

Bhutan for Life

Environmental and Social Management Plan

for

Jigme Khesar Strict Nature Reserve (2022)

1. Introduction

(A) Project Background

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

BFL seeks to achieve the following objectives:

- Help Bhutan remain carbon neutral by increasing forest and vegetative cover within the Protected Area System;
- Enhance the socio-economic wellbeing of communities in and in the vicinity of the PAs through climate-informed natural resources management;
- Maintain stable, thriving and diverse populations of key species contributing toward national and global biodiversity goals;
- Strengthen organizational, institutional, and financial capacity for effective management of PAS. BFL includes five components that reflect these goals, divided into 16 milestones (or outputs) and over 80 detailed activities.

(B) Scope of ESMP

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

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

This ESMP will be implemented by BFL focal person in 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

The only Strict Nature Reserve declared by the Royal Government of Bhutan in 1993 and came into operation in the year 2010. The then known as Toorsa Strict Nature Reserve was renamed to Jigme Khesar Strict Nature Reserve (JKSNR) in honor of His Majesty the King Jigme Khesar Namgyel Wangchuck in October 2014. The reserve covers an area of 784.225 km² that can be categorized into different habitat zones from tropical broadleaved forest in the south to an alpine meadow in the north.

The strict reserve is located in the western part of Bhutan between 27°34' and 27°11' latitude and 89°54' and 89°10' longitude bordering with Indian state of Sikkim to its west and forming a contiguous natural habitat of alpine meadows with Autonomous Tibet region of China in its north. The altitude ranges from 1361masl to over 5597 masl. Geographically, northern part of reserve consists mostly of rugged mountain terrains, rocky peaks, screes, and harbouring numerous sacred alpine lakes and few plains. The southern parts are scoured steeply by streams and rivers forming narrow valleys. Alluvial and colluvial formation are apparent in the narrow valleys of reserve, which consist of soil, silt, clay, sand and gravels brought done by the action of the soil and water erosion.

The Reserve is currently administered by four sections (Nature Conservation Section; Forest Protection and Enforcement Section; Social Forestry and Extension Section; and Forest Resources Management Section) from the head office. There are two range offices and three outposts under the Reserve. The management is currently manned with 26 technical and 4 nontechnical staff. This level of manpower is adequate for a successful implementation of the reserve activities within the given time frame.

(b) Climatic conditions

The reserve experiences a cold climatic condition in the alpine zone and warmer in the lower foothills. As shown in figure 1, minimum and maximum temperature was recorded as -11.090 and 08 with mean temperature as 0.667°C. Maximum Relative Humidity recorded was 98%, minimum 39% and mean RH was 77% respectively. The area receives snowfall from November to April month and it melts with onset of April month, providing an abundance of soil water prior to the monsoon period. Maximum rainfall was recorded between June-August months.

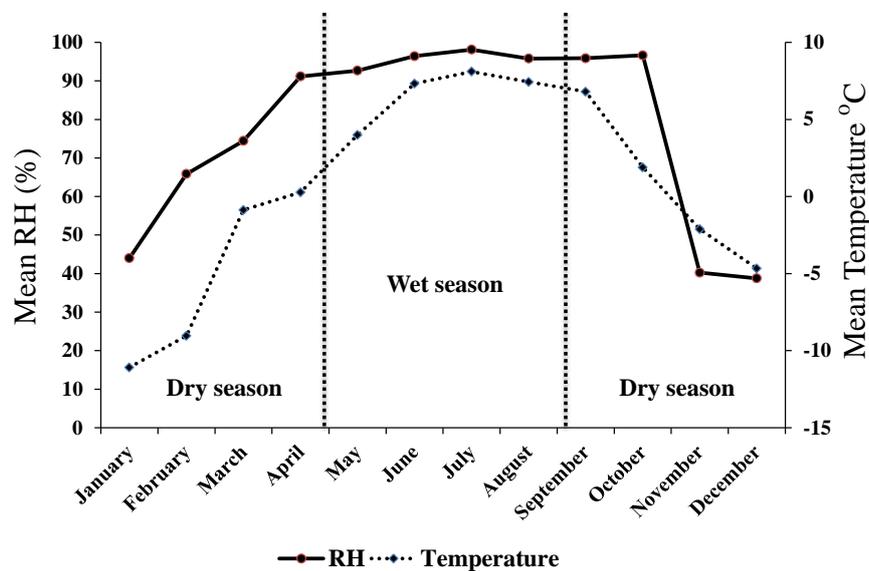


Figure 1 Pluiothermic diagram showing wet and dry months at study sites. Based on mean relative humidity and temperature

(c) Hydrological conditions

The reserve has several cultural and historical significant sites such as Nub-Tshonapata lake, Ngatsho, Dingtsho, Ngetotsho, Regotsho, Chunduegang and Chundulhatsho which are legendary lakes attributed with historical, spiritual and traditional beliefs in the country. Legendry story of Nublang (*Bos indicus*, native cattle breed at Sombaykha) and Relm (Cymbals) at Paro dzong was linked to Nub-Tshonapata Lake that was treasured by Terton Sherab Mebar in the past. These Lakes are equally important sources for many tributaries of Haa Chhu, Wang Chhu and Amochhu under Haa Dzongkhag benefiting the down valleys for their agriculture, drinking and other domestic purposes.

(d) Flora and fauna

This is the only protected area in Bhutan without permanent human settlements, except for few migratory yak herding communities. It protects the western most variant of temperate forests in the country ranging from broadleaf forests to alpine meadows in the north. Being virtually uninhabited, the area has one of the most pristine temperate and alpine vegetation in the entire Himalayas. The area is truly a conservation jewel in the Eastern Himalayas, abound by many globally endangered species of mammals and high value medicinal plants, rich plant communities, and endowed with many critical watersheds for two major rivers of Bhutan.

It is also a home to many endemic and threatened mammal species such as Tiger, Snow Leopard, Red Panda, Alpine Musk Deer, Bhutan Takin, Asiatic Black Bear; and endemic plants like *Meconopsis superba*, and *Bhutanthera himalayana* in northern frontiers.

The reserve area has recorded 473 species of plants including tree & shrub (205), herb & grasses (193) and orchids (75), 39 species of mammals, 203 bird species, 68 butterflies' species and 7 fishes. Species listing consist of four endangered (En), seven vulnerable (V), nine near-threatened (NT), 19 least concern (LC) and 11 in Schedule I under Forest Nature Conservation Act of Bhutan.

(e) Socio-economic conditions

Administratively JKSNR comprises of four geogs namely Bjee and Sombaykha geog under Haa, and Tendruk and Norgaygang geog under Samtsee dzongkhag. Almost 70% of the reserve area falls under Bjee geog. JKSNR does not have a permanent settlement residing inside the reserve area; however, 57 herders of Bjee, Kartsho and Eusu have traditional grazing rights in the area. Sombaykha, Tendruk and Norgaygang geogs practices subsistence farming and few of them own livestock to supplement their income.

3. Planned activities in Year 2021

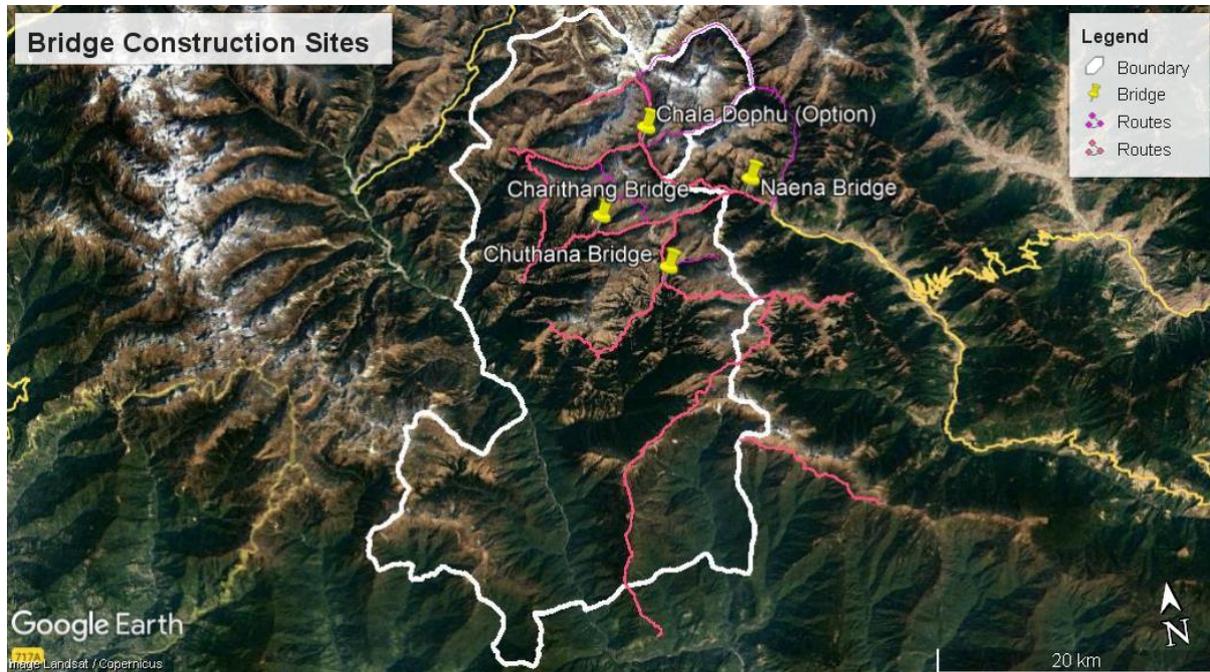
The planned activities in JKSNR that require an ESMP are the following:

Activity 3.1: Cantilever Bridge construction

- *Budget: Nu.2001625.85*
- *Timeline: January-June 2022*
- *Location: Chuthana, Charithang, and Naena*

Three cantilever bridges shall be constructed over the Chuthana River, Charithang River and the Naena River under Bjee geog. The strict nature reserve has almost 57 seasonal herders, three major RBA outposts at Charithang, Sinchulumpa, and Shaktoe with several sub-outposts for a security reason, Indian Army outposts, and trading routes for the local communities. These institutions and herding grounds are fragmented by high mountains and torrent Rivers affecting the daily chores of the herders; movement of the security personals and commuters, transportation of ration to RBA outposts, and hindering the forest personals in conducting a regular patrolling in the area. During the summer season, the rivers at the

proposed site swell and cut off the routes both for the herders, RBA personals and the forestry officials conducting patrolling in the area. Therefore, construction of bridges over these rivers is inevitable and would benefit the forestry officials, army personals, traders and the seasonal herders throughout the year.



Map 1: Location of bridge construction sites (Chuthana, Charithang and Naena)

Specifically, the bridges at Chutana River will connect Lolithang, Labana, Jarzajortab, Tshochekha, Drasa, Tamzhing, Baeyena and Bjichila grazing grounds with Tshonapatra, Jadhothen, Tshephu, Tsang, Womji, Regona, and Tshabjo grazing grounds benefiting almost 31 herders of Bjee, Eusu and Katsho geogs. This bridge will also benefit the Bhutan and Indian Army personals (approx. 100 personals) in reaching their base camps and also in transporting ration regularly. Most importantly, it benefits forestry personals in conducting regular patrolling (**Image 1**).

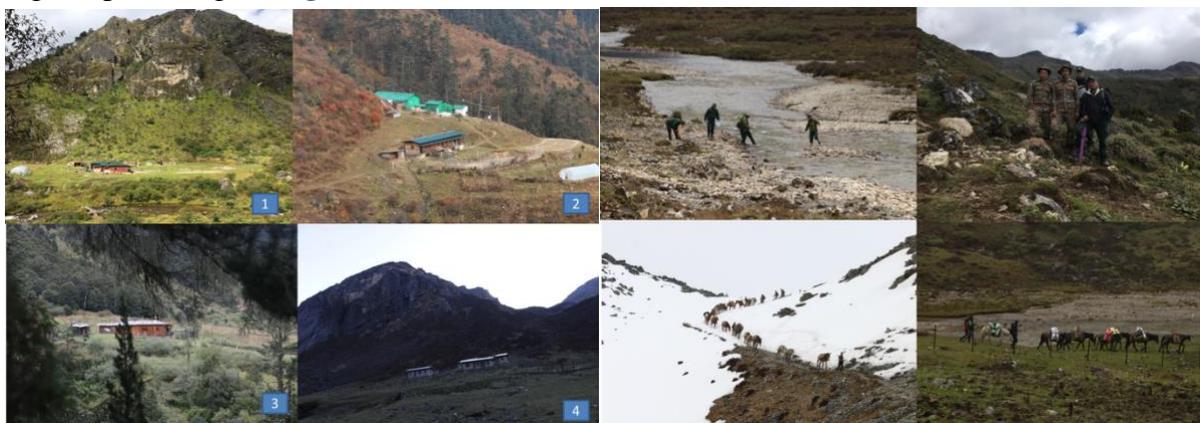


Image1. Beneficiaries viz. RBA base camps (1.Sinchulumpa, 2.Takha, 3.Charithang, 4.Chala); local commuters, and forestry on patrolling.

Charithang Bridge will benefit the herders of Jazagortap, Charithang, Zorsumla, Chunyena, Sinchulumpa, Haa La, Borigom, Boriwongma, and Lharigang for almost six months of their herding season and it is also a lifeline to Bhutan and Indian personals based at Charithang, Lharigang, and Phutregang RBA base camps; and main connectivity for the commuters travelling to China. This bridge will also enhance the SMART patrolling along the border of China and India by forestry personals (**Image 1**).

Nenana Chhu Bridge shall benefit 25 herders residing in Shaktoe, Chala Dophu, Sinchulumpa, Pangkala, Haa La, Jula, Chuthana, Chunzomtsee, Lolithang and Drasa grazing ground. Moreover, construction would connect three RBA basecamps of Charithang, Sinchulumpa, and Shaktoe with their RBA wing office at Damthang and it will also benefit Indian Army and the commuters transiting to China. The bridge would also support and enhance the forestry law enforcement activities like regular patrolling, attending human wildlife conflict, and apprehension of illegal cases within and around the reserve area.



Image 2. Grazing grounds of Lolithang, Drasa, and Tshabjo La

The proposed sites are the indispensable connectivity for the commuters that fall in the northern portion of the reserve area and the sites comprises of alpine grassland along with sparse fir forest. Chuthana and Charithang construction site falls in plain area surrounded by fir forest with Rhododendron undergrowth. Nenana construction site falls in shallow gorge valley surrounded with mixed conifer forest and Rhododendrons (**Image 3**). Three bridge sites were selected with series of proposition from the herding community and army personal as well.



Image 3. Bridge construction sites (1.Chuthana, 2.Charithang and 3. Naena River)

The bridge construction work shall be awarded to and executed from January 2022 to June 2022. Flow of the construction work might be hindered at certain point of the season because of the harsh climatic condition during January, February and March months, however, the timber mobilization, and resources procurement shall be carried in these seasons. The masonry works shall be implemented from April 2022 until June 2022. A total budget of Nu.**2001625.85** was approved in year 4 Q1 and Q2 inclusive of work charges for the initial site verification, regular monitoring, and final evaluation of construction works by the funding agency, and the implementing agency.

Under this project, three cantilever bridges shall be constructed which requires of 1) site clearance (manual cutting of shrubs); 2) manual excavation of the bridge foundation; 3) gathering of resources (collection of stone and sand at site, procurement and transportation of cement & other materials, and processing wooden blocks); and 4) construction works (Layout, masonry work, and wood work). Works shall be guided by approved engineer drawing and timely monitoring by the site in-charge and engineer.

The working sites are remotely located and therefore, execution of work by the foreign workers shall be difficult and cost in-effective. Accordingly, the construction work shall be awarded to the benefited herders which might account their ownership and will also improve the work quality. Work will be awarded to a group of 10 individuals (herders) with a prescribed contract agreement for the period of six months (Jan 2022-June 2022). Harsh climatic condition at the construction sites would require good living room with heating system in place that will increase work efficiency. Therefore, Chuthana, Jazagortap and

Taenkha herder hut shall be used as living room by the workers and they will feed on springs nearby for drinking and washing.

The construction work shall be carried at a 2 days waking distance from the nearest settlement under Bjee geog. However, few seasonal herders may reside nearby the construction site during summer season (May-June) and the work will not damage or hampered the livings in and around the site. It might incur certain pollutants in the river system through masonry and wood works, however, work being time-bound in nature, one season, Do's and Don'ts in the contract agreement, and specifying in the mitigation measure of social and environment safeguard shall minimize the impact on surrounding environment and social livelihoods.

4. Mitigation Measures for Environmental and Social Impacts

1. Construction of three Cantilever Bridges

The potential environmental and social impact for this activity includes:

- Cutting down vegetation
- Generation of waste as a result of camping and construction works
- Workers' health and safety
- Erosion & water pollution

Potential impact	Impact scale	Proposed mitigation measures	Responsible Party	Costs (million)
Activity 1: Construction of three Cantilever bridges at Chuthana, Charithang and Naena Chhu				Nu. 2001625.85
Cutting down vegetation: Cutting down of trees and other vegetation for construction purposes	Long term major	<ul style="list-style-type: none"> • Pre-construction: Design the construction in a way that minimizes the need to cut down trees (by selecting proper activity sites and ensuring that damage to vegetation is minimized on each selected site) • During construction: Ensure that no accidental damage is caused to local vegetation • After construction: Development of the construction site with native trees in place of the cut trees 	BFL focal, Bjee Range Officer, Contractors	To be included in the contract agreement
Waste: Generation of waste as a result of construction activities	Short term minor	<ul style="list-style-type: none"> • Pre-construction: Requirements for appropriate waste management should be included in the bidding documents, as a precondition for the contractor's selection • During construction: 		

		<ul style="list-style-type: none"> ○ Ensure that camps are located away from existing stream, river, or water sources, and that no discharge from camps is made into nearby water bodies; ○ Proper containers/waste bins should be provided at the project site; ○ Dumping of waste on the sides of the road, on private land, or in other non-designated places should be prohibited; ○ Dumping waste shall be prohibited on fragile slopes, forests, religious or other culturally sensitive areas or areas where livelihood is derived; ○ Collection, transportation and final disposal of all waste should be undertaken regularly [monthly] ○ All construction materials should be covered during the transportation to avoid waste dispersion; ○ The options for reuse/recycling of the generated waste should be taking into consideration (e.g. excavated soil, etc.). ○ Burning of construction waste should be prohibited. <ul style="list-style-type: none"> ● After construction: <ul style="list-style-type: none"> ○ All waste shall be removed from the project site. 	BFL Focal, Bjee Range Officer, Contractors	To be included in the contract agreement
Water quality: Contamination of local water sources may occur due to waste water and sewage from construction sites	Short term minor	<ul style="list-style-type: none"> ● Pre-construction: Requirements for appropriate measures to prevent water contamination should be included in the bidding documents, as a precondition for the contractor's selection ● During construction: <ul style="list-style-type: none"> ○ An environment-friendly toilet (e.g., pit toilet) and washing facilities should be made available, built with locally available materials 		

		<ul style="list-style-type: none"> ○ Open defecation in the vicinity of project sites should be prohibited ○ Throwing waste in water sources should be prohibited ○ Surface run off directly from the construction site to the nearby stream should be avoided <ul style="list-style-type: none"> ● After construction <ul style="list-style-type: none"> ○ Pit toilets are dismantled and pits are covered ○ All waste is removed from the project site 	BFL Focal, Bjee Range Officer, Contractor	To be included in the contract agreement
Soil erosion, landslides and flooding	Short term minor	<ul style="list-style-type: none"> ● Pre-construction: <ul style="list-style-type: none"> ○ Sites are prone to soil erosion or landslides shall be avoided, to the extent possible ● During construction: <ul style="list-style-type: none"> ○ Retention structures shall be constructed, to the extent possible using environmentally friendly materials. If not possible, a concrete wall could be considered; ○ The area of ground clearance should be minimized; ○ Avoid sensitive alignments, such steep hillsides and ecological sensitive areas; ○ Maintain trail surface and alignment with vegetation and where possible install slope protection 	BFL Focal, Bjee Range Officer, Contractor, Site Engineer	To be included in the contact agreement.
Workers' health and safety	Short term 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 all the time ● Ensure that no underage workers, or children are engaged ● Ensure decent work conditions, including an appropriate salary, working hours, accommodation and other essential amenities as 		

		<p>per the Operational Health and Safety Guidelines are available for workers.</p> <ul style="list-style-type: none"> • Ensure that workers are employed on the principle of equal opportunity and fair treatment, and there is no discrimination with respect to any aspects of the employment relationship, such as recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, and disciplinary practices. • Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns 	BFL Focal, Bjee Range Officer, Contractor	To be included in the contract agreement.
<i>COVID-19 related risk</i>		<ul style="list-style-type: none"> • Follow COVID 19 safety protocols circulated by Ministry of Health (MoH). 	BFL focal, Bjee Range Officer, Contractor	Include in contract agreement
Conflict between temporary workers and local communities		<ul style="list-style-type: none"> • Workers shall be made aware of local culture and traditions, as well as the legal consequences of harassment and intimidation, especially with regards to sexual harassment and gender-based violence • Local communities shall be made aware of the engagement of temporary workers in project sites. • Strict monitoring shall be carried out to ensure conflicts are minimized 	BFL focal, Contractor	Include in contract agreement

5. ESMP Implementation Arrangements

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

This ESMP should be part of the contract that the PA will sign with the Contractor(s) for implementation of the planned activities in JKSNR in the 2022. The Contractor is obligated to perform all proposed preventive or mitigation environmental and social measures in this plan and to keep the evidence of any documents related to applying these measures (e.g., letter asking the municipality for disposal of inert waste, records on OHS information session performed for all workers before start of activities, all developed EHS plans, etc.). An OHS information session should be organized by the Contractor for all workers prior to starting of the project activities and prior any specific tasks with high health risks.

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

Disbursement of project funds to the PA will be contingent upon their full compliance with the safeguard's requirements.

6. ESMP Monitoring Arrangements

The BFL focal person in JKSNR 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.

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

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

SI#	Activities	Monitoring team	Timeline		Location	Means of Verification
			Start	Complete		
1	Construction of three cantilever bridges	Field Focal	Jan 2022	June 2022	Chuthana, Charithang, Naena River	Field Reports
		ESS focal	May 2022	June 2022		

1. Construction of cantilever bridges

Monitoring by implementing entities:

Initial construction site verification for three bridges shall be carried by BFL focal in presence of CFO, Range officer, Bjee; financial representatives, and the site engineer, Dzongkhag Engineering section.

The BFL focal along with the site engineer will conduct a periodic monitoring (once a month) since the inception of construction work to maintain the work quality and standards as per the engineering drawing and ESS mitigation measures.

The BFL focal shall also submit the field reports to ESS focal after every visit to the construction site.

Monitoring by ESS consultants:

The ESS focal shall monitor the work status, work quality, and ESS mitigation measures compliance through photographic evidences provided by the IAs during the work implementation as per the datelines given above.

ESS focal/officer shall furnish an annual report to BFL Fund Secretariat in January 2023.

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

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

7. Capacity Need and Budget

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

The budget for construction of cantilever bridges is:

1. Construction of cantilever bridges US\$ 26501.07

SI#	Activity	Amount (Nu.)	Budget for ESS mitigation
1	Construction of Cantilever bridges	2001625.85	Nil
Total		2001625.85	

8. Consultation and Disclosure Mechanisms

This ESMP has been prepared in a participatory manner, and an initial community consultation was carried out with herders during citizen scientist training in 2021. Therefore, the site identification and endorsement works were made in principle during the same meeting by the herders and the management. Thus, three cantilever bridges shall be constructed at Chuthana, Charithang, and Naena River in Bjee Geog under Haa Dzongkhag. However, second round of meeting shall be convene with herding communities, RBA personals, geog administration, Dzongkhag administration, and management before the construction works is executed. During this meeting following points shall be delivered if required:

1. Optional site identification if the identified sites are not stable.
2. Social impacts and benefits,
3. Who and how the work will be executed?
4. How the quality of work will be assured?

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

9. Stakeholder Engagement Plan

The local community who have traditional rights in the vicinity of the planned BFL activities in JKSNR will be engaged throughout the implementation of these activities as follows:

1. Construction of cantilever bridges at Chuthana, Charithang and Naena River
 - a. Dates: January 2022
 - b. Agenda: Alternative site identification and work awarding mechanism.
 - c. Location: JKSNR, HQ

The BFL focal person has to 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. The participant list and the consultation minutes shall be shared to PCU while submitting the physical progress report at later stage.



ROYAL GOVERNMENT OF BHUTAN
GEWOG ADMINISTRATION
BJEE GEWOG
HAA, DZONGKHAG



གཞུང་ལོ་ ༡༤ ཚེས

Ref:Haa.Bji/Adm-31/2021-2022 / 765

Dated-21/10/2021

ནགས་ཚལ་གཙོ་འཛིན་འགོ་དཔོན་ལུ་

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སྒྲི

གནད་དོན་ ཉམས་མེད་ངོས་སྤྱོད་ལུ་ལཱ་

དེ་ནི་ ང་བཅས་ སྤྱི་སྐོར་འོག་གི་ལོ་རྒྱུ་འཇོ་སྤྱོད་མི་ཚུ་གི་དོན་ལུ་ འགོ་འགྲུལ་ཐབ་
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ཅིག་ལས་བཟུལ་ཐོབ་དོ་མེད་པ་ལས་ འཇིགས་མེད་རྒྱལ་གསེར་རང་བཞིན་སྤུང་སྤྱོད་དམ་འདུག་སེའོངས་གི་ཡིག་ཚང་རྟོང་
ལས་ མ་དངུལ་རྒྱུ་བདག་པོ་གནང་ཐོག་ལས་ ལས་སྤྱི་ཚུ་མ་དེ་སྤྱེ་ལུ་འབད་མི་འདི་ལུ་ ང་བཅས་སྐོར་འོག་བདག་སྤྱོད་རྟོང་ས་
ལས་ ཉམས་མེད་མེད་པའི་ངོས་སྤྱོད་ལུ་ལཱ་ལཱ་ཨིན། ཞེས་རང་ལྷོ་ ༠༩ པའི་ཚེས་ ༡༩ ལུ།

Gup
Bjee Gewog
Haa Dzongkhag
སྤྱི་སྐོར་འོག་གི་འགོ་དཔོན་

ANNEXURE II-

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 Sl. No. 21 of Regulation on Occupational Health, Safety and Welfare 2012.

1. General Facility Design and Operation

Integrity of Workplace Structures

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

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

Severe Weather and Facility Shutdown

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

Workspace and Exit

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

Fire Precautions

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

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

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

- 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.

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_accomodation.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-60593977-91c6-4140-84d3-737d0e203475-jqetNIh

3. Heating, air conditioning, ventilation and light

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

4. Water

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

5. Wastewater and solid waste

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

6. Rooms/dormitories facilities

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

8. Sanitary and toilet facilities

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

9. Cooking and laundry facilities

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

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

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

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