UPPER KHUDI HYDROPOWER PROJECT

Lamjung, Gandaki Province

Progress Report

(Nov 2025)

Super Khudi Hydropower Ltd.

Charkhal, Dillibazar

Kathmandu, Nepal

Tel: 01-4424655

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1 Introduction

1.1 Background

Super Khudi Hydropower Ltd. aims to develop Upper Khudi Hydropower Project in Lamjung district of Gandaki Province and is dedicated to supply the power to the national grid to fulfill the present energy demand. It is a run of river type project in the Khudi River with 26 MW installed capacity. The Khudi River is a snow-fed Perennial River originating from Lamjung Himal situated at an elevation of nearly 5000m amsl in Lamjung District. It is one of the tributaries of the Marsyangdi River. The river flows through dense and undisturbed forest and joins the Marsyangdi River at Khudi Bazaar. The catchment area is elongated from North-West to South-East direction draining toward the south. The catchment area at the proposed intake is 72.3 km^2.

1.2 Location and Access

The project is located in ward no 2 & 3 of Marshyangdi Rural Municipality of Lamjung district. The headworks area of the project lies near the Probi village and the powerhouse area lies at Batase Odar. The approximate distance of the powerhouse and headworks of the project from Beshisahar, the district headquarter of Lamjung, is 9 km and 15 km respectively. Geographically the project area lies within $84^0$18'32" E / $84^0$19'26" E to $84^0$20'44" E and $28^0$18'22" N to $28^0$21'19" N/ $28^0$21'50" N.

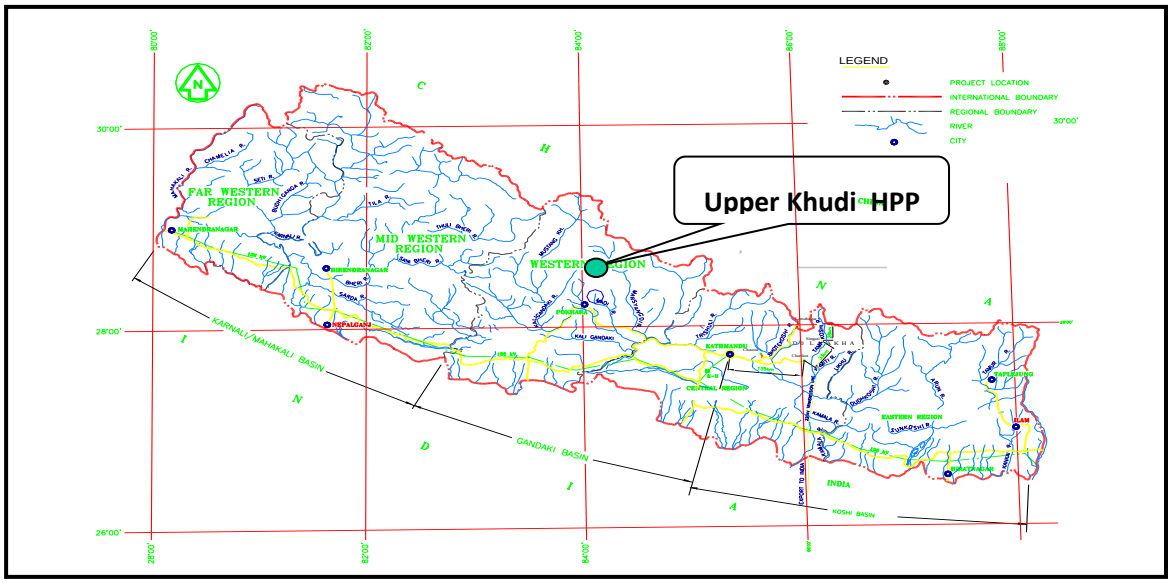

Figure 1: Project Location

1.3 Brief Project Description

The main structures of the project are an overflow weir, undersluice, side intakes, gravel trap, approach tunnel, settling basin, headrace tunnel, forebay, penstock, anchor blocks, saddle supports, power house and tailrace canal. The project diverts water from the Khudi River to the intake by means of the weir which passes through a 3.9 km long headrace tunnel and 2.5 km long penstock and is finally released to the Khudi River after power generation. The power generated from the Khudi river is evacuated to the Tadikuna Substation of NEA by means of approximately 5 km long 132 kV transmission line.

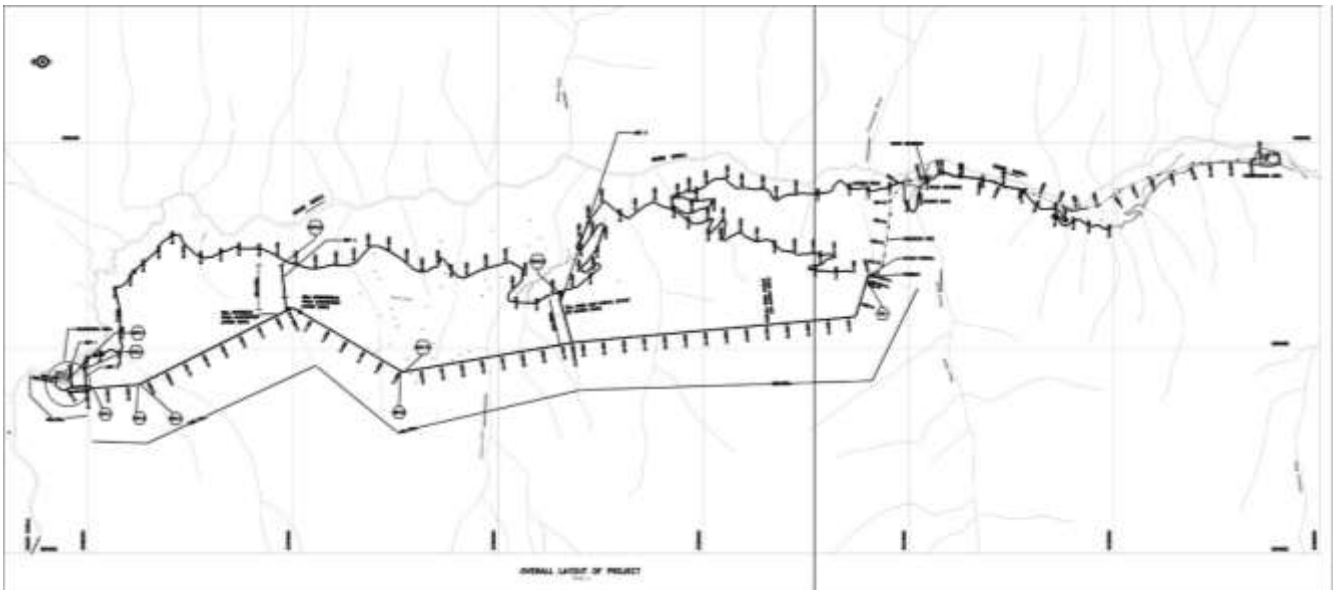

Figure 2: Project Overall Layout

1.4 Salient Features

Project Location

Province		:	Gandaki
Zone		:	Gandaki
District		:	Lamjung
Intake Site		:	Probi Village
Powerhouse Site		:	Batase Odar
Geographical Co-ordinates			
	East	:	84^0 20’44”
	West	:	84^0 18’32” E to 84^0 1’26” E
	North	:	28^0 21’19” N to 28^0 21’50” N
	South	:	28^0 18’22” N

General

Name of River	:	Khudi
Nearest Town	:	Besisahar
Type of Scheme	:	Run-of-River
Gross Head	:	531.88 m
Net rated Head	:	513.11 m
Installed Capacity	:	26 MW
Average Annual Energy after Outage	:	156.51 GWh
Dry Season Energy	:	51.35 GWh
Wet Season Energy	:	105.15 GWh

Hydrology

Catchment Area	:	72.32 sq.km

Mean Annual Discharge	:	7.38 m^3/s
Design Discharge (at 40 % PoE)	:	5.85 m^3/s
Riparian Release	:	0.26 m^3/s
Design Flood Discharge	:	182 m^3/s (at 100 Year's Flood)
Average Annual Precipitation	:	5,176 mm

Diversion Weir

Type of Weir	:	Boulder Lined, Overflow Type
Length of Weir	:	30 m
Crest Elevation	:	1504.77 m
Spillway type	:	Over Flow
Undersluice Opening (W X H)	:	2.5m X 5.0m
Undersluice Crest Level	:	1,506 m

Intake and Gravel Trap

Type of Intake	:	Orifice
Nos of Opening	:	2
Size of Intake (W x H)	:	2.6m x 1.2m
Intake Sill Level	:	1,503.16 m
Length of Gravel Trap	:	17.5 m
Width of Gravel Trap (Avg.)	:	6 m
Overall depth	:	4.5 m
Particle size to be trapped	:	$\geq$ 2.0 mm
Flushing Channel	:	31.5 m

Approach Tunnel

Type	:	Underground Inverted D-Shaped
No. of canal	:	1
Length	:	105.85 m
Size (W x B)	:	2.5m x 2.5m

Settling Basin

Type	:	2 Nos. / Hopper Shaped
Dimension (L x B x H)	:	(59m x 6m x 10.4m)
Inlet Transition Length	:	7 m
Particle Size to be settled	:	$\geq$ 0.15 mm
Trapping Efficiency	:	90% at 15°C

Headrace Tunnel

Type	:	Inverted D Shaped
Internal Diameter	:	2.5m x 2.5m
Length	:	3,971 m
Steel Thickness/Type of Lining	:	Concrete Lining

Forebay

Type	:	Underground
Length	:	17 m
Width (Or size)	:	4.3 m
Normal Operation Level	:	1,499.97 m
Steel Penstock Pipe		
Type	:	Steel Pipe (Surface)
Internal Diameter	:	1.45 m
Length	:	2512 m
Steel Thickness	:	12-25 mm
Nos. of Anchor Blocks	:	37
Nos. of Saddle Supports	:	321
Powerhouse		
Type	:	Surface
Size (L x W)	:	42.5m x 15m
Height	:	15.5 m
Turbine Axis Level	:	972.5 m
Tailrace		
Type	:	Rectangular, RCC
Tailrace Length	:	80 m
Size (W x D)	:	3.8m × 2.9m
Tailrace Water Level	:	968.6 m
Turbine		
Type	:	Vertical Axis Pelton Turbine
Number	:	2
Rated Output Capacity per unit	:	13 MW
Turbine Axis Level	:	972.5 m
Net Head	:	513.11 m
Discharge per Unit	:	2.925 m^3/s
Efficiency	:	91 %
Governor		
Type	:	PID
Adjustment for Speed Drop	:	Automatic Switch Over
Generator		
Type	:	Synchronous
Rated Output Capacity per Unit	:	16.25 MVA
Power Factor	:	0.8
Generation Voltage	:	11 kV
Frequency	:	50 Hz
No of Units	:	2

Excitation System	:	Fully Static Brushless
Efficiency	:	97 %
Transformer		
Type	:	3-Phase Oil Immersed
Rated Capacity	:	16.25 MVA
Voltage Ratio	:	11/2 132 kV
No of Units	:	2
Vector Group	:	YNd11
Frequency	:	50 Hz
Efficiency	:	99%
Transmission Line		
Voltage Level	:	132, kV, Single Circuit
Length	:	5 km
Conductor Type	:	ASCR "WOLF"
From	:	Upper Khudi Hydropower Project's Switchyard
To	:	NEA's Tarikuna Substation

2 Project Implementation

The company obtained the Generation license on May 2018. The RCoD date of the project is Jan 2026. The project has completed IEE and EIA studies of the transmission line and the project. The project is now in the construction phase. The Supervision & Management Consultants, Civil Contractors, Explosives Supplier, Electromechanical supplier, Hydromechanical Supplier and Transmission line contractor have already been mobilized and working at site. The land acquisition for the transmission line has been completed. The electromechanical design has been completed and the manufacturing and supply of equipment is in process. The details of the contractors of the project are as follows.

Description	**Contractor's Name**	**Number of Manpower**
Civil Contractor	Baibhav / Adwin JV	Skilled - 75
		Unskilled - 80
Hydromechanical (penstock pipe fabrication) Contractor	Cangzhou Spiral Steel Pipes Group Co. Ltd	
Hydromechanical Erection Contractor	Cream Hydel Pvt. Ltd.	Skilled - 20
		Unskilled - 10
Electromechanical Contractor	Troyer AG-SpA (Italy), Troyer Hydro Pvt. Ltd. (India)	
Transmission Line Contractor	Baibhav / Adwin JV	Skilled - 8
		Unskilled - 30
Explosive Supplier	Synex Power Pvt. Ltd.	

3 Financing Arrangement

The financial arrangement of consortium banks are:

- Global IME Bank as the Lead Bank
- Himalayan Bank
- Kumari Bank
- Agriculture Development Bank

The debt equity ratio has been maintained as 70:30.

4 Present Status of Work:

4.1 Civil Works

4.1.1 Cofferdam

The first phase and second phase of cofferdam construction and river diversion work is completed. The river has also been diverted and passes through undersluice.

4.1.2 Weir and Undersluice

The project weir has an axis length of 26 m, divided into two construction phases of 13 m each. The first phase (13 m) is almost completed, and the river has already been diverted through the undersluice. The second phase (13 m) of weir construction is currently in progress. The completed portion of the weir (first phase) has been safeguarded with a plum wall approximately 3–4 m high, extending from the first cutoff to the last cutoff and boulder filling in between cutoff wall is in progress .

The divide wall and guide wall concreting are completed. Bypass canal concreting has been completed. The counterfort wall concreting is also completed.

In addition, the boulder lining and ARC concreting work in the undersluice have been completed. The steel lining works at both the undersluice and intake orifice have also been completed.

Figure 3: Weir & Undersluice Construction

Figure 4: Bypass Canal Construction

Figure 5: Guide Wall & Divide Wall Construction

Figure 6: Guide Wall Construction

Figure 7: Counterfort Wall Construction

4.1.3 Intake and Gravel trap

The construction of the intake is in progress. Plum concrete work at the intake gate portion has also been finished. Currently, rebar works at the intake portion are in progress. The graveltrap excavation is completed and rebar work is in progress. In addition, the steel lining work at the gravel flush canal end has been completed. Guide wall construction between intake and protection wall is in progress.

Figure 8: Intake Construction

Figure 9: Graveltrap Construction

4.1.4 Approach Tunnel

The 420 m long approach tunnel with a cross-section of 3 m × 3 m is being excavated from both the intake and the outlet at Marta Khola. To date, approximately 403 m of the tunnel has been excavated, which is about 96% of the total length.

Table 1: Approach tunnel construction progress

Total Length (m)	Excavation from Intake (m)	Excavated from Marta (m)	Total Excavation (m)	Completion %
420 m	62 m	341 m	403 m	96 %

Figure 10: Approach tunnel Construction

4.1.5 Approach Pipe

The site clearance and excavation for the approach pipe is in progress. The fabrication of approach pipe is in progress at the workshop.

4.1.6 Settling Basin

The rock excavation and slope stabilization work including rock bolting, wire mesh laying, and shotcrete application for the settling basin have been completed. Excavation of hopper is ongoing at present.

Figure 11: Settling basin construction

4.1.7 Flood Protection Works

Flood protection works such as gabion walls, stone masonry walls, and boulder riprap have been done as per site conditions to safeguard the structures from potential floods and landslides at the headworks, along the penstock alignment, and at the access road.

Figure 12: Flood protection work

4.1.8 Headrace Tunnel

The headrace tunnel is 3971m long and has the excavation size of 3 m × 3 m. The headrace tunnel is being excavated from outlet, adit 3 and adit 4. Till date, about 96 % of length of the headrace tunnel has been excavated and the required supports are provided. About, 3805.75 m length of tunnel has been excavated till date from five faces. The project has two adits with 454 m total length. The excavation of both adits has been already completed. The breakthrough of tunnel section between outlet portal and Adit 3 was done on 16th July 2025. Similarly, breakthrough of tunnel section from Settling basin inlet to Adit 4 d/s was done on 24th Sep 2025 Additionally, about 808 m of invert lining has been completed so far.

Table 2: Headrace tunnel Excavation progress

Description	Total Length (m)	Excavation from Outlet (1 Face) (m)	Excavated from Adit 3 (2 Face) (m)	Excavated from Adit 4 (2 Face) (m)	Total Excavation (m)	Completion %
Headrace Tunnel Excavation	3971 m	1568.75 m	1335 m	902 m	3805.75 m	96 %
Adit 3	238				238	100 %
Adit 4	216				216	100 %

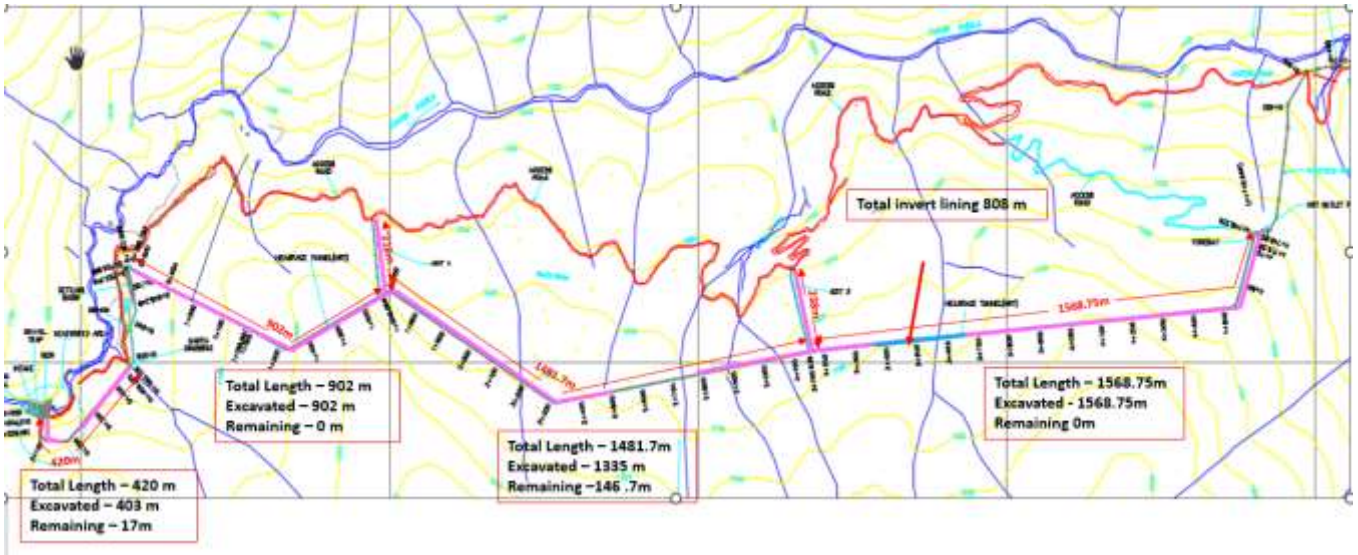

Figure 13: Tunnel construction progress

Figure 14: Shotcreting, Break Through Adit 4 D/S & Invert Lining in Tunnel

4.1.9 Underground Forebay

Due to space constraints at the surface, an underground forebay has been proposed at the tunnel outlet. The excavation of the forebay has already been completed. Similarly, spot bolting, initial shotcrete, wire mesh installation, and rib installation have also been completed.

Figure 15: Forebay construction

4.1.10 Anchor Blocks, Saddle Blocks & Syphon

The project has a 2,512 m long steel penstock, requiring a total of 37 anchor blocks and 318 saddle blocks. To date, 31 anchor blocks and 280 saddle blocks have been completed.

The penstock pipe erection work is progressing in parallel. For the remaining anchor blocks and saddle blocks works such as excavation, PCC, stone soling, formwork, reinforcement laying, and concreting are being carried out simultaneously.

Table 3: Anchor block construction progress

S.N.	Description	Excavation	Concreting
1	VAB1		
2	CAB2	Completed	Completed
3	CAB3	Completed	Completed
4	VAB4	Completed	Completed
5	VAB5	Completed	ongoing
6	VAB6	Completed	Completed
7	VAB7	Completed	Completed
8	VAB8	Ongoing	Completed
9	CAB9	Complete	Completed
10	CAB10	Complete	ongoing
11	AB11		
12	CAB12		
13	VAB13	Completed	ongoing
14	AB14	Completed	Completed
15	CAB15	Completed	Completed
16	CAB16	Completed	Completed
17	CAB17	Completed	Completed
18	CAB18	Completed	Completed
19	CAB19	Completed	Completed
20	CAB20	Completed	Completed
21	HAB21	Completed	Completed
22	VAB22	Completed	Completed
23	VAB23	Completed	Completed
24	CVAB24	Completed	Completed
25	HAB25	Completed	Completed

26	CAB26	Completed	Completed
27	HAB27	Completed	Completed
28	CAB28	Completed	Completed
29	VAB29	Completed	Completed
30	CAB30	Completed	Completed
31	VAB31	Completed	Completed
32	HAB32	Completed	Completed
33	CAB33	Completed	Completed
34	VAB34	Completed	Completed
35	VAB35	Completed	Completed
36	VAB36	Completed	Completed
37	CAB37	Completed	Completed

Figure 16: Anchor block construction

4.1.11 Powerhouse and Tailrace

The concreting work up to the maintenance bay level has been completed, and the superstructure construction is currently in progress. The excavation of the tailrace has been completed, and concreting works are ongoing. In addition, earthwork filling around the powerhouse is being carried out simultaneously. The sole plates for the crane beam rail have been installed. The roof truss of powerhouse has been delivered at the project site.

Figure 17: Powerhouse & Tailrace Construction

4.2 Hydromechanical Works

The project has a 2,512 m long penstock pipe, all of which has already been delivered to the site. Erection works are in progress, with approximately 2,000 m of penstock erected to date.

The design of gates, expansion joints, bifurcation, and manholes has been completed, and fabrication is currently underway. The frames of the bypass gate, undersluice gate, and intake gate have also been delivered to the site.

At the intake, the steel lining work at the orifice intake and undersluice has been completed. Additionally, the frame installation of the bypass gate, undersluice gate, and tailrace gate has been completed. The trash rack frame installation at the bypass canal has also been finalized.

Figure 18: Pipe Erection & Frame Installation Work

4.3 Electromechanical Works

The design of the electromechanical components is nearly completed, and the process of manufacturing and supply is currently underway. The EOT crane and roof truss has already arrived at the project site.

Figure 19: Supply of EOT Crane & Roff Truss

4.4 Transmission Line

The transmission line survey and detailed design have been completed, and the required land has been acquired. The structural tower drawings and detailed design have also been finalized and approved. The contractor has been mobilized, and tower foundation works are ongoing at site.

Out of a total of 20 transmission line towers, the foundations of 11 towers have been completed. The status of the transmission line foundation works is summarized below:

Table 4: Transmission tower foundation work progress

S, N.	Tower Description	Excavation	Foundation Concreting
1	AP1	Completed	Completed
2	AP2	Completed	Completed
3	AP3	Completed	Completed
4	AP5	Completed	Completed
5	AP5/1	Completed	Completed

6	AP7	Completed	Completed
7	AP8	Completed	Completed
8	AP8/1	Completed	Completed
9	AP9	Completed	Completed
10	AP9/1	Completed	Ongoing
11	AP10	Completed	Completed
12	AP11	Completed	Completed
13	AP12	Completed	Ongoing

Figure 20: Transmission tower foundation construction

4.5 Land Acquisition

The project has already acquired 52 ropani land required for the project components, office, staff quarters, store, army camp, bunker and other facilities.

4.6 Camps and other facilities

The project has already constructed the office, staff quarter, store and other facilities required for the site staffs of the project. Similarly, the labor camps at headworks, adits and power house have also been constructed.

Figure 21: Camp & housing

4.7 Army Camp and Bunker House

The camps, bunker and other facilities required for the army are already completed. The army is stationed in the army camp.

Figure 22: Army camp

4.8 Environmental & Social Mitigation

The total budget allocated in the EIA report has already been released to the Sarokar Samiti. The project has also contributed to the CSR activities which include hume pipe laying, gabion works, river training works, upgrading community road, truss bridge, supply of electrical poles etc.

Figure 23: CSR activities

4.9 Access Road and Bridge

The construction of access road upto headworks has been completed. A hume pipe culvert has been constructed at the Kichhe Khola to cross the vehicle easily even in the monsoon season.

Figure 24: Access road

5 Work Progress

The realistic measurement of work progress in the construction is a key element for successful project management which provides as-built information for project planning, estimate, cost control etc. It helps determine the earned value of a project and forecasts the cost at completion and estimated completion date. The present work progress at the site has been monitored, evaluated and the corresponding individual work progress is presented in the table below.

Table 5: Individual physical progress achieved

S.N.	Description	Total Work	Progress till date	Progress % till date	Remarks
1	**Civil Works**				
A	**Underground Structure**				
i	Approach pipe	200 m	30 m	20%	Partially excavated
ii	Approach Tunnel	420 m	403 m	96%	Excavation in progress
iii	Portals, Adits, Headrace Tunnel and Forebay	3971 m	3805.75 m	96%	Excavation in progress
B	**Surface Structure**				
i	Coffer dam			100%	Completed
ii	Weir & Undersluice			83%	Cut off walls are 80 % completed & undersluice, divide walls & guide walls are 100 % completed.
iii	Intake & Gravel trap			50%	Excavation and concreting work in progress.
iv	Settling Basin			65%	Excavation work is completed & slope stabilization work (rock bolt, wiremesh, shotcrete) in progress
v	Flood Protection Work			60%	Flood protection works as per requirement at different locations.

vi	Penstock and Anchor Blocks (surface)			93%	Out of 37 nos. of anchor blocks and 318 nos. of saddle blocks, 31 nos. of anchor blocks & 280 nos. of saddle blocks are completed and remaining works are ongoing.
vii	Power House & Tailrace			90%	Foundation works, shear walls and concreting upto maintenance bay level is completed and superstructure concreting work is in progress Tailrace excavation is completed and concreting work is almost completed.
viii	Switchyard			30%	Site clearance & excavation work is in progress.
ix	Spillway canal			30%	Excavation work in progress.
2	**Hydromechanical Works**			90%	Out of 2512 m, 2,200 m length penstock has been erected and testing completed. Steel lining in intake & undersluice are completed and steel frame installation is in progress.
3	**Transmission Line**			45%	Procurement of Land completed. Out of 20 towers, the foundations of 11 towers are completed. LC has been open for tower materials.
4	**Electromechanical Works**			50%	Design completed and manufacturing and delivery is in progress.
5	**Access Road**			100%	Completed.

Based on the progress presented in table 5, the physical progress was calculated and it is 83.30 % till date.