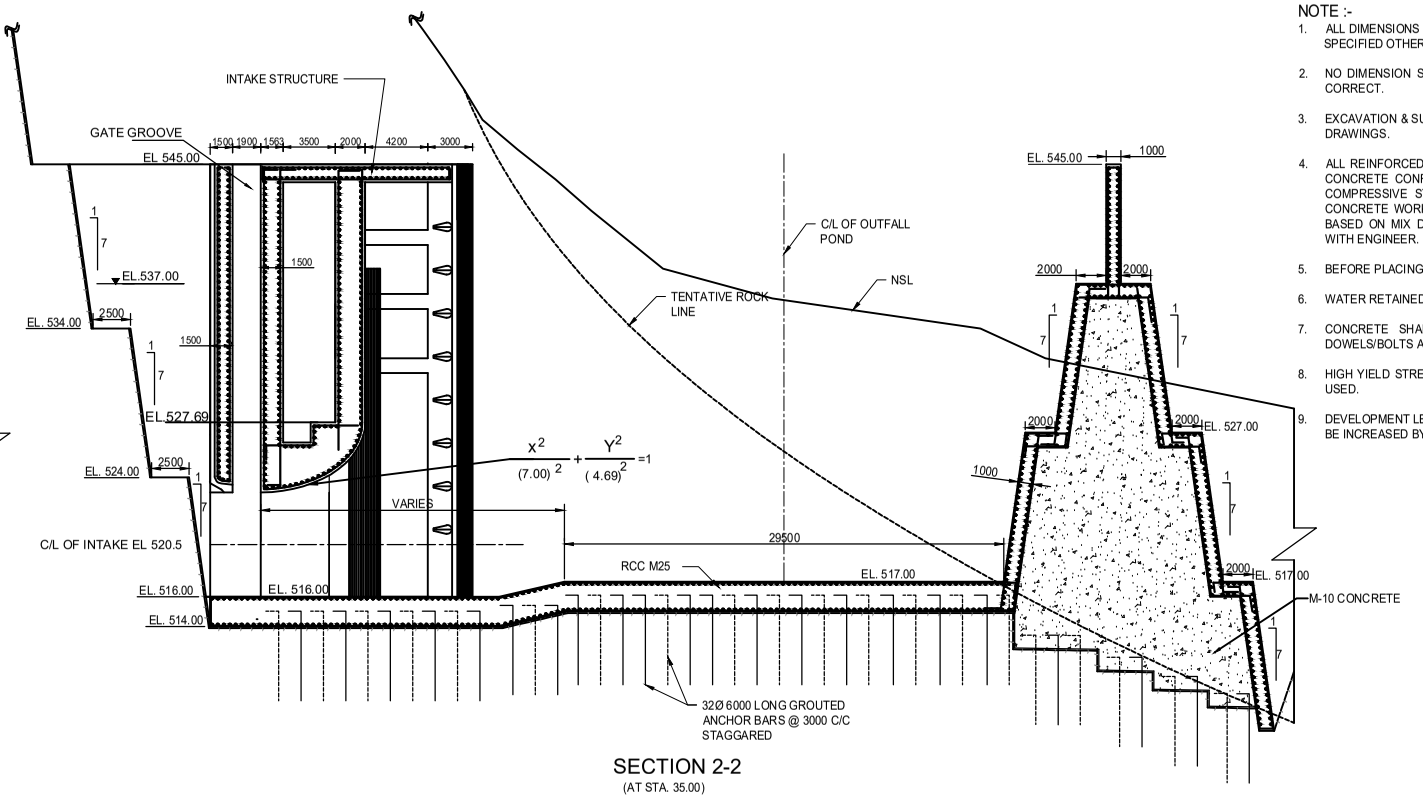
अभिकल्पित DSGN.	परिक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-OFA3-S05

JANUARY, 2023



SECTION 1-1
(AT STA. 0.00)

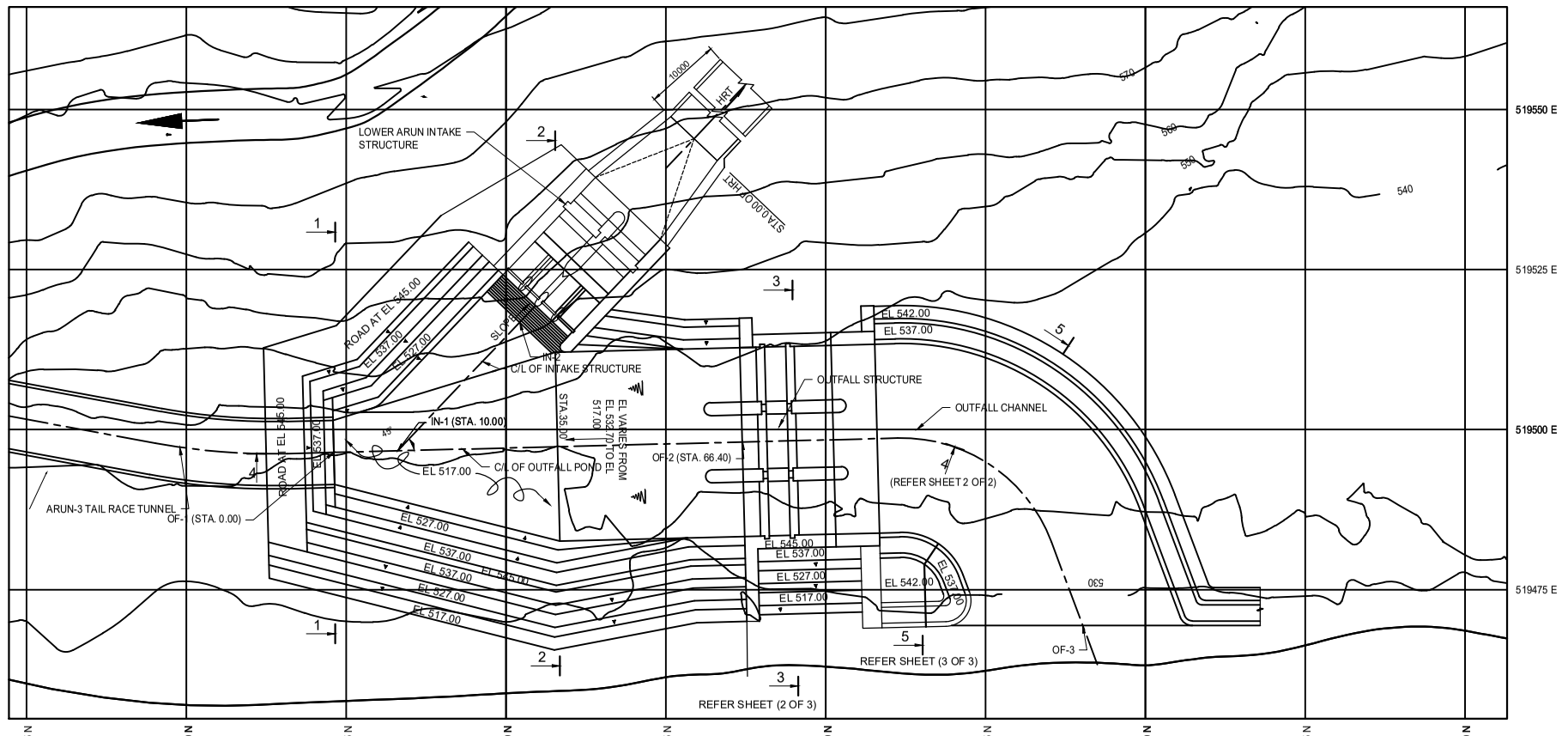


$$\frac{X^2}{(7.00)^2} + \frac{Y^2}{(4.69)^2} = 1$$

SECTION 2-2
(AT STA. 35.00)

NOTE :-

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES UNLESS SPECIFIED OTHERWISE.
2. NO DIMENSION SHALL BE SCALED OUT, ONLY WRITTEN DIMENSIONS ARE TO BE TAKEN AS CORRECT.
3. EXCAVATION & SUPPORT SYSTEM IS NOT SHOWN FOR CLARITY, FOR DETAILS REFER SEPARATE DRAWINGS.
4. ALL REINFORCED CEMENT CONCRETE WORK SHALL CONFORM TO IS:456. M25 A20 GRADE OF CONCRETE CONFORMING TO IS:456 (LATEST REVISION) HAVING 28 DAYS CHARACTERISTIC COMPRESSIVE STRENGTH NOT LESS THAN 25N/SQMM. SHALL BE USED FOR REINFORCED CONCRETE WORK IN FIRST STAGE CONCRETE. THE QUANTITIES OF INGREDIENTS SHALL BE BASED ON MIX DESIGN CONFORMING TO IS:456 AND SHALL BE FINALIZED IN CONSULTATION WITH ENGINEER.
5. BEFORE PLACING CONCRETE ROCK SURFACE SHALL BE LEVELED AND WATERED.
6. WATER RETAINED IF ANY, SHALL BE REMOVED FROM DEPRESSIONS.
7. CONCRETE SHALL BE THOROUGHLY COMPACTED AND FULLY WORKED AROUND THE DOWELS/BOLTS AND INTO THE CORNERS OF THE FORM WORK/CONCRETE OUTLINE GEOMETRY.
8. HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS: 1786 (GRADE FE 500) SHALL BE USED.
9. DEVELOPMENT LENGTH OF BAR SHALL BE ATLEAST 49 TIMES DIAMETER OF THE BAR AND SHALL BE INCREASED BY 10% IN CASE OF TWO BARS IN CONTACT (BUNDLE OF TWO BARS).



LAYOUT PLAN OF TAIL RACE OUTFALL POND

REFERENCE DRAWINGS :-

1. TAIL RACE OUTFALL LAYOUT PLAN SHEET (1 OF 2 & 2 OF 2) .....LAHEP-OFA3-S01 TO S02

CONNECTED DRAWINGS :-

1. TAIL RACE OUTFALL POND-PATTERN REINFORCEMENT DETAILS.....LAHEP-OFA3-S07 TO S8 (SHEET 2 OF 3 TO 3 OF 3)

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 1 OF 3

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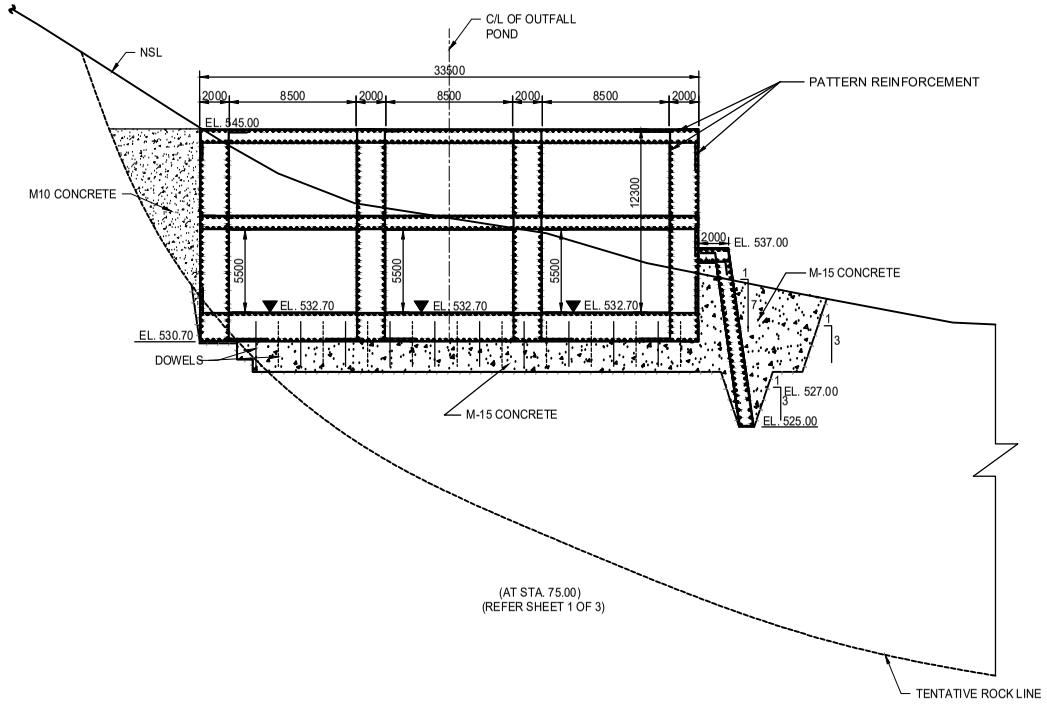
SJVN LIMITED

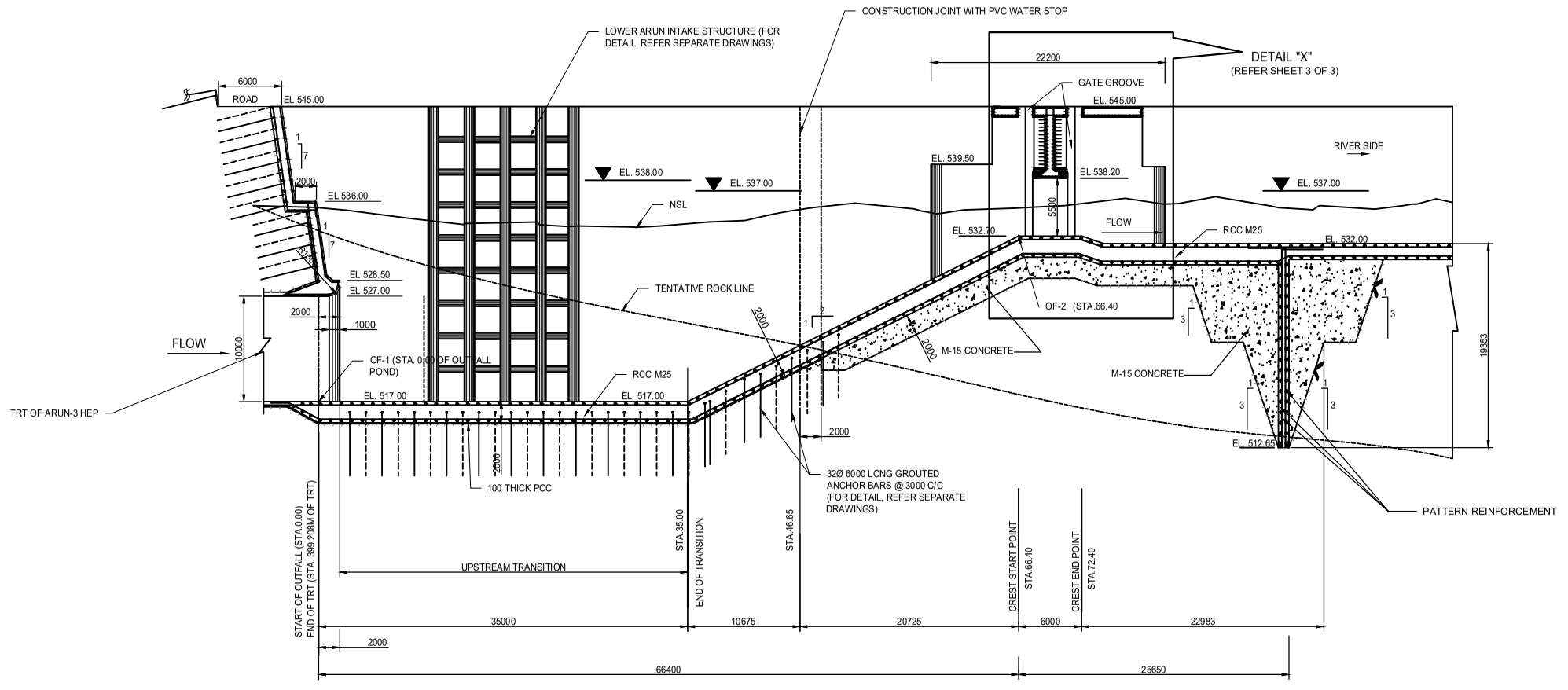
लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

TAIL RACE OUTFALL POND
PATTERN REINFORCEMENT DETAILS

अभिकल्पित DSGN.	परिवित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	परतुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-OFA3-S06 | JANUARY, 2023





SECTION 4-4

(LONGITUDINAL SECTION THROUGH OUTFALL POND)

(REFER SHEET 1 OF 3)

CONNECTED DRAWINGS :-

1. TAIL RACE OUTFALL POND-PATTERN REINFORCEMENT .....LAHEP-OFA3-S06 TO 08, (SHEET 1 OF 3 & 3 OF 3)

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 2 OF 3

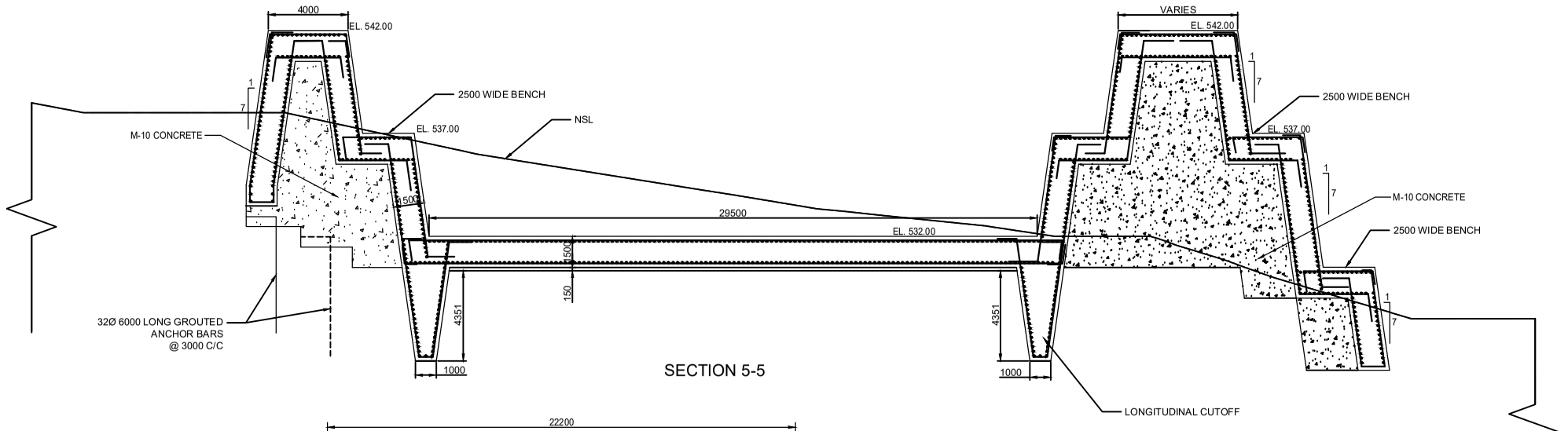
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

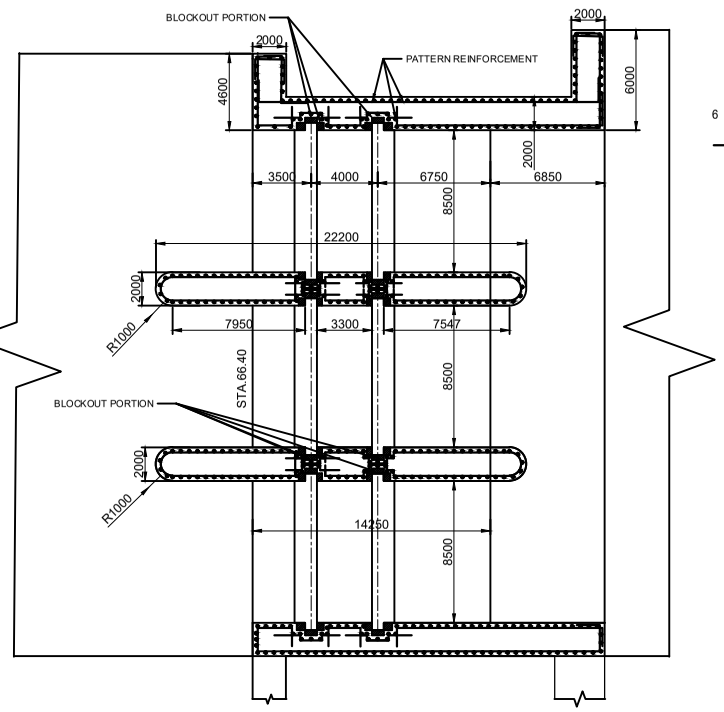
TAIL RACE OUTFALL POND
PATTERN REINFORCEMENT DETAILS

अभिकल्पित DSGN.	परिवित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

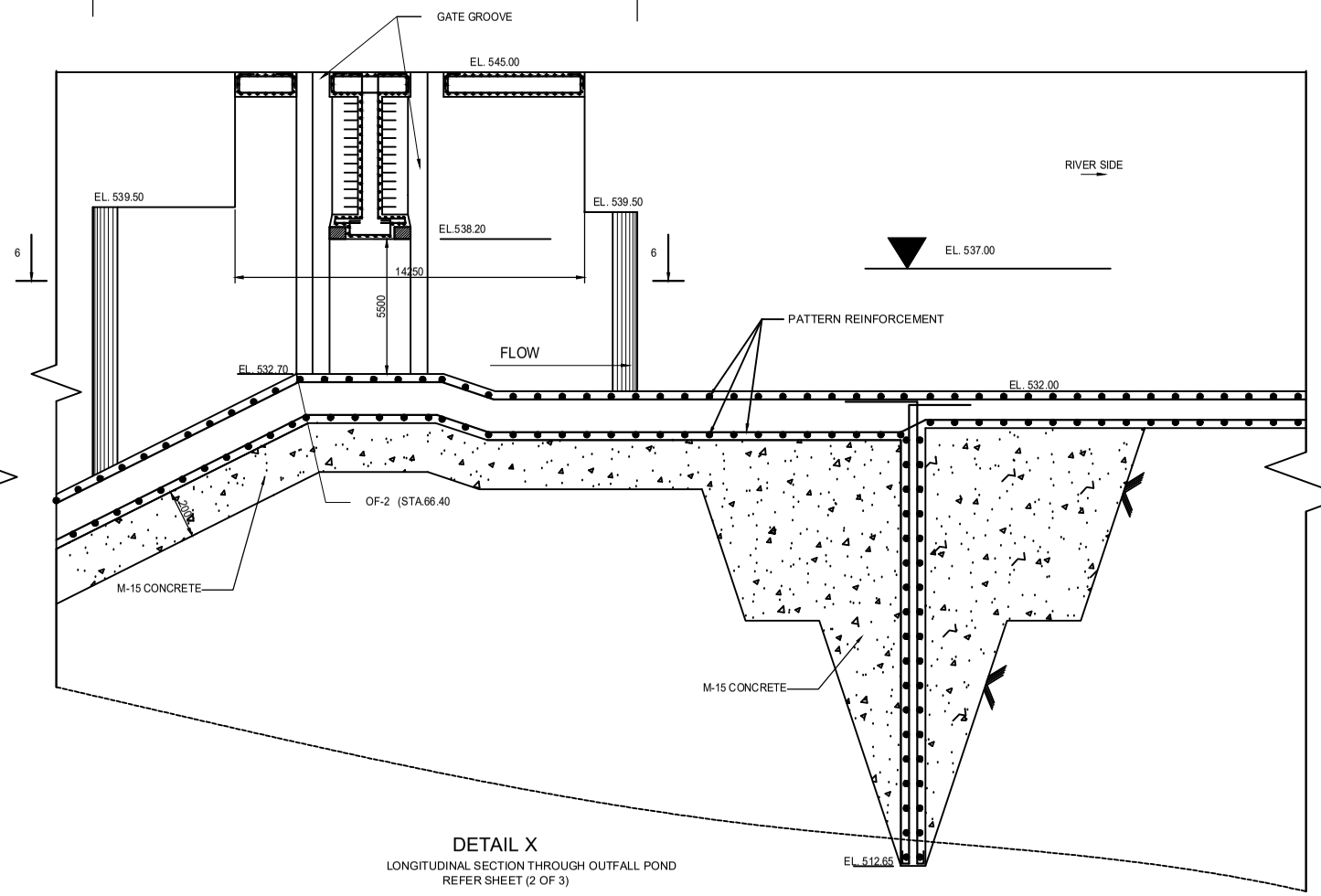
DRG.NO.LAHEP-OFA3-S07 | JANUARY, 2023



SECTION 5-5



SECTION 6-6



DETAIL X

LONGITUDINAL SECTION THROUGH OUTFALL POND
REFER SHEET (2 OF 3)

CONNECTED DRAWINGS :-

1. TAIL RACE OUTFALL POND-LAYOUT PLAN AND SECTIONS.....LAHEP-OFA3-S06 & S07 (SHEET 1 OF 3 & 2 OF 3))

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 3 OF 3

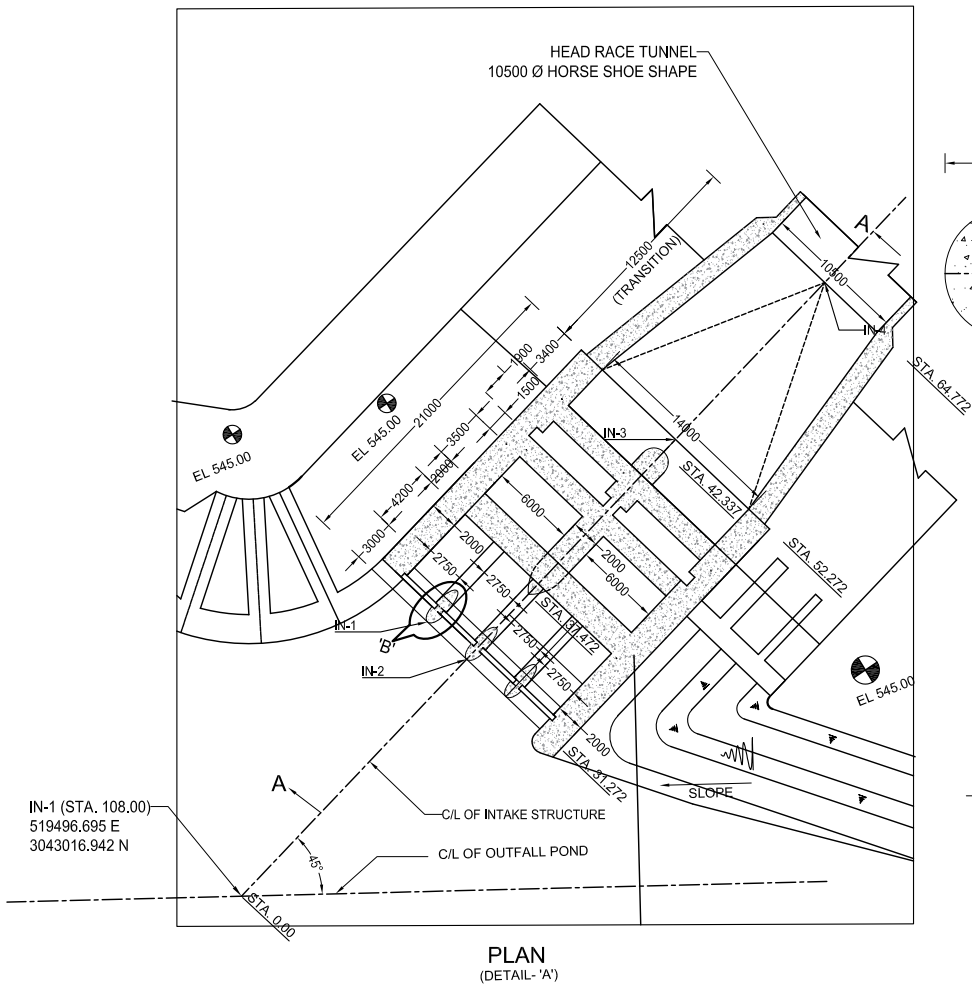
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

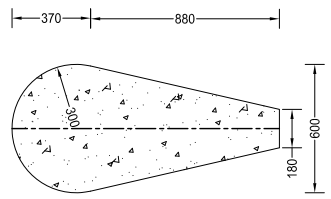
TAIL RACE OUTFALL POND
PATTERN REINFORCEMENT DETAILS

अभिकल्पित DSGN.	परिक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	पस्तुत SUBM.	अनुमोदित APPD.

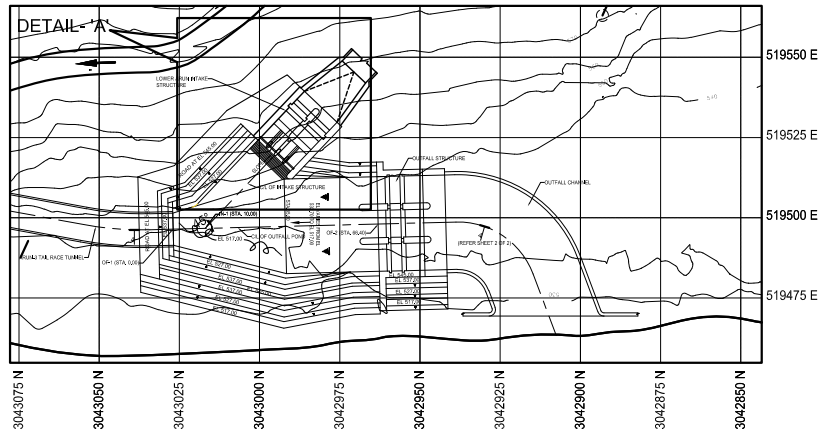
DRG.NO.LAHEP-OFA3-S08 | JANUARY, 2023



PLAN
(DETAIL- 'A')



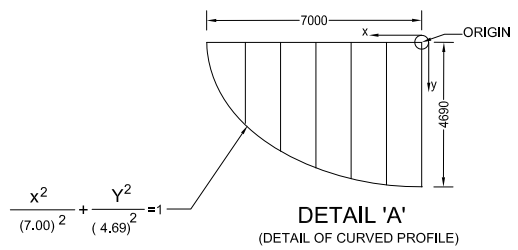
DETAIL 'C'



KEY PLAN

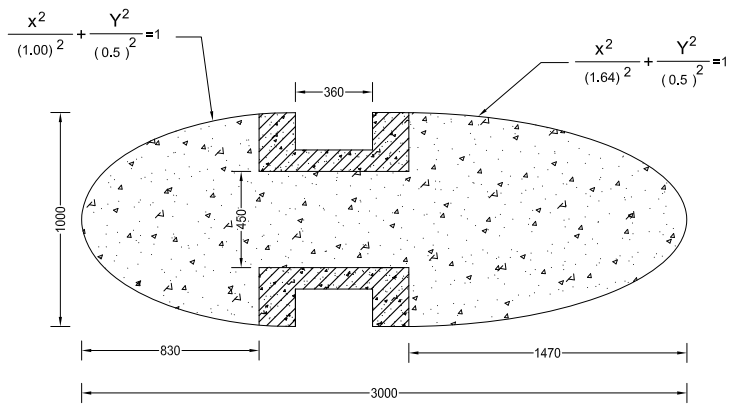
NOTE :-

1. ALL DIMENSIONS ARE IN MILLIMETRES, ELEVATIONS AND STATIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
2. NO DIMENSION SHALL BE SCALED OUT, ONLY WRITTEN DIMENSIONS TO BE TAKEN AS CORRECT.
3. M25 A20 IS:456 HAVING 28 DAYS CHARACTERISTIC COMPRESSIVE STRENGTH OF NOT LESS THAN 25N/mm2 SHALL BE USED FOR REINFORCED CONCRETE WORK.
4. HIGH YIELD STRENGTH DEFORMED BARS (GRADE Fe 500) CONFORMING TO IS: 1786 (LATEST REVISION) SHALL BE USED.
5. M30 A20 GRADE OF CONCRETE SHALL BE USED IN REGION AS SHOWN IN THE DRAWINGS.

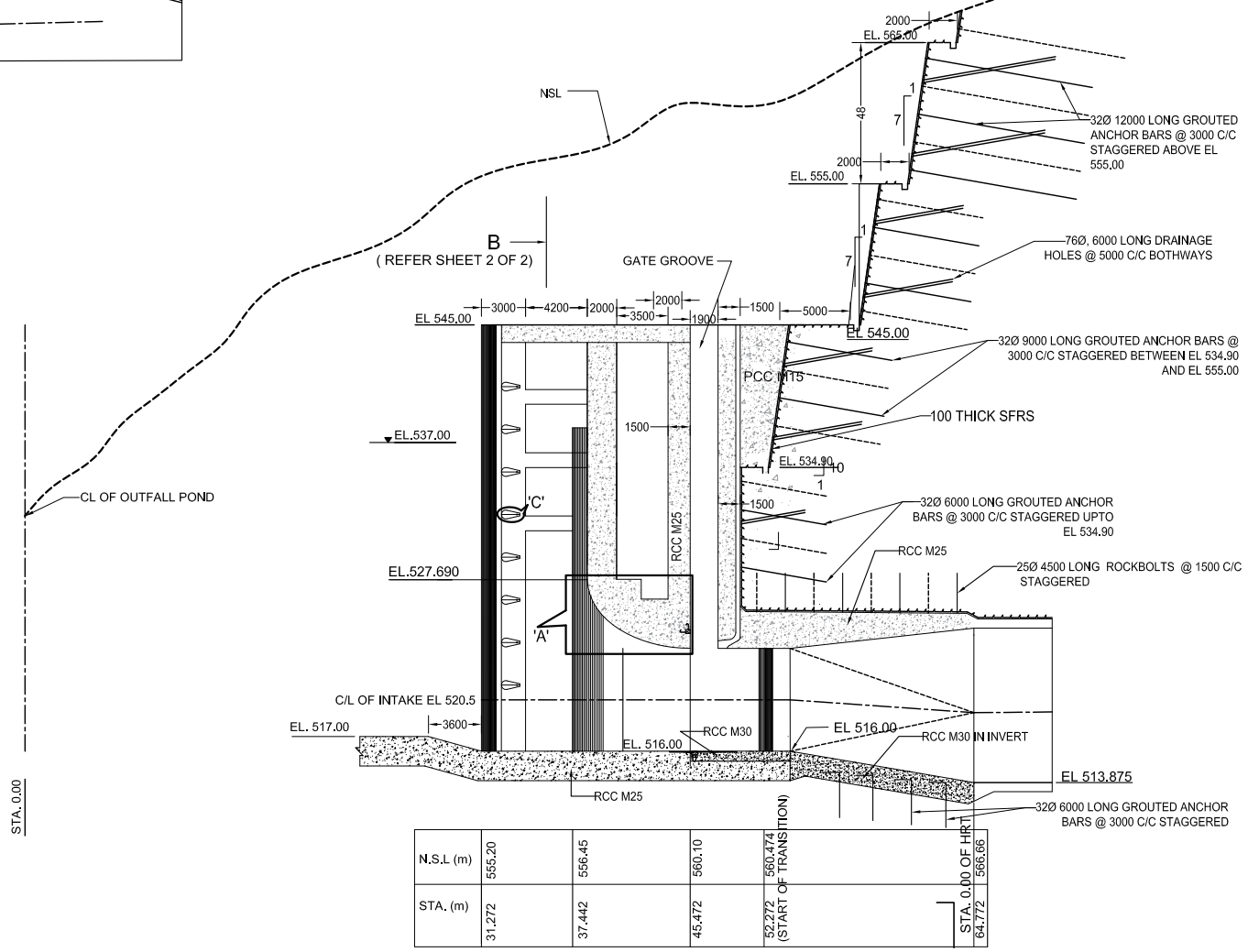


DETAIL 'A'
(DETAIL OF CURVED PROFILE)

CO-ORDINATES OF SOME IMPORTANT POINTS OF INTAKE			
S.N	POINTS	CO-ORDINATES	
		EASTING	NORTHING
1	IN-1	519515.863	3043012.678
2	IN-2	519514.364	3043009.241
3	IN-3	519533.615	3043000.850
4	IN-4	519547.366	3042994.856



DETAIL 'B'



SECTION A-A THROUGH C/L OF INTAKE

CONNECTED DRAWINGS :-

1. INTAKE STRUCTURE-LAYOUT PLAN AND SECTIONS (SHEET 2 OF 2) LAHEP-IN-S02

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 1 OF 2

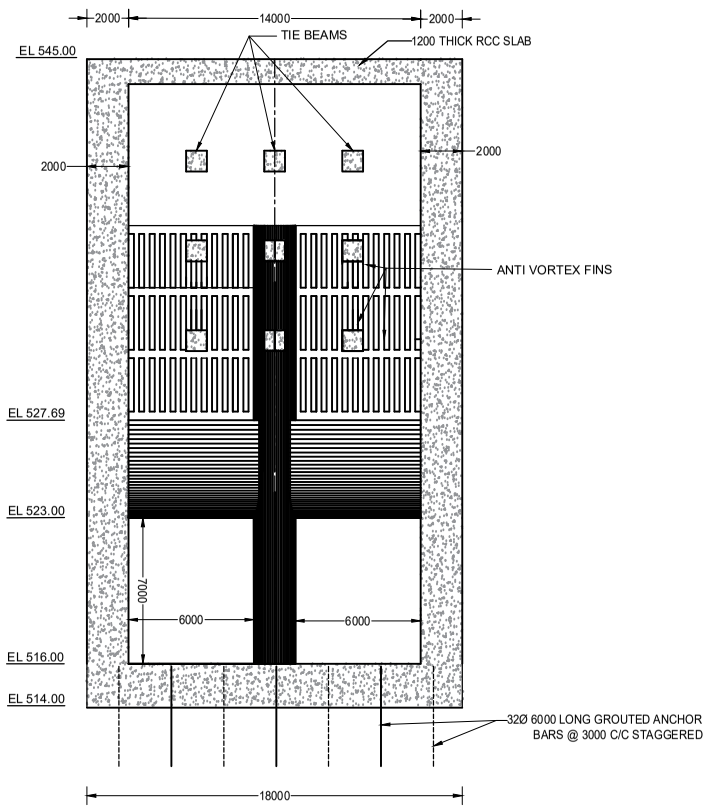
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

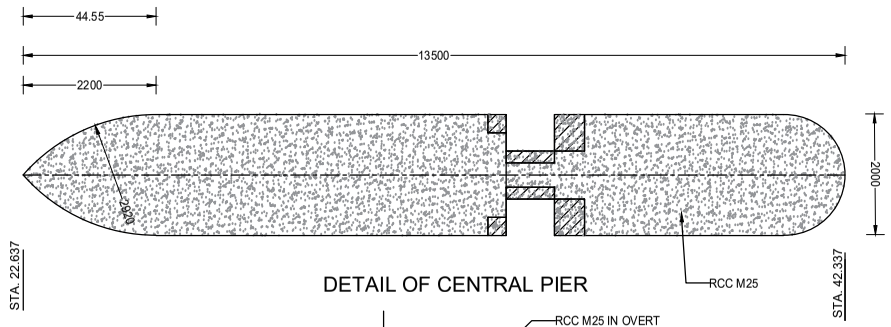
INTAKE STRUCTURE
LAYOUT PLAN AND SECTIONS

अभिकल्पित DSGN.	सविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

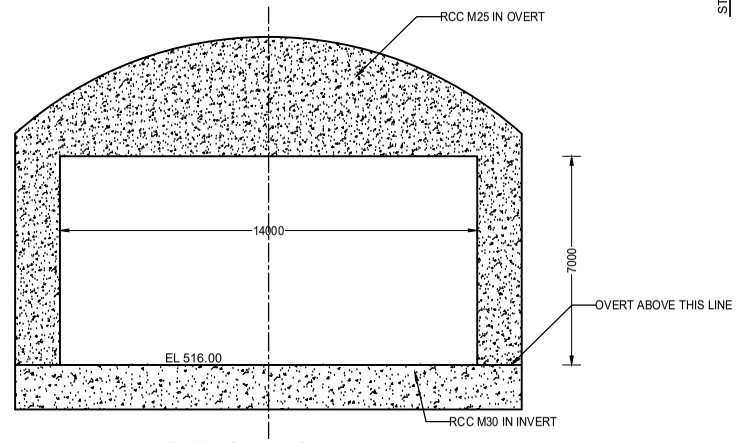
DRG.NO. LAHEP-IN-S01 | JANUARY, 2023



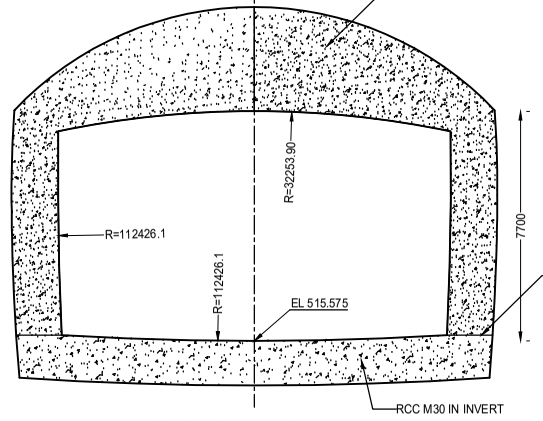
SECTION B-B



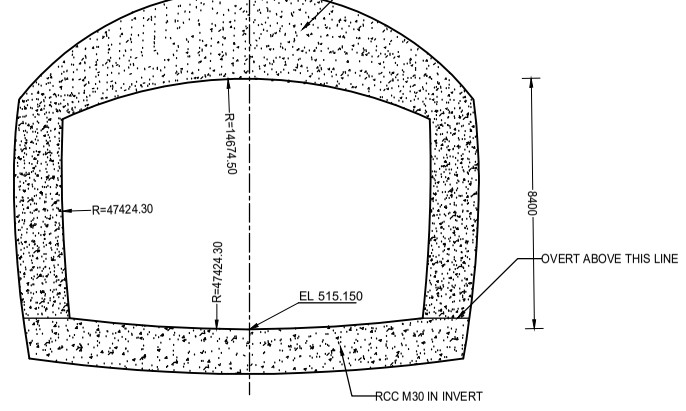
DETAIL OF CENTRAL PIER



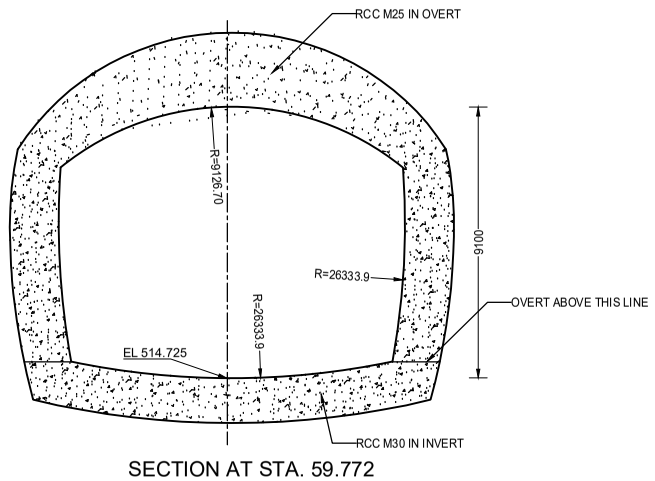
SECTION AT STA. 52.272



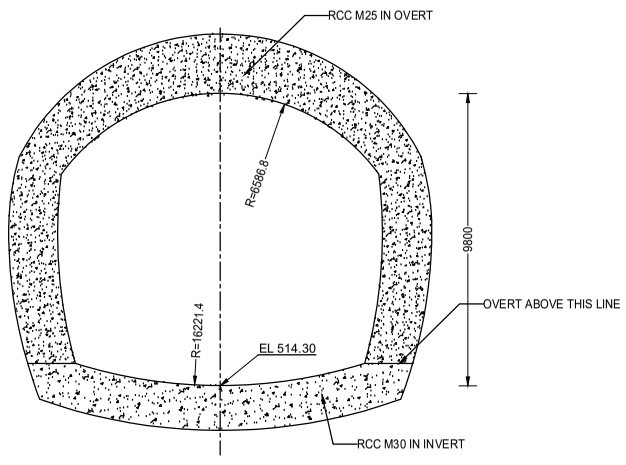
SECTION AT STA. 54.772



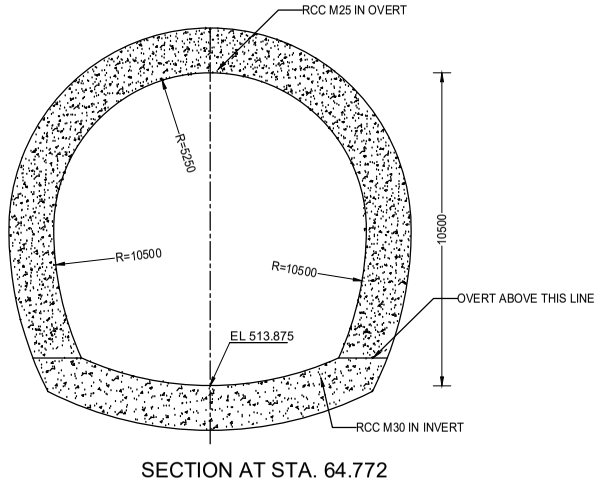
SECTION AT STA. 57.272



SECTION AT STA. 59.772



SECTION AT STA.62.272



SECTION AT STA. 64.772

CONNECTED DRAWINGS :-

1. INTAKE STRUCTURE-LAYOUT PLAN AND SECTIONS (SHEET 1 OF 2) LAHEP-IN-S01

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 2 OF 2

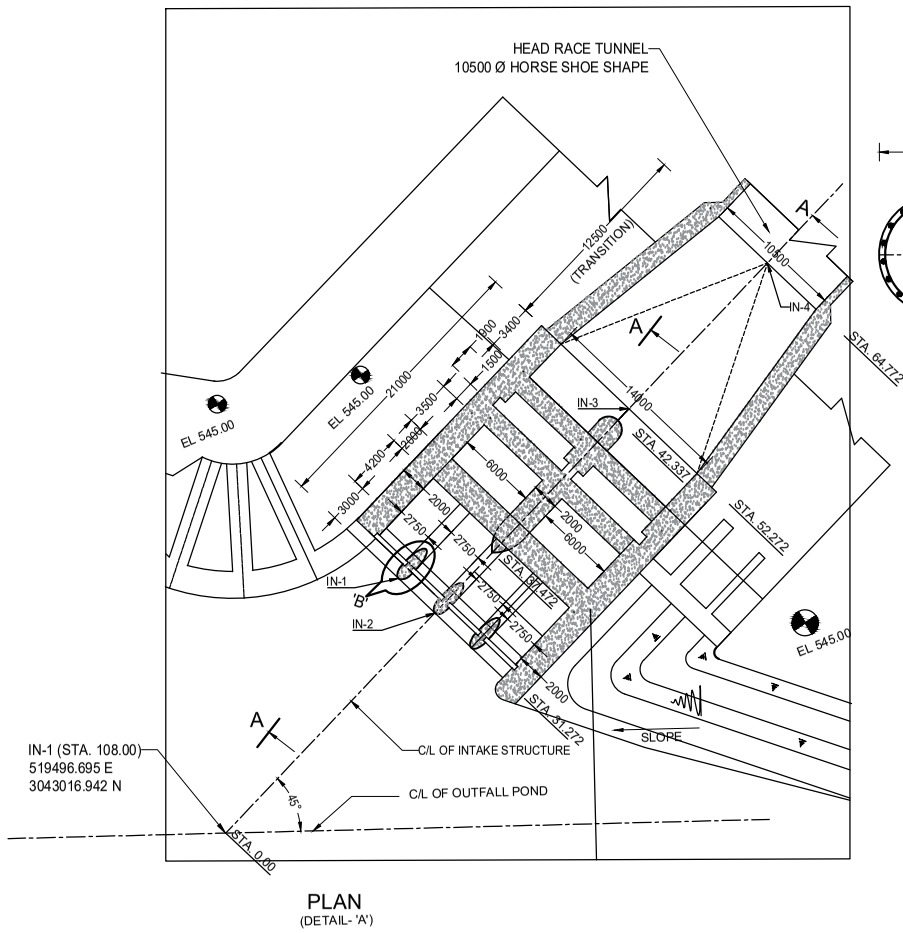
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

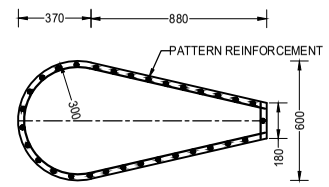
INTAKE STRUCTURE
LAYOUT PLAN AND SECTIONS

अभिकल्पित DSGN.	संविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	पस्तुत SUBM.	अनुमोदित APPD.

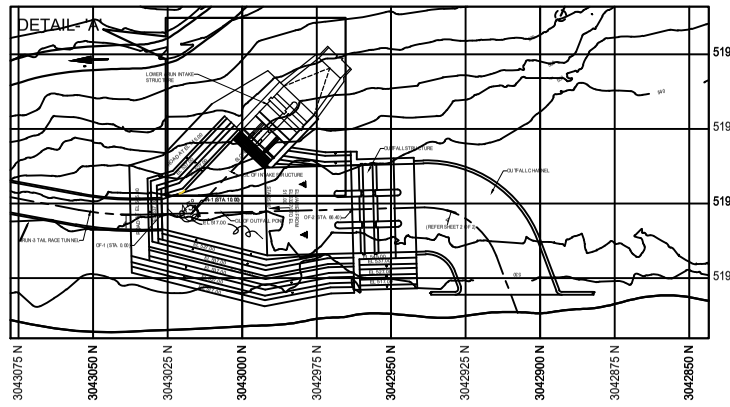
DRG.NO. LAHEP-IN-S02 | JANUARY , 2023



PLAN
(DETAIL- 'A')



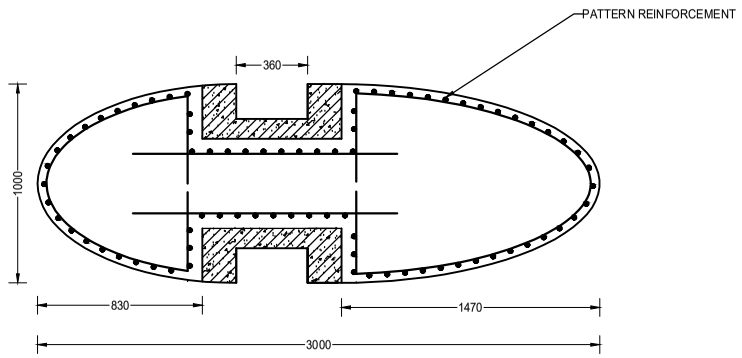
DETAIL 'C'



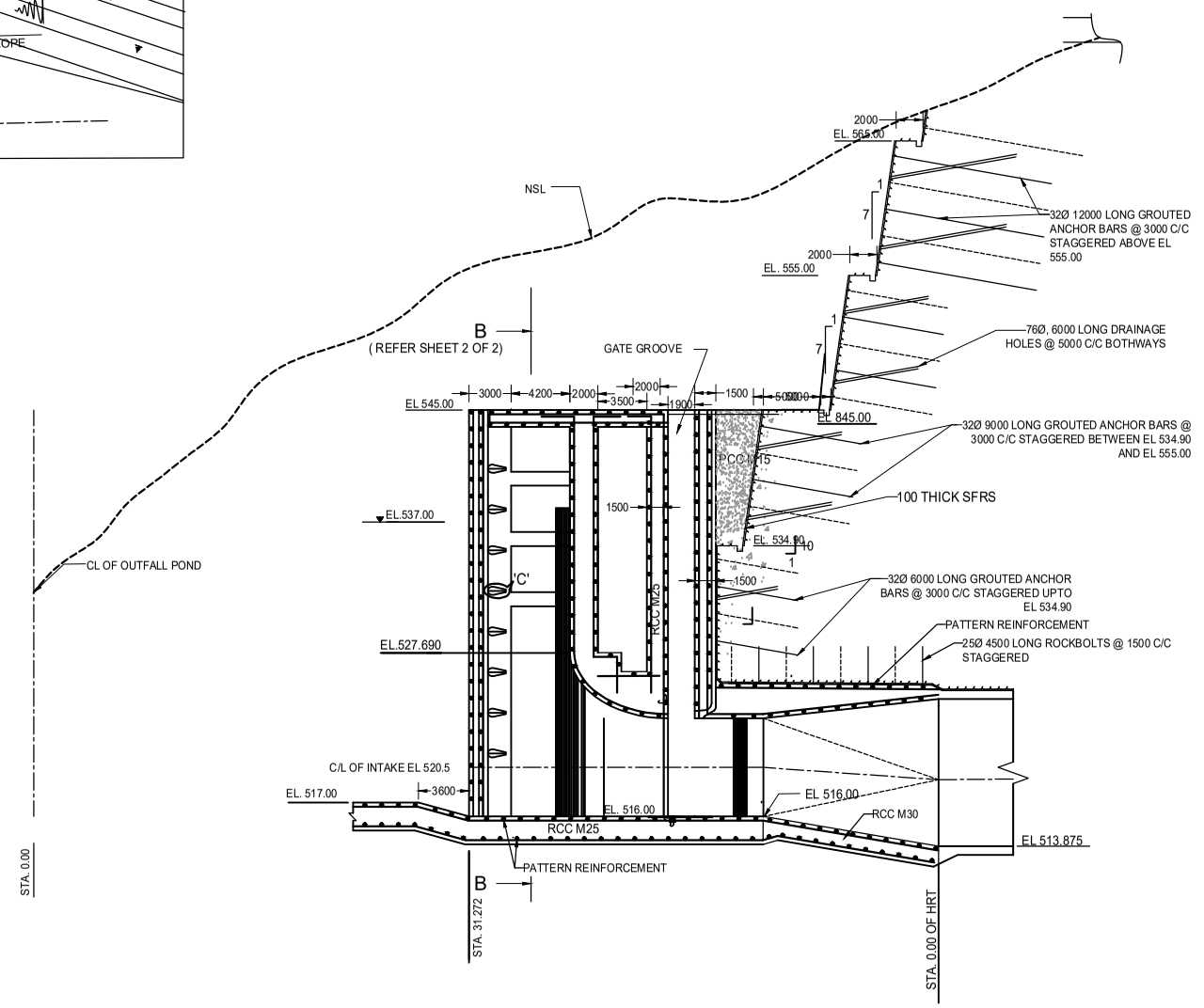
KEY PLAN

NOTE :-

1. ALL DIMENSIONS ARE IN MILLIMETRES, ELEVATIONS AND STATIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
2. NO DIMENSION SHALL BE SCALED OUT, ONLY WRITTEN DIMENSIONS TO BE TAKEN AS CORRECT.
3. M25 A20 IS:456 HAVING 28 DAYS CHARACTERISTIC COMPRESSIVE STRENGTH OF NOT LESS THAN 25N/mm2 SHALL BE USED FOR REINFORCED CONCRETE WORK.
4. HIGH YIELD STRENGTH DEFORMED BARS (GRADE Fe 500) CONFORMING TO IS: 1786 (LATEST REVISION) SHALL BE USED.
5. M30 A20 GRADE OF CONCRETE SHALL BE USED IN THE REGION AS SHOWN IN THE DRAWINGS.
6. MAINTENANCE PLATFORMS AT DIFFERENT ELEVATION (NOT SHOWN IN THIS DRAWING) IN THE INTAKE STRUCTURE SHALL BE AS PER DETAILED CONSTRUCTION DRAWINGS.



DETAIL 'B'



SECTION A-A THROUGH C/L OF INTAKE

CONNECTED DRAWINGS :-

1. INTAKE STURCTURE-LAYOUT PLAN AND SECTIONS (SHEET 2 OF 2) LAHEP-IN-S04

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 1 OF 2

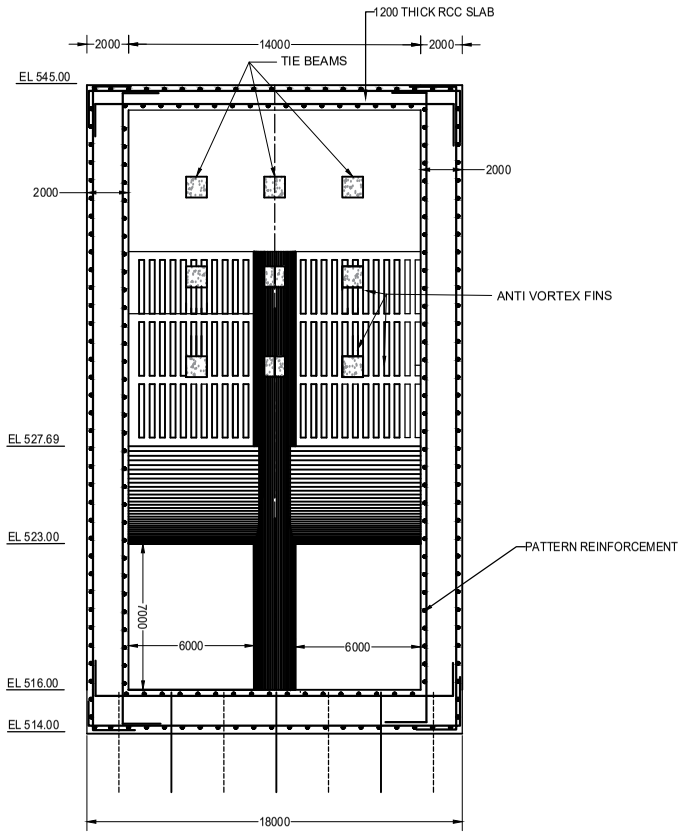
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

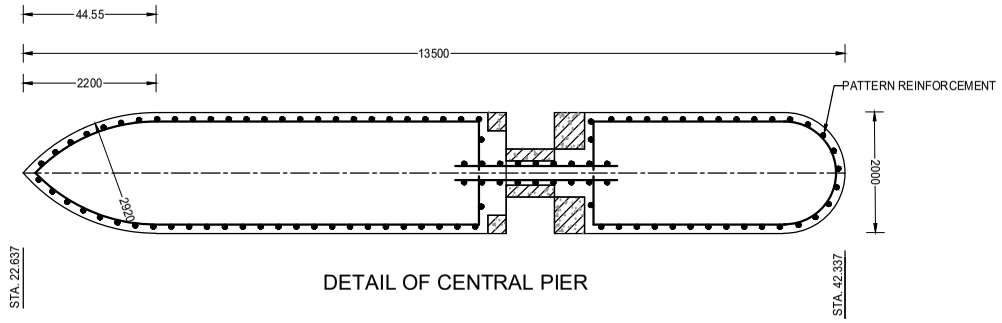
INTAKE STRUCTURE
PATTERN REINFORCEMENT

अभिकल्पित DSGN.	परिवित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

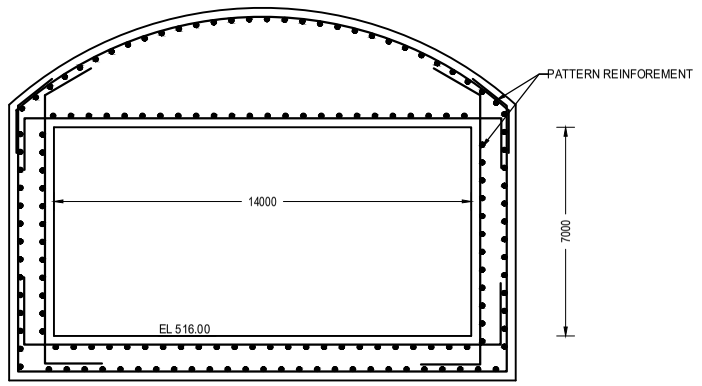
DRG.NO. LAHEP-IN-S03 | JANUARY, 2023



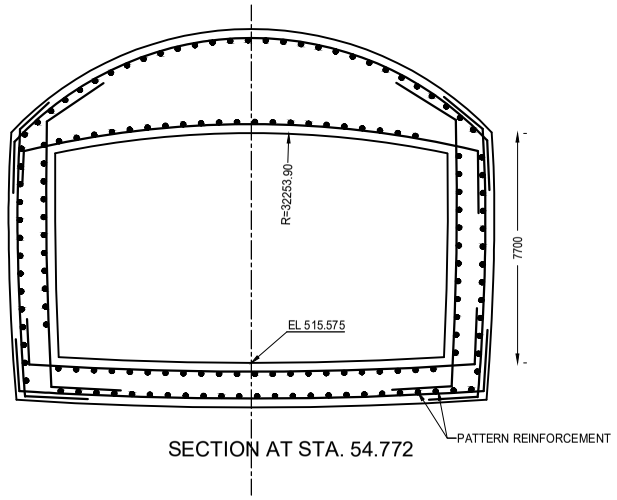
SECTION B-B



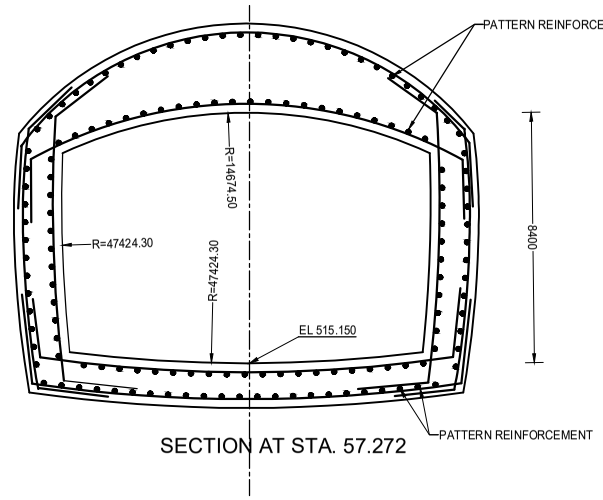
DETAIL OF CENTRAL PIER



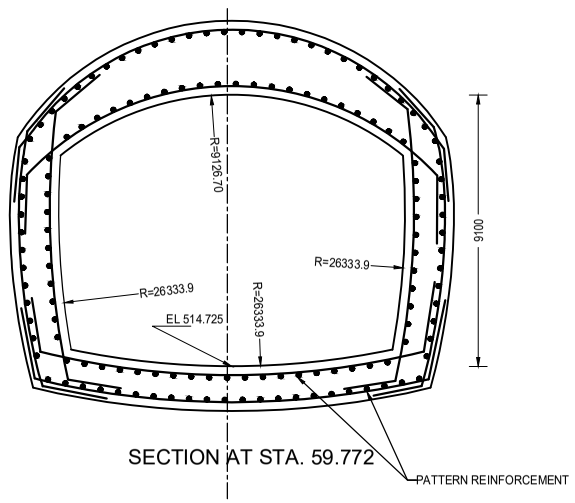
SECTION AT STA. 52.272



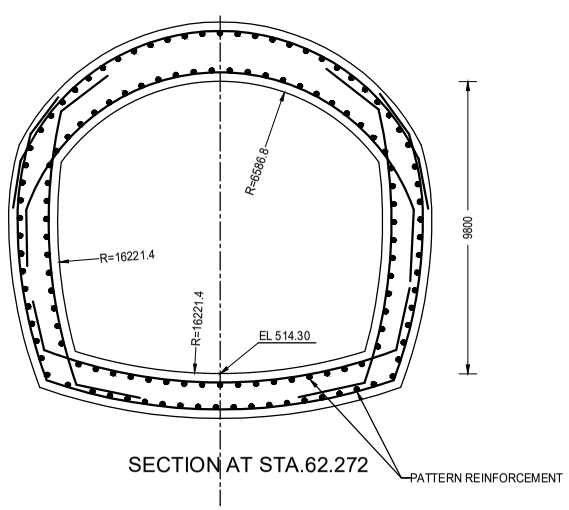
SECTION AT STA. 54.772



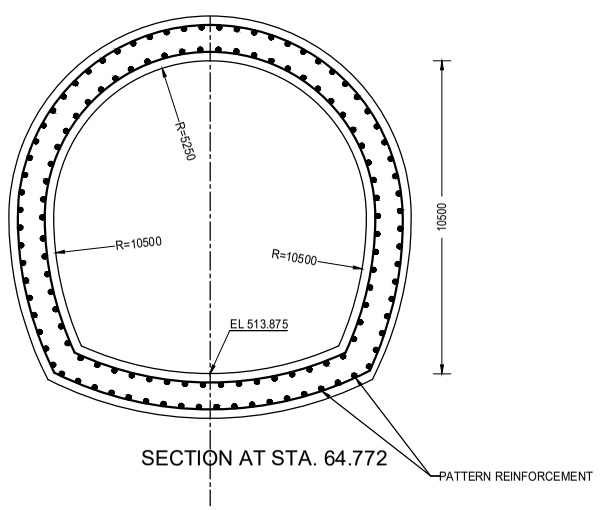
SECTION AT STA. 57.272



SECTION AT STA. 59.772



SECTION AT STA.62.272



SECTION AT STA. 64.772

CONNECTED DRAWINGS :-

1. INTAKE STRUCTURE-LAYOUT PLAN AND SECTIONS (SHEET 1 OF 2) LAHEP-IN-S03

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 2 OF 2

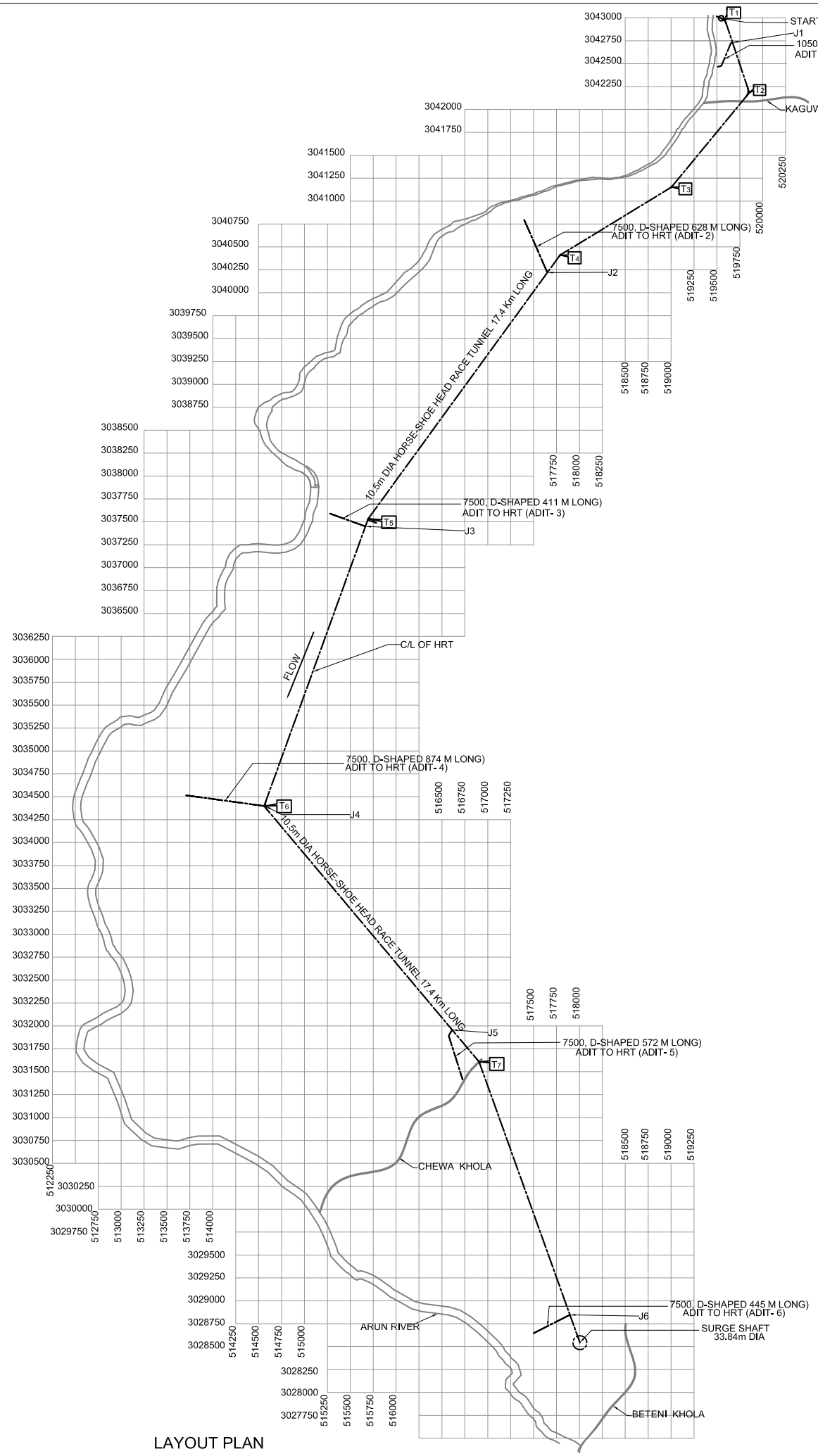
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

INTAKE STRUCTURE
PATTERN REINFORCEMENT

अभिकल्पित DSGN.	सविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APP'D.

DRG.NO. LAHEP-IN-S04 JANUARY , 2023



LAYOUT PLAN

NOTE :-

1. ALL DIMENSIONS ARE IN MILLIMETRES & ELEVATIONS AND STATIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED
2. NO DIMENSION IS TO BE SCALED OUT ONLY WRITTEN DIMENSIONS TO FOLLOWED
3. T1,T2,T3,T4,T5,T6 & T7 ARE VERTEX POINTS OF CURVES.
4. THE TUNNEL INVERT LEVELS ALONG THE HEAD RACE TUNNEL ARE FINISHED LEVELS.
5. THE ACCESS GATE FOR EMERGENCY INSPECTION OF H.R.T HAS BEEN PROVIDED THROUGH ADIT-3
6. CO-ORDINATES OF JUNCTION POINTS OF THE ADITS WITH HRT ARE FOR THE INTERSECTION POINTS OF THE CENTRE LINES

TABLE-1

SLOPE & LEVELS ALONG HEAD RACE TUNNEL

STATION		SLOPE	ELEVATION FINISHED (M) (TIL)
FROM (M)	TO (M)		
0.000 (START POINT OF HRT)	300.000 Adit -1/Spill Tunnel	1:273.28	513.875 (START OF HRT)
300.000 Adit -1/Spill Tunnel	3860.943 Adit-2	1:273.28	512.777 Adit -1/Spill Tunnel
3860.943 Adit-2	7272.307 Adit-3	1:273.28	499.747 Adit-2
7272.307 Adit-3	10516.306 Adit-4	1:273.28	487.263 Adit-3
10516.306 Adit-4	13697.401 Adit-5	1:273.28	475.393 Adit-4
13697.401 Adit-5	17085.148 Adit-6	1:156.25	463.752 Adit-5
17085.148 Adit-6	17408.592 (C/L OF SS)	1:156.25	442.070 Adit-6

TABLE-2

ADIT DETAILS OF HEAD RACE TUNNEL

ADIT	DIAMETER (M)	SHAPE	LENGTH (M)
ADIT -1	10.5	HORSE SHOE	328
ADIT -2	7.5	D- SHAPE	629
ADIT -3	7.5	D- SHAPE	411
ADIT -4	7.5	D- SHAPE	874
ADIT -5	7.5	D- SHAPE	572
ADIT -6	7.5	D- SHAPE	445

TABLE-3

CO-ORDINATES OF IMPORTANT POINTS ALONG HRT

S.N	POINTS	CO-ORDINATES	
		EASTING	NORTHING
1	START OF HRT	519547.366	3042994.856
2	J-1	519670.904	3042729.826
3	J-2	517650.423	3040220.393
4	J-3	515665.201	3037450.138
5	J-4	514575.592	3034397.694
6	J-5	516612.120	3031956.321
7	J-6	517896.203	3028847.559
8	C/L OF SURGE SHAFT	518005.479	3028543.133

TABLE-4

CO-ORDINATES OF VERTEX POINTS

S.N	POINTS	CO-ORDINATES	
		EASTING	NORTHING
1	T1	519588.235	3042977.043
2	T2	519853.851	3042182.735
3	T3	519004.279	3041152.499
4	T4	517788.566	3040410.239
5	T5	515695.530	3037533.835
6	T6	514559.585	3034399.019
7	T7	516905.703	3031606.931

LEGEND :

C/L = CENTRE LINE
T.I.L. = TUNNEL INVERT LEVEL
STA. = STATION
SS = SURGE SHAFT
J = POINT OF INTERSECTION OF C/L OF ADIT & HRT
T = VERTEX POINT OF CURVE

CONNECTED DRAWINGS :

1. HEAD RACE TUNNEL LAYOUT PLAN & L-SECTION (SHEET 2 OF 2) ...LAHEP-HT-S02

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 1 OF 2

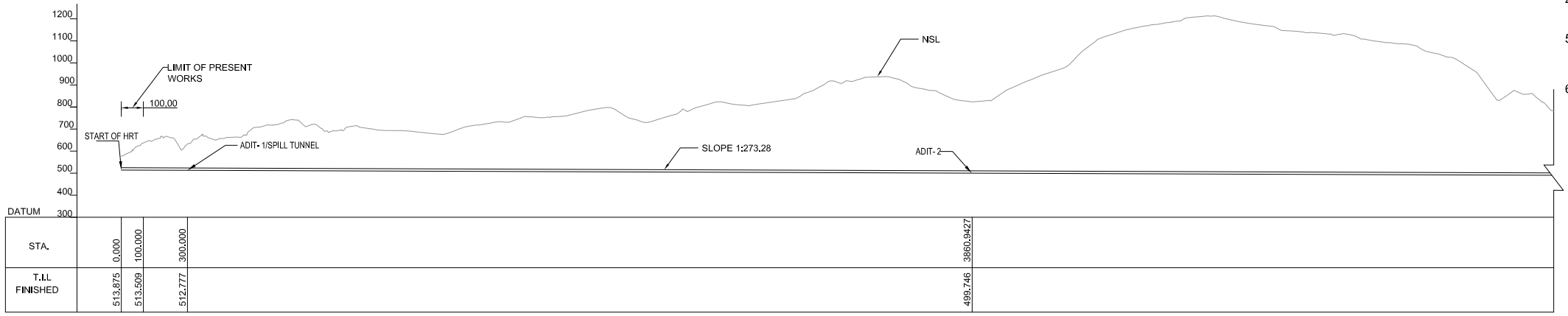
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

HEAD RACE TUNNEL
LAYOUT PLAN & L- SECTION

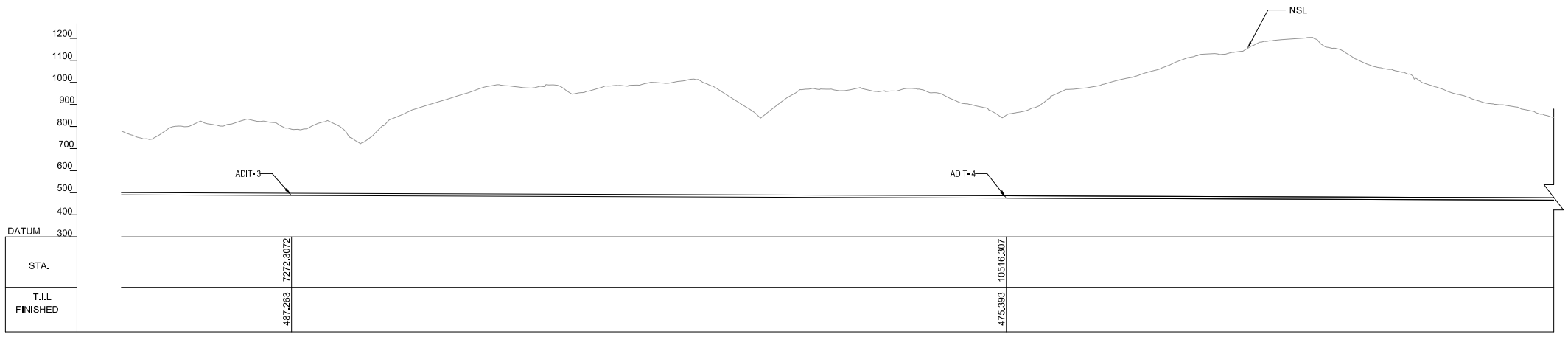
अभिकल्पित DSGN.	सविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-HT-S01 | JANUARY, 2023



NOTE :-

1. ALL DIMENSIONS ARE IN MILLIMETRES & ELEVATIONS AND STATIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION IS TO BE SCALED OUT ONLY WRITTEN DIMENSIONS TO BE FOLLOWED.
3. FOR TYPICAL SECTION OF H.R.T REFER SEPERATE DRAWING.
4. THE TUNNEL INVERT LEVELS ALONG THE HEAD RACE TUNNEL ARE FINISHED LEVELS.
5. THE SLOPE IN INVERT IN HRT FROM STA.0.000 TO STA.13697.401 IS 1:273.28 AND FROM STA. 13697.401 TO THE END OF HRT IS 1: 156.25.
6. THE ACCESS GATE FOR THE EMERGENCY INSPECTION OF H.R.T HAS BEEN PROVIDED THROUGH ADIT-3.



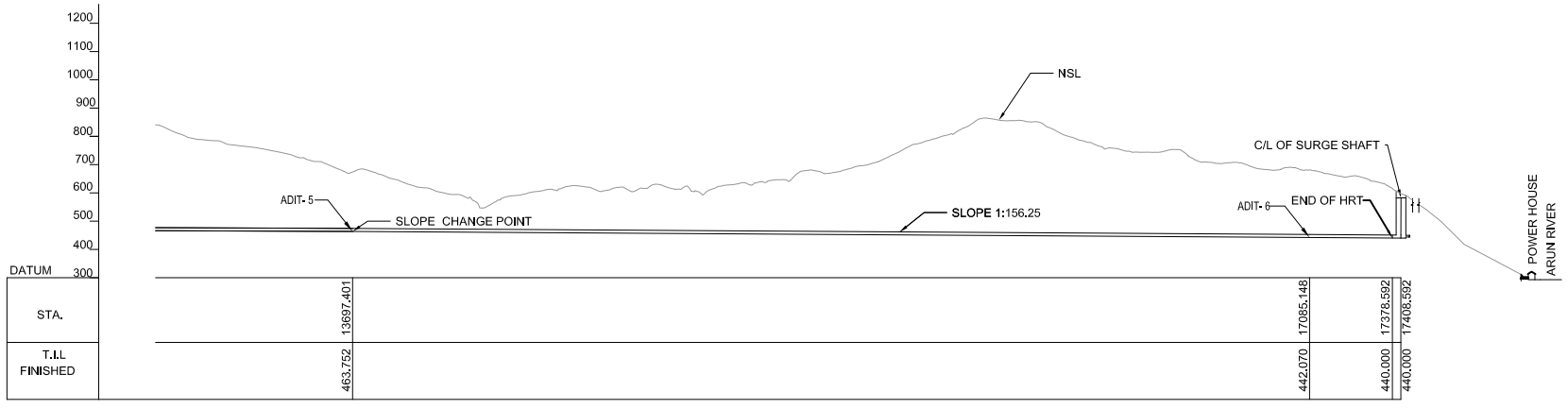
LEGEND :

C/L=CENTRE LINE
T.I.L.=TUNNEL INVERT LEVEL
STA.= STATION

CONNECTED DRAWINGS :

1. HEAD RACE TUNNELLAYOUT PLAN & L-SECTION (SHEET 1 OF 2)....LAHEP-HT-S01

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION



SHEET 2 OF 2

एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरुण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

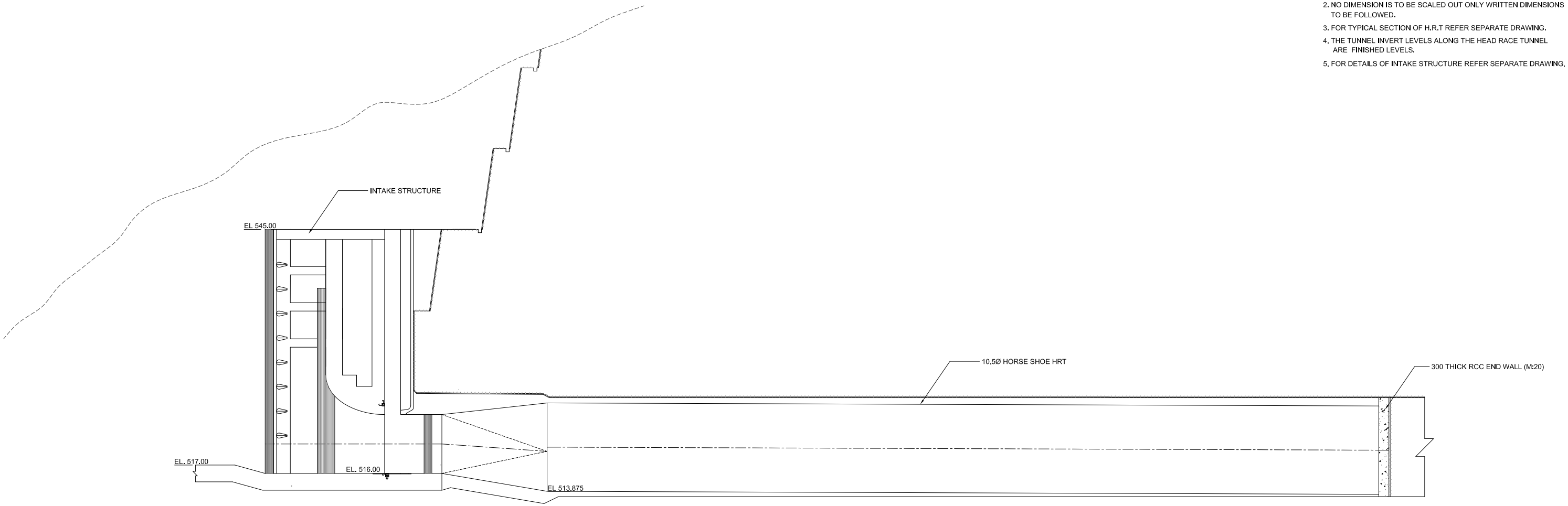
HEAD RACE TUNNEL LAYOUT PLAN & L- SECTION

अभिकल्पित DSGN.	संविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-HT-S02 | JANUARY, 2023

NOTE :-

1. ALL DIMENSIONS ARE IN MILLIMETRES & ELEVATIONS AND STATIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION IS TO BE SCALED OUT ONLY WRITTEN DIMENSIONS TO BE FOLLOWED.
3. FOR TYPICAL SECTION OF H.R.T REFER SEPARATE DRAWING.
4. THE TUNNEL INVERT LEVELS ALONG THE HEAD RACE TUNNEL ARE FINISHED LEVELS.
5. FOR DETAILS OF INTAKE STRUCTURE REFER SEPARATE DRAWING.



STA.	0.000		100.000
T.I.L FINISHED	513.875		513.509

EXTENT OF HRT IN PACKAGE-I

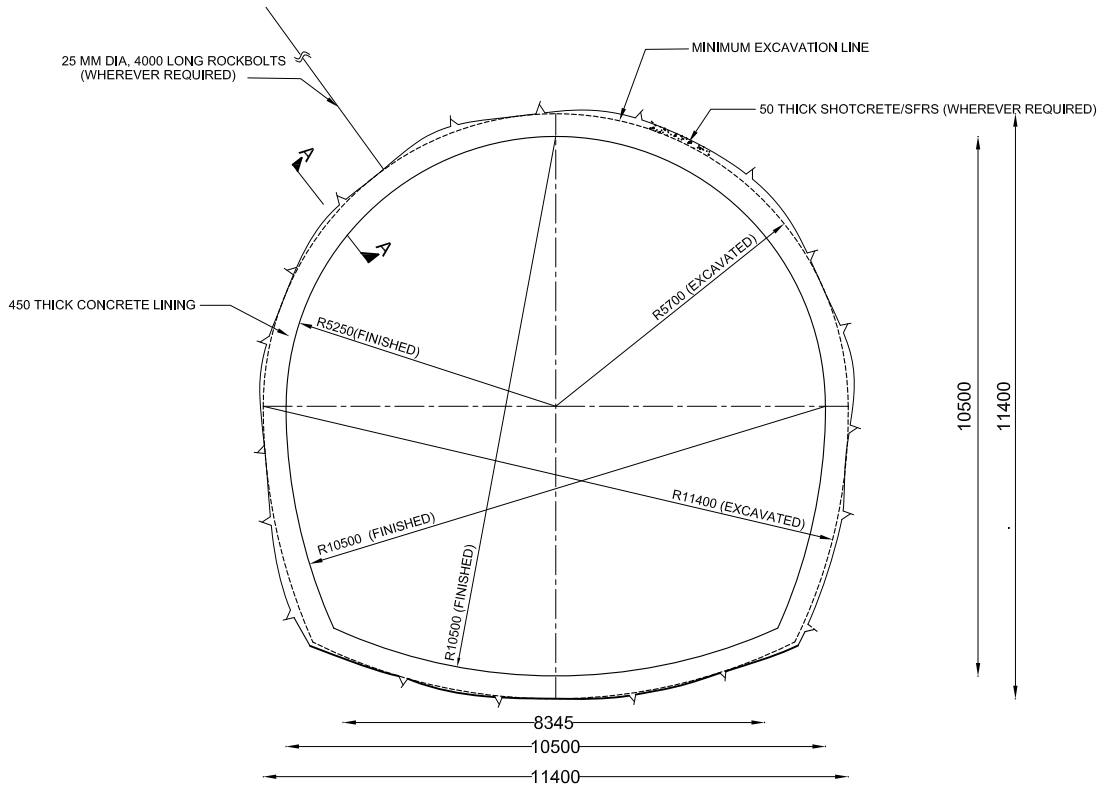
SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

एसजेवीएन लिमिटेड
SJVN LIMITED

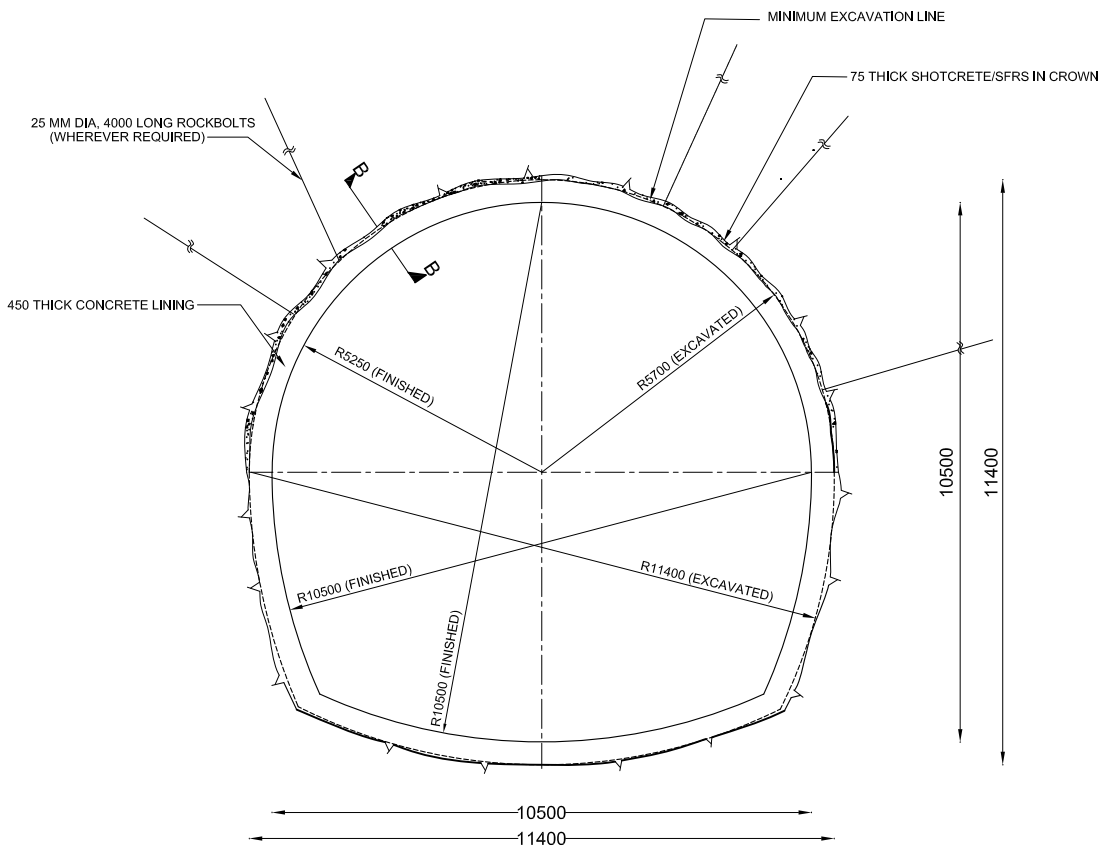
लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

HEAD RACE TUNNEL
(STA.0.00 TO 100.00)
L- SECTION THROUGH INTAKE

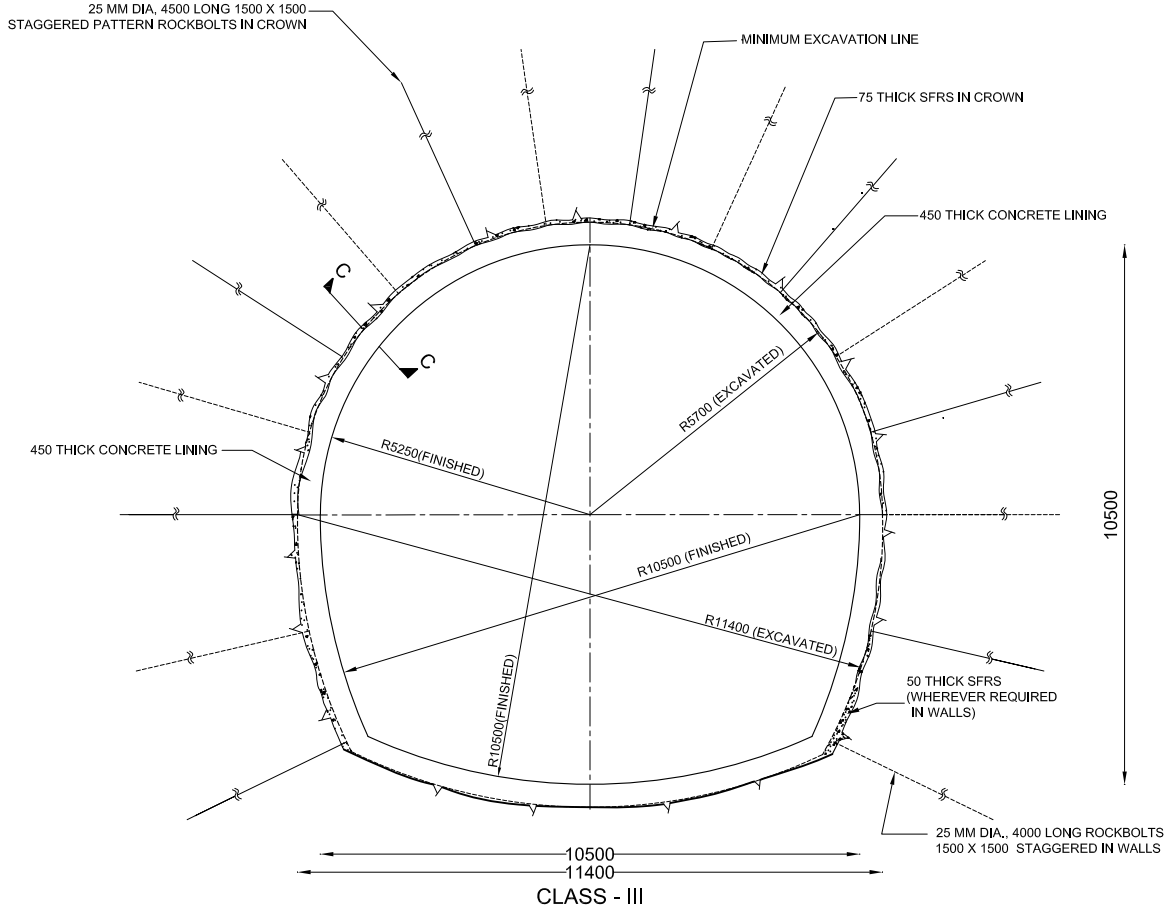
अभिकल्पित DSGN.	परिक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.
DRG.NO. LAHEP-HT-S03		JANUARY, 2023



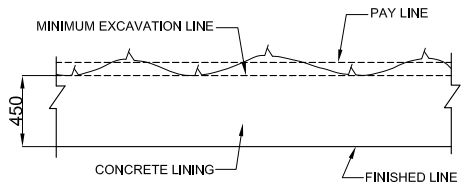
CLASS - I
VERY GOOD ROCK



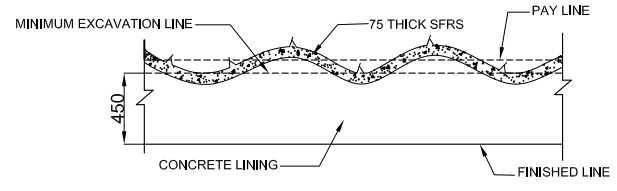
CLASS - II
GOOD ROCK



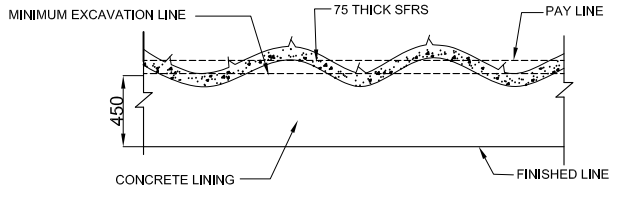
CLASS - III
FAIR ROCK
(REFER NOTE:14)



SECTION A-A
(ROCK BOLTS NOT SHOWN)



SECTION B-B
(ROCK BOLTS NOT SHOWN)



SECTION C-C
(ROCK BOLTS NOT SHOWN)

NOTE:-

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED
2. NO DIMENSION SHALL BE SCALED OUT ONLY WRITTEN DIMENSIONS ARE TO BE TAKEN AS CORRECT.
3. THE TYPICAL SECTIONS SHOWN REPRESENT THE EXCAVATION AND PRIMARY SUPPOERT MEASURES TO BE PROVIDED IN THE EXCAVATION STAGE FOR 10.5M DIA (FINISHED) HORSE SHOE SHAPED TUNNEL.
4. BLOCKING AND WEDGES USED TO INITIALLY SET THE STEEL RIB MAY BE STEEL OR CONCRETE BLOCKS.
5. THE DISTANCE BETWEEN BLOCKING POINTS SHALL NOT BE MORE THAN 1.2M
6. THE LENGTH, SPACING AND INCLINATION OF ROCK BOLTS ARE INDICATIVE ONLY AND MAY BE MODIFIED TO SUIT SITE CONDITION/JOINT PATTERN OF ROCK.
7. SFRS PROVIDED DURING EXCAVATION SHALL BE THE PART OF PERMANENT LINING.
8. PAYLINE FOR UNDERGROUND EXCAVATION SHALL BE 100MM BEYOND MINIMUM EXCAVATION LINE FOR ALL ROCK CLASSES.
9. AT JUNCTION REACHES WITH ADITS, THE EXCAVATED SECTION TO BE ADOPTED SHALL BE DECIDED BY THE ENGINEER-INCHARGE DEPENDING UPON THE SITE CONDITIONS. THE JUNCTION REACH SHOULD BE 60M I.e. 30M UPSTREAM AND 30M DOWNSTREAM FROM THE MEETING POINT OF CENTERLINE OF THE ADIT WITH THE CENTERLINE OF TUNNEL.
10. DRAINAGE HOLES ARE NOT SHOWN IN THE DRAWING. NECESSARY MEASURES (76 MM DIA 5000 LONG DRAIN HOLES) OF EXCAVATED SURFACE SHALL BE DIRECTED BY THE ENGINEER.
11. STEEL LAGGING AS PER PROVISIONS OF TECHNICAL SPECIFICATION MAY BE REQIRED.
12. THE SEGMENT OF STEEL RIBS SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND MAY BE ALTERED DURING CONSTRUCTION AFTER APPROVAL OF ENGINEER INCHARGE.
13. PERFO BOLTS, EXPANSION SHALL TYPE BOLTS, RESIN/CEMENT GROUTED ROCK BOLTS SHALL BE USED AS DETERMINED BY THE ENGINEER INCHARGE AS PER THE ROCK CONDITIONS.
14. IN CLASS-III ADDITIONAL 32Ø, 6M LONG ROCK BOLTS MAY BE PROVIDED IN THE UPPER 180° OF TUNNEL SECTION WHEREVER REQUIRED AS PER DIRECTION OF ENGINEER INCHARGE.

CONNECTED DRAWINGS :

1. HEAD RACE TUNNEL EXCAVATION AND SUPPORT DETAILS ROCK CLASS I TO V (SHEET 2 OF 2) LAHEP-HT-S05

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 1 OF 2

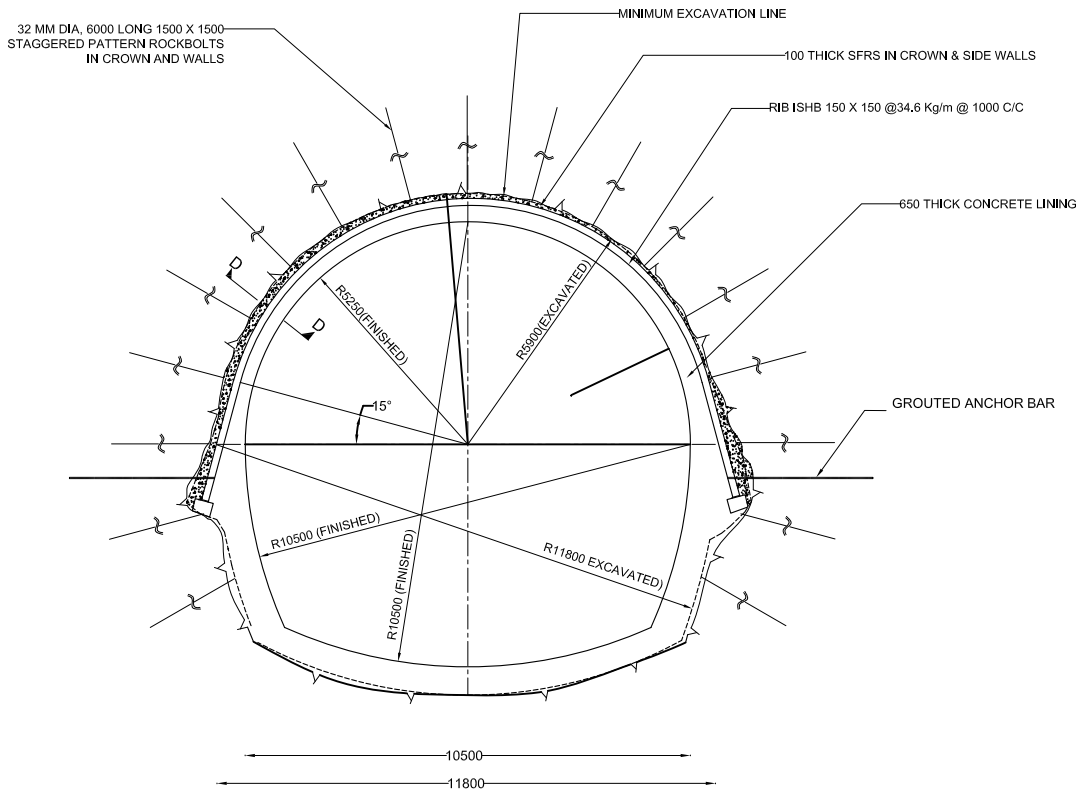
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

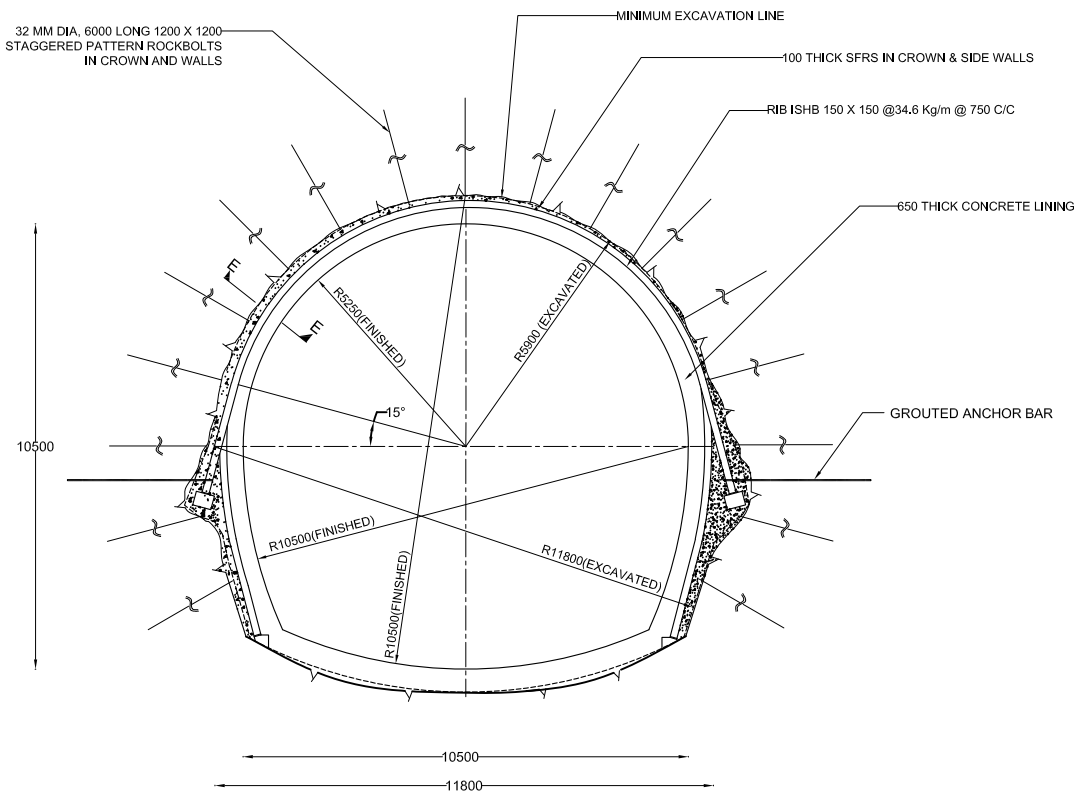
HEAD RACE TUNNEL
(STA.0.00 TO STA.100.00)
EXCAVATION AND SUPPORT DETAILS
FOR ROCK CLASS I TO V

अभिकल्पित DSGN.	संविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-HT-S04 | JANUARY, 2023



CLASS - IV
POOR ROCK

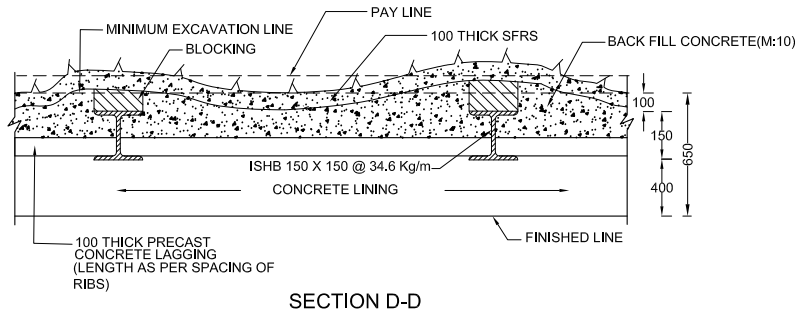


CLASS - V
VERY POOR ROCK

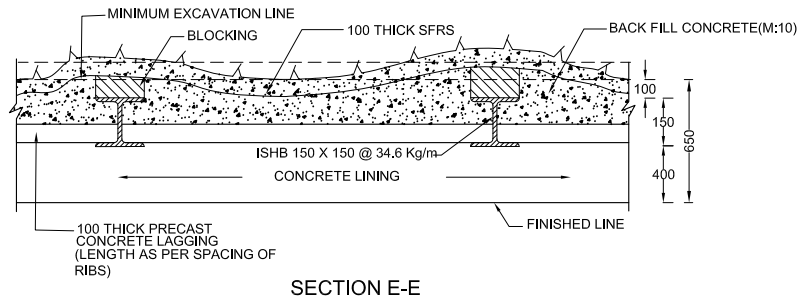
CONNECTED DRAWINGS :

1. HEAD RACE TUNNEL EXCAVATION AND SUPPORT DETAILS
   ROCK CLASS I TO V (SHEET 1 OF 2) ...LAHEP-HT -S04

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION



SECTION D-D
(ROCKBOLTS NOT SHOWN)



SECTION E-E
(ROCKBOLTS NOT SHOWN)

SHEET 2 OF 2

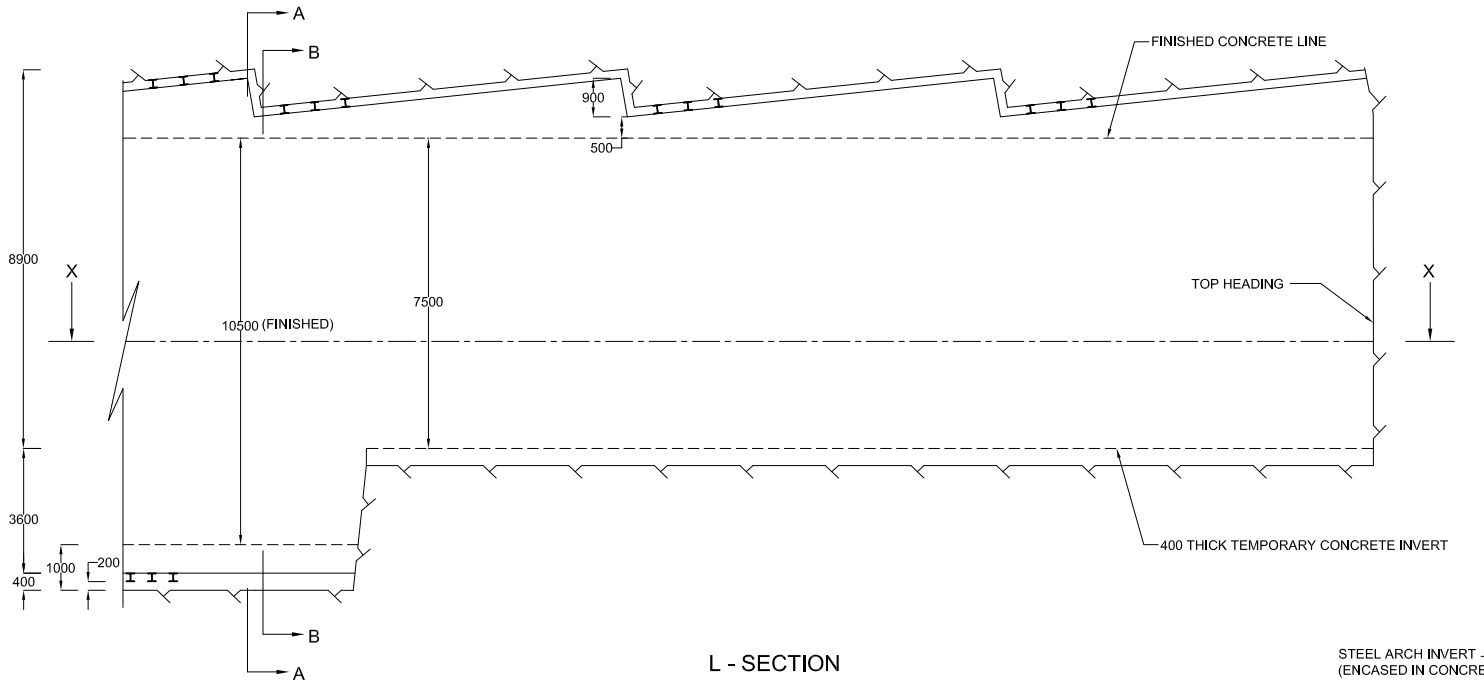
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

HEAD RACE TUNNEL
(STA.0.00 TO STA 100.00)
EXCAVATION AND SUPPORT DETAILS FOR ROCK CLASS I TO V

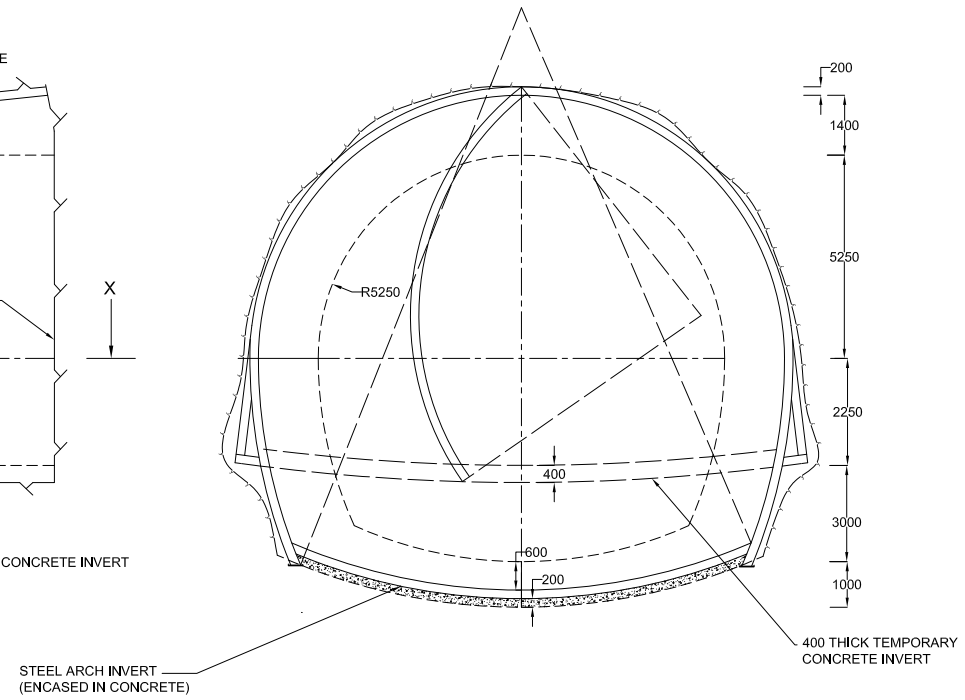
अभिकल्पित DSGN.	सविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-HT-S05 | JANUARY, 2023



L - SECTION

ALTERNATIVE -1(a)
(SHOWING EXCAVATION PROFILE)



SECTION A-A (MAXIMUM)

ALTERNATIVE -1(a)
(SHOWING DIMENSIONS ONLY)

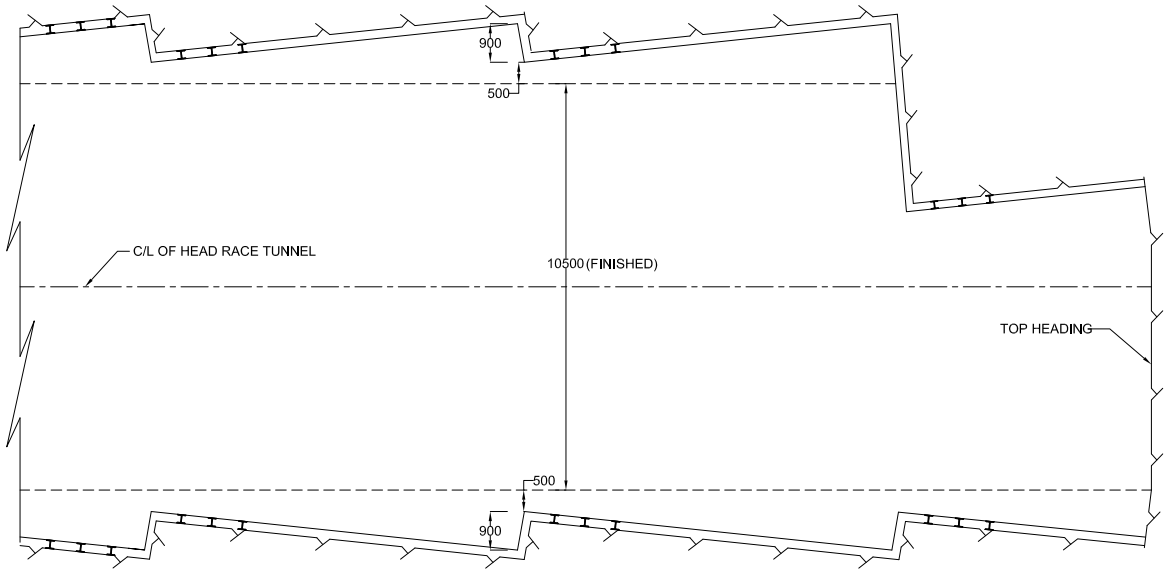
NOTE :-

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SPECIFIED OTHERWISE.
2. DIMENSIONS ARE NOT TO BE SCALED OUT. ONLY WRITTEN DIMENSIONS ARE TO BE TAKEN AS CORRECT.
3. THIS SET OF DRAWINGS SHOWS THE EXCAVATION AND SUPPORT DETAILS AS AN ALTERNATIVE - 1 WITH THREE OPTIONS i.e. 1(a), 1(b) AND 1(c) TO BE ADOPTED IN EXTREMELY POOR ROCK CLASS.
4. THESE ALTERNATIVES ARE TO BE APPLIED AS PER THE GSI VALUES (TABLE-1) & AS PER ACTUAL SITE CONDITIONS AND MAY NOT BE NECESSARY IN THE ENTIRE REACH.
5. THE EXCAVATED SECTIONS VARY FROM MINIMUM SECTION TO MAXIMUM SECTION IN ALTERNATIVE 1(a) AND 1(b). THE EXCAVATED SECTION REMAINS CONSTANT IN ALTERNATIVE 1(c).
6. IN SOME REACHES ALL THE SUPPORTING MEASURES AS SHOWN IN THE TABLE 2 ON SHEET 2 OF 4 MAY NOT BE NECESSARY, AND BE DROPPED FROM THE SEQUENCE AS PER SITE CONDITION.
7. PAYLINE FOR UNDERGROUND EXCAVATION SHALL BE 100 mm BEYOND MINIMUM EXCAVATION LINE FOR ALL ROCK CLASSES
8. THE EXCAVATION SHALL ADVANCE AS DIRECTED BY THE ENGINEER-IN-CHARGE.
9. THE EXCAVATED SECTION SHALL BE LOGGED GEOLOGICALLY AFTER THE BLAST AS SOON AS POSSIBLE AND 3-D LOGS PREPARED. A PROBE HOLE 30m MAY BE DRILLED AFTER EVERY 20m TO ASCERTAIN THE GEOLOGY AHEAD.
10. PROPER CARE SHALL BE TAKEN DURING THE EXCAVATION BY CONTROLLED BLASTING OR BY HYDRAULIC HAMMERING TECHNIQUE TO ENSURE MINIMUM FRACTURE OF ROCKS BEYOND THE MINIMUM FRACTURE LINE.
11. ROCK BOLTS DIRECTION IS INDICATIVE ONLY AND MAY BE SUITABLY MODIFIED BY THE ENGINEER-IN-CHARGE AS PER THE SITE CONDITIONS.
12. IF REQUIRED THE EXCAVATED SECTIONS MAY BE REDUCED AS PER THE ACTUAL SITE CONDITIONS.
13. IN SOME REACHES ALL STEPS MENTIONED IN THE SEQUENCE MAY NOT BE ESSENTIAL AND MAY BE DROPPED FROM THE SEQUENCE AS PER THE SITE CONDITIONS AND AS DIRECTED BY THE ENGINEER-IN-CHARGE.

TABLE - 1	
GSI VALUES	TYPE OF SUPPORT
LESS THAN 15	ALTERNATIVE 1(a)
15 TO 35	ALTERNATIVE 1(b)
35 TO 45	ALTERNATIVE 1(c)

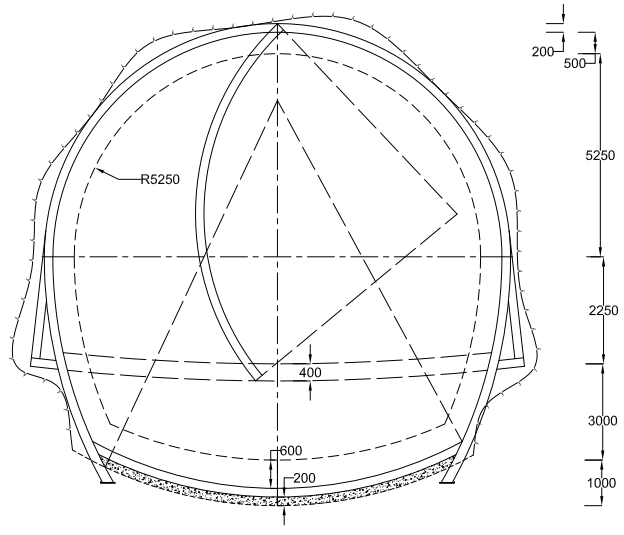
CONNECTED DRAWINGS :

1. HEAD RACE TUNNEL
   EXCAVATION AND SUPPORT DETAILS
   EXTREMELY POOR ROCK (SHEET 2 OF 4) ..LAHEP-HT-S07
2. HEAD RACE TUNNEL
   EXCAVATION AND SUPPORT DETAILS
   EXTREMELY POOR ROCK (SHEET 3 OF 4) ..LAHEP-HT-S08
3. HEAD RACE TUNNEL
   EXCAVATION AND SUPPORT DETAILS ..LAHEP-HT-S09
   EXTREMELY POOR ROCK (SHEET 4 OF 4)



SECTIONAL PLAN AT X-X

ALTERNATIVE -1(a)
(SHOWING EXCAVATION PROFILE)



SECTION B-B (MINIMUM)

ALTERNATIVE -1(a)
(SHOWING DIMENSIONS ONLY)

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 1 OF 4

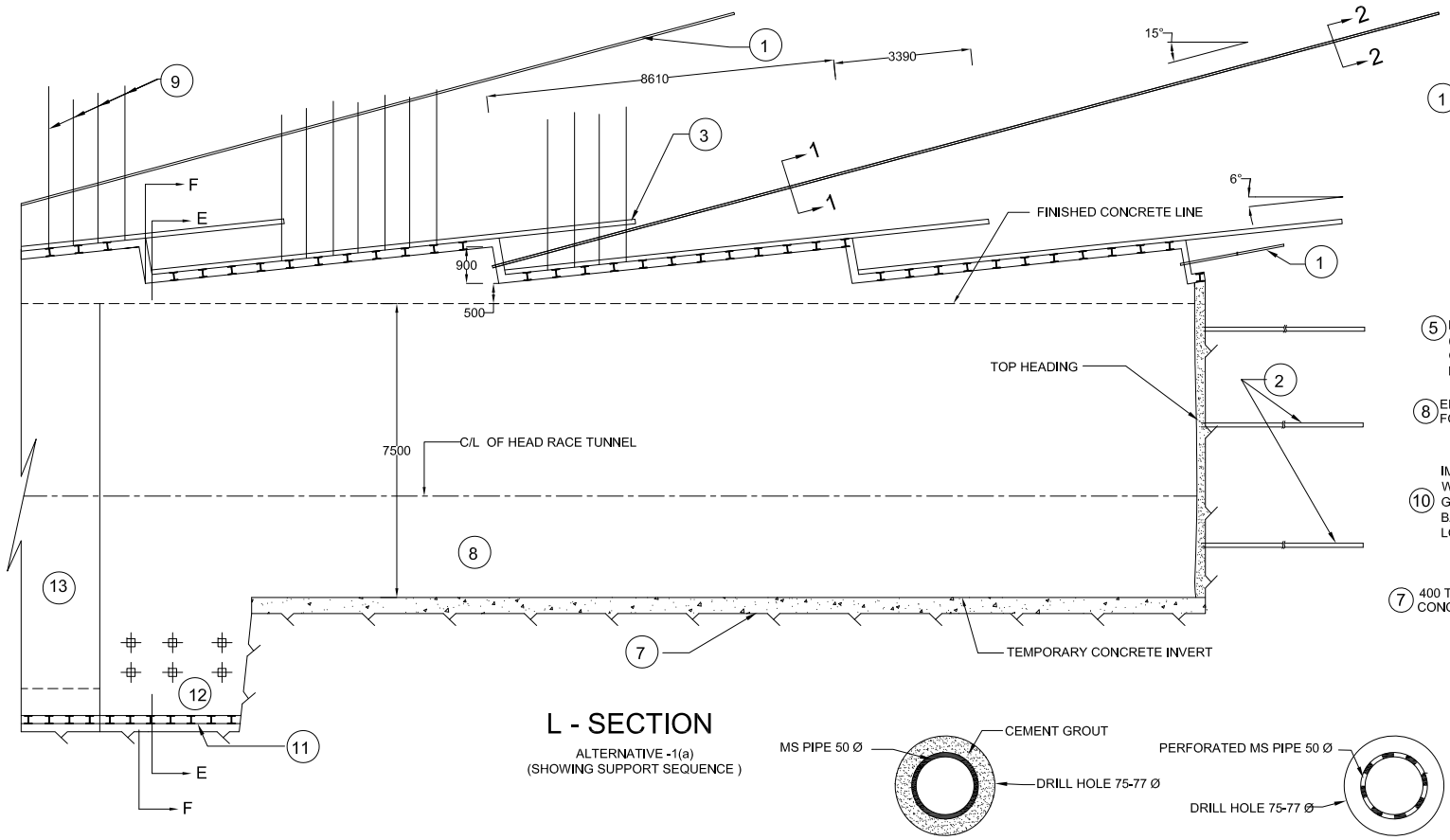
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

HEAD RACE TUNNEL
(STA. 0.00 TO STA. 100.00)
EXCAVATION AND SUPPORT DETAILS
EXTREMELY POOR ROCK

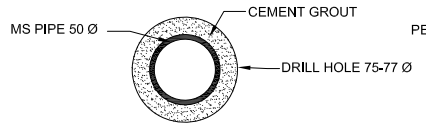
अभिकल्पित DSGN.	सविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-HT-S06 | JANUARY, 2023



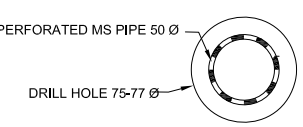
L - SECTION

ALTERNATIVE -1(a)
(SHOWING SUPPORT SEQUENCE)



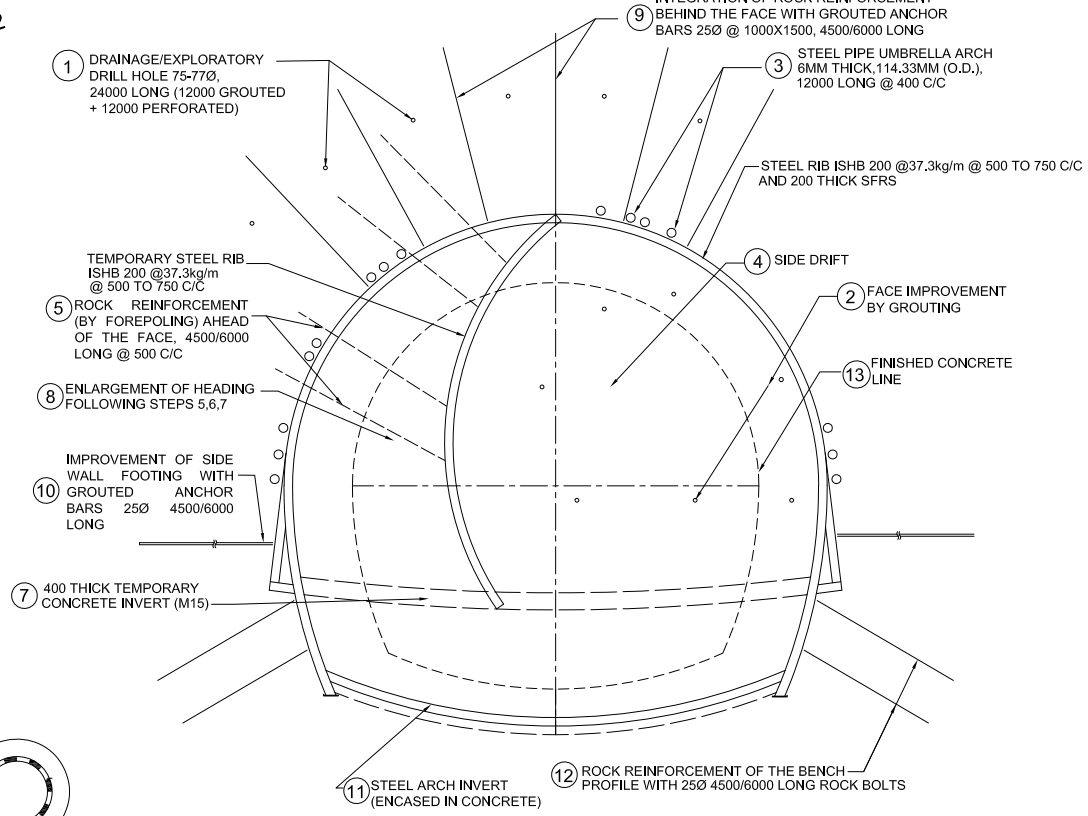
SECTION 1-1

12000 LONG GROUTED DRAINAGE/EXPLORATORY
DRILL-HOLE 75-77Ø



SECTION 2-2

12000 LONG PERFORATED DRAINAGE/EXPLORATORY
DRILL-HOLE 75-77Ø



SECTION F-F

ALTERNATIVE -1(a)
(DIMENSIONS NOT SHOWN FOR CLARITY)

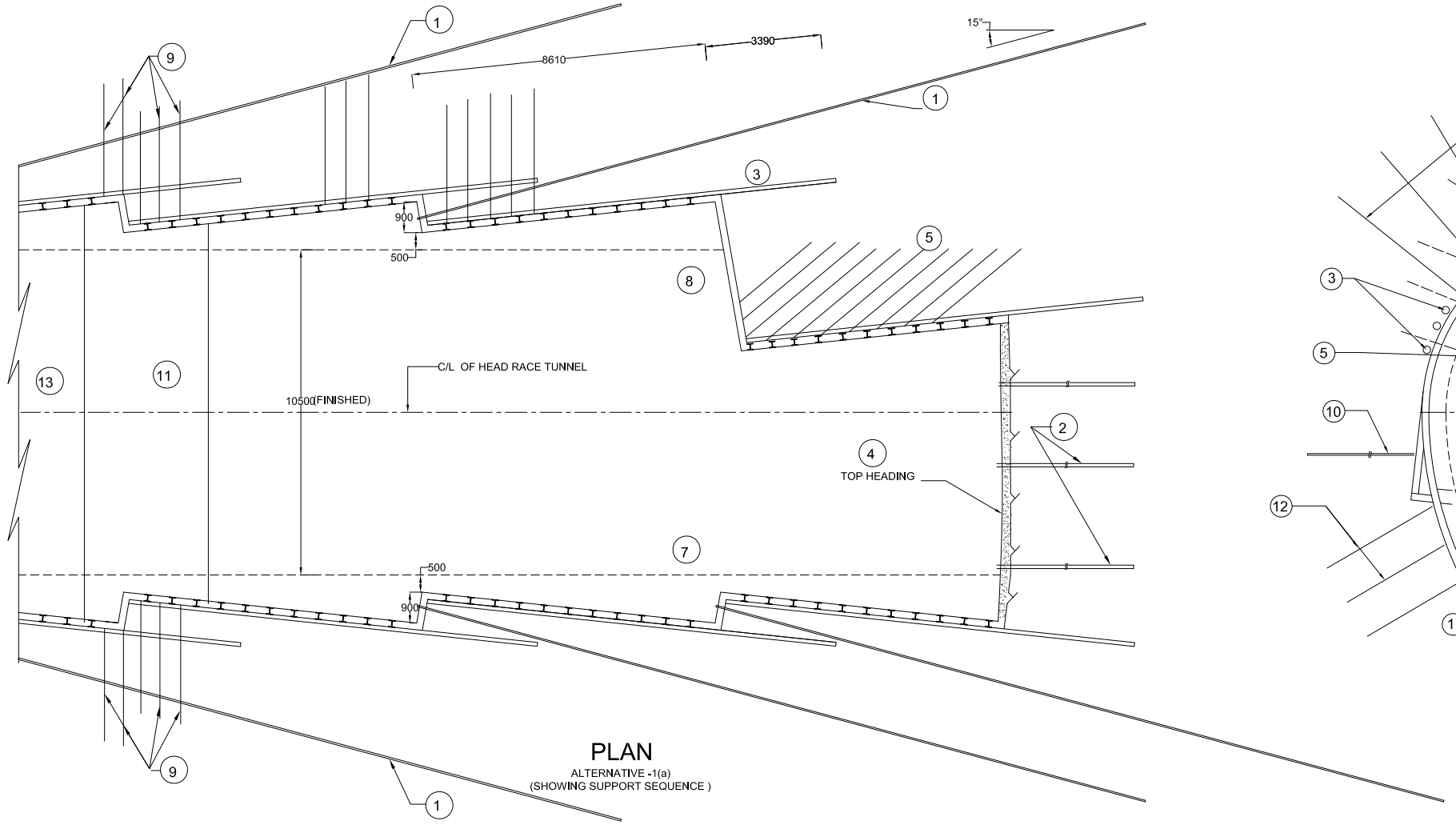
TABLE - 2

S. NO.	DESCRIPTION	ALTERNATIVE		
		1a	1b	1c
1.	DRAINAGE/EXPLORATORY DRILL HOLE CONE	E	E	E
2.	FACE IMPROVEMENT BY GROUTING	E	E	W
3.	STEEL PIPE UMBRELLA	E	E	--
4.	SIDE DRIFT	E	--	--
5.	ROCK REINFORCEMENT BY FORE POLING AHEAD OF FACE	E1	--	--
6.	RADIAL ROCK REINFORCEMENT AT THE FACE	W	W	W
7.	TEMPORARY INVERT (TOP HEADING)	E	E	W
8.	ENLARGEMENT OF HEADING	E	--	--
9.	INTEGRATION OF ROCK REINF--ORCEMENT BEHIND THE FACE	E	W	W
10.	IMPROVEMENT OF SIDE WALL FOOTING	E	E	E
11.	BENCHING AND STEEL ARCH CONCRETE INVERT	E	E	E
12.	ROCK REINFORCEMENT OF THE BENCH PROFILE	E	E	E
13.	FINAL LINING	E	E	E

E --- ESSENTIAL
W --- WHEN AND IF NECESSARY
E1 -- ONLY IN THE LEFT WALL

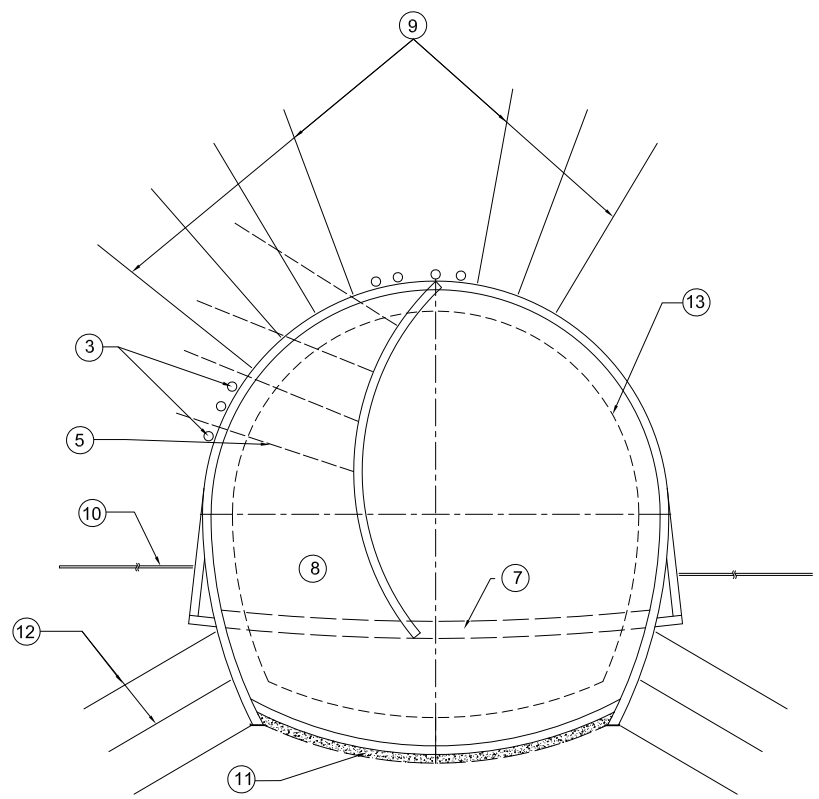
STEP 1 TO 7 HAVE TO BE COMPLETED BEFORE STARTING THE NEXT ROUND.

STEP 9 TO 10 SHOULD BE COMPLETED BEFORE BENCHING



PLAN

ALTERNATIVE -1(a)
(SHOWING SUPPORT SEQUENCE)



SECTION E-E

ALTERNATIVE -1(a)
(DIMENSIONS NOT SHOWN FOR CLARITY)

CONNECTED DRAWINGS :

1. HEAD RACE TUNNEL
   EXCAVATION AND SUPPORT DETAILS
   EXTREMELY POOR ROCK (SHEET 1 OF 4) ...LAHEP- HT -S06
2. HEAD RACE TUNNEL
   EXCAVATION AND SUPPORT DETAILS
   EXTREMELY POOR ROCK (SHEET 3 OF 4) ... LAHEP-HT -S08
3. HEAD RACE TUNNEL
   EXCAVATION AND SUPPORT DETAILS
   EXTREMELY POOR ROCK (SHEET 4 OF 4) ...LAHEP-HT -S09

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 2 OF 4

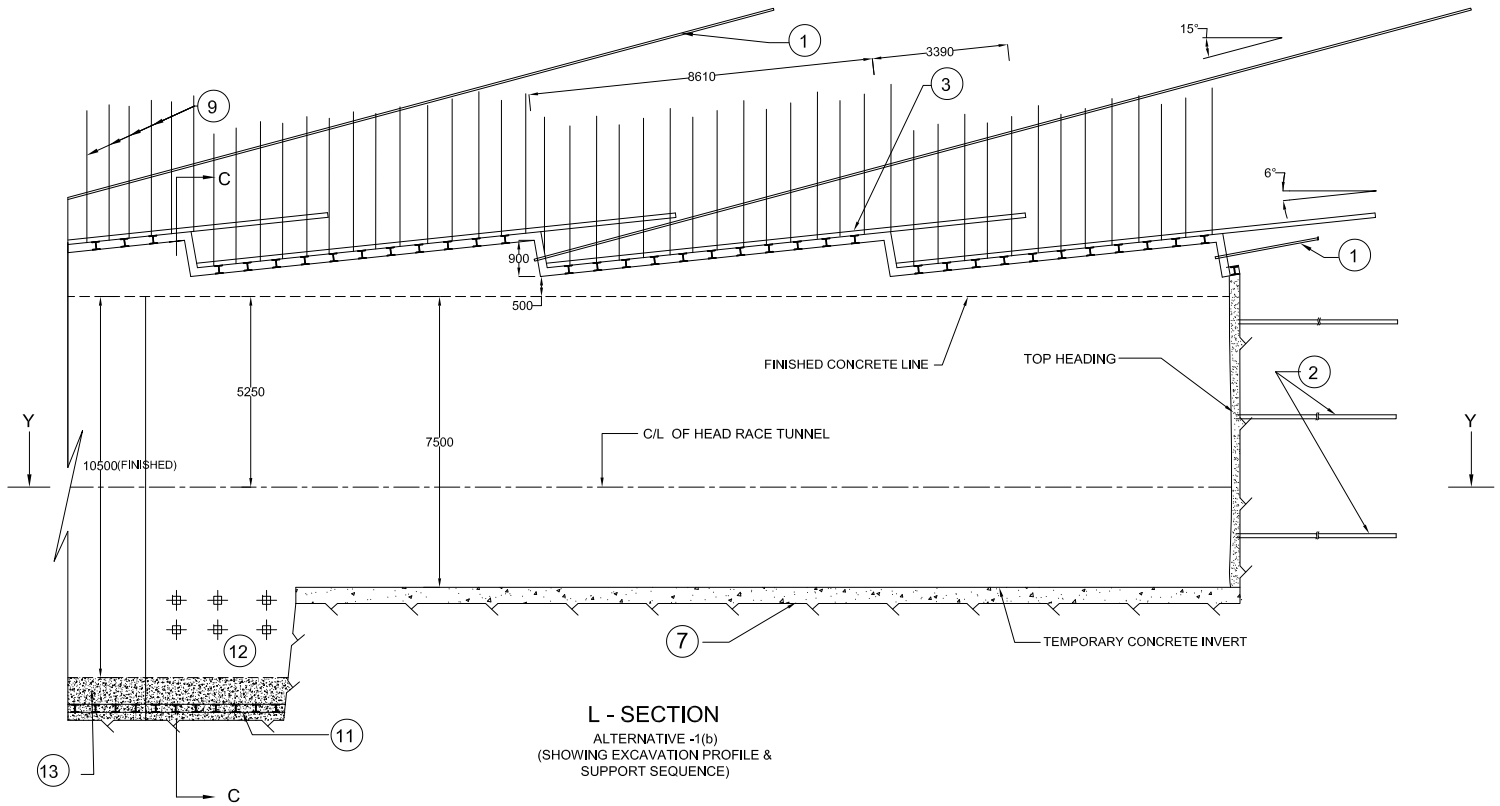
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरुण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

HEAD RACE TUNNEL
(STA. 0.00 TO STA. 100.00)
EXCAVATION AND SUPPORT DETAILS
EXTREMELY POOR ROCK

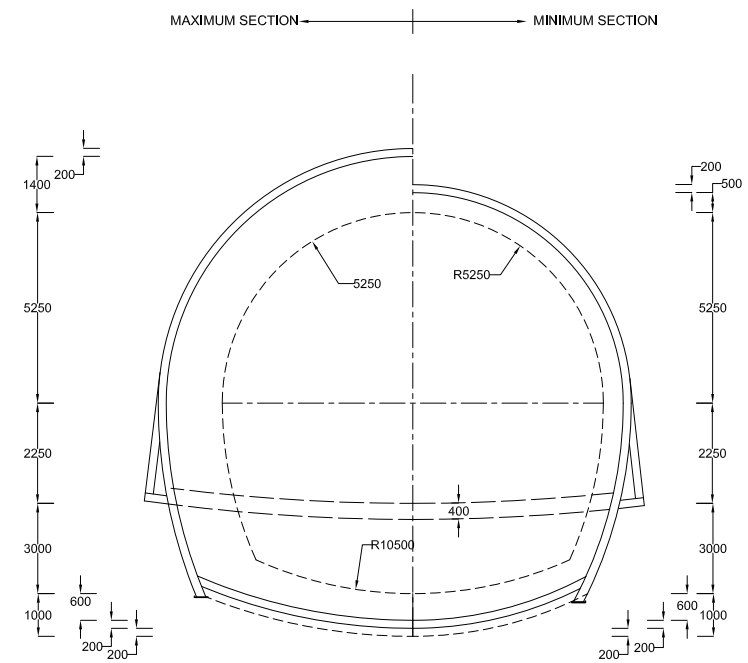
अभिकल्पित DSGN.	सविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-HT-S07 | JANUARY, 2023



L - SECTION

ALTERNATIVE -1(b)
(SHOWING EXCAVATION PROFILE & SUPPORT SEQUENCE)

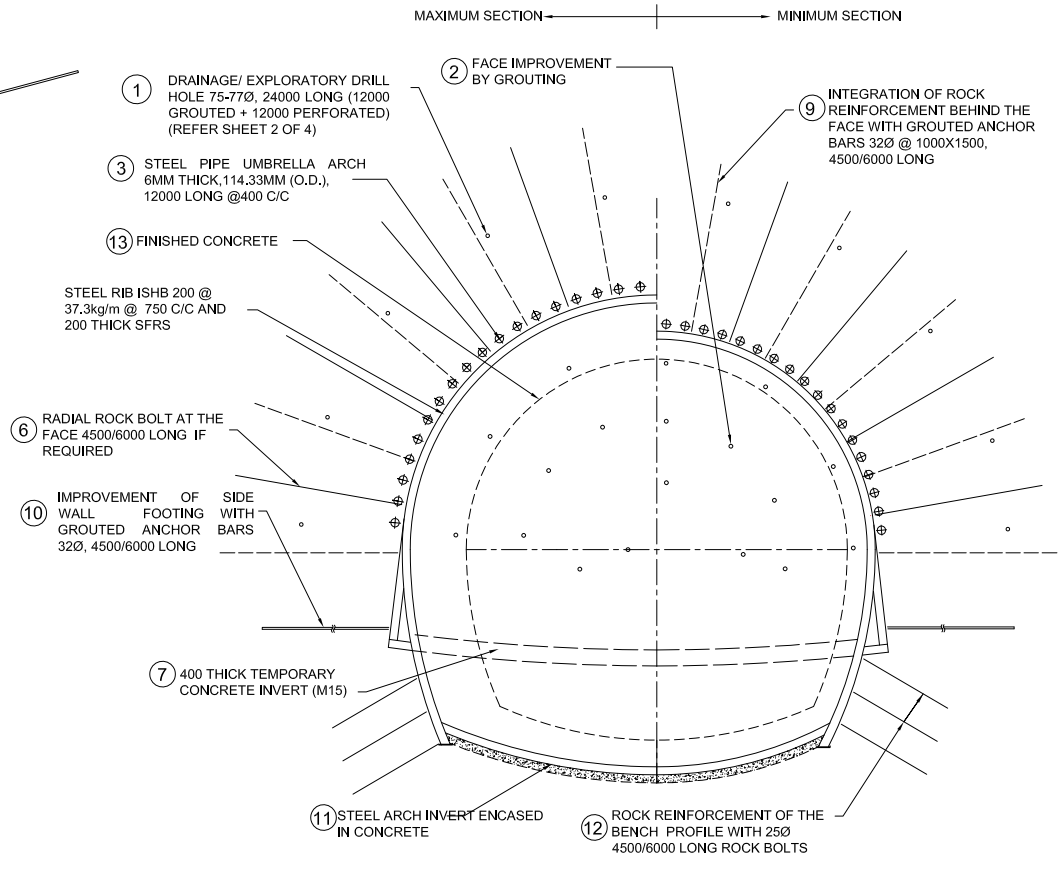


SECTION C-C

ALTERNATIVE -1(b)
(SHOWING DIMENSIONS ONLY)

SECTIONAL PLAN AT Y-Y

ALTERNATIVE -1(b)
(SHOWING EXCAVATION PROFILE & SUPPORT SEQUENCE)



SECTION C-C

ALTERNATIVE -1(b)
(DIMENSIONS NOT SHOWN FOR CLARITY)

CONNECTED DRAWINGS :

1. HEAD RACE TUNNEL
   EXCAVATION AND SUPPORT DETAILS
   EXTREMELY POOR ROCK (SHEET 1 OF 4) ...LAHEP-HT -S06
2. HEAD RACE TUNNEL
   EXCAVATION AND SUPPORT DETAILS
   EXTREMELY POOR ROCK (SHEET 2 OF 4) ...LAHEP-HT -S07
3. HEAD RACE TUNNEL
   EXCAVATION AND SUPPORT DETAILS ...LAHEP-HT -S09
   EXTREMELY POOR ROCK (SHEET 4 OF 4)

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 3 OF 4

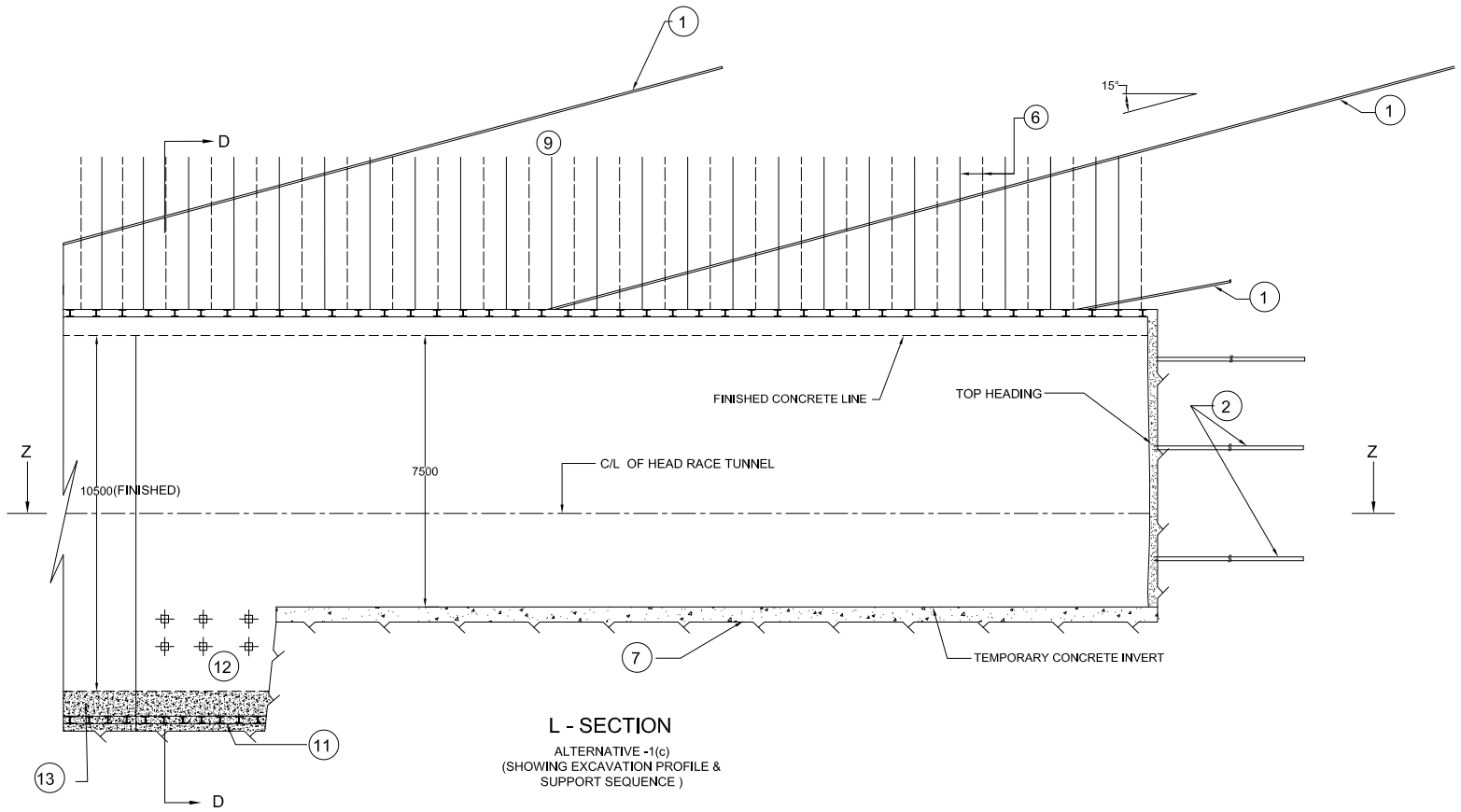
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

HEAD RACE TUNNEL
(STA. 0.00 TO STA. 100.00)
EXCAVATION AND SUPPORT DETAILS
EXTREMELY POOR ROCK

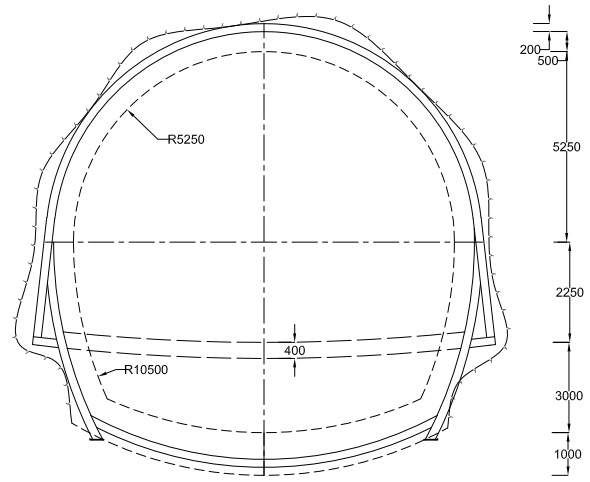
अभिकल्पित DSGN.	परिक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-HT-S08 | JANUARY, 2023



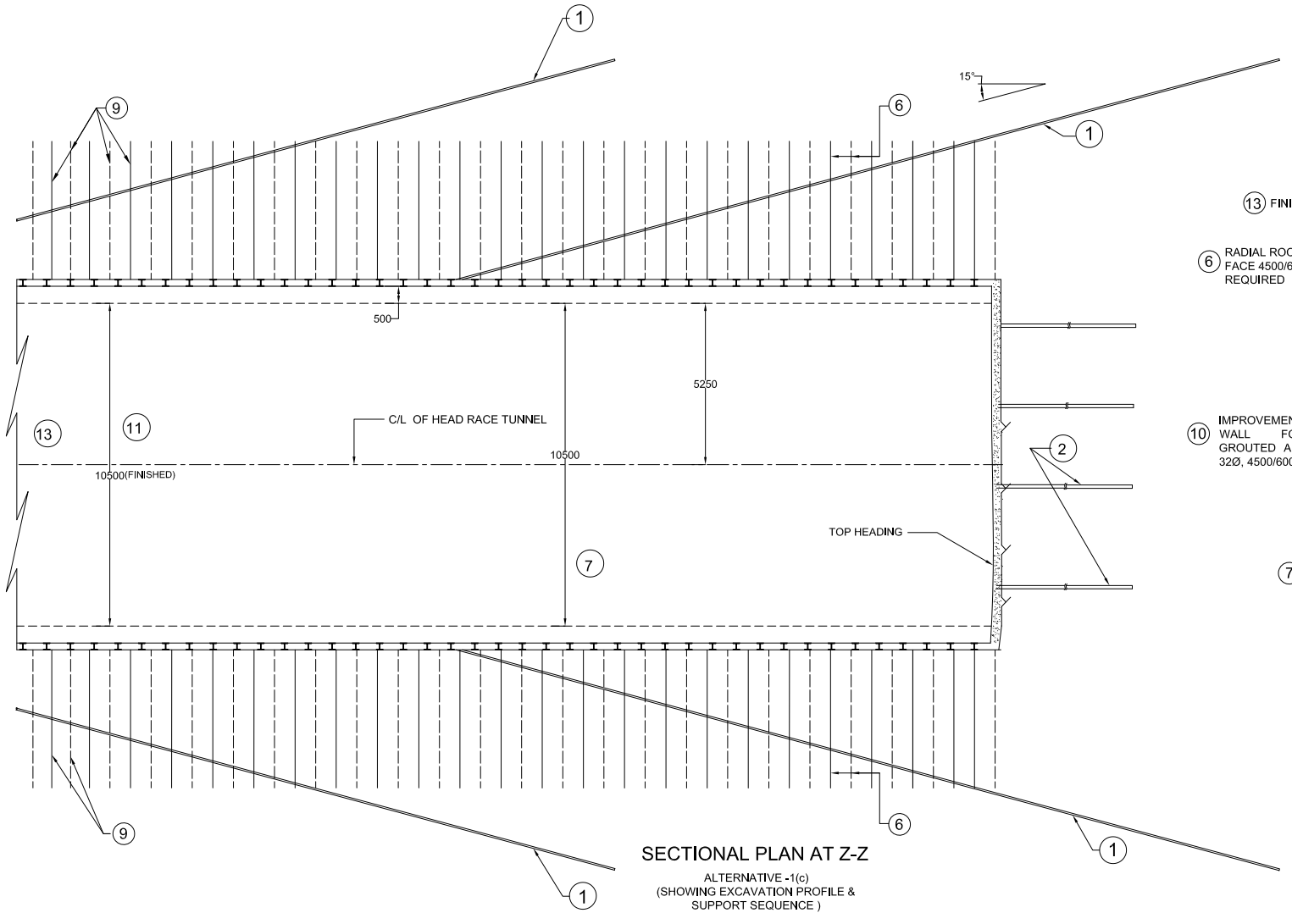
L - SECTION

ALTERNATIVE -1(c)
(SHOWING EXCAVATION PROFILE & SUPPORT SEQUENCE)



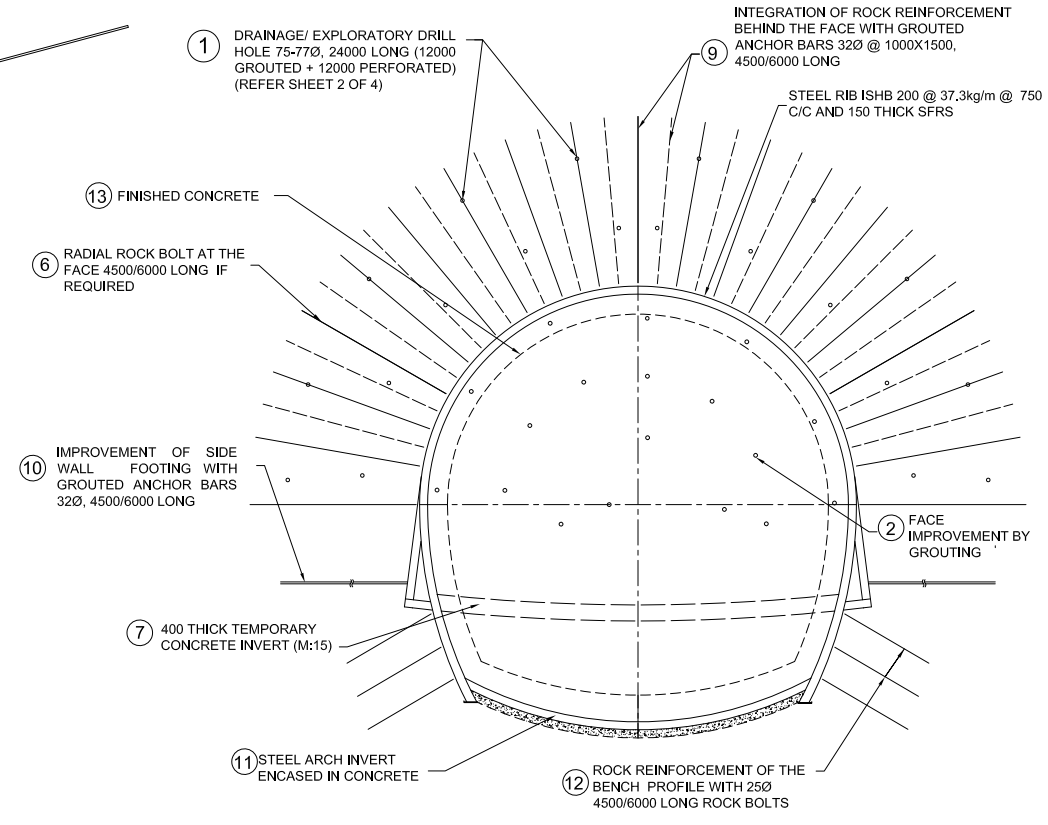
SECTION D-D

ALTERNATIVE -1(c)
(SHOWING DIMENSIONS ONLY)



SECTIONAL PLAN AT Z-Z

ALTERNATIVE -1(c)
(SHOWING EXCAVATION PROFILE & SUPPORT SEQUENCE)



SECTION D-D

ALTERNATIVE -1(c)
(DIMENSIONS NOT SHOWN FOR CLARITY)

CONNECTED DRAWINGS :

1. HEAD RACE TUNNEL EXCAVATION AND SUPPORT DETAILS EXTREMELY POOR ROCK (SHEET 1 OF 4) ...LAHEP-HT -S06
2. HEAD RACE TUNNEL EXCAVATION AND SUPPORT DETAILS EXTREMELY POOR ROCK (SHEET 2 OF 4) ... LAHEP-HT -S07
3. HEAD RACE TUNNEL EXCAVATION AND SUPPORT DETAILS EXTREMELY POOR ROCK (SHEET 3 OF 4) ... LAHEP-HT -S08

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

SHEET 4 OF 4

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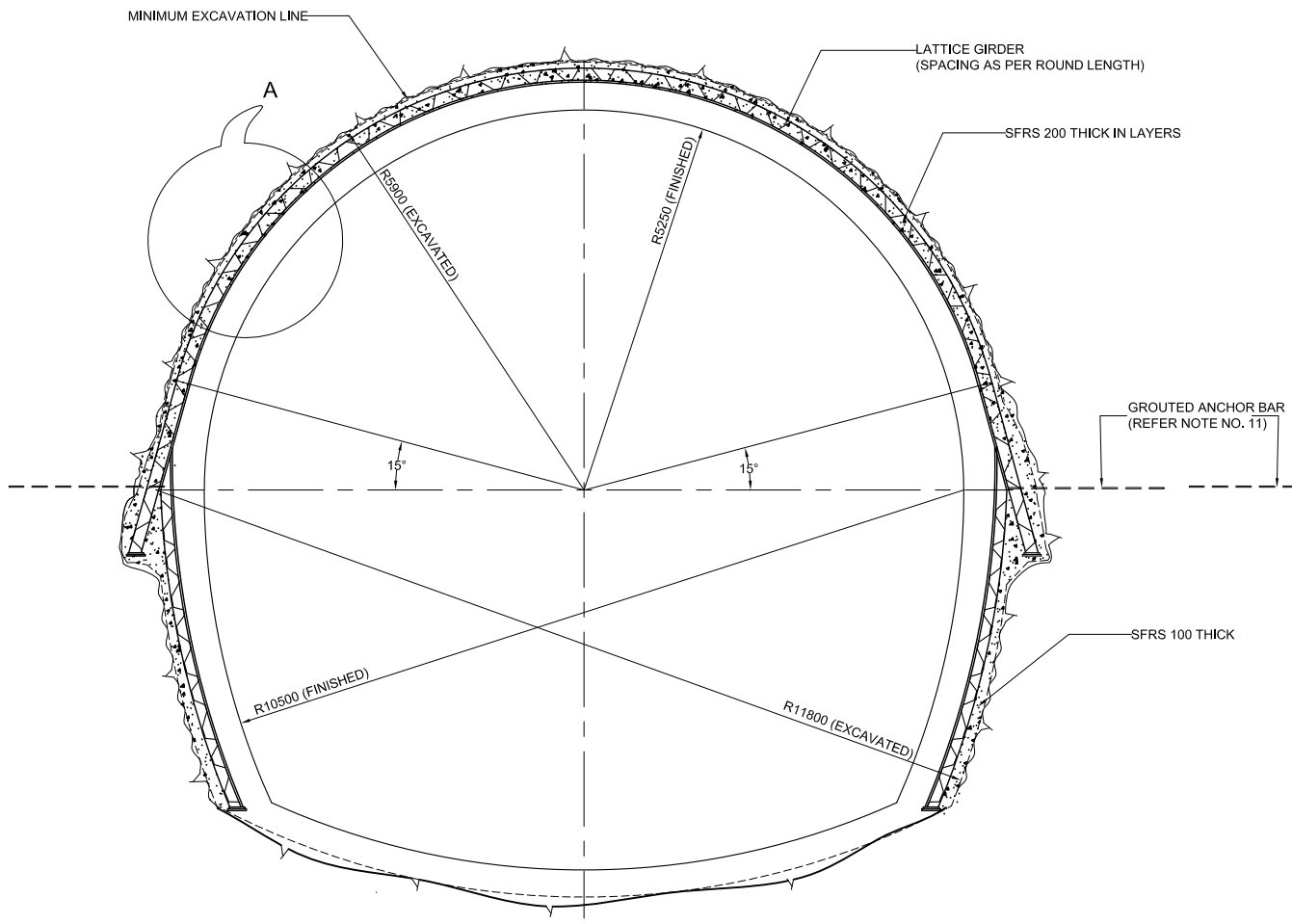
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

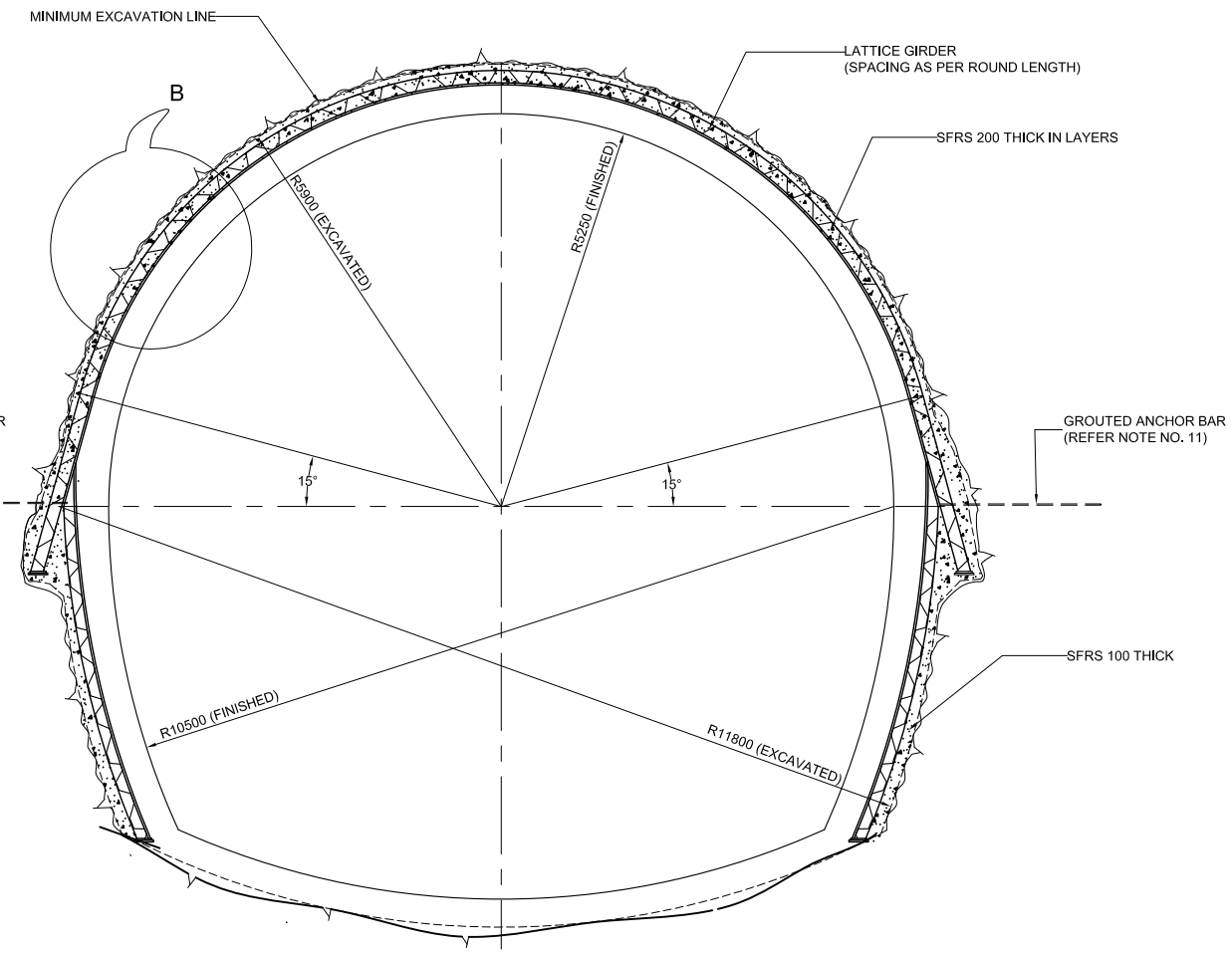
HEAD RACE TUNNEL
(STA. 0.00 TO STA. 100.00)
EXCAVATION AND SUPPORT DETAILS
EXTREMELY POOR ROCK

अभिकल्पित DSGN.	संविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

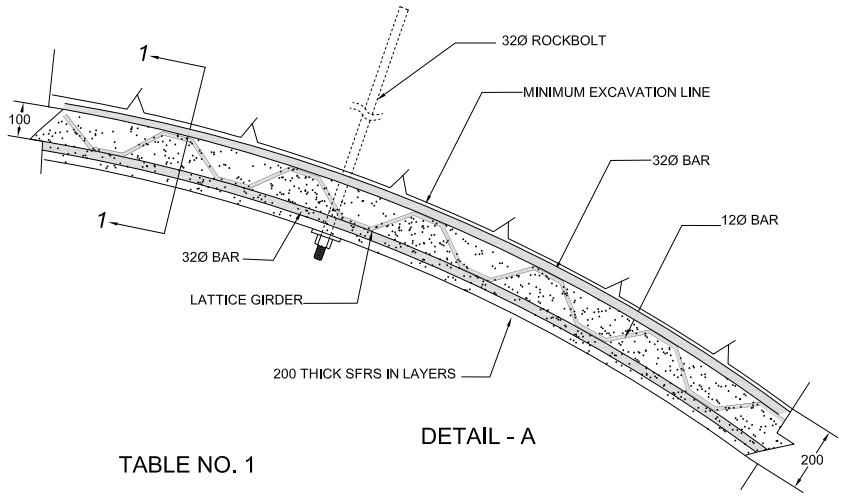
DRG.NO.LAHEP-HT-S09 | JANUARY, 2023



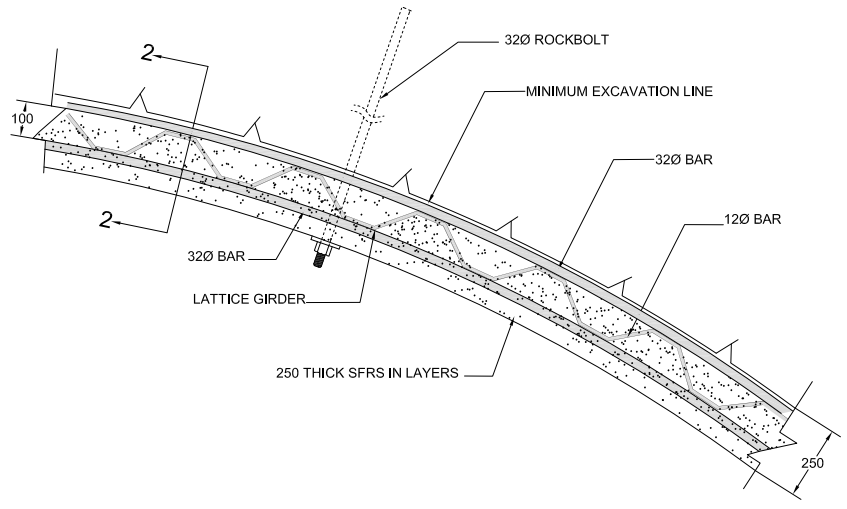
ROCK CLASS - IV
(ROCKBOLTS NOT SHOWN - SEE TABLE 1)



ROCK CLASS - V
(ROCKBOLTS NOT SHOWN - SEE TABLE 2)



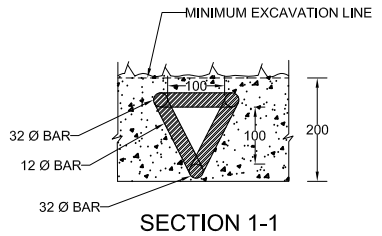
DETAIL - A



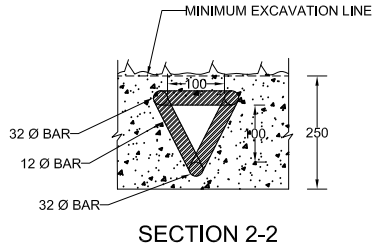
DETAIL - B

TABLE NO. 1

EXCAVATION AND SUPPORT ELEMENTS FOR ROCK CLASS IV		
1	ROUND LENGTH	1.0M TO 1.5M
2	LATTICE GIRDER	100/32/32 (DEPTH/DIA. OF INNER (SINGLE) BAR/ DIA. OF OUTER BARS)
3	ERECTION OF LATTICE GIRDER	0.50M BEHIND TUNNEL FACE IN EVERY ROUND
4	SFRS	200 THICK IN LAYERS
5	ROCKBOLTS	32 DIA. , 6000 LONG @ 1.5M C/C
6	FOREPOLING	32 DIA. , 4000 LONG @ 300-500 C/C



SECTION 1-1



SECTION 2-2

TABLE NO. 2

EXCAVATION AND SUPPORT ELEMENTS FOR ROCK CLASS V		
1	ROUND LENGTH	0.75M TO 1.5M
2	LATTICE GIRDER	100/32/32 (DEPTH/DIA. OF INNER (SINGLE) BAR/ DIA. OF OUTER BARS)
3	ERECTION OF LATTICE GIRDER	0.50M BEHIND TUNNEL FACE IN EVERY ROUND
4	SFRS	250 THICK IN LAYERS, 50 THICK SEALING COAT OF SFRS AT FACE (WHEREVER REQUIRED)
5	ROCKBOLTS	32 DIA. , 6000 LONG @ 1.5M C/C
6	FOREPOLING	32 DIA. , 4000 LONG @ 300-500 C/C

GENERAL GUIDELINES FOR EXCAVATION AND SUPPORT SEQUENCE FOR ROCK CLASS IV AND V	
1	DRILLING AND BLASTING
2	MUCKING
3	SCALING WITH HYDRAULIC BREAKER
4	SFRS (FIRST LAYER)
5	INSTALLATION OF LATTICE GIRDER
6	FORE POLING
7	SFRS (SECOND LAYER)
8	ROCKBOLTING
9	GEODETIC MEASUREMENT

NOTE:-

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SPECIFIED OTHERWISE.
2. NO DIMENSION SHALL BE SCALED OUT ONLY WRITTEN DIMENSIONS ARE TO BE TAKEN AS CORRECT.
3. THIS DRAWING SHOWS ALTERNATE ROCK SUPPORT SYSTEM TO BE ADOPTED IN ROCK CLASS IV AND V FOR 10.5 M (FINISHED DIA.) HORSE SHOE SHAPED HRT. ROCK SUPPORT TO BE IMMEDIATELY APPLIED FOR SAFETY OF WORKMEN AND MACHINERY AS THE EXCAVATION PROCEEDS; SHALL BE DECIDED BASED ON SITE CONDITIONS AND AS DIRECTED BY THE ENGINEER.
4. FOR THE DETAILED SPECIFICATIONS OF ROCK BOLTS, SHOTCRETE AND WIREMESH REFER SEPARATE DRAWINGS.
5. DRAINAGE HOLES ARE NOT SHOWN IN THE DRAWING, NECESSARY DRAINAGE MEASURES DURING CONSTRUCTION SHALL BE ADOPTED AS DIRECTED BY ENGINEER.
6. FOR DETAILS OF ROCK SUPPORT AT JUNCTION OF ADIT WITH HEAD RACE TUNNEL REFER SEPARATE DRAWINGS.
7. ADDITIONAL ROCKBOLTS OR ALTERNATE ROCK SUPPORT MAY BE INSTALLED AS DIRECTED BY ENGINEER IN GENERAL,BUT AT FOLLOWING LOCATION IN PARTICULAR.
   a. IN AREAS WHERE THERE IS LOW ROCK COVER AT CROWN.
   b. IN AREAS OF POPPING ROCK UNDER HIGH PRIMARY STRESS CONDITIONS CAUSED BY HIGH OVERBURDEN MORE THAN ABOUT 1000 M OR DUE TO TECTONIC STRESSES
   c. AT MAJOR FAULT ZONES.
   d. WHERE GROUND WATER CONDITIONS LEAD TO PROGRESSIVE INSTABILITY WHICH IS BEYOND THE CONTROL OF NORMAL ROCK REINFORCEMENT.
   e. TO SECURE LOOSE BLOCKS NOT REMOVED BY SCALING
   f. IF SLABBING OCCURS IN WALLS.
   g. TO SECURE SEVERE OVERBREAKS, CAUSED BY PROXIMITY OF FAULTS OR SHEAR ZONES.
   h. TO SECURE HAUNCHES.
   I. AT INDIVIDUAL WEDGE FORMATION PROVIDE 32 MM Ø ROCK BOLTS OF SUITABLE LENGTHS.THE DIRECTION OF THE BOLTS MAY BE KEPT IN SUCH A WAY THAT THEY ACT LARGELY IN TENSION.
8. DIRECTION OF THE ROCK BOLTS MAY BE SUITABLY ADJUSTED BY THE ENGINEER AS PER ROCK CONDITIONS AT SITE.
9. FOR FABRICATION DETAILS OF LATTICE GIRDER REFER SHEET 2 OF 2.
10. THE FOREPOLE INSTALLATION SHALL BE RESTRICTED TO UPPER 180° OF EXCAVATED SECTION.
11. ALL THE GROUTED ANCHOR BARS SHALL BE IN POSITION BEFORE BENCHING DOWN THE HRT SECTION.
12. PAYLINE FOR UNDERGROUND EXCAVATION SHALL BE 100mm BEYOND THE MINIMUM EXCAVATION LINE FOR ALL ROCK CLASSES.
13. THE ROCK BOLTS SHALL BE EITHER MECHANICAL EXPANSION SHELL TYPE OR RESIN-END ANCHORAGE TYPE, FULLY CEMENT GROUTED. THEY SHALL BE IMMEDIATELY INSTALLED BEHIND THE WORKING FACE. CEMENT GROUTING SHALL BE CARRIED OUT IMMEDIATELY AFTER INSTALLATION OR SUBSEQUENTLY AS A SEPERATE OPERATION, BUT THE ROCKBOLTS SHALL BE RETENSIONED BEFORE GROUTING.
14. THE EXCAVATED SECTION SHALL BE LOGGED GEOLOGICALLY AFTER THE BLAST AS SOON AS POSSIBLE AND 3-D LOGS PREPARED.ALL LOOSE WEDGES IF FORMED SHALL BE SUITABLY SUPPORTED AS DIRECTED BY THE ENGINEER.
15. STEEL RIBS ISHB 150 x 150@34.6 KG/M SHALL BE PROVIDED IN AREAS OF HIGH OVER BREAKS,CAVITY AREAS AND IN VERY ROUGH ROCK PROFILE INSTEAD OF LATTICE GIRDERS.

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

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SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

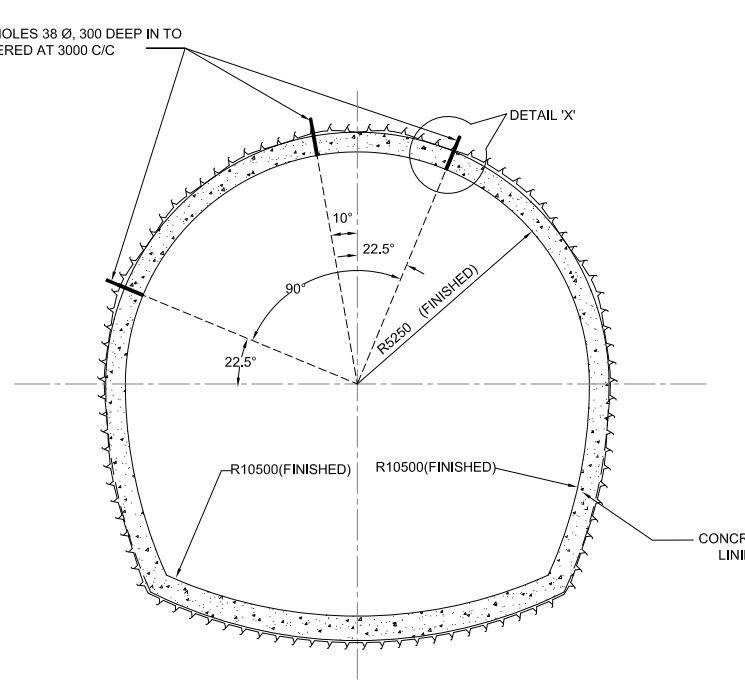
HEAD RACE TUNNEL
(STA.0.00 TO STA.100.00)
EXCAVATION AND SUPPORT SYSTEM
ALTERNATIVE SUPPORT WITH LATTICE GIRDER
FOR ROCK CLASS IV AND V

अभिकल्पित DSGN.	संविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

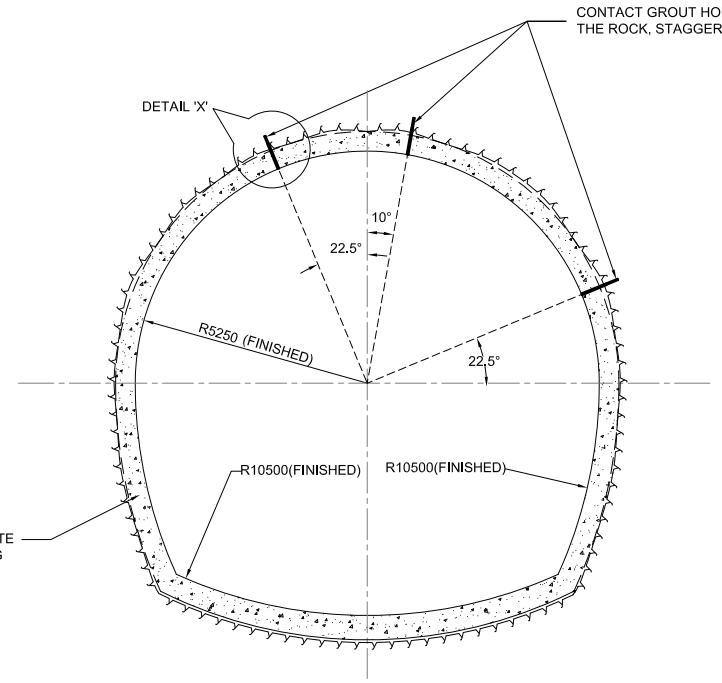
DRG.NO.LAHEP-HT-S10 | JANUARY, 2023

NOTE:-

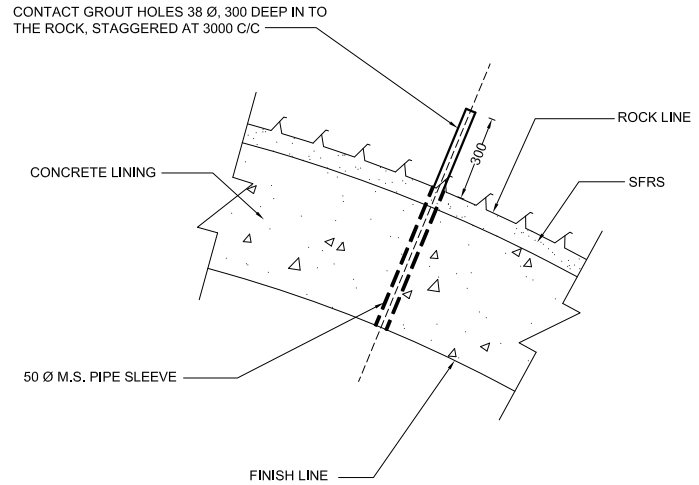
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SPECIFIED OTHERWISE.
2. NO DIMENSION IS TO BE SCALED OUT. ONLY WRITTEN DIMENSIONS ARE TO BE TAKEN AS CORRECT.
3. CONTACT GROUTING IS TO BE DONE IN THE ENTIRE LENGTH OF TUNNEL. THE DEPTH OF HOLES FOR CONTACT GROUTING SHALL BE 300mm BEYOND THE SUPPORTS INTO THE ROCK
4. CONTACT GROUTING SHALL BE DONE AT LEAST 28 DAYS AFTER DOING LINING OF TUNNEL.
5. PATTERN OF HOLES SHALL BE AS INDICATED AND SPACING OF DIFFERENT PLANES OF HOLES SHALL BE 3 METERS.
6. GROUTING IS TO BE DONE AT A PRESSURE OF 2.5 kg/cm^2.
7. THE GROUT MIX FOR CONTACT GROUTING SHALL NORMALLY BE CEMENT,WATER AND SAND IN THE RATIO 1:1:1 BY WEIGHT.
8. THE PROCEDURE, DETAILS AND SPECIFICATIONS OF CONTACT GROUTING AS COVERED IN IS:5878 (AS COVERED IN PART VII) SHALL BE FOLLOWED DEPENDING UPON THE GROUT INTAKE OR AS DETERMINED BY THE WATER TESTS.



SECTION 1,3,5---- (PATTERN A)

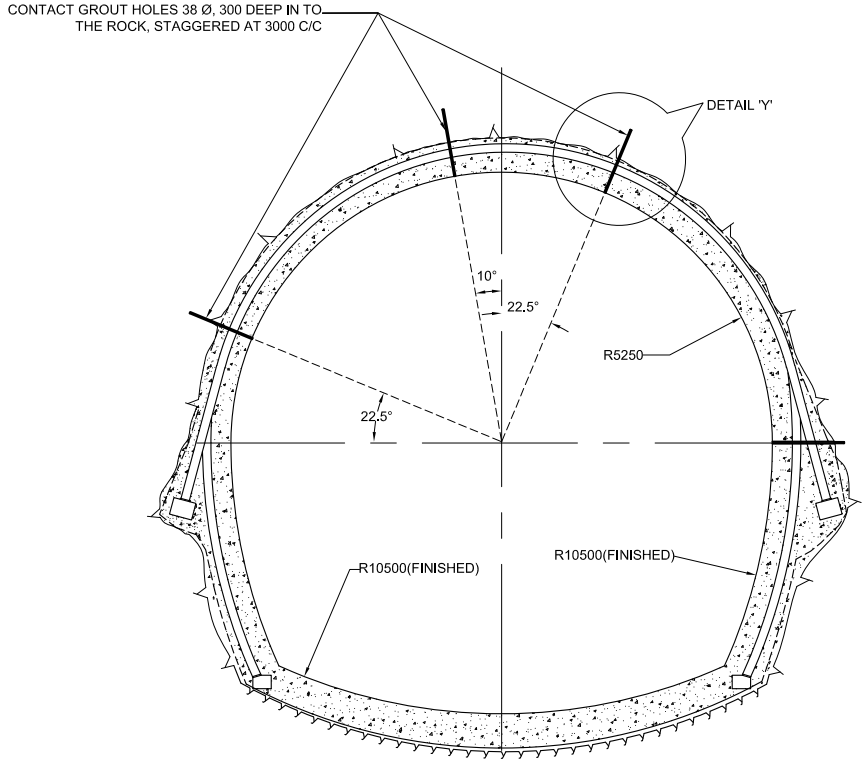


SECTION 2,4,6---- (PATTERN B)

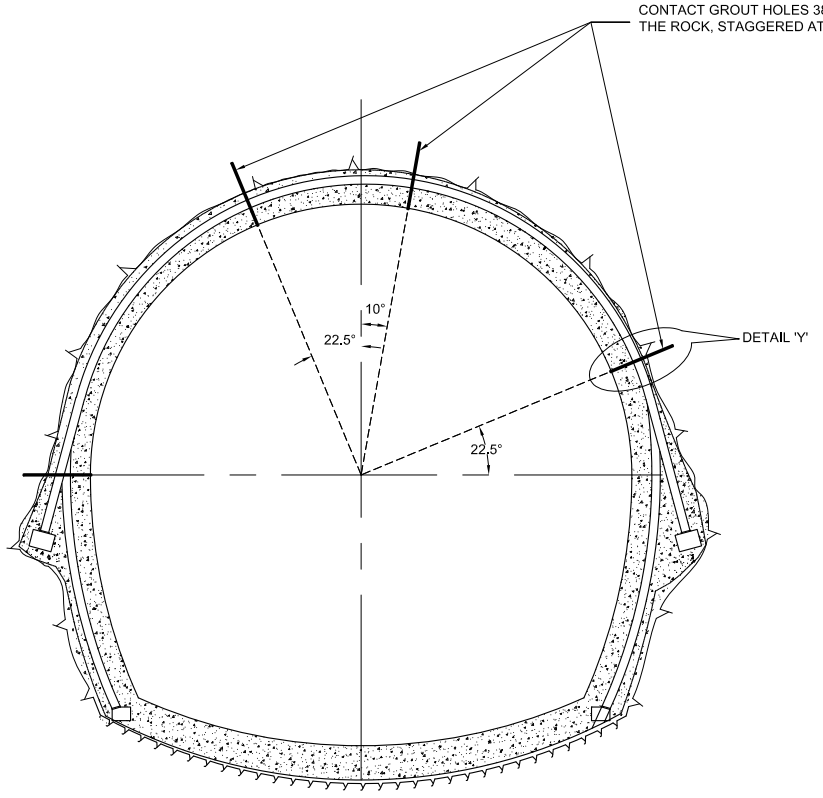


DETAIL 'X'

_ALTERNATE SECTIONS 3000 APART
CONTACT GROUTING (WITHOUT RIB)

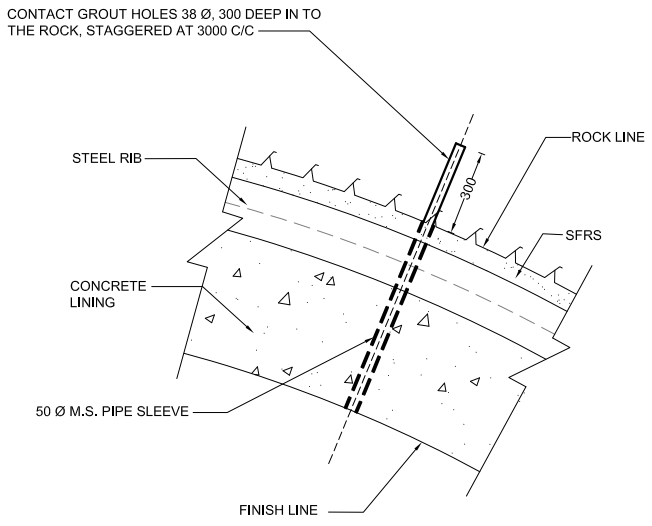


SECTION 1,3,5---- (PATTERN A)



SECTION 2,4,6---- (PATTERN B)

ALTERNATE SECTIONS 3000 APART
CONTACT GROUTING (WITH RIB)



DETAIL 'Y'

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

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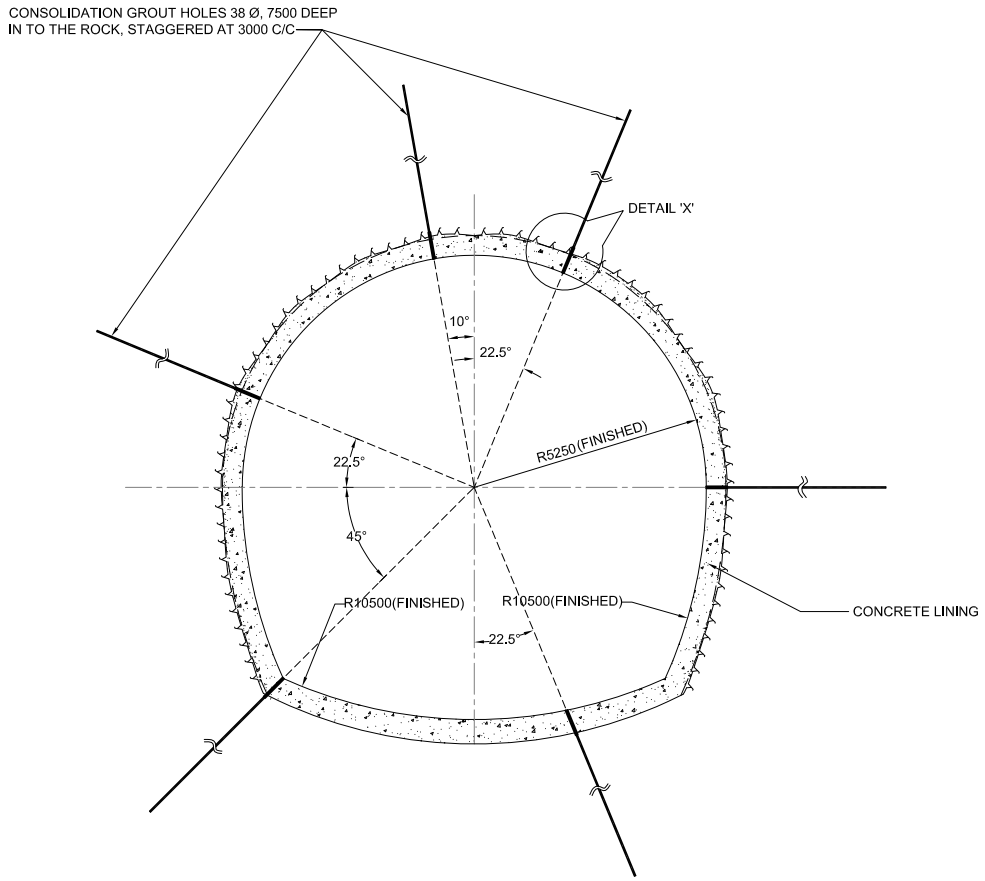
SJVN LIMITED

लोअर अरुण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

HEAD RACE TUNNEL
(STA.00.00 TO STA. 100.00)
CONTACT GROUTING DETAILS

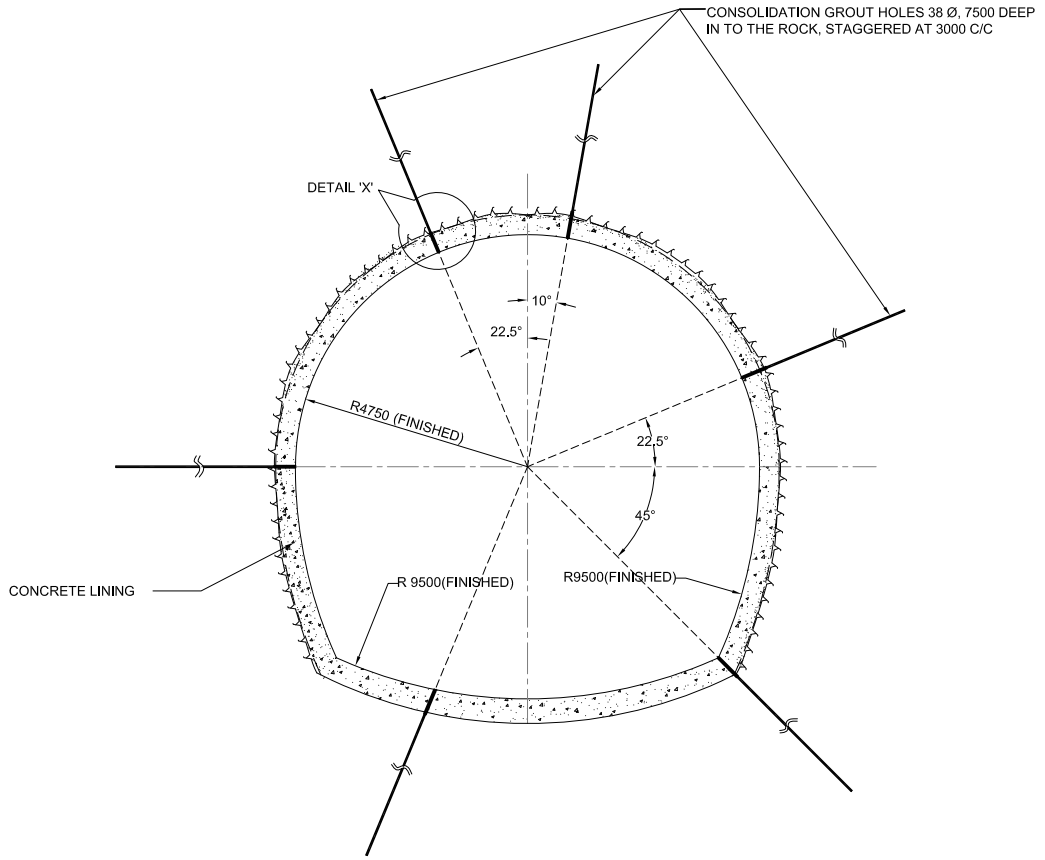
अभिकल्पित DSGN.	सविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-HT-S11 | JANUARY, 2023



SECTION 1,3,5----- (PATTERN A)

(SUPPORTS NOT SHOWN)



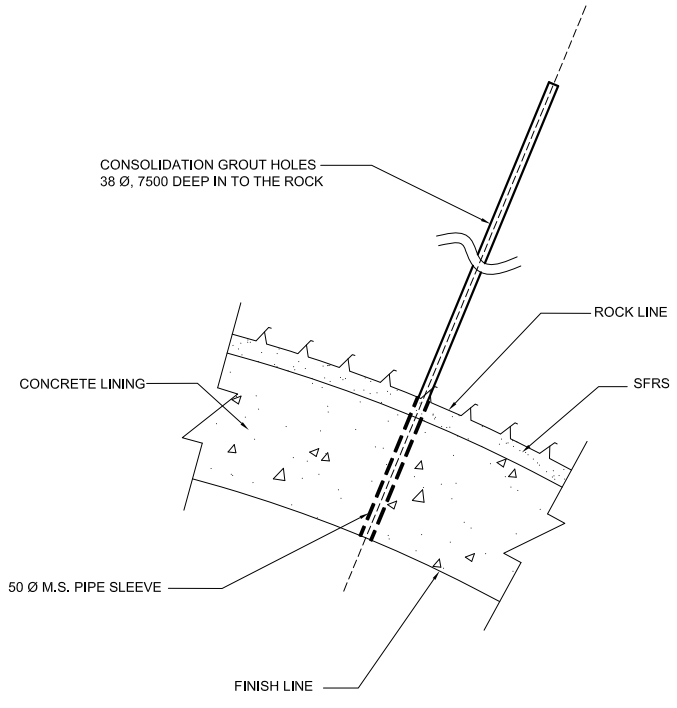
SECTION 2,4,6---- (PATTERN B)

(SUPPORTS NOT SHOWN)

NOTE:-

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS SPECIFIED OTHERWISE.
2. NO DIMENSION IS TO BE SCALED OUT, ONLY WRITTEN DIMENSIONS TO BE TAKEN AS CORRECT.
3. CONSOLIDATION GROUTING SHALL ALWAYS BE DONE AFTER THE CONTACT GROUTING IS COMPLETED IN A LENGTH OF ATLEAST 60 m AHEAD OF THE POINT OF GROUTING.
4. THE PATTERN AND DEPTH OF HOLES IN DIFFERENT PLANES SHALL BE AS INDICATED.
5. THE SPACING OF DIFFERENT PLANES OF HOLES SHALL BE 3m.
6. GROUT PRESSURE SHALL BE 5 kg/cm^2 to 7 kg/cm^2 DEPENDING UPON ROCK STRATA.
7. THE TUNNEL REACHES FOR CONSOLIDATION GROUTING SHALL BE DECIDED AFTER COMPLETION OF EXCAVATION OF TUNNEL.HOWEVER, CONSOLIDATION GROUTING IN GENERAL SHALL BE CARRIED OUT IN ROCK CLASS IV, V, VI, AREAS OF HEAVY SEEPAGE, SHEAR ZONES, ADIT JUNCTIONS ETC.
8. THE CONTACT DRILL HOLES PROVIDED IN UPPER 180° SHALL BE REDRILLED TO CARRY OUT CONSOLIDATION GROUTING LATER ON.
9. WATER TESTS AS DIRECTED BY THE ENGINEER SHALL BE DONE TO CHECK THE EFECTIVENESS OF GROUTING PROCESS.
10. SAME HOLES, IF REQUIRED CAN BE DRILLED UPTO A DEPTH OF 15m FOR CURTAIN GROUTING AS PER THE DIRECTION OF ENGINEER TO CONTROL SEEPAGE. IN THIS CASE MULTI-STAGE GROUTING WITH HIGHER GROUTING PRESSURE UPTO 30kg/cm2 MAY BE PROVIDED.
11. FOR GROUTING OF ADIT PLUGS REFER SEPERATE DRAWINGS.
12. FOR CONSOLIDATION GROUTING MIX SHALL BE CEMENT AND WATER IN THE RATIO 5:1 TO 0.8:1 DEPENDING UPON THE GROUT INTAKE OR AS DETERMINED BY THE WATER TESTS.
13. FOR CONSOLIDATION GROUTING IN THE CAVITY REACHES ADDITIONAL HOLES MAY BE DRILLED AS PER THE INSTRUCTIONS OF THE ENGINEER. THE HOLES SHALL BE TAKEN INTO THE ROCK TO THE DEPTH NOT LESS THAN 6m BEYOND THE CAVITY.

ALTERNATE SECTIONS 3000 APART



DETAIL 'X'

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

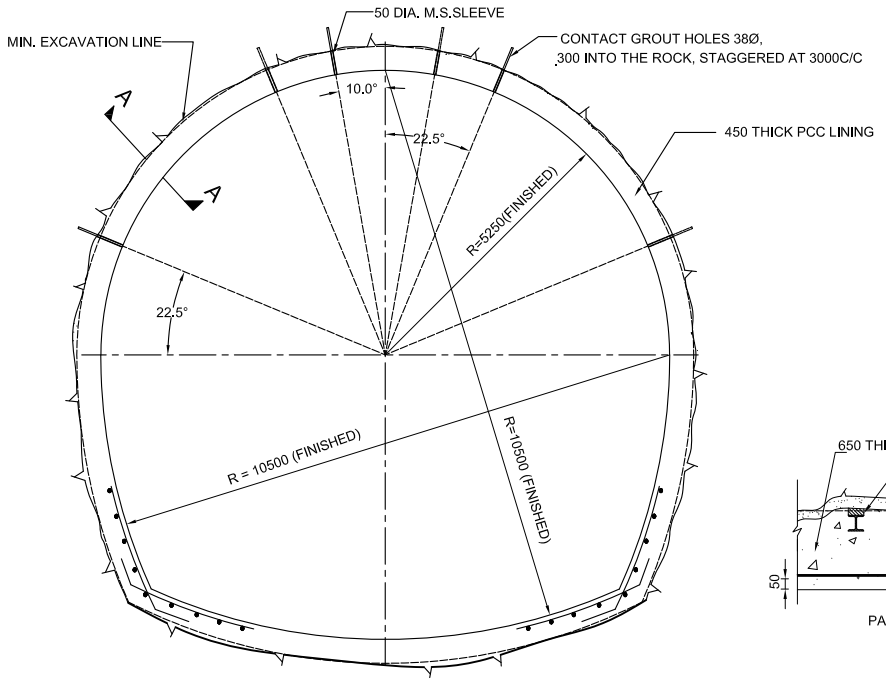
एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

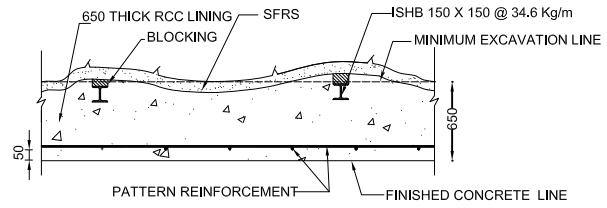
HEAD RACE TUNNEL
(STA. 0.00 TO STA. 100.00)
CONSOLIDATION GROUTING DETAILS

अभिकल्पित DSGN.	संविक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

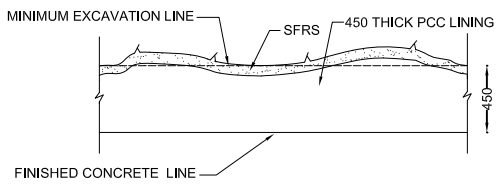
DRG.NO.LAHEP-HT-S12 | JANUARY, 2023



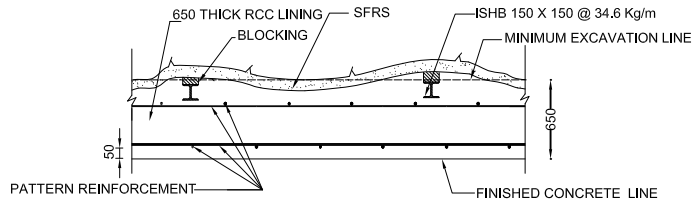
CLASS I,II & III



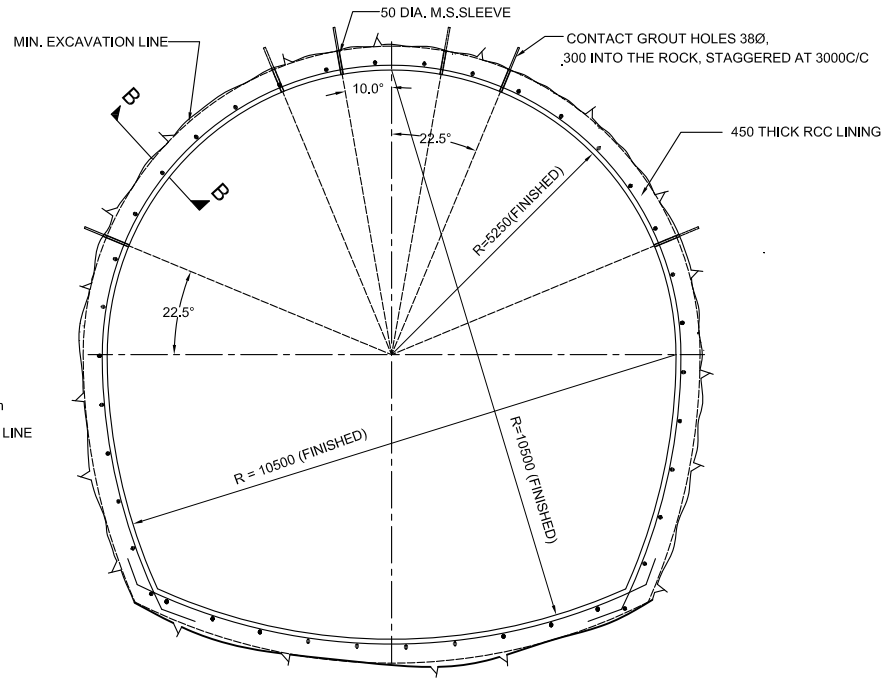
SECTION C - C



SECTION A-A

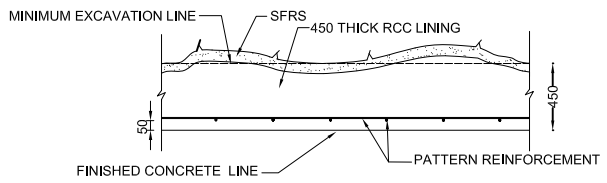


SECTION D - D



CLASS I,II & III

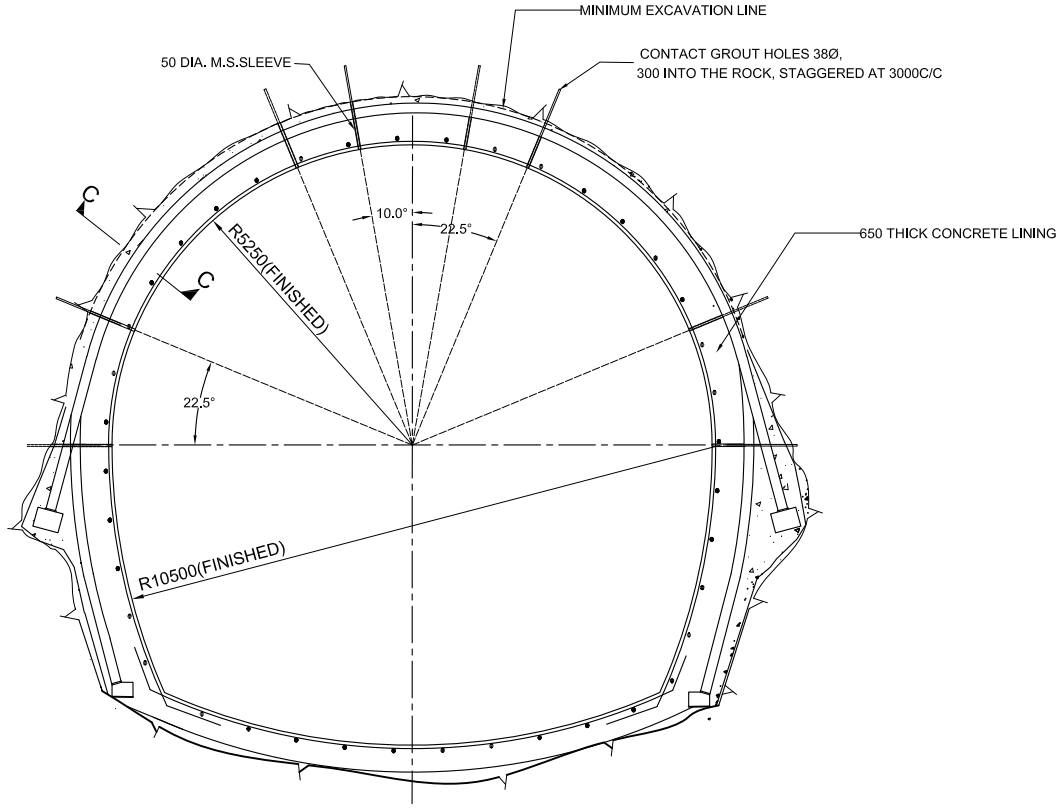
(FOR LOW COVER /KHOLA REACH & CAVITY REACHES)



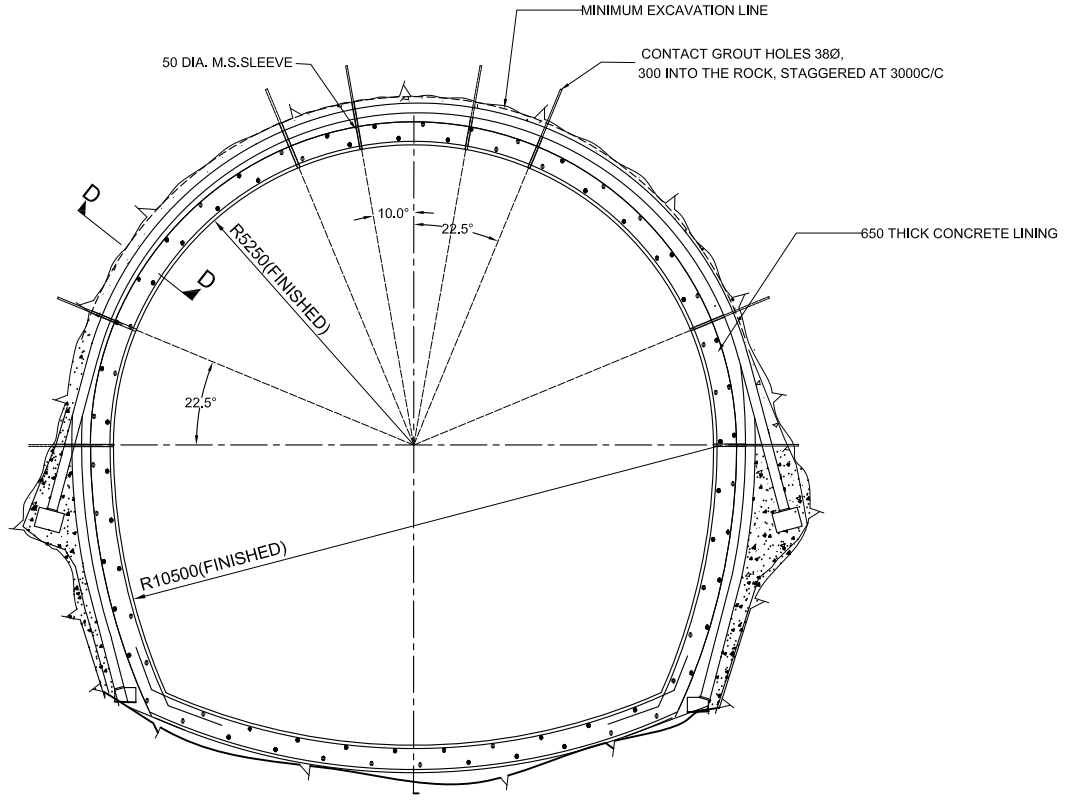
SECTION B-B

NOTE:-

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE SCALED OUT ONLY WRITTEN DIMENSIONS ARE TO BE TAKEN AS CORRECT.
3. CONCRETE SHALL BE OF GRADE M25 A20 CONFORMING TO IS :456 (LATEST REVISION).
4. REINFORCEMENT STEEL SHALL CONFORM TO IS:1786, HIGH STRENGTH DEFORMED BARS (Fy=500 N/Sq.mm).
5. REINFORCEMENT AS SHOWN IN THE DRAWING IS PATTERN REINFORCEMENT. THE ACTUAL REINFORCEMENT SHALL BE AS PER CONSTRUCTION DRAWINGS.
6. THE TUNNEL REACHES TO BE PROVIDED WITH REINFORCEMENT SHALL BE DECIDED AFTER EXCAVATION OF TUNNEL.
7. FOR SUPPORT AND GROUTING DETAILS REFER SEPERATE DRAWINGS.
8. THE PROCEDURES, DETAILS AND SPECIFICATIONS FOR GROUTING AS COVERED IN IS: 5878 (PART VII) SHALL BE FOLLOWED.



CLASS - IV & V
VERY POOR ROCK
(WITH SINGLE LAYER OF REINFORCEMENT)
(REFR NOTE 6)



CLASS - IV & V
VERY POOR ROCK
(WITH DOUBLE LAYER OF REINFORCEMENT)
(REFR NOTE 6)

SPECIFICATION DRAWING
NOT TO BE USED FOR CONSTRUCTION

एसजेवीएन लिमिटेड
SJVN LIMITED

लोअर अरूण जल विद्युत परियोजना नेपाल (669 मैगावाट)
LOWER ARUN H. E. PROJECT NEPAL (669 MW)

HEAD RACE TUNNEL
(STA. 00.00 TO STA.100.00)
LINING DETAILS(TYPICAL CROSS SECTIONS)
ROCK CLASS I TO V

अभिकल्पित DSGN.	सचिक्षित CHKD.	संस्तुत RECM.
रेखांकित DRWN.	प्रस्तुत SUBM.	अनुमोदित APPD.

DRG.NO.LAHEP-HT-S13 | JANUARY, 2023

Data Sheets

Volume-6, Section-8

Data Sheets

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DATA SHEET - 1 PAGE ___ OF ___ PAGES

Work Commitments

Name of Construction Company (Sole Bidder); Partner of a joint venture/Consortium and/or sub-contractor(s):

Bidder should provide information on their current commitments on all construction contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion.

Name of contract	Description of works	Stipulated date of completion	Contract Value (equivalent INR)*	Value of outstanding work (INR equivalent)*	Estimated completion date
1.					
2.					
3.					
4					
5					
6.					
7.					
8.					
9.					
10.					

* i) Exchange rate as on date of award of Contract.
ii) Mention exchange rate adopted.

Date _____ Signature ----------

DATA SHEET - 2

Personnel Capabilities

Name of Bidder or Partner of a joint venture

For specific positions essential to contract implementation, Bidders should provide the names of at least two candidates qualified to meet the specified requirements. The data on their experience should be supplied in separate sheets using ***Form 2A*** *for each candidate.*

1.	Title of position	
	Name of prime candidate	
	Name of alternate candidate	
2.	Title of position	
	Name of prime candidate	
	Name of alternate candidate	
3.	Title of position	
	Name of prime candidate	
	Name of alternate candidate	
4.	Title of position	
	Name of prime candidate	
	Name of alternate candidate	
5.	Title of position	
	Name of prime candidate	
	Name of alternate candidate	

Note: Names proposed above will be posted against the work. Any change in name at later stage will require the approval of the Employer.

DATA SHEET - 2A

Personnel Candidate Data

Name of Bidder or Partner of a joint venture

Position		Candidate ( ) Prime ( ) Alternative
Candidate information	Name of candidate	Year of birth
	Professional qualifications	
Present employment	Name of employer	
	Address of employer	
	Telephone Fax	Contact (manager/personnel officer)
	Present job title of candidate	Years with present employer

Summarize professional experience to meet the specified requirements, in reverse chronological order. Indicate particular technical and managerial experience relevant to the Project.

From: *month/yr.*	*To:* *month/yr.*	*Company*	*Project (country)/Position/Relevant technical and management experience*

DATA SHEET - 3
Equipments :

Name of Bidder or Partner of a joint venture

The Bidder should indicate availability of all Equipment, which he would propose to use for the Contract, in separate sheets in a form as shown below:

List of Proposed Equipment

No.	Name of Equipment	Capacity or production rate	Nos. of unit	Year of manufacture	Current ownership *1	Current location (country)	Estimated purchase price (INR per unit)
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

*1: Classify as I for owned (Lead Partner or other Partner), or II to be leased and III to be purchased. The proposed old Equipment should not be older than 50% of scheduled life of Equipment.

Separate Form-3A should be prepared for major items of equipment listed in this Form-3.
Separate Form-3B should be prepared for deployment schedule of all the above Equipment.

NB:

- If Contractor proposes any special methodology of construction for any of the structure, a note to its effect to be attached and technical details and justification also to be furnished.
- The construction equipment planning should be commensurate with construction methodology, availability of construction material and overall construction programme.
- Contractor shall plan suitable units of the Equipment as per requirements of the working fronts.

DATA SHEET - 3A

Equipment Data

Name of Bidder or Partner of a joint venture

Name of equipment		
Equipment information	1. Name of manufacturer	2. Model and power rating
	3. Capacity or production rate	4. Year of manufacture
Current status	5. Current location	
	6. Details of current commitments	
Source	7. Indicate source of the equipment ( ) Owned ( ) Leased ( ) To be purchased	

Omit the following information for equipment owned or to be purchased by the Bidder or Partner.

Present Owner	8. Name of owner	
	9. Address of owner	
	Telephone Fax	Contact name and title
Agreements	Details of lease/manufacture agreements specific to the Project:	

DATA SHEET - 3B

Deployment Schedule for Equipment

Name of Bidder or Partner of a joint venture

Deployment Schedule

S. No.	Name of Equipment	Capacity or production rate	Nos. of unit	Year of manufacture	Monthwise Deployment (reckoned from Commencement date)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

DATA SHEET – 3C

DELETED

DATA SHEET – 4

Financial Data

Name of Bidder or Partner of a joint venture

Bidders, including each Partner of a joint venture, should provide financial information to demonstrate that they meet the requirements stated in the Instructions to Bidders summarizing actual assets and liabilities in Indian Rupees equivalent. Based upon known commitments, summarize projected assets and liabilities in Indian Rupees equivalent for the next two years. Each Bidder or Partner of a joint venture must fill in this form

Financial information in INR equivalent	CURRENT YEAR (Million INR)		PROJECTED FOR NEXT TWO YEARS (Million INR)			
	Financial Year		Financial Year		Financial Year	
	1st half (6 month)	2nd half (6 month)	1st half (6 month)	2nd half (6 month)	1st half (6 month)	2nd half (6 month)
1. Turnover						
2. Total assets						
3. Current assets						
4. Total liabilities						
5. Networth						
6. Current liabilities						

*(Attach **printed** audited financial statements*

Specify proposed sources of financing to meet the cash flow demands of the Project, net of current commitments)

Source of financing	*Amount (INR equivalent)*
1.	
2.	
3.	

Firms owned by individuals, and partnerships may submit their balance sheets certified by a registered accountant, and supported by copies of tax returns, if audits are not required by the laws of their countries of origin.

Date _____ Signature _____

Note :

1. Please attach separate sheet for the details of the :
   a. sub-contractor
   b. holding company .
2. Exchange rate at the end of each year.
3. Mention exchange rate adopted.
4. To please attach detailed data sheet wherever possible.
5. Evidence of access to lines of credit (Sole Bidder / Lead Partner of JV) in line with clause 5.1 b) of ITB to be submitted alongwith the bid.

DATA SHEET - 5

Proposed Site Organization

Name of Bidder or Partner of a joint venture

A. Preliminary Site Organization Chart *

B. Narrative Description of Site Organization Chart

C. Description of Quality Assurance at Site

D. Description of Relationship between Head Office and Site Management

*** Note:** The details of foreign nationals (number and designation) to be deployed at site should also be specified.

DATA SHEET-6

PROPOSED SUBCONTRACTORS

Name of Bidder or Partner of a joint venture

Section of Works	Approximate Value [1]	Name(s) & Address(es) of Subcontractors	Description & location of similar works previously executed
1.			
2.			
3.			
4.			

1. The contractor shall provide in the above format the details of proposed subcontractor other than those proposed to be engaged as sub-contractor for meeting the specified qualifying criteria under clause 5 & 6 of ITB.

[1] Value in INR equivalent

DATA SHEET – 7

CONSTRUCTION PROGRAMME

Name of Bidder or Partner of a joint venture

Submit a construction programme in bar chart form, which starts at the date of Letter of Acceptance and is completed within scheduled time as specified in Appendix to Tender.
The Construction Programme shall show various activities and their period including interdependent milestones specified in Appendix to Tender. The duration of interdependent milestones shall be kept same as specified in Appendix to Tender

DATA SHEET 8

CONSTRUCTION METHODS

Name of Bidder or Partner of a joint venture

The Bidder shall submit an outline of description of proposed methods, sequences, facilities and layouts to be used for construction. The information should be submitted in sufficient detail to allow an assessment of the general adequacy of the Bidder's proposal. Sketches, drawings and diagrams should be included where ever necessary for clarification of the description. Required number and classification of manpower, equipment and materials to be used for each particular activity shall be described. The Bidder shall prepare construction methodology in detail after careful study of Project site, geology, construction material, hydrology & project access roads etc. The construction methodology should commensurate with Construction Equipment planning, project personnel and detail construction programme and milestones. The construction methodology proposed by the bidder should be best suited with Equipment planning (with month-wise deployment schedule) and construction schedule to complete the works within the overall time frame provided in the Bid documents.

DATA SHEET- 9

LABORATORY EQUIPMENT

Name of Bidder or Partner of a joint venture

List the detailed breakdown of equipment to be furnished for sampling and testing of materials for concrete, fill materials or any other items in the Contractors field laboratory. The equipment and instruments listed should be grouped under heading with cross-reference to the relevant tests or standards detailed in the Technical Specifications.

DATA SHEET-10

SURVEYING EQUIPMENT

Name of Bidder or Partner of a joint venture

List equipment for surveying and setting-out work (Equipment shall also be used by Employer for verification purposes as and when required).

DATA SHEET-11

BREAK DOWN OF PRICES
(To be submitted later, if required by the Employer)

Name of Bidder or Partner of a joint venture

Note: *Bidders are not required to complete this Data Sheet at the time of preparation of Bids. Only the Bidders, who are requested by the Employer, will submit the analysis of unit rates as per the format below in accordance with the Instructions to Bidders. (Clause 27.1).*

Bidder shall provide the breakdown of such Unit Prices as the Employer may determine, in accordance with the form shown hereunder. This cost breakdown shall include the breakdown of local as well as foreign currencies and shall include overhead and profit. This form shall become part of the Contract and no claims may be made against the Employer for excess or deficiency therein whether actual or relative to other items.

Item No._____ (in the Schedule)

Work:_____

Unit Price:

Foreign Component: _____

Local component : _____

Particular Description (by item):	Unit Quantity	Foreign Currency Rate	Foreign Currency Amount	Local Currency Rate	Local Currency Amount
1. Material costs					

Subtotal 1		----------		----------	
2. Manpower costs (by grade, except supervisory and managerial staff)					

Subtotal 2		----------		----------	
3. Plant and equipment costs (by type)					

	Subtotal 3	----------	----------
4.	Costs of supervisory and managerial staff		

	Subtotal 4	----------	----------
5.	Other direct		

	Subtotal 5	----------	----------
6.	Indirect costs, if any		

	Subtotal 6	----------	----------
7.	Overhead and profit		

	Subtotal 7	----------	----------
	Total 1+2+3+4+5+6+7	==========	==========

Signature: _____

Title and position: _____

DATA SHEET- 12

Confirmation of the Site Visit by the Bidder

Name of Bidder or Partner of a joint venture

We……

……(Name of Bidder) whose registered office is at……
…… declare herewith that our representatives have visited the site of the works on……day of ……2023…….., and that we have fully informed ourselves of all conditions, local and otherwise, which may affect the preparation of this bid and the performance of works.

Give names and positions of the representative(s) who took part in the site visit(s):

Name:…….. Signature:……..

Position:…….. Date:……..

Representative of…….

……

Name:…….. Signature:……..

Position:…….. Date:……..

Representative of…….

……

Name:…….. Signature:……..

Position:…….. Date:……..

Representative of…….

……

Name:…….. Signature:……..

Position:…….. Date:……..

Representative of…….

……

Name:…….. Signature:……..

Position:…….. Date:……..

Representative of…….

……

DATA SHEET -13

Additional/ Supplemental Information

Name of Bidder or Partner of a joint venture

Add any further information that the Bidder considers to be relevant to the evaluation. If the Bidder wishes to attach other documents, list them below.

Bidders should not enclose testimonials, certificates, and publicity material with their applications; they will not be taken into account in the evaluation of qualifications and will be discarded.