

Bhutan For Life

**Environmental and Social
Management Plan for Royal
Manas National Park**

January 2023 - June 2024

Royal Manas National Park / Gelephu

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Bhutan for Life
Environmental and Social Management Plan for Royal Manas National Park (RMNP) for
January 2023 - June 2024

1. Introduction

1.1 Project Background

The Bhutan for Life (BFL) project aims to ensure a robust network of Protected Areas (PAs) and Biological Corridors (BCs) that secure human well-being, biodiversity conservation and increase climate resilience in Bhutan. The project shall sustain for 14-years, in this duration an immediate improvement to the management of Bhutan's protected areas for climate resilience and biodiversity gains are sought. Meanwhile the country would gradually ratchet 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 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; and
- 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.

1.2 Scope of ESMP

The preparation of this Environmental and Social Management Plan (ESMP) was deemed necessary in order to manage the environmental and social impacts. The mitigation actions required to implement the project was 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 the 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.

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

1.4 Applicable law, policies, and regulation

This ESMP is developed in strict adherence and compliance to the guidelines set forth in 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 (The Local Government Act of Bhutan, 2009; 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), and Local Government Act of Bhutan, 2009.

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;
- General standards on both occupational and community health and safety and 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. Regarding environmental impacts, there are no direct contradictions between the RGoB laws and regulations and the WWF's SIPP, but the requirement of the latter is more extensive. All project activities should fully comply both with the RGoBs Regulations on the Environmental Clearance of Projects, and with the procedures and mitigation measures prescribed in this ESMF. In case the

WWF's SIPP requirements turn out to be extensive, strict, or detailed compared to RGoB legislation and policies, the former will apply to all project activities.

Regarding social impacts, the status of non-title holders and informal land use, and the commitment to participatory decision-making processes conclude the primary discrepancies between the RGoB laws and regulations and the WWF's SIPP. 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 during the project in order to develop various safeguards documents. RGoB legislation does not include three requirements reflected in SIPP. For the purpose 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

2.1 Geological and topographical conditions

Royal Manas National Park (RMNP) established as game sanctuary and later notified as Manas Wildlife Sanctuary in 1964 is the oldest park in Bhutan. It was gazetted as National Park in 1993. Spanning an area of 1057.28 sq. km, the park is located at the convergence of the Indo-Gangetic and Indo-Malayan bio-geographical realm. The park forms cornerstone of PA network as it shares corridors with Jigme Singye Wangchuck National Park (JSWNP) in northwest, Jomotshangkha Wildlife Sanctuary (JWS) in southeast, Phibsoo Wildlife Sanctuary (PWS) in the southwest and Phrumsengla National Park (PNP) in central north. Further the park abuts with Indian Manas National Park in the south and forms significant part of Transboundary Manas Conservation Area (TraMCA) thereby promoting ecosystem management at landscape level.

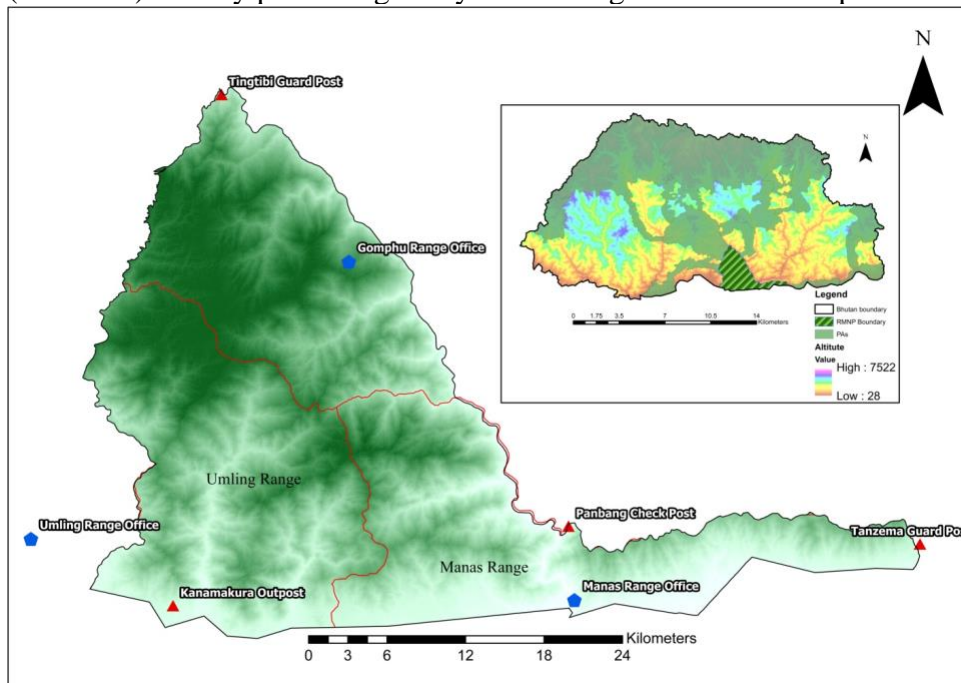


Figure 1: Location map of RMNP along with jurisdiction of rang offices

The forest type of the park is generally sub-tropical forest. It is further classified into four eco-floristic zones; Tropical monsoon forests (< 500 m), Sub-tropical forests (500 -1000 m), Warm broadleaved forests (1000 – 2000 m) and Cool broadleaved forests (2000-2714 m). The southern belt of the park has an interspersed of irregular swathes of grasslands.

The geology of RMNP consists mostly of Buxa formation characterized of dolomites, quartzite, variegated phyllite, metasedimentary phyllite and limestone bed rocks. The southern part of the park consists of bhabar tract containing sandstone, limestone and shale. Alluvial and colluvial formation result from slow erosion of rock from the northern area of the park stemming as a result of heavy rainfall during monsoon. Boulders are of granite, gneiss and quartzite and the gravel deposits contain granite, gneiss, phyllite, and slate schist.

2.2 Climatic conditions

Royal Manas National Park has a moist subtropical to cool temperate climate with four distinct seasons. Summer lasts from May to August with annual maximum temperature ranging from 20°C to 40°C. The rainfall ranges from 200 mm to 4400 mm annually. Autumn lasts between September and November experiencing changeable weather, which gradually takes on the shape of winter pattern. Characterized by cool weather and fog, winter is relatively drier with rare shower and average temperature ranges from 5°C to 20°C. The park experiences strong to moderately strong wind in the months of February- April.

2.3 Hydrological conditions

Royal Manas National Park abounds with towering mountains punctuated with perennial rivers and transitory rivers and streams. The largest river of the country, Manas drains about two third volume of the water of the country. It springs from four major tributaries viz. Mangde Chhu, Chamkar Chhu, Kuri Chhu and Drangme Chhu in eastern and central Bhutan. The other perennial rivers such as Udigang, Kukulung, Kanamakura and Sukuntaklai rivers forms some of the important watersheds of RMNP. Many other transitory and seasonal streams are evident along the southern foothill landscapes during monsoon season. Waterholes forms an integral part of functioning ecosystem and are erratically distributed with higher density along the foothill belt of the park.

2.4 Flora and fauna

RMNP is famed for harboring great populace of wildlife diversity. The park is home to 65 species of mammals, 497 birds, 69 fishes, 181 butterflies, 69 herpetofauna and more than 900 vascular plant species. It provides safe refuge for many charismatic and threatened species such as Royal Bengal tiger, Golden Langur, Clouded leopard, Asian elephant, Asiatic water buffalo, Asiatic wild dog and Asiatic gaur. About 48% of mammal species recorded in the Park are threatened species red listed by IUCN. The park is unarguably one of the strongholds of tigers in Bhutan. Since 2011, the park had been annual monitoring of tiger population initiated under the aegis of TraMCA. The park is one among two national parks from Bhutan which is approved site for Tiger conservation under Conservation Assured Tiger Standard (CATS) in 2019. In the subsequent year, the park is the joint winner of the Conservation Excellence Award TX2 along with Manas Tiger Reserve, India.

The national park is also home to globally rare and endangered floral species such as *Dalbergia oleyeri* (IUCN endangered species), *Aquilaria malaccensis* (IUCN vulnerable), *Taxus baccata*

(Scheduled 1 species in FNCA 1995) and *Podocarpus neriifolia* the only conifer broadleaved tree found rarely distributed in the park area.

2.5 Socio-economic conditions

RMNP falls within the political jurisdiction of three Dzongkhags (Zhemgang, Sarpang and Pemagatshel). Like many other parks in the country, there are community settlements living within and in the vicinity of RMNP. There are about 1400 households with 5331 people living in the park. Majority of the people depend their livelihood on agro-farming system. They cultivate primarily paddy as food crop and grows areca nut, oranges, cardamom and ginger as cash crops. Living in the forest fringe areas, their life style is dependent on forest based resources such as NWFPs and other forest produces. They also earn living by rearing livestock and poultry farms. Rearing improved cattle breed particularly *Jersey* cow has become common practices due to earning of high income from dairy products.

Although the communities are politically into different jurisdiction, their customs and tradition doesn't differ much. However, in terms of their language, there is a slight difference in their native dialect. People in Pemagatshel commonly speak *Sharchopkha*, Zhemgang people speak *Khengkha* and people in Sarpang speaks commonly *nepali* and *sharchopkha*.

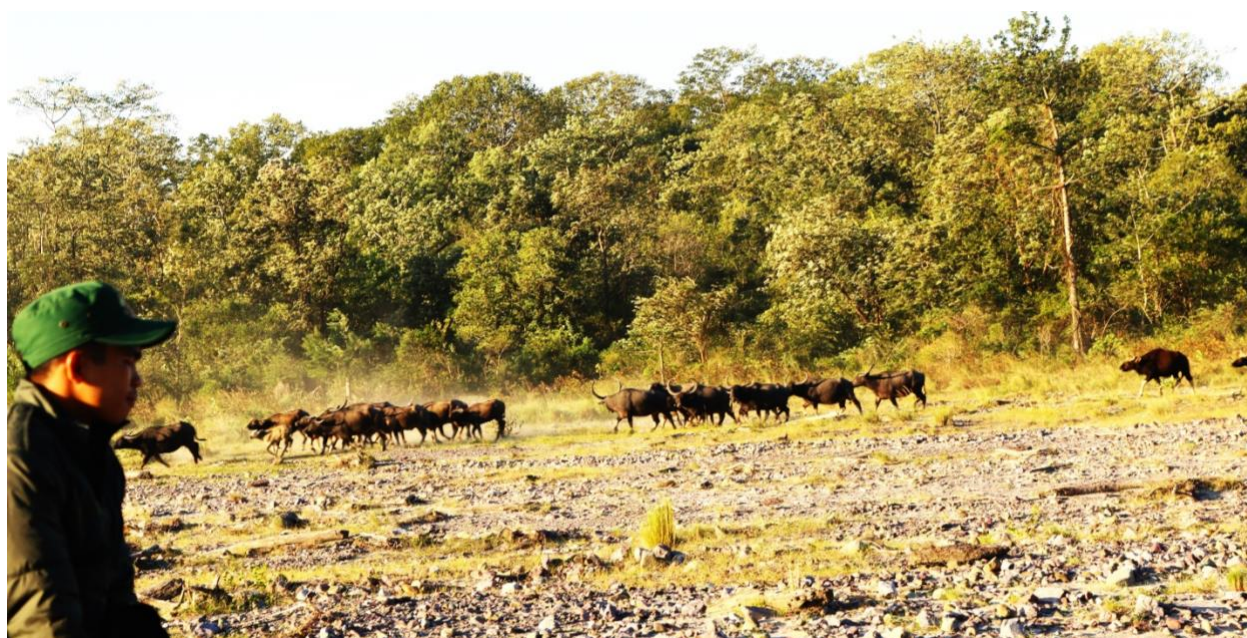


Figure 2: Asiatic water buffalo and gaur at Gelongkhola, Manas

3. Planned activities for January 2023 - June 2024

3.1. Maintenance of Gomphu Range staff quarter and water supply pipeline

- a. Budget: Nu. 2,000,000
- b. Timeline: January - June, 2024
- c. Location: Gomphu, Trong Gewog, Zhemgang

Gomphu is a small village with around 60 plus households located about 9km away from Tingtibi-Panbang high way. The Gomphu range office is located at the North-west corner of the village and the nearby settlements are around 300 to 500 m away. The range office compound with forest

range office and a staff quarter is fenced. The two units staff quarter was constructed around 2004 and the structure currently is in need of maintenance. The roofing, ceiling, floor, wooden window frames and doors are all damages due to old age. As a part of structure maintenance work, all the damage parts such as windows and door frames, ceiling, roofing and flooring will be replaced and repainted. The work will be handed over to community firm from the same locality. Thus, total of 10 to 15 workers will be coming for work in the morning and they will be returning to their own house in the evening without having to camp separately.

3.2. Construction of Ngangchhu River Bank Protection Wall

- a. Budget: Nu. 1,000,000
- b. Timeline: January - June, 2024
- c. Location: Manas, Ngangla Gewog, Zhemgang

Ngangchhu is a stream which flows down from the catchment opposite to Manas compound and joins the Manas River. However, during monsoon season, the stream gets enlarged into river size and it erode the area, causing change in its course thereby posing risk of washing away the road (Mathanguri to Panbang), suspension bridge, approach road to Manas compound and the vehicle parking area. Therefore, the bank protection wall (gabion or concrete) measuring 20m x 3m will be constructed below the bridge and in the down stream so that it streamlined the flow of river into the Manas River. The wall construction work will be carried out between January to June, 2024 by employing 10 to 15 workers from Panbang community. The Panbang community is the nearest settlement to the activity site and it is around 10 km away. The workers will be temporarily camped inside Manas compound in the transient camp/guest house. The proposed work is expected to complete with the expenditure of Nu. 1.00M.

3.3 Maintenance of VIP guest house at Manas

- a. Budget: Nu. 3,000,000
- b. Timeline: October - December, 2023
- c. Location: Manas, Ngangla Gewog, Zhemgang

The VIP guest house is one of the prominent structures inside Manas compound. However, due to old ages many parts of the structures are damages. The heavy downpour and high humidity in the south have further worsen the structure conditions. The wooden window frames, doors, ceiling, floor and roofing are damaged and needs maintenance. Therefore, as a part of the maintenance, all the rotten and damaged parts of the structures will be replaced with new materials with same art and design. The structures including roof will then be repainted. The 10 to 15 skilled workers will be employed to carry out the maintenance work. The workers will be sourced from nearby Panbang community. During the work, the workers will be temporarily camped at empty staff quarter (transient camp) at Manas.

3.4 Development of eco-trail from Manas to Hatilora and Manas to Gahati

- a. Budget: Nu. 2,500,000
- b. Timeline: October 2023 – March 2024
- c. Location: Manas, Ngangla Gewog, Zhemgang

Manas having pristine natural habitat with rich biodiversity and beautiful landscape with has been the destination for many eco-tourists yearly. However, the area lacks proper eco-tourism facilities or products other than normal river rafting. Thus, as a part of eco-tourism facilities development

in the area, the park management has proposed to develop two eco-trails (nature walk foot path); Manas-Hatilora trail and Manas-Gahati trail, in the area. As a part of eco-trail development work, activity such as clearing of bushes along the trail, labeling of path surface for smooth walk and fixing stone slabs along the trail will be done. Also, a resting gazebo with sitting benches will be constructed at the end of eco-trail. The amenities such as toilet and drinking water supply will be made available at resting gazebo. Since, there is a high risk that the wild animals might destroy the gazebo in the night, the barbed/concertina wire fencing around the gazebo will be installed. The signages and wastebins will also be installed along the trail and at resting gazebo. To carry out the work, around 10-15 workers will be employed from the nearby Panbang community. The workers will be camped within Manas compound in one of the staff quarters which is empty (transient camp).

3.5 Management of lowland grassland at Specialthang and Kanamakura

- a. Budget: Nu. 1,900,000 (Nu. 700,000 and Nu. 1,200,000)
- b. Timeline: January - March, 2023 and January - March, 2024
- c. Location: Kanamakura, Taraythang Gewog, Sarpang and Specialthang, Ngangla Gewog, Zhemgang

This is one of the prime activities for wildlife habitat management carried out in the park yearly. The grasslands are important habitat for many wild animals and especially for herbivores. The management of grassland is important to provide new, palatable and nutritious young grass shoots for wild animals. If the grasslands are not managed timely, its qualities get deteriorated as it gets overgrown by other woody and invasive species. The warm weather and heavy monsoon condition in the south further accelerate the deterioration rate as growth of other vegetations and invasive species occurs fast. Therefore, timely management is important to retain healthy grassland habitats for wildlife.

RMNP has interspersion of irregular swathes of grasslands along the plains in southern belts. The Park management has managed more than 200 Ha of grasslands in the earlier years at Specialthang and Kanamakura. Similarly, this year also with the financial support from Bhutan for Life project with Nu. 0.70 M and Nu.1.20M in 2024, the park management plan to manage the grasslands at same locations.

Specialthang is a huge plain area located in the south-east region of RMNP, near to the international border with India. The area is bound by two seasonal rivers; Gelongkhola River and Norbutangki River in the west. The area is primarily grasslands with few shade bearing trees. The surrounding areas with slopy hills towards north are all forest land of sub-tropical forests type. The activity site is located inside park area and there are no settlements in the vicinity. The nearest settlement is Manas Range office compound located about 10 km away.

Kanamakura is situated at southwest of RMNP, near to south border. It has a plain landscape which gently raise into hills towards the North. The activity site is surrounded by the thick sub-tropical forest. Kanamakura River runs from the east of the grassland and the riverine grassland is located along the shore side of Kanamakura River.

The grassland management activities include application of prescribed burning in a mosaic fashion by sub-dividing grassland into blocks and creating fire lines around them. Then it requires removal of unburned woody and invasive species and sowing or plantation of native and highly palatable

grass seeds. As the grassland management works requires application of prescribed burning which is possible only in dry season, the grassland management works are implemented during peak dry season with appliance of prescribed burning and broadcasting of grass seeds during spring (March to April) or pre-monsoon.

The grassland management works doesn't require application of any complex technologies. By the nature of site location inside forests (inside Park) and due to absence of road connection, the activities are usually carried out manually by simple human force. The application of prescribed burnings are easier provided it is done in right time. But the removable of woody and invasive species from the site are laborious and it requires minimum of 60 to 70 laborers to work for around two weeks under the technical guidance of forestry staff. The workers will be employed from nearby settlement areas (Panbang and Taraythang) and they will be camped at Specialthang watch tower and Kanamakura guard post.

The risk associated with the activity is the application of prescribed burning, which might turn into wild fire. The precautions are usually taken by making effective fire lines and using safety gears during the application of prescribed burning.

3.6 Maintenance of Solar Lighting System at Kanamakura Guard post

- a. Budget: Nu. 500,000
- b. Timeline: July - September 2023
- c. Location: Kanamakura, Taraythang Gewog, Sarpang

Kanamakura guard post is located at the remote south border area inside dense subtropical forest without any settlement in the vicinity. The area doesn't have any modern facilities such as electricity, telecommunication network, etc... except it is being connected with a seasonal forest road (gets blocked during summer or monsoon season). The guard post is being guarded by 7 to 10 forestry personnel throughout the year on monthly rotational basis. The area was one of the risky areas in the past due to insurgency issues along the border areas. Thus, around 30 military personnel are also placed in the same guard post guarding the border areas. The guard post without having electricity supply, the solar lighting system was installed around a decade ago. However, due to old age, the solar lighting systems are now damaged and are not functioning properly. The batteries are all ruined. The wiring systems are malfunctioning despite having to replace the bulbs time and again. The area being located at border and inside a dense forest, it is risky for the duty personnel (both forestry & army). Thus, the maintenance of solar lighting system was planned. As a part of maintenance work, all the ruined batteries, solar panels, wires & wiring systems and bulbs will be replaced with new ones. The 1 or 2 technical experts will be hired in fixing the solar lighting system. The workers will be camped in Kanamakura guard post (transient camp) till the work is completed which might take around two weeks.

3.7 Maintenance of Shengmatar to Kanamakura Forest Road

- a. Budget: Nu. 700,000
- b. Timeline: October - December 2023
- c. Location: Kanamakura, Taraythang Gewog, Sarpang

Around 16 km long Shengmatar to Kanamakura forest road is the main entry of RMNP from western side of the park. The forest road runs through dense subtropical forest and it is mainly used by the park staffs and by Kanamakura outpost military personnel. The road remains dry and

pliable during dry seasons. However, during summer or monsoon season, because of heavy downpours in the south, the road gets washed away in multiple parts. Many trees nearby the road fall and the road gets blocked. The falling of land or landslides, deep cutting of road surface due to heavy surface water run off and gully formation along the road makes the forest road worst during monsoon season. Therefore, the annual maintenance of the forest road is required to be carried out during post monsoon season so that the accessibility of park field staffs including guard post duty personnel are not affected. As a part of forest road maintenance work, the landslides, fallen stones or boulders and trees will be removed from the road by deploying JCB excavator. The deep cutting, holes, drains or gullies formed along the road will be filled with stones and soil. The bushes grown along the road side will be cleared using 2 to 3 helpers or handy men. The workers (excavator operator and handy men) will be temporarily camped along the forest road. The forest road maintenance work will be completed within two weeks.

4. Potential social and environmental impacts

4.1 Maintenance of Gomphu Range Staff quarter and Water supply pipeline

Following are some the possible common environmental and social impacts foreseen during the implementation of the proposed activities:

i. Environment Impacts:

- Waste generation (cement bags, rotten wooden windows, doors, wooden cutoffs)

ii. Social Impacts

- Worker's health and safety

4.2 Construction of Ngangchhu River Bank Protection Wall

Following are some the possible common environmental and social impacts foreseen during the implementation of the proposed activities:

i. Environment Impacts:

- Generation of construction waste

ii. Social Impacts

- Worker's health and safety

4.3 Maintenance of VIP guest house at Manas

Following are some the possible common environmental and social impacts foreseen during the implementation of the proposed activities:

i. Environment Impacts:

- Waste generation (rotten wooden windows, doors, wooden cutoffs, cement bags)

ii. Social Impacts

- Worker's health and safety

4.4 Eco-trail Development from Manas to Hatilora and Manas to Gahati

Following are some the possible common environmental and social impacts foreseen during the implementation of the proposed activities:

i. Environment Impacts:

- Generation of construction wastes (excavated soils from the trail development and wooden cutoffs from gazebo construction)

- ii. Social Impacts
 - Worker’s health and safety

4.5 Management of Lowland Grassland at Specialthang and Kanamakura

Following are some the possible common environmental and social impacts foreseen during the implementation of the proposed activities:

- i. Environment Impacts:
 - Risk of wild fire during prescribed burning
 - Risk of introducing invasive species

- ii. Social Impacts
 - Risk of fire burns during the prescribed burning
 - Occupational health and safety of the workers

4.6 Maintenance of Solar Lighting System at Kanamakura Guard post

Following are some the possible common environmental and social impacts foreseen during the implementation of the proposed activities:

- i. Environment Impacts:
 - Generation of e-wastes (old batteries, solar panels, wires and bulbs)

- ii. Social Impacts
 - Worker’s health and safety

4.7 Maintenance of Shengmatar to Kanamakura Forest Road

Following are some the possible common environmental and social impacts foreseen during the implementation of the proposed activities:

- i. Environment Impacts:
 - Waste generation (while clearing the fallen logs and rocks)
 - Dust generation during construction

- ii. Social Impacts
 - Worker’s health and safety

5. Mitigation Measures for Environmental and Social Impacts

Potential impacts to the environment and society along with the mitigating measures are listed below in the table:

Potential impact	Impact scale	Proposed mitigation measures	Responsible Party	Costs (million)
Activity 1: Maintenance of Gomphu Range Staff Quarter & Water Supply				Nu. 2,000,000
1. Waste generation (cement bags, rotten wooden windows,	Short time Minor	<ul style="list-style-type: none"> • Workers will be briefed about waste management at site; • Waste bins and pit for different types of waste (degradable/non-degradable/recycle/reuse/etc.) will be installed at the site; and 	RMNP Management	To be incorporated in the bidding document

doors, wooden cutoffs)		<ul style="list-style-type: none"> Waste will be removed from site after completion of work. Depending upon waste type, it will be either reused or transported to proper dumping site. 		
2. Worker's health and Safety	Short time Minor	<ul style="list-style-type: none"> Comply with the workers' health and safety guidelines; Access to health facilities (first aid kit will be made available at construction site & Basic health unit (BHU) is available at walkable distance; No underage workers, or children will be engaged; Ensure conducive working environment, including an appropriate salary, working hours and proper accommodation; Ensure workers are employed on the principle of equal opportunity & 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; and Implement a grievance mechanism for workers 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. 	RMNP Management	To be incorporated in the bidding document
Activity 2: Construction of Ngangchu River bank Protection wall at Manas				Nu. 1,000,000
1. Generation of construction waste	Short time Minor	<ul style="list-style-type: none"> Workers will be briefed about waste management at site; Waste bins and pit for different types of waste (degradable/non-degradable/recycle/reuse/etc.) will be installed at the site; and Waste will be removed from site after completion of work. Depending upon waste type, it will be either reused or transported to proper dumping site. 	RMNP Management	To be incorporated in the bidding document
2. Worker's health and Safety	Short time Minor	<ul style="list-style-type: none"> Comply with the workers' health and safety guidelines; Access to health facilities (first aid kit will be made available at construction site & 	RMNP Management	To be incorporated in the bidding document

		<p>Basic health unit (BHU) is available at walkable distance;</p> <ul style="list-style-type: none"> • No underage workers, or children will be engaged; • Ensure conducive working environment, including an appropriate salary, working hours and proper accommodation; • Ensure workers are employed on the principle of equal opportunity & 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; and • Implement a grievance mechanism for workers 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. 		
Activity 3: Maintenance of VIP Guest house at Manas				Nu. 3,000,000
1. Waste generation (rotten wooden windows, doors, wooden cutoffs, cement bags)	Short time Minor	<ul style="list-style-type: none"> • Workers will be briefed about waste management at site; • Waste bins and pit for different types of waste (degradable/non-degradable/recycle/reuse/etc.) will be installed at the site; and • Waste will be removed from site after completion of work. Depending upon waste type, it will be either reused or transported to proper dumping site. 	RMNP Management	To be incorporated in the bidding document
2. Worker's health and Safety	Short time Minor	<ul style="list-style-type: none"> • Comply with the workers' health and safety guidelines; • Access to health facilities (first aid kit will be made available at construction site & Basic health unit (BHU) is available at walkable distance; • No underage workers, or children will be engaged; • Ensure conducive working environment, including an appropriate salary, working hours and proper accommodation; • Ensure workers are employed on the principle of equal opportunity & fair 	RMNP Management	To be incorporated in the bidding document

		<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; and</p> <ul style="list-style-type: none"> • Implement a grievance mechanism for workers 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. 		
Activity 4: Eco-trail Development from Manas to Hatilora and Manas to Gahati				Nu. 2,500,000
1. Generation of construction wastes (excavated soils from the trail development and wooden cutoffs from gazebo construction)	Short time Minor	<ul style="list-style-type: none"> • Workers will be briefed about waste management at site; • Waste bins and pit for different types of waste (degradable/non-degradable/recycle/reuse/etc.) will be installed at the site; and • Waste will be removed from site after completion of work. Depending upon waste type, it will be either reused or transported to proper dumping site. 	RMNP Management	To be incorporated in the bidding document
2. Worker's health and Safety	Short time Minor	<ul style="list-style-type: none"> • Comply with the workers' health and safety guidelines; • Access to health facilities (first aid kit will be made available at construction site & Basic health unit (BHU) is available at walkable distance; • No underage workers, or children will be engaged; • Ensure conducive working environment, including an appropriate salary, working hours and proper accommodation; • Ensure workers are employed on the principle of equal opportunity & 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 	RMNP Management	To be incorporated in the bidding document

		<p>conditions and terms of employment, and disciplinary practices; and</p> <ul style="list-style-type: none"> • Implement a grievance mechanism for workers 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. 		
Activity 5: Management of Lowland Grassland at Kanamakura & Specialthang				Nu. 1,900,000
1. Risk of forest fire during prescribed burning	Short time Minor	<ul style="list-style-type: none"> • If fire is required as control measure, controlled/ prescribed burning (fire lines, fuel load reduction, backfiring etc.) will be carried out; • Burning of trees and other plants in the area outside grassland will be avoided; <p>Precondition: Time of prescribed burning should be informed to site in charge.</p> <p>During Improvement:</p> <ul style="list-style-type: none"> • Avoid unnecessary grassland fires • Prescribed burning to be done in morning 	RMNP Management	To be part of the activity cost
2. Risk of introducing invasive species	Long term Major	<ul style="list-style-type: none"> • Assess appropriateness of species in terms of biodiversity, water efficiency, forest fire, local needs, cultural sensitivity, survival, etc; • Ensure that only native species are planted; • Regular weeding and control measures need to be carried out. Biological control measures (broadcasting desired species) need to be emphasized; and • Invasive species if grown at the site shall be uprooted and burned properly (without seed proliferation). 	RMNP Management	To be part of the activity cost
3. Risk of fire burns during the prescribed burning	Short time Minor	<ul style="list-style-type: none"> • Comply with the workers' health and safety guidelines and comply with measures identified under sl. no. 4. 	RMNP Management	To be part of the activity cost
4. Worker's health and Safety	Short time Minor	<ul style="list-style-type: none"> • Comply with the workers' health and safety guidelines • Access to health facilities (first aid kit will be made available at construction site & Basic health unit (BHU) is available at walkable distance; • No underage workers, or children will be engaged; 	RMNP Management	To be part of the activity cost

		<ul style="list-style-type: none"> • Ensure conducive working environment, including an appropriate salary, working hours and proper accommodation; • Ensure workers are employed on the principle of equal opportunity & 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; and • Implement a grievance mechanism for workers 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. 		
Activity 6: Maintenance of Solar Lighting System at Kanamakura Guard post				Nu. 500,000
1. Generation of e-wastes (old batteries, solar panels, wires and bulbs)	Short time Minor	<ul style="list-style-type: none"> • Workers will be briefed about e-waste management at site; • Waste bins to collect e-waste will be installed at the site; and • After completion of work, e-waste will be transported from site to e-waste dealer or e-waste recycling agencies. 	RMNP Management	To be incorporated in the bidding document
2. Worker's health and Safety	Short time Minor	<ul style="list-style-type: none"> • Comply with the workers' health and safety guidelines; • Access to health facilities (first aid kit will be made available at construction site & Basic health unit (BHU) is available at walkable distance; • No underage workers, or children will be engaged; • Ensure conducive working environment, including an appropriate salary, working hours and proper accommodation; • Ensure workers are employed on the principle of equal opportunity & 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; and 	RMNP Management	To be incorporated in the bidding document

		<ul style="list-style-type: none"> Implement a grievance mechanism for workers 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. 		
Activity 7: Maintenance of Shengmatar to Kanamakura Forest Road				Nu. 700,000
1. Waste generation		<ul style="list-style-type: none"> Workers will be briefed about waste (specially logs or debris & dust) management at site; All fallen logs or wood debris will be dumped & arranged in one safe location below road to let it decompose safely; and Usable debris will be collected from site and transported to proper place. 	RMNP Management	To be incorporated in the bidding document
2. Dust generation during construction		<ul style="list-style-type: none"> Precondition: Requirement to limit emission should be included in work order and site in charge should be well informed. During maintenance: Patrol route, materials and vehicles should be water-sprayed on dry and windy days. BFL focal and concern section 18. Fitness and emission test of the vehicles shall be performed; Ensure there is use of protective masks for the workers in dust; Vehicles speed must be regulated in dust areas; and Vehicles and machines maintenance are done regularly to reduce the leakages of motor oils and emissions. 	RMNP Management	To be incorporated in the bidding document
3. Worker's health and Safety	Short time Minor	<ul style="list-style-type: none"> Comply with the workers' health and safety guidelines; Access to health facilities (first aid kit will be made available at construction site & Basic health unit (BHU) is available at walkable distance; No underage workers, or children will be engaged; Ensure conducive working environment, including an appropriate salary, working hours and proper accommodation; Ensure workers are employed on the principle of equal opportunity & fair treatment, and there is no discrimination with respect to any aspects of the 	RMNP Management	To be incorporated in the bidding document

		<p>employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, and disciplinary practices; and</p> <ul style="list-style-type: none"> • Implement a grievance mechanism for workers 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. 		
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6. ESMP Implementation arrangements

The implementation of project activities will be carried out by the RMNP management. The BFL focal person in RMNP shall work under the supervision of management to implement the BFL project activities in RMNP. The management and focal person are responsible for compliance with all procedures outlined in this ESMP and 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 RMNP management will sign with the Contractor(s) and other relevant stakeholders for implementation of the planned activities in RMNP in 2023 and 2024. The Contractor or implementers are 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 OHS plans, etc.). An OHS information session should be organized by the Contractor or implementers for all workers prior to start of the project activities and prior any specific tasks with high health risks.

The RMNP management along with range offices shall monitor the implementation of proposed measures by the implementer, contractor and subcontractors with visual checking, reviewing the records of evidence that the measures have been applied. Non-compliances should be recorded and report to the ESS focal immediately, and the ESS focal will report it to the PCU (M&E Officer). Every 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 requirements.

7. ESMP monitoring arrangements

The BFL focal person under the supervision of RMNP management 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.

RMNP management is also fully responsible for the compliance of all external contractors and service providers working in the RMNP with the safeguard requirements outlined in this ESMP.

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	Maintenance of Gomphu Range Staff Quarter & Water Supply	Field focal	Jan 2024	June 2024	Gomphu, Trong, Zhemgang	Field visits and reports
		ESS focal	July 2024	July 2024		Reports
		BFLFS	July 2024	July 2024	Reports	
2	Construction of Ngangchhu River Bank Protection Wall	Field focal	Jan 2024	June 2024	Manas, Ngangla, Zhemgang	Field visits and reports
		ESS focal	June 2024	July 2024		Field visits and reports
		BFLFS	July 2024	July 2024		Reports
3	Maintenance of VIP guest house at Manas	Field focal	October 2023	December 2023	Manas, Ngangla, Zhemgang	Field visits and reports
		ESS focal	January 2024	January 2024		Reports
		BFLFS	January 2024	January 2024		Reports
4	Eco-trail Development from Manas to Hatilora and Manas to Gahati	Field focal	Oct 2023	March 2024	Manas, Ngangla, Zhemgang	Field visits and reports
		ESS focal	January 2024	March 2024		Field visits and reports
		BFLFS	January 2024	July 2024		Reports
5	Management of Lowland Grassland at Specialthang and Kanamakura	Field focal	January 2023, 2024	March 2023, 2024	Specialthang, Ngangla, Zhemgang and Kanamakura, Taraythang, Zhemgang	Field visits and reports
		ESS focal	July 2023 July 2024	July 2023 July 2024		Reports
		BFLFS	July 2023 July 2024	July 2023 July 2024		Reports
6	Maintenance of Solar Lighting System at Kanamakura Guard post	Field focal	July 2023	Sept 2023	Kanamakura, Taraythang, Zhemgang	Field visits and reports
		ESS focal	January 2024	January 2024		Reports
		BFLFS	January 2024	January 2024		Reports
7	Maintenance of Shengmatar to	Field focal	October 2023	December 2023		Field visits and reports

	Kanamakura Forest Road	ESS focal	January 2024	January 2024	Kanamakura, Taraythang, Zhemgang	Reports
		BFLFS	January 2024	January 2024		Reports

Monitoring by ESS Focal officer at PCU:

- 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 - Semi-annual report submitted to the BFL Fund Secretariat in July 2023, January 2024 and July 2024; and
- Bi-annual reports of the Secretariat to WWF US (as part of mid-year and final Annual Performance Reports).

8. 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.

Sl. No.	Activities	Budget (Nu)	Budget for ESS mitigation (Nu. Million)
1	Maintenance of Gomphu Range Staff Quarter & Water Supply	2,000,000	No separate budget for ESS mitigation is proposed. ESS mitigation measures will be met from the respective activity costs.
2	Construction of Ngangchhu River Bank Protection Wall	700,000	
3	Maintenance of VIP guest house at Manas	3,000,000	
4	Eco-trail Development from Manas to Hatilora and Manas to Gahati	2,500,000	
5	Management of Lowland Grassland at Specialthang and Kanamakura	1,900,000	
6	Maintenance of Solar Lighting System at Kanamakura Guard post	500,000	
7	Maintenance of Shengmatar to Kanamakura Forest Road	700,000	
	Total	11,300,000	

The proposed activities are of very small scale and there are no adverse social and environmental impacts which require mitigation measures. Therefore, separate fund for mitigation measures is not proposed.

9. Consultation and Disclosure Mechanisms

This ESMP has been prepared in a participatory manner and consulted verbally with local leaders, the *Gups* (head of *Gewogs*) who represents the whole communities. The management informed local leader regarding the planned project activities, solicit their opinions and enable them to question proposed mitigation measures. There were no issues raised during the talk with local leaders since our project activities sites are inside PA and no settlements in the activity sites or in vicinity.

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

10. Stakeholder engagement plan

The proposed activities for RMNP under the BFL funded project for year 5 and 6 (2023 and 2024) are all inside the Park area and there are no settlements in the activity sites or in vicinity, possibly it may not to have any adverse environment and social impacts. However, in the lieu of unseen impacts in the future, the RMNP management has consulted with local leaders verbally to solicit their opinions and to enable them to question proposed mitigation measures. And the *Gups* informed there is no any objection as there are no settlements.

In case, if any consultations happen to carry out during implementation due to any unforeseen consequences, the BFL focal person under the supervision of RMNP management shall submit the official minutes of consultation meetings (along with a list of participants, disaggregated by gender and age) to ESS focal within one week after the completion of the consultation. The ESS consultants will submit the consultation reports to the PCU (M&E officer) one week after their receipt. The PCU (M&E officer) will report to the Secretariat on a semi-annual basis.

Annexure 1

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) 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 shall 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. Legionella pneumophila) 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 of 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

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 be 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