

Bhutan for Life
Environmental and Social Management Plan for
Biological Corridor Six (BC 6)-2021

1. Introduction

(A) Project Background

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

BFL seeks to achieve the following objectives:

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

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

(B) Scope of ESMP

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

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

This ESMP will be implemented by BFL focal person in each park authority (PA) and biological corridor (BC), and by the contractor to be commissioned by each PA\BC for the project.

(C) Purpose of ESMP

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

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

(D) Applicable law, policies, and regulation

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

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

In general, RGoB's laws, policies, and guidelines are in line with the WWF's environmental and social safeguards requirements. However, there are a few differences between the two systems. With regard to environmental impacts, there are no direct contradictions between the RGoB laws and regulations and the WWF's SIPP, but the requirements of the latter are more

extensive. All project activities should fully comply both with the RGoB's Regulations on the Environmental Clearance of Projects, and with the procedures and mitigation measures prescribed in this ESMF. In case that the WWF's SIPP requirements are more extensive, strict, or detailed than the RGoB legislation and policies, the former will apply to all project activities.

With regard to social impacts, the primary discrepancies between the RGoB laws and regulations and the WWF's SIPP refer to the status of non-title holders and informal land use, and the commitment to participatory decision-making processes. First, according to the WWF's SIPP, all users of land and natural resources (including people that lack any formal legal ownership title or usage rights) are eligible to some form of assistance or compensation if the project adversely affects their livelihoods. The RGoB laws only recognize the eligibility of land owners or formal users to receive compensation in such cases. Second, the WWF's SIPP require extensive community consultations as part of the development of various safeguards documents and during project activities. RGoB legislation does not include similar requirements. For the purposes of the BFL project, the provisions of the WWF's SIPP shall prevail over the RGoB legislation in all cases of discrepancy.

The occupational health and safety of workers in construction will be in compliance with Labour and Employment Act-2007, Regulation on Occupational Health, Safety and Welfare, 2012 and any other national documents. The list of the OHS requirements shall be attached along the Bill of Quantities (BoQ) along with an appropriate item description to allow the bidder to quote reasonably against the item, and to enable strict compliance and ease the monitoring during the project implementation time

2.Environmental and Socio-Economic Conditions:

(a) Geological and topographical condition

BC 6 connects Sakteng Wildlife Sanctuary (SWS) in the north with Jomotshangka Wildlife Sanctuary (JWS) in the South. The total area of the BC is 270.80 km² out of which about 124.56 km² or 46% is under Trashigang District (Kangpara; 19.87% & Merak; 26.38%) under Trashigang District, while 54 percent lies under Samdrup Jongkar District (Laurii; 15.93%, Martshella; 17.13%, Serthi; 17.70% and Samrang; 2.96%).

It is situated approximately between 26.98666N and 27.240223N latitudes and 91.78820E and 91.928484 longitudes. Biological corridor 06 has an altitudinal variation from 530 to 4300 meters above mean sea level (masl). Tropical broad-leaved forest is a main vegetation composition of the Biological corridor 06.

The BC 6 has over 99.28 percent (268.86Km²) of the land covered under forest cover with different types of forest types such as Cool and warm Broad-Leaved Forest and Fir Forest, shrubs (0.33%: 0.899 Km²) and meadows (0.03%; 0.863km²).

It was declared in 1999. However, there is no management plan as of now. Even the local communities are not aware of BC6 existence. Thus, an awareness program is crucial before implementing the activities under BC6.

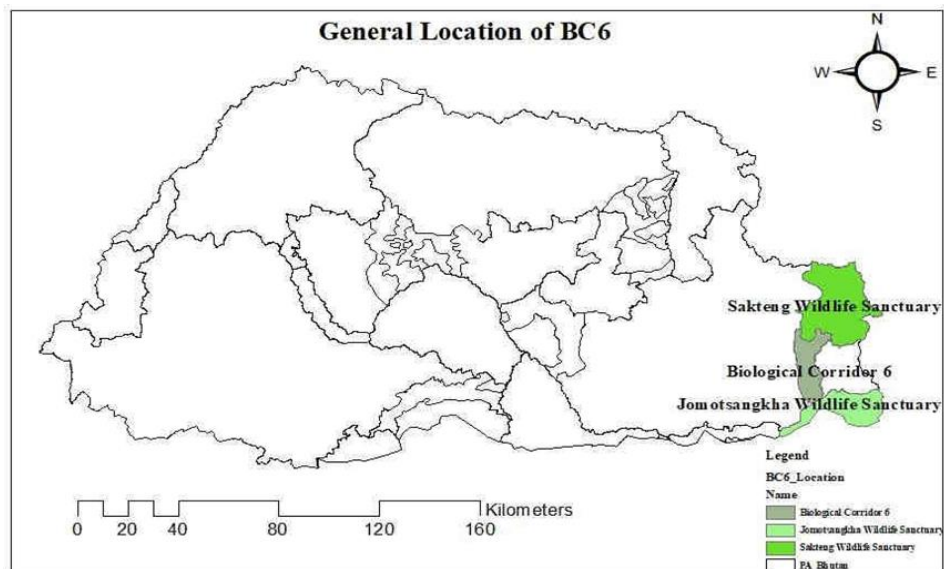


Figure 1: General Location of BC 6 in relation to B2C2 in Bhutan (This is as per New PAs size)

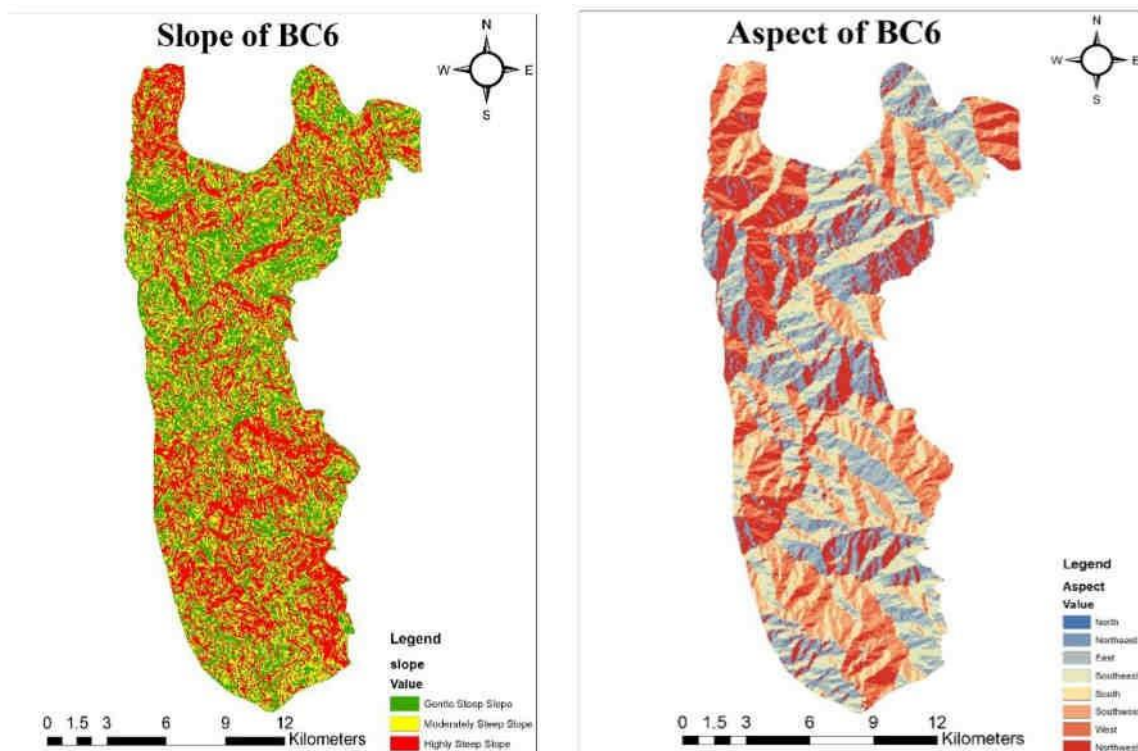


Figure 3 Slope & Aspect of BC 6 (Slope is re-classified into Gentle ($\leq 25^\circ$), Moderate ($\geq 25^\circ$ to 35°) & Steep Slope ($\geq 35^\circ$))

(b) Climatic conditions

BC 6 falls within the Humid subtropical climate or Subtropical Oceanic highland climate (Cwb) as per the Koppens climates classification of Bhutan. with Majority (80 %) of areas falling under temperate, dry winter and warm summer (Cwb), While the northern areas adjoining SWS and Chenla areas experiencing cold, dry winter, warm summer (Dwb).

Annual Mean temperature (AMT) of BC6 is 20.80°C with warm Annual Mean Clod Temperature (ACMT) & Annual Warm Mean Temperature 9AWMT) of 23.58°C respectively. The areas experience a mean precipitation of 2164.9 mm per year as per the table below:

Table: Climatic condition BC 6 as per secondary sources

Weather Station	Life Zone	Altitude	AMT	ACMT	WMT	PPT
Khaling station	Wet Forest	2020	13.73	6.35	19.51	1614.39
Thrimshing Station	Moist Forest	1350	16.26	6.76	22.82	1371.22
Daifarm Station	Wet Forest	280	23.35	17.61	27.67	2824
Koipani Station	Wet Forest	240	29.87	16.57	24.32	2850
Average Mean			20.803	11.8225	23.58	2164.9

Source: weather station of Bhutan, Data Source: Climate Data of MoAF, ArcGis

(c) Slope and Aspect

The general topography for this corridor is moderate to steep slope ranging from zero degrees to more than 35 degrees. The slope classification was carried out based on the standard adopted for developing Local Forest Management Plans (LFMP) in Bhutan. It was classified at an interval of 0 – 25 degrees, 25-35 degrees and more than 35 degrees corresponding to gentle slope, moderately steep slope and steep slope respectively. The spatial information was generated in ArcGis 10.4 Version with LULC 2016.

Table: Reclass slope

Slope Class	Cell Count	Area in Sq. Km	Percent cover
0-25	97220	83.70505834	30.91088876
25-35	102562	88.30444552	32.60936611
>35	114735	98.78522802	36.47974513*
		270.7947319	100

BC 6 areas have equal proportion of slope with slight differences in percent cover. Steep slope constitutes 36%, followed by 32% of gentle slope and only about 30% are gentle slope. The spatial occurrences are well distributed all across BC 6 areas. Typically, gentle slope is concentrated in higher altitude of sub-alpine areas and valley, whereas, the middle portion of areas, near Tshong-Tshongma base and Largab areas, the slope is steep. These are the areas that occurs mostly along the ridges and at many parts were found to be inaccessible to people. North-West facing dominates the areas with 18.94%, followed by East and South East Facing slope

Table 2: Re-classed Aspect of BC 6

Aspect Class	Area in Sq. Km	Percent cover
North	0.4106903	0.1516611

Northeast	33.237503	12.274058
East	42.566287	15.719023
Southeast	40.610987	14.996964
South	32.275782	11.918911
Southwest	37.59237	13.882238
West	32.800983	12.112859
Northwest	51.300128	<u>18.944286*</u>
	270.79473	100

(d) Hydrological conditions

The rivers, streams and water bodies contribute to about 0.02 Percent (0.05 Sq. Km) of the total corridor area. mainly consisting from portion of *Nyera Ama* river in West and *Jomorii* in East. Water bodies such as small lake, ponds, marshland and waterhole are found in its natural extent.

(e) Flora and fauna

BC 6 had an enumeration of 20 Mammals, 107 Birds and 157 plant species from first ever rapid biodiversity assessment from ten Biodiversity Plots in 2019. However, with revision and extension of areas from 160 sq. km to 270 sq.km, Additional around eight Biodiversity Grids (1614 to 2092) were assigned to BC6. Currently, BC 6 has about 18 Biodiversity Plots to explores the flora and fauna and accordingly, implement the conservation program in it. Flora and fauna.

Wildlife (Flora & Fauna) of Biological Corridor Six (BC6), Trashigang Eastern Bhutan, has remained unexplored and unprotected. This report summarizes the results of a comprehensive biological survey in Northern BC 6 areas (*Chenla*), and lays down the foundation for establishing the first management plan for BC 6 to conserve biodiverse hotspots

1.Mammal

BC 6 has records of 20 mammal species, representing about 15.5 percent mammal species in Bhutan hitherto. The recorded mammal constitutes three Endangered (EN) Species namely Red Panda (*Ailurus fulgens*), Dhole (*Cuon alpinusa*) and Asiatic Elephant (*Elephas maximus*) including five Vulnerable (VU) species such Common Leopard (*Panthera pardus*), Gaur (*Bos gaurus*), Asiatic Black Bear (*Ursus thibetanus*), Sambar (*Rusa unicolor*) & Capped Langur (*Trachypithecus pileatus*). Near threatened (NT) species such as Himalayan Goral (*Naemorhedus goral*), Assamese Macaque (*Macaca assamensis*) and Black Giant Squirrel (*Ratufa bicolor*) were also captured.



Figure 1© Tandin Wangchuk, Forest Ranger II, Trashigang Forest Division. Endangered Red panda (*Ailurus fulgens*) is only species in a family *Ailuridae*. They are the native to Himalaya. BC 6 harbors good number of Red Panda around Ningsangla, Chenla & S hinang-Juk areas. However, their existences are threatened in its natural extent due to habitat fragmentation and degradation, attributed to cattle Harding in the locality.

2. Birds

Assessment of bird diversity is being carried out using Mac Kinnon's listing methods especially in Alpine and sub-alpine forest.

We recorded about 107 species of birds, which represents about 14.22 percent of bird records in Bhutan. Rapid survey on birds had been carried out only in Alpine and sub-Alpine forest mostly concentrated in four Micro-habitat such as Alpine meadow, fire forest, Cool broad leaved and water bodies in higher altitudes.

Pheasant species such as Monal pheasant, Himalayan monal, blood pheasant, *Satyr tragopan* and Jungle fowl were recorded. Recording of *Trimicks tragopon* and *Blyth tragopan* from the vicinity of BC 6, signify the need for further exploration of Birds in other region of the areas.



Figure 3: Picture© Tshering Dorji & Dawa Tshering, Forest Ranger, Trashigang Forest Division. Trimminck's stragopan (*Tragopantemminckii*) is evaluated as the Least Concern (LC) on IUCN Red List of Threatened species. It is been records in camera trap outside the BC 6 under Warmrong Range. *T.temminckii* is recorded for the first time in Bhutan from Jomotshangkha Wildlife Sanctuary(JWS) in 2014. Further, the reports of sighting it from Sakteng Wildlife Sanctuary (SWS), signify the SWS-BC6-JWS plays a significant landscape for pleasant or medium sized ground dwelling birds' species in the region.

3.Plant

Stratified random sampling method was used as sampling design for four different strata via. Fir forest, sub-alpine forest, Open Meadow and Cool Broad-Leaved Forest. Sample plots were laid along altitudinal gradient or laterally inside 4x4km NFI grids with Plot size of 20x20m & 2x2m were used for three, regeneration and herb assessment. We recorded about 157 species of plants, representing only 2.9 Percent to the total plant records in Bhutan, with good record of Rhododendron species (16 Species), representing 33.3 percent of Rhododendron species in Bhutan. *Rhododendron kesangiae*, native to Bhutan and endangered species such as *Tetracentron sinense*, *Primula bhutanica*, *Sapria himalayana* and newly discovered *Bulbophyllum trongsaense* were also recorded from the locality.



Figure 4. Picture ©Tandin Wangchuk, and team, flora team of RBA assessment 2019. *Sapria himalayana* Griff. – It is a rare holophrastic plant under the family *Rafflesiaceae*. They are in the brink of extinction and is classified Endangered (EN) in IUCN. It grows on the roots of lianas and is totally dependent on the host plant for food, nutrients and water for its survival. RBA survey team while heading towards Grid 2012 and 2011 encountered this magnificent plant growing under the shades of some Oak and *Beilschmedia* sp. with associates of *Pandanus unguifer* and *Dipteris conjugata* ferns.



Figure 5 @ RBA team, Trashigang Forest Division. *Bulbophyllum trongsaesensis* new to science, discovered from Trongsa by Bhutanese scholar in early 2020. *B.trongsaesenes* is also found in its natural extent of Chenla & Nyingla. Further, there is reports of sighting from Lhuntshe Districts as well.

(f) Socio-economic conditions

There are no records of permanent settlement inside BC areas (LULC 2016). However, about 2253 Household with a population of over 18,902 are recorded in Six Geog of Merak, Kangpara, Lauri, Serthig, Marteshela & Samrang under Trashigang and Samdrup Jonkhar District respectively in which BC 6 falls partially or in buffer areas.

These are tentative figures as the socio-economic survey is yet to be assessed and finalized. The main source of income for the communities in the area is agricultural farming in lower Geog of BC 6, such as Martshela, Serthig, Kangpara and Samrang. however, community of Merak and Lauri are into livestock-based farming.

3. Planned activities in Y2021

Activities that are planned in BC 6 in 2021 include the following:

Activity 1: Construction of Range Office at Warmrong

There is urgent need for additional structure at Wamrong Range Office under BC6. This is to cater the additional responsibility of services delivery and enhance conservation imitative including BC 6 Areas. Currently, Range Office is hosted in old two storied traditional Bhutanese structures with ground floor being used as the Office of Range Office, while the first floor serves as the residential purposes. Construction work will be started from July 2021 (1st Quarter of Fiscal year 2021 to 2022) and is expected to be completed by December 2022 (2nd Quarter of Fiscal year 2022-2023) with construction time frame of 18 months. We have an earmarked allocated budget of Nu. 5Million from BTFEC as the 3rd Year BFL financing.

Proposed site falls within the Institutional land of DoFPS with site name mentioned to as *Tshozor* under the Plot Numbered, LUM 1236 with plot area of 6.244 Acres. Total area of Range is 14.3 Acer with the two plots LUM-1231(7.1) and Lum 1236 (6.2) with GPS coordinated of 27.130546° E & 91.567674° N with elevation of 2038Masl.

Currently, Majority of BC 6 activities are implemented by 18 Technical staff with four ESP of Warmrong Range with the mandates of catering forestry service delivery and conservation inside and out of protected areas. It is located at 90 Km away from Division Headquarter, Trashigang. With this, management had proposed for the new Range Office construction at Warmrong with the objective is to host Office of both Range and BC in new structure, while the current old structure will be renovated to host two more staff inside the campus.

Warmrong Forest Range Office is constituted by three Beat offices, One Forestry Office and one Check Post spreaded across four Geog of Khaling, Lumang, Kangpara and Thrimshing under Two Dungkhag of Warmrong and Thrimshing. 18 technical staff supported by four ESP cum Resident of RO, along with three staff quarters.



Figure: Range Office cum RO resident



Figure: Current quarters for staff of Warmrong range



BC 6 being located in extremely remote location between Merak Geog boundary in the North, Kangpara in the West, Laurii in the East and Serthig & Samrang in the South, it takes two and half days to reach nearest BC 6 boundary from Division Head Quarter, Trashigang. It is about 200km away of motorable road till Threlphu and one and half day journey from Threlphu to chenla on foot.

Construction of Office inside Warmrong Range Campus is crucial as it only the nearest Range Office to the BC 6 Areas. Warmrong being located closed to BC 6 areas among the other Range Offices under Trashigang Forest Division. However, it is about 70 km away from nearest motorable road, and a day and half long on foot from Nearest motorable road. The Office is designated to provided services as well as implement conservation program in BC 6.

G+1 storied Range Office Construction at Tshozor, under Warmrong Dungkhag, Trashigang District will be constructed by awarding the contract through Government Procurement System. There will be about 15 to 20 construction works employed by the contractures for about 18 Month. Construction material such as timber will be procured from registered private sawmiller based at Trashigang, which is about 83km from proposed site. Boulders and sand item will be brought from the authorized surface collection site of NRDCL (Natural Resources Development Corporation Limited) from Phegparii, which is about 30 km away. The construction materials that are not readily available will be procured by contractors either from Trashigang or Samdrupjongkhar, that is 90km away from construction site temporally worker will be hosted within the Range Campus in the temporally huts made of the CGI sheet with toilet and waste bin made attached to the huts. It is expected to use about 1000ML of water per day during the construction of Office for 18 months. The following structure specification of Development Control Regulation of Bhutan will be used as the specification and design:

- All structural timber shall conform to the IS883
- moisture content of the structural timber shall not exceed 12%
- all structural timber shall have a minimum allowable bending stress of 7mpa
- a minimum allowable horizontal shear stress, f_v , of 0.6mpa, a minimum modulus of elasticity(e) of 9800mpa, and maximum unit weight of 5.75 kn/m³.
- (g)formwork
- properly brace and shore form work to maintain alignment and tolerance in accordance with is456:2000.

- form work shall comply with clause 11 of is 456:2000.
- stripping of form work shall comply with clause 11.3 of is456:2000

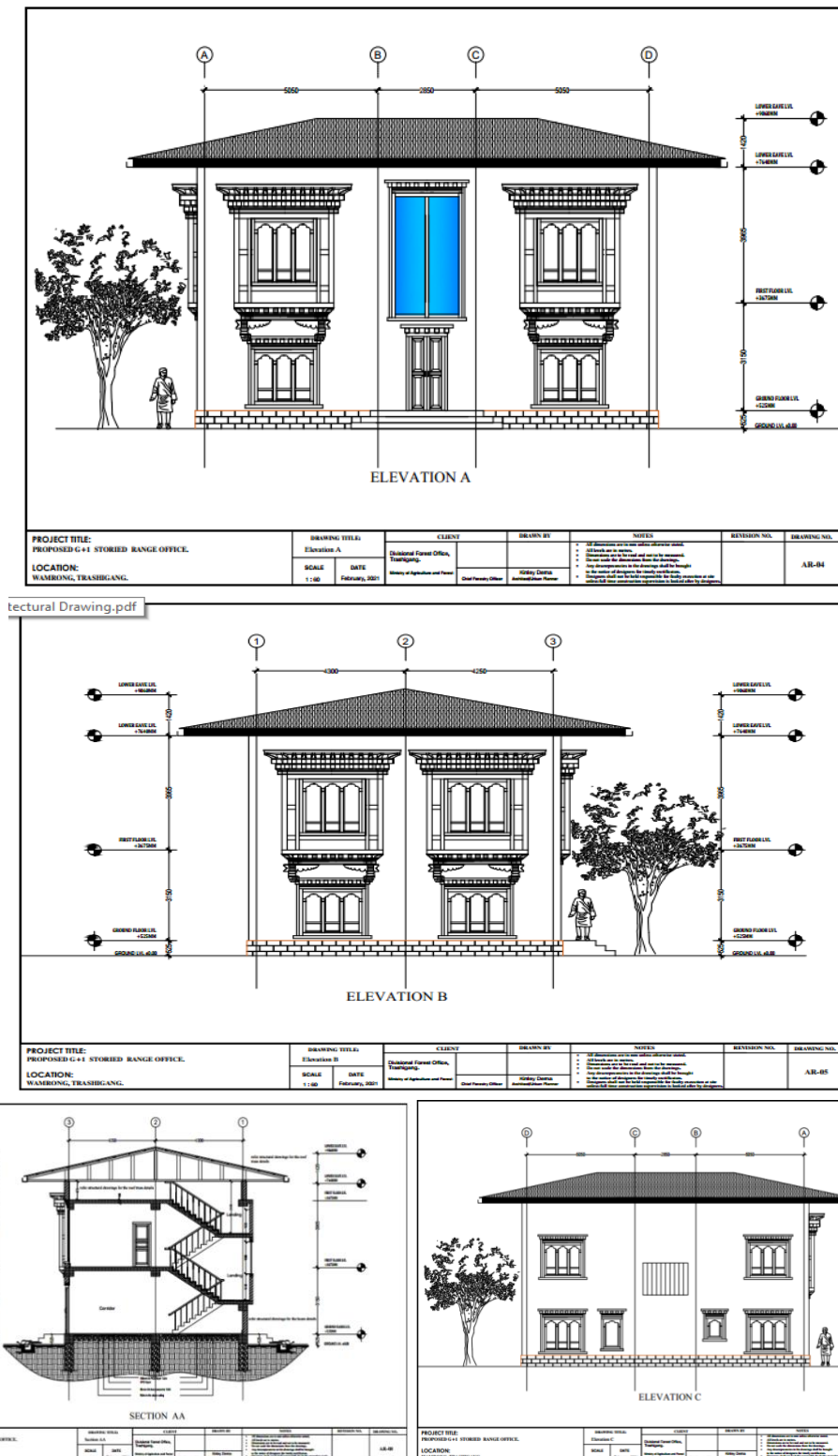


Figure: Architectural drawing of Range office

The environmental and social impacts are the following:

- Access to and usage of water distribution network used by BPCL and Range staff

- Workers' health and safety

Noise disturbance: Possible noise disturbance as a result of outdoor equipment usage and transportation vehicles driving around the construction site

Activity 2: Restoration of waterholes at BC 6.

The planned area is under Wangshingla and Nysangla under BC 6 areas. It is planned to carry out from March 2021 to June and November 2021 to December 2021. The budget for the activity is Nu. 75,000 and 1,00,000/- respectively. There are no communities in the activity site and the activity includes digging of earth manually for removal of siltation from waterholes. Further, about 2km artificial inlet will be constructed to facilitate infiltration of downstream by ten workers, under the supervision of technical staff. The worker will be residing on the open grassland which is about 2km away from waterhole management site in temporarily hut constructed for them.

The waterholes will be constructed as per the habitat management guideline developed by the Department by inserting pipe into the ground (2 Feet depth). The soil dug during the process will be used to cover the pipeline without major issue. The excavated soil will be used to cover the trenches to bury Pipe line. The work will also include removal and clearing of snags, and debris in and around the waterholes as well as the trails to water holes for the animals.

There will be no felling of trees, while for siltation removal as well as clearing corridor for pipeline at wangshingla waterhole improvement works

The environmental and social impacts are the following

- Wastes: Soil from digging activities and waste from the bio-degradable from cleaning activities such as dried grasses, snags and debris;
- Workers' health and safety (safety gears and religious offering)
- Risk of poaching of animals which will be very minimal

4. Environmental and Social Impacts and Mitigation Measures

Potential impact	Impact scale	Proposed mitigation measures	Responsible party	Costs
Activity 1: Construction of Range Office at Warmrong				Nu. 60,000/- (US \$ 833.33)
Water Access: Access to and usage of water distribution network used by BPCL and Range staff	short term <i>(Only during the construction Phase)</i> Major (Will have to share the scared resources)	Before: Prepare and accords water management plan in consultation with BPC and community to ensure the access to water sources. we will have connection to the water pipe line of BPC so as to connect the water source and constructs internal water distribution network for construction sites and staff quarters During: Construct or provided water storage facility to store the water for construction site and labour camp. After: Build or incorporate the water and sanitation facility along with other structure design or drawing	BFL focal & Contractor	1.Consultation cost: 1.a. Nu.10,000/- 2.. Issuing of Temporally water storage facility and pipeline: 2.a. Sintex Procurement Nu, 20,000/- 2.b. 500m PIPELINE Connection, Nu. 10,000/- Water Total Mitigation Cost for Water is Nu. 40,000/-
Noise disturbance: Possible noise disturbance as a result of outdoor equipment usage and transportation vehicles driving around the construction site	Short term Minor	<i>Pre-construction:</i> requirements to limit noise pollution should be included in the bidding documents, as a precondition for the contractor's selection <i>During construction:</i> <ul style="list-style-type: none"> Noise level control should be performed before the startup of construction activities; The construction work should not be permitted during the nights, the operations on site shall be restricted to the hours 7am—7pm; Vehicles that are excessively noisy shall not be operated until corrective measures have been taken; Earplugs and protecting devices shall be provided to workers on site.	BFL focal and Contractor	To be incorporated in bidding documents
Air quality: dust as a result of construction works and possible emissions from transportation vehicles	Short term Minor	<i>Pre-construction:</i> requirements to limit emissions should be included in the bidding documents, as a precondition for the contractor's selection <i>During construction:</i>	BFL focal and Contractor	To be incorporated in bidding documents

		<ul style="list-style-type: none"> • Construction site, transportation routes and materials handling sites should be water-sprayed on dry and windy days; • Construction materials should be stored in appropriate and covered places to minimize dust; • Before allowing vehicles on site, fitness and emission test of the vehicle shall be performed; • Vehicle loads likely to emit dust need to be covered; • Workers should wear protective masks if dust appears; • Vehicle speed should be restricted within the construction site; • Regular maintenance of the vehicles and construction machinery should be performed in order to reduce any leakages of motor oils, emissions and dispersion of pollution; <p>Burning of debris from ground clearance shall be prohibited.</p>		
Waste: generation of waste as a result of construction activities	Short term Minor	<p><i>Pre-construction:</i> requirements for appropriate waste management should be included in the bidding documents, as a precondition for the contractor's selection</p> <p><i>During construction:</i></p> <ul style="list-style-type: none"> • Identification of the different waste types at the project site (soil, asphalt, food, etc.); • Ensure that camps are located away from existing stream, river, or water sources, and that no discharge from camps is made into nearby water bodies; • Proper containers/waste bins 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; 	BFL focal person and Contractor	Waste management after construction: Nu 20,000 /-

		<ul style="list-style-type: none"> • Dumping waste shall be prohibited on fragile slopes, forests, religious or other culturally sensitive areas or areas where livelihood is derived; • Collection, transportation and final disposal of all waste should be undertaken regularly (Weekly, on Friday along with Forestry staff) • All construction materials should be covered during the transportation to avoid waste dispersion; • The options for reuse/recycling of the generated waste streams should be taking into consideration (e.g. excavated soil, etc.). • Burning of construction waste should be prohibited. <p><i>After construction:</i></p> <p>All waste shall be removed from the project site.</p>		
<p>Workers health and safety including COVID</p> <p>Refer to the full OHS guidelines attached where ever relevant)</p> <p>Prone to accident and injury due to falls or falling object during construction site</p>	Short term and Minor	<ul style="list-style-type: none"> • Comply with the workers' health and safety guidelines • Ensure regular health screening for the workers pre and during construction activities • Ensure that no underage workers, or children are engaged • Ensure decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers • Ensure 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, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices. 	BFL focal and Contractors	To be incorporated in bidding documents

		<p>Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns</p> <ul style="list-style-type: none"> Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) 		
Activity 2: Water hole improvement Works				
<p>Waste: soil from excavation activities and waste from construction activities</p>	<p>Short term</p> <p>Minor</p>	<ul style="list-style-type: none"> Proper containers/waste bins should be provided at the project site; Dumping of waste in the waterholes, on the sides of the road, on private land, or in other non-designated places should be strictly prohibited. Dumping of 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 carried out on a daily basis and not left in the protected areas <p>Burning of construction waste should be prohibited.</p>	<p>BFL focal person</p> <p>Contractor</p>	<p><i>Meet from Activity cost</i></p>
<p>Workers health and safety including COVID</p> <p>Refer to the full OHS guidelines attached where ever relevant)</p>	<p>Short term</p> <p>Minor</p>	<ul style="list-style-type: none"> Comply with the workers' health and safety guidelines Ensure regular health screening for the workers pre and during construction activities Ensure that no underage workers, or children are engaged Ensure decent work conditions, including an appropriate salary, working hours, accommodation and food for workers shall be provided to all workers Ensure 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 	<p>BFL focal person</p> <p>Contractor</p>	<p><i>Meet from Activity Cost</i></p>

		<p>wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.</p> <p>Implement a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns</p> <ul style="list-style-type: none"> • Strictly abide by COVID prevention protocols (use masks, maintain distance, wash hands regularly etc.) 		
Increased poaching	<p>Short term</p> <p>Minor</p>	<ul style="list-style-type: none"> • Construct waterholes in areas where poaching is limited • Park authorities shall carry out increased patrolling during and after the waterhole construction • Install camera trap 	<p>BFL focal person</p> <p>Contractor</p>	<i>Meet from Monitoring and anti-poaching patrolling budget</i>

5. ESMP Implementation arrangements

The implementation of project activities will be carried out by the BFL focal person in BC 6. The focal person will be responsible for compliance with all procedures outlined in this ESMP, as well as compliance with any requirements to obtain clearances, permits, approvals, or consent documents from relevant authorities and stakeholders. Since most of the activities outlined in 2021 will be carried out by the forestry official there is no need to sign an agreement with the Contractor(s) for implementation of the planned activities in BC 6 in 2021. However, an OHS information session should be organized by the BFL focal for all workers/ forestry officials prior to start of the project activities and prior any specific tasks with high health risks.

The BFL focal of BC 6 needs to monitor the implementation of proposed measures with visual checking, reviewing the records of evidence that the measures have been applied. Non-compliances should be recorded and the Report on any non-compliances should be reported to the ESS Officer immediately, and the ESS Officer will report it to the PCU (M&E Officer). Each non-compliance should be closed with appropriate measure/s and the evidence should be kept.

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

6. ESMP monitoring arrangements

The BFL focal person in BC 6 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.

BC 6 is also fully responsible for the compliance of all external contractors and service providers working in the BC 6 with the safeguard's requirements outlined in the ESMP.

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

Sl.	Activities	Monitoring team	Timeline		Location	Means of Verification
			Start	Complete		
1	Range Office Construction at Warmrong					
	1.1 Preparing drawing & Estimates	Field focal	January 2021	March 2021	TFD	Architectural, Structure, Electrical, Plumbing and Sanitation Drawing along with estimate Ready
	1.2 Prepare detailed estimate for floating tenders on Govt. eGP		April 2021	May 2021	TFD, TDA	Tender floated in Govt. EDP for construction of Range Office at Warmrong
	1.3 Work evaluation and Awarding		June 2021		TFD, TDA	Contract documents
	1.4 Construction kicked- off		July 2021	December 2022	TFD	Progress, Physical and Financial Report
	1.5 Handing-Taking		December 2022		TFD	Handing-Taking report
		ESS Officer	4 th week Nov, 2021		Trashigang	Field monitoring
2	Improvement of Waterholes in BC 6					

	2.1 Wangshingla Waterhole Works <i>2.1.1. Survey and Estimate Preparation for Wangshingla Waterhole improvement</i>	Field Focal	April 2021		Wangshingla	Survey and estimate report
	<i>2.1.2. Water Hole improvement work</i>	Field Focal and RO Warmrong	April 2021	May 2021	Wangshinla	Work Completion report
	2.2. Nysangla Waterhole Works <i>2.2.1. Survey and estimate preparation</i>		April 2021		Nusangla	Survey and estimate report
	<i>2.2.2. Water Hole improvement work</i>		April 2021	May 2021	Nusangla	Work Completion report
		ESS officer	4 th week May, 2021		Nusangla	Monitoring report

Note: TFD: Trashigang Forest Division, **TDA:** Trashigang Dzongkhag Administration, **SFES:** Social Forestry & Extension Section

1. Range Office Construction at Warmrong

Monitoring by implementing entities:

- At least weekly field visits
- Monthly reports prepared by implementing entities and submitted to ESS officer

Monitoring by ESS officer:

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

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

2. Improvement of Waterholes in BC 6

Monitoring by implementing entities:

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

Monitoring by ESS officer at PCU:

- 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, 2022.

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 15 to 20 workers.

The budget for all of the activities is **Nu. 5.175 Million**. A separate budget **Nu. 0.060Million** of will cover the implementation of the ESMP mitigation measures.

The budget for each of the activities is:

1. Range Office Construction at Warmrong – **Nu. 5 Million**
2. Improving waterholes: **Nu. 0.175Million**

A separate budget of **USD 833.33 (Nu.60,000/-)** will cover the implementation of the ESMP mitigation measures.

8. Consultation and Disclosure Mechanisms

This ESMP has been prepared in a participatory manner with BC6. A community consultation will be carried out as described in section 9. This is mainly to inform local communities

regarding the planned project activities, solicit their opinions, and enable them to question proposed mitigation measures. The main issues that were raised during the consultation meeting include the following:

The detailed minutes of the consultation meeting will be kept as a requirement for this ESMP, along with a full list of participants (disaggregated by gender and age).

The full English version of this ESMP, as well as an executive summary in Bhutanese, shall be disclosed on the website of MoAF, BFL 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 that resides in the vicinity of the planned BFL activities in BC 6 will be engaged throughout the implementation of these activities.

For waterholes restoration activities, there will be consultation with the communities as some of the waterholes are as big as lake and are considered holy. The consultation will be with the local leaders (Gup) and the communities to inform and get consent from the communities. It will involve religious offerings to the deities of the lakes.

The date of consultations for water hole improvement is:

- Date: 13th December, 2020
- Agenda: Social consent on water holes restoration at Wangshingla and Nysangla areas

For Range Office construction at Warmrong, the planned date of consultations was:

- Dates: 11th December, 2020 by BFL Focal, 19th December 2020 by PD-BFL-PCU
- Agenda: Conservation plan and areas confirmation with local Government Administration, Warmrong Dungkhag

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.

10. Consultation and Disclosure Mechanisms

This ESMP has been prepared in a participatory manner, and a community consultation was carried out on **11/12/2020 & 19/12/2020 for Range Office Construction by BFL Focal and Honorable Director of DoFPS, Program Director of BFL-PCU** respectively at **Warmrong Range** to inform local communities regarding the planned project activities, solicit their opinions, and enable them to question proposed mitigation measures. The main issues that were raised during the consultation meeting include the following:

The detailed minutes of the consultation meeting are attached to this ESMP, along with a full list of participants (disaggregated by gender and age).

Annex 1. Community consultation minutes for waterhole improvement work at Wangshingla and Nysangla under BC 6

SL No.	Name	Gender (M,F,O)	Age	Vulnerable group (youth, differently abled, etc.)	Signature	Remarks (designation)
16	Yingne	M	58	—	(16)	
17	Santana Wangpo	M	26	—	(17)	
18	Yanten Dorji	M	29	—	(18)	
19	Keptun Dorji	M	35	—	(19)	
20	Phurba Chokpor	F	31	—	(20)	
21	Chime Jangmo	F	30	—	(21)	
22	Somawa Wangdi	M	42	—	(22)	
23	Tulay Wangchuk	M	50	—	(23)	
24	Somawa Tulzang	M	41	—	(24)	
25	Ngawang Thulay	M	22	—	(25)	
26	Tenzin Thoma	F	33	—	(26)	
27	Keptun Wangchuk	F	31	—	(27)	
28	Zomba Humeis	F	26	—	(28)	
29	Dorson	F	28	—	(29)	
30	Yompa Uden	F	40	—	(30)	

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མངའ་སྡེ་རྒྱལ་ཚོལ་ཡིག་ཚང་། མཐུན་ཚུགས་པ་གྲིས་བསྐྲང་།
Ministry of Agriculture and Forests
Department of Forests and Park Services
Divisional Forest Office
Trashigang
Ref. TGD/NCS-04/2019-2020/ *504* Date: 09th, December 2020

Office Order

Mr. Ugyen Dechen, Forestry Officer, Head of Mature Conservation Section (NCS) will be on tour w.e.f 10/12/2020 to 18/12/2020 towards Warmrong and BC 6 areas (Chenia).

He will be engaged in 'monitoring of works of BFL and conducting ESS consultation for 3rd Year BFL financing for BC 6 activities.'

(Signature)
(Karma Deki)
Chief Forester **FORESTRY OFFICER**
FORESTATION
TRASHIGANG

Copy to:

1. Project Director, PCU, BFL for kind information, please
2. Concerned staff for necessary action
3. Office Copy/NCS



Technical Report on consultation on Waterhole management and Assessment of Social & Environment Screening (ESS) for Wildlife Habitat management Activities as 3rd Year BFL Activities within BC 6



Stakeholders:

Community of Kangpara Geog,
Trashigang District



Dated: 10/12/2020 to 17/12/2020

Report Submitted by:

1. Ugyen Dechen, Forestry Officer, BFL Focal Person

Report Submitted to:

1. Project Director, BFL-PCU, Thapa Bhutan
2. Mr. Karma Leki, CFO, TFD, Trashigang

1

Minutes of Meeting on Consultation Meeting

Date: 23/11/2020

Venue: Threlphu Community Lhakhang

Participants: Threlphu Community, Tshogpa, Gomdey Lam and Forestry Officials

Total Participants: 28 (20 Male & 8 Female)

A community consultation meeting was conducted on 23rd November 2020 held at Threlphu Lhakhang with the 24 participants led by the Chiwog Tshogpa. Since, out of total participants nine were female dominated by male with 15 male participants mainly to inform local communities regarding the planned project activities, solicit their options, and enable them to question proposed mitigation measures and feedbacks from the public. The main issues and points that were discussed during the consultation meeting are kept detail by the minute's keeper Mr. Phuntsho Wangdi. The detail minutes are attached separately.

Objective:

- To inform local communities regarding the planned project activities
- Enable them to question proposed mitigation measures
- To educate the advantage and disadvantage of project activity

SL No.	Discussions/Agenda	Outcome/Resolution
1.	Public of Threlphu community were informed regarding the consultation meeting with regard to the BC6 related activity at Shinangjilo and Chenla	As informed, the public gathered at Threlphu Lhakhang ground for consultation meeting and registered all the participants by BFL, Kangpara.
2.	Mr. Ugyen Dechen, Sr. FR-III, Khaling BO highlighted the importance of BC6, and its impact in the current trend. He also highlighted how the Covid-19 pandemic has hampered the pace of developmental activities. For instances, he mentioned that biodiversity which plays as a crucial role and a factor contributing for the boost in tourism sector also got hampered with the pandemic. The need of contribution and cooperation from the public were well informed.	The public expressed their gratitude to the government, especially to the Department of Forest and Park Services for bringing up so many developments in their Chiwog through BC6 activities, funded by BFL. They committed to work if given any opportunity henceforth.
3.	As informed, the creation of waterholes and water pipe line connecting from Yurchungbrangsa to Shinangjilo were discussed. It was suggested that the water pipe to be connected into Shinangjilo Tsho. All the activities will be spearheaded by Mr. Ugyen Dechen.	Public expresses their gratitude if drinking water is to be connected from Yurchungbrangsa to Shinangjilo area so that they don't have to go to fetch water from the source itself. The creation of water hole/artificial pond would further benefit the wild as well as domestic

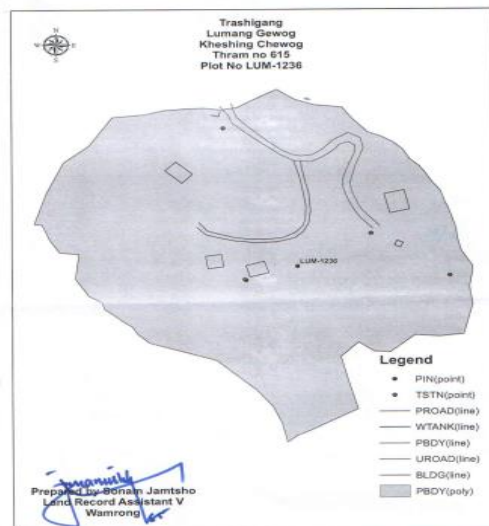
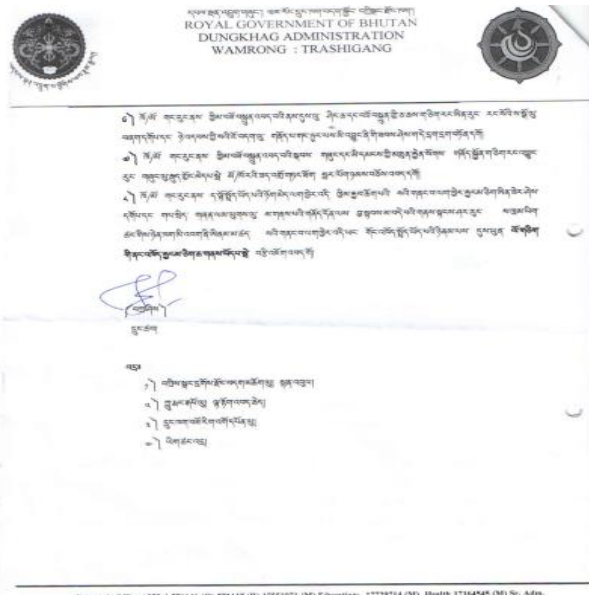
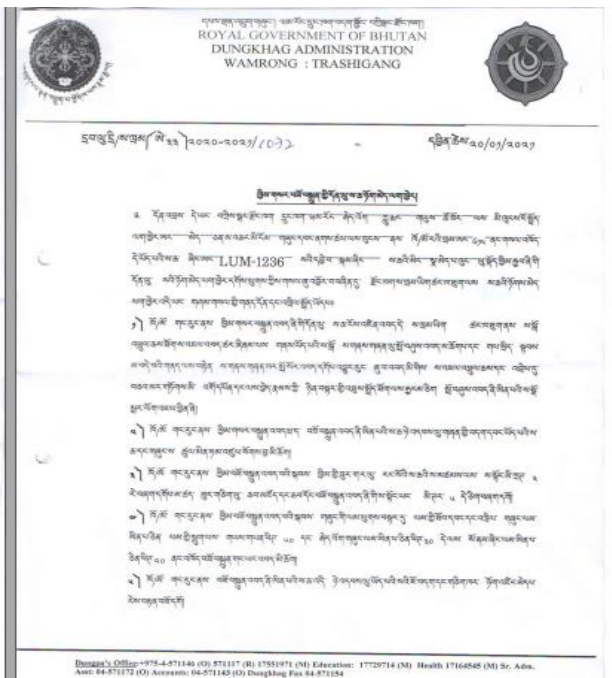
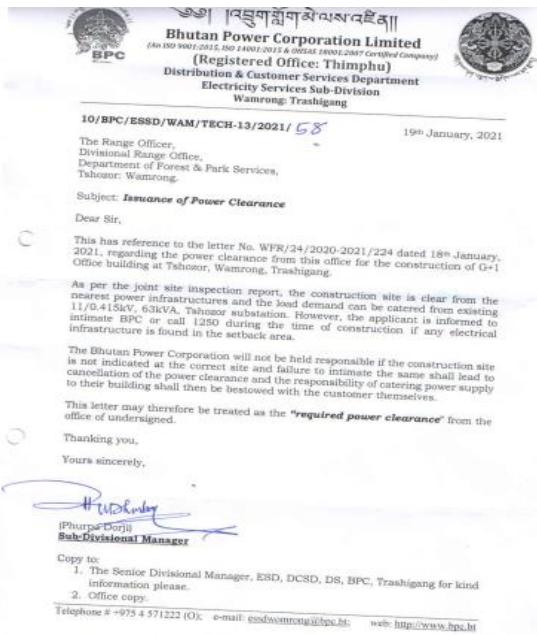
	Sr.FR-III, Khaling BO.	animals. However, the connection of water pipe directly into Shinangjilo Tsho was objected since they believe that the mixture of two waters from different sources would bring ill luck in their community. Therefore, it was decided that the water will be passed into the artificial ponds.
4.	Before the start of an activity, it was discussed that a simple ritual to be performed at sites to ward off any ill lucks that may happen.	Mr. Tshering Chopel and Mr. Kuenga Gyelsken to perform ritual/prayers of religious offering such as Sang and Serkem both the site at Ejungbrangsa water source and Shinangjilo before commencement of an activity. Tools and equipments to be arranged by themselves.
5.	Discussed on the community labour contribution during Shinangjilo works with terms and conditions that how they are going to start the works.	Workers were sorted out voluntarily for Shinangjilo works and accepted to do works based on the daily wage rate. Following people are the members: 1. Sonam Tobgay 2. Sonam Rinchen 3. Tshering Chopel 4. Ugyen Wangdi 5. Yeshe Tshering 6. Rinzin Dorji 7. Kinley Gyelsken 8. Rinchen Dorji 9. Kuenga Gyelsken
6.	The activities at Chenla with regard to raising water pipe at drinking water source and creation of water holes just below the guest house were discussed. All the activities at Chenla will be spearheaded by Mr. Phuntsho Wangdi, FR-II, Kangpara BO. The workers were also sorted out.	The work at Chenla will be carried out right after the completion of Shinangjilo works. The following members volunteered: 1. Sonam Tobgay 2. Rinchen Dorji 3. Kinley Gyelsken 4. Sonam Rinchen

Photograph during community consultation meeting on 24/11/2020 held at Threlphu



Annexure 2: Range Office construction Clearances and approval





Annexure. BFL: SUGGESTED OCCUPATIONAL HEALTH AND SAFETY STANDARDS

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

This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. It is based on the IFC's Environmental, Health, and Safety Guidelines (April 30, 2007)¹ and the Occupational Health and Safety Guidelines of Bhutan's Construction Development Corporation Ltd., which relies on the national Regulation on Occupational

Health, Safety and Welfare 2012, Regulation on Working Conditions 2012 and Labour Act 2007, and in compliance to Sl. No. 21 of Regulation on Occupational Health, Safety and Welfare 2012.

1. General Facility Design and Operation

Integrity of Workplace Structures

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

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

Severe Weather and Facility Shutdown

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

Workspace and Exit

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

Fire Precautions

The workplace should be designed to prevent the start of fires through the implementation of fire codes applicable to industrial settings. Other essential measures include:

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

Lavatories and Showers

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

Potable Water Supply

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

Clean Eating Area

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

Lighting

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

Safe Access

- Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe, and appropriate access.
- Equipment and installations requiring servicing, inspection, and/or cleaning should have unobstructed, unrestricted, and ready access.
- Covers should, if feasible, be installed to protect against falling items.
- Measures to prevent unauthorized access to dangerous areas should be in place.

First Aid

- The employer should ensure that qualified first-aid can be provided at all times. A sufficient number of first aid boxes or cupboards shall be provided and maintained so as to be readily available during all working hours, provided that the distance of the nearest first aid box or a cupboard stall be not more than 200m from any working place.
- First aid kits include all equipment outlined in Annex 1 to these Guidelines.
- Remote sites should have written emergency procedures in place for dealing with cases of trauma or serious illness up to the point at which patient care can be transferred to an appropriate medical facility.

Work Uniform

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

Air Supply

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

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

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

3. Physical Hazards

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

Rotating and Moving Equipment

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

protective measures include:

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

Noise

- No worker should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- Although hearing protection is preferred for any period of noise exposure in excess of 85 dB(A), an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the 'allowed' exposure period or duration should be reduced by 50 percent.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
- Periodic medical hearing checks should be performed on workers exposed to high noise levels.

Vibration

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

Electrical

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

- Marking all energized electrical devices and lines with warning signs
- Locking out (de-charging and leaving open with a controlled locking device) and tagging-out (warning sign placed on the lock) devices during service or maintenance
- Checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools
- Double insulating / grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter (GFI) protected circuits
- Protecting power cords and extension cords against damage from traffic by shielding or suspending above traffic areas
- Appropriate labeling of service rooms housing high voltage equipment ('electrical hazard') and where entry is controlled or prohibited
- Establishing "No Approach" zones around or under high voltage power lines
- Rubber tired construction or other vehicles that come into direct contact with, or arcing between, high voltage wires may need to be taken out of service for periods of 48 hours and have the tires replaced to prevent catastrophic tire and wheel assembly failure, potentially causing serious injury or death
- Conducting detailed identification and marking of all buried electrical wiring prior to any excavation work

Eye Hazards

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

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

Welding / Hot Work

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

- Provision of proper eye protection such as welder goggles and/or a full-face eye shield for all personnel involved in, or assisting, welding operations. Additional methods may include the use of welding barrier screens around the specific work station (a solid piece of light metal, canvas, or plywood designed to block welding light from others). Devices to extract and remove noxious fumes at the source may also be required.

Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result temperature stress-related injury or death. Use of personal protective equipment (PPE) to protect against other occupational hazards can accentuate and aggravate heat-related illnesses. Extreme temperatures in

permanent work environments should be avoided through implementation of engineering controls and ventilation. Where this is not possible, such as during short-term outdoor work, temperature-related stress management procedures should be implemented which include:

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

Ergonomics, Repetitive Motion, Manual Handling

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

- Facility and workstation design with 5th to 95th percentile operational and maintenance workers in mind
- Use of mechanical assists to eliminate or reduce exertions required to lift materials, hold tools and work objects, and requiring multi-person lifts if weights exceed thresholds
- Selecting and designing tools that reduce force requirements and holding times, and improve postures
- Incorporating rest and stretch breaks into work processes, and conducting job rotation
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions

Working at Heights

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

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

Illumination

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

- Use of energy efficient light sources with minimum heat emission
- Undertaking measures to eliminate glare / reflections and flickering of lights
- Taking precautions to minimize and control optical radiation including direct sunlight.

- Exposure to high intensity UV and IR radiation and high intensity visible light should also be controlled
- Controlling laser hazards in accordance with equipment specifications, certifications, and recognized safety standards. The lowest feasible class Laser should be applied to minimize risks.

4. Personal safety equipment for workers

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

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

Workers are instructed regarding safety equipment as follows:

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

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

2. Drainage

- The site is adequately drained.

3. Heating, air conditioning, ventilation and light

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

4. Water

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

5. Wastewater and solid waste

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

- Wastewater, sewage, food and any other waste materials are adequately discharged in compliance with national and/or international standards and without causing any significant impacts on camp residents, the environment or surrounding communities.
- Specific containers for rubbish collection are provided and emptied on a regular basis.
- Pest extermination, vector control and disinfection are undertaken throughout the living facilities at least once.

6. Rooms/dormitories facilities

- Rooms/dormitories are kept in good condition.
- Rooms/dormitories are aired and cleaned at regular intervals.
- Rooms/dormitories are built with easily cleanable flooring material.
- Rooms/dormitories and sanitary facilities are located in the same buildings.
- Residents are provided with enough space.
- The number of workers sharing the same room/dormitory is minimized.
- Doors and windows are lockable and provided with mosquito screens when necessary.
- Mobile partitions or curtains are provided.
- Adequate number of furniture such as table, chair, mirror, and lamps are provided for all workers.
- Separate sleeping areas are provided for men and women.

7. Bed arrangements and storage facilities

- A separate bed is provided for every worker.
- The practice of “hot-bedding” is prohibited.
- There is a minimum space of 1 meter between beds.
- The use of double deck bunks is minimized.
- If double deck bunks are in use, there is enough clear space between the lower and upper bunk of the bed.
- Workers are provided with comfortable mattresses. Workers may be expected to use their own pillows and bed linens.
- Workers wash bed linen frequently and applied with adequate repellents and disinfectants (where conditions warrant).
- Adequate facilities for the storage of personal belongings are provided.
- Separate storages for work clothes and PPE and depending on condition, drying/airing areas are provided.

8. Sanitary and toilet facilities

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

9. Cooking and laundry facilities

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

10. Leisure, social and telecommunications facilities

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

Contents of first aid box or cup-boards

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

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