Bhutan for Life

Environmental and Social Management Plan for

Jigme Singye Wangchuck National Park,

2021

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 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 each park authority (PA) and biological corridor (BC), and by the contractor to be commissioned by each PA/BC 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.

(D) Applicable law, policies, and regulation

This ESMP is developed by following the guidelines as set forth in the BFL's ESMF.

Applicable RGoB laws and policies include the Constitution of the Kingdom of Bhutan, 2008; legislation on land and moveable property (Land Act of Bhutan 2007; Land Rules, 2007; The Moveable Cultural Property act of Bhutan, 2005); legislation and regulations on forests and protected areas (National Environment Protection Act, 2007; Forest and Nature Conservation Act of Bhutan, 1995; Forest and Nature Conservation Rules and Regulations of Bhutan, 2017; National Forest Policy, 2011); legislation on water and waste prevention (Water Act of Bhutan, 2011; Waste Prevention and Management Act, 2009); legislative requirements on environmental assessment (Environmental Assessment Act, 2000 and Regulations on the Environmental Clearance of Projects, 2001); and other relevant laws (Livestock Act of Bhutan, 2001; The Biodiversity Act of Bhutan, 2003; The Pesticides Act of Bhutan, 2000; The Penal Code of Bhutan, 2004; National Access and Benefit Sharing (ABS) Policy (Draft), 2014).

WWF's safeguards policies that are relevant to this project are as follows: Policy on Environment and Social Risk Management; Policy on Protection of Natural Habitats; Policy on Involuntary Resettlement; Policy on Indigenous Peoples; Standard on Pest Management; Policy on Accountability and Grievance System; Standard on Physical Cultural Resources; as well as general standards on occupational and community health and safety and on energy efficiency.

In general, RGoB's laws, policies, and guidelines are in line with the WWF's environmental and social safeguards requirements. However, there are a few differences between the two systems. With regard to environmental impacts, there are no direct contradictions between the RGoB laws and regulations and the WWF's SIPP, but the requirements of the latter are more extensive. All project activities should fully comply both with the RGoB's Regulations on the Environmental Clearance of Projects, and with the procedures and mitigation measures prescribed in this ESMF. In case that the WWF's SIPP requirements are more extensive, strict, or detailed than the RGoB legislation and policies, the former will apply to all project activities.

With regard to social impacts, the primary discrepancies between the RGoB laws and regulations and the WWF's SIPP refer to the status of non-title holders and informal land use, and the commitment to participatory decision-making processes. First, according to the WWF's SIPP, all users of land and natural resources (including people that lack any formal legal ownership title or usage rights) are eligible to some form of assistance or compensation if the project adversely affects their livelihoods. The RGoB laws only recognize the eligibility of land owners or formal users to receive compensation in such cases. Second, the WWF's

SIPP require extensive community consultations as part of the development of various safeguards documents and during project activities. RGoB legislation does not include similar requirements. For the purposes of the BFL project, the provisions of the WWF's SIPP shall prevail over the RGoB legislation in all cases of discrepancy.

2. Environmental and Socio-Economic Conditions:

(A)Geological and topological condition

Centrally located and encompassing a wide altitudinal variation & vegetation, Jigme Singye Wangchuck National Park (JSWNP) is the third largest Protected Area in the Country. The park borders Royal Manas National Park in the south and it is connected to Jigme Dorji National Park (JDNP) and Wangchuck Centennial National Park (WCNP) to the north and Phrumsengla National Park (PNP) to the north east by biological corridors, thus forming a contagious belt between tropical south and alpine north. Administratively, JSWNP covers 5 districts partially.

The 1730 sq.km national park was gazetted in 1995 with objective of securing ecological connectivity and managing & conserving the natural & cultural heritages of Central Bhutan. JSWNP best represents the middle Himalayan ecosystem & contains several ecological biomes ranging from sub-tropical to alpine meadow. The biologically diverse park has recorded the presence of 39 mammals, 270 birds, 139 species of butterflies, 16 fishes, 43 species of herpetofauna and we are yet to establish the baseline for, fungal diversity and diversity of orchids and herbal plants.

Amongst the mammals, the species includes some of the Asia's most charismatic species including the Royal Bengal tiger, golden langur, musk deer, clouded leopard, golden cat, marbled cat, red panda, gaur etc. Birds of conservation significance include Rufous-necked Hornbill, Satyr tragopan and Himalayan Monal. JSWNP also harbors 50% of the population of 'Critically Endangered' White-bellied Heron.

Over 4000 people reside in the national parks 561 households spread over 5 geogs partially in five districts adapting to various climatic conditions and vegetation covers.

(b) Hydrology:

The eastern boundary of the park, from Trongsa to Tingtibi is defined by Mangde Chhu river, whereas Punatshang Chhu touches the mid-western part of the park in Taksha. Nika Chhu river drains the Chendebji valley in the northern part of the park by joining the Mangde Chhu

river. Numerous other streams and rivulets originate from the snow-fed alpine lakes in Black Mountain area, and melting snow and monsoon rain contribute to the water volume. This network of small perennial and annual tributaries flow down the steep slopes, often as waterfalls, and along valleys to become tributaries of the larger rivers. The distinct rainy and dry seasons results in wide seasonal variations in the river flows, with large volumes of sediment-laden water flowing during the monsoon and low volume during the dry, winter season. The local communities also rely on the water from these rivers for domestic and for irrigation, and contributing to the water withdrawal from the rivers.

There are several major hydropower plants being constructed along rivers of Punatshang Chhu (Kamechu-Taksha), Mangde Chhu (Langthel), and the Nika Chhu, which fall on the border of the national park.

(c) Socio-economic condition of the local communities:

There is a diversity of communities residing inside the national park, including some of Bhutan's first settlers; the Oleps community in Rukha village in Athang geog and the Monpa communities in Jangbi, Wangling, and Phumzur villages in Langthel geog, and the Reti community under Jigmechoeling geog, Sarpang Dzongkhag. The latter village has only 7 Monpa households, but are an important part of Monpa community. In total, there are more than 4000 people in to 561 households that live inside the national park.

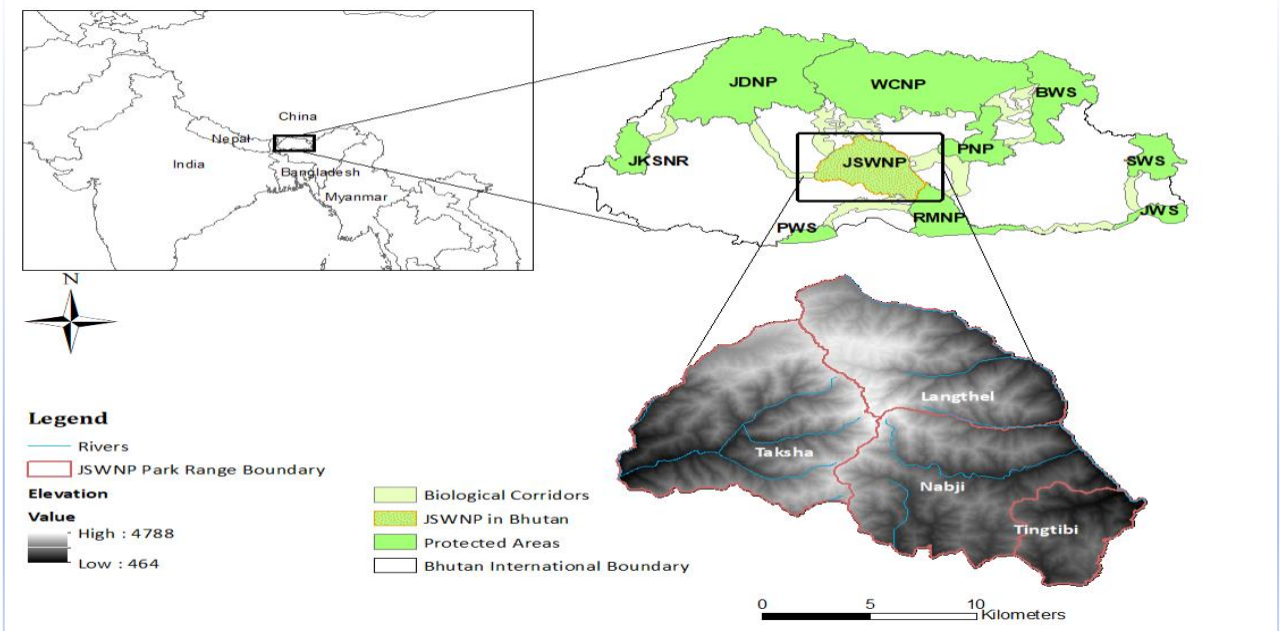
Geog	**Dzongkhag**	**Total Households**	**Population**
Athang	Wangdi Phodrang	121	1152
Korphu	Trongsa	207	1522
Langthel	Trongsa	74	711
Tangsibji	Trongsa	76	777
Trong	Zhemgang	83	817
Total		**561**	**4979**

Table 1 Communities in JSWNP

The three villages of Korphu, Nabji, and Nimshong from Korphu *geog* have the highest number of households, whereas the villages in Athang *geog* are smaller and scattered. Overall, Korphu, Trong, and Tangsibji *geogs* have a smaller number but larger sized villages, whereas Langthel and Athang *geogs* have several scattered villages. The people from these villages depend on the natural resources in the national park for their livelihoods.

The major sources of livelihoods for the communities in the national park are agriculture and livestock rearing, with some income from sale of non-wood forest products.

Some households also engage in labour-based wage earning, especially in the RGOB sectors. These are mostly in villages closer to towns and infrastructure projects sites, where jobs are available. Casual labour is highest in Langthel, Korphu, and Athang *geogs*, whereas trade-based cash income is highest in Trong *geog*.



3. Planned activities in 2021

Following activities are planned in Jigme Singye Wangchuck National Park for 2021:

1. **Revival of Waterhole in Tamala.**

Tamala lake is situated at Tamala, the highest point along Zhemgang-Gelephu highway. the lake used to be a perennial water body, used by wildlife throughout the year as waterhole in the past; however, today the lake is degraded due to overgrowth of vegetation, deposition of mud and rotting wooden materials. According to the locals, the lake began to shrink in size after construction of national highway just about 100 meters away from the lake, and today, the lake totally dries up during winter season. Pollution caused by roadside dumping of plastics, bottles and wrappers by travelers also adds to deterioration of the lake. Therefore, the activity intends to restore the lake to its original shape and size.

The main interventions planned to be carried out are: Laying of a boulder wall (about 50 meters long and 1.5 meters high) in one end of the lake, removal of shrubs and 18 numbers of trees that have encroached in the lake area, removal of external pollutants such as plastics, bottles and rotting wooden debris, digging of mud deposits and their removal to increase depth and size of the lake and connection of and external water supply to the lake using polyethene pipe to restore perennial nature of the lake. After the cleaning and digging works, a uniform strip of stone slabs (width of 1.5 to 2 meters) will be laid around the lake, which will act as a buffer to prevent pollutants and mud from entering the lake. Before these interventions, an assessment of the site will be carried out to determine the extent of degradation. The assessment works will be carried out in March, 2021 and the restoration interventions will be carried out in third quarter (July to September, 2021). A total budget of Nu. 5,25,000/- (five hundred twenty-five thousand only) has been allocated for this activity through BFL program.

The main works are Vegetation removal, muck digging and cleaning of the site. Seven to ten local people, preferably unemployed youths, will be employed for one month to execute manual works such as digging towards the periphery of the lake, vegetation removal and cleaning. A medium sized excavator (JCB) will be hired to carry out muck digging and its removal from the water-logged and sinking areas towards the center of the lake, the excavator will also be useful in removing huge logs that are lying in the lake and in laying the boulder wall. No concrete and metal will be used. For removal of the trees, power chain saw will be hired from the locality. Trees will be marked, felled, and disposed as per the existing rules. The workers will live in a concrete housing near the site. The house has drinking water supply, toilet, and kitchen facilities, so wastes would not be an issue. No electricity is available, so LPG gas will be used for cooking and solar lamps and candles will be used for lighting purposes. The nearest community from the site is Tama village, which is located more than 3 kilometers away. Few wildlife species such as barking deer, sambar deer and wild pigs are seen around the site. The activity would not adversely impact these animals.

Some of the adverse impacts (environmental/ social) of this activity are:

- Increase risk of poaching/ hunting
- Temporary change of quality of the water in the lake
- Waste generation from the activity (mud and debris)
- Waste generation by workers
- Workers' health and safety including COVID

2. Construction of retention wall in Tintgibi

A two-units staff quarter for JSWNP has been constructed in Tingtibi, with financial support from BFL program. The staff quarter is located below national highway, due to which the thromde regulations require construction of a retention wall between the building and the road. Due to this, a 30-meters long stone and concrete wall construction is proposed. The wall would act as a preventive measure to mitigate risk of the road getting damaged and for the safety of dwellers of the staff quarter. The activity will be carried out during second quarter of 2021 (April- June). A budget of Nu. 2,80,000/- (two hundred eighty thousand only) has been allotted for this activity through BFL program.

The main works include digging of foundation for the wall, which will be done manually using spade, crowbar, shovel and pickaxe and construction of the stone wall using concrete paste to stick the stones together. The whole work will be outsourced to a local contractor who will execute the works as per agreed terms and conditions. Approximately, around 8 truckloads of stones, 4 truckloads of sand and over 160 bags of cement would be required to complete the activity. The sand and stones will be procured from local supplier while cement will be procured from Gelephu. The number of workers would depend upon the contractor's discretion. For the accommodation of the workers, an existing building, which has electricity connection, water supply, toilet and kitchen facilities is available at the site. Since the site falls inside a thromde, there are over 100 households in the locality, most of whom are dependent upon business (shops, hotels, restaurants and rental).

Following are the adverse impacts (environmental and social) of this activity:

- Dust production and air quality change
- Noise disturbance
- Waste generation
- Workers health and safety including COVID

3. Office and staff quarter renovation in Langthel range

Langthel range is one of the four ranges of JSWNP. The range has its office located in Tongtophey, Langthel, just beside the location of Langthel gewog office. A main office building, with attached quarter for the ranger and another staff quarter building with three

family units comprise the infrastructure. Both of these buildings are old and require immediate renovation. The floor on both of the buildings are broken with cracks and holes all around, the ply woods that makes the ceiling have given way, broken and fallen off in most parts. Furthermore, the drains around both the buildings are also damaged and the foot path between the two buildings have been damaged as well. These pose safety concerns for the dwellers. Therefore, an immediate renovation is felt necessary.

The major works in this activity would be to perform flooring works on both office and staff quarter buildings, replacement of ceiling, construction of drains around the staff quarter and office building and restoration of footsteps leading from staff quarter to office building. The work will be carried out during third and fourth quarters of 2021 (July to December). A total budget of Nu. 8,35,000/- (eight hundred thirty-five thousand only) is allotted for this activity. The whole work will be outsourced to a local contractor who will execute the works as per agreed terms and conditions. Approximately, around 4 truckloads of stones, 1 truckload of sand and over 120 bags of cement would be required to complete the activity. The sand and stones will be procured from local supplier while cement will be procured from Gelephu. The number of workers would depend upon the contractor's discretion. For the accommodation of the workers, a temporary camp will be pitched within the site, water will be used from existing supply of office building, electricity will be connected from the office building and toilets in office building will be used.

Following are the adverse impacts (environmental and social) of this activity:

- Dust production and air quality change
- Noise disturbance
- Waste generation
- Workers health and safety including COVID

4. Riverbank protection wall construction in Reeti

Reeti village is a remote community in Jigmechholing gewog of Sarpang district, and falls inside JSWNP. The community with about 30 households depends upon agriculture and livestock rearing for livelihood. The community has a primary school, an outreach clinic (ORC) and a Lhakhang as community centers. Gongchhu (Gongkhola) is the main river that flows through the village and a smaller river, Rongchhu flows from near the school and joins the main river below the school. Both of these rivers increase in their volume during monsoon

season and become small during winter. This habit of the rivers pose threat to the school and agricultural fields during the monsoon as the swollen rivers easily gets into agriculture fields and village at multiple points. Therefore, riverbank protection measures, especially gabion wall construction was felt necessary, and the gewog administration requested the park to provide support and BFL came to fulfill this need. Although there are multiple sites requiring such mitigation measures in Reeti, this particular site was selected for this year out of people's consensus. The people, along with their local government weighted the severity of need and decided to select this site for the first intervention this year.

The main activity is to construct gabion wall (about 100 meters long) along a stretch of Gongchhu, above Zhompagang village of Reeti and protect the agriculture fields from flooding. Stone wall will be laid inside iron wire net. The whole work will be outsourced to a local contractor who will execute the works as per agreed standards. The number of workers will depend upon the contractor's discretion. Approximately, there would be around 10 workers who would be mainly local residents and commute from the nearest community which is around 100 meters-500 meters. There will be no machinery used as well as no concrete will be used. However, the workers will have to get inside the river causing disturbance. The work would take around 1 month to complete. The work will be carried out in fourth quarter of 2021 (October to December, 2021).

Following are the adverse impacts (environmental and social) of this activity:

- Water quality change
- Noise disturbance
- Waste generation
- Workers health and safety including COVID

5. Restoration of Alpine Meadows in Wangjela

Wangjela, a sub-alpine area under JSWNP, at an altitude of 3300 to 3500 masl located in the North of Phobjikha valley is selected for the activity. Wangjela is a traditional yak herding pastureland whereby the semi nomadic herders keep their yak herds in the area during the winter months when it is too cold in the alpine areas. In the olden days few families dwelled permanently in Wangjela and even grew few crops besides yak herding; however, today, this area is only used as a transit for the yaks during the winter months, grazing there for around 3 months. Due to this, the pasturelands have given way for juniper bushes which has led to

substantial decrease in the size of pasturelands. The Juniper species is a pioneer species and tend to overtake such natural grasslands in higher altitude. This trend in the region has not only left the few yak herding families who still use this grassland to graze their yaks worried, but also deteriorated the natural habitat of the wild ungulates in the region, which serves as the main prey base for the tiger population in the region; this region is an important tiger habitat. Also, currently, it is a national concern that the number of yak herding communities is decreasing at alarming rate and we need to encourage the age-old practice of yak herding.

The main activities are to de-branch the extensive growth of Juniper bushes in the meadow areas, whereby all the lateral branches will be removed up to breast height of all the Juniper trees and the main stem singled out. This will open up ground space for growth of grasses for yaks and wild ungulates. Other species such as Rosa sp. Will also be removed as these are invasive in the region and degrade the meadow. The removed materials will be disposed off properly; will be collected in one location and burnt.

The activity will be carried out in second quarter (April to June) of 2021. First of all, an assessment will be carried out by a team from the park, during which exact extent of area and number of trees for intervention will be identified. After that the team will go for the actual intervention. Around five to seven local workers (preferably from Phobjikha) and two power chain saws will be hired for the activity. Two staff from the park's headquarter and two from Chendebji Deputy range will be part of the team. The team will be accommodated in the transit huts at Wangjela. Everyone will carry a sleeping bag and blankets. Cooking will be done using firewood available locally. Water is available in nearby stream. Temporary pit toilet will be dug and covered with soil after the completion of the activity.

Following are the adverse impacts (environmental and social) of this activity:

- Improper removal of vegetation
- Air quality change
- Noise disturbance
- Waste generation
- Workers health and safety including COVID

4. Environmental and Social Impacts and Mitigation Measures

Potential impact	Impact scale	Proposed mitigation measures	Responsible party	Costs
Activity 1: Revival of waterhole in Tamala				
Increase risk of poaching/ hunting	Long-term; Minor	• Increase patrolling in the area • Provide conservation awareness programs	-Tingtibi ranger -BFL focal in JSWNP	Cost will be met from yearly patrolling and conservation awareness budgets.
Temporary change of quality of the water in the lake	Short-term; Minor	• Minimise water disturbance during the activity by not letting the machine get inside the water while digging (digging in the surrounding area only) • Avoid throwing wastes in the water body • Clean up the area after the activity completion	-BFL focal in JSWNP -Tingtibi ranger	Cost will be included in the activity budget.
Waste generation from activity (mud and debris)	Short-term; Minor	• Proper disposal of mud and debris • Avoid dumping in slopes and roadside areas	-BFL focal in JSWNP -Tingtibi ranger	Cost will be included in the activity budget .

Waste generation by workers	Short-term; Minor	• Identification of the different waste types at the project site (soil, asphalt, food, etc.); • Ensure that camps are located away from existing stream, river, or water sources, and that no discharge from camps is made into nearby water bodies; • Proper containers/waste bins shall be provided at the project site; • Dumping of waste on the sides of the road, on private land, or in other non-designated places shall be prohibited; • Dumping waste shall be prohibited on fragile slopes, forests, religious or other culturally sensitive areas or areas where livelihood is derived; • Collection, transportation and final disposal of all waste should be undertaken regularly (weekly). • The options for reuse/recycling of the generated waste streams should be taking into consideration (e.g. excavated soil, etc.). • Burning of construction waste shall be prohibited. After construction: • All waste shall be removed from the project site at the end of the activity.	-BFL focal in JSWNP -Tingtibi ranger	Cost will be included in the activity budget (for cleaning after the activity completion).
Workers' health and safety including COVID (Refer to the full OHS guidelines attached where ever relevant)	Short-term; Minor	• Strictly follow workers' safety protocols • Ensure safety kits and first aid kits. • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged. • Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers. • Use safety gears (helmet, gumboots, gloves).	-BFL focal in JSWNP -Tingtibi ranger	Cost will be included in the activity budget (for safety gears).

		• Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) • Implement workers' GRM.		
Activity 2: Construction of retention wall in Tintgibi				
Dust production and air quality change	Short-term; Minor	• Workers should use face mask regularly. • Construction site, transportation routes and materials handling sites should be water-sprayed on dry and windy days; • Construction materials should be stored in appropriate and covered places to minimize dust; • Vehicle loads likely to emit dust need to be covered; • Vehicle speed should be restricted within the construction site;	-Contractor -BFL focal of JSWNP -Tingtibi ranger	Cost should be included in the activity budget
Noise disturbance	Short-term; Minor	• Requirements to limit emissions should be included in the bidding documents. • The construction work should not be permitted during the nights, the operations on site shall be restricted to the hours 7am—7pm; • Vehicles that are excessively noisy shall not be operated until corrective measures have been taken; • Earplugs and protecting devices shall be provided to workers on site.	-Contractor -BFL focal of JSWNP -Tingtibi ranger	Cost should be included in the activity budget

Waste generation	Short-term; Minor	*Pre-construction*: • Requirements for appropriate waste management should be included in the bidding documents, as a precondition for the contractor's selection. *During construction:* • Identification of the different waste types at the project site (soil, asphalt, food, etc.); • Ensure that camps are located away from existing stream, river, or water sources, and that no discharge from camps is made into nearby water bodies; • Proper containers/waste bins shall be provided at the project site; • Dumping of waste on the sides of the road, on private land, or in other non-designated places shall be prohibited; • Dumping waste shall be prohibited on fragile slopes, forests, religious or other culturally sensitive areas or areas where livelihood is derived; • Collection, transportation and final disposal of all waste should be undertaken regularly (weekly). • Possible hazardous waste (motor oils, vehicle fuels, etc.) should be collected separately and authorized collector and transporter should be sub-contracted to transport and finally dispose; • All construction materials should be covered during the transportation to avoid waste dispersion; • The options for reuse/recycling of the generated waste streams should be taking into consideration (e.g. excavated soil, etc.). • Burning of construction waste should be prohibited. After construction: • All waste shall be removed from the project site.	-Contractor -BFL focal of JSWNP -Tingtibi ranger	Cost should be included in the activity budget

Workers health and safety including COVID Refer to the full OHS guidelines attached where ever relevant)	Short-term; Minor	• Strictly follow workers' safety protocols • Ensure use of safety kits and first aid kits. • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged. • Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers. • Use safety gears (helmet, gumboots, gloves). Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) • Implement workers' GRM.	-Contractor -BFL focal of JSWNP -Tingtibi ranger	Cost should be included in the activity budget
Activity 3: Office and staff quarter renovation in Langthel range				
Dust production and air quality change	Short-term; Minor	• *Pre-construction:* requirements to limit emissions should be included in the bidding documents, as a precondition for the contractor's selection *During construction:* • Construction site, transportation routes and materials handling sites should be water-sprayed on dry and windy days; • Construction materials should be stored in appropriate and covered places to minimize dust; • Before allowing vehicles on site, fitness and emission test of the vehicle shall be performed; • Vehicle loads likely to emit dust need to be covered; • Workers should wear protective masks if dust appears; • Vehicle speed should be restricted within the construction site;	-Contractor - BFL focal of JSWNP -Langthel ranger	Cost should be included in the activity budget

		• Regular maintenance of the vehicles and construction machinery should be performed in order to reduce any leakages of motor oils, emissions and dispersion of pollution; • Burning of debris from ground clearance shall be prohibited.		
Noise disturbance	Short-term; Minor	• Requirements to limit emissions should be included in the bidding documents. • The construction work should not be permitted during the nights, the operations on site shall be restricted to the hours 7am—7pm; • Vehicles that are excessively noisy shall not be operated until corrective measures have been taken; • Earplugs and protecting devices shall be provided to workers on site.	-Contractor - BFL focal of JSWNP -Langthel ranger	Cost should be included in the activity budget
Waste generation	Short-term; Minor	*Pre-construction*: • Requirements for appropriate waste management should be included in the bidding documents, as a precondition for the contractor's selection. *During construction:* • Identification of the different waste types at the project site (soil, asphalt, food, etc.); • Ensure that camps are located away from existing stream, river, or water sources, and that no discharge from camps is made into nearby water bodies; • Proper containers/waste bins shall be provided at the project site; • Dumping of waste on the sides of the road, on private land, or in other non-designated places shall be prohibited; • Dumping waste shall be prohibited on fragile slopes, forests, religious or other culturally sensitive areas or areas where livelihood is derived;	-Contractor - BFL focal of JSWNP -Langthel ranger	Cost should be included in the activity budget

		• Collection, transportation and final disposal of all waste should be undertaken regularly (weekly). • Possible hazardous waste (motor oils, vehicle fuels, etc.) should be collected separately and authorized collector and transporter should be sub-contracted to transport and finally dispose; • All construction materials should be covered during the transportation to avoid waste dispersion; • The options for reuse/recycling of the generated waste streams should be taking into consideration (e.g. excavated soil, etc.). • Burning of construction waste should be prohibited. After construction: • All waste shall be removed from the project site.		
Workers health and safety including COVID Refer to the full OHS guidelines attached where ever relevant)	Short-term; Minor	• Strictly follow workers' safety protocols • Ensure use of safety kits and first aid kits. • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged. • Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers. • Use safety gears (helmet, gumboots, gloves). • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) • Implement workers' GRM.	Contractor BFL focal of JSWNP Langthel ranger	Cost should be included in the activity budget
Activity 4: Riverbank protection wall construction in Reeti				

Water quality change	Short-term; Minor	*Pre-construction:* • Requirements for appropriate measures to prevent water contamination should be included in the bidding documents, as a precondition for the contractor's selection *During construction:* • An environment-friendly toilet (e.g., pit toilet) and washing facilities should be made available, built with locally available materials • Throwing waste in water sources should be prohibited • Possible hazardous waste (motor oils, vehicle fuels, lubricants) should be collected separately and authorized entity should be transporting and disposing the hazardous waste; *After construction* • Pit toilets are dismantled and pits are covered • All waste is removed from the project site	-Contractor -BFL focal of JSWNP	Cost should be included in the activity budget
Noise disturbance	Short-term; Minor	• Requirements to limit emissions should be included in the bidding documents. • The construction work should not be permitted during the nights, the operations on site shall be restricted to the hours 7am—7pm; • Vehicles that are excessively noisy shall not be operated until corrective measures have been taken; • Earplugs and protecting devices shall be provided to workers on site.	-Contractor -BFL focal of JSWNP	Cost should be included in the activity budget

Waste generation	Short-term; Minor	*Pre-construction*: • Requirements for appropriate waste management should be included in the bidding documents, as a precondition for the contractor's selection. *During construction:* • Identification of the different waste types at the project site (soil, asphalt, food, etc.); • Ensure that camps are located away from existing stream, river, or water sources, and that no discharge from camps is made into nearby water bodies; • Proper containers/waste bins shall be provided at the project site; • Dumping of waste on the sides of the road, on private land, or in other non-designated places shall be prohibited; • Dumping waste shall be prohibited on fragile slopes, forests, religious or other culturally sensitive areas or areas where livelihood is derived; • Collection, transportation and final disposal of all waste should be undertaken regularly (weekly). • Possible hazardous waste (motor oils, vehicle fuels, etc.) should be collected separately and authorized collector and transporter should be sub-contracted to transport and finally dispose; • All construction materials should be covered during the transportation to avoid waste dispersion; • The options for reuse/recycling of the generated waste streams should be taking into consideration (e.g. excavated soil, etc.).	-Contractor -BFL focal of JSWNP	Cost should be included in the activity budget

		• Burning of construction waste should be prohibited. After construction: • All waste shall be removed from the project site.		
Workers health and safety including COVID Refer to the full OHS guidelines attached where ever relevant)	Short-term; Minor	• Strictly follow workers' safety protocols • Ensure use of safety kits and first aid kits. • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged. • Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers. • Use safety gears (helmet, gumboots, gloves). • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) • Implement workers' GRM.	-Contractor -BFL focal of JSWNP	Cost should be included in the activity budget
Activity 5: Restoration of Alpine Meadows in Wangjela				

Removal of vegetation	Long-term; Minor	• Only de-branching should be done; no complete felling of trees shall be permitted. • Precautions should be taken to ensure that no accidental damage is caused to local vegetation • The removed branches shall be disposed properly	-BFL focal in JSWNP	Cost is covered in activity budget
Air quality change	Short-term; Minor	• Ensure that the power chain saw is in good condition • Use appropriate lubricants and fuel in the power chain saw to minimize the emission. • Ensure that the machines are operated by licensed operators for efficiency.	-BFL focal in JSWNP	Cost is covered in activity budget
Noise disturbance	Short-term; Minor	• Ensure that workers use ear plugs • Ensure that the machines are not operated early in the morning and late in the evening to minimize disturbance to wildlife • The machines shall only be operated by licensed operators, with minimum noise.	-BFL focal in JSWNP	Cost is covered in activity budget
Waste generation	Short-term; Minor	• Ensure that camps are located away from existing stream, river, or water sources, and that no discharge from camps is made into nearby water bodies; • Pit toilets shall be constructed for temporary use and coverd after the activity completion. • Proper containers/waste bins shall be provided at the project site; • Dumping of waste on the sides of the road, on private land, or in other non-designated places shall be prohibited; • Dumping waste shall be prohibited on fragile slopes, forests, religious or other culturally sensitive areas or areas where livelihood is derived; • The options for reuse/recycling of the generated waste streams should be taking into consideration (e.g. excavated soil, etc.).	-BFL focal in JSWNP	Cost is covered in activity budget

		• Burning of construction waste shall be prohibited. After construction: • All waste shall be removed from the project site at the end of the activity.		
Workers health and safety including COVID Refer to the full OHS guidelines attached where ever relevant)	Short-term; Minor	• Strictly follow workers' safety protocols • Ensure use of safety kits and first aid kits. • Ensure that no underage workers, or children are engaged. • Decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers. • Use safety gears (helmet, shin-guards, gumboots, glovees) • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) • Implement workers' GRM.	-BFL focal in JSWNP	From the activity cost

5. ESMP Implementation arrangements

The implementation of project activities will be carried out by the BFL focal person in JSWNP. 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 contract that the PA will sign with the Contractor(s) (including community contractors) for implementation of the planned activities in JSWNP in 2021. The Contractor 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 (e.g., letter asking the municipality for disposal of inert waste, records on OHS information session performed for all workers before start of activities, all developed EHS plans, etc.). An OHS information session should be organized by the Contractor for all workers prior start the project activities and prior any specific tasks with high health risks. The JSWNP's Supervising Engineer needs to monitor the implementation of proposed measures by the Contractor and Contractor's subcontractors 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-compliances should be reported to the ESS officers immediately, and the ESS officers will report it to the PCU (M&E Officer). Each non-compliance should be closed with appropriate measure/s and the evidence should be kept. Disbursement of project funds to the PA will be contingent upon their full compliance with the safeguard's requirements.

6. ESMP Monitoring Arrangements

The BFL focal person in JSWNP 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. JSWNP is also fully responsible for the compliance of all external contractors and service providers working in the JSWNP with the safeguard's requirements outlined in the ESMP. The monitoring of activities under this ESMP will be carried out in the following manner:

The monitoring of activities under this ESMP will be carried out in the following manner:

Sl. No	Activities	Monitoring team	Timeline		Location	Means of Verification
			Start	Complete		
1	Revival of waterhole in Tamala	Field focal	June, 2021	September, 2021	Tamala, Tingtibi range, JSWNP	Site assessment report. Implementaiton report. Completion report.
		ESS officer	2nd Week August, 2021			Monitoring report
2	Construction of retention wall in Tintgibi	Field focal	May, 2021	June, 2021	Tingtibi, JSWNP	Contract award documents Implementaiton report Completion report
		ESS officer	1st week June, 2021			Monitoring report
3	Office and staff quarter renovation in Langthel range		August, 2021	December, 2021	Langthel, JSWNP	Contract award documents Implementaiton report Completion report
		ESS officer	2rd week November, 2021			Monitoring report
4	Riverbank protection wall construction in Reeti	Field focal	October, 2021	December, 2021	Reeti, JSWNP	Contract award documents Implementaiton report Completion report
		ESS officer	2rd week November, 2021			Monitoring report
5	Restoration of Alpine Meadows in Wangjela	Field focal	May, 2021	June, 2021	Wangjela, JSWNP	Site assessment report. Implementaiton report. Completion report.
		ESS officer	1st week June, 2021			Monitoring report

1. Revival of waterhole in Tamala

Monitoring by implementing entities:

- Field visits at least twice—during the intervention and then monthly as part of the "SMART patrolling" activity (will be adapted based on field conditions, and also based on the availability of SMART patrolling activities).
- Reports by the implementing entities submitted to ESS officer once during the intervention and once after the completion of work.

- Monitoring by ESS officer at PCU:
  - Field monitoring by ESS officer –monitoring through photographic/video evidence submitted by the IAs during the implementation as per the given dateline in the table above.
  - Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2022.

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

2. Construction of retention wall in Tintgibi

- Monitoring by implementing entities:
    - At least weekly field visits
    - Monthly reports prepared by implementing entities and submitted to ESS Officer at PCU.
- Monitoring by ESS officer at PCU:
    - Field monitoring by ESS officer – monitoring through photographic/video evidence submitted by the IAs during the implementation as per the given dateline in the table above.
    - Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2022.
- Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final APRs)

3. Office and staff quarter renovation in Langthel range

Monitoring by implementing entities:

- Field visits—at least weekly
- Monthly reports by the implementing entities submitted to ESS officer

Monitoring by ESS officer at PCU:

- Field monitoring by ESS officer – monitoring of the work once during the implementation and through field report from IAs after completion of the work.
- Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2022.

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

4. Riverbank protection wall construction in Reeti

Monitoring by implementing entities:

- Field visits—at least weekly
- Monthly reports by the implementing entities submitted to ESS officer

Monitoring by ESS officer at PCU:

a. Field monitoring by ESS officer – monitoring of the work once during the implementation and through field report from IAs after completion of the work.

b. Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2022.

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

5. Restoration of Alpine Meadows in Wangjela

Monitoring by implementing entities:

a. Field visits at least twice—during the intervention and within three months after the intervention

b. Reports by the implementing entities submitted to ESS officer within a week after each field visit

6. Monitoring by ESS officer at PCU:

a. Field monitoring by ESS officer –monitoring through photographic/video evidence submitted by the IAs during the implementation as per the given dateline in the table above.

b. Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2022.

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

8. Capacity Need and Budget

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

The budget for each of the activities is: Nu. 5,25,000/-, Nu. 2,80,000/-, Nu. 8,35,000/-, Nu. 5,00,000/- and Nu. 2,50,000/-. A separate budget of Nu. 10,000/- will cover the implementation of the ESMP mitigation measures for improvement Alpine meadows; for rest of the activities, the ESS mitigation budget is included in activity budget.

9. Consultation and Disclosure Mechanisms

This ESMP has been prepared in a participatory manner; various stakeholders such as local government, school administrations in the park and local people were consulted through telephonic conversation and virtual meets; due to coronavirus restrictions, physical meetings were not conducted. People were consulted regarding the planned project activities to solicit their opinions, and enable them to question proposed mitigation measures. The main issues that were raised during the consultation meeting include the following:
For the riverbank protection works, there are multiple sites requiring such an intervention in Reeti; therefore, people requested if the same interventions could be made in remaining sites as well. We explained that since the area was prioritized by the people themselves, along with their local government by weighting the severity of need and decided to select this site for the first intervention this year, from next year similar prioritization can be done and similar intervention can be done in the remaining sites in the following years.

Community consultation will be carried out before implementation of the work to inform local communities regarding the planned project activities and get feedback from them regarding the activities before implementing it. The detailed minutes of the consultation meeting will be attached to this ESMP, along with a full list of participants (disaggregated by gender and age).

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.

10. Stakeholder engagement plan

The local community that resides in the vicinity of the planned BFL activities in JSWNP will be engaged throughout the implementation of these activities.

- For all construction activities (construction of retention wall and riverbank protection)– one consultation meeting has to be organized during the intervention period, and subsequent consultations have to be held annually (these can be combined with consultations for other BFL or non-BFL activities).
- For activities that have no direct impact on communities (improvement of alpine meadows and waterhole revival)–consultation meetings have to be organized once a year (can be combined with consultations for other BFL or non-BFL activities).

1. **Revival of waterhole, Tamal lake**

- Dates of consultation: June, week 2, 2021
- Agenda: Rationale behind the intervention, importance of conserving wildlife, basics of Human wildlife conflict (HWC), advantages of restoring waterholes, and future management will be discussed.
- Location: Tama village

2. **Construction of retention wall in Tingtibi**

- Dates of consultation: May, week 1, 2021
- Agenda: Problem statement, need for the intervention, structural design of the protection works, work ethics, budget, pros of the intervention and future management will be discussed.
- Location: Tingtibi range office

3. **River bank protection work, Reeti**

- Dates of consultation: October, week 1, 2021
- Agenda: Site allocation, reason for the intervention, funding mechanisms, work ethics, future management will be discussed.
- Location: Reeti Lhakhang.

4. **Restoration of Alpine meadows (habitat management):**

- Dates of consultation: May, week 1, 2021
- Agenda: Need for the intervention, advantages of restoring the meadows, importance of wildlife conservation and future management plans will be discussed.
- Location: Wangjela.

Annexure BFL: SUGGESTED 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)[1] 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 climate, 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 through the implementation of fire codes applicable to industrial settings. 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.
- 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.
- 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.

- Equipping facilities 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.

Lavatories and Showers

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

Potable Water Supply

- Adequate supplies of potable 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

- Workplaces should, to the degree feasible, receive natural light and be supplemented with sufficient artificial illumination to promote workers' safety and health, and enable safe equipment operation. Supplemental 'task lighting' may be required where specific visual acuity requirements should be met.
- Emergency lighting of adequate intensity should be installed upon failure of the principal artificial light source to ensure safe shut-down, evacuation, etc.

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 should, if feasible, be installed to protect against falling items.
- 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 stall be not more than 200m from any working place.
- First aid kits include all equipment outlined in Annex 1 to these Guidelines.
- Remote sites should have written emergency procedures in place for dealing with cases of trauma or serious illness up to the point at which patient care can be transferred to an appropriate medical facility.

Work Uniform

- The contractor shall provide a working uniform to each worker.
- All workers shall be required to attend the duty in proper uniform unless otherwise instructed by the Contractor.

Air Supply

- Sufficient fresh air should be supplied for indoor and confined workspaces. Factors to be considered in ventilation design include physical activity, substances in use, and process related emissions. Air distribution systems should be designed so as not to expose workers to draughts.
- Re-circulation of contaminated air is not acceptable. Heating, ventilation and air conditioning (HVAC) systems should be equipped, maintained and operated so as to prevent growth and spreading of disease agents (e.g. Legionnella pneumophilia) or breeding of vectors (e.g. mosquitoes and flies) of public health concern.

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

- 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.
- 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 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- Although hearing protection is preferred for any period of noise exposure in excess of 85 dB(A), an equivalent level of protection can be obtained, but less easily managed, by limiting the

duration of noise exposure. For every 3 dB(A) increase in sound levels, the 'allowed' exposure period or duration should be reduced by 50 percent.

- 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

Exposure to hand-arm vibration from equipment such as hand and power tools, or whole-body vibrations from surfaces on which the worker stands or sits, should be controlled through choice of equipment, installation of vibration dampening pads or devices, and limiting the duration of exposure.

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
- Rubber tired construction or other vehicles that come into direct contact with, or arcing between, high voltage wires may need to be taken out of service for periods of 48 hours and have the tires replaced to prevent catastrophic tire and wheel assembly failure, potentially causing serious injury or death
- Conducting detailed identification and marking of all buried electrical wiring prior to any excavation work

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.
- Provisions should be made for persons who have to wear prescription glasses either through the use overglasses or prescription hardened glasses.

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 (a solid piece of light metal, canvas, or plywood designed to block welding light from others). Devices to extract and remove noxious fumes at the source may also be required.

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, and avoiding consumption of alcoholic beverages

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:

- Facility and workstation design with 5th to 95th percentile operational and maintenance workers in mind
- 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
- 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' accommodation[2]

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.
- The living facilities are built using adequate materials, kept in good repair and kept clean and free from rubbish and other refuse.

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 or WHO standards.
- 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 is regularly monitored.

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 rubbish collection are provided and emptied on a regular basis.
- Pest extermination, vector control and disinfection are undertaken throughout the living facilities at least once.

6. Rooms/dormitories facilities

- Rooms/dormitories are kept in good condition.
- Rooms/dormitories 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.
- Mobile partitions or curtains are provided.
- Adequate number of furniture such as table, chair, mirror, and lamps are provided for all workers.
- Separate sleeping areas are provided for men and women.

7. Bed arrangements and storage facilities

- A separate bed is provided for every worker.
- The practice of "hot-bedding" is prohibited.
- There is a minimum space of 1 meter between beds.
- The use of double deck bunks is minimized.
- If double deck bunks are in use, there is enough clear space between the lower and upper bunk of the bed.
- Workers are provided with comfortable mattresses. Workers may be expected to use their own pillows and bed linens.
- Workers wash bed linen frequently and applied with adequate repellents and disinfectants (where conditions warrant).
- 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 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.
- Shower facilities are provided with water heating facilities.

9. Cooking and laundry facilities

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

10. Leisure, social and telecommunications facilities

- Basic social collective spaces should be available to workers.
- Workers are provided with dedicated places for religious observance, as appropriate.
- The employer provides workers with local sim cards that can be used for communication on their personal cell phones.

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