1125 MW DORJILUNG HYDROPOWER PROJECT (DHPP)
MONGAR AND LHUENTSE DZONGKHAG

CONSTRUCTION OF ACCESS ROAD TO VARIOUS PROJECT COMPONENTS

CONSTRUCTION ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (C-ESMP)

April, 2025

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ABBREVIATIONS

BOD	Biochemical Oxygen Demand
C-ESMP	Contractors- Environment and Social Management Plan
DoCDD	Department of Culture and Dzongkha Development
DGM	Department of Geology and Mines
DHPP	Dorjilung Hydro-electric Power Project
DoC	Department of Culture
EC	Environment Clearance
ES	Environmental Standards
ESHS	Environment, Social, Health and Safety
ESIA	Environment and Social Impact Assessment
ESMP	Environment and Social Management Plan
FSL	Full Supply Level
GBV/ SEA	Gender Based Violence/ Sexually Exploited Abuse
GLOF	Glacial Lake Outburst Flood
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
MoH	Ministry of Health
NBC	National Biodiversity Centre
NWFP	Non-Wood Forest Product
OHS	Occupational Health & Safety
PIU	Project Implementation Unit
RBP	Royal Bhutan Police
RGoB	Royal Government of Bhutan
RoW	Right of Way
TMP	Traffic Management Plan
WMP	Waste Management Plan
WQMP	Water Quality Management Plan

1 INTRODUCTION

This section describes the purpose, organizational structure, procedures/approval process, management of change process, applicability, staffing and reporting requirements for this construction Environmental and Social Management Plan (C-ESMP).

1.1 Project description

The proposed Dorjilung Hydro-electric Power Project [1](the Project or DHPP) is located on the Kurichhu river in Mongar Dzongkhag (district), in the eastern part of Bhutan. It is designed as a run-of-river project for peak energy production, with a 139.5-meter-high dam (85 m high above the riverbed), small reservoir storage (6.8 km long, 1.46 km² at FSL) whose parts extend in Lhuentse Dzongkhag. The powerhouse (PH) for the Project is located about 16 km downstream of the dam. A headrace tunnel (HRT), 14.97 km long and 11 meters in diameter, conveys water from the dam to the powerhouse. The powerhouse is located approximately 6 km upstream of the existing Kurichhu Hydropower Plant, putting the DHPP dam about 20 km upstream the Kurichhu dam. The DHPP dam site is located about 7 km downstream of Autsho township and the PH is located near Lingmethang township.

The HRT construction involves six (6) intermediate construction adits, with access roads designed to reach each adit portal along the closest and most feasible routes. The total length of access road will be 27.58 km providing access to the other location like dam site, adit portals, headrace tunnel (HRT), surge shaft, and powerhouse, facilitating the transport of construction materials and equipment. For these access roads, a gradient of 1 in 12 has been generally applied, while a gradient of 1 in 15 has been used specifically for the new alignment of the Mongar-Lhuentse Secondary National Highway. Several alternatives were assessed for providing access to project components, considering the area's topography, site conditions, and social impacts. The total length of access roads is approximately 27.58 km, which includes two bailey bridges for various project components, excluding the realignment of the Mongar-Lhuentse Secondary National Highway. The construction footprints of the access roads, including the two bailey bridges, are located outside any ecologically sensitive or legally protected areas.

Out of 27.58 km of access road, few stretches of the road passes through private land affecting over 1.91 acres of private land. The minimum formation width of 8.00 m has been taken for construction of new access road and additional formation width of 4.00 m for improvement of the existing roads. The map of location of the project with access road is given in **Error! Reference source not found.** and Figure 1-2.

[1] Synonymously called "Dorjilung Hydropower Project (DHPP)".

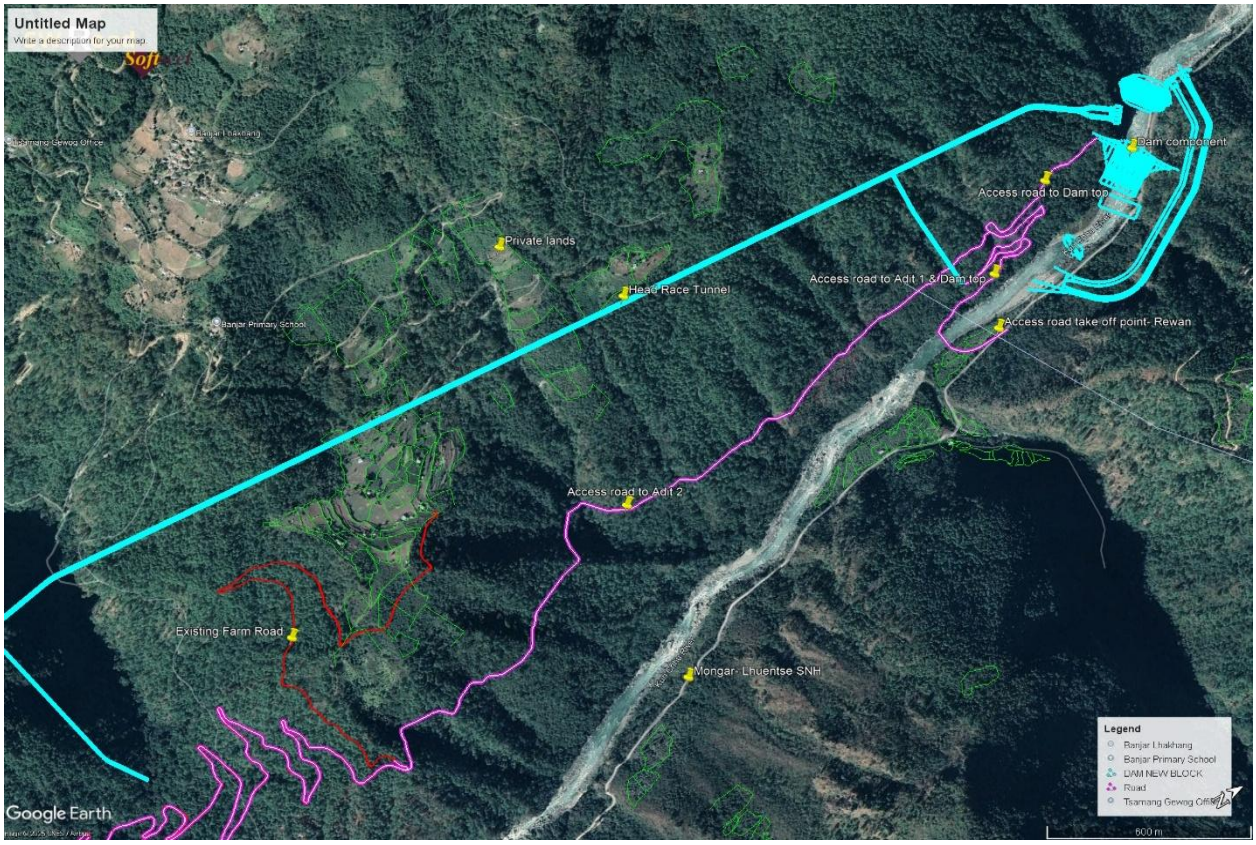


Figure 1-1: Access Road to Adit 1, Dam top and Adit 2

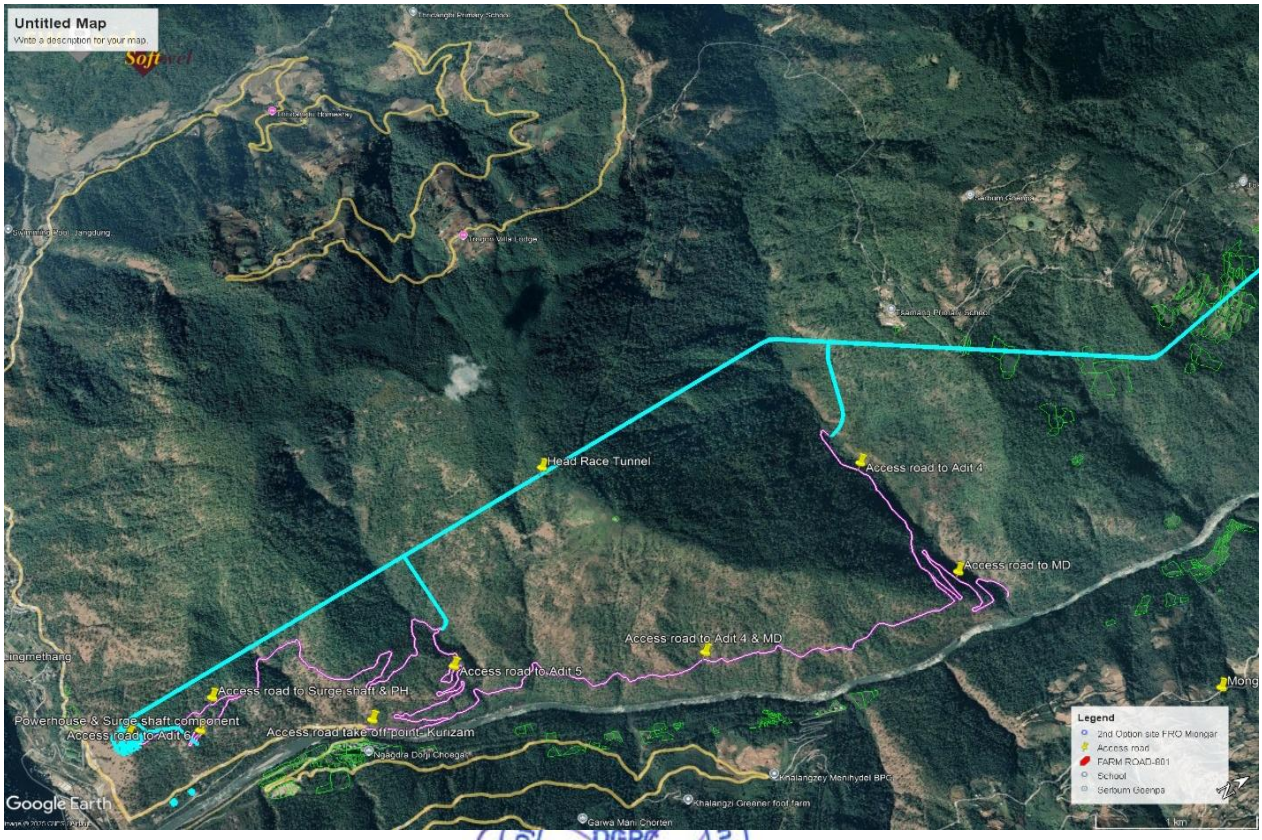


Figure 1-2: Map of Access Roads to Adit 4, 5, 6, Surge shaft & Powerhouse

1.2 Purpose of C-ESMP

This document presents the plan for the Construction Environmental and Social Management and Monitoring Plan (hereinafter referred to as the C-ESMP) for the construction of access roads for the project. This C-ESMP has been prepared based on the Project's Environmental and Social Impact Assessment (ESIA) and Environmental Social Management Plan (ESMP).[2] This C-ESMP, which is to be included in the bidding documents, expands upon the Project's ESMP and specifies the management plans and their minimum requirements that must be implemented by the Contractor (herein referred to as the "Contractor"), and which are required, as part of the contract between the Owner and the Contractor, to be implemented and complied with by the Contractor during the construction phase. These plans also identify the responsibilities of the Project Owner, Dorjilung Hydro Power Project (DHPP).

DHPP, as the Project Owner, has ultimate responsibility for project construction, ensuring that all project required mitigation measures are implemented, and that the Project conforms with World Bank (WB) and Royal Government of Bhutan's (RGoB) standards. There is other mitigation requirements included within the Land Requisition and Livelihood Restoration Plan (LALRP) and Gender and Social Vulnerability Action Plan (GSVAP) for which DHPP retains primary responsibility and which will not be delegated to the Contractor. The Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) Prevention and Response Action Plan is a shared responsibility. A Biodiversity Management Plan (BMP) has been developed for the Project, and the mitigation measures pertinent to the construction of access roads are further elaborated and incorporated in this C-ESMP. This C-ESMP focuses on those mitigation requirements that DHPP will delegate to the Contractor, while retaining ultimate responsibility for their implementation via monitoring, enforcement and oversight. In accordance with the Project's ESMP, a separate Occupational Health and Safety Management Plan (OHSMP, or Implementation Plan, OHSIP) has been developed and included in the bidding documents for the construction of the access road. This C-ESMP references the OHSMP where necessary to ensure consistency.

1.3 Organizational Structure:

This C-ESMP includes 19 individual management plans, as follows:

1. **Error! Reference source not found.**
2. ESHS Training and Code of Conduct for Construction Workers Plan

1.3.1 Purpose

The purpose of the worker induction training and the Code of Conduct (see Annex 1: Sample Employee Code of Conduct) is to establish minimum expectations regarding the training and behavior of the Contractor's workforce, especially in terms of health and safety, protection of the environment, and interactions with local residents.

1.3.2 Key Risks and Impacts

The DHPP ESIA identifies the following key pre-construction phase risks and impacts related to construction worker induction training and Code of Conduct:

[2] The Project's ESIA, ESMP, BMP, and CIA were disclosed on March 10, 2025, at https://www.drukgreen.bt/portfolio/dorjilung-hpp/.

- Potential conflicts between workers and local residents, including increased risks of GBV/SEA/SH.
- Impacts on the physical and biological environment.
- Risks to worker health and safety.

1.3.3 Contractor Minimum Requirements

The contractor must, at a minimum, comply with the applicable requirements outlined below:

- The Contractor will deliver and implement a structured, tiered training program to ensure that all its workers, including subcontractors, acquire the necessary ESHS awareness and competencies.
- The workers will be strictly advised to maintain harmony and adhere to the C-ESMP, OHSMP and code of conduct.
- The workers will demonstrate respect for local customs and traditions.
- Workers visiting the local communities or interacting with local residents shall follow appropriate standards of dress and personal hygiene and behave in a manner consistent with the Code of Conduct. Fighting (physical or verbal), creating a nuisance, or creating a disturbance in or near local villages will be prohibited.
- Workers will not be allowed to engage in gender-based violence (GBV or intimidation, including physical or verbal harassment and sexual exploitation and abuse, directed toward female workers, female residents of the local villages, or other women. (Refer Community Health and Safety Management Plan for details)
- Emphasize that Environmental and Biodiversity Awareness Training will be included as part of the worker induction training.
- Workers will not be allowed to engage in any hunting, fishing, poaching, wildlife trading, logging, collection of firewood, clearing of vegetation, and collection of/trade in plants, animals, and non-timber forest products (NTFPs).
- Workers will be prohibited to defecate in open areas or water bodies, but only use provided toilets and waste disposal facilities.
- Workers will be equipped with proper PPEs while working and will be advised to maintain proper carefulness while working. (Refer Occupational Health and Safety Plan and Emergency Preparedness and Response Plan)

Three levels of training will be implemented, using the C-ESMP and OHSMP as the primary training materials:

1. ***General Environmental Awareness*** program to all workers employed by the Contractors or its Sub-contractors, raising environmental issues related to general issues such as environmental conservation, waste management, health, hygiene and safety, social behavior in camps, cultural resources protection. Understanding of GBV, SEA/SH, Child labour and Forced Labour risks and management. Awareness training will also propose a session dedicated to the presentation of individual work contract content, employment conditions defined by the Human Resource management of the Contractors and an introduction to the Worker Code of Conduct.
2. ***Health and Safety Awareness***, including AIDS/HIV and other STIs awareness program on prostitution, human trafficking and sexual harassment; Basic health: fight malaria and water diseases, improve sanitation; emergency response and evacuation.
3. ***Targeted training including job specific environmental training*** of workers affected to particularly sensitive environmental activities; tasks requiring a work permit; first aid and transportation of injured people; handling of fuel and dangerous materials, firefighting, etc.

Each new recruit must participate in the awareness-raising programme within 10 days following his recruitment. Each employee in charge of sensitive activities will follow a catch-up session every 6 months. Training will be delivered by the Contractor-ESHS Manager and staff or by a specialized consultant appointed by the Contractor. All personnel will be trained in the most appropriate language (Dzongkha, English or other). The sessions will be recorded in a register where the names of all participants will be noted.

The training program is outlined in below. A tentative list of training programs is presented in Annex 2.

- An induction training programme to be delivered to all personnel and tailored to the specific needs of the construction staff (own personnel and subcontractor staff) and for site visitors.
- ESHS training.
- General orientation and job/task-specific training as needed for the performance of the duties to which the person (Contractors and subcontractor staff) is assigned to.
- External/statutory training required according to regulatory provisions.
- Refresher training including toolbox discussions.

Training needs for each role are identified and tracked using a training and competency/skills matrix, which outlines the specific training required for each role. All training sessions delivered will be properly documented, and the records will be filed for reference. Information on the training activities planned and completed will be included in the monthly report. Attendance sheets will be signed by staff for all courses, including toolbox talks, and a course evaluation sheet will be completed by attendees to assess the effectiveness of the training.

Both DGPC and Contractors will maintain a training register containing details such as the name of the training session, the date, a list of attendees, their signatures, and the trainer's name. All training records, including evaluation and attendance sheets, will be stored in a central location and made available during any audit conducted by DGPC or relevant authorities, in compliance with ISO 14001 requirements.

1.3.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Organize and provide training to all contractors and subcontractors, who can then deliver it to their workers.
- Prepare and provide worker induction training plan and materials that encompass, but not limited to, the C-ESMP, OHSMP and Code of Conduct.
- Ensure all workers receive induction training and sign the Code of Conduct, and monitor compliance.
- Monitor the Contractor's oversight and enforcement of the Code of Conduct.
- Review the Contractor's reporting on training and grievances.
- Monitor the SEA/SH related GRM to ensure that protocols are followed in a timely manner, referring complaints to the service provider to review and address SEA/SH complaints.
- Regularly review the monitoring and evaluation (M&E) of progress on SEA/SH activities, including the reassessment of risks as appropriate.

1.3.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

- Number of employees receiving environmental and cultural sensitivity training.
- Number of employees receiving H&S training.
- Number of new employees receiving and signing the Workers' Code of Conduct.
- Number of worker grievances received and a summary of the grievances, the number of grievances resolved and pending, and the average time period from receipt of the grievance to its resolution.
- Number of workers receiving GBV-SEA/SH Training
- Number of GBV/SEA/SH trainings conducted
- Number of workers receiving Biodiversity Awareness Training
- Number of worker grievances received and a summary of the grievances, the number of grievances resolved and pending, and the average time period from receipt of the grievance to its resolution.

- The amount of training conducted and consideration of its effectiveness will be monitored during construction. **Error! Reference source not found.**1**Error! Reference source not found.** below provides a guideline for ESHS training implementation and monitoring.

Table 4-1: Training Monitoring

Program	Participants	Implementation schedule	Audit Timing
Training Register	Maintained for the Project by ESHS staff	Updated as required	n/a
Basic Training - General introduction to safety work	All staff and workers of the project	Before starting work	Every 6 months
Technical Training - Safety equipment	All construction workers	Daily & before starting work at the construction site	Every 6 months
Safety Awareness	All staff and workers of the project	Once a month (depending on the status of the project)	Every 6 months
Following safety incident	All project personnel and construction workers	Immediately (after the incident)	n/a

3. Soil Erosion and Sediment Management Plan
4. Muck Disposal Planning and Management PlanMuck Disposal Planning and Management Plan
5. Waste Management Plan
6. Explosive and Blasting Management Plan
7. Emergency Preparedness and Response Plan
8. Water Quality Management Plan
9. Emissions, Dust and Noise Management Plan
10. Vegetation Clearing Plan
11. Landscaping and Re-vegetation Plan
12. Biodiversity Management Plan
13. Traffic Management Plan
14. Management of Construction Worker Colonies (Camps)
15. GBV SEA/ SH (Gender-Based Violence, Sexually Exploited Abuse/ Sexual Harassment) Management Plan
16. Hazardous Materials Management Plan
17. Community Health and Safety Management Plan
18. Cultural Heritage Management Plan
19. Occupational Health and Safety Plan

1.4 Procedures

This section describes the process for how the Contractor will apply the C-ESMP in a timely manner.

The general development and approval process is as follows:

- The Contractor will implement a C-ESMP prepared by PIU, including all other sub-plans.
- The PIU will provide this C-ESMP to the Lenders for their review.
- The PIU will incorporate any comments of Lenders, along with its own comments, and provide an integrated to C-ESMP.
- The PIU will address all comments provided by the Lenders and provide a Final C-ESMP.
- The Project Engineer/PIU, Owner, and Lenders will review and, if acceptable, approve (provide "No Objection" in the case of the Lenders) the Final C-ESMP and Labor Management Plan.
- Hard and soft signed copies of the Final C-ESMP will be distributed by the PIU to the Contractor, Owner, and Lenders.
- The Final C-ESMP shall be completed before the initiation of ground-disturbing activities.

1.5 Management of Change

The need may arise to modify the C-ESMP as work methods change or are amended, or new work methods are added. This is part of, and consistent with the Adaptive Management approach. The process below establishes the Management of Change requirements for any and all changes to the C-ESMP.

It is anticipated that most proposed changes to the C-ESMP will be initiated by the Contractor. The Management of Change process, however, does allow for the Owner or the Lenders to propose changes when it is reasonably likely that the current C-ESMP is not sufficient to prevent:

- Serious health and safety incidents.
- Environmental and social impacts greater than those disclosed in the ESIA.
- New impacts not disclosed in the ESIA.
- Violation of RGoB law.
- Non-conformance with the Lenders' requirements, including the:
- World Bank Environmental and Social Framework (ESF) Environmental and Social Standards (ESS).
- World Bank Environmental, Health, and Safety (EHS) General Guidelines (2007).
- Requirements of other Lenders involved in co-financing parts of the Project.

Table 1-1 below defines three categories of potential changes to the C-ESMP and the review and approval process associated with each.

Table 1-1: Project C-ESMP Management of Change Process

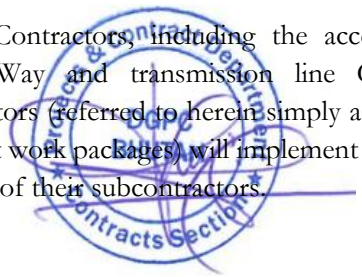
Category of Change	Change Description	Action
Category 3	Changes that have the potential to, or are reasonably likely to, result in decreased Contractor ESHS performance, and/or are likely to result in an increase in ESHS	The Contractor will notify the Owner/PIU of the proposed change and provide the rationale and justification for the change. The Owner

Category of Change	Change Description	Action
	impacts above those disclosed in the ESIA, result in new impacts not disclosed in the ESIA, require the acquisition of rights to use additional land, or require additional permits/approvals from the government	will notify the Lenders within two weeks of the receipt of the request for a C-ESMP change. This category of change requires approval by the Owner and Lenders before implementation. The Contractor will not commence specific activities relevant to the change that would likely result in an increase in Environmental, Social, Health, and Safety (ESHS) risks and impacts until changes are agreed with and approved by the Lenders.
Category 2	Changes that have the potential to, or are reasonably likely to result in, decreased Contractor ESHS performance, but are unlikely to result in any increase in environmental/social impacts above those described in the ESIA, or result in new impacts not described in the ESIA, or require the acquisition of the right to use additional land	The Contractor will notify the Owner of the proposed change and provide the rationale and justification for the change. The Owner will notify the Lenders within two weeks of receipt of request for a C-ESMP change. This category of change only require approval by the Owner before implementation, unless the Lenders object within 30 days of receipt of the notice of change.
Category 1	Changes that are expected to result in similar or improved ESHS performance and are unlikely to result in any increase in environmental or social impacts above those described in the ESIA	The Contractor will notify the Owner/ PIU of the proposed change and provide the rationale and justification for the change. The Owner will notify the Lenders as part of its quarterly Environmental and Social Issues Compliance Report. This category of change requires only Owner approval before implementation.

The Contractor is required to maintain a copy of the current version of the C-ESMP at its construction site management office at all times. The Contractor understands that the Owner/ PIU and/or Lenders will use the current version of the C-ESMP as the basis for conducting periodic inspections and audits.

1.6 Applicability

The C-ESMP applies to all Project Contractors, including the access road, bridges, Farm Road improvement/Realignment of High Way and transmission line Contractors, as well as their subcontractors, and any sub-subcontractors (referred to herein simply as subcontractors). It is expected that each of the Contractors (of different work packages) will implement the C-ESMP developed by PIU, which will apply to themselves and each of their subcontractors.



1.7 Staffing

Each Contractor will have an ESHS Team to implement and report the C-ESMP and applicable portions of plans. The Contractor's ESHS Team shall include an Environment and Social Officer and an OHS Officer along with other OHS supervisors as specified in Annexure IVB, who works with their respective Construction Site Engineer/Manager.

1.8 Reporting

Each Contractor will submit an Environmental, Social, Health and Safety Monitoring Report on a monthly basis (or as specified otherwise) to the PIU, summarizing performance for the prior month, year to date, and from initiation of construction to date.

In the event of any project-related incidents resulting in an injury to the public or a worker hospitalization or fatality, the Contractor shall notify PIU and the Project Engineer immediately (within 24 hours), and, in turn, PIU shall notify the World Bank within 48 hours of their notification.

2 LEGALAND REGULATORY REQUIREMENTS

A comprehensive assessment of the legal and regulations relevant to environmental and social safeguards, and their applicability to the project road has been undertaken. This review includes the relevant environmental and social laws of the Royal Government of Bhutan (RGoB), international treaties and conventions that Bhutan supports, and applicable international frameworks. The findings are outlined in the Regulatory Requirements section of Chapter 2, Volume VIII: ESIA of the Detailed Project Report, which was disclosed on March 10, 2025, on DGPC's website and is available to contractors at any time at https://www.drukgreen.bt/portfolio/dorjilung-hpp/.

The ESIA volume may be referred for any further details on the applicable legal and regulatory framework of the project access road. The types of clearance required are mentioned in **Error! Reference source not found.**.

2.1 National regulations related to project implementation

Several Bhutanese institutions, at central and local levels are concerned with the Dorjilung HPP development and implementation. The following sections detail the area focused and relevant laws, rules, regulations and guidelines.

Table 2-1: Applicable Bhutanese Laws, rules, regulations, standards and guidelines

Focus area	Laws, Rules, Regulations and Guidelines
Environmental Clearance	Environmental Assessment Act, 2000 Regulation for Environmental Clearance of Projects (RECOP), 2016 National Environment Protection Act, 2007 National Environment Strategy, 2020 Bhutan Environmental Standards 2020, and Drinking Water Quality Standards, 2016 National Biodiversity Framework Guide for Environmental Clearance Application Procedure, 2022 Environmental Assessment General Guideline, 2012 Environmental Assessment Guideline for Hydropower Projects, 2012 Environmental Assessment Guideline for Roads and Highways, 2012 Environmental Assessment Guideline for Power Transmission Line Projects, 2012 Environmental Codes of Practice, Highways and Roads, 2000 Environmental Codes of Practice, Installation of Underground and Overhead Utilities, 2004
Land	Land Act of Bhutan, 2007 Rules and Regulations for Lease of Government Reserved Forest Land & Government Land, 2018
Forest and Biodiversity	National Forest Policy, 2011 Forest and Nature Conservation Act, 2023 Forest and Nature Conservation Rules and Regulations, 2023 Forest and Nature Conservation Bill, 2021 Biodiversity Act, 2003
Climate change	Climate Change Policy of the Kingdom of Bhutan, 2020 Regulation on Substances that Deplete the Ozone Layer and Hydrofluorocarbons, 2021
Water	Water Policy, 2007 Water Act of Bhutan, 2011 Water Regulation of Bhutan, 2014 Guideline for Development of Hydropower Projects, 2018

Focus area	Laws, Rules, Regulations and Guidelines
	Guideline to Determine Minimum Environmental Flow Regulations for Dewatered Reaches of Hydropower Projects in Bhutan, 2019 Bhutan Drinking Water Quality Standard, 2016
Waste	Waste Prevention and Management Act of Bhutan, 2009 Waste Prevention and Management Regulation, 2012 (amended 2016) National Waste Management Strategy, 2019
Emissions	Environmental Standards 2020
Labour, employment and Occupational Health and Safety	Labour and Employment Act (LEA), 2007 Regulations on Occupational Health, Safety and Welfare, March 2012 Regulations on Working Conditions, 2022 (first edition in 2009) Regulations on Occupational Health and Safety for Construction Industry, 2022 Regulations on Occupational Health, Safety and Welfare, 2022 Revised National Workforce Wage Rate, 2015 Guideline for the Approval, Employment, and Management of Border Town Foreign Workers (BTFW), 2022 National Gender Equality Policy (NGEP) 2020 and the specific provisions in the law that criminalize sexual harassment in the workplace
Traffic	Road Safety and Transport Act, 1999 Road Safety and Transport Regulations, 2021
Disaster	Disaster Management Act of Bhutan, 2013
Indigenous Peoples	No policy documentation of Indigenous Peoples from the Government is publicly available in Bhutan.

2.2 Key E&S Guidelines and Standards

There are a several guidelines for health and medical waste management, environmental assessment, planning and development of human settlements construction of buildings and disaster management planning, as mentioned in Table 2-2.

Table 2-2: Bhutanese Guidelines and Standards related to Environment, Social, Health and Safety

Guideline	Prepared by	Description
Occupational Health and Safety: Guidelines for health professionals	Occupational Health and Safety Program Department of Public Health	Management and certification of occupation related issues and medical certification processes pertaining to medical screening for employment, immigration and disability compensation purposes
National guideline on infection control and medical waste management	Health Care & Diagnostic Division Department of Medical Services Ministry of Health	Health care associated infection (HCAI) and infection control measures and waste management
32nd Education Policy Guidelines and Instructions, 2018	Policy and Planning Division Ministry of Education	Reference on all education policies, guidelines and circulars that have been issued since the previous publication
Environmental codes of practice highways and roads 2000	Department of Roads Ministry of communications	Road construction and maintenance activities
Environmental assessment general guideline – 2012	National Environment Commission	Environmental assessment process

Guideline	Prepared by	Description
A Guide to Environmental Clearance Application Procedure – 2022	National Environment Commission	EC application process
Environmental assessment guideline for hydropower projects – 2012	National Environment Commission	Environmental assessment for Hydropower Projects
Environmental assessment guideline for roads and highways – 2012	National Environment Commission	Environmental assessment for Roads and Highways
Environmental assessment guideline for power transmission line projects – 2012	National Environment Commission	Environmental assessment for Power Transmission lines
Guideline to Determine Minimum E-flow Regulations for Hydropower Projects in Bhutan	National Environment Commission	E-flow determination
Bhutan Drinking Water Quality Standard 2016	National Environment Commission	Water quality standards
Environment Standards 2020	National Environment Commission	Standards for physical environment and project emissions (air, noise, emission, sewage)
Protected Area Zonation guidelines 2020	Department of Forest and Park Services	Classification of protected areas into different zones as per the functions of the area with prescriptions on management interventions
Guidelines for Planning and Development of Human Settlements in Urban and Rural Areas of Bhutan, 2013,	Department of Human Settlement, Ministry of Works and Human Settlement	Promotion of eco-friendly technologies, conservation of natural environment, management of environmental hazards (resilience planning)
Building code of Bhutan 2018	Department of Human Settlement, Ministry of Works and Human Settlement	Sets out technical requirements, standards and design considerations applicable for construction of buildings
Differently-abled-friendly-construction-Guideline	Department of Engineering Services Ministry of Works and Human Settlement	
Bhutan Architectural-Guidelines 2014	Ministry of Works and Human Settlement	Construction, repair and restoration of traditional structures and construction of modern buildings with respect to traditional architectural designs
Traditional architecture guidelines	Department of Urban Housing and Development Ministry of Works and Human Settlement	Guide on traditional architectural elements for buildings
Bhutan Green Building Design Guidelines 2013	Department of Engineering Services Ministry of Works and Human Settlement	Green principles and approaches mainly for new design and construction of buildings

Guideline	Prepared by	Description
Contingency Planning Guidelines for Bhutan 2014	Department of Disaster Management Ministry of Home and Cultural Affairs	Guide for preparing realistic and implementable Contingency Plans
Disaster Management Planning Guideline 2014	Department of Disaster Management Ministry of Home and Cultural Affairs	Guide for preparing disaster management plans

The required statutory clearances, such as the Environment Clearance, Forestry Clearance, Administrative Clearance, No Objection Certificates (NOCs) shall be obtained and provided by the PIU. The Contractor will be responsible for securing any additional clearances required for new activities beyond this planned scope during construction. The PIU, however shall provide support to facilitate the process.

2.3 World Bank ESF and E&S Standards

The project seeks international financing of the World Bank (WB) and therefore, the Environmental and Social Standards (ESS) of the bank shall be adhered to. These standards outline best practices for managing environmental and social risks and is applicable to the following standards: ESS 1 mandates a full Environmental and Social Impact Assessment (ESIA) due to the project's high-risk nature; ESS 2 addresses abor conditions, as construction will require a large workforce, including foreign workers; ESS 3 focuses on resource efficiency and pollution management, given the significant energy, water and waste generation: ESS 4 highlights community health and safety risks from labor influx and construction activities; ESS 5 deals with land acquisition and displacement, affecting both government and private land; ESS 6 ensures biodiversity conservation, as the project impacts natural habitats and biodiversity corridors; ESS 8 safeguards cultural heritage, with early designs already considering key heritage sites; and, ESS 10 emphasizes stakeholder engagement, requiring public consultations and disclosure of E&S documentation.

3 Institutional Arrangements

3.1 Organizational Structure

The proposed organizational structure of the Project implementation is shown in Figure 3-1, and a brief description of these organizations in terms of E&S management is described below.

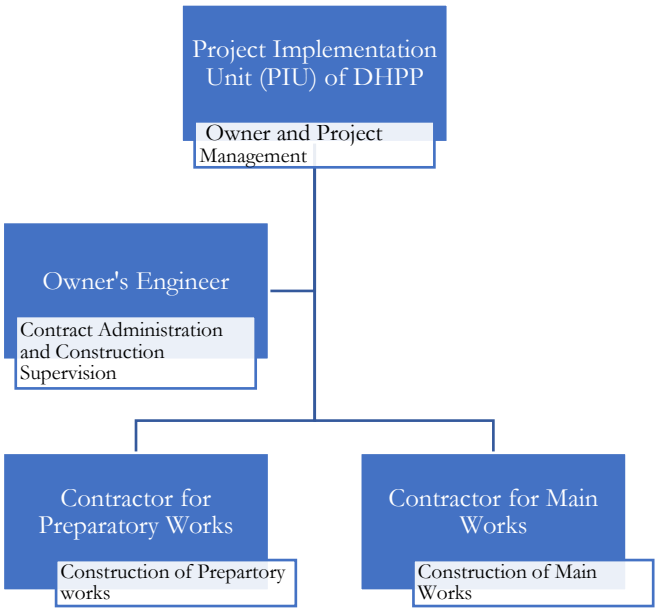


Figure 3-1: Proposed organizational structure of the Project implementation

- **Project Implementation Unit**. DGPC, as the Project Owner, will be responsible for overall implementation. DGPC will establish a Project Implementation Unit (PIU) tasked with procuring contractors, coordinating day-to-day activities, and implementing DHP activities on-site. The PIU will liaise closely with affected communities and collaborate with local authorities, reporting directly to the DGPC General Manager. PIU will oversee Environmental, Social, Health, and Safety (ESHS) management through a dedicated ESHS Section with four specialized units: an Environment Unit, a Social Unit, an Occupational Health and Safety (OHS) Unit and a Biodiversity Unit. The details of ESHS staffing in these units and their responsibilities are explained in the next section.
- **Owner's Engineer (OE):** The PIU will engage a construction supervision consulting firm to serve as the Owner's Engineer (OE), responsible for overseeing contract administration and ensuring quality control of the Contractor's work. The OE will form a dedicated ESHS Unit to monitor the project's ESHS performance and to regularly coordinate with the PIU ESHS team. The ESHS unit will include three specialized units—Environmental, Social and OHS.
- **Contractor for Access Roads**: PIU will procure a contractor to construct preparatory works. The Contractor will have a small ESHS team to manage ESHS risks during the construction.

3.2 ESHS Staffing in PIU, OE and Contractors

The tentative ESHS staffing arrangements of the Project are proposed in Table 3-1. Each entity will have an ESHS manager to manage their ESHS team with adequate environmental, OHS, social and biodiversity staff.

Table 3-1: E&S Staffing in PIU, OE and Contractors

Project Entity	Environmental Unit	OHS Unit	Social Unit	Biodiversity Unit
PIU	1 ESHS Manager 2 Environmental Staff Plus Env. Panel of Experts -1	3 OHS staff	3 Social staff Plus Social Panel of Experts - 1	2 Biodiversity staff (Biodiversity – 1 Aquatic Ecologist-1)
Owners Engineer	1 ESHS Manager 6 Environmental Staff (Env. Specialists – 2 Env. Inspectors – 4)	10 OHS staff (OHS Officers - 4 OHS Inspectors – 6)	4 Social staff (Social– 1 Resettlement – 1 Labour/GBV – 1 SEP/GRM – 1)	1 Biodiversity specialist
Contractor for Access Roads	1 ES Officer and 1 OHS Officer[3] for each Contractors			

3.3 Role and Responsibilities of ESHS Staff

3.3.1 PIU ESHS Staff

The PIU's ESHS Manager is key to ESHS matters throughout the project lifecycle. This includes ensuring compliance with the ESMP, associated plans (e.g., BMP, LALRP), and all ESHS obligations. The PIU ESHS team coordinate closely with the OE and Contractor ESHS teams, government authorities, the World Bank, and local communities to maintain consistent ESHS standards and transparency,

The key responsibilities of PIU ESHS staff include, but are not limited to:

- **Pre-Construction Phase**
  - Develop ESHS Specifications for tender documents.
  - Participate in tender evaluations and contractor negotiations, focusing on ESHS aspects.
  - Coordinate with government authorities and agencies on land acquisition, compensation, and necessary pre-construction approvals.
  - Obtain all required environmental permits and clearances.
- **Construction Phase**
  - Collaborate with the OE to ensure alignment of ESHS activities.
  - Participate in coordination meetings with OE and Contractor representatives to address ESHS issues.
  - Conduct site inspections, monitor compliance with ESHS requirements, and oversee corrective actions.
  - Prepare quarterly ESHS performance reports and update the PIU Project Director on ESHS progress.
  - Serve as the liaison to relevant government departments and support OE in resolving non-conformances and grievances.
- **Operating Phase**
  - Oversee the transition of ESHS management responsibilities to DHPP plant O&M departments.

[3] Refer Annexure IV B for additional manpower for OHS

- Ensure the implementation of operational-phase ESMP measures.
- Transfer all relevant E&S documents and data compiled during construction to O&M teams.
- Confirm that all temporarily used sites are rehabilitated.

3.3.2 Owner's Engineer ESHS Staff

The OE ESHS team provides technical guidance and oversight, ensuring that the Contractor's work meets ESHS commitments. The OE ESHS staff are instrumental in capacity building, coordinating monitoring activities, verifying the Contractor's compliance, and reporting non-conformances. The key responsibilities are:

- Train and build capacity of PIU ESHS staff on ESIA findings, ESMP obligations, and construction-phase ESHS management.
- Develop baseline documentation (report templates, checklists, NCR forms) for ESHS monitoring.
- Support PIU in organizing daily inspection activities, registering and following up on non-conformances, and guiding corrective actions.
- Coordinate continuously with PIU E&S Units and keep them informed of ESHS performance.
- Review and approve the Contractor's ESMP (C-ESMP) and Occupational Health and Safety Implementation Plan (OHSIP) prior to construction commencement.
- Conduct or participate in weekly site inspections, ensuring the Contractor meets ESHS obligations, and escalate serious non-conformances to the OE Project Director.
- Oversee the Contractor's ESHS performance and prepare monthly ESHS monitoring reports, including recommendations for penalties if persistent non-conformance occurs.
- Enforce the suspension of works for significant ESHS violations until corrections are made.
- Implement compliance monitoring programs (water, air quality) and interpret results in monthly reports.
- Engage with local communities, address ESHS-related concerns, manage grievances, and handle unexpected environmental or social incidents.
- Maintain a comprehensive ESHS documentation database and assist PIU in resolving ESHS complaints and preparing for audits and inspections by lenders or independent panels of experts.

3.3.3 Role of the Contractor ESHS Staff

The Contractor's ESHS team ensures that on-site construction activities comply with ESHS standards. The Contractor's ESHS Manager must be a high-ranking staff in the Contractor's organization and should have the authority to influence work methods and halt activities if critical ESHS issues arise.
The key responsibilities are:

- Develop and implement the C-ESMP and OHSIP.
- Design and manage wastewater treatment, muck disposal, landfill, and waste management facilities as required.
- Execute all mitigation measures and actions as outlined in the C-ESMP and OHSIP.
- Adjust construction methods and activities to remain compliant with ESHS obligations.
- Ensure all subcontractors and suppliers adhere to the same ESHS standards.

- Regularly inspect all construction sites, record observations, and promptly address non-conformances identified by OE or PIU.
- Submit weekly and monthly ESHS activity reports to the OE E&S Unit.
- Participate in weekly inspections and ESHS meetings with PIU and OE.
- Organize and deliver ESHS training for both management and workers.
- Engage and inform the local community about construction activities, ensuring transparent communication and resolving any related concerns.

3.3.4 Role of the E & S Panel of Experts

DGPC's Panel of Experts, comprising environmental and social specialists, provides independent guidance and recommendations throughout the project. The key responsibilities include:

- Review the organizational setup, technical capacity, and financial resources allocated to ESHS management.
- Assess progress against action plans (e.g., ESMP, LALRP, BMP) and verify compliance with schedules and quality standards.
- Identify obstacles, offer solutions, and evaluate the quality of reports submitted by the Contractor or service providers in ESHS-related fields.
- Provide DGPC with recommendations to enhance practices, resolve complex ESHS challenges, and improve overall project performance.
- Submit a report of recommendations within one month of each visit, and ensure these reports are publicly available on the DGPC website.

4 ENVIRONMENT AND SOCIAL MANAGEMENT AND MONITORING PLAN[4]

The following sections present the detailed Environment and Social Management and Monitoring Plan (ESMP)**,** which outlines specific guidelines for the Contractor and the PIU to follow, implement and enforce throughout the construction period. The Contractor's environmental and social performance will be evaluated based on their adherence and compliance with the implementation of these plans.

4.1 ESHS Training and Code of Conduct for Construction Workers Plan[5]

4.1.1 Purpose

The purpose of the worker induction training and the Code of Conduct (see Annex 1: Sample Employee Code of Conduct) is to establish minimum expectations regarding the training and behavior of the Contractor's workforce, especially in terms of health and safety, protection of the environment, and interactions with local residents.

4.1.2 Key Risks and Impacts

The DHPP ESIA identifies the following key pre-construction phase risks and impacts related to construction worker induction training and Code of Conduct:

- Potential conflicts between workers and local residents, including increased risks of GBV/SEA/SH.
- Impacts on the physical and biological environment.
- Risks to worker health and safety.

4.1.3 Contractor Minimum Requirements

The contractor must, at a minimum, comply with the applicable requirements outlined below:

- The Contractor will deliver and implement a structured, tiered training program to ensure that all its workers, including subcontractors, acquire the necessary ESHS awareness and competencies.
- The workers will be strictly advised to maintain harmony and adhere to the C-ESMP, OHSMP and code of conduct.
- The workers will demonstrate respect for local customs and traditions.
- Workers visiting the local communities or interacting with local residents shall follow appropriate standards of dress and personal hygiene and behave in a manner consistent with the Code of Conduct. Fighting (physical or verbal), creating a nuisance, or creating a disturbance in or near local villages will be prohibited.
- Workers will not be allowed to engage in gender-based violence (GBV or intimidation, including physical or verbal harassment and sexual exploitation and abuse, directed toward female workers, female residents of the local villages, or other women. (Refer Community Health and Safety Management Plan for details)
- Emphasize that Environmental and Biodiversity Awareness Training will be included as part of the worker induction training.

[4] The cost for all the Plans hereunder is to be included in the relevant sections of the BoQ of the Bidding document.
[5] This plan shall be referred in tandem with Occupational Health and Safety Management Plan (OHSMP) attached separately as Annexure IV B of the Tender Document.

- Workers will not be allowed to engage in any hunting, fishing, poaching, wildlife trading, logging, collection of firewood, clearing of vegetation, and collection of/trade in plants, animals, and non-timber forest products (NTFPs).
- Workers will be prohibited to defecate in open areas or water bodies, but only use provided toilets and waste disposal facilities.
- Workers will be equipped with proper PPEs while working and will be advised to maintain proper carefulness while working. (Refer Occupational Health and Safety Plan and Emergency Preparedness and Response Plan)

Three levels of training will be implemented, using the C-ESMP and OHSMP as the primary training materials:

4. ***General Environmental Awareness*** program to all workers employed by the Contractors or its Sub-contractors, raising environmental issues related to general issues such as environmental conservation, waste management, health, hygiene and safety, social behavior in camps, cultural resources protection. Understanding of GBV, SEA/SH, Child labour and Forced Labour risks and management. Awareness training will also propose a session dedicated to the presentation of individual work contract content, employment conditions defined by the Human Resource management of the Contractors and an introduction to the Worker Code of Conduct.
5. ***Health and Safety Awareness***, including AIDS/HIV and other STIs awareness program on prostitution, human trafficking and sexual harassment; Basic health: fight malaria and water diseases, improve sanitation; emergency response and evacuation.
6. ***Targeted training including job specific environmental training*** of workers affected to particularly sensitive environmental activities: tasks requiring a work permit; first aid and transportation of injured people; handling of fuel and dangerous materials, firefighting, etc.

Each new recruit must participate in the awareness-raising programme within 10 days following his recruitment. Each employee in charge of sensitive activities will follow a catch-up session every 6 months. Training will be delivered by the Contractor-ESHS Manager and staff or by a specialized consultant appointed by the Contractor. All personnel will be trained in the most appropriate language (Dzongkha, English or other). The sessions will be recorded in a register where the names of all participants will be noted.

The training program is outlined in below. A tentative list of training programs is presented in Annex 2.

- An induction training programme to be delivered to all personnel and tailored to the specific needs of the construction staff (own personnel and subcontractor staff) and for site visitors.
- ESHS training.
- General orientation and job/task-specific training as needed for the performance of the duties to which the person (Contractors and subcontractor staff) is assigned to.
- External/statutory training required according to regulatory provisions.
- Refresher training including toolbox discussions.

Training needs for each role are identified and tracked using a training and competency/skills matrix, which outlines the specific training required for each role. All training sessions delivered will be properly documented, and the records will be filed for reference. Information on the training activities planned and completed will be included in the monthly report. Attendance sheets will be signed by staff for all courses, including toolbox talks, and a course evaluation sheet will be completed by attendees to assess the effectiveness of the training.

Both DGPC and Contractors will maintain a training register containing details such as the name of the training session, the date, a list of attendees, their signatures, and the trainer's name. All training records, including evaluation and attendance sheets, will be stored in a central location and made available during any audit conducted by DGPC or relevant authorities, in compliance with ISO 14001 requirements.

4.1.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Organize and provide training to all contractors and subcontractors, who can then deliver it to their workers.
  - Prepare and provide worker induction training plan and materials that encompass, but not limited to, the C-ESMP, OHSMP and Code of Conduct.
  - Ensure all workers receive induction training and sign the Code of Conduct, and monitor compliance.
  - Monitor the Contractor's oversight and enforcement of the Code of Conduct.
  - Review the Contractor's reporting on training and grievances.
  - Monitor the SEA/SH related GRM to ensure that protocols are followed in a timely manner, referring complaints to the service provider to review and address SEA/SH complaints.
  - Regularly review the monitoring and evaluation (M&E) of progress on SEA/SH activities, including the reassessment of risks as appropriate.

4.1.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

- Number of employees receiving environmental and cultural sensitivity training.
- Number of employees receiving H&S training.
- Number of new employees receiving and signing the Workers' Code of Conduct.
- Number of worker grievances received and a summary of the grievances, the number of grievances resolved and pending, and the average time period from receipt of the grievance to its resolution.
- Number of workers receiving GBV-SEA/SH Training
- Number of GBV/SEA/SH trainings conducted
- Number of workers receiving Biodiversity Awareness Training
- Number of worker grievances received and a summary of the grievances, the number of grievances resolved and pending, and the average time period from receipt of the grievance to its resolution.

- The amount of training conducted and consideration of its effectiveness will be monitored during construction. **Error! Reference source not found.**1**Error! Reference source not found.** below provides a guideline for ESHS training implementation and monitoring.

Table 4-1: Training Monitoring

Program	Participants	Implementation schedule	Audit Timing
Training Register	Maintained for the Project by ESHS staff	Updated as required	n/a
Basic Training - General introduction to safety work	All staff and workers of the project	Before starting work	Every 6 months

Program	Participants	Implementation schedule	Audit Timing
Technical Training - Safety equipment	All construction workers	Daily & before starting work at the construction site	Every 6 months
Safety Awareness	All staff and workers of the project	Once a month (depending on the status of the project)	Every 6 months
Following safety incident	All project personnel and construction workers	Immediately (after the incident)	n/a

4.2 Soil Erosion and Sediment Management Plan

4.2.1 Purpose

The purpose of the Soil Erosion and Sediment Control Management Plan is to minimize erosion and sediment impacts, with special provisions for controlling all disturbed areas during the monsoon season, to ensure that the Project complies with the soil erosion requirements of the World Bank's Environmental, Health, and Safety General Guidelines (World Bank, April 30, 2007, Section 4.1 – Soil Erosion).

4.2.2 Key Risks and Impacts

Slope Stability Condition

The project area shows a notable susceptibility to landslides and rockfalls, as evidenced by several existing slide occurrences. A total of seven landslides have been identified, with most situated near the Kurichhu drainage. The two most significant landslides are located at Dorjilung and on the right bank approximately 1 km downstream of Dorjilung, collectively covering an estimated area of around 23 acres (9.31 hectares). The active landslide activity has been observed below the existing farm road between Tokari and Banjaar village which is fairly away from the access roads to construction sites.

The Figure 4-1 highlights the major landslide zones along with their respective location coordinates.

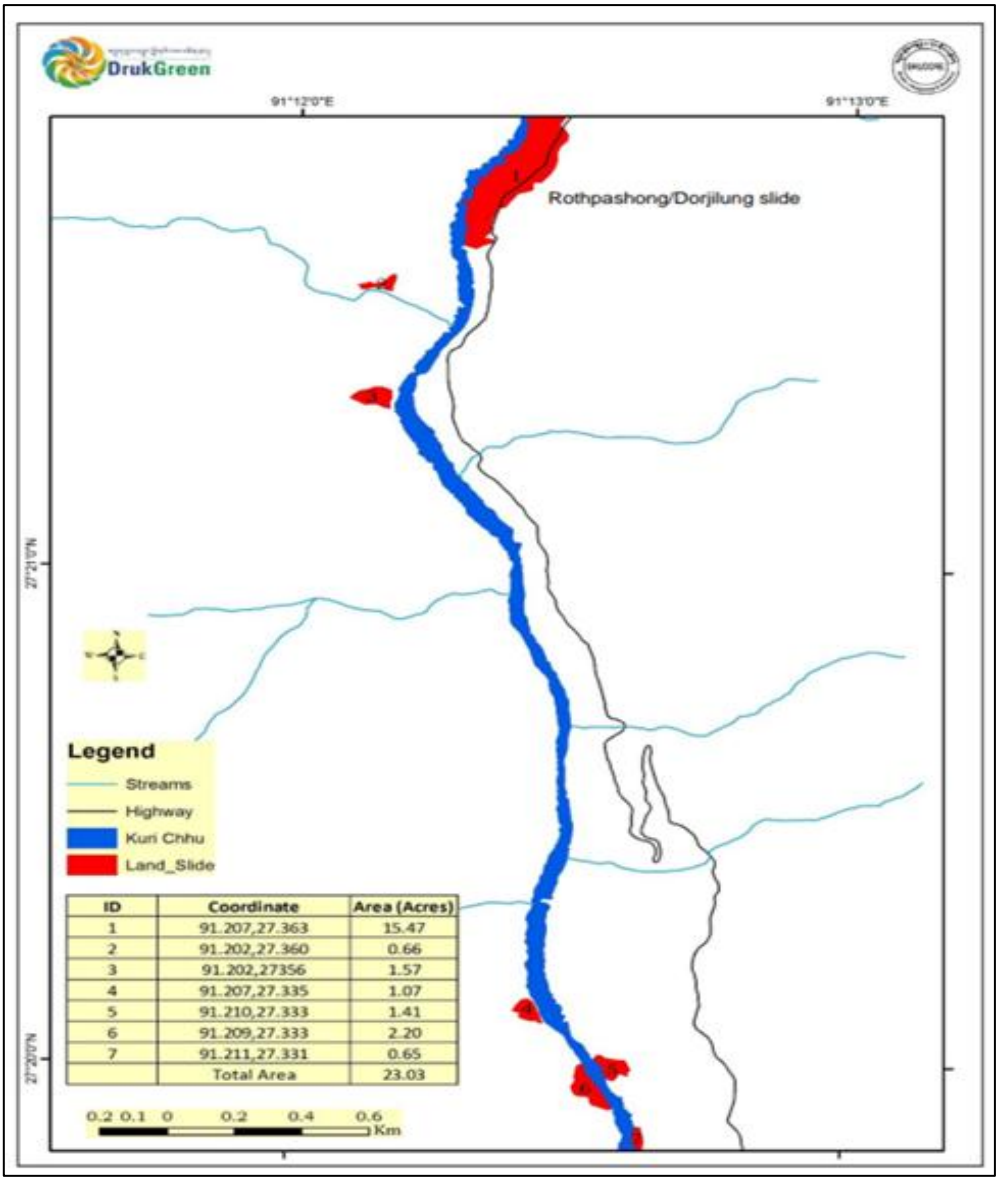


Figure 4-1: Figure showing active landslide area

In addition to the identified landslides, notable slope instabilities have been observed within the road's right of way. Following road construction, there is a potential risk of rockfalls, cut slope failures, particularly in areas with loose colluvium deposits on hill slopes. These failures are likely to be caused by the combination of steep slopes and unstable soil materials. However, these risks can be effectively mitigated through the implementation of construction of protective retaining walls (RRM & Gabion) and cross drainage structures and other road safety measures.

The DHPP ESIA identifies the following key construction phase risks and impacts related to soil erosion and sediment:

- Loss of topsoil from erosion and landslides.
- Landslides causes property damage, injury and death.
- Slope instability risk and disruption of transportation routes.
- Sediment deposition, pollutant discharge and debris flow into the waterbody affecting water quality and aquatic habitat and biota.

- Increased surface erosion from disturbed slopes causing disturbance with the construction of roads, bridges and Culverts.
- Ground disturbance for the construction of access roads.
- Sediment runoff from muck and topsoil stockpiling sites.

4.2.3 Contractor Minimum Requirements

Erosion control measures will be applied to all land that is stripped or excavated, all embankments and temporary or permanent deposits of materials in order to minimize and control the resulting sediment loads before they reach the Kurichhu river or tributaries.

The contractor must, at a minimum, comply with the applicable requirements outlined below:

- **Loss of topsoil from erosion and landslides**
  - Only the required trees will be removed, and stumps, roots, smaller plants, shrubs, and ground cover will be left to protect the soil from erosion.
  - Vegetation removal will be minimized in areas prone to landslides.
  - Clearing activities will be avoided during the monsoon season whenever possible.
  - Areas not required for immediate construction will not be cleared.
  - The use of herbicides for clearing vegetation will be prohibited.
  - Vegetation removal will be carried out in stages to help retain topsoil and prevent large-scale erosion.

- **Property damage, injury, and death due to landslides**
  - Careful excavation of slopes above settlements will be conducted to prevent landslides from affecting nearby communities.
  - Slope stabilization works will be carried out immediately after excavation to prevent erosion and mitigate risks.

- **Slope instability risks and disruption of access**
  - Clearing will be done just ahead of construction activities to avoid leaving disturbed areas exposed to erosion.
  - Clearing boundaries will be clearly marked using flagging, temporary fencing, or other methods.
  - Sensitive areas (like community forests, biological corridors, and steep slopes) will be marked as no-clearing zones with signs, unless clearing is needed or approved by the PIU.

- **Sediment deposition, water pollution, and debris flow impacting water quality and aquatic habitats**
  - Cut and fill slopes will be carefully maintained with minimal disturbance beyond the construction limits (Right of Way).
  - Earthworks will be suspended during the rainy season to avoid erosion and sedimentation.
  - Material with the best mechanical properties will be used for backfilling during excavation.
  - Disturbed areas will be quickly stabilized, drainage systems will be controlled, and sediment traps will be implemented to prevent runoff.
  - Areas prone to erosion will be protected with temporary and permanent drainage works, ensuring stormwater is managed without concentrating in streams or eroding slopes.
  - Retaining and gabion walls will be constructed at strategic locations, especially upstream of the river and stream, to prevent scouring.

- Erosion control structures will be inspected routinely (monthly) to ensure they are functioning as intended.

- **Increased surface erosion from disturbed slopes**
  - Cut and fill operations will be completed as quickly as possible to avoid leaving unfinished earthworks, particularly during the rainy season.
  - Slope protection measures such as cut-off and toe-drains, along with bioengineering techniques, will be used to protect exposed slopes.
  - Excavation and earth-moving will be carefully managed to minimize soil exposure both in terms of area and time.
  - Terraces and bioengineering measures will be implemented where necessary to prevent soil erosion.

- **Ground disturbance for the construction of access roads**
  - Areas not approved for construction will remain untouched and preserved in their natural state.
  - Slope breakers, including silt fences, staked hay or straw bales, or sandbags, will be installed to reduce runoff velocity and direct water away from construction sites.

- **Disturbance caused by the construction of roads, bridges, and culverts**
  - Erosion control measures will be put in place before the rainy season begins, ideally prior to construction activities.
  - Bioengineering structures will be implemented at each construction site to control erosion.

- **Sediment runoff from muck and topsoil stockpiling sites**
  - Earthwork spoils will be stored in designated locations according to the Muck and Spoil Management Plan.
  - Silt fencing will be installed around stockpiles near rivers, tributaries, or springs before any earthworks begin.
  - Adequate drainage systems and cross drainage will be set up around spoil and muck disposal areas to prevent runoff.
  - Muck disposal sites will be protected with retaining walls, cross drainage and other engineering solutions, along with bioengineering measures, to reduce erosion risks.

4.2.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitor Contractor performance (see below) and ensure erosion, sediment and landslide-related grievances are addressed by the Contractor in a timely manner and measures put in place to prevent future similar grievances.

4.2.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

- Status of implementation and maintenance of erosion and sediment control measures.
- Number and location of slope failures.
- Number of locations where sediment has escaped past control measures.

4.3 Muck Disposal Planning and Management Plan

4.3.1 Purpose

The purpose of the Muck Disposal Planning and Management Plan is to minimize risk to the environment and public safety relating to the handling, categorization, transport, and disposal of mucks and spoil to ensure that the Project complies with the waste management requirements of the World Bank's Environmental and Social Framework (ESS 3: Resource Efficiency and Pollution Prevention and Management) and the World Bank's Environmental, Health, and Safety General Guidelines (World Bank, April 30, 2007, Section 1.6 – Waste Management).

4.3.2 Key Risks and Impacts

The DHPP ESIA identifies the following key construction phase risks and impacts related to muck and spoil:

- Geotechnical stability of the spoil disposal areas.
- Careless disposal of construction spoil (unwanted soil and rock).
- Potential for erosion and sedimentation and other impacts on water quality.
- Impacts on forest and natural habitat.
- Impacts on agricultural land.

4.3.3 Contractor Minimum Requirements

The spoil materials from surface and underground excavations will be reused for land reclamation and aggregate production, while the rest will be stored in an environmentally responsible way, with 12 muck disposal sites identified by PIU.

The contractor must, at a minimum, comply with the applicable requirements outlined below:

- Designated Disposal Sites:
  - Use only the 12 muck disposal sites identified and handed over by the PIU as mentioned in Table 4-2..
  - Always use the nearest designated muck disposal sites relevant to each construction area as mentioned in Table 4-1.
  - Spoil and muck must be placed only in these designated and approved disposal areas.

Table 4-1: Details of the dumping plan for each of the contract package

SL. No.	Description	Identified Muck Disposal Sites	Average Distance to the Disposal Site (km)	Volume of muck from each work site
1	Take off from highway (near bridge 1) from 0 km to 0.2 km	MD 1	3.1	41.2784
2	Take off from Tsamang-Banjar Farm (Bypass Road) from 0 km to 1.2 km	MD 2	0.7	24,776.13
3	Take off from Tsamang-Banjar Farm (Bypass Road) from 1.2 km to 2.74 km	MD 3	0.8	60,825.70
4	Road to adit 1 from 0 km to 0.55 km	MD 2	0.5	24,176.67

SL. No.	Description	Identified Muck Disposal Sites	Average Distance to the Disposal Site (km)	Volume of muck from each work site
5	Take off from Bridge 1 from 0.25 km to 0.926 km	MD 2	0.74	24,855.22
6	Road to Dam top from 0.55 km to 1.05 km	MD 2	0.5	31,052
7	Take off from highway (near bridge 2) from 0 km to 0.7 km	MD 1	6.1	20,873.57
8	Take off from Tsamang-Banjar Farm Road from 0 km to 1.62 km	MD 5	1.4	64,181.87
9	Take off from Tsamang-Banjar Farm Road (Improvement) from 1.5 km to 4.88 km	MD 4	1.7	14,863.02
10	Take off from Tsamang-Banjar Farm Road (Improvement) from 0 km to 1.5 km	MD 5	0.4	19,700.61
11	Road connecting adit 3 from 2.3 km to 3.16 km	MD 6	0.5	12,553.61
12	Road to Bridge 2 from 0.8 km to 2.3 km	MD 6	0.8	113,346.11
13	Take off near Kuri Zampa from 0 km to 1 km	MD 12	2	14,153.08
14	Road connecting Adit 4 from 1 km to 1.6 km	MD 10	0.3	14,492.06
15	Road connecting Adit 4 from 1.6 km to 2.5 km	MD 9	0.3	12,788.08
16	Road connecting Adit 4 from 2.5 km to 6.08 km	MD 8	2	156,365.16
17	Road to MD 7 from 0 km to 1.92 km	MD 8	1.3	38,805.09
18	Road connecting adit 5 from 0 km to 0.5 km	MD 12	2.3	17,348.18
19	Road connecting adit 5 from 0.5 km to 2.19 km	MD 10	2	91,655.76
20	Road to Muck Dump 11 from 0 km to 2.3 km	MD 10	2.4	128283.316
21	Road connecting adit 6 from 2.3 km to 3.35 km	MD 11	1.7	72,546.85
22	Road to surge shaft from 0 km to 0.99 km	MD 11	0.5	43,675.43

- The capacity for each of the MD designated above is given in Table 4-2.

Table 4-2: Identified Muck Disposal Sites with capacity

SN	Muck Disposal Area	Capacity (m3)
HEAD WORKS		

SN	Muck Disposal Area	Capacity (m3)
1	MD 1	51,085.20
2	MD 2	690,384.50
3	MD 3	2,455,894.00
ADIT 2		
4	MD 4	312,280.10
5	MD 5	256,410.10
ADIT 3		
6	MD 6	701,500.00
ADIT 4		
7	MD 7	752,438.50
ADIT 5		
8	MD 8	612,177.20
ADIT 6		
9	MD 11	291,037.50
Powerhouse & Tail Race Tunnel		
10	MD 9	319,664.70
11	MD 10	439,301.10
12	MD 12	424,422.60

- Earthwork and Reuse:
  - Balance earthwork wherever feasible to minimize the requirement for spoil disposal.
  - Reuse spoil and muck to the maximum extent possible (e.g., for aggregate in concrete, road base material, and backfilling of quarries and borrow pits).
  - Minimize surplus muck generation and maximize reuse to reduce demand for additional land and resources.
- Engineering Design and Stability:
  - Ensure all muck and spoil piles are stable, with height, berm, and slope parameters determined through engineering calculations.
  - All muck disposal sites shall undergo geotechnical design to ensure structural stability and prevent slope failure; designs must be submitted to PIU for non-objection prior to disposal.
  - Provide gabions/retaining walls and proper drainage systems for slope stability and erosion control.
- Environmental Protection Measures:
  - Avoid disposal in natural drainage areas; preserve or realign such drainage if necessary.
  - Provide foot drainage, stormwater ponds, and settling ponds below spoil disposal areas to capture and treat sediment-laden runoff before discharge to water bodies.
  - Test pH of water in settling basins and apply neutralizing agents like lime if acidity is detected.
  - Conduct testing of muck and runoff for pollutants (e.g., heavy metals, nitrogen oxides, SO_2, VOCs).
  - Polluted muck should be securely stored to prevent river contamination.
- Topsoil and Site Rehabilitation:
  - Remove and store topsoil separately for use in site rehabilitation and landscaping around the headrace, camp areas, and public spaces.

- After muck is placed and compacted, cover it with topsoil and promote vegetative growth for slope stabilization and aesthetic blending with the environment.
- Deposit and reuse topsoil during restoration works, especially to vegetate the banks of the headrace and public open spaces.
- Fully rehabilitate disposal sites after completion of disposal operations, including native soil cover and full landscaping/vegetation.

- Site-Specific Design Considerations:
  - Ensure all 12 Muck Disposal sites are geotechnically designed considering environmental, social, and financial risks, including slope failure.
  - Provide enhanced vegetative cover on Muck Disposal sites promptly to reduce visual impacts on Kurichhu River and nearby streams.
  - Design Muck Disposal sites to withstand monsoon flows from Kurichu River and include enhanced vegetative cover for visual and erosion control.

4.3.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitor Contractor performance as below and ensure muck and spoil disposal plans are implemented properly.
- Ensure that the Owner's Engineer closely monitors the construction of the spoil disposal areas, as per the engineering design, as a failure of these facilities will result in significant environmental and social impacts and pose risks to community health.
- Conduct regular monitoring and inspection of the spoil disposal areas, especially for the first 2 years after construction and after each monsoon season.

4.3.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

- Volume of spoil placed in each spoil disposal area.
- Volume of spoil reused for other purposes.
- Water quality of seepage leaving all settling basins (i.e. all drainage from spoil disposal areas).
- Any additional muck disposal area used
- Grievances related to Muck disposal work

4.4 Waste Management Plan

4.4.1 Purpose

The purpose of the Waste Management Plan (WMP) is to minimize risk to the environment and public safety relating to the storage, transport, and disposal of solid and hazardous wastes, and to ensure that the Project complies with the waste management requirements of the World Bank's Environmental and Social Framework (ESS 3: Resource Efficiency and Pollution Prevention and Management), and the World Bank's Environmental, Health, and Safety General Guidelines (World Bank, April 30, 2007, Section 1.6).

4.4.2 Key Risks and Impacts

The DHPP ESIA identifies the following key construction phase risks and impacts related to waste:

- Improper disposal of organic or food waste will be a significant health risk.
- Littering, soil and water pollution from improperly managed non-hazardous wastes.
- Adverse health impacts and pollution due to improper management of hazardous waste
- Litter from domestic solid wastes and construction debris and attract rodents and pests.

4.4.3 Contractor Minimum Requirements

A waste management programme will be mandatory for contractors and their sub-contractors. The programme includes waste management plans which will be implemented appropriately by the contractors. The first relates to wastes of the domestic type (essentially generated by the camps) and non-hazardous wastes generated on the construction sites, while the second is related to hazardous wastes.

These plans include procedures, in accordance with local regulations or with international best practice, concerning the handling, transport, storage, treatment and elimination of wastes according to their category. The contractor must, at a minimum, comply with the applicable requirements outlined below:

- **Solid Waste Management**
  - The contractor will ensure that all facilities are kept clean, and no littering or illegal dumping occurs within the project area by workers.
  - Measures will be taken to prevent littering and improper disposal of waste. Litter bins, containers, and collection facilities will be provided at work sites for proper waste disposal.
  - Construction waste will be kept separate from domestic waste.
  - Solid waste may be temporarily stored at a designated area on-site, which will be covered to protect it from precipitation, have a berm to prevent contact with surface runoff, and be fenced to prevent wind-blown litter. Storage containers will be weatherproof, tip-proof, and scavenger-proof to avoid attracting wildlife.
  - Waste disposal areas will be clearly marked to specify the types of waste allowed in each container. Containers will be placed in visible, easy-to-identify locations, with labels for recyclable materials, organic waste, hazardous waste, paper, glass, etc.
  - Recyclable materials (e.g., wooden plates, steel, scaffolding material, packaging materials, paper, cement bags, containers, glass, wood, junk) will be separated and stored on-site. These materials will either be reused or sold to waste collectors for recycling.
  - Employees will be trained on waste segregation, with separate bins for recyclables and perishables provided at work and common areas.

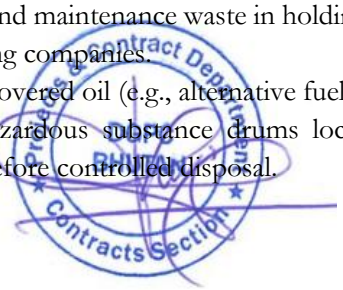
- **Disposal of Solid Waste**
  - The contractor will identify a suitable location for a sanitary landfill within the project area and obtain approval from the DHPP for its use. The landfill site must comply with national and international standards. The contractor will also assess the use of an incinerator for solid waste management and apply the best approach.
  - Burning of solid waste in open air will be strictly prohibited.
  - Solid waste will not be buried in fill or backfill areas.

- **Disposal of Construction Waste**
  - Construction debris will only be disposed of at sites previously identified and approved by DHPP.

- Debris from dismantling existing structures will be reused by the project or provided to local residents for reuse.
- The contractor is responsible for arranging transportation and disposal of all construction waste, including debris from dismantling and clearing activities.
- Upon completion of the project, all construction debris will be removed from the site.

- **Organic waste**
  - Install in-vessel composters at each campsite to convert food and organic waste into nutrient-rich compost for landscaping and plantation development.
  - Provide sufficient, well-maintained containers for organic waste. Ensure timely collection and transport to composting facilities.
  - Engage with local waste management authorities and services to ensure sustainable and environmentally sound disposal methods.
- **Non-hazardous waste**
  - Construct a controlled landfill site meeting international standards (impermeable liner, leachate collection, and treatment) to safely dispose of non-recyclable household-type wastes. The site will be developed with a view to its long-term use so that it can serve the needs of the future operator village of the Dorjilung HPP facility. The location of the site will be discussed with local authorities, and RGOB approval will be received before implementation.
  - Collect and separate waste at the source—paper, plastics, metals, glass—using designated covered bins and containers in the workers' camps.
  - Ensure materials like metal, wood, cardboard, and plastics are recycled or reused where possible. Prohibit the burning of waste.
  - Conduct training to promote effective segregation and proper disposal.
  - Inspect landfill sites and project areas regularly to ensure cleanliness and proper waste management.

- **Hazardous and Medical Waste Management**
  - **Secure Storage and Trained Handling:**
    - Store all hazardous and medical waste (e.g., oils, solvents, acids, paints, bitumen, used needles) in designated, secure areas with impervious floors, covers, bunds, and clear warning signage.
    - Only trained and authorized personnel will handle hazardous and medical waste.
  - **Management of Special Waste Streams:**
    - Store items like batteries, oil filters, and printer cartridges separately.
    - Manage spent lead-acid batteries as hazardous waste until transferred to a recycling facility.
    - Obtain PIU's approval for all disposal methods.
  - **Chemical and Bituminous Waste Control:**
    - Minimize the use of highly toxic chemicals; store used chemicals securely and return them to suppliers or authorized facilities.
    - Prevent tar and bituminous products from contaminating work areas, borrow pits, water bodies, or agricultural land.
    - Return unused or rejected bituminous products to the supplier's plant.
  - **Recycling, Reuse, and Safe Disposal:**
    - Collect used oils, lubricants, and maintenance waste in holding tanks for return to suppliers or disposal via approved recycling companies.
    - Explore reuse options for recovered oil (e.g., alternative fuel or low-grade diesel).
    - Do not distribute empty hazardous substance drums locally. If rinsed, treat rinse water appropriately; crush drums before controlled disposal.
  - **Medical Waste Disposal:**



- Collect medical waste in secure, clearly labeled containers.
- Incinerate medical waste at Mongar Regional Referral Hospital under a formal agreement.

- **Transport and Contingency Measures:**
  - Coordinate hazardous and medical waste transport with licensed and authorized waste carriers.
  - If no local treatment facilities exist, repatriate waste to countries with appropriate capabilities (e.g., India).
  - Alternatively, construct a secure, impervious hazardous waste pit for temporary storage, with RGoB approval and local authority consultation.

4.4.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Ensure waste-related grievances are addressed by the Contractor in a timely manner and measures put in place to prevent future similar grievances.
- Monitor Contractor performance as below.

4.4.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report on weekly at yards and campsites on the following metrics:

- Volume of waste generated broken down by solid waste, recyclables, construction waste, and hazardous waste.
- Volume of various types of waste transported off-site for ultimate disposal and location of disposal sites.

4.5 Explosive and Blasting Management Plan[6]

4.5.1 Purpose

The purpose of the Blasting and Explosives Management Plan is to conduct the blasting process in a safe and sound manner. The plan also minimizes the risk to the environment and public safety relating to the transport, storage, and use of explosive materials; and ensures that the Project complies with the explosive management requirements of the Department of Law and Order (DLO), Royal Bhutan Police (RBP) and World Bank's Environmental, Health, and Safety General Guidelines (World Bank, April 30, 2007, Section 1.5).

4.5.2 Key Risks and Impacts

The DHPP ESIA identifies the following key construction phase risks and impacts related to blasting and explosives:

- Use of explosives will generate noise and vibration which may startle or disturb nearby people, livestock, and wildlife.
- Potential damage to structures from vibration.

[6] This plan shall be referred in tandem with Occupational Health and Safety Management Plan (OHSMP) attached separately as *Annexure IV B* of the Tender Document

- Blasting techniques could result in some localized fracturing of rock, which could create a preferential groundwater flow path that could also reduce or eliminate flow in some springs and streams.
- Accidental explosions and danger of explosives.

4.5.3 Contractor Minimum Requirements

The contractor should consult the 'Explosive Rules-1989' by the Ministry of Home Affairs for a more detailed understanding and to realign the project C-ESMP accordingly. The Contractor shall utilize the designated explosive storage yards identified by the PIU, as specified in Table 4-3.

Table 4-3: Location of Explosive Yards and area

Sl. No.	Explosive magazine	Component	Area (Acres)
1	EX 1	Access road to Dam top and Adit 1	0.569
2	EX 2	Access road to Adit 2	0.569
3	EX 3	Access road to Adit 3	0.569
4	EX 4	Access road to Adit 4	0.569
5	EX 5	Access road to Adit 5, 6, surge Shaft & Powerhouse	0.569

The contractor must, at a minimum, comply with the applicable requirements outlined below:

Regulatory Compliance and Safety Protocols:

- All activities related to the transportation, storage, processing, packaging, blasting, and disposal of explosives must comply with Bhutanese regulations.
- The contractor must adhere to safety measures such as vibration limits, pre-blast surveys, and proper notification to the local community.
- Explosive materials will be transported by licensed contractors using specialized vehicles, with separate transport for explosives and detonators, and escorted by the Royal Bhutan Police (RBP).

Blasting operations must be conducted during daylight hours and will be halted in adverse weather conditions like storms or thunderstorms.

Transport of Explosives:

1. **Permit and Pass Requirements:**
    - Explosives can only be transported with a valid permit and escorted by the Royal Bhutan Police (RBP). Each consignment must be accompanied by a pass issued by the consignee, which should be attached to the waybill, invoice, or dispatch note.
    - Copies of the pass must be sent to the permitting authority and the Dzongdag (district administrator) of the destination jurisdiction.
    - Different types of explosives cannot be transported together in the same carriage.
2. **Carriage Restrictions:**
    - Explosives must not be transported in vehicles carrying passengers.
    - The maximum quantity of explosives allowed per carriage is 10 tons for "plain" regions and 8 tons for "hill" regions.
3. **Loading and Unloading Locations:**
    - Explosives should be loaded and unloaded at a safe distance from station buildings, passenger platforms, factories, and public places, as well as areas storing hazardous goods.

- Loading or unloading must occur near an authorized magazine or premises with a proper permit.
- Loading after sunset is permitted until 10 PM in well-illuminated areas approved by the Dzongdag.

4. **Competent Personnel in Charge:**
   - A qualified and experienced person must oversee the transportation of explosives at all times. This person is responsible for supervising loading and unloading, ensuring safety, and ensuring proper handling during transit.
   - The person in charge must avoid dangerous driving, unnecessary stops, or delays that could pose a risk to public safety.

Storage Requirements:

- Location and Distance: The allocated area for explosive storage must be used. There are total of 5 explosive yards (EY1-EY5) identified along the project sites as mentioned in Table 4-3. Explosives must be stored in enclosed containers or secure buildings which are already identified at a minimum distance of 500 meters from the nearest occupied structure.
- Separation of Explosives and Detonators: These materials must be kept in separate storage units or containers, maintaining at least 50 meters of distance between them. An earth bund of at least 5 meters in height must be placed between them to prevent chain reactions.
- Fire Safety and Vegetation Clearance: Vegetation must be cleared around storage sites to reduce fire hazards, and fire extinguishers should be strategically placed throughout the area.
- Perimeter Security and Access Control: The storage site must be fully enclosed with fencing and monitored with 24/7 access control. Entry is restricted to authorized personnel only.
- Qualified Supervision: All explosive handling and blasting activities will be overseen by a certified trained and competent Explosives Supervisor / Blaster to ensure adherence to safety protocols.
- Only certified/ qualified personnel will handle explosives, and the blasting process will be supervised to maintain safety standards.
- The contractor will adopt optimized blasting techniques, including the use of delay detonators for confined areas.
- In the event of any operational failures, only competent personnel trained in explosives handling will address the issue, following strict safety measures to prevent accidents.
- Operations will be immediately suspended if adverse weather conditions, such as storms or thunderstorms, pose a threat.

Safety Blasting Operation Procedure:

- A blaster and supervisor must be certified and trained by a recognized institute or agency to qualify for blasting operations.
- A safety perimeter will be defined for all blasting performed at ground surface. A minimum radius of 300 m, free of population, is generally established for surface blasting, to avoid risk of accident by flying rocks. The Contractors will define the applicable safety radius in compliance with applicable regulations and in conformity with the anticipated explosive load used.
- All populations in the concerned radius will be transferred to an appropriate shelter (not their existing houses) to be installed by the Contractors, prior to each blasting operation. Such shelters may consist of metallic containers, with reinforced roofs, installed as close as possible to the residential areas concerned. Such containers can also be moved according to the needs.

- Blasting alert procedure including (i) systematic visit of each concerned building (to ensure all concerned population has been transferred to the shelter point and (ii) appropriate siren alerts prior to blasting and after blasting (to ensure all loads went off before allowing the community to go back home).

Respect of maximum blast induced ground vibration imposed by law in Bhutan (Mines and Minerals Management Regulations, 2022): Whenever any damage to private or public property or places of cultural heritage is reportedly caused by blast-induced ground vibration, the cost of rehabilitation will be borne by the Contractors.

Vibration Control and Monitoring:

- Compliance with Vibration Limits: Blasting-induced ground vibrations must comply with Bhutan's legal limits (as per the Mines and Minerals Management Regulations, 2002). If any private or cultural property sustains damage, the Contractors will be responsible for repair costs.
- Measurement and Predictive Analysis: Peak Particle Velocity (PPV) and vibration frequency must be measured for every blast. A predictive model should be developed to assess expected vibration levels and adjust blasting methods accordingly.
- Pre-Blast Survey: Prior to initiating blasting, buildings within 500 meters of the blast site must be surveyed in the presence of a bailiff. Any existing cracks or structural weaknesses must be documented. Owners of structures unable to withstand permitted PPVs should receive compensation, and such buildings must be demolished before blasting begins.
- Monitoring Equipment Installation: Vibration recorders (3-4 units) must be installed in selected residences near the blasting zone in close coordination with the PIU. Recorded vibration levels must be documented and included in the Monthly Progress Report.

Operating Hours and Weather Considerations:

- All explosive-related activities must be conducted during daylight hours, with blasting operations immediately suspended if severe weather conditions, such as storms or thunderstorms, pose a threat to safety.

The PIU will carry out measurements of peak particle velocity (PPV) and frequency of the ground vibration induced by blasting and to develop a predictor equation for ground vibration for the site. Depending on the type of structures and the dominant excitation frequency, the peak particle velocity (PPV) in mm/s on the ground adjacent to the structures not belonging to the Contractors may not exceed the values given below in the following **Error! Reference source not found.**2.

Table 4-2: Maximum Peak Particle Velocity Permissible

Type of Structure	**Dominant excitation frequency (in Hz) and maximum permissible PPV value in mm/s**		
	<8Hz	**8-25 Hz**	**>25Hz**
Domestic Houses	5	10	15
Industrial Buildings	10	20	25
Place of Cultural Heritage	2	5	10

Note: PPV= Peak Particle Velocity

Prior to any blasting activity, a survey of all buildings within project area from any anticipated blasting point will be carried out by the Contractors and PIU, in the presence of a representatives from Local and District

Administrations, to establish baseline and of defects/cracks already observed in the building walls and roof and which, eventually in case of claim, will not be considered for compensation. During this survey, the Contractors and PIU will identify all buildings of poor construction, which may not support the allowed PPV and may collapse during blasting. These buildings must be compensated and demolished before starting blasting activities.

The PIU will install in selected residence buildings close to blasting sites, vibration recorders (3 to 4 units) to ensure maximum permissible PPV applicable is complied with. Vibration levels will be recorded for each blast and results provided at least quarterly. Any activity undertaken with explosives will be carried out during daylight hours only and always under the control of the Supervisor. They will be suspended in the event of imminent arrival of storms or thunderstorms and a threat.

4.5.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitor Contractor performance as below and ensure blasting and explosive-related grievances are addressed by the Contractor in a timely manner and measures put in place to prevent future similar grievances.

4.5.5 Monitoring Requirements

- The transportation, storage, processing, packaging on-site, blasting, and disposal of the blasting material shall comply with the Bhutanese regulations on the use of explosives.
- Before initiating blasting activities, survey buildings within 500 m of the blast site with a bailiff present. Document existing cracks or structural issues. Identify and compensate owners of weak buildings that cannot withstand permitted PPVs, then demolish these structures before blasting commences.
- Monitoring Equipment Installation: Under PIU supervision, install vibration recorders (3-4 units) in select residences near blasting areas. Record vibration levels for each blast and include results in the Monthly Progress Report.
- Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:
- The number of detonations and number of explosives used.
- Number of grievances filed related to blasting and explosives and their resolution.
- Number of misfires that happened.
- Number of explosives and accessories damaged during transportation.

4.6 Emergency Preparedness and Response Plan[7]

4.6.1 Purpose

The purpose of the Emergency Preparedness and Response Plan (EPRP) is to help protect workers and local residents from unplanned events that could result in injury or death, and to ensure that the Project complies with the emergency preparedness and response requirements of the World Bank's Environmental, Health, and Safety General Guidelines (World Bank, April 30, 2007, Section 3.7).

[7] This plan shall be referred in tandem with Occupational Health and Safety Management Plan (OHSMP) attached separately as *Annexure IV B* of the Tender Document.

4.6.2 Key Risks and Impacts

The PIU ESIA highlights the following key risks and impacts concerning emergency preparedness and response during the construction phase:

- Risks to the health and safety of the community and project workers, along with the potential for loss of life, injuries, or damage to physical assets due to natural disasters or project-related emergencies.

4.6.3 Contractor Minimum Requirements

This plan shall address all reasonably foreseeable emergencies that may occur at the Project, including flooding, glacial lake outburst floods (GLOFs), dam break, sudden unexpected release of water from the dam or powerhouse, earthquakes, fires, landslides, tunnel collapse, hazardous gas concentrations in the tunnels, drowning, traffic accidents, and similar events, and will include a Response Plan detailing procedures for addressing these potential emergencies at the Project site, such as flooding, GLOFs, dam failure, earthquakes, fires, and other incidents.
The contractor must, at a minimum, comply with the applicable requirements outlined below:

This program will include:

- **Identification of risks:**
  - Address all potential emergency situations such as flooding, GLOFs, dam failure, earthquakes, fires, landslides, etc.
- **Organizational structure:**
  - Define roles of key personnel, internal and external communication procedures (within the Project team and with local communities/government agencies).
- **Pollution control:**
  - Include pollution control equipment like storage design, anti-pollution kits, fire extinguishers, safety data sheets.
- **Fire Prevention and Control:**
  - Conduct routine inspections of electrical and gas systems.
  - Designated smoking areas with clear fire hazard signage.
  - Maintain fire safety equipment with easy access to fire exits.
- **Natural Disaster Response:**
  - Develop specific disaster response plans.
  - Conduct regular disaster drills.
  - Reinforce structures to withstand natural disasters.
- **Drowning Risk Mitigation:**
  - Provide life jackets and flotation devices for workers near water.
  - Install safety barriers and warning signage near riverbanks.
  - Offer water safety and rescue training and ensure standby rescue teams during river construction.
- **Emergency Response Team and Communication:**
  - Form a specialized Emergency Response Team.
  - Maintain efficient communication systems for rapid emergency response.
  - Regularly update and test emergency communication plans.
- **Rescue Equipment and Evacuation Planning:**
  - Ensure availability of rescue and first aid equipment (including water rescue gear).

- Clearly mark evacuation routes and assembly points.
- Regularly maintain and check rescue equipment.

- **Monitoring and Improving:**
  - Consistently monitor emergency preparedness measures.
  - Document incidents and continuously improve safety measures based on feedback.
- **Records management**:
  - Establish a system to store and maintain easily retrievable records of occupational accidents, incidents, and audits.
- **Safety communication:**
  - Display safety posters prominently on the site.
  - Ensure regular publicity of occupational health and safety matters.
- **Training:**
  - Conduct specific training and test drills on emergency response for all employees at any stage of the work.
- **Emergency Procedures:**
  - Describe the Contractor's command structure for responding to an emergency.
  - Preventative measures to avoid emergencies, if possible.
  - Monitoring to detect developing emergency conditions (e.g., river flow, gas monitoring systems).
  - Ensure equipment is available and well-maintained at the construction site.
  - Visual and auditory alarms to notify personnel and the public of emergencies.
  - Communication procedures for notifying personnel, responders, residents, and authorities.
  - Conduct regular training exercises and drills for workers.
  - Awareness training for local residents on emergency protection measures.
  - Establish evacuation plans for personnel and nearby residents.
  - Detailed rescue procedures.
  - Maintain records of training exercises, drills, and actual emergencies.
  - Document lessons learned from training exercises and actual emergencies.
  - Incident reporting and close-out procedures.
- **Consultation and Approval:**
  - Prepare the plan in consultation with central, district, Gewog, and ward offices.
  - Hold information meetings with local villages to familiarize residents with the plan and procedures once approved by DHPP.

4.6.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitor implementation of Emergency Preparedness and Response Plan.
- Monitor Contractor performance.

An anti-pollution program will be implemented to outline emergency procedures for handling leaks or accidental spills of hazardous substances. The plan aims to ensure sufficient resources for quick response, minimizing pollution spread and limiting environmental and health impacts, particularly in the Kurichhu River and its tributaries.

4.6.5 Monitoring Requirements

- Number of community information meetings held.
- Number, type, and severity of emergencies that occur.

- Number of worker and community injuries and fatalities.
- Number of drills and lessons learned

4.7 Water Quality Management Plan

4.7.1 Purpose

The purpose of the Water Quality Management Plan (WQMP) is to minimize risk to surface and groundwater quality from project construction activities, and to ensure that the Project complies with Bhutan's water quality regulations and the World Bank's Environmental and Social Framework (ESS 3: Resource Efficiency and Pollution Prevention and Management) and Environmental, Health, and Safety General Guidelines wastewater and ambient water quality requirements (World Bank, April 30, 2007, Section 1.3).

4.7.2 Key Risks and Impacts

The PIU ESIA identifies the following key pre-construction phase risks and impacts related to water quality:

- Domestic wastewater.
- Industrial stormwater runoff from the batching plant, quarry, crusher, spoil disposal areas, workers' camps, parking areas, fabrication shops, maintenance yards, and fuel depot.

4.7.3 Contractor Minimum Requirements

The Contractor shall be fully responsible for any contamination to the existing water quality within the project site. They will be responsible for monitoring the quality of all discharges on a monthly basis or getting a competent laboratory to do so.

The contractor must, at a minimum, comply with the applicable requirements outlined below:

- **Discharge Management**: Ensure proper drainage and treatment of any water runoff from preconstruction areas, including the access road and bridge construction sites.
- **Greywater and Rainwater**: Drainage from worker camps and equipment areas should be treated to avoid contamination of nearby water bodies.
- **Sedimentation Control**: Implement sedimentation basins at drainage outlets to prevent pollutants from being discharged into surrounding streams or groundwater.
- **Industrial Stormwater**: Runoff from any equipment yards or maintenance areas must be managed, including the installation of oil-water separators to prevent contamination of water bodies.
- **Groundwater Management**: Any groundwater seepage from preconstruction tunnel or access road works should be managed using stormwater ponds to filter out suspended solids before discharge.
- **Wastewater Treatment**: Ensure that any wastewater from worker camps or equipment areas is treated before discharge to ensure it meets environmental standards.
- **Stormwater Pond Maintenance**: Regularly maintain and clean stormwater ponds to avoid sediment buildup and ensure proper discharge.

Drinking water distributed in the colonies will be sampled regularly at source (spring and streams) and at tap levels in the camp to ensure the good level of residual chlorine and the absence of coliforms.

Sampling sites and parameters may change in the course of construction in order to adapt to the areas of activity and the types of activity observed.

The monitoring may vary from a weekly frequency (for drinking water distributed in the camps, for example) to monthly frequency for the other parameters (drainage, wastewater).

Compliance monitoring will be done against standards from RGoB and cover at least the following water quality indicators:

- Organic pollution: BOD (5), nitrates, phosphates, particularly related to the residential areas and the sewerage systems.
- Oils and grease, relating to drainage from the areas used for mechanical activities, storage of hazardous substances (hydrocarbons) and wastewater from the canteens.
- Suspended sediments at the outlet of major drainage areas and sedimentation ponds.

This monitoring will be supervised by the PIU ESHS who will incorporate control measurements at points identical to those surveyed by the contractor into his own water quality monitoring process.

4.7.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitor Contractor performance as below
- Ensure water quality-related grievances are addressed by the Contractor in a timely manner and measures put in place to prevent future similar grievances.

4.7.5 Monitoring

Water quality monitoring during construction stage will involve 3 different types of monitoring on quarterly basis:

i. The compliance monitoring, under the responsibility of the CC, whose objective is to ensure any liquid discharge leaving any construction site is compliant with applicable effluent discharge regulations and standards.
ii. The environmental monitoring, under the responsibility of the PIU whose objective is to monitor the water quality of the receiving environment, the Kurichhu river and any of its concerned tributaries receiving effluents from construction sites, in order to ensure the project activities, have no significant impact on surface water quality.
iii. The control monitoring, also under the responsibility of the PIU based on random samplings of Contractors effluents to ensure the monitoring results from the Contractors are true and accurate.

The contractor will follow the water quality monitoring plan which will be aimed at highlighting the quality of the environmental management implemented on the sites. This monitoring will verify discharge compliance, in other words it will concern all points where liquid effluents (wastewater, drainage) leave the limits of the work site concerned to enter the natural environment. The contractor concerned will be under the obligation to ensure conformity of its effluents with the applicable standards.

Each contractor will track and provide monthly reports on the following metrics for both their own work and that of their subcontractors:

- Water quality monitoring in the Kurichu River at the location of the proposed access road bridge.

- Monitoring report on the water quality of streams intersected by access roads at the respective work sites
- The water parameters to be monitored include at least: Total coliforms, BOD5, COD, Total Nitrogen, Nitrate, Nitrite, Phosphate, Total hydrocarbons, pH, TSS, Turbidity, dissolved O_2 and toxic metals (Pb, Cd, Hg, Cr6+).
- Water quality will be compared with National Standard.
- Number of grievances filed related to water quality and their resolution.

4.8 Emissions, Dust and Noise Management Plan

4.8.1 Purpose

This plan shall be implemented to manage atmospheric emissions, dust, noise, and vibrations in all areas potentially affected by construction along the access roads. It includes management plans to minimize air quality degradation, noise pollution, and associated health risks for local residents, workers, and wildlife. This ensures compliance with Bhutan's air quality regulations and aligns with the World Bank's Environmental and Social Framework (ESS 3: Resource Efficiency and Pollution Prevention and Management) as well as the Environmental, Health, and Safety General Guidelines, specifically addressing noise (Section 1.7) and air emissions and ambient air quality requirements (Section 1.1) outlined in the World Bank's April 30, 2007 guidelines.

4.8.2 Key Risks and Impacts

The key risks and impacts related to noise, vibration, and air quality will be evident in both the pre-construction and construction phases.

Pre-construction phase risks and impacts:

- Health Impacts: Exposure to dust, emissions, and noise can lead to respiratory issues, hearing loss, and other health concerns for workers and nearby communities.
- Environmental Damage: Air pollution and dust may harm local ecosystems, affecting plant and animal life.
- Regulatory Risks: Non-compliance with air quality and noise regulations could result in legal penalties, fines, and project delays.
- Community Disturbance: Excessive noise and dust can generate complaints from local communities and damage the project's reputation.
- Operational and Cost Impacts: Poor management may lead to delays, increased costs, and work stoppages due to health concerns and mitigation efforts.

Construction phase risks and impacts:

- Air Quality Degradation: Fugitive dust from disturbed soils, crushers, and batching plants can reduce ambient air quality.
- Emissions: Project vehicles and equipment contribute to air pollution.
- Community and Worker Health Impacts: Dust and smoke emissions can cause respiratory problems, reduce visibility, and pose health risks to workers and nearby communities.

Effective mitigation strategies are essential to minimize these risks and ensure regulatory compliance, environmental protection, and community well-being.

4.8.3 Contractor Minimum Requirements

The Contractor shall implement and adhere to the Emissions, Dust, and Noise Management Plan which includes air quality plans developed by the project to control air quality impacts from construction activities, including excavation, drilling, blasting, heavy equipment operation, quarrying, crushing, concrete batching, earthworks, embankment and channel construction, material haulage, and worker camp development. The contractor must, at a minimum, comply with the applicable requirements outlined below:

Emission Control for Machinery & Vehicles

- Maintain construction machinery and vehicles in optimal condition to reduce emissions and ensure compliance with regulations.
- Use idling control technologies and turn off equipment when not in use to minimize fuel consumption.
- Conduct mandatory monthly maintenance of vehicles per manufacturer specifications.
- Operate diesel generators efficiently with regular maintenance to keep emissions within design limits.
- Prohibit poorly maintained vehicles and equipment exceeding emission limits from the site.
- Ensure high-temperature biomass combustion to minimize smoke emissions and disturbances.

Dust and Particulate Matter Suppression

- Conduct wet blasting and drilling to limit dust emissions.
- Regularly spray water on dirt roads, disturbed areas, and stockpiles, increasing frequency in dry and windy conditions (at least 2-4 times daily).
- Pave or stabilize unpaved roads near communities to reduce fugitive dust.
- Cover trucks transporting powder materials (cement, sand, lime) with clean, impervious sheeting to prevent spillage and emissions.
- Ensure stockpiled materials prone to dust are enclosed or covered with impervious sheeting.
- Restrict vehicle speed to 20 km/hr on site and access roads to prevent excessive dust generation.
- Minimize dust from storage areas by watering materials, especially during strong winds, and regularly sprinkling conveyor belts at crushing plants.

Site Management & Environmental Safeguards

- Limit surface clearing strictly to the project footprint.
- Phase vegetation removal to prevent large exposed areas vulnerable to wind erosion.
- Progressively stabilize and restore disturbed areas through agricultural reuse or planting fast-growing vegetation.
- Locate batching at least 500 meters from residential areas and ensure they are equipped with effective dust control systems.
- Position batching plants, crushers, and power plants downwind and at least 300 meters from worker housing and local residences.

Community Engagement

- Inform local communities about construction schedules, mitigation measures, and potential air quality impacts.

- Implement regular air quality monitoring and provide a grievance mechanism to address community concerns.

Prohibited Practices & Alternative Measures

- Prohibit the open burning of cleared vegetation and solid waste (except wood or non-recycled paper).
- Minimize the use of wood for cooking in worker camps and provide alternative fuel sources.
- Ensure cement unloading is done on pallets and covered with tarpaulin sheets during non-working periods.
- This plan must be implemented prior to the start of project construction activities to mitigate air quality impacts effectively.

4.8.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Ensuring the Contractor completes the physical inspection of structures potentially affected by construction-related vibration before the initiation of construction activities.
- Ensuring that noise and vibration-related grievances are addressed by the Contractor in a timely manner, with measures put in place to prevent future similar grievances.
- Monitoring the compliance with Emissions, Dust and Noise Management Plan.
- Monitoring Contractor performance.

4.8.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

Noise and Vibration Monitoring

- Conduct noise monitoring in the nearby project area on a monthly basis (or as needed) to ensure compliance with National and WB criteria, especially when work activities in the vicinity increase.
- If monitoring indicates noise levels exceed RGoB and WB criteria, additional mitigation measures will be applied to bring noise levels within acceptable limits.
- Record and address grievances related to noise and vibration.
- Maintain a record of noise levels from crushers and batch plants.
- The Client will conduct regular noise monitoring to ensure compliance and protect employees exposed to high noise levels. Measures such as plant and vehicle maintenance, use of soundproofed equipment, and limiting operating hours of noisy installations (e.g., crushing plant, blasting) will be implemented.
- Off-site noise standards from RGoB will be enforced, with Contractors carrying out noise controls near inhabited areas and within construction sites. Night shifts will be limited to non-noisy activities or work conducted underground or away from residential areas. Surface blasting will not be allowed at night.
- Additional noise reduction measures will be implemented for work near biodiversity-sensitive areas.

Air Quality and Fuel Monitoring

- Monitor ambient air quality (SO_2, NO_2, TSP, PM_{10}, $PM_{2.5}$, CO, Ozone) on a quarterly basis or more frequently if needed, based on Bhutan Environment Standards 2020, on quarterly basis

- Conduct visual monitoring of fugitive dust from construction activities daily during the dry season.
- Record the number of times water is sprinkled for dust suppression.

4.9 Vegetation Clearing Plan

4.9.1 Purpose

The Vegetation Clearing Plan aims to manage vegetation removal efficiently, minimizing environmental impact, protecting biodiversity, and ensuring compliance with regulations. It outlines procedures for clearing land for construction, such as dam sites and access roads, while promoting sustainable practices like soil erosion control and habitat preservation, and supporting land restoration efforts after construction.

4.9.2 Key Risks and Impacts

The DHPP ESIA identifies the following key construction phase risks and impacts related to vegetation clearing plan:

- Loss of Biodiversity: Clearing vegetation can destroy wildlife habitats and disrupt ecosystems.
- Soil Erosion: Removal of vegetation may lead to soil erosion and sedimentation, impacting water quality.
- Ecosystem Service Disruption: Vegetation clearing can affect essential services like water filtration and carbon storage.
- Invasive Species: Clearing may introduce invasive species, harming native plant and animal populations.
- Impact on Communities: Local communities reliant on forest resources may experience negative effects on their livelihoods.

4.9.3 Contractor Minimum Requirements

The contractor must, at a minimum, comply with the applicable requirements outlined below:

- Avoid clearing operations during bird breeding season (March to May).
- Only necessary areas will be cleared, with clear demarcation to limit extra clearing; an environmental expert will verify proper preparation.
- A scaring campaign will precede each clearing activity to allow fauna to escape, using sound or vibration emissions targeting small mammals and slow-moving species.
- Clearing activities must be structured to prevent anarchic methods; centrifugal clearing avoids creating vegetation islands that act as traps.
- Demarcate the area to be cleared with measures to ensure compliance, monitored by forestry authorities.
- Organize removal of forest waste wood and branches with no commercial or local value, and if burning, ensure waste is placed more than 50 meters from the forest edge to prevent fire risk.
- Implement control measures to limit clearing to the minimum required.
- Establish control measures to prevent hunting or poaching during land clearing.
- Maintain wildlife crossing corridors during large-scale clearing to allow animals to disperse into surrounding forests.
- A team will visit the area prior to clearing to scare away animals using noise generators.
- Chemical clearing methods, including defoliants and herbicides, are prohibited.

- Bulldozer clearing is banned within 10 meters of sensitive areas as per the Biodiversity Management Plan; manual clearing is allowed instead.
- Fire clearing is not authorized, except for burning forest waste in designated areas under strict conditions.
- Stump removal will prevent mixing forest waste with topsoil, which must be stripped and stored before site development.

4.9.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitor Contractor performance and ensure vegetative clearing-related grievances are addressed by the Contractor in a timely manner and measures put in place to prevent future similar grievances.

4.9.5 Monitoring Requirements

- Environmental Expert Verification: An environmental expert will check that the work is properly prepared and done before clearing activities begin to ensure compliance with environmental standards.
- Compliance with Demarcation: Monitoring will be conducted by PIU/ forestry authorities to ensure the area being cleared strictly adheres to the designated boundaries and limits additional clearing.
- Scaring Campaign Effectiveness: The success of scaring campaigns, using sound or vibration, will be monitored to ensure fauna, particularly small mammals and slow-moving species, are given the opportunity to escape before clearing starts.
- Control of Forest Waste Disposal: There will be monitoring of the disposal of forest waste, including ensuring that if burning is necessary, it's done more than 50 meters from the forest edge to minimize fire risks.
- Wildlife Crossing Corridors: The maintenance of wildlife crossing corridors during large-scale clearing will be monitored to ensure that animals can safely disperse into surrounding forests.
- No Hunting or Poaching: Monitoring will be in place to ensure no hunting or poaching occurs during land clearing activities.
- Chemical and Fire Use Compliance: There will be strict monitoring to ensure that chemical clearing methods (e.g., herbicides, defoliants) and fire clearing are not used, and that burning of waste is only allowed under specified conditions.
- Soil Erosion Checks: Assessing soil stability and sedimentation, especially near rivers and slopes.
- Biodiversity Monitoring: Tracking impacts on local flora and fauna, and implementing mitigation measures as needed.
- Water Quality Testing: Monitoring water bodies for sedimentation or turbidity changes due to clearing activities.
- Invasive Species Control: Monitoring and managing the spread of invasive species post-clearing.

4.10 Landscaping and Re-vegetation Plan

4.10.1 Purpose

The purpose of the landscaping or Re-vegetation Plan is to make sure that the project area is restored in a progressive manner to a similar condition to that prior to the commencement of the works, or to a condition agreed to with the land owner, through grading/backfilling activities, soil replacement, revegetation, clean-up and best management practices.

4.10.2 Key Risks and Impacts

The DHPP ESIA identifies the following key construction phase risks and impacts related to site restoration:

- Failure to restore pre-construction conditions.
- Unnecessary delays in stabilizing and restoring disturbed areas.
- Failure to adequately stabilize and revegetate disturbed areas.

Protection of the soil by re-vegetation will be undertaken on the sites either during construction works (stabilization and erosion control) or on completion of construction works (rehabilitation). A sowing and planting program will be drawn up by the contractor showing the proposed methods and the species to be used. In all cases, indigenous plant species, approved by PIU will be preferred.

Temporary re-vegetation (or mechanical protection against erosion) will be required for any area that is to remain bare, without being consolidated or reused, for a period of more than six months. This will be the case with the stocks of topsoil to be preserved when stripping the land for later reuse during re-vegetation operations.

4.10.3 Contractor Minimum Requirements

The contractor must, at a minimum, comply with the applicable requirements outlined below:

- Re-establish plant cover on decommissioned areas as soon as possible.
- Use local species for site replanting and if possible, plants with special status (endangered, at risk of extinction, etc.) if the new edaphic conditions are favorable.
- Reuse the topsoil that was set aside at the start of construction work, to rehabilitate decommissioned areas and slopes of the muck disposal areas, in favor of local species development.
- Ensure that it will be possible to maintain or improve the soil productivity of rehabilitated sites, that the sites are safe physically (no risk of landslide, falling material or similar dangers) and that they are stable and not subject to erosion.
- Maximize the reuse of excavated material when restoring affected areas, in order to reduce the volume of material to be eliminated and stored permanently.
- Ensure that sites are restored in keeping with the surrounding environment, while favoring the establishment of vegetation having high environmental value as fauna habitat and/or a return to pre-construction land use.
- Ensure that natural drainage is re-established and avoid pounding.
- For temporarily disturbed areas that remain in private ownership (including agricultural lands), the land shall be restored to its original condition and use, unless otherwise agreed with the property owner and after consultation that is recorded in writing.
- The Contractor shall use mulch, blankets, and mats, along with native grass seeds, in situations when disturbed soil is difficult to stabilize, such as bare or exposed soil, steep slopes, (generally steeper than 1:3), slopes where the erosion potential is high, disturbed areas where plants are slow to develop.

4.10.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitor Contractor performance as below and ensure site restoration-related grievances are addressed by the Contractor in a timely manner and measures put in place to prevent future similar grievances.

4.10.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

- Number of hectares vegetatively stabilized.
- Number of hectares restored.
- Number of hectares still disturbed.
- Land handed back to owners.

4.11 Biodiversity Management Plan

4.11.1 Purpose

The Biodiversity Management Plan (BMP) of C-ESMP objectively aims to limit disturbances to wildlife, reduce habitat destruction or degradation. The number of obligations in favor of biodiversity conservation are already part of the specific technical plans to be prepared by the Contractors through the protection of the physical environment.

4.11.2 Key Risks and Impacts

The DHPP ESIA identifies the following key construction phase risks and impacts related to biodiversity management plan:

- Ecosystem and Wildlife Disruption: Construction activities can harm local ecosystems, disrupt habitats, and threaten biodiversity, particularly affecting endangered species and migratory wildlife.
- Water Quality and Aquatic Life Impact: Changes in water flow and quality can negatively affect aquatic ecosystems and fish populations, impacting local communities relying on these resources.
- Deforestation and Land Degradation: Construction activities may lead to deforestation, soil erosion, and ecosystem degradation, disrupting forest health and biodiversity.
- Legal and Compliance Risks: Failure to comply with environmental laws and biodiversity agreements can result in legal consequences, project delays, and reputational damage.
- Long-Term Environmental Consequences: Inadequate biodiversity management may cause irreversible environmental damage, including species extinction and ecosystem imbalance, affecting both the environment and local livelihoods.

4.11.3 Contractor Minimum Requirements

The contractor must, at a minimum, comply with the applicable requirements outlined below:

The PIU will incorporate a code of conduct for staff, contractors and their workers into its biodiversity policies. The Biodiversity Code of Conduct include following rules:

- Workers are restricted from entering into notified prohibited/unauthorized areas.
- Workers are restricted on possessing hunting rifles, snares, traps, fishing net, ammunition, poisons, etc.
- Workers shall not be allowed fishing & hunting in the project area.

- Workers will be prohibited from sell/buy bush meat and hunting products.
- Workers shall control on harvesting firewood or construction timber and other NWFP (Non-Wood Forest Products).
- Workers shall adhere to signage installed at appropriate locations in the project area.
- Obligations on individuals to report violations of these rules.

Adherence to the Biodiversity Code of Conduct shall be enforced by Contractors and monitored by PIU & Forestry Officials. Workers violating the above code of conduct will be liable for prosecution and penalty as per Law/ Act/ Rules and Regulation of Bhutan.

Water quality: Eventual protection of aquatic biodiversity through preservation of water quality. Several measures imposed to the Contractors are detailed in the following plans:

- Drainage, Erosion and Sedimentation Control Plan (control of sediment discharge in water).
- Muck Disposal Planning and Management Plan (control of sediment discharge in water).
- Hazardous Substances and Explosives Management Plan (prevention of chemical pollution).
- Waste Management Plan (prevention of chemical pollution).
- Emergency Preparedness and Response Plan (prevention of chemical pollution).

Hydraulic discontinuity: In addition to the E-flow management plan, an additional control measure is necessary. Indeed, there is a risk of hydraulic discontinuity linked with the construction of the project. The complementary measure consists in the verification of the water crossing to ensure the hydraulic continuity is preserved and ensure no other ecological barriers are created to fish movement (ensure the connection between the tributaries and the main river).

Air Quality: Eventual protection of terrestrial biodiversity through the preservation of air quality as detailed in the Emissions, Dust and Noise Management Plan, focusing particularly on the control of dust emissions.

Noise: Eventual protection of terrestrial biodiversity through noise control (engines, noisy activities, blasting). Measures already described in plans:

- Emissions, Dust and Noise Management Plan.
- Quarry Management Plan.
- Road Traffic and Access Management Plan.

Specific additional measures from the BMP concern:

- To avoid/limit surface basting from March to May to preserve the breeding period of the Dark-rumped Swift/ birds.
- To avoid crushing activities in the vicinity of the cliffs from March to May to preserve the breeding period of the Dark-rumped Swift.
- Signage at large wildlife crossing points, reporting collisions or injured animals.

Light emission: In relation to site light emissions during nighttime, the following measures are required by the BMP:

- Development of a light management plan.
- Reduce the night work period to specific sites and operations to avoid fauna behavioral disturbance.
- Install directional lighting for activity areas, security lighting and colony lighting.

- For lighting other than that necessary for safety, limit the lighting duration to what is strictly necessary.

Road traffic: In relation to road traffic and risk of accident, specific BMP measure includes:

- Development and implement a proper Traffic Management Plan.
- Appropriate signage at large wildlife crossing points.
- A protocol will be proposed to report the collisions with animals. This will consist in identifying the species hit, as much as possible the GPS coordinate of the event will be taken (this will allow to highlight if some areas can be considered as a highly frequented crossing zone), the date and any other comments about the situation. If a high number of collisions is noted, an adaptive measure will be proposed. As an example, if an area is identified as a crossing zone, implementation of fauna passage could be a solution.

Colonies, workers, and social influx: In relation to the presence of workers and colonies, several measures for the conservation of biodiversity are already available in the specific plans (i) Management of Construction Worker Colonies (Camps) and (ii) ESHS Training for Construction Workers Plan. Measures from BMP include:

- Agreement with Royal Bhutan Police (RBP) and the DoFPS to avoid risk of poaching for export and supply of bush meat to workers and other influx populations (responsibility PIU).
- Agreement with RBP and the DoFPS to randomly control in colonies and influx population, the banning or confiscation of arms and traps, bushmeat consumption, capture and killing of wild animals (responsibility PIU).
- Awareness training on biodiversity conservation (workers and communities).
- Preparation of a code of conduct in case of interaction with wildlife such as primates, snakes, big cats or other big fauna and information to workers; responsibility CC.
- Demobilization and restoration of the temporary roads which will not be preserved.
- Ban on the public use of new access roads dedicated to project construction and maintenance (managed by Contractors during construction and Operator during operation).

Pre-construction surveys:

Collection of seeds along and right of way of the access road construction and broadcasting: Collecting seeds of native grasses and trees along the new access road alignment is important for promoting ecological restoration. By encouraging the planting of these local species in areas impacted by the project, we can enhance the conservation value of the landscape and support quick re-vegetation. Native plants are well-adapted to the local conditions, improving soil stability, biodiversity, and ecosystem resilience, ensuring a sustainable recovery of the affected area.

Once road construction is completed, a quantified amount (kg) of native seeds will be broadcast onto the affected areas to ensure rapid recovery and revegetation. This approach will help restore natural habitats, improve biodiversity, and enhance the overall aesthetics of the landscape. By prioritizing native species, the process will also promote soil stability and long-term ecological health, supporting a quicker, more sustainable regeneration of the environment.

Vegetation clearing: In relation to clearing activities, most measures are detailed in the Vegetation Clearing Plan. Measures from the BMP include:

- Avoid the main period of birds breeding for clearing operations.

- Generate noise and vibration signals in the areas to be cleared prior to start clearing activities to facilitate the escape of mobile species such as snakes, lizards and other slow-moving species.
- In addition to the vegetation clearing plan, the ecological protection plan and the landscaping and re-vegetation plan, the project owner must make sure that the construction companies respect the delimitation of the area to clear:
  - Unnecessary clearing will be avoided, and areas to be cleared will be clearly indicated to limit additional clearing. The environmental expert will check that the work is properly done before the beginning of the clearing activities,
  - A scaring campaign will be organized before every clearing activity to give an opportunity to the fauna to escape. These campaigns can be organized as sound or vibration emission campaigns, for several minutes in the areas concerned. The main target of these campaigns are the small mammals and other small species (crawling species and slow-moving species) as big mammals will easily be seen and avoided and
  - Clearing activities must be structured and not lead anarchically. The most common method is centrifugal clearing, that avoids creating small islands of vegetation that can be considered as traps.

Segregation and waste disposal and management of green waste:

- The charcoal making works will be contracted to local charcoal contractors, if NRDCL, and other relevant agencies do not take all the felled materials, including logs, timber, and other parts. OR
- Contact steel industries to dispose of timber related wastes.

Invasive species: In relation to alien invasive species, a specific request from BMP is to monitor and control alien invasive species on construction sites.

General during construction: BMP requires:

- Rescue procedure for trapped or injured animals.
- Regular inspection of dangerous sites to wildlife (electrical risk, risk of entrapment, risk of collision) including implementation of corrective actions, awareness of site personnel for the identification of risks and reporting of incidents. Corrective actions could include wildlife tunnels or speed reduction measures (eg. speedbumps).

The following other measures imposed to the Contractors by the ESMP include:

- Minimize areas where plant cover is disturbed and restrict clearing to essential areas.
- Avoid disturbing vegetation next to construction work areas.
- Avoid crossing or disturbing plant communities of interest, as much as possible.
- Protect natural vegetation along drainage ditches, ravines and gorges as much as possible by maintaining a buffer zone.
- Obtain prior authorization from the PIU before proceeding with any clearing of land.
- Restrict movements of vehicles and machinery to the designated access roads and work areas.
- Strictly prohibit harvesting of plant resources by workers in the project area.
- Observe any emergence of alien invasive species within construction sites.
- Fence the working areas to prevent fauna from interfering with construction and operational activities.
- Limit the speed of vehicles on dirt roads and in areas with high livestock potential.
- Manage waste on worksites to prevent proliferation of undesirable species and to prevent animals from becoming accustomed to seeking food there.

- Use sediment traps or sedimentation ponds downstream areas susceptible to erosion to limit disturbances and deterioration of aquatic habitats.
- Avoid reproduction and sensitive period for the species concerned:
  - The construction companies will have to make sure that their activities schedules are compatible with all the species biological cycle,
  - Blasting activities must avoid birds breeding periods that happen from March to May,
  - Crushing activities at the vicinity of cliffs (favorable habitat for critical species) must avoid breeding period from March to May,
  - Land clearing activities must avoid birds breeding period and

It will be the responsibility of the PIU to ensure all the data, reports, and methodologies related to terrestrial and aquatic biodiversity and to critical habitats are effectively transferred to DGPC-Operator before operation starts.

Beyond the measures described above, key elements for success in the conservation of the biodiversity within and around the PIU concern the commitment of DGPC regarding:

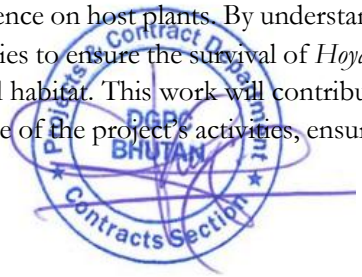
- The selection of a competent and committed construction company that already has ESHS routine management and corporate culture procedures in place.
- The requirements of the ESMP and the BMP to be clearly detailed in the ESHS specifications of the measures and in the commitments of DGPC to identify realistic budget allocation in proportion to the efforts and appropriate staffing of parties.
- The ability of the project owner and/or its engineer to mobilize qualified personnel surrounded by a network of expertise.
- A comprehensive ESMP aimed at preserving all components of the physical environment, commensurate with the scale of the project.
- A comprehensive BMP ensures no net loss on natural habitat and net gain on critical habitats.

4.11.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitor Contractor performance as below.
- **Survey of birds and bird nests**:

Prior to the construction of the access road, a comprehensive survey and mapping of birds and bird nests will be conducted to assess the species inhabiting the area. This survey will focus on identifying residents and breeding species, as well as documenting active nests or other nesting evidence, to determine which species may be impacted by the construction activity. The findings will inform targeted conservation efforts to mitigate potential disruptions and enhance habitat quality. Additionally, the survey will guide habitat improvement and enrichment initiatives, both within the project vicinity and in surrounding areas, to support the long-term sustainability of affected bird population Survey of Bhutan Wax Plant *(Hoya bhutanica): Hoya bhutanica*, an endemic species found within the access road construction area, will undergo a thorough survey, mapping, and collection process to facilitate its rescue, rehabilitation, propagation, and eventual reintroduction. This survey will provide valuable insights into the micro-habitat requirements of the species, as well as its specific dependence on host plants. By understanding these critical factors, we can implement effective conservation strategies to ensure the survival of *Hoya bhutanica* and mitigate the impact of the construction activity on its natural habitat. This work will contribute to a no net loss of biodiversity and enhance biodiversity net gain because of the project's activities, ensuring a positive ecological outcome in the long term.



4.11.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

- Wildlife and Habitat Tracking: Assist PIU in regular monitoring of wildlife populations and habitats, focusing on endangered species and habitat changes due to project activities such as construction and altered water flow.
- Water Quality and Aquatic Life Assessment: Continuous monitoring of water quality parameters and aquatic ecosystems to detect impacts on fish populations and river biodiversity.
- Vegetation and Forest Health Checks: Ongoing evaluation of vegetation, forest cover, and plant species diversity to assess the effects of construction and operations on local ecosystems.
- Invasive Species Surveillance: Monitoring for the presence and spread of invasive species that may harm native biodiversity and disrupt ecosystems.
- Compliance and Restoration Monitoring: Ensuring adherence to environmental regulations and assessing the effectiveness of ecosystem restoration measures, with periodic audits to confirm project compliance and successful mitigation efforts.

4.12 Traffic Management Plan[8]

4.12.1 Purpose

The purpose of the Traffic Management Plan (TMP) is to minimize the risk of traffic accidents and resulting injuries and fatalities to both workers and the public, as well as wildlife, to maintain safe and continuous pedestrian access to community facilities, and to ensure that the Project complies with the traffic safety requirements of the World Bank's Environmental, Health, and Safety General Guidelines (World Bank, April 30, 2007, Section 3.4) as well as the World Bank's Good Practice Note on Road Safety (World Bank, October 2019).

4.12.2 Key Risks and Impacts

The DHPP ESIA identifies the following key construction phase risks and impacts related to traffic:

- Vehicular traffic accidents and wildlife strikes.
- Speeding of vehicles.
- Interruption of local resident access to community facilities and other community services.

4.12.3 Contractor Minimum Requirements

This plan will apply to all project-contracted vehicular traffic and all vehicle-accessible areas in construction sites, laydown and storage areas, labor camps, the project access road, and service roads. Road traffic is the prime cause of accidents during the construction phase on major infrastructure projects. It is therefore essential to regulate traffic both on site and outside.
The contractor must, at a minimum, comply with the applicable requirements outlined below:
Traffic and Transport Management:

[8] This plan shall be referred in tandem with Occupational Health and Safety Management Plan (OHSMP) attached separately as *Annexure IV B* of the Tender Document.

- Establish a Grievance Redress Mechanism (GRM), interfaced with PIU's GRM, to address complaints from local communities or stakeholders regarding traffic issues, ensuring quick and effective resolution of concerns.

Driver Qualifications and Training:

- Ensure all drivers (of both light and heavy vehicles) have valid driving licenses and undergo regular eyesight tests to ensure they are capable of driving safely.
- Provide ongoing training sessions focused on responsible driving practices, including:
- Adhering to speed limits.
- Avoiding driving under the influence of alcohol, drugs, or certain medications.
- Performing routine vehicle maintenance, such as monitoring tire wear and ensuring the load is secured properly.

Road Signage and Safety Measures:

- Enhance road signage in sensitive areas, such as near villages, schools, dusty stretches, sharp turns, and construction site entrances/exits.
- Install species-specific warning signs in critical biodiversity zones (e.g., wildlife corridors) to reduce vehicle-wildlife collisions.
- Implement temporary safety measures, including signage, in the event of road obstructions, vehicle breakdowns, or accidents to ensure road users are clearly informed.
- Provide designated parking areas for trucks and other vehicles, separate from active roadways, to reduce congestion and improve safety.

Speed Control and Routing:

- Install effective speed bumps at key locations, particularly at village boundaries and other populated areas, to enforce reduced speeds and improve safety.
- Enforce strict speed limits, especially in inhabited and ecologically sensitive areas, to reduce the risk of collisions with pedestrians, animals, and other vulnerable road users.
- Limit deviations from planned routes for project vehicles, ensuring that all vehicles follow defined itineraries to maintain predictable traffic flow.
- Restrict heavy vehicle movement on public roads during nighttime and school commute hours to minimize risks to pedestrians and local communities.

Vehicle Use and Monitoring:

- Prohibit project vehicles from transporting local residents, unauthorized equipment, or goods unrelated to construction activities to maintain safety and compliance.
- Ensure that all trailers, skips, and haulage trucks are properly covered to prevent material spillage and minimize dust emissions.
- Conduct random inspections of drivers to verify proper licensing and compliance with DUI (Driving Under the Influence) policies, ensuring road safety.

Awareness and Safety Initiatives:

- Raise awareness and provide training for drivers of both light and heavy vehicles on essential safety practices, such as:
- Avoiding driving under the influence of alcohol, drugs, or medications.
- Understanding the risks of excessive speed.

- Monitoring tire wear and ensuring load stability.
- Ensure that all drivers undergo eyesight testing and are fully capable of operating vehicles safely.

Enhanced Road Signage and Parking:

- Improve signage in sensitive areas, including near schools, villages, and road sections affected by dust, sharp bends, or construction activities.
- Install additional signage focused on biodiversity protection in critical areas like wildlife corridors and habitats of large fauna.
- Provide clear safety rules and temporary signage in case of partial road obstructions, vehicle breakdowns, or accidents.
- Offer dedicated parking areas for trucks, separate from the main roadway, to reduce traffic congestion and improve safety.

Pedestrian Plan:

- Develop a Pedestrian Plan to ensure safe walking routes for local residents between villages and for students accessing schools, promoting safe mobility in the project area.

4.12.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitor Contractor performance as below.
- Monitor traffic congestion around the construction sites and the risk of accidents
- Approach to any other relevant officials for any traffic related works

4.12.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

Traffic and Transport Management:

- Track complaints and response times through the Grievance Redress Mechanism.
- Monitor traffic flow, congestion, and adherence to safe driving policies.

Driver Qualifications and Training:

- Ensure all drivers have valid licenses and pass medical checks.
- Track training completion and adherence to safe driving practices (speed, alcohol-free, vehicle maintenance).

Road Signage and Safety Measures:

- Monitor signage placement, visibility, and effectiveness, especially in sensitive areas.
- Ensure proper use of designated parking areas and temporary safety measures.

Speed Control and Routing:

- Track speed violations and the effectiveness of speed bumps.
- Monitor compliance with approved routes and restrictions on heavy vehicle movements.

Vehicle Use and Monitoring:

- Monitor unauthorized use of vehicles and compliance with load coverage.
- Conduct random inspections to check driver licenses and adherence to DUI rules.

Awareness and Safety Initiatives:

- Track completion of driver safety training and knowledge of safe driving practices.
- Monitor regular eyesight and health checks for drivers.

Enhanced Road Signage and Parking:

- Track installation and maintenance of road signs, especially in critical areas.
- Monitor usage of parking areas and effectiveness of temporary signage.

Pedestrian Plan:

- Track pedestrian pathway usage and safety.
- Monitor incidents involving pedestrians and the effectiveness of safety measures.

4.13 Management of Construction Worker Colonies (Camps) [9]

4.13.1 Purpose

Managing construction worker colonies at project sites is essential for ensuring worker welfare, productivity, and compliance with legal and environmental standards. It involves providing safe housing, clean water, sanitation, healthcare, and secure living conditions, which boost morale and reduce absenteeism. Proper management also ensures workplace safety, prevents accidents, and controls site access. Compliance with labor laws, environmental regulations, and corporate social responsibility (CSR) standards fosters good community relations while minimizing legal risks. Efficient resource management, including food, water, waste disposal, and sustainable energy use, supports project sustainability and strengthens the company's reputation.

4.13.2 Key Risks and Impacts

The DHPP ESIA identifies the following key construction phase risks and impacts related to Management of construction worker colonies:

- Health, Safety, and Social Risks: Inadequate living conditions, poor sanitation, and lack of healthcare can cause disease outbreaks, accidents, and labor unrest due to unmet worker expectations.
- Operational and Environmental Challenges: Resource shortages, improper waste management, and environmental pollution can disrupt camp operations, delay the project, and cause ecological harm.
- Legal and Reputational Impacts: Non-compliance with labor, health, and environmental regulations may lead to fines, project shutdowns, and damage to the company's reputation, affecting stakeholder trust and community relations.

4.13.3 Contractor Minimum Requirements.

During the pre-construction phase of access roads, bridges and road re-alignment, the Contractor shall be responsible for identifying and establishing their own camp sites. For road construction activities, as only a small number of workers will be deployed at each Workfront, camps will be

[9] This plan shall be referred in tandem with Occupational Health and Safety Management Plan (OHSMP) attached separately as *Annexure IV B* of the Tender Document.

mobile and shift progressively as road access improves and work advances further into the project area. The relevant clearance/approvals and applicable fees for setting up of temporary camps sites shall be borne by the contractors. A semi-permanent and temporary camp management program must be followed by Contractors based on the specification prepared by the PIU.

The contractor must, at a minimum, comply with the applicable requirements outlined below:

Camp Management and Access Control

- A designated manager and team will oversee camp operations and regulate access.
- Security measures include full fencing around camps and work sites, 24/7 checkpoints, and security systems as required.
- Access control will involve identification badges and designated vehicle checkpoints.

Essential Infrastructure and Facilities

- Camp infrastructure will include:
    - Reliable water supply, sanitation systems, waste management, and stormwater drainage.
    - Sanitary equipment and shared facilities (bathrooms, toilets, etc.).
    - Separate and adequate facilities for female workers.
- Housing standards will meet 2024 Building and Roadworks Specifications:
    - Separate buildings for men and women.
    - Minimum 3.5 m^2 per worker, up to 4 workers per room.
    - Adequate lighting, ventilation, and cleanable flooring.
    - Beds, lights, and power outlets provided.

Sanitation and Hygiene

- Sanitary buildings will be no more than 30 m from dormitories, accessible via well-lit, dry paths.
- Facilities will provide privacy (partitions and lockable doors), proper lighting, and ventilation.
- Ratios:
    - 1 toilet for every 10 workers.
    - 1 shower/sink for every 6 workers.
- Regular cleaning of sanitation facilities and septic tanks.
- Potable water will be tested regularly (e.g., for fecal coliforms).
- Waste management systems and frequent trash collection in place.

Food and Supplies

- Canteens will follow strict food hygiene procedures.
- Fresh food storage and monitoring to be ensured by contractors.
- Local shops and small commissaries may be allowed under controlled conditions.
- Contractors are encouraged to source food locally without affecting community supply.

Health, Safety, and Environmental Awareness

- Awareness campaigns and control measures will address drug and alcohol misuse (aligned with the Worker Code of Conduct).
- Biodiversity protection awareness will be promoted through posters and strict bans on firearms, wild meat, and live animals in the camps.

4.13.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Ensure Adequate Facilities: Provide proper accommodation, clean water, sanitation, and recreational areas for workers.
- Health and Safety Management: Implement safety protocols, healthcare services, and emergency plans to protect workers.
- Legal and Compliance Oversight: Ensure adherence to labor laws, health standards, and environmental regulations.
- Resource and Logistics Management: Oversee the supply of essentials like food, water, and medical services, along with waste management.
- Stakeholder Communication: Address worker concerns and engage with local communities to maintain positive relations and prevent conflicts.
- Monitor the Contractor's oversight and enforcement as below.

4.13.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

- Health and Safety Oversight: Regular inspections of sanitation, water quality and healthcare facilities to ensure worker safety and prevent health issues.
- Compliance Monitoring: Ongoing checks to ensure the camp adheres to labor laws, safety standards, and environmental regulations, minimizing legal risks.
- Living Conditions Evaluation: Routine assessments of worker accommodations for cleanliness, safety, and comfort to maintain a positive and productive environment.
- Resource and Supply Monitoring: Continuous tracking of food, water, and medical supplies to avoid shortages and ensure consistent camp operations.
- Environmental and Security Monitoring: Regular monitoring of waste management, pollution control, and security measures to protect the environment and maintain safety within the camp.

4.14 GBV SEA/ SH (Gender-Based Violence, Sexually Exploited Abuse/ Sexual Harassment) Management Plan

4.14.1 Purpose

The objectives of this training will be to familiarize the workers on the gender sensitivities that need to be respected in the project sites so that they do not come into conflict with the law at any point of time:

- To familiarize workers with the relevant agencies to reach out in times of GVB and SEA/SH situations/cases.
- Familiarize workers with approaches on reporting to avail GRM services.

4.14.2 Risks and Impacts

Familiarization of the following few Acts would be of great help for the Contractors and employers in orienting the workers:

- Domestic Violence Prevention Act of Bhutan, 2013.
- Penal Code of Bhutan (amended 2021).
- Labour and Employment Act of Bhutan, 2007.

Few risks that the local people might be exposed to with the influx of sudden workers in the project sites are:

- Young women and girls in risk of getting lured to sex related (informal and illegal trades).
- STIs due to sudden influx of workers who will have disposable cash against the cash-ridden local people.
- Teenage pregnancies and other unwanted social ills like inter faith marriages and children from illicit affairs resulting to children without the identities of fathers.
- Change in the usual ways of life as the local people will be exposed to foreign people and foreign ways of life suddenly.
- Bubble economy as there will be sudden surge of money in the local economy during the project phase.

The positive impacts would be as follows:

- More employment opportunities for women and girls, especially those in the small-scale businesses and road side vegetable vendors.
- Increased enrolment of girl children to schools as the parents will have more incomes at the household levels.
- Better socio-economic.

4.14.3 Minimum Contractor Requirements:

Some of minimum requirements by contractors, but not limited to should be given:

- Prohibit "at the gate" hiring. The Mongar employment office is to serve only local residents (e.g., Mongar and Lhuentse Rural Municipalities) who can prove their local residency to discourage the influx of job-seekers.
- People seeking employment will be restricted from entering the project construction area by security personnel at the security checkpoints.
- The Contractor will announce vacancy via various means of communication methods to clarify where hiring will be done, the minimum requirements, and to discourage influx to the project area for employment.
- The Contractor will be responsible for the return of the workers it hires to the place where they were recruited or to their place of domicile, as soon as their employment in the Project ends.
- The Contractor will provide training to all workers and staffs on SEA/SH
- Provide awareness programs for local officials at the affected rural municipality and ward levels regarding monitoring and managing GBV SEA/SH.
- Require non-local workers (i.e., those from locations other than Mongar and Lhuentse Dzongkhag) to live in the designated workers' camps and discourage non-local workers from moving their families to the project area, as a conditions of employment.
- Employment contracts for all workers shall include clauses on GBV/SEA/SH prevention to strengthen workplace safety.
- Training shall be provided to workers on SEA/SH awareness and responsibilities and adopt a Code of Conduct (CoC) that prohibits workers/staff from engaging in any form of sexual activity with members of the local community, except in the case of marriage.
- CoC standards shall be posted in public spaces, including workers' residences and village centers, to raise awareness.

- Communities, especially women and children, shall be educated on SEA/SH risks and reporting procedures.
- Contractors' capacity shall be strengthened to monitor public health and safety risks.
- Mechanisms shall be put in place to protect vulnerable groups from harassment and exploitation, focusing on enforcing the code of conduct.
- Capacity-building for law enforcement and clear reporting lines for the GRM shall be communicated to workers.

4.14.4 Monitoring requirement.

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

- **Policy and Incident Tracking:** Monitor GBV/SEA/SH incidents, enforce disciplinary actions, and ensure police reporting.
- **Contract and Compliance Monitoring:** Ensure GBV/SEA/SH clauses are included in contracts and track worker compliance.
- **Training and Awareness:** Track training participation, assess effectiveness via evaluations, and monitor community awareness efforts.
- **Code of Conduct (CoC):** Ensure CoC standards are posted in public spaces.
- **Contractor Supervision and Safety:** Assess contractor's capacity to manage health, safety, and enforce GBV/SEA/SH prevention measures.
- **Vulnerable Population Protection:** Monitor protection mechanisms for vulnerable groups, including vulnerable women and minors, and ensure incident response.
- **Local Labor Employment:** Track local versus outsider labor hires and their impact on community safety.
- **Training Impact and Reporting:** Monitor the effectiveness of training programs, including financial independence and compliance with GRM procedures.
- **Cultural and Socio-Economic Studies:** Track compliance with cultural respect, and conduct socio-economic and gender impact assessments, including data collection, surveys, and the establishment of community watchdogs.

4.14.5 Client's Responsibilities

PIU will be responsible for the following actions:

- Coordinate with Mongar and Lhuentse District officials regarding the monitoring of project-related GBV SEA/SH issues:
- Hold a meeting regularly with district representatives to review GBV SEA/SH and growth of any illegal and unsafe settlements.
- Provide advice to district officials in managing any GBV SEA/SH and ensuring orderly development.
- Provide training to maximize opportunities for local businesses to obtain contracts for the provision of goods and services to the Project.
- Monitor Contractor performance (see Section below).

4.15 Hazardous Materials Management Plan[10]

[10] This plan shall be referred in tandem with Occupational Health and Safety Management Plan (OHSMP) attached separately as *Annexure IV B* of the Tender Document.

4.15.1 Purpose

The purpose of the Hazardous Materials Management Plan (HMMP) is to minimize risk to the environment and public safety relating to the transport, storage, handling, use, leaks, and spills of hazardous materials (e.g., diesel fuel, other petrochemicals, paints, solvents, oils, grease, herbicides, pesticides), and to ensure that the Project complies with the hazardous materials management requirements of the World Bank's Environmental and Social Framework (ESS 3: Resource Efficiency and Pollution Prevention and Management) and Environmental, Health, and Safety General Guidelines (World Bank, April 30, 2007, Section 1.5).

4.15.2 Key Risks and Impacts

The DHPP ESIA identifies the following key construction phase risks and impacts related to hazardous materials:

- Health effects from hazardous material exposure threatening risk to community and workers health.
- Accidental spillage or leakage into the river or local streams used for potable and irrigation.
- Contamination to ground water seeps/springs.
- Soil and water contamination.

4.15.3 Contractor Minimum Requirements

The contractor must, at a minimum, comply with the applicable requirements outlined below:

Hazardous Material Management

- Implement strict storage and handling protocols to prevent spills and leaks.
- Store fuels and chemicals in secure, contained facilities at least 100m from water bodies.
- Conduct regular inspections to detect leaks and ensure compliance.
- Establish and maintain spill response procedures, including immediate containment and cleanup.
- Provide adequate spill kits at work areas and ensure trained personnel handle incidents.

Transport, Storage, and Use of Hazardous Materials

- The contractor must submit a method statement detailing hazardous materials used, along with procedures for transport, storage, and handling.
- Use approved transport companies equipped with safety measures, spill response materials, and emergency contacts. Drivers must be trained in safe transport practices.
- Maintain an inventory of hazardous materials with Material Safety Data Sheets (MSDS) available on-site.
- Store hazardous substances in manufacturer-recommended containers within enclosed, secured structures with secondary containment.
- Ensure hazardous material storage areas are at least 50m from water bodies and display hazard signs.
- Equip storage sites with appropriate fire extinguishers and provide protective measures during vehicle and equipment servicing.
- Repair or remove leaking equipment promptly and check storage tanks and vehicles weekly.
- Prohibit the storage of empty fuel or oil drums on-site.

Spill Prevention and Response Plan

- Develop a Spill Prevention and Response Plan covering transport, storage, and handling measures, as well as response actions.
- In case of a spill, assess injuries and notify the contractor's ESHS office. Immediate action should be taken to contain the spill and prevent environmental damage.
- Notify PIU in case of major spills posing environmental or health hazards.
- Deploy maintenance teams with protective gear for cleanup using approved containment and disposal methods.
- Ensure spills are not flushed into local drainage systems but disposed of per government regulations.
- Evacuate affected areas if necessary, following established communication and approval protocols.
- Prevent transformer oil contamination by ensuring it does not contain PCBs and implementing containment measures.
- Submit incident reports with root cause analysis, corrective actions, and preventive measures to PIU.
- Conduct regular training and emergency response drills to ensure staff preparedness.

4.15.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitoring of the implementation of Hazardous Materials Management Plan by Contractors.
- Monitor Contractor performance (see below).
- Review Contractor's Incident Report and Root Cause Analysis.

4.15.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

- Inventory of all hazardous materials used or stored at the site for the Project.
- Number and volume of accidental spills and leaks and their resolution.

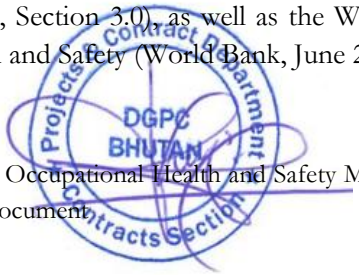
Performance Indicators

- Accuracy of Hazardous Material Inventory;
- Percentage of workers trained in spill prevention and response;
- Percentage of hazardous materials properly labeled and stored as per safety standards.

4.16 Community Health and Safety Management Plan[11]

4.16.1 Purpose

The purpose of the Community Health and Safety Management Plan (CHSMP) is to implement all reasonable precautions to protect the health and safety of nearby communities and villages, and to ensure that the Project complies with the requirements of the World Bank's Environmental and Social Framework (ESS 4: Community Health and Safety), Environmental, Health, and Safety General Guidelines (World Bank, April 30, 2007, Section 3.0), as well as the World Bank's Guidance Note for Borrowers on ESS 4: Community Health and Safety (World Bank, June 2018).



[11] This plan shall be referred in tandem with Occupational Health and Safety Management Plan (OHSMP) attached separately as *Annexure IV B* of the Tender Document.

4.16.2 Key Risks and Impacts

The following construction phase activities will have impacts on the community health determinants and parameters:

- Changes in the physical, biological, and social conditions may impact individual health status, especially vulnerable people such as the elderly, children, and people with pre-existing health conditions.
- Physical and economic displacement and social and economic shocks caused by dramatic and rapid changes taking place in local villages may affect the psychology and mental well-being of local residents.
- Potential introduction of communicable and infectious diseases due to contact with migrant workers or increase in vector population
- Long-term presence of migrant labor may create social conflicts between workers and local communities as well as increase the rate of illicit behavior and crime such as SH/SEA.
- Potential conflicts between workers and local residents.
- Increase in non-communicable diseases due to alteration in lifestyle and consumption pattern.
- Introduction of vehicular traffic in an area unfamiliar with traffic safety measures.
- Crowding of local health care facilities and potential shortage of medical supplies.
- Unsafe or inappropriate use of explosives and hazardous materials.
- Inappropriate use of force by security personnel in controlling access to construction areas and protecting the project workers, equipment, and facilities from vandalism, sabotage, and terrorism
- Sudden and rapid changes in water levels downstream from the powerhouse during peaking operations.
- Potential for project-related emergencies.

4.16.3 Contractor Minimum Requirements

The contractor must, at a minimum, comply with the applicable requirements outlined below:

Public Awareness & Safety Measures

- Launch an awareness campaign before the start of construction works.

Access Control & Security

- Fence off project infrastructure, restrict public access to construction facilities, and control entry points for public safety.
- Enhance security around workers' camps with fencing, guards, and lighting.
- Limit worker movement to camps at night, except for night shifts.

Health & Well-being

- Conduct health screenings for migrant workers to detect contagious diseases before camp entry.
- Establish medical centers at workers' camps to reduce reliance on local healthcare.
- Ensure condom availability to prevent STDs.
- Assign a gender/GBV specialist to address related issues.

Community & Workplace Safety

- Organize safety education sessions on project risks, including hazardous materials, traffic, and security.
- Install protective fencing and warning signs at hazardous project sites.
- Follow policies on gender-based violence (GBV), sexual exploitation and abuse (SEA), and human trafficking as per action plans.

4.16.4 Client's Responsibilities

PIU will be responsible for the following actions:

- Monitor the implementation of Community Health and Safety Management Plan.
- Community health-related actions.
- Community safety-related actions.
- Develop a specially constituted SEA/SH GRM Committee comprised of representatives of the client, community, Dzongkhag officials, and Contractor, that is also representative preferably of women. Develop a standard operating procedure (SOP) for the SEA/SH GRM Committee.
- A gender/GBV specialist or gender focal person will lead, support, and link/coordinate with the project GRM, extended SEA/SH GRM and contractors' GRM.
- Conduct awareness programs on SEA/SH for the local community and project workers.
- Organize annual health camps in coordination with the District Health Office.
- Project will request the concerned authority to establish police posts at appropriate location in the project area and deploy police personnel, including females, to these posts.
- Set up an extended SEA/SH GRM at the project level and Gewog level, as a part of the overall Project GRM, which will include a child-friendly procedure.
- Monitor Contractor performance (see below).

4.16.5 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following indicators:

- **Worker Health & Safety** – Number of workers screened for communicable diseases, positive cases, and medical treatments required.
- **Training & Awareness** – Health, safety, and emergency response training sessions conducted, including drills.
- **Community & Worker Grievances** – Complaints related to worker interactions and construction impacts, along with resolution status.
- **Protection & Misconduct Prevention** – Cases of trafficking, gender-based violence (GBV), and sexual exploitation, along with sensitization activities and signed Codes of Conduct (CoC).
- **Emergency Preparedness** – Availability of emergency equipment and implementation measures on-site.

4.17 Cultural Heritage Management Plan

4.17.1 Purpose

The purpose of the Cultural Heritage Management Plan (CHMP) is to preserve and protect both tangible and intangible cultural heritage from adverse impacts associated with the construction and operation of

the Project in accordance with the World Bank's Environmental and Social Framework's requirements (ESS 8). Cultural heritage and archaeological resources include all tangible heritage as well as other tangible and intangible resources, as defined under WB ESS 8. These include:

- Monuments.
- Structures having archaeological, paleontological, historical, architectural, or religious significance.
- Works of art.
- Natural sites or natural features (including trees and plants) with cultural values.
- Graves and burial grounds.
- Archaeological and paleontological finds (scattered or in their original context).
- Accordingly, shrines, stupas, temples, other places of worship, trees, stones and natural features associated with indigenous community spiritual beliefs are all included.

4.17.2 Key Risks and Impacts

The DHPP ESIA identifies the following key risks and impacts related to cultural heritage resources during the construction phase:

- Potential physical impact on cultural sites within the direct project footprint, requiring relocation prior to construction work.
- Impact of construction related environment nuisances, such as vibration, noise, and dust, in cultural heritage sites close to construction sites.
- Impact on natural heritage sites, particularly rivers, waterfalls, and mountains, due to modifications in these natural features.
- Impact on the culture of local community people due to presence of migrant populations with different cultural background.
- Chance of discovery of in-situ cultural artefacts with archaeological significance as a result of construction of project components, which will involve large-scale excavation at several locations.
- Disturbance to sites in close proximity to project facilities including:
  - Tsamang, Tsakaling, Chali and Saling project site.
  - Other natural areas of spiritual/religious significance to local residents
- Potential impacts on cultural resources that are not yet known may occur during the construction phase of the Project, from 'Chance Finds', during clearing or excavation work. Adverse impacts from the loss of such resources, uncovered by chance, are avoided by suitable mitigation measures.
- Change in traditional architecture, and traditional buildings resulting from increased connectivity.
- Increased noise levels in close proximity to cultural sites and disturbances during festivals, cultural gatherings, and traditional ceremonies.

Influx of non-local workers and potential change in demographics resulting from increased connectivity may potentially have impacts on existing cultural and traditional norms of the community, distinct cultural and religious practices, language, respect for local culture and traditions, traditional knowledge and lifestyle, rituals and cultural practices.

4.17.3 List of cultural sites identified in CHMP

The Department of Culture and Dzongkhag Development (DoCDD), Ministry of Home Affairs, has released the Essential Guide to Sacred Sites (Nyes) for various Dzongkhags, documenting both tangible and intangible nationally recognized religious and cultural sites, with 11 sites in Lhuentse and 5 in Mongar districts inventoried and described in detail, including one site from Tsenkhar Gewog (Phu Ningla Nye),

which is located more than 5 km away from the project components, while the National Biodiversity Centre has also prepared a map indicating the location of historical sites throughout the country, showing that most of these sites are spread across central and eastern Bhutan. The details of cultural sites are mentioned below Table 4-4-4.

Table 4-4-4: Cultural Heritage Site details.

	Gewog	Name	GPS	Significant features
1	Tsamang	Ganglapong Jangchu choling Lhakhang	27°25'30.84618"N 91° 8' 36.6338"E Elevation:1589m	This has statues such as the Toenpa, Guru Pema Juney and Chenrezig. It is on the slope north of the HRT,
2	Tsamang	Kuling Goenpa Lhakhang	27°25'48.00"N 91° 7'30.96"E	The caretaker Jigme Dorji did not know details about the Goenpa but claims that the Lhakhang is very old.
3	Tsamang	Drangmaling Nanggar Lhakhang (old)	27°18'44.69515"N 91° 9' 14.84215"E Elevation:1825m	This Lhakhang has existed for four generations and is a part of a private house. Because of this, the community decided to construct a new Lhakhang and the Lhakhang was handed over to the house owner, Ngawang Gyeltshen. It was built to mark the boundary between Tsamang and Wangling. Relics include statues of Sangay Sacha Thuba, Milarapa, Dorlma, and Zamba lha. Many of thestatues are in a very poor state. According to the DCDD (February 2023, this will no longer be considered a cultural site as the relics will be moved to the new lhakhang).
4	Tsamang	Serbum goenpa	27°19'25.7"N 91°10'52.6"E Elevation:2016 m	Belongs to the community but has no one to look after it. It contains the Chugchi zhay. The caretakers cannot remember when it was built. It is believed to be built by Raychunpa a disciple of Melarapa. The goenpa is under the care of a Khenpo, and there are 5 monks. The main statue is Chagtongchentong, No Tsechus are performed here
5	Tsamang	Drangmaling Nanggar Lhakhang (New)	27° 18' 4.48826"N 91°13'43.59295"E Elevation:1746m	The lhakhang is newly constructed and yet to be consecrated. No relics or statues have been installed yet.
6	Tsamang	Tokari Goenpa Lhakhang	27°20'20.18803"N 91° 11'25.98659"E Elevation:1436m	The temple is quite old, but the caretaker was not able to say when it was constructed.

	Gewog	Name	GPS	Significant features
				The lhakhang contains important relics such as statues of the eight manifestations of Guru Padmasambhava, Chenrezig, Dhu Sum Sangay, Khando Mandarava, and Yeshe Tsogyal. The second Gyalwa Karmapa founded the Lhakhang and handed it over to the community, who handed it over to Gangtey Tulku. The Lhakhang has currently undergone three renovations. The community is waiting for the clearance to cut the wood needed for the building of the Lhakhang's upcoming renovation. Seven nuns reside at the nunnery at the Lhakhang and are undergoing their grade 2 studies.
7	Tsamang	Kadam Chorten	27° 20' 8.93209"N 91° 11'19.98974"E Elevation:1525m	It was constructed to subdue evil spirits in the area.
8	Tsamang	Banjar Dungnga Choekhorling Lhakhang	27°22'16.03898"N 91°10'56.58542"E Elevation:1768 m	The main relic found in the Lhakhang is Guru Rinpoche and Sangay Tempa which was received from Punakha. Other relics are the statue of Zhabdrung Ngawang Namgyel, Chenrezig and Dorji Sempa. The Llhakhang was renovated to current size in 2003
9	Tsamang	Lamai Zhabjey	27°21'17.5334"N 91°11'23.03372"E Elevation:1500 m	This Ney features the footprint of Gyalwa Karmapa, the second Karmapa. The chorten is currently managed by an elderly woman named Karma mo, who always offers a butter lamp each day. It was constructed by the late Tekpala.
10	Tsamang	Guru Rinpochoe Ney Go	27° 20'4.28762"N 91°11'21.96823"E Elevation:1514 m	This location is said to have been marked as the entrance to a secret treasure by Guru Rinpoche. On auspicious days, locals visit the site and offer butter lamps. The sacred location is home to a stone relic that is believed to be Guru Rinpoche's shoe and Conch.
11	Saleng	Lingmethang Lhakhang	27°15'40.99"N 91°10'14.74"E Elevation:800m	The land belongs to Department of Roads but the lhakhang is currently being taken care of by Kadam Gomdhey. Also called the Depong Zenglen Lhakhang. The lhakhang contains the KheyLo Choe Sum. The lhakhang was constructed 30 years ago, to protect the community from evil spirits. A three-day Tshog Bum is recited

	Gewog	Name	GPS	Significant features
				in the ninth month of the Bhutanese calendar. Every year, the caretakers are changed.
12	Saleng	Thridangbi Lhakhang	27°17'4.86"N 91° 9'33.46"E Elevation:1450m	The caretaker was absent, and the Lhakhang locked, no information could be gathered.
13	Saleng	Jangdung Chiwog Lhakhang	27°15'52.37"N 91° 9'2.12"E Elevation:750m	The caretaker was absent, and the Lhakhang locked, no information could be gathered.
14	Saleng	Masang daza Lhakhang	27°14'53.14"N 91° 9'16.11"E Elevation:830	The caretaker was absent, and the Lhakhang locked, no information could be gathered.
15	Chaling	Namling Chorten	27° 18' 44.2656"N 91° 13' 9.70075"E Elevation:969.542m	The chorten is about 300 years old. This is a sacred stupa of enlightenment that Kyabji Namkhai Nyingpo Rinpoche constructed, funded by Aum Dedron from Chaling. In 2021, it was renovated by the community. The statue of Namkhai Nyigpo Rinpoche's third incarnation is located inside the glass enclosure adjacent to the chorten, financed by Tulku Wangdla. The surrounding also has a sacred fig tree (Ficus religiosa) planted by Namkhai Nyingpo Rinpoche.
16	Chaling	Kurizam Pema Yoedling Lhakhang	27°16'24.53"N 91°11'38.06"E Elevation:526m	There was no one available to give information.
17	Chaling	Kurizam Nagdra Dorjeechoe Lhakhang	27°16'24.53"N 91°11'38.06"E Elevation:526m	Gyeltshen tulku is in charge of the lhakhang. Over 50 monks reside at the lhakhang. Three Buddha sculptures were among the major artefacts found. Every year, grand prayers are held, during which 500 or so visitors are welcomed and given blessings.
18	Chaling	Hot stone bath	27°16'3.49"N 91°11'34.77"E	This place is located in the dewatered section of the Kurichhu below the Kurizam. It is used by both local people and outsiders to have stone bath during winter
19	Chaling	Karmapa Drubchu	27°19'27.56766"N 91°13'33.88289"E Elevation:871 m	According to legend, the third Karmapa Jample Ngawang Drukda's stomach was washed in the sacred spring and the stone stained with the Karmapa's blood can still be seen in the Ney.

	Gewog	Name	GPS	Significant features
20	Tsakaling	Takhambi Thekcholing Lhakhang	27°23'40.33025"N 91° 13' 0.76483"E Elevation: 1537m	The construction began in 2002 and has not yet been completed. Relics include the 13-foot-tall Guru Rinpoche, Pema Lingpa, and Drolma. Khenpo Thekcho Dorji looks over the lhakhang, The Lhakhang is home to 40 monks.
21	Tsakaling	Tashi Choeling Lhakhang	27°23'54.35624"N 91°12'31.57067"E elevation:1537m	The Lhakhang was built in the eighth century. It houses the Chenrezig. On the 13th, 14th, 15th, and 16th of Dawdangpa in the Bhutanese calendar, Nungneys are held at the Lhakhang every year.
22	Tsenkhar	Autsho Chorten	27° 26' 3.26656"N 91° 10' 23.30234"E Elevation:820 m	There was no one present to provide information. Information will be updated after the February 2024 field visit.
23	Tsenkhar	Autsho Dhoetrey (cremation ground)	27°26'47.38"N 91°10'19.33"E Elevation:830 m	Used by locals for cremation. This is located upstream of the submergence area.

4.17.4 Contractor Minimum Requirements

The contractor must, at a minimum, comply with the applicable requirements outlined below:

1 Construction Planning & Mitigation

- Minimize disruption to access routes, provide clear signage, and disseminate information on alternative paths.
- Implement dust suppression and noise reduction measures to protect cultural sites.
- Engage with local communities, cultural authorities, and visitors about ongoing construction and mitigation efforts.
- Conduct regular site monitoring and promptly address any identified issues.
- Incorporate cultural heritage awareness in site inductions for all workers.

2 Chance Finds Procedure

If any physical cultural resources (PCR) are discovered during construction:

- Immediate Response: Halt construction near the site, secure the area, and notify the Department of Culture and Dzongkha Development (DoCDD) and Department of Geology and Mines (DoGM).
- Documentation: Record the find with photographs and GPS coordinates.
- Assessment: Conduct an initial review; if significant, seek expert evaluation and determine preservation or mitigation measures.
- Reporting: Submit a detailed Chance Find Report and include findings in environmental monitoring reports.
- Worker Training: Train workers to recognize and properly handle cultural artifacts, with support from DoCDD and DoGM.

3 Cultural Heritage Conservation Actions

- Relocate cultural heritage sites only after consulting local communities, ensuring rituals are performed, and moving them in a culturally appropriate manner.
- Maintain access to cultural sites and, if necessary, construct temporary alternative routes.
- Restore landscapes post-construction to minimize visual and spiritual impacts.
- Provide training on cultural sensitivities and enforce a Workers' Code of Conduct.
- Coordinate with PIU to protect heritage structures from vibration and dust.
- Avoid disrupting local festivals, rituals, and gatherings by consulting with affected communities.
- Regularly update a central list of cultural sites and restrict heavy transport near them to prevent damage.
- Implement a Chance Finds Procedure in line with Bhutanese law, World Bank standards, and international heritage protection guidelines.
- Follow the project Grievance Redress Mechanism (GRM) to promptly address concerns related to cultural heritage.
- Develop and enforce a Blasting and Explosives Management Plan to prevent damage to historically and culturally significant sites.
- Engage stakeholders through transparent and inclusive community participation to address concerns and find practical solutions.

4.17.5 Project Client's responsibilities:

- Keep records and follow expert verification procedures.
- Undertake consultations with the local communities.
- Notify the relevant authorities, including, but not limited to: the Department of Culture and Dzongkha Development (DoCDD) and Department of Geology and Mines (DoGM) and the local Police Office (in the case of human remains).
- Follow chain of custody instructions for movable finds, including coordinating with relevant Department of Culture and Dzongkha Development (DoCDD) and Department of Geology and Mines (DoGM) and other Government of Bhutan agencies.
- Undertake mitigation activities.
- Communicate all decision making and outcomes to relevant stakeholders.

4.17.6 Client's Responsibilities

In case of an accidental find while the contractor safeguards the site and informs the owner, the PIU will do the following to manage impacts on tangible and intangible aspects of cultural heritage:

- The Project will notify the Department of Culture and Dzongkha Development (DoCDD) and Department of Geology and Mines (DoGM) in case of such a find.
- Based on the recommendation of the investigation report provided by the department, further actions will be taken.
- Carry out extensive consultations with the local communities prior to relocating cultural heritage resources impacted by the Project.
- Monitor Contractor performance (see below).

4.17.7 Monitoring Requirements

Each Contractor will monitor its (and its subcontractors') performance and report monthly on the following metrics:

- Number of affected cultural sites relocated.
- Number of chance finds.
- Number of grievances filed related to cultural heritage resources.
- Number of consultations with the communities on the cultural aspects
- Number of days construction activities were stopped to avoid disturbance of key festivals in the area

4.18 Occupational Health and Safety Plan12

The Occupational Health and Safety Plan (OHSP) aims to implement all reasonable precautions to protect the health and safety of project workers while ensuring compliance with the World Bank's Environmental and Social Framework (ESS 2: Labor and Working Conditions) and the Environmental, Health, and Safety General Guidelines.

The objective of the OHSP is to establish a range of activities that ensure workers on construction sites operate in healthy environments, minimizing the risk of diseases, epidemics, and accidents. The plan will adhere to relevant laws and regulations of the Royal Government of Bhutan (RGoB), International Labour Organization (ILO) guidelines, and the World Bank's ESS 2 requirements.

The detailed Occupational Health and Safety Management Plan (OHSMP) is attached separately as an Annexure IV B of Tender Document.

[12] This plan shall be referred in tandem with Occupational Health and Safety Management Plan (OHSMP) attached separately as *Annexure IV B* of the Tender Document.

Annex 1: Sample Employee Code of Conduct

Sample Employee Code of Conduct

We are the Contractor, _____. We have signed a contract with DHPP for Construction of Access Road for Dorjilung Hydropower Project (DHPP). These Works will be carried out at sites of the DHPP. Our contract requires us to implement measures to address environmental and social risks related to the Works, including the risks of sexual exploitation, sexual abuse and sexual harassment.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the Works. It applies to all our staff, laborers and other employees at the Works Site or other places where the Works are being carried out. It also applies to the personnel of each subcontractor and any other personnel assisting us in the execution of the Works. All such persons are referred to as **"Contractor's Personnel"** and are subject to this Code of Conduct.

This Code of Conduct identifies the behavior that we require from all Contractor's Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behavior will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

REQUIRED CONDUCT

Contractor's Personnel shall:

1. carry out his/her duties competently and diligently;
2. comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
3. demonstrate respect for local customs and traditions. Workers visiting the local communities or interacting with local residents will strictly follow appropriate standards of dress and personal hygiene and behave in a manner consistent with the Code of Conduct. Fighting (physical or verbal), creating nuisance, or creating a disturbance in or near local villages is prohibited.
4. do not engage in any form of any hunting, fishing, poaching, wildlife trading, logging, collection of firewood, clearing of vegetation, and collection of/trade in plants, animals, and non-timber forest products (NTFPs).
5. do not possess any illegal substances, abuse alcohol, carry firearms, or consort with women.
6. do not defecate in open areas or water bodies and use provided toilets and waste disposal facilities
7. maintain a safe working environment including by:
   a) ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
   b) wearing required personal protective equipment;
   c) using appropriate measures relating to chemical, physical and biological substances and agents; and
   d) following applicable emergency operating procedures.
8. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
9. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;

10. not engage in Sexual Harassment, which means unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature with other Contractor's or Employer's Personnel;
11. not engage in Sexual Exploitation, which means any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another;
12. not engage in Sexual Abuse, which means the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;
13. not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage;
14. complete relevant training courses that will be provided related to the environmental and social aspects of the Contract, including on health and safety matters, Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH);
15. report violations of this Code of Conduct; and
16. not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Employer, or who makes use of the grievance mechanism for Contractor's Personnel or the project's Grievance Redress Mechanism.

RAISING CONCERNS

If any person observes behavior that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

Contact Contractor's Environment & Social Expert/Officer with relevant experience in handling gender-based violence, or if such person is not required under the Contract, another individual designated by the Contractor to handle these matters in writing at the site address in [*fill in contact incl. phone number*] or in person.

The person's identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

There will be no retaliation against any person who raises a concern in good faith about any behavior prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

CONSEQUENCES OF VIOLATING THE CODE OF CONDUCT

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

FOR CONTRACTOR'S PERSONNEL:

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact [enter name of Contractor's contact person(s) with relevant experience] requesting an explanation.

Name of Contractor's Personnel: [insert name]
Signature: ----------
Date: (day month year): _____

Attachment

Behaviors constituting sexual exploitation and abuse (sea) and behaviors constituting sexual harassment (SH)

The following non-exhaustive list is intended to illustrate types of prohibited behaviors.

1) Examples of sexual exploitation and abuse include, but are not limited to:

- *A Contractor's Personnel tells a member of the community that he/she can get them jobs related to the work site (e.g. cooking and cleaning) in exchange for sex.*
- *A Contractor's Personnel that is connecting electricity input to households says that he can connect women headed households to the grid in exchange for sex.*
- *A Contractor's Personnel rapes, or otherwise sexually assaults a member of the community.*
- *A Contractor's Personnel denies a person access to the Site unless he/she performs a sexual favor.*
- *A Contractor's Personnel tells a person applying for employment under the Contract that he/she will only hire him/her if he/she has sex with him/her.*

2) Examples of sexual harassment in a work context

- *Contractor's Personnel comment on the appearance of another Contractor's Personnel (either positive or negative) and sexual desirability.*
- *When a Contractor's Personnel complains about comments made by another Contractor's Personnel on his/her appearance, the other Contractor's Personnel comment that he/she is "asking for it" because of how he/she dresses.*
- *Unwelcome touching of a Contractor's or Employer's Personnel by another Contractor's Personnel.*
- *A Contractor's Personnel tells another Contractor's Personnel that he/she will get him/her a salary raise, or promotion if he/she sends him/her naked photographs of himself/herself.*

Annex 2 Tentative Training Program for Construction Workers

Name of training	Training Topics
Site Induction Training	Introduce the site for new participants; Scope of work; Program overview and hazards addressed - specific Project and Plant; Construction organization; Protective clothing, minimum size requirements and mandatory requirements; Emergency alarms, evacuation procedures and assembly sites; Smoking on site; Accident report; First aid facility; Prevention and prevention of fire and explosion; Cleaning of equipment (including management and maintenance of overhead cranes and cables); Noise/vibration at work; Self-audit and self-assessment of OH&S at work and place of activities; PPE requirement; Electrical and related equipment; Work at night; Cooperation with employers; Drug and Alcohol Policy; Confined space; Prohibited items.
General Environmental Awareness for Construction Workers	Introduction to environmental impacts related to construction activities and the need to protect the environment. Areas/issues of particular environmental sensitivity in or in the vicinity of the construction area. Description of obligations/responsibilities of individual workers in terms of general environmental protection. Roles and responsibilities of Contractor and construction supervisors, as well as lines of reporting in relation to environmental issues. Prohibitions on hunting, explosive and chemical fishing, logging, collection of non-timber forestry products, purchasing or trading in wildlife or wildlife meat, and gathering and harvesting medicinal or valued plants or trees.

Name of training	Training Topics
	Prohibition of possessing guns, snares, traps, and other hunting equipment. Waste management practices in camps and on construction sites. Pollution control measures on construction sites. Vegetation clearing procedures. Cultural property issues, including chance-finding procedures). Penalties for violation of rules and regulations.
General Health and Safety Awareness for Construction Workers	Introduction to health and safety issues in construction camps and on construction sites, including main areas of risk to workers and others. Education on basic hygiene practices to minimize the spread of typical tropical diseases. HIV/AIDS and STD awareness, including information on methods of transmission and protection measures. GBV/SEA/SH awareness Covid-19 awareness. Prohibition of drugs. Prohibition of alcohol on construction sites. Procedures for seeking medical assistance in emergency or non-emergency situations and procedures for seeking other health-related assistance (e.g. STD testing or counselling). OH&S awareness, including basic procedures for: Traffic and road safety. Electricity hazards. Explosives hazards. Fire and fire protection. Pesticide and chemical use. Hazardous materials management. Use of Personal Protection Equipment (PPE) and processes for obtaining relevant PPE. Penalties for violation of rules and regulations.
Working in an enclosed Space	Working in enclosed space training in accordance with local and international accreditation.
First aid	First Aid training in accordance with local and international accreditation.
Emergency response	Knowledge of hazardous materials located on-site. Potential for spills and releases. Environmental and human effects of spills/releases.

Name of training	Training Topics
	Emergency response procedures, including priorities of responses. Location and use of spill response equipment. Communication and reporting measures.
Electrical safety	Working with electrical equipment training in accordance with local and international accreditation.
Working on the water	Working on or near the water training in accordance with local and international accreditation.
Hand tools	Safe use of hand tools training in accordance with local and international accreditation.
Food safety	Food hygiene training in accordance with local and international accreditation.
Fire and explosion prevention	Causes of fire. Fire prevention measures. Firefighting equipment use and maintenance. Firefighting procedures and emergency response procedures Emergency assistance contacts Requirements for waste burning on-site Methods to train other workers in fire protection methods
Working with hazardous chemicals/substances	Correct handling and storage procedures, including procedures in storage areas in terms of registering materials Correct use procedures, including refuelling procedures, calculating amounts to be used and ensuring effective equipment operation Disposal of used storage containers Hazardous waste storage procedures Non-hazardous waste management Medical issues associated with exposure to substances Emergency response procedures