TALLO LIKHU JALAVIDHYUT AAYOJANA (28.1 MW)



MONTHLY PROGRESS REPORT #48

APRIL, 2022 (18 Chaitra, 2078 to 17 Baisakh, 2079)

Prepared By:



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1 PROJECT OVERVIEW AND INSTITUTIONAL ARRANGEMENT

Tallo Likhu Jalavidhyut Aayojana is a run-of-river (RoR) hydropower project which utilizes gross head 118 m and design discharge of 29.75 m³/s resulting to an installed capacity of 28.1 MW. The entire project area (headworks to powerhouse) is located in Likhu-Tamakoshi Rural Municipality (Saipu, ward no. 2 and Bijulikot ward no. 4) of Ramechhap, Bagmati Province, Nepal. Geographically, the project lies between Longitudes 86°15'38" E to 86°13'17" E and Latitudes 27°25'56" N to 27°22'47"N. Geologically, the project area belongs to the Lesser Himalayas.

The project's headworks area is accessible via two different road routes. One from Kathmandu-Dhulikhel-Charikot-Nayapul-Dhobi-Sirise (227 km) and another from Kathmandu-Dhulikhel-Khurkot-Manthali-Dhobi-Sirise (170 km).

CONSTRUCTION MANAGEMENT

The Employer/Owner	Swet Ganga Hydropower & Construction Ltd. (SGHCL)	
The Engineer/ Consultant	Sanima Hydro and Engineering Pvt. Ltd. (SHEPL)	
The Contractor (Civil Construction Works)	High Himalaya Hydro-Bavari Construction J.V.	
The Contractor (Hydro-mechanical Works)	Machhapuchhre Metal & Machinery Works (P.) Ltd. (3MW)	
The Contractor (Electro-mechanical Works)	Asia Pacific Power-Tech Co. Ltd., China	
The Contractor (Transmission-line Works)	Aster Teleservices Nepal Pvt. Ltd.	
Pre-construction works, camp facilities, social environment	Direct by the Employer	

2 KEY DATES

Table 1: Key dates of major events of the project

Description	Date
Generation License issued by Department Elec-	2 Baisakh 2073 (14 April 2016)
tricity Development (DoED), Ministry of Energy (MoE), Government of Nepal (GoN)	The license period of the project is from 28 Chaitra 2072 to 27 Chaitra 2107 B. S.
Power Purchase Agreement (PPA) with Nepal Electricity Authority (NEA)	14 Poush 2073 (29 December 2016)
Financial Closure	10 Falgun 2074 (22 February 2018)
Contract of Main Civil Works	5 Chaitra 2074 (19 March 2018)
Contract of Hydro-mechanical Works	9 Poush 2075 (24 December 2018)
Contract of Electro-mechanical Works	18 Bhadra 2076 (4 September 2019)
Contract of Transmission Line Works	8 Shrawan 2077 (23July 2020)
RCOD	15 Mangsir 2078 (1 December 2021)

3 CONTRACT PACKAGES AND IMPLEMENTATION

Main civil construction works	Contract Package 1
Hydro-mechanical works	Contract Package 2
Electro-mechanical works	Contract Package 3
Transmission Line works	Contract Package 4
Pre-construction works, camp facilities, social environment	Direct by the Employer

4 FINANCING

Equity	Promoters	25% of the total Project Cost
Debt	Consortium of Banks	75% of the total Project Cost (Lead Bank: Laxmi Bank Ltd, Member Banks: Kumari Bank Ltd., Hydroelectricity Investment and Development Company Ltd. Cen- tury Commercial Bank Ltd., and Prabhu Bank Ltd.)

5 RESOURCES AT SITE

5.1 MANPOWER FROM EMPLOYER AND ENGINEER'S SIDE:

Table 2: Human Resource at site from the Employer and Engineer's side

Description	Number
General Manager	1
Resident Engineer	1
Environment and Social Officer	1
Finance/Admin Officer	1
Civil Engineer	3
Electrical Engineer	2
Mechanical Engineer	1
Engineering Geologist	1
Safety Coordinator	1
Civil Overseer/Sub-overseer	4
Mechanical Overseer	6
Electrical Overseer/Sub-	7
overseer	
Surveyor	2
Social Mobilizer	3
Admin Assistant	2
Driver	4
Cook	3
Office Helper	5
Construction Helper	6
Store keeper	1
Total:	55

5.2 MANPOWER FROM CIVIL CONTRACTOR'S SIDE:

Table 3: Human Resource at site from the Civil Contractor's side

Description	Number
Technical Manpower	19
Financial and Administrative manpower	27
Skilled workers(Machine Operators, Electricians, Heavy Drivers)	31
Semi-Skilled workers(Light Drivers, Civil workers)	24
Unskilled workers(Helpers, Kitchen workers, Pump operators)	22

Description	Number
Security guards	21
Total (A)	144
Other Workers (Sub-Contractors)	
DL/Bhimeshwor Construction (Headworks, Seti and Powerhouse)	48
Shaili Construction (Headworks)	9
Karan-Arjun Construction (Main Inlet)	20
Dreamland construction (Seti Outlet)	40
Gaiya Devi Construction (VB02)	28
Total (B)	145
Grand Total (A+B)	289

Note: Data as per weekly report provided by the Main Civil Contractor on 30th April 2022.

5.3 MANPOWER FROM HYDRO-MECHANICAL CONTRACTOR'S SIDE:

Table 4: Human Resource at site from the Hydro-Mechanical Contractor's side

Description	Number
Site Project Engineer	1
Site Supervisor	3
Safety Officer	1
Store In-charge	1
Quality Controller	1
Electrician	1
Sand Blasting Operator	1
Hydra Operator	1
Tractor driver	1
Fitter	4
Welder	6
Helper	10
Cook	3
Total	34

5.4 EQUIPMENT MOBILIZED BY CIVIL CONTRACTOR

Table 5: Equipment mobilized by the Civil Contractor

S.N.	Equipment Name	Number	S.N.	Equipment Name	Number
1	Generator 62.5KVA	2	24	Pusher leg	37
2	Generator 30KVA	1	25	Blaster (Exploder)	6
3	Generator 125KVA	1	26	Siren	6
4	Generator 25 KVA	1	27	Core Cutting machine	2
5	Generator 160 KVA	3	28	Hand drilling machine	3
6	Generator 250 KVA	2	29	Air compressor	7
7	Air Receiver tank	4	30	Vibrators	8
8	Ohm meter	6	31	Water pump 10"	2
9	Excavator	4	32	Water pump 12"	1
10	Dump Truck	11	33	Water Pump 1.5"	6
11	Transportation Truck	1	34	Water pump 6"	4

S.N.	Equipment Name	Number	S.N.	Equipment Name	Number
12	Backhoe Loader (JCB)	3	35	Grinding machine(4")	6
13	Wheeled loader	4	36	Grinding machine(7")	1
14	Tractor	3	37	Welding machine	8
15	Light vehicle	6	38	Ply cutter machine (8"/7")	1
16	Concrete Batching Plant	1	39	Prism with tripod set	5
17	Concrete mixer	10	40	Leveling staff (5m)	4
18	Grouting pump	4	41	Total station (Topcon)	3
19	Concrete pump	3	42	Auto level with tripod set	4
20	Transit mixer	4	43	Shotcrete machine PZ5	3
21	Blower fan set	2	44	Compressive test machine	2
22	Pull out test machine	1	45	Lubricator	43
23	Shotcrete Robot (Jacon)	1	46	Diesel Tank 16000Ltr	3

5.5 EQUIPMENT MOBILIZED BY HYDRO-MECHANICAL CONTRACTOR

Table 6.	able 6. Equipment mobilized by the mydro-wechanica				
S.N.	Equipment	Number			
1	Hydraulic Crane	1			
2	Excavator	1			
3	Tractor	1			
4	Diesel Generator (200 KVA)	1			
5	Diesel Generator (40 KVA)	1			
6	Diesel Generator (12.5 KVA)	1			
7	Welding Machine	14			
8	Compressor	1			
9	Grinding Machine (7")	14			
10	Grinding Machine (4")	8			
11	Master Oven	1			
12	Portable Oven	14			

Table 6: Equipment mobilized by the Hydro-Mechanical Contractor

CONSTRUCTION MATERIALS STORED BY CIVIL CONTRACTOR AT SITE: 5.6

Materials	Unit	Balance Quantity
Diesel	Litres	14,160
Rebar (25mm dia.)	Ton	-
Rebar (20mm dia.)	Ton	3.90
Rebar (16mm dia.)	Ton	1.10
Rebar (12mm dia.)	Ton	18.30
Cement	Bags	3.892
Plasticizer	Kg	1,680.00
Steel Fibre	Kg	125.00
Micro Silica	Kg	400.00
Accelerator	Kg	275.00

Table 7: Construction material stored by the Main Civil Contractor

Note: Data as per weekly report 191 provided by the Main Civil Contractor on 30 April 2022.

6 CIVIL CONSTRUCTION WORK PROGRESS

6.1 HEADWORKS

The work progress achieved at headworks area in April, 2022 is as follows:

- Construction of the stone masonry stair in the intake area has been completed.
- Concreting has been completed for 28 m stretch of the fish passage (chainage 0+087.00 m to 0+115 m). Reinforcement bar installation work is ongoing at the stretch between chainage 0+065 m to 0+087 m.
- Construction of the settling basin spillway has been completed along with the upstream and downstream wing walls.
- Construction of the box culvert crossing has been completed at the main inlet kholsi crossing. Also, the concrete casing for the headrace pipe section in the kholsi crossing has been completed.

S. N.	Description	Unit	Quantity	Remarks
1	C25 concrete	m ³	230.00	
2	C35 concrete	m³	-	
3	1:6 Stone masonry	m ³	10.00	
4	Rebar	Ton	21.00	

Table 8: Progress at headworks in April, 2022



Figure 1: Headworks area from downstream side



Figure 2: View of fish passage



Figure 3: Settling basin spillway guide wall

6.2 HEADRACE TUNNEL, SYPHON CROSSING AND SURGE SHAFT

6.2.1 HRT FROM MAIN INLET PORTAL TO SETI OUTLET PORTAL

The full concrete lining work has been carried out for 155 m stretch in April 2022. (Total concrete lining completed = 806 m out of 865 m). The concrete lining works have been completed from the main inlet portal and pipe installation work is ongoing. The base concreting has been completed for the bell mouth area.

Lining				
Туре	Face	Design length (m)	Completed length (m)	Remaining (m)
	Face 1	528.32	528.32	-
Shotcrete	Face 2	292.80	292.80	-
	Total	821.12	821.12	-
14/011	Face 1	528.32	528.32	-
concrete	Face 2	292.80	292.80	-
concrete	Total	821.12	821.12	-
E	Face 1	263.00	263.00	-
Full	Face 2	602.00	543.00	59.00
Contracte	Total	865.00	806.00	59.00
Dine	Face 1	37.00	-	37.00
Section	Face 2	25.00	-	25.00
	Total	62.00	-	62.00

Table 9: Civil Work progress for the tunnel stretch from Main inlet portal to Seti outlet portal



Figure 4: Reinforcement installation for concrete lining at the Seti Outlet tunnel

6.2.2 HRT FROM SETI INLET PORTAL TO POKU OUTLET PORTAL

All works have been completed.

6.2.3 HRT FROM POKU INLET PORTAL TO MAIN OUTLET PORTAL

All works have been completed.

6.2.4 SETI CROSSING

Boulder lining has been accomplished at the downstream of the Seti Kholsi crossing. Concrete infill is yet to be done.



6.2.5 POKU CROSSING

All civil works have been completed at this portion. No civil work has been carried out in the month of April 2022.

6.2.6 SURGE SHAFT, ROCK TRAP AND CONNECTING TUNNEL

All works have been completed.

6.3 PENSTOCK, POWERHOUSE AND TAILRACE

PENSTOCK ALIGNMENT:

Penstock Protection Valve (PPV) House:

Construction of the penstock protection valve house is ongoing. Anchor block VB01:

Plum concreting at the anchor block VB01 has been completed up to the invert of the pipe.

Anchor block VB02:

The geo-grid structure of road retaining wall at either sides of anchor block VB02 has been completed. Plum concreting works is going.**POWERHOUSE**:

All concreting works of the powerhouse have been completed and electro-mechanical installation works is ongoing. Painting works is ongoing in the powerhouse walls.

CONTROL ROOM AND OFFICE BUILDING:

All RCC works of the control room building and the office building have been completed. Block masonry construction work is ongoing in the office building along with plaster and painting works.

TAILRACE:

All civil works of tailrace have been completed.

SWITCHYARD:

All civil works of the switchyard have been completed.

Table 10	Fable 10: Progress at penstock, powerhouse and tailrace in April, 2022						
S.N.	Description	Unit	Quantity (Powerhouse and control building)	Quantity (Penstock alignment)			
1	C25 concrete	m ³	-	200.00			
2	Re-bar	ton	-	8.00			
3	C25 Plum concrete	m ³	-	500.00			



Figure 5: PPV house and anchor block VB01



Figure 6: Saddle supports of the penstock pipe from VB01 to VB02



Figure 7: Powerhouse from East



Figure 8: Boulder lining with concrete infill for the permanent access road at the left side of anchor block VB02

7 HYDRO-MECHANICAL WORKS

The progress of hydro-mechanical installation works achieved in April 2022 is listed below:

- Erection of bell mouth has been completed at the main inlet portal tunnel side.
- Installation of railings is ongoing in the settling basin and intake area.
- Testing of radial gate hoist is ongoing.
- The undersluice stoplog leaf has been shifted to the left bay using the lifting beam.
- Installation of fine trash-rack is ongoing in the conveyance tank.



Figure 10: Installation of bell mouth at the main inlet portal tunnel



Figure 11: Installation of conveyance tank fine trash-rack



Figure 12: Testing of radial gate



Figure 13: Railing installation in the settling basin

8 ELECTRO-MECHANICAL WORK PROGRESS

The work progress of the electro-mechanical installation works in April 2022 is below: Unit 1:

- Rotor-pole assembly is ongoing.
- Installation of cable tray has been completed.

Unit 2:

- Runner-shaft assembly, rotor and upper bracket have been lowered inside unit 2.
- Connection of cable and insulation painting work is ongoing.
- Installation of firefighting pipe and cooling pipe is ongoing.
- Installation of cable tray has been completed.

Switchyard:

- Installation of main equipment has been completed except installation of isolation transformer and termination works.
- Filling of filtered transformer oil has been completed in both transformers.
- Installation of lighting tower has been completed.
- High voltage, low voltage and neutral bushing of the transformers have been installed.
- High voltage cable and control cable laying from control room to switchyard has been completed.

New Khimti Substation:

- Installation of main substation equipment and metering equipment has been completed.
- Transmission line protection panel has been installed inside the control room.
- Gravel laying work is ongoing.

PPV house:

• Installation of rail leagues for EOT crane has been completed.



Figure 14: Final installation of Stator, rotor and upper bracket at unit 2



Figure 15: Main turbine erection works at unit 1



Figure 16: Cable laying from control room to switchyard



Figure 17: Hydraulic oil pipeline and cooling pipeline works at unit 1 and 2



Figure 18: Rotor pole erection works for unit 1



Figure 19: Rail league installation for PPV house EOT crane



Figure 20: Aggregate laying in the New Khimti substation bay

9 CONSTRUCTION POWER

The 12 km long construction power line has been erected from headworks area to Sangutar in coordination with NEA and the public. The line has been charged from a 6 MVA transformer at Manthali on 16 Mangsir, 2076. The NEA's dedicated line has been made available to all working fronts. Regular monitoring and bush-cutting is ongoing.

10 TRANSMISSION LINE WORKS (132 KV)

In April 2022, erection of two towers (AP38 and AP58) has been completed. With this, the erection works have been completed for 60 towers. The concreting works have been completed for 61 tower foundations. Conductor stinging works have been completed for 19.781 km stretch and OPGW cable has been installed for 15.329 km.



Figure 21: Erection of AP58



Figure 22: Foundation works, protection works and backfill at AP57

S.N	Description of Work	Design quantity	Completed till date	Remaining	Remarks
1	Foundation Excavation	62 Nos.	61 Nos.	1 No.	
2	Foundation concreting	62 Nos.	61 Nos.	1 No.	
3	Tower Erection	62 Nos.	60 Nos.	2 Nos.	
4	ACRS Conductor stringing	22 km	19.781 km	2.219 km	
5	OPGW cable stringing	22km	15.329 km	6.671 km	

Table 11: Transmission line work progress

11 SOCIAL AND PUBLIC

The major social activities undertaken in April 2022 are:

- Distribution of compensation to the affected people of Transmission Line Right of Way.
- Financial support has been provided to the local club of Sirise for organizing Volleyball tournament.
- Water spraying is continued in the market area using tractor mounted tank.
- Cremation house has been constructed at the upstream of the weir pondage area.



Figure 23: Gathering and discussion with stakeholder regarding project activities

12 OCCUPATIONAL SAFETY AND HEALTH (OSH)

Besides the construction activities, Occupational Safety & Health (OSH) has also been considered one of the major components of the project. The OSH team at the site promotes a safe and healthy environment at the working fronts by implementing safety and health standards and safe working procedures through awareness and monitoring. The OSH team ensures preparedness in accidents and emergencies. Regular meetings with the contractors and workers are conducted for the enhancement of the safety culture. The OSH team regularly monitors the working fronts to ensure safe practice and discourage safety non-compliance.

The company has also hired an external consultant team (SMS Environment and Engineering Pvt. Ltd) for monitoring the safe working environment. The external consultant regularly performs safety audits at site to ensure the compliance of OSH and provide necessary corrective measures.

12.1 OSH IMPLEMENTATION BY THE CONTRACTORS

Table 12: OSH implementation by the Civil Contractor

Particular	Description	Remarks
Compliance of PPE at all working fronts	Workers have been provided with appropriate PPE. The use of PPE is well monitored.	
Incinerator	Incinerators has been installed at the Powerhouse camp area for waste management.	Installed at a safe distance from accommodation area and kitchen
Electric bulb installation	Additional bulbs have been installed at the main inlet tunnel and the Seti Outlet tunnel for enhancing visibility.	Continued
International Safety day	The workers were gathered and provided with safety awareness on the occasion of International Safety day.	

Table 13: OSH implementation by the Hydro-mechanical contractor

Particular	Description	Remarks
PPE	Appropriate PPE has been provided to the welders, fitters, helpers, and site supervisors as per work nature.	
Penstock pipe shielding	The penstock pipe opening at VB02 has been shielded with a steel plate to ensure the safety of passers-by.	Completed

Table 14: OSH implementation by the TL contractor

Particular	Description	Remarks
Toolbox talk	Toolbox talks have been organized regularly before the start of work.	Ongoing
Use of drone	A drone has been used for stringing conductors in relatively unsafe areas.	Ongoing
Use of safety harness	The workers have been provided with the safety harness and it is utilized during stringing works.	Ongoing

12.2 TEST RESULTS

Table 15: Illumination Intensity in the Tunnel

S. N.	Location	Readings at working face (LUX)	Min. Light required, (LUX), Nepal	Readings inside tunnel (LUX)	Min. Light required, (LUX), Nepal	Status	
1	Main inlet	120	100	70	50	Normal	
2	Set outlet	130	100	65	50	Normal	
3	Seti inlet						
4	Poku outlet						
5	Poku inlet	work Completed, the tunnel has been closed					
6	Main outlet						

S. N.	Location	Readings at working face (LUX)	Min. Light required, (LUX), Nepal	Readings inside tunnel (LUX)	Min. Light required, (LUX), Nepal	Status
7	Surge shaft	Work Completed, Surge shaft has been closed				

Table 16: Oxygen level in the tunnel

S.N	Locations	Status	
1	Main inlet	Natural air circulation between Face 1 and 2.	
2	Set outlet		
3 Seti inlet		Natural air circulation between Face 3 and 4.	
4	Poku outlet		
5	Poku inlet	Natural air circulation between Face 5 and 6.	
6	Main outlet		
7	Surge shaft	Work Completed.	

Table 17: Sound intensity in the tunnel

S.N.	Locations	Measured Noise Level (dBA)	Status	
1	Main inlet	Breakthrough on 2078-02-13. No	After Breakthrough,	
2	Set outlet	loud noise after breakthrough	generally noise level does not exceed 85dBA. Workers are provided noise protection PPE	
3	Seti inlet			
4	Poku outlet	Breakthrough on 2076-08-30. No loud noise after breakthrough		
5	Poku inlet			
6	Main outlet	Breakthrough on 2077-02-20. No loud noise after breakthrough		
7	Surge Shaft	Breakthrough on 2077-04-20 No loud noise after breakthrough		

13 PROGRESS PHOTOGRAPHS



Figure 24: Panorama View of headworks area



Figure 25: Gradient maintenance of access road at VB02 area



Figure 26: Completion of first stage plum concrete at anchor Block VB01



Figure 27: Safety awareness to workers on International Safety Day (April 28)



Figure 28: Insertion of rotor inside the stator



Figure 29: Cleaning of runner

Figure 30: Installation of cable tray inside powerhouse

Figure 31: Power cable laying from control room to switchyard

Figure 32: View of switchyard

14 PROGRESS CHART