JAGDULLA HYDROPOWER COMPANY LIMITED

जगदुल्ला हाईड्रोपावर कम्पनी लिमिटेड

Progress Report
January 2024

नेपालको पानी, जनताको लगानी

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1. PROJECT BACK GROUND

Brief Description of Project

Government of Nepal intends to develop the hydropower potential of Nepal in an economically efficient and sustainable manner to meet the much needed and growing power demand in the country. Nepalese Government has taken an initiation to establish a company to develop the various sustainable potential projects and diversified investors of Nepal and abroad in Public-Private-Partnership and the BOOT (Built-Operate-Own-Transfer) Model in the process of developing large scale hydropower projects. As a result, Vidhyut Utpadan Company Limited (VUCL) came into picture and was established and registered in Department of Industries, Government of Nepal under Company Act 2063 BS. Jagdulla Hydropower Company Limited (JHCL) is a subsidiary company of Vidhyut Utpadan Company Limited (VUCL) established in 2017 to develop Jagdulla Peaking Run-of-River Hydroelectric Project (JHEP).

The JHCL-HEP (106 MW) Hydro power project is located on Jagdulla River, in Dolpa District of Nepal, which is 748.3 Km from Kathmandu via Nepalgunj. Jagdulla Hydropower Company Pvt. Ltd (JHCL) was incorporated & registered on 2074 Jestha 16 as a private limited company under the Nepalese Companies Act 2063 duly floated by public-private shareholding of VUCL and General public with an aim to plan, promote, organize & execute the Jagdulla Hydro-electric Project.

Capital structure

S. N.	Company capital structure	NPR
1.	Authorized Capital	8 Arab
2.	Issued Capital	7.1 Arab
3.	Paid up Capital	101.1 Crore

Share structure

After the Revision of Company Regulation 2078 from the Special AGM of Jagdulla Hydropower Company Limited on dated 2078/10/24, here is the updated Share Structure of the Company.

- Promoters share holding

Promoters	Total percentage	Percentage of equity
VUCL	51%	26
HIDCL		10
NEA		9
Karnali Province		5
Jagdulla/ Mudkechula RM		1

- Public shares

Description	Total percentage	Percentage of share holding
Overall District	49%	33%
Project affected local people (Dolpa District)		10%
TL affected people		3%
JHCL Employee		3%

Board Members and Management Team

Jagdulla holds well experienced board members and management team for the execution of timely completion of the project. The board and team members with their names and designation are presented below:
As per the Second Revised Company Regulation 2078, the number of the Board Member will be 7. Here is the Details of the representative from Respective Organizations.

SN	Organization	No of Boar Member	Remarks
1	VUCL	2	
2	HIDCL	1	
3	NEA	1	
4	Independent Director (Infra)	1	
5	From General Public Shareholders	2	
Total No's of Representatives on BoD		7	

Board members:

Only two Number of the Persons are representing on the board on the behalf of the VUCL and One number from Independent Director.

Sandeep Kumar Dev
Joint Secretary, Ministry of Energy, Water Resources and Irrigation
Chairman

Arjun Kumar Gautam
Chief Executive Officer, Hydroelectricity Investment And Development Company Limited
Director

Surya Prasad Rijal
Independent Director, Vidhyut Utpadan Company Limited
Director

Er. Mohan Prasad Gautam
CEO, Upper Tamakoshi Hydropower Limited
Director

Prakash Adhikaree
Director, JHCL
Independent Director (Infrastructure Expert)

Management Team:

Sanjay Sapkota
Chief Executive Officer
Email: ceo@jhcl.com.np

Rajendra Panthi
Senior Contract Engineer

Suresh Olee
Acting Project Manager - JHEP (106 MW) / Senior Hydropower Engineer
Cell: 01-4579242
Email: soli@jhcl.com.np | olisuresh128@gmail.com

Sajani Aryal
Senior Finance Manager

Prabhu Ram Silwal
Senior Geologist
Email: prsilwal@jhcl.com.np

Man Prasad Neupane
Senior Public Relation Officer

Megha Raj Sharma
Acting Project Manager - JAHEP(120 MW) / Senior Geotechnical Engineer

Mandira Khadka
Administration Officer
Email: mkhadka@jhcl.com.np

Parwat Krishna Pokharel
Account Officer
Email: pkpokharel@jhcl.com.np

Subash Khadka
Civil Engineer (Infrastructure)

Ashok Bista
Hydro-Mechanical Engineer
Email: abista@jhcl.com.np

Bishal Malla
Civil Engineer (Infrastructure)

2. BROAD SCOPE OF WORK

Survey license:

a) Jagdulla PROR project

The project received the survey license for PROR of 106 MW issued by DoED on dated 05 Kartik 2076 and upto 05 Ashoj 2078.

b) 132 KV power evacuation transmission line.

Transmission survey License of 132KV TL from powerhouse to Nalgad Hub substation, Danipeepal issued by DoED on 04 Poush 2076.

Transmission survey License of 132KV TL from powerhouse to Bafikot Hub substation, Rukum (West) issued by DoED on 15 Falgun 2078 and up to Magh 2080.

The projects hold four packages for its COD in 2028. The brief information about the packages is as under:

Lot-1: Infrastructure Development work

The first contract package (Lot-1) is proposed as Infrastructure Development work which includes the pre-construction works like construction of access road, camp facilities, bridges, construction power, water supply, etc. These works are proposed to be carried out by local contractors before the start of main construction work of project. Domestic Bidding Competition has been envisaged for Lot-1 on BOQ Model and some of works has already been awarded to Nepalese contractors.

Lot-2: Civil and Hydro-mechanical work

The second package (Lot-2) is proposed for Civil and Hydro-mechanical work, which includes civil works of Dam, power house, surge shaft, descanding basin, cofferdam, and tunnel works etc. Hydro-mechanical works include fabrication and erection of gates, penstock tunnel, tailrace gates etc. International Bidding Competition has been proposed for Lot-2 on EPC Model.

Lot-3: Electro-mechanical work

The third package (Lot-3) is proposed for Electro-mechanical work which includes design, manufacturing and supply of electromechanical equipment's including electric overhead travelling (EoT) cranes, firefighting equipment, and equipment for compressed air supply, HVAC etc. International Bidding Competition has been proposed for Lot-3 on P&DB Model.

Lot-4: Transmission Line and Sub-station work

The fourth Package (Lot-4) is proposed for Transmission Line and Sub-station work, which will include the building of 132KV transmission line from powerhouse Illa village to NEA 132KV Bafikot Substation including installation of substation at Bafikot substation. International Bidding Competition has been proposed for Lot-4 on P&DB Model.

3. Jagdulla PRoR Hydroelectric project (106 MW)

JHEP is Peaking Run of the River (PRoR) project of 6 hours of peaking capacity with dam of height 23 m. and discharge of 16.2 m^3/s. It consists vertical Pelton turbines of 3 units with capacity of 36 MW each. More information regarding JHEP is detailed as under:

Project Layout of JHEP:

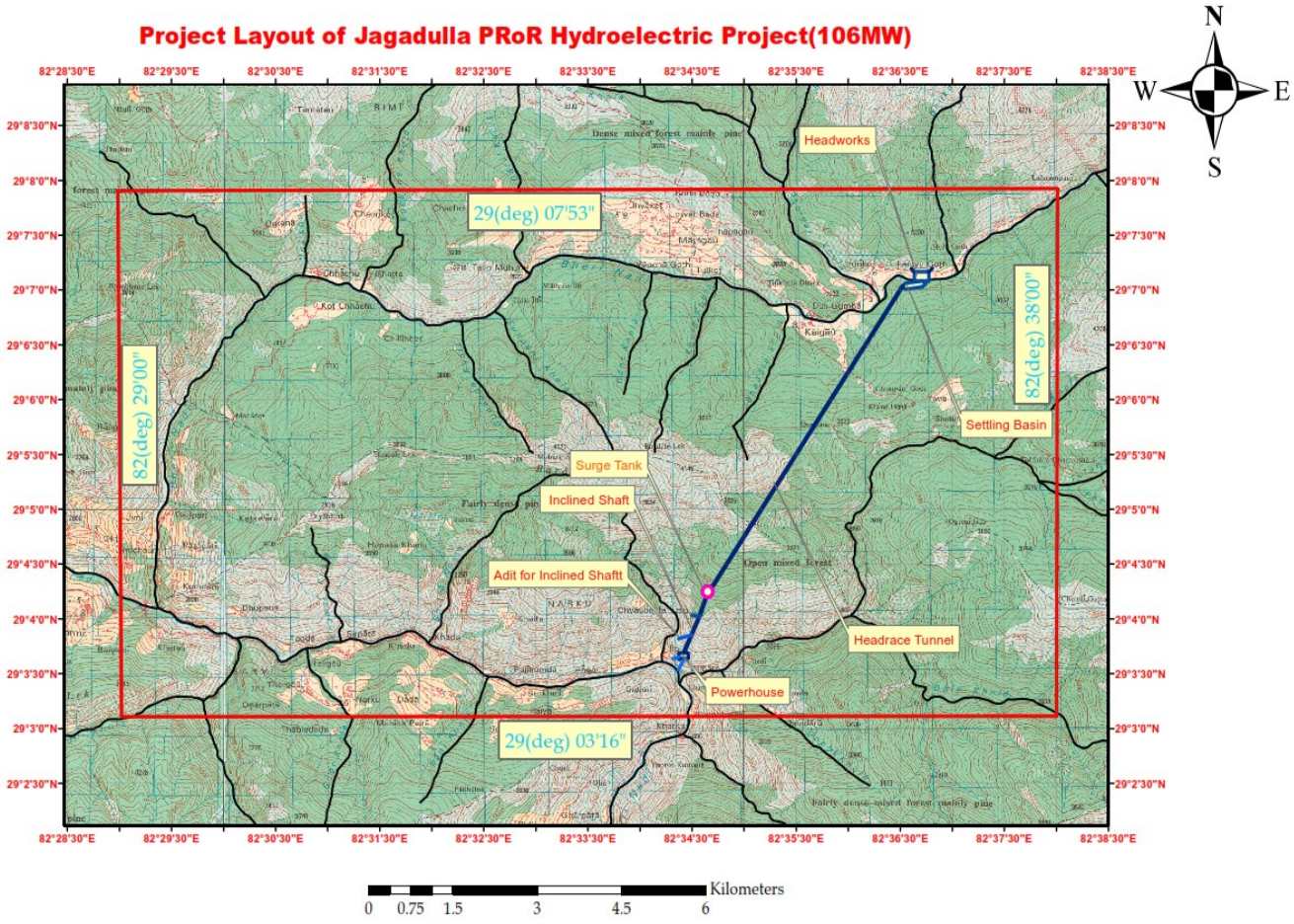


Figure 1: Project Layout

Salient Features of the JHEP

1	**Project Location**		
	Province	:	Karnali Province
	Zone	:	Karnali
	District	:	Dolpa
	Intake Site	:	Hurikot, Dolpa
	Powerhouse Site	:	Ila, Dolpa
	Geographical Co-ordinates		
	Latitude	:	82033'43" E to 82038'00" E
	Longitude	:	29003'16" N to 29007'53" N
	Conservation Area (if any)	:	No
2	**General**		
	Name of River	:	Jagdulla
	Nearest Town	:	Kaigaun and Ila
	Type of Scheme	:	Peaking Run off River (PROR)
	Gross Head	:	786.56 m
	Net rated Head	:	766.54 m
	Installed Capacity	:	106.0 MW
	Total Annual Energy (with Outage)	:	623.47 GWh
3	**Hydrology**		
	Catchment Area	:	633.83 sq. km.
	Mean Annual Discharge	:	28.83 m^3/s
	Design Discharge (Q39)	:	16.7 m3/s
	Riparian Release	:	0.467 m^3/s
	Flood Discharge for Headworks Design (1000 years)	:	1141 m^3/s

	Average Annual Precipitation	:	638 mm
4	**Diversion Weir**		
	Type of Weir	:	Barrage (3 nos. opening) with emergency spillway
	Length of Weir	:	38 m (Barrage), 45.70 m (Emergency Spillway)
	Crest Elevation	:	2696.00 m asl
	Spillway type	:	Uncontrolled Ogee shaped
	Undersluice Opening (W X H)	:	7.0 m X 7.0 m
	Undersluice Crest Level	:	2678.00 m asl
5	**Intake Structure cum Gravel Trap**		
	Type of Intake	:	Side Intake
	Nos of Opening	:	2
	Size of Intake (W x H)	:	2.0 m (B) x 2.0 m (H)
	Intake Sill Level	:	2683.70 m asl
	Length of Gravel Trap	:	Not Applicable
	Width of Gravel Trap (Avg.)	:	Not Applicable
	Overall depth	:	Not Applicable
	Particle size to be trapped	:	Not Applicable
	Flushing Channel	:	Not Applicable
6	**Approach Canal**		
	Type	:	Underground, pressurized
	No. of canal	:	2
	Length	:	36.10 m and 49.00 m
	Size (W x B)	:	2 m (B) x 2 m (H)
7	**Desanding Basin**		

	Type	:	DuFour with intermittent flushing
	Dimension (L x B x H)	:	120 x 13 x 9.30 m
	Inlet Transition Length	:	25.50 m
	Particle Size to be settled	:	0.1 mm
	Trapping Efficiency	:	>90%
8	**Headrace Pipe/Tunnel**		
	Type	:	Inverted D-shaped tunnel
	Internal Diameter	:	2.90-3.50 m, varies
	Length	:	6135 m
	Steel Thickness/Type of Lining	:	150 mm-450 mm, varies
	Nos. of Anchor Blocks	:	Not Applicable
9	**Surge Tank/Forebay**		
	Type	:	Restricted orifice
	Effective Depth	:	49.85 m
	Diameter (Or size)	:	7 m (1.2 m)
	Up Surge Level	:	EL. 2708.76 m asl
	Down Surge Level	:	EL. 2666.73 m asl
	Normal Operation Level	:	EL. 2683.53 m asl
10	**Steel Penstock Pipe**		
	Type	:	Underground, pressurized
	Internal Diameter	:	2.10 m
	Length	:	1406.69 m
	Steel Thickness	:	10- 48 mm
	Nos. of Anchor Blocks	:	Not Applicable
	Nos. of Saddle Supports	:	Not Applicable
11	**Powerhouse**		
	Type	:	Underground
	Size (L x W)	:	77.80 m x 14.00 m
	Height	:	33.45 m

	Turbine Axis Level	:	1906.40 m asl
12	**Tailrace**		
	Type	:	Inverted D-shaped tunnel
	Tailrace Length	:	330 m
	Size (W x D)	:	5 m x 5 m
	Tailrace Water Level	:	El. 1900.50 m asl
13	**Turbine**		
	Type	:	Pelton, Vertical axis
	Number	:	3
	Rated Output Capacity per unit	:	35.50 MW
	Turbine Axis Level	:	1906.40 m asl
	Net Head	:	767.68 m
	Discharge per Unit	:	5.40 m^3/s
	Efficiency	:	90 %
14	**Governor**		
	Type	:	Digital Governor
	Adjustment for Speed Drop	:	0-10%
15	**Generator**		
	Type	:	Vertical shaft
	Rated Output Capacity per Unit	:	41.98 MVA
	Power Factor	:	0.85
	Generation Voltage	:	13.80 kV
	Frequency	:	50 Hz
	No of Units	:	3
	Excitation System	:	Brushless
	Efficiency	:	97.50 %
16	**Transformer**		

	Type	:	3x1 Ph, Oil Immersed
	Rated Capacity	:	42 MVA
	Voltage Ratio	:	13.80 kV/132 kV
	No of Units	:	9+1
	Vector Group	:	Ynd11
	Frequency	:	50 Hz
	Efficiency	:	99.50 %
17	**Transmission Line**		
	Voltage Level	:	132 kV
	Length	:	45 km
	Conductor Type	:	BEAR
	From	:	Ila
	To	:	Banfikot, West Rukum
18	**Project Cost Estimate**		
	Total Cost of the Project	:	NRs. 19,901,454,303 (W/O financing)
19	**Construction Period**	:	5 years

Detail feasibility/Engineering study

An agreement was signed between NEA engineering, a subsidiary company of NEA and JHCL-JHEP for the study of feasibility study and preparation of cost estimate and tender documents in respect of JHEP. Brief information about agreement reflecting all its aspect is detailed as below.

Agency	Agreement Signed Date	Agreement end Date	Scope of work	Status of work	Contract award amount (NPR)	Amount released to Agency (NPR)	LD/ Retention (NPR)	EOT	Remarks
NEA Engineering Co. Pvt. Ltd	6 Dec 2017	6 Jun 2019	Detail Design	Detail Design completed on Ashad 2077	34,87,00000 Revised contract amounts 27,69,73,806.83	223,825,944.12 (For due amount final RA bill has been submitted by consultant.)			Completed
NEA Engineering Co. Pvt. Ltd	24 Dec 2017	24 Aug 2019	EIA Study	EIA is under progress	2,00,55,550.75	40,11,110.15		Kartik 2080	Completed

The progress of aforesaid contract to till date is as under:

Event	Completion Date (in months)	Status
Inception Report	3	Received
Design Basis Memorandum (DBM)	8	Received
Hydrological, Sedimentation and GLOF Report	10	Received
Geological Baseline Report including ERT	14	Received
Interim Design Report	18	Received
Draft Final Report including Tender Documents and Drawings	19	Received
Final Report	20	Received

Figure 2: Drilling For Geotechnical Study

Besides above, progress of additional works as per the company requirement assigned to above contract is tabulated as under:

Event	Status
Feasibility Study Report	Received
Topographic Survey Report	Received
Cadastral Analysis	Received
Updated Report	Received
Transmission Line Reconnaissance Survey Report	Received
Interim Drilling Report	Received
Design Cost Estimate and Preparation of the Tender Document of Test Adit and TRT	Received
Design Cost Estimate and Preparation of the Tender Document of 100 m Long Bridge over Bheri River in Tribeni	Received
Design Cost Estimate and Preparation of the Tender Document of Camp facilities	Received
Desk Study Report of the TL from Ila to Bafikot Substation (132 KV)	Received
Power Evacuation Report of the TL from Ila to Bafikot Substation (132 KV)	Received

3.4 Environment Impact Assessment (EIA)

EIA is required to implement any kind of structure with subsequent approval of same from GoN. Status of EIA of the project JHEP is as follow:

Activity	Status	Completion Date	Remarks
Contract Agreement of EIA between VUCL and NEAEC	Completed	14-Dec-017 and updated to 11-Feb-2022	Contract between VUCL and NEAEC
Permission from department of NATIONAL Park and Wildlife Conservation (DNPWC) and Ministry of Forest and Environment (MOFE)	Completed	18-May-018	EIA Study

Activity	Status	Completion Date	Remarks
Feasibility Study permission from Ministry of Forest and Environment	Completed	25-Nov-018	EIA Study permission from MOFE
Permission from Ministry of Forest and Environment (MOFE) for EIA Study	Completed	28-Nov-18	Letter from NEAEC to JHCL
Condition for EIA Study of JHCL.	Completed	31-Jan-020	Letter from MOFE to JHCL
Scoping and TOR letter from JHCL to DOED	Completed	28-Aug-020	
Extension of time for EIA Study upto February 11, 2022	Completed	6- Nov-020	Meeting between JHCL and NEAEC
Presentation in DOED	Completed	5-Apr-021	
Comments from DOED	Completed	9-Apr-021	
Modification of Scoping and term of reference	Completed	12- Apr-021	letter from DOED
Modified Scoping and TOR forward for approval	Completed	14-Jun-021	Letter from JHCL to DOED
Letter from DOED to MoF	Completed	30-Jun-021	
Comments from DoF	Completed	4-Jul-021	
Approval from MoFE of TOR and Scoping Works	Completed	17 Mangsir 2078	
Public Hearing	Completed	Public Hearing was Completed • In HW on dated 2 Poush 2078 • In Dewatering Zone on Dated 4 Poush 2078 • In PH on dated 6 Poush 2078	
Tree Counting Works	Completed	25 Chaitra 2078	
Final EIA Report	Completed	Submitted to the DoED on 2079/06/06 revised submission on 2079/07/21 and Presentation date is on 2079/08/01	

Final EIA has been approved by Ministry of Forest and Environment (MoFE) on dated 2080/07/13.

Proposed Revised Schedule: JHEP

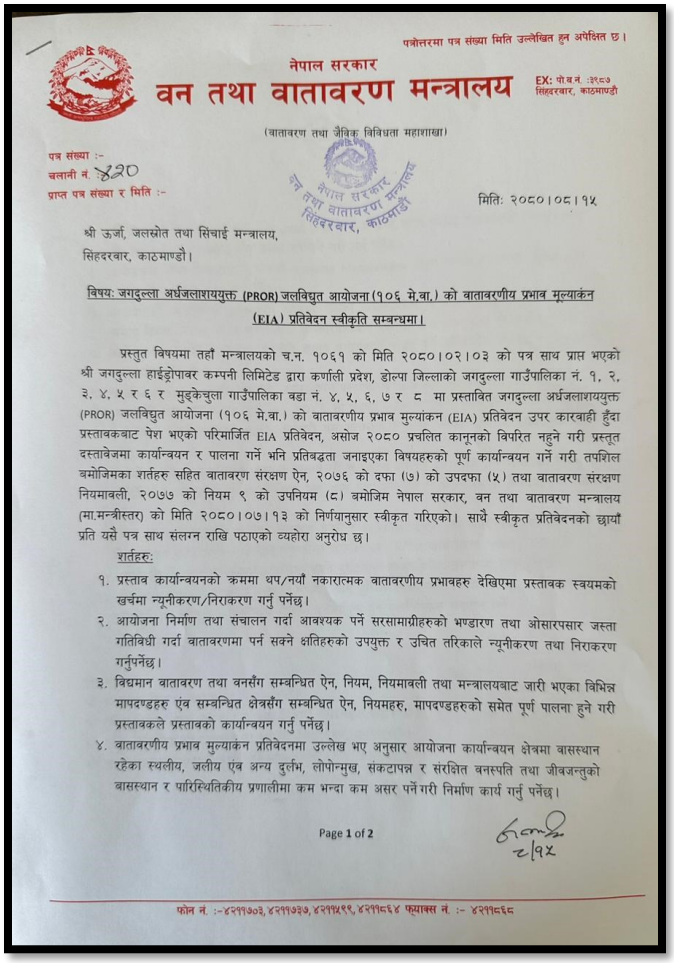
Activity No.	Activity	Months of 2080					Reamrks
		Asar	Shrawan	Bhadra	Asoj	Kartik	
1	**Approval Process of EIA Report**						
1.A	Report Submitted to DOED for approval process						Already completed
1.B	12 copies of report Submitted to DOED for presentation						Already completed
1.C	Presentation at DOED						Already completed
1.D	Submit Revised Report to DOED after incorporating comments						Already completed
1.E	Forward report by DOED to MOEWRI						Already completed
1.F	Forward report by MOEWRI to MOFE						Already completed
1.G	Send report to local level and central level agencies for comment and publish Notice in national daily (7 days) and in website also						Underway
1.H	Presentation at MOFE						
1.I	Submit Revised Report to incorporating comments received from MOFE Presentation						
1.J	Submit final revised report incorporating all comments received (if any) on the version published in website and notice in national daily						
1.k	Approval of EIA Report						**EIA REPORT APPROVED**

NEA ENGINEERING COMPANY LTD.

Figure 3: Public Hearing Program at Powerhouse

Figure 4: Public Hearing Program at Dewatering Zone

Figure 5: Public Hearing Program at Headwork Area



पत्रोत्तरमा पत्र संख्या मिति उल्लेखित हुन अपेक्षित छ।

नेपाल सरकार

वन तथा वातावरण मन्त्रालय

EX: पो.ब.नं. :३९८७ सिंहदरबार, काठमाण्डौं

(वातावरण तथा जैविक विविधता महाशाखा)

पत्र संख्या :-
चलानी नं. ४२०
प्राप्त पत्र संख्या र मिति :-

मितिः २०८०।०८।१५

श्री ऊर्जा, जलस्रोत तथा सिंचाई मन्त्रालय,
सिंहदरबार, काठमाण्डौं।

विषयः जगदुल्ला अर्धजलाशययुक्त (PROR) जलविद्युत आयोजना (१०६ मे.वा.) को वातावरणीय प्रभाव मूल्यांकन (EIA) प्रतिवेदन स्वीकृति सम्बन्धमा।

प्रस्तुत विषयमा तहाँ मन्त्रालयको च.नं. १०६१ को मिति २०८०।०२।०३ को पत्र साथ प्राप्त भएको श्री जगदुल्ला हाईड्रोपावर कम्पनी लिमिटेड द्वारा कर्णाली प्रदेश, डोल्पा जिल्लाको जगदुल्ला गाउँपालिका नं. १, २, ३, ४, ५ र ६ र मुड्केचुला गाउँपालिका वडा नं. ४, ५, ६, ७ र ८ मा प्रस्तावित जगदुल्ला अर्धजलाशययुक्त (PROR) जलविद्युत आयोजना (१०६ मे.वा.) को वातावरणीय प्रभाव मूल्यांकन (EIA) प्रतिवेदन उपर कारवाही हुँदा प्रस्तावकबाट पेश भएको परिमार्जित EIA प्रतिवेदन, असोज २०८० प्रचलित कानूनको विपरित नहुने गरी प्रस्तुत दस्तावेजमा कार्यान्वयन र पालना गर्ने भनि प्रतिबद्धता जनाइएका विषयहरुको पूर्ण कार्यान्वयन गर्ने गरी तपशिल बमोजिमका शर्तहरु सहित वातावरण संरक्षण ऐन, २०७६ को दफा (७) को उपदफा (५) तथा वातावरण संरक्षण नियमावली, २०७७ को नियम ९ को उपनियम (८) बमोजिम नेपाल सरकार, वन तथा वातावरण मन्त्रालय (मा.मन्त्रीस्तर) को मिति २०८०।०७।१३ को निर्णयानुसार स्वीकृत गरिएको। साथै स्वीकृत प्रतिवेदनको छायाँ प्रति यसै पत्र साथ संलग्न राखि पठाएको व्यहोरा अनुरोध छ।

शर्तहरु:

१. प्रस्ताव कार्यान्वयनको क्रममा थप/नयाँ नकारात्मक वातावरणीय प्रभावहरु देखिएमा प्रस्तावक स्वयमको खर्चमा न्यूनीकरण/निराकरण गर्नु पर्नेछ।
२. आयोजना निर्माण तथा संचालन गर्दा आवश्यक पर्ने सरसामाग्रीहरुको भण्डारण तथा ओसारपसार जस्ता गतिविधी गर्दा वातावरणमा पर्न सक्ने क्षतिहरुको उपयुक्त र उचित तरिकाले न्यूनीकरण तथा निराकरण गर्नुपर्नेछ।
३. विद्यमान वातावरण तथा वनसँग सम्बन्धित ऐन, नियम, नियमावली तथा मन्त्रालयबाट जारी भएका विभिन्न मापदण्डहरु एंव सम्बन्धित क्षेत्रसँग सम्बन्धित ऐन, नियमहरु, मापदण्डहरुको समेत पूर्ण पालना हुने गरी प्रस्तावकले प्रस्तावको कार्यान्वयन गर्नु पर्नेछ।
४. वातावरणीय प्रभाव मुल्यांकन प्रतिवेदनमा उल्लेख भए अनुसार आयोजना कार्यान्वयन क्षेत्रमा वासस्थान रहेका स्थलीय, जलीय एंव अन्य दुर्लभ, लोपोन्मुख, संकटापन्न र संरक्षित वनस्पति तथा जीवजन्तुको वासस्थान र पारिस्थितिकीय प्रणालीमा कम भन्दा कम असर पर्ने गरी निर्माण कार्य गर्नु पर्नेछ।

Page 1 of 2

फोन नं. :-४२११७०३, ४२११७३७, ४२११५९९, ४२११८६४ फ्याक्स नं. :- ४२११८६८

Figure 6: EIA Approval from MoFE

3.5 Project Land

Land acquisition of the JHEP was completed on Falgun 2076. A detail of project land is as below.

Description	Area	Status	Remarks
Private Land	260 ropani	acquired	

Figure 7: Public Interaction Program during Land Acquisition

As per the project requirement additional Land is to be acquired for which rate finalization from CDO office of Dolpa has been accomplished. Due to Worldwide Nobel Covid pandemic the distribution of compensation for additional land to the affected people is on hold. Further land acquisition work has been resumed and our team is working on it. It is being done as per the site requirement and necessity

3.6 Completed/Ongoing Construction Activities

3.6.1 Test Adit Tunnel

For geological study at powerhouse a drift of 2.5/2.5 was proposed by JHEP and accordingly for executions of the works of the drift LOA was awarded to M/S Sherpa/P.S JV. 15 ton of explosive and 18000 nos. of different serial of detonators are used for excavation of Test Tunnel 1, 210m and test tunnel 2, 275m. The details of the contract and its status to till date is as under:

Activity	Contract award Date	Contract Completion Date	Name of Agency	Status till date	Contract amount inc VAT (NPR)	*Amount paid to contractor till date (NPR)*	*Retention amount (NPR)*	Remarks
Test Adit Tunnel	15-JUN-2020	JUL-13-2022	Sherpa/PS JV	Completed	87,41,6,331.86	86,288,747.98	38,18,086.23	Completed

Explosive Processing

On Dated 2077/10/15 a request letter for approval from the Nepal Army for the use of explosives to execute the works of drift was submitted and permission of same was granted from Nepal Army on dated 2077/05/04. However, the explosive was not instantly handed to the contractor from Nepal Army due to the shortage of explosives at army storage. To resolve the crisis of explosive further request letter for approval regards to purchasing of explosives from the neighboring country India was submitted to the army on dated 2077/12/23 and waiver of same from Nepal Army was issued on dated 2077/12/23. Subsequently, explosive was purchased from India and same has been transported to Site. Explosive has been used for the excavation of test tunnel and the excavation work of test tunnel is completed.

Figure 8: Test Tunnel Completed

Figure 9: Test Tunnel Photos

Figure 10: Test Tunnel Photos

3.6.2 Prefab Office cum Residential Building

Necessary accommodation & offices for the employees at the site for the supervision of the pre-construction activities a pre-fab office cum residential building was planned and to execute the construction of the pre-fab office cum residential building contract was awarded to M/S Sherpa Hydro on dated 31-AUG-2020. Accordingly, M/S Sherpa Hydro executed the works of the pre-fab office cum residential building and the same is completed.

Brief overview of the aforesaid contract is as below:

Pre-fab Building			
Contract award Date	31 -AUG - 2020	**Contract amount inc VAT (NPR**	17,25,3,827.79
Contract Completion Date	31-APR-2021	**Amount paid to contractor till date (NPR)**	1,58,29,359.19
Name of Agency	Sherpa hydro	**Retention amount (NPR)**	698,038.1
Status till date	Completed		

Figure 11: Completed Prefab Office cum Residential Building

3.6.3 Construction of Camp facilities at Headwork's Area

Contract has been awarded to Sherpa Hydro Construction Pvt. Ltd. 14 August 2022. Since, we have resolved all the issues at site and the excavation work has been started. Contractor has prepared all the necessary preparatory work including access road to Headwork's camp. We have deployed the team lead by Site In charge for the supervision of construction works to ensure the timely completion of the work without compromising the quality.

Construction of Camp facilities at Headwork's Area			
Contract award Date	11-Dec-2022	**Contract amount inc. VAT (NPR**	311,418,245.72
Contract Completion Date	10-Dec-2024	**Amount paid to contractor till date (NPR)**	19,637,937.00
Name of Agency	Sherpa hydro		
Status till date	Ongoing		

Camp work progress photos are attached below:

Figure 12: Headwork's Camp Access Road excavation start

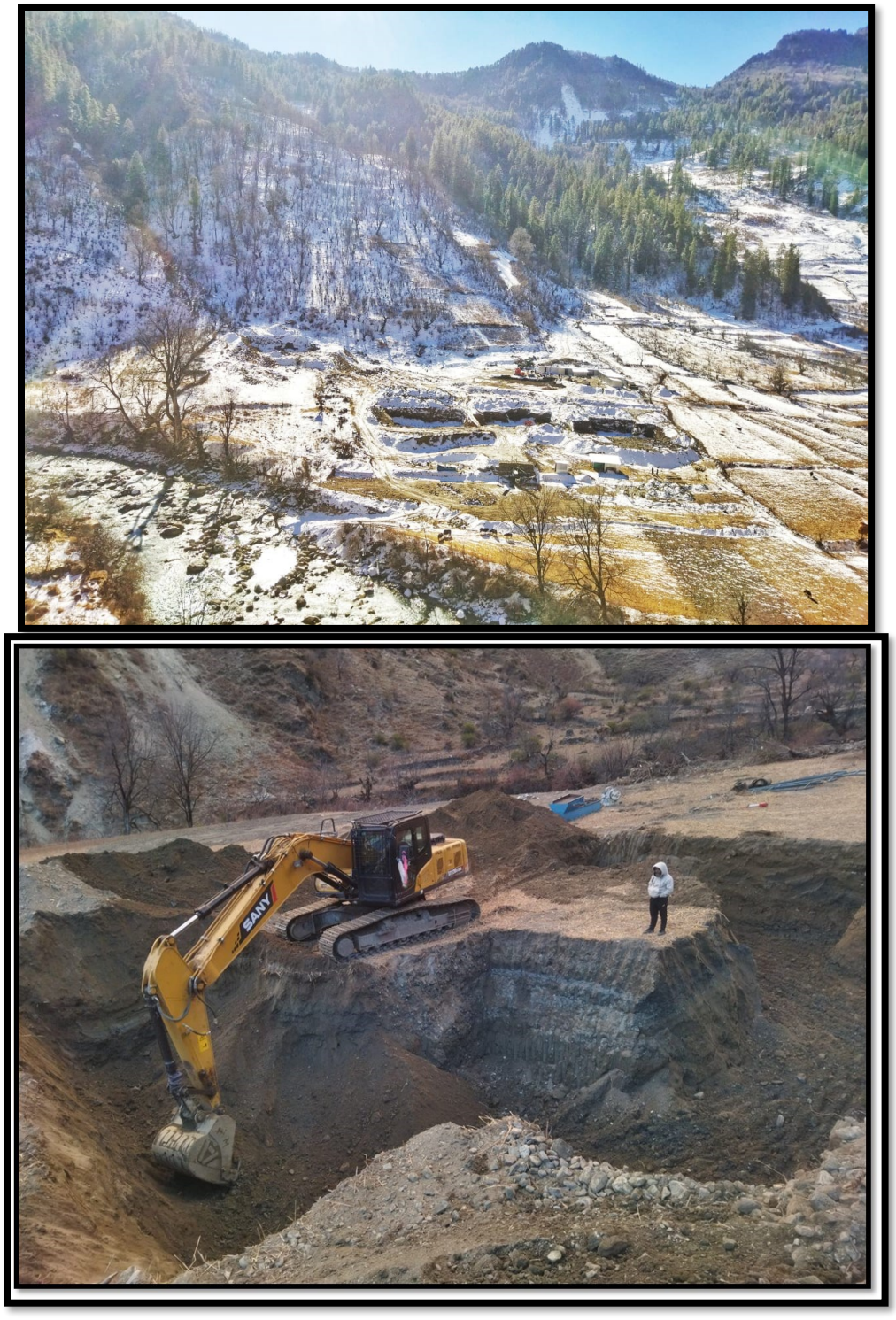


Figure13: Layout and Excavation on Foundation of Camp Facility at head works

Figure 14: Layout of the HW Camp Facilities

Figure 15. Crusher plant setup at Headworks

Figure 16: CST Machine Setup Headworks

Figure 17: Different activities of Camp House at head works

Figure 18: Crusher Plant installed at head works

Figure 19: Labor Camp at head works


Kaigaun, Kamali Province Jan 2, 2024, 15:43


Kaigaun, Kamali Province Jan 2, 2024, 15:42

Figure 20: Construction material store at site

3.6.4 Installation of Bailey Bridges (For the site Excess)

Contract has been awarded to Ravi Chakra –Bfour JV to Design, Supply and Install 253.59 m of Bailey Bridges at different location required for the project access. The company has finalized the modality for the abutment works. Abutment work must be done through the Public Committees (Including local stakeholders for the individual bridges). We have completed the committee formation works coordination with local governments. Design has been submitted by the contractor and it is in reviewing phase. We will be finalizing the review with in December, 2023 and instruct contractor to start manufacturing.

Photos of work progress has been attached below:

Design, Delivery and Installation of Single - Span Bailey Bridge Over Jagdulla River			
Contract award Date	24-Aug -2023	**Contract amount inc. VAT (NPR)**	267,705,205.50
Contract Completion Date	23-Aug-2024	**Amount paid to contractor till date (NPR)**	22,139,458.00
Name of Agency	Rabi Chakra - Bfor JV		
Status till date	Ongoing		

Figure 21: Location Survey by Personals

Bailey Bridge finalization and JHCL Personals and Contractor's

Figure 22: User Committee Formation for Bailey bridge at HW

Figure 23:: User Committee Formation for Bailey bridge at PH

3.6.5 Access Road Opening (Triveni to Illa to Kaigaun)

Access road is the most important part of the preparatory work to start the project construction works. Most of the access road has been completed beside the portions with hard rock presence. We have finalized the contractor for the blasting and access road excavation works. The Contractor (Serpa Hydro Construction Pvt. Ltd) has completed all the preparatory works and explosive has been received at site. Blasting works will be started from 1 of Poush 2080. Almost 40 km access road has been completed and 5 Km hard rock part is in construction.

Access Road (Trebeni to Kaaigaun)			
Contract award	12-March -2023	**Contract amount inc**	101,638,283.33

The photos of blasting preparation are attached below:

Figure 24: Drilling Works for Explosive on Access Road

Figure 25: Bunker House Maintenance and Storage of Explosive at Suligad Barrack

Figure 26: Blasting of Rock along the access Road

3.6.6 RCC Motorable Bridge at Bheri River

Under the access road, a bridge is to be built at Triveni, Jajarkot over the Bheri River. For construction of the Bridge over Bheri River a contract agreement was performed between Jagdulla Hydropower Company Limited and Caravan/Hirachan JV on dated 29-July-2020.As per contract Caravan/Hirachan JV has completed the design works of the bridge and the IEE of the Bridge is completed. The foundation concreting work of right abutment pier 2 is complete and river training work 100 m is partially complete.

The details of contract between Jagdulla Hydropower Company Limited and M/S Caravan/Hirachan JV pertaining to the Bridge at Triveni over Bheri river is as under:

Design and Build of Bridge Over Bheri River at Trevini , Dolpa			
Contract award Date	29-July-2020	**Contract amount inc VAT (NPR**	148,925,928.75
Contract Completion Date	28- Dec -2022	**Amount paid to contractor till date (NPR)**	6,558,559.31
Name of Agency	Hirachan Caravan JV	EOT-28 July -2024	
Status till date	Ongoing		

Figure 27 : Layout of the RCC Motorable Bridge

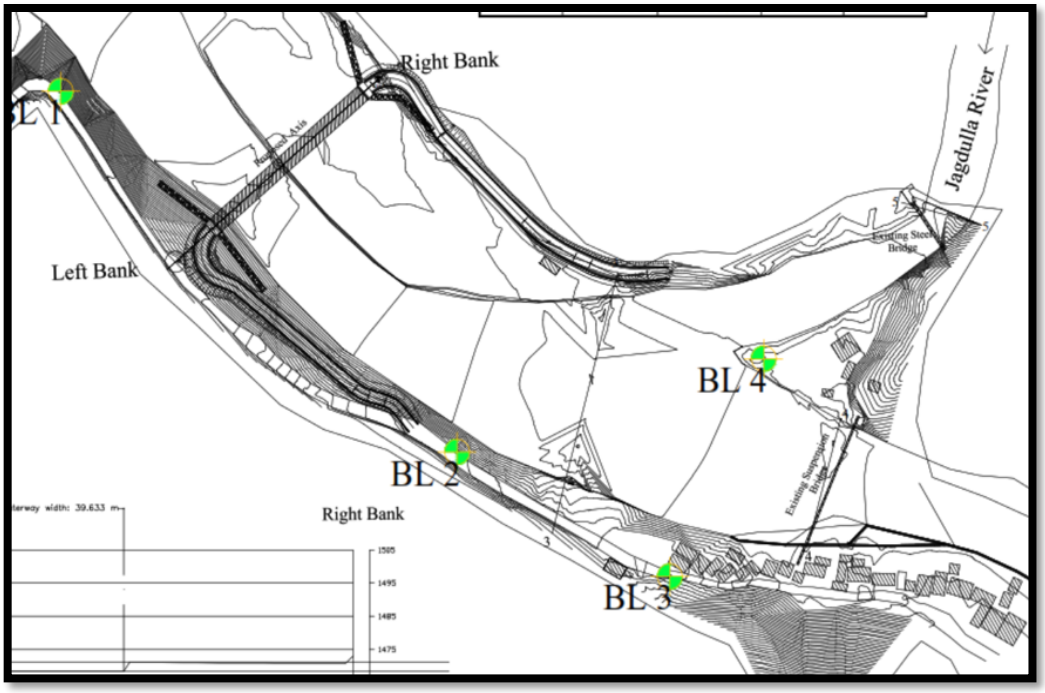


Figure 28 : Technical Team of RCC Bridge.

Figure 29: : Carrying and River Crossing of the Equipment of RCC Bridge.

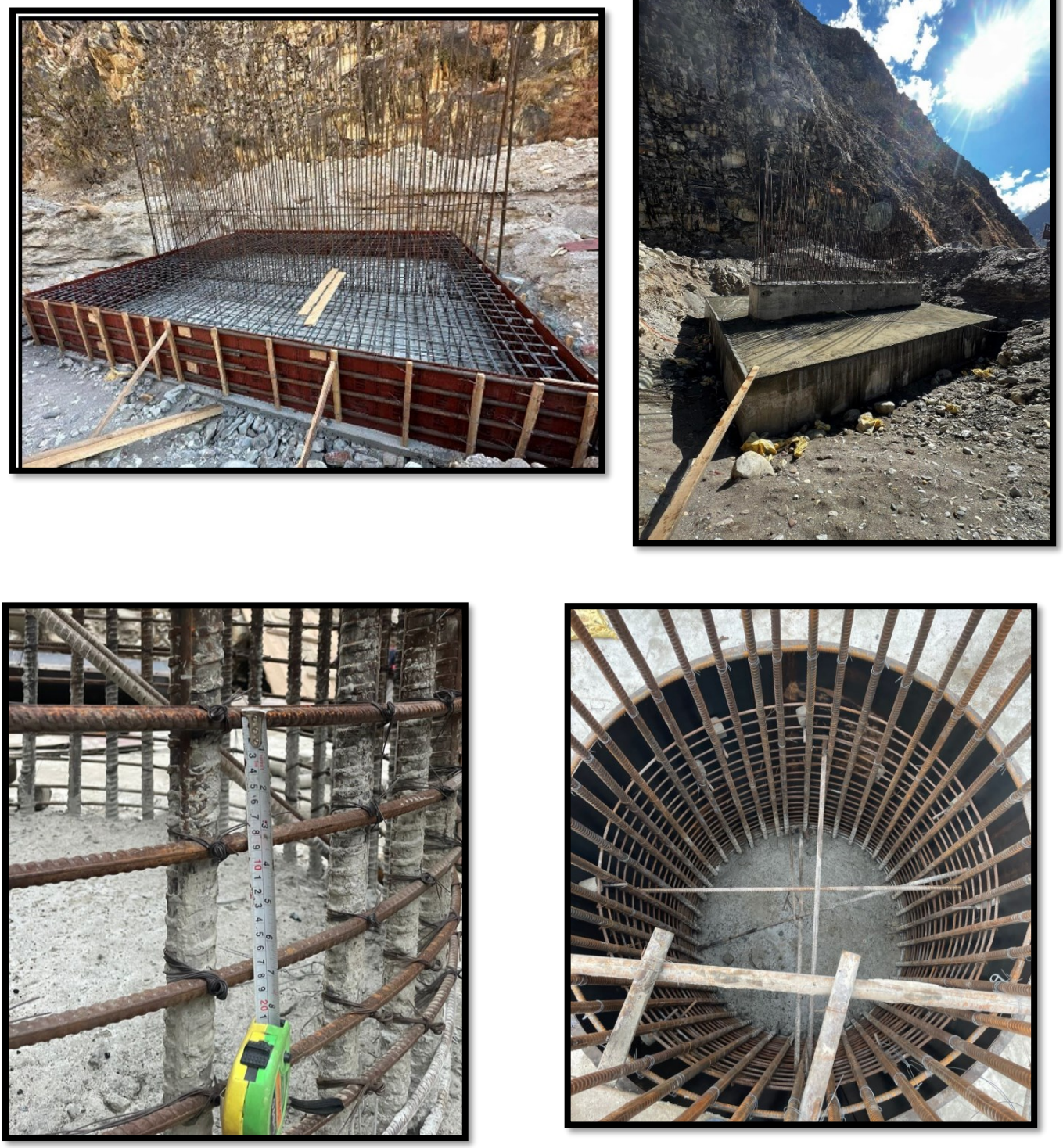


Figure 30:: Construction of Right Abutment

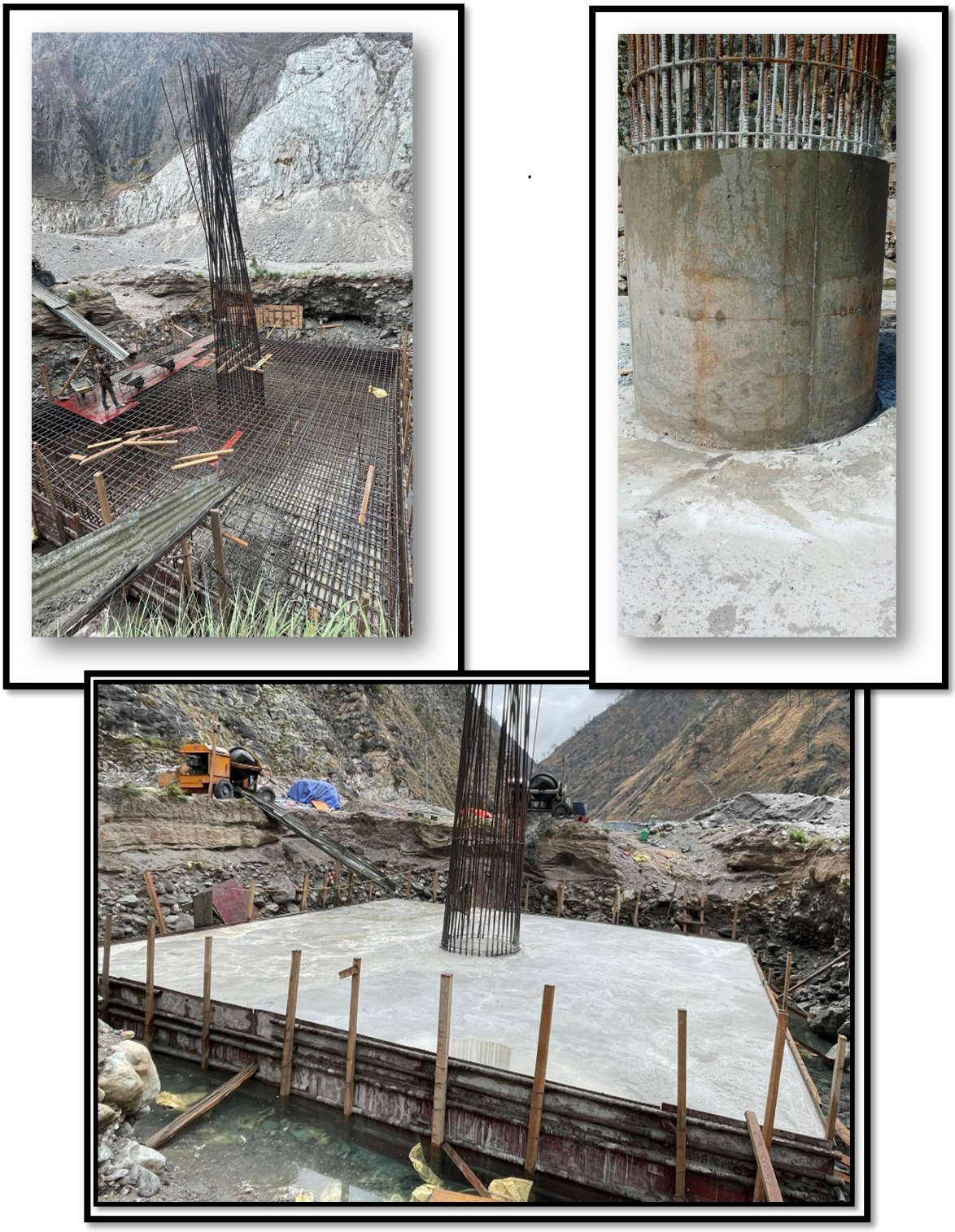


Figure 31: Construction preparation of RCC Bridge Pier

Figure 32: Construction preparation of RCC Bridge Pier

3.7 Power Purchase Agreement (PPA)

For the evacuation of power of JHEP after the completion of the project JHEP has approached the only one distribution company of Nepal - NEA for Power Purchase Agreement, continuous follow-up is being going on with NEA for the same and is on the final stage.

Figure 33: Slide Presentation of PPA at NEA Office

Figure 34: Connection Agreement with NEA of Power Evacuation of Jagdulla PRoR HEP (106 MW)

Till date, achievements regarding PPA between NEA and JHEP are as follows:

Activity	Status	Application submission date	Completion date	Remarks
Application to PDD of NEA,	completed	05-03-2021	On 27-6-2021 PDD of NEA called for Energy Locking.	Delay for energy locking due to covid-restrictions.
PPA Slide presentation at NEA office	completed		30/07/2021	
Energy locking signing	completed		28/06/2021	
Grid impact study presentation	completed		9/03/2021	
Connection agreement with NEA	Completed		10/06/2078	In NEA Substation (Banfikot)
Approval from Electricity Regulatory Commission	To be submitted		Within this fiscal year	
Final PPA with NEA	Completed		Final signed at 26/01/2080	

Figure 35: Power Purchase Agreement (PPA) with NEA of Power Evacuation of Jagdulla PRoR HEP (106 MW)

3.8 Equity and Debt Management

Financing of project is associated to the Cabinet decision made on 2075-11-27. The Cabinet concluded a program '**JANTA KO JALVIDHYUT**' which brought a platform for Nepalese people for developing hydropower of Nepal by their involvement and ownership by means of shareholding. The program has also framed the shareholding of GoN agency for financing of the projects listed within the program. The share structure as define by the program is tabulated below.

i. Promoters shares

Description	Total percentage of share	Percentage of shareholding
Associated Province	51%	5%
Local Government		5%
GoN and its Agency		41%

ii. General Public shares

Description	Total percentage of share	Percentage of share holding
JHEP/Promoters Employee	49%	3%
Project affected local people		10%
District locals		33%
TL affected people		3%

Note: In case percentage of shareholding of JHEP/Promoters Employee, Project affected local people and TL affected people would not be achieved fully or partially than by means of notice share shall be sell out.

Based on above share structure, the FC works is in full swing and its progress till date is as under.

- **Equity Management Plan**
  - Promoters share holding

Promoters	Total percentage of share	Percentage of equity	MOU	Remarks
VUCL	51%	26	Completed	
HIDCL		10		
NEA		9		
Associated province		5		
Local GoN		1		

  - General Public shares

Description	Total percentage of share	Percentage of share holding	Remarks
JHCL Employee	49%	3%	Share shall be issued after achieving 50% of progress of project.
Project affected local people		10%	
District locals		33%	
TL affected people		3%	

- **Debt Management Plan**
  - The board meeting number 81 of dated 2078/11/25 has formed subcommittee for finalization financial closure for the development of Jagdulla Hydropower Project 106 MW in request of HIDCL. The subcommittee has formed as coordinator director Mr. Mahesh Rimal with two-member Mr. Sanjay Sapkota Acting CEO and Mr. Parwat Krishna Pokharel, Account Officer.
  - Different meeting held with interested consortium partner HIDCL, EPS, NIFRA Bank, NABIL Bank, as per the discussion it is finalized NIFRA will lead the consortium and NABIL will be Co-Led as Commercial Bank. Consortium Partner decided to sign Term Sheet in suitable and favorable time.

- On 2079/03/17 Board Meeting number 90 draft Term Sheet has been presented and board of director instruct management to finalize Term Sheet with minor correction.
- Here is the Finalized Consortium for the Project financing for the Jagdulla PROR HEP (106 MW). On 19th October 2023, The Indicative Term Sheet has been signed by the Consortium Bank.

Name of the Bank	Pattern	Allocated Amount (NPRS in Million)
NIFRA	Lead Partner	4380 Million
NABIL Bank Limited	CO-Lead Partner	4300 Million
HIDCL	Member	4000 Million
Laxmi Sunrise Bank Limited	Member	2000 Million
Everest bank Limited	Member	1500 Million

- On 11th December 2023, representatives from the Consortium Bank were visited the Project Site for finalization of the loan approval and agreement.

Figure 36: Meeting with EPF

Figure 37: Interaction with NIFRA related to FC

Figure 38: Project Financing Consortium Finalization on HIDCL Office in the presence of BOD of JHCL

Figure 39: Interaction with Karnali Province related to Equity Investment

Figure 40: Site visit by the Consortium Bank Partner's

Procurement status

Procurement of the Good, Works and Service of the Jagdulla PRoR HEP (106 MW) on Fiscal Year 2079/80 are ongoing to achieve the goal of the Procurement Plan of JHCL. Here is the Details of the Procurement.

Description of Works	Notice Publication	Technical Evaluation	Financial Evaluation	Awarded
Consulting Services for Complete Project Contract Management/Construction Supervision works including Review and Finalization of Detailed Project Report and assistance in Bidding Process.	August 14, 2021 and Re-notice on October 23, 2022	Bid opening is completed, technical and financial evaluation is under process.	In Process	In Process
EOI for Consulting Services for Environment Impact Assessment (EIA) of Jagdulla –A Hydroelectric Project (82.3 MW).	EOI: August 21, 2022 RFP: September 30, 2022	Completed	Completed	ERMC-SHRESTHA –GRID J/V
EOI for Consulting Services for Detailed Feasibility Study of Transmission Line of Jagdulla PRoR Hydroelectric Project (106 MW).	EOI: August 21, 2022 RFP: September 30, 2022	Completed	Completed	ERMC-UDAYA J/V
Construction of Camp Facilities at Headworks Site of Jagdulla PRoR Hydroelectric Project.	14 August 2022	Completed	Completed	Sherpa Hydro Construction P.ltd
DESIGN, SUPPLY, DELIVERY AND INSTALLATION OF SINGLE SPAN BAILEY BRIDGE OVER JAGDULLA RIVER	07th November 2022	Completed	Completed	Ravi Chakra -Bfour JV

Description of Works	Notice Publication	Technical Evaluation	Financial Evaluation	Awarded
Construction of Access Road (TRIBENI TO ILLA), at Different Chainages	Planning to Publish on Date: 13th November 2022	Completed	Completed	Sherpa Hydro Construction P.ltd
BIDDING DOCUMENT OF BIDDERS FOR THE PROCURMENT OF CONSTRUCTION OF LOT NO.2 CIVIL AND HYDRO-MECHANICAL WORKS UNDER EPC CONTRACT	Updating the Biding Document and Cost Estimate as per the EPC Guidelines of PPMO			
Supply and delivery of 4WD double cab Vehicle	Notice published on 23 June 2023	Completed	Completed	United Traders Syndicate Pvt. Ltd
Supply delivery installation testing and commissioning of 4.5 KWP Institution al Solar PV System (ISPS) at JHEP, Mudkechula		Completed	Completed	Tamu Appliances Suppliers
Design Supply delivery and Installation of Single -span Bailey Bridge Over Jagdulla River	24 March 2023	Completed	Completed	Rabi Chakra-Bfour JV
Design Review and Construction Supervision of the Motorable Composite Bridge Tribeni, Dolpa		Completed	Completed	Innovative Engineering Services Pvt. Ltd
Construction of Partition and Installation of Electrical Appliances and Networking Works.	30 July 2023	Completed	Completed	SP Group of Engineering & Associates

Description of Works	Notice Publication	Technical Evaluation	Financial Evaluation	Awarded
Procurement of the supply and delivery of 4WD double cab	23 June 2023	Completed	Completed	United Traders Syndicate Pvt. Ltd
Video Modeling of the Jagdulla PRoR HEP	Completed			
Management Information System of the JHCL	Completed			
Others Procurement	Biding Document Preparation has been completed			

4. Jagdulla A PRoR Hydropower project (JAHEP)

Besides executing the works of JHEP the team members and board management are also engaged in developing of Jagdulla-A HEP, a cascade project of Jagdulla Hydropower Company Limited. JAHEP is Peaking Run of the River (PRoR) project of 6 hours of peaking capacity with dam of height 22 m & 4 m. and discharge of 30.6 m^3/s. It consists vertical Pelton turbines of 3 units with capacity of 41.80 MW each. More information regarding JAHEP is detailed as under:

4.1 Survey License:

The Survey license received from DoED on 09.04.2077 for a feasibility study of Jagdulla–A and it is renewed at 2080.04.20.

4.2 Project Layout:

The project layout of JAHEP is as below:

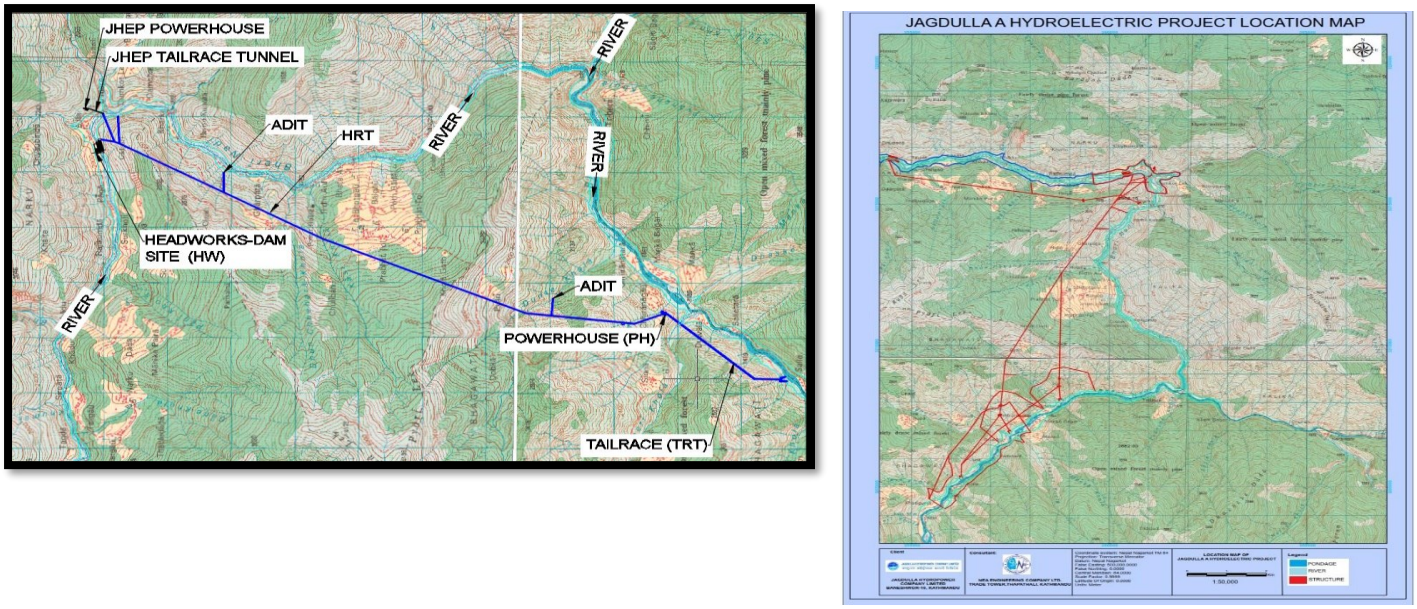


Figure 41: Layout of the JAHEP (120.6 MW)

After the visit of the site of JAHEP the consultant submitted the various layout along with the inception report. Based on the report JHEP selected above feasible project layout.

4.3 Salient Features of the JAHEP:

1 River Diversion Works	
Type	Diversion Channel
U/S Coffer Dam	5.0 m high
D/S Coffer Dam	3.0 m high
Diversion Channel Section	8.0 m X 4.5 m
Diversion Channel Length	219.09 m
2 Headworks 3	
Dam crest length	53 m
Dam height	22.00 m from the crest level of under sluice
Dam top elevation	1948.00 masl
3 Headworks 2	
Dam crest length	37m
Dam height	4.0 m from the crest of under sluice
Dam top elevation	1934.00 masl
4 Headworks 3	
Main Spillway	
Type	Gated Broad Crested
Number and size	2 nos. radial gate, 11.0m(B) X 15.0m(H)
Crest elevation	1929.00 masl
5 Undersluice Spillway	
Type	Sluice
Number and size	1 no. radial gate,6.0m(B) X6.5m(H)
Crest elevation	1926.00 masl
6 Trash Passage Spillway	
Type	Ogee and gated
Crest elevation	1940.5 masl
Number and Size	1 no. vertical gate, 6.0m X 3.5m
7 Fuse Plug Spillway	
Type	Embankment Bay
Crest Level	1946.0 masl
8 Headworks 2	
Diversion weir	
Type	Broad crested weir

Number and size	1 no., 32m long
Crest Level	1934.00 masl

9 Under sluice spillway

Type	Sluice
Number and size	1 no. of vertical gate, 2.0m (B) X 3.0m(H)
Crest Level	1930.00 masl

10 Headworks 3

Type of intake	Semi-frontal
Number and size of intake	2 Nos, 2.70 m (B) x 2.70 m (H)
Invert level	1934.30 masl
Deck level	1948.00 masl
Trashrack	Inclined at 80º to horizontal

11 Headworks 2

Type of intake	Semi-frontal
Number and size of intake	1 No, 1.50 m (B) x 1.50 m (H)
Invert level	1932.00 masl
Deck level	1936.00 masl
Trashrack	Inclined at 80º to horizontal

12 Headworks 3

Culvert Size	2 Nos, 2.70 m (B) x 2.70 m (H)
Length	202.45 m

13 Headworks 2

Culvert Size	1 No., 1.50m (B) X 1.50m (H)
Length	5m

14 Headworks 3

Type	Intermittent flushing
Size of particles to be settled	0.15 mm
Number of bays	2
Inlet transition length	15.30 m
Size	110.00 m (L) x7.00 m (B)

15 Headworks 2

Type	Intermittent flushing
Size of particles to be settled	0.5 mm
Number of bays	1
Inlet transition length	7.06 m
Size	18.00m(L) X 4.00m(B)

16	**Total Cost with IDC as**	**27,662,024.04**
	Interest rate	10%
	IRR	12.36%
	EIRR/ROE (Return on	16.87%
	NPV	5,325,327
	B/C	1.24

4.4 Detail Feasibility and Engineering Study

Contract agreement for detail design study of Jagdulla-A was signed with NEA Engineering on 30.08.2077.

As per the contract the deliverables that is to be provided by the NEA Engineering and its progress till date is tabulated as below:

Event	Completion Date (in months)	Status
Draft Inception Report	3	Received
Inception Report	6	Received
Topographical Survey and Mapping Report	8	Received
Design Basis Memorandum (DBM)	10	Received
Draft Hydrological, Sedimentation and GLOF Report	10	Received
Hydrological, Sedimentation and GLOF Report	14	Received
Interim Design Report	12	Received
Power Market, Power System and Evacuation Study Report	13	
Geological Baseline Report	14	Received
Draft Feasibility Study Report	19	Received
Feasibility Study Report	20	
Design Workshop	21	
Draft Tender Document and Tender Drawing	22	
Final Detailed Engineering Study Report	24	
Final Tender Document and Tender Drawings	24	

Event	Completion Date (in months)	Status
Bio Monthly Progress Report with Presentation	Within 15 days of the Reporting Month	

After Submission of the Inception report of JAHEP by the Consultant, the team of the Consultant and Client had visited to the site and discussed on so many times, concluded that the capacity will be increased from 82.3 MW to 120 MW. After the Application submitted to the DoED for the Amendment of the Area and Capacity JHCL got the Amendment with updated generated capacity (from 82.3 MW to 120.6 MW) and License Area on dated 2080.04.20.

4.5 Environment Impact Assessment (EIA) Study

Contract agreement for EIA study of Jagdulla-A was signed with ERMC/SHRESTHA/GRID JV on 30.08.2077.
As per the contract the deliverables that is to be provided by the Consultant and its progress till date is tabulated as below:

S. No.	Reporting	Schedule in months	Status
1.	Submission of Inception Report to JHCL	1	Received
2.	Submission of Draft Scoping Report and TOR to JHCL	4	Received
3.	Approval of Scoping and ToR document by MoFE	7	
4.	Submission of Environmental Baseline Report	10	
5.	Submission of Draft EIA Report to JHCL	15	
6.	Submission of Draft EIA Report to JHCL to MoFE through DoED	16.5	
7.	Approved EIA report from MoFE	18	

5. Budget Summary of Previous Year

The project and administrative expenditure of fiscal year 2078-2079 of JHEP was affected by worldwide Pandemic Nobel Corona Virus.

It was deemed the completion of detail Feasibility/Engineering of JHEP and EIA study of JHEP in the fiscal year 2078-79. However, covid-19 affected the schedule works and its proposed budget. In similar manner Compensation distribution to the land affected owners of additional land required for JHEP was too affected by the Covid-19. The time-consuming approval from the army for the use of explosives, the shortage of same at Nepal Army storage and the purchasing of the explosives from neighboring country India resulted in JHEP a long period for the use of explosives, ultimately halting the test audit tunnel works for a long period and consequently fall in the proposed budget of the works. Because of aforesaid reasons, only expenditure of 25 % (Nineteen Crore Thirty-Five Lakh Ninety-one Thousand Three Hundred Fifty-six Rupees Only) of the total revised approved budget of fiscal year 2078-79 was achieved.

Information regarding the approved budget and expenditure of the same fiscal years 2078-79 is tabulated below.

S. N.	Budget	Fiscal year 2079-80			Progress in percentage
		Approved Budget	Revised Budget	Expenditure till the end of the fiscal year.	
1	Current expenditure	46801798.00	46801798.00	31586194.00	67%
2	Project Expenditure				
2.1	Jagdulla PRoR Hydroelectric Project	614876518.00	614876518.00	98741071.00	16 %
2.2	Jagdulla-A hydropower project	97549488.00	97549488.00	61999091.00	64 %
3	Capital expenditure	1265000.00	1265000.00	1265000.00	100 %
Total		**760492805.00**	**760492805.00**	**193591356.00**	**25 %**

6. Main objectives, policies and programs of fiscal year 2080/81

6.1 Main Objectives:

1. As detailed engineering study report and bidding documents have been received for the development of the project, the necessary pre-construction activities such as obtaining the approval of the EIA report from DoED, financial closure required for the construction of the project, PPA between NEA and JHEP for the evacuation of the JHEP power is complete and the generation license shall be achieved before the commencement of the construction works.
2. Hiring of main consultant for the regular monitoring and supervision of the construction works during the construction of the project and engaging it to accomplish the pre-qualification works of Lot 2 (civil and hydro-mechanical) & float the NIT of Lot-2 package and evaluate the bids of same.
3. Commencement of upgrading of the access road, concrete and Bailey Bridges and office cum residential building before the construction of the project.
4. Under the social responsibility for the residents of the project-affected villages and wards, programs are to be created for better relationships between the project, the local government and the residents so as to create an environment to support and facilitate the completion of the project by mitigating the obstacles during the construction of the project.
5. To expedite the detailed Feasibility and Engineering study work of the company's new project, Jagdulla-A Hydropower Project (120.6 MW).

6.2 Policy and Program:

S. N	Policy and Programs	Goal
1.	Approval of EIA report from GoN	Getting Approval, the final EIA Report from Ministry of Forest and Environment (MoFE).
2.	Hiring of main consultant	Hiring of main Consultant for regular monitoring and supervision of construction works during project construction.
3.	Pre-qualification and tender works related to Lot 2 (Civil and Hydro-Mechanical)	Floating Invitation of notice for the Selection of contractors of LoT-2 and completion of evaluation of same. Floating NIT for financial and technical bids to the contractors selected under PQ.
4.	Financial closing	Since the projects falls under 'JANTA KO JALVIDHYUT' accordingly equity required to be revised and concerned stakeholder has been intimated of same. The aforesaid works shall be completed within this fiscal year. Financial Closing will be completed by coordinating with the financial institution and banks for the loan required for the construction of the project.
6.	Obtaining generation license	Getting Approval of the Generation License (GL) from DoED)
8.	Construction of Bridge and access road	Under the concept of Design & Build, contract of bridge at the starting point of the access road of the project (in Triveni, Dolpa) has been started and design and IEE of same has been approved from the JHEP. Consequently, as per the approved construction schedule woks shall be executed. Completion of the construction of an additional 9 nos. of Bailey Bridges on the access road of the project. Completion of the Blasting area to connect the access road at different sections of the project (Tribeni-Illa-Kaigau Road)

S. N	Policy and Programs	Goal
9.	Construction works of residential cum office buildings	The construction work of the temporary prefab building at the power house site, Illa, is completed. Construction work (office cum residential buildings) has been started at Headwork's Site and planning to expedite the works as per approved Work Schedule. Selection of the contractors will be completed, and Start the works (office cum residential buildings) at the powerhouse site after the connection of the road.
10.	Additional land acquisition work	As the consultant has submitted a report to acquire an additional 50 Romanies of land, distribution of compensation to the affected land owners based on the rate finalized by the District Compensation Determination Committee Dolpa shall be performed.
11.	Training and career development	Training, including field visits, shall be performed by identifying appropriate programs for the career development of the working employees.
12.	Social Responsibility Program (CSR)	In coordination with the concerned local bodies, track road and gabion in the river for the protection of Ila Village has been conducted, and additional work will be started.
13.	Jagdulla-A Hydropower Project (120.6 MW)	After getting the License upgradation and area from DoED, we planning to Obtain the reports from the consultant according to the agreement reached between NEA Engineering and JHCL associated with detailed engineering study of the Jagdulla-A Hydropower Project(120.6 MW)
14.	Other works	For further study of the project, Gauge Reading, Discharge Measurement, and Sediment Sampling work shall be continued. Hiring of consultancy services as required by the JHEP during course of time.

7. Conclusion and Future Planning

In conclusion, this progress report provides a comprehensive overview of the current state of our project and the milestones achieved during the reporting period. As we navigate through the project timeline, we have accomplished most of the milestones within the targeted timeline and our team is working hard to accomplish the milestones further.

In conclusion, the progress made during this reporting period sets a solid foundation for the next phase of our project. The commitment to excellence, adaptability, and effective collaboration positions us for continued success. We look forward to the challenges and opportunities that lie ahead as we work collectively toward the project's successful completion.

PHOTOGRAPHS

Figure 42: Secretary, MoEI, Joint Secretory (Dinesh Ghimire) and the Team on Site Visit

Figure 43: Site Visit by Board Member's

Figure 44: Blasting area of the Access Road to the Project Site

Figure 45: Access Road to the Project Site constructed by IDO, Dolpa

Figure 46: Site visit by Personals from Financial Institutions, Dolpa