SWET GANGA HYDROPOWER & CONSTRUCTION LIMITED
Sankha Park, Dhumbarahi, G.P.O.Box 19737, Kathmandu Nepal
Site Office: Sirise, Ramechhap

TALLO LIKHU JALAVIDHYUT AAYOJANA
(28.1MW)

MONTHLY PROGRESS REPORT # 36

APRIL, 2021

(19thChaitra, 2077 to 17thBaisakh, 2078)

Prepared By:

SANIMA HYDRO AND ENGINEERING (P.) LIMITED.
Shankha Park, Dhumbarahi, Kathmandu M.C, Ward no.: 04, Nepal
G. P.O. Box. 19737, Kathmandu, Nepal
Tel: (977-1) 4372828/ 4373030/ 4015788, Fax: (977-1) 4015799
Email: sanima@sanimahydro.com, Web: www.sanimaengineering.com

SWET GANGA HYDROPOWER & CONSTRUCTION LIMITED
Sankha Park, Dhumbarahi, G.P.O.Box 19737, Kathmandu Nepal
Site Office: Sirise, Ramechhap

TALLO LIKHU JALAVIDHYUT AAYOJANA (28.1 MW)

MONTHLY PROGRESS REPORT # 36

APRIL, 2021

(19thChaitra, 2077to 17thBaisakh, 2078)

	Signature	Date
Prepared By:		
	AashishDhakal	
Checked By:		
	Sajan Shrestha/ SudipChapagain	
Approved By:		
	Bhoj Raj Paudel	

SANIMA HYDRO AND ENGINEERING (P.) LIMITED.
Shankha Park, Dhumbarahi, Kathmandu M.C, Ward no.: 04, Nepal
G. P.O. Box. 19737, Kathmandu, Nepal
Tel: (977-1) 4372828/ 4373030/ 4015788, Fax: (977-1) 4015799
Email: sanima@sanimahydro.com, Web: www.sanimaengineering.com

Table of Contents

1 PROJECT OVERVIEW AND INSTITUTIONAL ARRANGEMENT 1
2 KEY DATES 1
3 CONTRACT PACKAGES AND IMPLEMENTATION 1
4 FINANCING 2
5 RESOURCES AT SITE 2
5.1 MANPOWER FROM EMPLOYER AND ENGINEER'S SIDE: 2
5.2 MANPOWER FROM CIVIL CONTRACTOR'S SIDE: 2
5.3 MANPOWER FROM HYDRO-MECHANICAL CONTRACTOR'S SIDE: 3
5.4 EQUIPMENT MOBILIZED BY CIVIL CONTRACTOR 3
5.5 EQUIPMENT MOBILIZED BY HYDRO-MECHANICAL CONTRACTOR 4
5.6 CONSTRUCTION MATERIALS STORED BY CIVIL CONTRACTOR AT SITE: 4
6 CIVIL CONSTRUCTION WORK PROGRESS 5
6.1 HEADWORKS 5
6.2 HEADRACE TUNNEL, SYPHON CROSSING AND SURGE SHAFT 8
6.2.1 HRT INLET PORTAL 8
6.2.2 SETI OUTLET PORTAL 8
6.2.3 SETI INLET-POKU OUTLET TUNNEL STRETCH 9
6.2.4 POKU INLET- MAIN OUTLET TUNNEL STRETCH 9
6.2.5 SETI CROSSING 10
6.2.6 POKU CROSSING 11
6.2.7 SURGE SHAFT, ROCK TRAP AND CONNECTING TUNNEL 12
6.3 PENSTOCK, POWERHOUSE AND TAILRACE 12
7 HYDRO-MECHANICAL WORKS 14
8 ELECTRO-MECHANICAL WORK PROGRESS 17
9 CONSTRUCTION POWER 18
10 TRANSMISSION LINE WORKS (132 KV) 18
11 SOCIAL AND PUBLIC 21
12 OCCUPATIONAL SAFETY AND HEALTH (OSH) 21
12.1 MAIN CIVIL CONTRACTOR 22
12.2 HYDRO-MECHANICAL CONTRACTOR 22
12.3 TEST RESULTS 23
13 PROGRESS PHOTOGRAPHS 24
14 PROGRESS CHART 29

List of Photos

Figure 1: Weir, Intake and Undersluice from top....6
Figure 2: Construction of weir panel 4 6
Figure 3: Settling basin 7
Figure 4: Headrace pipe and saddle support....7
Figure 5: Tunnel from Face 01....8
Figure 6: Construction of saddles at Poku Outlet portal....9
Figure 7: Junction between concrete lining and shotcrete-concrete section at Face 6....9
Figure 8: Tunnel Excavation Progress....10
Figure 9: Seti Crossing and Seti inlet....11
Figure 10: Pipe at Poku crossing anchor block....11
Figure 11: Surge shaft from top 12
Figure 12: Construction activities in the Powerhouse 13
Figure 13: Powerhouse from penstock alignment....13
Figure 14: Protection works around switchyard area....14
Figure 15:Headrace pipe from conveyance tank 15
Figure 16: Storage of pipes at HM yard 15
Figure 17: Penstock pipe alignment between wyee and VB02....16
Figure 18: Pipeline layout in Bay 01....17
Figure 19: Spiral case in Bay 02 17
Figure 20: Completion of tower erection in AP61....18
Figure 21: Concrete works ongoing in AP37 19
Figure 22: Irrigation canal across the siphon crossing for public use (concrete slab)....21
Figure 23: View of weir, intake and undersluice....24
Figure 24: Construction of fish passage....24
Figure 25: Compressive strength test of shotcrete core 25
Figure 26: Plum concrete at Poku crossing 25
Figure 27: Powerhouse from back....26
Figure 28: Construction of new staff quarter building at Powerhouse camp....26
Figure 29: Stone masonry works for switchyard protection 27
Figure 30: Distribution of masks with orientation to the workers at Powerhouse....27
Figure 31: Awareness of COVID-19 to the workers....28
Figure 32: Spiral case in Bay 01 28
Figure 33: Welding of spiral case from inside 29

List of Tables

Table 1: Key dates of major events of the project....1
Table 2: Human Resource at site from the Employer and Engineer's side 2
Table 3: Human Resource at site from Civil Contractor's side....2
Table 4: Manpower list of Hydro-Mechanical Contractor 3
Table 5: Equipment mobilized by Civil Contractor 3
Table 6: Equipment mobilized by Hydro-Mechanical Contractor 4
Table 7: Construction material stored by Main Civil Contractor 4
Table 8: Progress at headworks inApril, 2021 5
Table 9: Work progress from main inlet portal in April, 2021 8
Table 10: Work progress from Seti outlet portal in April, 2021....8
Table 11: Tunnel Progress as of April, 2021....10
Table 12: Work progress details of surge shaft in April, 2021....12
Table 13: Progress at penstock, powerhouse and tailraceinApril, 2021 12
Table 14: Transmission Line progress....19
Table 15: OSH implementation by the Civil Contractor....22
Table 16: OSH implementation by Hydro-Mechanical Contractor 22
Table 17: Luminous intensity inside the tunnel 23
Table 18: Oxygen level inside the tunnel 23
Table 19: Noise level inside the tunnel 23

1 PROJECT OVERVIEW AND INSTITUTIONAL ARRANGEMENT

TalloLikhuJalavidhyutAayojana is a run-of-river (RoR) hydropower project which utilizes Gross Head 118 m and Design Discharge of 29.75 m^3/s resulting in 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, BagmatiProvince of 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'sheadworks 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 Electricity Development (DoED), Ministry of Energy (MoEn), Government of Nepal (GoN)	2nd Baisakh 2073 (14th April 2016)
	The license period of the project is from
	28th Chaitra 2072 to 27th Chaitra 2107 B. S.
Power Purchase Agreement (PPA) with Nepal Electricity Authority (NEA)	14th Poush 2073 (29th December 2016)
Financial Closure	10th Falgun 2074 (22nd February 2018)
Contract of Main Civil Works	5th Chaitra 2074 (19th March 2018)
Contract of Hydro-mechanical Works	9th Poush 2075 (24th December 2018)
Contract of Electro-mechanical Works	18th Bhadra 2076 (4thSeptember 2019)
Contract of Transmission Line Works	8th Shrawan 2077 (23rdJuly 2020)
RCOD	15th Mangsir 2078 (1st 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. Century 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
Public Relation Officer	1
Environment Officer	1
Finance/Admin Officer	1
Civil Engineer	4
Electrical Engineer	2
Mechanical Engineer	1
Engineering Geologist	2
Safety Coordinator	1
Civil Overseer/Sub-overseer	6
Mechanical Overseer	3
Electrical Sub overseer	1
Surveyor	3
Social Mobilizer	3
Admin Assistant	2
Driver	4
Cook	2
Office Helper	4
Construction Helper	11
Kitchen Helper	2
Total:	**56**

5.2 MANPOWER FROM CIVIL CONTRACTOR'S SIDE:

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

Description	Number
Technical Manpower	23
Financial and Administrative manpower	26
Skilled workers(Machine Operators, Electricians, Heavy Drivers)	43
Semi-Skilled workers(Light Drivers, Civil workers)	20
Unskilled workers(Helpers, Kitchen workers, Pump operators)	47

Description	Number
Security guards	24
Other Workers (Sub-Contractors)	
Balaji Metal Works	4
Karan-Arjun Construction (Main Inlet)	22
NPS Construction (Poku Inlet Tunnel)	21
Hem Construction (Surge shaft and main outlet)	36
Helmo and Sherpa Construction (Poku Outlet Tunnel)	4
Dreamland Construction (Seti Inlet/Outlet)	18
GaiyaDevi Construction (Tailrace)	16
DL/Bhimeshwor Construction (Headworks and Powerhouse)	85
Shaili Construction (Headworks)	20
Likhu Saipu Construction (Poku Anchor Block)	19
Champakali Construction (Seti Anchor Block)	19
Total	**447**

Note: Data as per weeklyreport provided by the Main Civil Contractor on30th April 2021.

5.3 MANPOWER FROM HYDRO-MECHANICAL CONTRACTOR'S SIDE:

Table 4: Manpower list of Hydro-Mechanical Contractor

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	7
Helper	14
Cook	4
Total	**40**

5.4 EQUIPMENT MOBILIZED BY CIVIL CONTRACTOR

Table 5: Equipment mobilized by Civil Contractor

S.No.	Equipment Name	Number	S.No.	Equipment Name	Number
1	Generator 62.5KVA	2	25	Pusher leg	37
2	Generator 30KVA	1	26	Blaster (Exploder)	6
3	Generator 125KVA	1	27	Siren	6
4	Generator 25 KVA	1	28	Core Cutting machine	2
5	Generator 160 KVA	3	29	Hand drilling machine	3
6	Generator 250 KVA	2	30	Air compressor	7
7	Air Receiver tank	4	31	Vibrators	8

S.No.	Equipment Name	Number	S.No.	Equipment Name	Number
8	Ohm meter	6	32	Water pump 10”	2
9	Excavator	4	33	Water pump 12”	1
10	Dump Truck	11	34	Water Pump 1.5”	6
11	Transportation Truck	1	35	Water pump 6”	4
12	Backhoe Loader (JCB)	3	36	Grinding machine(4”)	6
13	Wheeled loader	4	37	Grinding machine(7”)	1
14	Tractor	3	38	Welding machine	8
15	Light vehicle	6	39	Ply cutter machine (8”/7”)	1
16	Concrete Batching Plant	1	40	Prism with tripod set	5
17	Concrete mixer	10	41	Leveling staff (5m)	4
18	Grouting pump	4	42	Total station (Topcon GM-105)	3
19	Concrete pump	3	43	Auto level with tripod set	4
20	Jackhammer	38	44	Shotcrete machine PZ5	3
21	Blower fan set	2	45	Compressive test machine	2
22	Pull out test machine	1	46	Lubricator	43
23	Shotcrete Robot (Jacon)	1	47	Diesel Tank 16000Ltr	3
24	Transit mixer	4	48	Muck loader on wheel base	1

5.5 EQUIPMENT MOBILIZED BY HYDRO-MECHANICAL CONTRACTOR

Table 6: Equipment mobilized by Hydro-Mechanical Contractor

S.No.	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	17
8	Compressor	1
9	Grinding Machine (7”)	14
10	Grinding Machine (4”)	10
11	Mother Oven	1
12	Portable Oven	17
13	Hand Cutter Set	4
14	Hand Drill Machine	2
15	Pug Machine	2

5.6 CONSTRUCTION MATERIALS STORED BY CIVIL CONTRACTOR AT SITE:

Table 7: Construction material stored by Main Civil Contractor

Materials	Unit	Balance Quantity
Diesel	Litres	28,144.00
Rebar (25mm dia.)	Ton	0.96
Rebar (20mm dia.)	Ton	5.14
Rebar (16mm dia.)	Ton	14.38

Materials	Unit	Balance Quantity
Rebar (12mm dia.)	Ton	24.52
Cement	Bags	9,397
Plasticizer	Kg	605.00
Steel Fibre	Kg	15,885.00
Micro Silica	Kg	14,360.00
Accelerator	Kg	10,725.00
Rock bolt (2m long 20mm dia.)	Nos.	227
Rock bolt (3m long 20mm dia.)	Nos.	80
Rock bolt (4m long 25mm dia.)	Nos.	4
Steel rib (ISMB 150)	Set	6
Wire mesh (100mm x 100mm x 4mm)	Kg	1,216.02

Note: Data as per civil contractor's store record made on 30thApril 2021.

6 CIVIL CONSTRUCTION WORK PROGRESS

6.1 HEADWORKS

The progress at Headworks as ofApril2021 is as follows:

- The cleaning work at weir panel 4 has been completed. Guide work for Pokali has also been completed. The construction of this panel has been completed up to the level of 738.00m amsl.
- The construction of the fish passage has been ongoing. Panel 4& 5 have been completed.
- The construction of settling basin panel 1, 2 and 3 has been completed. The construction of the panels 4, 5 and 6 has been ongoing. The panels have been completed up to the level of 739m amsl.
- The construction of the settling basin panel 7 and 8 has been completed except one riverside wall in which 2.7m height is remaining.
- The left wall and gated portion of settling basin panel 9 (conveyance tank) has been completed up to the level of 740m amsl and right side wall has been completed up to the level of 741.90amsl.
- The concreting in 33 number of saddle supports has been completed in the Headrace pipe.

Table 8: Progress at headworks inApril, 2021

S.NO.	Description	Unit	Quantity	Remarks
1	C25 concrete	m^3	415.05	
2	C35 concrete	m^3	24.00	
3	C15 concrete	m^3	6.00	
4	Rebar	Ton	32.57	

Figure 1: Weir, Intake and Undersluice from top

Figure 2: Construction of weir panel 4

Figure 3: Settling basin

Figure 4: Headrace pipe and saddle support

6.2 HEADRACE TUNNEL, SYPHON CROSSING AND SURGE SHAFT

6.2.1 HRT INLET PORTAL

Till the end of theApril 2021, the total excavated length from this portal is 794.30 m. InApril2021, the excavated length of tunnel from this portal is 33.50m. The equivalent volume of excavation totals 760.75 cubic meters. Most of the support type observed during this month is support type IV and V.

Table 9: Work progress from main inlet portal in April, 2021

Portal	Excavation (m)	Excavation (m^3)	Rock bolt (Nos.)	Shotcrete (m^2)
Main inlet portal	33.50	760.75	374	421.76

6.2.2 SETI OUTLET PORTAL

Till the end of April2021,the total excavated length of the tunnel from this portal is 894.15m.In April 2021, the excavated length of tunnel from this portal is 36.90m. The equivalent volume of excavation totals 837.96 cubic meters. Most of the support type observed during this month is support type IV.

Table 10: Work progress from Seti outlet portal in April, 2021

Portal	Excavation (m)	Excavation (m^3)	Rock bolt (Nos.)	Shotcrete (m^2)
Seti outlet portal	36.90	837.96	407	464.57

Figure 5: Tunnel from Face 01

6.2.3 SETI INLET-POKU OUTLET TUNNEL STRETCH

Till the end of April 2021, the concrete lining in this tunnel stretch has been completed in the invert and walls for all portions except the portal plug block areas. The concreting in the saddle supports has been ongoing at the Poku outlet portal area. 3 out of 5 saddles have been completed.

Figure 6: Construction of saddles at Poku Outlet portal

6.2.4 POKU INLET- MAIN OUTLET TUNNEL STRETCH

Till theend of April 2021, the final concreting in this tunnel stretch has been completed for 1264m length in invert and wall. The final shotcrete in the Poku inlet tunnel has been completed. The final concreting carried out from Poku inlet portal is 836.00 m and that from main outlet portal it is 428.80m.

Figure 7: Junction between concrete lining and shotcrete-concrete section at Face 6

Table 11: Tunnel Progress as of April, 2021

Portal	Length of tunnel (m)	Excavation length (m)	Remaining length (m)	Progress (%)
Inlet portal	825.84	794.30	31.54	96.18
Seti outlet	922.28	894.15	28.13	96.95
Seti inlet	654.90	654.90	0	100.00
Poku outlet	564.00	564.00	0	100.00
Poku inlet	936.40	936.40	0	100.00
Outlet portal	818.55	818.55	0	100.00
Total	**4,721.97**	**4662.30**	**59.67**	**98.73**

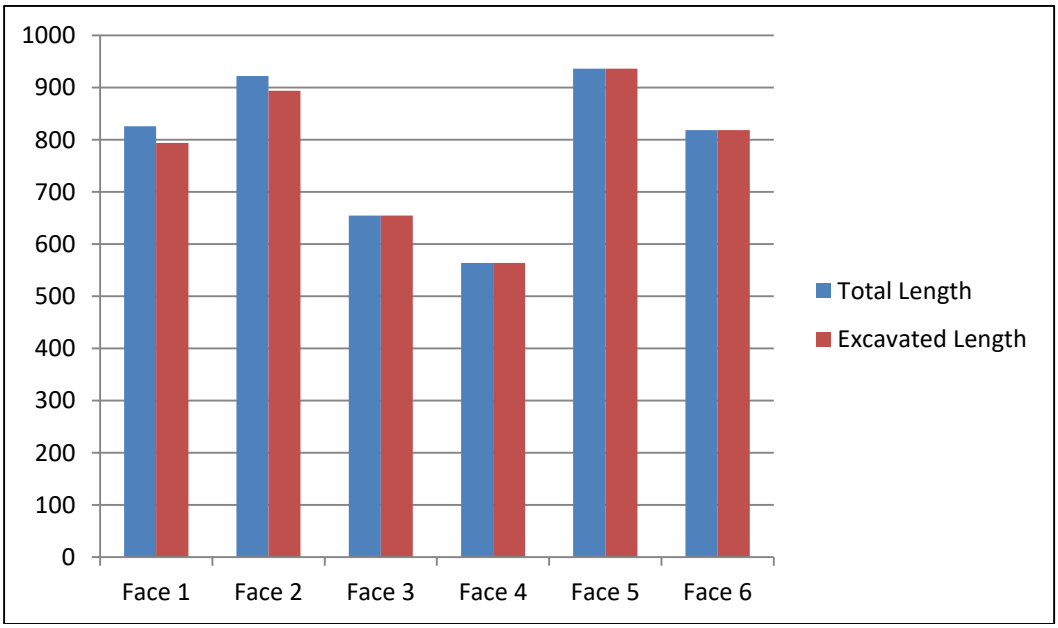

Figure 8: Tunnel Excavation Progress

6.2.5 SETI CROSSING

The reinforcement works have been started for the Anchor Block SK-CB03. Arrangement has been made for passage of irrigation canal across the siphon alignment near Seti inlet portal. The concrete work for the pipe alignment from the anchor block SK-VB02 to the Seti Outlet portal has been ongoing.C25 plum concrete work at the Seti crossing anchor blockSK-VB02 has been completed up to the level of 709.60m amsl. Final reinforcement work has been ongoing for this block.

Figure 9: Seti Crossing and Seti inlet

6.2.6 POKU CROSSING

The plum concrete work at the Poku Anchor block has been ongoing at the level of 685.10m amsl. Rock cutting for pipe alignment at the right side of the crossing has been continued.

Figure 10: Pipe at Poku crossing anchor block

6.2.7 SURGE SHAFT, ROCK TRAP AND CONNECTING TUNNEL

Till the end of April 2021, the concreting in the wall of surge shaft has been completed up to 43.70m from the base. The full concrete lining of the connecting tunnel has also been completed.

Table 12: Work progress details of surge shaft in April, 2021

Description	Concrete (m)	C25 concrete (m^3)	Reinforcement (ton)
Surge shaft	6.00	185.00	5.00

Figure 11: Surge shaft from top

6.3 PENSTOCK, POWERHOUSE AND TAILRACE

In April 2021, no civil work has been carried out in the penstock alignment since all the saddle supports between wyee and VB02 have already been casted and handed over to the HM contractor.In the powerhouse bay 01, concrete has been casted at shear walls up to the level of633.83m amsl. C25 concrete has been casted around the draft tube up to the level of 624.15m amsl.

In the powerhouse bay 02, concrete has been casted at shear walls up to the level of 633.83m amsl.

The concrete casting in the columns and beams of Bay 03 has been completed.

The construction of the tailrace has been completed except the gate wall at panel 1.

Table 13: Progress at penstock, powerhouse and tailraceinApril, 2021

S.No.	Description	Unit	Quantity (Powerhouse)	Quantity(Penstock)	Quantity (Tailrace)
1	C25 concrete	m^3	127.15	-	145.44
2	Re-bar	ton	13.97	-	7.96

Figure 12: Construction activities in the Powerhouse

Figure 13: Powerhouse from penstock alignment

Figure 14: Protection works around switchyard area

7 HYDRO-MECHANICAL WORKS

The progress of hydro-mechanical works achieved till the end ofApril, 2021 are:

- Installation of both the undersluice radial gate panels has been completed.Frames have been installed for the undersluice stoplog, trash passage gate, fish passage stoplog, trash-rack, intake gates, gravel flushing gates, gravel flushing stoplogs, settling basin inlet gate, settling gate outlet gate, settling basin flushing gate, settling basin flushing stoplog, draft tube gate and tailrace stoplog.
- 124.27m length of Headrace pipe has been installed out of 331.47m.
- At the Seti crossing, pipe has been installed for 77.27m stretch out of 161.9m.
- At the Poku crossing, pipe has been installed for 28.51m stretch out of 182.88m.
- In the penstock alignment, pipe has been installed for total of 104.18m length out of 233.68m including the wyee bends and branches.

Till date, 658 number of 14mm thick plates have been cut out of 670, which is 98.21% of the total required quantity. Out of the 658 plates, 561 have been rolled.

Figure 15:Headrace pipe from conveyance tank

Figure 16: Storage of pipes at HM yard

Figure 17: Penstock pipe alignment between wyee and VB02

8 ELECTRO-MECHANICAL WORK PROGRESS

Thework progress of the Electro-mechanical installation works till the end of April 2021 has been listed below:

- The outside welding of Spiral case at Bay 02has been finalized. Bach cheeping and final welding is ongoing inside this unit.
- The cooling, filter and embedded pipeline layout at the tailrace side has been completed in Bay 02.
- The levelling of spiral case has been done in Bay 1.
- Shifting of spiral case sections has been ongoing in Bay 1.
- The foundation bolts of EOT crane and earthing plates have been installed in Bay 3.

Figure 18: Pipeline layout in Bay 01

Figure 19: Spiral case in Bay 02

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 16th of Mangsir, 2076. The NEA dedicated line has been made available to all working fronts.

10 TRANSMISSION LINE WORKS (132 KV)

Till the end of April 2021, 37 private lands out of 39 have been purchased. The excavation works have been completed for 46 tower foundations. The concreting works have been completed for 37 tower foundations. Tower erection has been completed for two tower locations and protection works have also been completed for two tower locations.

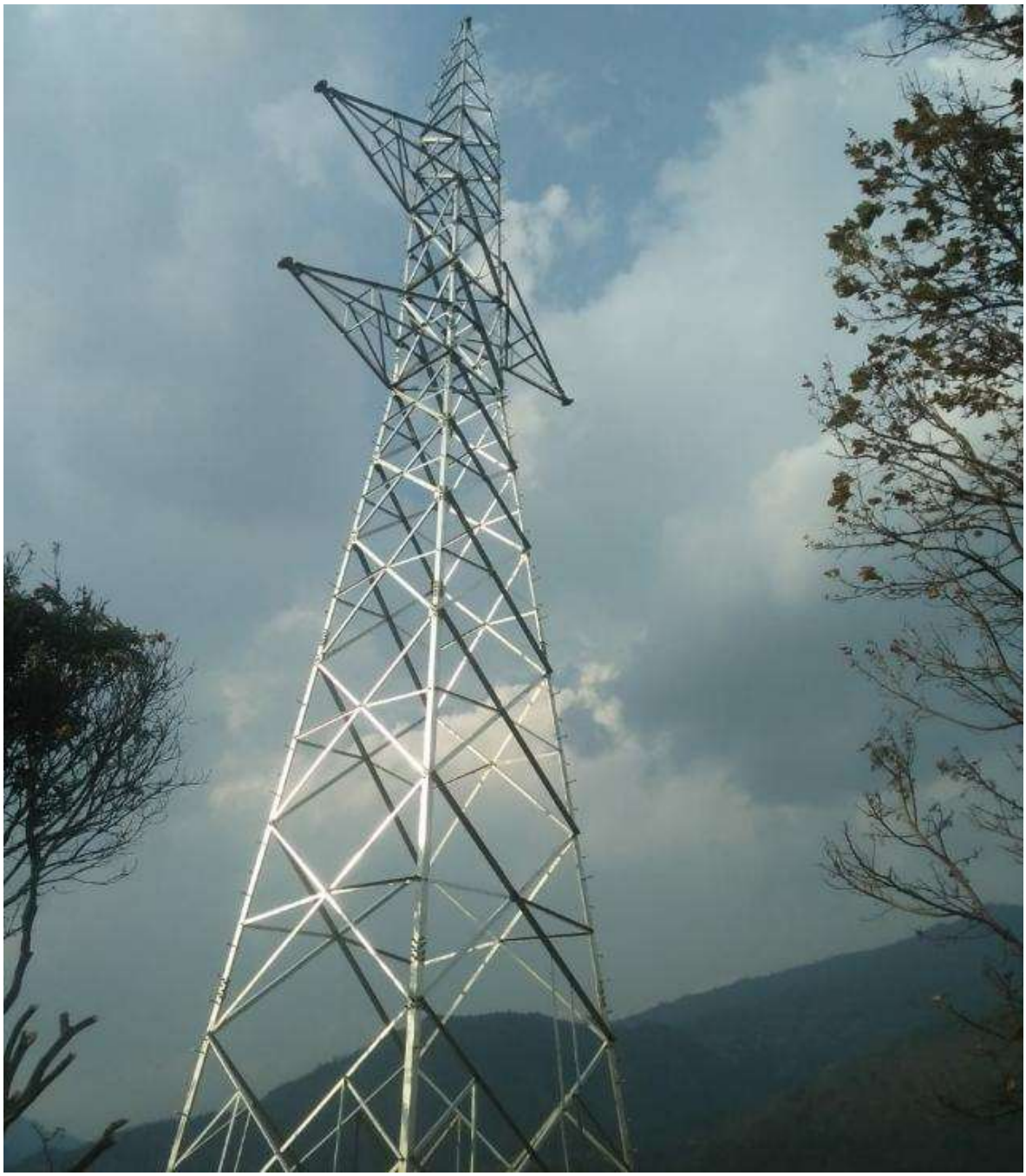

Figure 20: Completion of tower erection in AP61

Figure 21: Concrete works ongoing in AP37

Table 14: Transmission Line progress

S. N	Location	Type of Tower	Excavation	Stub Setting	Reinforcement	PCC	RCC	Backfill	Erection
1	AP0	SD+0	Completed	Completed	Completed	Completed	Completed	Completed	-
2	AP1	SB+0	Completed	Completed	Completed	Completed	Completed	Completed	Completed
3	AP2	SC+0	Completed	Completed	Completed	Completed	Completed	Completed	-
4	AP3	SM+0	Completed	Completed	Completed	Completed	Completed	Completed	Materials shifted to site for erection
5	AP4	SM+0	Completed	Completed	Completed	Completed	Completed	Completed	
6	AP5	SM+0	Completed	Completed	Completed	Completed	Completed	Completed	
7	AP6	SC+0	Completed	Completed	Completed	Completed	Completed	Completed	-
8	AP7	SC+0	3 legs excavated, hard rock encountered in one leg						
9	AP8	SB+0	Completed	Completed	Completed	Completed	Completed	Completed	-
10	AP9	SM+0	Completed	-	-	-	-	-	-
11	AP10	SM+0	Completed	Completed	Completed	Completed	Completed	Completed	-
12	AP12	SM*+0	ROW Land issue						
13	AP13	SM+0	Completed	Completed	Completed	Completed	Completed	Completed	-
14	AP14	SM+0	3 legs excavated, hard rock encountered in one leg						
15	AP15	SM*+0	Completed	Completed	Completed	Completed	Completed	Completed	-
16	AP16	SM+0	Completed	Completed	Completed	Completed	Completed	Completed	-
17	AP17	SM+6M	Completed	Completed	Completed	Completed	Completed	Completed	-
18	AP19	SM*+0	Completed	Completed	Completed	Completed	Completed	Completed	-
19	AP20	SM*+6	Completed	Completed	Completed	Completed	Completed	Completed	-
20	AP21	SM*+0	Completed	Completed	Completed	Completed	Completed	Completed	-

21	AP22	SM*+0	Completed	Completed	Completed	Completed	Completed	Completed	-
22	AP23	SM+0	Completed	-	-	-	-	-	-
23	AP24	SM+0	Completed	ROW Land issue					
24	AP25	SC+0	Completed	Completed	Completed	Completed	Completed	Completed	-
25	AP26	SB+0	Excavation ongoing but hard rock encountered						
26	AP27	SC+0	Completed	Completed	Completed	Completed	Completed	Completed	-
27	AP28	SC+0	Completed	Completed	Completed	Completed	Completed	Completed	-
28	AP29	SM+0	Planning to use excavator						
29	AP30	SB+0	Completed	Completed	Completed	Completed	Completed	-	-
30	AP31	SC+0	Completed	Completed	Completed	Completed	Completed	-	-
31	AP32	SM+0	Completed	Completed	Completed	Completed	Completed	-	-
32	AP33	SB+0	Completed	Completed	Completed	Completed	Completed	-	-
33	AP34	SC+0	Completed	Completed	Completed	Completed	Completed	-	-
34	AP35	SC+0	Completed	Completed	Completed	Completed	Completed	-	-
35	AP36	SC+0	Planning to use excavator						
36	AP37	SB+0	Completed	Completed	Completed	Completed	Completed	-	-
37	AP38	SC+6M	Completed	Completed	Completed	Completed	Completed	-	-
38	AP39	SM+0	Completed	Completed	Completed	Completed	Completed	-	-
39	AP40	SM+0	Completed	Completed	Completed	Completed	Completed	-	-
40	AP41	SM+0	Ongoing	-	-	-	-	-	-
41	AP42	SM*+0	Planning to use excavator						
42	AP43	S90	Planning to use excavator						
43	AP44	S90	Planning to use excavator						
44	AP45	SB+0	Completed	Completed	Completed	Completed	Completed	Completed	-
45	AP46	SM+0	Completed	Completed	Completed	Completed	Completed	Completed	-
46	AP47	SC+0	Completed	Completed	Completed	Completed	Completed	Completed	-
47	AP48	SM+6	Completed	Completed	Completed	Completed	Completed	Completed	-
48	AP49	SM*+0	Completed	Completed	Completed	Completed	Completed	Completed	-
49	AP50	SM+0	Completed	Completed	Completed	Completed	Completed	Completed	-
50	AP51	SM+0	Completed	Completed	Completed	Completed	Completed	Completed	-
51	AP53	SM+0	Completed	Completed	Completed	Completed	Completed	Completed	-
52	AP54	SM+6	Completed	-	-	-	-	-	-
53	AP56	SM+0	Completed	-	-	-	-	-	-
54	AP57	SM*+6	Ongoing	-	-	-	-	-	-
55	AP58	SB+0	ROW Land issue						
56	AP59	SC+0	-	-	-	-	-	-	-
57	AP60	SC+0	Ongoing	-	-	-	-	-	-
58	AP61	SC+0	Completed	Completed	Completed	Completed	Completed	Completed	Completed
59	AP62	SC+0	-	-	-	-	-	-	-
60	AP63	SC+0	2 legs	2 legs	2 legs	2 legs	2 legs	2 legs	Land issue
61	AP64	SM*+3	Completed	Completed	Completed	Completed	Completed	Completed	-
62	AP65	SD+0	-	-	-	-	-	-	-

Note: Data as per report provided by the TL Contractor on 30th April 2021.

11 SOCIAL AND PUBLIC

The major public support activities undertaken in April, 2021 are:

- Construction of water supply project at Phedi has been completed and the pipe installation is ongoing.
- Muck management at Kabaitar is ongoing.
- Meeting was organized with the CDO and DFO regarding forest tree management and COVID.
- Irrigation canal has been constructed across the Seti crossing siphon for public.

Figure 22: Irrigation canal across the siphon crossing for public use (concrete slab)

12 OCCUPATIONAL SAFETY AND HEALTH (OSH)

Swet Ganga Hydropower & Construction Limited is concerned with protecting the safety, health and welfare of people engaged in work or employment. A separate department has been formed for monitoring the Occupational Safety and Health compliance. The goal of the department is directed in fostering a safe work environment. The OSH department determines vulnerabilities and provides mitigating and adoptive measures to overcome any work related adversities. It analyses problems through surveillance in determining hazards, conditions of work, and exposure of workers. Also, the OSH department assesses the health of workers and takes measures to reduce vulnerability of hazards and risk which can cause health impairment. It also dictates on measures to prevent unnecessary exposure during normal operating conditions.

The scope of the OSH department also includes emergency preparedness to continue on in case of possible accidents and emergencies. The team has been providing health and safety

education, health promotion, and promotion of work ability through disseminating Information on identified workplace health hazards. Regular meetings are conducted for the improvement of safety culture.

The company has made the use of PPE mandatory as per the nature of job. Lifebuoy rings have been installed at the working areas near to the river with sufficient length of ropes. The deep excavation areas have been indicated by signage and barricades. The electric panel boards have been fenced with the implementation of LOTO (Lock Out-Tag Out). Also, water spraying in the access road has been carried out daily with two tractor mounted tanks for dust control. Fire extinguishers are installed at the working fronts for fire safety. Fire extinguishers use training is given.
The safety consultant SMS Environment and Engineering Ltd conducts safety audits at regular interval for enhancement of OSH practice. The records of OSH related activities at site during the month of April, 2021 are:

12.1 MAIN CIVIL CONTRACTOR

Table 15: OSH implementation by the Civil Contractor

Particular	Description	Remarks
Compliance of PPE	All workers have been instructed to comply with the PPE requirements. Workers not complying with PPE requirements are removed from site and given safety education by the Safety Officer as per the degree of non-compliance.	Ongoing
Extension of blower duct and dewatering in the tunnel	The main civil contractor has extended the blower ducts in Headrace tunnel Face 1 and 2 up to the working area in order to assure sufficient air in the working area. Also, regular dewatering has been carried out.	Ongoing
Electrical safety	The contractor has used electrical panel boards with proper insulation at all working fronts.	Ongoing
Reporting	Regular safety reports have been provided by the civil contractor in weekly basis.	Ongoing
COVID protocol	COVID protocol has been prepared and is being followed with proper monitoring.	Ongoing

12.2 HYDRO-MECHANICAL CONTRACTOR

Table 16: OSH implementation by Hydro-Mechanical Contractor

Particular	Description	Remarks
Compliance of PPE	Full PPE compliance at both construction area as well as workshop area	Ongoing
First aid box	The HM contractor has maintained a fully equipped first aid box in the workshop with regular monitoring.	
Safety briefing	The HM contractor has been conducting work related safety briefings at site on regular basis.	Ongoing
COVID protocol	COVID protocol has been prepared and is being followed with proper monitoring.	Ongoing

12.3 TEST RESULTS

Table 17: Luminous intensity inside the tunnel

S.No.	Location	Readings at working face (LUX)	Min. Light Required (LUX)	Readings in-sidetunnel (LUX)	Min. Light required, (LUX)	Status
1	Main inlet	110	100	70	50	Normal
2	Set outlet	115	100	75	50	Normal
3	Seti inlet	110	100	69	50	No drilling
4	Poku outlet	105	100	73	50	No drilling
5	Poku inlet	107	100	71	50	No drilling
6	Main outlet	105	100	62	50	No drilling
7	Surge shaft	155	100	-	-	Normal

Table 18: Oxygen level inside the tunnel

S.No.	Locations	Oxygen level (%)	Oxygen required (%, V/V)	Status
1	Main inlet	19.8 to 20.6	19.5	Normal
2	Set outlet	19.6 to 20.2	19.5	Normal
3	Seti inlet	Natural air circulation between Face 03 and 04		
4	Poku outlet			
5	Poku inlet	Natural air circulation between Face 05 and 06		
6	Main outlet			
7	Surge shaft	Natural air circulation between Surge shaft and connecting tunnel		

Table 19: Noise level inside the tunnel

S.No.	Locations	Measured Noise Level (dBA)		Status
		Drilling ON	Drilling OFF	
1	Main inlet	85.5	68.5	Noise Level exceeds 85dBA during drilling, Workers are pro-vided with ear muffs with regular monitoring
2	Set outlet	87.6	70.3	
3	Seti inlet	No drilling (Excavation completed)		
4	Poku outlet			
5	Poku inlet	No drilling (Excavation completed)		
6	Main outlet			
7	Surge shaft	No drilling (Excavation completed)		

13 PROGRESS PHOTOGRAPHS

Figure 23: View of weir, intake and undersluice

Figure 24: Construction of fish passage

Figure 25: Compressive strength test of shotcrete core

Figure 26: Plum concrete at Poku crossing

Figure 27: Powerhouse from back

Figure 28: Construction of new staff quarter building at Powerhouse camp

Figure 29: Stone masonry works for switchyard protection

Figure 30: Distribution of masks with orientation to the workers at Powerhouse

Figure 31: Awareness of COVID-19 to the workers

Figure 32: Spiral case in Bay 01

Figure 33: Welding of spiral case from inside

14 PROGRESS CHART