

Bhutan for Life Environmental and Social Management Plan for RMNP (2022)

1. INTRODUCTION

(A) Project Background

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.

2. ENVIRONMENTAL AND SOCIO-ECONOMIC CONDITIONS

(A) 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 share 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.

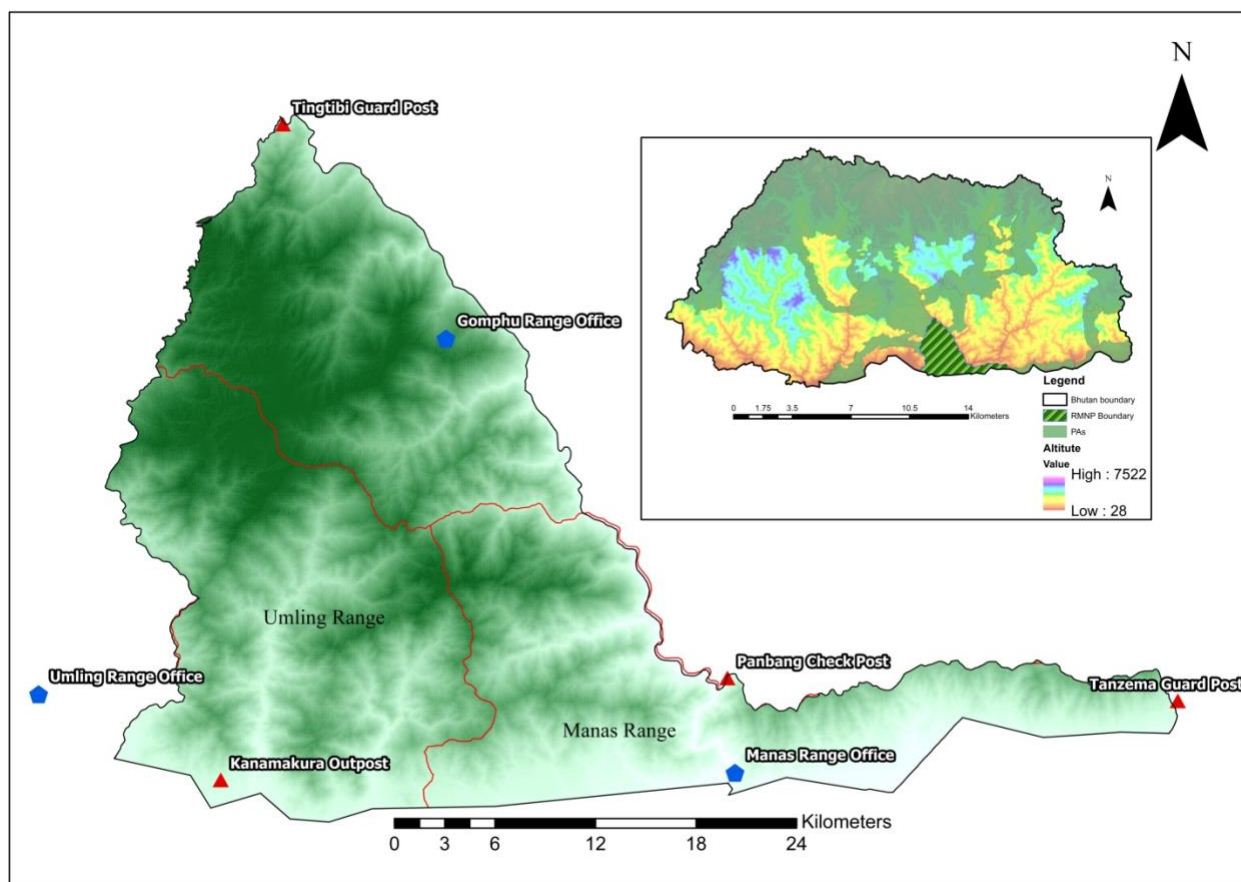


Figure 1: Location map of RMNP along with jurisdiction of rang offices. .

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 interspersions of irregular swaths 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.

(B) 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.

(C) 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.

(D) 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 oleveri* (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.

(E) 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 Pema Gatsel commonly speak *Sharchopkha*, Zhemgang people speak *Khengkha* and people in Sarpang speaks commonly *nepali* and *sharchopkha*.

3. PLANNED ACTIVITIES IN YEAR 4 (2022)

Followings are the planned activities for RMNP in Year 4 (2022) under Bhutan for Life project;

Activity 1: Manage lowland grassland at Specialthang and Kanamakura

- Budget: Nu. 1.000 M
- Timeline: January – May (2022)
- Location: Specialthang and Kanamakura

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. 1.000 M, 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 shed 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.

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 by February or beginning of March and by sowing grass seeds during spring (March end or in April).

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 prescribe 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 accommodated in the existing watch tower in the middle of the grassland and also temporary shelter will be constructed to accommodate the remaining workers. Water will be used from the nearby source and waste will be managed under the monitoring of forestry staffs in the accommodation.

The risk associated with the activity is the application of prescribe 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 prescribe burning.

Potential social and environmental impacts of the activity are;

- Occurrence of non-native species due to grassland improvement work
- Cutting down of trees and plants that are encroaching on the grassland negatively affects the ecosystem of the lowland grasslands (e.g., grazing areas are diminished)/ fallen logs affect wildlife movements
- Accidental Forest fire during burning of residual debris
- Accidental removal of Endangered and ecologically significant species
- Growth of non-palatable species

Activity 2: River Bank Protection at Manas River

- Budget: Nu. 1.570 M
- Timeline: January – June (2022)
- Location: Manas

Description:

The construction of gabion wall will be carried out at the bank of Manas river, adjacent to VVIP guest house, Manas under Ngangla Gewog, Zhemgang District. The Manas river is one of the largest rivers in the country formed by joining Mangdechu and Drangmechu at Panbang and it flows from Panbang through RMNP and exit from south into India. The river gets swollen during summer. The swollen river specially during monsoon season has washed away the base of river bank adjacent to VVIP guest house at Manas and has posed risks to the structures. The gabion wall measuring 29m long was constructed at the nearby site in the previous year. However, due to continuous land fall at the site caused by heavy rain, there is the need of additional wall to stabilize or protect the site. Some of the temporary measures such as filling of gullies formed at the site with stones and logs were carried out during last monsoon as an immediate measure. The proposed gabion wall will be constructed as the permanent bank protection structures at the site.

The gabion wall construction will be carried out during dry season, in winter (starting from January, 2022) as it is not possible to work during monsoon as river bank gets covered up by the swollen river. The wall will be constructed manually by deploying around 8 to 10 local labourers

using wire mesh and stones. The labourers will be temporarily sheltered at the site within the Manas compound. The compound is consisting of quarters for forestry staffs & Royal Bhutan Army and VVIP guest house. There is no settlement in the area.

Potential social and environmental impacts of the activity are;

- Disturbance of natural habitat
- Waste management during construction
- Water contamination as a result of construction
- Workers' health and safety

4. MITIGATION MEASURES FOR ENVIRONMENTAL AND SOCIAL IMPACTS

Given the scale of the project, the impacts, both environmental and social are expected to be minimal in both the sites. The impacts are minor and reversible and can be minimized or mitigated by developing appropriate measures. Specifically, to address these concerns, the project will comply with the relevant Acts and Rules and Regulations of the Kingdom of Bhutan. ESMP is prepared as per requirement based on ESMF to ensure adequate mitigation measures.

Therefore, for all the potential environment and social impacts related to each activity, mitigation measures have been prepared as shown in table below:

| Potential impact | Impact scale | Proposed mitigation measures | Responsible party | Costs |
|---|-------------------------|--|-------------------|------------------|
| <i>Activity 1: Management of lowland grassland at Specialthang and Kanamakura</i> | | | | Nu.1.000M |
| Occurrence of non-native species due to grassland improvement work | Long term Major | <ul style="list-style-type: none"> • Assess suitability of species in terms of biodiversity, water efficiency, local needs, survival, etc. • Ensure that only native species are planted • Invasive species grown at the site shall be uprooted and burned properly (without seed proliferation) | RMNP management | |
| Felling of trees encroaching inside grassland negatively affects the ecosystem of the lowland grasslands. | Long term Major | <ul style="list-style-type: none"> • Assess the impacts of climate change on lowland grasslands to identify alternative approaches to the sustainable management of the grasslands • Ensure that no accidental damage is caused to local vegetation—major trees that are supposed to be cut shall be clearly marked and only marked trees will be cut • Removal of trees needs to be done in an environmentally sustainable way • Burning of trees and other plants unnecessarily shall be avoided • Proper disposal of the fallen woods/debris to enhance wildlife movement. | RMNP management | |
| Accidental Forest fire during burning of residual debris | 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 should be avoided. • Comply with the workers' health and safety guidelines | RMNP management | |

| | | | | |
|---|---------------------|---|--------------------------|--------------|
| Accidental removal of Endangered and ecologically significant species | Short time Minor | <ul style="list-style-type: none"> • Preliminary assessment of species composition and species mapping need to be carried out before implementation of the activity | RMNP management | |
| Growth of non-palatable species | Short time Minor | <ul style="list-style-type: none"> • Regular weeding and control measures need to be carried out. Biological control measures (broadcasting desired species) need to be emphasized | RMNP management | |
| Waste generation | Short time Minor | <ul style="list-style-type: none"> • Laborers will be briefed about management of waste such as food waste while at the site • Waste bins and pit will be installed at the site, and bins/waste removed from the site upon completion of the activity. | RMNP management | |
| Potential impact | Impact scale | Proposed mitigation measures | Responsible party | Costs |
| <i>Activity 2: River Bank Protection at Manas river</i> | | | | |
| Disturbance of natural habitat | Long time Major | <ul style="list-style-type: none"> • Ensure careful siting, alignment, design of rig sites, and/or timing of works (seasonal) • limit use of heavy machinery and avoid using it when important species are present at site. • Ensure soil excavation is carried out with minimal impact to natural habitats | RMNP management | |
| Waste management during construction | Short time Minor | <ul style="list-style-type: none"> • Proper containers/waste bins should be provided at the project site • Dumping of waste in the river, in its vicinity, or in other non-designated places should be strictly prohibited • Collection, transportation and final disposal of all waste should be carried out on a daily basis and not left in the river areas • Burning of construction waste should be prohibited | RMNP management | |

| | | | | |
|---|---------------------|---|-----------------|--|
| Water contamination as a result of construction | Short time Minor | <ul style="list-style-type: none"> • Avoid pouring construction materials or waste into the river | RMNP management | |
| Workers' health and safety including COVID-19 related precautions | Short time Minor | <ul style="list-style-type: none"> • Comply with the workers' health and safety guidelines • Access to health facilities for the workers pre and during construction activities need to be available and ensure first aid kit is available at construction site & Basic health unit (BHU) needs to be available in walkable distance. • Ensure that no underage workers, or children are engaged • Ensure conducive working environment, including an appropriate salary, working hours and accommodation shall be provided to all workers. • 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 • 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. • Follow the COVID protocol circulated by the ministry and use protective measure such as face mask and sanitizers. | RMNP management | |

5. 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 2022. 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 EHS 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 officer immediately, and the ESS officer 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 safeguards requirements.

6. 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 safeguards 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 | Management of lowland grassland at Specialthang and Kanamakura | Field focal | March | June | Specialthang, Manas, Zhemgang And Kanamakura, Taraythang, sarpang | Physical verification of site. Submit monitoring report to ESS focal |
| | | ESS officer | April | June | | |
| 2 | River bank protection at Manas river | Field focal | January | June | Manas, Ngangla Gewog, Zhemgang | Physical verification of site. Submit monitoring report to ESS focal |
| | | ESS officer | March | Nov | | |

1. Management of lowland grassland at Specialthang and Kanamakura

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

Monitoring by ESS officer at PCU:

- c. 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.
- d. Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2023.

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

2. River bank protection at Manas river

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 through photographic/video evidence submitted by the IAs during the implementation as per the given dateline in the table above.
- a. Reports by ESS officer to BFL Fund Secretariat – Annual report submitted to the BFL Fund Secretariat in January, 2023.

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

7. CAPACITY NEED AND BUDGET

Activities under this ESMP will be implemented by the BFL focal person under the supervision of RMNP management, supervising engineer (if deployed by management) and contractor(s) or Range Officers (if implemented departmentally) that will employ workers.

The budget for each of the activities is:

| Si. No. | Activities | Budget (Million) Nu. | Budget for ESS mitigation (Nu) Million |
|---------|--|----------------------|---|
| 1 | Management of lowland grassland at Specialthang and Kanamakura | 1.000 | No. separate budget for ESS mitigation is required. ESS mitigation measures will be met from total budget for the respective activities |
| 2 | River bank protection at Manas River | 1.570 | |
| | | | |

8. 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. With regard to management of the grassland, it is annual activity and has already been thoroughly consulted with the relevant agencies in the beginning of the activity. 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 MoAF and WWF, Bhutan Program. Hard copies of the ESMP should also be available at the RMNP Management Office and at the PCU Office.

9. STAKEHOLDER ENGAGEMENT PLAN

The proposed activities for RMNP under the BFL funded project for year 4 (2022) are all inside the Park area and there are no settlements in the activity sites or in vicinity, possibly it may not 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 officer within one week after the completion of the consultation. The ESS officer

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 I:

BFL: OCCUPATIONAL HEALTH AND SAFETY STANDARDS

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

This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. It is based on the IFC's Environmental, Health, and Safety Guidelines (April 30, 2007)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 SI. No. 21 of Regulation on Occupational Health, Safety and Welfare 2012.

1. General Facility Design and Operation

Integrity of Workplace Structures

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

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

Severe Weather and Facility Shutdown

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

Workspace and Exit

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

Fire Precautions

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

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

¹

<https://www.ifc.org/wps/wcm/connect/1d19c1ab-3ef8-42d4-bd6b-cb79648af3fe/2%2BOccupational%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES&CVID=1s62x8l>

- 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 within and around the construction sites.
- All other precautions, as are reasonably practicable, shall be taken to prevent initiation of ignition from all other possible sources such as open flames, frictional sparks, overheated surfaces of machinery or plant, chemical or physical, chemical reaction and radiant heat.
- At every workplace adequate provision of water supply for firefighting shall be provided and maintained.
- Facilities shall be equipped with firefighting equipment (e.g., fire extinguishing bottle). The equipment should be maintained in good working order and be readily accessible. It should be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present.
- Manual firefighting equipment shall be easily accessible and simple to use.
- Fire extinguishers and emergency alarm systems that are both audible and visible should be in place.
- Fire exits should be identified and marked in Dzongkha and English- all workers should be made aware of the fire exits.

Lavatories and Showers

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

Potable Water Supply

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

Clean Eating Area

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

Lighting

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

Safe Access

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

First Aid

- The employer should ensure that qualified first-aid can be provided at all times. A sufficient number of first aid boxes or cupboards shall be provided and maintained so as to be readily available during all working hours, provided that the distance of the nearest first aid box or a cupboard stall be not more than 200m from any working place.

- First aid kits include all equipment outlined in Annex 1 to these Guidelines.
- Each first aid box or a cupboard shall be distinctly marked "FIRST AID"

Air Supply

- Workplace should have adequate ventilation for fresh air

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

2. 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.
3. The information session should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.

3. Physical Hazards

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

Rotating and Moving Equipment

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

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

Noise

- No worker should be exposed to a noise level greater than 90 dB(A) for a duration of more than 8 hours per day without wearing ear plugs/ear muffs.
- Exposures to impulsive or impact noise shall not exceed 140dB(A).
- For every 3 dB(A) increase in sound levels from the permissible limit of noise, the 'allowed' exposure period or duration should be reduced by 50 percent.
- Where it is not practicable to reduce the noise, the employer must limit the duration of time persons employed or working in the workplace are exposed to the noise so that such persons are not exposed to excessive noise.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
- Periodic medical hearing checks should be performed on workers exposed to high noise levels.

Vibration

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

Electrical

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

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

Eye Hazards

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

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

Welding / Hot Work

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

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

Working Environment Temperature

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

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly
- Providing temporary shelters to protect against the elements during working activities or for use as rest areas

- Use of protective clothing
- Providing easy access to adequate hydration such as drinking water or electrolyte drinks.

Ergonomics, Repetitive Motion, Manual Handling

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

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

Working at Heights

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

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

Illumination

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

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

4. Personal safety equipment for workers

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

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

Workers are instructed regarding safety equipment as follows:

- Always wear complete set of protective wear.

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

5. Standards for workers' accommodation²

1. General living facilities

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

2. Drainage

- The site is adequately drained.

3. Heating, air conditioning, ventilation and light

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

4. Water

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

5. Wastewater and solid waste

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

6. Rooms/dormitories facilities

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

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

- Separate storages for work clothes and PPE and depending on condition, drying/airing areas are provided.

8. Sanitary and toilet facilities

- Sanitary and toilet facilities are constructed from materials that are easily cleanable.
- Sanitary and toilet facilities are cleaned frequently and kept in working condition.
- Toilets, showers/bathrooms and other sanitary facilities are designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors.
- Separate sanitary and toilet facilities are provided for men and women.
- Toilet and shower facilities are conveniently located and easily accessible.
- Toilet facilities are environmentally friendly (e.g., pit toilet) and sewage is not disposed into the worksite.
- Open defecation in the vicinity of project sites should be prohibited.
- An adequate number of hand wash basins and showers/bathrooms facilities are provided.

9. Cooking and laundry facilities

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

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

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

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