



**MATHILLO SAGU KHOLA SMALL HYDROPOWER PROJECT
(10MW)**

DOKAKHA, BAGMATI PROVINCE, NEPAL

**Progress Report
November 2024**

Developer

Alampu Jalabidhyut Bikas Company Pvt. Ltd.

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Table 1. project work progress

1. BACKGROUND

Mathillo Sagu Khola Small Hydropower Project is located within Bigu Gaupalika of Dolakha District of Bagmati Province. Mathillo Sagu Khola Small Hydropower Project is a run-of-river (RoR) type of hydropower project.

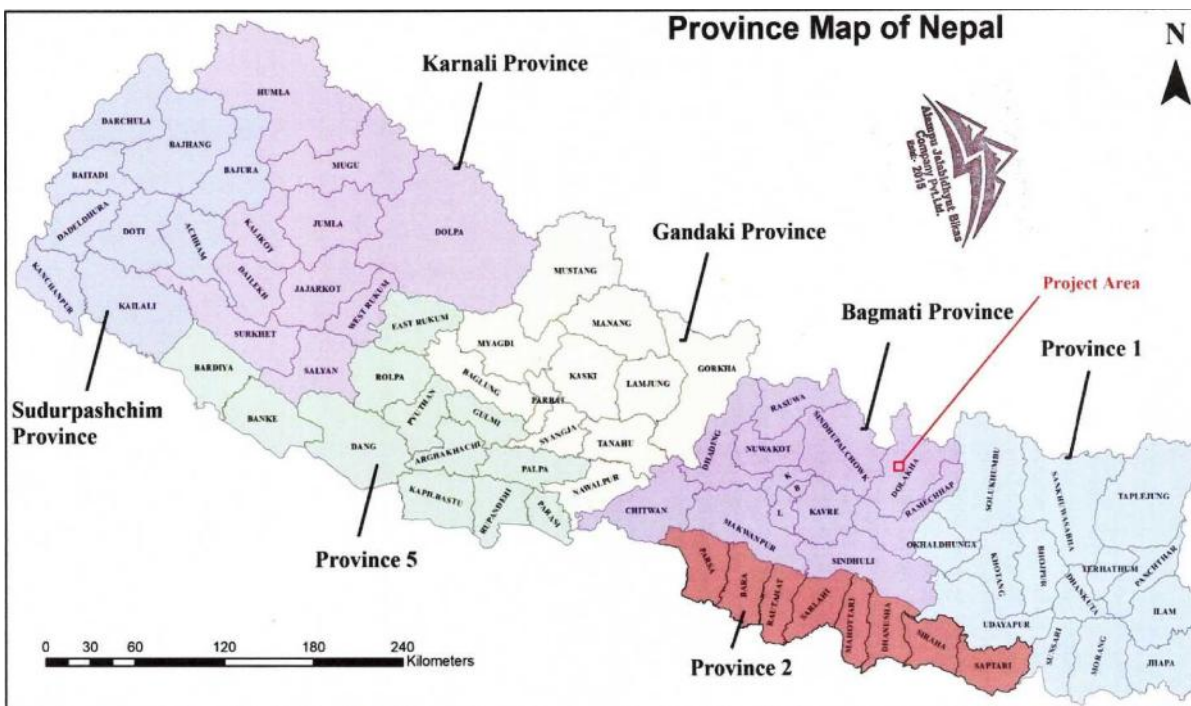
The Developer obtained the Survey License for the Mathillo Sagu Khola Small Hydropower Project from the Department of Electricity Development on 3rd Poush, 2072. During the Study, it was observed that the hydrological conditions were favourable leading to the decision to utilize water from two different intakes: one at Kharta Khola as the main intake and another at Kothali Khola as a secondary intake, with elevations of 2193 m for both intake and with resulting gross head of 418.50 m. The project is capable of delivering 16.245 GWh of energy annually to NEA substation (Singati-Lamosanghu, 132/33 kV, 30 MVA) at Singati of Dolakha district.

2. OBJECTIVE

The main objective is to highlight the project activities that has been carried out during the last year from Bhadra 2080 BS to Shrawan 2081 BS

3. PROJECT AREA

The project site is accessible by one-hour drive from Singati Bazaar through 35 km gravel road which is proposed to be black-topped in the near future. Singati Bazaar is linked with Charikot Bazaar, a district headquarter of Dolakha through single lane black topped road of 47.5 km length. Further, Charikot is connected to Lamosanghu and then to Kathmandu through Araniko Highway. The total distance to reach Charikot Bazaar from Kathmandu is 133 km. Public Transportation services are available from Kathmandu to Sorung and Alampu gaon via Singati Bazaar in all weather. The Project site is accessible through 20 min drive from Sorung. There is no air route available to reach Dolakha District at this point of time.



4. SALIENT FEATURE OF THE PROJECT

| | | |
|---|---|------------------------|
| Name of the Project | Mathillo Sagu Khola Small Hydropower Project | |
| Source | Kharta and Kothali Khola | |
| Type of Development | Run-of-River (R-o-R) | |
| Project District | Dolakha | |
| Project Gaupalika /Municipality | Bigu | |
| Accessibility | | |
| Kathmandu to Charikot | 133 km (Black topped Road) | |
| Charikot to Singati | 47.5 km (Black topped Road) | |
| Singati to Sorung | 25 km (Gravel/Earthen Road) | |
| Sorung to Project Site | 10 km (Gravel/Earthen Road) | |
| Transmission | | |
| Length | 18 km (from powerhouse of MSKSHPP to NEA s/s at 132/33 kV Singati S/S) | |
| Voltage | 33 kV | |
| Hydrology | Kharta | Kothali |
| Catchment area at Intake side | 35 km ² | 17 km ² |
| Design flood at Intake (1 in 100 Years) | 21 m ³ /s | 10 m ³ /s |
| General Hydraulics | Kharta | Kothali |
| Gross head | 418.50 m | 418.50 m |
| Design flow | 2.00 m ³ /s | 0.99 m ³ /s |
| Capacity | 10 MW | |
| Diversion Weir | Kharta | Kothali |
| Type | Concrete Boulder Boulder | Concrete |
| | Lining | Lining |

| | | |
|-----------------------------------|--|-------------------------------|
| Length | 9.30 m | 7.05 m |
| Height | 3.0 m from river bed | 3.0 m from river bed |
| Crest elevation | 2193.00 masl masl | 2193.00 |
| Intake | Kharta | Kothali |
| Type | Sub-merged orifice orifice Side intake | Sub-merged Side intake |
| Size of opening | 1.5 m x 1.3 m, 2 nos. 1 No. | 2 m x 1.3 m, |
| Gravel Trap | Kharta | Kothali |
| Type | Gravity Flushing type Flushing type | Gravity |
| Flushing head | 2.30 m | 1.70 m |
| Particle Size to be trapped | 5 mm | 5 mm |
| Dimension | 7.70 m*3.5 m*3.70 m m | 7 m*2 m*1.75 |
| Approach Canal | Kharta | Kothali |
| Type | RCC, Box culvert culvert | RCC, Box |
| Length | 31 m | 20 m |
| Size | 1.5 m x 1.55 m m | 1.0 m x 1.1 |
| Settling basin | Kharta | Kothali |
| Type/ No of bays | Gravity Flushing Flushing type Double chamber chamber | Gravity type Single |
| Nominal size of trapped particles | 0.02 mm | 0.02 mm |
| Trap efficiency | 90% | 90% |

Length

| | | |
|------------------|------|-------|
| Inlet transition | 13 m | 8.5 m |
| Uniform section | 51 m | 30 m |

| | | |
|-------|-----------------|-------|
| Width | 4.50 m each bay | 5.0 m |
|-------|-----------------|-------|

| | | |
|-------|--------|-------|
| Depth | 4.80 m | 3.0 m |
|-------|--------|-------|

| | | |
|-----------------|---------------|----------------|
| Headpond | Kharta | Kothali |
|-----------------|---------------|----------------|

| | | |
|--------|--------|------|
| Length | 12.0 m | 11 m |
|--------|--------|------|

| | | |
|-------|--------|-------|
| Width | 9.25 m | 5.0 m |
|-------|--------|-------|

| | | |
|-------------------------------|--|-----------------------------------|
| Headrace/Penstock Pipe | Kharta to T-junction Junction | Kothali to T- Junction |
|-------------------------------|--|-----------------------------------|

| | | |
|--------|--------|--------|
| Length | 2095 m | 1425 m |
|--------|--------|--------|

| | | |
|----------|-------|-------|
| Diameter | 1.0 m | 0.8 m |
|----------|-------|-------|

T-junction to Powerhouse

| | |
|------------------------------|----------------------|
| Length and Internal Diameter | 1533 m and 1.20 m ID |
|------------------------------|----------------------|

Powerhouse

| | |
|------|---------|
| Type | Surface |
|------|---------|

| | |
|------|--------------------------|
| Size | 25.0 m x 16.60 m x 9.0 m |
|------|--------------------------|

Tailrace

| | |
|------|-----------------|
| Type | RCC Rectangular |
|------|-----------------|

| | |
|--------|------|
| Length | 46 m |
|--------|------|

| | |
|------|------------------------|
| Size | 1.5 m x 1.3 m (B x H) |
|------|------------------------|

Turbine

| | |
|-------------------|-----------------|
| Type/No. of units | Pelton / 2 Nos. |
|-------------------|-----------------|

| | |
|--------------|--------------|
| Rated output | 5000 kW each |
|--------------|--------------|

| | |
|----------------|----------|
| Rated net head | 400.04 m |
|----------------|----------|

| | |
|------------------|------|
| Rated Efficiency | 90 % |
|------------------|------|

| | |
|-------|---------|
| Speed | 600 rpm |
|-------|---------|

Generator

| | |
|--------------------|--------------------------------|
| Type/ unit | Brushless synchronous / 2 Nos. |
| Rated Capacity | 5900 kVA each |
| Rated efficiency | 96 % |
| Generation voltage | 6.3 kV |
| Power factor | 0.85 |

Transformer

| | |
|------------------|---------------------|
| Type | Step-up Transformer |
| Unit | 1 No. |
| Rated capacity | 12,500 kVA |
| Rated efficiency | 99 % |
| Vector group | YnD11 |
| Power factor | 0.80 |
| Voltage ratio | 6.3/33 kV |
| Frequency | 50 Hz |

Contract Energy

| | |
|---------------|--------------------|
| Annual energy | 56.83 GWh (100%) |
| Dry energy | 9.91 GWh (17.44%) |
| Wet energy | 46.92 GWh (82.56%) |

5. PROGRESS IN SUMMARY

Table 1. project work progress

| S.N | Description | Progress |
|-----|--|--|
| 1 | Detail Topographic Survey for detail design | Detail Survey has been completed. |
| 2. | Approval for land purchase and Tress cutting | <ul style="list-style-type: none"> • Application proceeded on 8th Jestha 2081 to the concerned Government Authority. • Coordination and Initiation for land purchase/acquisition with locals • Visit of Team of Experts comprising of Managing Director, Senior Hydraulic Design Engineer and Senior Hydropower Engineer |
| 3. | Detail Design work | <ul style="list-style-type: none"> • Detail Design work and preparation of tender Documents for Civil, HM, EM and TL is undergoing. |
| 4. | Pre-Construction Works | <ul style="list-style-type: none"> • The Mathillo Sagu Khola Small Hydropower Project is making steady progress in its pre-construction phase, with ongoing land acquisition, infrastructure development, and planning for camp facilities. |

5.1. Detailed Topographic Survey for Detail Design

The detailed topographic survey for the Mathillo Sagu Khola Small Hydropower Project (10 MW) has been successfully completed in collaboration with KSM Engineering Consultancy Pvt. Ltd. The survey covered key tasks essential for the project's detailed design and construction phases. Benchmarks and trig points were established to ensure accurate alignment with the national grid, while close traverse work was conducted to establish traverse points and rectify errors across the intake to the powerhouse area.

At least 10 critical reference points were set at strategic locations, including the headworks, inlet and outlet portal areas, surge shaft, and powerhouse, providing reliable markers for the project's subsequent stages.

Additionally, the survey team conducted a comprehensive topographical survey of the headworks, penstock alignment, inlet portal, and powerhouse areas. River cross-section measurements were performed at 20m intervals over a span of 500m at both the headworks and powerhouse areas (250m upstream and 250m downstream), ensuring precise data collection.

This completed survey has provided a robust foundation for finalizing the project's detailed design and advancing towards its implementation.

5.2. Approval for the Land Purchase and Tress Cutting

For the approval of land purchase and tree cutting, the necessary documents have been submitted to the relevant government authorities, and the approval process is currently underway. This involves coordination with various stakeholders, including local landowners and government

officials, to ensure compliance with legal requirements. The land acquisition process is critical for securing key areas, including those required for construction and access routes. Tree cutting, which is essential for clearing space for infrastructure, follows strict environmental guidelines to minimize the project's ecological impact. Efforts are also being made to engage with the local community to address any concerns and ensure smooth execution of the land acquisition and tree-clearing process.

5.3. Detail Design Work

With the detailed topographic survey successfully completed, the design phase for the Mathillo Sagu Khola Small Hydropower Project (10 MW) is now well underway. Sanima Hydro and Engineering Pvt. Ltd. is the consultant to prepare the detailed design for the civil, hydro-mechanical (HM), and electro-mechanical (EM) components of the project.

Leveraging the comprehensive survey data, the design team is actively working on critical aspects such as the layout of the powerhouse, headworks, and penstock alignment. This process ensures that the project meets stringent technical standards while optimizing efficiency and cost-effectiveness. Sanima Hydro's expertise in hydropower design is driving thorough evaluations of hydraulic modeling, structural integrity, and system performance.

This detailed design work also supports the development of tender documents for procuring materials and selecting contractors, paving the way for the project's transition to the construction phase.

5.4. Pre-Construction Works

The pre-construction works for the Mathillo Sagu Khola Small Hydropower Project are progressing steadily. The location for the camp facilities has been selected, and a proposed access road route to the camp is under review. Prefabricated structures have been proposed for the permanent camp to expedite the construction process and ensure timely accommodation for project personnel. Road protection measures are also being planned to safeguard against any potential environmental impacts, ensuring smooth and safe access throughout the project's duration. These preparatory activities are crucial in laying the groundwork for the construction phase, and all efforts are being made to ensure that the project remains on schedule and progresses efficiently.

6. Conclusion

The Mathillo Sagu Khola Small Hydropower Project (10 MW) is making steady progress toward its construction phase. The detailed topographic survey, completed with KSM Engineering Consultancy Pvt. Ltd., has provided precise data for benchmarks, traverse points, and river cross-sections, forming a solid foundation for the detailed design phase.

Land purchase and tree-cutting approvals are in process, ensuring compliance with legal and environmental standards. Meanwhile, Sanima Hydro and Engineering Pvt. Ltd. is advancing the detailed design of civil, hydro-mechanical, and electro-mechanical components, along with tender document preparation for procurement and contractor selection.

Pre-construction works, including access road planning and camp facility setup with prefabricated structures, are progressing efficiently. These milestones highlight the project's readiness to transition smoothly into the construction phase.

7. Photographs



Figure 3 detail Survey work



Figure 4 Detail Survey Work