

Bhutan for Life

Environmental and Social Management Plan for Sakteng Wildlife Sanctuary, 2022

1. Introduction

a) Project Background

The Bhutan for Life (BFL) project aims to ensure a robust network of protected areas and biological corridors that secures human well-being, biodiversity conservation and increase climate resilience in Bhutan. The project provides a 14-year financial bridge that allows for immediate improvement in the management of Bhutan's protected areas for climate resilience, and the prompt delivery of mitigation, adaptation and biodiversity gains, while the country gradually ratchets up its own financing resources.

BFL seeks to achieve the following objectives:

- Help Bhutan remain carbon neutral by increasing forest and vegetative cover within the Protected Area System;
- Enhance the socio-economic wellbeing of communities in and in the vicinity of the PAS through climate-informed natural resources management;
- Maintain stable, thriving and diverse populations of key species contributing toward national and global biodiversity goals;
- Strengthen organizational, institutional, and financial capacity for effective management of PAS.

BFL includes five components that reflect these goals, divided into 16 milestones (or outputs) and over 80 detailed activities.

b) Scope of ESMP

The preparation of this Environmental and Social Management Plan (ESMP) was required in order to manage the environmental and social impacts through and specific mitigation actions required to implement the project in accordance with the requirements of WWF's Social Safeguards Integrated Policies and Procedures (SIPP), the project's Environmental and Social Management Framework (ESMF), and applicable national legislation and regulations.

The ESMP provides an overview of the environmental and social baseline conditions on the routes of the proposed second segment of the project summarizes the potential impacts associated with the proposed activities and sets out the management measures required to mitigate any potential negative impacts.

This ESMP will be implemented by BFL focal person in Sakteng Wildlife Sanctuary (SWS) and the contractor to be commissioned by SWS for the project.

c) Purpose of ESMP

This Site-Specific ESMP is a project-specific source document detailing the environmental and social protection requirements to mitigate and minimize the adverse impacts. The ESMP's primary purpose is to ensure that the environmental requirements and social commitments associated with the project are carried forward into implementation and operational phases of the project and are effectively managed. The specific objectives of this ESMP are as hereunder:

- Minimizing any adverse environmental, social and health impacts resulting from the project activities;
- Conducting all project activities in accordance with the relevant RGoB Laws and WWF's safeguard operational policies and guidelines;
- Preventing environmental degradation as a result of either individual subprojects or their cumulative effects;
- Enhancing the positive environmental and social outcomes of project activities;
- Ensuring that the proposed mitigation measures are feasible and cost-efficient;
- Providing an Action Plan to ensure that the project impact mitigation measures are properly implemented and monitored;

Ensuring that all stakeholders are engaged in the project activities' preparation and implementation, and their concerns are fully addressed.

2. Environmental and Socio-Economic Conditions:

a) Geological and topographical conditions

The Sakteng Wildlife Sanctuary (SWS) is located in between the latitudes of 27°10'49.45"- 27°29'10.51" North and longitudes of 91°46'37.98"- 92°07'28.94" East. It has an area of 742.46 sq. km. It was established in 2003 representing the easternmost temperate and alpine ecosystems of Bhutan. It borders with the Indian State of Arunachal Pradesh in north and east, Phongmey Gewog under Trashigang Dzongkhag in the west and Lauri Gewog, Samdrup Jongkhar in south. The Sanctuary is connected to Jomotshangkha Wildlife Sanctuary (JWS) by a biological corridor in the south forming a part of Bhutan Biological Conservation Complex (B2C2).

SWS cover about 100% of Sakteng Gewog and 64.68% of Merak Gewog. However, for faster public service delivery and to save administrative cost, SWS management provides forestry services to the remaining villages/settlements/seasonal grazing ground of Merak Gewog falling outside the Sanctuary area like Sheytami, Drana, Chipling (seasonal grazing area), Kashateng village and network of seasonal grazing land spread over entire Gewog. In ground, the SWS manage the entire Gewogs of Merak and Sakteng covering a total of 902 sq. km.

Geologically, the Sanctuary is Tethyan meta-sediments and surface drift comprise of Periglacial, Aeolian and Colluvium on slopes with substantial alluvium in high valley (WII, 2005). The upper part of SWS is wide with gentle slopes and scree, harbouring numerous alpine lakes. The lower parts are scoured steeply by streams and rivers forming narrow valleys.

Merak and Gyengu villages under Merak Gewog and Pussa, Tengma, Manirong, Sakteng, Borangmang and Borangtse under Sakteng Gewog are located in the mid valley. Thrakthri, Dak, Murbee and Kheliphu are situated in the lower hill slope. Joenkhar, Tholong, Shingkar and Khashiteng are located on lower valley.

b) Climatic conditions

SWS can be categorized into three climatic zones; subtropical, temperate, and alpine meadows. Altitude ranges from 1600-4500 m with sub-tropical climate in the low-lying valleys to alpine meadows in the higher mountains. The majority of the SWS fall under temperate zone. The temperate climatic condition is characterized by cold winters and warm summers with occasional heavy rainfall. Area receives highest rainfall during the month of June, July and August with sporadic rainfall throughout late April to early October, especially during late afternoon. Snowfall occurs from mid-October till early April.

c) Hydrological conditions

SWS can be divided into five sub-watersheds of Eastern Bhutan. Amongst which Gam-ree watershed is largest followed by Yachu, Shaar-chhu, Jomo-ree and Meraama-ree. Three major rivers of SWS: Gam-ri, Mera-ama-ree and Jomo-ree are fed by numerous small and medium size lakes, streams and seasonal rain/snow. There are no permanent snow-capped mountains in SWS.

Gam-ree originates from the extreme north eastern part of the bordering India at Jang-Puensum (three brothers) and Dremaling lake joined by numerous small streams. Bamukpa-ree is the major tributary of Gam-ree originating from Tsho-na, Tshetzung area. Mera-ama-ree originates from Kayakpa, northern flank of Mount Yanglay-Yangchung. Gam-ree meets Drangme-Chhu below Trashigang Dzong (Chhazam) and Mera-ama-ree joins Bara-Nadhi (river) in India. The Jomo-ree originates from Serkemla and Mount Jomo Kungkar joined by numbers of small and big streams. Taktakpa-ree originates from Mount Yanglay-Yangchung flowing through Taktakpa village, Gerkhu-ree and Kheliphu-ree flowing through Kheliphu village joins Jomo-ree at Jompa village in Lauri under Samdrup Jongkhar.

d) Flora

In total of 858 plant species with 141 families under 35 orders were recorded from SWS. Out of this 57% were herbs (including climbers), 17% trees, 14% shrubs and 12% orchids. About 65% of SWS area is dominated by coniferous forest, 19% broadleaved and 16% forest scrub.

SWS harbours 41 species of Rhododendrons out of which *Rhododendron bhutanense* and *R. kesangiae* are endemic to Bhutan. Rhododendron in association with other tree species

occupies the majority of the forest type – ranging from Chir pine forest to Alpine scrub. Out of 426 orchids in Bhutan, 131 species of orchids were recorded in SWS.

e) Fauna

In total 39 mammal species are recorded from SWS representing seven orders of animal kingdom. Of which 15 species are carnivores under six families, two species each of Dog and Weasel, one species each of Red Panda, Bear and Civet. Eight species of Rodents under four families including Squirrel, Porcupine, Vole and Mouse. Eight species of ungulates under four families composed of Antelope, Deer, Musk Deer and Pig, Three species of lagomorphs, three species of primates and, one species each of Mole and Shrew.

Till date 283 bird species recorded from SWS. Major group of birds recorded are Babbler (40 spp.), Warbler (27 spp.), Finch (16 spp.), Flycatchers (12 spp.), Corvid (10 spp.), Cuckoo (10 spp.), Galliformes (9 spp.), Tit (9 spp.), Bird of Prey (8 spp.) and Pigeon (8 spp.). Further, SWS also serves as potential winter roosting ground for endangered species like Black Necked Crane (*Grus nigricollis*) as evidenced in 2013 at Thrakthri and Borangmang and, near Gam-ree at Sakteng under Sakteng Range.

f) Socio-economic conditions

Merak and Sakteng have remained in isolation from the rest of the country for many decades until recently and are considered one of the poorest Gewogs with 46.9% poverty rate (Trashigang, 2011). However, with recent advancement of infrastructure development such as road and electricity connectivity, the living standard of these communities have improved manifold. It has not only created more employment opportunities for the local people but also has attracted increasing number of tourists. The motor roads have given better market accessibility to the people to sell their products in wide range.

Little more than 5000 people in 13 villages with 772 households from two Gewogs of Merak and Sakteng reside in the Sanctuary. About 85% of the people in Merak and Sakteng practice semi-nomadic lifestyle with few households engaged in subsistence agriculture farming. Livestock farming is the mainstream occupation followed by civil servants, carpenter, weaver, cook, driver, caretaker, contractor, guide, painter, monks and nuns.

Main sources of income for these communities are from the sales of livestock produce such as butter, cheese, fermented cheese “Yoshu”, meat and wool to the nearby towns. Of late, they have also started collecting non-wood forest produce such as mushrooms, wild vegetables, tubers, incense making herbs and medicinal plants to supplement their income.

3. Planned activities in Year 2022

Activity 1: Construction of Garage cum Store

Budget: Nu. 1,251,699.06

Timeline: Oct, 2022 to June 2023.

Protected area management comprised of four technical section viz. Nature Conservation, Forest Resource Management, Social Forestry and Extension, and Forest Protection and Enforcement section with two technical staff in every section. Currently, these officials are housed in three small rooms making working environment congested. For the safe storage of office equipment and stationeries one of the office spaces is used as store. Construction of separate store shall enable SWS management to allocate four independent office spaces for four sections. Top floor of two storeyed will be used as office store and ground floor of the building will be use as garage for pool vehicle which otherwise remain out door.

Total estimated amount for the construction of garage cum store is Nu. 1,251,699.06. The structure will be constructed within registered land of SWS. The work shall be outsourced in accordance to the RGoB's procurement rules and regulations and, commenced from October 2022. Approximately 10-15 workers will be deployed by the contractor, however the no. of the workers is upon the discretion of the selected contractor. Local communities will be encouraged to be employed for the work and if there is no skilled labourers in the locality, temporary workers will be engaged. The local workers will commute from their house whereas for the temporary labours, temporary accommodation with all basic amenities will be provided by the contractor. Existing water source will be used for cooking and drinking purposed and waste will be managed in the camps and strictly monitored time to time by SWS.

Potential environment and social impacts of the activity are;

1. Noise pollution
2. Waste generation from construction and workers
3. Occupational health safety
4. Disturbance to office

Activity 2: Maintenance of Office building and drinking water supply system

Budget: Nu. 694,967.00.

Timeline: March, 2022 to July, 2022

Decade old Sakteng Range office building is in immediate need of maintenance viz. replacement of decayed/rotten wooden flooring and ceiling, repair plinth and roof drain and, replacement of old water supply pipe line and water storage take. The work is proposed to implement from March 2022 with estimated amount of Nu. 694,967.00. Waste wood generated from the replacement of floor and ceiling shall be use as firewood and waste

concrete material generated during repair of plinth and roof drain shall be use for soling of Range Office parking.

The maintenance of water supply system work involves replacement of old HDP pipe with GI pipe. Therefore, there should not be any kind of conflict with other water users. However, every precautionary measure shall be placed to avoid any kind of damage or disruption to water supply line of other users in course of replacing water supply line. Approximately 5-7 local workers will be employed for the work. They will commute from their house and waste generated during the maintenance will be managed by Sakteng Park Range office.

The maintenance/repair work is petty in nature so, environment and social impact from the work will be insignificant. Nevertheless, the probable impacts are;

1. Waste generation from construction and digging of soil
2. Occupational health and safety of workers
3. Disturbance to office

Activity 3: Maintenance of SWS Head Office building, staff quarters and approach road.

Budget: Nu. 979,391.39

Timeline: April, 2022 to Oct, 2022.

SWS HQ office building and staff quarters were constructed in the year 2006, since than no repair work has been done to maintain these structures. Due to the weathering process CGI sheets roofs are forming rust and, plinth, drains and approach roads is deteriorating day by day. While painting will increase life span of CGI sheet, it will also help to reduce heat emission and reflection on sunny days. Timely repair of external concrete work (plinth, drain etc.) and roads will increase durability of super structure and provide healthy living condition for the occupants. The estimated cost for the maintenance work is **Nu. 979,391.39** and will be commence from April 2022.

Approximately 10-12 local workers will be employed for the work and they will commute from their houses. Waste generated during the maintenance of the office structure will be managed by SWS office.

Foreseen environment and social impact of the activity are;

1. Waste generation from construction workers
2. Disturbance to office and occupants
3. Noise pollution
4. Air pollution
5. Occupational health and safety of workers

4. Mitigation Measures for Environmental and Social Impacts

Potential impact	Impact scale	Proposed mitigation measures	Responsible Party	Costs (million)
Activity 1: Construction of Garage cum Store				
Noise pollution	Short term minor	No unbearable noise is expected to emit during the work. However, for the peace and privacy of the staff residing nearby working time is will be restricted to 7 AM to 6 PM.	Contractor and BFL Focal	<i>Nu10,000 for waste management after construction</i>
Waste generation from construction and workers	Short term minor	<ul style="list-style-type: none"> Awareness briefing on waste management to the contractor and worker prior to commencement of work Install proper waste bins Segregate non-biodegradable waste and dumped in designated land fill site Construct proper toilet for workers 	Contractor and BFL Focal	
Disturbance to office	Short term minor	<ul style="list-style-type: none"> Noisy machinery should be used during off-days Workers should not loiter near office premises without formal dress 	Contractor and BFL Focal	
Occupational health safety or workers including COVID related precautions	Short term minor	<ul style="list-style-type: none"> Comply with the workers' health and safety guidelines (attached) Access to health facilities for the workers pre and during construction activities need to be available and ensure first aid kit is available at construction site all the time- Basic health unit (BHU) needs to be available in walkable distance or the workers need to be checked once in a month by authorized medical doctor. Ensure that no underage workers, or children are engaged Ensure decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers Ensure decent work conditions, including an appropriate salary, working hours, accommodation and other essential amenities as per the Operational Health and Safety Guidelines are available for workers. Ensure that workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation 	Contractor and BFL Focal	<i>Will be met from the activity cost</i>

		<p>(including wages and benefits), working conditions and terms of employment, and disciplinary practices.</p> <ul style="list-style-type: none"> • Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns- the worker with grievance shall report in their grievance to Range/beat/ HQ or gewog office. All workers shall be briefed about the GRM before the starting the work. • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) 		
Activity 2: Maintenance of Office building and drinking water supply system				
Waste generation from construction and digging of soil	Short term minor	<ul style="list-style-type: none"> • Awareness briefing on waste management to the contractor and worker prior to commencement of work • Install proper waste bins • Segregate non-biodegradable waste and dumped in designated land fill site • Construct proper toilet for workers • Dig soil should be use to refill pipeline trenches and properly dressed 		<i>Will be met from the activity cost</i>
Disturbance to office	Short term minor	<ul style="list-style-type: none"> • Noisy machinery should be used during off-days 		
Occupational health and safety of workers including COVID related precautions	Short term minor	<ul style="list-style-type: none"> • Comply with the workers' health and safety guidelines (attached) • Access to health facilities for the workers pre and during construction activities need to be available and ensure first aid kit is available at construction site all the time- Basic health unit (BHU) needs to be available in walkable distance or the workers need to be checked once in a month by authorized medical doctor. • Ensure that no underage workers, or children are engaged • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and other essential amenities as per the Operational Health and Safety Guidelines are available for workers. • Ensure that workers are employed on the principle of equal opportunity and fair 		

		<p>treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, and disciplinary practices.</p> <ul style="list-style-type: none"> • Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns- the worker with grievance shall report in their grievance to Range/beat/ HQ or gewog office. All workers shall be briefed about the GRM before the starting the work. • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) 		
Activity 3: Maintenance of SWS Head Office building, staff quarters and approach road				
Waste generation from construction workers	Short term minor	<ul style="list-style-type: none"> • Awareness briefing on waste management to the contractor and worker prior to commencement of work • Install proper waste bins • Segregate non-biodegradable waste and dumped in designated land fill site • Construct proper toilet for workers 		<i>Will be met from the activity cost</i>
Noise pollution		No significant noise is expected to produce during the work. To maintain the peace and privacy of the occupant working time is restricted to 8 AM to 5 PM.		
Air pollution		<ul style="list-style-type: none"> • Apply wet sanding while removing rust from the CGI sheet • Mixing of road resurfacing material should be done away from residential area • Put protective mask during applying of road resurfacing material 		
Disturbance to office and occupants		<ul style="list-style-type: none"> • Noisy machinery should be used during off-days • Ensure workers do not loiter near office premises and staff quarter unnecessarily • Ensure safe passage for visitors and occupants during maintenance of approach road 		
Occupational health and safety of workers including COVID related precautions		<ul style="list-style-type: none"> • Comply with the workers' health and safety guidelines (attached) • Access to health facilities for the workers pre and during construction activities need to be available and ensure first aid kit is available at construction site all the time- Basic health unit (BHU) needs to be available in walkable distance or the 		

		<p>workers need to be checked once in a month by authorized medical doctor.</p> <ul style="list-style-type: none"> • Ensure that no underage workers, or children are engaged • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and other essential amenities as per the Operational Health and Safety Guidelines are available for workers. • Ensure that workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, and disciplinary practices. • Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns- the worker with grievance shall report in their grievance to Range/beat/ HQ or gewog office. All workers shall be briefed about the GRM before the starting the work. • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) 		
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5. ESMP Implementation Arrangements

The implementation of project activities will be carried out by the BFL focal person in SWS. The focal person will be responsible for compliance with all procedures outlined in this ESMP, as well as compliance with any requirements to obtain clearances, permits, approvals, or consent documents from relevant authorities and stakeholders.

This ESMP should be part of the estimate/contract that the SWS will implement/sign with the contractor(s) for implementation of the planned activities. The BFL Focal or concerned implementing entity is obligated to perform all proposed preventive or mitigation environmental and social measures in this plan and to keep the evidence of any documents related to applying these measures. An OHS information session shall be organized by the implementing agency/contractor for all workers prior to start of the project activities and prior any specific tasks with high health risks.

The SWS's Supervising Engineer needs to monitor the implementation of proposed measures by the contractor and contractor's representative with visual checking, reviewing the records of evidence that the measures have been applied and ask the contractor to apply the measures as soon as possible. Non-compliances should be recorded and the report on any non-compliance should be reported to the ESS officer immediately, and the ESS officer will report it to the PCU (M&E Officer). Non-compliance should be closed with appropriate measure/s and the evidence should be kept.

As agreed upon, disbursement of project funds to the SWS will be contingent upon their full compliance with the safeguards requirements.

6. ESMP Monitoring Arrangements

The BFL focal person in SWS will closely monitor the implementation of all planned activities and the required mitigation measures, and ensure that they fully comply with this ESMP and with the terms and conditions included in the environment clearances issued by RGoB's national authorities.

SWS is also fully responsible for the compliance of all external contractors and service providers working in the SWS with the safeguard's requirements outlined in the ESMP.

Protocol for monitoring of activities under this ESMP will be carried out as follow;

SI#	Activities	Monitoring team	Timeline		Location	Means of Verification
			Start	Complete		
1	Construction of Garage cum Store	Field Focal	October 2022	June 2023	SWS HO, Phongmey	Work completion report
		ESS focal	Nov, 2022			
2	Maintenance of Office building and drinking water	Field Focal	March 2022	July 2022	Sakteng	Work completion

	supply system	ESS focal	May, 2022			report
3	Maintenance of SWS Head Office building, staff quarters and approach road	Field Focal	April 2022	October 2022	SWS HO, Phongmey	Work completion report
		ESS focal	Sept, 2022			

Activity 1: Construction of Garage cum Store

Monitoring by implementing entities:

- As the construction work is in the office premises, BFL focal or one staff will do regular monitoring of the work.
- Progress report of the work shall be submitted monthly.

Monitoring by ESS consultants: – monitoring of the work once during the implementation and through field report from IAs after completion of the work.

Quarterly reports by PCU (M&E officer) to Secretariat

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

Activity 2: Maintenance of Office building and drinking water supply system

Monitoring by implementing entities:

- As the construction work is in the office premises, one staff of Sakteng Range will do regular monitoring of the work and BFL focal shall make monitoring visit twice a month.
- Progress report of the work shall be submitted monthly.

Monitoring by ESS consultants: monitoring through photographic/video evidence submitted by the IAs during the implementation as per the given dateline in the table above.

Quarterly reports by PCU (M&E officer) to Secretariat

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

Activity 3: Maintenance of SWS Head Office building, staff quarters and approach road

• Monitoring by implementing entities:

- As the construction work is in the office premises, BFL focal one staff do regular monitoring of the work and shall make monitoring visit twice a month.
- Progress report of the work shall be submitted monthly.

Monitoring by ESS consultants: monitoring through photographic/video evidence submitted by the IAs during the implementation as per the given dateline in the table above.

Quarterly reports by PCU (M&E officer) to Secretariat

Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

7. Capacity Need and Budget

Activities under this ESMP will be implemented by the BFL focal person, supervising engineer/staff, and a contractor that will employ workers as mentioned in the contract agreement.

- **The budget for each of the activities is: (last section)**

Sl#	Activity	Amount (Nu.)	Budget for ESS mitigation
1	Construction of Garage cum Store	1,271,699.06	10000
2	Maintenance of Office building and drinking water supply system	694,967.82	
3	Maintenance of SWS Head Office building, staff quarters and approach road	979,391.39	
Total		2,946,058.27	10000

8. Consultation and Disclosure Mechanisms

The proposed garage cum store will be constructed within registered land of SWS and small in nature. Moreover, local settlements are away from the construction site. Hence, the construction will not affect/impact any of the nearby residents.

There will be minor maintenance of SWS HO building, approach road and staff quarter and, Range office. These activities will not have any impact to local community. Proposal for maintenance of staff quarter has been proposed by the occupants.

The full English version of this ESMP, as well as an executive summary in Bhutanese, shall be disclosed on the website of MoAF and WWF, Bhutan Program. Hard copies of the ESMP should also be available at the PA Management Office and at the PCU Office

9. Stakeholder Engagement Plan

The occupant of the staff quarter will be consulted prior to commencement of maintenance work so that they can prepare accordingly. They will also be engaged throughout the maintenance work. Their opinion will be noted and any concerns raised will be addressed. They will be informed about all the necessary precautionary measures need to be under taken during the maintenance work.

Annexure I-

BFL: OCCUPATIONAL HEALTH AND SAFETY STANDARDS

Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. Implementing entities should hire contractors that have the technical capability to manage the occupational health and safety issues of their workers, extending the application of the hazard management activities through formal procurement agreements.

This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. It is based on the IFC's Environmental, Health, and Safety Guidelines (April 30, 2007)¹¹ and the Occupational Health and Safety Guidelines of Bhutan's Construction Development Corporation Ltd., which relies on the national Regulation on Occupational Health, Safety and Welfare 2012, Regulation on Working Conditions 2012 and Labour Act 2007, and in compliance to Sl. No. 21 of Regulation on Occupational Health, Safety and Welfare 2012.

1. General Facility Design and Operation

Integrity of Workplace Structures

Permanent and recurrent places of work should be designed and equipped to protect occupational health and safety:

- Surfaces, structures and installations should be easy to clean and maintain, and not allow for accumulation of hazardous compounds.
- Buildings should be structurally safe, provide appropriate protection against the climatic conditions, and have acceptable light and noise conditions.
- Fire resistant, noise-absorbing materials should, to the extent feasible, be used for cladding on ceilings and walls.
- Floors should be level, even, and non-skid.
- Heavy oscillating, rotating or alternating equipment should be located in dedicated buildings or structurally isolated sections.

Severe Weather and Facility Shutdown

- Workplace structures should be designed and constructed to withstand the expected elements for the region and have an area designated for safe refuge (e.g., in case of earthquake).

Workspace and Exit

- The space provided for each worker, and in total, should be adequate for safe execution of all activities, including transport and interim storage of materials and products.

Fire Precautions

The workplace should be designed to prevent the start of fires. Other essential measures include:

- The workplace shall be provided with adequate means of protection and escape in case of fire.
- The workplace shall be provided with adequate number of relevant fire extinguishers.

¹¹<https://www.ifc.org/wps/wcm/connect/1d19c1ab-3ef8-42d4-bd6-bcb79648af3fe/2%2BOccupational%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES&CVID=1s62x8l>

- Workers shall wear shoes without iron or steel nails or any other exposed ferrous materials which is likely to cause sparks by friction.
- Smoking, lightening, or carrying of matches, lighters or smoking materials shall be prohibited within and around the construction sites.
- All other precautions, as are reasonably practicable, shall be taken to prevent initiation of ignition from all other possible sources such as open flames, frictional sparks, overheated surfaces of machinery or plant, chemical or physical, chemical reaction and radiant heat.
- At every workplace adequate provision of water supply for firefighting shall be provided and maintained.
- Facilities shall be equipped with firefighting equipment (e.g., fire extinguishing bottle). The equipment should be maintained in good working order and be readily accessible. It should be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present.
- Manual firefighting equipment shall be easily accessible and simple to use.
- Fire extinguishers and emergency alarm systems that are both audible and visible should be in place.
- Fire exits should be identified and marked in Dzongkha and English- all workers should be made aware of the fire exits.

Lavatories and Showers

- Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work in the facility (one for at least one for every 20 workers). Toilet facilities should also be provided with adequate supplies of water and soap and also be connected to sewerage system.

Potable Water Supply

- Adequate supplies of clean drinking water should be provided to workers at the work site.

Clean Eating Area

- Where there is potential for exposure to substances poisonous by ingestion, suitable arrangements are to be made for provision of clean eating areas where workers are not exposed to the hazardous or noxious substances.

Lighting

- Workplace should receive adequate natural light and if required supplemented with artificial illumination to promote worker's safety and enable safe equipment operation.
- Emergency lighting of adequate intensity should be provided in case of failure of the powerline.

Safe Access

- Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe, and appropriate access.
- Equipment and installations requiring servicing, inspection, and/or cleaning should have unobstructed, unrestricted, and ready access.
- Covers need to be provided where ever necessary, if there is risk of falling of overhead object.
- Measures to prevent unauthorized access to dangerous areas should be in place.

First Aid

- The employer should ensure that qualified first-aid can be provided at all times. A sufficient number of first aid boxes or cupboards shall be provided and maintained so as to be readily available during all working hours, provided that the distance of the nearest first aid box or a cupboard shall be not more than 200m from any working place.
- First aid kits include all equipment outlined in Annex 1 to these Guidelines.
- Each first aid box or a cupboard shall be distinctly marked "FIRST AID"

Air Supply

- Workplace should have adequate ventilation for fresh air

2. Information Provision on Occupational Health and Safety (OHS)

1. The Contractor is responsible to hold an information session to familiarize all workers with the OHS procedures specified in these guidelines, in order to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow workers.
2. The information session should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.

3. Physical Hazards

Physical hazards represent potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity.

Rotating and Moving Equipment

Injury or death can occur from being trapped, entangled, or struck by machinery parts due to unexpected starting of equipment or unobvious movement during operations. Recommended protective measures include:

- Designing machines to eliminate trap hazards and ensuring that extremities are kept out of harm's way under normal operating conditions. Examples of proper design considerations include two-hand operated machines to prevent amputations or the availability of emergency stops dedicated to the machine and placed in strategic locations.
- Where a machine or equipment has an exposed moving part or exposed pinch point that may endanger the safety of any worker, the machine or equipment should be equipped with, and protected by, a guard or other device that prevents access to the moving part or pinch point. Guards should be designed and installed in conformance with appropriate machine safety standards.

Noise

- No worker should be exposed to a noise level greater than 90 dB(A) for a duration of more than 8 hours per day without wearing ear plugs/ear muffs.
- Exposures to impulsive or impact noise shall not exceed 140dB(A).
- For every 3 dB(A) increase in sound levels from the permissible limit of noise, the 'allowed' exposure period or duration should be reduced by 50 percent.
- Where it is not practicable to reduce the noise, the employer must limit the duration of time persons employed or working in the workplace are exposed to the noise so that such persons are not exposed to excessive noise.

- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
- Periodic medical hearing checks should be performed on workers exposed to high noise levels.

Vibration

In any workplace where persons are at work in any process or operation which involves exposure to vibration which may constitute a risk to their health, it shall be the duty of the employer to provide, so far as is reasonably practicable, effective means to reduce the vibration.

Electrical

Exposed or faulty electrical devices, such as circuit breakers, panels, cables, cords and hand tools, can pose a serious risk to workers. Overhead wires can be struck by metal devices, such as poles or ladders, and by vehicles with metal booms. Vehicles or grounded metal objects brought into close proximity with overhead wires can result in arcing between the wires and the object, without actual contact. Recommended actions include:

- Marking all energized electrical devices and lines with warning signs
- Locking out (de-charging and leaving open with a controlled locking device) and tagging-out (warning sign placed on the lock) devices during service or maintenance
- Checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools
- Double insulating / grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter (GFI) protected circuits
- Protecting power cords and extension cords against damage from traffic by shielding or suspending above traffic areas
- Appropriate labeling of service rooms housing high voltage equipment ('electrical hazard') and where entry is controlled or prohibited
- Establishing "No Approach" zones around or under high voltage power lines
- Conducting detailed identification and marking of all buried electrical wiring prior to any excavation work
- Every person who is working on an electric supply line or apparatus or both shall be provided with tools and devices such as gloves, rubber shoes, and safety belts, ladders, earthing devices, helmets, line testers, hand lines whichever is relevant for protecting him/her from mechanical and electrical injury.

Eye Hazards

Solid particles from a wide variety of industrial operations, and/or a liquid chemical spray may strike a worker in the eye causing an eye injury or permanent blindness. Recommended measures include:

- Use of machine guards or splash shields and/or face and eye protection devices, such as safety glasses with side shields, goggles, and/or a full-face shield. Frequent checks of these types of equipment prior to use to ensure mechanical integrity is also good practice.
- Where machine or work fragments could present a hazard to transient workers or passers-by, extra area guarding or proximity restricting systems should be implemented, or PPE required for transients and visitors.

Welding / Hot Work

Welding creates an extremely bright and intense light that may seriously injure a worker's eyesight. In extreme cases, blindness may result. Additionally, welding may produce noxious fumes to which prolonged exposure can cause serious chronic diseases. Recommended measures include:

- Provision of proper eye protection such as welder goggles and/or a full-face eye shield for all personnel involved in, or assisting, welding operations. Additional methods may include the use of welding barrier screens around the specific work station.

Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result temperature stress-related injury or death. Use of personal protective equipment (PPE) to protect against other occupational hazards can accentuate and aggravate heat-related illnesses. Extreme temperatures in permanent work environments should be avoided through implementation of engineering controls and ventilation. Where this is not possible, such as during short-term outdoor work, temperature-related stress management procedures should be implemented which include:

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly
- Providing temporary shelters to protect against the elements during working activities or for use as rest areas
- Use of protective clothing
- Providing easy access to adequate hydration such as drinking water or electrolyte drinks.

Ergonomics, Repetitive Motion, Manual Handling

Injuries due to ergonomic factors, such as repetitive motion, overexertion, and manual handling, take prolonged and repeated exposures to develop, and typically require periods of weeks to months for recovery. These OHS problems should be minimized or eliminated to maintain a productive workplace. Controls may include:

- Use of mechanical assists to eliminate or reduce exertions required to lift materials, hold tools and work objects, and requiring multi-person lifts if weights exceed thresholds (adult man- 50kg, adult female-25kg)
- Selecting and designing tools that reduce force requirements and holding times, and improve postures
- Incorporating rest and stretch breaks into work processes, and conducting job rotation
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions

Working at Heights

Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling more than two meters; into operating machinery; into water or other liquid; into hazardous substances; or through an opening in a work surface. Fall prevention / protection measures may also be warranted on a case-specific basis when there are risks of falling from lesser heights. Fall prevention may include:

- Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area
- Proper use of ladders and scaffolds by trained workers
- Use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal life-lines
- Appropriate training in use, serviceability, and integrity of the necessary PPE

- Inclusion of rescue and/or recovery plans, and equipment to respond to workers after an arrested fall

Illumination

Work area light intensity should be adequate for the general purpose of the location and type of activity, and should be supplemented with dedicated work station illumination, as needed. Controls should include:

- Use of energy efficient light sources with minimum heat emission
- Undertaking measures to eliminate glare / reflections and flickering of lights
- Taking precautions to minimize and control optical radiation including direct sunlight.
- Exposure to high intensity UV and IR radiation and high intensity visible light should also be controlled
- Controlling laser hazards in accordance with equipment specifications, certifications, and recognized safety standards. The lowest feasible class Laser should be applied to minimize risks.

4. Personal safety equipment for workers

All workers are equipped with the following personal safety equipment: helmet, gloves, ordinary boots and reflective vest.

Workers that are exposed to dust should also be provided with eye protection glasses and face mask. Workers that are exposed to noise should be provided with ear plugs. Workers that need to work in the dark should be provided with hand and cap lamps.

Workers are instructed regarding safety equipment as follows:

- Always wear complete set of protective wear.
- Do not wear loose clothing, such as overhang shirt, jackets, mufflers etc.
- Tuck shirt and jacket well.
- Secure helmet with belt under the chin.
- Tuck the bottom sleeves of trouser inside safety boot.
- Dress with reflector

5. Standards for workers' accommodation²

1. General living facilities

- The location of the facilities is designed to avoid flooding or other natural hazards.
- The living facilities are located within a reasonable distance from the worksite.
- Transport is provided to worksite safe and free if the accommodation is reasonably far from the worksite.
- The living facilities are built using adequate materials, kept in good repair and kept clean and free from waste and refuse.

² Based on Workers' accommodation: processes and standards—A guidance note by IFC and the EBRD (August 2009): https://www.ifc.org/wps/wcm/connect/60593977-91c6-4140-84d3-737d0e203475/workers_accommodation.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-60593977-91c6-4140-84d3-737d0e203475-jqetNIh

2. Drainage

- The site is adequately drained.

3. Heating, air conditioning, ventilation and light

- Living facilities are provided with adequate heating, ventilation, and light systems including emergency lighting.

4. Water

- Workers have easy access to a supply of clean/ potable water in adequate quantities.
- The quality of the water complies with national/local requirements and is regularly monitored.
- Tanks used for the storage of drinking water are constructed and covered to prevent water stored therein from becoming polluted or contaminated.
- The quality of the drinking water

5. Wastewater and solid waste

- Wastewater, sewage, food and any other waste materials are adequately discharged in compliance with national and/or international standards and without causing any significant impacts on camp residents, the environment or surrounding communities.
- Specific containers for waste collection are provided and emptied on a regular basis.

6. Rooms/dormitories facilities

- Rooms/dormitories are kept in good condition. They are aired and cleaned at regular intervals.
- Rooms/dormitories are built with easily cleanable flooring material.
- Rooms/dormitories and sanitary facilities are located in the same buildings.
- Residents are provided with enough space.
- The number of workers sharing the same room/dormitory is minimized.
- Doors and windows are lockable and provided with mosquito screens when necessary.
- Separate sleeping areas are provided for men and women.
- A separate bed is provided for every worker and use of double deck bunks is minimized.
- Workers are provided with comfortable mattresses. Workers may be expected to use their own pillows and bed linens.
- Adequate facilities for the storage of personal belongings are provided.
- Separate storages for work clothes and PPE and depending on condition, drying/airing areas are provided.

8. Sanitary and toilet facilities

- Sanitary and toilet facilities are constructed from materials that are easily cleanable.
- Sanitary and toilet facilities are cleaned frequently and kept in working condition.
- Toilets, showers/bathrooms and other sanitary facilities are designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors.
- Separate sanitary and toilet facilities are provided for men and women.
- Toilet and shower facilities are conveniently located and easily accessible.

- Toilet facilities are environmentally friendly (e.g., pit toilet) and sewage is not disposed into the worksite.
- Open defecation in the vicinity of project sites should be prohibited.
- An adequate number of hand wash basins and showers/bathrooms facilities are provided.

9. Cooking and laundry facilities

Cooking and laundry facilities should be available for workers at the worksite or in close vicinity to it. These facilities should be kept in clean and sanitary conditions.

Annex 1. Contents of first aid box or cup-boards

The first aid boxes or cup-boards shall be distinctively marked with white cross on a green background and shall contain the following equipment:

1. Small sterilized dressings (12)
2. Medium size sterilized dressings (6)
3. Large size sterilized dressings (6)
4. Large size sterilized burn dressings (6)
5. (1/2 oz.) Sterilized cotton wool (6 packets)
6. (2oz.) Bottle containing a two per cent alcoholic solution of iodine (1)
7. (2oz.) Bottle containing Betadine (antiseptic solution) having the dose and mode of administration indicated on the label (1)
8. Roll of adhesive plaster (1)
9. A snake bite lancet (1)
10. Torch light (1)
11. Pair of scissors (1)
12. Tablets Aspirin (5gms) 2 dozen
13. Burn Ointment (2 tubes)
14. Dettol (2 phial, about 2 ozs)
15. Bandages 4 inches wide
16. Bandages 2 inches wide
17. Triangular bandages (2)
18. Packets of safety pins (1)
19. A supply of suitable splint