



ESIA Executive Summary



Executive Summary

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1 INTRODUCTION

Burapha Agroforestry Co Ltd ('Burapha') is proposing to construct and operate the Burapha Veneer and Plywood Mill (hereafter 'the Project') in Hin Heup District, Vientiane Province approximately 80km north northwest of Vientiane. The Company has negotiated a concession agreement for approximately seven ha of land in the Hin Heup Light Industrial Zone in proximity to the villages of Ban Viengthong, Ban Phonesoung and Ban Khone Phook.

An Environmental and Social Impact Assessment (ESIA) for the Project has been prepared by Earth Systems on behalf of Burapha Agroforestry Co Ltd. This Executive Summary forms a part of the suite of ESIA documents.

1.1 Project Context

Planted forests are an important source of wood and fibre, making up seven percent of global forest area and with the potential to contribute an estimated two-thirds of the current round wood market internationally. Global consumption of wood products continues to rise, and planted forest areas are expected to double across Asia over the next four decades.

Lao PDR has the potential to develop its expanding plantation sector and capture the potential benefits of this global demand.

While the establishment of large scale plantations has stalled in recent years due to moratoriums on land concessions in 2007 and 2012, the government is now working on policy to promote sustainable plantation forestry. The government, through the National Socio-Economic Development Plan (NSED) 2016 – 2020 has also placed an emphasis on the promotion of processing industries to realise high value wood products and furniture production.

In light of these policy developments, Burapha intends to expand its agroforestry plantations throughout the four Provinces it operates in and is conducting a separate Environmental and Social Impact Assessment (ESIA) for plantation expansion. The success of the expanded agroforestry operations is reliant on a suitable processing unit to produce high value products at a higher production rate than are currently produced by Burapha's sawmill / wood manufacturing unit in Nabong, Vientiane Province. Similarly, the success of the Burapha Veneer and Plywood Mill is reliant on the expansion of Burapha landholdings for plantation forestry.

1.2 Project Overview

1.2.1 Project Proponent

The Proponent is Burapha Agroforestry Co. Ltd. Burapha Agroforestry was established in 1993 by a Lao-Swedish joint venture. The Company currently operates its agroforestry operations in the Provinces of Vientiane Prefecture, Vientiane Province, Xayabouly Province, and Saysomboun Province in central Lao PDR. The Company operates a tree nursery and sawmill / furniture manufacturing facility in Xaythany District, Vientiane Prefecture.

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1.2.2 Brief Project Description

The Mill

The Burapha Veneer and Plywood Mill (Mill) will process primarily small diameter Eucalyptus logs into veneer and plywood products.

The Mill will process approximately 112,000 m³ of sawlogs per annum at full capacity, providing approximately 48,000 m³ of finished product per annum. The raw timber will be sourced from Burapha Agroforestry operations from which are located across four Provinces / prefectures in central Lao PDR (Vientiane Prefecture, Vientiane Province, Xayabouly Province and Saysomboun Province). These plantations will be certified for environmental and social sustainability, a requirement of the Mill's Forest Stewardship Council (FSC) Chain of Custody Certification. The Mill may also process logs from other plantation owners, if the plantation operations meet sustainability criteria for the Mill.

Approximately 366 people will be employed to operate the Mill, with approximately 120 people working per shift. Approximately 59 people will work the veneer line (per shift) and 63 people on the plywood line (per shift).

The wood processing will be comprised of two primary facilities: a veneer-manufacturing unit and a plywood-manufacturing unit. Veneer processing will comprise:

- Debarking and cutting into unit lengths;
- Peeling into veneer sheets; and
- Veneer drying.

The plywood manufacturing line will comprise:

- Gluing veneers together and pressing in hot presses; and
- Finishing processes such as sanding and trimming.

Finished products will comprise:

- Construction grade plywood (approximately 60% of output), used for wood construction, concrete forms, furniture;
- Packaging plywood (approximately 25% of output), used for packaging material; and
- Sub-floor plywood (approximately 15% of output), used in floor construction.

The Transportation Network

The proposed Mill site is centrally located with respect to Burapha plantation landholdings and to National Road 13. Raw logs will be transported from Burapha plantations to the Mill and finished wood products will be transported from the Mill to Vientiane for domestic sales and for export to Thailand, Vietnam, and Myanmar (refer to Figure 1-2).

Proposed inbound and outbound transportation routes are provided in Table 1-1:

Table 1-1 Primary (proposed) log and plywood transport routes

Transport Route	Roads
Mill Access Route	4501
North East inbound route	13N and 5
North West inbound route	4544 and 13N
West / South West inbound	4501, 4502, 11, 4
South East in-bound and out-bound route	13N and 10
Southern inbound	120 13N

Approximately 14 trucks will each haul 30 m³ of raw logs to the Mill per day throughout the year at full operational capacity. Plywood will be shipped via Highway 13 to Vientiane, with an average of three trucks carrying 50 m³ of finished product per day. An additional 17 personnel will be employed or contracted to haul logs to the Mill and finished products to end markets.

1.2.3 Project Objectives

Commercial Objective

The commercial objective of the Project is the provision of a plywood manufacturing facility to support Burapha's expanding agroforestry operations. Mill operations will provide value added benefit to the Company and the plantation forestry sector. The operation of the Project will be undertaken in accordance with best industry practice and will comply with the conditions and standards prescribed by the GOL. Further, the operation will be undertaken according to the socio-economic and environmental objectives presented below.

Environmental Objectives

The environmental objective of the Project is to avoid any potentially adverse environmental impacts that may result from the Project, and mitigate impacts where they are unavoidable. Detrimental environmental impacts will be minimised through the use of industry best practice, and adherence to GOL and international environmental standards and regulations.

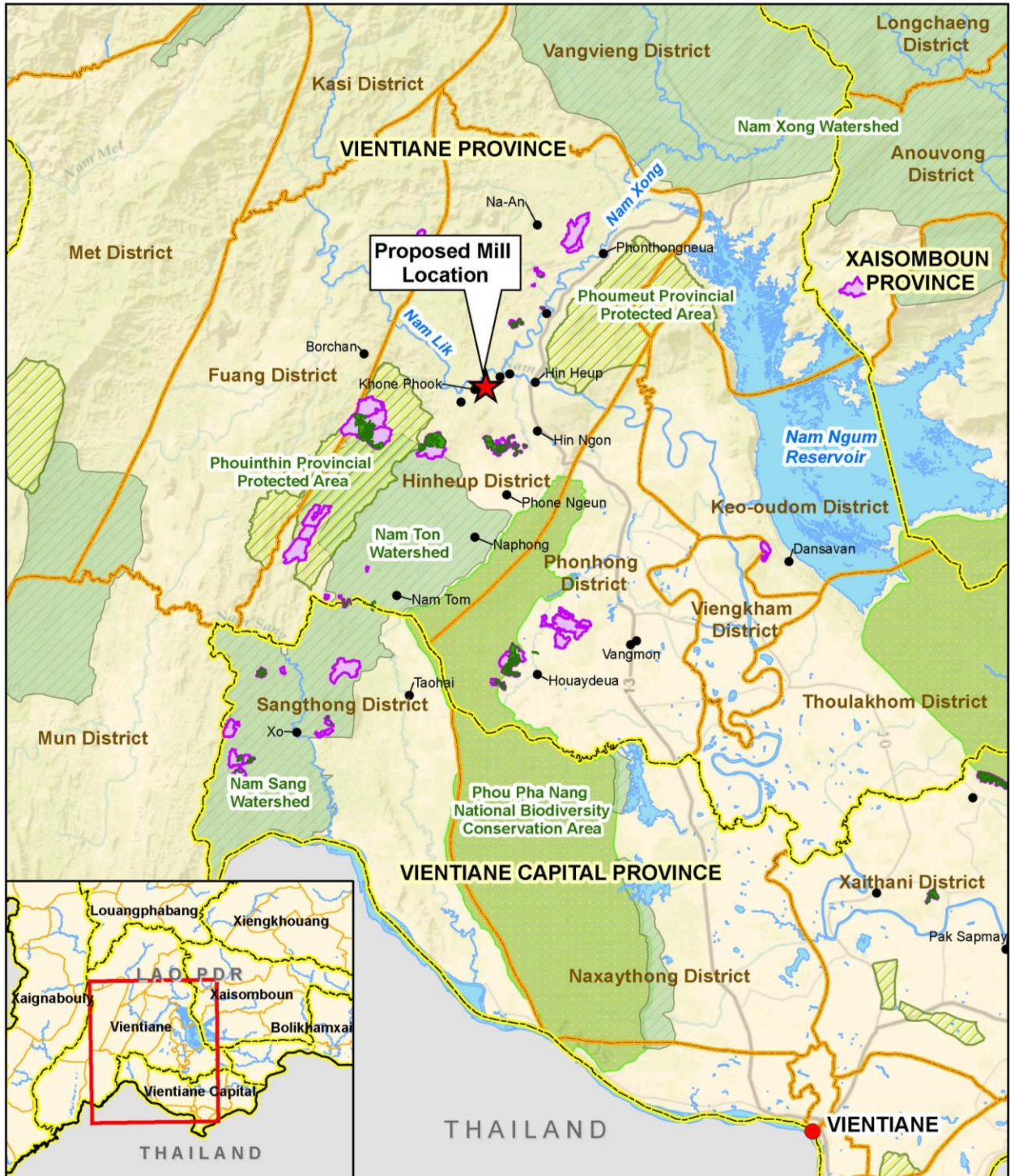
Socio-Economic Objectives

The socio-economic objectives of the Project are to (i) further develop the wood manufacturing potential of the region to support the expanding plantation forestry sector; (ii) generate revenue for the Company and tax benefits / royalties for the GOL; and (iii) provide employment opportunities for local residents.

1.2.4 Project Benefits

The Project supports the GOL's economic development plans for the region and is expected to generate substantial national, regional and local benefits including an initial US\$ 26 million foreign capital investment and resulting construction jobs and spin-off benefits; approximately 366 full time positions (during mill operations) with a priority on the recruitment and skills development of local workers; and an estimated US\$ 15.5 million per annum in revenue (at full production) and over US\$2 million per annum in GOL tax revenue.

The Mill will also facilitate the expansion of Burapha's agroforestry project to an initial 5000 ha, resulting in a further US\$ 11 million of foreign capital; 896 full-time positions and US\$ 200,000 government revenue in the form of land fees and taxes.



<p>Burapha Mill Project</p>	<p>Legend</p> <ul style="list-style-type: none"> ★ Proposed Mill Location ● Villages BAFCO Planted Area (2015) BAFCO Land Holdings (2015) Provincial Boundaries District Boundaries National Biodiversity Conservation Area (NBCA) Provincial Protected Areas Watershed Areas Major Water Bodies 	<p>Revision: Draft</p>
<p>Project Location</p>		<p>Date: August 2016</p>
<p>Map Scale @ A4: 1:500,000</p> <p>Coordinate System: WGS 1984 UTM Zone 48N Projection: Transverse Mercator Datum: WGS 1984</p>		<p>Author : Earth Systems</p> <p>EARTH SYSTEMS Environment Water Sustainability Suite 801, 23 Singha Road Ban Nongbone, Vientiane, Lao PDR Email: enviro@earthsystems.com.au Website: www.earthsystems.com.au</p>

Figure 1-1 Proposed Mill Location

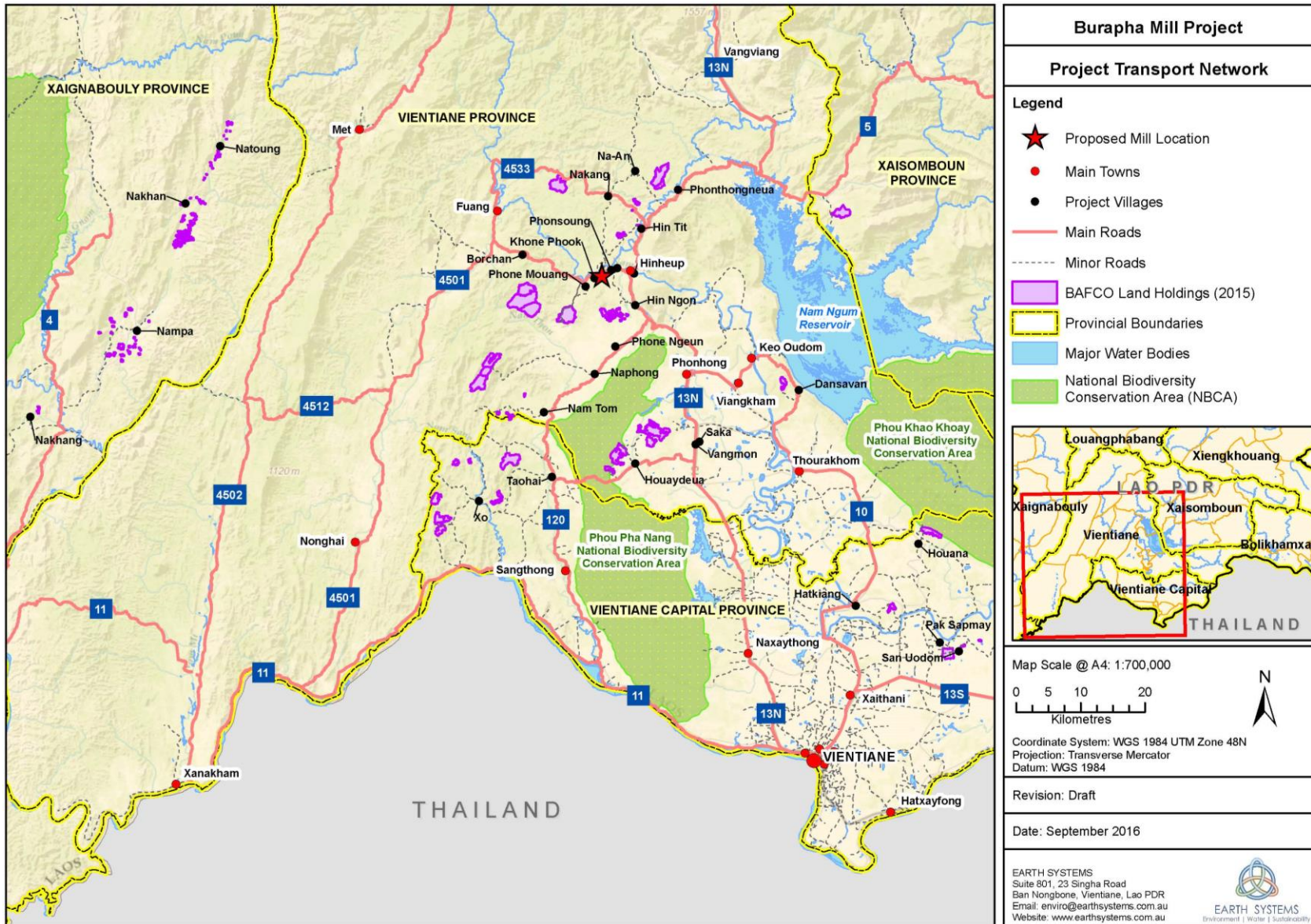


Figure 1-2 Proposed Transportation Network

1.3 Environmental and Social Impact Assessment

1.3.1 ESIA Objectives

The ESIA for the Burapha Veneer and Plywood Mill Project has been prepared by Earth Systems on behalf of Burapha Agroforestry Co Ltd.

The ESIA identifies the baseline conditions, the environmental and social risks and benefits of Project implementation, and the potential impacts associated with Project construction and operation. The likelihood and magnitude of these impacts are assessed based on available Project information. A framework for further community and Government consultation is also provided.

Consistent with Lao PDR legislation, this ESIA includes consideration of environmental and social aspects and impacts. A stand-alone Environmental and Social Management and Monitoring Plan (ESMMP) is provided as part of the ESIA (refer to Volume C).

1.3.2 Scope of the ESIA

The ESIA considers the benefits, risks, and potential impacts of constructing and operating the veneer and plywood mill as well as the transport of raw logs to the site and finished product to market.

A separate ESIA is being conducted in parallel to this ESIA to account for Burapha's intended expansion of its Agroforestry Plantation Operations.

Burapha currently has 8,000 ha of concession area for plantations, with approximately 3,000 ha planted with primarily Eucalyptus and a comparatively smaller area of Acacia. The Company will continue to plant suitable areas within the remaining 5,000 ha of its current concessions. It is estimated that approximately 5,000 ha of plantation lands are required to provide adequate raw material to continuously operate the Mill.

1.3.3 Environmental and Social Consultant

The Earth Systems Group is a multidisciplinary environmental and social engineering and science firm that develops and implements innovative and effective environment, water, and sustainability solutions throughout the world. Established in 1993, they have successfully completed over 500 major projects in Australia, Asia, Africa, South America, North America and the Pacific. Earth Systems has been operating in Lao PDR for more than 15 years, competing a range of environmental and social consultancy projects including EIAs for some of the country's most significant mining and hydropower project.

The Earth Systems Group is comprised of Earth Systems Sole Co. Ltd. and Earth Systems Consulting, as follows:

- Earth Systems Sole Co. Ltd, a licensed EIA consultant in Lao PDR with considerable experience conducting environmental and social assessments in the region; and
- Earth Systems Consulting, with offices located throughout the world, has technical experts in their respective fields to provide specialist inputs where required. These social and environmental specialists have considerable experience of working in Lao PDR for a range of assessments, including environmental and social assessment for a number of large agroforestry operations.

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1.3.4 Structure of the ESIA

The ESIA is comprised of four volumes:

- **Volume A: Executive Summary (this report);**
- Volume B: ESIA Report;
- Volume C: ESIA Appendices; and
- Volume D: Environmental and Social Management and Monitoring Plan and Public Consultation and Disclosure Plan

2 LEGISLATION AND GUIDELINES

2.1 Lao PDR Government Institutional Guidelines

2.1.1 Environmental and Social Impact Assessment

The key government agency responsible for environmental and social assessment of the Project via the EIA process is the Department of Natural Resources and Environmental Policy (DNREP), and Department of Natural Resources and Environmental Monitoring (DNREM) Ministry of Natural Resources and Environment (MONRE). The **Ministerial Instructions for the Conduct of ESIA's (No. 8030 – December 2013)** and the **Guideline on Public Involvement in the Environmental and Social Impact Assessment Process (2013)** currently guides the environmental and social assessment process in Lao PDR, which has considerably strengthened the associated permitting requirements and applicable industry requirements. Recently released **Environmental Assessment Guidelines (2016)** outline the updated format and procedural requirements of this process.

2.2 National Legislation and Guidelines

Wood Processing facilities operate in accordance with the **Law on Industrial Processing No. 48 / NA (2013)** and are more broadly governed by the **Law on Forestry (2007)**. The Ministry of Industry and Commerce (MOIC) is responsible for regulating and promoting manufacturing, trade, and import and export activity of finished wood products. MONRE, Ministry of Agriculture and Forestry, Ministry of Planning and Investment, Ministry of Finance and their Provincial and District offices provide additional oversight.

Table 2-1 Relevant Lao PDR laws, regulations and policies for the Burapha Veneer and Plywood Mill Project

Title	Year
Laws	
Law on Forestry	2007
Law on Processing Industry	2013
Environmental Protection Law	2013
Land Law	2003
Law on Labour Protection	2013
Law on Investment Production	2009
Law on Water and Water Resources	2017
Law on Land Transport, No. 24/NA, dated 12 December 2012	2012
Law on Tax, No. 05/NA, dated 20 December 2011	2011
Law on Value-added Tax, No. 52/NA, dated 23 July 2014	2014
Decree	
Decree on the Promulgation and Enforcement of National Environmental Standards, No. 81/PMO, dated 21 February 2017	2017
Decree on Environmental Protection Fund, No. 94/PMO, dated 08 March 2017	2017
Decree on Compensation and Resettlement of People Affected by Development Projects	2016
Decree on State Land Leases and Concessions	2009
Decisions, Directives, Regulations, and other Legislation	
Environmental Impact Assessment Guidelines	2016
Order of the Prime Minister on Strickness the Management and Inspection of Logging, Wood Transport and Timber Business	2016
Decision on the Approval of List of Eligible and Prohibited Wooden Products for Export	2016
Instruction on the List of Eligible and Prohibited Wooden Products for Export	2016
Decision on Timber Product Standards	2015

Instruction on Pollution Control, No. 0745/MONRE, dated 11 February 2015	2015
Ministerial Instruction of ESIA Process of Investment Projects and Activities	2013
Guideline on Public Involvement in Environmental and Social Impact Assessment Process	2013
Decision on Timber Processing Management	2007
Decision concerning the Standard of Wood, Rattan and Bamboo Processing Industry Factories (No. 1140/MOIC)	2007
Regulation Regarding Buying and Selling Timber from Plantations, (No. 1862/MOIC)	2008
Notification on the Management of Wood Transport Vehicle, Wood Extraction Machinery, and Wood Processing Machinery, No. 1440/MOIC.DIMEX, dated 04 September 2008	2008
Agreement on Standards of Wood Manufacturing Facility, No. 0719/MOIC, dated 03 March 2009	2009
Regulation on Wastewater Discharge from Processing Industry	2006
Notification on the Management of wood transport vehicle, wood extraction machinery, and wood processing machinery.	2008
Standard on Wood Processing Factory, No. 0719/MOIC, dated 03 April 2009	2009
Notice No. 1791/MOICDIME regulating the import and export of plantation grown timber	2011
Joint Agreement on the Transportation of Logs, Sawn timber, Stumps, Burl/weed fall and Wood products	2008

2.3 Project Emissions and Discharge Standards

Burapha is committed to meeting national and applicable international discharge and emissions standards throughout construction and Mill operations. Applicable standards are provided in Table 2-2, with the more stringent guideline / value applied where discrepancies occur:

Table 2-2 Project Emissions Standards and Guidelines

Parameter	Guideline
Air Quality	Decree on the National Environmental Standards (MONRE, 2017)
	General EHS Guidelines: Air Emissions and Ambient Air Quality (IFC, 2007)
	Ambient Air Quality Guidelines (WHO, 2005)
Water Quality	Decree on the National Environmental Standards (MONRE, 2017)
	Lao PDR General Industrial Wastewater Discharge Standards
	IFC EHS Board and Particle-Based Products (2007)
Noise	Decree on the National Environmental Standards (MONRE, 2017)
	General EHS Guidelines: Noise. (IFC, 2007)

2.4 International Policies, Guidelines, and Standards

Burapha is committed to developing and operating the Mill to an international standard. Key international policies, guidelines, and standards relevant to the Project include:

- IFC *Sustainability Framework* (2012). The updated Sustainability Framework reflects the evolution in good practice for sustainability, risk mitigation, and transparency. It consists of the revised **IFC Policy on Environmental and Social Sustainability**, a newly introduced **Access to Information Policy**, and revised **Performance Standards**, and
- World Bank *General Environmental, Health, and Safety Guidelines* (2007) and *EHS Guidelines for Board and Particle Based Products* (2007).

The ESIA and associated reporting will incorporate international best practices and will align with relevant certification requirements, including:

- Forest Stewardship Council (FSC) Chain of Custody Standard (FSC-STD-40-004);
- International Association for Impact Assessment (IAIA) Guidelines and Standards;

- International Organisation for Standardisation, environmental and social management systems (ISO 14001);
- Occupational Health and Safety Management Systems (e.g. OHSAS 18001 and / or ISO 45001); and
- Social Accountability International (SA8000).

3 DETAILED PROJECT DESIGN AND ANALYSIS OF ALTERNATIVES

3.1 Mill Layout and Design

3.1.1 Veneer and Plywood Production

Plywood production is comprised of six (6) primary processes, namely: log sorting and debarking; veneer peeling and clipping; veneer drying; plywood assembly; plywood pressing; and plywood finishing.

Log sorting, conditioning, and debarking – logs of suitable dimension and quality for peeling will be sorted according to size in the log stockyard upon arrival. After sorting, Burapha will employ a mechanised log rounder debarker to peel off the Eucalyptus bark, remove the dirt / debris, and round the log. Logs will then be cut to length to fit the lathe (~125 – 270 cm).

Veneer peeling and clipping - plywood veneer will be rotary cut (veneer peeling) with a veneer lathe. The green veneer will then be clipped to size, graded and stored for drying. Defects, such as knots and splits are then cut out of the sheet. The Mill will be outfitted with 2' and 4' peeling lines.

Veneer drying – drying of veneer to between approximately 8 - 12 percent moisture content aids the gluing process during plywood manufacture.

Plywood assembly - assembly of the plywood prior to pressing entails the jointing of the narrow strips of veneer, which are edge-glued to make sheets of the required size. Glue is then applied to the inner plies or core, which in turn, are laid between the outer veneers ready for bonding. It is understood that Burapha will utilise a melamine modified urea formaldehyde resin, comprised of phenol formaldehyde (60 %) and urea formaldehyde (approximately 40%), with ammonium sulfate for a curing agent.

Plywood pressing – once veneers are laid-up as assembly plywood sheets, they will be fed into hydraulic presses to bring the veneer into contact with the adhesive. Burapha will use a cold press followed by a hot press that will cure the glue. The hot press platens are heated by steam.

Finishing – primary finishing, which involves the trimming, sanding, and upgrading of the plywood after pressing, is undertaken to enhance the marketability of the product. Trimming saws will cut the boards to the required size, which will then be sanded with drum sanders to the desired surface smoothness. Damage or imperfections to the face of veneers will then be manually repaired by plugging and patch application.

Burapha plywood specifications have been identified as: size - 1220mm x 2400mm or 1220mm x 2440mm; average thickness – 16mm; density – 550 kg/m³ – 680 kg/m³.

3.1.2 Ancillary Facilities

The final design for the Mill layout, including ancillary facilities is currently being determined during the Feasibility study. The following facilities will be included within the Project concession:

- **Log stockyards** – trucks will offload logs to one of two stockyards for sorting and storage. The stockyards may have sprinkler systems to prevent logs from warping as they dry.
- **Power** – the Mill will use electricity and steam to power operations. At least 10kV electricity is required for Mill operations, which will be supplied from the adjacent Hin Heup Sub-Station. A number of power poles will be implemented, and transmission lines extended from the current infrastructure. A heating centre will be equipped with a boiler to generate requisite heat / steam for processing, with offcuts combusted for steam generation.
- **Air compressing and ventilation** – a dust removal room will house air compression and ventilation equipment to extract dust from applicable areas. Local exhaust ventilation, extraction and collection

systems will vacuum wood dust from various facilities (e.g. sanding, sawing / clipping, etc.). The system will also provide ventilation for the formaldehyde mixing station.

- **Water supply and drainage system** – groundwater will be abstracted via a pump / well to supply operational and firefighting tank water. The drainage system will recycle washwater from the glue spreaders and veneer dryers. Water from other areas will drain via pipes and channels to the passive water treatment pond.
- **Firefighting pump room** – A firefighting pool will be positioned next to the firefighting pump in a standalone facility.
- **Factory roads** – there will be two site access roads, one concrete and the second gravel, totalling approximately 500m of road length, with 400 mm wide stormwater diversion channels on each side of the roads.
- **Security** – A steel wire mesh fence (1.8m x 1500m) will surround the Mill, with a security room / guard manning the Mill gate.
- **Communication and security emergency system** – the Mill will be outfitted with a communication system to provide warning in the event of an emergency and isolation (emergency shut-off) for equipment from a centralised location.
- **Water treatment pond** – water will be conveyed from the Mill, log stockyards, and the remainder of the footprint to a pond for passive treatment. The basin will be designed to have a 15-day hydraulic resident time and will accommodate peak flows from at least the 1:10 average return interval storm.

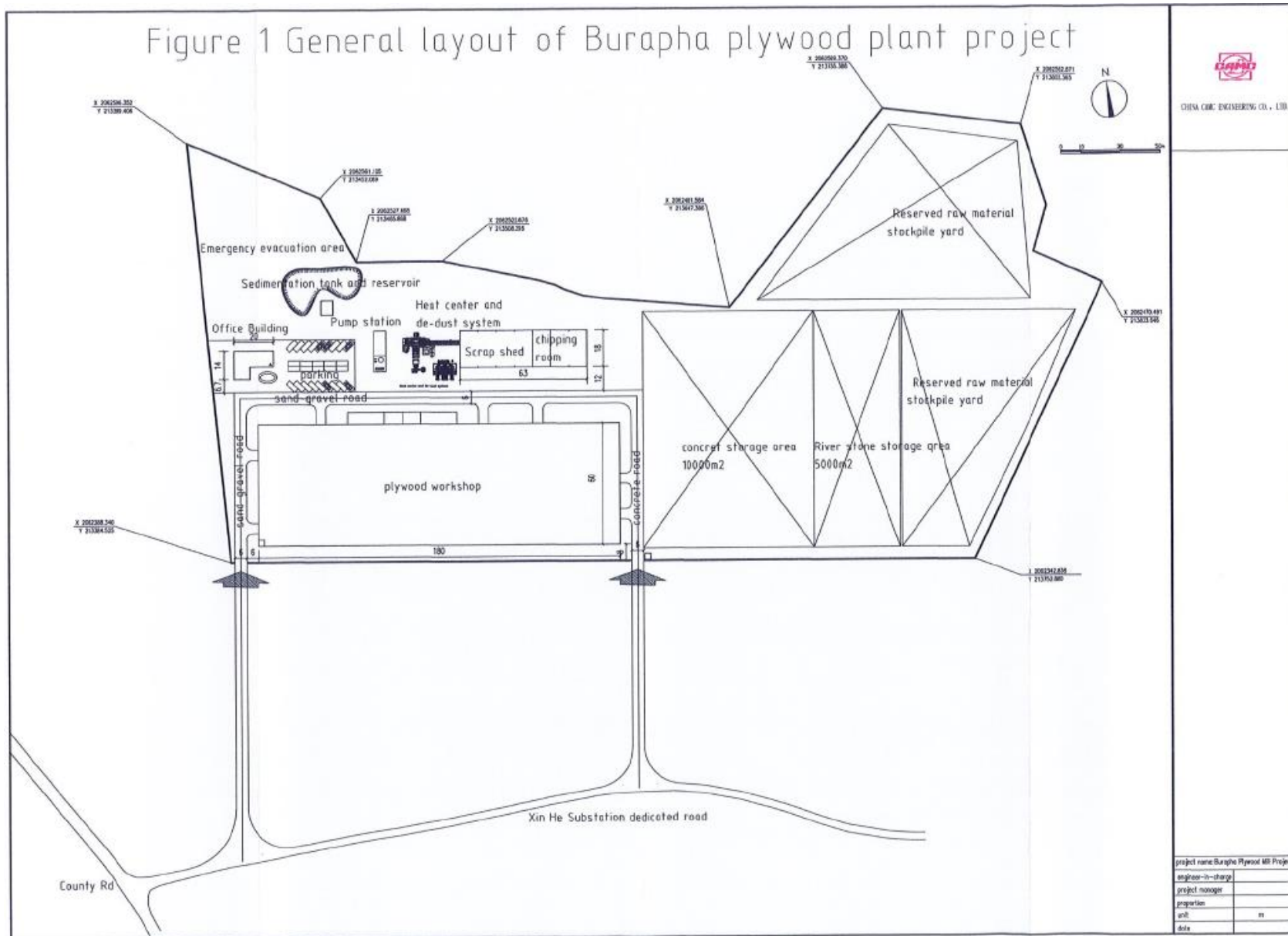
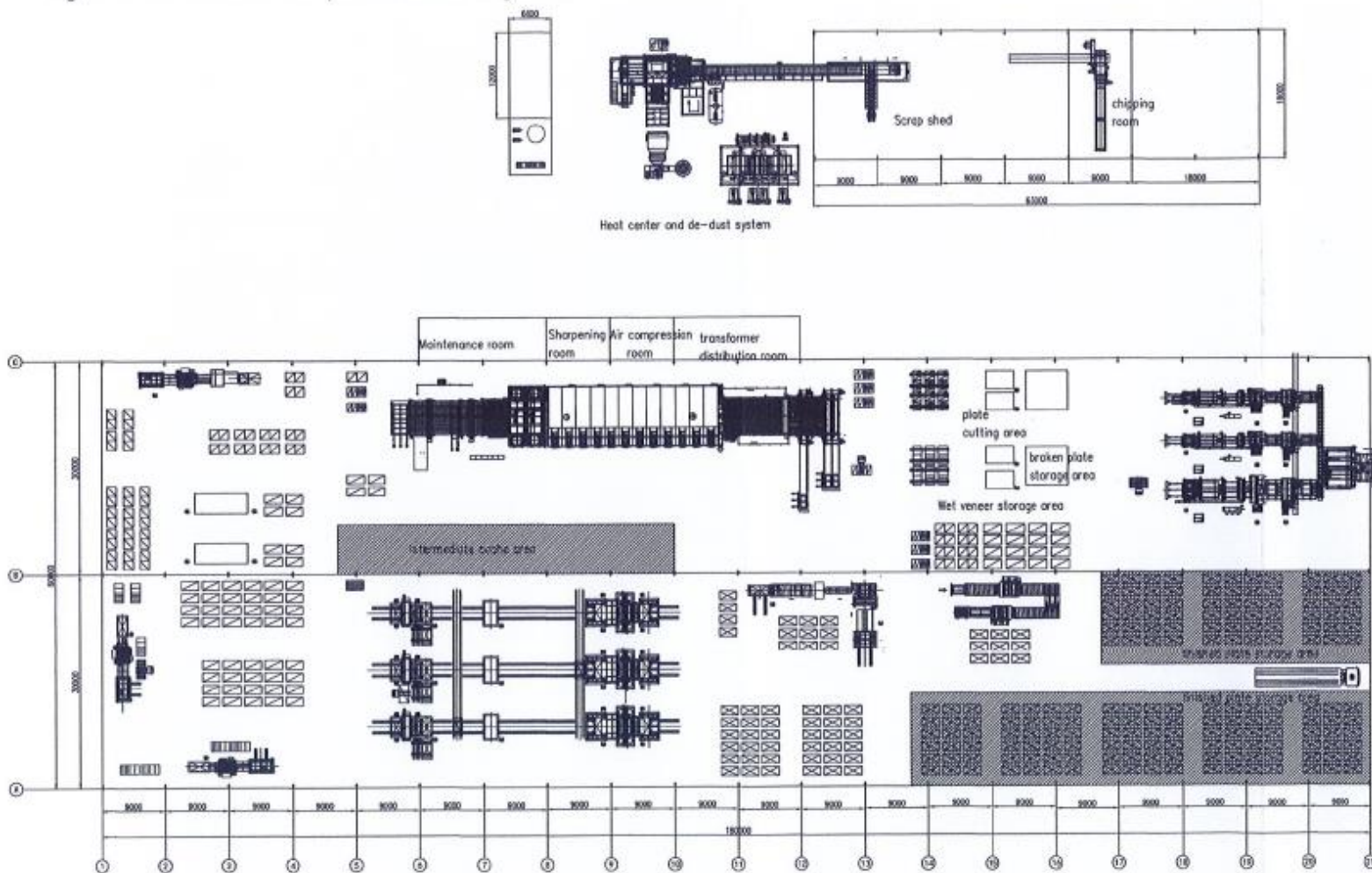


Figure 3-1 Mill and Ancillary Facilities Layout

Figure 2 General process layout



OTEC OGC ENGINEERING CO., LTD.

Project name: Burapha Plywood Mill Project	
engineer-in-charge	
project manager	
pages	250
unit	mm
date	

Figure 3-2 Mill Process Layout

3.2 Transportation Network Description

Raw logs will be transported from Burapha plantations to the Mill and finished wood products will be transported from the Mill to Vientiane, Thailand, and likely China for domestic sales and export, respectively. The proposed Mill site is centrally located with respect to Burapha plantation landholdings, minimising the cumulative log hauling distances the extent practicable.

The Project Area is serviced by Provincial Road No. 4501 that connects to National Road 13 at Ban Hin Heup Tai and is the main thoroughfare linking Hin Heup, Feuang and Sanakan District capitals. The section of Road 4501 near the Project site was sealed in 2009 and is accessible year-round.

3.3 Alternatives Considered in Project Planning

Two locations were evaluated for implementation of the Mill, namely:

- Hin Heup District (Preferred Alternative); and
- Xaythany District (Nabong Site), adjacent Burapha's sawmill and wood manufacturing facility.

Separate alternatives analysis for the Project Feasibility Study and the ESIA identified the Hin Heup Option as the preferred alternative primarily because of the lower transport costs and lower risks for environmental and social impacts during transport and operations.

Additional alternatives analyses were conducted during the Feasibility Study. Burapha and its consulting engineers considered a number of equipment options and Mill design options to maximise productivity, meet financial objectives, and meet performance objectives for environmental and social outcomes.

3.4 No Project Alternative

By not constructing and operating the Mill, Burapha (and other regional plantation operators) would have very few options for the raw material they are currently growing or intend to grow. Further benefits as well as potential impacts would not occur, including:

- The approximately 366 jobs that are expected to be generated through Project operations would not be available, hindering the economic growth in the region;
- The secondary jobs created through expansion of the Burapha Agroforestry Operations would not be available;
- Potential impacts derived from Project construction (e.g. noise, dust, erosion and sedimentation) would not occur (refer to below and Section 5.3); and
- Potential impacts from Project operations (e.g. potential for water quality impacts, air quality impacts, etc.) would be avoided (refer to below and Section 5.3).

4 ENVIRONMENTAL AND SOCIAL SETTING

4.1 Physical Components

4.1.1 Land

The proposed Burapha Mill site abuts the village boundaries of Ban Phonesoung and Ban Khone Phook in Hin Heup District. Burapha is negotiating a concession agreement for approximately seven ha of land that was previously granted to a Malaysian logging company (HIPA) approximately 10 years ago.

The concession is immediately adjacent the Hin Heup Substation and Ray Farm Bio-Organic Fertiliser Factory. The entire area (including village lands) has been zoned for light industry by the GOL (totalling approximately 1,950 ha of light industrial zone).

Approximately 70% of the Project footprint was previously graded, and is still largely devoid of vegetation (due to compaction) with the exception of scattered native and non-native grasses. Native vegetation was previously cleared from the entire footprint, with some natural revegetation having occurred recently. The Project area is relatively flat, with some slight undulation to the north and northwest where the area has not yet been graded.

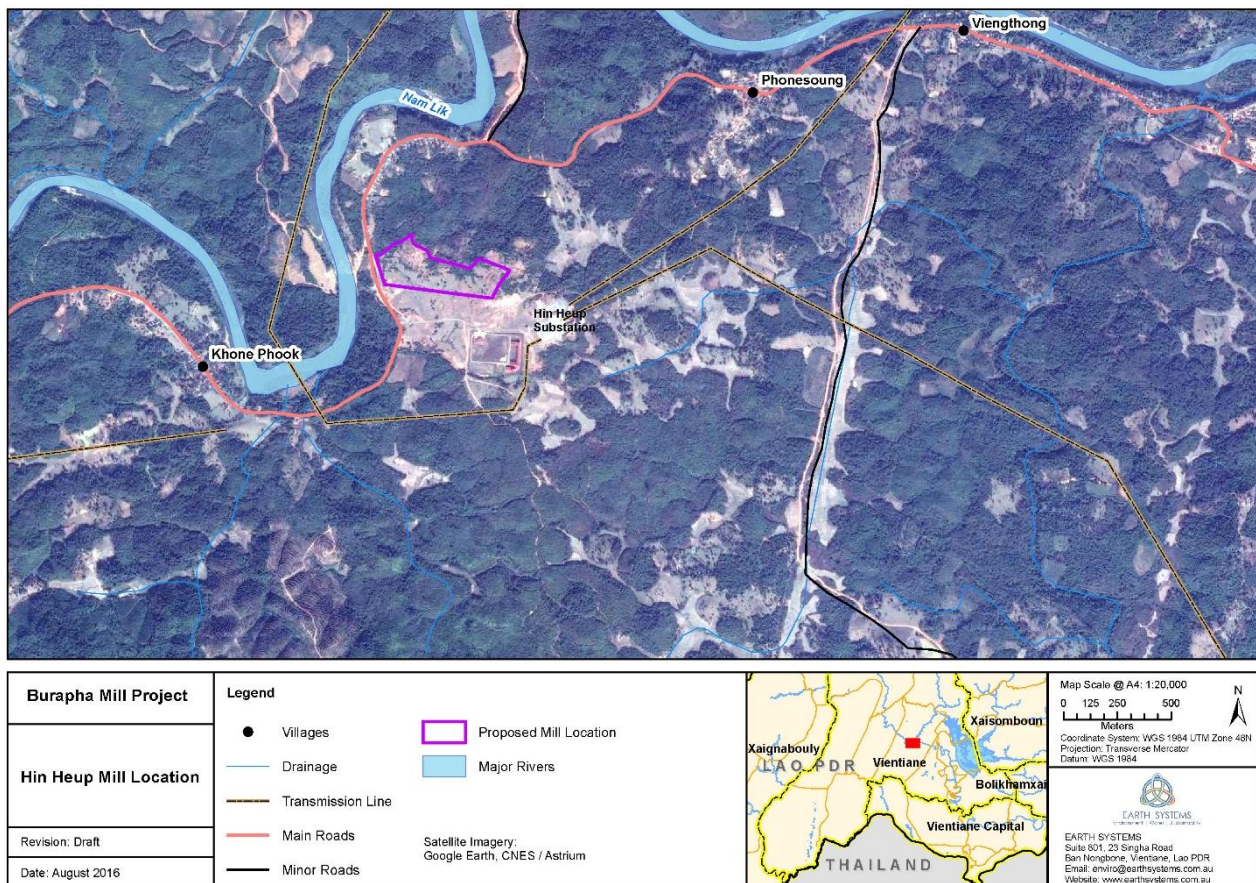


Figure 4-1 Satellite Image of proposed Project footprint

4.1.2 Topography, Geology, and Soils

The Mill site is quite flat and varies between 211 and 221 metres above sea level (masl). The western edge of the site, closest to the Nam Lik River, sits at 211 masl and slopes slightly (1°) upwards to the east. The eastern edge of the site is at 221 masl.

The majority of rock beneath the site is shallow marine sediments of Triassic age, intruded by volcanic rocks. The Mill will be built on a combination Ferric/Haplic Acrisol soils. Acrisol soils are clay-rich / strongly weathered acid soils found on moderately to well-drained hilly or undulating topography. The shallow A horizon of an Acrisol is normally characterised by dark, acidic organic matter which gradually transitions to a lighter leached Eluvial (E) horizon.

The Haplic Acrisol meets the central concept of its Reference Soil Group and that there are no particular soil features that deserve to be separately mentioned. Therefore a Haplic Acrisol is best described through the general description of an Acrisol. Ferric Acrisol are characterised by reddish to blackish concretions or nodules, coarse mottles, and typical accumulations of Fe (and Mn) oxides.

4.1.3 Drainage and Hydrology

The Mill site drains to a number of small unnamed ephemeral channels that converge off-site and drain to the Nam Lik River via a circuitous and sometimes sub-surface channel. The channels are not natural streams, but artefacts of historic grading from previous land use of the concession area.

The Mill will be located approximately 150 m east of the Nam Lik River. The Nam Lik, a major perennial river, reaches a depth of nearly 15m and discharges 3,500 m³ during rainy years at Ban Hin Heup approximately three river km east of the Mill site. The Nam Lik is now partially regulated by the Nam Lik 2 hydropower scheme upstream of the mill site, decreasing mean monthly streamflow during the rainy season. Within a few years, the Nam Lik 1 Hydropower Project will impound the river directly to the north and west of the Mill. The reservoir will not extend beyond the deeply incised river channel (for that portion of the reservoir in proximity to the Mill site).

There are several small perennial tributaries of the Nam Lik that are to the east and south of the site, including the Houay Mieng, Houay Karng, Houay Larn, and Houay Lai. The Nam Xong River discharges into the Nam Lik approximately four km downstream of the proposed Mill site.

4.1.4 Water Quality

Nam Lik River surface water is good quality with little apparent impact from industry in the region. March 2016 water quality sampling of the Nam Lik (conducted for this ESIA) found that the water was very clear (low turbidity and TSS) with near neutral pH, and temperature typical of the region. A moderate dissolved oxygen concentration (6.15ppm), low nutrient concentration, and an absence of measured pollutants indicate that the water quality is suitable for a range of aquatic biodiversity and water uses

Total coliform was found to be high (as is typical of surface waters in proximity to human settlement in the region). The potential contaminants from veneer and plywood manufacturing (fat, oil, and grease; formaldehyde; ammonia) and associated by-products (COD, and BOD) were either below laboratory detection limits or had very low concentrations. The exception was phenolic substances, where the Nam Lik sample had a concentration of 0.047 mg/L, above the Lao ambient water quality guideline of 0.005 mg/L.

4.1.5 Air Quality

Air quality in the Project region is generally very good, given the distance from significant industry. Seasonal burning of vegetation for agricultural site preparation is likely the greatest contributor to pollution (generally from February – May.) Emissions from the few small to moderate size industrial facilities and vehicles as well as dust from unsealed roads / cleared areas are secondary contributors to air pollution.

March 2016 monitoring of dust concentrations over a 3-day period (continuous measurement) at the Mill site found total particulate matter and finer fraction concentrations (TSP, PM₁₀, and PM_{2.5}) were high for two of the three days, with peaks and troughs throughout the sampling period. Baseline monitoring likely captured some of the worst air quality conditions for the year, as vegetation burning for agricultural site preparation was observed to be widespread. A minor rain event on March 26 (day 3) dropped dust concentrations considerably.

For the majority of the 3-day period, particulates were above WHO particulate size guidelines. Lao PDR guidelines for TSP ($\geq 330 \mu\text{g}/\text{m}^3$) and PM10 ($\geq 120 \mu\text{g}/\text{m}^3$) were exceeded during the first half of the sampling period. On average, PM₁₀ and PM_{2.5} exceeded relevant criteria, while TSP was below Lao PDR guidelines.

4.1.6 Noise

Noise emissions in the Project area vary considerably with distance from the Road 4501 and settlements. Ambient noise conditions were high adjacent road 4501 and within settlements during the day and moderate for much of the night. Noise abates incrementally with distance from the road and settlements.

Noise was monitored continuously for three days starting on March 23 at the nearest social receptor from the proposed Mill site, in Ban Phonesoung Sub-Village, approximately 0.5 km from the proposed Mill site. Ambient noise was found to be very high during the day, due to heavy traffic and social activity (e.g. music). Noise levels appear to follow normal trends for a busy road during the day that experiences frequent truck and car traffic. However, night-time noise appears to resemble a busy urban area (i.e. higher than a typical rural setting).

Noise levels often exceeded WHO day and night-time dB criteria over the 3-day sampling period, while on average noise was below WHO day and Lao PDR guidelines. There were occasional peaks during daylight hours that exceeded Lao PDR levels, but noise levels were generally below the national guidelines, and more frequently exceeding WHO guidelines.

4.2 Biological Components

4.2.1 Terrestrial Flora

The proposed Mill site has been cleared of native forests, graded for industrial activity, and occasionally supports grazing livestock. There is no quality habitat in the area.

May 2016 botanical surveys identified a dominance of native and non-native grasses and herbs with scattered small trees on the northern fringe. No internationally or nationally threatened flora were identified within the Mill site. Of the species that have been assessed, all are considered as Least Concern or Lower Risk (IUCN, 2016).

4.2.2 Terrestrial Fauna

Due to the lack of habitat and industrial activity in the immediate area, animal occurrences are likely to be transient, with the possible exception of burrowing animals. No vertebrates were observed within the Mill site during May 2016 biodiversity surveys (with the exception of livestock).

The results of site surveys, local knowledge surveys, and assessment of secondary information indicates that it is highly unlikely that any fauna species of conservation significance inhabit the site. The majority of mammals seen in the vicinity of the Mill site by villagers are considered globally Least Concern (IUCN), with their populations stable. All mammals reported by villagers are common to Lao PDR and the region.

4.2.3 Aquatic Biodiversity

The ephemeral drainages to the immediate north of the Project footprint do not support aquatic biodiversity. They are artefacts of historic grading (essentially man-made) with no quality habitat. However, discharge from the site will reach the Nam Lik River, which is high value habitat for a number of aquatic species.

Local residents routinely collect fish, aquatic snails, eel, shrimp, crustaceans, and aquatic invertebrates from the river during all seasons. During local knowledge surveys, residents of Ban Khone Phook, Ban Phonesoung, and Ban Viengthong identified 13 fish that are commonly caught. An additional 21 fish species were found in secondary data that may inhabit the river in the region. Ten of these fish are threatened according to IUCN. While secondary data generated from field sampling of the Nam Lik River was not found to be publicly available, it is reasonable to assume that one or more of the 10 threatened fish inhabit the river, at least seasonally as migrating fish make their way up from the Mekong / Nam Ngum, generally during the rainy season.

4.3 Social Setting

4.3.1 Overview

For the purpose of the social setting, the study scope consists of:

1. The Project Area - including villages with land directly impacted by the Project and / or within a three kilometre radius of the proposed Project Footprint; and
2. The Transportation Route – settlements located directly on key in-bound and out-bound transportation routes.

Three villages (hereafter the Project Villages) have been identified in close proximity to the Project site including:

1. Ban Khone Phook (including a main village settlement, sub-village and military camp);
2. Ban Phonesoung (including a main village settlement); and
3. Ban Viengthong (including a main village, resettlement site and Phiengdy sub-village settlement).

Approximately 47 villages (hereafter the Transport Villages) are located within 50 metres of the key inbound and outbound transportation routes in Vientiane Province.

4.3.2 History, Population and Growth

There are approximately 36,825 people living in the 47 villages along the proposed transportation routes in Vientiane Province. The Province is one of the most densely populated in the country with a total population of 419,100 people, consisting of 80,400 households and a population density of 27 people per km² (NSC, 2015). The Province has grown by 7% over the last decade including modest positive net migration - the majority to Vientiane Capital. Migrants are predominately young (between 15 and 29) and a key driver is unemployment or underemployment (Phouxay 2010).

The three Project Area villages have a total of 346 households and 1,856 inhabitants. Ban Khone Phook is the oldest village in the Project Area, established in 1756. Ban Phonesoung and Ban Viengthong villages relocated here after the end of the Indochina war (mid 1970s). More recent changes include:

- Consolidation of Ban Phongthong, Ban Phonthan and Ban Phonxay into Ban Viengthong (1989);
- Establishment of a military residence in Ban Khone Phook (2006);
- Resettlement of 16 Hmong families to Ban Khone Phook (2008); and
- Planned relocation (within village lands) of 59 households within Ban Viengthong that will be affected by the Nam Lik 1 Hydropower Project (2017).

The Project Area has experienced 2.42% population growth over the last 12 months. This includes a natural growth rate of 1.46% and migration rate of 0.96% – the majority of migrants attracted by better infrastructure and services in the area.

Table 4-1 Demographic indicators of Project Area villages

Village Name	No. HH	No. Families	No. People		Avg. Household Size	Gender Ratio
			Female	Total		
Ban Khone Phook	116	126	322	629	5.4	0.95
Ban Phonesoung	90	111	229	487	5.4	1.12
Ban Viengthong	140	145	361	740	5.3	1.05
TOTAL PROJECT AREA	346	382	912	1856	5.4	1.04

Source: ES Village Surveys, 2016

4.3.3 Ethnicity and Religion

The majority (88%) of people living in the Project Area villages are Lao Loum (Lao-Tai). The remaining population consist of Khmu (Mon-Khmer) (9.6%) and Hmong (Hmong-Mien) (2.7%). Approximately 90% of the population in the Project Area are Buddhist, with a small minority (10%) practicing Animism.

4.3.4 Wealth, Poverty, and Vulnerable Populations

Wealth and Poverty

Vientiane Province has one of the lowest rates of poverty in the country with an average of 12% in 2012-2013. Those Districts closest to Vientiane Capital and serviced by National Road No. 13 tend to have lower poverty rates than others.

According to information obtained during village surveys for this ESIA, the majority of households in the Project Area villages are reportedly 'very well off' (20%) and earning an average of 50 million LAK (USD 6,250) per annum; or 'sufficiently well off' (72%) earning an average of 19 million LAK (USD 2,375) per annum. Poverty incidence is reportedly low with 4% of families perceived as poor (with land), earning an average of 6 million LAK (USD 750) per annum or 16,438 LAK (USD 2.05) per person, per day.

Disadvantaged

During village surveying for this ESIA, a total of 50 households (or 14%) within the Project Area were identified as vulnerable. The majority (68%) of these households are located in Ban Viengthong. The most common group of vulnerable households are single female headed households. One household was identified as landless and with income below the national poverty line.

4.3.5 Housing and Community Infrastructure

Housing

The majority of houses in Vientiane Province are single or double story wooden houses with corrugated iron roofs (NSC 2015) Concrete single-story cement houses are becoming more common in more wealthy villages across the Province.

Consistent with the Provincial trend, most (87%) houses in the Project Area are single story cement houses. Approximately 6% are wooden houses – the largest proportion in Ban Phonesoung and in the Viengthong sub-settlement of Phiengdy, and 5% are semi-concrete structure with two storeys. Only 1% of houses are constructed with wood / bamboo.

Community Infrastructure

The percentage of villages with critical community infrastructure in Vientiane Province is well above the national average. In addition, 89% of villages in Vientiane Province have year-round access to road infrastructure and in turn access to health, education and market infrastructure and services in other villages and the District and Provincial centre.

All Project Area villages are connected to the electricity grid (with the exception of Phiengdy sub-village), have a primary school located in the village, and have good road access. Project villages do not have government health facilities or markets, and instead access District facilities in Hin Heup (~5 km away).

4.3.6 Accessibility and Transportation

The Project Area is serviced by Provincial Road 4501. This road connects to National Road 13 at Ban Hin Heup Tai and is the main thoroughfare linking Hin Heup, Feuang, and Sanakham District capitals.

The section of Road 4051 near the Project site was sealed in 2009 and is accessible all year-round. The main settlements of each of the Project villages, as well as an army camp and one (1) sub-settlement are located on this road (refer to Figure 1-2). Local vehicles, pedestrians and livestock utilise this road as a key route within and

between Project villages and the District Capital. Traffic on this road including trucks, buses, cars, tuk-tuks and motorbikes is generally frequent during the day and moderate during the evening.

4.3.7 Electricity and Energy Use

Approximately 98% of villages in Vientiane Province have access to electricity. The majority of households are connected. The main source of energy for cooking is fuel wood (92%) followed by charcoal (11.5%).

All villages and most households in the Project Area are connected to the grid with the exception of Phiengdy sub-village. All households in the Project area reportedly use wood and charcoal cooktop stoves as their primary means of cooking. Wood fuel is generally collected from residential land, upland areas and plantation areas. All households in Ban Phonesoung and 20 percent of households in Ban Khone Phook also use charcoal. Fuel wood for charcoal production is also sourced in nearby village lands.

4.3.8 Health and Food Security

Health Access

Approximately 73% of villages in Vientiane Province are located within 30 km of a District or Provincial hospital and 67% are located less than 10 km from a village health centre (WFP 2013). Year-round road access for 83% of villages in Vientiane Province facilitates good access to these facilities and services.

All Project Area villages have a health representative and medicine box located in the village. A small private clinic operates in Ban Viengthong. The majority of households in the Project Area seek medical treatment from the Hin Heup District Hospital which is located a short distance away. The hospital currently has 10 beds and 14 qualified doctors and nursing staff.

Morbidity and Mortality

Hin Heup District hospital recorded a total of 9,157 out-patient and 593 in-patient cases during the period 2014-2015. The most prevalent illnesses included throat infections, common cold and other nose, and ear infections; followed by digestion disease, mental illness, injuries and accidents and diarrhoea / simple dehydration.

Common illnesses reported in the Project Area over the last 12 months include fever, diarrhoea and sore throats. Incidence of tropical disease (i.e. dengue and malaria) and in Project villages is low. There are no recorded cases of HIV/AIDS. The main cause of death in the Project Area was reported as 'old age'. Specific causes of death could not be determined.

Nutrition and Food Security

Approximately 96% of the population in Vientiane Province have acceptable food consumption / nutrition (WFP 2013). Key nutrition indicators for children under five years old (i.e. stunting, weight, wasting) for the Province are below national average.

Village level surveying indicates that nutrition and food security in the Project Area is generally good. Rice sufficiency is high; villages are close to the District market; and most households are engaged in a mixture of subsistence agriculture and natural resource collection, and cash generating activities (i.e. trading, skilled and salaried work).

4.3.9 Education, Literacy and Communication

Vientiane Province has 422 primary schools and 91 secondary schools. General education indicators (attendance rates, literacy) for the Province are well above the national average.

There are three primary schools in the Project Area – one in each village. The secondary school is located in Hin Heup District Capital. Approximately 98.75%, 83.10% and 25.16% of children are enrolled in primary, lower

secondary and higher secondary schools respectively. Primary school completion rates amongst adults is relatively high (81%).

Less than half of adults and in the Project Area villages have completed secondary school. Completion rates for females are low for both primary (50%) and secondary (29%).

Lao is the most commonly spoken language in the Project Area. Other languages spoken include Khmu and Hmong. Adult literacy rates (Lao language) are generally high (93%). Female literacy is also reportedly high with the exception of Ban Khone Phook (50%). Despite these relatively high literacy levels, villagers reported lower levels of comprehension of language spoken by outsiders – indicating a degree of functional illiteracy.

4.3.10 Unexploded Ordnance

UXO risk is low in the Project Area. None of the Project villages reported land affected by UXO or UXO related incidents (deaths or injuries) in the last five years. Analysis of US aerial bombing data indicates that the closest known bombing was over 21 km to the south in Phonhong District.

4.3.11 Gender Dimensions

Development projects can disproportionately impact women. Gender disaggregated data has been provided, where applicable, throughout the ESIA. Key observations on gender dimensions in the Project area include:

- **Division of Labour:** Both men and women are involved in agricultural activities although there is often a division of tasks. In general, men undertake hunting and fishing livelihood activities. Labouring is also male dominated. Women undertake most household duties (i.e. cooking and cleaning) and lead the collection of NTFP. The handicraft industry is a particularly important income generating activity in the region, and most women are engaged in this activity. Reported daily income (~50,000 LAK) is below rates for male dominated activities (i.e. unskilled to skilled labouring) which are reportedly between 50,000 to 100,000 LAK.
- **Education:** Adult education and literacy, rates amongst females in the Project Area is fairly high (76%), although female education achievement is relatively low (just under half of the women in the Project Area had attended primary school).
- **Vulnerable Groups:** There is a high number (25) of female headed households in the Project Area, particularly Ban Viengthong.

4.4 Economies, Livelihoods, and Natural Resource Use

4.4.1 Regional Economy

Vientiane Province is a fast-developing region due to its natural and mineral resources, relatively good road infrastructure and proximity to Vientiane Capital. The Province's GDP grew by an average of 8% per annum between 2011-2015 and was valued at 5,075 billion Kip in 2015. Hin Heup District is the gateway to the North of Lao PDR and like the rest of Vientiane Province is experiencing rapid growth (average of 7% per annum). Key sectors include agriculture and forestry, industry, energy and mines, and trade.

4.4.2 Local Economies and Livelihoods

Local economies are transitioning to market-based economies and include a mixture of subsistence and cash-income agriculture, and cottage industry including handicrafts and charcoal production. Two industrial zones are present in the Project region and employment opportunities are being created through the growth of light and heavy industry.

Agriculture

Agriculture is the primary livelihood activity for households in the Project Area. This includes lowland rice cultivation (79% households); vegetable cultivation (83% households); livestock rearing (30% households) and commercial tree / orchid plantations (16% households). Agriculture is also a main income generating activities for 49% of households in the Project area.

Local Handicrafts

The local handicrafts industry is the largest generator of employment, with approximately 313 households or 91% engaged in this sector. The majority of those engaged are women. Villagers have relationships with handicraft traders who supply material and purchase finished products (most Sinh's). Women earn an average of LAK 54,000 (USD 6.75) per day while also completing the bulk of household activities. Handicrafts were reported as one of the top two income generating activities in all Project Area Villages.

Factory Work and Casual Labour

Factory work and casual labour are important income generating activities for households in each of the Project Area villages.

Approximately 25 people (seven women) hold full time employment with local factories. Another 20-30 labourers (mostly men) are employed on a casual basis. On average, the factory workers earn 1.2 to 2 million kip (\$150 to \$250) per month. Factories in the area include cassava factories, a white charcoal production plant; an organic fertiliser factory; and an agarwood oil refinery.

Other casual labour opportunities (again mostly men) include general construction, farm labouring and logging labouring. Daily rates vary between agricultural labouring (LAK 50,000 or USD 6.25); construction (LAK 80,000; or USD 10.00); logging (LAK 100,000 or USD 12.50) and highly skilled labour (150,000 or USD 18.75).

Villagers in Ban Phonesoung and Ban Khone Phook reported that there are not ample employment opportunities in the area and to ensure a sufficient income, some families migrate seasonally in search of work.

Local charcoal production

There is a small charcoal production industry in Ban Phonesoung. The white charcoal factory was established in 2005 and comprises 30 kilns with 10 m³ input capacity for each kiln. Approximately 25 households are directly involved. The factory remains operation approximately 10 kilns during wet season due to lack of wood supply (Mai Tew or *Cratoxylum formosum*) and runs full operations during dry season. The white charcoal production factory purchases Mai Tew from villagers with a price of 180,000 kip/m³ (\$22.50) and 90,000 kip/m³ (\$11.25) for mixed firewood. The village people source Mai Tew in individually allocated degraded forest land and also in the Lao Yunmu Forestry Development Company's land which remains undeveloped

Government employment

Income generated through employment with village and Hin Heup District Government was also reported as an important income generating activity in the Project Area Villages. Ban Viengthong was reported as having the highest government employment (42% of total households) while Ban Phonesoung was 17% and Ban Khone Phook was 11%.

4.4.3 Land Allocation, Ownership and Use

Village land allocation and use

Since 1996, the Ministry of Agriculture and Forests (MAF), has been aimed at devolving most decisions about land use and land allocation to the village level through its Land and Forest Allocation Program (LAFA). Village lands (predominately upland cultivation areas) are commonly being reallocated to concessions and villagers are turning to employment and small enterprise, whilst maintaining paddy rice production; livestock; and vegetable gardens.

Land allocation and zoning for Project Area villages is presented in Table 4-2

Table 4-2 Land allocation in the Project Area

Village	Total Area (ha)	Land Allocation (ha)											
		Residential land	Garden land	Lowland ag. Land	Upland ag. Land	Orchard / plantation	Production Forest	Protection Forest	Conservation Forest	Company Land	Degraded / Regeneration Forest	Grazing land	Concession land
Phonesoung	753	39	0	24	0	136	0	0	8	0	376	0	170
Viengthong	524	8	0	46	0	190	50	0	4	76*	86	0	64
Khone Phook	1,566	17	10	49	124	107	659	70	8	0	0	71	451
TOTAL	2,843	64	10	119	124	433	709	70	20	76	462	71	685

Source: ES Village Survey (2016)

*Land purchased by Lao Yunmu Forestry Development Company covering three villages

Villagers commonly hold land certificates for agricultural land, with the exception of Ban Phonesoung, who have land tax documents (receipts) only. Only two households in the Project Area have a land use certificate for residential land. Documents are generally held jointly between male and female heads of households, with the exception of Ban Phonesoung (male only).

Industrial Zones and Concession Areas

A significant amount of land in the Project region has recently been rezoned as a Light Industrial Zone (1,950 ha) by the District Governor (District Agreement, 2016). The Light Industrial Zone affects the village land of Ban Phonesoung and Ban Khone Phook. Villagers continue to use this land until concessions are awarded and lands have been developed. Current concessions / developments are listed in Table 4-3. Several large plantation concessions are also present in Ban Khone Phook and Ban Phonesoung.

Table 4-3 Industrial and Plantation Concessions in the Project Area

Zone / Concession	Land Holding (Ha)	Village Lands
Heavy Industrial Zone		
BSS Cassava factory	17 ha	B. Khone Phook
Light Industrial Zone		
Agarwood Plantation	15 ha	B Phonesoung
BKN White Charcoal Factory	0.6 ha	B Phonesoung
Lay farm Organic Fertiliser	1 ha	B Phonesoung
Hin Heup Substation	2 ha	B Phonesoung
Lao Yunming Eaglewood Agarwood Plantation	380 ha	B. Viengthong, B. Phonesoung, B. Khone Phook
Lao Yunming Eaglewood Perfume Extraction Factory	-	as above
Rubber Plantation of Mr. Douangchanh	140	B. Khone Phook
Lao Yunmu Forestry Development Co., Ltd	73 ha	B. Viengthong, B. Phonesoung, Khone Phook
Lilieng Rubber Plantation	100 ha	B. Khone Phook
Burapha Mill site	9 ha	B Phonesoung

4.4.4 Agricultural Land Use and Activity

The primary agricultural land uses in the Project Area include lowland agriculture, orchard / plantations and grazing. Small areas are also allocated to vegetable gardens – mostly within residential areas. There is also a limited amount of upland (permanent) agriculture).

Rain fed rice cultivation

Lowland rice cultivation is most important to households in Ban Khone Phook and Ban Viengthong where 229 households manage approximately 98 ha of rain-fed lowland rice fields (0.4 ha per household) with average yields of between 4-5 tonnes per ha. Only 30 households (33%) households cultivate lowland rice in Phonesoung on approximately 28 ha of land (0.9 ha per household). Reported yields in Ban Phonesoung are much lower at 2.8 tonnes per ha.

Orchids and Plantation forestry

Approximately 16% of households in the Project region are developing small-holder commercial tree plantations. This includes teak (10ha) and rubber (50 ha) in Ban Khone Phook; and agarwood (15 ha), rubber (4ha) and eucalypt (0.5 ha) in Ban Phonesoung. Most of these plantations are yet to reach maturity and provide income for households involved.

Eight households in Ban Phonesoung manage a five ha plantation of Mai Tew (or Pink Empat) which is sold to the BKN Company's white charcoal production plant. Villagers reportedly supply approximately 150 – 200m³/ per week. A small number of households manage fruit orchards including orange (5ha) in Ban Viengthong and orange / lemon (2.5ha) in Ban Phonesoung.

Livestock and Poultry

Approximately 134 (30%) households manage approximately 500 head of cattle and 27 (8%) households manage approximately 213 buffalo in the three Project area villages. Grazing lands total 71 ha. Ban Viengthong has the highest number of households (108), livestock (363 head) and grazing land (224ha). Numbers of livestock have increased steadily in all the Project Area villages over the last three years as households become wealthier.

All households in the Project area manage poultry with average holdings per household high in Viengthong (50) an average in Khone Phook (22) and Ban Phonesoung (17). Goats are not common in the Project Area as they are reportedly harder to manage, susceptible to disease, and destroy vegetable gardens.

Vegetable cultivation

The cultivation of vegetables is an important activity in Ban Viengthong where each household manages a garden plot (1 rai or 1600m² plots) mainly located along the Nam Lik River bank. Approximately half of the households in Ban Khone Phook and Ban Phonesoung also cultivate vegetables on much smaller plots (25m² to 100m²) within the village settlement area. Production includes green leafed vegetables, cucumber, long beans and chill.

Upland agriculture

There is reportedly no shifting cultivation in the Project area villages. Permanent upland agriculture cultivation is practiced by 70% of households in Ban Viengthong on approximately 64 ha of land. Crops include cassava, sugar cane and maize. A small area (4ha) of sugar cane is managed by four households in Ban Phonesoung. Villagers in Ban Khone Phook have converted upland agricultural areas to orchards and plantations.

4.4.5 Forest Resource Use

Forest resources including timber and non-timber forest products (NTFP) are commonly collected and used by villages in Lao PDR. Such forest resources are often important in allowing villagers to meet their subsistence nutritional needs, and provide a safety net during times of food scarcity. NTFP are also an important source of income for rural households, particularly for disadvantaged groups such as women and ethnic minorities (SNV, 2006).

Non-Timber Forest Products

Approximately 94% of households in Project Area villages collect NTFPs, primarily for personal / household consumption. All households in Ban Khone Phook also reportedly earn an income from this activity. NTFPs are mainly collected within village lands including paddy fields, fallow forests, ponds or streams. A total of 19 NTFP plant species were identified during focus group discussions for this ESIA, including edible and medicinal plants.

All households in the Project Area collect fuel wood from degraded / fallow land, plantation areas and upland areas and use it for household cooking. Ten households in Ban Phonesoung produce charcoal and source fuel wood from the same areas. Fuel wood resources are reportedly plentiful.

Timber Forest Products (TFPs)

Almost all households in the Project Area collect timber from village lands. The most common tree species harvested by villages in the Project Area include *Aporosa ficifolia* (Mai Meud), *Peltophorum dasyrrhachis* (Mai Sa Phang), *Lagerstroemia* (Mai Peuay), *Cephalostachyum virgatum* (Mai Hia), *Trema orientalis* (Mai Por Hou), and *Oxytenanthera parvifolia* (Mai Zord). These are reportedly sourced from within village boundaries, along Phuthing Mountain, within grazing areas, along paddy fields and fallow forests.

Whilst villagers in Ban Viengthong and Ban Khone Phook reported that TFPs were plentiful in their villages as they regenerate easily, villagers in Ban Phonesoung reported a decrease in these forest resources.

Hunting

Hunting is reportedly not very common in the Project Area. Only a few households are engaged in hunting activities. During focus group discussions, villagers reported that animals (both large and small) are found less frequently due to the decrease of forest cover / declining habitat value.

4.4.6 Water Resource Use

The major waterbodies in the region include the Nam Lik River, the Nam Ngum River and reservoirs for both rivers where water was compounded for hydropower generation. The largest tributary of the Nam Ngum is the Nam Lik River. As for most rural parts of Lao PDR, local surface and ground water resources (rivers, streams, lakes, wetlands, aquifers etc.) play a significant role in the day to day lives of people living in rural areas. With limited infrastructure, these villagers often rely on nearby water resources for their drinking water and to a lesser extent, electricity generation. The same waterways are important sources of fish and other aquatic resources. They are also often used for washing, bathing and swimming.

The most important water resources for local villages are the Nam Lik River, nearby streams and wells or bores. Residents in the Project Area mainly drink from bottled water, although it was reported that residents in Ban Khone Phook drink water from wells or bores (after boiling it first). There are reportedly no water shortages experienced in the Project Area.

4.4.7 Fisheries and Aquatic Resource Use

More than 90% of households in the Project Area are engaged in fishing and the collection of aquatic resources, primarily for their own consumption. In Ban Viengthong approximately 50 households also sell their catch to other people in other villages or at the local market.

The Nam Lik River, the Nam Som River, and the small perennial tributaries of the Nam Lik are known habitat for a number of aquatic species. Villagers of Ban Khone Phook, Ban Phonesoung, and Ban Viengthong identified 14 fish that are commonly caught in the region, most of which in the Nam Lik.

4.5 Cultural Heritage, Archaeology, and National Heritage

There are no sites of cultural or archaeological significance within or directly adjacent to the Project footprint, though significant sites do occur in each of the three Project area villages (e.g. spirit forests, temples, cemeteries, etc.).

4.6 Visual Amenity

The Project Area is a mosaic of built up settlement areas, industrial concessions, agricultural plots and degraded regeneration forests lying on undulating land overlooking the Nam Lik River.

The District GOL intends to develop the wider area around Ban Hin Heup for tourism adjacent the Nam Lik 1 reservoir after it is impounded. This area is considered likely to draw tourism given the potential for leisure activities on the reservoir and the location being a mid-way point for road transport on Highway 13 between Vientiane and Vang Vieng / Luang Prabang to the north, two of the more popular tourist attractions in the country.

5 RISK ASSESSMENT

5.1 ESIA Risk Assessment

A Risk Assessment was conducted for the ESIA based upon the International Risk Management Standard (ISO31000). Key environmental and social risks potentially resulting from Project development were identified using the risk assessment framework. The risk assessment was initially conducted without consideration to implementation of any management and mitigation with the goal of identifying the most significant potential risks in the absence of mitigation.

Following the assessment and initial risk ranking, proposed management and mitigation measures were identified to avoid or minimise the identified risks and a revised risk ranking provided to identify residual risks.

The assessment identified 14 High risks and 16 Medium risks **prior** to the implementation of proposed Project management and mitigation measures. For each of these key risks, detailed mitigation, management and monitoring measures have been developed.

The implementation of proposed management measures is expected to result in a significant reduction of risk. The residual risk assessment identified two High residual risks, 19 Moderate risks with the remaining 18 risks identified as Low. The High residual risks include potential for injury / death from traffic related incidences and discharge of hazardous materials during transport (e.g. road accident and spillage).

Detailed management and mitigation measures have been outlined in the ESIA Report and ESMMP to ensure the residual risks are minimised wherever possible.

5.2 Risk Monitoring and Review

Risk monitoring and review is critical to managing environmental and social risks effectively for the Project life, and feed into all steps in the risk management process. Burapha is committed to a risk management approach and has developed a series of policies and procedures to guide management strategies which will be implemented for the Burapha Project. Burapha will undertake annual internal audits for all significantly ranked risks, and will also commission annual independent external reviews of the ESR Department's risk management via Forest Stewardship Council (FSC) audits.

6 ASSESSMENT OF IMPACTS AND OPPORTUNITIES

6.1 Revenue and Economic Development

On a regional and local level, the Project is expected to generate significant direct and indirect benefits, including:

- Investment - The establishment of the Mill Project will require an initial investment of \$26.5 million USD into the Lao economy.
- Direct Employment - Approximately 383 full-time positions will be created for Mill and transport operations. Skilled labour requirements will provide training / skills enhancement opportunities. Preference will be given to the recruitment of local workers. Additional jobs will be created for construction.
- Government Revenue - The Project will provide a significant contribution to GOL tax revenues with an estimated annual tax revenue of more than \$2 million USD when the mill reaches full production (BAFCO Mill Feasibility 2016).
- Spin-off benefits – The construction and operation of the Project is expected to provide local supplier opportunities. Project development in the Hin Heup light industrial zone is expected to provide further impotence to the development of the area. The Eucalyptus plantation forestry sector will benefit as a whole from Mill operations through the development of a higher value export alternative; the technological advances in introducing a modern manufacturing unit; and incentive to expand sustainable / certified plantation operations.

The Mill will also facilitate the expansion of Burapha’s agroforestry project to an initial 5000 ha, resulting in further foreign capital expenditure; 896 full-time positions and government revenue in the form of land fees and taxes.

Revenue and Economic Development Impact Assessment

The Project is expected to generate significant direct and indirect economic benefits for the local, regional and national economy.

6.2 Land Use and Resettlement and Displacement of People

The proposed Mill site is located on a concession area previously granted to a Malaysian logging company (HIPA) that was returned to the Government of Lao (GOL) approximately 10 years ago. The land is within an area zoned for Light Industry by the Province.

The site does not affect any village land. No resettlement is required for the Project.

Land Use Impact Assessment

The Project does not affect any village land and no resettlement will be required. Impacts will be **Negligible**.

6.3 Employment

The Project will create approximately 383 full time positions. This includes approximately 366 full-time positions for Mill operations - 182 people working per shift (59 people for the veneer line and 63 people on the plywood line; and 17 full-time truck drivers for in and out-bound haulage). Mill operations will require

training of the local workforce to fulfil skilled labour opportunities. Recruitment of the Burapha workforce will target people from the local communities.

Securing employment with the Project will be one of the greatest concerns among the local population. Surveying conducted for this ESIA in the three nearest villages has highlighted the growing importance of wage-based work as the area transitions to a market based industrialised economy. There are currently limited full-time employment opportunities and many villagers are forced to seek seasonal employment in other areas of the country.

There is the risk of potential issues associated with employment which may include:

- Unequal opportunity for employment, either perceived or actual, between different villages, ethnic groups, genders and recent migrants versus long-term residents;
- Frustration arising from inadequate employable skills among the local workforce and ability to obtain skilled labour positions;
- Social impacts resulting from shift work and changes to the family dynamic; and
- Occupational health and safety (refer to Section 6.4).

Management measures are identified in the ESIA and ESMMP (Volume C) including strong community engagement and grievance resolution; local first and equal opportunity employment practices and training and skills development programs are expected to greatly reduce the likelihood and consequence of these potential impacts.

Employment Impact Assessment

The Project is expected to generate approximately 383 full time positions – the majority for people in the local area. This is expected to be a benefit to the local community and region.

6.4 Occupational Health and Safety

Occupational health and safety risks are inherent in mill and transport operations. Some of the primary risks include:

- Hazards associated with loading, transport and unloading logs;
- Hazards associated with the use of and working in proximity to heavy equipment and machinery;
- Exposure to dust and potentially noxious chemicals; and
- Explosion / fire hazards from flammable materials.

Burapha has an existing OHS Policy and Principals Manual which provides targets, specifies integrating OH&S into daily activities through proactive and preventative measures, and documents requirements to actively renew health and safety programs through continuous improvement and monitoring. The Burapha OHS manual will be updated to address specific risks proposed by the Mill and transport operation and management / mitigation obligations identified in the ESMMP.

Occupational health and safety aspects will be incorporated into the Mill design.

Occupational Health and Safety Impact Assessment

Though OH&S risk cannot be entirely avoided, the likelihood and consequence of potential impacts is expected to be **Low** with diligent implementation of OH&S measures described in the ESMMP and BAFCO OH&S Policy and Principals Manual.

6.5 Transport and Traffic Safety

Approximately 82,700 m³ of raw logs will be harvested in Burapha plantations in Vientiane Province, Xayabouly Province, Saysomboun Province and Vientiane Capital annually. An average of 14 in-bound haulage trucks will operate each day, hauling as much as 30m³ of raw logs per truck. An average of three trucks per day will haul approximately 50m³ per truck of finished product to market (Vientiane, Thailand, Myanmar, China). The Mill will produce approximately 32,000 m³ annually.

Forty-six villages with a total of 36,825 people (hereafter the Transport Villages) are located on six (6) key inbound and outbound transportation routes in Vientiane Province (Table 6-1):

Table 6-1 Primary (proposed) log and plywood transport routes

Transport Route	Roads
Mill Access Route	4501
North East inbound route	13N and 5
North West inbound route	4533 and 13N
West / South West inbound	4501, 4502, 11, 4
South East in-bound and out-bound route	13N and 10
Southern inbound	120 13N

The most heavily impacted villages will include those with settlements located on Provincial Road No.4501 and in close proximity to the Mill. These include settlements in Ban Phonesoung and Ban Viengthong for haul trucks utilising the transportation routes above.

Ambient traffic conditions on the haul roads are quite heavy, particularly for Highway 13 and Provincial Road 4501. Traffic on Road 4501, comprised of trucks, buses, cards, motorbikes, and tuk-tuks, is frequent during the day and moderate during the evening.

The addition of Burapha trucks on the road will have negligible impact on ambient conditions on national, Provincial and District arterials. Burapha transport on smaller unsealed roads associated with plantations will be very infrequent, associated with harvest every seven years. However, there are several associated physical, biological, and social risks associated with hauling raw timber and the finished product that must be diligently mitigated, including:

- Community health and safety – people living near or travelling on transportation routes will be at risk for vehicle strike resulting in injury or death. This risk will increase in locations that have relatively high population density; where Burapha trucks most frequently use; and where road infrastructure condition is poor. There is increased risk for children who typically do not have the same awareness of hazards associated with roads and transport.
- Biological receptors – flora and fauna may be impacted in the event of an accident leading to hazardous materials discharge, including native fauna as well as livestock;
- Soil and water quality – soil and water quality may be impacted by hazardous materials discharge during vehicle refuelling or maintenance or in the event of a road-side accident; and
- Air quality – vehicles will emit pollutants and generate dust, which may prove a nuisance for people living in proximity to the access roads.

The risks and potential impacts are assessed in the ESIA for each of the above receptors. Management measures identified in the ESIA and ESMMP (Volume C) will significantly reduce the potential for significant impacts (e.g. driver safety training, vehicle maintenance, speed limits, travel hours, emergency preparedness and response requirement, etc.). However, nuisance level impacts cannot be entirely avoided or mitigated.

Traffic and Traffic Safety Impact Assessment

Though risks from transportation cannot be entirely avoided, impacts to community health and safety is expected to be **Low** with diligent implementation of transportation safety measures described in the ESMMP

6.6 Community Safety, Health and Nutrition

The primary threat to community health and safety from Project implementation will be associated with transportation of logs / finished product to and from the site, respectively (as above). Vehicle transport poses a risk for the greatest number of people / villages as well as the most serious safety risk.

Effluent from the Mill will not pose a threat to community health and safety as the primary pollutants of concern from veneer and plywood manufacturing (nutrients and other organic materials) are not a threat to human life. Design controls and management measures will minimise effluent concentrations to meet national and IFC guidelines for effluent discharge. Hazardous materials (primarily hydrocarbons) pose a more significant risk, however management measures are expected to minimise the chance of discharge to Nil from Mill operations. Risk for discharge during transport of hazardous materials must be carefully managed.

While air quality and noise will require diligent management to ensure occupational health and safety, impacts to nearby residents will be limited to nuisance emissions during transport of materials. Air and noise emissions from the Mill are not expected to impact the nearest community due to design controls and distance of potential receptors.

The economic development and employment opportunities created for local residents will increase household incomes and their ability to purchase food (improving nutrition) and access better medical services and treatment.

Community Safety, Health and Nutrition Impact Assessment

Though risks from traffic, hazardous materials, etc. cannot be entirely avoided, impacts to community health and safety is expected to be **Low** with diligent application of management measures described in the ESMMP.

6.7 Community Water Use

The most important water resources for local villages are the Nam Lik River, nearby perennial streams, and wells or bores. Water from these sources is utilised for household garden irrigation, washing, and other beneficial uses (whereas local communities use bottled water for drinking).

With design controls and diligent application of management / mitigation measures to avoid discharge of potentially toxic materials, effluent is unlikely to contribute pollutants that would affect community water use.

The Mill is expected to abstract approximately 23,000 m³ per year (m³/a) of groundwater to meet operational requirements at full capacity. Due to the distance from village bores / wells and the location of the proposed Mill bore, impacts to village groundwater availability are not anticipated. If impacts occur, Burapha will provide an alternate water source for those affected.

Community Water Use Impact Assessment

With appropriate design controls and passive water quality treatment, impacts to community water from effluent will be **Low**. Impacts to groundwater hydrology are expected to be **Very Low**.

6.8 Effluent

Without proper management, there is significant risk that discharge from the Mill would affect water quality, with potential impacts on downstream aquatic biodiversity. Unmanaged / untreated discharge during the various phases of veneer and plywood manufacturing may be high in nutrients / organic material which may increase biological oxygen demand (BOD) and / or chemical oxygen demand (COD) to the extent that dissolved oxygen levels in receiving waters may be depleted, and benthic organisms consequently stressed or killed. Discharge of such materials in excess of national and international guidelines would directly impact aquatic habitat. With the exception of potential discharge of hazardous materials, potential water quality pollutants are not considered hazardous for human health.

Burapha is committed to meeting national and international standards for effluent discharge. Diligent management and mitigation measures will be required to ensure the Company meets these standards. Process water from washing glue spreader and air dryer will be recycled, with zero discharge from these facilities. A water treatment pond will be constructed to allow for passive microbial treatment of surface water prior to its discharge from the site. Water from the log stockyard and the remainder of the Mill footprint would be routed to this pond (which will serve as a settling pond for suspended sediments).

The quality of liquid waste from plywood manufacturing is monitored by analysing the following characteristics: pH, biological oxygen demand, chemical oxygen demand, total suspended solids, phenol, and total ammonia. The water quality monitoring regime specified in the ESMMP will identify whether discharge meets applicable standards, and provide for adaptive management to avoid impacts to downstream water bodies / receptors.

Water Quality Impact Assessment

With appropriate design controls and passive water quality treatment and a commitment to meeting National and International Standards, impacts from effluent discharge will be **Low**.

6.9 Terrestrial Biodiversity and Use

The risks for impacts to terrestrial biodiversity are very low during Project construction and operations. No quality habitat exists on the site, with vegetation having been previously cleared and much of the site graded and the soil compacted. During May 2016 biodiversity surveys on the site, no threatened or High Conservation Value flora or fauna were found. Impacts to terrestrial biodiversity will be Very Low.

Natural resources (NTFP, TFP, etc.) utilised by local residents will not be impacted.

Indirect impacts, mainly associated with employment and increased incomes in the Project area are expected to be positive (i.e. reduced reliance on natural resources).

Terrestrial Biodiversity and Resource Use Impact Assessment

Impacts to terrestrial biodiversity, forest resources and resource use will be **Very Low**.

6.10 Aquatic Biodiversity and Use

Effluent may impact water quality in the absence of suitable management measures. Though aquatic habitat and biodiversity are absent on-site, drainage will reach the Nam Lik River, which has quality habitat for a range of aquatic species (likely including some threatened fish species) and is an important fishery for local residents.

The river will significantly dilute effluent from the site. Unmitigated risk is therefore Moderate. Cumulative discharge of nutrients / organic matter from industry in the region may elevate biological oxygen demand and

chemical oxygen demand, decreasing dissolved oxygen concentrations to levels that may prove deleterious to aquatic species, particularly following impoundment of the river for the Nam Lik 1 Hydropower Project.

Burapha is committed to managing effluent discharge with design controls (recycling glue spreader / veneer dryer washwater) and management measures (passive water quality treatment) to ensure discharge meets applicable standards, reducing potential impacts to aquatic biodiversity and aquatic resource use to Low.

Routine water quality monitoring of effluent will be conducted to ensure discharge meets applicable standards and inform adaptive management strategies, if necessary.

Aquatic Biodiversity and Use Impact Assessment

With appropriate design controls and passive water quality treatment, impacts to aquatic biodiversity and aquatic resource use will be **Low**. Water quality monitoring will ensure downstream biodiversity / water users are protected and inform adaptive management strategies, if necessary.

6.11 Erosion and Sediment Transport

Due to (i) the highly dispersive nature of the soil at the Mill site; (ii) the precipitation regime in the region (i.e. moderately high seasonal volumes and high intensity rains during the height of the rainy season); and (iii) the need to clear approximately seven ha for construction, the topsoil and subsoil at the site will be susceptible to significant erosion and sedimentation of neighbouring seasonal streams and potentially the Nam Lik River during construction.

This is mitigated by the flat topography of the site. Stormwater control and erosion / sediment control facilities will be implemented in advance of ground disturbing activities. Proper controls will minimise sediment inputs to a level that is satisfactory to stakeholders.

A sedimentation basin (which will be converted to the Water Treatment Pond during operations) will retain surface water from the Project footprint, allowing coarser sediments to settle. Some of the finer fraction will discharge from the site.

Erosion and Sediment Transport Impact Assessment

With effective stormwater, erosion, and sediment control; construction phase impacts to water quality from erosion and sedimentation will be **Moderate** and operations phase impacts will be **Low**.

6.12 Hazardous Materials

The Project will be required the transport, storage, handling, and disposal (where applicable) of hazardous materials / hazardous waste throughout operations and during construction to a lesser extent. The formaldehyde utilised in the wood adhesive presents a significant occupational health and safety risk for the workforce if inhaled. The remainder of the materials used in the adhesive (i.e. urea / phenol, ammonium sulfate) may impact aquatic habitat if discharged from the site (as above).

In addition, diesel fuel and other hydrocarbons; sewage and greywater, and medical waste would impact groundwater and surface water quality in the event of accidental discharge. Burapha is committed to International best practices for transport, storage, handling of hazardous materials and appropriate disposal of hazardous waste including design controls, provision of Personal Protective Equipment, training, record keeping, and emergency preparedness and response planning. Though the potential for accidental discharge cannot be entirely removed, it is anticipated that this impact will be Low.

Burapha will develop, implement, communicate, adhere to and maintain a relevant and current **Waste Management Plan** which defines all on-site and off-site strategies, operational controls and management

practices relating to hazardous and non-hazardous waste management. Potential waste streams and their sources will be identified, classified and managed during operations and incorporated into the Waste Management Plan and the design of on-site facilities.

The Company will develop and implement an **Emergency Preparedness and Response Plan**, incorporating requirements identified in the Project ESMMP, Emergency Preparedness and Response Sub-Plan. Burapha will also develop an **Occupational Health and Safety Plan** or Standard Operating Procedure that ensures their workforce is adequately trained to avoid exposure to potentially toxic substances and is provided appropriate personal protective equipment (PPE).

Routine monitoring of hazardous materials storage, handling, and disposal areas will be conducted throughout construction and operations to ensure personnel are effectively managing potential pollutants, as per the ESMMP. Where applicable, non-compliances will be documented with corrective action reports and remedial measures implemented.

Hazardous Materials Impact Assessment

Though risks from hazardous materials cannot be entirely avoided, impacts to communities, the workforce, water quality, soil quality, and biodiversity will be **Low** with diligent application of management measures and monitoring provided in the ESMMP.

6.13 Non-Hazardous Materials

Waste management at the Project will require the construction of several specifically designed facilities (i.e. storage and separation area for recyclables; residue waste landfill for non-recyclables and non-hazardous materials; sewage and grey water treatment plants). The first priority for the management of wastes generated by the Project will be to reduce the volume of waste generated, which will be achieved by procuring supplies that produce less waste by virtue of the way they are produced, packaged, or consumed; procuring supplies that have been produced from recycled materials, if possible; and maximising the efficiency of all on site production processes.

All non-hazardous waste will be managed in a manner that avoids impacts to surface and air quality, soil and surface / groundwater, visual amenity, and prohibits animal forage.

Routine monitoring of all waste containment and disposal areas will be conducted throughout construction and operations, as per the ESMMP. Where applicable, non-compliances will be documented with corrective action reports and remedial measures implemented.

Non-Hazardous Materials Impact Assessment

Impacts to receptors from non-hazardous waste will be **Low**.

6.14 Site Contamination

Burapha is committed to operating the facility in a manner that avoids site contamination. The Company will develop a *Waste Management Plan* (WMP) that identifies appropriate disposal methods for hazardous and non-hazardous wastes, and certified facilities for off-site disposal. Volumes of hazardous waste will be tracked and recorded with a Hazardous Materials Register. Measures to contain discharge in the event of accidental spillage will be identified in the Project *Emergency Preparedness and Response Plan* (EPRP). Management measures provided in the ESMMP will be incorporated into the WMP and EPRP.

All on and off-site disposal facilities will be appropriately designed to ensure that surface water, groundwater, and soils are not contaminated. Non-hazardous waste disposal areas will be routinely covered to avoid wildlife egress and disease spread through such potential vectors.

Routine monitoring will include all waste containment and disposal areas, to ensure contractors / Burapha staff are managing waste consistent with Company / Project policies.

Site Contamination Impact Assessment

Impacts to surface water, groundwater, soil and downstream receptors are expected to be **Low** with development and implementation of an effective waste management strategy, routine monitoring of facilities, and corrective action plans.

6.15 Air Quality

Air emissions from veneer and plywood plants typically include: dust, nitrogen oxide gases (NO_x); sulfur dioxide gas (SO₂); carbon monoxide gas (CO); and a number of volatile organic compounds (VOCs). VOCs, including formaldehyde (CH₂O), are likely to be emitted from the processing of veneer and use of glues, solvents, fuels and other hydrocarbons on-site. Combustion gases SO₂, CO and NO_x originate from the exhaust of diesel and petrol fuelled vehicles, and from generators and boilers on-site. In addition, the formaldehyde utilised in the resin for gluing veneer panels into plywood poses an occupational health and safety risk for the workforce if inhaled (refer to Section 8.6).

The Mill will be designed to meet IFC emissions guidelines for Board and Particle-Based Products (2007), the staff outfitted with appropriate personal protective equipment (PPE), and the use of PPE required for applicable jobs. It is anticipated that emissions will not present a risk for nearby communities due to the distance from receptors and design controls.

Similarly, air emissions during construction will likely only be an issue for workers due to the distance of the site from villages (i.e. > 0.5 km). Dust will be generated during vegetation clearance / earthworks, road construction, and during travel on the unsealed access roads.

Air Quality Impact Assessment

With appropriate design controls, PPE, and application of additional management measures provided in the ESIA, residual impacts for receptors will be **Low**.

6.16 Noise

During construction, vegetation clearance / grading, other heavy machinery, and transport activities will emit noise. During the operations, primary noise emissions will occur where sawing, milling, processing, drying, loading and transport activities. Noise at the Mill site will be high and will require strict adherence to hearing protection requirements for all staff.

Impacts to communities from noise generated at the Mill are expected to be Low. Sensitive human receptors are topographically shielded from the Mill site and residences are more than 0.5 km away, with the majority more than 1 km away. Burapha will either plant a number of rows of Eucalyptus surrounding the Mill to attenuate noise emissions or will build a noise attenuating wall. Night-time shift activities will not include noise generating activities that exceed national / international guidelines.

Log trucks will pass through villages during materials transport. Trucks may provide nuisance level noise impacts. Speed limits though town will be strictly enforced, thus only Moderate level impacts are anticipated.

Noise will be indirectly monitored through implementation of the Project Grievance Mechanism, whereby complains will be registered, and adaptive management measures evaluated and implemented in the event of impacts.

Noise Impact Assessment

Noise impacts from haul trucks will be short-duration **Moderate** impacts. With design controls and noise attenuation, impacts from the Mill will be **Low**.

6.17 Archaeology and Cultural Heritage

There are no known sites of cultural or archaeological significance within or directly adjacent to the Project footprint. Known areas of cultural (e.g. spirit forests, temples, and cemeteries) and archaeological importance are outside of the area of influence from the Project.

A Chance Find Procedure (ESMMP, Volume C) has been developed that identifies the communications protocol and procedures that will be undertaken if an artefact or significant site is found during Project construction. Impacts are expected to be Very Low.

Archaeology and Cultural Heritage Impact Assessment

Residual impacts will be **Very Low** with the implementation of the chance find procedure.

6.18 Gender, Ethnic Minorities and Vulnerable Groups

Ensuring Project benefits are equally accessible to women, vulnerable groups and ethnic minorities will help minimise the potential for disproportionate impacts on these groups.

Whilst there are low levels of vulnerability in the Project Area, there are a relatively high number (36) of single female headed households and households (10) with members that have disabilities. There are also a small number of ethnic minorities in the three villages including Khmu households (9.6% of the population) and 10 Hmong households (2.7% of the population).

Implementing equal opportunity policies and targeting gender / ethnic balance in hiring will minimise the risk of exacerbating existing inequalities affecting vulnerable groups and ethnic minorities and ensure that Project benefits are equally accessible to all groups.

Gender, Ethnic Minorities and Vulnerable Groups Impact Assessment

Residual impacts will be **Very Low** with the implementation of equal opportunity employment policies, and community consultation.

6.19 Visual Amenity

The Mill site is considered the best location in the immediate area to minimise impacts to visual amenity. The Mill will be constructed adjacent the Hin Heup Substation and an organic fertiliser manufacturing facility (industrial area) and the area is topographically shielded on three sides from direct line of site.

The Mill will not be visible from neighbouring Ban Hin Heup, Ban Viengthong, Ban Phonesoung, Ban Khone Phook, and Ban Phone Mouang. Viewshed analysis conducted for this ESIA indicate that the primary areas that will have direct line of site to the Mill are the slopes / plateaus in the distance and ridge-tops to the north, south, and west. None of these areas are populated. The visual amenity of the area planned for tourism development (adjacent the reservoir in the Ban Hin Heup area) will not be impacted. Impacts to visual amenity are considered Very Low.

In the absence of vegetative screening, the Mill will be visible from the primary access road to the west of the Mill site. Burapha will plant trees (likely Eucalyptus) for noise attenuation to shield direct line of site from the road and river area.

Visual Amenity Impact Assessment

Impacts to visual amenity will be **Low**.

6.20 Cumulative Impacts

The Burapha Mill Project will make a significant contribution to the Hin Heup District Government's plan to develop the Project Area. This project, along with other existing and planned projects in the area are expected to have a multiplier effect, generating government revenue, employment and spin-off economic opportunities in the Project region and cumulatively boosting the regional economy.

Key potential cumulative impacts include:

- Surface and ground water hydrology - The Mill will source operational water from groundwater (or surface water if necessary). Current and future industrial developments in the area may have similar operational water requirements. This has the potential to draw down the regional aquifer or reduce surface water in the Nam Lik river and its tributaries, potentially affected other water users.
- Water quality - In the absence of adequate management, there is a risk that discharge from the Project Area will have elevated BOD and COD concentrations, moderately high sediment loads (during construction), and hazardous materials / waste, each of which may have implications for the health of aquatic biodiversity and beneficial uses of water. With effective design controls and management measures impacts will be low. Similar risks are likely in other industrial developments across the area. Failure to properly manage these risks could contribute to diminished water quality in and around the Project area.
- Transport – Project vehicles will contribute to increased traffic on local and regional roads. Key issues include road / community safety, degradation of road infrastructure; the transport of hazardous materials, nuisance noise and vibration, and air quality relating to dust generation and vehicle emissions. Transport related impacts of the Mill project will be low with effective management. Continued development of the area is expected to increase use of local and regional roads and related transport impacts.

Cumulative Impact Assessment

Cumulative benefits for the regional economy will be **Moderate**; Cumulative impacts to water quality will be **Low**; and cumulative impacts to traffic will be **Low – Moderate**.

7 STAKEHOLDER CONSULTATION AND PUBLIC INVOLVEMENT

Throughout the ESIA process, formal and informal consultations were undertaken with Central, Provincial, and District Government Officials and the local communities.

7.1 Objectives

The overall objective of stakeholder consultation for the Project is to improve decision-making, build understanding to ensure the long-term viability of the Project, to enhance potential Project benefits, and to ensure stakeholders have a voice in the assessment and outcomes.

7.2 Stakeholder Identification

Lao legislation defines stakeholders as “any person, legal entity or organisation who / which are interested in, involved in or have interests in an investment project, in an activity or a manner (related to the project) because they are involved in or (are likely to be) affected by the investment project” (MONRE, 2010).

The following key stakeholder groups have been identified for the Project:

Villages in Close Proximity to the Mill

Villages in close proximity to the Mill include Ban Khone Phook, Ban Phonesoung and Ban Viengthong. No individuals nor communal lands are required for development of the Project. Households may be impacted by noise, air quality, water quality and availability, increased traffic, community safety and associated impacts.

Villages along the Transportation Network

Forty-seven (47) villages are located on key roads along the Company’s planned transportation network. It is expected that the Mill operation will require a minimum of 14 trucks to the site daily to support operations and households in these villages may be impacted by increased traffic, community safety and associated impacts.

Government of Lao PDR

Government of Lao PDR stakeholders include:

- Hin Heup District government and line offices;
- Vientiane Province government and line departments;
- Central Government line agencies (particularly MONRE, Ministry of Planning and Investment and Ministry of Industry and Commerce).

Other Stakeholders

Other stakeholders identified for the Project include:

- Residents along transport routes from plantations, scattered throughout Vientiane Prefecture, Vientiane Province, Xayabouly Province and Saysomboun Province;
- Private companies operating in the vicinity of the Project, such as those having land concessions for Ray Organic Fertiliser factory, Naly Jalernsub Cassava Factory, Ban Phonesoung White Charcoal Factory; Lao Yunmu Forestry Development Company, and Lao Yunming Eaglewood Processing Import & Export Company; and
- NGOs and aid projects working in Hin Heup District, including Oxfam, Village Focus International.

7.3 Summary of ESIA Consultation Activities

A series of initial consultations have been conducted during the ESIA period (refer to Table 7-1). These included meetings with central, Provincial and District level representatives; village meetings and surveying; technical studies and site visits. The purpose of these engagements was to introduce the Project; collect information on the Project Area; and seek feedback from key stakeholders. Key outcomes of the consultations and how these issues are addressed in the ESIA are outlined in the ESIA Report (Volume B).

Table 7-1 Summary of Consultation Conducted during the ESIA

Date	Consultation	Stakeholders
Kick-Off Meeting		
21 March 2016	Central meeting (ESIA Kick off)	Department of Environment and Social Impact Assessment
Initial ESIA / Scoping Study Consultations		
1 April 2016	Vientiane Provincial Meetings	Provincial Cabinet Office; Provincial Department of Natural Resources and Environment (Head of Forest Resource Extraction Section and Deputy Head of Resettlement Section), Provincial Department of Industry and Commerce, Provincial Department of Agriculture and Forestry, Provincial Department of Planning and Investment
24 March 2016	Hin Heup District Meetings	District Administration Office, District Office of Planning and Investment, District Office of Natural Resources and Environment, District Office of Industry and Commerce, DONRE
24-26 March 2016	Village level meetings and village socio-economic and land use surveys	Village authorities and other village representatives in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook
ESIA Field Studies		
17-18 May	Biodiversity Technical Study consultations	Focus group meetings with a selection of community members in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook.
15-16 June 2016	Village level focus groups and household surveys	Focus group meetings with a selection of community members in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook
17-18 May 2016	Cultural heritage and archaeology consultations	Focus group meetings with a selection of community members in representatives in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook.
Draft ESIA Formal Consultations		
3-4 October 2016	Village level consultations	Village level consultation meeting to present findings of the ESIA and invite feedback / comment.
10 October 2016	Hin Heup District level consultations	District consultation meeting to present findings of the ESIA and invite feedback / comment.
TBC	Central / Provincial level consultations	Central level consultation meeting to present findings of the ESIA and invite feedback / comment.

Source: Earth Systems 2016

7.4 Continuing Consultation

The Company will be expected to continue formal and informal consultation with stakeholders as the Project continues into the operational phase. Procedures for grievance management throughout the Project life have been outlined in the ESMMP that are designed to provide an open and transparent channel for communication between the community and the Company.

The Public Consultation and Disclosure Plan (Volume C) will provide a framework for consultation and information disclosure for the implementation of the Burapha Mill Environmental and Social Impact Assessment (ESIA) processes throughout the construction and operational phases of the project. The PCDP has been developed using international best practice and Burapha's existing Operational Manual for communications (2012) which sets out methods of communication as well as roles and responsibilities for information dissemination.

7.5 Grievance Management

The first step in conflict resolution is conflict avoidance. Conflict avoidance is a key goal of the stakeholder consultation process for the ESIA and for the ongoing community engagement program. Regular consultation and engagement with local community members will effectively reduce the occurrence of disagreements and conflicting positions.

Despite the best practice community engagement, it is likely that grievances will arise throughout the life of the Project, and it is important that these are dealt with in a fair and transparent manner before they escalate. The phases of conflict development and appropriate interventions can be summarized as follows:

- Conflict avoidance → Consultation & participation in planning, decision making;
- Simple disagreements → Informal negotiation, discussion and mediation;
- Early conflict development → Reference to Village Grievance Committee;
- Conflicting positions taken → Reference to Grievance Committee at District level;
- Conflicting positions hardened → Reference to Grievance Committee at Provincial level; and
- Intractable conflict → Refer conflict to National Court.

Burapha Agroforestry Co., Ltd has an established Standard Operating Procedure (SOP) for grievance management, *BAFCO-SOP-010-Dispute Resolution*. This procedure is designed to provide an open and transparent channel for communication between the community and the company. It has been developed to meet the requirements of the FSC Forest Management Standard utilising the Global Forestry Services (GFS) Forestry Support Program and is considered applicable for the Burapha Veneer and Plywood Mill Project. The procedure is summarised below.

Communication

Burapha's grievance mechanism, *BAFCO-SOP-010-Dispute Resolution*, prescribes a proactive approach to conflict avoidance, promoting regular formal and informal communication to minimise areas of conflict arising from the Project. Types of communication include:

- Establishment of a Conflict/Dispute Resolution Committee that includes both the management and adequate representation of all critical groups of the community including women. Committee meetings should be held regularly about every 3-4 months;
- Consultation on forest resource usage by communities;
- Ongoing consultation on village level socio-economic development;
- Communication on the establishment and progress of any social programmes; and
- Provision of relevant information on the type, scope, potential impacts and timing of operations to affected local communities.

Conflict Management and Dispute Resolution

The Conflict Management and Dispute Resolution is a 4-step process as follows:

1. All conflicts or disputes shall also be raised formally within the Conflict / Dispute Resolution Committee;
 - » The committee shall try to resolve the conflict through consensual negotiation;
 - » All information relating to the conflict (meeting notes, maps, photos, agreed corrective actions etc.) shall be recorded for company records and distribution to relevant stakeholders;
 - » Corrective actions, where applicable, are agreed upon by the committee;

2. Any conflict that cannot be resolved within the committee needs to be raised with the company's District Manager. The District Manager shall consider the records / results of the committee resolution process and propose a resolution;
 - » The parties directly involved in the conflict shall then have the opportunity to meet and discuss the issues directly with the Company's District Manager in efforts to come to an agreement. This meeting should be facilitated by an independent third-party mediator;
3. Conflicts that still cannot be resolved are then referred to the company's Regional Director. The process at this step is the same as step 2.
4. Any conflict that cannot be resolved in steps 1-3 is then referred to the civil court system in Lao PDR. The party raising the unresolved conflict shall be responsible for their own representation in the Lao PDR Court system.

8 MANAGEMENT AND MONITORING

8.1 Environmental and Social Management System

The ESIA has outlined the likely environmental impacts based on the current Project design options and has outlined a professional management and monitoring program consistent with Lao PDR legislation and international industry best practices for wood processing operations. The proposed management strategy for the construction and operation phases of the Burapha Veneer and Plywood Mill Project has been documented in the ***Environmental and Social Management and Monitoring Plan***, a separate stand-alone document (Volume C). In accordance with regulatory requirements, during the construction and operations phases of the Project it is expected that the ESMMPs will be updated as required to incorporate any significant changes during the life of the Project.

A site-specific ***Emergency Preparedness and Response Plan*** (EPRP) will be developed for the Project (in addition to Burapha's current EPRP) to specify preventative measures, communication protocols, and response procedures in the event of an emergency. This plan will incorporate national and international best practices that address the key risks associated with veneer and plywood manufacturing in the context of the Project region.

The effective implementation and regular updating of these Plans in response to changing needs will ensure that environmental impacts attributable to the Project are minimised and potential environmental and social benefits are maximised. Ongoing consultation with the GOL, local communities and other stakeholders will be important to ensure consideration of stakeholder interests in the planning and development of the Project.

8.2 Monitoring and Reporting

The implementation of an appropriate monitoring strategy as part of the ESMMP is important to ensure that existing management measures are effective, and to identify the need for improved or additional measures. The environmental monitoring program for the Project will include six categories of monitoring:

- **Routine construction monitoring** - conducted weekly throughout construction to evaluate the efficacy of design controls and management measures (e.g. stormwater, erosion, and sediment controls structures), hazardous materials storage and handling facilities, safe work practices, etc.;
- **Routine operation monitoring** - monthly monitoring to evaluate occupational health and safety measures, hazardous and non-hazardous materials / waste storage facilities and handling practices;
- **Community engagement and social monitoring** – regular engagement with and biennial socio-economic monitoring of affected communities
- **Discharge monitoring** – quarterly water quality monitoring at the siltation basin / water treatment pond to measure pH, BOD₅, COD, total suspended solids, dissolved solids, phenols, Kjeldahl nitrogen, total phosphorous, and oils / grease;
- **Ambient monitoring** – conducted if discharge monitoring identifies exceedances in effluent guidelines. Nam Lik River water measured (same parameters as discharge monitoring) immediately downstream of discharge point to evaluate influence on ambient conditions; and
- **Investigation monitoring** – conducted when routine monitoring identifies potential non-compliance issues or affected communities provide complaints via the Grievance Mechanism.

The Burapha environmental and social compliance officer will provide Quarterly Monitoring Reports and an ***Annual Environmental and Social Monitoring Report*** that records the results of monitoring and identifies adaptive management strategies, where required.

Non-compliances identified during any of the above monitoring will trigger the development of a **Non-Compliance Report** that identifies the issue, provides corrective actions to remedy the issue, a timeline for completion, and person / people responsible for corrective actions.

8.3 Budget for Environmental and Social Monitoring

Burapha will provide a budget estimate for annual environmental and social monitoring that will be included in the Final **Environmental and Social Management and Monitoring Plan**.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

The development of the Burapha Veneer and Plywood Mill will provide an important processing plant to value add plantation forestry grown in the region. It will add to the local economy by providing jobs and local supplier opportunities. It will also provide important export income to Lao PDR.

The siting of the Mill is low impact from an ecological perspective being in a cleared industrial zone.

The Mill can generate wastes and discharges that will need to be carefully managed to ensure that discharge requirements are met, and the downstream environment protected.

9.2 Recommendations

The following are recommended to ensure the Mill meets national and international guidelines and stakeholder expectations:

- Update and implement Burapha's human resource policies to reflect a commitment to local employment, training and skills development and ensure equal opportunity and employment practices for all people in the Project Area
- Design and Implement a participatory Community Development Program specific to the Mill Project in coordination with affected villages and the District government to support local development initiatives and entrepreneurial enterprise;
- Implement designed controls for glue spreader and veneer dryer washwater to ensure zero discharge from the site. Recycle washwater to avoid or minimise water treatment requirements;
- Implement the designed passive water treatment pond (with a dual purpose to capture and retain course sediment) to allow for microbial degradation of organic materials in surface water to protect downstream aquatic biodiversity;
- Develop a comprehensive **hazardous materials register** (with MSDS) to continuously track volumes;
- Develop and implement a **Waste Management Plan** (refer to ESMMP Sub-Plan, Volume C) that identifies hazardous and non-hazardous waste streams and suitable disposal methods and locations;
- Develop and implement an **Emergency Preparedness and Response Plan** (refer to ESMMP Sub-Plan, Volume C) that identifies communication protocols, hazardous materials handling and storage procedures, training requirements, and clean-up materials;
- Develop and implement an **Occupational Health and Safety Plan** (refer to ESMMP Sub-Plan) that identifies training requirements, PPE requirements, design / safety controls, etc. to protect the Mill workforce;
- Identify budgeting requirements for environmental and social monitoring and reporting.



Chapter 1 | Introduction

Chapter 1 | Introduction

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1 INTRODUCTION

This Final Environmental and Social Impact Assessment (ESIA) Report for the Burapha Veneer and Plywood Mill Project (Project) has been prepared by Earth Systems on behalf of Burapha Agroforestry Co Ltd (Burapha). This ESIA Report forms a part of the Impact Assessment documents for the Project.

The proposed Project is located in Hin Heup District of Vientiane Province in Lao PDR (Figures 1-1 and 1-2). The ESIA identifies baselines conditions and the potential environmental and social impacts associated with Project construction and operation. The likelihood and magnitude of these impacts are assessed based on currently available Project information. A framework for further community and Government consultation is also provided.

Consistent with Lao PDR legislation, this ESIA includes consideration of both environmental and social aspects and impacts. A stand-alone ***Environmental and Social Management and Monitoring Plan*** is also provided as part of the ESIA (refer to Volume C).

1.1 Presentation of the Project

Burapha and its consultant are simultaneously conducting ESIA's for its Veneer and Plywood Mill and its Agroforestry Operations, respectively. This ESIA assesses the Company's proposed Mill operation alone. The Burapha Agroforestry Operation ESIA is a standalone set of documents.

1.1.1 Brief Project Description

Mill

Burapha is proposing to construct and operate a veneer and plywood mill (Mill) in Hin Heup District, Vientiane Province approximately 80km north northwest of Vientiane bordering the village boundaries of Ban Phonesoung and Ban Khone Phook.

The Mill will process raw logs from Burapha Agroforestry operations which are located across four provinces / prefectures in central Lao PDR (Vientiane Prefecture, Vientiane Province, Xayabouly Province and the newly created Saysomboun Province). Raw logs will be transported to site and processed into various grades of plywood, including:

- Construction grade plywood (approximately 60% of output), used for wood construction, concrete forms, furniture;
- Packaging plywood (approximately 25% of output), used for packaging material; and
- Sub-floor plywood (approximately 15% of output), used in floor construction.

Finished products will be sold in Lao PDR and exported, as significant demand has been identified in Asia and abroad.

Transport Network

The transport network (refer to Figure 4-2) links the Mill with Burapha Agroforestry concessions which are located across four provinces / prefectures in central Lao PDR (Vientiane Prefecture, Vientiane Province, Xayabouly Province and Saysomboun Province).

The Project Area is serviced by Provincial Road No.4501 that connects to National Road 13 at Ban Hin Heup Tai and is the main thoroughfare linking Hin Heup, Feuang and Sanakan District capitals. The section of Road 4501 near the Project site was sealed in 2009 and is accessible year-round.

1.1.2 Project Setting

Mill Site

The proposed Project will be located in Hin Heup District of Vientiane Province, approximately 80km north northwest of Vientiane (refer to Figure 1-1) bordering the village boundaries of Ban Phonesoung and Ban Khone Phook. The greater Project region (1950.7 ha) has been zoned for light industry by the GOL. Burapha has signed a lease / concession agreement for approximately seven ha of State Concession land within this light industry zone. No land or assets from neighbouring villages will be impacted through development on this concession. The concession is in an industrial setting, immediately adjacent the Hin Heup Substation and Ray Farm Bio-Organic Fertiliser Factory, with the majority of the area having been graded previously and all the native vegetation removed.

The site has been cleared of native forests, graded for industrial activity, and sometimes supports grazing livestock. There is no quality terrestrial habitat in the area. May 2016 botanical surveys identified a dominance of native and non-native grasses and herbs with scattered small trees on the northern fringe. No internationally or nationally threatened flora were identified within the Mill site. Due to the lack of habitat and industrial activity in the immediate area, animal occurrences are likely to be transient, with the possible exception of burrowing animals. No vertebrates were observed within the Mill site during May 2016 biodiversity surveys (with the exception of livestock).

The Mill site drains to a number of small unnamed ephemeral cannels that converge off-site and drain to the Nam Lik River via a circuitous and sometimes sub-surface channel. The channels are not natural streams, but are artefacts of historic grading (i.e. natural drainage to the southwest now flows to the northwest). The drainages do not support aquatic biodiversity, with no quality aquatic habitat on-site. However, discharge from the site will reach the Nam Lik River, which is high value habitat for a number of aquatic species and an important fishery for local residents.

Transport Network

Raw logs will be transported from Burapha plantations to the Mill and finished wood products will be transported from the Mill to Vientiane for domestic sales and to Thailand, Vietnam, Myanmar, and Europe (via Thailand) for domestic sales (approximately 50%) and export (approximately 50%), respectively.

The proposed Mill site is centrally located with respect to Burapha plantation landholdings and to National Road 13, minimising the cumulative log hauling distances to the extent practicable (refer to Figure 4-3). As per Lao legislation (Forestry Law, Article 13), Burapha will work with the GOL (MOIC) to define pre-determined transport routes, weight checkpoint, and hauling schedules.

Table 1-1 Primary (proposed) log and plywood transport routes

Transport Route	Roads
Mill Access Route	4501
North East inbound route	13N and 5
North West inbound route	4544 and 13N
West / South West inbound	4501, 4502, 11, 4
South East in-bound and out-bound route	13N and 10
Southern inbound	120 13N

Approximately 10-12 trucks will each haul 30 m³ of raw logs to the Mill per day throughout the year at full operational capacity. Plywood will be shipped via Highway 13 to Vientiane, with an average of three (3) trucks each carrying 50 m³ per day. An additional 13-15 personnel will be employed or contracted to haul logs to the Mill and finished products to end markets.

1.1.3 Purpose of the Project

Commercial Objectives

The commercial objective of the Project is the provision of a plywood manufacturing facility to support Burapha's expanding agroforestry operations. Mill operations will provide value added benefit to the Company and the plantation forestry sector. The operation of the Project will be undertaken in accordance with best industry practice and will comply with the conditions and standards prescribed by the GOL. Further, the operation will be undertaken according to the socio-economic and environmental objectives presented in this ESIA.

Environmental Objectives

The environmental objectives of the Project are to identify and mitigate any potentially negative environmental impacts that may result from the Project. Environmental impacts will be minimised through adherence to GOL and international environmental standards and regulations

Socio-Economic Objectives

The socio-economic objectives of the Project are to (i) further develop the wood manufacturing potential of the region to support the expanding plantation forestry sector; (ii) generate revenue for the Company and tax benefits; and (iii) provide employment opportunities for local residents and land for intercropping rice (or potentially other crops) between tree rows for subsequent trade in these crops.

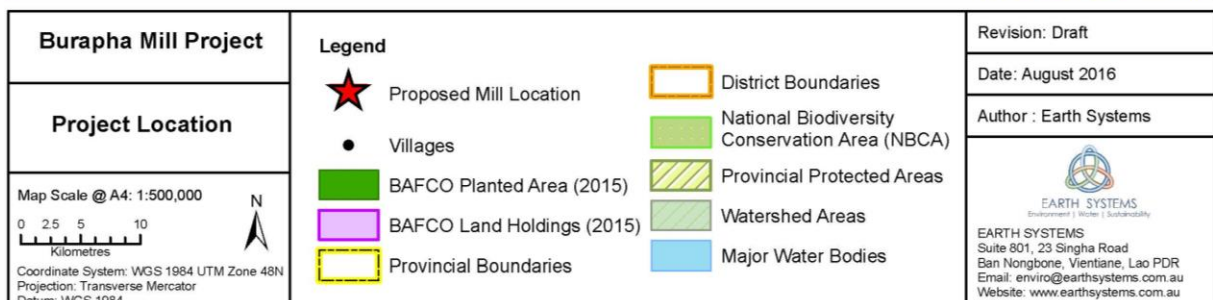
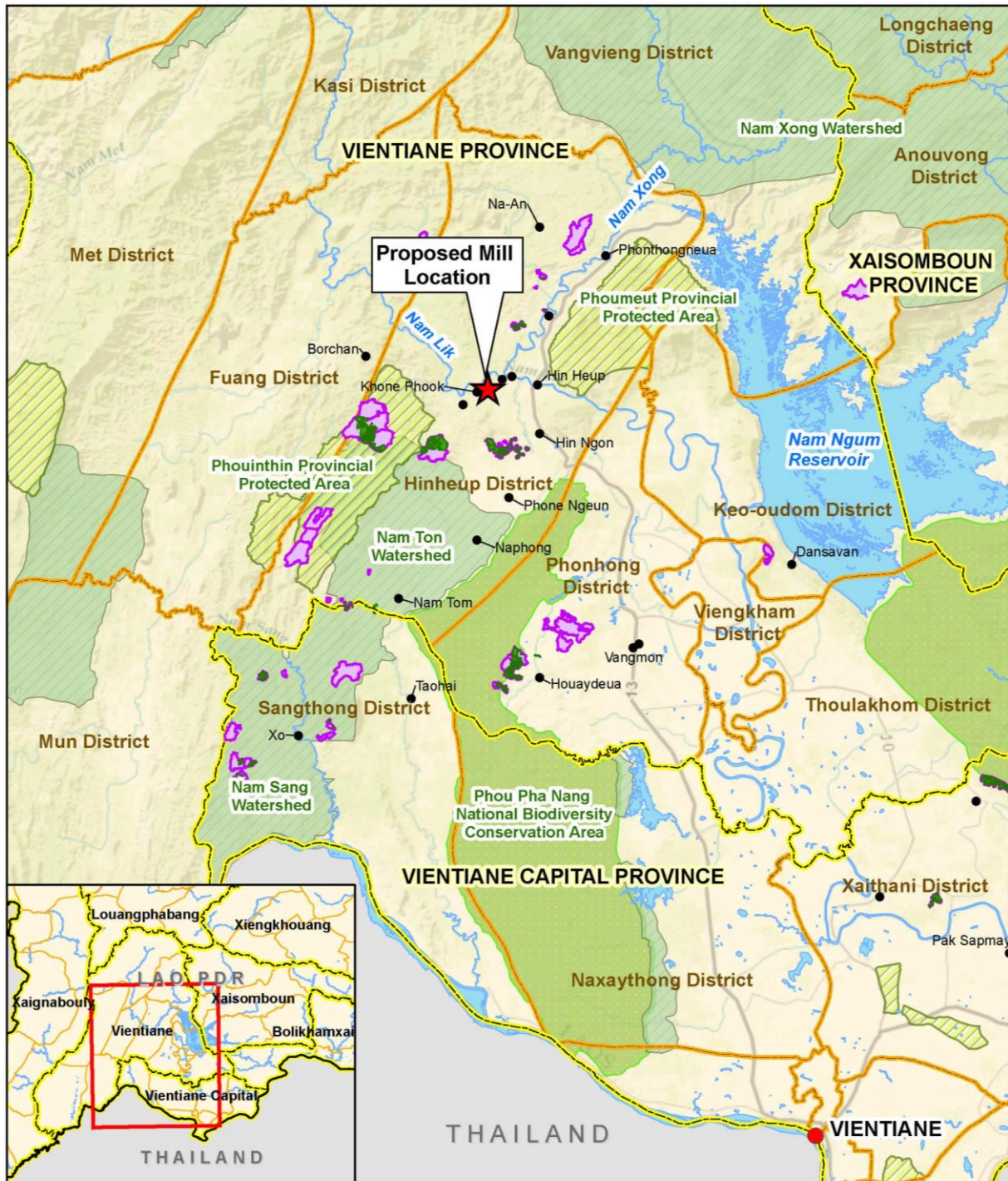


Figure 1-1 Burapha Veneer and Plywood Mill Location

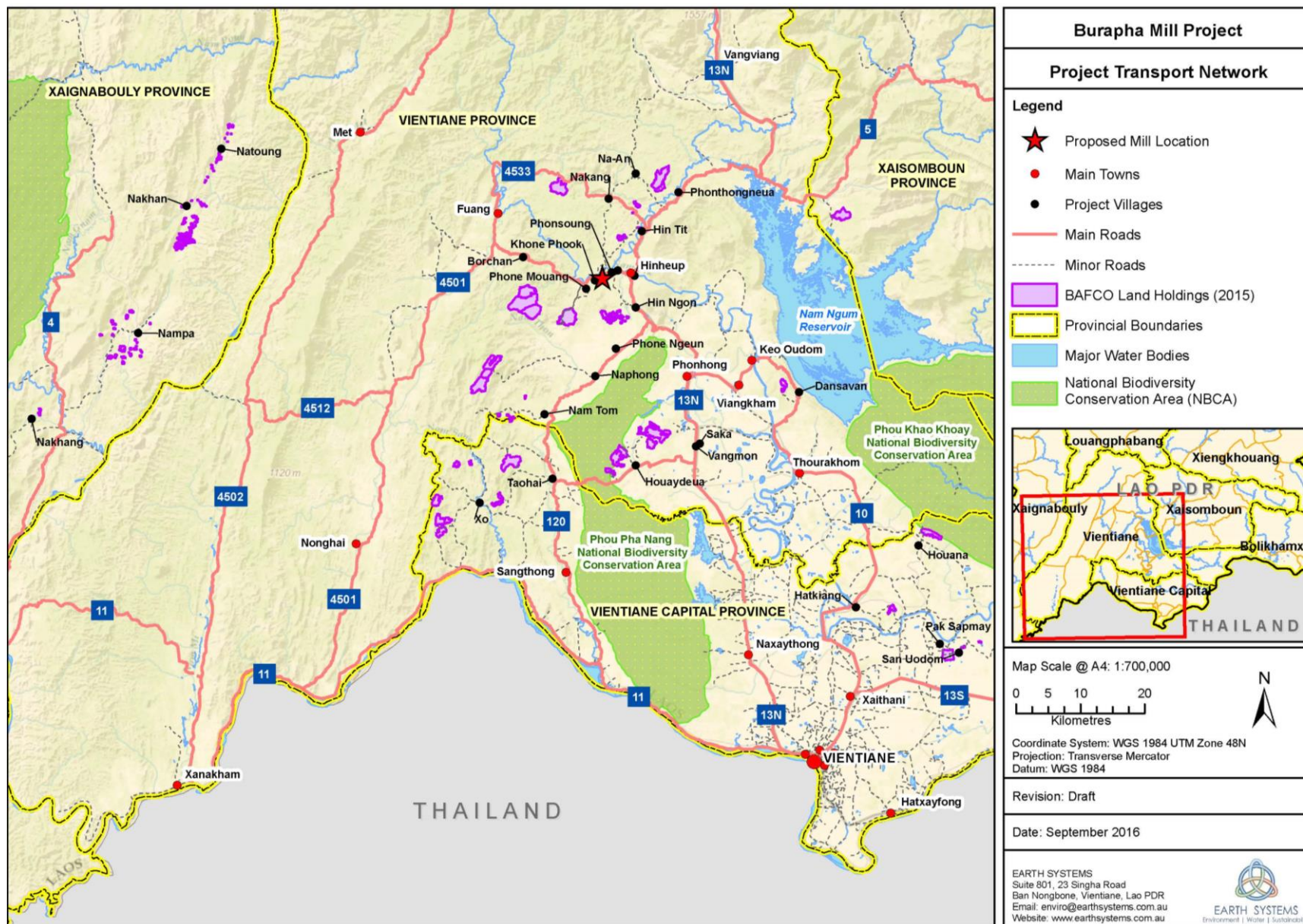


Figure 1-2 Proposed Project transport network

1.2 Project Proponent

Burapha Agroforestry Co. Ltd is a Lao-based company established in 1993 through a Lao (Mrs. Souphayvanh Thiangchanxay holds 5%) - Swedish (BAFCO AB holds 95%) joint venture. Burapha is based in Vientiane and has regional offices in Vientiane Prefecture, Vientiane Province, and Xayabouly Province. Burapha currently operates a tree nursery and sawmill/furniture manufacturing facility (Nabong Farm) in Xaythany District, Vientiane Prefecture. In addition to the proposed Project, Burapha is also currently conducting a separate feasibility study and ESIA for the Agroforestry expansion Project in Vientiane Capital, Vientiane, Xayabouly, and Saysomboun Provinces to supply raw materials for its timber processing factories.

1.2.1 Corporate Environmental and Social Policies

Burapha is committed to its Corporate Social and Environmental Responsibility (CSER) framework. The Company operates within the confines of its *Environmental and Social Management System (ESMS)*, with a hierarchy of documentation including Policies, Operations Manuals, Standard Operating Procedures, Work Instructions, and Databases / Forms / Reports / and Plans. Within the ESMS documentation are a series of commitments to environmental and social sustainability for its agroforestry operations, sawmill and wood manufacturing facility, and nursery. Many of these commitments are articulated in the following policies:

- Burapha Occupational Health and Safety Policy;
- Burapha Land Acquisition Policy;
- Burapha Communications Policy;
- Burapha Human Resources Policy; and
- Chain of Custody for the Burapha Factory Policy.

Burapha is committed to constructing and operating its Mill to meet national and international standards with respect to environmental and social sustainability. In addition to national requirements, Burapha will construct and operate the Mill to meet obligations of the following:

- Forest Steward Council Chain of Custody Certification Standard (FSC-STD-40-004) – the Mill will be certified for FSC CoC, which requires meeting specific environmental and social standards, policies and procedures;
- World Bank General Environmental, Health, and Safety Guidelines (2007) and EHS Guidelines for Board and Particle Based Products (2007), which specify best practices for environmental and social considerations; and
- Conditions of Contract for Construction (2010), which specifies requirements for the Project Owner and Construction Contractors, which will serve to ensure commitments identified in the ESIA and ESMMP are implemented during Project construction.

Sustainability is a key component of Burapha's current wood manufacturing facility. Burapha only sources wood from sustainably managed plantations of eucalyptus, acacia, teak, and plans to source additional wood from sustainably managed plantations of rubber and FSC or PEFC certified native species. Burapha achieved FSC™ Chain of Custody certification in May 2011 for its Nabong sawmill and wood manufacturing plant. Though the certification has expired, the Company continues to operate according to the requirements of this certification. The company also supports the European Union's *Forest Law Enforcement Governance and Trade (FLEGT)* initiative to counter trade in illegal wood.

Burapha does not purchase any wood that falls under any of the following criteria:

- Illegally harvested wood;
- Wood harvested in violation of traditional or civil rights;

- Wood harvested from forests in which high conservation values are threatened by management activities;
- Wood harvested from areas being converted from forests and other wooded ecosystems to plantations or non-forest uses; or
- Wood from forests in which genetically modified (GM) trees are planted.

1.2.2 Experience with Management of Socio-Economic Issues

Burapha has developed a business model that promotes improved social welfare in Lao PDR while implementing their business in a socially responsible manner.

Community Development

For their agroforestry operations, Burapha contributes in poverty eradication accordingly:

- Development Funds for Village Cooperation and Concessions, including contributions to Village Development Funds (1 – 3 million Kip / ha), Khum Development Funds (40,000 Kip / ha); and District Development Funds (80,000 Kip / ha);
- Concession payments according to applicable laws and regulations; and
- Agricultural development for farmers (land use comprises 30% for plantations and 70% for agriculture).

The Company also contributes to village infrastructure development directly, through upgrade of roads / implementation of bridges in various locations (associated with plantation operations).

Employment Opportunities

Burapha currently employs approximately 119 full time staff and a seasonal workforce comprised of representatives from communities participating in their agroforestry operations.

The Company conducts its business in a manner that ensures adherence to national labour policies / requirements for full-time staff and casual employees. Burapha articulates its labour policies in a number of documents, including the ***Code of Conduct, Human Resource Policy, Burapha Employee Handbook, Employee Representatives Manual***, and in signed contracts.

The *Burapha Code of Conduct* clearly identifies Company policies with respect to promotion of international human and labour rights; promotion of a workplace that is safe, healthy and free of discrimination; and policies regarding honesty, transparency, ethics, and equal opportunity.

Burapha is committed to standards / guidelines of the UN's Universal Declaration of Human Rights and the Core Conventions of the International Labour Organization (ILO) from which Burapha has derived the following principles:

- **Safe and Healthy Workplace** - employees are entitled to safe and healthy workplaces. No employee shall be subject to any physical, psychological or sexual harassment, punishment or abuse;
- **Diversity** – Burapha recognizes diversity as strength. Discrimination against any employee in respect of race, ethnic background, gender, disability, sexual orientation, religion, political opinion, maternity, social origin or similar characteristic is prohibited;
- **Forced Labour** - Any form of involuntary labour is prohibited;
- **Child Labour** - Use of child labour is not permitted. The minimum age for employment shall be in accordance with the ILO Convention or the age specified by local legislation if higher. The employment of young persons shall not jeopardize their education or their development.
- **Wages** - Wages are paid directly to the employees. Employees shall be paid at least the minimum legal wage or the wage specified in an applicable collective labour agreement;

- **Working hours** - Working hours shall not exceed 48 hours and overtime 12 hours per week on average over a year, unless other conditions are specified in local laws or an applicable collective labour agreement.

1.2.3 Project Proponent Contact Details

Box 1-1 Burapha Contact Details
Burapha Agroforestry Co. Ltd. P.O. Box 118 34 Kaysone Phomvihane Rd 46 Vientiane, Lao PDR. Tel: +856 21 451 841 Fax: +856 21 451 844

1.3 Environmental and Social Consultant

1.3.1 Consultant EIA Licence Details

The Earth Systems Group is comprised of Earth Systems Sole Co. Ltd. and Earth Systems Consulting, as follows:

- Earth Systems Sole Co. Ltd, a licensed EIA consultant in Lao PDR with considerable experience conducting environmental and social assessments in the region; and
- Earth Systems Consulting, with offices located throughout the world, has technical experts in their respective fields to provide specialist inputs where required.

Earth Systems Sole Co. Ltd will provide appropriate environmental assessment licence information to the Ministry of Natural Resources and Environment (MONRE) (e.g. Environmental Management License and/or Environmental Impact Assessment Services Registration License).

1.3.2 Earth Systems ESIA Experience

The Earth Systems Group is a multidisciplinary environmental and social consulting firm which develops and implements innovative and effective environment, water and sustainability projects throughout the world. Established in 1993, they have successfully completed over 500 major projects in Australia, Asia, Africa, South America, North America and the Pacific.

Earth Systems has been operating in Lao PDR for more than 15 years, completing a range of environmental and social consultancy projects, including ESIA's for some of the country's most significant mining and hydropower projects. Earth Systems' experience also includes conducting environmental and social assessments of plantation / agroforestry projects in the country. Earth Systems' impact assessment expertise includes managing multi-disciplinary teams composed of international and local experts in preparing international standard environmental and social impact assessments that meet national regulatory and, if required, investment bank requirements for project permitting.

1.3.3 Main Contributors to the ESIA

The main contributors to the ESIA study team are listed in Table 1-2.

Table 1-2 Main contributors to ESIA

Key Earth Systems Staff	Position	Qualifications
Earth Systems Staff		
Nigel Murphy	Project Director / ES Director	M. Env. Sc., B.Sc (Hons)., MEIANZ, CenvP.

Key Earth Systems Staff	Position	Qualifications
Justin Mercer	Project Manager/ Principal Env. Scientist	M.Sc. Nat. Res./ B.Env.Sc.
Chris Smithies	Senior Environmental Scientist	BEnvMgmt, BBusTech, MAppSci
Bounta Nuanvixay	Senior Environmental and Social Consultant	M EnvMgm, BSc (Forestry), Dip Eng (Irrigation)
Sengkeo Thongvanna	Senior Office Manager / Project Assistant	BA (English); Dip. Account/Admin
Souchitta Chemcheng	Environmental Engineer	BE (Environmental)
Megan Price	Senior Ecologist	PhD / BSc (Hons)
Joanne Nightingale	Senior Ecologist	BSc, DPhil
Gwendoline Raban	Senior Environmental Scientist	B.Sc / B.A. MEIANZ
Naveena Wijesekara	Senior Environmental Scientist	Msc.Env. / B. Sc (Hons), GradCert EnvPlanning
Tom Callander	Principal Social Scientist	M. SocSc, BBus.
Brett Davis	Senior Environmental Scientist	BSc, MSc, PhD, MEIANZ, MIMWA, MAusIMM
Paul Quinn	Senior Environmental Scientist	PhD, BSc (Hons), GradInstP, CAZANZ
Stephen Isaac	Senior Environmental Scientist	MSc Env Sci / B.Sc
Wayne Pagel	Senior Environmental Scientist	BE, PGDipEarthSci, CPESC
Associates		
Dr Pheng Phengsintham	Terrestrial Biodiversity Specialist	PhD / MSc / B.Sc
Mr Sisomphone Soukhavongsa	Cultural Heritage Specialist	Msc / B.Sc

1.3.4 ESIA Consultant Contact Details

Box 1-2 Consultant Contact Details
<p>Earth Systems Sole Co. Ltd. Suite 801, 23 Singha Road Ban Nongbone Vientiane, Lao PDR Tel: +856 (0) 21 454-434 Email: enviro@earthsystems.com.au Web: www.earthsystems.com.au</p>

1.4 Structure of the ESIA and Assessment Strategy

1.4.1 ESIA Approach

The ESIA identifies the baseline conditions, the environmental and social risks and benefits of Project implementation, and the potential impacts associated with the Project. The likelihood and magnitude of these impacts are assessed based on available Project information. A framework for further community and Government consultation is also provided.

The overarching objectives of this ESIA are to:

- Provide a description of the proposed Project;
- Identify key environmental and social management issues associated with all stages of the Project;
- Describe how Burapha will plan and operate the Project to prevent and mitigate adverse environmental and social impacts;
- Describe how Burapha will monitor and manage environmental and social aspects; and
- Assess any significant residual or cumulative impacts associated with the proposed Project.

1.4.2 Structure of the ESIA Report

The ESIA is comprised of four volumes:

- Volume A: Executive Summary;
- Volume B: ESIA Report; and
- Volume C: Environmental and Social Management and Monitoring Plan.

The format of the ESIA report is as follows:

- Chapter 1: Summary of the proposed Project, the proponent, and the report's author;
- Chapter 2: The need and benefits of the Project at the local and national scale;
- Chapter 3: The policy, legal and administrative framework for environmental assessment of the Project;
- Chapter 4: A detailed description of the scope of the Project, including project alternatives considered;
- Chapter 5: The existing environmental setting within and around the Project Area;
- Chapter 6: The existing social setting within and around the Project Area;
- Chapter 7: Potential physical impacts and proposed management;
- Chapter 8: Potential biological impacts and proposed management;
- Chapter 9: Potential social impacts and proposed management;
- Chapter 10: Risk assessment of the Project;
- Chapter 11: Potential cumulative impacts;
- Chapter 12: The stakeholder consultation process and public involvement in the Project;
- Chapter 13: A summary of the environmental and social management and monitoring program;
- Chapter 14: The conclusions derived from the ESIA;
- Chapter 15: References used in the ESIA; and
- Chapter 16: Glossary of technical terms used in the ESIA.

1.4.3 ESIA Specialist Studies and Data Sources

The studies listed in Table 1-3 were commissioned as part of the EIA process to provide information in areas of importance or where gaps in data were identified. Results of field studies were incorporated into the ESIA (volume B) and / or informed the development of management plans (Volume C).

Table 1-3 Specialist studies commissioned as part of the ESIA

Specialist Study Title	Author	Reference
Air, Noise, and Vibration Study	Earth Systems	Volume B, Ch. 4
Archaeology and Cultural Heritage Study	Mr Sisomphone Soukhavongsa	Volume B, Ch. 5
Terrestrial Biodiversity	Dr Pheng Phengsintham	Volume B, Ch. 4
Water Quality	Earth Systems	Volume B, Ch. 4

Table 1-4 Other technical investigations supporting the ESIA

Specialist Study Title	Author	Reference
Terrestrial Biodiversity and Forest Resource Use Species Lists	Dr Pheng Phengsintham	Volume B, Ch. 4
Aquatic Biodiversity and Resource Use Species Lists	Earth Systems	Volume B, Ch. 4
Water Quality Baseline Data Tables	Earth Systems	Volume B, Ch. 4

Specialist Study Title	Author	Reference
Village Profile	Earth Systems	Volume B, Ch. 5
Stakeholder Consultation Records	Earth Systems	Volume C



Chapter 2 | Policy, Legal and Institutional Framework



Chapter 2 | Policy, Legal and Institutional Framework

2	POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK	2-1
2.1	Corporate Environmental and Social Policies	2-1
2.1.1	Experience with Management of Socio-Economic Issues	Error! Bookmark not defined.
2.2	Relevant National Legislation and Guidelines	2-1
2.2.1	Lao PDR Institutional Framework and Environmental Permitting Process	2-1
2.2.2	Governance of Wood Processing	2-3
2.2.3	Relevant Legislation and Guidelines.....	2-4
2.3	International Policies, Guidelines and Standards	2-8
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2 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Corporate Environmental and Social Policies

Burapha is committed to its Corporate Social and Environmental Responsibility (CSER) framework. The Company operates within the confines of its *Environmental and Social Management System (ESMS)*.

The Company's commitments to meeting national legislation and guidelines as well as specific international guidelines and best practices for environmental and social sustainability are described in Chapter 1 of this ESIA. Relevant National Legislation and Guidelines

2.1.1 Lao PDR Institutional Framework and Environmental Permitting Process

The key government agency responsible for environmental and social assessment of the Project via the EIA process is the Department of Natural Resources and Environmental Policy (DNREP), and Department of Natural Resources and Environmental Monitoring (DNREM) Ministry of Natural Resources and Environment (MONRE). The ***Ministerial Instructions for the Conduct of ESIA's (No. 8030 – December 2013)*** and the ***Guideline on Public Involvement in the Environmental and Social Impact Assessment Process (2013)*** currently guides the environmental and social assessment process in Lao PDR, which has considerably strengthened the associated permitting requirements and applicable industry requirements. Recently released ***Environmental Assessment Guidelines (2016)*** outline the updated format and procedural requirements of this process.

Duties of MONRE include:

- Providing technical guidelines for report preparation, including the EIA, Environmental and Social Management and Monitoring Plan (ESMMP);
- Conducting field surveys in collaboration with the local administration and the concerned agencies;
- Participating in discussions at village and district levels, together with the project affected people and other stakeholders;
- Actively coordinating discussion meetings at Provincial or Capital level;
- Reviewing EIA and ESMMP reports; and
- Consideration and issue environmental compliance certificates to approve reports and plans, where applicable.

The responsibilities of concerned agencies in the EIA process, as described in the EIA Decree, include:

- Providing technical comments for EIA and ESMMP Reports;
- Participation in meetings at the District level (where Provincial or Capital divisions participate), Provincial level or Capital level (where ministerial agencies participate); and
- Participation field surveys, with MONRE.

The role of local authorities in the EIA process includes:

- Cooperation with project developers in field surveying and in data collection for report preparation;
- Organisation of consultation meetings with project affected people and other stakeholders;
- Dissemination of information to relevant people, including: the objectives of investment projects, potential benefits for stakeholders, social and environmental impacts which may arise from investment projects and measures to prevent and minimise those impacts; and

- Assessment of ESMMPs before MONRE will issue environmental compliance certificates to approve those plans.

The current EIA and environmental permitting process in Lao PDR is described below and is illustrated in Figure 2-1. The first step is the screening process to determine whether the project is a Category 1 or Category 2 project. Table 2-1 outlines the definitions of Category 1 and 2 projects as stated in the *Ministerial Agreement on the List of Investment Projects and Activities Requiring for the Conduct of IEE or ESIA (2013)*.

Table 2-1 Project Categories as defined by the Ministerial Agreement on List of Investment Projects and Activities Requiring for Conducting IEE or ESIA (2013).

Category	Project
Category 1	Small scale investment projects with minor environmental and social impacts.
Category 2	Large scale investment projects which are complicated or create significant env. or social impacts.

Category 1 projects require an Initial Environmental Examination (IEE), while the Category 2 projects require an Environmental Impact Assessment (EIA) to be undertaken.

During the project scoping phase, the Project Developer prepares a Scoping Report and detailed Terms of Reference (TOR) for the preparation of the EIA. MONRE will revise, comment and approve the TOR to ensure the proposed EIA approach satisfies GOL requirements.

The preparation of the EIA Report and ESMMP require consultations with local authorities and affected peoples. MONRE conducts administrative and technical reviews of the EIA Report and ESMMP. The Project Developer is required to revise the EIA Report and ESMMP to comply with the consolidated comments provided by MONRE. Once MONRE is satisfied with the EIA Report and ESMMP (if applicable), the Environmental Compliance Certificate is issued with specific conditions, where required. Figure 2-1 provides a schematic representation of the current EIA cycle in Lao PDR.

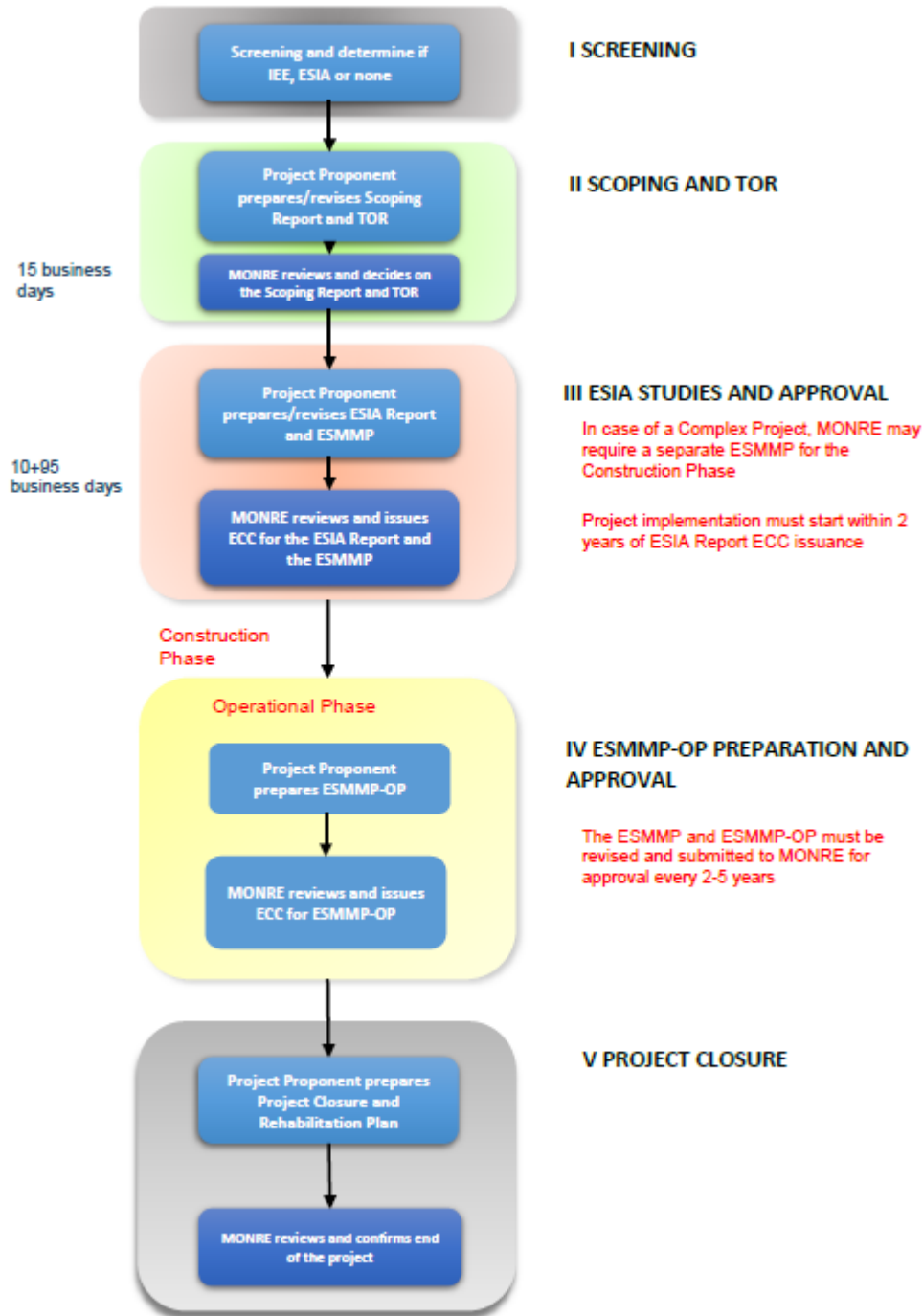


Figure 2-1 ESIA process in Lao PDR (MONRE, 2016)

2.1.2 Governance of Wood Processing

The Ministry of Industry and Commerce (MOIC) is responsible for regulating and promoting manufacturing, trade, and import and export activity of finished wood products. MONRE, Ministry of Agriculture and Forestry, Ministry of Planning and Investment, Ministry of Finance and their provincial and district offices provide additional oversight.

Ministry of Industry and Commerce (MOIC) is responsible for governing and developing industrial and commercial activity in Lao PDR. It oversees the sale, transport, processing and export of logs, processed timber and finished wood products as well as industrial environmental management, occupational health and safety,

industrial waste and regulations to protect and control pollution from industry. The relevant departments that fall under the MOIC include:

- Department of Industry
- Department of Production and Trade Promotion;
- Department of Import and Export;
- Department of Foreign Trade Policy;
- Department of Domestic Trade;
- Department of Inspection;
- Lao National Chamber of Commerce and Industry; and
- Economic and Trade Research Institute.

Through these Departments, MOIC is responsible for overseeing and implementing several relevant laws, including the *Law on Enterprise No 46/NA (2013)*, the *Law on Customs No. 05/NA (2005)* and the *Law on Industrial Processing No 48/NA (2013)*.

Ministry of Natural Resources and Environment (MONRE) is the chief agency responsible for the management of natural resources and environment and social management in the Project area. MONRE and its Provincial Departments (PONRE) will monitor / audit the Project for adherence to environmental standards concerning development activities.

Ministry of Agriculture and Forestry (MAF) is responsible for implementing national constitution, laws, resolutions of the National Assembly, etc. across the spectrum of agricultural and forestry related industry and may propose refinement to existing legislation. MAF (amongst other duties) is responsible for supplying raw materials for processing industries and sustainable commodity production. Applicable line agency responsibilities include Department of Forestry (DOF) permitting processing factories and agroforestry operations and the Department of Forest Inspection (DOFI) shares some responsibility for facilities inspection.

Ministry of Finance (MOF) is responsible for the collection of taxes and royalty payments for various laws including the *Law on Tax No. 04/NA (2005)*, the *Law on Value-Added Tax No. 04/NA (2006)* and the *Decree on Land Tax No. 01/PO (2007)*. Within the MOF, the **Department of Customs** is the agency tasked with determining and collecting the duties on goods exported for Lao PDR.

Ministry of Public Works and Transport (MPWT) is responsible for developing national and provincial roads, urban transport systems, and river and road transport. MPWT has legislative responsibility across a range of relevant laws including the *Law on Land Transport No. 03-97/NA (1997)* and *Law on Land Traffic No. 02/NA (2012)*. MPWT and MAF have a *Joint Agreement No. 0019/MAF-No. 2139/MoCT on the Transportation of Logs, Sawn timber, Stumps, Burl/weed fall and Wood products*.

2.1.3 Relevant Legislation and Guidelines

Table 2-2 lists the main decrees, laws, regulations and policies relevant to the permitting of a mill project in Lao PDR.

Table 2-2 Relevant Lao PDR laws, regulations and policies for the Burapha Veneer and Plywood Mill Project

Title	Year
Laws	
Law on Forestry	2007
Law on Processing Industry	2013
Environmental Protection Law	2013
Land Law	2003

Title	Year
Law on Labour Protection	2013
Law on Investment Production	2009
Law on Water and Water Resources	2017
Law on Land Transport, No. 24/NA, dated 12 December 2012	2012
Law on Tax, No. 05/NA, dated 20 December 2011	2011
Law on Value-added Tax, No. 52/NA, dated 23 July 2014	2014
Decree	
Decree on the Promulgation and Enforcement of National Environmental Standards, No. 81/PMO, dated 21 February 2017	2017
Decree on Environmental Protection Fund, No. 94/PMO, dated 08 March 2017	2017
Decree on Compensation and Resettlement of People Affected by Development Projects	2016
Decree on State Land Leases and Concessions	2009
Decisions, Directives, Regulations, and other Legislation	
Environmental Impact Assessment Guidelines	2016
Order of the Prime Minister on Strickness the Management and Inspection of Logging, Wood Transport and Timber Business	2016
Decision on the Approval of List of Eligible and Prohibited Wooden Products for Export	2016
Instruction on the List of Eligible and Prohibited Wooden Products for Export	2016
Decision on Timber Product Standards	2015
Instruction on Pollution Control, No. 0745/MONRE, dated 11 February 2015	2015
Ministerial Instruction of ESIA Process of Investment Projects and Activities	2013
Guideline on Public Involvement in Environmental and Social Impact Assessment Process	2013
Decision on Timber Processing Management	2007
Decision concerning the Standard of Wood, Rattan and Bamboo Processing Industry Factories (No. 1140/MOIC)	2007
Regulation Regarding Buying and Selling Timber from Plantations, (No. 1862/MOIC)	2008
Notification on the Management of Wood Transport Vehicle, Wood Extraction Machinery, and Wood Processing Machinery, No. 1440/MOIC.DIMEX, dated 04 September 2008	2008
Agreement on Standards of Wood Manufacturing Facility, No. 0719/MOIC, dated 03 March 2009	2009
Regulation on Wastewater Discharge from Processing Industry	2006
Notification on the Management of wood transport vehicle, wood extraction machinery, and wood processing machinery.	2008
Standard on Wood Processing Factory, No. 0719/MOIC, dated 03 April 2009	2009
Notice No. 1791/MOICDIME regulating the import and export of plantation grown timber	2011
Joint Agreement on the Transportation of Logs, Sawn timber, Stumps, Burl/weed fall and Wood products	2008

The **Law on Forestry** (2007) officially recognises wood processing facilities as business enterprises that must operate in accordance with the Law on Industrial Processing (2013) provides a number of Articles relating to processing, import and export, transport, and taxes, including:

- Article 45. Recognises the processing of timber, export of timber and forest products, and transportation of timber and forest products as forestry business(es) and stipulates that organisations are required to register the enterprise according to the Law on Enterprise.
- Article 50. Processing of timber and forest products – allows for the processing of timber in accordance with the Law on Industrial Processing No 48/Na (2013), encourages value added activities to satisfy domestic consumption and to process finished products for export, and includes the objective of modernizing processing facilities.

- Article 52. Import and Export of timber and forest products – authorises export of logs / sawn timber for planted trees that are not listed for prohibition and specifies that import and export of timber and forest products are conducted according to national laws and regulation.
- Article 53. Transport of timber and forest products – transportation of logs and forests products within the country shall be in compliance with the laws and regulations, including: payment of resource tax and duties, log marking, documentation for transport, transporting through pre-determined routes with weight checkpoints, and seasonal and time restrictions.
- Article 114 – Rights and duties of forestry offices – DOFI has the authority to inspect timber as it leaves the processing facility and at export.

The **Law on Processing Industry (2013)** determines principles, regulations, and measures relating to the establishment, operations, and administration of industrial and handicrafts processing activities. It has the objective of expanding the processing and handicrafts industries and in to integrate the processing industry with Agroforestry. Relevant sections of the law include:

- *Article 5. Basic Principles of Processing Industry – processing facilities will be in-line with polices, strategies and the National Social-Economic Development Plan and will be compliant with laws and regulations; facilities will make effective use of resources, generate added-value, promote sustainable development, and minimise environmental impacts; will secure advanced technical standards, safety, sanitation, environment, and public order; and will secure transparency, justice, and equality before the law.*
- *Article 11. Establishment of a Factory - Anyone that is granted a business license for a processing industry, before it is allowed to establish a factory, shall meet the following requirements: A document describing its processing process and factory technical details; A construction permit from the Public Works and Transportation Sector based on conditions as agreed with the Industry and Commerce Sector regarding the location of the factory; and an environmental impact assessment certificate from the Environment Sector following requirements as set in Article 29 of this Law. The Industry and Commerce Sector through cooperation with relevant sectors shall inspect and verify the requirements set in paragraphs 1, 2 and 3 of this Article before a factory can be established.*
- *Article 12. Factory Location - The location of processing industry factories of all types, sizes and levels shall comply with the following requirements: has appropriate area for the business operation based on the size and type of the factory; has convenient road access; shall meet the standards as established in the laws and regulations, particularly shall not cause danger, annoyance, damage, and shall not cause environmental and social impacts; have a distance from the conservation forest, protected forest, production forest and riverhead as determined by laws and regulations; and have a distance from schools, hospitals, temples, cultural areas and other locations as provided in the laws and regulations.*
- *Article 15. Safety and Sanitation - To secure safety and sanitation, the factory shall be equipped with safety and hygienic systems as defined by the Labour Law, and other relevant laws and regulations. Factory business operators shall develop and implement a factory disaster management plan.*
- *Article 23. Environmental Protection - Factory operations must adhere to the Law on Environmental Protection, the Urban Planning Law, and regulations issued by the Ministry of Industry and Handicrafts.*
- *Article 24. Environmental Risk Impact for Factories - Based on the importance and needs for environmental and social control and protection, a factory can be divided into three levels of environmental risk impact as follows: (1) First-level factory has a low level of environmental risk impact or danger that does not require an environmental impact assessment; (2) Second-level factory has a moderate level of environmental risk impact or annoyance that is required to make an environmental management plan; (3) Third-level factory has a high level of environmental risk impact that is required to have strict control and is subject to environmental impact assessment.*
- *Article 25. Environmental Protection Measures - The establishment and operation of a factory business shall not cause environmental impact over the set standards, including the traffic, sound, light, colouring agents,*

odours, toxic fumes, dust, smoke, vibrations, temperature, moisture, and others as provided in the Law on Environmental Protection, other relevant laws, specific regulations issued by the Industry and Commerce Sector and regulations issued by other relevant sectors. The first-level factory is not required to have a buffer zone, the second-level factory is required to have at least a twenty-meter firewall zone and the third-level factory is required to have at least fifty meters from the factory building to the fence.

- *Article 27. Management of Chemical Substance and Hazardous Waste - The operation of a chemical industry factory and hazardous waste shall comply with the laws and regulations, international treaties and agreements to which Lao PDR is a Party. Dangerous chemical substance and hazardous waste have a negative impact on the environment and society. Producers or users of dangerous chemical substances in the processing industry factories shall have a permit issued by the Industry and Commerce sector. The process for applying, issuing, monitoring, inspecting and cancelling this permit will be provided in a regulation. The Industry and Commerce Sector shall play a leading role, in cooperation with other relevant sectors, for the importation and management of chemical substances.*
- *Article 50. Obligations of Factory Operators – sets out 11 specific obligations for operators, including:*
 - » *Establish and operate a factory according to its factory operations' permit and technical regulations;*
 - » *Provide social welfare and safety protection for employees according to laws and regulations;*
 - » *Pay customs duties, taxes [and] other obligations and fees in accurate and full amount and on a timely basis;*
 - » *Meet regulations on the use of labour;*
 - » *Shall establish a unit to manage safety, sanitation, environment, chemical [substances] and disaster at the factory as defined in a separate regulation;*
 - » *Report on severe accidents that occur in the factory to the relevant sectors, including the Industry and Commerce Sector;*
 - » *Cooperate with local authorities where the factory is located to receive facilitation and assistance regarding the operation of factories, particularly public security and order, and the environment;*
 - » *Respond to official information surveys and provide information on factory activities as required by laws and regulations.*
 - » *Notify the Industry and Commerce Sector of the temporary and permanent closure or bankruptcy [of a business];*
 - » *Cooperate with Government officials in the implementation of laws and regulations;*
 - » *Implement other obligations as provided in relevant laws and regulations.*
- *Article 60. Prohibitions for Factory Operators – specifies prohibited activities.*

The **Law on Customs (2015)** and the **Decree on the Import and Export of Goods No. 114/PM (2011)** regulate the import and export of all products. The Law on Customs provides principles, rules and measures for export-import, transit and movement of goods with Lao PDR with a view to encouraging investments, protecting legitimate benefits in various fields, ensuring revenue collection for State budget, and contributing to national social and economic development.

The **Environmental Protection Law (2012)** is the overarching piece of environmental legislation in Lao PDR. The law specifies the principles, rules and measures to manage, protect, monitor and rehabilitate the environment, as well as to contribute to the socio-economic development of the nation and reduce the impacts of climate change (Article 1). Articles 51 and 52 specifically address the rights, duties and obligations of natural resource users:

Article 51: Rights and duties of natural resources users

1. *Persons, individuals and organizations can utilize natural resources in compliance with the related laws and regulations.*

Article 52: Obligations of natural resources users - The obligations of natural resources users are as follows:

1. *To use natural resources in an economic, reasonable, efficient and sustainable way;*
2. *To assess the impact that might occur on social and natural environment from natural resources usage and implement appropriate protection or mitigation of the impacts as defined in the related laws and regulations;*
3. *Do not adversely impact the rights and benefits of others in using the natural resources;*
4. *To solve the impacts and restore areas which are affected from utilization of natural resources;*
5. *To contribute and participate in natural resource protection;*
6. *To pay natural resources, eco-system and environmental protection fee as defined in the specific regulations;*
7. *To compensate for losses that affect the social and natural environment as a result of utilization of natural resources; and*
8. *To implement other obligations as defined in the laws and regulations.*

The **Law on Labour Protection, 2013** applies to all employers, registered and unregistered employees, Lao employees working for foreign organisations, and foreign employees working within Lao PDR. The Law focuses employer, employee, government, and labour representatives, and inspectors in achieving its objectives and principles. In summary, these principles include: obligations for formal contracts; providing skills development; labour protection obligations; labour equality requirements; wage requirements, occupational health and safety requirements; and resolution of labour dispute protocol. The law also promotes of employment for the poor, disadvantaged, disabled, unemployed, and for those with social problems with the aim of boosting skills development, access to recruitment services, fair treatment, and income generation to overcome poverty.

The **Land Law, 2003**, describes the system of land tenure, with all land recognised as the property of the nation, and remaining under the control of the Government of the Lao PDR. However, the law recognises and protects private land use rights. These rights can be transferred, granted by the State, or inherited provided taxes on the land have been paid. Land is categorised in accordance with the form of use, and various principles are outlined in the legislation for respective land use. This law provides an important framework for any land compensation, as despite the lack of freehold title, the land use rights are a tradeable commodity. The land classification administration is also important for determining the various categories of land use within the Project area. The Land Law, 1997 was amended in 2003 to set out the main institutional responsibilities for land management and administration in Lao PDR and stipulates that the overall responsibility for land administration will, once established, belong to the National Land Management Authority (now part of MONRE).

The **Law on Water and Water Resources, 2017**, outlines a similar approach with all water and water resources remaining the property of the State. If relevant approvals are gained by an applicant seeking to use water resources, individuals or entities may attain water use rights. Article 29 stipulates a range of responsibilities for all water users, including the preservation of water resources, the efficient use of water, and the responsibility to maintain water quality, including the environmental and aesthetic qualities of water bodies.

2.2 International Policies, Guidelines and Standards

2.2.1 World Bank / IFC Performance Standards

Burapha is committed to developing the Mill Project to an international standard. In addition to compliance with national environmental and social standards and regulations for Lao PDR, Burapha aims to align with the requirements of the IFC *Sustainability Framework* (2012). The IFC Guidelines and Sustainability Framework are summarised below.

The Sustainability Framework developed by the IFC articulates strategic commitment to sustainable development and is an integral part of its approach to risk management. Originally implemented in April 2006, the Sustainability Framework was subsequently updated in 2011, and became effective on January 2012. The key changes include: the categorisation of financial intermediaries (FI) projects according to risk; a requirement for free prior and informed consent (FPIC) from indigenous peoples in certain situations; the addition of protection for migrant workers; strengthened transparency on greenhouse gas emissions; the disclosure of extractives project contracts; and the promise of more project-level information.

The updated Sustainability Framework reflects the evolution in good practice for sustainability, risk mitigation, and transparency. The Sustainability Framework consists of the revised IFC Policy on Environmental and Social Sustainability, a newly introduced Access to Information Policy and revised Performance Standards.

Table 2-3 IFC Performance Standards (2012)

Performance Standards	Objectives
1 Assessment and Management of Environmental and Social Risks and Impacts	<ul style="list-style-type: none"> • To identify and evaluate environmental and social risks and impacts of the project; • To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment; • To promote improved environmental and social performance of clients through the effective use of management systems; • To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately; and • To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.
2 Labour and Working Conditions	<ul style="list-style-type: none"> • To promote the fair treatment, non-discrimination, and equal opportunity of workers; • To establish, maintain, and improve the worker-management relationship; • To promote compliance with national employment and labour laws; • To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain; • To promote safe and healthy working conditions, and the health of workers; and • To avoid the use of forced labour.
3 Resource Efficiency and Pollution Reduction	<ul style="list-style-type: none"> • To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; • To promote more sustainable use of resources, including energy and water; and • To reduce project-related GHG emissions.
4 Community Health, Safety and Security	<ul style="list-style-type: none"> • To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances; and • To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.
5 Land Acquisition and Involuntary Resettlement	<ul style="list-style-type: none"> • To avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs; • To avoid forced eviction; • To anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost⁴ and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected;

Performance Standards	Objectives
	<ul style="list-style-type: none"> To improve, or restore, the livelihoods and standards of living of displaced persons; and To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.
6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	<ul style="list-style-type: none"> To protect and conserve biodiversity; To maintain the benefits from ecosystem services; and To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.
7 Indigenous Peoples	<ul style="list-style-type: none"> To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples. To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts. To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner. To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle. To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present. To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.
8 Cultural Heritage	<ul style="list-style-type: none"> To protect cultural heritage from the adverse impacts of project activities and support its preservation. To promote the equitable sharing of benefits from the use of cultural heritage.

The IFC EHS Guidelines are technical reference documents that provide guidance for projects in relation to key environmental, health and safety issues and parameters. Key EHS guidelines relevant to the Project include:

- General Environmental Health and Safety Guidelines (2007); and
- EHS Guidelines for Board and Particle Based Products (2007);

Other IFC guidelines potentially relevant to the social impacts of the Project include:

- Environmental Health and Safety Guidelines for Water and Sanitation (2007);
- Addressing Grievances from Project-Affected Communities (2009);
- Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets (2007);
- A Guide to Biodiversity for the Private Sector (2006); and
- Sections I and II of the World Bank Group Pollution Prevention and Abatement Handbook (PPAH, 1999) (note: Section III was superseded by the revised IFC Environmental, Health and Safety Guidelines in 2007).

2.2.2 Forest Stewardship Council (FSC) Chain of Custody

Burapha will achieve FSC Chain of Custody certification for the Mill Project. FSC CoC certification is “*designed to provide a credible guarantee to customers, whether business, government or end consumer, that products which are sold with a specified FSC certificate code are originated from well-managed forests, controlled sources, reclaimed*”

materials, or a mixture of these. FSC Chain of Custody certification thereby facilitates the transparent flow of goods made from such materials through the supply chain" (FSC, 2016).

FSC Chain of Custody Certification (FSC-STD-40-004, V3 2016) requirements are divided into four parts:

- Part 1 includes the universal requirements for Chain of Custody control which apply to all CoC operations;
- Part 2 presents the three control systems for making FSC claims on outputs, of which organisations choose one system for each established FSC product group;
- Part 3 provides the requirements and thresholds for using the FSC on-product labels; and
- Part 4 provides supplementary requirements addressing specific situations for CoC control systems.

The FSC standard defines and addresses the basic elements of Chain of Custody management systems, namely:

- Quality management: responsibilities, procedures, and records;
- Product scope: defines produce groups and outsourcing arrangements;
- Material sourcing: materials specifications;
- Material receipt and storage: identification and storage requirements;
- Production control: control of quantities and determination of FSC claims;
- Sales and delivery: invoicing and transport documentation requirements; and
- Labelling: application of FSC labels on-product and labelling thresholds.

FSC-STD-40-004 is the main standard that applies for the certification of all Chain of Custody operations, allowing organisations to sell and label products under various categories of FSC labelling (i.e. FSC 100%, FSC Mix, FSC Recycles, or FSC Controlled Wood). The Standard may be combined with complementary policies or standards according to the scope of the organisation's certificate, including:

- FSC-POL-40-002: Group Certification;
- FSC-STD-40-003: Multi-site Certification;
- FSC-STD-40-005: Controlled Wood; and
- FSC-STD-40-007: Reclaimed Wood.

2.2.3 FIDIC Conditions of Contract for Construction (2010)

FIDIC is the International Federation of Consulting Engineers. It was formed in 1913, with the objective of promoting the interests of consulting engineering firms globally. The FIDIC forms are the most widely used forms of contract internationally, including by the World Bank for its projects.

Relevant clauses in *Conditions of Contract for Construction (2010)* guidelines include:

- Clause 4.18 on Protection of the Environment.
- Clause 4.24 on Fossils (covers chance finds of archaeological or geological value)
- Clause 6.4 on Labour Laws
- Clause 6.7 on Health and Safety
- Clause 6.16 on Festivals and Religious Customs
- Clause 6.24 on Non-discrimination and equal opportunity

2.2.4 Other International Standards and Guidelines

The Project will incorporate international best practices and will align with potentially relevant certification requirements that the Company currently adheres to or may prescribe to in the future, including:

- International Association for Impact Assessment (IAIA) Guidelines and Standards;
- International Organisation for Standardisation, environmental and social management systems (ISO 14001);
- Occupational Health and Safety Management Systems (e.g. OHSAS 18001 and / or ISO 45001); and
- Social Accountability International (SA8000).

2.3 Discharge and Ambient Monitoring Standards

In developing an environmental and social management and monitoring program for the Project, it will be necessary to consider:

- Discharge / emissions guidelines for off-site releases of water, waste and potential airborne contaminants; and
- Ambient guidelines for the protection of beneficial uses and environmental values (e.g. aquatic fauna / fisheries protection, drinking water protection, etc.).

Applicable standards are provided in Table 2-4, with the more stringent guideline / value applied where discrepancies occur:

Table 2-4 Project Emissions Standards and Guidelines

Parameter	Guideline
Air Quality	Decree on the National Environmental Standards (MONRE, 2017)
	General EHS Guidelines: Air Emissions and Ambient Air Quality (IFC, 2007)
	EHS Guideline Board and Particle Based Products (IFC, 2007)
	Ambient Air Quality Guidelines (WHO, 2005)
Water Quality	Decree on the National Environmental Standards (MONRE, 2017)
	Lao PDR General Industrial Wastewater Discharge Standards
	Effluent Guideline for Board and Particle Based Products (IFC, 2007)
	Guidelines for Drinking water quality 3rd edition (WHO, 2008)
Noise	Decree on the National Environmental Standards (MONRE, 2017)
	General EHS Guidelines: Noise. (IFC, 2007)



Chapter 3 | Project Description and
Alternatives

Chapter 3 | Project Description

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3 PROJECT DESCRIPTION AND ALTERNATIVES

3.1 Project Overview

The Burapha Veneer and Plywood Mill will process primarily small diameter Eucalyptus logs into veneer and plywood products. The raw timber will be sourced from Burapha Agroforestry operations (and potentially other large-scale plantation operators, boutique plantation operators, and small farmer owned out-grower schemes provided they meet certification requirements).

The Mill will process approximately 112,000 m³ of sawlogs per annum at full capacity, providing approximately 48,000 m³ of finished project per annum. The peeler logs will be sourced from Burapha Agroforestry operations from which are located across four provinces / prefectures in central Lao PDR (Vientiane Prefecture, Vientiane Province, Xayabouly Province and Saysomboun Province). These plantations will be certified for environmental and social sustainability, a requirement of the Mill's Forest Stewardship Council (FSC) Chain of Custody Certification. The Mill may also process logs from other plantation owners, if the plantation operations meet sustainability criteria for the Mill.

Approximately 366 people will be employed to operate the Mill, with approximately 122 people working per shift. Approximately 59 people will work the veneer line (per shift) and 63 people on the plywood line (per shift).

Finished products will comprise:

- Construction grade plywood (approximately 60% of output), used for wood construction, concrete forms, furniture;
- Packaging plywood (approximately 25% of output), used for packaging material; and
- Sub-floor plywood (approximately 15% of output), used in floor construction.

3.2 Project Location

The location for the proposed Burapha veneer and plywood mill is in Hin Heup District, Vientiane Province approximately 80km north northwest of Vientiane (refer to Figures 4-1 and 4-2) bordering the village boundaries of Ban Khone Phook and Ban Phonesoung. The Company is currently negotiating a concession agreement for approximately seven ha of land within an area zoned for Light Industry by the Province.

The site is surrounded by the following:

- The north is adjacent to an individual land (military zone) and a seasonal stream with 74+32+190+126+69 meters;
- The south is adjacent to the land of high-voltage transmission lines of 373 meters, 25 meters from the power line post;
- The east is adjacent to the land of Hin Heup Substation + a seasonal stream of 90+79+74 meters; and
- The west is adjacent to the land of BSS., Ltd of 205 meters.

3.3 Transport and Road Infrastructure

Raw logs will be transported from Burapha plantations to the Mill and finished wood products will be transported from the Mill to Vientiane for domestic sales and to Thailand, Vietnam, Myanmar, and Europe (via Thailand) for domestic sales (50%) and export (50%), respectively.

The proposed Mill site is centrally located with respect to Burapha plantation landholdings and to National Road 13, minimising the cumulative log hauling distances to the extent practicable (refer to Figure 4-3). As per Lao legislation (Forestry Law, Article 13), Burapha will work with the GOL (MOIC) to define pre-determined transport routes, weight checkpoint, and hauling schedules.

Key inbound and outbound transportation routes are provided in Table 3-1:

Table 3-1 Primary (proposed) log and plywood transport routes

Transport Route	Roads
Mill Access Route	4501
North East inbound route	13N and 5
North West inbound route	4544 and 13N
West / South West inbound	4501, 4502, 11, 4
South East in-bound and out-bound route	13N and 10
Southern inbound	120 13N

Approximately 14 trucks will each haul 30 m³ of raw logs to the Mill per day throughout the year at full operational capacity (assuming 200 working days / year). Plywood will be shipped via Highway 13 to Vientiane, with an average of three (3) trucks each carrying 50 m³ per day (200 hauling days / year). An additional 17 personnel will be employed or contracted to haul logs to the Mill and finished products to end markets.

3.4 Project Schedule

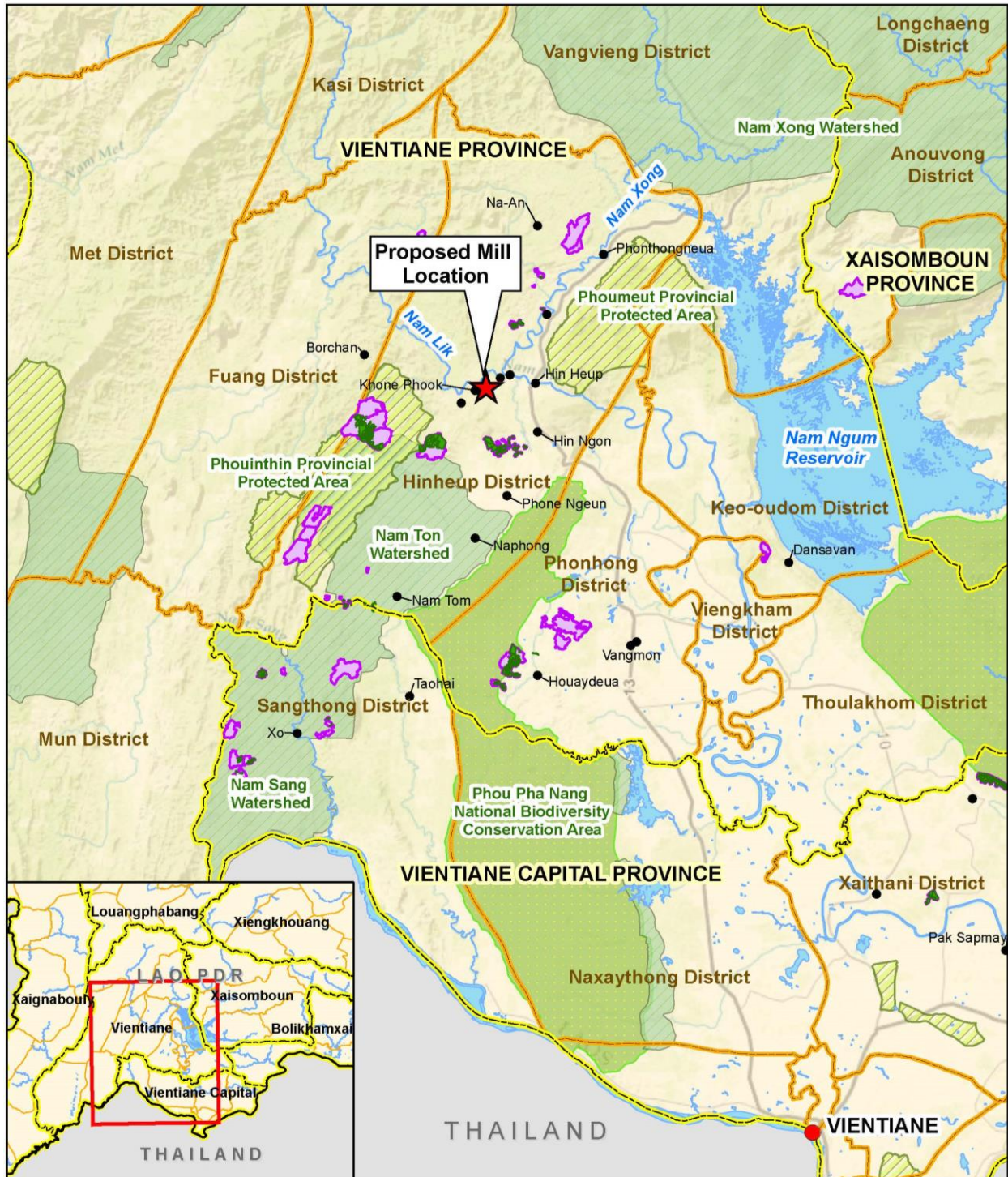
The Project construction will take 18 months to complete including pre-construction works after granting construction permit from the GOL. The industrial land concession period ends in 2046 with possible renewal. The Mill operations will continue as long as it generates benefits to the GOL, local people and investors. Project scheduling will be finalised following completion of the Feasibility Study. A preliminary schedule is provided in Tables 3-2 and 3-3.

Table 3-2 Preliminary Project Scheduling

Project Phase	Description	Anticipated Timeline
Pre-Construction	Road construction	7 months
	Grading	
	Stormwater channels, erosion and sediment control	
	Electricity and water supply	
Construction	Mill construction and ancillary facilities	11 months
Operations	Project commissioning.	18 months from the start of construction

Table 3-3 Indicative Mill Design and Construction Schedule

S/N	项目	Items	Duration (Month)	12 months												12 months												12 months																								
				0th	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	22nd	23rd	24th	25th	26th	27th	28th	29th	30th	1st	2nd	3rd	4th	5th	6th												
1	设计	Design																																																		
1.1	方案设计	Project Design	1.5																																																	
1.2	施工图设计	Construction Drawing Design	13																																																	
1.3	竣工图设计	As-built Drawing Design	2.5																																																	
2	设备	Equipment																																																		
2.1	设备供货	Manufacturing	12																																																	
2.2	设备运输	Transportation	9																																																	
3	土建	Civil Works																																																		
3.1	三通一平	Three supplies and one leveling	4.5																																																	
3.2	临时设施	Temporary facilities	2																																																	
3.3	基础开挖	Base excavation	5																																																	
3.4	基础浇筑	Foundation pouring	5																																																	
3.5	设备基础浇筑	Equipment foundation pouring	5																																																	
3.6	胶合板厂房装配	Plywood workshop assembly	5																																																	
3.7	厂房地面浇筑	Plant floor pouring	4																																																	
3.8	地面施工	Ground construction	2																																																	
3.9	原料堆场	Raw material stockpile yard	4																																																	
3.10	厂区道路	Road in plant area	4																																																	
3.11	厂区管网	Pipeline net in plant area	4																																																	
3.12	附属工程	Ancillary works	9																																																	
4	安装	Installation																																																		
4.1	设备安装	Equipment installation	7																																																	
4.2	非标制作及安装	Non-standard manufacture and installation	8																																																	
5	设备调试	Equipment debugging	3.5																																																	
6	设备联动调试	Equipment Linkage Debugging	1.5																																																	
7	培训	Personnel Training	1.5																																																	
8	验收	Project acceptance	0.5																																																	
9	移交	Hand-over	0.25																																																	
10	质保期	Defects Notification Period (Warranty period)	12																																																	
11	最终接收证明	FAC	0.5																																																	



<p>Burapha Mill Project</p>	<p>Legend</p>		<p>Revision: Draft</p>
<p>Project Location</p>	<p>★ Proposed Mill Location</p> <p>● Villages</p> <p>■ BAFCO Planted Area (2015)</p> <p>■ BAFCO Land Holdings (2015)</p> <p>■ Provincial Boundaries</p>	<p>▭ District Boundaries</p> <p>■ National Biodiversity Conservation Area (NBCA)</p> <p>▨ Provincial Protected Areas</p> <p>▨ Watershed Areas</p> <p>■ Major Water Bodies</p>	<p>Date: August 2016</p> <p>Author : Earth Systems</p>
<p>Map Scale @ A4: 1:500,000</p> <p>0 2.5 5 10 Kilometres</p> <p>Coordinate System: WGS 1984 UTM Zone 48N Projection: Transverse Mercator Datum: WGS 1984</p>	<p>EARTH SYSTEMS Environment Water Sustainability</p> <p>EARTH SYSTEMS Suite 801, 23 Singha Road Ban Nongbone, Vientiane, Lao PDR Email: enviro@earthsystems.com.au Website: www.earthsystems.com.au</p>		

Figure 3-1 Burapha Veneer and Plywood Mill Location

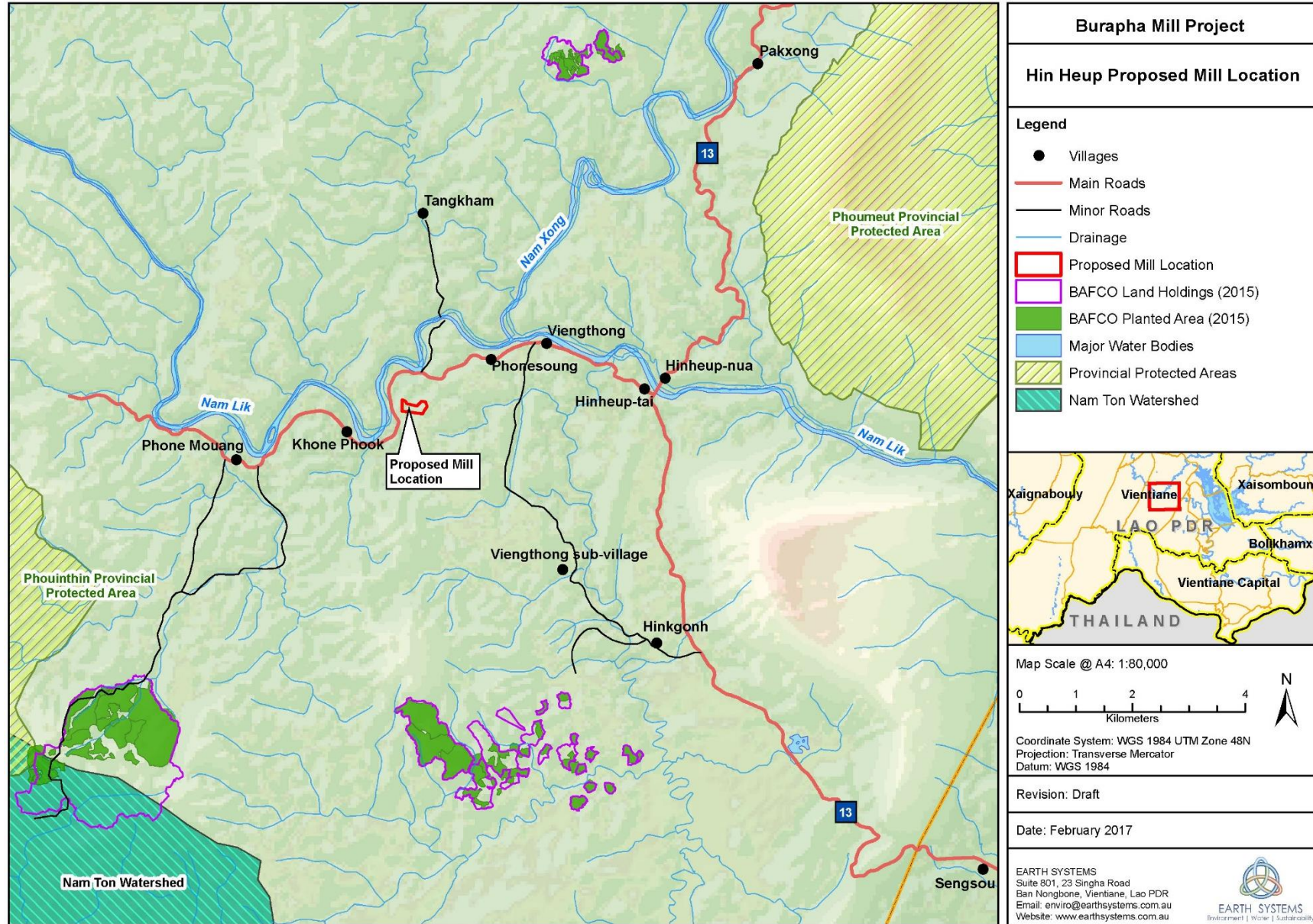


Figure3-2 Regional map with Mill location

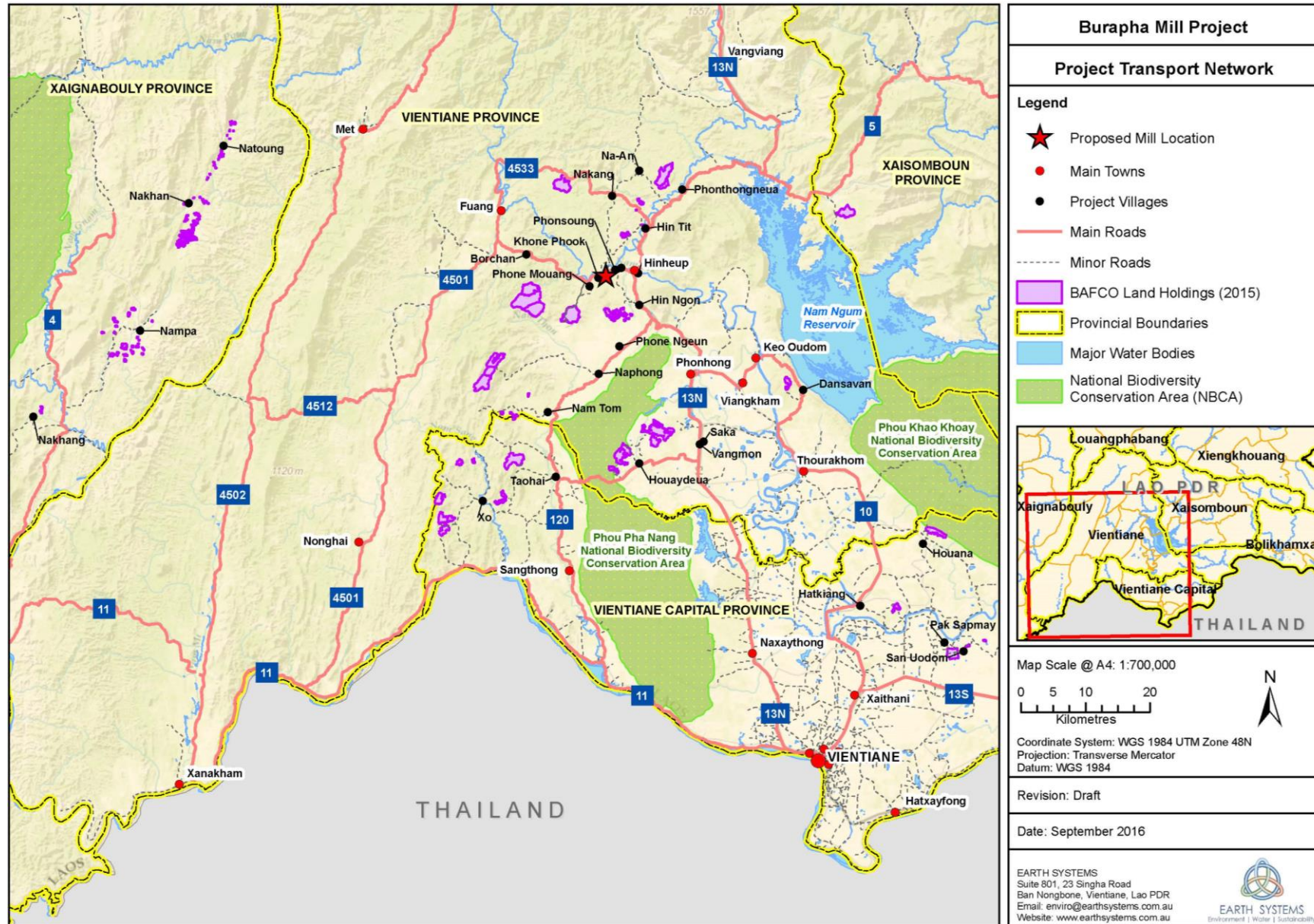


Figure 3-3 Preliminary log and plywood transport infrastructure

3.5 Project Benefits

The Project supports the GOL's economic development plans for the region and is expected to generate substantial national, regional and local benefits including an initial US\$ 26 million foreign capital investment and resulting construction jobs and spin-off benefits; approximately 366 full time positions (during mill operations) with a priority on the recruitment and skills development of local workers; and an estimated US\$ 15.5 million per annum in revenue (at full production) and over US\$2 million per annum in GOL tax revenue.

The Mill will also facilitate the expansion of Burapha's agroforestry project to an initial 5000 ha, resulting in a further US\$ 11 million of foreign capital; 896 full-time positions and US\$ 200,000 government revenue in the form of land fees and taxes.

3.6 Key Performance Indicator

The Project Feasibility Study indicates that the construction and operation of the veneer and plywood mill will require a total investment of \$15 million. Additional \$3.7 million will be required for Project operations including labour cost and procurement. The Project will produce approximately 48,000m³/annum of veneer and plywood and selling at the estimate cost of \$22.9 million per annum. It was estimated that the investment rate of return is 31.3%. Table 3-4 provides key financial performance indicators.

Table 3-4 Key Performance Indicator

Key Performance Indicator	
CAPEX (USD)	-15,193,380
Working Capital (USD)	-3,738,590
Investment Rate of Return ((%)	31.3%
Net Present Value (USD)	25,535,452
Employees	363
Annual Sale (m ³)	48,000
Annual Sale (USD)	22,983,420
Annual Export Value (USD)	18,386,736

3.7 Project Components

Burapha has conducted a Feasibility Study for the Mill and is finalising Project design / equipment selection. The general layout of the Mill and ancillary facilities is provided in Figure 3-4 and the Mill process layout is provided in Figure 3-5. The following describes the Project according to currently available information.

3.7.1 Veneer and Plywood Production

Plywood production is comprised of six (6) primary processes, namely: log sorting and debarking; veneer peeling and clipping; veneer drying; plywood assembly; plywood pressing; and plywood finishing.

Log sorting, conditioning, and debarking – logs of suitable dimension and quality for peeling will be sorted according to size in the log stockyard upon arrival. Before peeling, logs are often conditioned which involves the exposure of the logs to both heat and moisture to soften the wood. Burapha will not condition logs, however the Company has indicated the need to assess whether this will be required (which may have implications for wastewater management).

After sorting (and conditioning, if applicable), Burapha will employ a mechanised log rounder debarker to peel off the Eucalyptus bark, remove the dirt / debris, and round the log. Logs will then be cut to length to fit the lathe (~125 – 270 cm).



Plate 3-1 Log Debarker



Plate 3-2 Log Debarker

Veneer peeling and clipping - plywood veneer will be rotary cut (veneer peeling), with the peeler block rotated around its axis in a lathe whilst the veneer sheet is cut by a knife which is mounted parallel to the block's axis. The veneer sheets are then conveyed to a multi-tray system for storage. The green veneer will then be clipped to size, graded and stored for drying. Defects, such as knots and splits are then cut out of the sheet. The Mill will be outfitted with 2' and 4' peeling lines.



Plate 3-3 Veneer Peeler



Plate 3-4 Veneer Peeler

Veneer drying – drying of veneer to between approximately 8 - 12 percent moisture content aids the gluing process during plywood manufacture. The Burapha drying line will be comprised of a drying machine and automatic plate separating machine and three roller type veneer dryers. Veneer drying accounts for approximately 70 percent of the thermal energy consumed in plywood production and approximately 60 percent of the mill's total energy requirement, which will be sourced from the Mill's biofuel boiler. The biofuel boiler will use off-cuts and potentially other untreated wood waste generated from the Mill processing.



Plate 3-5 Veneer roller dryer



Plate 3-6 Veneer Conveyor

Plywood assembly - assembly of the plywood prior to pressing entails the jointing of the narrow strips of veneer, which are edge-glued to make sheets of the required size. Glue is then applied to the inner plies or core, which in turn, are laid between the outer veneers ready for bonding. This operation accounts for a large share of the manual labour employed in the production process.

Plywood manufacturing mills typically use one of three types of resin / adhesive (or a combination of the three): urea-formaldehyde glue; phenol-formaldehyde glue; or melamine-formaldehyde glue. Glues will be mixed at the mill and applied on roller spreaders during assembly. It is understood that Burapha will utilise a melamine modified urea formaldehyde resin, comprised of phenol formaldehyde (60%) and urea formaldehyde (approximately 40%), with ammonium sulfate for a curing agent.



Plate 3-4 Plywood Assembly Table

Plywood pressing – once veneers are laid-up as assembly plywood sheets, they will be fed into hydraulic presses to bring the veneer into contact with the adhesive. It is understood that Burapha will use a cold press followed by a hot press that will cure the glue. The hot press platens are heated by steam from the biofuel boiler.



Plate 3-8 15-layer plywood press



Plate 3-9 Plywood presses with ventilation

Finishing – primary finishing, which involves the trimming, sanding, and upgrading of the plywood after pressing, is undertaken to enhance the marketability of the product. Trimming saws will cut the boards to the required size, which will then be sanded with drum sanders to the desired surface smoothness. Damage or imperfections to the face of veneers will then be manually repaired by plugging and patch application.

Burapha plywood specifications have been identified as: size - 1220mm x 2400mm and 1220mm x 2440mm; average thickness – 16mm; density – 550 kg/m³ – 680 kg/m³.

3.7.2 Water Supply and Drainage System

Approximately 23,040 m³ of groundwater per annum will be abstracted via a pump / well to supply operational and firefighting tank water. Water management from the site will include:

- Mill water - 100% of process water from the mill will be recycled / reused for operations (e.g. washwater from the glue spreaders and veneer dryers). Water that may have glue residue or other contaminants will be fed back through the system in a continuous process (refer to Chapter 6);
- Runoff from the log stockyard will be conveyed via grass swales or pipes to a treatment pond, whereby passive treatment will ensure concentrations of nutrients and other applicable standards meet national and applicable international discharge standards (refer to below and Chapter 6);
- Rain surface waters from the heat centre, chipping room, de-dusting facility, engineering workshop, vehicle service areas and pumping station will be passed through a grease and oil filter trap before re-joining the rainwater drains;
- The remainder of the site has been designed for clean water runoff to velocity dissipaters and offsite discharge to appropriate locations (refer to Figure 3-8).

Water Treatment and Sedimentation Pond –

Water will be conveyed from the log stockyards to a pond for passive treatment. The basin has been designed to have a 15-day hydraulic resident time and will accommodate peak flows from at least the 1:10 average return interval storm to allow for passive microbial treatment of surface water from the Project footprint (Mill process water will be treated separately). The pond will also serve as a settling pond to capture suspended sediments throughout construction and operations.

The log yard drainage system is a closed system. The proposed log yard area for the plywood mill is 15,000m² (10,000m² concrete and 5,000m² gravel or cobble). A drainage ditch will be constructed along the entire perimeter of the log yard that has the same capacity as the stormwater drain (0.6mx 0.5m). Earth bunding may also be introduced to control runoff from the sports field and reserve land from entering the log yards. Either through operations such as log-wetting or from rain events, runoff from the yard will be channelled under gravity to a sediment treatment pond. The pond will be periodically maintained by the removal of sediments as part of earth terracing on the sports field and garden areas.

The sediment pond will have a capacity of 1000m³ and provide a 15day minimum residence time for sediment laden flows under normal operations. The dimensions of the pond will be 25m x 12m x 3.3m. The areas immediately surrounding the pond will be landscaped for aesthetics. The pond will be barricaded, and sign-posted for safety.

The sediment pond is designed to have reinforced hard walls and edges (likely concrete or riprap) and an earthen bottom. During large storm events excess flows will passed through the outlet connected to a drain that joins the stormwater drainage system. (Refer to item 1 Stormwater Drainage System). The stormwater drainage system passes through an energy dissipation basin on the site boundary, which provides additional sediment control.

3.7.3 Sewage and Greywater Facilities

Construction Phase

Civil works for the construction phase of the plywood mill will require approximately nine months to construct the plywood mill workshop/building, carpark areas, offices, engineering workshops, septic waste system, personal amenities and pumping station. The workforce during this time will peak at about 160 people.

This septic waste facilities will include the following:

- 9x toilets;
- 6x wash basins;
- 10x showers;
- 2x wash basins for kitchen waste.

The septic system will process water drawn from flush toilets and will be mixed with grey water from showers, kitchen areas and hand wash basins. Wastewater will be passed to a single 20m³ septic tank installed below ground. The tank has a 3-chamber internal structure which provide a primary source of sludge separation and anaerobic decomposition. Once near full (75%) a government sanctioned vendor will collect the waste and transport it to a government operated septic treatment facility. The civil works contractor will be required to report to Burapha and government on the safe collection transport and delivery of all waste (i.e. chain of custody certification demonstrating proper disposal at a certified facility). It is proposed the waste be managed by Division of Water Treatment in DONRE, Hin Heup District with support from the environmental compliance unit of DONRE. All fees and charges for the treatment of waste will be provided to government accordingly.

As the civil works construction phase advances, the in-house septic waste management system will come online (refer to Operational Phase below) which will then allow plywood mill plant fit out teams and staff to use this facility and no longer require offsite septic processing. Once operational the in-house septic management system will process all generated waste.

Operations Phase

The in-house septic system will process water drawn from flush toilets and will be mixed with grey water from showers, kitchen areas and wash basins. Kitchens will be fitted with food screens and oil traps. All sources of water within the septic system are drawn from personal use areas and not from manufacturing. Septic waste facility configuration:

- 18x toilets;
- 7x urinals;
- 16x hand basins;
- 10x wash basins for kitchen waste.

The total raw water demand for the sewerage treatment system will be 40m³/day. This maximum demand is unlikely to be reached as the work force, including management, will live offsite. An oversized plant volume adds to operational safety and can accommodate moderate plant expansion.

For compliance with applicable discharge standards (refer to Chapter 2), Burapha will implement a Membrane Bio-reactor (MBR) treatment system that provides advanced tertiary treatment.

MBR System Operation

Grey and black water will be combined, and tertiary treated by a Membrane Bio-reactor (MBR) Sewage Treatment System. Three 20m³ septic tanks will be installed below ground at each of the toilet block locations. Each tank has a 3-chamber internal structure which provide the primary source of sludge separation and anaerobic decomposition. Service / inspection holes will be installed at each tank. The septic waste from the toilet and shower once passed through the tanks will reach the second screening tank called a Grill Regulating Tank (GRT) via DN300 gravity fed pipe system. The GRT purpose is to adjust unevenness of the volume and character of the incoming wastewater. It creates a homogenous mix that provides for improved processing efficiency for the MBR. Effluent from the GRT to the MBR is automatically controlled according to the volume within the GRT viz when a certain volume is reached.

Once inside the MBR, the effluent undergoes several processing steps, which combines physical separation/filtration (membranes) and biological breakdown (aerobic and anaerobic). The first chamber of the MBR is anoxic breakdown and is largely for denitrification. The water is then passed through the membrane system with pores ranging from 0.1um to 0.001um made of PVDF. Air is pumped through the membrane chamber facilitating aerobic breakdown. The treated water is then passed back through to the anoxic chamber in a repeat fashion with each pass improving the quality of effluent. To enhance the treatment a poly-aluminium chloride (PAC) based coagulant will be applied in both the anoxic chamber and membrane chamber.

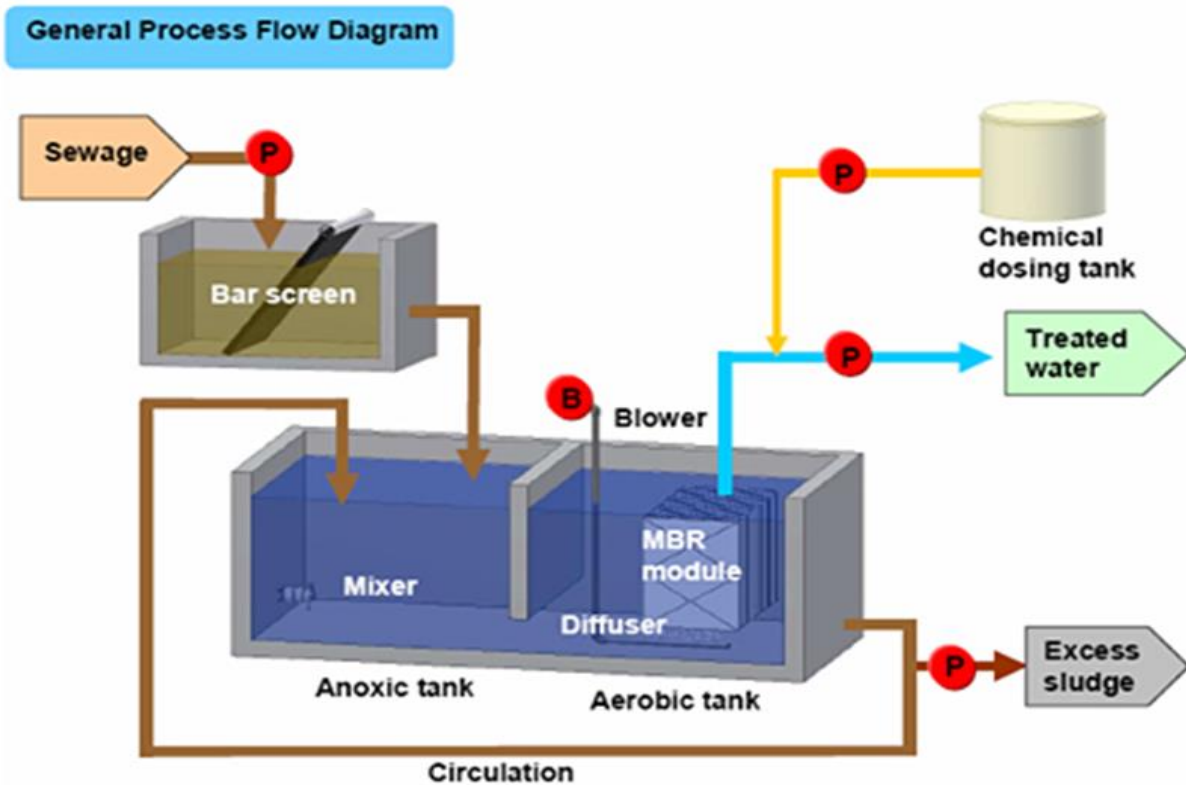


Figure 3-5: MBR Treatment Process

The dimensions of the GRT: 4m x 4m x 3.5m (above ground), and the MBR Integrated Equipment including PAC is a 2.8m diameter cylindrical container 5m in length, also built above ground. The plant is located the western boundary. Refer to Figure 3-6.



Figure 3-6: Typical MBR Unit with GRT

The resultant by products of the MBR system collected are sludge and treated effluent water that will meet effluent standards of the Project (refer to ESMMP - A1.4 Effluent and Ambient Water Quality Guidelines). The solid sludge collected will be converted to dry bricks and disposed of in the production boiler furnace. The

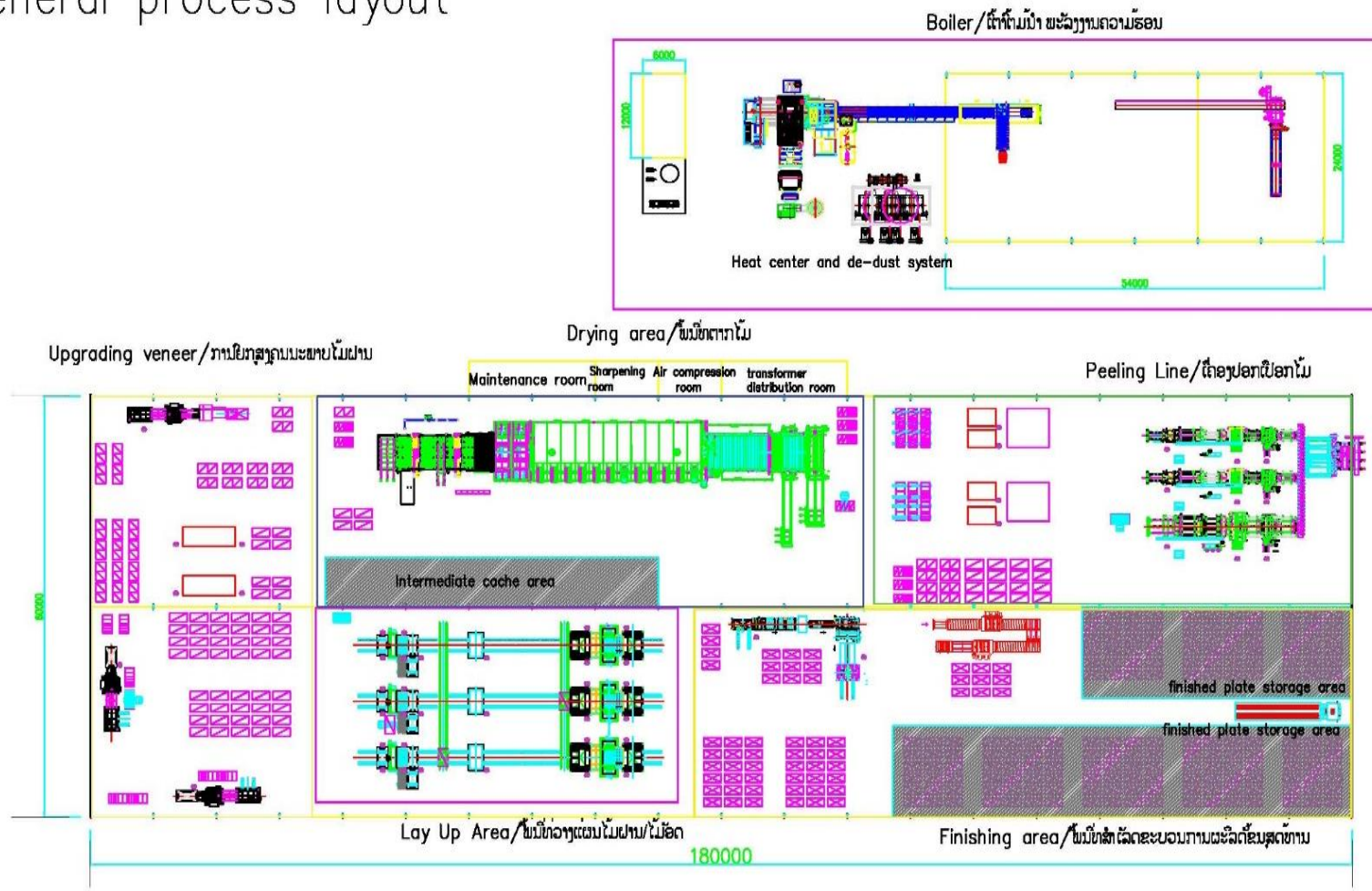
treated water (filtrate) will be pumped to the north east reserve land and used for the irrigation of grass on a sports field and or gardens.

3.7.4 Ancillary Facilities

The final design for the Mill layout, including ancillary facilities is provided in Figure 3-4. The following facilities will be included within the Project concession:

- **Log stockyards** – trucks will offload logs to one of two stockyards for sorting and storage. The stockyards may have sprinkler systems to prevent logs from warping as they dry.
- **Power** – the Mill will use electricity and steam to power operations. Approximately 181 kWh/m³ electricity is required for Mill operations, which will be supplied from the adjacent Hin Heup Sub-Station. A number of power poles will be implemented, and transmission lines extended from the current infrastructure. A heating centre will be equipped with a biofuel boiler to generate requisite heat / steam for processing, with offcuts combusted for steam generation. The biofuel boiler is expected to generate 8.5 MW of energy per annum.
- **Air compressing and ventilation** – a dust removal room will house air compression and ventilation equipment to extract dust from applicable areas. Local exhaust ventilation, extraction and collection systems will vacuum wood dust from various facilities (e.g. sanding, sawing / clipping, etc.). The system will also provide ventilation for the formaldehyde mixing station.
- **Firefighting pump room** – The log yard sediment pond, sewage treatment and stormwater systems will not be connected to the firefighting pond (tank). The firefighting tanks provides a standalone source of clean water that will circulated through the firefighting equipment (sprinklers and pumps) installed throughout the factory and facilities. Water for firefighting will be sourced from groundwater.
- **Factory roads** – Two site access roads will be constructed, one concrete and one gravel road, with a combined length of approximately 500m. Stormwater diversion channels (400mm width) will be constructed on each side of the roads.
- **Security** – A steel wire mesh fence (1.8m x 1500m) will surround the Mill, with a security room / guard manning the Mill gate.
- **Communication and security emergency system** – the Mill will be outfitted with a communication system to provide warning in the event of an emergency and isolation (emergency shut-off) for equipment from a centralised location.
- **Landscaping** – preliminary design indicates that grass will be planted within the Project footprint in non-operational areas.

General process layout



project name	Burapha Plywood Mill Project
engineer-in-charge	
project manager	
proportion	250
unit	mm
date	

Figure 3-7 Mill Process Layout

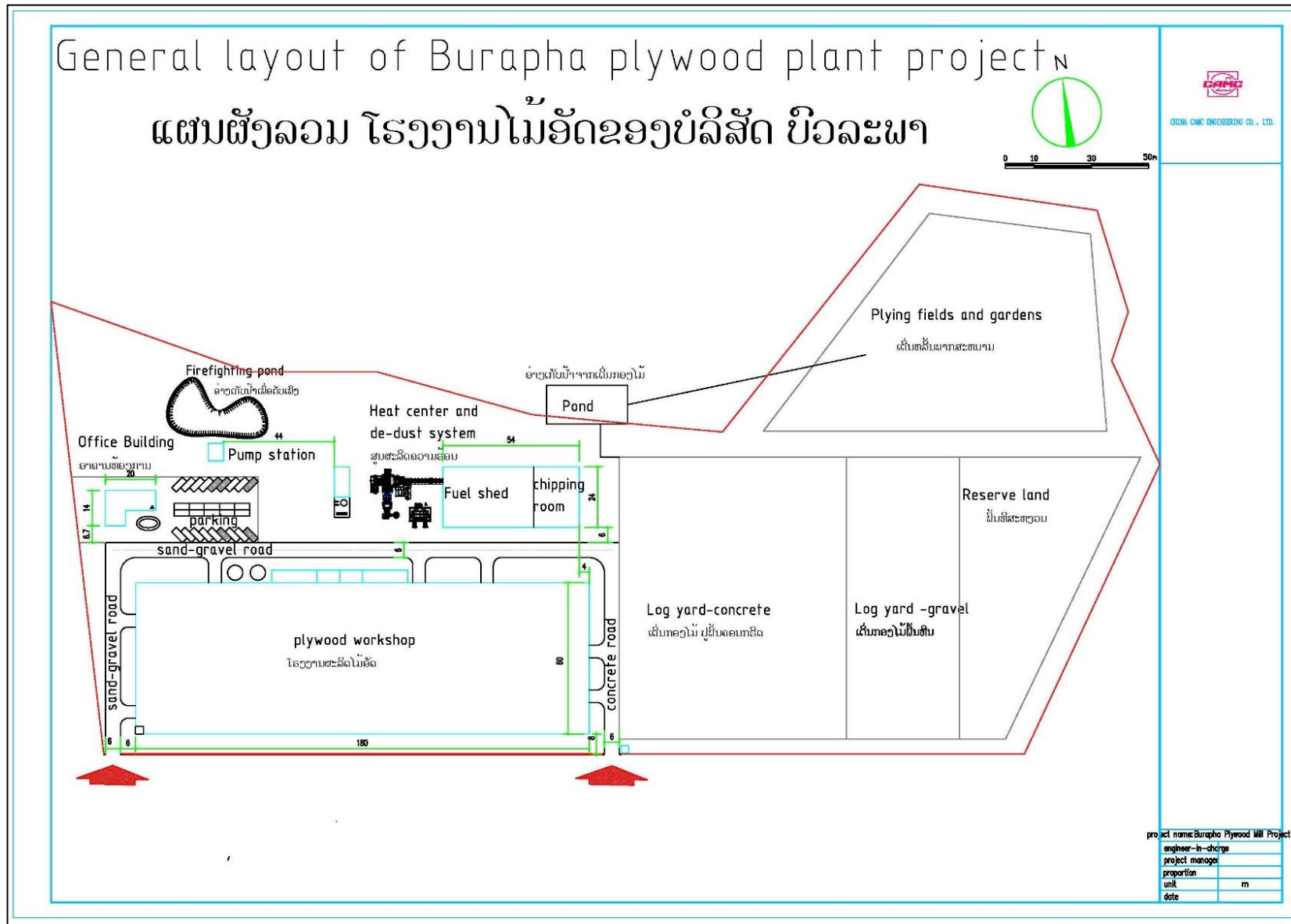


Figure 3-8: General Layout

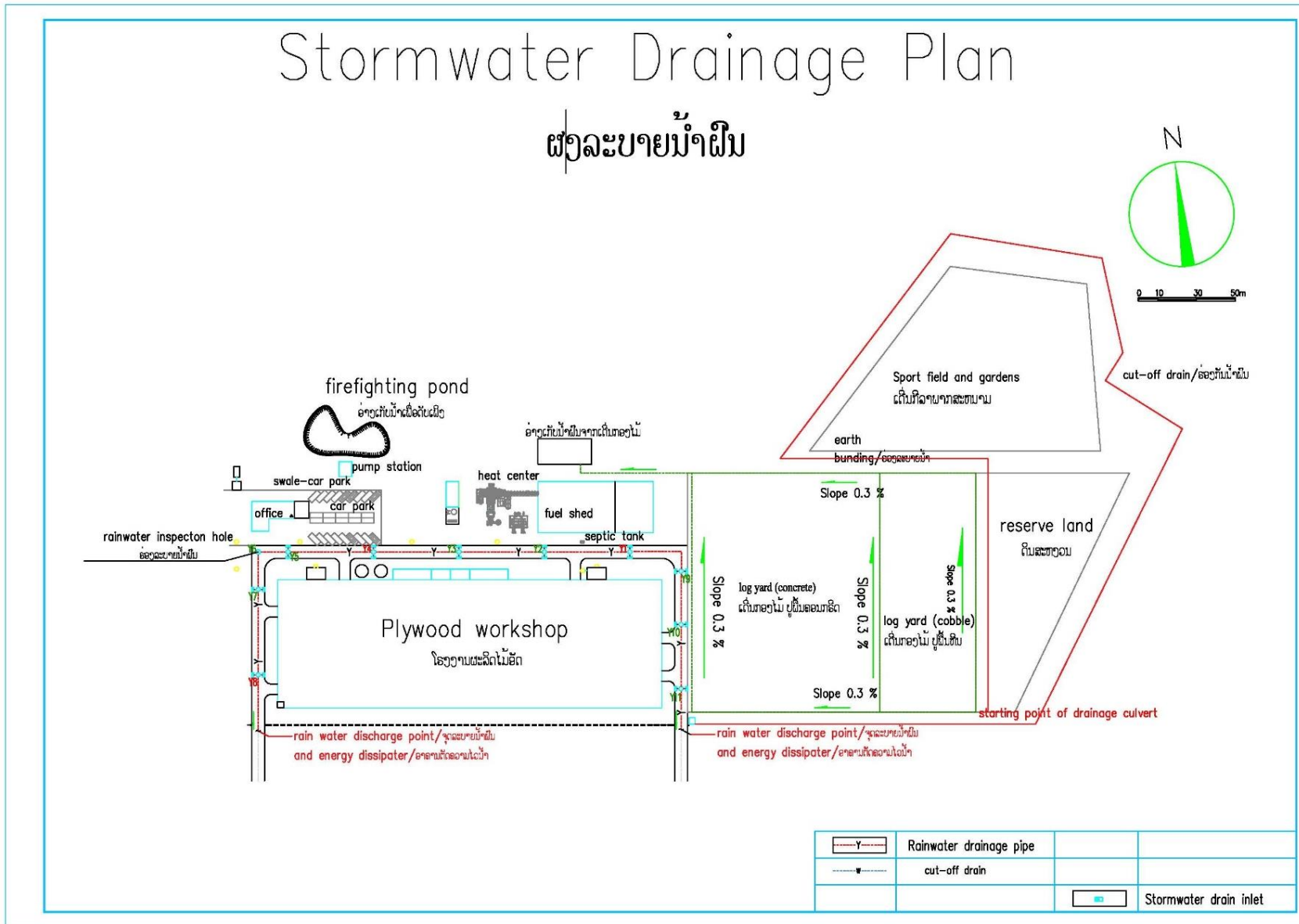


Figure 3-9: Stormwater Drainage Plan

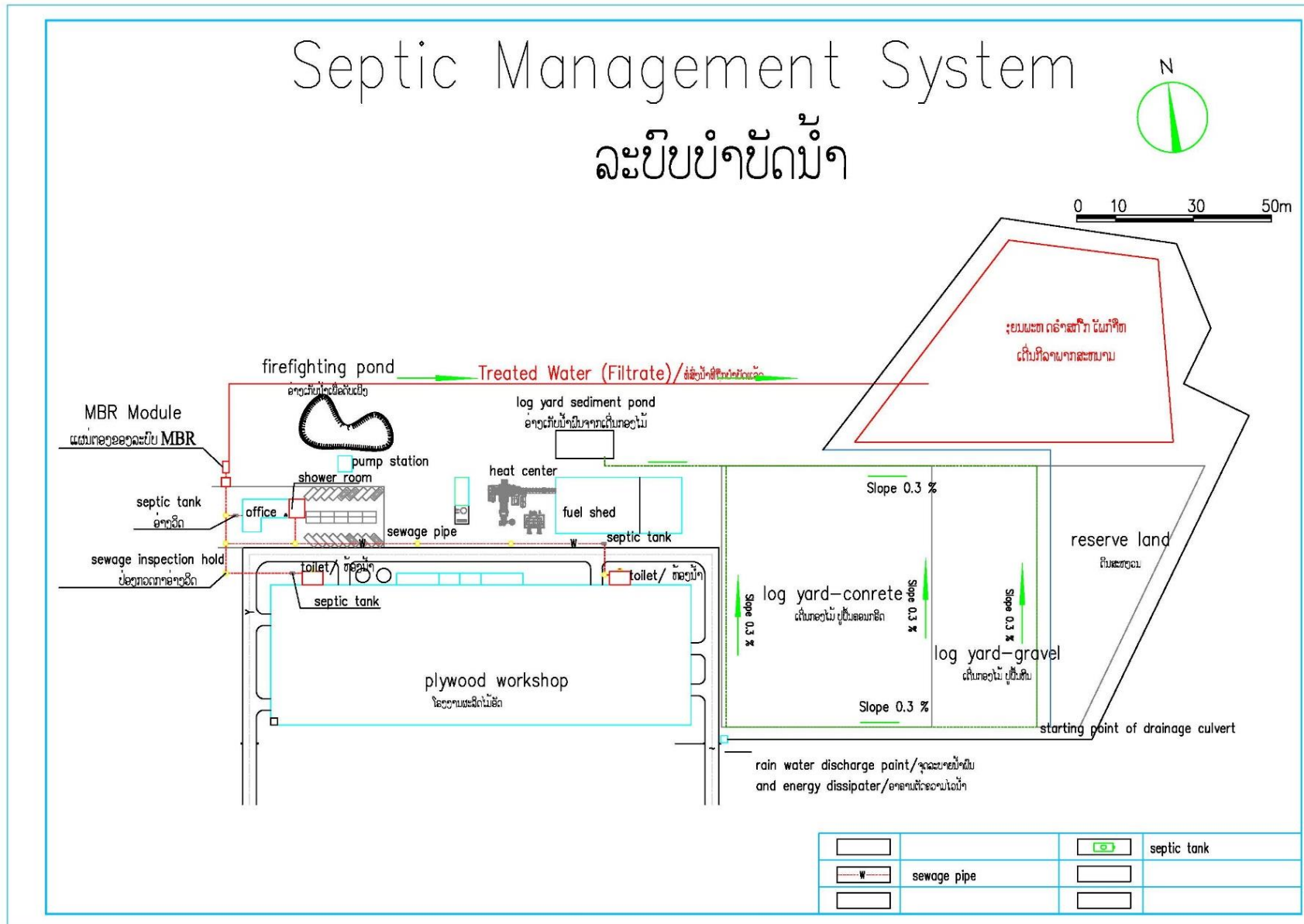


Figure 3-10: Septic Management System

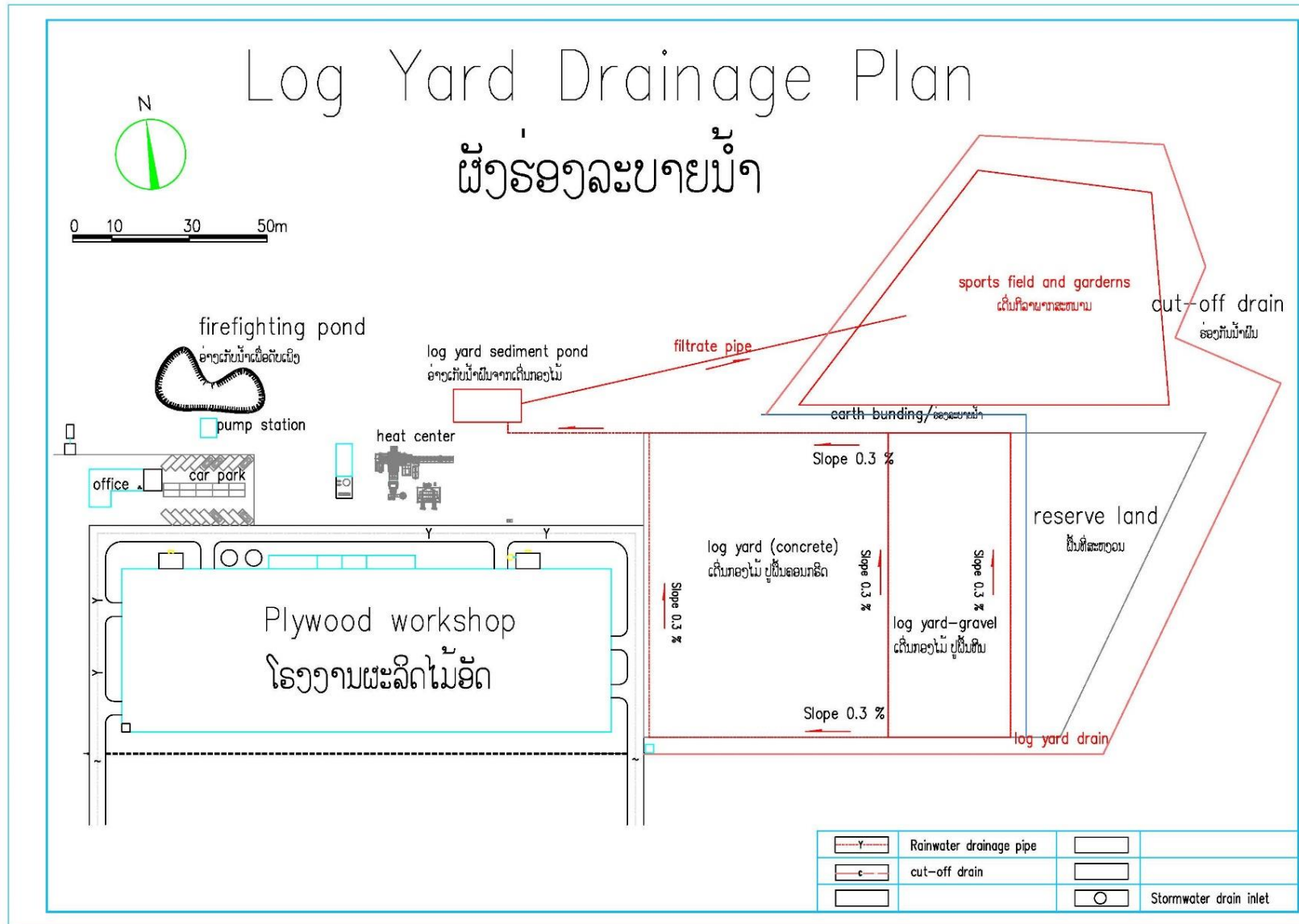


Figure 3-11: Logyard Drainage Plan

3.8 Design Alternatives

3.8.1 Project Location

Two locations were evaluated for implementation of the Mill, namely:

- Hin Heup District (Preferred Alternative); and
- Xaythany District (Nabong Site), adjacent Burapha's sawmill and wood manufacturing facility.

3.8.2 Equipment

The primary design alternatives for the Mill are currently being considered during the Feasibility Study. A technical consultant has been engaged to identify the most appropriate equipment options, site layout, and procurement strategy. Earth Systems is working with Burapha to ensure that environmental and social considerations are considered during Project design.

Preliminary Mill production lines and equipment / materials are summarised in Table 3-4.

Table 3-4 Primary Burapha Production Lines and Components

Production Lines		Investments	
Department	Components	Materials / Notes	No. of lines
Log handling	Log yard	Circular saw	1
	Log cutting		
Peeling	Peeling Line	4ft peeler	2
		8ft peeler	1
Side Products	Green waste	Chipper	1
	Dry Waste		
	Bark / log ends		
	Dust extraction	TBD	1
Drying	Dryer	VTS6 4800/9+2	1
		Moisture analyser	1
Veneer handling	Composer	4ft composer	2
	Patching machines	Raute Patchpal Pro	1
	Scarf-jointing unit	8x4 scarf-jointing	1
Gluing and Hot Pressing	Manual lay-up lines	Roller glue spreaders	3
	Glue kitchen	Mixers	2/3
	Pre-press	4x8	3
	Hot-press	4x8, 20-opening, auto	3
		Phenol resin	
Finishing	Trimming line	4x8	1
	Panel handling	Panel turner	1
	Sanding line	2-head	3
Assembly	Supervision and training		NA

3.9 Analysis of Alternatives

Separate alternatives analysis for the Project Feasibility Study and the ESIA identified the Hin Heup Option as the preferred alternative primarily because of the lower transport costs and lower risks for environmental and social impacts during transport (refer to Table 3-5).

3.9.1 Comparison of Environmental and Social Effects

Mill Location

The alternatives analysis for the two proposed Mill locations (Hin Heup site and Nabong site) identified significant variability with respect to the socio-economic benefits and likelihood / magnitude of environmental / social impacts during construction and operations.

The alternatives analysis identified the Hin Heup site as the preferred alternative. The following factors are considered the most important with respect to environmental and social aspects:

- The Hin Heup site is closer to Burapha plantation operations, requiring less travel, which will reduce community health and safety risks, occupational health and safety risks, and risks to terrestrial aquatic biodiversity in the event of a spill during materials transport;
- Villagers currently earn less in villages near the Hin Heup site and there is gender inequality with respect to job opportunities in these villages. The Project would provide much needed jobs and an equal opportunity employer;
- Social receptors are further from the Hin Heup site. Noise and dust emissions are less likely to impact neighbouring villages (i.e. residents > 0.5 km from the Hin Heup site and 50m from the Nabong site).
- Groundwater bores occur within 50 – 100m of the Nabong site. Abstraction for Mill processing may impact water availability. Impacts to groundwater from accidental discharge would be a risk for down-gradient water users.
- Surface water is hydraulically connected to aquatic habitat at the Nabong site. Impacts to water quality would likely prove more deleterious at the Nabong site.

Table 3-5 Summary alternatives analysis for environmental and social issues, Hin Heup and Nabong options

Theme	Favoured Location		Discussion
	Hin Heup	Nabong	
Log Transport	✓		Hin Heup Site is closer to current Burapha plantations (and likely future plantation areas), requiring less travel – which will reduce community health and safety risks, occupational health and safety risks, and risk to terrestrial / aquatic habitat and biodiversity in the event of a spill during hazardous materials transport
Land acquisition	-	-	Neither site requires acquisition of village lands. Impacts to assets avoided with either option.
Employment	✓		There is currently gender inequity with respect to job opportunities in the villages near Hin Heup site. The Project would provide an equal-opportunity employer
Socio-economic	✓		The socio-economic status of individuals / communities in the Hin Heup region is lower, therefore staffing the Mill with individuals from local communities would likely provide greater benefit at the local scale
Traffic	✓		Significantly more traffic on access roads through affected villages. Addition of up to 17 haul trucks / day would be negligible.
Roads and electricity	✓		Both sites have readily available electricity. Nabong area has largely unsealed roads, which are more easily degraded and a source for wind erosion / dust.
Dust	✓		At the Nabong site, ~15 houses from the Ban San Oudom village occur within 100 m of the proposed footprint (and five within 50 m). Residents would be subjected to increased noise and dust during construction and noise, dust, and potentially other air quality impacts during operations
Noise	✓		

Theme	Favoured Location		Discussion
	Hin Heup	Nabong	
Terrestrial Biodiversity	-	-	No impacts anticipated for either site.
Aquatic Biodiversity	✓		Perennial streams are further from the proposed Hin Heup footprint than for the Nabong Site. The risk of water quality impacts on downstream users (e.g. villagers, aquatic biodiversity) is less.
Aquatic Biodiversity	✓		Houay Som, a small seasonal stream connected to perennial wetlands, runs immediately adjacent the Nabong site. Discharge of hazardous materials would impact aquatic habitat, aquatic biodiversity (fish) commonly collected immediately downstream of the proposed Project area and water utilised by livestock. Nam Lik is further, and not directly connected to surface water hydrology at the Hin Heup Site
Groundwater	✓		Bores adjacent the Nabong site and 0.5 km from the Hin Heup Site. Impacts to groundwater hydrology from abstraction for operations and potential impacts to groundwater quality more significant for water users down gradient of Nabong.
Resources	-	-	No impacts to non-timber forest products or timber forest products for either site.
Visual Amenity		✓	There is potential that the Nam Lik 1 reservoir area will provide recreational / tourism opportunities near Ban Hin Heup. Vegetation retention and planting will likely be required to avoid impacts to the aesthetics of the area. Anticipated impacts are Low for both sites.
Air quality	✓		Cumulative impacts to air quality are expected to be significantly higher for the Nabong Site, given the industry in the region and the unsealed roads.
Cumulative Impacts	-	-	Cumulative impacts Low for both sites. Cumulative water quality impacts (with other industry in the region) may impact the quality of aquatic habitat in downstream receiving waters.
Score	11	1	The Hin Heup Option is the preferred alternative

3.9.2 No Project Alternative

By not constructing and operating the Mill, Burapha (and other regional plantation operators) would have very few options for the raw material they are currently growing or intend to grow. Further benefits as well as potential impacts would not occur, including:

- The approximately 366 jobs that are expected to be generated through Project operations would not be available, hindering the economic growth in the region;
- The secondary jobs created through expansion of the Burapha Agroforestry Operations would not be available; and
- Potential impacts for environmental (Chapters 5 and 6) and social receptors (Chapter 7) derived from Project construction and operations would not occur.



Chapter 4 | Environmental Setting

Chapter 4 | Environmental Setting

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4. ENVIRONMENTAL SETTING

4.1 Physical Setting

4.1.1 Topography, Geology and Soils

The majority of rock beneath the Mill site are shallow marine sediments of the Triassic Age, intruded by volcanic rocks. The site is nearly flat, varying between 211 and 221 m above sea level (masl). The western edge of the mill site, closest to the Nam Lik River, sits at 211 masl and slopes slightly upwards ($\sim 1^\circ$) to the eastern edge of the site at 221 masl (refer to Figure 4-1).

The Mill will be developed on a combination Ferric/Haplic Acrisol soils (refer to Figure 4-2). Acrisols are clay-rich / strongly weathered acid soils found on moderately to well-drained hilly or undulating topography. The shallow A horizon of an Acrisol is generally characterised by dark, acidic organic matter which gradually transitions to a lighter leached Eluvial (E) horizon. The main feature of this mineral horizon is the loss of silicate clay, iron, or aluminium leaving a concentration of sand and silt particles (NRED, 2016).

Acrisols have an Argic sub-surface (B horizon), starting less than 1 m from the soil surface, transitioning from the overlying E Horizon. This B horizon is enriched with alluvial silicate clays which may present a heightened erosion risk if exposed.

The Haplic qualifier to Acrisol reflects that this soil type meets the central concept of its Reference Soil Group and that there are no particular soil features that deserve to be separately mentioned. Therefore a Haplic Acrisol is best described through the general description of an Acrisol.

Ferric Acrisol feature accumulations of Fe (and Mn) oxides, often with poor aggregation of soil particles in Fe- and Mn-depleted zones. The segregation is the result of redox processes that may be active or relict and a typical feature of tropical soils with high rainfall (FAO, 2014).

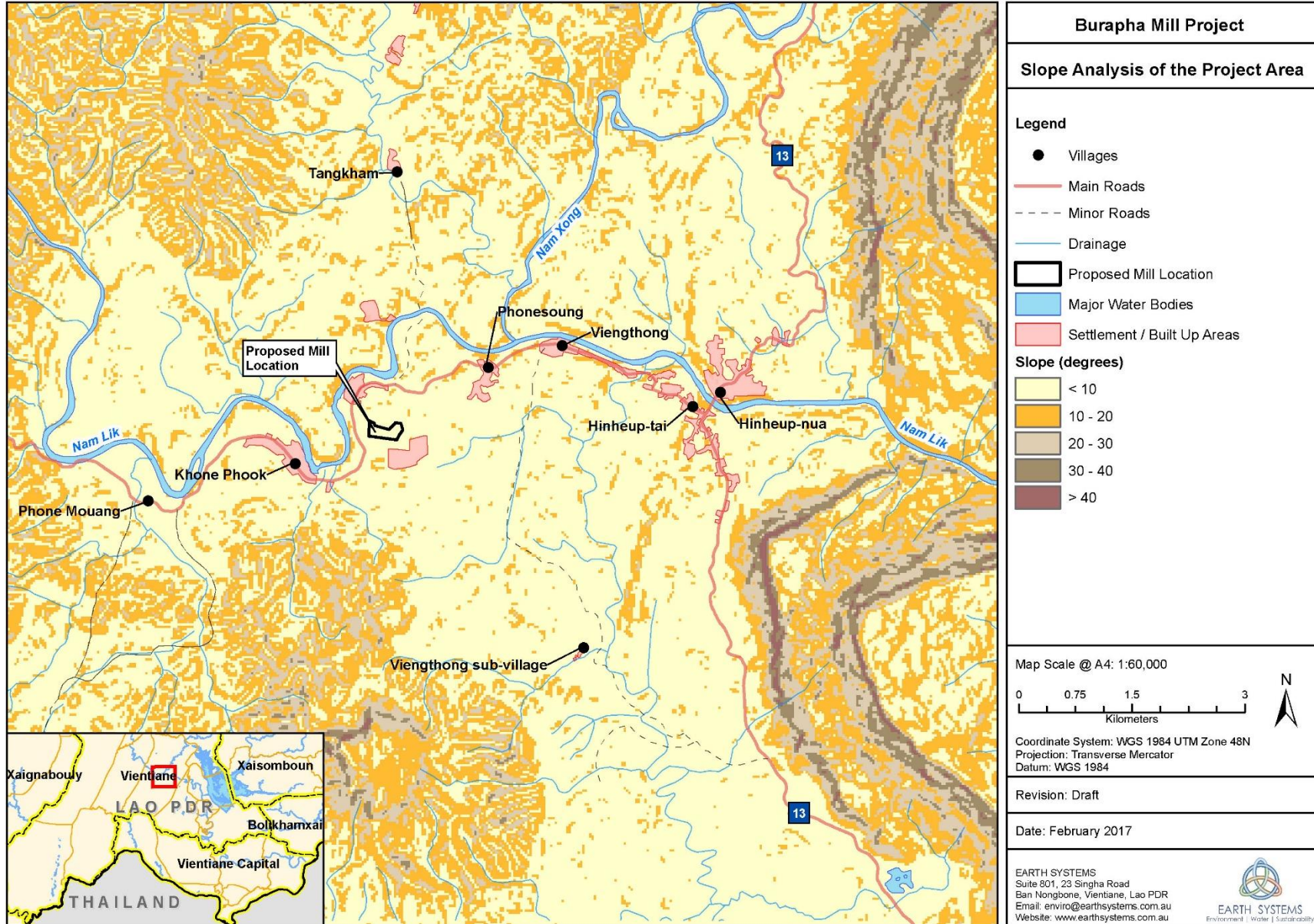


Figure 4-1 Topography of proposed Mill site

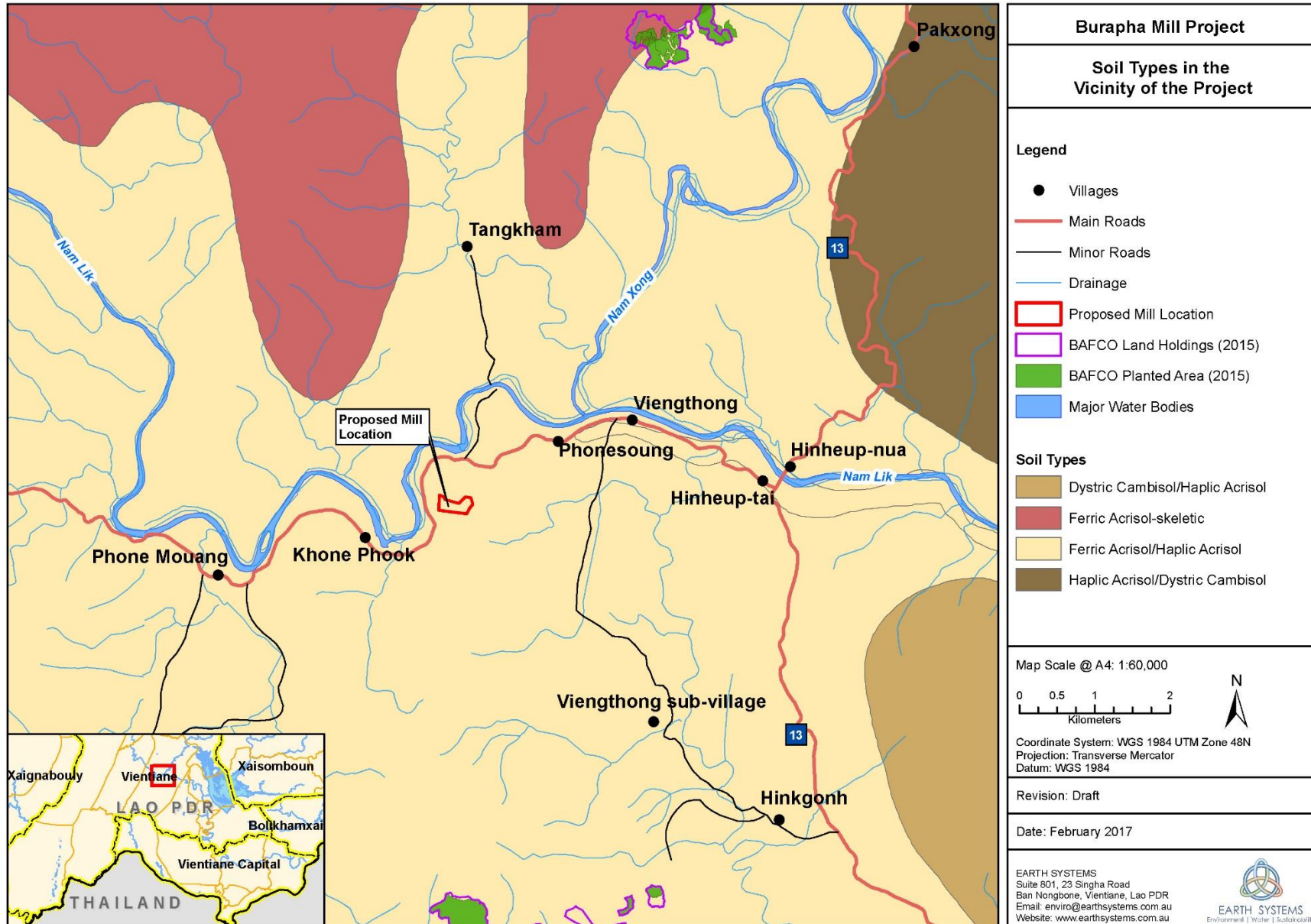


Figure 4-2 Regional soil types (NAFRI)

4.1.2 Drainage and Hydrology

The Mill site drains to several small unnamed ephemeral channels that converge off-site and drain to the Nam Lik River via a circuitous and sometimes sub-surface channel. The channels are not natural streams, but are artefacts of historic grading from previous land use of the concession area (refer to Plates 4-1 and 4-2).



Plate 4-1 Drainage channel, Mill footprint



Plate 4-2 Drainage channel no. 2, Mill footprint

The Nam Lik, a major perennial river (Plate 4-3), with average width 115 m, discharges ~3,500 m³/s during rainy years and minimum of 32 m³/s during dry season. The average Nam Lik's velocity is 0.745m/s and the maximum average depth is 2.38m (Vientiane Provincial Meteorology Department, 2007) at the Ban Hin Heup gauging station approximately seven river km east of the Mill site. The Nam Lik is now partially regulated by the Nam Lik 2 hydropower scheme approximately 30 river km upstream of the Mill site, decreasing mean monthly streamflow during the rainy season. Within a few years, the Nam Lik 1 Hydropower Project will impound the river directly to the north, east, and west of the Mill, with the Mill footprint and near surrounds unaffected.

There are several small perennial tributaries of the Nam Lik that are to the east and south of the site, including the Houay Mieng (Plate 4-4), Houay Karng, Houay Larn, and Houay Lai. The Nam Xong River discharges into the Nam Lik approximately 4 km downstream of the proposed Mill site.



Plate 4-3 Nam Lik Downstream from Mill Site



Plate 4-4 Houay Mieng, Nam Lik tributary

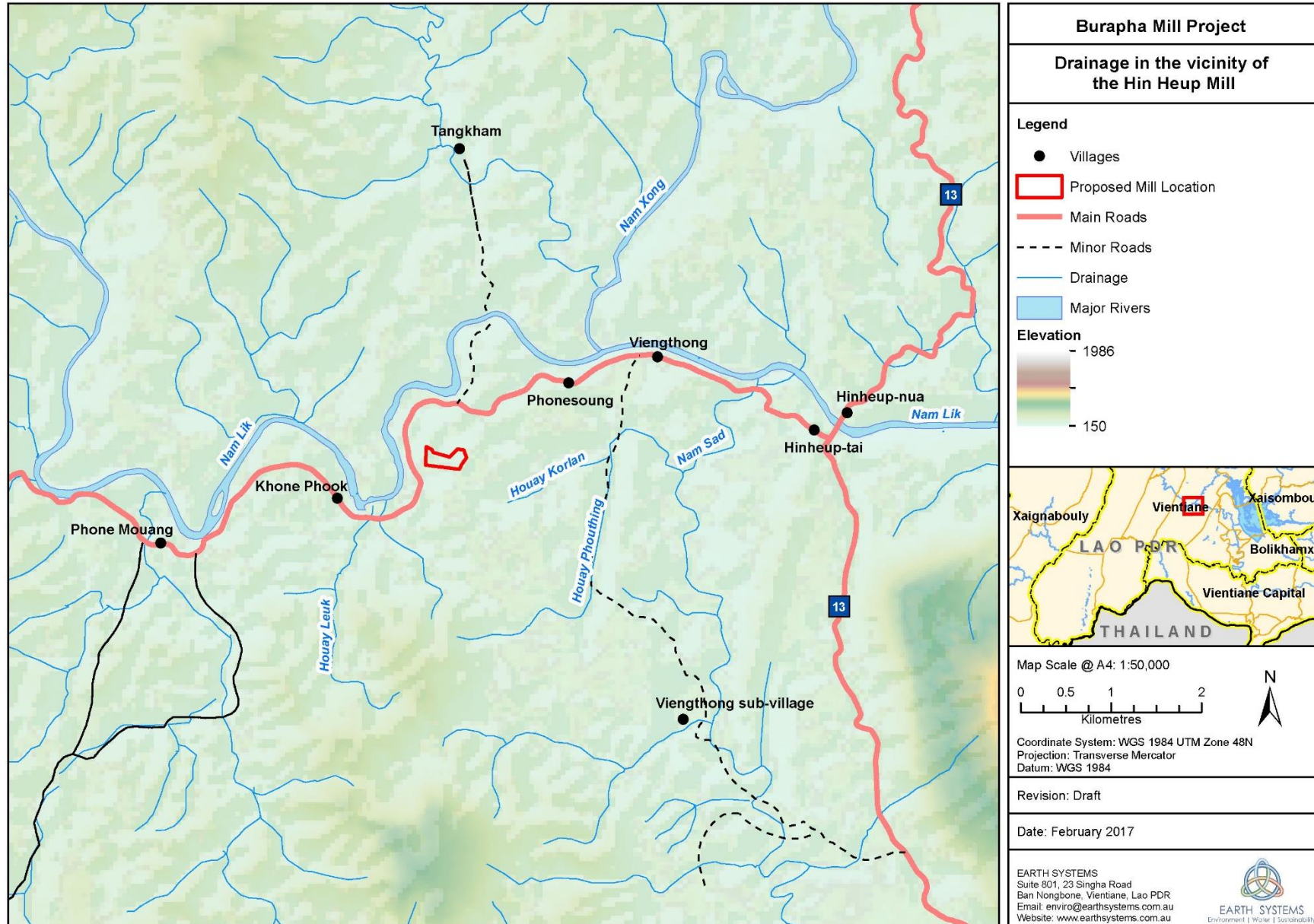


Figure 4-3 Drainage in the vicinity of the Mill site

4.1.3 Climate

The region is subjected to a pronounced tropical monsoon cycle, with a relatively cooler dry season from November to February, a humid and hot season from March to April, and a hot and wet season from May to October. Average monthly temperatures range from 19°C in December/January to 27°C in June.

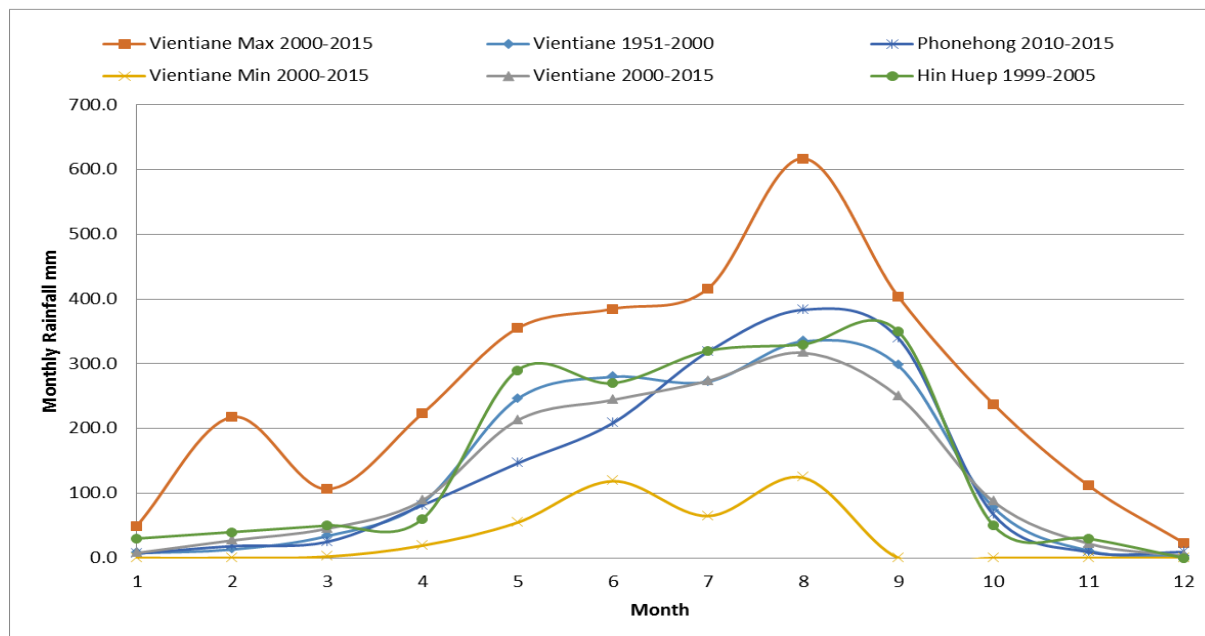


Figure 4-4 Mean monthly rainfall (mm) at Ban Hin Heup (Anderson and Carlstedt, 1998, Kinouchi, 2010), Vientiane (DMH 2015) and Phonhong (Tu Tiempo, USGS 2016)

The nearest long-term weather station (in Vientiane approximately 80 km to the southeast) measured average temperatures ranging from 16°C to 34°C (Table 4-1). The nearest short-term meteorological station is located at Phonhong, approximately 20 km southeast from the mill site. Annual average rainfall across the region typically ranges from 1,300 to 2,700 mm (IUCN, 2013, Liu et al., 2015, Claridge 1996), with the highest rainfall between July and September. August mean total rainfall (typically the wettest month) generally exceeds 300 mm. Wet season rains can constitute 84 to 94 % of the total annual precipitation (Kallio, 2014, Liu et al., 2015). Rainfall is expected to be slightly higher in Hin Heup than for Vientiane (Table 4-1).

Humidity does not vary as greatly as precipitation across the year, ranging between 66% and 84%. Humidity is at its highest in August and lowest in March, similar to rainfall patterns.

Table 4-1 Climatology information from Vientiane weather station based on monthly averages over the 50-year period (1951-2000; World Meteorological Organisation, 2016)

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Total Rainfall (mm)	7.5	13.0	33.7	84.9	245.8	279.8	272.3	334.6	297.3	78.0	11.1	2.5	1,661
Mean Rainy Days	1	2	4	8	15	18	20	21	17	9	2	1	118
Max. °C	35.6	37.8	40.0	41.1	38.9	37.8	36.1	37.2	38.9	38.9	34.4	33.4	41.1
Min. °C	0.0	7.6	12.1	17.1	20.0	21.1	21.2	21.1	21.2	12.9	8.9	5.0	0.0
Mean Daily Max. °C	28.4	30.3	33	34.3	33	31.9	31.3	30.8	30.9	30.8	29.8	28.1	34.3
Mean Daily Min. °C	16.4	18.5	21.5	23.8	24.6	24.9	24.7	24.6	24.1	22.9	19.3	16.7	16.4

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Humidity %	70	68	66	69	78	82	82	84	83	78	72	70	75

Mean prevailing wind direct at the Mill site mirrors regional trends (Table 4-2). Wind direction is determined by the Asian Monsoon, with easterly winds predominant in the dry season and south-easterly and south-westerly winds in the wet season. Available data and modelling at Vientiane and Phonehong, to the south of the Mill site, and CSIRO TAPM modelling at Hin Heup, suggest that wind direction is consistent across the Project region.

Table 4-2 Monthly mean prevailing wind direction at the mill site Project from data and modelling (TAPM)

2015	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hin Heup	E	ESE	ESE	SE	SSE	SSW	WSW	SSW	SSE	E	E	E
Vientiane	SE	SE	SE	S	SW	SW	S	S	SSW	S	S	SSE
Phonhong	S	SSW	SSW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SW

Mean monthly evaporation for Vientiane in the latter part of the last century ranged from 115 mm in January to 156 mm in April (Table 4-3). Monthly mean maximums and minimums mirror peak temperatures in April and January, respectively.

Table 4-3 Mean monthly evaporation (mm) at Vientiane (NOAA 1961-1990)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
115.2	116.8	140.7	156.1	138.9	118.9	116.7	148.5	114.3	127.6	125.5	116.8	1,536.0

4.1.4 Surface Water Quality

Surface water quality assessment for baseline information was conducted in Nam Lik River which is located approximately 500m to the north from the Mill site (refer to Figure 4-9). There was no perennial stream adjacent to the Mill location, and therefore, additional water quality assessment was not necessary.

Nam Lik River surface water is good quality with little apparent impact from industry in the region. During the conduct of the ESIA, water quality was sampled for field and laboratory analyses immediately downstream of the proposed Project footprint at Latitude: 18°38'27.348"N; Longitude: 102°16'57.3201"E (refer to Table 4-4 and Figure 4-9) in March 2016.

Nam Lik water was very clear (low turbidity and TSS) with near neutral pH, and temperature typical of the region. A moderate dissolved oxygen concentration (6.15ppm), low nutrient concentration, and an absence of measured pollutants indicate that the water quality is suitable for a range of aquatic biodiversity and water uses. Total coliform was found to be high (exceeding the detection limit of 2300 MPN / 100 mL), which is typical in Lao PDR near villages / livestock.

The potential contaminants from veneer and plywood manufacturing (fat, oil, and grease; formaldehyde; ammonia) and associated by-products (COD, and BOD) were either below laboratory detection limits or had very low concentrations. The exception was phenolic substances, where the Nam Lik sample had a concentration of 0.047 mg/L, above the Lao ambient water quality guideline of 0.005 mg/L.

Table 4-4 Water quality parameters from the Nam Lik, near the mill site (in March 2016)

Parameter	Nam Lik	Lao Ambient WQ Guideline [#]	Analysis Method*
Temperature (°C)	23.6	-	Field test
pH	7.32	5 to 9	Field test
Dissolved oxygen (ppm)	6.15	> 6	Field test
Chemical oxygen demand (mg/L)	ND <5.0	5 ml/L	
Biochemical oxygen demand (BOD ₅ : mg/L)	0.88	1.5	

Parameter	Nam Lik	Lao Ambient WQ Guideline [#]	Analysis Method [*]
Total suspended solids (mg/L)	ND	-	
Total dissolved solids (mg/L)	131	-	
Turbidity (NTU)	1.6	-	
Conductivity (µ/cm)	173.8	-	Field test
Ammonia (NH ₃ : mg/L)	0.13	0.2	
Fat, oil, grease (mg/L)	ND <1	2	
Formaldehyde (mg/L)	ND <0.05	-	
Phenolic substances (mg/L)	0.047	0.005	
Total coliform group (MPN/100 ml)	>2300	<5000	

Key: ND – Not Detected

[#] Agreement on the National Environmental Standard, Lao PDR 2009.

^{*} Field parameters were collected using a TPS 90-FLT Field Lab Analyser.

4.1.5 Groundwater Quality

Groundwater from wells / bores are sourced by residents of Ban Khone Phook, Ban Phonesoung, and Ban Viengthong for gardens, washing, and other uses. Residents indicated that groundwater is not consumed as drinking water or cooking water (sourced from bottles) due to its reported poor quality (pathogens). Due to the distance of the Mill site from any village bores (>0.5 km), groundwater quality was not assessed for the Project footprint.

Groundwater quality will be tested when the bore is drilled for the Mill abstraction well for baseline conditions.

4.1.6 Air Quality

Air quality in the Project region is generally within national ambient air quality guidelines, given the distance from significant urban areas and industry. Seasonal burning of vegetation for agricultural site preparation is likely the greatest contributor to impaired air quality in the region, generally from February – May (NASA 2016). Additional secondary sources of air emissions in the area include (refer to Plates 4-6, and 4-7):

- Vehicular traffic along dirt tracks;
- Dust carried on prevailing winds;
- Open cooking using firewood or fossil fuels; and
- Small to moderate size industrial local industries (cassava/fertiliser factories, etc.).

Monitoring of dust concentrations was conducted over a 3-day period in March 2016 (Plate 4-5) at Ban Phonesoung Sub-Village (settlement area close to the Mill site). Monitoring was conducted using the Dusttrak DRX 8533 with methods described in the equipment manual (<https://www.tsi.com/getmedia/3699890e-4adf-452f-9029-f3725612d5d1/8533-8534-DustTrak-DRX-6001898-Manual-US?ext=.pdf>). Monitoring found that total suspended particulates (TSP), particulate matter <10 microns in diameter (PM₁₀), and fine particulates <2.5 microns in diameter (PM_{2.5}) concentrations were high for two of the three days, with peaks and troughs throughout the sampling period.



Plate 4-5 Dust Monitoring Plate 4-6 Ray Organic Fertiliser Factory Plate 4-7 Traffic emissions

Baseline monitoring likely captured some of the worst air quality conditions for the year, as vegetation burning for agricultural site preparation was observed to be widespread at that time. A minor rain event on March 26 (day 3) dropped dust concentrations considerably. Baseline particulate concentrations in the wet season are generally low due to natural suppression by the regular rainfall and less biomass burning.

For the majority of the 3-day monitoring period, PM_{2.5} and PM₁₀ were above WHO particulate size guidelines. Lao PDR guidelines for TSP ($\geq 330 \mu\text{g}/\text{m}^3$) and PM₁₀ ($\geq 120 \mu\text{g}/\text{m}^3$) were exceeded during the first half of the sampling period. On average, PM₁₀ and PM_{2.5} exceeded relevant criteria, while TSP was below Lao PDR guidelines. There were at least three significant peaks over the first 48 hours, with all parameters exceeding $2,100 \mu\text{g}/\text{m}^3$. Peaks occurred in the early evening, when people are travelling home from work and cooking dinner.

Due to the location of the Project and the lack of major industrial activity in the area, concentrations of other emissions such as sulphur dioxide (SO₂), carbon monoxide (CO) and nitrogen oxides (NO_x) are assumed to be low under normal conditions.

Table 4-5 Twenty-four (24) hour mean particulate concentrations for 3 days in the dry season ($\mu\text{g}/\text{m}^3$)

	Hin Heup (Mean)	Lao Criteria	WHO Criteria
Total Suspended Particulates (TSP)	191	330	n/a
Particulate Matter <10 microns (PM10)	190	120	50
Particulate Matter <2.5 microns (PM2.5)	185	n/a	25

Baseline concentrations of particulates in the wet season are anticipated to be generally low due to natural suppression by regular rainfall and reduced biomass burning. Due to the location of the Project and the lack of major industrial activity in the area, concentrations of other emissions such as sulfur dioxide (SO₂), carbon monoxide (CO) and nitrogen oxides (NO_x) are assumed to be low under normal conditions.

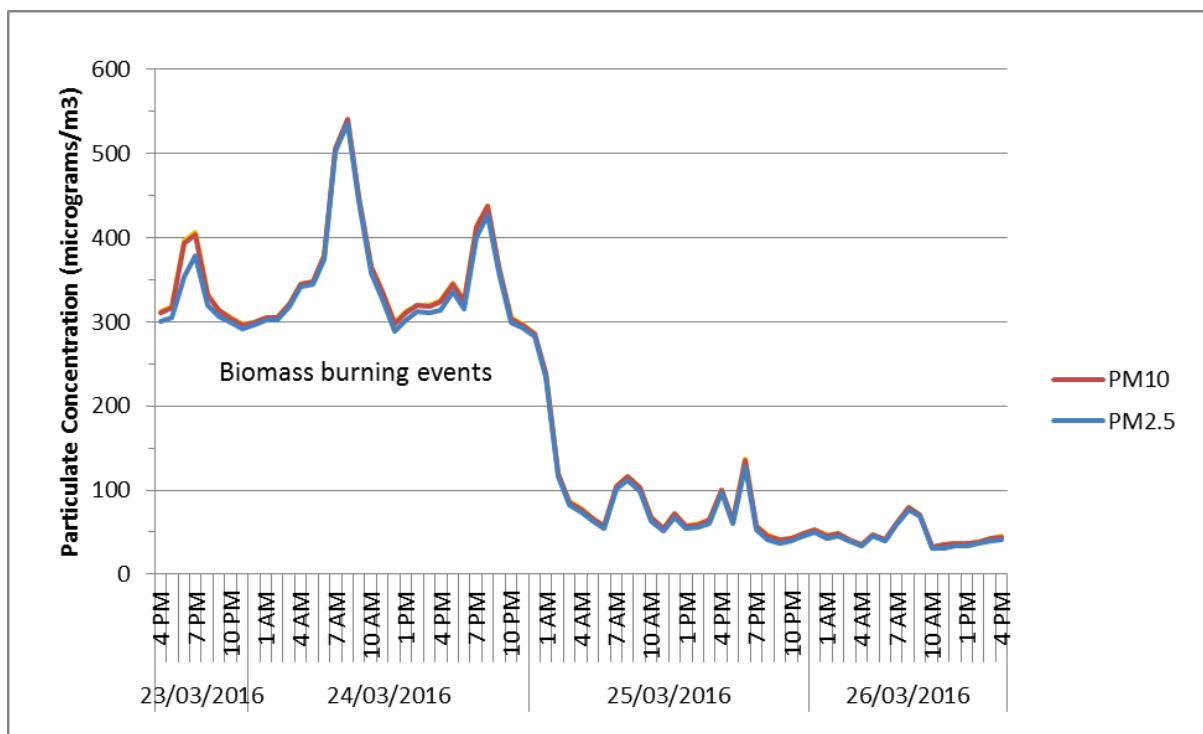


Figure 4-5 Mean hourly particulates ($\mu\text{g}/\text{m}^3$) at Ban Phonsoung Sub-Village

4.1.7 Noise

Noise emissions in the Project area vary considerably with distance from Road 4501 and settlements. Ambient noise conditions were high adjacent the road and within settlements during the day and moderate for much of the night, with noise abating incrementally with distance from activity.

Noise was monitored continuously for three days starting on March 23 using as Casella 245 noise monitor at the nearest social receptor from the proposed Mill site, in Ban Phonsoung Sub-Village. Ambient noise was found to be very high during the day, due to heavy traffic and social activity (e.g. music). Noise levels appear to follow normal trends for a busy road during the day that experiences frequent truck and car traffic. Minimum night-time noise levels were typically low for a rural location, but interspersed by high infrequent noise maxima (passing traffic/trucks).

Ambient noise conditions often exceeded WHO day and night-time criteria, while on average noise was below WHO day and Lao PDR guidelines (refer to Table 4-6). Noise levels were generally below the national guidelines and more frequently exceeding WHO guidelines.

Noise peaked during the day from 6am to 6pm, with a maximum of LAeq 87.4 dB and did not drop below 30 dBA during the 3-day sampling period.

Table 4-6 Ambient noise levels recorded at the mill site over a 3-day period, with WHO (2009) and Lao PDR (2009) guideline levels

	Baseline Noise	Noise Criteria		
	Phonsoung Site	Lao PDR	WHO Day	WHO Night
Absolute Peak	91.4	115	-	-
LA Maximum	87.4	-	-	-
LAeq Ambient	59.2	70	55	-
LA Minimum	34.4	-	-	45

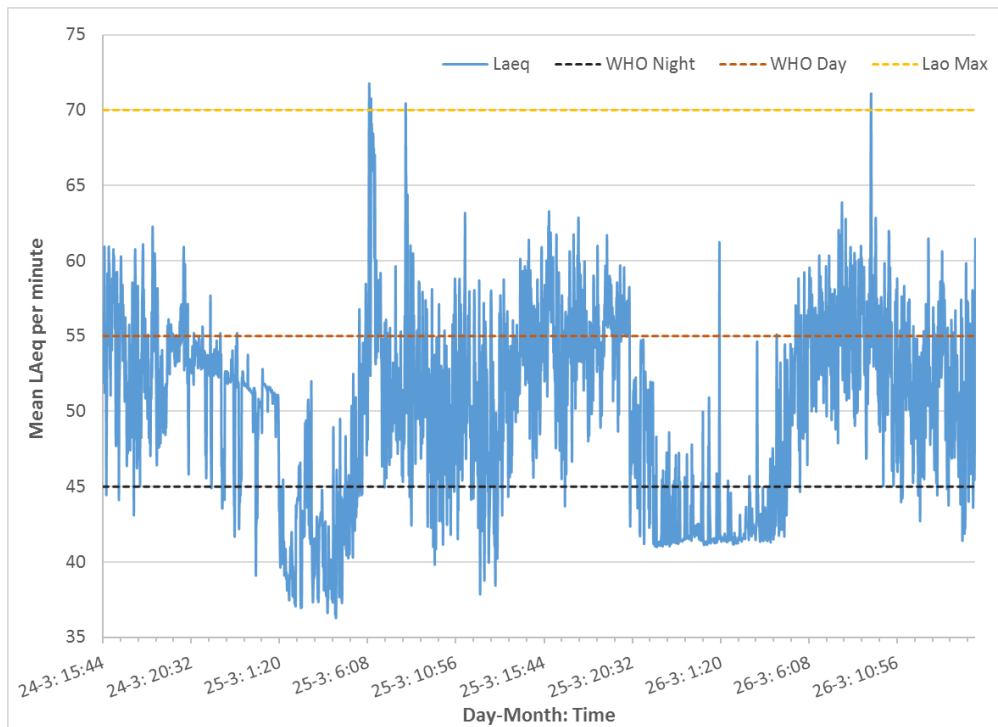


Figure 4-8 Mean LAeq (per minute) over a 3-day sampling period at the mill site

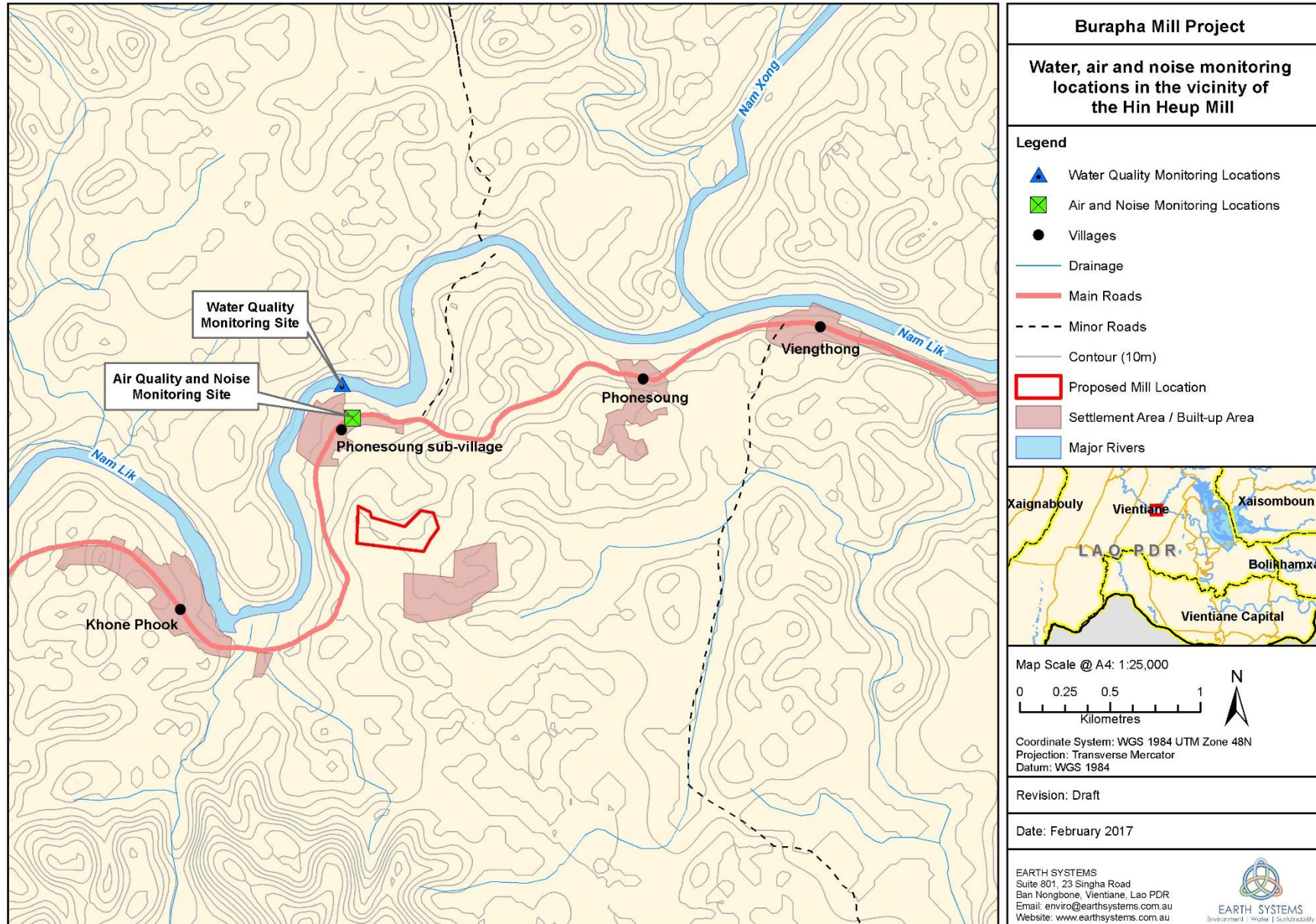


Figure 4-9 Water Quality, Air Quality and Noise Monitoring Locations

4.1.8 Natural Hazards

Tropical Storms and Floods

The Nam Lik River has been historically prone to flooding during the rainy season. With the construction of the Nam Lik 2 Hydropower Plant approximately 30 river km upstream of the Project Area and subsequent regulation of discharge from the reservoir, the likelihood of flooding has reduced. However, several perennial tributaries discharge to the Nam Lik between the Nam Lik 2 HPP and the Project area, providing some potential for flood events in the event of a significant tropical storm or typhoon. The near-term construction of the Nam Lik 1 Hydropower Project will allow for further regulation of Nam Lik water levels immediately downstream of the Project area. It is anticipated that this will significantly reduce the chance of flooding. The assessment below considers current conditions (i.e. pre-Nam Lik 1 HPP regulation of the river).

There has been an increase in frequency and severity of hydro-meteorological events in Lao PDR, particularly tropical typhoons in recent years (UNISDR, 2012), with several typhoons and tropical storms that have caused flooding in the greater region.

The GOL Department of Meteorology and Hydrology have set warning (14 m) and danger (15 m) water levels of the Nam Lik River at Ban Hin Heup, approximately seven river km downstream of the Project footprint. The Nam Lik has previously reached 15 m depth at Ban Hin Heup and thus is capable of flooding.

Seismic Activity

The risk of earthquake in the region is low. No earthquakes (2.5+ magnitude) has been recorded in the 20 year monitoring period for the region (USGS, 2016). The majority of earthquakes have been recorded to the northwest, with a 4.6 magnitude being recorded in 2011 near Houay Ngou, Xayabouly Province (~60 km NW). Other seismic events (e.g. volcanoes) do not occur in the region.

Fires

Fires are unlikely to affect the Mill site due to the historic vegetation clearing in the area.

Climate Change

Temperatures have increased on average between 0.1 to 0.3°C per decade across Lao PDR from 1951 to 2000 (World Bank, 2011). Rainfall decreased over this same 50-year period. Temperatures are expected to increase in the region by 1.4°C to 4.3°C by the end of the century (World Bank, 2011, ICEM, 2013).

Recent studies have estimated that the annual precipitation for the Mekong Basin will increase by 13.5% from the historical mean of 1,509 mm to 1,712 by 2030 (World Bank, 2011, ICEM, 2013). This increase is projected to be mostly confined to the wet season. It is anticipated that there might be a decrease in dry season precipitation, with decreases of up to 25% from historic values (UNISDR, 2012). While other predictions have calculated a 22% increase in dry season rain (Eastham et al., 2008).

Closer to the Mill site, it has been estimated that the Nam Ngum, downstream of the reservoir, will experience a 7% discharge increase during the wet season, if CO₂ increases to 540 ppm (from 360 ppm baseline, AIACC, 2006). An increase to 720 ppm of CO₂ is predicted to increase Nam Ngum's discharge by 12%. Under these scenarios, dry season discharge is similar for an increase to 540 ppm CO₂, but there is an almost doubling (47%) if CO₂ concentrations reach 720 ppm.

4.2 Biological Setting

4.2.1 Protected Areas and Watershed Reserves

International and National Biodiversity Conservation Areas

The Project is not located within or near any internationally recognised areas of conservation importance including Important Bird Areas (IBAs), Ramsar sites, or World Heritage Sites. There are two nationally protected areas within the broader region surrounding the Mill. These areas are the Phou Phanang NBCA (12 km southeast of the Mill site) and Phou Khao Khoay NBCA (approximately 45 km southeast).

Phou Phanang is predominantly covered by degraded forests with patches of evergreen forest. Agricultural encroachment, shifting cultivation and logging are reportedly common in the Phou Phanang NBCA (Fujita, 2004). High quality evergreen forest is located in the interior of the NBCA, far from access points.

Phou Khao Khoay NBCA covers 200,000 ha and contains a mosaic of evergreen, mixed deciduous, dry dipterocarp and pine forests. The NBCA supports several wildlife species that are of international and national conservation concern (Vongkhamheng, 2015).

Watershed Reserves

There are large Watershed Reserves to the south and north of the Project. The Nam Ton Watershed Reserve is approximately 8 km southwest of the mill site, while Nam Song (24 km) and Nam Ngum (34 km) are to the northeast.

Provincial and District Protection Areas

The Project is four km west of the Phou Kaison District Protected Forest, six km southwest of the Phou Meut Provincial Protected Forest and six km east of the Phou Inthin Provincial Protected Forest. These forests are protected for their water resources, soils, and natural resource provisions. Some portions of these provincial and district protected areas have suitable forest cover to support some globally and nationally threatened vertebrate and plant species. However, the majority of these areas have been impacted by agricultural and logging activities in recent years / decades and are now mostly composed of degraded and fallow forests.

4.2.2 Terrestrial Biodiversity

Vegetation and Habitat Types

The proposed Mill site was cleared of native forests and graded for industrial activity prior to Burapha leasing the concession, and the area now occasionally supports grazing livestock. There is no quality habitat in the area.

May 2016 botanical surveys identified a dominance of native and non-native grasses and herbs with scattered small trees on the northern fringe. No internationally or nationally threatened flora were identified. Of the species that have been assessed, all are considered as Least Concern or Lower Risk (IUCN, 2016).

Only Young Fallow Forest and Degraded Forest (as per Lao Forest Law 2007) occur within the Project Footprint. The majority of species within the fallow are native. Invasive grass and herb species are common across the site. The habitat types are described as follows:

1. **Young fallow (1-2 years)** – this type of fallow is dominated by the mid-storey and understorey, with no trees or shrubs exceeding 5 m height (refer to Table 4-7). Despite the high species richness in both the two lower structural layers, the floristic composition does not resemble natural forest types (e.g. deciduous) and is thus considered modified habitat. The majority of species are native and common to the region and Lao PDR, with the exception of two weed species of global significance: *Chromolaena odorata* and *Mimosa pudica* (ISSG, 2016).

The Forest Law (2007) describes fallow forest as, “forest areas where deforestation for cultivation has been practiced or areas which have gone under various forms of encroachment for many years.”

- Degraded Forest** – the majority of the site is highly compacted from historic industry activity associated with the previous concessionaire. As such, only native and non-native grasses have established. Cattle were observed grazing the area, thus the grasses have been grazed to near ground level.

The Forest Law describes degraded forest as “forest areas that have been heavily damaged such as land without forest or barren forestland, which are allocated for tree replanting, agriculture – tree products, permanent animal husbandry area or using land for other purposes in accordance with socio-economic development plan.”

Table 4-7 Young fallow forest (2 years) structural assemblage and dominant flora species in the Mill Site

Structural Component	Scientific Name	Family	Habit
Canopy: Height 5 m - 10 m	NA		
	NA		
Mid-storey: Height 1.3 m - 4 m	<i>Alstonia scholaris</i>	Apocynaceae	T
	<i>Casearia grewiaefolia</i>	Salicaceae	TL
	<i>Cassia timorensis</i>	Fabaceae	TL
	<i>Cratoxylum formosum</i>	Guttiferae	T
	<i>Croton laevigatus</i>	Euphorbiaceae	TL
	<i>Crypteronia paniculata</i>	Crypteroniaceae	T
	<i>Duabanga grandiflora</i>	Lythraceae	T
	<i>Gonocaryum lobbianum</i>	Cardiopteridaceae	TL
	<i>Macaranga denticulata</i>	Euphorbiaceae	TL
	<i>Mallotus barbatus</i>	Euphorbiaceae	TL
	<i>Mallotus paniculatus</i>	Euphorbiaceae	TL
	<i>Microcos paniculata</i>	Tiliaceae	T
	<i>Peltophorum dasyrrhachis</i>	Fabaceae	T
	<i>Sandoricum koetjape</i>	Meliaceae	T
Understorey: Height 0 m - 1.3 m	<i>Alsomitra sarcophylla</i>	Cucurbitaceae	C
	<i>Bauhinia sp.</i>	Fabaceae	C
	<i>Chromolaena odorata</i> #	Asteraceae	H
	<i>Combretum decandrum</i>	Combretaceae	C
	<i>Crotalaria sp.</i>	Fabaceae	H
	<i>Melastoma normale</i>	Melastomataceae	H
	<i>Micromelum hirsutum</i>	Rutaceae	H
	<i>Mimosa pudica</i> #	Fabaceae	H
	<i>Paspalum commersonii</i>	Gramineae	H
	<i>Sauropus androgynus</i>	Phyllanthaceae	H
	<i>Streblus ilicifolius</i>	Moraceae	TL
	<i>Thysanolaena maxima</i>	Poaceae	H
	<i>Zizyphus oenoplia</i>	Rhamnaceae	SH

KEY: T – Tree; TL – Treelet; C – Climber; H – Herb; SH – Shrub; # - 100 World’s Worst Invasive Species

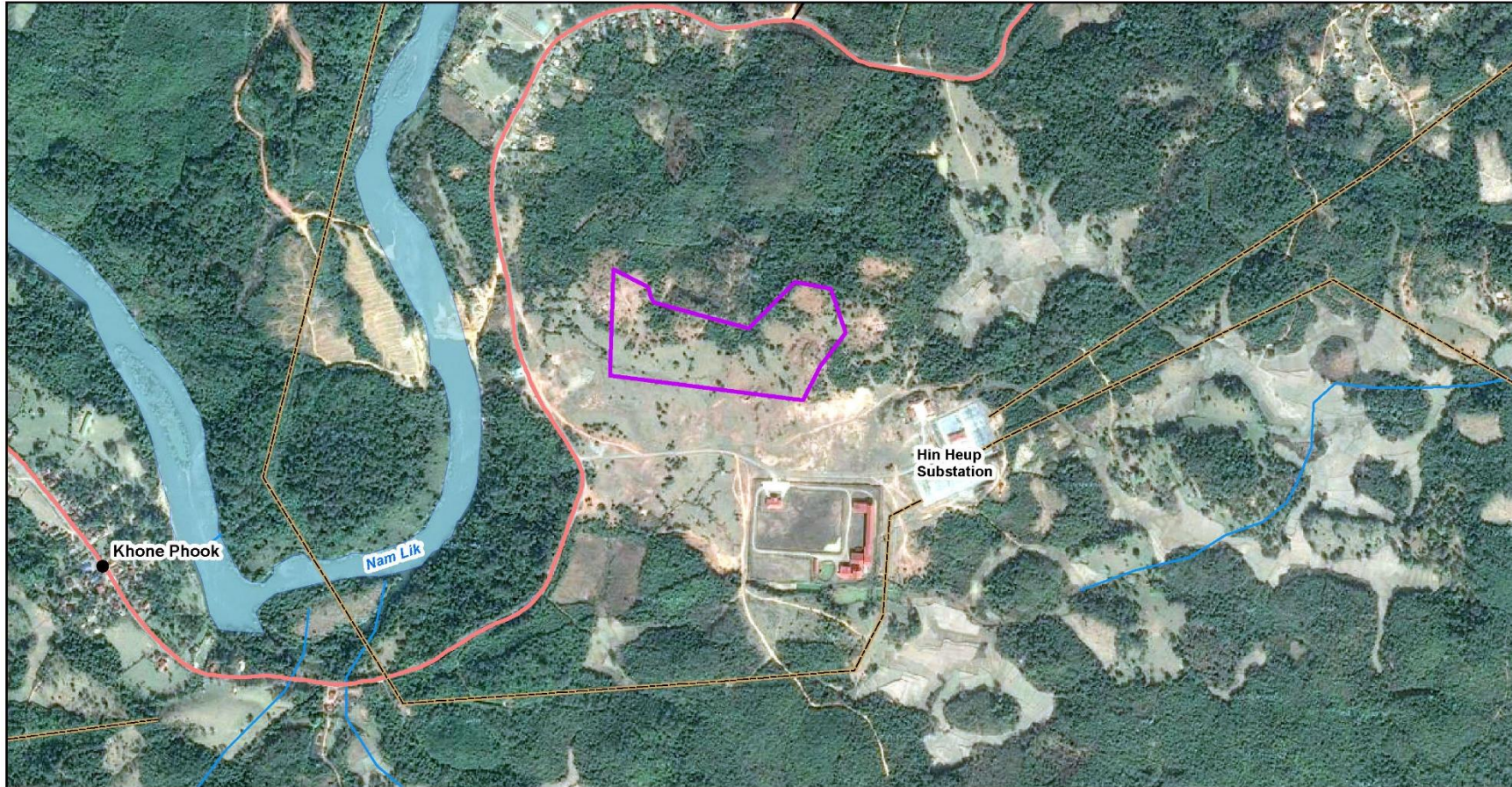


Figure 4-10 Satellite image of the Mill footprint

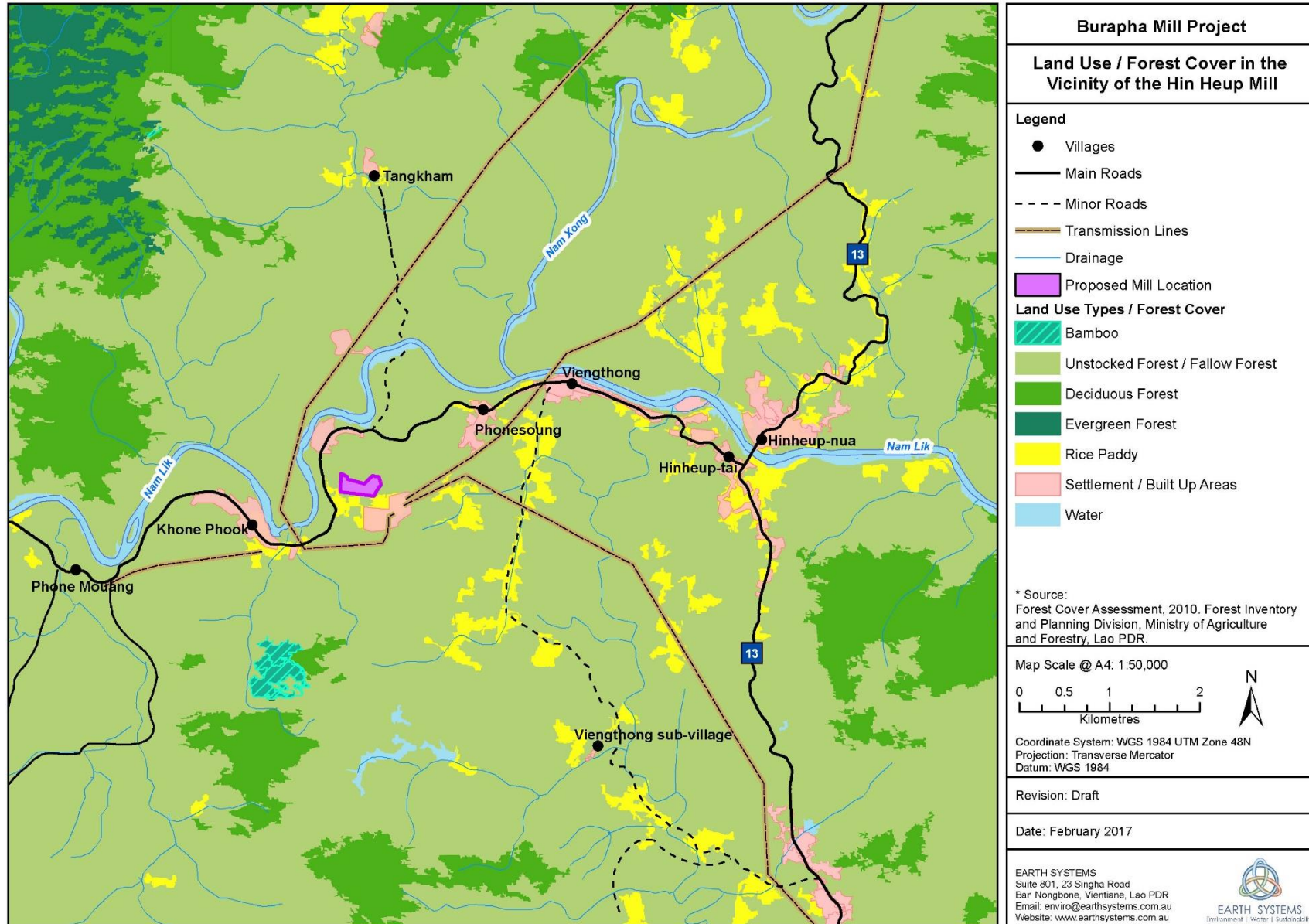


Figure 4-11 Forest Cover in the Project area (Source GOL Forest Inventory Planning Data, 2012)

Flora

The majority of flora identified within the Mill site are common to degraded forests in the region, though most species have not been assessed for their conservation status or rarity. Many of the flora identified are used, or are capable of being used, as NTFPs or as timber. However, these were generally identified as growing outside of the mill site.



Plate 4-8 Vegetation Surveys in the Mill Site



Plate 4-9 Degraded habitat in the Mill Footprint

Two invasive plants of global significance were identified within the mill site and surrounds. *Chromolaena odorata* (Siam weed) is a perennial shrub native to South and Central America (ISSG, 2016). The fast-growing weed forms dense stands/bushes preventing the establishment of other flora species. The South American native, *M. pudica*, was introduced as an ornamental to many regions and has become a widespread weed in agricultural areas, pastures and plantations. The climber (or liana) forms dense mats on the ground, preventing the growth of other species (ISSG, 2016).

Table 4-8 Flora species identified within the mill site, that have been assessed for their international (IUCN) and Lao PDR (Phongoudome and Mounlamai, 2004 in brackets) conservation status or are known invasive species

Scientific name	Common names	Status	Scientific name	Common Name	Status
<i>Alstonia scholaris</i>	White cheesewood	LR/LC (LR/LC)	<i>Lasia spinosa</i>	Phak narm, Lasia	LC
<i>Centella asiatica</i>	Phak nork, Asiatic pennywort	LC	<i>Marsilea crenata</i>	Phak vaen, Marsilea	LC
<i>Cratogeomys formosum</i>	Pink empat	LR/LC	<i>Mimosa pudica</i> #	Sensitive plant	LC
<i>Chromolaena odorata</i> #	Siam weed	N/A	<i>Paspalum commersonii</i>	Kodo Millet	LC
<i>Diplazium esculentum</i>	Phak kout, Fern	LC	<i>Peltophorum dasyrrhachis</i>	Mai sa phang/Mai sa kham, Peltophorum tree	N/A (LR/LC)
<i>Eleusine indica</i>	Phak yayi khuay, Eleusin grass	LC	<i>Saccharum spontaneum</i>	Canne sauvage	LC
<i>Hydrolea zeylanica</i>	Phak be eian, Hydrolea	LC	<i>Ziziphus jujuba</i>	-	LC
<i>Ipomoea aquatica</i>	Phak bong, Ipomoea	LC		-	

Key: LC – Least Concern; LR – Lower Risk; # – South America native (100 worst invaders)

Fauna

Due to the lack of habitat and industrial activity in the immediate area, animal occurrences are likely to be transient, with the possible exception of burrowing animals. No vertebrates were observed within the Mill site during May 2016 biodiversity surveys, with the exception of livestock that had wandered into the area (the area is not relied upon for grazing).

The results of site surveys, local knowledge surveys, and assessment of secondary information indicates that it is highly unlikely that any fauna species of conservation significance inhabit the site. The majority of mammals seen in the vicinity of the Mill site by villagers are considered globally Least Concern (IUCN), with their populations stable. All mammals reported by villagers are common to Lao PDR and the region.

A total of 12 mammal species, 23 bird species, six reptile species and eight frog species were identified by villagers as inhabiting or recently inhabiting the area surrounding the Mill site (refer to Table 4-9).



Plate 4-10 Hin Heup substation, adjacent Mill footprint **Plate 4-11 Ray fertiliser, adjacent Mill footprint**

Mammals

During local knowledge surveys and biodiversity focus group discussions, villagers reported seeing 12 mammals in the general area, though indicated that none were specifically seen in the proposed Mill site. As above, due to the lack of cover / habitat and the industrial activity in the region, the site is not considered important habitat for mammals.

The majority are considered globally Least Concern (IUCN), with their populations stable and are common to Lao PDR and the region. Two species, the black giant squirrel and large Indian civet, are classified as globally Near Threatened. One species has been classified as *Restricted* by the MAF: the large brown flying squirrel (*Petaurista philippensis*). The large brown flying squirrel has been classified as *Restricted* because it has been determined that it is rare and close to extinction in Lao PDR and is of special importance and utility for socio-economic and the natural environment reasons.

Birds

Birds identified by local residents will also favour land adjacent to the Mill footprint rather than the site itself. Seven of the 23 identified are waterbirds. The other 16 species are:

- Common myna (*Acridotheres tristis*)
- Bay woodpecker (*Blythipicus pyrrhotis*)
- Greater coucal (*Centropus sinensis*)
- Japanese quail (*Coturnix japonica*)
- Crow-billed drongo (*Dicrurus annectans*)
- Great eared-nightjar (*Eurostopodus macrotis*)
- Red junglefowl (*Gallus gallus*)
- Chestnut-crowned laughingthrush (*Garrulax erythrocephalus*)

- Hill myna (*Gracula religiosa*)
- Wire-tailed swallow (*Hirundo smithii*)
- Changeable hawk-eagle (*Nisaetus cirrhatus*)
- Common tailorbird (*Orthotomus sutorius*)
- Collared scops-owl (*Otus bakkamoena*)
- Green-billed malkoha (*Phaenicophaeus tristis*)
- Crested finchbill (*Spizixos canifrons*)
- Spotted dove (*Stigmatopelia chinensis*)

All but one of these birds are common and widespread across the country. The wire-tailed swallow, has been considered 'Potentially at Risk' in Lao PDR.

Reptiles and Amphibians

Five of the six reptiles seen by villagers in the area may inhabit the Mill site (habitat not suited to Bengal monitor lizard (*Varanus bengalensis*)). The other reptile species have not been assessed for their global population statuses.

Seven of the eight frog species identified by villagers are globally secure, while one requires further investigation (Limborg's frog *Limnonectes limborgi*, DD). All of these frogs will need at least seasonal wet conditions. While it is more likely for the majority of these frogs to inhabit areas close to the Nam Lik or seasonally inundated areas, the common tree frog (*Polypedates leucomystax*) may move further into forested areas. However, the degraded, fallow forest and open areas of the mill site are unlikely to provide year-round habitat for even the common tree frog.

Table 4-9 Fauna of conservation and/or management importance identified by villagers during Local Knowledge Surveys as being present in vicinity of the Mill site, with international (IUCN) and national (Duckworth et al. 1999) threatened / conservation statuses

Common English Name	Scientific Name	Lao Name (English)	IUCN Red List Status	Lao PDR Status	Frequency of Sighting	Captured	Last Seen	Location / Habitat
House mouse#	<i>Mus musculus</i>	Nou waiy	LC		D	Yes		Forest, plantation
Large brown flying squirrel	<i>Petaurista philippensis</i>	Bang yai	LC*		D	No		Forest, plantation
Black giant squirrel	<i>Ratufa bicolor</i>	Ka hok dam	NT	PARL	D	No		Forest, plantation
Wild boar	<i>Sus scrofa</i>	Mou pa	LC	LKL	D	No		Forest, plantation
Large Indian civet	<i>Viverra zibetha</i>	Hen hang kan	NT		M		Aug 2015	Forest, plantation
Common myna#	<i>Acridotheres tristis</i>	Nok lieng	LC		D	No		Forest, village
Japanese quail	<i>Coturnix japonica</i>	Nok khoum	NT	LKL	D	No		River, plantation
Wood snipe	<i>Gallinago nemoricola</i>	Nok kee ka deuan	VU	LKL	D	No		River bank
Wire-tailed swallow	<i>Hirundo smithii</i>	Nok aen	LC	PARL	M	Yes	2016	Forest, plantation
Grey-headed lapwing	<i>Vanellus cinereus</i>	Nok ka ten hua tau	LC	PARL	D	No		River
Bengal monitor lizard	<i>Varanus bengalensis</i>	Laen	LC	PARL	R			
Limborg's frog	<i>Limnodynastes limborgi</i>	Khiet na	DD		D	Yes		River, plantation, forest

KEY: Conservation Statuses: # - non-native or introduced; * - Restricted (MAF 2003 Regulation 360/AF); EN – Endangered; VU – Vulnerable; NT – Near Threatened; DD – Data Deficient; LC – Least Concerned; ARL – At Risk in Lao PDR; LKL – Little Known in Lao PDR; PARL – Potentially At Risk in Lao PDR; Local Knowledge Responses: D – Daily; W – Weekly; M – Monthly; R – Rarely

4.2.3 Aquatic Biodiversity

The ephemeral drainages to the immediate northwest of the Project footprint do not support resident populations of aquatic biodiversity. They are artefacts of historic grading (essentially man-made) with no quality habitat. There is no adequate pathway for fish to migrate from the Nam Lik to spawn or otherwise inhabit the Project area. Other aquatic species may occur seasonally, but visual observation of the channels indicates this is highly unlikely (refer to Plates 4-12 and 4-13).

However, discharge from the site will reach the Nam Lik River, which is high value aquatic habitat. The Nam Lik River, the Nam Som River, and the small perennial tributaries of the Nam Lik to the east and south of the proposed Project footprint are known habitat for many aquatic species. Villagers of Ban Khone Phook, Ban Phonesoung, and Ban Viengthong identified 13 fish that are commonly caught in the region, mostly in the Nam Lik. Each of these fish are common to the region and are not listed as nationally rare or threatened in the IUCN database. Local residents also collect shrimp, eels, crustaceans, dragon fly larvae, and aquatic snails. None of these benthic organisms were identified to the species level.



Plate 4-12 Nam Lik fishing near Khone Phook



Plate 4-13 Aquatic resource collection, Nam Lik

Threatened Species

There is suitable habitat in the Nam Lik downstream of the Mill for the globally Vulnerable Southeast Asian softshell turtle, Asian small-clawed otter and smooth-coated otter and the IUCN identifies the area as within their range. These species were not identified during local knowledge surveys nor are they found in literature.

Fish

Villagers of Ban Khone Phook, Ban Phonesoung, and Ban Viengthong identified 13 fish that are commonly caught in the region and an additional 21 fish were identified during literature review for the region. Ten of the 34 fish species with Potential to occur in the Nam Lik and tributaries are threatened according to the IUCN red list (2016). These include:

- *Bangana behri* VU
- Giant carp *Catlocarpio siamensis* CR
- *Hypsibarbus lagleri* VU
- Flying minnow *Laubuca caeruleostigmata* EN
- Elephant ear gourami *Osphronemus exodon* VU
- *Oxygaster pointoni* VU

- Striped catfish *Pangasianodon hypophthalmus* EN
- Giant pangasius *sanitwongsei* CR
- Jullien's golden carp *Probarbus jullieni* EN
- *Serpenticobitis cingulata* VU

Of these fish, only Julien's golden carp is known to occur in the immediate area, according to readily available sources of information.



Chapter 5 | Socio-economic and Cultural Setting

Socio-Economic and Cultural Setting

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5 SOCIO-ECONOMIC AND CULTURAL SETTING

5.1 Social Setting

5.1.1 Introduction

The proposed Mill Project, located in the Hin Heup District, Vientiane Province, is approximately 80 kilometres north of Vientiane Capital (refer to Figure 5-1).

The Project site lies in a peri-urban area, within a Light Industrial Zone, approximately five kilometres to the east of the Hin Heup District centre. It is accessed via a paved village road connecting to National Road 13. The site consists primarily of cleared land, previously used by the HIPA as a logging stock yard and is immediately adjacent the Hin Heup Substation and the Ray Farm Bio-Organic Fertiliser Factory.

For the purpose of this baseline and *Chapter 9 Potential Social Impacts and Proposed Management and Mitigation*, the study scope consists of:

1. The Project Area - including the Project footprint, settlements with land potentially indirectly impacted by the Project and / or within a three kilometre radius of the proposed Project Footprint; and
2. The Transportation Route – settlements located directly on key in-bound and out-bound transportation routes.

The Project Area

Three villages with a total of 1,856 people (hereafter the Project Villages) have been identified in close proximity to the Project site (refer to Figure 5-1):

1. Ban Khone Phook - including Khum Thahan sub-village and a military camp;
2. Ban Phonesoung; and
3. Ban Viengthong - including a resettlement site and Phiengdy sub-village settlement.

The proposed site abuts the borders of two of these villages (Ban Khone Phook and Ban Phonesoung). All the Project villages have main settlements located on the main site access road and within three km of the Mill site.

The Transportation Route

Approximately 47 villages with a total of 36,825 people (hereafter the Transport Villages) are located within 50 metres of the five key inbound and outbound transportation routes in Vientiane Province (Figure 5-2).

This chapter presents socio-economic and cultural heritage information collected during consultation exercises with Vientiane Provincial and Hin Heup District government officials and Project Village residents and authorities (Refer to Chapter 11: Stakeholder Consultation); as well as data from relevant secondary information (e.g. District, Provincial and National socio-economic data).

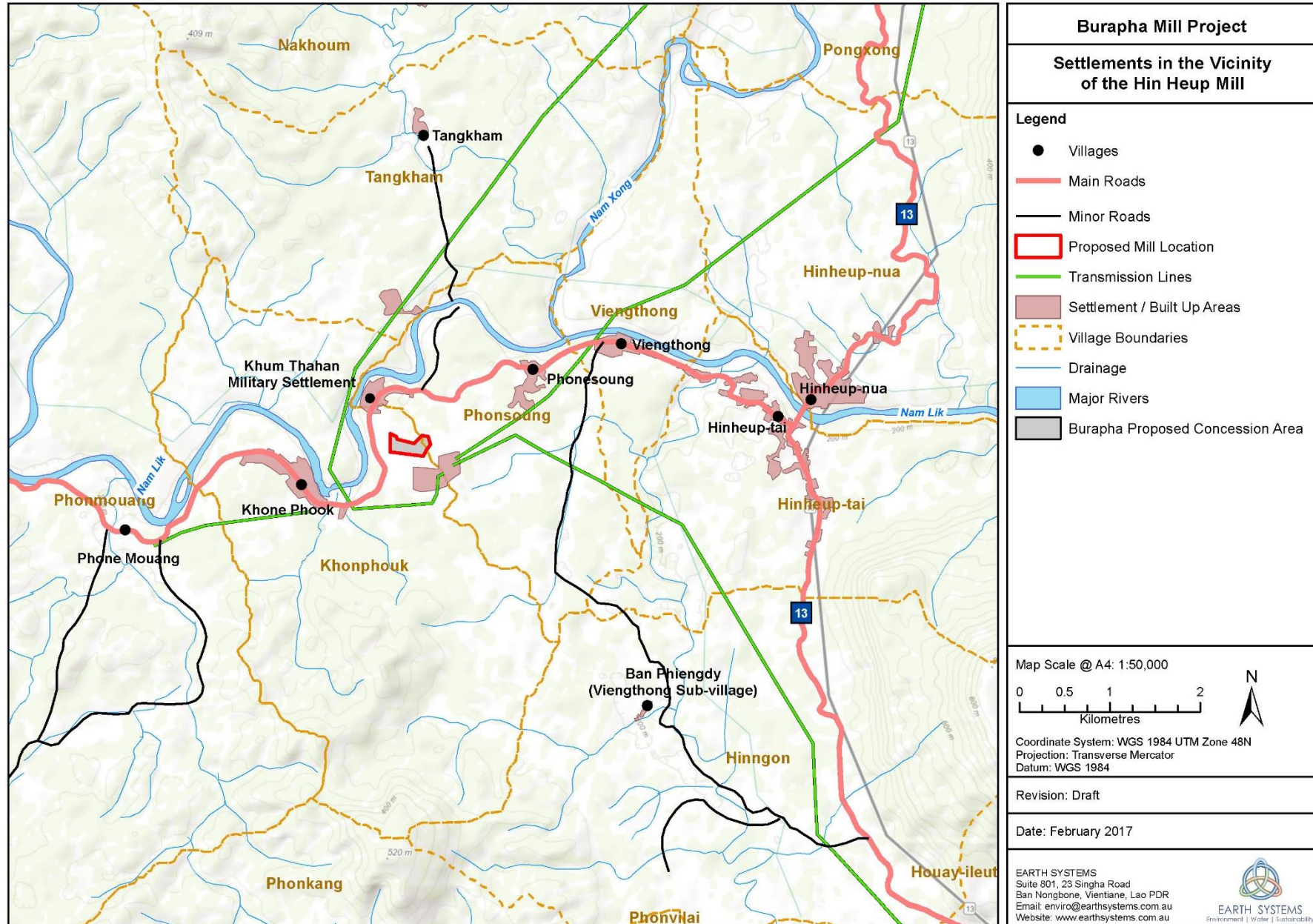


Figure 5-1 Settlements in the Project Area.

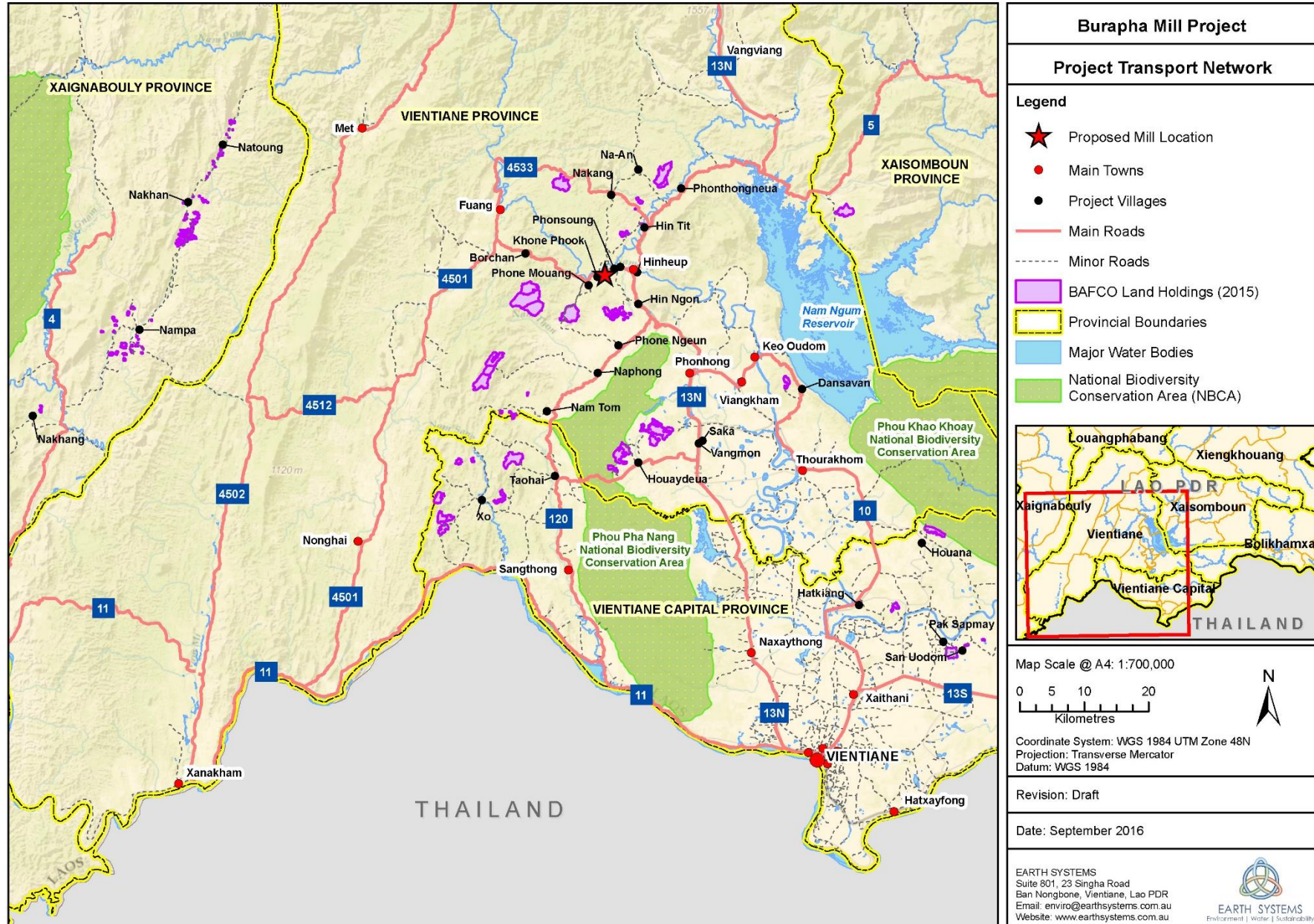


Figure 5-2 Settlements along the Transportation Route

5.1.2 Population and Demographics

Regional Level

Vientiane Province is one of the most densely populated Provinces in the country with a total population of 419,100 people, consisting of 80,400 households and a population density of 27 people per km². (NSC, 2015). The Province is relatively large (15,610 km²) and is divided into 11 Districts with 434 villages. Hin Heup District has a population of 29,000, approximately 7% of the Province's total population. Average household size is similar to the Provincial level. Table 5-1 summarises the demographic indicators for the Province and District.

Table 5-1 Regional demographic indicators

Region	No. Districts	No. Villages	No. HHs	Population			Avg. HH Size	Sex Ratio	Avg. Pop. Density
				Total	Urban	Rural			
National	141	8,507	952,386	6,492,400	2,137,800	4,354,600	5.3	100	27
Vientiane Province	11	434	80,400	419,100	139,800	279,300	5.1	1.02	27
Hin Heup District	-	43	5,700	29,200	-	-	5.1	-	-

Source: NSC, 2015

Project Area

The Project villages have a total of 346 households and 1,856 inhabitants (refer to Table 5-2). Ban Viengthong is the largest village (740 people) and Ban Phonesoung (487 people) the smallest. Average household size in the Project Area is 5.4 persons per household, which is relatively consist across the three villages. The gender ratio is 1.04 males to females, with the highest in Ban Phonesoung.

Age distribution in the Project Area is presented in Table 5-3. Approximately 56% of the population are of working age (14 – 65 years old). Ban Viengthong (60%) has the highest proportion of working age population.

Table 5-2 Demographic indicators of Project Area villages

Village Name	No. HH	No. Families	No. People		Avg. Household Size	Gender Ratio	Dependency Ratio
			Female	Total			
Ban Khone Phook	116	126	322	629	5.4	0.95	44.8
Ban Phonesoung	90	111	229	487	5.4	1.12	47.6
Ban Viengthong	140	145	361	740	5.3	1.05	39.7
PROJECT AREA	346	382	912	1856	5.4	1.04	44

Source: ES Village Surveys, 2016

Table 5-3 Age distribution in the Project Area

Village Name	Age groups (years)			
	0-5	6-14	15-65	65+
Ban Khone Phook	62	157	347	63
Ban Phonesoung	62	152	255	18
Ban Viengthong	32	105	446	157
TOTAL PROJECT AREA	156	414	1,048	238

Source: ES Village Surveys, 2016

5.1.3 Population Growth, Resettlement and Migration

Regional Level

Vientiane Province experienced population growth from 388,895 to 419,100 people in the last decade – an increase of 7%. Hin Heup District has experienced considerably higher growth from 25,197 to 29,300 people (or 15%) over the same period.

Migration trends in the region were greatly affected by the two Indochinese wars (late 1950's to early 1960's and late 1960's to the early 1970's) and subsequent centralization, collectivisation and administrative and territorial restructuring before the 1980's. Recent migration trends have seen increases in young migration and rural to urban migration (particularly to Vientiane Capital) driven by social and economic factors (e.g. people moving to be with family or for jobs or education). Resettlement resulting from large development activities (i.e. hydropower) has also increased.

Vientiane Province experiences modest positive net migration - mainly due to its proximity to Vientiane Capital. The majority of out-migration was to Vientiane Capital. Migrants are predominately young (between 15 and 29) and a key driver is unemployment or underemployment (Phouxay 2010).

Project Area

Ban Khone Phook is the oldest village in the Project Area, established in 1756. The village ancestors originated from Houaphan Province. Ban Phonesoung and Ban Viengthong villages were established at their current locations after the end of the Indochina war (mid 1970s). Ban Phonesoung originated from Khoune District in Xiengkhuang Province and Ban Viengthong originated from various Districts in Houaphan and Xiengkhuang Provinces. More recent changes include:

- Consolidation of Ban Phongthong, Ban Phonthan and Ban Phonxay into Ban Viengthong (1989);
- Establishment of a military residence in Ban Khone Phook (2006), when sixteen families moved into the military area;
- Resettlement of ten Hmong families to Ban Khone Phook (2008); and
- Planned relocation (within village lands) of 60 households within Ban Viengthong that will be affected by the Nam Lik 1 Hydropower Project (2017).

Data on population growth in the Project villages over the last 12 months is provided in Table 5-4 and Table 5-5. The Project Area has experienced 2.42% population growth over the last 12 months. The natural growth rate in the Project villages is 1.46%, with some variation between villages. Crude birth rates ranged from 0.62% - 1.94%. Crude death rates ranged from 0 - 0.16% (Table 5-4).

Table 5-4 Population Changes in Project Villages over Past 12 months

Village name	Total Population (2016)	No. of live births	Crude birth rate (%)	No. of deaths	Crude death rate (%)	Natural growth rate (%)
Ban Khone Phook	629	12	1.94%	1	0.16%	2.10%
Ban Phonesoung	487	3	0.62%	0	0.00%	0.62%
Ban Viengthong	740	13	1.79%	0	0.00%	1.79%
TOTAL	1856	28	1.45%	1	0.05%	1.50%

Source: ES Village Survey (2016)

The Project Area has experience net migration of 18 people (0.96%) over the last 12 months (Table 5-5). Ban Viengthong experienced a relatively large number of individuals moving to the village in search of better infrastructure and services. Ban Khone Phook was the only village that experienced out-migration, where residents left mainly to look for new economic opportunities.

Some seasonal migration also occurs in the Project Area, with all villages reporting that some residents travel temporarily to other Provinces or to Thailand to provide labour.

Table 5-5 Migration in Project Area over the past 12 months

Village	In-migration			Out-migration			NET Migration
	No. Families	No. People	Reasons	No. Families	No. People	Reasons	
Ban Khone Phook	1	6	Marriage	1	7	Economic	-1
Ban Phonesoung	0	3	Marriage	0	0	N/A	3
Ban Viengthong	3	16	Marriage; economic	0	0	N/A	16
TOTAL	4	25		1	7		18

Source: ES Village Survey (2016)

5.1.4 Ethnicity and Religion

Regional Level

Lao PDR is a multi-ethnic country with 49 ethnic groups divided into four main language family groups including Lao-Tai, Mon-Khmer, Sino-Tibetan and Hmong-Mien. Lao Tai speaking people account for approximately 60% of the population. Other family groups are generally considered 'ethnic minority' groups. The largest include Mon-khmer and Hmong-Mien making up 35% and 10% of the population respectively.

The majority of the population in Vientiane Province are Lao Loum (Lao Tai) (60%), followed by Hmong-Mien (18%) and Mon-khmer (14%), (NSC, 2005;2007). In Hin Heup District, the largest groups are the Mon-Khmer (51%) and Lao-Tai (41%). The main religions in the Province are Buddhism (67%), followed by Animism (30%).

Table 5-6 Summary of the Main Language Families in the Region

Language family	Description
Lao Tai	Lao-Tai groups (often referred to as Lao Loum) traditionally reside in lowland areas and for the most part cultivate paddy fields, practice Buddhism and are integrated into the national economy. This linguistic family includes the Lao, the dominant group, and various related ethnic groups such as Tai Dam, Tai Daeng, Tai Khao, Tai Lue and Tai Phuan.
Mon-Khmer	The Mon-Khmer (often referred to as Lao Theung) traditionally live in the middle hill areas, are animist, tend to practice swidden agriculture, utilise forest products and are relatively isolated from the dominant lowland culture - although there has been assimilation and integration for centuries. This linguistic family includes the Khmu, the Phong and the Phouak ethnic subgroups. Their language links them to the Mon (Menam Region) and the Khmer (Cambodia).
Hmong-Mien	The Hmong-Mien migrated from China to Laos in the 19th century and include a number of ethnic groups: Hmong Ntsoua, Hmong Daw, Lu Mien and Kim Mun. They generally inhabit highland regions, are animist and practice shifting cultivation.

Source: Chazee 1999 and NSC 2005

Project Area

Data on ethnicity and religion in the Project Area is presented in Table 5-7. The majority (88%) of people in the Project Area villages are Lao (Lao-Tai). The remaining population consist of a small number of ethnic minority groups including the Khmu (Mon-Khmer) (9.6%) and Hmong (Hmong-Mien) (2.7%).

The majority of the population in the Project area practice Buddhism, with a small minority (10%) practicing Animism in Ban Khone Phook.

Table 5-7 Ethnicities of the surveyed population in the Project Area

Village Name	Ethnicity (% of population)			Religion (% of population)	
	Lao	Khmu	Hmong	Buddhist	Animist
Ban Khone Phook	79	13	8	90	10
Ban Phonesoung	90	10	-	100	-
Ban Viengthong	93	7	-	100	-
TOTAL PROJECT AREA	88	9.6	2.7	97	3

Source: ES Village Survey (2016)

5.1.5 Governance Structures and Systems for Planning and Development

National and Provincial Level

Lao PDR is a unitary state comprising 18 Provinces and 141 Districts. Each Province is administered by an appointed Governor and an elected National Assembly has evolved to be the central legislative and primary oversight body of the Government. An overview of the institutional framework in Lao is provided in Figure 5-3.

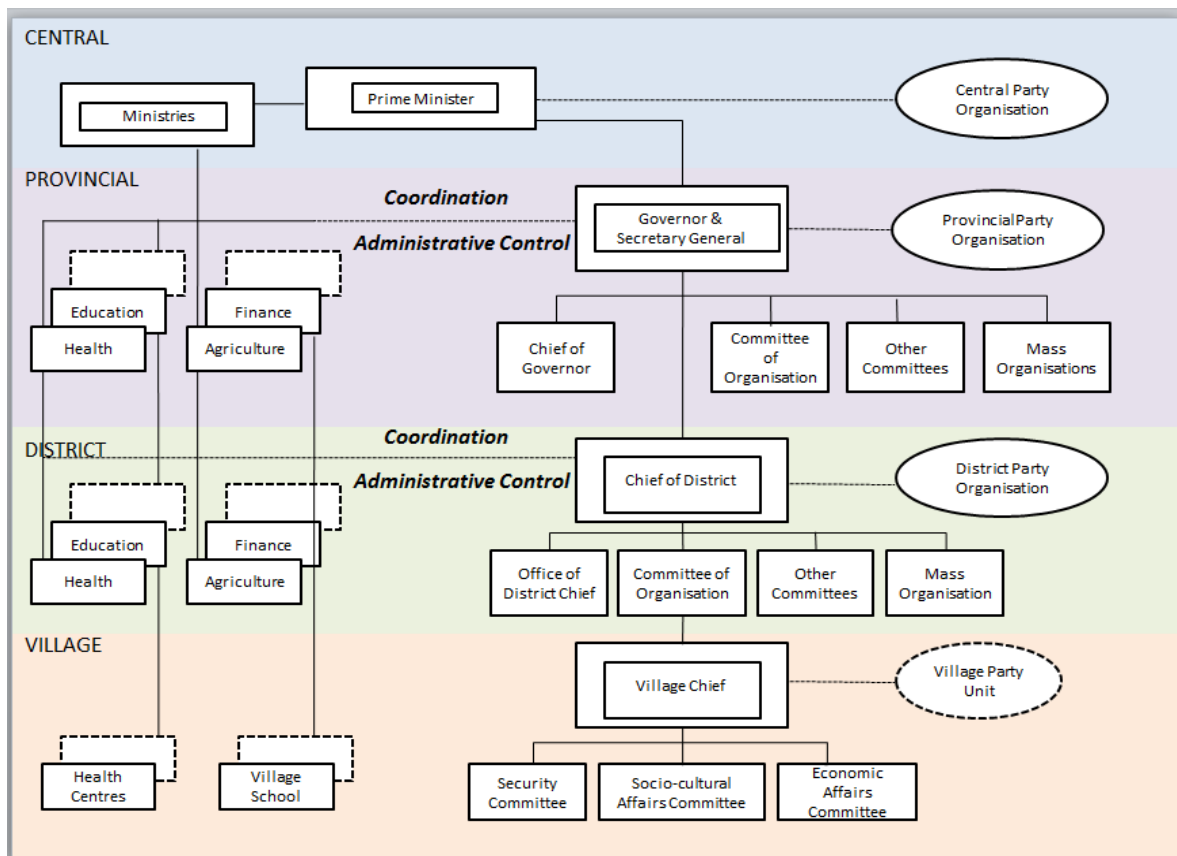


Figure 5-3 The political organisation and administration structure in Lao PDR.

Source: Adapted from UN, 2005

District and Village Level

With the promulgation of the *Law on Local Administration* (2003), Lao PDR made a policy shift towards empowering local authorities, primarily through the creation of consultative bodies at the District and village levels. At the District-level, chiefs/deputy chiefs of the District are appointed by the Government, while village heads are elected by the villagers whom they represent.

In some Districts villages are organised into development clusters called 'koumbans' to facilitate administration and share services / infrastructure (i.e. schools and health clinics). Hin Heup District has a total of five koumbans, including NaSan, KonKeo, HinHeup, PhaBong and NaVangKee. District Government representatives are appointed to represent the Koumban. All of the Project villages are part of the Hin Heup Koumban.

For the most part, villages operate autonomously, but village reporting meetings give the District Government the opportunity to have input into village plans to ensure that they are aligned with the greater development plans for the koumban and District as a whole.

Other Levels of Governance

Special Committees

At the Central, Provincial and District levels, special committees may be formed to make decisions regarding proposed developments on a project by project basis, and are generally dissolved once the project is complete.

Mass Organisations

Four mass organisations exist in Lao PDR – the Lao Front for National Construction (commonly referred to as the Lao Front), the Lao Federation of Trade Unions, the Lao Youth Organization, and the Lao Women's Union.

Mass organisations are present at all levels – National, Provincial, District and village. At the District and Provincial levels, mass organisations report to the District Governor in their capacity as General Secretary of the Local Party Committee. At the local level, the Lao Front is particularly active; focusing on building national solidarity and ensuring that the interests of ethnic minority groups are considered and upheld.

5.1.6 Wealth, Poverty and Vulnerable Populations

Regional Level

Information on poverty and income inequality in the Project region are presented in Table 5-8, Table 5-9 and Figure 5-4.

The national poverty rate in Lao PDR has declined over the past decade from 33.5% down to 23.2% (Table 5-8), allowing Lao PDR to reach its MDG target of reducing poverty to below 24% by 2015 (World Bank, 2015). Both rural and urban areas saw declines down to 10.0% and 28.6% respectively. The national poverty lines (i.e. the minimum level of income deemed adequate) for Lao PDR is 203,613 LAK (USD 25.5) per month or 6,694 LAK (USD 0.84) per day (Table 5-9).

Vientiane Province has one of the lowest rates of poverty in the country with an average of 12% in 2012-2013). Poverty rates vary across the 11 Districts, ranging 9.9% in Phonhong District in the Provincial capital area to 33% in Meun District in the north of the Province (refer to Figure 5-4). Those Districts closest to Vientiane Capital and serviced by national road 13 tend to have lower poverty rates than others. Hin Heup District had a poverty rate of 17.1%, with an estimated 4,889 poor individuals (MPI, 2016).

Whilst poverty in Lao PDR has decreased, income inequality (as measured by the GINI index) has risen nationally from 33.5 in 2002-2003 to 36.1 in 2012 – 2013. This was mainly driven by a widening rural-urban gap and rising inequality in urban areas within and across Provinces (SODA, 2015). In contrast to the national rate, income inequality in Vientiane Province has decreased slightly to 0.31 in 2012-2013.

Table 5-8 Incidents of Poverty and Income Inequality in Lao PDR and Vientiane Province

	Poverty Rate (%)			Income Inequality (GINI)		
	2002-2003	2007-2008	2012-2013	2002-2003	2007-2008	2012-2013
National	33.5	27.6	23.2	0.33	0.35	0.36
Urban	19.7	17.4	10.0	0.34	0.36	0.375
Rural	37.7	31.7	28.6	0.30	0.33	0.32
Vientiane Province	19.0	28.0	12.0	0.32	0.32	0.31

Source: LECS5, 2014 and LECS4, 2008

Table 5-9 National poverty lines in Lao PDR

Category	Poverty Line (per person per month) 2008		Poverty Line (per person per month) 2012/2013	
	LAK	USD	LAK	USD
National	192,000	24.0	203,613	25.5
Urban	240,000	30.0	221,391	27.7
Rural	180,000	22.5	196,412	24.6

Source: World Bank, based on PMO 2009 and LECS5, 2013

Project Area

Wealth and Poverty

During village level surveying in the Project Area, village chiefs / committees were asked to group families into four (4) categories – very well off, sufficiently well off, poor with land and poor with no land; and then estimate the average annual income of families in those categories.

The majority of families in the Project Area are reportedly 'very well off' (20%) and earning an average of 50 million LAK (USD 6,250) per annum; or 'sufficiently well off' (72%) earning an average of 19 million LAK (USD 2,375) per annum. Poverty incidence is reportedly low with 4% of families perceived as poor (with land), earning an average of 6 million LAK (USD 750) per annum or 16,438 LAK (USD 2.05) per person, per day.

Table 5-10 Perceptions of family wealth in surveyed villages in the Project Area

Village	Very well-off		Sufficiently well-off		Poor with SOME land		Poor with NO land	
	% of families	Avg. family p. a. income (mill kip)	% of families	Avg. family p. a. income (mill kip)	% of families	Avg. family p. a. income (mill kip)	% of families	Avg. family p. a. income (mill kip)
Ban Khone Phook	1.6%	120	87.3%	15 - 20	2.4%	4 to 5	0.8%	0.0
Ban Phonesoung	60%	40.0	30%	15	10%	0	0.0	0.0
Ban Viengthong	6.9%	60.0	91.7%	25	1.4%	14	0.0	0.0
TOTAL PROJECT AREA	20.6%	50	72.3%	19	4.2%	6	0.3%	0

Source: ES Village Survey (2016)

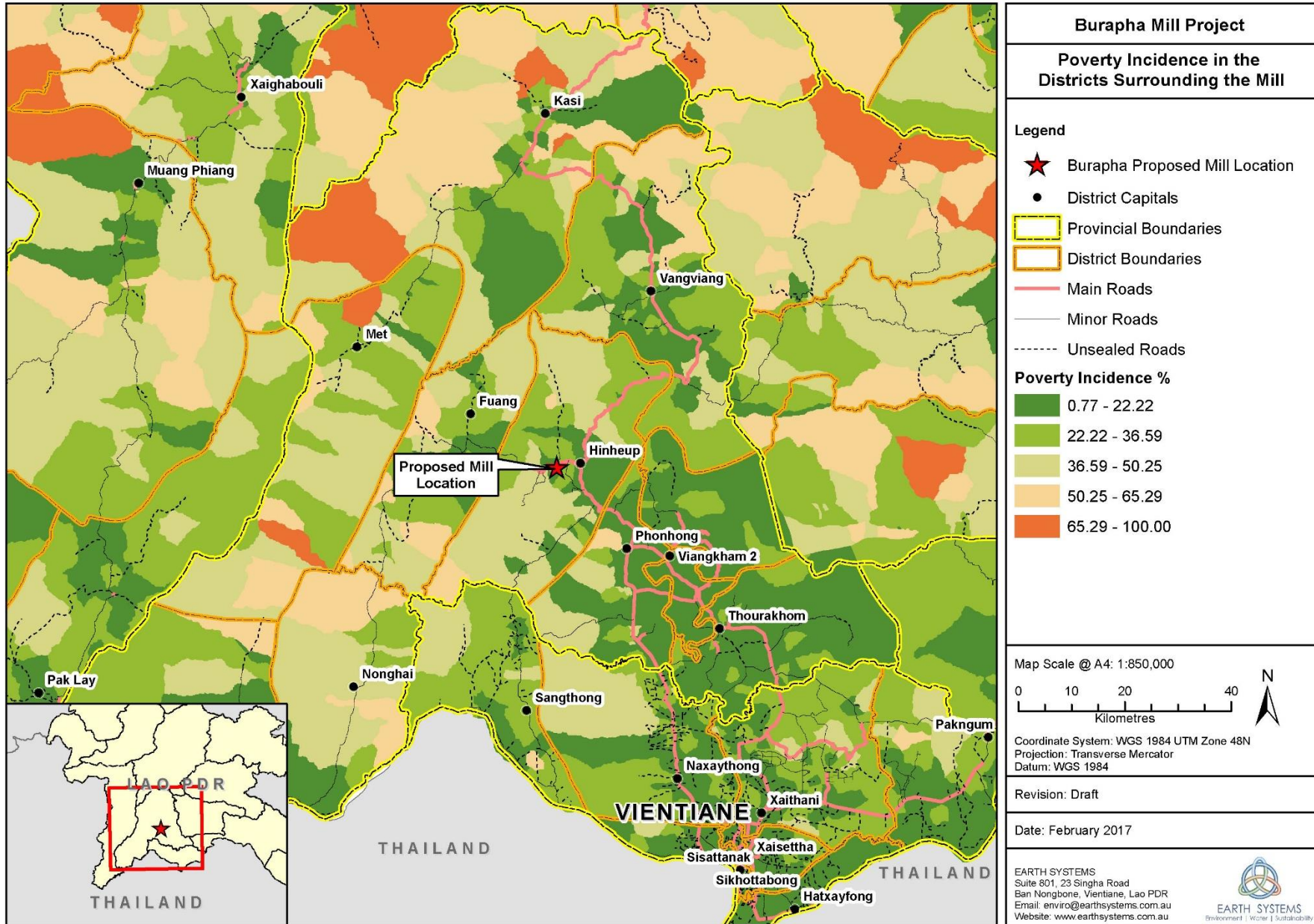


Figure 5-4 Poverty Incidence in Vientiane Provinc

Disadvantaged

Table 5-11 presents the disadvantage households in the Project Area. Disadvantaged or vulnerable households were classified into four sub-categories:

- Households with persons falling under the poverty line or without land;
- Divorced or widowed female headed households with dependents and low income;
- Households with no labour; and
- Elderly households with infirm or elderly persons.

Generally, there were low levels of vulnerability in the Project Area, with approximately 9% of households (33) considered vulnerable across the three villages. Ban Viengthong had the highest number of vulnerable households (12% of households in the village) and only one (1) household was identified as landless and with income below the national poverty line.

The most common group of vulnerable households were single female headed households, a trend which was common in all surveyed villages. Other notable disadvantaged groups included elderly / infirmed, households with no labour and landless households. Ban Viengthong reported both the highest number of households headed by single females and the highest number of elderly or infirmed households.

In addition to the above household data, it was noted that 10 Hmong families have moved to Ban Khone Phook since 2007 to work on the rubber plantation and are reported to be experiencing disadvantage through lack of land tenure, no permanent dwellings and due to their minority status within the village.

Table 5-11 Vulnerability of surveyed villages in the Project Area

Village Name	No of HH in village	Below Poverty Line/ Landless	Single Female-headed	No Labour	Elderly / Infirm	Total
Ban Khone Phook	116	1	4	3	1	9
Ban Phonesoung	90	0	7	0	0	7
Ban Viengthong	140	0	8	0	9	17
TOTAL	346	1	19	3	10	33

Source: ES Village Survey (2016)

5.1.7 Housing and Community Infrastructure

Regional Level

Housing

In general, housing in Lao PDR is considered either permanent (constructed of concrete / brick, wood or a combination of the two materials) or semi-permanent (constructed of bamboo, plywood and / or grass). Materials used for housing are generally correlated with income, wealth, and the proximity of villages to the District capital.

There are four basic types of housing as defined in the National Census (NSC 2015) including:

- 1) Concrete / brick houses;
- 2) Concrete / wooden houses;
- 3) Wooden houses and
- 4) Bamboo, plywood grass houses.

In the 2015 Census, the majority of Vientiane Province are single or double story wooden houses with corrugated iron roofs (NSC 2015). Concrete single-story cement houses are becoming more common in more wealthy villages across the Province.

Community Infrastructure

Over the last decade, the Government has more than doubled the percentage of villages with critical infrastructure across the country - including grid electricity, water supply infrastructure, road access, health facilities and primary schools. This has been facilitated through both infrastructure development and administration consolidation (with a 25% reduction in the number of villages).

A summary of village infrastructure in the Project region in 2015 is presented in Table 5-12. In Vientiane Province and more specifically Hin Heup District, most villages now have access to grid electricity and the national road network. The percentage of villages with education, health and water supply infrastructure is above the national average. In addition, 89% of villages in Vientiane Province have year-round access to road infrastructure and in turn access to health, education and market infrastructure and services in other villages and the District and Provincial centre.

Table 5-12 Summary of village infrastructure in the region

Region	No. of villages	Electricity	Water supply	Road access	Market	Health facility	Primary school
National	8,507	75.3%	14.7%	80.5%	6.8%	16.4%	75.5%
Vientiane Province	434	98.6%	20.3%	97.2%	10.1%	15.2%	76.7%
Hin Heup District	43	98.0%	19.0%	98.0%	7.0%	19.0%	72.0%

Source: NSC, 2015

Project Area

Housing

Consistent with the Provincial trend, most (84%) houses in the Project Area are Type 1 - ground floor cement houses (refer to Plate 5-2). This is also consistent with the peri-urban location / close proximity to the District capital and perceptions of wealth outlined in Section 5.1.6. Approximately 16% of houses are wooden (with tin roofs) with the largest proportion in Ban Khone Phook and in the Viengthong sub-village of Phiengdy. Only 5% of houses are constructed with wood / bamboo. In general, the further away the village from the District capital, the more wooden houses were present, especially in Ban Khone Phook, which is the furthest away from the Hin Heup District capital. The majority of traditional houses in Ban Viengthong are located in Phiengdy.

Table 5-13 Housing in surveyed villages in the Project Area

Province / Project Stage	Percentage (%) Households				
	Concrete / Cement (2 Storey)	Concrete / Cement (1 Storey)	Wood / Cement (2 storey)	Wood (tin roof)	Wood / Bamboo
Ban Khone Phook	0%	70%	0%	29%	1%
Ban Phonesoung	0%	83%	6%	11%	0%
Ban Viengthong	0.7%	96%	9%	9%	11%
TOTAL PROJECT AREA	0%	84%	5%	16%	5%

Source: ES Village Survey (2016)

Community Infrastructure

A summary of local infrastructure in villages in the Project Area is presented in Table 5-14. Further detail on local infrastructure and access to services is outlined in sections on housing, sanitation and assets; accessibility, transportation and electricity; health; and education.

Local infrastructure in the Project Area is reflective of the regional trends. All Project villages are connected to the electricity grid (with the exception of Phiengdy sub-village), have a primary school located in the village, and have good road access. Project villages do not have government health facilities or markets, and instead access District facilities in Hin Heup (~5 km away). Irrigation infrastructure was only reported in Ban Viengthong, where four weirs are used to irrigate rice paddies.

Table 5-14 Summary of local infrastructure in the Project Area

Region	Road Access	Grid Electricity	Village Health Facility	Village Market	Village School	Domestic Water	Irrigation Water	Other
Ban Khone Phook	All year	✓	Medicine box	No	Primary	Open and closed wells / Bore	No	Army area
Ban Phonesoung	All year	✓	Medicine box	No	Primary	Closed well / bore	No	-
Ban Viengthong	All year	✓	Medicine box, private clinic	No	Primary	Closed well / bore	No	Weir

Source: ES Village Survey (2016)



Plate 5-1 Ground floor cement house, Ban Viengthong



Plate 5-2 Ground floor cement house in Ban Viengthong



Plate 5-3 Ground floor cement house in Ban Phonesoung



Plate 5-4 Bamboo house in Ban Phonesoung



Plate 5-5 Wooden house in Ban Khone Phook



Plate 5-6 Ground floor cement house in Ban Khone Phook

5.1.8 Accessibility and Transportation

Regional Level

Transportation in Lao PDR depends primarily on roads (over 80% of freight traffic and some 95% of passenger traffic), followed by river and air transport (NSC, 2011). The volume of goods and passenger transportation has increased by 8.4% per annum and 10% per annum respectively over the last five years. The development of road infrastructure remains a centrepiece of the government's socio-economic development agenda.

Approximately 89% of villages in Vientiane Province have year-round access to road infrastructure. The majority of roads are gravelled or earthen. A small number of roads, usually national and Provincial are sealed (i.e. concrete, asphalt or tarred).

Project Area

The Project Area is serviced by Provincial Road 4501. This road connects to National Road 13 at Ban Hin Heup Tai and is the main thoroughfare linking Hin Heup, Feuang and Sanakan District capitals. The section of Road 4501 near the Project site was sealed in 2009 and is accessible year-round. The main settlements for each of the three Project villages as well as an army camp and one sub-settlement are located on this road (refer to Figure 5-5).

Commercial vehicles (trucks, busses and songtheo), local vehicles (cars, motorbikes, bikes), pedestrians and livestock utilise this road as a key route within and between Project villages and the District Capital. Traffic on Road 4501 is generally frequent during the day and moderate during the evening. This is supported by noise monitoring conducted in May 2016 (refer to Chapter 4). Major accidents along the main road are reportedly rare. Speed limits through the village settlements were reported to be 30 – 40 km, although are rarely observed. The roads within the villages are unsealed and are also accessible year-round.



Plate 5-7 Truck passing though main road in Ban Khone Phook



Plate 5-8 Vehicle passing though main road in Ban Viengthong



Plate 5-9 Hin Heup Substation, adjacent to Mill site



Plate 5-10 Forms of transport used in Project Area villages

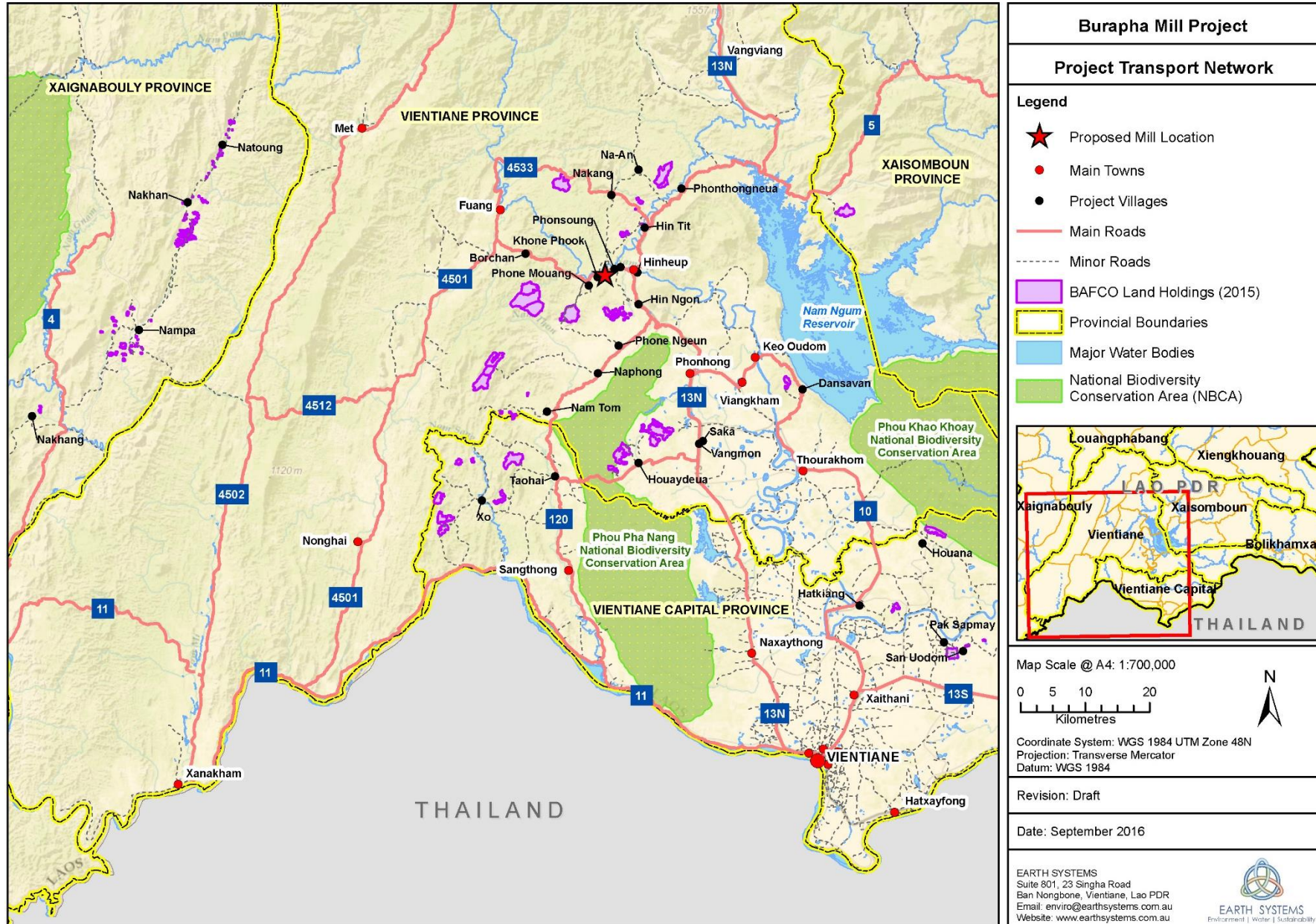


Figure 5-5 Transportation route

5.1.9 Electricity and Energy Use

Regional Level

In 2012, 70% of the population in Lao PDR had access to electricity, growing from 51% in 1990 (WB, 2015). The majority of households are connected via the national electrical grid, with some support for off-grid mechanisms in the more remote areas. In 2015, Vientiane Province and Hin Heup District over 98% of villages in the region had access to electricity.

Wood is the most common source of fuel used for cooking in Vientiane Province and is used by over 92% of households. Charcoal is also used for cooking, though mostly in urban areas (11.5% of households) rather than rural areas (1.4% of households). Other forms of energy such as electricity, sawdust and gas are only used by a very small minority of households in the Province (NSC, 2005).

Project Area

Villagers in the Project Area use a range of energy sources including electricity, wood fuel and charcoal.

Electricity is used for lighting and running small appliances. All Project villages (and settlements) are connected to the grid with the exception of Ban Viengthong Sub-village (Phiengdy Settlement). All households in areas where grid electricity is available access this electricity. Hydropower and generators were not reported to be used in the Project Area. Solar power is only used in the Ban Viengthong Sub-village (Phiengdy Settlement) where solar panels were provided to the 22 households of the sub-village through a Singaporean development project in 2014. Residents in the sub village reported that there are plans for the settlement to become connected to the grid in the near future.

All households in the Project area reportedly use wood and charcoal cooktop stoves as their primary means of cooking. A small number of households in Ban Khone Phook (10%) use electricity for cooking as well. There is currently no reported use of gas in the Project villages.

Fuel wood is generally collected from individually owned degraded forest and plantation areas. All surveyed households in Ban Phonesoung and 20 percent of surveyed households in Ban Khone Phook also use charcoal. This high charcoal use is reflective of the household and commercial charcoal production activities in the area. Ban Phonesoung produces its own charcoal, with approximately 10 households owning kilns with a production of 50 bags per production cycle. Fuel wood for charcoal production is also sourced in nearby village lands.

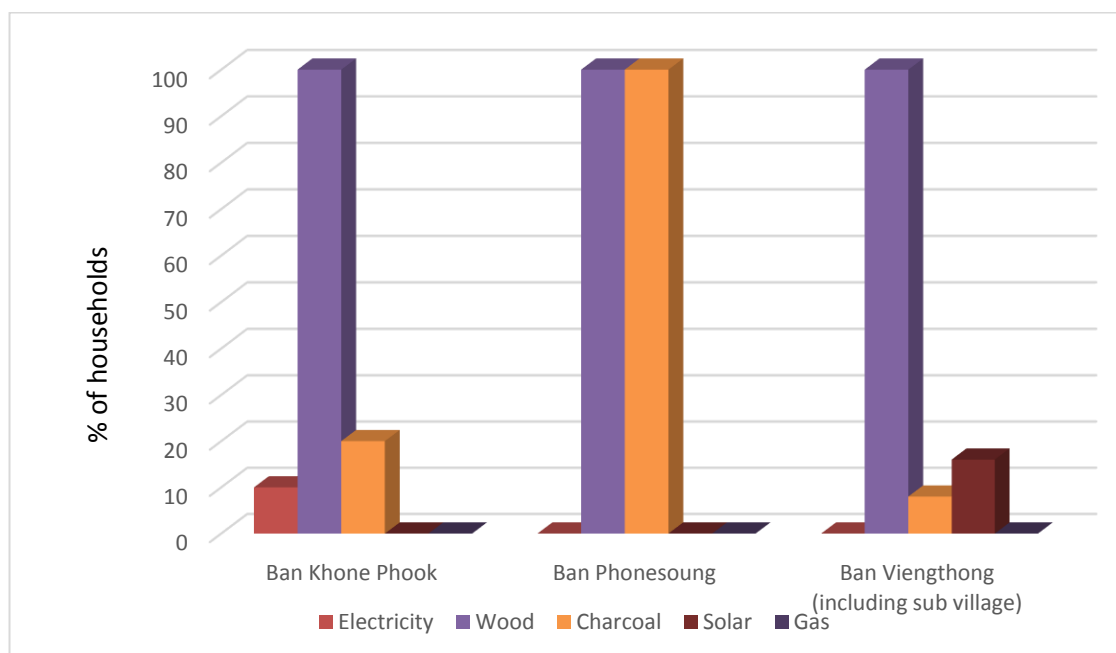


Figure 5-6 Sources of energy used for cooking in the Project Area (Source: ES Village Survey 2016)

5.1.10 Health and Food Security

Access to Health Facilities and Health Seeking Behaviour

Regional Level

Approximately 73% of villages in Vientiane Province are located within 30 km of a District or Provincial hospital and 67% are located less than 10 km from a village health centre (LECS4, 2008). Year-round road access for 83% of villages in Vientiane Province facilitates access to these facilities and services.

Health services in Hin Heup District are comprised of one District hospital with 10 beds, and 5 health centres, each with two beds. The District has 67 health staff (of which 37 are female). Only one medical doctor is on staff.

The District has an active maternal and child health program. During 2014/2015 189 women gave birth at the hospital and five at home with midwife support. A total of 1590 women attended antenatal care at the hospital during this period. Child immunization services are provided. During 2014/2015, 300 children under the age of one had received full immunization and nearly 500 were partly immunised.

Project Area

Due to their proximity to Hin Heup District Capital, villages in the Project Area have good access to health facilities and services. The Hin Heup District hospital is located between 2 – 7 km away, depending on the village. The Provincial hospital is located in Phonhong District, 35 km from the Project Area.

A small private clinic operates in Ban Viengthong (Table 5-15) which has three full-time staff but no beds. All three villages have a health representative and medicine box located in the village. The majority of households in the Project Area seek medical treatment from the Hin Heup District Hospital. The government vaccination team has conducted four visits in the last 12 months to the Project villages.

Table 5-15 Access to health facilities in the Project Area

Village Name	Location / Distance from village to health service (km)			
	Medicine Box	Health Centre	Clinic	Hospital
Ban Khone Phook	In village / health rep.	-	5 km away	7km away
Ban Phonesoung	In village / health rep.	-	1 km away	3 km away
Ban Viengthong	In village / health rep.	-	In village	2 km away

Source: ES Village Survey (2016)

Morbidity and Mortality

Regional Level

Hin Heup District hospital recorded a total of 9,157 out-patient and 593 in-patient cases during the period 2014-2015. The most prevalent diseases in adults recorded by the District were throat infections, common colds and other nose, and ear infections, followed by digestion disease, mental illness, injuries and accidents and diarrhoea / simple dehydration. Other less prevalent cases included skin diseases, lung infections and high blood pressure. Children commonly had throat infections, the common cold, diarrhoea and other infections. Dengue was not reported in the District hospital, although a number of people came in for a blood tests and were diagnosed with the common flu.

Project Area

Illnesses reported by village health representatives in the Project Area are presented Table 5-16.

According to this data, most people suffered from common illnesses such as fever, diarrhoea and sore throats. Other illnesses included high or low blood pressure (28 cases) diabetes (10 cases) and heart disease (3 cases). Ban Viengthong generally had the highest number of reported cases of illness, aside from general illnesses such as fever and sore throats which were reported for nearly all residents in Ban Phonesoung. Only two cases

of dengue were reported (in Ban Viengthong) and no cases of malaria were identified. There were also no cases of HIV/AIDs or STDS reported in the Project Area.

The main cause of death in the Project Area was reported as 'old age'. Specific causes of death could not be determined.

Table 5-16 Common sickness in surveyed villages in the Project Area (number and % of cases)

Cause of illness	Ban Khone Phook		Ban Phonesoung		Ban Viengthong		TOTAL PROJECT AREA	
	No.	%	No.	%	No.	%	No.	%
Malaria	0	0%	0	0%	0	0%	0	0%
Dengue	0	0%	0	0%	2	2%	2	0%
Cholera	0	0%	0	0%	0	0%	0	0%
ARI	0	0%	0	0%	1	1%	1	0%
Tuberculosis	3	10%	0	0%	0	0%	3	0%
HIV/AIDS	0	0%	0	0%	0	0%	0	0%
STD	0	0%	0	0%	0	0%	0	0%
High blood pressure	3	10%	5	1%	15	15%	23	2%
Low blood pressure	0	0%	0	0%	5	5%	5	0%
Heart disease	0	0%	0	0%	3	3%	3	0%
Diabetes	1	3%	5	1%	5	5%	11	1%
Fever	10	34%	450	49%	40	40%	500	48%
Diarrhea	6	21%	0	0%	20	20%	26	3%
Sore throat	6	21%	450	49%	10	10%	466	45%
Total	29	100%	910	100%	101	100%	1040	100%

Source: ES Village Survey (2016)

Nutrition and Food Security

Regional Level

Recent surveying conducted by the World Food Program (WFP) (2013) indicates that despite the country's steady economic growth Lao PDR continues to suffer from high rates of under-nutrition, and faces three serious problems: wasting, stunting and micronutrient deficiencies (refer to Table 5-17).

Table 5-17 Key Nutrition Indicators (Children U5 and Infants)

Province	U5 Stunting	U5 Under-weight	U5 Wasting	U5 Mortality Rate	Infant Mortality Rate
National	44.2 %	26.6 %	5.9 %	89	76
Vientiane Province	42.6 %	18.9 %	4.6 %	37	31

Source: WFP 2013

The World Food Program (2013) indicates that 96% of the population in Vientiane Province have acceptable food consumption. Key nutrition indicators for the Province are below national averages.

Project Area

Village level surveying indicates that nutrition and food security in the Project Area is generally good. Rice sufficiency is high; villages are close to the District market; and most households are engaged in a mixture of subsistence agriculture, natural resource collection and cash generating activities (i.e. trading, skilled and salaried work).

Rice production and sufficiency is a key indicator of overall food security (refer to Table 5-18). Over 90% of households in Khone Phook and Viengthong cultivate rice. The majority of these households produce enough rice to support consumption year-round. Only 30% of households in Ban Phonesoung cultivate rice and as such rice sufficiency is much lower. Interviews with the Phonesoung village chief indicated that very little land in the village is suitable for agriculture and rice yields are very low.

Households manage rice shortages in a variety of ways including purchasing rice through income from labour, job salaries, or other livelihood activities. Some households also trade livestock in exchange for rice supply. For example, in Ban Viengthong, households with salaried employment purchase rice while others manage rice shortages by selling handicrafts, livestock and agricultural produce (i.e. yam beans and sugar cane) to purchase rice.

Beyond rice sufficiency, food variety and protein intake are also key indicators of nutrition. The typical Lao diet consists of rice, particularly glutinous rice, complemented by small portions of leafy vegetables and fish. Other common food items are root crops, eggs, meat and poultry, and fruits. Approximately 83% of households in the Project Area cultivate vegetables in small gardens and poultry / livestock ownership is also relatively high. More than 90% of households were engaged in fishing, either daily or seasonally and nearly all households collected forest resources.

Table 5-18 Rice Production and Rice Security in the Project Area

Village	Total no of HH	Total HH that cultivate rice	% that cultivate rice	Percentage (%) and number of households with rice (based on those that cultivate rice)							
				12 Months		9-11 Months		6-8 Months		≤ 5 Months	
				No.	%	No.	%	No.	%	No.	%
Ban Khone Phook	116	104	90%	104	100%	0	0	0	0	0	0
Ban Phonesoung	90	30	33%	8	26%	10	33%	12	40%	0	0
Ban Viengthong	140	126	90% for consumption, 10% for sale	101	80%	19	15%	6	5%	0	0
TOTAL PROJECT AREA	346	260	75%	213	82%	29	11%	18	7%	0	0

Source: ES Village Survey (2016)



Plate 5-11 Health Clinic at Ban Viengthong



Plate 5-12 Hin Heup District Hospital

5.1.11 Education and Literacy

Regional

Vientiane Province has 422 primary schools (335 complete and 87 incomplete schools, generally years 1-3) and 91 secondary schools. Hin Heup District has 31 complete and nine incomplete primary schools with 214 primary school teachers / teaching staff) in 2013. There are seven secondary schools with 169 teachers / teaching staff).

School attendance rates have been increasing over the last five years (Hin Heup SEDP 2014-19; LaoEDU Info, 2014). Attendance rates for primary schools reached 98.75% in 2015 and attendance rates for lower and upper secondary schools was 83.1% and 25.2% respectively.

General education indicators in Vientiane Province are well above the national average. Adult literacy rates are 84% for females and 90% for males. Primary (107.1%) and secondary gross enrolment rates (57.4%) are also above the national average, with this rate being higher in males than females.

Table 5-19 General Education Indicators in Lao PDR and Project Provinces

Indicator	National (2014-15)			Vientiane Province (2014-15)		
	Total	Female	Male	Total	Female	Male
Adult literacy rate (%)	83.2*	76*	90.7*	87*	84*	90*
Primary gross enrolment rate (%)	118.4	116.3	120.3	107.1	106.4	107.7
Lower secondary gross enrolment rate (%)	78.1	76.0	80.2	92.4	89.5	95.1
Upper secondary gross enrolment rate (%)	45.8	42.9	48.6	57.4	52.6	62

Source: Annual School Census 2014-15, NSC, 2015; WFP, 2013 *2013 data. The gross enrolment ratio can be greater than 100% as a result of grade repetition and entry at ages younger or older than the typical age at that grade level.

Project Area

There are three primary schools in the Project Area – one in each village. The primary school in Ban Phonesoung has one classroom that is shared by two grades. A total of 254 students, including 146 females are enrolled in these schools. There are no secondary schools in the Project Area and residents reported travelling 1 to 7 km (depending on the village) to attend secondary school in the Hin Heup District capital.

Table 5-20 Access to education facilities in the Project Area

District / Province	Village Name	Location / Distance from Village to School (km)			
		Primary	Lower Secondary	Upper Secondary	Tertiary
Hin Heup District, Vientiane Province	Ban Khone Phook	In village	7 km	7 km	60 km
	Ban Phonesoung	In village	3 km	3 km	60 km
	Ban Viengthong	In village	1 km	1 km	60 km

Source: ES Village Survey (2016)

School completion rates amongst adults for the Project Area are provided in Table 5-21 School Completion Rates in the Project Area Primary school completion is relatively high among males except for residents of Ban Viengthong (54%). Completion rates for secondary school were 50% or below in all Project villages. Completion rates for females are low at both the primary and secondary level though females recorded higher completion for both in Ban Viengthong.

Lao is the most commonly spoken language in the Project Area. Other languages spoken include Khmu and Hmong. Adult literacy rates are generally high (93%). Female literacy is also high with the exception of Ban Khone Phook (50%) villagers. Despite relatively high literacy levels, villagers reported lower levels of comprehension of language spoken by outsiders – indicating a degree of functional illiteracy.

Table 5-21 School Completion Rates in the Project Area

Village Name	Primary School		Secondary School	
	% Adults	% Females	% Adults	% Females
Ban Khone Phook	90	50	40	26
Ban Phonesoung	99	30	45	10
Ban Viengthong	54	69	47	50
Average	81	50	44	29

Source: ES Village Survey (2016)

Table 5-22 Literacy rates in the Project Area

Adult literacy	Adult literacy rate (%)	Adult literacy rate (% of female)	% of men that can speak Lao	% of women that can speak Lao	% of men that can understand Lao (as spoken by outsiders)	% of women that can understand Lao (as spoken by outsiders)
Khone Phook	90	50	100	100	80	80
Phonesoung	99	99	100	100	95	95
Viengthong	90	80	100	100	80	70
Average Project Area	93	76	100	100	85	82

Source: ES Village Survey (2016)



Plate 5-13 Primary school classroom in Ban Phonesoung



Plate 5-14 Primary school in Ban Khone Phook

5.1.12 Unexploded Ordnance

Regional Level

Unexploded ordnance (UXO) refers to explosive devices that have failed to detonate. Throughout the Second Indochina War (1964-1973) over two million tons of ordnance were dropped in the Lao countryside.

Approximately 25 % of Laos' 10,000 plus villages are UXO contaminated (NRA, 2016). Much of the data on UXO in Lao PDR relates to US bombing campaigns. However, this data is not comprehensive and bombing undertaken by the Thai and Lao governments has not been fully documented or mapped.

Project Area

UXO risk is low in the Project Area. None of the Project villages reported land affected by UXO or UXO related incidents (deaths or injuries) in the last five years. Analysis of US aerial bombing data indicates that the closest known bombing site was more than 21 km to the south in Phonhong District.

5.1.13 Gender

Development projects can result in a disproportionate impact on women. Best practice EIA requires gender dimensions to be properly understood and gender equity in community consultation at each stage of the assessment and planning process. Gender disaggregated data has been provided, where applicable throughout the sections of this chapter and discussion of gender roles has been mainstreamed. Observations on gender roles in the Project Area are presented below.

- As in other parts of Lao PDR, there is a gendered division of labour and a gendered division of the income and benefits of labour in the Project Area.
- Some roles are traditionally undertaken by men (e.g. hunting and fishing) and some roles are traditionally undertaken by women (e.g. collection of non-timber forest products (NTFPs), cooking and cleaning).
- Reflective of national trends in economic participation, women in the Project Area are engaged in the handicrafts industry and informal sectors such as retail and vending.
- The handicraft industry is particularly important in the Project Area (refer to Section 5.2) and women from all villages are engaged in this activity. It is also the most important source of income for Ban Viengthong. There are 313 households from the Project Area that are involved in the handicraft industry. Women earn an average of LAK 54,000 (USD 6.75) per day while also completing the bulk of household activities (i.e. child care, food preparation, washing etc.).
- Small scale business and trading is the second most important source of income in Ban Phonesoung and this activity is undertaken more commonly by women than men. Although there is no formal market in the Project Area, a number of informal shops and stalls are located in the Ban Phonesoung sub-village, and along the primary access road that dissects each village.
- Whilst women are less likely to be involved in industrial labour and factory work, there are some women in the Project Area undertaking these activities. This includes three women from Ban Phonesoung who are employed at a local white charcoal factory and five women from Ban Khone Phook who are employed on a casual basis at the BSS Cassava Factory.
- Generally, both men and women in the Project Area are involved in agriculture, agricultural trading and working in government services.
- Adult literacy rates amongst females in the Project Area is fairly high (76%), although female education achievement is relatively low (just under half of the women in the Project Area had attended primary school).
- There is a high number (25) of female headed households in the Project Area, particularly Ban Viengthong (refer to Section 5.1.6).

5.2 Economies, Livelihoods and Resource Use Setting

5.2.1 Regional Economy

Vientiane Province is a fast-developing region due to its natural and mineral resources, relatively good road infrastructure and close proximity to Vientiane Capital. The Province's GDP grew by an average of 8% per annum between 2011-2015 and was valued at 5,075 billion Kip in 2015. Key sectors include agriculture and forestry, industry, energy and mines, and trade. According to the Vientiane Province 5 Year Development Plan (2016 – 2020), the percentage of the labour work force in the agricultural sector decreased slightly to 73% in 2015, whilst labour in the services and industry sectors, increased to 27% and 12% respectively.

Hin Heup District is the gateway to the North of Lao PDR and like the rest of Vientiane Province is experiencing rapid growth (average of 7% per annum). According to the Hin Heup District Five Year Socio-Economic Development Plan (2014 – 2019), the GDP totalled approximately 301.18 billion Lak in 2014 with a per capita income of 9.68 million Lak (USD1,225). The agricultural and forestry sector, which is valued at 149.74 billion Lak, contributed to nearly half of the GDP, increasing in value by 28.4% in the last five years. Industry services were valued at 88.39 billion Lak in 2014 which represents a decrease from 65.8% to 28.7% in the last five years. Over the same period the services sector increased from 5.7% to 21.6% and has a value of 65.06 billion LAK.

5.2.2 Local Economies and Livelihoods

Local economies are transitioning to market-based economies and include a mixture of subsistence and cash-income agriculture, and cottage industry including handicrafts and charcoal production. Two industrial zones are present in the Project Area and employment opportunities are being created through the growth of light and heavy industry.

The majority of households in the Project Area earn an income from agriculture (71% of households) and the handicraft industry (61% of households), followed by labour activity (32%), government services (28%) and factory work (25%). Some households also earn an income from NTFP collection (10%) and fishing (10%). Table 5-23 provides a breakdown of households engaged in various income generating activities in the Project Area and Table 5-24 provides a breakdown of the relative importance of each source of income for the households. Further details on each income generating activity is presented in the sections below.

Table 5-23 Breakdown of income generating activities in the Project Area

Village	% of HH engaged									
	Agriculture	Labouring	Government services	Small trade	Factory*	NTFP collection	Handicraft	Agricultural trade	Building and construction	Fishing
Ban Khone Phook	80%	17%	11%	7%	9%	30%	80%	0%	0%	0%
Ban Phonesoung	13%	100%	7%	4%	28%	0%	80%	2%	0%	0%
Ban Viengthong	100%	0%	43%	0%	36%	0%	100%	0%	2%	36%
TOTAL PROJECT	71%	32%	23%	3%	25%	10%	87%	1%	1%	10%

Source: ES Village Survey (2016)

*Factory work includes the cassava factory, the white charcoal production factory and the garment factory (outside the Project Area).

Table 5-24 Most importance source of income for Project Area villages

Village	Income generating activities (1=most important)					
	1	2	3	4	5	6
Ban Khone Phook	Agriculture	Labour	Government services	Small scale trading	Factory	NTFP collection

Village	Income generating activities (1=most important)					
	1	2	3	4	5	6
Ban Phonesoung	Labour	Small scale trading	Handicraft	Factory	Agricultural trading	Government services
Ban Viengthong	Handicraft	Agriculture	Government services	Factory	Building and construction	Fishing

Source: ES Village Survey (2016)

Agriculture

Agriculture is the primary livelihood activity practiced most households in the Project Area. This includes lowland rice cultivation (79% of households); vegetable cultivation (83% of households); livestock rearing (30% households) and commercial tree / orchid plantations (16% households). Agriculture is also the main income generating activity for 71% of households in the Project Area and is the most important source of income in Ban Khone Phook and second most importance source of income in Ban Viengthong.

Local Handicrafts

The local handicrafts industry is the largest generator of employment with women from approximately 313 households engaged in this sector. This includes women from 93 households in Ban Khone Phook, 80 households in Ban Phonesoung and 140 households in Ban Viengthong. Weaving is the most common activity in all three villages and the main products made by women are the *Sinh* (Lao tube skirt), *Pha Biang* (breastcloth), and *Tin Sinh* (the foot of the *Sinh*). Villages have relationships with handicraft traders who supply material and purchase the finished products.

Rates for handicraft labour in the Project Area range from 70,000 – 250,00 kip per piece. On average the *Sinh* (Lao skirt) can be completed within 3 – 7 days. Women earn an average of LAK 54,000 (USD 6.75) per day while also completing the bulk of household activities (i.e. child care, food preparation, washing etc). Products are sold at the markets in Vientiane city and a complete *Sinh* can fetch a price of up to 500,000 kip per piece.

Handicrafts were reported to be in the top two income generating activities in Ban Phonesoung and Ban Viengthong.



Plate 5-15 Handicraft production in Ban Phonesoung



Plate 5-16 Weaving in Ban Viengthong

Factory Work and Casual Labour

Factory work and casual labour are important income generating activities for households in each of the Project Area villages. Approximately 32% of people in the Project Area are engaged in labouring and approximately 25% in factory work.

During village group discussions for this ESIA, it was reported that 25 people (seven women) hold full-time employment positions with local factories. Factories in the area include cassava and tapioca factories, white

charcoal production plant; organic fertiliser factory; and an agarwood oil refinery. Ban Viengthong had the highest proportion of households engaged in factory work.

Based on village focus group discussions, residents in the Project Area are employed in the following industries:

- One electrician from Ban Phonesoung is employed in the Cassava factory.
- The white charcoal production factory employs 12 general labourers from Ban Phonesoung, including three females.
- The fertiliser factory is not currently in production but five people from Ban Khone Phook are employed full time at the facility as caretakers.
- Four workers from Ban Khone Phook and one person from Ban Phonesoung are employed at the Hin Heup electricity substation.
- The Lao Yunming Eaglewood Processing Company employs three full-time staff and 20 – 30 casual labourers (mostly men) from Ban Phonesoung and Ban Viengthong.

Casual labour opportunities include general construction, farm labouring and logging labouring. Daily rates vary between agricultural labouring (LAK 50,000 or USD 6.25); construction (LAK 80,000; or USD 10.00); logging (LAK 100,000 or USD 12.50) and highly skilled labour (150,000 or USD 18.75). Some households also provide labour for the construction of white charcoal kilns. Labouring is the most important source of income in Ban Phonesoung (100% of households engaged in this activity) and the second most important source of income for Ban Khone Phook (17% of households in the village are engaged in this activity) (refer to Table 5-23 and Table 5-24).

Employment opportunities are limited in Ban Phonesoung and Ban Khone Phook as employment is often casual / seasonal. Thus, to earn a living, some families migrate seasonally to another part of the country outside of Lao PDR for job opportunities.



Plate 5-17 Ray organic fertiliser factory, adjacent Mill footprint



Plate 5-18 View of the cassava factory on the adjacent bank of Nam Lik River

Local charcoal production

There is a small charcoal production industry at the household level in Ban Phonesoung and Ban Viengthong (in Phiengdy sub-village). Approximately 10 households in Ban Phonesoung and some households in the Ban Viengthong sub-village are involved, producing approximately 50 bags per day.



Plate 5-19 Charcoal production, Phiengdy settlement (Ban Viengthong sub-village)



Plate 5-20 Charcoal production, Phiengdy settlement (Ban Viengthong sub-village)

Government employment

Income generated through employment with the Hin Heup District government was also reported as an important income generating activity in the Project Area Villages. It was reported as particularly important in Ban Viengthong with 43% of households working for the government. Occupations within government include policemen, nurses, and teachers, in Hin Heup District as well as outside Districts and Provinces. Some residents in the Project Area are also employed in the army camp in Ban Khone Phook.

Small Scale Trading

Small scale trading represented only a minor form of income generation in Ban Khone Phook (7%) and Ban Phonesoung (4%). Village surveys indicated that there were no households reportedly engaged in small scale trading in Ban Viengthong.

5.2.3 Land Allocation, Ownership and Use

Village land allocation and use

Since 1996, a nation-wide program under the direction of the Ministry of Agriculture and Forests (MAF) has been aimed at devolving most decisions about land use and land allocation to the village level through its Land and Forest Allocation Program (LAFAs). These decisions are taken within a framework provided by the Land Allocation Unit (LAU) of the Division of Agriculture and Forests. The LAU liaises with villagers to decide on the allocation of land use for village land and they jointly develop a set of rules for land use categories. In most cases, nine land use categories are applied to most villages including five forest categories (e.g. production, protection, conservation), three agricultural (village land reserves, production land, and highland agricultural land) and one for village settlement. These allocated land uses are then roughly mapped, with the map often displayed in a central place in the village.

Information on land allocation and land use rights in the Project Area was collected during village surveying for this ESIA. The LAFAs were conducted in the three villages in 1997. Land allocation and zoning for Project Area villages is presented in Table 5-25. Land area across the Project villages totals 2,843 ha. Major land use categories include Production forest (709 ha), concession land (685 ha), degraded / regeneration forest (462 ha) and orchard / plantations (433 ha). Land concessions account for 24% of village land in the Project Area. In addition, Lao Yunmu Forestry Development Company has purchased 76 ha of land that includes land within village boundaries of all three villages. Although Ban Phonesoung has the smallest population, it also has double the residential land of Ban Khone Phook and almost five times the residential land of Ban Viengthong. Ban Khone Phook is the only village recorded to have upland agricultural land, grazing land, garden land and protection forest.

Table 5-25 Land allocation in the Project area

Village	Total Area (ha)	Land Allocation (ha)											
		Residential land	Garden land	Lowland ag. Land	Upland ag. Land	Orchard / plantation	Production Forest	Protection Forest	Conservation Forest	Company Land	Degraded / Regeneration Forest	Grazing land	Concession land
Phonesoung	753	39	0	24	0	136	0	0	8	76*	376	0	170
Viengthong	524	8	0	46	0	190	50	0	4		86	0	64
Khone Phook	1,566	17	10	49	124	107	659	70	8		0	71	451
TOTAL	2,843	64	10	119	124	433	709	70	20	76	462	71	685

Source: ES Village Survey (2016)

*Land purchased by Lao Yunmu Forestry Development Company covering three villages

Villagers commonly hold land use documents for both residential and agricultural land, with the exception of Ban Phonesoung, who have land tax documents (receipts) only. Only two households in the Project Area have a land use certificate for residential land. These are generally held jointly between male and female heads of households, except for in Ban Phonesoung where the male heads of households generally hold the documents.

Industrial Zones and Concession Areas

A significant amount of land in the Project Area has recently been rezoned as a Light Industrial Zone (1950 ha) by the District Governor (District Agreement, 2016). The light industrial zone affects the village land of Ban Phonesoung and Ban Khone Phook. Villagers continue to use this land until concessions are awarded and lands have been developed. As village lands (predominantly upland areas) are being reallocated to concessions, villages are turning to employment and small enterprise as their main sources of income, whilst keeping lowland agriculture, livestock management and vegetable garden cultivation as subsistence activities. Some villages are also engaged in small holder commercial plantations.

Current concessions / developments in the Project Area are listed in Table 5-26. Approximately 722 ha of land from the three villages is allocated as concession land. Several large plantation concessions are occur in Ban Khone Phook and Ban Phonesoung including the Asian Nived Agarwood / Teak plantation (~330 ha) and Lilieng Rubber Plantation (~100 ha).

The heavy industrial zone is located to the north of the Mill site, between the confluence of the Nam Lik and Nam Song. It covers a total area of 61,000 ha and is still used by local residents for NTFP collection and agricultural production.

Table 5-26 Industrial and Plantation Concessions in the Project Area

Zone / Concession	Land Holding (Ha)	Village Lands
Heavy Industrial Zone		
BSS Cassava factory	17 ha	B. Khone Phook
Light Industrial Zone		
Agarwood Plantation	15 ha	B Phonesoung
BKN White Charcoal Factory	0.6 ha	B Phonesoung
Ray farm Organic Fertiliser	3 ha	B Phonesoung
Hin Heup Substation	2 ha	B Phonesoung

Lao Yunming Eaglewood Agarwood Plantation	380 ha	B. Viengthong, B. Phonesoung, B. Khone Phook
Lao Yunming Eaglewood Perfume Extraction Factory	-	as above
Rubber Plantation of Mr. Douangchanh	140	B. Khone Phook
Lao Yunmu Forestry Development Co., Ltd	73 ha	B. Viengthong, B. Phonesoung, Khone Phook
Lilieng Rubber Plantation	100 ha	B. Khone Phook
Burapha Mill site	7 ha	B Phonesoung

General Land Use

Information on land use in and around the Mill site has been gathered from a number of sources, including:

- Forest Inventory and Planning Division Land-use Mapping (FIPD) (2010);
- Local knowledge surveys; and
- Detailed land-use surveys.

Analysis of FIPD data (2010) and ground truthing were undertaken to identify the current use of land resources within Project Area. Land cover types were classified using manual interpretation of the FIPD data at a scale of approximately 1:50,000. The classifications used GOL classification system, whereby periodic land cover mapping is conducted (FIPD 2010). Village land allocation and land use, including village boundaries was collected during village surveying and local knowledge surveys.

The main land cover type in the Project Area villages is unstocked / fallow forest, which has been disturbed by human activities including timber harvest and shifting cultivation. Lowland agriculture, plantations, grazing land and production forest are the main land uses in the Project Area, as well as land allocated under concessions for industry, with settlement area making up the remainder of categorised land (Figure 5-8).

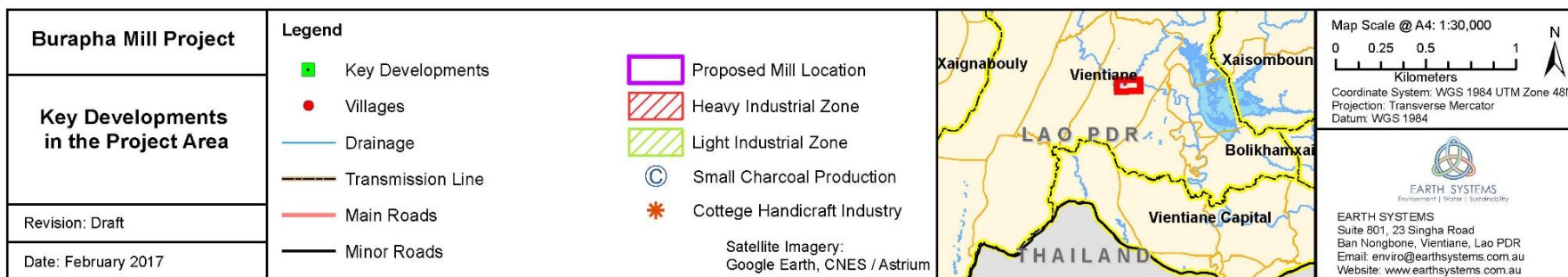
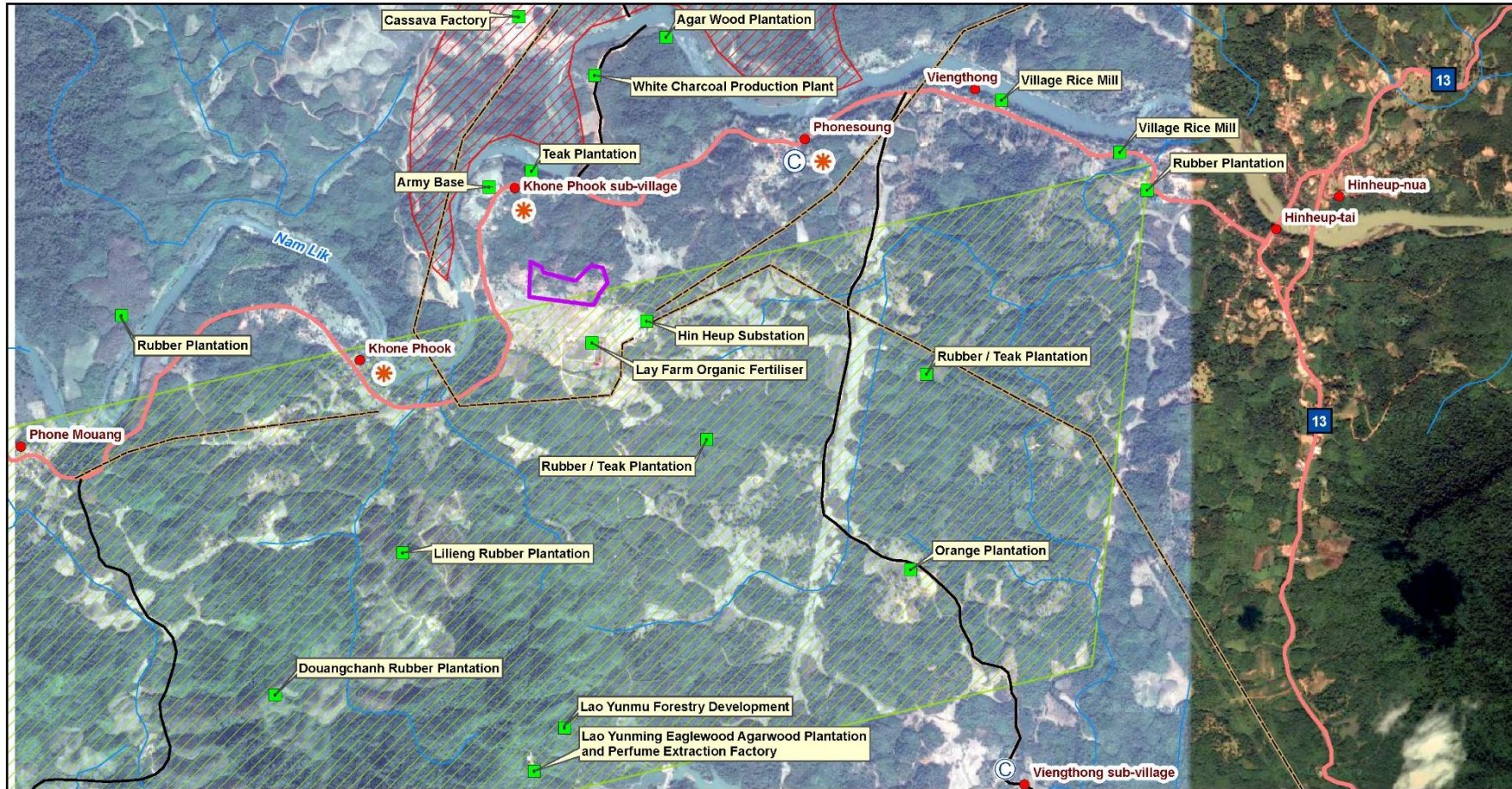


Figure 5-7 Key Industries in the Project Area

Land Use / Forest Cover in the Project Area

Agricultural Land Use and Activity

The main agricultural land uses in the Project Area include lowland agriculture, orchid / plantations and grazing. Small areas are also allocated to vegetable gardens – mostly within residential areas. There is also a limited amount of upland (permanent) agriculture).

Rainfed Rice Cultivation

Approximately 79% of households in the Project Area cultivate rainfed rice. This is most important to households in Ban Khone Phook and Ban Viengthong where 229 households from both villages manage approximately 98 ha of rain-fed lowland rice fields (0.4 ha per household) with average yields of between 4-5 tonnes per ha. Only 30 households (33%) cultivate lowland rice in Ban Phonesoung on approximately 28 ha of land (0.9 ha per household). Reported yields in Ban Phonesoung are much lower at 2.8 tonnes per ha. Rice paddies in Project Area villages are mainly located close to residential areas and along the main road.

Vegetable Cultivation

Approximately 83% of households cultivate vegetables in the Project Area. This is an important activity in Ban Viengthong where each household manages a garden plot (1 rai or 1600m² plots), mostly along the Nam Lik River. Approximately half of the households in Ban Khone Phook and all households Ban Phonesoung also cultivate vegetables on much smaller plots (25m² to 100m²) within the village settlement area. Production includes green leafed vegetables, cucumber, long beans, pumpkin and chilli.



Plate 5-21 Low land rice paddy, Ban Viengthong



Plate 5-22 Vegetable gardens in Ban Khone Phook

Orchids and Plantation forestry

Approximately 16% of households in the Project Area are developing small-holder commercial tree plantations, with the majority of these being in Ban Khone Phook. Plantations in the Project Area include teak, rubber, agar wood and eucalypt. In Ban Khone Phook, 20% of households manage 10 ha of teak plantation and 10% of households manage 50 ha of rubber plantation. In Ban Phonesoung a small number of households are engaged in agarwood (15 ha), rubber (4ha) and eucalypt (0.5 ha) plantations. Most of these are yet to reach maturity and provide income generation.

In Ban Phonesoung, eight households manage a 5-ha plantation of Mai Tiu (or Pink Empat) which is sold to the BKN Company's white charcoal production plant. Villagers reportedly supply approximately 150 – 200m³/per week. A small number of households manage fruit orchids including orange (5 ha) in Ban Viengthong and orange / lemon (2.5 ha) in Ban Phonesoung.



Plate 5-23 Agar wood plantation



Plate 5-24 Agar wood plantation

Livestock and Poultry

Livestock ownership in the Project Area is presented in Table 5-27. Whilst raising livestock is an important livelihood activity, none of the villages reported this as a dedicated income generating activity. Approximately 134 (30%) households manage approximately 500 head of cattle and 27 (8%) households manage 213 buffalo in the Project Area. Grazing lands total 71 ha.

Ban Viengthong has the highest number of households with livestock (108 households owning 363 head of cattle) and grazing land (224ha). The other surveyed villages have more modest numbers of households with livestock and grazing land. Livestock numbers have increased steadily in all Project Area villages over the last three years as households have become wealthier. Whilst natural growth and death was a key reason for changes in livestock numbers, some also increased due to commercial production, sale and trade.

Livestock generally graze along rice paddy fields, especially in Ban Phonesoung and Ban Khone Phook. The preferred livestock watering areas for the three villages are the Nam Lik and local streams such as Houay Lai, Houay Mieng, Houay Huakang for residents of Ban Phonesoung or the Houay Apao in Ban Khone Phook.

All households in the Project Area manage poultry with average holdings per household high in Viengthong (50) and average in Khone Phook (22) and Ban Phonesoung (17). Goats are not common in the Project Area as they are reportedly harder to manage, susceptible to disease, and destroy vegetable gardens.

Table 5-27 Livestock ownership in the Project Area in 2015

Livestock	Livestock type and ownership											
	Khone Phook			Phonesoung			Viengthong			Total Project Area		
	Total livestock type	No. of HH	% of HH	Total livestock type	No. of HH	% of HH	Total livestock type	No. of HH	% of HH	Total livestock type	No. of HH	% of HH
Buffalo	47	6	5	83	13	14	83	8	6	213	27	8
Cows	120	17	15	105	17	19	280	100	71	505	134	39
Goat	0	6	5	8	1	1	10	1	1	18	8	2
Poultry	2,600	116	100	1,557	90	100	7,000	140	100	11,157	346	100
Pig	0	0	0	0	0	0	120	4	3	120	4	1

Source: ES Village Survey (2016)

Upland Agriculture

There is no shifting cultivation conducted within the proposed Project footprint, and residents of neighbouring villages indicate that they no longer practice shifting cultivation during village surveys (though this claim cannot be substantiated). Permanent upland agriculture cultivation is practiced by households in Ban Viengthong where 20 ha of village land has been allocated for this activity. The main crops include cassava, yam bean, sugar cane and maize. Approximately 70% of households manage 60 ha of cassava, with an annual yield of 10 tonnes / ha. Half of the households in the village manage 10 ha of sugar cane, with a yield of 8 tonnes / ha and 30% of households cultivate 15 ha of yam beans. Yam beans are generally planted along the Nam Lik River and sometimes intercropped with maize. Annual yield are reportedly 10 tonnes per hectare.

A small area (4ha) of sugar cane is managed by four households in Ban Phonesoung. Villagers in Ban Khone Phook have converted upland agricultural areas to orchids and plantations.

5.2.4 Forest Resource Use

Regional Level

Forest resources including timber and non-timber forest products (NTFPs) are commonly collected and used by villages in Lao PDR. Such forest resources are often important in allowing villagers to meet their subsistence nutritional needs, and provide a safety net during times of food scarcity. NTFPs are also an important source of income for rural households, particularly for disadvantaged groups such as women and ethnic minorities (SNV, 2006). NTFPs also provide an important source of medicine for subsistence use in most local communities. Commonly traded NTFPs in Lao PDR include benzoin, turpentine and rosin, damar oil, honey and wax, cardamom, rattan, bamboo and sugar palm. Medicinal plants are also an important portion of this trade and are harvested regularly. Bamboo shoots, greens, fish, wild tubers, and invertebrates (such as snails and insect larvae) are some of the NTFPs important for food security and local source of protein.

Timber forest products are also important to rural livelihoods in Lao PDR, and are used for fuel, construction and handicrafts. For example, some 85% of domestic energy consumption for cooking is derived from fuel wood and charcoal. The estimated use of fuel wood and charcoal by local communities is between 4 and 5 million m³/year, the majority of which is collected directly from forests (World Bank, 2005).

Project Area

Non-timber Forest Products (NTFPs)

The majority of forest resources in the Project Area are located in Ban Khone Phook, where village land allocation includes 659 ha of production forest and 70 ha of protection forest. Production forest in Ban Phonesoung has been re-allocated for residential / agricultural land expansion. All three villages have a small amount of conservation forest, Ban Phonesoung (eight ha), Ban Viengthong (four ha) and Ban Khone Phook (eight ha).

The proposed Mill site is not a source of NTFP collection for local residents, although the surrounding land in the light industrial zone was still used by local villages. Residents mainly collected NTFPs from within the village boundary in areas such as paddy fields, fallow forests, ponds or streams.

Approximately 94% of households collected NTFPs, primarily for local consumption, although 30% of households in Ban Khone Phook reported earn an income from this activity. A total of 19 NTFP plant species were identified as being used by villagers in the field surveys of the Greater Project Region. The most common edible NTFPs collected in local villages include bamboo shoots, vegetables and mushrooms and non-edible NTFPs such as rattan are also collected.

All households in the Project Area collect fuel wood from residential land, plantation areas and upland areas and use it for household cooking. Ten households in Ban Phonesoung and some households in Phiengdy sub village produce charcoal and source fuel wood from the same areas. Fuel wood resources are reportedly plentiful.

Households in Ban Phonesoung and Ban Viengthong reported gathering less NTFPs than five years ago due to the decrease of forest cover and the increase of the residents in the villages. NTFP availability in Ban Khone Phook was reportedly unchanged in the last five years.

Timber Forest Products (TFPs)

Almost all households in the Project Area collect timber from village lands. The most common tree species harvested include *Aporosa ficifolia* (Mai Meud), *Pittosporum dasyrrhachis* (Mai Sa Phang), *Lagerstroemia* (Mai Peuay), *Cephalostachyum virgatum* (Mai Hia), *Trema orientalis* (Mai Por Hou), and *Oxytenanthera parvifolia* (Mai Zord). These are reportedly sourced from within village boundaries, along Phuthing mountain, within grazing areas, along paddy fields and fallow forests.

Whilst villagers in Ban Viengthong and Ban Khone Phook reported that TFPs were plentiful in their villages as they regenerate easily, villagers in Ban Phonesoung reported a decrease in these forest resources.

Hunting

Information from village surveying and focus group discussions for this ESIA indicate that hunting is not very common amongst households in the Project Area. Only a few households are engaged in hunting activities and it is usually practiced in the form of trapping. It is reported that most children in Ban Phonesoung conduct trapping during their school break. They trap for birds, rats and squirrels along rice paddies and fallow forest within village boundaries. Villagers also reported that animals (both large and small) are becoming less frequent due to the decrease of forest cover and it is prohibited to hunt.

5.2.5 Water Resource Use

Regional Level

The major waterbodies in the region include the Nam Lik River, the Nam Ngum River and reservoirs for both rivers where water was compounded for hydropower generation. The largest tributary of the Nam Ngum is the Nam Lik River, which flows past the Mill site (refer to Chapter 4).

Like in most of rural Lao PDR, local surface and ground water resources (rivers, streams, lakes, wetlands, aquifers etc.) play a significant role in the day to day lives of people. With limited infrastructure, these villagers often rely on nearby water resources for their drinking water and to a lesser extent, electricity generation. The same waterways are important sources of fish and other aquatic resources (refer to 5.2.6). They are also often used for washing, bathing and swimming.

Project Area

Information on water resources and use in the Project Area was gathered through hydrological site investigations (refer to Chapter 4), village level surveying and local fisheries and aquatic resource knowledge surveying (refer to Section 4.2.3). Village level surveying indicated that the most important water resources for local villages are the Nam Lik River, nearby streams and wells or bores.

There are a number of small perennial tributaries of the Nam Lik that are to the east and south of the Mill site, including the Houay Mieng, Houay Karng, Houay Larn, and Houay Lai. The Nam Song discharges into the Nam Lik approximately four km downstream of the proposed Mill site. In Ban Viengthong, four weirs from the Houay Kor larn, Houay Phouthing and Houay Lai provide water year-round which approximately 30 households use to irrigate rice paddies.

Residents in the Project Area mainly drink from bottled water, although it was reported that residents in Ban Khone Phook drink water from wells or bores (after boiling it first). Water resources used by residents in the Project Area are outlined in Table 5-28. No villages reported water shortages.

Table 5-28 Household water sources in the Project Area

Village	Drinking	Bathing / Laundry	Fishing
Khone Phook	Open and closed well/bore, bottled water	River / stream, open and closed well/bore	Nam Lik river and streams
Phonesoung	Bottled water	Closed well/bore	Nam Lik river and Streams
Viengthong	Bottled water	Stream, Nam Lin, closed well/bore	Nam Lik river

Source: ES Village Survey (2016)



Plate 5-25 Hand pump, Ban Viengthong



Plate 5-26 Nam Lik water abstraction

5.2.6 Fisheries and Aquatic Resource Use

Regional Level

Aquatic resources play a key role in the lives and livelihoods of rural households in Lao PDR. Fish and other aquatic products are the primary source of animal protein for most people in rural Lao PDR (Claridge et al., 1997; Hubbell, 1999) and are believed to account for some 8% of national GDP (MWBP, 2006). In some parts of the country, aquatic resources provide 70-90% of the animal protein in local diets (ADB, 2003).

Fishing for economic income is primarily undertaken by men. Men usually undertake fishing activity using cast nets in rapids sections, directional traps close to the banks and large mesh gill nets in deeper pools. In smaller streams and standing water, scoop nets, fence traps, bamboo traps and hook and line fishing poles are used. Women and children are typically responsible for gathering aquatic resources in these smaller streams and pools, to eat or to use in handicraft-making. These products become especially important in times of rice shortage (MWBP 2006). Women are also especially engaged in the management of fishponds.

Project Area

Over 90% of households in the Project Area are engaged in fishing and the collection of aquatic resources, primarily for own consumption. Fishing is most important in Ban Viengthong, where 95% of households engaged in this activity on a daily basis and 36% of households (50) also sell their catch to other villages or the local market. Residents of Ban Khone Phook fish mainly on a weekly and seasonal basis and residents in Ban Phonesoung conduct the majority of their activities seasonally.

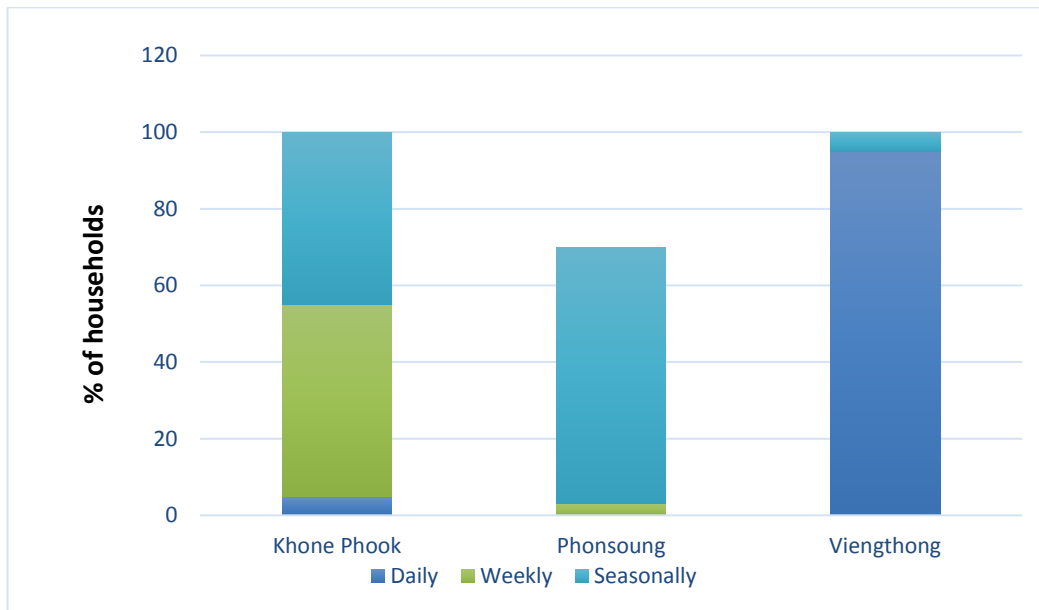


Figure 5-7 Frequency of fishing for households in the Project Area

The Nam Lik River, the Nam Som River, and the small perennial tributaries of the Nam Lik to the east and south of the proposed Project footprint are known habitat for a number of aquatic species. Villagers of Ban Khone Phook, Ban Phonesoung, and Ban Viengthong identified 14 fish that are commonly caught in the region, mostly in the Nam Lik. These include Pa King, *Cyclocheilichthys enoplos* (Pa Jard), *Yasuhikotakia modesta* (Pa Mooth), *Bagarius yarrelli* (Pa Khae), *Anabas testudineus* (Pa Kheung), *Homaloptera smithi* (Pa Tit). Local residents also collect shrimp, eels, crustaceans, dragon fly larvae, and aquatic snails.

Villages generally reported catching less fish compared to five years ago, mainly due to an increase in the number of people fishing, poorer water quality, and increase used of more intensive fishing equipment.

In terms of fishing locations, focus group discussions indicated that waterways (rivers, streams, lakes, ponds) in close proximity to the village settlements are used as potential fishing locations. These include the Nam Lik and its tributaries, as well as the Nam Song (refer to Table 5-29). Villages in the Project Area also manage fishponds, with Ban Khone Phook having the highest number.

Table 5-29 Common fishing sites in the Project Area

Village	Number of fish ponds	Fishing Sites	
		Dry season	Wet season
Ban Khone Phook	23 (which source water from tributaries of the Nam Lik)	Nam Lik, Houay Koy, Houay Nam Pang, Houay Hong Xeng, etc.	Nam Lik
Ban Phonesoung	4 (which source water from tributaries)	Nam Lik	Nam Lik
Ban Viengthong	1 fish pond (50 x 200m)	Nam Lik, Nam Song	Nam Lik, Nam Song, Nam Sad



Plate 5-27 Fishing in Ban Viengthong



Plate 5-28 Fishing in Ban Khone Phook

5.3 Cultural Setting

5.3.1 Cultural, Archaeology and Natural Heritage

Regional

There are no registered significant international archaeological sites within 50 km of the Mill site.

There is an infrequently visited tourism site approximately 15 km north of the Mill site, Pha Bong limestone mountain/cliff complex. The area has numerous caves and vertical limestone spires. The site is difficult to access during the wet season. The Pha Bong Tourism Management and Development Plan emphasises the importance of promoting and protecting cultural heritage around Pha Bong. The management plan includes plans for tourism awareness seminars. With road upgrades and newly constructed bridges, the Pha Bong limestone complex may be the most important tourist, cultural heritage and potentially archaeological site (with more exploration and surveys) near the mill site. The potential for the area to be developed as a tourist and recreational area may add to the cultural heritage and significance of the region.

Project Area

There are no known internationally or nationally important cultural, natural or archaeological heritage sites in the Project Area. The Mill site's soil has been moderately disturbed, consequently the presence of archaeological sites and artefacts are unlikely.

A number of locally important sites exist in the Project Area. These include:

- Ban Phonesoung Spirit Forest - This forest is located opposite to the village temple. The spirit forest is dominated by bamboo and shrub, although some large trees remain. All villagers respect this forest as it is deemed sacred following the occurrence of two important events. The spirit forest is surrounded by an old trench - it is unknown who built the trench and when it was constructed, but surveyed villagers indicated it is likely a relic of the first Indo-China war.
- Ban Phonesoung Spirit Site – This spirit house was constructed in the 1970s and is located to the west of the village, in the same direction as the village's cemetery. As well as respecting the spirits, the "Jao Phor Pak Song River" is also respected. Respects are paid every July (Lao Lunar month). Offerings of chicken, Lao white whisky and sticky rice and pigs are given according to the year.
- Wat Suntisouk Xayyaram Temple – This temple is located in Phonesoung village. The temple was built in 1971 and there is a sim (ordination hall, Plate 5-30), kuti (monks' living quarters) and ho kong (drum tower, Plate 5-31).



Plate 5-29 Spirit Forest, Ban Phonesoung



Plate 5-30 Ordination Hall, Wat S. Xayyaram



Plate 5-31 Drum Tower, Wat S. Xayyaram

5.3.2 Visual Amenity

Regional

The region is generally scenic; therefore, visual amenity is considered important. The Pha Bong Tourism Management and Development Plan emphasises the importance of visual amenity in the region, with a focus on the road to, and the Pha Bong limestone complex. There are also several other forested and mountainous areas in the region that add to the amenity.

Another important feature of the region is the Nam Lik and its riparian corridor. The Nam Lik is a wide river and its riparian corridor is largely intact in some areas, creating a significant vista for the region. The visual amenity of the Nam Lik will be impacted by the construction of the Nam Lik 1 Hydropower Project, approximately 10 km to the east of the mill site.

Project Area

The area directly surrounding the Mill site is relatively flat, with undulating hills ranging from 200 to 250 masl. The hilly terrain and patchy forested areas largely block direct line of site to the proposed Project footprint. The proposed footprint is currently a mixture of cleared, grassy land and scattered trees.



Chapter 6 | Physical Impacts

Chapter 6 | Potential Physical Impacts and Mitigation Measures

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6. POTENTIAL PHYSICAL IMPACTS AND MITIGATION MEASURES

6.1 Land

A land area of seven ha will be acquired for the Mill site. The majority (approximately 70%) of the land was previously graded and is still largely devoid of vegetation. The Project area is relatively flat, with some slight undulation to the north and northwest where the area has not yet been graded.

Impacts to land will be minimal and will include small changes to surface morphology (i.e. from grading); minor impacts to soil character and soil quality; and conversion of a highly degraded floral community to a built environment, each of which will be initiated during Project construction and will continue throughout operations.

6.1.1 Issues and Finding

Construction

Impacts to surface morphology will be minor, as the area is relatively flat and has been previously disturbed. Impacts to soil quality and character will include compaction of soil surfaces and some erosion of topsoil and potentially subsoil.

Operations

No additional physical impacts to the surface morphology will occur following Project construction. If log stockyards or other areas are expanded / implemented in subsequent years following construction, management and mitigation measures specified for Project construction will be required.

6.1.2 Management and Mitigation

Construction & Operations

Burapha will implement the following management and mitigation measures to minimise impacts to surface morphology during Project construction:

- Rehabilitated areas within the Project footprint will be planted and maintained. Where revegetation efforts fail, replacements will be planted early in the rainy season each year until the sites achieve full cover (refer to erosion and sediment control management measures) and;
- Stormwater and erosion / sediment control will be completed prior to additional ground disturbing activities. Construction will occur during the dry season to the extent practicable but may continue into the rainy season provided suitable management measures are in place to reduce erosion and minimise sediment transport.

6.1.3 Impact Assessment

Despite the long-term conversion of the landscape to a built environment, no significant impacts are anticipated. Given previous earthworks, impacts to surface morphology will be minor.

Impact Assessment

Anticipated impacts from conversion of the landscape and morphology for the Project to a built environment will be Very Low with the implementation of proposed measures.

6.2 Water Quality

To meet applicable IFC and Lao PDR water quality standards, it may be necessary to treat water prior to its discharge from the site. The design of the Mill regarding handling of process water and the passive water treatment facility will be key in minimising the chance of impacts to aquatic habitat.

Potential contaminants in effluent pose a moderate risk for environmental and social receptors downstream of the Burapha Mill Project. Though Burapha will design the Mill to avoid discharge of process waters to the receiving environment, diligent application of management and mitigation measures listed below (and in Section 6.3 and 6.4) are required during construction and operations to avoid potentially significant impacts and to minimise less deleterious inputs. This will be particularly important for surface water as the ephemeral channels that drain the Project footprint flow to the Nam Lik River which provides high value habitat for aquatic species and is also an important fishery for nearby residents.

Table 6-1 identifies the primary pollutants of concern according to Project phase or operational process and the associated parameters of interest for water quality (e.g. BOD, COD, and pH).

Table 6-1 Potential water quality impacts from Veneer and Plywood effluent

Parameter of Interest	Project Phase or Operation							
	Construction	Log Stockyard	Debarking	Log Conditioning	Veneer Production	Plywood Production	Power	General
BOD		✓	✓		✓	✓		✓
COD		✓						
DS		✓		✓	✓			
TSS	✓	✓	✓	✓	✓	✓		
Total Solids		✓		✓	✓			
Phenols		✓		✓	✓	✓		
Kjeldahl N		✓		✓	✓	✓		
Total P		✓		✓	✓	✓		
pH		✓		✓		✓		
Pathogens								✓
Hydrocarbons	✓						✓	✓

The risk of impacts to water quality during operations are more significant than during construction. Unmanaged / untreated discharge during the various phases of veneer and plywood manufacturing may be high in nutrients / organic material which may increase biological oxygen demand (BOD) and chemical oxygen demand (COD) to the extent that dissolved oxygen levels in receiving waters may be depleted, and benthic organisms consequently stressed or killed. Discharge of such materials in excess of national and international guidelines would directly impact surface water quality and aquatic habitat. The transport, storage, handling and disposal of hazardous materials or waste (i.e. hydrocarbons, sewage) and non-hazardous waste (e.g. refuse) may also prove deleterious to downstream beneficial uses of surface or groundwater and aquatic biodiversity in particular in the event of accidental discharge.

The Burapha Mill has been designed to avoid discharging process water to groundwater and off-site surface water and a passive treatment pond will allow for microbial degradation of nutrients / organic matter in runoff prior to its discharge from the site. Diligent application of hazardous and non-hazardous materials / waste management measures provided in Section 6.3 and erosion and sediment control provided in Section 6.4 will minimise associated risk to meet applicable national and international guidelines for effluent and ambient water quality.

6.2.1 Issues and Findings

Construction

Surface Water

The primary risks to surface water quality during construction of the Mill include:

- Sediment transport to receiving waters during construction and / or during the first rainy season following construction and associated potential impacts to aquatic habitat, aquatic biodiversity, and some beneficial uses of surface water;
- Potential for accidental discharge of hazardous materials (e.g. hydrocarbons) during transport, storage, and / or handling and disposal of hazardous wastes and potential impacts to aquatic habitat / species and beneficial uses;
- Pathogens (e.g. faecal coliform, total coliform, E. Coli) from unsuitable sewage containment / treatment facilities; and
- Potential impacts from non-hazardous waste streams.

Groundwater

There is some potential for accidental discharge of hazardous / non-hazardous materials during construction, primary related to the use of hydrocarbons. Due to the distance of the site from social receptors (wells / bores are >0.5 km from the footprint), significant impacts to groundwater quality from minor to moderate spillage volume of hydrocarbons during construction is not considered a major risk. However, management and mitigation measures provided in Section 6.3 are required to avoid or minimise the likelihood of spillage.

Operations

Surface Water

Potential impacts to surface water quality during Mill operations may include discharge of one or more of the following to receiving waters:

- Leachate with tannins, lignin, phenols, and / or fatty acids from the log stockyard (and log conditioning, if applicable) leading to elevated chemical oxygen demand (COD) and biological oxygen demand (BOD);
- Nutrient loading and formaldehyde discharge leading to elevated BOD and total suspended solids (TSS);
- Pathogens (e.g. faecal coliform, total coliform, E. Coli) from unsuitable sewage containment / treatment facilities;
- Hydrocarbons, other hazardous materials from accidental discharge events;
- Nutrients or other contaminants from inappropriate disposal of non-hazardous material; and
- Sediment from ongoing erosion of cleared areas / unsealed roads.

Potential impacts vary according to the phase of plywood manufacture (refer to below). Untreated or unmanaged effluent from the following operational activities have the potential to impact water quality during Mill operations:

- Log storage;
- Log debarking and bucking;
- Log conditioning;
- Veneer production;
- Plywood production;

Log Debarking

Burapha will employ a mechanised log rounder debarker to peel off the Eucalyptus bark and round the log prior to veneer production. Quantitative assessment for water quality impacts from log rounders (as opposed to drum debarkers and hydraulic debarkers) is not well documented. It is anticipated that effluent from the rounder debarker will be similar to the drum debarker. A quantitative assessment of pollutant concentrations for BOD₅ and TSS is based on the assessment of 8 hydraulic and 3 drum debarking operations (ESEPA, 1977).

Table 6-2 Pollutant loading in effluent from hydraulic debarking and drum debarking operations

Type of debarking	Hydraulic Debarker (mg/L)	Drum Debarker (mg/L)
Average TSS	1,292	2,688
TSS Range	521 – 2,362	2,016 – 3,171
Average BOD ₅	109	691
BOD ₅ Range	56 – 250	480 - 987

Source: USEPA, 1977

Log Conditioning

Prior to veneer peeling, logs are typically soaked in warm water or a steam vat (conditioning) to improve the cutting action of the veneer lathe or slicer. Burapha does not intend to condition logs, however the Company has indicated a need to assess whether this is required. Conditioning will leach chemicals of variable toxicity such as lignin, tannins (in some Eucalyptus species), phenols and fatty acids from the wood. The leachate typically has high BOD (150 – 5,000 mg / l) and COD (750 – 7,500 mg / L) concentrations (IFC, 2007a) and low pH, and may indirectly impact aquatic habitat / aquatic biodiversity by decreasing dissolved oxygen levels and promoting eutrophication.

Table 6-3 provides the result of steam vat effluent assessed for six (6) plywood plantations in North America.

Table 6-3 Example steam vat (conditioning) waste water constituents

Parameter	Average [#]	Range [#]
Biological Oxygen Demand (BOD)	1,633	460 – 3,117
Chemical Oxygen Demand (COD)	4,900	1,668 – 8,670
Dissolved Solids (DS)	2,612	917 – 5,080
Suspended Solids (SS)	661	74 – 2,940
Total Solids (TS)	3,388	991 - 5450
Phenols	0.44	0.20 – 0.69
Kjeldahl Nitrogen (Kjld-N)	19.84	1.87 – 56.8
Total Phosphorous as PO ₄ (T-PO ₄ -P)	5.84	1.73 – 14.00
pH	4.93	4.12 – 5.38

Adapted from USEPA, 1977

[#]All units are mg/l except pH.

Log Stockyard

Leachate from the log stockyard may have relatively high BOD and COD concentrations potentially impacting the quality of aquatic habitat in receiving waters. Dilution in the Nam Lik will mitigate the impacts for the river, with no impacts from stockyard leachate anticipated.

In the absence of suitable stormwater management and erosion / sediment control the unsealed stockyard is a source of sediment for subsequent transport to surface water.

Veneer Drying

Veneer dryers accumulate wood particles and volatile hydrocarbons condense on the surface of dryers to form an organic deposit (pitch). Dryers must be cleaned periodically to avoid excessive build-up of these substances. Wood particles are generally removed either by flushing with water (dryer washwater) or by blowing with air (or generally a combination of both). A high pH detergent is often applied to dissolve most of the pitch which is then rinsed off with water.

The nature of the dryer wash water varies according to the amount of water used, the amount of scraping prior to application of water, condition of the dryer, operation of the dryer, and to some extent, the species of wood that is being dried.

Most dryers are equipped with deluge systems to extinguish fires that might be started inside the dryer. This water is usually handled in a manner similar to the handling of dryer washwater. Fire deluge water can add significantly to the waste water problems in some cases.

Table 6-4 provides the results from analyses of effluent following (a) removal of the bulk of wood residue by blowing it out with air (and hauling it away), and then washing the dryer with water for 45 minutes to remove more wood particles; and (b) after caustic detergent was applied and rinsed off with water for another 45 minutes (USEPA, 1977).

Table 6-4 Example analysis of dryer washwater from two phases of washing

Parameter	A (following first wash)	B (following caustic detergent)
Biological Oxygen Demand (BOD)	210	840
Chemical Oxygen Demand (COD)	1,131	6,703
Dissolved Solids (DS)	643	1,095
Suspended Solids (SS)	113	5,372
Total Solids (TS)	756	6,467
Phenols	1.31	0.20
Kjeldahl Nitrogen (Kjld-N)	17.7	211.0
Total Phosphorus as PO ₄ (T-PO ₄ -P)	1.93	11.00

Adapted from USEPA, 1977

Plywood Production

One or more of three (3) types of adhesives are typically used to when pressing veneer strips into plywood: urea formaldehyde resin, melamine formaldehyde resin, and / or phenol formaldehyde resin. Burapha is currently assessing which resin it will use during the conduct of the Project Feasibility Study.

Water quality pollution from plywood production are generally expressed (measured) as BOD and total suspended solids (TSS). BOD is the measure of the amount of oxygen that bacteria will consume while decomposing organic matter under aerobic conditions (i.e. BOD is not discharged but is the by-product of organic pollutants in discharge). Plywood manufacturing processes have the potential to discharge high concentrations of nutrients and lesser concentrations of formaldehyde (or its metabolites). Dissolved oxygen

may be rapidly consumed by water borne bacteria when decomposing these nutrients, potentially impacting the health of benthic organisms who depend on dissolved oxygen to sustain life.

Though formaldehyde is a known carcinogen (refer to Section 6.6), its toxicity is associated with inhaling high concentrations of the chemical. Formaldehyde is rarely found in water due to rapid microbial degradation (ATSDR, 2008). Its impacts to water quality are associated with elevated BOD.

Suspended solids from veneer any plywood manufacturing are comprised of nutrients that are not expected to harm aquatic life or people that utilise the water. TSS is visible and is not aesthetically pleasing for downstream water users.

Hazardous and Non-Hazardous Materials

The use of hydrocarbons and potentially additional hazardous materials poses a threat to surface and groundwater quality in the event of an accidental discharge (refer to Section 6.3). With proper design controls, implementation of management / mitigation measures, and emergency preparedness and response planning and training, significant impacts are not anticipated.

6.2.2 Management and Mitigation

Construction

Burapha will implement the following during construction to minimise the potential impacts to water quality:

- **Sediment traps / sedimentation basin** - Burapha will construct a sedimentation basin, stormwater drainage channels, velocity dissipaters, and sediment control devices during early site preparation activities to promote settling of solids through the reduction of flow velocity and temporary water detention (refer to Chapter 3). The settling pond will be converted to the long-term sedimentation and water quality treatment pond (refer to Section 6.3.1). The construction phase basin(s) will:
 - » Capture surface water runoff from the entire clearance area with rock-lined diversion berms and channels diverting and conveying water;
 - » Be adequately sized to slow the velocity of water to the extent that the majority of larger fraction particles (i.e. sand and sandy silt) drop from suspension prior to its discharge (refer to below);
 - » Be armoured with riprap at the sediment basin / traps inlet(s) and discharge outlet(s) to minimise erosion; and
 - » Discharge to a constructed rock-lined (and / or potentially grass-lined) channel or swale to convey water from the basin / traps to the seasonal drainages to the northeast of the Project footprint.
- **Additional erosion and sediment control** – Burapha will implement the management measures listed in Section 6.4.1 to minimise construction phase erosion and sedimentation of watercourses;
- **Hazardous and non – hazardous materials and waste** - Burapha will implement the management measures listed in Section 6.3.1 to avoid construction phase impacts from hazardous / non-hazardous materials and waste, including sewage and greywater.

Operations

Burapha has designed the Mill to ensure effluent will meet applicable national and international guidelines. Management and mitigation will be implemented to achieve compliance with:

- Agreement on the National Environmental Standards of Lao PDR (2009); and
- IFC Board and Particle Based Products (2007).

Select standards (applicable to the Project) are provided in Table 6-5. All other parameters shall comply with the Lao National Standards (2009) and IFC Guidelines, whichever is more stringent.

Table 6-5 Effluent Guidelines for Board and Particle Based Products (IFC, 2007a) and Lao PDR (2009)

Parameter	Units	IFC Guideline Value	Lao Guideline
pH	S.U.	6-9	6-9
BOD ₅	Mg/L	50	30
COD	Mg/L	150	125
Total Suspended Solids (TSS)	Mg/L	50	50
Formaldehyde	Mg/L	10	-
Temperature increase	°C	<3#	<3#

#At the edge of a scientifically established mixing zone which takes into account ambient water quality

Mill Design

The Mill will be designed to avoid discharge of process waters during operations. Burapha technical design consultants have designed the Mill for 100% recycling / reuse of process water. There will be no discharge of process water from the Mill.

Sedimentation and Water Treatment Basin

Drainage from surfaces the log stockyard will be directed via stormwater channel(s) to the Sedimentation and Water Treatment Basin to allow for microbial breakdown of potential contaminants, which may include excessive nutrients, lignans, and tannins.

As above, Burapha will construct a sedimentation basin to temporarily retain stormwater and allow suspended solids to settle-out during construction. This settling pond will be converted to the operations phase water treatment pond, with passive bio-treatment of nutrients / organics in pond water prior to its discharge from the site. Preliminary design of the basin includes the following features:

- The treatment basin will be designed to have a 15-day hydraulic resident time (HRT). Modelling indicates that the planned size of the basin will appropriately accommodate passive treatment and settling of particulates (12m x 12m x 3.3m);
- The basin will accommodate peak flows from at least the 1:10 average return interval storm event;
- A flocculent dosing station will be considered to remove dispersive clays and / or tannins if they prove to be an issue;
- Hydrophytes ('water-loving' vegetation) will be planted around the rim of the pond (with the exception of the excavator access point and inlet to for nutrient uptake and to facilitate microbial degradation);
- Water will be piped or conveyed to the basin via rock-lined swales from the stockyard;
- The inlet and outlet of the basin will be lined by riprap to minimise the erosive potential of water;
- A rock-lined channel will convey discharged water to a channel with velocity dissipaters, for off-site discharge to an appropriate location (refer to Chapter 3);
- A berm or cut-off drain will be constructed to the north / northeast of the site to reduce surface water flow throughout the Project footprint;
- Clean water discharging from the remainder of the Project footprint (e.g. from the Mill rooftop, vegetated areas of the Project footprint, sports field and gardens) will be conveyed by channels to velocity dissipaters / sediment traps before controlled discharge offsite (refer to Chapter 3).

As water from the log stockyard will drain to the basin, the pond water / discharge will be monitored regularly for appropriate water quality parameters (refer to ESMMP, Volume C) including nutrients, BOD, COD, pH, oil and grease, TSS / turbidity, etc. If discharge is found to be in excess of applicable effluent standards, the size of the treatment pond or active treatment methods (in addition to passive treatment) will be considered.

Two additional water quality monitoring locations have been initially selected for future monitoring regimes during construction and operation phases at upstream and downstream of the Mill site. The coordinates are (also see Figure 4-9):

- Upstream location: Latitude: 18°38'24.4176"N; Longitude: 102°17'11.1398"E
- Downstream location: Latitude: 18°37'57.1008"N; Longitude: 102°16'52.0258"E
- Discharge point will be identified where possible.

Log Stockyard

The following will be developed to treat stormwater from the site to avoid significant surface water contamination from the log stockyard:

- The surface of the stockyard will be compacted during construction, with a moderately impermeable surface layer lining applied (either clay-rich material, low volume concrete additive, or cellulose / lignin binder);
- Runoff will be directed via a storm drain to the Sedimentation Basin / Passive Treatment Pond and
- Log yard irrigation water will be recycled to the extent practicable (if applicable).

Hazardous and Non-Hazardous Materials and Waste

Hazardous and non-hazardous materials will be managed according to measures provided in Section 6.3.

6.2.3 Impact Assessment

Construction

Though some erosion and sediment transport during construction is inevitable, the potential impacts will be mitigated significantly with the implementation of appropriate stormwater management and erosion / sediment control. Finer soil fractions will likely discharge from site to the ephemeral channels, with some reaching the Nam Lik River. Due to dilution in the Nam Lik, impacts will be Low.

Management and mitigation measures for the transport, storage, handling and disposal of hazardous and non-hazardous waste (refer to Section 6.3.2) will minimise risk of discharge, and emergency preparedness and response requirements will minimise the impacts in the event of accidental release. Potential impacts are considered Low.

Operations

Any discharges will meet Lao PDR and IFC effluent discharge standards. With the application of management and mitigation measures and ongoing monitoring, it is expected that any water discharge from the site will have a negligible to low impact on water quality.

To meet applicable IFC and Lao PDR water quality standards, the design of the Mill to avoid discharge of process water is key for minimising the potential for significant water quality impacts. Passive treatment of water from the log stockyard will effectively treat nutrients, tannins, lignins. The passive water treatment facility will also continue to serve as a settling pond for suspended sediment throughout operations.

It is anticipated that the management measures listed in Section 6.3.1 are suitably robust to avoid the discharge of hazardous and non-hazardous waste to receiving waters. In the event of an accidental release, emergency preparedness and response requirements (e.g. training, spill clean-up kits) identify in Section 6.3 and detailed in the Project ESMMP will minimise impacts to the extent practicable.

Should routine monitoring identify discharge in excess of international / national guidelines, active water treatment in the treatment basin may be required.

Impact Assessment

Design controls and diligent application of management and mitigation measures are expected to ensure impacts to water quality are **Low**.

6.3 Hazardous and Non-Hazardous Materials

The Burapha Mill Project will require the transport, storage, handling, and disposal (where applicable) of the following hazardous materials / hazardous waste (herein referred to hazardous materials):

- Oils, solvents, and hydrocarbons (e.g. diesel);
- Wood adhesive (comprised of formaldehyde, urea / phenol, ammonium sulfate); and
- Medical waste including sharps, bandages etc.

General waste materials will be generated by the Project from construction activities, administration, procurement and Mill maintenance and operations. Specifically designed facilities will be constructed to manage non-hazardous wastes on site including:

- Storage and separation area for recyclables;
- Residue waste landfills for non-recyclable, nonhazardous materials; and
- Sewage and greywater treatment plants.

6.3.1 Issues and Findings

Construction

Non-Hazardous Waste

General waste materials generated from construction and workforce facilities may physically impact the environment (with potential biological / social implications), including: contamination of receiving surface for improperly stored or untreated wastes; increased populations of wildlife due to food wastes, including rats and other potential vectors for disease; and impaired visual amenity.

The drainage system of the Mill Project adopts rainwater and sewage water separation system. The septic tank will be greater than 20 m³ which considers approximately 400 persons/day. The location of septic tank is set up beside the office building and near the red line, which avoids people entering the area, and avoiding disruption to the normal operation of the Mill. The detailed calculation will be supplied in the construction drawing stage.

Hydrocarbons

Diesel fuel will be utilised by construction vehicles. Additional hydrocarbons (fuel, oils, solvents, etc.) will be stored and handled on-site in a maintenance bay. Accidental discharge of hydrocarbons may impact water and soil quality. Improperly stored hydrocarbons are a fire hazard.

Sewage and greywater

At its peak, the construction workforce will comprise approximately 160 people. Sewage and greywater will be generated that would present a risk for water quality, aquatic fauna, and beneficial uses of water if unmanaged.

Typical septic wastewater contains proteins, carbohydrates, oils and fats that consume oxygen during the process of breaking down. Chemicals are also a part of wastewater and they too require oxygen as part of their breakdown processes. Low levels of BOD and COD at discharge are required by the company. Another feature of sewage water is the high levels of total suspended solids (TSS), which gives the wastewater a black colour.

This is typically removed as sludge along the processing chain. Sewage also contains coliform bacteria which indicate the presence of pathogens that are potentially harmful to humans, and processing of the wastewater must reduce their concentrations prior to release.

Operations

A number of hazardous and non-hazardous materials and waste may impact receptors during operations. Burapha will provide a comprehensive register of materials / waste following completion of the Project Feasibility Study. The following assessment reflects known materials for consideration.

Hydrocarbons

Diesel fuel will be utilised for vehicles / equipment / processing and for power generation. Accidental release of hydrocarbons would potentially impact receiving waters (ground and surface water) and soil quality. Hydrocarbons are also a fire hazard, which threatens occupational and community health and safety as well as air quality.

Additional hydrocarbons may include unleaded fuel, oils, solvents, etc. for pump, vehicle fuelling and maintenance, etc.

It is anticipated that diesel fuel will be transported to the site from Vientiane by road. Fuel tanks will be constructed at the Power Plant and at the heavy equipment fuel depot (diesel only).

Plywood Resin

The adhesive utilised for gluing the veneer strips poses a risk to benthic aquatic species if discharged to surface waters. Discharge of the resin (or processing washwater) would likely increase biological oxygen demand to the extent the dissolved oxygen concentrations in the water are decreased and aquatic biodiversity impacted.

For humans, the formaldehyde in the resin is hazardous if inhaled (refer to Section 6.6). Formaldehyde can cause short-term illness if inhaled in sufficient concentration and is a known carcinogen if chronically inhaled.

Table 6-6 Resin Quantities

Resin Type	Manufacturer	Percentage of Use (%)	Production Capacity (m³)	Amount of Resin per m³ (Kg)	Total Amount of Resin (Ton/year)
Prefere 4976	Dynea ptl	60	50,000	85	2,550
Prefere 4405	Dynea ptl	30	50,000	85	1,275
Melamine Urea Formaldehyde Resin	PT. Dover Chemical, Indonesia	10	50,000	85	435

Off-cuts

Plywood will be trimmed following pressing of veneer sheets. As above, the resin comprises a risk for water quality and air quality. Off-cuts from other processes (i.e. pre-gluing processes) will be burned to power the Project boiler. The glue requires burning above 900° C to volatilise the potential pollutants. Burapha is currently investigating whether the Mill can accommodate volatilisation. Otherwise, off-cuts with glue residue will have to be disposed of in an appropriate facility.

Sewage and greywater

As above, improperly stored or untreated sewage and greywater pose a risk for downstream receptors. In the absence of suitable management, discharge from the proposed bathrooms / kitchens may impact downstream water users, aquatic habitat / fauna. Improper septic may also cause nuisance level odour impacts.

Medical Wastes

Sharps, bandages, etc. are potential vectors for the spread of disease.

Non-Hazardous Waste

As per the construction phase, non-hazardous waste will be generated throughout Project operations. Sources of waste include packaging, general refuse (e.g. from administrative facilities), and food waste, etc. Improperly stored or untreated waste may contaminate surface and groundwater, increase wildlife populations, and impair visual amenity.

Off-cuts and other woody waste will be utilised to generate power in the biofuel boiler, with no residual waste stream.

6.3.2 Management and Mitigation

Construction

Management and mitigation for hazardous and non-hazardous waste is provided for the operations phase, below.

Contractors will be required to adhere to the practices articulated in the Project ESMMP for the construction phase. Contractors will develop and implement a CEMP that identifies site-specific measures in response to ESMMP requirements (e.g. locations and specifications of required controls). Adherence to the ESMMP and development of a CEMP that meets Burapha's approval will be a contract provision.

- Contractor' CEMPs will identify site-specific management and mitigation measures that include requirements and build upon measures provided in the Hazardous and Non-Hazardous Materials Sub-Plan of the ESMMP, namely appropriate transport, storage, handling, and disposal of hazardous and non-hazardous waste (also refer to Operations phase, below) as well as monitoring and reporting protocols;
- CEMPs will include management and mitigation measures provided in the Emergency Preparedness and Response Sub-Plan (refer to ESMMP). The sub-plan identifies training requirement, communication protocols, the necessity for spill response materials on-site, and occupational health and safety requirements;
- Burapha and a suitable contractor (e.g. on-site environment and sustainability manager) will routinely monitor the construction area, vehicle laydown area, chemical storage areas (etc.) on a weekly basis (refer to ESMMP) and will provide Burapha with a monthly and quarterly monitoring report identifying the status of hazardous and non-hazardous materials management, non-compliance issues, remedial measures required, etc.

Operations

The primary management implication regarding general waste and hazardous materials is the need for appropriate storage and management of these substances to avoid any potential impacts on human health and environmental values. Waste management at the Project will require the construction of several specifically designed facilities (i.e. storage and separation area for recyclables; residue waste landfill for non-recyclables and non-hazardous materials; sewage and grey water treatment plants). Sewage, grey water and process water will be treated on site.

The waste management procedures for the Project will be based on the following hierarchy (in decreasing order of preference):

1. Minimise the production of waste.
2. Maximise waste recycling and reuse.
3. Treatment of waste.
4. Safe waste disposal.

The first priority for the management of wastes generated by the Project will be to reduce the volume of waste generated, which will be achieved by:

- Procuring supplies that produce less waste by virtue of the way they are produced, packaged or consumed;
- Procuring supplies that have been produced from recycled materials, if possible; and
- Maximising the efficiency of all on site production processes.

The Burapha Mill Project will develop, implement, communicate, adhere to and maintain a relevant and current **Waste Management Plan** which defines all on-site and off-site strategies, operational controls and management practices relating to hazardous and non-hazardous waste management. The Plan will be periodically reviewed or updated whenever relevant changes are made to site operating practices. Potential waste streams and their sources will be identified, classified and managed during operations and incorporated into the *Waste Management Plan* and the design of on-site facilities.

Burapha will develop and implement an **Emergency Preparedness and Response Plan**, incorporating requirements identified in the Project ESMMP, Emergency Preparedness and Response Sub-Plan.

Burapha will also develop an **Occupational Health and Safety Plan** or Standard Operating Procedure that ensures their workforce is adequately trained to avoid exposure to potentially toxic substances and is provided appropriate personal protective equipment (PPE).

Hazardous Materials and Waste

Hazardous substances on the Project site will be acquired, handled and stored in accordance with GOL legislation and other international guidelines such as:

- IFC, Chapter 1.5 Hazardous Materials Management, Environmental, Health, and Safety General Guidelines 2007;
- IFC, Chapter 3.5 Transport of Hazardous Materials, Environmental, Health, and Safety General Guidelines 2007; and
- United Nations, Transport of Dangerous Goods - Model Regulations. 17th Revised Edition (Volume 1) Geneva 2011.

The following measures will be incorporated into the **Burapha Mill Project Waste Management Plan** and will be implemented throughout operations:

- Contracted transportation personnel will have appropriate hazardous materials training;
- The Project will verify that hazardous materials transporters have readily available emergency response plans and capabilities which are of an acceptable standard;
- The Project will verify that hazardous materials transporters remain licensed by the appropriate authority(s);
- The Project will ensure that all hazardous materials unloading, storage and mixing facilities operate and are maintained according to sound, accepted engineering practices, quality control and quality assurance procedures, and release prevention and release containment measures;
- The Project will operate unloading, storage and mixing facilities using proactive inspection processes, preventive maintenance and contingency plans to prevent and/or contain releases and control and respond to worker exposures;
- Hazardous materials will be managed in compliance with all relevant Lao PDR statutory obligations, licenses and other requirements;
- An up-to-date register of hazardous materials and dangerous goods will be compiled and maintained on-site. The register will include the types, quantities, location and current Material Safety Data Sheets (MSDS);

- Storage, handling, disposal practices, determination of suitable PPE, etc. will be based on classification of hazardous waste according to up-to-date MSDS information;
- Hazardous materials storage tanks and transfer systems / piping containing hazardous materials will be designed and constructed in above ground facilities. Storage facilities will be suitably colour coded and labelled. All bulk hazardous materials storage tanks will have engineered overflow / overpressure protection devices;
- Systems will be implemented to detect leaks (e.g. visual inspections, active leak detection systems / alarms, periodic integrity testing, etc.) from hazardous materials storage facilities (tanks and piping) and to recover products;
- All hazardous materials storage installations including temporary facilities will be designed and constructed for secondary containment. Secondary containment facilities will have the capacity to hold a minimum of 110 percent of the volume of the largest tank in the containment area. Secondary containment for bulk storage tanks will have a typical water permeability equivalent to untreated concrete;
- Designated facilities will be used for the collection and temporary on-site storage of hazardous wastes. Where applicable, these facilities will include suitable fencing, signage, roofing, lighting, a means of communicating emergency, and lightning protection;
- Suitable drainage within and around long-term hazardous materials containment areas will be constructed including rainfall protection;
- Employees and relevant contractors will be trained to manage hazardous materials, meet compliance with regulatory requirements, apply proper use of PPE, and understand emergency response and preparedness planning (refer to ESMMP Emergency Preparedness and Response Sub-Plan);
- Hazardous material storage areas and distribution, transport, and handling procedures will be routinely monitored / audited to verify management and disposal conforms to applicable standards. Records of audits will be maintained (refer to Emergency Preparedness and Response Plan, ESIA Update, Volume II);
- A Standard Operating Procedure (SOP) for hazardous materials transport, unloading, transfer, storage, handling, use and disposal will be developed;
- Burapha personnel will be responsible for reporting spills or releases of hazardous materials to regulatory authorities. Communication lines between the Mill Project and local emergency service groups will be established and information related to hazardous materials on site will be provided to local emergency services. Communication protocols and contact numbers will be identified in Burapha's ***Emergency Preparedness and Response Plan***;
- If suitable off-site disposal facilities for hazardous wastes are not available or are not adequate in protecting human health and the environment, on-site disposal options will be considered where legally authorised including incineration of glue containers. On-site disposal facilities will be supported by scientifically defensible studies that demonstrate compliance with relevant laws and permits and will minimise potential impacts on human health and the receiving environment; and
- Burial of hazardous wastes, liquid or semi-solid wastes (including sewage slurry, grey water, sewage treatment sludge, medical waste, hydrocarbon products, hydrocarbon or chemical contaminated soils) is only allowed if there is no other viable alternative such as treatment / disposal, recycling, reprocessing or composting. Disposal of these wastes will comply with statutory obligations and will not adversely impact human health or the environment.

Sewage and Greywater

Grey and black water will be treated by a Membrane Bio-reactor (MBR) Sewage Treatment System. Three 20m³ septic tanks will be installed below ground at each of the toilet block locations. Each tank has a 3-chamber internal structure which provide the primary source of sludge separation and anaerobic decomposition.

Service / inspection holes will be installed at each tank. The septic waste from the toilet and shower once passed through the tanks will reach the second screening tank called a Grill Regulating Tank (GRT) via DN300 gravity fed pipe system. The GRT purpose is to adjust unevenness of the volume and character of the incoming wastewater. It creates a homogenous mix that provides for improved processing efficiency for the MBR. Effluent from the GRT to the MBR is automatically controlled according to the volume within the GRT viz when a certain volume is reached.

Once inside the MBR, the effluent undergoes several processing steps, which combines physical separation/filtration (membranes) and biological breakdown (aerobic and anaerobic). The first chamber of the MBR is anoxic breakdown and is largely for denitrification. The water is then passed through the membrane system with pores ranging from 0.1um to 0.001um made of PVDF. Air is pumped through the membrane chamber facilitating aerobic breakdown. The treated water is then passed back through to the anoxic chamber in a repeat fashion with each pass improving the quality of effluent. To enhance the treatment a poly-aluminium chloride (PAC) based coagulant will be applied in both the anoxic chamber and membrane chamber.

During construction, the 3-chamber internal structure will provide a primary source of sludge separation and anaerobic decomposition. Once near full (75%) a government sanctioned vendor will collect the waste and transport it to a government operated septic treatment facility. The civil works contractor will be required to report to Burapha and government on the safe collection transport and delivery of all waste (i.e. chain of custody certification demonstrating proper disposal at a certified facility). It is proposed the waste be managed by Division of Water Treatment in DONRE, Hin Heup District with support from the environmental compliance unit of DONRE. All fees and charges for the treatment of waste will be provided to government accordingly.

Non-Hazardous Wastes

To maximise recycling and reuse, waste will be segregated into different types at the location where they are generated. Solid waste will be segregated into three categories as follows:

- Biodegradable materials – vegetation and food scraps;
- Recyclable materials – processed timber; hard plastic; glass; metal; paper and cardboard; and tyres (waste will be further segregated within this category.); and
- Non-hazardous residue waste.

Additional measures will include:

- The Project will develop and implement a process for segregation of non-hazardous and hazardous wastes that is appropriate to their disposal methods;
- Landfills will be designed, constructed and operated to ensure geotechnical stability, prevention of adverse impacts to wildlife, and surface and groundwater quality;
- The potential for leachate generation and the estimated leachate impact from landfills will be evaluated and managed. Discharges from landfills will meet applicable standards;
- The burning of waste at landfills may only be undertaken where permitted by relevant authorities and with an operational license / permit (if required). Site personnel will be present to monitor burning operations where permitted;
- Waste disposed of in landfills will be routinely covered to prevent wind-blown dispersion of litter and odours and to limit access for native fauna / pest species;
- Landfill sites will have a fence or berm erected around their perimeter. Signage at the entrance will include appropriate contact information, accepted wastes for disposal, and banned wastes from disposal;

- Off-site treatment and / or disposal facilities will be inspected prior to their selection and use to verify that they are engineered and operated in a manner that protects human health and environmental receptors. Periodic follow-up inspections of these facilities is required; and
- Non-hazardous waste storage and disposal facilities will be periodically audited to ensure the efficacy of environmental management measures.

6.3.3 Impact Assessment

Construction

While the risk of an accidental release of hazardous materials can never be completely avoided, implementation of the proposed mitigation, management and monitoring measures will ensure that the impacts associated with the use, storage and transport of hazardous materials are minimised throughout the life of the Project.

The successful implementation of the prescribed solid waste management principles and management measures is expected to effectively reduce significant impact from general waste to Very Low.

Further detail regarding the potential social and health impacts of the Project associated with general waste and hazardous materials is provided in the ESMMP.

Operations

Diligent implementation of the management measures identified above and adherence to the ESMMP Hazardous and Non-Hazardous Materials Sub-Plan and Emergency Preparedness and Response Sub-Plan will minimise the potential impacts from waste and will ensure staff respond to a spill appropriately. Impacts are expected to be Low.

Impact Assessment

With proposed measures in place, the risk of significant impact from accidental release of hazardous materials will be reduced to **Low** during Project construction and operations. Anticipated impacts from waste generated by the Project will also be **Low** with proper management described in Section 6.3.2.

6.4 Erosion and Sedimentation

Due to (i) the highly dispersive nature of the soil at the Mill site; (ii) the precipitation regime in the region (i.e. moderately high seasonal volumes and high intensity rains during the height of the rainy season); (iii) the need to clear approximately seven ha for construction; and (iv) significant area that will be left unsealed and devoid of vegetation throughout operations, the topsoil and subsoil at the site will be susceptible to erosion and sedimentation of neighbouring ephemeral channels and potentially the Nam Lik River. This is mitigated by the flat topography of the site. It is anticipated that the application and maintenance of the stormwater and erosion and sediment control facilities (ESC) identified below will minimise sediment inputs to a level that is satisfactory to stakeholders.

The Mill region is particularly susceptible given that soil mapping indicates a Ferric Acrisol lies beneath the site. This soil type is characterised by proportionally higher fine materials in the subsoil (clay, silt, and fine sands) resulting from the pedological process of soil illuviation and thus a greater potential for erosion than the topsoil. Excessive sedimentation may impact the quality of habitat for benthic organism (e.g. difficulty finding prey, poor spawning habitat), while potential secondary impacts include impaired health and vitality of aquatic species and as well as denigrated visual amenity.

The potential for erosion is most significant during the rainy season (approximately May to September) with wind erosion during the dry season contributing comparatively and significantly less particulate to

watercourses. It is therefore imperative that stormwater and erosion / stormwater control are implemented in advance of seasonal rains.

6.4.1 Issues and Findings

Construction

The potential for erosion and sedimentation will likely be most pronounced during construction. Vegetation clearing, major earthworks, and surface water diversion / changes to drainage patterns during construction will provide areas that are prone to water and wind erosion (to a lesser extent).

The design and construction of the unsealed access road will be particularly important in controlling sediment-laden runoff from the Project site. Roads intercept, concentrate and direct potentially large drainage areas to receiving waters. The road surfaces are also likely to have a high rate of runoff due to the compaction or road construction material.

Operations

During operations, much of the bare soil surfaces that were previously exposed will be covered with building structures, rock, concrete, and a stormwater system established. Soils unconsolidated during construction / earthworks will be compacted and less likely to erode. However, the log stockyards and unsealed access road will still be susceptible to erosion throughout operations. Concrete, rooftops, and other impervious surfaces will concentrate stormwater and its erosive potential will be significant in the absence of adequate stormwater management.

Armoured stormwater channels and the long-term water quality treatment pond (and siltation basin) will be complete. Diversion channels will divert 'clean' sheet flow around the Mill Site. Provided management and mitigation measures are completed before the onset of the rainy season, it is anticipated that sediment transport to receiving waters will dissipate significantly during operation.

6.4.2 Management and Mitigation

Construction

The Project will minimise erosion and sediment transport from the site through scheduling and phasing, and implementation of effective stormwater, erosion, and sediment control.

Scheduling and Phasing

Construction, maintenance, rehabilitation and restoration projects should be scheduled and phased to reduce the volume and duration of soil exposed to erosion by wind, rain, runoff and transport of sediment off-site.

General phasing requirements shall consider the following:

- The sequence of ESC installation and removal in relation to the scheduling of earth disturbing activities should be identified prior to, during and after construction to ensure the proper functioning of all stormwater, ESC measures and facilities;
- Construction of surface water diversion channels and installation of ESC facilities should be scheduled for completion in advance of ground disturbing activities for primary controls (i.e. sediment basins and water diversion structures) to the extent practical and in advance of the rainy season to minimise sheet erosion from upstream / upslope sources;
- Soil disturbing activities should be phased such that critical areas (areas adjacent receiving waters) are not disturbed during the rainy season to the extent practicable and such areas are protected through development of suitable stormwater management measures and erosion / sediment control facilities;

- Topsoil stripping and stockpiling should be scheduled for the dry season to the extent practicable. Stormwater and ESC facilities will be implemented prior to major ground disturbing activities; to allow for implementation of ESC facilities in cleared areas and for soil stockpiles;
- Grading activities should be planned to minimise the length of time between initial soil exposure and final grading;
- The optimum time for road and facilities construction is during the dry season, whereas soil-disturbing restoration projects should be timed for completion just prior to the wet season, for planting at the onset of rains. As above, where this is not possible, stormwater and ESC facilities will be developed in advance of major ground disturbing activity;
- Staged seeding and mulching (or other select erosion control measures) should be implemented on exposed soil as work progresses to the extent practicable. During the rainy season, surface stabilisation should be planned for immediate implementation;
- Regular monitoring and routine maintenance of stormwater channels, and erosion / sediment control facilities should be scheduled prior to the onset of construction; and
- A monitoring and maintenance program that provides an inspection schedule, sediment cleanout levels, repair parameters, time frames, and directions for sediment removal will be developed, a framework for which is included in this ESMMP.

Vegetation Clearance

- Vegetation clearance will be restricted to the minimum area required for Project implementation and a safe working environment. Prior to construction vegetation clearance areas should be clearly delineated and marked, with exclusion zone clearly identified that prohibit vehicular access;
- Vegetation clearance should be conducted in the dry season to the extent practicable to provide ample time for site preparation / earthmoving activities. Stormwater and ESC facilities will be developed in advance of major earthworks to minimise impacts of vegetation clearance during the rainy season;
- Vegetation clearance should be phased (as above) to limit the amount of time cleared areas are exposed to wind and water. For example, the Secondary Log Stockyard should be constructed in year two or three, if appropriate;
- Designated vegetative buffers should be incorporated into design plans and maintained for the designated area around the ephemeral watercourses;

Stormwater Control

Effective ESC for the protection of downstream surface waters requires stormwater management in combination with ESC measures and facilities. Effective stormwater management requires significant analysis and planning prior to designing primary facilities. Preliminary modelling has been undertaken for this ESIA (refer to Section 6.5). Further assessment is required to identify the extent of stormwater management controls required for the Project site (i.e. site water balance; mapping and delineation of catchments and drainage boundaries; surface water hydrology modelling, including concentration of runoff and runoff coefficients sufficient to determine peak discharge events; historic precipitation and flooding analysis, etc.) Data from these assessments should be used to determine the size of controls necessary to convey water to ESC facilities from peak storm event.

Stormwater will be managed as follows:

- Temporary diversion channels / swales will intercept and direct 'clean' water upslope of disturbed areas and convey it to a stabilised outlet at a non-erosive velocity (refer to below);
- Additional channels will intercept and direct sediment laden runoff from disturbed areas to an appropriate sediment basin / trapping structure;

- Stormwater channels of sufficient size will be constructed to convey water along roadsides and other facilities subject to flood drainage;
- Long-term and temporary drainage channels will be designed and constructed such that the water volume and flow velocity does not exceed the capacity of the channel nor erode the channel (i.e. allowable flow velocity). Typical design values are:
 - » 1.5 – 2.0 m / s for grass lined channels;
 - » 1.5 – 3.0 m / s for rock-lined channels (100 – 350 mm rock); or
 - » 1.3 to 5.0 m / s for channels lined with temporary erosion control mats.

The velocity typically allowable for unlined drainage channels varies with soil type. Acceptable velocities are considered:

- » 0.3 m / s for extremely erodible soils;
- » 0.45 m / s for sandy soils;
- » 0.5 m / s for sandy loams; and
- » 0.6 m / s for non-dispersive silty loams.

Erosion Control

Erosion control methods, specified in the ESMMP, will include the following:

- Vegetation retention, as above;
- All stormwater channels, sediment basins / traps, and outlets of pipes, drains, culverts, etc. will have inlet / outlet protection comprised of an apron of appropriately sized rock / riprap placed to prevent scour and reduce the velocity and / or energy of stormwater flows. The riprap also works as a secondary sediment control device as it captures some of the coarser sediment in water travelling through it;

Sediment Control

The primary means of desilting surface water prior to discharge from site will be diversion of water to a sedimentation basin or series of sediment traps (i.e. smaller basins). As the site will require a passive water treatment pond / siltation basin during operations, it is anticipated that the construction phase sedimentation basin will be converted to a long-term facility for operations. The operations phase treatment pond will be larger than that required for construction phase sediment control (longer retention time for passive aerobic treatment of water quality – refer to Section 6.2.2).

The sediment basin will temporarily detain sediment laden runoff and store it under calm conditions, allowing sediment to settle out before the runoff is discharged. Sediment basins should be designed to capture runoff from only disturbed soil areas, with diversion channels implemented to divert upstream water from undisturbed areas.

Sediment basins, as measured from the bottom of the basin to the principal outlet are considered effective if they have the capacity equivalent to 100 m³ of storage per hectare of contributory area. The length of the basin should be at least twice the width, though 3-4 times the width is optimal and the depth should be at least 1 m, though no > 1.8 m for safety reasons. Proper hydraulic design of the outlet is critical to achieving the desired performance of the basin. Burapha will conduct the following during Feasibility Study:

- The locations of proposed sediment basins and traps will be identified and mapped. Water balance and engineering calculations should be conducted to justify the size and position of permanent basins;
- The volume and rate of runoff from the Project Area and its upstream watershed should be calculated for each significant control facility, including anticipated peak flows for the design storm events; and

- Design information for primary controls (e.g. proposed sediment basins) should include supporting calculations and measurements for suitable engineering.

Operations

The primary design features to minimise erosion and sediment transport during operations include:

- Stormwater management - diversion channels will intercept and route clean water around the Project footprint; collect sediment laden waters from within the Project footprint and convey this water to the Sedimentation Basin at northwest corner of the concession area (refer to Section 6.2.2, Water Quality for more detail). The operations phase treatment pond will be designed to have a 15-day hydraulic resident time (HRT) and will accommodate peak flows from at least the 1:10 average return interval storm event.
- Long-term diversion channels, whether for clean water or contact water, will have velocity control structures to minimise the erosive energy of water being conveyed and armouring for scour protection at key locations;
- Stormwater, erosion, and sediment control facilities identified for construction (Section 6.2.1 and 6.4.1) will be retained for operations.
- Progressive revegetation efforts will continue during operations for all non-operational areas within the footprint. Revegetation will be considered complete when at least 70% of the landform is vegetated with perennial vegetation; and
- Water quality will be routinely monitored during operations (refer to the ESMMP). If TSS or Turbidity exceeds Project thresholds, Burapha will survey the Mill Footprint and develop additional stormwater, erosion, and sediment control to ensure discharge meets statutory requirements and the satisfaction of stakeholders.

Roads

The following management and mitigation measures should be implemented to minimise erosion and suspended sediment input to receiving waters from access road and road infrastructure facilities:

- Roads will be constructed during the dry season to the extent possible. ESC facilities for unsealed roads will be completed before the onset of the rainy season;
- The road design will include a drainage system to channel water from the road surfaces to outlets with ESC facilities, including rip-rap at inlets and outlets of culverts and channels and sediment control basins constructed for larger catchment areas;
- Roads should be constructed with cross-fall slopes of (maximum 3%) to promote rapid drainage from unsealed road surfaces to avoid scouring. Where cross-fall is insufficient, waterbars should be constructed to direct water to road discharge channels that will be outfitted with velocity dissipaters and sediment control (e.g. rip-rap, sumps and/or silt fencing);
- Drainage from upslope of road surfaces will be diverted via roadside drainage channels to culverts with velocity dissipaters and sediment control at outlets;
- Culverts will be installed at drainage crossings, perpendicular to the road alignment and implemented with appropriate slopes to facilitate water and sediment movement with deposition and consequent culvert blockages;
- Permanent / long term roads will be designed using an average peak storm recurrence interval of 50 years, and temporary structures should be designed using an average recurrence interval of two years (24-hour storm events);
- Batter slope angles will be minimised to the extent feasible;
- Excess soil will be transported to the topsoil stockpile or temporary stockpiles, with stockpile locations identified prior to the onset of construction; and

- Where feasible, vegetation will be left intact on road verges and roadside batters to reduce surface flow velocity and erosive potential.

6.4.3 Impact Assessment

Construction

The Project area is susceptible to erosion, and erosion and sediment transport will be most pronounced during construction (or at the onset of the first rainy season following construction). Risk to downstream water quality will be avoided through measures proposed in Section 6.4.2, including phasing of works, installation of erosion and sediment control devices, and stormwater management. Based on the construction layout, proposed management measures, and dilution capacity of the river, it is anticipated the impacts will not be significant for the Nam Lik River.

It is anticipated that the stormwater, erosion and sediment controls will minimise impacts to Moderate. Significant impacts to aquatic habitat / aquatic biodiversity are not anticipated.

Operations

The risk of significant erosion and sedimentation during operations will be effectively reduced to Low during operations following implementation of stormwater, erosion, and sediment controls. Soil surface in the stockyard and unsealed road will remain exposed during the rainy season and will continue to be a source of sediments to stormwaters. It is anticipated that sediment control measures will be suitable to inhibit transport of larger particle sizes of sand, while some loading of clay and fine silt fractions is unavoidable.

Impact Assessment

Project impacts on water quality from erosion and transport of sediments into receiving surface water will be **Moderate** during construction and **Low** during operations given the implementation of prescribed management measures.

6.5 Hydrology

6.5.1 Issues and Findings

The Burapha Veneer and Plywood Mill Feasibility Study identified that the Mill requires approximately 23,040m³ per year (m³/a) to operate at full capacity and will discharge approximately 4,896 m³/a to the sewage system. The Project is expected to abstract groundwater to meet operational requirements from a bore located on-site. However, if groundwater volume is found to be inadequate to meet this requirement, surface water from the Nam Lik River may be required.

The abstraction of approximately 63 m³ of groundwater or surface water from the Nam Lik is not expected to impact the hydrology of either. However, more comprehensive modelling will be required if surface water will be utilised for operations.

Mass Water Balance in a Veneer and Plywood Mill

A detailed water balance has not yet been completed for operations. Water usage in veneer and plywood manufacturing depends on the types of unit operations employed and the degree of recycle and reuse of water practiced. The water balance will account for total water requirement, water reserves (e.g. for operations and firefighting), water recycling / reuse, etc.

Burapha will store water in an above ground water tank located in the pump room. Design specifications for the well and water tank have not yet been finalised.

Mill operations are expected to require water for the following:

- Log conditioning (if applicable);
- Irrigating the logs in the stockyard;
- Cleaning of veneer dryers;
- Washing of the glue lines and glue tanks;
- Cooling water;
- Fire water;
- Sewage; and
- Kitchen and misc.

Construction

Construction of the Mill will not require abstraction of surface or groundwater. Potential impacts to surface water will be limited to the short-term retention of water in the sedimentation basin during the rainy season. No Impacts to hydrology will occur during Project construction.

Surface water drains in a north-westerly direction for the majority of the site. As an erosion control measure, surface water will be directed to channels and a sedimentation basin for discharge to an ephemeral drainage to the northwest of the site. Discharge to the drainage channel will approximately equal that of the sheet flow that currently flows to the channels (i.e. no trans-catchment water diversion). Once the basin has filled, surface water hydrology will approximately replicate the pre-construction regime.

Operations

The topography of the site indicates that groundwater likely flows west (to the Nam Lik River). There are no groundwater bores / wells between the Mill site and the river. The nearest bores / wells are located approximately 0.5 km to the north (with rolling hills in-between) in Phonesoung Sub-Village and 1.1 km to the southwest in the village of Khone Phook, which are primarily used for garden irrigation (drinking water is entirely sourced from bottles). Do to the distance from the abstraction point and the anticipated aquifer recharge, no impacts are anticipated.

If impacts are identified (through the Grievance Mechanism), Burapha will provide an alternate source of water to mitigate the effects.

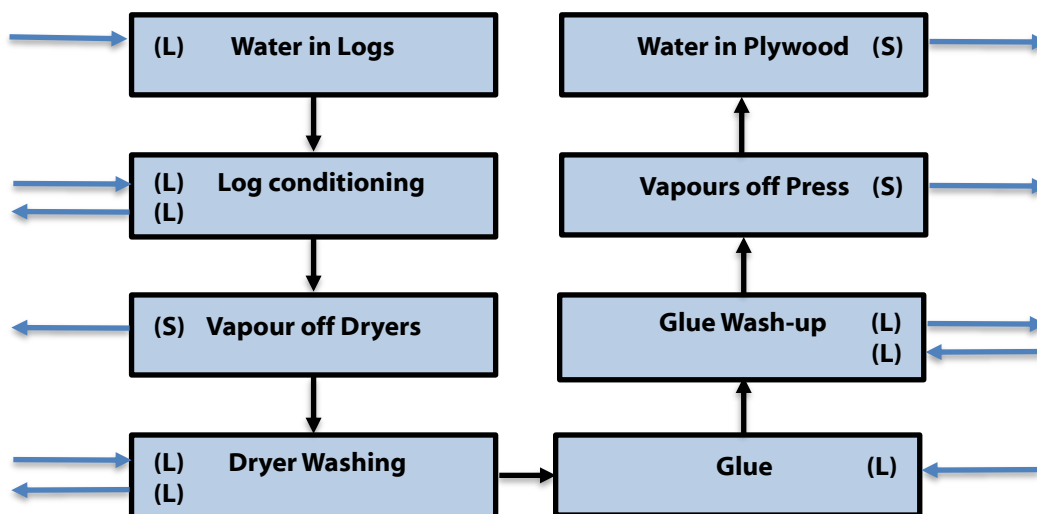


Figure 6.1 Plywood Mill Water Balance Schematic

L = Liquid; S= Steam / Vapour

6.5.2 Management and Mitigation

Construction

Surface water hydrology will be managed as per Section 6.4.1 and 6.3.1.

Operations

Burapha will develop and implement a Grievance Mechanism (refer to ESMMP). If water availability in nearby village bores / well is impacted, the Company will provide an alternate source of water equal to that currently abstracted. This would likely entail drilling deeper at effected bores or providing water tanks and water in villages.

6.5.3 Impact Assessment

The risk for impacts to downstream and downgradient receptors is Very Low. No impacts are anticipated.

Impact Assessment

No impacts to surface or groundwater hydrology are anticipated during construction or operations.

6.6 Air Quality

Air emissions will occur as a result of Project construction and operational activities. Though a number of potential pollutants will be generated during Project operations, it is anticipated that concentrations will not exceed regulatory guidelines nor present a risk for nearby communities (refer to below). There is significant occupational health and safety risk that will be mitigated through appropriate hazardous materials management (refer to Section 6.3) and occupational health and safety measures (refer to Section 8.4).

Similarly, air emissions during construction will likely only be an issue for workers due to the distance of the site from villages (i.e. > 0.5 km). Dust will be generated during vegetation clearance / earthworks, road construction, and during travel on the unsealed access roads (referred to below as PM₁₀ - particulate matter with an aerodynamic diameter of 10 micrometres or less and PM_{2.5} - particulate matter with an aerodynamic diameter of 2.5 micrometres or less, often referred to as "fine particles").

Dust is created during board manufacture, log handing, chipping, screening, veneer trimming cutting and sanding. Wood dust has been evaluated by the International Agency for Research on Cancer (IARC), a division of the World Health Organization (WHO), as a Group 1 carcinogen (carcinogenic to humans).

Volatile Organic Compounds (VOCs), including formaldehyde (CH₂O), are released from the processing and drying of woods products. VOCs are a large group of chemicals that include any compound of carbon, excluding carbon monoxide (CO), carbon dioxide (CO₂) and methane (CH₄). Many individual VOCs are known to be harmful to human health, such as those emitted from fuels and industrial processes.

Formaldehyde (CH₂O) is a simple carbon-based gas (also known as methanal) naturally found in the environment, and is emitted by all timber species, particularly during the drying process. A formaldehyde based resin will be used during plywood pressing, providing a more acute source of pollutant emissions. Exposure to formaldehyde may cause short-term ill effects for humans (nuisance level) and chronic exposure may cause certain types of cancer, including leukaemia (NCI, 2016). In 2011, the US National Toxicology Program named formaldehyde as a known carcinogen in its 12th Report on Carcinogens (NTP, 2011) and in 2013 the International Agency for Research on Cancer (IARC) reclassified formaldehyde as a Group 2A carcinogen, for very high

concentrations. Such concentrations are hundreds of times greater than the levels emitted from timber and plywood manufacturing.

The primary emissions from the plywood mill operation will come from the boiler and dryer processes. According to engineering specifications, emissions estimates for both the boiler and dryer are expected to be 50 mg/m³ for particulate matter which collectively is still well below the 320 mg/m³ set out in the Decree on National Environmental Standards (2017). It is understood that design specifications for any mill equipment generating emissions includes a requirement for compliance with International Finance Corporation (IFC) guidance on emissions limits for sawmills and manufactured wood products (2007) as prescribed below:

IFC Guidelines on emissions limits for sawmills and manufactured wood products

Pollutant	Units	Guideline Values
Wood dust	mg / Nm ³	50
VOC's	mg / Nm ³	20

6.6.1 Issues and Findings

Construction

During site preparation, a number of construction-related emission sources will be generated that may impact local air quality. Potential sources of air quality impacts from construction activities include;

- Clearing of vegetation and topsoil (and subsequent wind erosion);
- Open burning of vegetation;
- Vehicle travel on unsealed roads;
- Storage of fuels on-site; and
- Vehicle exhaust emissions.

Land clearance activities will produce dust emissions and gaseous combustion emissions for short-periods of time that may be a nuisance for the workforce if adequate protective equipment is not provided. As villages are greater than 0.5 km from the construction site and roads through villages are paved, nearby residents are not expected to be subject to increased dust emissions during construction.

If Burapha intends to burn slash following vegetation clearance, the Project will contribute to increased airborne particulates in the region for a handful of days. Opening burning for land clearance is a common seasonal occurrence in Lao PDR, and results in increased airborne particulate concentrations above international health criteria regionally. Open burning of cleared vegetation should be avoided where possible, as the wood smoke contains increased concentrations of particulates TSP, PM₁₀, PM_{2.5} and combustion gases CO and NO_x.

During site preparation, some additional vehicle exhaust emissions associated with truck movements are anticipated along the access roads. However, given the level of traffic on these roads, the contribution from Project related activities will be very minor.

Operations

Primary emissions of concern during operations include dust (TSP, PM₁₀ and PM_{2.5}), VOCs including formaldehyde (CH₂O), and combustion gases (SO₂, NO_x and CO).

Inhalable particulate matter (PM₁₀ and PM_{2.5}) sourced from wood dust, chipping, cutting and sanding and also from combustion soot represents a respiratory health risk. Sawmill operations may use controlled incineration to dispose of wood waste for utility boilers, hot gas generators and thermal fluid heaters, which may result in

emissions of gases such as sulfur dioxide (SO₂), nitrogen oxides (NO_x), and carbon monoxide (CO), which may also arise from combustion in diesel generators or truck exhausts.

Volatile organic compounds (VOCs) and formaldehyde (CH₂O) are of particular concern due to their emissions from wood heating in veneer dryers and presses. VOCs are also emitted from wood glues / resins. The United States Environmental Protection Agency (USEPA) and Australian National Pollutant Inventory (NPI) provide estimated emissions from wood product manufacture and processing as summarised in Table 6-6.

Table 6-7 Likely Emissions from Wood Mills (adapted from USEPA 1998, NPI 2006)

Process	Substances Used	Likely Air Emissions
Sawing and milling	Wood and wood products	Particulates (TSP, PM ₁₀ , PM _{2.5}) Oxides of nitrogen (NO _x) Carbon monoxide (CO) Volatile Organic Compounds (VOCs)
Plywood and Veneer	Veneer, phenol-formaldehyde resins, urea-formaldehyde resins, melamine-formaldehyde, resins, sodium hydroxide, ammonium sulfate, acids, ammonia.	Volatile Organic Compounds (VOCs) Oxides of nitrogen (NO _x) Carbon monoxide (CO) Particulates (TSP, PM ₁₀ , PM _{2.5}) Formaldehyde, Phenol, condensable hydrocarbons, Terpenes, Methanol, Acetic acid, Ethanol
Wood-fired Boilers Biomass incinerators	Waste wood and bark	Particulates (TSP, PM ₁₀ , PM _{2.5}) Oxides of nitrogen (NO _x) Carbon monoxide (CO) Volatile organic compounds (VOCs)

Transport

Vehicular travel is anticipated to only slightly increase the existing concentrations of road-generated dust, vehicle exhaust emissions sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and particulates. Exhaust emissions are not expected to be significant, though sulfur content in diesel fuel in Lao PDR is high (up to 2,500 ppm sulfur), resulting in potentially high SO₂ exhaust emissions. Road dust and vehicle emissions are not likely to impact more than 200 m from roads (Watson, WRAP 2000) in the dry season.

6.6.2 Management and Mitigation

Construction

The following measures will be included in contractor CEMP(s) and will be implemented by Burapha and contractors:

- the log stockyard will be sealed (concrete) and the secondary log yard will have gravel applied to the surface;
- Burapha will progressively rehabilitate areas not needed for operations upon completion of construction in a given location. Progressive rehabilitation will include ripping and other appropriate soil preparation and planting at the onset of the rainy season;
- Contractors will avoid loading and dumping of topsoil during high winds. Topsoil stripping should also be conducted at times when soil moisture can be expected to be optimal to minimise dust formation. If this is not possible, the application of water during topsoil-stripping may be necessary;

- Burapha / contractors will avoid open-burning of cleared vegetation and general wastes. Unavoidable waste incineration (e.g. cleared vegetative material) will be undertaken in accordance with the IFC General EHS Guidelines - Waste Management Facilities (2007) (refer to ESMMP); and
- A **Grievance Mechanism** (refer to Project ESMMP) will be implemented to provide nearby residents a forum to inform Burapha / the GOL of dust impacts. Burapha will respond to complaints appropriately (i.e. water applications on roads, and other measures identified below for roads); and
- Burapha will assess the need for water application (or a commercially available eco-surfactant to bind surface particulates) and mitigate dust generated, as needed.

Operations

The Project workforce will be protected from emissions through various control technologies (refer to below) and occupational health and safety measures. Some of the design for emissions control technologies are currently being considered during Feasibility Study.

Burapha will develop an **Occupational Health and Safety Standard Operation Procedure** prior to the commencement of operations that will detail safe storage and handling techniques for hazardous inhalable materials; suitable personal protective equipment (PPE), including dust masks; and training requirements for safe operating procedures.

Wood Dust

Potential impacts from wood dust and larger particulates generated during sawing, machining and sanding operations will be avoided as follows:

- Dust extraction systems will be provided in Mill locations where particulates are formed, including: log debarking, saws, sanding, shaping, and routing machines. Cyclones or bag filters are typically employed to remove particulates from the air stream;
 - » Cyclone – a flue gas fan that collects particulates. Requires additional power and can impart swirling/stratified gas flow in system that can potentially concentrate gas emissions.
 - » Fabric Filter (Baghouse) – large fabric bags that collect particulates. Typically require cooling below 160°C, pressure drop and additional flue gas fans. Particulate matter can clog filters and require regular bag replacement, maintenance and environmental disposal, which can prove challenging in developing countries.
- Wood dust will be collected and reused as a fuel and / or sold to interested parties (if applicable); and
- Appropriate personal PPE masks/respirators will be worn by Burapha personnel.

Drying and Pressing

The following will prevent, minimise, and control emissions of VOCs and formaldehyde during drying of wood:

- Use of a Recuperative Thermal Oxidiser (RTO) for wood dryers to reduce VOCs;
- Use of enclosed booths for spraying activities.
- Use of High Volume Low Pressure (HVLP) spraying or electrostatic spray systems to improve spray transfer efficiency; and / or
- Air recirculation into the spray booth should be used to reduce the volume of air that needs to be treated before release.

Fuel Burning & Boilers

Burapha will incorporate the following techniques (adapted from FPJ 200, IFC 2007) into final design:

- Fuel efficiencies will be optimised, where feasible;

- Wood waste will be burned in the biofuel boiler to generate heat / steam for operations;
- A constant fuel supply will be employed to boiler/incinerator;
- Wet wastes (e.g. sawmill chips) and dry wastes (e.g. planer shavings) will be stored separately. Wood waste fuel will be a constant moisture content to the extent practicable;
- Ash from incineration of wood waste will be stored in a contained, wind resistant area until it has fully cooled.

It is anticipated that emission will comply with applicable guidelines (i.e. national standards and IFC standards). However, if assessment during the Feasibility Study determines further emission control is required. These may include:

- Thermal oxidisers – VOC control technology which destroys VOCs, CO and condensable organics by burning them at high temperatures.
- Electrostatic Precipitator (ESP) – repetitive electrostatic pulse drops out particulates from stack flue. The composition of the collected fly ash depends on the fuel used.
- Scrubbers – pass exhaust air through a water spray to remove particulates (wet scrubber).
- Exhaust gas recycle, regenerative catalytic oxidation (RCO), and adsorption systems for veneer dryers and presses.

Transport

Specific mitigation and management measures to minimise emissions along the access roads include:

- Burapha will impose a speed limit in the vicinity of potential receptors such as villages or isolated residences to reduce dust generation;
- Vehicles will be routinely maintained (in accordance with the vehicle manufacturer's instructions);
- The main access road will be sealed or have gravel applied;
- Access roads will be maintained regularly to prevent rutting and potholes; and
- Vehicles will be prohibited from idling/waiting near villages.

6.6.3 Impact Assessment

Construction

Project construction activities may lead to significant dust emissions if unmanaged including wind-blown dust from untreated open areas during the dry season and emissions from vehicular traffic and on-site machinery. With the application of prescribed management measures, impacts are expected to be Low due to the distance of construction activity from receptors.

Operations

Significant risks to workforce / community health from impaired air quality will be effectively managed through design controls and occupational health and safety measures listed in Section 6.6.2. It is anticipated that emissions will be below national and international air quality / emissions standards and potential impacts will be Low.

Due to heavy traffic volumes on the transport network and Burapha use of sealed roads to move logs / finished products, air quality impacts associated with transportation will be Low.

Impact Assessment

With suitable design controls and occupational health and safety requirements, air quality impacts during construction and operations will be **Low**.

6.7 Noise and Vibration

Though fairly significant noise and vibrations will be generated during Mill construction and operations, the impacts to nearby residents is expected to be Low. Sensitive human receptors are topographically shielded from the site and residences are more than 0.5 km away, with the majority being > 1 km away. In addition, the ambient noise at and near the Mill site is currently very high.

Transport of raw logs and finished products will provide a source for nuisance-level noise and vibration along the transport routes. Given the transportation infrastructure is largely comprised of busy Provincial and National roads, ambient conditions will largely remain unchanged. However, short duration nuisance level impacts may occur at some rural locations near plantations, where current traffic conditions / ambient noise and vibration are low.

The most significant potential impact will be for the workforce. Some components of Mill operations will generate significantly high noise emissions. Burapha will have to ensure adherence to requirements for ear protection to safeguard its workforce.

6.7.1 Issues and Findings

Construction

Noise

Noise will be generated during Mill construction, with heavy equipment movements for land clearing and grading activities, generators for power requirements, etc. providing significant emissions (refer to Table 6-6). The nearest residents may experience some noise disturbance, though this is likely to be of short-term and of moderate impact given their distance. Impacts to wildlife are considered Negligible as the Mill footprint is adjacent other industry and is thus unlikely to harbour noise sensitive species.

Table 6-8 Source noise levels of mill site equipment during construction (adapted from Malherbe 2005, Holland 1981).

Construction & Closure Equipment	Maximum Noise levels at source dB(A)
Haul truck	121
Dump truck	119
Hydraulic Excavator	125
Dozer	116
Grader	114
Wheeled Loader	116

Vibration

Ground vibration impacts during site preparation are expected to be predominantly short-term and localised to site preparation / land clearance areas and are not expected to impact local communities.

Operations

Noise

Sawing, mechanical sanders, and additional wood processing activities are high intensity noise sources that may impact the occupational health and safety of the workforce and provide nuisance level impacts for the

local community in the absence of suitable management. Ambient noise levels are moderately high in nearby villages, largely due to the traffic regime. Given the implementation of management measures identified below, noise emissions are not expected to impact local residents during the days. However, night time shift work may provide nuisance level noise if design controls are not suitably robust.

Table 6-9 Source noise levels of mill site equipment (adapted from WHO 1995, Malherbe 2005,).

Operations Equipment	Maximum Noise levels at source dB(A)
Saws	115
Milling	110
Sanders	105
Electric Drills	106
Pneumatic Tools (e.g. grinder)	110
Haul Truck	121
Wheeled Loader	116

Vibration

Due to the distance of receptors, vibration impacts from Mill operations are not expected to impact local communities. Vehicles transporting logs / finished wood products may provide nuisance level impacts for people living adjacent segments of the transport network (refer to below).

Transport

Noise

Increased vehicle movements along local roads / highways are anticipated during construction, though vehicles will account for a small fraction of traffic on what are currently very busy roads. Noise impacts to local receptors from vehicle transit during construction is therefore considered Negligible.

During operations, the factors that will affect noise emissions from Mill traffic will include the volume of traffic, the speed of traffic and the composition of traffic (number of heavy vehicles versus light vehicles). Generally, heavier traffic volumes, higher speeds and a larger number of heavy vehicles results in more traffic noise, although impacts will depend strongly on the magnitude of the change in the existing noise regime and the sensitivity of the receptors. Given that noise from road traffic in the region is currently very high, the slightly increased traffic levels are unlikely to change ambient noise conditions in the vicinity of the Mill. Moderately significant noise impacts may occur in rural villages near plantations, which will be limited to only the year(s) where harvest occurs.

Vibration

Vehicle traffic in particular induces vibration in two ways (Hajek et al. 2006):

- Ground-borne vibration – caused by the dynamic impact forces of tyres on the pavement or other surface that can propagate and excite building foundations, resulting in vibrations of building components; and
- Air-borne vibration – caused by low frequency sound produced by engines and exhaust systems (primarily associated with large diesel trucks) that can excite building components above ground.

Both types of vibration may be caused by the same vehicle at the same time. The generation of ground-borne vibration is strongly linked to surface evenness – the more uneven the surface, the greater the ground-borne vibration. Heavier vehicles typically produce higher ground-borne and air-borne vibration, and an increase in the number of heavy vehicles tends to result in more vibration peaks, but not necessarily higher peaks. Higher speeds increase both ground-borne and air-borne vibrations.

The ground vibration Peak Particle Velocity or PPV for vehicle traffic can be estimated using a standard curve provided by the US Bureau of Transport. For a passing heavy vehicle on a major road, this curve indicates PPVs of approximately;

- 2 mm/s at 5 m from the road;
- 1.5 mm/s at 10 m from the road;
- 1 mm/s at 15 m from the road; and
- 0.2 mm/s at 45 m from the road.

Heavy traffic vibration may be at nuisance levels up to 50m from the local road network. Residences located further than 50 m from roadways are of sufficient distance that ground-vibrations from traffic are not anticipated.

6.7.2 Management and Mitigation

Construction

The following measures are expected to minimise noise impacts to that below maximum noise levels in the construction area and ambient noise emissions in nearby villages, as specified in the Lao PDR *Agreement on the National Environmental Standards* (2009) and World Health Organisation *Guidelines for Community Noise* (1999) (refer to ESMMP for guidelines).

- Construction activities will be limited to daylight hours and large vehicle transport concentrated to daylight hours to the extent practicable;
- Vehicle idling and the use of air breaks in villages will be prohibited;
- Mobile noise sources will be site in less sensitive areas to take advantage of distance and shielding to the extent practicable;
- Vehicles will be regularly maintained and outfitted with appropriate noise attenuation (e.g. mufflers); and
- A **Grievance Mechanism** will be implemented to record and respond to community complaints; and

Operations

Burapha will incorporate the following design controls to minimise noise emissions during operations:

- Permanent mechanised noise / vibration sources will be isolated (housed inside additional noise attenuating structures);
- Vegetation will be retained and planted between the Mill and nearby communities;
- Suitable mufflers will be installed on compressor components and engine exhausts; and
- Where feasible, equipment with lower sound power levels will be selected.

Burapha will implement the following mitigation measures to minimise impacts:

- The workforce will be outfitted with suitable hearing protection and required to wear it within the facility. Hearing protection requirements will be specified in a stand-alone **Occupational Health and Safety SOP**;
- A formal **Grievance Mechanism** will be employed to record and respond to community complaints and inform the need for adaptive management; and
- Reported structural damage from vibration will be reviewed. In the unlikely event that Project operations are at fault, remedial action will be required (including compensation).

Should the above measures prove inadequate (i.e. community complaints), commercially-available acoustic shields can be effectively employed to reduce noise.

Transport

Specific mitigation and management measures to minimise noise emissions and vibration along access roads will include:

- Haul trucks will be scheduled for daylight hours to the extent practicable, though some hauling will occur during all shifts;
- The Mill access road will be maintained to reduce rumble;
- Speed limits will be strictly enforced; and
- The use of air/exhaust brakes will be prohibited within residential areas.

6.7.3 Impact Assessment

Construction

Noise emitted from Project construction will be localised and limited to daylight hours. Due to the distance of residences to the site, impacts to communities will be Low. Requirements for ear protection will protect the occupational health and safety of the construction workforce.

No impacts from vibration are anticipated.

Operations

Due to ambient noise conditions in nearby villages, topographic shielding, and noise attenuation, impacts to communities are expected to be Low during the day. Restrictions on noisy activities during night shifts will similarly prevent significant impacts. No vibration impacts from Mill operations are expected due to the distance of the Mill from the nearest houses.

The high risk for occupational health and safety associated with Mill activities will be avoided through strict adherence to hearing protection requirements.

Transport

Noise emissions on the access road will be minimised by enforcing speed limits through settlement areas and concentrating hauling traffic to daylight hours to the extent practicable. Ambient conditions will remain unchanged for the majority of villages along the transport route due to the number of large vehicles currently utilising the road network. Moderately significant noise impacts may occur in rural villages near plantations, which will be limited to only the year(s) where harvest occurs.

Impact Assessment

With design controls and management measures, noise and vibration impacts to local communities will be **Low** during Mill construction and operations.

Noise and vibration associated with transport will provide **Moderate** nuisance level impacts for more rural communities where ambient conditions are quiet.

Mill staff will be protected from potentially harmful noise emissions through strict requirements for noise protection (PPE), with **no impacts** anticipated.

6.8 Summary of Impact Assessment

Table 6-10 Physical Impact Assessment Summary Table for Construction and Operations

Aspect	Unmitigated Risk	Mitigated Risk	Impact Assessment
Surface morphology and soils	Low	Low	Low
Water Quality	Moderate	Low	Low
Hazardous and Non-Hazardous Materials	Moderate	Low	Very Low
Erosion and Sedimentation	High	Moderate	Low
Hydrology	Low	Low	Very Low
Air Quality	Moderate	Low	Low
Noise and Vibration	Moderate	Low	Moderate to Low



Chapter 7 | Potential Biological Impacts and Mitigation Measures

Chapter 7 | Potential Biological Impacts and Mitigation Measures

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7. POTENTIAL BIOLOGICAL IMPACTS AND MITIGATION MEASURES

7.1 Terrestrial Flora and Natural Forest

Project related impacts to terrestrial flora will be negligible and no native forest will be removed during Project construction or operations. Mill construction and operations will not impact any nationally or internationally threatened species or High Conservation Value forest or species (as per FSC).

Vegetation in the Mill footprint is comprised of native and non-native grasses and herbs with scattered trees (refer to Chapter 5). The site has been subjected to ongoing vegetation clearance and disturbance, with the majority of the surface soils highly compacted. Therefore, regeneration of vegetation following abandonment of the site by the previous concessionaire (HIPA) has been limited. No species of conservation value or resource value were identified within the Project footprint during 2016 biodiversity surveys for this ESIA. Livestock grazing is common within the Project footprint, with grasses, herbs and shrubs grazed to ground level throughout the site.

The vegetative communities surrounding the Mill footprint are more ecologically functional but are highly modified (as per national, IFC, and FSC definitions), having been cleared of natural habitat types. Soils surrounding the Project footprint are less compacted, therefore the native forests are regenerating slowly following historic logging and agricultural activity.

Regenerating forest bordering the Project footprint are young or old fallow, comprised largely of native species with some non-native invasive plants having colonised the area. Modified habitat types surrounding the Project footprint are:

1. **Young fallow (1-2 years)** – dominated by the mid-storey and understorey, with only two fast-growing species exceeding 5 m height.
2. **Fallow forest (3-7 years)** – has a more natural vegetative structure, but is still considered modified habitat since it no longer resembles natural forest floristic assemblage.

Although most species within and surrounding the Mill site have not been assessed for their conservation status or rarity (e.g. by IUCN), the plants recorded during surveys were found to be common in the region.

7.1.1 Issues and Findings

Construction

Construction of the Mill will require the clearance of approximately seven ha of highly degraded vegetation comprised of native and non-native grasses and herbs with no threatened species, HCV species or vegetative communities, or viable habitat for terrestrial fauna.

Operations

No further vegetation clearing will occur during Project operations. Areas in the buffer (surrounding the Mill) will be allowed to grow, with Eucalyptus trees planted along the western and northern boundaries to decrease impacts to visual amenity (refer to Chapter 8) and provide some noise attenuation (refer to Chapter 6).

7.1.2 Avoidance, Mitigation and Management Measures

Burapha will protect and enhance vegetation surrounding the Mill footprint (within the concession), during construction and operations. Specific measures for each phase are as follows.

Construction

Burapha and construction contractors will implement to the following during Mill construction:

- The construction footprint will be surveyed and clearly delineated and demarcated prior to vegetation clearing. Vegetation clearing and access to vehicles will be restricted to the footprint (i.e. buffer vegetation will be protected);
- Riparian vegetation in the ephemeral streams that drain the Project footprint will be protected. A 5m exclusion zone (on each side of the stream channels) will be enforced.
- The Burapha Compliance Officer will inspect the clearance area prior to ground disturbing activities to ensure the potential for impacts to vegetation are limited to the vegetation within the footprint.

Operations

Management and mitigation measures to protect vegetation or enhance vegetative communities during operations will include:

- Burapha will rehabilitate buffer vegetation (i.e. vegetation within the concession area but outside the Mill footprint) immediately following construction (at the onset of the first rainy season);
- Burapha will progressively rehabilitate non-operational areas within the Project footprint (as an erosion and sediment control measure);
- Vegetative buffer areas will be maintained for adequate cover throughout operations; and
- Burapha staff will be prohibited from collecting NTFP / TFP from surrounding forests, with the exception of local residents who have historically utilised the area for resource extraction.

7.1.3 Impact Assessment

The risks for impacts to terrestrial flora are very low during Project construction and operations. No quality habitat exists on the site, with vegetation having been previously cleared and much of the site graded and the soil compacted on the site. May 2016 biodiversity surveys on the site found no threatened or High Conservation Value flora. Impacts to terrestrial biodiversity will be Very Low.

Impact Assessment

Impacts to terrestrial biodiversity will be **Very Low**.

7.2 Invasive Species

A number of non-native invasive plants occur within the Project development area. Invasive and disturbance-tolerant species have the ability to colonise disturbed areas and reproduce quickly (ISSG, 2016).

Soil disturbance will encourage the spread of such species, particularly the more aggressive pioneers (such as *Chromolaena odorata* and *Mimosa pudica*). The proliferation of invasive species in cleared areas would provide sources of seed that may outcompete native vegetation adjacent the site. The unmitigated risk is considered only Moderate as these plants already occur throughout the region.

The relocation of construction equipment from other areas may introduce seed from species that do not currently exist in the area. The introduction of such species may lead to colonisation in neighbouring stands, a moderately significant direct impact.

It is anticipated that non-native *Eucalyptus* trees will be planted around the Mill to improve visual amenity and provide noise attenuation. The same traits that allow *Eucalyptus* to be successful plantation species, including rapid growth, high reproduction rate, and tolerance of a wide range of soil and climate conditions, also allow these species to be potentially invasive. *Eucalyptus camaldulensis* (for example) is particularly invasive in riparian zones (Tererai et al. 2014), transforming the species assemblage and quickly establishing canopy dominance (Forsyth et al., 2004).

7.2.1 Issues and Findings

Construction

The following impacts will require management during construction:

- Earthworks during construction will promote the spread of invasive plants particularly on the edges of roads and cleared areas; and
- Construction vehicles, relocated from another region, are a potential vector for seed from species occurring elsewhere in the region.

Operations

The disturbed soil around the newly constructed Mill will be vulnerable to quick succession of invasive species which may be transmitted by air, water, animals, people and vehicles to neighbouring vegetative communities. *Chromolaena odorata*, *M. pudica* and another highly invasive species known to occur in the area (*Imperata cylindrica*) have the potential to be the most problematic species due to their rapid growth, tolerance of variety of conditions and ability to dominate / outcompete native flora.

Eucalyptus trees pose a slight risk for encroachment into neighbouring vegetative communities. However, the spread would not be rapid (easily managed), particularly in comparison the pioneer shrub invasive plants.

7.2.2 Avoidance, Management, and Mitigation

Burapha will implement an Invasive Species Management Plan (refer to ESMMP) to specify construction and operations phase management and monitoring requirements.

The contractor's CEMP will incorporate ESMMP sub-plans to provide site-specific management measures for managing invasive species during construction.

Construction

Construction phase measures in the Invasive Species Management Plan are summarised as follows:

- Construction vehicles relocated to the site will be thoroughly washed upon arrival;
- Vegetation clearance will be restricted to the area required for construction, which will be clearly demarcated prior to earthworks; and
- Burapha and contractor personnel will monitor cleared areas for target invasive plants during monthly site monitoring and will prescribe hand weeding as required.

Operations

Burapha will manage invasive plants accordingly:

- Routine annual monitoring for invasive species will be conducted early in the dry season to allow for chemical application (if applicable) well in advance of seasonal rains and to target species early in their respective growth cycle;
- Herbicide applications will be conducted according to the requirements specified in the Project ESMMP (e.g. use of appropriate herbicides, dry season application only, avoidance of water resources, wind restrictions); and
- Herbicides will be transported, stored, handled and disposed of (unused herbicide and herbicide containers) according to measure detailed in Section 7.3, Hazardous and Non-Hazardous Materials.

7.2.3 Impact Assessment

There is a moderate risk that invasive plants that currently exist in the Project area will spread as a result ground disturbing activities and a low risk that new species will be introduced to the region. Impacts to neighbouring vegetative communities will be largely mitigated through measures summarised in Section 7.2.2 and detailed in the ESMMP. Impacts to vegetative communities will be Low, however some Eucalyptus may spread beyond the Project footprint.

Impact Assessment

Impacts to vegetative communities from invasive plants will be **Low**.

7.3 Terrestrial Fauna

Due to the lack of habitat and industrial activity in the immediate area, animal occurrences are likely to be transient, with the possible exception of burrowing animals. No vertebrates were observed within the Mill site during May 2016 biodiversity surveys (with the exception of livestock). Risk to terrestrial biodiversity are expected to be limited to potential impacts during transport.

The results of site surveys, local knowledge surveys, and assessment of secondary information indicates that it is highly unlikely that any fauna species of conservation significance inhabit the site. The majority of mammals seen in the vicinity of the Mill site by local residents are considered globally Least Concern (IUCN), with their populations stable. All mammals reported by villagers are common to Lao PDR and the region.

Terrestrial fauna likely to inhabit the greater Project region were identified during local knowledge surveys (12 mammal species, 23 bird species, six reptile species and eight amphibian species). Additional species with potential to occur in the region were identified through evaluation of secondary information (refer to Chapter 5).

Given the lack of habitat for terrestrial species in the Project footprint and the high level of human activity in the area (adjacent Hin Heup Power Plant and Ray Fertiliser Company), it is unlikely that the large majority of species identified by villagers / secondary data review are ever in the proposed Project footprint.

Threatened Species

Threatened and HCV species are unlikely at the Mill due the poor quality of the habitat at the site and in the immediate surrounds. Of the 28 threatened species identified during literature review that may occur in the region, only eight are considered candidates for utilising the area and only two are potential residents (refer to Table 7-1). The six birds are able to move easily and utilise a variety of habitats in the surrounding forested areas. No threatened mammals are likely to inhabit or otherwise occupy the site.

Table 7-1 Threatened fauna with potential to be found within the Mill site

Mill Footprint	Potential Inhabitation	Potential transients
Reptiles		
Black and white spitting cobra (<i>Naja siamensis</i>) VU, PARL	✓	✓
King cobra (<i>Ophiophagus hannah</i>) VU, PARL, R	✓	✓
Birds		
River lapwing (<i>Vanellus duvaucelii</i>) NT, ARL, IBA Congregatory		✓
Small pratincole (<i>Glareola lactea</i>) LC, PARL, IBA Congregatory		✓
Wood snipe (<i>Gallinago nemoricola</i>) VU, LKL		✓
Yellow-breasted bunting (<i>Emberiza aureola</i>) EN		✓
Jerdon's bushchat (<i>Saxicola jerdoni</i>) LC, biome-restricted		✓
Chestnut starling (<i>Sturnes malabricus</i>) LC, biome-restricted		✓

KEY: CR – Critically Endangered; EN – Endangered; VU – Vulnerable; NT – Near Threatened; DD – Data Deficient; LC – Least Concern; LR – Lower Risk; CD – Conservation Dependent; ARL – At Risk in Lao PDR; LKL – Little Known in Lao PDR; PARL – Potentially At Risk in Lao PDR; CARL – Conditionally At Risk in Lao PDR; R – Restricted; C – Controlled; IBA – International Bird Area

A number of the species identified during the assessment of secondary data are nocturnal/crepuscular and arboreal and therefore would rarely cross or use open, cleared or highly degraded habitat (e.g. black giant squirrel *Ratufa bicolor*, large Indian civet *Viverra zibetha*). Of the 23 species of bird reportedly seen in the vicinity, 16 may occasionally use the open Mill area (the other seven are waterbirds). The majority of reptiles seen by villagers are small and may inhabit the Mill site. The footprint is not conducive to amphibian inhabitation. None of the 12 mammals identified are likely to occur within the Mill site at any time.

7.3.1 Issues and Findings

Construction

There is a low risk for construction phase impacts to regional fauna, from the following:

- Vehicle collision;
- Habitat loss; and
- Noise and vibration.

Vehicle Collision

Accidental death and injury of fauna in and around the Project may be caused by collisions with vehicles. Increased traffic load and speed are positively correlated with roadkill rates (Corlatti *et al.*, 2009). Species that are most likely to be hit are (i) slow-moving species, (ii) nocturnal species that are startled by headlights and difficult to see, and (iii) predators feeding on carrion on the road or beside the road (Forman and Alexander, 1998).

Habitat Loss and Degradation

Small mammals (e.g. rodents) and reptiles may reside within the soil / scrub vegetation scheduled for soil disturbance and vegetation clearing, respectively. It is anticipated that most disturbance-sensitive species no longer reside in the Mill site and will not be impacted by the loss of habitat and associated degradation. Similarly, rare, threatened and endemic species are unlikely to be able to tolerate the poor quality habitat.

Noise and Vibration

Noise and vibration from construction activity may alter fauna species assemblage and distribution. It is likely that most animals will move away from noise sources during vegetation clearing and any road construction activities. Some fauna may also habituate to the altered noise regime.

Operations

The potential for impacts to terrestrial fauna will be less during Project operations. Potential impacts include (as above):

- Vehicular collision; and
- Noise and vibration.

Vehicle collision

Loaded log trucks, trucks carrying plywood to market, and vehicles transporting staff to and from the Mill may strike fauna.

Noise and Vibration

Mill operations will provide a steady source of localised low intensity noise and vibration (refer to Section 7.7). Sensitive animals will move away and noise tolerant species may become habituated to the altered noise regime.

7.3.2 Avoidance, Mitigation and Management Measures

Construction

Construction contractors will develop a site-specific Construction Environmental Management Plan (CEMP) prior to the conduct of ground disturbing activities. The requirement to adhere to measures identified in the CEMP and the Project ESMMP will be stipulated in construction contracts. The CEMPs will include measure to avoid and minimise the chance for impacts to fauna, (as follows) and training requirements (refer to ESMMP, Volume C).

Vehicle Strike

Contractors will incorporate the traffic management sub-plan from the ESMMP into their CEMP. In summary, contractors and Burapha employees will:

- Be trained in safe driving. Only trained individuals will operate vehicles;
- Adhere to speed limits on public roads, drive at safe speeds where speed limits are not provided, and will drive less than 20 km/hr within the construction area; and
- Not drive under the influence of alcohol or any other controlled substance.

Stock and wildlife mortalities resulting from site related activities will be reported in accordance with internal reporting procedures and applicable stakeholder and statutory requirements.

Noise and Vibration

Management and mitigation measures specified in Section 7.7 will be implemented to minimise noise and vibration to an acceptable level. In summary, the following will minimise noise and vibration related impacts for wildlife during construction:

- Construction activities will be limited to daylight hours; and
- Vehicles and equipment will be outfitted with proper noise attenuation (e.g. mufflers) for compliance with Project noise emission standards.

Habitat Loss and Degradation

Burapha has largely avoided habitat loss and degradation through site selection. Management measure during construction will apply to buffer areas and adjacent habitat bordering the concession area. Burapha will:

- Survey and clearly demarcate the construction area. Contractors will be prohibited from clearing or driving vehicles outside this development area;
- Disturbed vegetation within the Mill site but outside the constructed footprint will be rehabilitated following construction, as follows:
 - » Surface soil will be ripped during the dry season to approximately 0.5m to reduce compaction;
 - » The areas will be planted with native vegetation and likely Eucalyptus trees at the onset of the rainy season; and
 - » Buffer areas will be planted with herbaceous, shrub and tree species to promote habitat, and provide visual and acoustic buffer.
- The Burapha environmental education and awareness programs will improve the understanding of the importance of habitat preservation and to ensure that the prohibition for collection of forest resources are widely known.

Operations

The management and mitigation measures identified for the Construction phase will apply to Operations.

7.3.3 Impact Assessment

The development of the Project will not pose a significant risk for terrestrial species in the area due to the highly degraded nature of habitat and the neighbouring industry. Vehicular movements of construction personnel and Burapha staff does pose a risk for fauna. With driver training and enforcement of safe driving practices (identified in the ESMMP) it is anticipated that impacts will be Low.

Impact Assessment

With the implementation of management and mitigation measures for safe driving impacts to terrestrial fauna will be **Low**.

7.4 Aquatic Biodiversity

In the absence of suitable design controls and diligent application of management / mitigation measures for water quality protection, there is risk that effluent will impact downstream aquatic biodiversity. Potential contaminants in Project effluent (identified in Sections 7.2-7.4) include suspended sediment during construction; nutrients and pathogen during operations; and hazardous / non-hazardous materials during construction and operations.

The channels that drain the Project footprint are not natural watercourses - previous grading of the area forced water that had drained to the south to incise channels to the north during the rainy season. These channels are unlikely to support aquatic fauna when surface water is flowing (access to migrating species is blocked from perennial streams).

Though aquatic habitat and biodiversity are absent on-site, drainage will reach the Nam Lik River, which has quality habitat for a range of aquatic species (likely including some threatened fish species) and is an important fishery for local residents. During local knowledge surveys, residents of Ban Viengthong, Ban Khone Phook, and Ban Phonesoung identified 13 fish species that are caught in the Nam Lik, none of which

are nationally or internationally recognized threatened / rare species. A review of secondary literature found an additional 21 species that may inhabit the river, 10 of which are listed as globally threatened. As the area has not been studied extensively, it is likely that the fish assemblage considerably exceeds these numbers. Of the 10 globally listed species, only one (1) is known to inhabit the Nam Lik (*Probarbus jullieni*), according to publicly available literature sourced for this ESIA.

Though some of the fish migrate to river tributaries to spawn during the rainy season, site observation of the channels that drain the site and results of local knowledge surveys indicate that they likely do not host fish at any time throughout the year.

The Nam Lik River will significantly dilute effluent from the site. Unmitigated risk is therefore Moderate. Cumulative discharge of nutrients / organic matter from industry in the region may elevate biological oxygen demand (BOD) and chemical oxygen demand (COD), decreasing dissolved oxygen concentrations to levels that may prove deleterious to aquatic species, particularly following impoundment of the river for the Nam Lik 1 Hydropower Project as the decomposition of submerged vegetation may deplete dissolved oxygen concentrations.

The Mill has been designed to minimise less deleterious inputs (i.e. suspended sediments) and avoid discharge of more significant parameters for aquatic biodiversity (i.e. nutrients, hazardous materials). Provided design controls and management / mitigation measures detailed in Section 7.2 and summarised are effectively implemented, the risk for potential impacts to aquatic biodiversity will be managed to the satisfaction of stakeholders.

7.4.1 Issues and Findings

Construction

Construction phase impacts to water quality are expected to be limited to sediment transport to the ephemeral drainage channels to the northwest of the Project footprint. Stormwater management and erosion and sediment control will reduce sediment loading, particularly for larger fraction particulates. Though some sediment will likely reach the river, the dilution factor will significantly moderate impacts to less than significant for aquatic biodiversity.

The use of hydrocarbons during construction provides some risk for contamination of receiving waters and potential impacts for aquatic biodiversity. With the implementation of prescribed hazardous materials transport, storage, handling and disposal measures, discharge is considered unlikely. It is less likely that spillage will reach the Nam Lik.

Operations

As discussed in Section 7.2, the risk of impacts to water quality during operations are more significant than during construction, as follows:

- Unmanaged / untreated discharge during the various phases of veneer and plywood manufacturing may be high in nutrients / organic material which may increase biological oxygen demand (BOD) and / or chemical oxygen demand (COD) to the extent that dissolved oxygen levels in receiving waters may be depleted, and benthic organisms consequently stressed or killed. Discharge of such materials in excess of national and international guidelines would directly impact surface water quality and aquatic habitat in the event that the volume is sufficient to alter the chemistry of the Nam Lik;
- The transport, storage, handling and disposal of hazardous materials or waste (i.e. hydrocarbons, sewage) and non-hazardous waste (e.g. refuse) provides risk for accidental discharge and impacts to aquatic biodiversity; and
- In the absence of suitable stormwater, erosion, and sediment control measures, erosion and sedimentation of watercourses may impact the quality of aquatic habitat.

As significant design controls for process water will be implemented to avoid discharge of effluent with nutrient concentrations above Project guidelines; diligent application of hazardous and non-hazardous materials management measures; and stormwater, erosion and sediment control implemented before the rainy season, impacts to aquatic biodiversity are expected to be Low.

7.4.2 Avoidance, Mitigation and Management Measures

Construction

Burapha and construction contractors will implement the following to protect surface water quality and aquatic biodiversity during construction:

- Stormwater, erosion and sediment control facilities specified in Section 7.2 and 7.4 will minimise sediment loading in receiving waters;
- Vegetation buffers will be retained (5m minimum on each side) of ephemeral channels draining the Project footprint;
- Hazardous materials will be transported, stored, handled, and disposed of according to the management regime provided in Section 7.3;
- Non-hazardous waste will be properly disposed of, as per Section 7.3;
- Construction personnel will be trained in hazardous and non-hazardous materials management and emergency preparedness and response (as per ESMMP Sub-Plans, Volume C);
- Contractors will have suitable and readily available spill containment and clean-up materials; and
- Burapha and construction contractors will inspect the Project area throughout construction to ensure materials are properly handled, control measure effective, etc. and will document corrective actions required to remediate non-compliance events (refer to ESMMP).

Operations

The effective implementation of design controls and management / mitigation measures specified in Sections 7.2 (water quality) and 7.3 (hazardous and non-hazardous waste) are required throughout operations to protect aquatic biodiversity. These are summarised as follows:

- The Mill has been designed for zero discharge of process waters;
- The Siltation Basin / Water Treatment Pond will have a 15-day hydraulic resident time and will accommodate peak flows from at least the 1:10 average return interval storm event to allow for passive treatment of organic material / nutrients and to allow for settling of suspended sediment prior to discharge;
- The Burapha Mill Project will develop, implement, communicate, adhere to and maintain a relevant and current **Waste Management Plan** which defines all on-site and off-site strategies, operational controls and management practices relating to hazardous and non-hazardous waste management;
- All operations phase management / mitigation measures provided in Section 7.3 (hazardous and non-hazardous materials) will be implemented to protect aquatic biodiversity from potential impacts;
- Burapha staff will be trained in hazardous and non-hazardous materials management and emergency preparedness and response (as per ESMMP Sub-Plans, Volume C);
- Suitable and readily available spill containment and clean-up materials will be available at strategic locations in the Mill;
- The sewage and grey-water disposal / treatment facilities will be appropriately designed and adequately sized to ensure no discharge to receiving waters;

- Herbicide applications will be conducted according to provisions in the ESMMP, including prohibitions for rainy season applications (or any day with precipitation forecasted) and windy days, and within 25m of watercourses;
- Burapha will undertake water quality monitoring as per the ESMMP (Volume C); and
- All incidents involving wildlife will be monitored and reported in accordance with the ESMMP. Aquatic fauna management measures will be improved accordingly.

7.4.3 Impact Assessment

Due to the lack of aquatic habitat on site, the dilution factor of the river (i.e. river flow will be exponentially greater than discharge from the Mill site), and design controls / management measures to protect water quality, impacts to downstream aquatic biodiversity in the river will not be impacted.

While potential risks to water quality from the Project can never be completely mitigated, measures to protect water quality are expected to minimise potential impacts to Low.

Impact Assessment

With the implementation of design controls and management / mitigation measures for water quality impacts to aquatic biodiversity will be **Low**.

7.5 Protected Areas

The Project is not located within, or near to, any internationally recognised areas of conservation importance including Important Bird Areas (IBAs), Ramsar sites or World Heritage Sites. The footprint does not overlap any national, provincial, district, village protection / conservation areas, or watershed protection areas.

There are two nationally protected areas within the broader region surrounding the Mill. These areas are the Phou Phanang NBCA and Phou Khao Khoay NBCA. The northernmost edge of the Phou Phanang NBCA is 12 km south east of the mill site. Phou Khao Khoay NBCA is located approximately 45 km south east of the Mill and 40 km northeast of Vientiane and spans three provinces.

The Project is 4 km west of the Phou Kaison District Protected Forest, 6 km southwest of the Phou Meut Provincial Protected Forest and 6 km east of the Phou Inthin Provincial Protected Forest.

The transport route for Mill-associated vehicles will pass through or by national, provincial and district protected forests.

7.5.1 Issues and Findings

There will be no direct impact from the Mill footprint on nearby protected areas. Potential impacts to protected area values are associated with traffic, including:

- Traffic accidents resulting in spills when passing through protected areas;
- Vehicle strike of wildlife during transport of logs / materials.

7.5.2 Avoidance, Mitigation and Management Measures

Measures to avoid or minimise the chance for discharge of hazardous materials during transit and vehicle strike provided in Sections 6.3 and 7.3, respectively. In summary these include:

- Accident prevention measures, including: driver training, safe driving speeds, daytime transit requirements, safe driving conditions (weather), drug and alcohol prohibition, etc. to minimise the chance of car wreck and subsequent spillage or vehicle strike of animals; and
- Hazardous materials transport requirements (Section 7.3) to ensure appropriate drivers and handling of materials during transport;
- Emergency preparedness and response planning (Section 7.3) to minimise impacts in the event of an accidental discharge; and
- Reporting protocols in the event of a discharge (ESMMP, Volume C).

7.5.3 Impact Assessment

Mill construction and operations will not pose a significant risk to any protected areas in the vicinity of the Project. Though the possibility of vehicular accidents / vehicle strike cannot be entirely mitigated, Burapha requirements for trained drivers, appropriate driving condition requirements, and emergency preparedness and response provisions should minimise the risk for impacts to Low for protected areas and biodiversity within them during transport.

Impact Assessment

Project construction will not impact protected areas. Management measures for safe driving and hazardous materials transport are expected to minimise risks and reduce potential impacts to **Low**.

7.6 Impact Assessment Summary

Table 7-2 Biological Impact Assessment Summary

Aspect	Unmitigated Risk	Mitigated Risk	Impact Assessment
Terrestrial Flora and Natural Forest	Very Low	Very Low	Very Low
Invasive Species	Moderate	Low	Low
Terrestrial Fauna	Very Low	Very Low	Very Low
Aquatic Biodiversity	Moderate	Low	Low
Protected Areas (transport)	Moderate	Low	Low

A photograph of a rural village scene. In the foreground, there is a dirt road. To the left, a blue house with a wooden door and small arched windows is visible. To the right, a pink house with a satellite dish mounted on a bamboo pole is seen. A bamboo fence runs across the middle ground. The background is filled with lush green trees and a hillside. A dark blue banner with white text is overlaid on the upper part of the image.

Chapter 8 | Potential Social Impacts and Mitigation Measures

Chapter 8 | Social Impacts and Mitigation Measures

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8 POTENTIAL SOCIAL IMPACTS AND MITIGATION MEASURES

8.1 Revenue and Economic Development

The Project is expected to result in significant benefits to economic development at the national, regional and local levels. Processing of value added wood products from sustainable industrial tree plantations presents opportunities for socio-economic development in Lao PDR, particularly in rural areas.

8.1.1 Issues and Findings

Construction & Operations

National and Regional

At the national level, the Project will serve Lao PDR in meeting the stated objectives of the Forestry Strategy 2020 to achieve indicative targets of national socio-economic plans, provide goods and services to the economy and society, and contribute to the implementation of the National Growth and Poverty Eradication Strategy (2004) measures.

The establishment of the Mill Project will require an initial investment of approximately \$26 million USD into the Lao economy. The Project will provide a significant contribution to GOL tax revenues with an estimated annual revenue of over 18 million USD at full capacity, with profits and income tax providing an estimate \$2 million USD to the GOL annually.

The Mill will also facilitate the expansion of Burapha's agroforestry project to an initial 5000 ha, resulting in a further foreign capital investment; additional full-time positions and part-time work opportunities, and government revenue in the form of land fees and taxes.

The Eucalyptus plantation forestry sector is expected to benefit as a whole from Mill operations through the development of a high value export alternative; the technological advances in introducing a modern manufacturing unit; and incentive to expand sustainable / certified plantation operations. The Mill will also enhance the market for small logs from short rotation plantations including other plantation operators both large and small including farmer out-growers who currently have very few outlets for selling their raw material.

Local Economy

The Project supports the Hin Heup District Government's plan to develop the area as a light industrial zone, and transform the local economy from subsistence to a cash-based economy. Key to this the creation of jobs and small business opportunities.

The Project will create approximately 383 full-time positions (366 for the Mill and 17 drivers). Preference will be given to the recruitment of local workers. Training and skill enhancement opportunities will be provided to meet the skilled labour requirements of the Mill. Additional jobs will be created for construction. Further information is provided in Section 8.3

The Project will also require goods and services to be procured in the local area. Local procurement will result in increased business opportunities for local villages. The associated injection of cash into the local economy through local salaries and local procurement will have flow-on benefits for local business development and general increased consumption.

Project related employment and income generating activities have the potential for building worker expertise; accumulation of capital or repaying of debt; and increasing savings which could be utilized for investments in activities and/or inputs that could yield increased incomes from their existing livelihoods.

While economic development will have obvious benefits, there may be some associated impacts for local communities, such as:

- Change in, or loss of local livelihoods / livelihood security (i.e. increased reliance on wage-based income and move away from subsistence livelihoods);
- Localised increase cost of goods and services (prices driven up, increased consumption and disposable income of some households);
- Transfer of local authority from traditional elders to young wage-earners and possibly in-migrants;
- Increased inequality, particularly for those who continue to live traditional lifestyles (either because they are unwilling or unable to gain employment; and
- Intergenerational changes and conflicts due to change in economic status.

Overall, the presence of new livelihoods and employment opportunities is likely to increase average income in the Project Area. It may also result in)

8.1.2 Avoidance, Mitigation and Management Measures

Construction & Operations

Burapha will implement management and mitigation measures to maximise community benefits for economic development during construction and operations phases. Burapha will:

- Update their human resource policies to reflect a commitment to local employment, training and skills development and ensure equal opportunity and employment practices for all people in the Project Area (refer to Section 8.3);
- Develop and implement a 'local first' procurement and supply policy which favours sourcing of local products and services;
- Design and Implement a participatory Community Development Program specific to the Mill Project in coordination with affected villages and the District government designed to support local development initiatives and entrepreneurial enterprise;
- Align the CDP to the Government's socio-economic development and poverty reduction plans and initiatives and ensure that the CDP targets vulnerable groups and promotes equitable development;
- Regularly consult with local communities and ensure appropriate management of grievances through the implementation of an international standard grievance mechanism; and
- Regularly monitor employment statistics and socio-economic conditions in local villages to ensure effectiveness of employment management measures.

8.1.3 Impact Assessment

Construction & Operations

If managed effectively, the Project is expected to result in significant economic benefits at the national, regional and local levels. Over the life of the Project, changes in the economic status and education of local residents will change the nature of social issues faced by the Project. Regular social surveying will ensure that these changes are properly understood and that management and mitigation measures remain relevant.

Revenue and Economic Development Impact Assessment

The Project is expected to generate significant direct and indirect economic benefits for the local, regional and national economy.

8.2 Land Use, Resettlement and Displacement of People

The proposed Mill site is located on a concession area previously granted to a Malaysian logging company (HIPA) that was returned to the Government of Lao (GOL) approximately 10 years ago. The land is within an area zoned for Light Industry by the Province. The site does not affect any village land. No resettlement is required for the Project.

8.2.1 Issues and Findings

Construction and Operations

The Mill site

The proposed Mill site is located in State Concession Area, on land previously associated with Ban Khone Phook and Ban Phonesoung prior to its allocation to HIPA in the early 2000s.

The area surrounding the site has been zoned for light industry by the Hin Heup District Government and totals 1,950.71 ha. Several concessions have been granted in this area including factories and plantation projects. The Hin Heup Substation and the Ray Farm Bio-Organic Fertiliser Factory are located adjacent to the proposed Project Footprint.

Direct land impacts derived from the Project, particularly those associated with the conversion of land for the Project Footprint and construction of the site access road will be minimal. Currently, land in this site is mostly cleared and any existing vegetation is highly degraded.

The site does not fall within the land boundaries of surrounding villages and no houses or structures are located there. The only reported current use of this land by local villagers is for occasional livestock grazing. Burapha intends to construct a site perimeter fence. This fence will prevent cattle from entering the Mill site and protect them from potential injury.

The Surrounding Area

While the area surrounding the Mill site has been zoned for light industrial use, this land remains allocated to Ban Khone Phook, Ban Phonesoung and Ban Viengthong until concessions are granted. The majority of the land in the industrial zone consists of fallow / degraded forests. Villages have mostly ceased shifting upland agriculture practices and this land is now used predominately for grazing cattle.

Areas outside of the industrial zone include settlement areas, prime agricultural land (i.e. lowland rice fields) and permanent upland fields. These areas have become more important in supporting household livelihoods as village land areas have reduced.

The development of the Project is expected to create significant employment and spin-off business opportunities for local villages. There is potential for income generated from these activities to be re-invested into further development of remaining agriculture lands to improve productivity and livelihood security of households in the Project area.

8.2.2 Avoidance, Mitigation and Management Measures

Construction and Operations

Burapha will implement the following management and mitigation measures to minimise impacts relating to land use during construction and operations phases:

- Secure a lease / concession agreement and other necessary approvals from the GOL for the development of the site;
- Clearly demarcate the boundaries of the concession area through cadastral surveying and construction of a fence around the perimeter to prevent clearance / or use of areas outside the concession area; and
- Through the Project's Community Development Fund, consider supporting the development of intensive agriculture practices. This could be achieved through the provision of household financial management; agricultural training programs; or small-scale infrastructure support.

8.2.3 Impact Assessment

The Project does not affect any village land and no resettlement will be required. With the implementation of mitigation measures identified above, the residual impacts are anticipated to be negligible.

Land Use Impact Assessment

No resettlement will occur as a result of the Project. Impacts will be **Negligible**.

8.3 Employment

The Project will create significant employment and income generating opportunities. The majority of these opportunities will be permanent positions and preference will be placed on recruitment from Project Area villages. However, a number of potential issues may arise with the provision of employment opportunities including inequitable employment, education and skill limitations, workforce protection (i.e. discrimination / harassment and unsafe work environments) and social change - which can lead to community unrest and will require careful management. Given the implementation of several factories in the region and associated employment opportunities, the change to a more cash-based economy is occurring prior to Mill construction, therefore social changes are not anticipated.

8.3.1 Issues and Findings

Construction and Operations

The Project's construction will be completed by a contractor using its own labour force. A number of local labour opportunities are expected during construction.

The Project will create approximately 383 full time positions. This includes approximately 366 full-time positions for Mill operations - 162 people working per shift (59 people for the veneer line and 63 people on the plywood line; and 17 full-time truck drivers for in and out-bound haulage). Recruitment of the Project workforce will target people from the local communities. Mill operations will require training of the local workforce to fulfil skilled labour opportunities.

Securing employment with the Project will be one of the greatest concerns among the local population. Surveying in the three most affected villages has highlighted the growing importance of wage-based work as the area transitions to a market based industrialised economy. There are currently limited full-time employment opportunities and many villagers are forced to seek seasonal employment in other areas of the country.

Potential issues associated with the provision of employment opportunities are presented below.

Inequitable employment

There is potential for perceived or actual inequitable opportunity for employment between:

- Affected villages including the three villages in the Project Area and those along the main transportation network;
- Ethnic groups such as the small number of Mon-Khmer and Hmong households in the Project Area;
- Males and females – particularly in an area where there is a high percentage of female-headed households with the vast majority of women employed in the handicraft sector; and
- Recent migrants versus long-term residents, particularly in the Project area where in-migration is expected to increase as the industrial zones are further developed.

Education and Skills

Availability of qualified human resources has been identified as a significant challenge in Lao PDR (MPI and UNDP 2009). While the population in the Project Area has education and literacy rates above the national average, the majority of people are engaged in non-skilled employment and formal technical training is limited.

There is some risk that the local workforce will be frustrated with the provision of higher skilled / higher paid positions being filled by outsiders, if applicable.

Workforce Protection

Risks posed to workers across Lao PDR may include discrimination, forced labour, child labour and occupational health and safety.

Burapha supports the UN's Universal Declaration of Human Rights and the Core Conventions of the International Labour Organization (ILO). Burapha's *Code of Conduct* strictly prohibits child or forced labour. The company enforces a minimum age requirement, and stipulations for workers between 14 – 18 years of age (including weekly hour restriction and prohibition from hazardous work).

Occupational health and safety risks are inherent in mill and transport operations. Burapha has outlined its exiting OH&S policies in the *BAFCO OHS Policy and Principles Manual*. OH&S aspects concerning the Mill are covered in detail in Section 8.4.

Social Change

The Mill will operate 24-hours per day, 7-days per week. This may result in changes to traditional ways of life (i.e. nightshift employees sleeping during the day and being absent at night; women leaving traditional roles to work for the Mill), which may also lead to social problems, such as the breakdown of the family unit, domestic violence and anti-social behaviour.

8.3.2 Avoidance, Mitigation and Management Measures

Construction and Operations

Burapha will implement the following management and mitigation measures to minimise employment related impacts during construction and operations phases:

- Update existing human resource policies to addresses employment related aspects specific to the Mill Project;
- Extend the company's Code of Conduct to Burapha's contractors and suppliers through contractual obligations and conduct sufficient due diligence to ensure compliance;
- Develop and implement a preferential employment policy that will maximise use of Lao in workforce (i.e. compliance with the Labour Code) and prioritise employment of local residents;

- Where there is employment of skilled labour from outside the local area, implement of a human resources succession planning program, which recognises local staff with significant potential, and provides targeted training to develop these staff members with the goal of maximising local employment;
- Develop and implement a human resource training program specific to the Project and ensure the continuous training and development of local employees;
- Through the Community Development Program, improve sustainable livelihoods in the local communities to ensure that non-employees obtain economic benefit from the Project;
- Regularly consult with local communities and ensure appropriate management of grievances through the implementation of an international standard grievance mechanism; and
- Regularly monitor employment statistics and socio-economic conditions in local villages to ensure effectiveness of employment management measures.

8.3.3 Impact Assessment

If managed effectively, employment opportunities are likely to be one of the most significant economic benefits to local communities from the Project.

The Project will directly generate employment through the creation of jobs for the construction and operation of the mill and will indirectly generate employment through the creation of jobs with mill contractors and other service providers.

Implementation of the above management and mitigation measures, focusing on equal opportunity employment with priority for a workforce comprised of local peoples, will enhance socio-economic conditions in the region.

Through Burapha's training and succession program, an increasing number of local workers will enhance expertise in various aspects of the operations, providing the opportunity for advancement to more senior positions at the Mill site, within the Company, and / or for other opportunities.

Some local employees will work the nightshift. The resulting impacts on the village and the family structure will need to be monitored.

Employment Impact Assessment

The Project is expected to generate approximately 383 full time positions – the majority for people in the local area. This is expected to be a benefit to the local community and region.

8.4 Occupational Health and Safety

Occupational health and safety is a key issue for the Project requiring careful planning and management. Key risks inherent in mill and transport operations include:

- Hazards associated with loading, transport and unloading logs;
- Hazards associated with the use of and working in proximity to heavy equipment and machinery;
- Exposure to dust and potentially noxious chemicals; and
- Explosion / fire hazards from flammable materials.

Burapha is committed to OHS and has an existing *OHS Policy and OHS Principles Manual*. The manual provides targets, specifies integrating OH&S into daily activities through proactive and preventative measures and documents requirements to actively renew health and safety programs through continuous improvement and

monitoring. The BAFCO OHS manual will be updated to address specific risks proposed by the Mill and transport operations and the Project ESMMP and associated Standard Operating Procedures implemented to minimise OHS risks and provide specific response methods for emergencies.

8.4.1 Issues and Findings

Construction and Operations

Physical Hazards

The Mill Project presents a number of physical hazards associated with working with heavy equipment and machinery; and log transportation, storage and handling activities.

Hazardous machinery at the Mill site includes, conveyors, breakdown saws, log rounder debarkers and waste chipper; and veneer peeling and clipping. OH&S risks include injury or death from contact or being struck by projectiles from the machinery. Key issues are inappropriate use of machinery and poor design / failure of machinery safety systems (i.e. tag-out, lock-out or inter-lock systems).

Hazards in the log yard and during log handling activities include movement of trucks and loaders (i.e. front-end loaders or forklift trucks), the security / management of log stacks and incidents including log rolls and drops. OH&S risks include injury or death as a result of vehicles movement and or contact with logs. Key issues include manual handling activities and inadequate design / layout of stock pile areas and decking.

Noise Exposure

The Mill machinery including breakdown saws, log rounder debarkers, waste chipper and veneer peeling and clipping have the potential to emit high noise levels (i.e. above 85 decibels). Short and long-term exposure to noise can be harmful to hearing (i.e. above 85 dB over 8 hrs, or above 100 dB over short periods). Noise reduction measures (building design; sound barriers; insulation etc..) and protective equipment will reduce the potential impact of high noise levels on mill workers.

Dust Exposure

High levels of dust will be generated during the milling processes and in the log yard. Short and long-term exposure to dust and dust inhalation (i.e. PM₁₀ and below) can lead to irritation, asthma, allergic reaction and increased risk of nasopharyngeal complications (i.e. cancer). Dust reduction measures (i.e. dust extraction, filtration and air ventilation systems and sealed site surface) and protective equipment (i.e. dust masks) will reduce the potential impact on mill workers.

Chemical Exposure

Chemical hazards represent potential for illness or injury due to single acute exposure or chronic repetitive exposure to toxic substances. There is a risk of exposure to noxious chemicals during milling processes including exposure to formaldehyde vapour from resins – particularly during glue mixing; and dust generated during finishing processes. Elevated exposure can lead to eye, nose and throat irritation, lung conditions and nasopharyngeal complications (i.e. cancer).

Explosion and Fire Hazards

Explosion / fire hazards from flammable materials including hydro-carbons (i.e. oils and fuel for machinery and vehicles), resin and glues, and combustible dust comprise a significant risk.

Industrial Vehicle Driving

Transport of raw logs to site and finished product to market will require experienced / suitably trained drivers to safely operate haul trucks. Transport provides an occupational health and safety risk for Burapha / contracted drivers (as well as community health and safety (refer to Section 8.5).

General Working Environment

Other potential issues requiring consideration include adequately sized workspaces for safe performance of duties; unobstructed exits; appropriate work environment temperature and adequate and well maintained facilities (lunch areas, meeting rooms, lavatories etc.).

8.4.2 Avoidance, Mitigation and Management Measures

Construction and Operations

Burapha will implement the following management and mitigation measures to eliminate or mitigate OH&S hazards and potential impacts during construction and operations phases:

- Design the Mill to operate in a manner consistent with national legislation and regulations as well as IFC Performance Standards;
- Update the company's Occupational Health and Safety manual, and emergency and response procedures to ensure relevance to the Mill operations;
- Consult with and where appropriate support the development of local health facilities which may be required by the Project;
- Incorporate safe design principles and practices into the Mill layout and machinery planning and design process;
- Develop Mill site area and machinery / equipment specific management plans which identify hazards, assess risks and outline appropriate control measures;
- Ensure all heavy machinery and equipment has appropriate safety guards, control devices and systems and are subject to regular inspection and maintenance;
- Mechanise log handling where possible and ensure log loading and storage areas are designed and operated to minimise physical hazards and risks;
- Design and implement appropriate electrical hazard mitigation measures;
- Design and implement appropriate noise mitigation measures and require the use of protective hearing equipment in areas with noise levels over 85 decibels;
- Design, install and maintain appropriate dust extraction, filtration and ventilation systems and require the use of appropriate PPE in high risk areas;
- Replace hazardous substances where possible and where required, design and implement engineering and administrative measures to avoid or minimise exposure;
- Develop and implement fire and explosion prevention and control measures;
- Ensure Burapha staff and contractors are suitably trained to operate the vehicles they are tasked with driving;
- Ensure that qualified first-aid can be provided at all times through the provision and maintenance of first aid equipment / infrastructure and trained staff;
- Develop and implement a comprehensive OH&S training program and operator certification program for specific tasks and duties to ensure awareness and competence of all personnel on site; and
- Regularly monitor and report on OH&S incidents and the effective implementation of OH&S mitigation measures, and develop / implement corrective actions where required.

The Mill will have an in-house medical service to provide first aid in the event of an accident.

8.4.3 Impact Assessment

OH&S risks associate with the operation of the Mill cannot be entirely avoided however through diligent implementation of the above management and mitigation measures the likelihood and consequence of OH&S impacts will be low.

Regular and on-going monitoring and reporting of OH&S incidents and the development of effective corrective actions is necessary to ensure measures remain relevant and applicable to Mill equipment and processes.

Occupational Health and Safety Impact Assessment

Though OH&S risk cannot be entirely avoided, the likelihood and consequence of potential impacts is expected to be **Low** with diligent implementation of OH&S measures described in the ESMMP and BAFCO OH&S Policy and Principals Manual.

8.5 Transport and Traffic Safety

During construction, the major items requiring transport to the Mill will be materials for Project construction, plant consumables, personnel, food and other consumables. During operations, raw logs will be transported from Burapha plantations to the Mill and finished wood products will be transported from the Mill to Vientiane for domestic sales and to Thailand, Vietnam, Myanmar, and Europe. Approximately 112,000 – 124,300 m³ of raw logs (at 90% capacity) will be harvested from Burapha plantations in Vientiane Province, Xayabouly Province, Saysomboun Province and Vientiane Capital. An average of 14 in-bound haul trucks will operate each day. The Mill will produce approximately 43,200 – 48,000 m³ of finished product, at 90% and full production capacity, respectfully. An average of two - three trucks per day will haul finished product to market.

Transport related impacts range from damage/loss of infrastructure and assets to injury or death. Groups potentially impacted include the Project workforce; communities on transportation routes; and the wider public (i.e. other road users).

8.5.1 Issues and Findings

Construction and Operations

Increased Road Use

The existing road network will be utilised for all transport to and from the Mill. During construction, materials, equipment / machinery required for the construction and fit out of the Mill will be transported via national and Provincial roads) to the Mill site. During operation, the Project will transport timber via village, District, Provincial and national roads to the Mill site. Plantations are dispersed over a wide area and up to 100 km from the Mill site. Actual routes and haulage schedules will be developed in coordination with District and Provincial governments in accordance with the requirements of the national law.

Increased usage of village roads for harvest will be infrequent and short-term in nature, primarily limited to harvesting and replanting operations which will occur approximately every 7-8 years. Usage will be higher on village roads which service large planted areas.

Provincial and national roads will experience more frequent usage by Project vehicles. Project road usage is presented in Figure 8-1. The most heavily used road will be a 5 km stretch of Road 4501 between National Road 13 and the Mill site. Two villages are located on this road including Ban Phonesoung and Ban Viengthong. Ban Hin Heup Tai (considered part of the District Capital) is also located on the corner of National Road 13 and Road 4501. Other 'medium' use roads in Vientiane Province include 13N, 4533, 120 and 4504. An analysis of settlements located along the high and medium use road networks was undertaken. This analysis indicates that 47 villages with a total of 36,825 people are located on these roads (refer to table 8-1).

Table 8-1 Villages and Population Located on High and Medium Use Roads

Village Name	Road Name					Village Population
	4501	13N	4533	0120	4504	
No. Villages	6	21	5	11	4	47
Population	3252	19661	1931	9066	2915	36,825

* Village settlements within 50m of High and Medium Use Project Roads

Community Safety (Transport)

The key community safety risk from Project vehicles (i.e. cars and haulage trucks) is personal injury or death resulting from vehicle collisions; truck roll overs; and logs and other material falling off trucks.

This risk will be increased for people living near or travelling on transportation routes; on routes with light ambient traffic conditions; and on roads where the quality of the infrastructure is low or has been damaged. Night time transportation presents additional risk factors due to poorly lit roads and other vehicles.

While village road usage is expected to be infrequent, the potential for impacts on road infrastructure and community safety during these periods is high and require careful management. Village roads surfaces are typically unsealed and are susceptible to damage from large vehicles. Ambient traffic conditions on these roads is usually light. These roads are typically used for a variety of purposes by local communities (i.e. access to farming areas, water sources, schools, markets, health services, etc.). The presence of large trucks on these roads presents a high risk to community safety. Degradation of these roads increases safety risks further.

Provincial and District road surfaces are either gravel or sealed and have been designed and built for heavy vehicle usage. Ambient traffic conditions are typically high. The addition of Burapha trucks on these roads is expected to have a negligible impact on ambient conditions. The potential for impacts on road infrastructure integrity and community safety remain and require careful management.

Risks to community safety will be highest in Ban Viengthong and Ban Phonesoung which are located on Provincial Road No 4501. This road is paved and is currently in relatively good condition. However, the risk of accidents along the route is likely to be exacerbated by the narrow road width within the villages as well as the high prevalence of road hazards such as pedestrians (particularly children), livestock (buffalo, cattle, goats) and slow moving vehicles (such as tractors and bicycles).

On both village and Regional / National roads, children are likely to be at greatest risk of road accidents, as they commonly play by the roadside, and use the roads to walk/ride to and from school.

Transport of hazardous materials

During Construction and Operation there is potential for Project vehicles bringing supplies to the Mill to be involved in an accident along the Project transport route. This could result in spills of hazardous materials (e.g. hydrocarbons or chemicals) with consequent significant adverse impacts.

The potential social and health impacts of a spill of hazardous materials could be significant if an incident occurred in the vicinity of a village or major waterway (refer to Section 6.3).

Other Transport Related Health and Safety Risks

Other risks related to transport and traffic safety include:

- Unsafe loading / unloading practices, particularly in relation to logs (refer to Section 8.4);
- Unsafe driving practices including speed, use of alcohol or drugs, fatigue (caused by long shifts) and in vehicle distraction including the use of mobile phones; and
- Un-roadworthy / poorly maintained vehicles which increase the potential likelihood and/or consequence of transport related incidents.

- Nuisance-level noise and vibration along the transportation routes (refer to Section 6.7)
- Air quality relating to dust generation and vehicle exhaust emissions (refer to Section 6.6).

8.5.2 Avoidance, Mitigation and Management Measures

Construction & Operation

Burapha will implement the following management and mitigation measures to eliminate or reduce risks posed by Project transportation activities during construction and operation:

- Develop and implement a Transport Management Plan for the management of the vehicle fleet (including contractor vehicles) and transportation movements which integrates transport related safety aspects;
- Ensure road safety precautionary controls, such as restricting material deliveries (particularly for hazardous materials and dangerous goods transport) and workforce movements during periods when more vulnerable road users are present on the route (e.g. during school opening and closing times);
- Coordinate regularly with relevant government authorities to seek approval for transportation routes; confirm transportation schedules; and manage specific road safety issues along Project routes;
- Develop and implement a robust vehicle purchasing, maintenance and 'fit for purpose' monitoring program for all Project vehicles with a focus on loading, weight and height limits for designated routes;
- Monitor and enforce transport safety protocols for employees and contractors to minimise road accidents, including mandatory training, driver certifications (i.e. for heavy vehicles or transport of hazardous materials), regular driver checks, adherence to local traffic laws, zero and tolerance for driving under the influence of drugs and alcohol;
- Implement measures to manage risks inherent during the transportation of hazardous materials as outlined in Section 6.3;
- Implement measures to minimise noise impacts, including along the transportation route as detailed in Section 6.7;
- Implement measures minimise dust generation along Project access roads and vehicle emissions along Project transportation routes as detailed in Section 6.6;
- Develop and implement a transportation and monitoring program (including community grievance mechanism and road accident log) to monitor transport related impacts, the effectiveness of mitigation and management measures and inform the development of corrective actions where required; and
- Ensure Burapha's Emergency Preparedness and Response Plan includes specific emergency response procedures for road transportation (and the transport of hazardous materials).

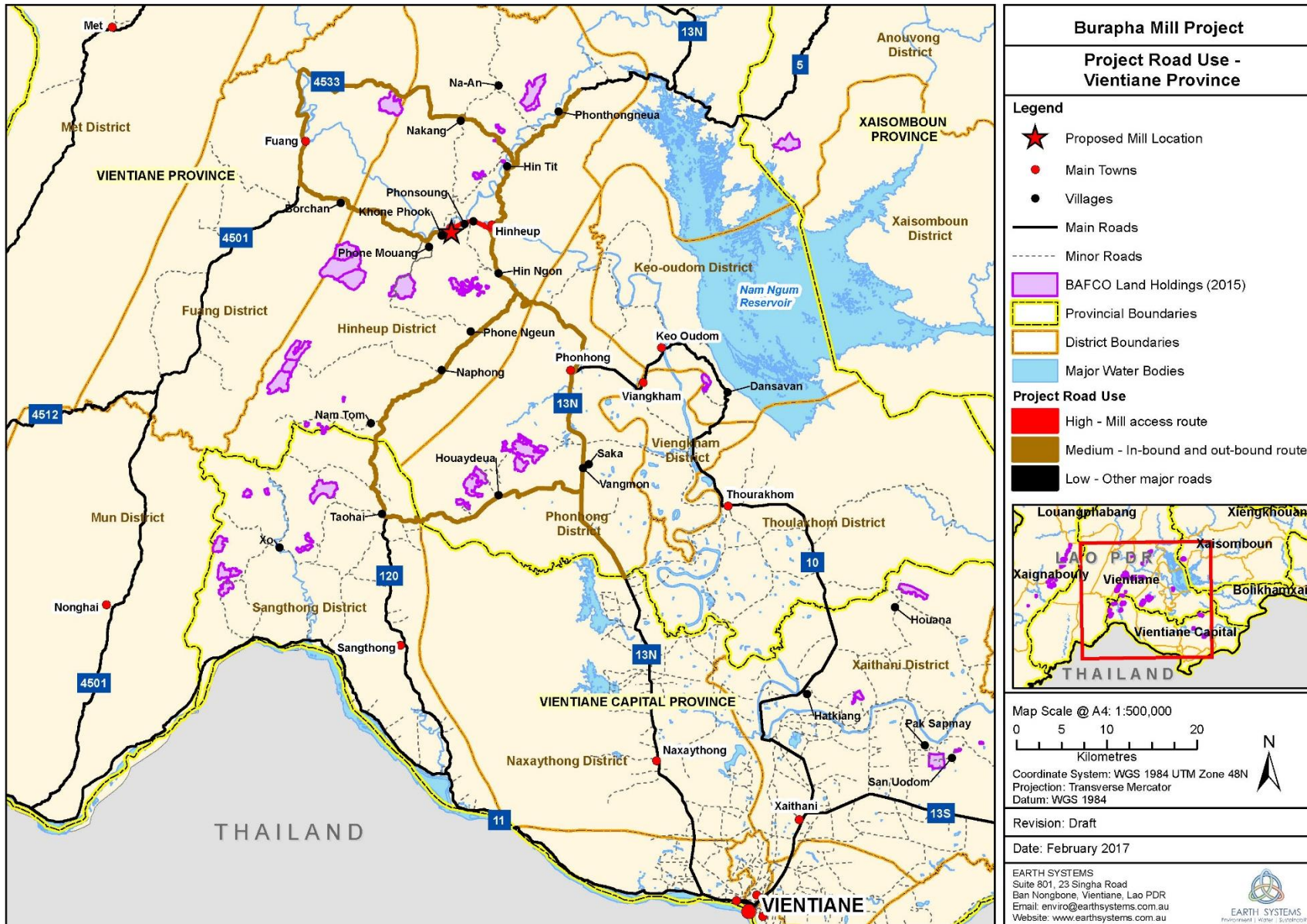


Figure 8-1 Project Road Usage

8.5.3 Impact Assessment

The addition of Project vehicles on plantation village roads will occur in short phases during each plantation cycle and will likely have short term impacts on ambient traffic conditions. The addition of Project vehicles on regional roads will occur more frequently however are likely to have negligible impacts on ambient traffic conditions. Road 4501 will experience the highest number of Project vehicles.

While safety risks to communities in proximity to these roads and to road users cannot be entirely avoided, safety related impacts are expected to be low with diligent implementation of transportation safety measures outlined above.

Regular and on-going monitoring and reporting of traffic related incidents and the development of effective corrective actions is necessary to ensure measures remain relevant and applicable to Project transportation movements and the conditions of transport infrastructure.

Traffic and Traffic Safety Impact Assessment

Though risks from transportation cannot be entirely avoided, impacts to community health and safety is expected to be **Low** with diligent implementation of transportation safety measures described in the ESMMP

8.6 Community Safety, Health and Nutrition

The primary risk to community health and safety from Project implementation will be associated with transportation of logs / finished product to and from the site, respectively (refer Section 8.5).

Other community health and safety aspects that require consideration and management include:

- Increased access to food and medical services;
- Air and noise impacts related to Project transport and the operation of the Mill;
- Impacts community water resources affecting human health;
- Project workforce and communicable disease; and
- Community safety resulting from access to the Mill site.

8.6.1 Issues and Findings

Construction & Operation

Access to Food and Medical Services

The Mill will have in-house medical services to provide first aid services. Full-time Burapha staff will be provided with basic medical insurance which will increase access to and use of health services. In addition, the economic development and employment opportunities created for local residents will increase household incomes and this is likely to result in positive health impacts for all household members including:

- Improvements to household nutrition – increasing the ability of households to purchase (and consume) a greater variety of food from local markets; and
- Improved access to health services – providing the means for household members to access better medical treatment (i.e. travel to better facilities) and pay for treatment.

As the majority of the Project workforce will be employed locally, additional pressure on local medical services is not expected. Project coordination with local health services and support through the Community Development Fund is expected to help increase local medical resources.

Project health benefits are likely to be most pronounced for households with direct employment with the Project. Other households may experience indirect benefits (i.e. better local medical services; increased indirect incomes facilitating better access).

Air Quality and Noise

Air and noise emissions will occur during site construction, transport and 24/7 mill operations (refer to Section 6.6 and 6.7).

Key air quality related issues include transport generated dust, vehicle emissions and stack emissions. Sensitive receptors include people from villages in proximity to the Mill and villages located on Project transportation routes. Air quality issues at the Mill site will be managed through suitable design and process control. Burapha is committed to meeting applicable IFC emissions standards. As a result, air emissions from the Mill site are not expected to impact the health of nearby communities. Air quality impacts associated with transport are expected to be limited to nuisance level dust similar to that occurring on transport routes currently (refer to Chapter 6).

Noise generated from the Mill during operation and from Project vehicles on transportation routes has the potential to impact local communities. However due to ambient conditions and with the implementation of noise mitigation measures, noise impacts are expected to be low during the day. Restrictions on Project activities during night shifts is also expected to minimise potential impacts on communities.

Impacts on Community Water Resources Affecting Human Health

Potential impacts on community water resources and aquatic resource use are presented in Section 8.7. and 8.9 respectively. The Project will not impact community drinking water sources and as a result no negative impacts on human health are expected.

Primary pollutants from the Mill (nutrients and other organic materials) do not pose a threat to human health. Water discharged from site will be actively and passively treated, with concentrations of key parameters under national and IFC effluent discharge standards (refer to Section 6.2). Effluent is not expected to impact the health of local waterways or their ability to be used for irrigation, fishing or the collection of other aquatic resources.

Hazardous materials (primarily hydrocarbons) pose a more significant risk, especially along the transportation route, however management measures are expected to minimise the chance of discharge (refer to Section 6.3).

Workforce and Communicable Disease

The Project is not expected to require a large externally sourced workforce. During construction, a small externally sourced workforce will be present on site (including a small work camp). This presents risk of social impacts including social disruption and the spread of communicable disease. During operations, most of the workforce will be employed from local communities.

Disease transmission may occur from direct contact or improper management of solid waste, sewage and grey-water from the Mill site. Suitable education, training, facilities and waste management will be required to minimise disease transfer.

The risk of an increase in vector related diseases such as malaria and dengue and through the development of the Project is expected to be low. However, the Project could potentially increase the breeding habitat for disease bearing mosquitoes (e.g. through water collecting in borrow areas, sediment ponds, drainage channels left by construction activities), particularly during the early wet season and early dry season.

Public Access to Site and On-site Physical Hazards

The potential for physical traffic related impacts on local residents within the Mill site will be null / negligible as the site will have a perimeter fence and controlled access (security).

8.6.2 Avoidance, Mitigation and Management Measures

Construction & Operation

Burapha will implement the following management and mitigation measures to minimise community health and safety risks posed by Project activities during construction and operation:

- Support improvements in health care facilities and health education campaigns available to the general population through the Community Development Program;
- Implement measures to minimise community safety risks from Project transport as per Section 8.5;
- Implement the air quality and noise management measures in Section 6.6 and 6.7 respectively;
- Implement water quality management and hazardous materials management measures as outlined in Sections 6.2 and 6.3 respectively; and
- Ensure that public access to the Mill site is restricted and appropriate warning of the on-site hazards is communicated.

8.6.3 Impact Assessment

The Project is expected to increase access to food markets and medical services and have positive impacts on health and nutrition in local communities.

Impacts to community health and safety associated with air quality, noise, water quality, project workforce, communicable disease and on-site safety are expected to be low with the effective implementation of the above management and mitigation measures.

As outlined in Section 8.5, while public safety risks posed by Project transportation cannot be entirely avoided, safety related impacts are expected to be low with diligent implementation of transportation safety measures.

Community Safety, Health and Nutrition Impact Assessment

Though risks from traffic, hazardous materials, etc. cannot be entirely avoided, impacts to community health and safety is expected to be **Low** with diligent application of management measures described in the ESMMP.

8.7 Water Resource Use

8.7.1 Issues and Findings

Construction & Operation

The most important water resources for local villages are the Nam Lik River, nearby perennial streams, and wells or bores. There are several small perennial tributaries of the Nam Lik that are to the east and south of the Mill site, including the Houay Mieng, Houay Karng, Houay Larn, and Houay Lai. Water from these sources is utilised for household garden irrigation, washing, and other beneficial uses.

The primary drinking water source for households in the Project area is bottled water. While some households in Khone Phook utilise bore water, these bores are located more than three km from the Mill and will not be affected by the Project.

Unmanaged / untreated discharge from the Mill would pose a moderate risk for community water downstream of the site. With the implementation of design controls (active and passive treatment of water from the Mill) and diligent application of management / mitigation measures to avoid discharge of potentially toxic materials, effluent is unlikely to contribute pollutants that would affect community water use.

There is risk for erosion and sediment transport to receiving waters during the rainy season in the absence of suitable stormwater management and erosion / sediment control. Sediment would be transported to small ephemeral channels which are not reportedly used by local residents, to the Nam Lik River, and important water resource for many beneficial uses.

Contamination of local waterways may also occur through spills of hazardous materials during construction and operation phase transportation or accidental discharges.

During operations, the Mill is expected to abstract approximately 23,000 m³ per year (m³/a) of groundwater to meet operational requirements at full capacity. Due to the distance from village bores / wells and the location of the proposed Mill bore, impacts to village groundwater availability are not anticipated. If impacts occur, Burapha will provide an alternate water source for those affected.

8.7.2 Avoidance, Mitigation and Management Measures

Construction & Operation

Burapha will implement the following management and mitigation measures to minimise impacts on community water use during construction and operation:

- Implement water quality management and hazardous materials management measures as outlined in Sections 6.2 and 6.3 respectively; and
- Monitor any potential impacts to village groundwater bores through the Grievance Mechanism. If groundwater abstraction for the Project is found to be impacting village water supply, provide an alternate water source for those affected.

8.7.3 Residual Impact Assessment

With appropriate design controls and passive water quality treatment, impacts to community water from effluent are expected to be low. Impacts to groundwater hydrology are expected to be negligible.

Community Water Use Impact Assessment

With appropriate design controls and passive water quality treatment, impacts to community water from effluent will be **Low**. Impacts to groundwater hydrology are expected to be **Very Low**.

8.8 Terrestrial Resource Use

8.8.1 Issues and Findings

Construction & Operation

The majority (94%) of households in the Project Area villages collect NTFPs, primarily for local consumption. Only a small number of household's trap wildlife – including birds, rats and squirrels. Residents mainly collect NTFPs and trap wildlife from within the village areas such as paddy fields, fallow forests, ponds or streams.

The Project is not expected to have a direct impact on the availability of forest resources as the proposed Mill site is relatively small and was not reported to be a source of forest resource collection. No quality habitat exists on the site, with vegetation having been previously cleared and much of the site area graded and the soil

compacted on the site. Livestock grazing is common within the Project footprint, with grasses, herbs and shrubs grazed to ground level throughout the site.

During construction there is potential for the construction workforce to place pressure on local forest resources through engagement in collection and hunting practices.

During operations, potential indirect impacts on availability of forest resources, mainly associated with employment and increased incomes in the Project area are likely to be positive. This includes the potential for reduced reliance on natural resources and reduced collection activity as households increase intensive farming practices and utilise local markets. However, there is also potential for the increased consumption of forest resources that may be available from local markets.

8.8.2 Avoidance, Mitigation and Management Measures

Construction & Operation

Burapha will implement the following management and mitigation measures to minimise impacts on forest resources during construction and operation:

- As per Section 9.2, clearly demarcate the boundaries of the concession area and construct a fence around the perimeter to prevent vegetation clearance / or use of areas outside the concession area; and
- Burapha staff will be prohibited from collecting NTFP / TFP from surrounding forests, with the exception of local residents who have historically utilised the area for resource extraction.

8.8.3 Impact Assessment

The impact on the availability of forest resources will be very low during Project construction and operations. No quality habitat exists on the Mill site. The Mill site was not reported to be an area for forest resource collection by local residents.

Some indirect impacts may occur as a result of economic development and increased household income generation in the Project area. These may be both positive (i.e. reduced reliance on local resources) or negative (purchase of forest resources from local markets / traders).

Terrestrial Biodiversity and Resource Use Impact Assessment

Impacts to terrestrial biodiversity, forest resources and resource use will be **Very Low**.

8.9 Fishing and Aquatic Resources Use

8.9.1 Issues and Findings

Construction & Operation

Fishing and use of aquatic resources are important for the nutrition and food security of local communities throughout most of Lao, including for the Project Area. More than 90% of households surveyed for this ESIA (Project Area villages) are engaged in fishing and the collection of aquatic resources, primarily for their own consumption. Fishing was found to be the most important in Ban Viengthong, where 95% of households engage in this activity on a daily basis and 36% of households (50) also sell their catch to other villages or the local market.

The Nam Lik, Nam Song, and the small perennial tributaries of the Nam Lik to the east and south of the proposed Project footprint are known habitat for a number of aquatic species. Villagers of Ban Khone Phook, Ban

Phonesoung, and Ban Viengthong identified 14 fish species that are commonly caught in the region, mostly in the Nam Lik River.

In the absence of suitable design controls and diligent application of management / mitigation measures for water quality protection, there is risk that effluent will impact downstream aquatic biodiversity (refer to section 6.2 – 6.4). Though aquatic habitat and biodiversity are absent on-site, drainage will reach the Nam Lik River, which has quality habitat and is an important fishery. The river will significantly dilute effluent from the site. Thus, unmitigated risk is moderate.

In the absence of suitable management, cumulative discharge of nutrients / organic matter from industry in the region may elevate biological oxygen demand and chemical oxygen demand, decreasing dissolved oxygen concentrations to levels that may prove deleterious to aquatic species, particularly following impoundment of the river for the Nam Lik 1 Hydropower Project (refer to Section Chapter 13).

Burapha is committed to managing effluent discharge in accordance with national and IFC effluent discharge standards, thereby reducing potential impacts to aquatic biodiversity and aquatic resource use. Routine water quality monitoring of effluent will be conducted to ensure discharge meets applicable standards and inform adaptive management strategies, if necessary.

8.9.2 Avoidance, Mitigation and Management Measures

Construction & Operation

Burapha will implement the following management and mitigation measures to minimise impacts on aquatic resources during construction and operation:

- Burapha and construction contractors will implement the measures outlined in Section 6.2 – 6.4 and 7.4 to protect surface water quality and aquatic resource use during construction; and
- During operations, the design controls and management / mitigation measures specified in Sections 6.2 (water quality) and 6.3 (hazardous and non-hazardous waste) will be implemented to protect aquatic resources and use by local communities.

8.9.3 Impact Assessment

With appropriate design controls, passive water quality treatment, and effective erosion and sediment control, impacts to aquatic resource use are expected to be Low. Water quality monitoring will ensure downstream biodiversity / water users are protected and inform adaptive management strategies, if necessary.

Aquatic Biodiversity and Use Impact Assessment

With appropriate design controls and passive water quality treatment, impacts to aquatic biodiversity and aquatic resource use will be **Low**.

8.10 Archaeology, and Cultural Heritage

8.10.1 Issues and Findings

Construction & Operation

The Project will directly impact sites of international, national or regional archaeological values or cultural heritage significance, as no such sites are located in the Project vicinity.

Though each of the neighbouring villages have sites of cultural significance, none are known to occur on near the proposed Mill site, according to the results for the archaeological and cultural heritage investigation

conducted for the Project (i.e. field investigation and village surveys). Earthworks was conducted for the previous lease owner, thus the prospect for chance find of an archaeological sites and artefact is unlikely.

8.10.2 Avoidance, Mitigation and Management Measures

Construction & Operation

Burapha will implement its Chance Find Procedure (ESMMP, Volume C) which outlines the communications protocol and procedures that will be undertaken if an artefact or significant site is found during Project construction.

8.10.3 Impact Assessment

With the effectively implementation of the chance find procedure, impacts on archaeology and cultural heritage will be very low.

Archaeology and Cultural Heritage Impact Assessment

Residual impacts will be **Very Low** with the implementation of the chance find procedure.

8.11 Gender, Vulnerable Households and Ethnic Minorities

8.11.1 Issues and Findings

Construction & Operation

Development projects can result in a potential disproportionate impact on vulnerable groups including women, vulnerable households and ethnic minorities. Key issues and findings are presented below.

Gender

Gender dimensions in the Project area are typical of more urbanised areas across Lao PDR. Women generally have higher education and literacy levels and are more likely to be employed in income generating activities than for areas more distant from Vientiane or other larger urban centres. Despite this, traditional gender roles still exist within the household unit, with women typically carrying out domestic and child raising duties.

There is a thriving handicrafts sector in the Project Area, which is one of the largest generators of employment, providing approximately 370 jobs, mostly for women.

The development of the Mill is likely to have a differential impact on men and women. Key issues include:

- *Employment* - Due to gender dimensions in the local area, in the absence of intervention, men are more likely to accrue employment opportunities at factories / mills. The development and implementation of Burapha's labour policies, promoting equal opportunity and anti-discrimination will be important for ensuring women also have access to these opportunities.
- *Local handicraft sector* - There is a risk that employment opportunities associated with the Project could affect the handicraft sector as women reduce their handicraft activities, either in favour of working for the Project, or as a result of additional domestic work or livelihood activities resulting from men becoming employed at the Mill.
- *Consultation and Decision Making* - Men typically dominate community decision making. Women are typically under-represented within community leadership and their attendance and active participation at community meetings is often low. Burapha will develop and implement a public consultation and dissemination plan that will ensure more active participation in consultations between the company and affected communities.

- *Anti-social behaviour* – Projects that increase cash income may lead to anti-social behaviour such as the use of commercial sex workers, gambling and drug abuse, which can then lead to crime and domestic violence. This behaviour, when it occurs, tends to disproportionately affect women, as women are most often the targets of crime (including rape) and domestic violence. Given that the area is already transitioning to a cash based economy, the Mill Project is not expected to change social behaviour in this respect.

Vulnerable Households

Whilst there are low levels of vulnerability in the Project Area, there are a relatively high number of single female headed households (36) and households with members that have disabilities (10) - particularly in Ban Viengthong. If unmanaged, the majority of project benefits may go to more affluent households and could exacerbate existing levels of inequality in the Project area.

With proactive management measures such as targeted employment / training and community development, the Project has the potential to have a significant and positive impact on the livelihoods of vulnerable households.

Ethnic Minorities

A small number of ethnic minorities reside in the Project Area including Khmu households (9.6% of the population and Hmong households (10) in Ban Khone Phook). Potential issues could arise if these ethnic groups perceive that the Project is favouring one group over another.

8.11.2 Avoidance, Mitigation and Management Measures

Construction & Operation

Burapha will implement the following management and mitigation measures to minimise impacts on vulnerable groups in the Project Area during construction and operation:

- Implement the measures identified in Section 9.3 to maximise employment related benefits of the Project and mitigate potential impacts including an equal opportunity employment policy with preferential recruitment and training (where possible) of people from vulnerable groups;
- Cooperate with the Lao Women's Union at the District and Provincial level to ensure adequate women representation on the Project's CDP communities and to implement Community Development and Livelihood Improvement Programs focused on mitigating impacts on women and other vulnerable groups;
- Develop specific measures to enhance meaningful participation of women and other vulnerable groups in Project related consultations and decision making and their ability to effectively use the Project's grievance mechanism; and
- Regularly monitor employment statistics and socio-economic conditions in local villages to ensure effectiveness of management measures to address disproportionate impacts associated with vulnerable groups.

8.11.3 Impact Assessment

Ensuring Project benefits are equally accessible and to a degree targeted to women, ethnic minorities and vulnerable households in the Project Area will help minimise the potential for disproportionate impacts on these groups and should result in socio-economic benefits across the spectrum.

Management and mitigation measures identified in the ESIA and ESMMP including community engagement and grievance resolution; equal opportunity and targeted employment policies; targeted community development interventions; and regular social monitoring are expected to help Burapha understand and manage these potential issues.

Gender, Ethnic Minorities and Vulnerable Groups Impact Assessment

Residual impacts will be **Very Low** with the implementation of equal opportunity employment policies, and community consultation.

8.12 Visual Amenity

8.12.1 Issues and Findings

Construction & Operation

The Mill site is considered the best location in the area to minimise impacts to visual amenity. The Mill will be constructed adjacent the Hin Heup Substation and an organic fertiliser manufacturing facility (industrial area) and the area is topographically shielded on three sides from direct line of site.

The Mill will not be visible from neighbouring Ban Hin Heup, Ban Viengthong, Ban Phonesoung, Ban Khone Phook, and Ban Phone Mouang. Viewshed analysis conducted for this ESIA (refer to Figure 8-2) indicate that the primary areas that will have direct line of site to the Mill are the slopes / plateaus in the distance and ridge-tops to the north, south, and west. None of these areas are populated. The visual amenity of the area planned for tourism development (adjacent the reservoir in the Ban Hin Heup area) will not be impacted. Impacts to visual amenity are considered Very Low.

In the absence of vegetative screening, the Mill will be visible from the primary access road to the west of the Mill site. Burapha will plant trees (likely Eucalyptus) for noise attenuation and to shield direct line of site from the road and river area.

8.12.2 Avoidance, Mitigation and Management Measures

Construction & Operation

Burapha will implement the following management and mitigation measures to minimise impacts on visual amenity during construction and operation:

- Retention of existing vegetation bordering the Project Footprint / including within the concession area - i.e. removing only the specific area of vegetation that needs to be removed to facilitate the Project's construction;
- Progressive rehabilitation and revegetation of cleared areas;
- Planting fast-growing trees to the north, north-east and north-west of the Mill to shield it from view - probably eucalyptus; and
- Monitor the implementation of all management measures.

8.12.3 Impact Assessment

There are unlikely to be any residual impacts on visual amenity in the Construction period once the mitigation measures have been implemented.

Visual Amenity Impact Assessment

Impacts to visual amenity will be **Low**.

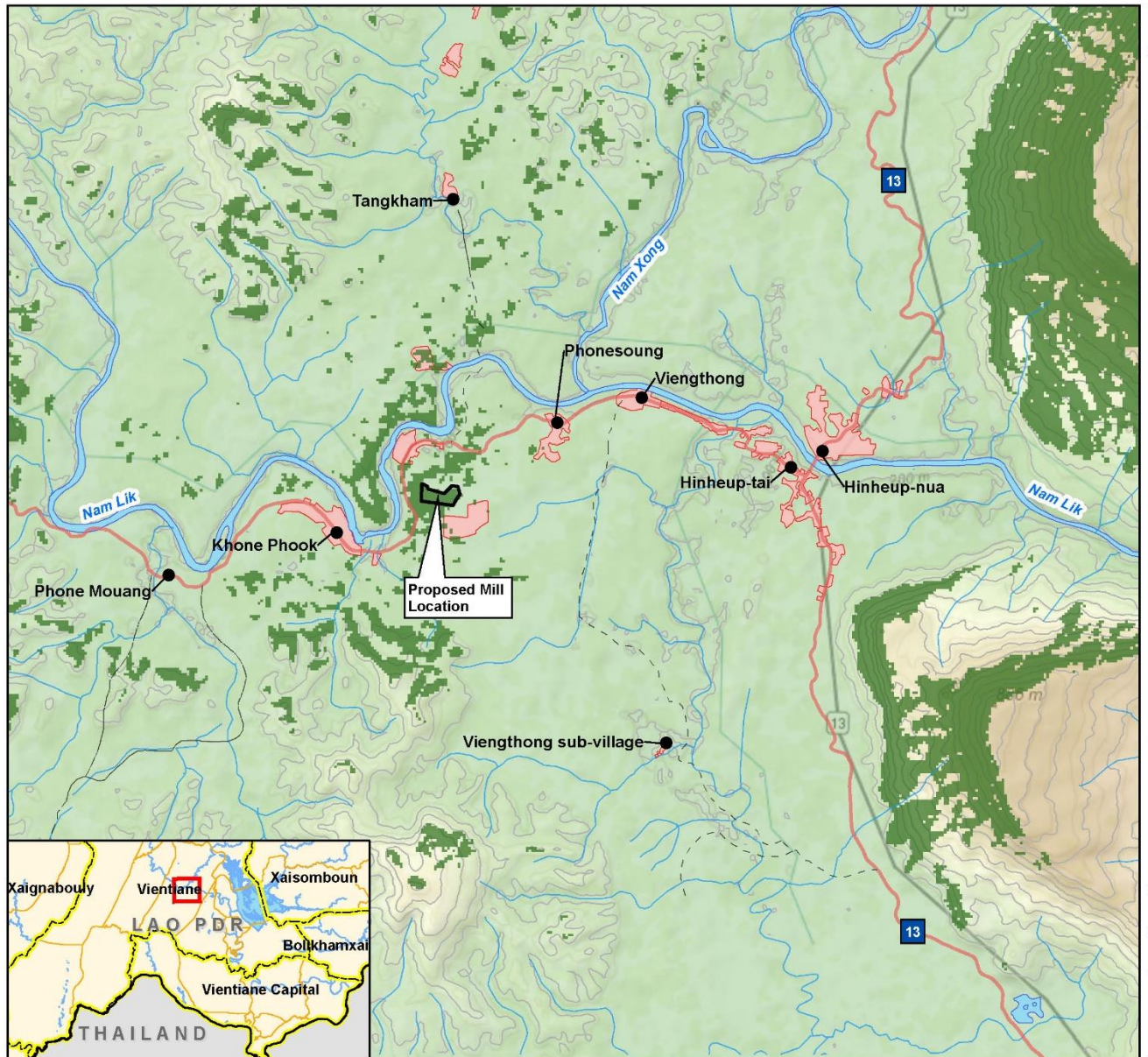


Figure 8-2 Viewshed Analysis



Chapter 9 | Risk Assessment



Chapter 9 | Risk Assessment

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9. RISK ASSESSMENT

9.1 ESIA Risk Assessment Methodology

9.1.1 Methodology and Approach

A risk assessment approach has been used to conduct this preliminary assessment of potential environmental and social impacts and to identify appropriate management and mitigation measures. The methodology is based upon ISO13000 Risk management — Principles and Guidelines, 2009 and ISO13010 Risk Management – Risk Assessment Techniques, 2009. The risk assessment for the ESIA will consider both risks for impacts and opportunities for benefits.

The natural environment will be altered by the construction and operation of any development project, which will result in some environmental and social impacts. A risk assessment framework has been used to identify key environmental and social risks that may result from the Project construction or operations.

The risk assessment has been conducted prior to consideration of management and mitigation to identify the most significant potential risks in the absence of mitigation. Following the categorisation of the initial risk ranking, proposed controls are identified to avoid or minimise the identified risks. Measures focus on either reducing the likelihood of occurrence or on decreasing the magnitude of the consequence to reduce the residual risk ranking to acceptable levels.

The risks associated with the Project have been separated into Construction and Operation Phases, as well as by thematic areas (i.e. physical, biological and social). The Construction Phase includes preparatory and clearance works conducted prior to the construction of the Mill and ancillary structures.

The risk assessment only reviews the potential impacts of the Mill Project based on the current Project design – it does not assess Project alternatives which are no longer being considered.

9.1.2 Risk Assessment Criteria

The risk assessment criteria used for the assessment are provided in Table 9-1 below. These are based on standard ISO31000 risk criteria (2009), and have been adapted for the Project.

Likelihood

As per ISO13000, Likelihood is defined as ‘the chance of occurrence’. In risk management terminology, the word ‘likelihood’ is used to refer to the chance of something happening, whether defined, measured or determined objectively or subjectively, qualitatively or quantitatively, and described using general terms or mathematically (such as a probability or a frequency over a given time-period). Further definition of Likelihood rankings is provided in Table 9-2.

Consequence

As per ISO31000, Consequence is defined as ‘the outcome of an event affecting objectives’. As outlined in the ISO standards: an event can lead to a range of consequences; which may be certain or uncertain and may have positive or negative effects on objectives. Consequences may be expressed qualitatively or quantitatively; and the initial consequences can escalate through knock-on effects (refer to Table 9-3).

The descriptions of each of the numerical consequence rankings used are described in their respective environmental and social and contexts in Table 9-3.

Table 9-1 Risk assessment criteria matrix with Likelihood and Consequence rankings

Likelihood		Consequence				
Level		1	2	3	4	5
5	Almost Certain	Medium	High	High	Very High	Very High
4	Likely	Medium	Medium	High	High	Very High
3	Possible -	Low	Medium	Medium	High	High
2	Unlikely	Low	Low	Medium	Medium	High
1	Rare	Low	Low	Low	Medium	High

Table 9-2 Summarised descriptions of Likelihood rankings

Likelihood		Summary
1	Rare	Very unlikely in the current or in a changing environment. Conceivable but highly improbable. The aspect / event may occur in very exceptional circumstances.
2	Unlikely	Less likely to happen in the current or a changing environment. The impact could occur at some time. The aspect / event has happened elsewhere under slightly similar circumstances.
3	Possible	It could happen in the current or a changing environment. The aspect / event has occurred before here or in similar circumstances elsewhere.
4	Likely	It probably will happen in the current or in a changing environment. The aspect / event is expected to occur. The aspect / event occurs in most circumstances.
5	Almost Certain	Frequent occurrence in current or in a changing environment. The aspect / event has occurred. The aspect / event occurs in almost all circumstances.

Table 9-3 Consequence description

Consequence		Environmental	Social
1	Slight	Slight / temporary impact on physical or biological receptor(s). Corrected < 1 day. Any amount contained within design requirements without additional impact.	Slight impact on community well-being. Written / verbal complaint from community. Immediately rectifiable.
2	Low	Minor non-compliance resolved within one week. Low impacts on biophysical environment. Easily compensated loss of some non-endangered flora / fauna (including aquatic life).	Low but ongoing impact on community health / well-being. Takes some time to resolve.
3	Medium	Non-compliance(s). Requires < 2 weeks remediation. Impacts on biophysical environment, managed locally. Loss (> 1 hectare or fauna replaceable or compensable, but at a cost) of non-endangered flora / fauna (including aquatic life). Quickly contained & corrected hazardous spills or emission on or off site.	Impacts that go beyond the local concerns but are recovered quickly and without significant lasting reputational or relationship impacts.
4	High	Significant non-compliance. (Against local or recognised international standards.) High local impacts on biophysical environment. Loss of endangered / highly regarded flora / fauna (including aquatic life). Significant contaminant outside containment but on-site. Non- acutely hazardous spill or emissions off site.	National and international concerns. Sustained NGO / stakeholder activism resulting in reputational damage. Difficult to resolve quickly.
5	Extreme	Severe impacts on biophysical environment. Very difficult to resolve and remediation. Significant loss of endangered / highly regarded flora / fauna (including aquatic life). Acutely hazardous spill or equivalent emission on or off site.	Complete breakdown of relationship with key stakeholders. Sustained negative media coverage on a national international level. Cessation or severe restriction of operations. Public outrage.

9.1.3 Risk Assessment Process

The methodology used for each step in the risk assessment process for the EIA is outlined in Figure 9-1, which shows how the risk assessment process fits within the overall Risk Management Process.

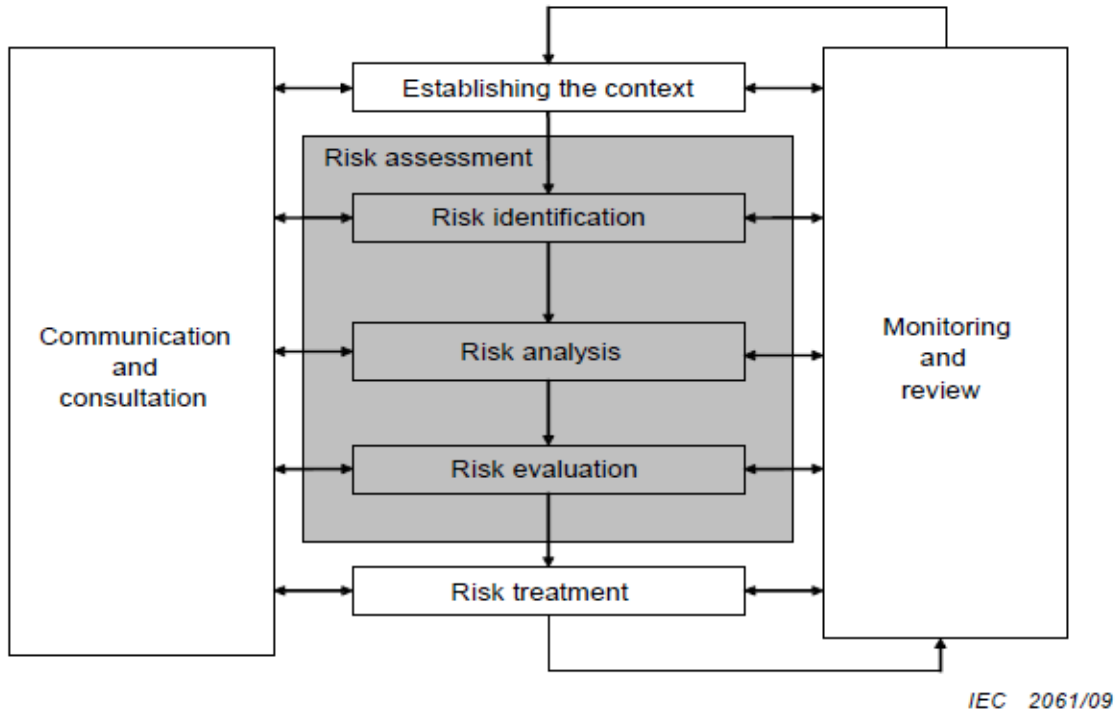


Figure 9-1. Risk Assessment Process (shaded) within the overall Risk Management Process (ISO13010)

Establishing the Context

“Before starting the design and implementation of the framework for managing risk, it is important to evaluate and understand both the external and internal context of the organization, since these can significantly influence the design of the framework.”

ISO13000

A comprehensive review was conducted of internal and external factors to be considered when managing risk. This enabled the scope and risk criteria to be established for the rest of the risk assessment. The process included the following:

- Conducting field and site visits;
- Conducting consultations with relevant stakeholders (refer to Chapter 12);
- Compiling and reviewing available information on the Project, including:
 - » Burapha scoping studies and feasibility reports;
 - » Existing Burapha policies, plans and procedures;
 - » Specialist environmental and social technical studies; and
 - » Compiling additional baseline information relevant to the Project area.

Communication and Consultation

“Communication and consultation with external and internal stakeholders should take place during all stages of the risk management process.

Therefore, plans for communication and consultation should be developed at an early stage. These should address issues relating to the risk itself, its causes, its consequences (if known), and the measures being taken to treat it. Effective external and internal communication and consultation should take place to ensure that those accountable for implementing the risk management process and stakeholders understand the basis on which decisions are made, and the reasons why particular actions are required.”

ISO13000

Communication and consultation have been conducted with a variety of stakeholders during the ESIA process. These have included consultations with:

- Villages potentially affected by the Project (e.g. through formal village consultations, refer to Chapter 13);
- Burapha;
- GOL authorities (Provincial and District); and
- Local NGOs.

These stakeholders and consultations are described in further detail in Chapter 13.

Risk Identification

“The purpose of risk identification is to identify what might happen or what situations might exist that might affect the achievement of the objectives of the system or organization. Once a risk is identified, the organization should identify any existing controls such as design features, people, processes and systems.

The risk identification process includes identifying the causes and source of the risk (hazard in the context of physical harm), events, situations or circumstances which could have a material impact upon objectives and the nature of that impact”

ISO13010

The risk identification process involved the generation of a comprehensive list of potentially significant environmental and social risks based on events that might create, enhance, prevent, degrade, accelerate or delay the achievement of Project objectives. For the current risk assessment, this process included:

- A review of risks previously identified in:
 - » Consultations with relevant stakeholders (refer to above);
 - » Burapha scoping studies and feasibility reports;
 - » Specialist environmental and social technical studies.
- Benchmarking against international standards and checklists, including those of the Equator Principles and World Bank/IFC; and
- Development of a Project Risk Register.

Risk Analysis

“Risk analysis consists of determining the consequences and their probabilities for identified risk events, considering the presence (or not) and the effectiveness of any existing controls. The consequences and their probabilities are then combined to determine a level of risk.

Risk analysis involves consideration of the causes and sources of risk, their consequences and the probability that those consequences can occur. Factors that affect consequences and probability should be identified. An event can have multiple consequences and can affect multiple objectives.”

ISO13010

For this step, causes and source of risk were considered, including their positive and negative consequences, and the likelihood that those consequences would occur. This involved an assessment of expected likelihood and consequences, based upon:

- A thorough understanding of the Project environmental and social baseline;
- The presence/absence of existing controls;
- Forecasts based upon common risks experienced by other similar projects; and
- Expert knowledge regarding the potential impacts of mill project construction and operations, as well as the likely effectiveness of mitigation measures.

This process was used to inform risk evaluation and guide risk treatment.

Risk Evaluation

"Risk evaluation involves comparing estimated levels of risk with risk criteria defined when the context was established, to determine the significance of the level and type of risk.

Risk evaluation uses the understanding of risk obtained during risk analysis to make decisions about future actions. Ethical, legal, financial and other considerations, including perceptions of risk, are also inputs to the decision."

ISO13010

Based on the results of previous steps, risks were evaluated by allocating a 'Level of Likelihood' and 'Level of Consequence' to each of the risks. The evaluation of Likelihood and Consequence were based on criteria outlined in Table 9-2 and Table 9-3 respectively. Risk exposure is then calculated based on the formula below, to identify the level of risk exposure as either Low, Moderate or High as per Table 9-1.

Risk Exposure = Level of Likelihood X Level of Consequence

Treatment

'Having completed a risk assessment, risk treatment involves selecting and agreeing to one or more relevant options for changing the probability of occurrence, the effect of risks, or both, and implementing these options.

This is followed by a cyclical process of reassessing the new level of risk, with a view to determining its tolerability against the criteria previously set, to decide whether further treatment is required.'

ISO13010

For this part of the risk assessment process, additional controls have been identified for the mitigation and/or reduction of risk, after careful evaluation of anticipated Project risks from a 'business as usual' scenario. Upon implementation of these controls, the consequences and likelihood of the risk have been re-evaluated to assess the anticipated residual level of overall risk exposure.

9.2 Results

The findings of the environmental and social risk assessment for the Project are provided Table 9-5 below.

Table 9-4 Environmental and Social Risk Assessment for the Burapha Mill Project.

Risk / Aspect / Hazard	Construction	Operations	Likely Primary Causes	Potential Receptors	Pre-Control Ranking			Potential Key Controls / Management Measures for the Project Development	Post-Control Ranking		
					Consequence	Likelihood	Risk		Consequence	Likelihood	Risk
Physical Risks and Proposed Management Measures											
Forest Conversion	✓		Land clearance associated with project footprint, including Mill, log stockyard, access road, and transmission line	Environment, Community	1	1	1	Site selected to avoid moderate to high value habitat; Survey, delineate, and mark boundaries; educate construction contractors regarding vegetation retention and monitor construction. Revegetate temporarily disturbed areas	1	1	1
Visual Amenity	✓	✓	Land clearance and construction of Project facilities	Community, Tourism	3	1	3	Industrial area selected; plant trees around Mill	2	1	2
Erosion and Sediment Transport	✓	✓	Vegetation clearance for construction of project footprint, access roads, soil stockpiling; grading and major earthworks during construction and ongoing existence of unsealed road / log stockyards during operations	Aquatic Biodiversity, Community	3	5	15	Design and implement erosion and sediment control measures (e.g. schedule earthworks during dry season, divert surface water around disturbed areas, construct sediment ponds or siltation basin to receive discharge from construction footprint, implement stormwater, erosion and sediment controls); Monitor erosion and sediment controls	2	4	8
Water Quality		✓	Nutrient loading in receiving waters from organic materials / constituents of resin (e.g. formaldehyde) elevating BOD, COD.	Environment, Community, Aquatic Organisms	4	4	16	Design and install appropriate waste water treatment system for sewage; Maintain vehicles / equipment at least 100 metres from surface waters; Transport, store, handle and dispose of hazardous/chemical waste/materials according to international Best Practices. Design Mill for zero discharge of washwater; implement passive water treatment pond for operations.	4	2	8
	✓	✓	Discharge of hazardous materials used during Mill operations to surface and / or groundwater (i.e. formaldehyde, diesel fuel, etc.)		5	2	10		5	1	5

Risk / Aspect / Hazard		Construction	Operations	Likely Primary Causes	Potential Receptors	Pre-Control Ranking			Potential Key Controls / Management Measures for the Project Development	Post-Control Ranking		
						Consequence	Likelihood	Risk		Consequence	Likelihood	Risk
Air quality	Air quality impacts on local communities or workforce; Breach of air quality standards	✓	✓	Dust and vehicle emissions from road traffic; dust from earthworks during construction	Workforce and Community	3	3	9	Apply dust minimisation for unsealed roads within close proximity to receptors; Enforce speed limits; Apply grievance mechanism; Conduct regular vehicle maintenance.	2	3	6
	Occupational health and safety impacted	☐	✓	Particulate generated from sawing, Mill operations	Workforce	3	5	15	Dust control facilities implemented in Mill; enforcement of PPE	2	1	2
		☐	✓	Formaldehyde or other gaseous emissions impacting workforce	Workforce	5	3	15	Training for Hazmat; PPE, Adequate ventilation; emergency preparedness and response planning	4	1	4
		☐	✓	Emissions of Volatile Organic Compounds (VOCs), NOx, CO, and / or other potential pollutants during Mill operations	Workforce and Community	3	3	9	Low emissions equipment selected, where practicable	3	2	6
Noise	Noise impacts on local communities. Breach of regulatory requirements	✓	✓	Construction activity; Mill Operations; Increased Traffic	Community and Workforce	3	5	15	Restrict construction and hauling to daylight hours; inform local residents of construction timelines; Select low-noise emissions equipment to the extent practicable; design and construct noise attenuating structures in Mill design; Utilise natural noise attenuation (topography and vegetated areas) during site selection. Enforce speed limits through villages along transport route; Apply grievance mechanism and adaptively manage	3	2	6
General Waste	Impacted visual amenity; attracting pests that may be vectors for disease, impacted water quality, excess waste going to landfills	✓	✓	Inadequate waste management program; lack of adequate waste storage facilities; lack of monitoring and enforcement of management procedures	Environment; Community	2	3	6	Adaptation and implementation of proper waste management registers and procedures (e.g. waste management hierarchy) and education of the project workforce regarding environmental issues	2	1	2

Risk / Aspect / Hazard		Construction	Operations	Likely Primary Causes	Potential Receptors	Pre-Control Ranking			Potential Key Controls / Management Measures for the Project Development	Post-Control Ranking		
						Consequence	Likelihood	Risk		Consequence	Likelihood	Risk
Accidental Events and Natural Hazards	Natural disasters	✓	✓	Floods, fire, landslides or earthquake; inadequate training or preparation in Emergency Response Plan	Community and Workforce Safety	5	2	10	Best practice Project design for natural hazards/disaster; adaptation and implementation of appropriate environmental emergency response procedures	3	2	6
Biological Risks and Proposed Management Measures												
Terrestrial Biodiversity	Loss and/or significant adverse impacts on flora communities / species of conservation significance	✓		Vegetation clearance for project footprint and associated facilities	Biodiversity	1	1	1	Only degraded floral communities removed during construction	1	1	1
	Loss and/or significant adverse impacts on fauna species and habitat of conservation significance	✓		Loss of habitat; disturbance from Project noise	Biodiversity	2	2	4	Site selection; prohibition from hunting	2	1	2
	Introduction or spread of exotic flora and fauna	✓	✓	Introduction of species on equipment / vehicles relocated to site; Poor or improper pest control/management methods.	Environment	3	2	6	Pre-treat vehicles / workers' boots before entering worksite (wash-down facilities); use appropriate and local species for revegetation; Monitor eucalyptus for seedling establishment and eradicate	2	2	4
Aquatic Biodiversity	Increased suspended sediment impacting habitat	✓	✓	Inadequate stormwater management / erosion and sediment control; Improper transport, storage, handling and disposal of hazardous materials and refuse.	Aquatic Habitat and Biodiversity	2	4	8	Construct effective stormwater management prior to the onset of the rainy season; Design and implement erosion and sediment control facilities; Properly transport, storage, handle, and dispose of hazardous materials; Staff training	2	3	6
	Nutrient loading leading to elevated BOD / COD and decrease in dissolved oxygen		✓	Discharge of Mill washwater; runoff from stockyard	Environment, Community	4	3	12	Zero discharge from equipment wash-down facilities; Proper transport, storage, handling, and disposal of hazardous materials; Staff training	4	1	4
	Discharge of hazardous materials / pollutants from Mill operations	✓	✓	Discharge of hazardous materials	Aquatic Habitat and Biodiversity	5	3	15	Educate workforce; Implement proper waste management registers and procedures; Monitoring and enforce waste management procedures	5	1	5

Risk / Aspect / Hazard	Construction	Operations	Likely Primary Causes	Potential Receptors	Pre-Control Ranking			Potential Key Controls / Management Measures for the Project Development	Post-Control Ranking			
					Consequence	Likelihood	Risk		Consequence	Likelihood	Risk	
Social Risks and Proposed Management Measures												
Occupational Health and Safety	Injuries associated with construction activity	✓		Lack of training; Ill-maintained equipment; Chance	Workforce	5	3	15	Require contractor to develop CEMP; Implement contractor training campaign, Provide PPE and require utilisation	4	1	4
	Injuries associated with saws, presses, and additional equipment for Mill operations		✓	Unsuitable equipment controls; Improper training; ill maintained equipment	Workforce	5	3	15	Appropriate safeguards on Mill equipment; Training; Provision and requirement for PPE	4	1	4
	Vehicular accident during transportation	✓	✓	Improper training; Speeding; Night driving; Poor road conditions; Drug or alcohol impairment	Community and Workforce	5	3	15	Enforce speed limits; Concentrate daytime transport to the extent practicable	5	1	5
	Exposure to hazardous chemicals	✓	✓	Improper training; Unsuitable management plans for chemical handling; Improper PPE	Workforce	4	4	16	Training; Provision and posting of MSDS; Appropriate storage and handling; Provision and requirement for PPE	4	1	4
	Exposure to particulates and additional air quality pollutants	✓	✓	Lack of suitable PPE; Improper Mill design	Workforce	3	5	15	Appropriate Mill design; Provision and requirement for PPE (dust masks)	3	1	3
Health, Nutrition and Community Safety	Impacted air quality	✓	✓	Particulate matter from unsealed roads, timber milling	Community and Workforce	2	3	6	Water application to unsealed roads near receptors during the dry season; Suitable Mill design for particulate capture	2	2	4
	Impacted air quality		✓	Stack emissions (e.g. VOCs, NOx, SO2, CO)	Community and Workforce	3	2	6	Mill equipment selection; Design	2	2	4
	Noise disturbance (nuisance level or more extreme)	✓	✓	Construction, Transport, Mill operations	Community and Workforce	2	2	4	Transport and Mill Operations during daylight hours; Mill designed with suitable noise attenuation devices	2	1	2

Risk / Aspect / Hazard		Construction	Operations	Likely Primary Causes	Potential Receptors	Pre-Control Ranking			Potential Key Controls / Management Measures for the Project Development	Post-Control Ranking		
						Consequence	Likelihood	Risk		Consequence	Likelihood	Risk
Economic Development and Employment	Perceived inequitable employment and training opportunities for local communities (including women and different ethnic groups)		✓	Inequitable employment policies; lack of training for local workers; low skill level of local workers.	Community and Workforce	3	3	9	Provide preferential employment to residents of nearby villages and districts; implement equitable recruitment policy; provide training where practicable; Consult with community to ensure that they are well informed and have realistic expectations of employment opportunities	3	1	3
	Failure to meet expectations regarding economic improvement		✓	Real or perceived lack of employment and training opportunities.	Community and Workforce	3	3	9	Local sourcing of goods and services; local business development as part of livelihood improvement strategy; adaptation and implementation Lao national and/or international standards and procedures for employment and training; community consultation	3	1	3
Traffic / transportation	Increased frequency of accidents along transportation routes	✓	✓	Speed limits in villages not set and/or enforced; Night-driving; Poor road conditions; Drug or alcohol intoxication; Overloading vehicles	Community / Occupational Health and Safety	5	3	15	Plan transport routes for avoidance of communities to the extent practicable; Enforce speed limits; Conduct regular vehicle maintenance; Train drivers and ensure they are operating within their respective assigned skill level; Implement incident reporting	4	2	8
	Impact on land and water resources from hydrocarbon / HazMat spills along access roads	✓	✓	Unsafe transportation of hazardous materials; lack of traffic control measures; inadequate road safety controls	Health and Safety, Community	4	3	12	Require driver safety training; enforcement speed limits; develop and implement emergency response procedures and ensure clean-up materials are on hand (spill kits)	4	2	8
	Increased noise along haul routes	✓	✓	Hauling raw logs and finished product	Community	2	5	10	Concentrate hauling during daylight hours to the extent practicable; plan transport routes carefully; Grievance Redress mechanism	2	3	6
	Increased dust generated during dry season (from transportation); breach of regulatory requirements	✓	✓	Nuisance dust generated from road traffic / timber milling	Health and Safety, Community	3	4	12	Require dust minimisation measures in Mill and roads; carefully plan transport routes; enforce speed limits; conduct routine monitoring; develop and implement grievance mechanism	3	3	9

Risk / Aspect / Hazard	Construction	Operations	Likely Primary Causes	Potential Receptors	Pre-Control Ranking			Potential Key Controls / Management Measures for the Project Development	Post-Control Ranking			
					Consequence	Likelihood	Risk		Consequence	Likelihood	Risk	
Damage to road infrastructure		✓	Hauling on unsealed roads	Community	2	4	8	Restrict hauling on unsealed roads to the dry season. Implement Grievance Redress Mechanism; Maintain roads as required	2	2	4	
Water use	Adverse impacts on downstream community uses of surface water in streams (irrigation, fisheries, domestic use); breach of regulatory requirements	✓	✓	Discharge of wash-water from Mill equipment; Inadequate transport, storage, handling of hazardous materials	Aquatic habitat, Aquatic species, Environment, Livestock, Community	5	3	15	Proper transport, storage, handling, and disposal of hazardous materials; Staff training; emergency preparedness and response planning	4	1	9
	Depletion of groundwater due to abstraction for Mill use	☐	✓	Hydraulic connectivity	Community	3	1	3	Grievance Redress Mechanism; Alternate water source if necessary	1	1	1
	Adverse impacts on local community uses of groundwater (domestic use); breach of regulatory requirements	✓	✓	Contamination of groundwater due improper handling/storage of hazardous materials; discharge of equipment wash-water	Environment, Community	3	1	3	Water quality/hydrology management measures; Best practice management of hazardous materials; monitoring and reporting; stakeholder consultation; remediation and compensation if impacts occur.	1	1	1
Vulnerable Groups		✓	Improper implementation of employment policies and compensation and livelihood restoration programs, social development programs	Community	4	2	8	Conduct consultation with particular attention to vulnerable groups, Implement Lao employment policies; Prioritise fair and equitable hiring practices	4	1	4	
Ethnicity		✓	Inconsistent compensation or consultation between ethnic groups, Improper implementation of employment policies	Community Unrest, Disruption of Traditional Social Structure	4	3	12	Consultation with all ethnic groups with particular attention to minority groups; implement Lao employment policies; Prioritise fair and equitable hiring practices	4	1	4	

Risk / Aspect / Hazard		Construction	Operations	Likely Primary Causes	Potential Receptors	Pre-Control Ranking			Potential Key Controls / Management Measures for the Project Development	Post-Control Ranking		
						Consequence	Likelihood	Risk		Consequence	Likelihood	Risk
Cultural Heritage	Adverse impacts upon sites of cultural heritage importance (i.e. cemeteries, spirit forests); breach of regulatory requirements	✓		Land disturbance and inappropriate cultural heritage management, lack of implementation of chance find procedures	Community	4	1	4	Consult with communities / the GOL to avoid disturbing areas of cultural disturbance; Minimise project footprint, Implement Chance Find Procedure; Compensate and facilitate appeasement ceremonies were requested, require noise minimisation measures; Educate staff with an awareness programs, Implement Grievance mechanism	1	1	1
Archaeology	Disturbance of sites of archaeological importance	✓	☐	Lack of understanding of archaeological values; Inadequate Chance Find Procedure; Inadequate archaeological assessment and management	Regulatory non-compliance; community upheaval	4	1	4	Avoid known areas of cultural significance during site selection. Implement Chance Find Procedure / staff and contractor education and awareness program	1	1	1
Grievances	Community dissatisfaction with grievance process	✓	✓	Lack of consultation, Lack of adequate resourcing by Company	Community Unrest, Reputation.	3	3	9	Develop a grievance procedure to an international and national standard	3	2	6
Tourism	Adverse impact on tourism	✓	✓	Loss of visual amenity; direct impacts on tourist sites (e.g. Nam Lik and surrounds)	Community and GOL dissatisfaction	4	2	8	Consider site selection carefully and in consultation with the GOL to ensure alignment with development plans; Implement measures to minimise impact on visual amenity (e.g. tree planting)	4	1	4

9.3 Risk Management Summary

9.3.1 Summary of Key Risks Prior to Mitigation

Of the risks prior to implementation of proposed Project management and mitigation measures, the risk assessment identified no Very High risks, 14 High risks and 16 Moderate risks (duplicated risks removed, e.g. hazardous material is a threat to water quality, water use, and aquatic species). The most significant potential risks prior to additional management measures are outlined in Table 9-5. These risks are expected to be reduced significantly through the implementation of proposed management and mitigation measures. The residual risk assessment following implementation of these measures identified three High residual risks, 19 Moderate risks with the remaining 18 risks considered Low.

9.3.2 Approach to Risk Management in ESIA

Management and mitigation measures have been proposed for each key risk associated with the Project. These are summarized in Table 9-4 and are described in detail in the relevant sections in Chapters 6 - 8, as well as the ESMMP (refer to Volume C). The risks will be managed and mitigated in accordance with the level of risk exposure and with due consideration of the nature and scale of the potential impacts.

9.3.3 Residual Risks

The implementation of proposed management and mitigation measures is expected to reduce the anticipated residual level of overall risk exposure for most of the identified risks (refer to Table 9-4). Although three residual risks are ranked as High the likelihood of impacts are ranked Very Low for each (a consequence rating of Very High necessitates a High or Very High risk ranking. Table 9-5 summarises the key High and Moderate residual risks that remain.

Table 9-5. Summary of key risks prior to mitigation and post mitigation

High Risks (Prior to Mitigation)	Residual Risk with Mitigation
Increased total suspended solids in surface waters and sediment deposition downstream of Project. Loss of topsoil	Moderate
Nutrient loading in receiving waters from organic materials / constituents of resin (e.g. formaldehyde) elevating BOD, COD and decreasing dissolved oxygen concentrations, impact aquatic biodiversity	Moderate
Discharge of hazardous materials used during transport to the Mill and potential impacts to surface and / or groundwater (i.e. formaldehyde, diesel fuel, etc.)	High
Particulate generated from sawing, Mill operations and associated OH&S issues	Low
Formaldehyde or other gaseous emissions impacting workforce	Moderate
Natural disasters	Moderate
Injuries associated with construction activity	Moderate
Injuries associated with saws, presses, and additional equipment for Mill operations	Moderate
Increased frequency of accidents along transportation routes	High
Increased noise along haul routes	Moderate
Exposure to airborne hazardous chemicals (OHS)	Moderate
Exposure to particulates and additional air quality pollutants (OHS)	Moderate
Increased dust generated during dry season (from transportation); breach of regulatory requirements	Moderate
Ethnic conflict due to inequitable impact (real or perceived) on different ethnic groups	Low

9.3.4 Risk Monitoring and Review

'As part of the risk management process, risks and controls should be monitored and reviewed on a regular basis to verify that:

- *assumptions about risks remain valid;*
- *assumptions on which the risk assessment is based, including the external and internal context, remain valid;*
- *expected results are being achieved;*
- *results of risk assessment are in line with actual experience;*
- *risk assessment techniques are being properly applied; [and]*
- *risk treatments are effective.*

Accountability for monitoring and performing reviews should be established.'

ISO13010

Periodic risk monitoring and review are critical to managing environmental and social risks effectively over the Project life, and feed into all steps in the risk management process (refer to Figure 9-1).

Risk

As part of its Corporate Environmental and Occupational Health & Safety System (CEOHS), Burapha should develop a risk management system for the Project consistent with ISO31000 *Risk Management — Principles and Guidelines* (2009). This should include:

- Ensuring that there is accountability, authority and appropriate competence for managing risk;
- Development of an organization-wide Risk Management Plan to ensure that the risk management policy is implemented, and that risk management is embedded in the organization's practices and processes;
- Allocation of appropriate resources for risk management;
- Establishing appropriate internal and external communication and reporting mechanisms; and
- Monitoring and review of the risk management framework.

9.3.5 Risk Management Framework

Based on the ISO31000 *Risk Management — Principles and Guidelines* (2009), key elements of the risk management framework are:

- Risk hierarchy;
- Risk governance and accountabilities;
- Risk System.

To ensure that the risk management framework is effective and continues to support organizational performance, Burapha should:

- Regularly assess the quality of risk management processes to identify opportunities for improvement;
- Measure risk management performance for the Project against indicators, which are periodically reviewed for appropriateness;
- Periodically measure progress against, and deviation from, a Project-specific risk management plan;
- Periodically review whether the risk management framework, policy and plan are still appropriate for the Project, given the organizations' external and internal context;

- Report on risk, progress with the risk management plan and how well the risk management policy is being followed; and
- Review the effectiveness of the risk management framework.

Decision relating to the improvement of the risk management framework, policy and plans will be made based on the results of monitoring and reviews. These decisions will aim to improve the organization's management of risk and its risk management culture. Burapha should periodically monitor and review the risk assessment conducted for the Project for the purposes of:

- Ensuring that controls are effective and efficient in both design and operation;
- Obtaining further information to improve risk assessment;
- Analysing and learning lessons from events (including near-misses), changes, trends, successes and failures;
- Detecting changes in the external and internal context, including changes to risk criteria and the risk itself which can require revision of risk treatments and priorities; and
- Identifying emerging risks.

Progress in implementing risk treatment measures and plans provides a performance measure. The results of the monitoring and review processes should be incorporated into Burapha's overall performance management, measurement and external and internal reporting activities.

The results of monitoring and review should be recorded and externally and internally reported as appropriate, and also be used as an input to the review of the risk management framework.

9.3.6 Risk Management Records

'Risk management activities should be traceable. In the risk management process, records provide the foundation for improvement in methods and tools, as well as in the overall process.'
ISO13010

Recording risk information that is concise, accurate and timely enables reports to be generated, which build corporate knowledge and contributes significantly to informed discussion on risk and uncertainty.

In accordance with ISO31000 Risk management — Principles and Guidelines (2009), Burapha that "Systems are in place to ensure that sustainability related records are established and maintained, accurate, legible, identifiable, securely stored and have established retention times based on legal requirements."

All environmental and social risk assessments conducted and associated documentation will be recorded and stored. As appropriate these records will include:

- Internal risk assessments;
- External risk assessments;
- Relevant Company procedures, standards, policies and plans;
- Relevant international guidelines and standards;
- Audit results; and
- Incident reports.



Chapter 10 | Cumulative Impacts

Chapter 10 | Cumulative Impacts

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10. CUMULATIVE IMPACT ASSESSMENT

10.1 Introduction

Cumulative impacts result when the impacts derived from a project are added to or interact with impacts associated with other projects or actions within a particular time and place. The combined, incremental effects of human actions may be compounded, leading to environmental and social impacts that exceed those associated with implementation of any individual project or action.

This Chapter provides information on existing and planned projects in and around the Project Area and an assessment of potential cumulative impacts.

10.2 Existing and Potential Projects in the Project Region

Existing and potential projects in and around the Project Area have been identified through consultation with the Provincial and District governments and a review of available secondary information.

10.2.1 Energy and Extractive Industry

Energy

There are currently three hydropower projects with a total installed capacity of 835 MW currently operating in Vientiane Province (MEM 2016). A further 11 projects are currently undergoing feasibility or construction (VTE Province 2016).

There are two main hydropower developments in proximity to the Mill Project. These include the Nam Lik 1 which is operational and the Nam Lik 1-2 which is currently under construction (refer to Table 10-1). The Hin Heup Sub-station, located in the Project area, facilitates transfer of power generated by these projects to the national grid.

Table 10-1 Hydropower Projects in Hin Heup District

Project Name	Location (in relation to Project)	Installed Capacity (MW)	Progress	Commercial Operation Date
Nam Lik 1-2	10 km west of the Mill site	100	Operational	2010
Nam Lik 1	10 km to the east of the mill site	65	Under construction	2017

Nam Lik 1-2 Hydropower Project.

The Nam Lik 1-2 Hydropower Project is located on the Nam Lik River, approximately 50km upstream of the District Capital of Hin Heup. The project is a diversion hydropower station, including dam, reservoir, diversion system, powerhouse and transmission system. The installed capacity of the project is 100MW, with an annual gross power generation of 435,000 MWh (CDM, 2006). The Project is being operated by the Nam Lik 1-2 Hydropower Company.

Nam Lik 1 Hydropower Project

The Nam Lik 1 Hydropower Project is currently being constructed on the Nam Lik River approximately five km downstream of Hin Heup District Capital. The Project will have an installed capacity of 64.5 MW. Commercial operations are due to commence in 2017.

The Nam Lik 1 project will create a reservoir on the Nam Lik river extending one km upstream of the Project Mill site and will also affect the lower reaches of the Nam Xong River (refer to Figure 10-1). The creation of the reservoir will require the relocation of 80 households within Ban Viengthong. Of these, 60 will relocate to a resettlement area just south of the present village settlement. The remaining households will self-relocate to other villages.

According to the Hin Heup District government, the Nam Lik reservoir will be developed and promoted by the as a multi-use reservoir including the development of tourism, fisheries and other uses.

Extractive Industry

There are currently at least five mining projects operating in Hin Heup District including two coal and three limestone mines. There are also two coal washing factories and a limestone factory associated with these operations. A further three coal and two copper and gold project are currently in exploration phase in the region. These projects of these projects or facilities are not located in close proximity to the Mill Area, with the closest being a limestone mine between the Project area and Ban Nakang and a new cement factory near the Highway 13 Nakang / Na An road split, approximately five km to the east.

10.2.2 Industrial Activity

The Hin Heup District Government is promoting industrial development in and around the District capital. The area comprises of degraded land and forest resources, good transportation infrastructure (i.e. Road N13 and the planned Boten-VTE Railway), water resources (i.e. Nam Lik and its tributaries) and high voltage electricity supplied by local hydropower projects through the Hin Heup Substation.

Two industrial zones have been established including a Heavy Industrial Zone and Light Industrial Zone (refer to Figure 10.1). The Heavy Industrial Zone is located to the north of the Mill site, between the confluence of the Nam Lik and Nam Song. The area totals 7,662 ha. The proposed Mill Project is located within the 1,950 ha Light Industrial Zone . Current developments in the Light Industrial Zone are presented in Table 10-2. Current industry includes the BSS cassava factory, BKN white charcoal factory, Ray organic fertiliser plant and the Lao Yunming Eaglewood perfume facility. These developments provide a significant number of full time jobs, most of which are held by people in the Project Area.

Two other important cottage industries operate in the Project Area including handicraft (material) production and charcoal production. These sectors employ an estimated 400-450 people from 313 and 20 households (for handicrafts and charcoal, respectively) from the Project Area.

Table 10-2 Industrial Zones and Development in the Project Region

#	Zone / Concession	Land Holding (Ha)
Heavy Industrial Zone		
H1	BSS Cassava factory	17 ha
Light Industrial Zone		
L1	Agarwood Plantation	15 ha
L2	BKN White Charcoal Factory	0.6 ha
L3	Ray farm Organic Fertiliser	2.6 ha

#	Zone / Concession	Land Holding (Ha)
L4	Hin Heup Substation	2 ha
L5	Lao Yunming Eaglewood Agarwood Plantation	380 ha
L6	Lao Yunming Eaglewood Perfume Extraction Factory	-
L7	Rubber Plantation of Mr. Douangchanh	140
L8	Lao Yunmu Forestry Development Co., Ltd	73 ha
L9	Lilieng Rubber Plantation	100 ha
L10	Burapha Mill site	9 ha

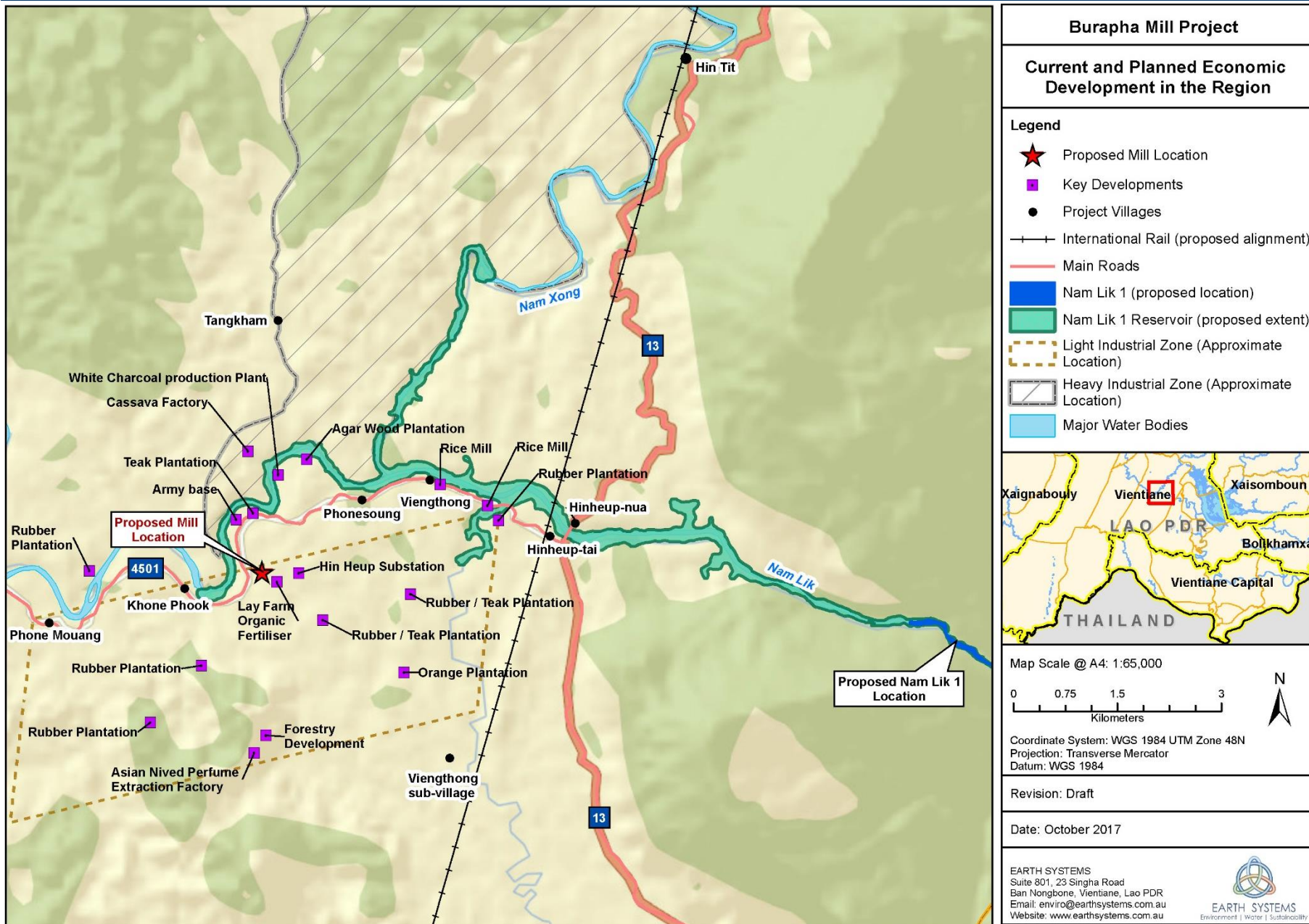


Figure 10-1 Economic Development in the Project Region

10.2.3 Agriculture and Plantation Forestry

Agriculture (including Plantation Forestry) is the currently the most important economic sector in the District with its value estimated at 95.25 Billion KIP (Hin Heup District Planning Office, 2014).

Agriculture

Rice Production

Rice production is the most important agricultural sector in Hin Heup District. There are currently 2400 ha of lowland rice cultivation areas with annual production of 10,994 tonnes. Lowland rice production areas remain fairly stable and are projected to slightly increase to 2440 ha over the next 5 years. There are several small rice mill operations in the Project Area (refer to Figure 10-1).

No data is available on upland rice production in the District and there is very little reported upland rice production in the Project Area. The government is actively reducing swidden agriculture practices and promoting the development of permanent upland agriculture and planted forestry in these areas (refer to below).

Other Crops

Other forms of agricultural production in the District are also projected to increase including cassava (745 ha), sweet corn (161 ha), sugar cane (1059 ha), yam bean (1042 ha), jobs tear (627 ha), pineapple (991 ha), banana (1810 ha) and green-leaf vegetables (314 ha). The BSS Cassava Factory located to the north of the proposed Project Area is providing processing capabilities for cassava grown across the wider region. Processing facilities for other crops are expected to be developed over the next five years.

Livestock

Expansion of livestock holdings is being promoted as a key livelihood development strategy for local villages. According to District data, there are currently an estimated 17,720 buffalo and 51,662 cattle in Hen Heup District. Stock holdings are estimated to increase by 20% over the next 5 years.

Planted Forestry

The Hin Heup District Government is promoting the development of commercial forestry plantations. Between 2009 and 2014, 7,175 ha were planted across the District. This included rubber (3,800), agarwood (2,292 ha), Teak (806 ha), Eucalyptus (200 ha) natural species including Mai Dou (Rosewood), Mai The Khan (Afzelia) and Mai tiew (*Cratexylon prunitifolium*) (77ha) (Hin Heup District Planning Office, 2014).

Key plantation developments in the Project Area are outlined in Table 10-2. These include the Lao Yunming Eaglewood Agarwood Plantation, Lao Yunmu Forestry Development Co., Ltd and Lilieng Rubber Plantation. Burapha has also started to develop eucalypt plantations in the wider area. Many of these plantations have (or have planned) processing facilities (refer to Section 10.2.2)

10.2.4 Transportation infrastructure

Road Infrastructure

The Project Area is supported by well-developed road infrastructure including National Highway 13 and several paved Provincial and District roads. Road infrastructure continues to be developed and maintained by the government with the support of international development agencies including the Asian Development Bank (i.e. Northern Transport Network Improvement Project) and the World Bank (Road Sector Project).

Rail Infrastructure

The GOL is about to embark on a railway project that will facilitate passage and freight services between Thailand and China - through Lao PDR. The Boten-Vientiane Railway Line Project is a USD 7 Billion, 427 km

project which is part of a regional rail connectivity initiative. Construction contracts for the project have recently been awarded. This project will take approximately six years to complete. The railway line will pass through the Project region. It is anticipated that a railway station and ancillary facilities will be developed in the area to facilitate passenger and freight transportation.

10.3 Assessment of Cumulative Impacts

The economic developments in and around the Project Area have the potential to result in cumulative environmental and social impacts for the area of influence. The potential cumulative impacts from these developments and the development of the Burapha Mill Project are described in the following sections.

10.3.1 Socio-Economic Impacts

Revenue, Economic Development and Employment

The presence of the Mill Project and other existing and planned developments in the light and heavy industrial zones is expected to result in a multiplier effect, generating government revenue, employment and spin-off economic opportunities in the Project region and cumulatively boosting the regional economy.

The Mill Project supports the Hin Heup District Government's plan to develop the area as a light industrial zone, and further transform the local economy from subsistence agriculture to a cash-based economy. Current industrial development in the area provides some regional job opportunities. The Mill Project will make a significant contribution to employment and economic opportunities for the local community, through the creation of approximately 387 full-time positions and the implementation of a local first recruitment policy.

The implementation of Burapha's Code of Conduct and Human Resource Policies has potential positive flow on affects for conditions at the workplaces of other company's operating in the area.

Land Use, Resettlement and Displacement of People

The government's strategy to develop industry in the Project Area has reduced the land available to villagers and their ability to practice natural resource based livelihood activities (i.e. upland agriculture, plantation forestry, and natural resource gathering). The creation of employment and income generating opportunities from the development of the area for local communities is a central tenant of the government's Develop Strategy.

Unlike some other projects in the region, the Mill Project does not affect any village land and no resettlement will be required. The Project is expected to make a positive contribution to the government's development strategy through the creation of jobs and spin-off businesses. Income from these activities and funds from the Project's community development program have the potential to be re-invested into the development of remaining agriculture lands (i.e. lowland rice fields) to improve productivity and livelihood security of regional households.

Occupational Health and Safety

Burapha is committed to updating and implementing international standard Occupational Health and Safety policies and procedures for the Mill Project. This has potential positive flow on affects for safe work place conditions and practices at other projects being constructed and operating in the area.

Transportation and Accessibility

The assessment of impacts resulting from the Project transportation activities (refer to Section 8.5) considers the cumulative impacts of Project vehicles on communities and other road users. Key issues include road / community safety, degradation of road infrastructure; the transport of hazardous materials, nuisance noise and vibration, and air quality relating to dust generation and vehicle emissions. The assessment concluded that transport related impacts will be low with effective management, given the heavy traffic on the primary inbound / outbound access road from the Mill site and the small representation that Burapha related vehicles will comprise.

The development of the Boten-Vientiane Rail will provide another transportation option for the Project and other development projects in the Project region. This is likely to reduce road transport related impacts on communities and road users.

Community Health and Safety and Nutrition

The Mill Project and other development projects in the area are likely to have multiplier effects on the growth of the local economy and in turn the development of District health and market facilities and services.

Project impacts on community health and safety associated with air quality, noise, water quality, workforce, communicable disease and on-site safety are expected to be low, and as a result, contribution to cumulative impacts will also be low.

Hydrology and Water use

The District Government's Industrial development plans highlight the abundant water resources as a key reason for the development of industry in the area.

The Mill requires approximately 21,900m³ per year (m³/a) to operate at full capacity which will be sourced from groundwater. However, if the groundwater volume is found to be inadequate, surface water from the Nam Lik River may be required. The abstraction of approximately 63 m³ of groundwater or surface water from the Nam Lik per day is not expected to significant impact hydrology.

However current and future industrial developments in the area may have similar operational water requirements. This has the potential to draw down the regional aquifer or reduce surface water in the Nam Lik River potentially affected other water users / hydropower generation. It is considered very unlikely that the Mill Project will utilise surface water for its operations.

The Nam Lik 1 HPP will regulate the Nam Lik River flow, providing more constant water supply year-round mitigating potential impacts to surface water hydrology. Industrial use of water resources will decrease water availability for electricity generation. However cumulative impacts are likely to be minor.

Terrestrial Biodiversity and Use

The Project will have negligible impacts on terrestrial biodiversity and its use by local communities and as result will not contribute to cumulative impacts in the area.

Water Quality

In the absence of adequate management, risks Project discharge include elevated BOD and COD, moderately high sediment loads (during construction) and hazardous materials. With effective design controls and management measures risks will be extremely low. Similar risks are likely in other industrial developments across the area. Failure to properly manage these risks could contribute to diminished water quality.

Aquatic Biodiversity and Use

While the Project is committed to meeting stringent national and international discharge standards, in the absence of adequate management, there is a risk that discharge will have elevated BOD and COD concentrations, potentially depleting dissolve oxygen in surface water and impacting the health and vitality of aquatic species. Unmitigated project effluent is not expected to significantly impact water quality in the Nam Lik River (with dilution), however given the current and potential industry development in the area, combined effluent may impact aquatic habitat and species.

The Nam Lik HPP will impound the river which is likely to result in decreased dissolved oxygen concentrations, thus the unmitigated impact would be exacerbated by industry in the region.

Hazardous and Non-Hazardous Materials

The Project will require the transport, storage, handling, and disposal (where applicable) of hazardous materials / hazardous waste. Other projects in the area are likely to have similar requirements. With more hazardous

materials transported and stored in the Area, the risk for incidents and accidental release and contamination of land and water resources is greater.

General waste materials will be generated by the Project and other Project developments during construction and operation. The cumulative waste generation will put pressure on existing landfills and waste management processes. This has the potential to lead to water, odour and other associated issues.

Air Quality

Air emissions from veneer and plywood plants typically include: dust, nitrogen oxide gases (NO_x); sulfur dioxide gas (SO₂); carbon monoxide gas (CO); and a number of volatile organic compounds (VOCs), with concentrations depending on design controls and processing capacity. The Mill will be designed to meet national and IFC emissions standards minimising impacts to very low. The development of other industry in the area and associated traffic volumes has the potential for cumulative air quality impacts, potentially affecting local communities.

Noise

Impacts to communities from noise generated at the Mill are expected to be Low. Trucks may provide nuisance level noise impacts. The development of other industry in the area and associated traffic volumes has the potential for cumulative noise impacts, potentially affecting local communities.

Visual Amenity

Industrial development is changing the landscape and visual amenity in and around the Project Area. This includes the conversion of degraded forest lands to plantation forestry and the development of small – medium processing facilities. The Nam Lik reservoir will also significantly alter visual amenity in the area.

The Project will have negligible impacts on visual amenity and as result will therefore not contribute to cumulative impacts in the area.

Archaeology and Cultural Heritage

There are no sites of cultural or archaeological significance within or directly adjacent the Project footprint. The development of the Mill and other projects in the area presents risks to unknown archaeology and cultural heritage. The Burapha Mill implementation is expected to have a negligible contribution to this impact due to a comprehensive Chance Find Procedure (refer to ESMMP).

Gender, Ethnic Minorities and Disadvantaged Households

Development projects can disproportionately impact vulnerable groups including women, vulnerable households and ethnic minorities. These groups may also lack the mean to benefit from economic development.

While impacts from the Mill Project will be low with effective implementation of management measures, these issues may be compounded by multiple developments in the area.

10.4 Key Conclusions

The Burapha Mill Project will make a significant contribution to the Hin Heup District Government's plan to develop the Project Area. This project, along with other existing and planned projects in the area are expected to have a multiplier effect, generating government revenue, employment and spin-off economic opportunities in the Project region and cumulatively boosting the regional economy.

With the effective development and implementation of management measures, the Mill Project will not significantly contribute to cumulative impacts on people and the environment or impede other developments in and around the Project Area.



Chapter 11 | Stakeholder Consultation

Chapter 11 | Stakeholder Consultation

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11. STAKEHOLDER CONSULTATION AND PUBLIC INVOLVEMENT

Public consultation and disclosure is a 'tool for managing two-way communication between the project sponsor and the public with the goal of improving decision making and building understanding by actively involving individuals, groups, organisation with a stake in the project' (IFC 1998). It is a core aspect of GOL's environmental and social legislation and a key requirement of many international financing institutions. In addition to these regulatory obligations, an open and consultative approach makes good business sense by reducing costs, reducing risks and enhancing reputation and commercial opportunity.

Throughout the ESIA process, formal and informal consultations were undertaken with national, provincial and district government officials, as well as the local community. Informal consultation has included regular discussions and the dissemination of project information to local residents and government staff. Formal consultations have included meetings relevant government authorities and environmental and socio-economic studies at the village level. Structured consultation workshops were also conducted with government, communities and other stakeholders to present the draft ESIA, share information about the Project and obtain feedback from Project stakeholders.

This chapter summarises the consultation undertaken and the associated outcomes before and during the drafting of the ESIA. Strategies for ongoing consultation throughout the life of the Project, as well as a description of the proposed grievance mechanism, are also discussed.

11.1 Objectives

The overall goal of public consultation and disclosure for the Burapha Mill Project is to improve decision-making, build understanding to ensure the long-term viability of the Project and to enhance potential Project benefits.

11.1.1 Public Consultation

The specific objectives of stakeholder consultation for the Project are to:

- Build two-way communications between the Burapha, the affected communities and other Project stakeholders for the ESIA process;
- Ensure that Project affected communities and other stakeholders are well informed of the Project, its environmental and social impacts, and proposed management measures;
- Collect relevant information on the Project Area from key stakeholders for use in the ESIA and associated management plans as well as development of the Project;
- Ensure stakeholder feedback on the Project and its impacts is gained through simple and effective communication processes; and
- Promote inclusive and informed decision-making on the development and management of the Project.

Consultation with key stakeholders in the development of the Project is critical to its success. Stakeholder consultation should be conducted throughout the life of the Project, including during construction and operation. Ideally, a good consultation process will be (IFC, 2007);

- Targeted at those most likely to be affected by the project;
- Early enough to scope key issues and have an effect on the project decisions to which they relate;

- Informative, as a result of relevant information being disseminated in advance;
- Meaningful to those consulted because the content is presented in a readily understandable format and the techniques used are culturally appropriate;
- Two-way so that both sides have the opportunity to exchange views and information, to listen, and to have their issues addressed;
- Gender-inclusive through awareness that men and women often have differing views and needs;
- Localized to reflect appropriate timeframes, context, and local languages;
- Free from manipulation or coercion;
- Documented to keep track of who has been consulted and the key issues raised;
- Reported back in a timely way to those consulted, with clarification of the next steps; and
- Ongoing as required during the life of the project.

The IFC identifies eight key components of good stakeholder engagement, as illustrated in Figure 11-1 below.



Figure 11-1 Key Components of Stakeholder Engagement (IFC, 2009)

11.1.2 Disclosure

Adequate disclosure regarding the details of the Project to stakeholders has been maintained throughout the ESIA process. Burapha's communication policy includes the delivery of information that is timely, transparent,

accurate and based on facts and to advocate and open dialogue with stakeholders. Key aspects of ensuring adequate disclosure include:

- Making information available regarding the Project at the Burapha office in Vientiane;
- Providing a description of the Project at the village level during socio-economic surveys, technical studies and formal consultations;
- Providing local communities with opportunities to ask questions about the Project during all consultations undertaken; and
- Providing handouts describing the Project at Village, District, Provincial and Central level consultations in both Lao and English languages.

11.2 Stakeholder Identification

Lao legislation defines stakeholders as “any person, legal entity or organisation who/which are interested in, involved in or have interests in an investment project, in an activity or a matter (related to the project) because they are involved in or (are likely to be) affected by the investment project” (MONRE, 2010). The following section provides an overview of Project stakeholders.

Villages in close proximity to the mill

The concession area abuts village land of Ban Khone Phook and Ban Phonesoung. No individuals nor communal lands are required for development of the Project. Households may be impacted by noise, air quality, water quality and availability, increased traffic, community safety and associated impacts.

Villages along the transportation route

The villages of Ban Hin Heup, Ban Viengthong, Ban Khone Phook, Ban Phonesoung, and Ban Mouang are located on Provincial Road 4501, the key access road connecting Highway 12 to the Mill site. It is expected that the mill operation will require a minimum of 14 trucks to the site daily to support operations and households in these villages may be impacted by increased traffic, community safety and associated impacts.

Government of Lao PDR

Government of Lao PDR stakeholders include:

- Hin Heup District government and line offices;
- Vientiane Provincial government and line departments; and
- Central Government line agencies (particularly MONRE, Ministry of Planning and Investment and Ministry of Industry and Commerce).

Other Stakeholders

Other stakeholders identified for the Project include:

- Residents of other villages in Hin Heup district;
- Residents of Vientiane Province;
- Private companies operating in the vicinity of the Project, such as those having land concessions for fertiliser production, the cassava factory, white limestone factory and the white charcoal production factory; and
- NGOs and aid projects working in Hin Heup district, including Oxfam, Village Focus International.

The list of stakeholders will continue to evolve over the life of the Project.

11.3 Consultation Process and History

A series of initial consultations have been conducted during the ESIA period (refer to Table 11-1). These included meetings with central, provincial and district level representatives; village meetings and surveying; technical studies and site visits. The purpose of these engagements was to introduce the Project; collect information on the Project Area; and seek feedback from key stakeholders.

At each consultation, a brief description of the Project was provided using the Project information sheet. Participants were given an opportunity to provide comments, advice and information relevant to the Project. Standard forms were used to record discussions.

Table 11-1 Summary of Consultations Conducted during the ESIA

Date	Consultation	Stakeholders
Kick-Off Meeting		
21 March 2016	Central meeting (ESIA Kick off)	Department of Environment and Social Impact Assessment
Initial ESIA / Scoping Study Consultations		
1 April 2016	Vientiane Provincial Meetings	Provincial Cabinet Office; Provincial Department of Natural Resources and Environment (Head of Forest Resource Extraction Section and Deputy Head of Resettlement Section), Provincial Department of Industry and Commerce, Provincial Department of Agriculture and Forestry, Provincial Department of Planning and Investment
24 March 2016	Hin Heup District Meetings	District Administration Office, District Office of Planning and Investment, District Office of Natural Resources and Environment, District Office of Industry and Commerce, DONRE
24-26 March 2016	Village level meetings and village socio-economic and land use surveys	Village authorities and other village representatives in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook
ESIA Field Studies		
17-18 May	Biodiversity Technical Study consultations	Focus group meetings with a selection of community members in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook.
15-16 June 2016	Village level focus groups and household surveys	Focus group meetings with a selection of community members in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook
17-18 May 2016	Cultural heritage and archaeology consultations	Focus group meetings with a selection of community members in representatives in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook.
Draft ESIA Formal Consultations		
6-7 Oct., 2016	Village level consultations	Village level consultation meeting to present findings of the ESIA and invite feedback / comment.
6 Sept., 2017	District level consultations	District consultation meeting to present findings of the ESIA and invite feedback / comment.
TBC	Central / Provincial level consultations	Central level consultation meeting to present findings of the ESIA and invite feedback / comment.

11.3.1 ESIA Kick Off Meeting

A formal ESIA kick-off meetings was held with Central GOL on March 21, 2016. The meeting with Mr. Thavone Vongphosy (Deputy Director General, Department of Environmental and Social Impact Assessment), was undertaken to gain appropriate permissions and ensure early engagement and participation of Central Government stakeholders in the environmental and social impact assessment process of the Project. The objective of the meeting was to present an overview of the Project and initial findings of feasibility design and environmental / social fieldwork activities and source feedback and advice from Central Government stakeholders.

11.3.2 Initial Government Consultation

After the ESIA kick-off meeting, initial consultation meetings were conducted with the Hin Heup District government and the Vientiane Provincial government on the 24th March 2016 and the 1st April 2016 respectively. The objective of the meetings was to present information on the Project and the ESIA process, obtain feedback, coordinate involvement of line agencies and discuss availability of relevant information. At each meeting, a brief description of the Project was provided (using the project information sheet) and participants were given an opportunity to provide comments, advice and information relevant to the Project. Standard forms were used to record discussions

In addition, specific information gathering meetings were held with key line agencies. Secondary information to support the ESIA such as census data, land allocation information and development plans were collected and arrangements were made for further information requests as required. Government agencies visited included the Hin Heup District Office of Natural Resources and Environment (DONRE), Hin Heup District Office of Industry and Commerce (DOIC), Hin Heup District Agriculture and Forestry Office (DAFO), and Hin Heup Planning and Investment Office.



Plate 11-1 Government consultation in Hin Heup District



Plate 11-2 Consultation with MONRE in Vientiane

11.3.3 Socio-Economic and Land Use Baseline Surveys

Village level surveying was conducted between March and June 2016. General information on Project affected villages was collected through detailed interviews with Village Authorities. Depending on availability in each village, the village level interviews were attended by a range of representatives including village chiefs, village elders as well as village representatives for security, land and tax, education (primary school teacher), village public health staff, the Lao Youth Union, the Lao Women's Union (LWU) the Lao Front for National Construction

(LFNC) and other interested villagers. A fixed questionnaire was used which covered a broad range of topics. Participatory village mapping exercises were conducted to identify key physical, biological and social features of the village. Representatives of the village joined the survey teams during field observations. Village leaders and other village representatives were also asked to provide initial feedback about the Project.



Plate 11-3 Consultation in Ban Viengthong



Plate 11-4 Consultation in Ban Phonesoung

11.3.4 Focus Group Discussions

Separate focus group discussions were held in each village with members of the general village population (with a focus on female participants) to obtain additional information on natural resource use, employment and industrial activity in the Project Area as well as obtain village opinions. These were conducted at the same time as village socio-economic and land use baseline surveys to reduce the chance of bias from village authorities.

11.3.5 Other Specialist Studies

Several other consultations were also conducted as part of the specialist technical studies conducted for the ESIA. These consultations are described below.

Biodiversity Technical Study

Local knowledge surveys and focus groups were conducted for the Biodiversity Technical Study which included both terrestrial and aquatic biodiversity and resource use. The focus groups were conducted in Ban Phonesoung, Ban Khone Phook and Ban Viengthong in May 2016. The survey team was comprised of Earth Systems (Australia), Earth Systems Sole (Lao PDR) and Dr. Pheng Phengsintham, from the Department of Biology, National University of Laos. Representatives from each village joined the team during site investigations for flora, fauna and forest resource use in the area. An official from Hin Heup District Office of Natural Resources and Environment (DONRE) assisted during village consultation and field observations. Consultations were also conducted with Hin Heup District Agriculture and Forestry Office (DAFO) and the Vientiane Provincial Agriculture and Forestry Office (PAFO).

Archaeology and Cultural Heritage Study

An Archaeology and Cultural Heritage Study was conducted by Mr Sisomphone Soukhavongsa, a specialist from the Ministry of Information, Culture and Tourism and the Earth Systems team. The study was based on local knowledge focus group meetings in Ban Phonesoung, Ban Khone Phook and Ban Viengthong. Villagers were invited to show any objects with prehistoric, archaeological, historical or cultural values they have collected and to relate some of their oral traditions (i.e. folk tales, legends, myths, sayings) concerning their landmarks and/or cultural objects. More detailed site surveys were also conducted in Ban Phonesoung, with

assistance from village representatives and District officials from Hin Heup District Office of Information, Culture and Tourism.

Information was obtained from the Hin Heup District Office of Information, Culture and Tourism and the Vientiane Province Office of Information, Culture and Tourism to help identify sites and objects of local or regional / national significance.

Health Baseline Study

Health baseline data was collected from officials at the Hin Heup District Health Office, and Hin Heup District hospital. Additional information on health in the Project affected villages was collected during village socio-economic baseline surveying.

11.3.6 Formal ESIA Consultations

Village Consultations

Statutory village consultations were conducted at the villages of Ban Viengthong and Ban Khone Phook on October 6, 2016 and at Ban Phonesoung on October 7, 2016. For each consultation, two MONRE representatives; two Hin Heup District representatives (DONRE and District Administrative Office); one Khoum Ban (Sub-District) representative; two Burapha staff; and three Earth Systems (consultant) representatives presented Project – related information to attendees from participating villages. The Project was described and the findings of the ESIA (benefits and potential impacts) presented, with feedback / questions encouraged. All questions, comments, and feedback were recorded. Meeting minutes and attendance records are provided in Annex 11-2. Whilst all villagers in the three villages were encouraged to attend, the village attendance was as follows:

- Ban Viengthong: 82 people (32 male / 50 female);
- Ban Khone Phook: 38 people (23 male / 15 female); and
- Ban Phonesoung: 59 people (28 male / 31 female).

District Consultations

Statutory District consultations for this ESIA were conducted on the 6th September 2017 in Hin Heup District with Central, Provincial, District and Village authorities in attendance. Provincial and Central Government Formal ESIA Consultations will be conducted following submission of the final Draft ESIA and ESMMP.

More than 101 people attended the District Consultation Workshop (refer to Annex 11-1), with Mr. Thavone Vongphosy (Deputy Director General) from DESIA chairing the event along with Mr. Vone Vorasane (Deputy District Governor, Hin Heup) and Mr. Bounhieng Xayaseng (Deputy Director of PONRE in Vientiane Province).

Table 11-2 Summary of GOL Representatives and Formal District Consultations for ESIA

Stakeholders	Departments
Representatives from Vientiane Province	PONRE, PICO, PAFO, PPI,
Representatives from Hin Heup District, Vientiane Province	District Administration Office, DONRE, DICO, DAFO, DPI, District Public Work and Transportation, District Youth Office, District Lao Women Union, District Federation Union, District Lao Front for National Construction, District Public Health Office, District Education and Sports Office, District Labour and social Welfare Office, District Defending Office, District Military Unit.

11.3.7 Formal ESIA Consultation for District / Provincial Level

A technical review consultation workshop for the Burapha's Mill ESIA was held at Phonhong District's meeting room on the 5th April 2018 with a total 85 participants (see Chapter 15 – Annex), representing from villages, district, province and central authorities. The consultation meeting was organized in tandem with the Agroforestry Mill ESIA Project.

Table 11-3 Summary of GOL Representatives at Formal District / Provincial Consultations for ESIA

Stakeholders	Departments
Representative from Vientiane Provinces	PONRE, Department of Industry and Commerce, PAFO, PPI
Representatives from Hin Heup District	District Cabinet Office, DONRE, District Industry and Commerce, DAFO, DPI, DPWT, District Youth Union, District Women Union, District Front for National Construction, District Health Office, District Labour and Social Welfare, District Education and Sport, District Defence Office.

11.4 Consultation Outcomes

11.4.1 ESIA Kick Off Meeting

Key feedback obtained during the meeting with MONRE are outlined in Table 11-4.

Table 11-4 MONRE: Key comments

Comment	How this is Addressed in the ESIA	ESIA Report Section Reference
<ul style="list-style-type: none"> Need to ensure that land acquired for the Project does not overlap with concession land from other projects. 	<ul style="list-style-type: none"> Land acquisition for the Mill Project will be conducted in consultation with applicable GOL authorities. 	<ul style="list-style-type: none"> ESIA, Volume B, Project Description
<ul style="list-style-type: none"> Consider integrating the Mill study as an IEE (a component of the Agro-Forestry ESIA). If the Mill study is conducted as an IEE instead of an ESIA, a scoping report will not be required. 	<ul style="list-style-type: none"> An ESIA will be developed for this Project 	<ul style="list-style-type: none"> NA

11.4.2 Initial Government Consultation

The outcomes of Provincial and District consultations for the Project are summarised in Table 11-5 together with relevant ESIA actions. The minutes and participant register from this meeting are provided in the PCDP (Volume C).

Table 11-5 Provincial and District Government – key comments and relevant ESIA actions related both Mill Options

Comment	How this is Addressed in the ESIA	ESIA Report Section Reference
<ul style="list-style-type: none"> Vientiane Province promotes the establishment of the biorefinery plant and expansion of eucalypt plantation but this has to be implemented in close consultation with local authorities especially on land acquisition activities. 	<ul style="list-style-type: none"> This will require the conduct of another ESIA and is not included in the scope of the Mill Project. 	NA

Comment	How this is Addressed in the ESIA	ESIA Report Section Reference
<ul style="list-style-type: none"> Queries regarding the location of the proposed mill site whether it will be located in the designated industrial zone. 	<ul style="list-style-type: none"> Ongoing consultation with government agencies involved in land management. Consideration of different land uses will be given during Project design. 	ESIA Volume B: Chapter 3, Project Description and Alternatives Analysis Chapter 11, Stakeholder Consultation
<ul style="list-style-type: none"> The need for close coordination with local authorities especially on land acquisition activities. 	<ul style="list-style-type: none"> Ongoing consultation with government agencies involved in land management. 	ESIA Volume B: Chapter 11, Stakeholder Consultation
<ul style="list-style-type: none"> Information must be accurate based on actual surveys and shall not rely solely on secondary data from Burapha itself, especially on land acquisition reports. 	<ul style="list-style-type: none"> Conduct of extensive consultations at the village, district, provincial and central level including socio-economic, biodiversity, archaeology and cultural heritage, noise and water quality studies. 	ESIA Volume B: Chapter 4, Environmental Setting; Chapter 5, Social Setting.
<ul style="list-style-type: none"> Information should be collected to gauge whether local livelihoods have improved within the Project area. 	<ul style="list-style-type: none"> Data is being collected during conduct of the ESIA that will provide a baseline against which to assess changes to livelihoods from Project implementation. 	ESIA, Volume B: Chapter 5, Social Setting; Chapter 8, Social Impacts and Management
<ul style="list-style-type: none"> We agree that the Project should go ahead because it will create employment opportunities for villagers. However, there is a need to conduct a detailed land survey in the proposed mill site to assess social impacts. 	<ul style="list-style-type: none"> Technical study / survey on land use including site investigations and ongoing consultation with government agencies and other organisations involved in land management. 	ESIA, Volume B: Chapter 4, Environmental Setting Chapter 5, Social Setting Chapters 6-8, Physical, Biological, and Social Impacts and Management (respectively)
<ul style="list-style-type: none"> Initial land survey for Burapha's proposed mill has been conducted in an area of 186ha in light industrial zone in Hin Heup district. This land includes villagers' land and concession land previously used by other development projects. 	<ul style="list-style-type: none"> Ongoing consultation with government agencies involved in land management. Utilisation of available information 	ESIA Volume B: Chapter 3, Project Description; Chapter 5, Social Setting; Chapter 8, Social Impacts and Management; Chapter 11, Stakeholder Consultation
<ul style="list-style-type: none"> The need to consider cumulative impacts of the area (i.e. impacts from Nam Lik 1 Hydropower Project). 	<ul style="list-style-type: none"> ESIA will include a cumulative impact assessment. 	ESIA Volume B: Chapter 9, Risk Assessment Chapter 10, Cumulative Impacts
<ul style="list-style-type: none"> What are the potential benefits for local people, company and the GOL from the Project? The ESIA report should provide clear information on economic and social benefits and impacts 	<ul style="list-style-type: none"> This will be addressed in the Project Benefits and 	ESIA Volume B: Chapter 1, Introduction; Chapter 3, Project Description; Chapter 8, Social Impacts and Management

11.4.3 Socio-Economic Surveys and Other Specialist Studies

During village level socio-economic surveying, village leaders and other village representatives were provided with an opportunity to express their thoughts regarding the Project. Feedback from these initial consultations and relevant ESIA actions are summarised in Table 11-6.

Table 11-6 Summary of Village Level Feedback

Feedback / Queries	How this is Addressed in the ESIA	ESIA Report Section Reference
<ul style="list-style-type: none"> Queries / requests regarding potential benefits and community development: How many jobs will be provided for the villagers in the proposed mill facility? 	<ul style="list-style-type: none"> Further consultations with Project affected villages on benefits and potential community development support; 	ESIA, Volume B: Chapter 3, Project Description; Chapter 8, Social Impacts and Management;

Feedback / Queries	How this is Addressed in the ESIA	ESIA Report Section Reference
<p>The villagers recommend for Burapha to source labours locally;</p> <ul style="list-style-type: none"> The company should provide development support to the village when the mill established. 	<ul style="list-style-type: none"> Development of an Environmental and Social Management and Monitoring Plan. Community development plan 	ESIA, Volume C, ESMMP
<ul style="list-style-type: none"> Queries and comments regarding potential impacts and mitigation measures: If the project affects individual land, will the company provide compensation? Request for fair compensation (i.e. using current market rate and avoid using GOL's rate), if the project affects individual land. 	<ul style="list-style-type: none"> Development of a compensation framework for loss of land, assets and livelihoods; Development of a grievance redresses mechanism. Development of an Environmental and Social Management and Monitoring Plan. 	ESIA, Volume B: Chapters 6-8, Physical, Biological, and Social Impacts and Management (respectively)
<ul style="list-style-type: none"> Queries regarding project schedule/timeline. 	<ul style="list-style-type: none"> Continued program of ESIA consultation with Project affected villages including formal village level consultation once draft ESIA has been completed. 	ESIA, Volume B: Chapter 11, Stakeholder Consultation ESIA, Volume C, ESMMP
<ul style="list-style-type: none"> Villages and villagers should be regularly informed about the project progress and activities. 	<ul style="list-style-type: none"> Regular contact with Project villages and dissemination of Project information is covered in the Public Consultation and Disclosure 	ESIA, Volume B: Chapter 8, Social Impacts and Management; Chapter 11, Stakeholder Consultation ESIA, Volume C, ESMMP

11.4.4 Village and District Formal Draft ESIA Consultations

Village Consultations

During formal village consultations, conducted on 6 - 7 October 2016 in the villages of Ban Viengthong, Ban Khone Phook, and Ban Phonesoung, the Project and findings of the ESIA were presented to village authorities, members of those communities, and GOL representatives to promote feedback from stakeholders and allow for issues identified during consultation to be integrated into the ESIA / ESMMP. Representatives from the villages of Ban Viengthong, Ban Khone Phook, and Ban Phonesoung included men and women that accepted the invitation to participate (82, 38, and 59 people from the villages respectively). GOL staff, including representatives from MONRE, Hin Heup DONRE, and Hin Heup Administration office also participated with Burapha staff and consultant presenters.

The feedback / queries and responses to those queries and ESIA reference section are provided in Table 11-7.

Table 11-7 Summary of Village Level Feedback

Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA Report Section Reference
Ban Viengthong		
<ul style="list-style-type: none"> Outgrower participation - How can village people engage in outgrower plantation scheme if they own land and provide labour? 	<ul style="list-style-type: none"> Burapha consults with Project villages regarding the Company's outgrower model; The outgrower scheme is discussed in the Burapha Agroforestry ESIA 	Burapha Agroforestry ESIA, Volume B: Project Description

Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA Report Section Reference
<ul style="list-style-type: none"> • Employment - The Company needs to ensure that jobs are provided and prioritized for the direct impacted communities. • Will the Project contribute to village development and alleviate poverty? 	<ul style="list-style-type: none"> • Burapha is committed to providing local communities with the first opportunity for employment. The mill is expected to generate significant job opportunities for the three communities closest to the proposed location. • Burapha is committed to compensating for village / government land leased for the concession according to GOL laws and regulations; • The Project will directly provide employment opportunities, and provide indirect benefits as more jobs are available than can likely be staffed with only residents of the three local communities. The influx of people for nearby communities will provide local vendors with additional sales opportunities; • The Project may require contracted labour, which will be sourced locally where appropriate services can be identified. 	<p>Burapha Mill ESIA, Volume B: Chapter 2, Legislation; Chapter 3, Project Description; Chapter 8, Social Impacts and Management Volume C, Project ESMMP</p>
<ul style="list-style-type: none"> • Potential Impacts – If land in proximity to the mill is impacted, how will it be compensated? Will the Project result in increased natural resource use, noise, traffic, water quality impacts, hazardous waste discharge? 	<ul style="list-style-type: none"> • A detailed risk assessment and potential impact assessment has been conducted for each of the parameters that have the potential to impact local communities. Management and mitigation measures are provided that are expected to avoid impacts or reduce levels to the satisfaction of all stakeholders. 	<p>Burapha Mill ESIA, Volume B: Chapter 6, Physical Impacts and Management; Chapter 7, Biological Impacts and Management; Chapter 8, Social Impacts and Management; Chapter 9, Risk Assessment Volume C, Project ESMMP</p>
<ul style="list-style-type: none"> • Mitigation measures - Establish and implement effective management and mitigation measures for hazardous waste discharge; Provide compensation for impacted water resources, land, crops, livestock, grazing land if required; and provide appropriate and fair compensation if required. 	<ul style="list-style-type: none"> • As above, robust management measures that meet national regulations and specific international standards will be applied to avoid discharge of hazardous waste. Water quality will be routinely monitored, and management measures refined if any discharges exceed acceptable guidelines; • Village land (i.e. the Project is in a previously allocated concession area), crops, livestock, grazing land will not be affected. 	<p>Burapha Mill ESIA, Volume B: Chapter 6, Physical Impacts and Management; Chapter 7, Biological Impacts and Management; Chapter 8, Social Impacts and Management; Volume C, Project ESMMP</p>

Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA Report Section Reference
<ul style="list-style-type: none"> • General Comments – request for the Company to support establishment of a village development fund and support the construction of a kindergarten. 	<ul style="list-style-type: none"> • Whilst Burapha Agroforestry operations include a Village Development Fund, this Project will not require village land, therefore VDF may not be implemented. • However, significant job opportunities (more than can be filled by the three nearest communities) will be available that will promote socio-economic advances in Ban Viengthong and other nearby communities. 	<p>Burapha Mill ESIA, Volume B: Chapter 8, Social Impacts and Management; Volume C, Project ESMMP</p>
Ban Phonesoung		
<ul style="list-style-type: none"> • Employment - The Company should take this priority into serious consideration during job recruitment process especially those directed impacted by the Mill's operations without gender discrimination. • Training - Skilled development and training should be provided prior to commencement of the employment. 	<ul style="list-style-type: none"> • Burapha is committed to hiring local labour for all its operations, and has a proven track record in providing jobs to local communities. The Company strictly enforces equal opportunity employment, and women make up a large percentage of the workforce. • Skills training, as well as occupational health and safety training, emergency preparedness and response training, etc. are provided to all employees to ensure they can effectively and safely conduct their jobs. 	<p>Burapha Mill ESIA, Volume B: Chapter 3, Project Description Chapter 8, Social Impacts and Management; Volume C, Project ESMMP</p>
<ul style="list-style-type: none"> • Potential Impacts – the community expressed concern over potential wastewater discharge and odours from the Mill; increased pressure on grazing land, access to natural resources; and potential health impacts to local communities from air pollution. 	<ul style="list-style-type: none"> • Wastewater discharge was identified as one of the highest risks for this Project in the ESIA. The Mill has been designed for no discharge of untreated water. All water discharged from site will meet national effluent standards and IFC Environmental Health and Safety Standards; • The risk for impacts from odour is considered negligible, given emissions and distance to receptors; • The land utilised has no beneficial natural resources on-site; it has been cleared of vegetation, with rock applied by previous concession holder. • The Mill will be built to IFC Performance Standards, which 	<p>Burapha Mill ESIA, Volume B: Chapter 3, Project Description; Chapter 6, Physical Impacts and Management; Chapter 7, Biological Impacts and Management; Chapter 8, Social Impacts and Management; Volume C, Project ESMMP.</p>

Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA Report Section Reference
	<p>requires air emissions that will not impact the health of neighbouring communities.</p>	
<ul style="list-style-type: none"> • Mitigation Requests • Provide transportation for the local workers to avoid road accidents and ensure their safety during night-time work shift; • Build fence / wall prior to conduct land grading in order to avoid soil side-casting and pushing down to lower areas; • Communicate with land owners in adjacent to the Mill area during site preparation and construction; • Establish effective wastewater treatment pond before discharge; • Provide jobs to local communities without gender discrimination; • Provide skilled development and training opportunities to local people; • Provide appropriate and fair compensation, if required. 	<ul style="list-style-type: none"> • Further technical study is required regarding worker transport. Shifts will be conducted for 8 hours maximum, minimising potential for exhaustion-related road accidents. • A wall will surround the facility, and no soil will be side-cast into streams. The area is relatively flat, and will be graded and compacted; not moved; • Burapha is currently communicating with neighbouring villages, and will be communicating regarding job opportunities. The construction location will not impact communities, as the new short access road will lead directly to the site; • As above, job opportunities will be available, with equal opportunity employment; • As above, skills training and additional training will be provided by Burapha; • Burapha will pay fair compensation, commensurate with job activity. 	<p>Burapha Mill ESIA, Volume B: Chapter 3, Project Description; Chapter 2, Legislation; Chapter 4, Environmental Setting; Chapter 5, Social Setting; Chapter 6, Physical Impacts and Management; Chapter 7, Biological Impacts and Management; Chapter 8, Social Impacts and Management; Volume C, Project ESMMP.</p>
MONRE Comments		
<ul style="list-style-type: none"> • Specific time period should be identified for the three work shifts. 	<ul style="list-style-type: none"> • The ESIA has identified that work will be conducted for 24-hours a day, in three 8-hour shifts. 	<p>Burapha Mill ESIA, Volume B: Chapter 3, Project Description</p>
<ul style="list-style-type: none"> • Change some translation terminologies as prescribed in the new Ministerial Instruction No. 8030 (2013). 	<ul style="list-style-type: none"> • The consultant translator is experienced in ESIA, and is fluent in English and Lao. The ESIA will be checked for consistency with MI No. 8030 	<p>ESIA, Volumes A, B, and C</p>
<ul style="list-style-type: none"> • Describe the transport truck with maximum loading capacity; 	<ul style="list-style-type: none"> • Trucks will have the capacity to haul 30m³ of raw logs to the Mill, and 50m³ of finished product from the Mill. 	<p>Burapha Mill ESIA, Volume B: Chapter 3, Project Description</p>
<ul style="list-style-type: none"> • Attach the overall layouts of the Mill site in the ESIA Report, including the main factory and its ancillary facilities; 	<ul style="list-style-type: none"> • Figure 3-4 in Chapter 3 provides the layout of the factory and ancillary facilities. The final Draft 	<p>Burapha Mill ESIA, Volume B: Chapter 3, Project Description</p>

Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA Report Section Reference
	ESIA submitted to DESIA will include completed design plans.	
<ul style="list-style-type: none"> Attach land leased agreement (it is understood that Burapha already signed land leased agreement with the GoL for the Mill site) as this would ease the approval process. 	<ul style="list-style-type: none"> Burapha will provide the signed lease agreement as an appendix or in Chapter 3 of the final Draft ESIA submitted to DESIA 	Burapha Mill ESIA, Volume B: Chapter 3, Project Description
<ul style="list-style-type: none"> Water quality monitoring activities should be involved by the GOL in each monitoring period; 	<ul style="list-style-type: none"> Water quality will be monitored by Burapha monthly for field parameters and quarterly for laboratory parameters; Burapha will consult with MONRE regarding coordinated monitoring, and will update the ESMMP accordingly. 	Volume C, Project ESMMP.
<ul style="list-style-type: none"> According to the new Decree on Compensation and Resettlement of the People Affected by Development Project No. 84 (2016), compensation must be completed prior to the issuance of the ECC, if required. 	<ul style="list-style-type: none"> Burapha will compensate for land lease prior to issuance of the ECC 	NA
<ul style="list-style-type: none"> Please define Project timeline in details in each phase. 	<ul style="list-style-type: none"> A Project schedule is provided in Chapter 3, Section 3.4. Preconstruction activities will take approximately 4 months (road construction, grading, stormwater channels, electricity and water supply). Construction of the Mill and ancillary facilities will occur over approximately 6 months. Project commissioning is anticipated for after 10 months after initiation of construction. The timing of pre-construction, construction, and commissioning will be dependent upon the timeline for acceptance of the ESIA and issuance of the ECC. 	Burapha Mill ESIA, Volume B: Chapter 3, Project Description

District Consultations

Table 11-8 provides key comments raised by authorities and representatives during District level consultations which was conducted on September 6, 2017 at Hin Heup District Administration Office. The list of participants is provided in Annex 11-1.

Consultations were conducted for the Burapha Plywood Mill ESIA (this document) and the Burapha Agroforestry Operations ESIA simultaneously. All comments related to the plywood mill are provided in Table 11-7. Those that refer to Agroforestry Operations are addressed in the Stakeholder Consultation Chapter of the Burapha Agroforestry Operations ESIA (Chapter 12).

Table 11-8 Summary of key issues raised at Formal District GOL Consultations

Comments / Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA / ESMMP Report Section Reference
<ul style="list-style-type: none"> The need to review design specifications and other information to compliance with the Project's Feasibility Study and land leased agreement; and then coordinate with relevant authorities for verification of data such as soil data if the Project will potentially have impacts on water, noise, odour, smoke and others. 	<ul style="list-style-type: none"> The ESIA has been developed at the same time as detailed Feasibility Study, therefore final design specifications are not included. However, Burapha has developed and will operate the factory according to International Finance Corporation (IFC) Performance Standards - IFC PS1: ESIA / ESMMP and IFC PS3 Resource Efficiency and Pollution Prevention, which requires strict adherence to international standards that meet or exceed Lao national law / standards and obligations; The ESIA has also described baseline values for environmental and social parameters, potential impacts based on analysis of plywood mill operations, and best practice management measures to mitigate impacts to levels acceptable for stakeholders. Burapha welcomes periodic inspections from the government environmental management unit (EMU) regarding compliance with national law and international obligations; Burapha will provide periodic environmental reports to EMU which outline adherences and cases of breaches in standards, with corrective actions identified and described. 	<p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapter 2, Legislation; Chapter 3, Project Description; Chapter 4, Environmental Setting; Chapter 6, Physical Impacts and Management; Chapter 7, Biological Impacts and Management; <p>ESIA Volume C, ESMMP</p>
<ul style="list-style-type: none"> The ESIA report for the Mill project is generic. Suggest the Project to revise the ESIA report to be more specific in terms of hazardous / chemical materials and waste management that will be potentially generated through the Mill operations such as wood bark, wastewater, air emission, noise and among others. Mitigation measures shall discuss details for wastewater treatment, waste management measures, impact mitigation measures, etc as a result of the Mill operations and harvesting activities. 	<ul style="list-style-type: none"> Burapha has identified and chosen in consultation with Government Authorities. The site which is not intersected by a water course, is relative flat, with vegetation already having been cleared by previous activities. The ESIA includes assessment of impacts that are specific to veneer and plywood mills and has provided management measures that will mitigate potential impacts. Issues such as hazardous materials, wood bark, wastewater, air emissions, noise, and many more are specifically addressed in the ESIA and management / monitoring of these measures and effluent (for example) are provided in the ESMMP. 	<p>Burapha Plywood Mill ESIA – Volume B:</p> <ul style="list-style-type: none"> Chapter 4, Environmental Setting; Chapter 6, Physical Impacts and Management; Chapter 7, Biological Impacts and Management; Chapter 8, Socio-Economic Impacts and Management; Chapter 9, Risk Assessment <p>ESIA Volume C, ESMMP</p>
<ul style="list-style-type: none"> Suggest the Company to reassess on alternative site for the veneer and plywood mill Project. The current Project area may not be sufficient for the Mill and its 	<ul style="list-style-type: none"> The site has been selected in consultation with GOL Authorities. 	<p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapter 2, Legislation;

Comments / Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA / ESMMP Report Section Reference
<p>ancillary facilities, and it is located in the light industrial zone with in close proximity to a military base 432. It is also important to take into account the Prime Minister Order No. 17/PM dated on 22 September 2008 Clause 12.1 – the wood processing factory shall not be located within or in adjacent to any protected, protection area, and only the GOL has the rights to approve new wood processing factory development. The Company shall examine regulations and principles for plantation activities determined by MAF and compliant with those regulations and principles</p>	<ul style="list-style-type: none"> The site is in a Light Industrial Zone, directly adjacent an electricity sub-station as well as a large fertiliser factory. A detailed alternatives analysis was conducted for the ESIA, with a specific alternative considered in Nabong. The Hin Heup site was selected based on the outcome of analysing 16 environmental and social parameters. The ESIA legislation chapter identifies that Burapha is required to meet all Lao PDR laws and regulations for wood processing as well as industry specific guidelines for IFC, which are very robust and require strict adherence to national law and international best practices. 	<ul style="list-style-type: none"> Chapter 3, Project Description and Alternatives Analysis; Chapter 4, Environmental Setting; Chapter 5, Socio-Economic Setting; <p>ESIA Volume C, ESMMP</p>
<ul style="list-style-type: none"> Proposed the Company to resolve issues associated with the Project development activities (issues with land acquisition), and report to provincial, district and village authorities and organize meeting to endorse decisions made 	<ul style="list-style-type: none"> Burapha has conducted numerous consultations with Government Authorities regarding the selection of the mill site. Site selection for Agroforestry Operations are detailed in the Burapha Agroforestry ESIA. 	<p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapter 2, Legislation; Chapter 3, Project Description; Chapters 4 and 5 (Environmental and Social Settings, respectively); Chapters 6,7, and 8: Physical, Biological, and Social Impacts and Management chapters, respectively; <p>ESIA Volume C, ESMMP</p>
<ul style="list-style-type: none"> It is required that the Company clearly coordinate with relevant authorities prior to conduct any Project activity in order to compliant with laws and regulations. 	<ul style="list-style-type: none"> The Burapha Agroforestry ESIA addresses Company obligations for land leasing / concession agreements for Project Activity. The Burapha Plywood Mill ESIA addresses requirements to conduct all activities, including stakeholder consultation, in compliance with Law Laws and regulations as well as applicable international standards. 	<p>Burapha Agroforestry Project ESIA, Chapter 3, Project Description;</p> <p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapter 2, Legislation; Chapter 11, Stakeholder Consultation <p>ESIA, Volume C, Public Consultation and Dissemination Plan</p>
<ul style="list-style-type: none"> Proposed the Company to consider increase development funds for province, district, and village according to the Law on Investment Promotion. This will enhance local development and capacity 	<ul style="list-style-type: none"> In addition to the benefits associated with labour opportunities and skills training, Burapha will pay District Development Funds. 	<p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapters 5, Social Setting;

Comments / Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA / ESMMP Report Section Reference
<p>building, and take into account the importance of public consultation activities to solve any issue relevant to the Project.</p>	<ul style="list-style-type: none"> The ESIA and ESMMP describe public consultation requirements and the Project Grievance Redress Mechanism that will be implemented to address and issues identified by any stakeholders. 	<ul style="list-style-type: none"> Chapter 8, Social Impacts and Management; ESIA Volume C, Public Consultation and Dissemination Plan
<ul style="list-style-type: none"> The Company should provide comprehensive and clear information on potential environmental and social impacts during operational phase including management and mitigation measures in place 	<ul style="list-style-type: none"> Burapha has addressed the potential impacts in relevant sections, management and mitigation measures, and monitoring tools available. Burapha will regularly review and update its management and mitigation measures where required through continued review, refinement, and submission of its ESMMP. 	<p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapters 6, Physical Impacts and Management; Chapter 7, Biological Impacts and Management; Chapter 8, Social Impacts and Management; Chapter 9 Risk Assessment; Chapter 10, Cumulative Impacts <p>ESIA Volume C, ESMMP</p>
<ul style="list-style-type: none"> The ESIA/Project shall identify roles and responsibility of GOL in E&S monitoring for both Agroforestry and Mill Projects. This includes proposed budget for monitoring exercises of central, provincial and district levels based on their scope of works. This will facilitate the implementation of the GOL when it comes into practice. 	<ul style="list-style-type: none"> Volume C of the ESIA, The Environmental and Social Management and Monitoring Plan identifies that GOL will facilitate in the environmental and social monitoring for this Project. Burapha proposes consultation with relevant GOL authorities at MONRE to discuss budget. 	<p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapter 11, Stakeholder Consultation; Chapter 12, Management and Monitoring; <p>Volume C, ESMMP Volume C, PCDP</p>
<ul style="list-style-type: none"> Proposed the Company to use local labours as priority particularly those households that leased their land for Agroforestry Project. 	<ul style="list-style-type: none"> Burapha has committed to use local labourers, with local communities given first opportunity for permanent job opportunities and part-time labour for their mill and agroforestry operations Burapha's current furniture manufacturing facility in Nabong is staffed almost entirely be local villagers, with the exception of a few operators requiring outside expertise. 	<p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapter 8 (Social Impacts and Management; <p>Volume C, ESMMP</p>
<ul style="list-style-type: none"> Requirements for maintaining effective communication with residents and relevant authorities on Project development plan and its potential impacts and benefits. 	<ul style="list-style-type: none"> Burapha has consulted with all potentially affected villages throughout the ESIA process. Burapha has developed a Grievance Redresses Mechanism, providing local residents with a clear pathway for communicating issues with the Company. All Burapha operations have local workforce presence, with communications disseminated accordingly. 	<p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapters 11, Stakeholder Consultation; Chapter 12, Management and Monitoring; <p>Volume C, ESMMP Volume C, PCDP</p>

Comments / Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA / ESMMP Report Section Reference
	<ul style="list-style-type: none"> The Company will implement annual socio-economic monitoring, requiring direct interaction with local villages, providing additional opportunity for communications. 	
<ul style="list-style-type: none"> The Project developer develops compensation plan according to Decree on Compensation and Resettlement Management in Development Projects No. 84/GO L, dated on 5 April 2016, and other relevant laws and regulations. 	<p>Burapha has a compensation mechanism for land leased / concession areas acquired. Company policy is articulated for compensation, with arrangements outlined for:</p> <ul style="list-style-type: none"> Perpetual Land Use Rights; Cooperation Agreements with Villages; Cooperation Agreement with Individuals. <p>Lease fees are commensurate or exceed that identified in the Decree on Compensation and Resettlement Management in Development Projects No. 84.</p> <p>Burapha can provide a compensation plan for MONRE approval.</p>	<p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapter 12, Management and Monitoring; <p>ESIA Volume C, ESMMP Burapha Agroforestry ESIA, ESMMP, PCDP</p>
<ul style="list-style-type: none"> Propose the Company to settle issues as above-mentioned and report to districts, provinces, and relevant departments, and then organize meeting to agree upon decisions made. 	<ul style="list-style-type: none"> Burapha is committed to meeting its obligations identified in the ESIA, ESMMP, and the pending Environmental Compliance Certificate. Burapha is confident that its application of management and monitoring that are required to meet national laws, regulations, and standards as well as robust international guidelines will ensure that issues identified above will be addressed in a manner deemed appropriate by stakeholders, including GOL. Burapha will provide quarterly and annual monitoring reports to keep MONRE and potentially additional stakeholders informed the efficacy of its management, improvements required, and measures taken to achieve improved outcomes. 	<p>Burapha Plywood Mill ESIA, Volume B:</p> <ul style="list-style-type: none"> Chapter 12, Management and Monitoring; <p>Volume C, ESMMP</p>
<ul style="list-style-type: none"> Revise the ESIA report based on the Technical Guidelines on ESIA of development projects and activities No. 2796.1/MONRE/DESIA, dated 19 December 2016, and compliant with relevant regulations and laws. 	<ul style="list-style-type: none"> Burapha's consultant has reviewed the guideline and updated in the Legislation Section. The Project and its ESIA / ESMMP will meet updated guidelines that have been released after the initiation of Project ESIA's. 	<p>Burapha Plywood Mill ESIA, Volume B: Volume C, Environmental and Social Management and</p>
<ul style="list-style-type: none"> The Company and its Consultant take into account the comments from the meeting and revise the ESIA accordingly. 	<ul style="list-style-type: none"> The ESIA has been revised where appropriate and will include additional changes following consultation with Central and Provincial Authorities, as per the ESIA process. 	<p>Monitoring Plan Volume C, Public Consultation and Dissemination Plan</p>

11.4.5 District / Provincial Government Formal Draft ESIA Consultations

Table 11-9 provides key comments raised by authorities and representatives during Provincial/Technical consultations which was conducted on April 5, 2018 at Phonhong District Meeting Hall. The list of participants is provided in Annex 11-3. Consultations were conducted for the Burapha Plywood Mill ESIA and the Agroforestry Operations ESIA simultaneously.

Table 11-9: Summary of key issues raised at Formal District / Provincial GOL Consultations

Comments / Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA / ESMMP Report Section Reference
<ul style="list-style-type: none"> Identify detailed water use in cooling process, management plan for wastewater discharged from workcamp and from the cooling process. 	<ul style="list-style-type: none"> The Mill will utilize approximately 23,040 m³ per year (~63 m³/day) to operate at full capacity and will discharge approximately 4,896 m³/year to the sewage system. Wastewater from the glue spreaders and veneer dryers will be recycled without release into the environment. Burapha will constructed water treatment system to prevent the loss of leachate to ground water with a design to have a 15-day hydraulic resident time. 	ESIA, Volume B: Chapter 3; Thematic Plan 1. Chapter 6: Section 6.5.
<ul style="list-style-type: none"> Provide detailed technical description and technology to be constructed and applied for the Mill. 	<ul style="list-style-type: none"> Technical description and technology for the Mill are presented in Chapter 3. 	ESIA, Volume B: Chapter 3;
<ul style="list-style-type: none"> Identify water source for the veneer and plywood production. The ESIA shall assess potential impacts on water source to be used in the Mill. 	<ul style="list-style-type: none"> Water supply system for operational and fire-fighting will be extracted via boreholes in the Mill site. 	ESIA, Volume B: Chapter 3; Chapter 6 Thematic Plan 1.
<ul style="list-style-type: none"> Provide adequate and clear budget for the monitoring of ESMMP implementation for central, provincial and district levels in collaboration with MONRE. 	<ul style="list-style-type: none"> The ESMMP implementation and monitoring budget for GOL has been initially provided in the ESMMP. Burapha will discuss with MONRE to agree on E&S monitoring budget. 	ESMMP: Section 13.1
<ul style="list-style-type: none"> The Company is required to contact the Department of Land Management to conduct land survey and issue state land which then the Company can make land concession as stated in the land regulations 	<ul style="list-style-type: none"> Detailed land survey of 7.0058ha has been completed. Burapha signed land lease agreement with Hin Heup District authorities (No. 17/SPMU.HH, dated 29 July 2016) for 30 years. 	ESIA, Volume B: Chapter 11 (this Chapter) – Annex 11-3.

11.4.6 Official Comments from MONRE on the Mill ESIA

The Department of Natural Resources and Environmental Policy of MONRE has provided additional comments after reviewing the Mill ESIA report (refer to a letter No. 0599/MONRE.DNREP.DSEA, dated 09/05/2018). Key comments with responses and references to relevant sections in ESIA are summarized on Table 11-10.

Table 11-10: Summary of key comments from MONRE on Mill ESIA

Comments / Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA / ESMMP Report Section Reference
<ul style="list-style-type: none"> All Tables of Contents should be presented at the beginning of each Volume without repeating in the Chapters. The setting of page numbers in the ESIA reports should 	<ul style="list-style-type: none"> All tables of Contents in individual Chapters have been removed and remain only the master Table of Contents. 	ESIA, Volume B

Comments / Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA / ESMMP Report Section Reference
<p>be in ordered as: 1, 2, 3, 4, 5... so that it is easier to find relevant contents / sections.</p>	<ul style="list-style-type: none"> The page number has been updated as per MONRE's comments. 	
<ul style="list-style-type: none"> The relevant legislation to be used in Project implementation as defined in the ESIA Reports has yet been updated. Thus, it is recommended to revise the list of legislation with most up-to-date versions. The review has found some legislation documents that were out-of-date. These include the Land Law (2003) which has been amended and promulgated in 2012; and the National Environmental Standards (2009) which has recently amended in 2017. 	<ul style="list-style-type: none"> The relevant legislation used in the ESIA Documents have been updated with the latest versions. The Land Law (2003 is still effective as the new Law has yet promulgated. The ESIA has been conducted since 2016 before the update of National Environmental Standards (2017). However, this will be updated in relevant Sections/Chapters. 	<p>ESIA, Volume B: Chapter 2; ESMMP, Volume D</p>
<ul style="list-style-type: none"> The Mill site: it is recommended that the Company shall outline details on site characteristics including surrounding land owners on each side, distance to river, etc. 	<ul style="list-style-type: none"> The Project location has been updated with detailed surrounding land ownership and site characteristics; The distance between the Mill site to Nam Lik River is approximately 150m and this information is provided in ESMMP. 	<p>ESIA, Volume B: Chapter 3, Chapter 11. ESMMP, Volume D: TP1 – Water Quality Management</p>
<ul style="list-style-type: none"> The ESMMP shall identify key activities, potential environmental and social impacts, the magnitude of impacts, management and mitigation measures, timeframe, responsibility, and budget for implementation of E&S activities in a table format. 	<ul style="list-style-type: none"> The ESMMP has identified key potential environmental and social impacts, and provided with management and mitigation measures for each thematic aspect in table format. The budget cannot be allocated in single management and mitigation measures. However, Burapha will ensure E&S implementation and monitoring budget will be included in construction contract. 	<p>ESIA, Volume B: Chapter 9 Volume D: ESMMP</p>
<ul style="list-style-type: none"> The Company shall update the current name of key agency responsible for ESIA – previously called the Department of Environmental and Social Impact Assessment and now called the Department of Natural Resources and Environmental Policy. 	<ul style="list-style-type: none"> The ESIA has been developed before changing the name of the key agency responsible for ESIA at MONRE. However, this has been updated in the ESIA Report. 	<p>ESIA, Volume B: Chapter 2</p>
<ul style="list-style-type: none"> The ESIA is required to quantify the amount of different glues to be applied in the veneer and plywood Mill production process, as well as detailed description on hazardous materials (glue) management and disposal as well as other materials. 	<ul style="list-style-type: none"> The ESIA and ESMMP have been updated with estimated amount of resins to be used in the plywood and veneer production process. 	<p>ESIA, Volume B: Chapter 6. ESMMP, Volume D: Thematic Plan 3</p>
<ul style="list-style-type: none"> The Company shall quantify the potential wastewater discharge from the Mill...m3/day, discharge from workcamp...m3/day, capacity of wastewater treatment plant and sediment pond (m³), including attachment of layouts. 	<ul style="list-style-type: none"> The drainage system of the Mill Project adopts rainwater and sewage water separation system. The septic tank will be greater than 20 m³ which considers approximately 400 persons/day. 	<p>ESIA, Volume B: Chapter 6, Section 6.3.</p>

Comments / Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA / ESMMP Report Section Reference
<ul style="list-style-type: none"> The Company is required to contact the DNEP to discuss on the environmental and social monitoring budget which will be allocated to national, provincial and district levels. 	<ul style="list-style-type: none"> The E&S implementation and monitoring budget for GOL has been initially provided in the ESMMP. Burapha will discuss with MONRE to agree on E&S monitoring budget. 	ESMMP, Volume D
<ul style="list-style-type: none"> The Company is required to contact the Department of Land Management to conduct land survey and issuance of state lands which then the Company can make land concession as stated in relevant regulations on land. 	<ul style="list-style-type: none"> Detailed land survey of 7.0058ha has been completed. Burapha signed land lease agreement with Hin Heup District authorities (No. 17/SPMU.HH, dated 29 July 2016) for 30 years. 	ESIA, Chapter 15 – Annex II
<ul style="list-style-type: none"> The identification of water quality monitoring should be at least three sites – one upstream from the Mill site, one at discharge, and one at downstream from the Mill. These water quality monitoring locations will be used for regular monitoring routine during Project construction and operation phases. 	<ul style="list-style-type: none"> The Project will not discharge wastewater to the environment except for stormwater run-off. One water quality monitoring location has been selected at Nam Lik River for ESIA baseline assessment. The water quality sampling locations will be selected in Nam Lik River or nearby stream immediately upstream and downstream, and at discharge if applicable during construction and operation phases. 	ESIA, Volume B: Chapter 6 ESMMP, Volume D: Thematic Plan 2
<ul style="list-style-type: none"> During the construction of the veneer and plywood Mill, it is recommended that the Company coordinates with relevant authorities in order to assign appropriate staff to conduct construction monitoring activities together with district, province. This is to ensure that the Mill location will not impact any protection area. Biodiversity survey should be undertaken at the Mill site including the identification of species, quantity timber and report the Department of Forestry for potential biodiversity offset planning in future. 	<ul style="list-style-type: none"> The Company will coordinate with local authorities for E&S monitoring during construction phase. The ESIA has assessed the biodiversity of the Mill site and it is suggested that the biodiversity offset plan is not necessary. 	ESIA, Volume B: Chapter 7; Chapter 11 ESMMP, Volume D

11.4.7 Provincial / Central Government Formal ESIA Consultation

The Provincial / central consultation meeting for the review of Burapha’s Mill ESIA was organized on 19th October 2018 at the meeting room of the Central Lao Front for National Construction. The meeting was attended by relevant key stakeholders from villages, district, province and central levels. Key comments raised during the meeting and responses / clarifications from Burapha and its consultant were outlined in Table 11-11. A list of meeting participants was provided in Chapter 15, Section 15.9.

Table 11-11: Summary of key issues raised at Formal Provincial / central GOL Consultations

Comments / Feedback / Queries	Burapha response and how this is addressed in the ESIA	ESIA / ESMMP Report Section Reference
<ul style="list-style-type: none"> The Project design layouts shall clearly identify the wastewater/sediment ponds with key information on the storage capacity, daily evaporation rate, daily wastewater input and output as well as attach the design layouts of production process that shows detailed activities and descriptions in the ESIA report. 	<ul style="list-style-type: none"> The design layouts with wastewater / sediment ponds were provided in Figure 3-7 to Figure 3-12; The sediment pond has a capacity to hold water for 1,000 m³ (see Figure 3-10). The stormwater run-off into the sediment pond varies according to seasons; The water use in the veneer and plywood mill production process is 63 m³/day and will be recycled 100%; The evaporation from the sediment pond cannot be estimated due to the small scale (25m x 12m x 3.3m of LWD); Detailed description of veneer and plywood production process was provided in Section 3.7.1 including figures and Plates 3-7. 	<p>Volume B – ESIA, Chapter 3, Section 3.7.1 Chapter 6, Section 6.5</p>
<ul style="list-style-type: none"> The Company shall identify location of waste storage facilities, spoiled biomass storage location that show in the design layouts and included in the ESIA Report. 	<ul style="list-style-type: none"> Location for waste storage was identified at the log peeling line which will be prepared for managing by-product handling area, see Figure 3-7. 	<p>Volume B, Chapter 3, Figure 3-7</p>
<ul style="list-style-type: none"> The Company shall identify the specification / name of veneer and plywood mill production machinery as well as country of manufacturing these machines. The specifications shall also include the air/dust and noise control capacity of the machines/technology. 	<ul style="list-style-type: none"> Specifications of machinery was provided in Section 3.7.1 and the names of the technology was outlined in Chapter 15 – Annex, Section 15.3; Dust and noise control measures cannot be identified at this stage. 	<p>Not available.</p>
<ul style="list-style-type: none"> The ESIA shall identify key PPE to be used in the Mill operations. 	<ul style="list-style-type: none"> The main PPE items to be used in the mill were provided in Chapter 15, Section 15.3. 	<p>Volume B, Chapter 15, Section 15.3.</p>
<ul style="list-style-type: none"> The Company shall pay more attention and work closely with local authorities and local communities in implementing the Project. This is because most communities still do not have the same consensus or common understanding on the Project's approach and objectives. 	<ul style="list-style-type: none"> The Company will coordinate with village located near the Mill site during construction and operation of the Project. 	<p>Volume B, Chapter 11, Section 11.5 (this Chapter).</p>
<ul style="list-style-type: none"> The Company shall coordinate with MONRE to discuss on budget for environmental and social management, mitigation and monitoring activities of the GOL (central, provincial and district levels). 	<ul style="list-style-type: none"> The Company is coordinating with relevant MONRE Departments to define GOL's monitoring budget. 	<p>ESMMP</p>
<ul style="list-style-type: none"> The Company agrees to revise the ESIA Report where possible; where information is not clear, the Company will revise and provide further clarification/explanations. 	<ul style="list-style-type: none"> N/A 	<p>N/A</p>

11.5 Continuing Consultation

The company will be expected to continue formal and informal consultation with stakeholders as the project continues into the operational phase. Procedures for grievance management throughout the Project life have been outlined in the ESMMP (Volume C) that are designed to provide an open and transparent channel for communication between the community and the Company.

The Public Consultation and Disclosure Plan (Volume C) will provide a framework for consultation and information disclosure for the implementation of the Burapha Mill Environmental and Social Impact Assessment (ESIA) processes throughout the construction and operational phases of the project. The PCDP has been developed using international best practice and Burapha's existing Operational Manual for communications (2012) which sets out methods of communication as well as roles and responsibilities for information dissemination.

11.6 Grievance Management

The first step in conflict resolution is conflict avoidance. Conflict avoidance is a key goal of the stakeholder consultation process for the ESIA and for the ongoing community engagement program. Regular consultation and engagement with local community members will effectively reduce the occurrence of disagreements and conflicting positions.

Despite the best practice community engagement, it is likely that grievances will arise throughout the life of the Project, and it is important that these are dealt with in a fair and transparent manner before they escalate. The phases of conflict development and appropriate interventions can be summarized as follows:

- Conflict avoidance → Consultation & participation in planning, decision making;
- Simple disagreements → Informal negotiation, discussion and mediation;
- Early conflict development → Reference to Village Grievance Committee;
- Conflicting positions taken → Reference to Grievance Committee at District level;
- Conflicting positions hardened → Reference to Grievance Committee at Provincial level; and
- Intractable conflict → Refer conflict to National Court.

Burapha Agroforestry Co., Ltd has an established Standard Operating Procedure (SOP) for grievance management, *BAFCO-SOP-010-Dispute Resolution*. This procedure is designed to provide an open and transparent channel for communication between the community and the company. It has been developed to meet the requirements of the FSC Forest Management Standard utilising the Global Forestry Services (GFS) Forestry Support Program and is considered applicable for the Burapha Veneer and Plywood Mill Project. The procedure is summarised below.

Communication

Burapha's grievance mechanism, *BAFCO-SOP-010-Dispute Resolution*, prescribes a proactive approach to conflict avoidance, promoting regular formal and informal communication to minimise areas of conflict arising from the Project. Types of communication include:

- Establishment of a Conflict/Dispute Resolution Committee that includes both the management and adequate representation of all critical groups of the community including women. Committee meetings should be held regularly about every 3-4 months;
- Consultation on forest resource usage by communities;
- Ongoing consultation on village level socio-economic development;

- Communication on the establishment and progress of any social programmes; and
- Provision of relevant information on the type, scope, potential impacts and timing of operations to affected local communities.

Conflict Management and Dispute Resolution

The Conflict Management and Dispute Resolution is a 4-step process, as follows:

1. All conflicts or disputes shall also be raised formally within the Conflict / Dispute Resolution Committee:
 - » The committee shall try to resolve the conflict through consensual negotiation;
 - » All information relating to the conflict (meeting notes, maps, photos, agreed corrective actions etc.) shall be recorded for company records and distribution to relevant stakeholders;
 - » Corrective actions, where applicable, are agreed upon by the committee.
2. Any conflict that cannot be resolved within the committee needs to be raised with the company's District Manager. The District Manager shall consider the records / results of the committee resolution process and propose a resolution:
 - » The parties directly involved in the conflict shall then have the opportunity to meet and discuss the issues directly with the Company's District Manager in efforts to come to an agreement. This meeting should be facilitated by an independent third-party mediator.
3. Conflicts that still cannot be resolved are then referred to the company's Regional Director. The process at this step is the same as step 2.
4. Any conflict that cannot be resolved in steps 1-3 is then referred to the civil court system in Lao PDR. The party raising the unresolved conflict shall be responsible for their own representation in the Lao PDR Court system.



Chapter 12 | Management and Monitoring

Chapter 12| Management and Monitoring

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12 ENVIRONMENTAL MANAGEMENT AND MONITORING

The Lao PDR *Decree on Environmental Impact Assessment (2010)* requires environmental and social management and monitoring to be undertaken for the construction and operations phases of the Project. A detailed ***Environmental and Social Management and Monitoring Plan*** (ESMMP) has been prepared as part of this ESIA as a separate stand-alone document (Volume C). It outlines a management and monitoring strategies for the construction and operation phases of the Project.

The ESMMP describes, in general terms, the proposed safeguard controls and methodologies required by the Project and provides a framework for monitoring to be undertaken in support of environmental and social management objectives.

Environmental management measures in the ESMMP cover the following aspects:

- Thematic
 - » Environmental Management
 - » Water Quality Management
 - » Erosion and Sediment Control
 - » Hazardous Material / Waste Management
 - » General Waste Management
 - » Erosion and Sediment Control
 - » Air Quality Management
 - » Noise Management
- Social Management
 - » Social Management
 - » Occupational Health and Safety
 - » Emergency Preparedness and Response
- Site Specific
 - » Road and Transport Management
 - » Chain of Custody

The ESMMP is intended to be a dynamic document that is reviewed every two years throughout operations and updated every five years (or more frequently, if required) to reflect changes in Project activities, Company commitments, environmental and social conditions, or legislative requirements.

Burapha is responsible for implementing the ESMMP. During construction, however, implementation of certain management activities may be assigned to a Construction Contractor. The contractors will develop a Construction Environmental Management Plan (CEMP) that incorporate relevant measures from the ESMMP.

Implementation of the ESMMP will require appropriate staff, financial resources, equipment and support systems.

12.1 Environmental Management System

The ESMMP provides a link between policy and implementation, summarising environmental and social commitments and providing the management measures and monitoring programs recommended to achieve these commitments. It provides a framework for documenting the environmental management processes and procedures within an Environmental and Social Management System (ESMS). This function of the ESMMP is represented schematically in Figure 12-1.

Priority and continual improvement targets are set in the ESMMP. These targets will be used to guide the environmental and social work program until the next revision of the document. The targets have been developed during Feasibility Study and prior to conclusion of detailed design; therefore, it may require amendment to reflect changes in Project design, environmental and social conditions, best practices and specific issues that arise.

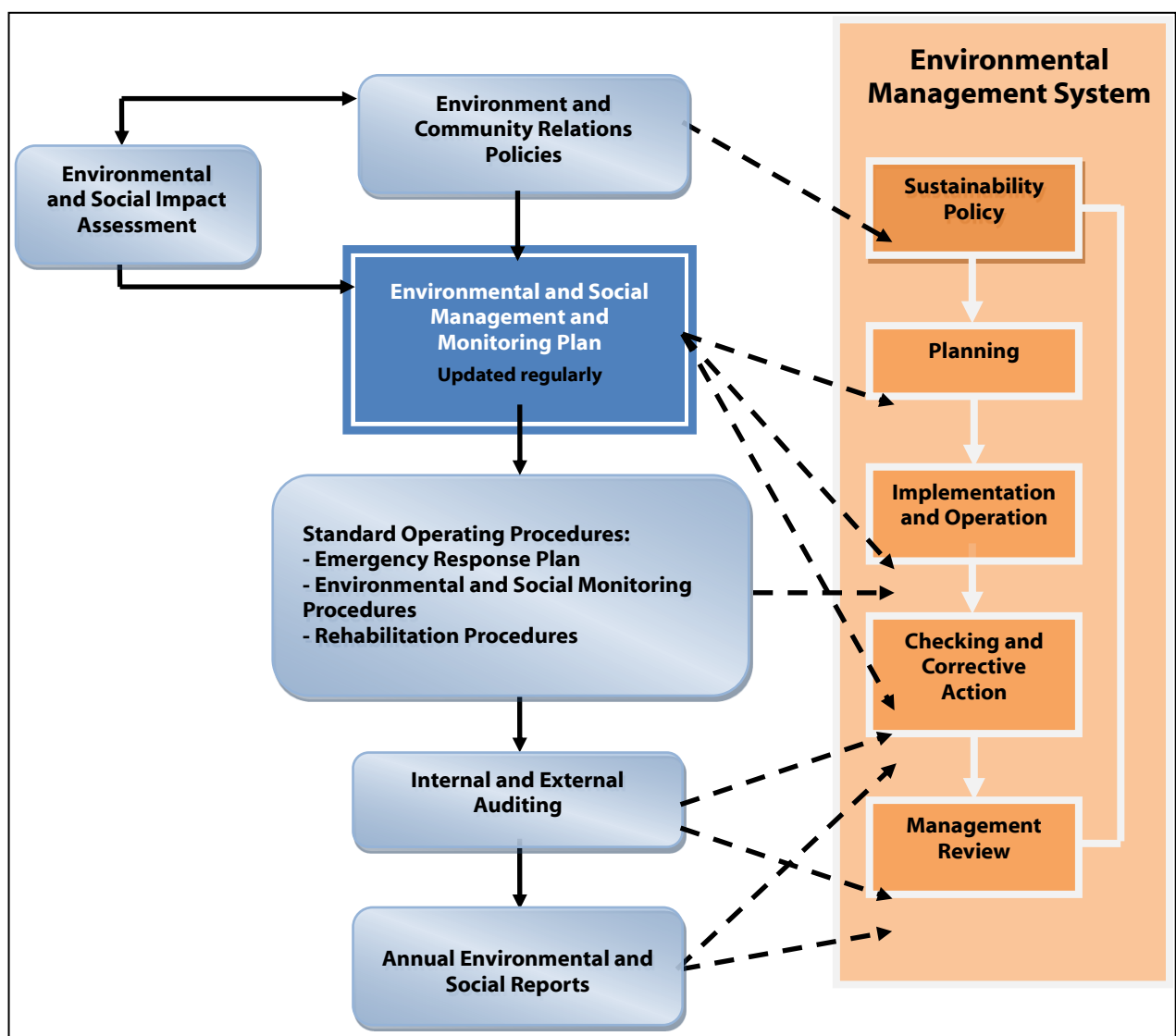


Figure 12-1 Schematic diagram of the ESMS framework

12.1.1 Responsibilities

Responsibilities of key participants for the environmental and social management of the Project are discussed below.

Community, Social & Environmental Responsibility Department

The Burapha Community, Social & Environmental Compliance (CSER) Department ensures compliance with national law and applicable international standards relative to environmental and social issues.

The CSER Department is responsible for:

- Conducting internal audits and overseeing external audits (e.g. FSC and GOL);
- Ensuring compliance with relevant legislation and Company policy by implementing appropriate management and monitoring systems;
- Ensuring the environmental and social management practices described in the ESMMP will be implemented effectively;
- Ensuring that contractors fulfil their contractual environmental, social and community development obligations;
- Providing specialist advice on environmental and social management strategies, as required, to Project managers, supervisors, contractors and other Project personnel;
- Monitoring the performance of the environmental and social management measures in the ESMMP;
- Regular liaison with the Government of Lao PDR, community and other stakeholders;
- Implementing environmental and social induction procedures and appropriate training for personnel and contractors; and
- Reporting the progress of the management and monitoring systems.

All Burapha staff and contractors are responsible for mitigating environmental and social impacts by implementing measures identified in the ESMMP. Specific responsibilities of key staff are described below.

Chief Operations Officer

The implementation, management and continued improvement of the ESMMP will be the overall responsibility of the Chief Operations Officer.

Deputy Chief Executive Officer

Operational implementation of the ESMMP will be supervised by the Deputy Chief Operations Officer who will support the CSER Manager.

In addition, the DCOO will be responsible for ensuring that all personnel and contractors comply with the regulations and procedures set out in the ESMMP, and carry out their work in a manner that prevents and minimises the environmental and social impacts.

CSER Manager

The day-to-day implementation of the ESMMP and associated monitoring / reporting will be the responsibility of the CSER Manager, overseen by the DCOO who will be supported by technical staff and officers.

12.1.2 External Parties

Forest Stewardship Council

FSC is a global organization that has been established to promote responsible forest management worldwide. FSC allows businesses and consumers to make informed choices about the forest products they buy.

An FSC accredited body will assess the Mill for FSC Chain of Custody certification and will conduct annual audits of the operations against relevant FSC standards. The FSC auditor will prepare annual audit reports.

MONRE

MONRE is the central governing agency for environment, land, forest, water, air, biodiversity as well as for minerals, natural disaster management, climate change, meteorology and hydrology. MONRE is the GOL agency responsible for monitoring the overall environmental and social performance of the Project.

Responsibilities of MONRE include:

- Applying GOL policies applicable to the Project;
- Supervisory role during Project construction;
- Reviewing regular Project reports, monitoring data, and revisions and updates to the ESMMP;
- Reviewing and approving (or providing no objection) to CEMPs;
- Coordinating GOL responsibilities in the ESMMP;
- Establishing other GOL committees as required;
- Monitoring of compensation and community development activities; and
- Monitoring of Project compliance with commitments and GOL standards.

Other GOL Organisational Levels

The Project will require establishing government institutional structures at all levels of Government. The GOL committees required for the implementation of environmental and social measures associated with the Project are summarised as follows and are likely to be coordinated by MONRE.

Other GOL organisational levels are expected to include **District level committees**, including:

- District Working Group (DWG – may be combined with the Provincial committee if approved by the GOL); and
- Grievance Redress Committee (GRC – may be combined with the Provincial committee if approved by the GOL).

In addition, each affected village will establish a Village Development Committee to coordinate grievance redress activities for that specific village.

12.2 Management and Mitigation Measures

Proposed management and mitigation measures for potential environmental and social impacts of the Project have been documented in the detailed ESMMP (Volume C). Targets and actions for continual improvement of the management system are also identified in the ESMMP.

12.3 Monitoring

The Project's monitoring program will include five categories of monitoring. A brief definition of these categories is included below, but for a more detailed outline of all monitoring to be conducted refer to the thematic / site-specific management plans below.

- **Construction Monitoring:** The CSER Manager (or suitably qualified monitor) will conduct weekly construction monitoring with the construction contractor compliance officer to visually inspect activities and the Project area to ensure proposed measures are adequately implemented and to prescribe corrective actions, when required.

- **Operation Monitoring:** The CSER Manager (or suitably qualified monitor) will conduct monthly monitoring of the Mill and ancillary activities to ensure design controls are effective and proposed management measures are implemented and will prescribe corrective actions, when required.
- **Discharge (emission) monitoring:** The monitoring of discharge to identify potential contaminants discharged or emitted from the Project, measured at the point of discharge.
- **Ambient monitoring:** Ambient monitoring will be required if discharge monitoring identifies that effluent / emissions exceed Project guidelines. Ambient water quality monitoring would be conducted in the Nam Lik River, immediately downstream of discharge from the Project area. Air / noise emissions would be monitored near the closest residences.
- **Investigation monitoring** is undertaken to determine the extent of impacts following an environmental incident (oil leakage, etc.), to verify that corrective actions have been implemented satisfactorily, or to verify / refute third-party claims of environmental impact.

1.1.1 Construction and Operations Monitoring

The CSER will undertake regular formal and informal inspections of sites and activities. Inspections will compare performance and implementation against the management strategies and targets in the ES MMP. Site inspections will include visual assessment of work compliance and evidence that recommended mitigation measures are implemented and effective.

A template for site inspectors will be developed and approved by Burapha's CSER to capture monitoring data that verifies the following, at a minimum:

- Results of field / laboratory water quality sampling (monthly) and air quality sampling (annually),
- Water management and controls are effectively implemented;
- Transport, storage, handling and disposal of hazardous and non-hazardous materials / waste are managed and controls implemented;
- Occupational health and safety measures are implemented and PPE utilised appropriately;
- Noise and dust issues are managed and controls implemented;
- Vehicle and equipment maintenance is undertaken;
- Emergency preparedness, including spill response equipment, firefighting equipment and maintenance, etc.;
- Appropriate signage is posted;
- Vehicle movements are effectively directed;
- Site security is effective;
- Adequacy of training, competency, and employment of workers on site;
- General awareness, conformance and enforcement of site procedures, protocols, and processes.

Where an issue, incident or non-conformance is observed and documented in a previous inspection, the inspector will note the effectiveness of the corrective actions implemented at the subsequent visit. The findings of site inspections will be incorporated into the Project Quarterly Reports.

1.1.2 Emissions and Ambient Monitoring

Prior to construction, Burapha will document the monitoring protocols, including monitoring locations, parameters, equipment, frequency, and QA/QC. To ensure that monitoring is successful and efficient, all relevant employees will be trained by an experienced person in the use of:

- Appropriate techniques, including use, calibration and maintenance of field monitoring equipment; sample collection, labelling and transport;
- Review and interpretation of field data and monitoring results; and
- Record keeping and reporting procedures, including using standard forms and entering into the environmental management databases.

The following direct sampling will be conducted, in addition to applicable visual observation detailed in the respective management plans (above).

Water Quality

Surface water quality will be sampled in effluent immediately downstream of discharge from the water treatment pond. Surface water will be monitored monthly for field parameters and quarterly for laboratory parameters, as follows:

- *Field parameters:*
 - » pH;
 - » Redox potential (ORP);
 - » Dissolved Oxygen (DO);
 - » Electrical conductivity (EC);
 - » Total dissolved Solids (TDS);
 - » Turbidity or Total Suspended Solids; and
 - » Temperature.
- *Laboratory parameters:*
 - » pH,
 - » Biological oxygen demand (BOD₅);
 - » Chemical oxygen demand (COD);
 - » formaldehyde;
 - » phenolic substances;
 - » total suspended solids (TSS);
 - » Kjeldahl nitrogen;
 - » Total phosphorous,
 - » Oil & Grease, and
 - » Pathogens (total coliform, faecal coliform).

Air Quality

The Boiler Stack will be sampled for NO_x, SO_x, PM₁₀ (particulate matter smaller than 10 microns in diameter). Sampling will be annual for the first three (3) years of operations, then will be conducted every five (5) years if concentrations are below national and international emissions standards. Suitable handheld equipment or gas capture will be employed (i.e. capable of assessing to applicable thresholds).

If off-cuts with phenol-formaldehyde resin are burned in the Boiler (which is not anticipated), the sampling program will be reassessed.

Noise

Burapha will employ noise monitoring equipment between the Mill and the nearest social receptors (i.e. Ban Khone Phook Sub-Village) on an annual basis to determine ambient noise conditions during the day and night. The monitoring equipment will log measurements (dB(A)) continuously (e.g. every 10 seconds) for 72 consecutive hours (three consecutive days) to compare it to national and international standards.

12.3.1 Social Monitoring - Construction and Operations Phases

The Social Management and Monitoring Program will be developed to identify and quantify the direct and indirect impacts of the Project on the surrounding community. Monitoring will be conducted quarterly and biannually, as follows:

- Regular quarterly monitoring of:
 - » Local workforce statistics (including employment by contractors);
 - » Local goods and services procured by the Operation;
 - » Road accidents involving Project workforce (including contractors) and Project vehicles and local residents;
 - » Reported grievances and resolutions; and
 - » Disbursement and effectiveness of the Community Development Fund.
- Monitoring every 2 years for:
 - » Population growth and immigration to the greater Project Area;
 - » Socio-economic and livelihood changes in the vicinity of the Project Area;
 - » Local attitudes toward the Operation; and
 - » Incidence of sexually transmitted infections (STIs) and health statistics.

All community grievances filed with Burapha will be recorded and addressed at weekly management meetings, with the results included in monthly and annual reports.

12.4 Reporting Systems

Burapha will employ the following environmental and community relations internal reporting systems:

- Quarterly reporting;
- Annual reporting.
- Non-compliance reporting; and
- Incident and hazard reporting.

Burapha will adopt the following internal reporting systems to manage environmental, social and community aspects associated with the Project:

- Incident reporting – MONRE will be notified within 24 hours of a significant incident involving an accident;
- Monthly and annual reporting – to be submitted to MONRE by the COO or DCOO;

The reporting requirements for the above are further described in the following sections.

12.4.1 Quarterly Reporting

The Company will prepare a quarterly operations report to summarise its environmental and social performance and significant activities, incidents and events for that period; and key tasks for the following quarter. The report will include a brief presentation of the Company environmental and social management systems; results from routine or investigation monitoring; and assessment of results against Company commitments, continuous improvement targets, and key performance indicators (KPIs), as follows:

Environmental Aspects

- Progress against the implementation of environmental measures listed in the ESMMP;
- Any difficulties encountered in implementation of the environmental measures and recommendations for corrective action;
- The number and type of non-conformances with the environmental measures and proposed remedial measures;
- Discussion of corrective actions from previously identified non-compliance issues;
- Relevant information from data and reports from the Construction Contractor;
- All Project-related accidents or incidents that relate to the health, safety, and welfare of stakeholders and the environment; and
- Monitoring data of environmental parameters and conditions, including any significant issues or changes.

Social and Community Aspects

- Progress against the implementation of social measures listed in the ESMMP;
- Results of ongoing stakeholder engagement;
- Any difficulties encountered in implementation of the social measures and recommendations for corrective action;
- The number and type of non-conformances with the social measures and proposed remedial measures;
- Relevant information from data and reports from the Construction Contractor;
- All Project-related accidents or incidents that relate to the health, safety, and welfare of stakeholders;
- Reported grievances and corrective actions taken; and
- Monitoring data of social parameters and conditions, including any significant issues or changes.

12.4.2 Annual Reporting

Burapha will prepare an *Annual Report* that summarises business and sustainability performance for each calendar year. The contents of the annual report are expected to include:

- Discussion of environmental and social performance;
- Detailed discussion of performance relative to commitments with focus on:
 - » Longer lead indicators; and
 - » Overview of significant findings of audits and facility inspections.
- A broad overview of monitoring activities carried out during the year with results compared to relevant guidelines;
- Discussion of any breach of compliance requirements, including the cause of the breach, and the corrective measures planned or underway to remediate the issue and prevent future occurrences;

- A discussion of significant incidents that have occurred;
- Overview of significant findings of audits and facility inspections;
- Results of Community Development Initiatives; and
- Identification of any deviation, revisions and updates from the ESMMP.

The finding of audit reports and recommendations for continuous improvements will be presented to the COO and the GOL in the Annual Report.

12.4.3 Incident Reporting

An incident is defined as any event that impacts on, or may potentially impact on the safety, health, environment or community, or any activity resulting in regulatory non-compliance or the breach of company policies, standards or commitments. The following situations will constitute an incident:

- Injury;
- Accident or near miss;
- Chemical spill;
- Spills of fuel or oil greater than 50 litres within workshop areas and bunds (safety event);
- Spills of fuel or oil outside of workshop areas and bunds (environment event);
- Near-miss environmental incidents;
- Fires;
- Uncontrolled air emissions; and
- Community incidents - primarily related to community grievances.

All environment or community-related incidents or issues will be reported by the Project workforce, including contractors to their direct Supervisor. The Supervisor is responsible for reporting the incident to CSER Manager. All incidents will be reported as soon as practicable to CSER Manager and within 24 hours of incident occurrence.

The CSER Manager will track all incidents in the **Incident and Accident Register** will be maintained to track all incidents (including near-misses and community complaints through the Grievance Mechanism), recommended corrective actions, timelines for completion of corrective actions, and efficacy of corrective actions.

The CSER will generate an Incident Report for all serious incidents (injuries, discharges exceeding regulatory guidelines). At a minimum, the following details will be required for incident reporting:

- Description of the event and its causes;
- Risk rating of the event;
- Description of corrective and preventative actions;
- Description of repairs, clean-up or other remedial measures;
- Identification of person / group responsible for remediation;
- Timeline for corrective action; and
- Actual or estimated costs of repair, clean-up or other remedial measures.

In the event of a significant incident, the relevant Government Authority will be notified within 24 hours of the event.

12.4.4 Non-Compliance Reporting

Non-Compliance Procedure

In the event that monitors identify non-compliance with management measures identified in the ESMMP or Company Policies (with no incident), an internal non-compliance report will be prepared. The report will include:

- Description of the non-compliance issue;
- Description of corrective action required;
- Identification of person / group required for corrective action;
- Timeline for completion of corrective action; and
- Measures required to reduce the likelihood of similar non-compliance events in the future.

Non-Compliance Communication

The provisions for a non-compliance procedure will be included in the Project tender documents and contracts for construction contractors and clearly communicated to the Project workforce via the initial site induction and general training.

12.5 Auditing and Review

Internal Audits

In accordance with regulatory requirements, it is expected that the ESMMP will be updated as required to incorporate any significant changes or at least every 2- 5 year intervals during the life of the Project.

Regular audits of the Project ESMMP and associated management systems will be undertaken internally and externally. The audits will assess:

- Adequacy of the ESMMP and associated plans with respect to the scale and nature of anticipated impacts and current development stage of the Project;
- Workforce awareness, competence and compliance with the ESMMP and associated plans and procedures;
- Performance of managers and operators in implementing, maintaining and enforcing the ESMMP and associated plans; and
- Suitability of allocated resources, equipment and budget for implementation of the ESMMP.

All audit recommendations will be discussed with the relevant division managers, where appropriate. Corrective actions will be documented and progress towards resolution reported.

All major revisions to the ESMMP (Construction ESMMP and Operations ESMMP) will be provided to GOL (via MONRE) for review and approval. The following instances typically trigger major revisions:

- Changes in legislation, policies or standards applying to the Project;
- Insufficient or inadequate measures for mitigation, i.e. environmental performance does not meet acceptable levels despite implemented controls;
- New information available about the Project's impacts that indicate impacts are either greater than anticipated or at an unacceptable level, i.e. via environmental or social monitoring data or grievance mechanism;
- Changes in Project scope, design, or work methods;

- New techniques or technologies available that meet the definition for 'best available techniques,' and would significantly reduce the impacts or increase the benefits of the Project;
- New best practices available that would reduce the impacts without commercially significant extra cost; and
- Measures of the ESMPP or conditions for the Project deemed unnecessary or ineffective in mitigating the adverse impacts.

FSC Audits

FSC certificates are valid for 5 years and the FSC accredited certification body will conduct annual surveillance audits to verify compliance under the FSC requirements. An FSC accredited body will assess the Chain of Custody operations against relevant FSC standards. Only accredited bodies are authorised to issue FSC certificates and undertake audits.

12.6 Budget for Environmental and Social Management and Monitoring

Burapha will provide sufficient resources to ensure the successful implementation of the environmental and social management and monitoring of the Project as identified in the ESMMP. The Company will also ensure that applicable contractors include sufficient resources for the environmental management of their activities.

General Environmental and Social Management Budget

Burapha will provide a budget estimate for annual environmental and social monitoring that will be included in the Final ESIA and ESMMP. The Company has allocated 78,360 USD for its 2017 CSER budget.

Chapter 13 | Conclusions



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13. CONCLUSIONS

13.1 Summary

The development of the Burapha Veneer and Plywood Mill will provide an important processing plant to value add plantation forestry grown in the region. It will add to the local economy by providing jobs and local supplier opportunities and will provide important export income to Lao PDR.

The siting of the Mill is low impact from an ecological perspective being in a cleared industrial zone and from a social perspective no community land / assets or resource rich land would be acquired for the concession.

While the Project will provide significant job opportunities and spin-off benefits there is the potential for associated impacts including inequitable benefits (perceived or actual) and social change leading to unrest / dissatisfaction within segments of the community. Occupational health and safety risks are inherent in mill and transport operations. These risks and potential impacts will require monitoring and effective management.

The Mill can generate wastes and discharges that will need to be carefully managed to ensure that discharge requirements are met and the downstream environment protected.

The transport of raw logs to the Mill and finished product to end markets provides some risk for community occupational health and safety that will also need to be managed to avoid potential impacts.

13.2 Assessment of Key Impacts and Opportunities

13.2.1 Economic Development

The Project will also support the Government of Lao PDR economic objectives for providing a value-added wood processing facility linked to a sustainably managed plantation operation, as is identified in the Law on Processing Industry (2013) and the 8th National Socio-Economic Development Plan, 2016-2020.

On a regional and local level, the Project will generate significant direct and indirect benefits, including:

- Investment - The establishment of the Mill Project will require an initial investment of \$26 million USD into the Lao economy.
- Direct Employment - Approximately 383 full-time positions will be created for Mill and transport operations. Skilled labour requirements will provide training / skills enhancement opportunities. Preference will be given to the recruitment of local workers. Additional jobs will be created for construction.
- Government Revenue - The Project will provide a significant contribution to GOL tax revenues with an estimated annual revenue of 18 million dollars at full capacity, with profits and workforce VAT expected to provide approximately 2 million USD in annual tax revenue.
- Spin-off benefits – The construction and operation of the Project is expected to provide local supplier opportunities. Project development in the Hin Heup Light Industrial Zone is expected to provide further impotence to the development of the area. The Eucalyptus plantation forestry sector will benefit as a whole from Mill operations through the development of a higher value export alternative; the technological advances in introducing a modern manufacturing unit; and incentive to expand sustainable / certified plantation operations.

13.2.2 Employment

The Project will create approximately 383 full time positions. This includes approximately 366 full-time positions for Mill operations - 182 people working per shift (59 people for the veneer line and 63 people on the plywood line; and 17 full-time truck drivers for in and out-bound haulage).

Mill operations will require training of the local workforce to fulfil skilled labour opportunities. Recruitment of the Burapha workforce will target people from the local communities most affected by the mill and transport operations.

There is the risk of potential issues associated with employment which may include:

- Unequal opportunity for employment, either perceived or actual, between different villages, ethnic groups, genders and recent migrants versus long-term residents;
- Frustration arising from inadequate levels of employable skills among the local workforce to obtain senior level positions;
- Social impacts resulting from shift work and changes to the family dynamic; and
- Occupational health and safety risks (refer to Section 6.4).

Management measures are identified in the ESIA and ESMMP (Volume C) including strong community engagement and grievance resolution; local first and equal opportunity employment practices and training and skills development programs which are expected to greatly reduce the likelihood and consequence of these potential impacts.

13.2.3 Transport and Traffic Safety

An average of 14 in-bound haul trucks will deliver raw logs to the Mill each day and an average of three trucks will haul finished product to market (Vientiane, Thailand, Myanmar, and Vietnam). The Project Area is serviced by Provincial Road No. 4501 that connects to National Road 13 at Ban Hin Heup Tai and is the main thoroughfare linking Hin Heup, Feuang and Sanakan District capitals.

The section of Road 4501 near the Project site was sealed in 2009 and is accessible year-round. Local vehicles, pedestrians and livestock utilise this road as a key route within and between Project villages and the District Capital. Traffic on this road including trucks, buses, cars, tuk-tuks and motorbikes is generally frequent during the day and moderate during the evening.

Key inbound and outbound transportation routes are provided in Table 13-1:

Table 13-1 Primary (proposed) log and plywood transport routes

Transport Route	Roads
Mill Access Route	4501
North East inbound route	13N and 5
North West inbound route	4533 and 13N
West / South West inbound	4501, 4502, 11, 4
South East in-bound and out-bound route	13N and 10
Southern inbound	120 13N

The addition of Burapha trucks on the road will have negligible impact on ambient conditions on National, Provincial and District arterials. Burapha transport on smaller unsealed roads (at plantations) will be very infrequent, associated with harvest every seven years. However, there are a number of associated physical, biological, and social risks associated with hauling raw timber and the finished product that must be diligently mitigated, including:

- Community health and safety – people living near or travelling on transportation routes will be at risk for vehicle strike resulting in injury or death. This risk will increase in locations that have relatively high population density; where Burapha trucks most frequently use; and where road infrastructure condition is poor. There is increased risk for children who typically do not have the same awareness of hazards associated with roads and transport;
- Biological receptors – flora and fauna may be impacted in the event of an accident leading to hazardous materials discharge, including native fauna as well as livestock;
- Soil and water quality – soil and water quality may be impacted by hazardous materials discharge during vehicle refuelling or maintenance or in the event of a road-side accident;
- Air quality – vehicles will emit pollutants and generate dust, which may prove a nuisance for people living in proximity to the access roads; and
- Noise – vehicles passing through villages will generate nuisance level noise impacts, potentially impacting more rural roads where ambient noise is typically low.

The risks and potential impacts are assessed in the ESIA for each of the above receptors. Management measures identified in the ESIA and ESMMP (Volume C) will significantly reduce the potential for significant impacts (e.g. driver safety training, vehicle maintenance, speed limits, travel hours, emergency preparedness and response requirement, etc.). However, nuisance level impacts cannot be entirely avoided or mitigated.

Though risks from transportation cannot be entirely avoided, impacts to community health and safety is expected to be **Low** with diligent implementation of transportation safety measures described in the ESMMP

13.2.4 Occupational Health and Safety

Occupational health and safety is a key issue for the Project requiring careful planning and management. The Project presents a number of associated risks, including:

- Hazards associated with loading, transport and unloading logs;
- Hazards associated with the use of and working in proximity to heavy equipment and machinery;
- Exposure to dust and potentially noxious chemicals; and
- Explosion / fire hazards from flammable materials.

Burapha is committed to occupational health and safety (OHS) and has an existing *OHS Policy and OHS Principles Manual*. The manual provide targets, specifies integrating OH&S into daily activities through proactive and preventative measures and documents requirements to actively renew health and safety programs through continuous improvement and monitoring. The Company also has an *Emergency Preparedness and Response Procedure* (EPRP).

Burapha will incorporate safe design principles and practices into the Mill layout and machinery planning and will refine OHS / EPRP policies and procedural documents to capture impact prevention and response protocols that are specific to the Veneer and Plywood Mill, based on management and monitoring protocols provided in the Project ESMMP (Volume C).

13.2.5 Hazardous and Non-hazardous Materials and Waste

The Project will be required the transport, storage, handling, and disposal (where applicable) of hazardous materials / hazardous waste throughout operations and during construction to a lesser extent. The formaldehyde utilised in the wood adhesive presents an occupational health and safety risk for the workforce if inhaled. The remainder of the materials used in the adhesive (i.e. urea / phenol, ammonium sulfate) may impact aquatic habitat if discharged from the site (as above).

In addition, diesel fuel and other hydrocarbons; sewage and greywater, and medical waste would impact groundwater and surface water quality in the event of accidental discharge. Burapha is committed to

International best practices for transport, storage, handling of hazardous materials and appropriate disposal of hazardous waste including design controls, provision of Personal Protective Equipment, training, record keeping, and emergency preparedness and response planning.

Burapha will develop, implement, communicate, adhere to and maintain a relevant and current **Waste Management Plan** which defines all on-site and off-site strategies, operational controls and management practices relating to hazardous waste management. Potential waste streams and their sources will be identified, classified and managed during operations and incorporated into the Waste Management Plan and the design of on-site facilities.

The Company will develop and implement an **Emergency Preparedness and Response Plan**, incorporating requirements identified in the Project ESMMP, Emergency Preparedness and Response Sub-Plan. Burapha will also develop an **Occupational Health and Safety Plan** or Standard Operating Procedure that ensures their workforce is adequately trained to avoid exposure to potentially toxic substances and is provided appropriate personal protective equipment (PPE).

Routine monitoring of hazardous materials storage, handling, and disposal areas will be conducted throughout construction and operations to ensure personnel are effectively managing potential pollutants, as per the ESMMP. Where applicable, non-compliances will be documented with corrective action reports and remedial measures implemented.

Though risks from hazardous materials cannot be entirely avoided, impacts to communities, the workforce, water quality, soil quality, and biodiversity will be **Low** with diligent application of management measures and monitoring provided in the ESMMP.

13.2.6 Non-Hazardous Waste

Waste management at the Project will require the construction of several specifically designed facilities (i.e. storage and separation area for recyclables; residue waste landfill for non-recyclables and non-hazardous materials; sewage and grey water treatment plants). The first priority for the management of wastes generated by the Project will be to reduce the volume of waste generated, which will be achieved by procuring supplies that produce less waste by virtue of the way they are produced, packaged, or consumed; procuring supplies that have been produced from recycled materials, if possible; and maximising the efficiency of all on site production processes.

All non-hazardous waste will be managed in a manner that avoids impacts to surface and air quality, soil and surface / groundwater, visual amenity, and prohibits animal forage. Impacts to receptors from non-hazardous waste will be **Low**.

Routine monitoring of all waste containment and disposal areas will be conducted throughout construction and operations, as per the ESMMP. Where applicable, non-compliances will be documented with corrective action reports and remedial measures implemented.

13.2.7 Site Contamination

Burapha is committed to operating the facility in a manner that avoids site contamination, and has designed the Mill for compliance with stringent IFC Performance Standards. The Company will develop a *Waste Management Plan* (WMP) that identifies appropriate on-site disposal methods for hazardous and non-hazardous wastes, and certified facilities for off-site disposal. Volumes of hazardous waste will be tracked and recorded with a Hazardous Materials Register. Measures to contain discharge in the event of accidental spillage will be identified in the Project *Emergency Preparedness and Response Plan* (EPRP). Management measures provided in the ESMMP will be incorporated into the WMP and EPRP.

All on and off-site disposal facilities will be appropriately designed to ensure that surface water, groundwater, and soils are not contaminated. Non-hazardous waste disposal areas will be routinely covered to avoid wildlife egress and disease spread through such potential vectors.

Routine monitoring will include all waste containment and disposal areas, to ensure contractors / Burapha staff are managing waste consistent with Company / Project policies.

Impacts to surface water, groundwater, soil and downstream receptors are expected to be **Low** with development and implementation of an effective waste management strategy, routine monitoring of facilities, and corrective action plans.

13.2.8 Water Quality

There is significant risk that unmitigated discharge from the Mill will affect water quality, with the potential for moderate impacts to downstream aquatic biodiversity. Unmanaged / untreated discharge during the various phases of veneer and plywood manufacturing may be high in nutrients / organic material which may increase biological oxygen demand (BOD) and / or chemical oxygen demand (COD) to the extent that dissolved oxygen levels in receiving waters may be depleted, and benthic organisms consequently stressed or killed. Discharge of such materials in excess of national and international guidelines would directly impact aquatic habitat. With the exception of potential discharge of hazardous materials, potential water quality pollutants are not considered hazardous for human health.

Burapha is committed to meeting national and international standards for effluent discharge. Diligent management and mitigation measures will be required to ensure the Company meets these standards. It is anticipated that recycling of washing process water from the glue spreader and air dryer will be required with zero discharge from these facilities. A water treatment pond will be required to allow for passive microbial treatment of surface water prior to its discharge from the site. Water from the log stockyard and the remainder of the Mill footprint would be routed to this pond (which will serve as a settling pond for suspended sediments).

The quality of liquid waste from plywood manufacturing is monitored by analysing the following characteristics: pH, biological oxygen demand, chemical oxygen demand, total suspended solids, phenol, and total ammonia. The water quality monitoring regime specified in the ESMMP will identify whether discharge meets applicable standards, and provide for adaptive management to avoid impacts to downstream water bodies / receptors.

With appropriate design controls and passive water quality treatment, impacts from effluent will be **Low**.

13.2.9 Erosion and Sediment Transport

During construction, the topsoil and subsoil at the site will be susceptible to erosion and sedimentation of neighbouring seasonal streams and potentially the Nam Lik River during the rainy season.

This is mitigated by the flat topography of the site. It is anticipated that the application and maintenance of the stormwater and erosion and sediment control facilities in advance of major earthworks will minimise sediment inputs to a level that is satisfactory to stakeholders.

Stormwater diversion channels and erosion / sediment control facilities will be developed in advance of ground disturbing activity. Surface water will be conveyed to a sedimentation basin (converted to the Water Management Pond during operations) which will retain water from the Project footprint, allowing coarser sediments to settle. Some of the finer fraction will discharge from the site.

With effective stormwater, erosion, and sediment control; construction phase impacts to water quality from erosion and sedimentation will be **Moderate** and operations phase impacts will be **Low**.

13.2.10 Community Water Use

The most important water resources for local villages are the Nam Lik River, nearby perennial streams, and wells or bores. Water from these sources is utilised for household garden irrigation, washing, and other beneficial uses (whereas local communities use bottled water for drinking).

With design controls and diligent application of management / mitigation measures to avoid discharge of potentially toxic materials, effluent is unlikely to contribute pollutants that would affect community water use.

The Project is expected to abstract approximately 23,000 m³ per year of groundwater to meet operational requirements from a bore located on-site. However, if groundwater volume is found to be inadequate to meet this requirement, surface water from the Nam Lik River may be required. The abstraction of approximately 63 m³ of groundwater or surface water is not expected to impact local hydrology. However, more comprehensive modelling will be required if surface water will be utilised for operations.

Due to the distance from village bores / wells and the location of the proposed Mill bore, impacts to village groundwater availability are not anticipated. If impacts occur, Burapha will provide an alternate water source for those affected.

With appropriate design controls and passive water quality treatment, impacts to community water from effluent will be **Low**. Impacts to groundwater hydrology are expected to be **Very Low**.

13.2.11 Noise

During construction, vegetation clearance / grading, heavy machinery, and transport activities will emit noise. During the operations, primary noise emissions will occur where sawing, milling, processing, drying, loading and transport activities. Noise at the Mill site will be high and will require strict adherence to hearing protection requirements for all staff.

Impacts to communities from noise generated at the Mill are expected to be Low. Sensitive human receptors are topographically shielded from the Mill site and the nearest residences are more than 0.5 km away, with the majority more than 1 km away. Burapha will either plant a number of rows of Eucalyptus surrounding the Mill to attenuate noise emissions or will build a noise attenuating wall.

Log trucks will pass through a number of villages during materials transport. Trucks may provide nuisance level noise impacts. Transport will be concentrated during the day, with night-time driving limited to that practicable. Speed limits though town will be enforced, thus only Moderate level impacts are anticipated.

Noise impacts from haul trucks will be short-duration **Moderate** impacts. With design controls and noise attenuation, impacts from the Mill will be **Low**.

13.2.12 Air Quality

Air emissions from veneer and plywood plants typically include: dust, nitrogen oxide gases (NO_x); sulfur dioxide gas (SO₂); carbon monoxide gas (CO); and a number of volatile organic compounds (VOCs). VOCs, including formaldehyde (CH₂O), are likely to be emitted from the processing of veneer and use of glues, solvents, fuels and other hydrocarbons on-site. Combustion gases SO₂, CO and NO_x originate from the exhaust of diesel and petrol fuelled vehicles, and from generators and boilers on-site. In addition, the formaldehyde utilised in the resin for gluing veneer panels into plywood poses an occupational health and safety risk for the workforce if inhaled (refer to Section 8.6).

The Mill will be designed to meet IFC emissions guidelines for Board and Particle-Based Products (2007), the staff outfitted with appropriate personal protective equipment (PPE), and the use of PPE required for applicable jobs. It is anticipated that emissions will not present a risk for nearby communities due to the design controls.

Similarly, air emissions during construction will likely only be an issue for workers due to the distance of the site from villages (i.e. > 0.5 km). Dust will be generated during vegetation clearance / earthworks, road construction, and during travel on the unsealed access roads.

With appropriate design controls, PPE, and application of additional management measures provided in the ESIA, residual impacts for receptors will be **Low**.

13.2.13 Cumulative Impacts

The Burapha Mill Project will make a significant contribution to the Hin Heup District Government's plan to develop the Project Area. This project, along with other existing and planned projects in the area are expected to have a multiplier effect, generating government revenue, employment and spin-off economic opportunities in the Project region and cumulatively boosting the regional economy.

Key potential cumulative impacts include:

- Surface and ground water hydrology - The Mill will source operation water requirements from groundwater and surface water (if necessary). Current and future industrial developments in the area may have similar operation water requirements. This has the potential to draw down the regional aquifer or reduce surface water in the Nam Lik river and its tributaries, potentially affected other water users.
- Water quality - In the absence of adequate management discharge from the Project Area risks include elevated BOD and COD, moderately high sediment loads (during construction) and hazardous materials. With effective design controls and management measures risks will be extremely low. Similar risks are likely in other industrial developments across the area. Failure to properly manage these risks could contribute to diminished water quality in and around the Project area.
- Transport – Project vehicles will contribute to increased traffic on local and regional roads. Key issues include road / community safety, degradation of road infrastructure; the transport of hazardous materials, nuisance noise and vibration impacts and air quality relating to dust generation and vehicle emissions. Transport related impacts of the Mill project will be low with effective management. Continued development of the area is expected to increase use of local and regional roads and related transport impacts.

Cumulative benefits for the regional economy will be **Moderate**; Cumulative impacts to water quality will be **Low**; and cumulative impacts to traffic will be **Low – Moderate**.

13.2.14 Other Impacts

Community Health and Safety

The primary threat to community health and safety from Project implementation will be associated with transportation of logs / finished product to and from the site, respectively (as above). Vehicle transport poses a risk for the greatest number of people / villages as well as the most serious safety risk.

Effluent from the Mill are not expected to pose a threat to community health and safety as the primary pollutants of concern from veneer and plywood manufacturing (nutrients and other organic materials) are not a threat to human life. Design controls and management measures will minimise effluent concentrations to meet national and IFC guidelines for effluent discharge. Hazardous materials (primarily hydrocarbons) pose a more significant risk, however management measures are expected to minimise the chance of discharge to Very Low.

While air quality and noise will require diligent management to ensure occupational health and safety, impacts to nearby residents will be limited to nuisance emissions during transport of materials. Air and noise emissions from the Mill are not expected to impact the nearest community, which is further than 0.5 km from the Mill.

Though risks from traffic, hazardous materials, etc. cannot be entirely avoided, impacts to community health and safety will be **Low** with diligent application of management measures described in the ESMMP.

Archaeology and Cultural Heritage

There are no sites of cultural or archaeological significance in the Project Area. No locally significant sites (i.e. temples or spirit forests) exist in close proximity to the proposed mill site.

A Chance Find Procedure (ESMMP, Volume C) has been developed that identifies the communications protocol and procedures that will be undertaken if an artefact or significant site is found during Project construction. Impacts are expected to be **Nil**.

Terrestrial Biodiversity and Terrestrial Resources

The risks for impacts to terrestrial biodiversity are very low during Project construction and operations. No quality habitat exists on the site, with vegetation having been previously cleared and much of the site graded and the soil compacted on the site. May 2016 biodiversity surveys on the site found no threatened or High Conservation Value flora or fauna. Impacts to terrestrial biodiversity will be **Very Low**.

Natural resources (NTFP, TFP, etc.) utilised by local residents will not be impacted.

Aquatic Biodiversity and Resource Use

Effluent may impact water quality in the absence of suitable management measures. Though aquatic habitat and biodiversity are absent on-site, drainage will reach the Nam Lik River, which has quality habitat for a range of aquatic species (likely including some threatened fish) and is an important fishery for local residents.

The river will significantly dilute effluent from the site. Unmitigated risk is therefore Moderate. Cumulative discharge of nutrients / organic matter from industry in the region may elevate biological oxygen demand and chemical oxygen demand, decreasing dissolved oxygen concentrations to levels that may prove deleterious to aquatic species, particularly following impoundment of the river for the Nam Lik 1 Hydropower Project.

Burapha will manage effluent discharge with design controls and management measures to ensure discharge meets applicable standards, reducing potential impacts to aquatic biodiversity and aquatic resource use to **Low**.

Visual Amenity

The Mill site is considered the best location in the area to minimise impacts to visual amenity. The Mill will be constructed adjacent the Hin Heup Substation and an organic fertiliser manufacturing facility (industrial area) and the area is topographically shielded on three sides from direct line of site.

The Mill will not be visible from neighbouring Ban Hin Heup, Ban Viengthong, Ban Phonesoung, Ban Khone Phook, and Ban Phone Mouang. Viewshed analysis conducted for this ESIA indicate that the primary areas that will have direct line of site to the Mill are the slopes / plateaus in the distance and ridge-tops to the north, south, and west. None of these areas are populated. The visual amenity of the area planned for tourism development (adjacent the reservoir in the Ban Hin Heup area) will not be impacted. Impacts to visual amenity are considered **Very Low**.

In the absence of vegetative screening, the Mill will be visible from the primary access road to the west of the Mill site. Burapha will plant trees (likely Eucalyptus) for noise attenuation to shield direct line of site from the road and river area.

Gender, Ethnic Minorities and Vulnerable Groups

Ensuring Project benefits are equally accessible to women, vulnerable groups and ethnic minorities will help minimise the potential for disproportionate impacts on these groups.

The Project Area has a thriving handicrafts sector, which employs mostly women and is one of the largest generators of employment in Project Area villages. There is a risk that employment opportunities associated with the Project could affect this sector as women reduce their handicraft activities, either in favour of working for the Project, or as a result of doing additional domestic work or livelihood activities as men become employed at the Mill. Engaging with women during Project development will help minimise the potential impacts on this sector.

Whilst there are low levels of vulnerability in the Project Area, there are a relatively high number (36) of single female headed households and households (10) with members that have disabilities. There are also a small

number of ethnic minorities in the three villages including Khmu households (9.6% of the population) and 10 Hmong households (2.7% of the population).

Implementing equal opportunity policies will minimise the risk of exacerbating existing inequalities affecting vulnerable groups and ethnic minorities and ensure that Project benefits are equally accessible to all groups.

13.3 Management and Monitoring

The ESIA has outlined the likely environmental impacts based on the current Project design options and has outlined a professional management and monitoring program consistent with Lao PDR legislation and international industry best practices for wood processing operations. The proposed management strategy for the construction and operation phases of the Burapha Veneer and Plywood Mill Project has been documented in the ***Environmental and Social Management and Monitoring Plan***, a separate stand-alone document (Volume C). In accordance with regulatory requirements, during the construction and operations phases of the Project it is expected that the ESMMPs will be updated as required to incorporate any significant changes during the life of the Project.

The implementation of an appropriate monitoring strategy as part of the ESMMP is important to ensure that existing management measures are effective, and to identify the need for improved or additional measures. The environmental monitoring program for the Project will include six categories of monitoring:

The implementation of an appropriate monitoring strategy as part of the ESMMP is important to ensure that existing management measures are effective, and to identify the need for improved or additional measures. The environmental monitoring program for the Project will include seven (7) categories of monitoring:

- **Routine construction monitoring** - conducted weekly throughout construction to evaluate the efficacy of design controls and management measures (e.g. stormwater, erosion, and sediment controls structures), hazardous materials storage and handling facilities, safe work practices, etc.;
- **Routine operation monitoring** - monthly monitoring to evaluate occupational health and safety measures, hazardous and non-hazardous materials / waste storage facilities and handling practices;
- **Community engagement and social monitoring** – regular engagement with and biennial socio-economic monitoring of affected communities
- **Discharge monitoring** – quarterly water quality monitoring at the siltation basin / water treatment pond to measure pH, BOD₅, COD, total suspended solids, dissolved solids, phenols, Kjeldahl nitrogen, total phosphorous, and oils / grease;
- **Ambient monitoring** – conducted if discharge monitoring identifies exceedances in effluent guidelines. Nam Lik River water measured (same parameters as discharge monitoring) immediately downstream of discharge point to evaluate influence on ambient conditions; and
- **Investigation monitoring** – conducted when routine monitoring identifies potential non-compliance issues or affected communities provide complaints via the Grievance Mechanism.

The Burapha environmental and social compliance officer will provide Monthly Monitoring Reports and an ***Annual Environmental and Social Monitoring Report*** that records the results of monitoring and identifies adaptive management strategies, where required.

Non-compliances identified during any of the above monitoring will trigger the development of a ***Non-Compliance Report*** that identifies the issue, provides corrective actions to remedy the issue, a timeline for completion, and person / people responsible for corrective actions.

13.4 Recommendations

The following are recommended to ensure the Mill meets national and international guidelines and stakeholder expectations:

- Update and implement Burapha's human resource policies to reflect a commitment to local employment, training and skills development and ensure equal opportunity and employment practices for all people in the Project Area
- Design and Implement a participatory Community Development Program specific to the Mill Project in coordination with affected villages and the District government designed to support local development initiatives and entrepreneurial enterprise;
- Design appropriate controls for glue spreader and veneer dryer washwater to ensure zero discharge from the site. Consider recycling washwater to avoid or minimise water treatment requirements;
- Design a passive water treatment pond (with a dual purpose to capture and retain coarse sediment) to allow for microbial degradation of organic materials in surface water to protect downstream aquatic biodiversity;
- Develop a comprehensive **Hazardous Materials Register** (with MSDS) to continuously track volumes;
- Develop and implement a **Waste Management Plan** (refer to ESMMP Sub-Plan, Volume C) that identifies hazardous and non-hazardous waste streams and suitable disposal methods and locations;
- Develop and implement an **Emergency Preparedness and Response Plan** (refer to ESMMP Sub-Plan, Volume C) that identifies communication protocols, hazardous materials handling and storage procedures, training requirements, and clean-up materials;
- Develop and implement an **Occupational Health and Safety Plan** (refer to ESMMP Sub-Plan) that identifies training requirements, PPE requirements, design / safety controls, etc. to protect the Mill workforce;
- Identify budgeting requirements for environmental and social monitoring and reporting.

Chapter 14 | References



Chapter 14 | References

14. REFERENCES 14-1

14. REFERENCES

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15. ANNEXES

15.1 Annex 1: Water Quality Analysis Results



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ANALYSIS REPORT

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SAMPLING SOURCE :-
SAMPLE TYPE : SURFACE WATER **RECEIVED DATE** : MARCH 30, 2016
SAMPLING DATE : MARCH 22, 2016 **ANALYTICAL DATE** : MARCH 30-APRIL 12, 2016
SAMPLING TIME : 12:30 HOUR **ANALYSIS NO.** : LAF141/2016
SAMPLING METHOD :- **WORK NO.** : LAB1131/2016
SAMPLING BY : CUSTOMER **REPORT NO.** : L05944/2016
ANALYZED BY : MISS KALLAYA SOMPHONG

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT
			NAM LIK LAF141/2016
CHEMICAL OXYGEN DEMAND	mg/L	OPEN REFLUX METHOD (SM 2012:5220 B)	ND
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105°C (SM 2012:2540 D)	ND
TOTAL DISSOLVED SOLIDS	mg/L	IN-HOUSE METHOD UAE.TP.DS.02* (TOTAL DISSOLVED SOLIDS DRIED AT 180 °C); SM 2012:2540 C	131
AMMONIA	mg/L NH ₃	PHENATE METHOD (SM 2012:4500-NH ₃ F)	0.13
FAT, OIL AND GREASE	mg/L	PARTITION-GRAVIMETRIC METHOD (SM 2012:5520 B)	ND
FORMALDEHYDE	mg/L	DISTILLATION, COLOURIMETRIC METHOD	ND
TOTAL PHENOLICS	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM 2012:5530 B AND 5530 C)	0.047
SAMPLE CONDITION			
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR
SEDIMENT			YELLOW

* : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 22nd EDITION, 2012.
 SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 22nd EDITION, 2012.
 ND : NON-DETECTABLE (CHEMICAL OXYGEN DEMAND < 5.0 mg/L, TOTAL SUSPENDED SOLIDS < 5.0 mg/L, FAT, OIL AND GREASE < 1 mg/L, FORMALDEHYDE < 0.05 mg/L).

Paewena Cl.
 (MISS PAWEENA CHARASCHOTEPINIT)
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APRIL 26, 2016

Piyapat S.
 (MRS PIYAPAT SUTTAMANUTWONG)
 LABORATORY SUPERVISOR

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SAMPLING SOURCE :-
SAMPLE TYPE : SURFACE WATER **RECEIVED DATE** : MARCH 30, 2016
SAMPLING DATE : MARCH 29, 2016 **ANALYTICAL DATE** : MARCH 30-APRIL 12, 2016
SAMPLING TIME : 13:45 HOUR **ANALYSIS NO.** : LAF674/2016
SAMPLING METHOD :- **WORK NO.** : LAB1131/2016
SAMPLING BY : CUSTOMER **REPORT NO.** : L05943/2016
ANALYZED BY : MISS KALLAYA SOMPHONG

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT
			H. SOM LAF674/2016
CHEMICAL OXYGEN DEMAND	mg/L	OPEN REFLUX METHOD (SM 2012:5220 B)	24.3
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105°C (SM 2012:2540 D)	50.0
TOTAL DISSOLVED SOLIDS	mg/L	IN-HOUSE METHOD UAE.TP.DS.02* (TOTAL DISSOLVED SOLIDS DRIED AT 180 °C); SM 2012:2540 C	89
AMMONIA	mg/L NH ₃	PHENATE METHOD (SM 2012:4500-NH ₃ F)	0.24
FAT, OIL AND GREASE	mg/L	PARTITION-GRAVIMETRIC METHOD (SM 2012:5520 B)	ND
FORMALDEHYDE	mg/L	DISTILLATION, COLOURIMETRIC METHOD	ND
TOTAL PHENOLICS	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM 2012:5530 B AND 5530 C)	0.038
SAMPLE CONDITION			
WATER'S COLOUR/TURBID			BROWN/TURBID
SEDIMENT			YELLOW

* : BASED ON STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 22ND EDITION, 2012.
 SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 22ND EDITION, 2012.
 ND : NON-DETECTABLE (FAT, OIL AND GREASE < 1 mg/L, FORMALDEHYDE < 0.05 mg/L).


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 APRIL 26, 2016

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Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Water Analysis report:

099

20 APR 2016



Vientiane Capital City
NamPaPa Nakhonluang
Chinaimo Water Treatment Plant Laboratory
Tel.:312564 or Mobile 2204693

Sampling Place:ບໍລິສັດ ເອີດ ຊີສຕິມສ ຈຳກັດ
(Earth Systems)

Testing Date: 23 /3~ 18/4/2016

N.	Description of analysis	units	Result's	Surface water Quality Standards of WREA
	Sampling Name		Nam Lik	
	Sampling date		22/3/16	
1.	Total Coliform group	MPN /100ml	>2300	<5000
2.	BOD ₅	mg/l	0.88	1.5

Remarks:

ແຫຼ່ງນ້ຳທຳມະຊາດ , ນ້ຳໃຕ້ດິນ ທາງລັດວິສະຫະກິດຍັງບໍ່ທັນ ມີມາດຕະຖານບັງຄັບໃຊ້.

Laboratory:

Ms Khonesavanh.K

Chief Chinaimo WTP:

ຄຳເໜືອງ ມະນີວັນ

General Manager NPNL:



ລຽງຫວາຍ ວັນນະລາດ

Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Water Analysis report



Vientiane Capital City
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Tel.:312564 or Mobile 2204693

100

20 APR 2016

Sampling Place: ບໍລິສັດ ເອີດ ຊິສຕິມສ ຈຳກັດ

(Earth Systems)

Testing Date: 29/3~19/4/2016

N.	Description of analysis	units	Result's	Surface water Quality Standards of WREA
	Sampling Name		H.Sorn	
	Sampling date		29/3/16	
1.	Total Coliform group	MPN /100ml	>2300	<5000
2.	BOD ₅	mg/l	3.71	1.5

Remarks:

ແຫຼ່ງນ້ຳທຳມະຊາດ , ນ້ຳໃຕ້ດິນ ທາງລັດວິສະຫະກິດຍັງບໍ່ທັນ ມີມາດຕະຖານບັງຄັບໃຊ້.

Laboratory:

Ms Khonesavanh.K

Chief Chinaimo WTP:

ຄຳເພືອງ ມະນີວັນ

General Manager NPNL:



ວຽກຫລາຍ ວັນນະລາດ

15.2 Annex 2: State Land Lease Agreement



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນາຖາວອນ
***** 0000 *****

ເມືອງ ຫົນເຫີບ
ຫ້ອງການ-ການເງິນ
ໜ່ວຍງານຄຸ້ມຄອງຊັບສິນຂອງລັດ

ເລກທີ...17.../ໜຄຊລ, ຫຫ
ຫົນເຫີບ, ລົງວັນທີ...29.1.07.1..2016

ສັນຍາເຊົ່າ

ເນື້ອທີ່ດິນລັດຄຸ້ມຄອງ

- ອີງຕາມ: ກົດໝາຍ ວ່າດ້ວຍຊັບສິນຂອງລັດ(ສະບັບປັບປຸງ)ເລກທີ 14/ສພຊ ລົງວັນທີ 5 ກໍລະກົດ ປີ 2012.
- ອີງຕາມ: ດໍາລັດຂອງນາຍົກລັດຖະມົນຕີ ສະບັບເລກທີ 135/ນຍ ລົງວັນທີ 25 /05/ 2009, ວ່າດ້ວຍການເອົາທີ່ດິນຂອງລັດໃຫ້ເຊົ່າ ຫຼື ຊໍາປະທານ.
- ອີງຕາມ: ຂໍ້ຕົກລົງຂອງທ່ານ ເຈົ້າເມືອງຫົນເຫີບ ສະບັບເລກທີ 187/ຈມຫຫ, ລົງວັນທີ 19/07/2016 ວ່າດ້ວຍການອະນຸຍາດໃຫ້ ບໍລິສັດ ບົວລະພາ ກະສິກໍາ-ປ່າໄມ້ ຈຳກັດ ນໍາໃຊ້ດິນລັດຄຸ້ມຄອງ.

ຫ້ອງການ-ການເງິນ ເມືອງຫົນເຫີບ (ໜ່ວຍງານຄຸ້ມຄອງຊັບສິນຂອງລັດ) ໃນນາມເຈົ້າຂອງຜູ້ຄຸ້ມຄອງຊັບສິນຂອງລັດເຊິ່ງໃນສັນຍາເອີ້ນວ່າ "ຜູ້ໃຫ້ເຊົ່າ" ອີກຝ່າຍໜຶ່ງແມ່ນທ່ານອໍານວຍການບໍລິສັດ ບົວລະພາ ກະສິກໍາ-ປ່າໄມ້ຈຳກັດ ໃນສັນຍາເອີ້ນວ່າ "ຜູ້ເຊົ່າ".

ເພື່ອອໍານວຍຄວາມສະດວກໃຫ້ແກ່ການລົງທຶນເຄື່ອນໄຫວທຸລະກິດ, ການປຸງແຕ່ງ ແລະ ການບໍລິການ ຮັບໃຊ້ກິດຈະການຕ່າງໆ ແລະ ຮັບໃຊ້ສັງຄົມຢ່າງວ່ອງໄວຄົບຖ້ວນທັງສອງຝ່າຍໄດ້ຕົກລົງເຫັນດີເປັນເອກະພາບກັນກຳນົດຂໍ້ຕົກລົງກ່ຽວກັບການເຊົ່າທີ່ດິນຕາມລະບຽບກົດໝາຍ ແລະ ຂໍ້ກຳນົດຕ່າງໆຂອງລັດດັ່ງລຸ່ມນີ້:

ມາດຕາ 1: ຈຸດປະສົງຂອງການເຊົ່າ.

"ຜູ້ໃຫ້ເຊົ່າ"ເຫັນດີໃຫ້ເຊົ່າເນື້ອທີ່ດິນຢູ່ເດີນໄຮ່ປ່າຈຳນວນ 7,0058 ເຮັກຕາ (ເຈັດຈຸດສຸນສຸນຫ້າສິບແປດ ເຮັກຕາ) ຫຼື 70.058 ຕາແມັດ (ເຈັດສິບຜັນຫ້າສິບແປດຕາແມັດ) ເພື່ອນໍາໃຊ້ເຂົ້າໃນກິດຈະການສ້າງໂຮງງານຝານໄມ້ຂອງບໍລິສັດຊຶ່ງມີຂອບເຂດຕິດແຕ່ລະດ້ານດັ່ງນີ້:

- ທິດເໜືອຕິດກັບ ດິນບຸກຄົນ (ຄຸ້ມທະຫານ)+ຫ້ວຍ 74+32+190+126+69 ແມັດ.
- ທິດໃຕ້ຕິດກັບ ດິນແລວໄຟຝ້າແຮງສູງ 373 ແມັດ ຫ່າງຈາກຫຼັກໄຟຝ້າ 25 ແມັດ.
- ທິດຕາເວັນອອກຕິດກັບ ດິນສະຖານີໄຟຝ້າ+ຫ້ວຍ 90+79+74 ແມັດ.
- ທິດຕາເວັນຕົກຕິດກັບ ດິນບໍລິສັດ BSS 205 ແມັດ.

ລາຍລະອຽດຕາມແຜນທີ່ຕອນດິນທີ່ຕິດມາພ້ອມສັນຍາສະບັບນີ້.

ມາດຕາ 2: ການກຳນົດເວລາເຊົ່າ.

"ຜູ້ໃຫ້ເຊົ່າ" ຕົກລົງເຫັນດີໃຫ້ "ຜູ້ເຊົ່າ" ເຊົ່າເນື້ອທີ່ດິນລັດຄຸ້ມຄອງໃນກຳນົດສາມສິບປີ (30 ປີ) ນັບແຕ່ວັນທີ 29 /07/2016 ເຖິງວັນທີ 28 /07/2046 ຖ້າໝົດກຳນົດເວລາໃນການເຊົ່າ "ຜູ້ເຊົ່າ" ຕ້ອງມອບເນື້ອທີ່ດິນຄືນໃຫ້ "ຜູ້ໃຫ້ເຊົ່າ" ໂດຍຕ້ອງໄດ້ມີການປົວແປງຄືນໃຫ້ຢູ່ໃນສະພາບດີ. ຖ້າ "ຜູ້ເຊົ່າ" ມີຈຸປະສົງຢາກເຊົ່າຕໍ່ ຫຼື ຢຸດເຊົາການເຊົ່າຕ້ອງຍື່ນຄໍາຮ້ອງຂໍເຊົ່າຕໍ່ ຫຼື ຢຸດເຊົາລ່ວງໜ້າ 90 ວັນ ກ່ອນວັນສິ້ນສຸດສັນຍາ.

ມາດຕາ 3: ຄ່າເຊົ່າ

ທັງສອງຝ່າຍໄດ້ຕົກລົງກຳນົດຄ່າເຊົ່ານຳກັນດັ່ງນີ້:

- 3.1. ເລີ່ມແຕ່ ປີທີ 1 ເຖິງ ປີທີ 5 “ຜູ້ເຊົ່າ” ຕ້ອງຊຳລະຄ່າເຊົ່າໃນອັດຕາ 2,000 ໂດລາ /1ເຮັກຕາ /1 ປີ, ລວມເປັນເງິນປີລະ 14,012 ໂດລາຕໍ່ປີ.
- 3.2. ປີທີ 6 ເຖິງປີທີ 10 “ຜູ້ເຊົ່າ” ຕ້ອງຊຳລະຄ່າເຊົ່າໃນອັດຕາ 2,100 ໂດລາ/1ເຮັກຕາ/1 ປີ, ລວມເປັນເງິນ 14,712 ໂດລາຕໍ່ປີ.
- 3.3. ປີທີ 11, ປີທີ 15 “ຜູ້ເຊົ່າ” ຕ້ອງຊຳລະຄ່າເຊົ່າໃນອັດຕາ 2,205 ໂດລາ/1ເຮັກຕາ/1 ປີ, ລວມເປັນເງິນ 15,448 ໂດລາຕໍ່ປີ.
- 3.4. ປີທີ 16, ປີທີ 20 “ຜູ້ເຊົ່າ” ຕ້ອງຊຳລະຄ່າເຊົ່າໃນອັດຕາ 2,315 ໂດລາ/1ເຮັກຕາ/1 ປີ, ລວມເປັນເງິນ 16,218 ໂດລາຕໍ່ປີ.
- 3.5. ປີທີ 21, ປີທີ 25 “ຜູ້ເຊົ່າ” ຕ້ອງຊຳລະຄ່າເຊົ່າໃນອັດຕາ 2,431 ໂດລາ/1ເຮັກຕາ/1 ປີ, ລວມເປັນເງິນ 17,031 ໂດລາຕໍ່ປີ.
- 3.6. ປີທີ 26, ປີທີ 30 “ຜູ້ເຊົ່າ” ຕ້ອງຊຳລະຄ່າເຊົ່າໃນອັດຕາ 2,553 ໂດລາ/1ເຮັກຕາ/1 ປີ, ລວມເປັນເງິນ 17,886 ໂດລາຕໍ່ປີ.
- 3.7. ຄ່າເຊົ່າທີ່ໄດ້ກຳນົດໄວ້ຂ້າງເທິງຈະເພີ່ມຂຶ້ນ 5% ຂອງທຸກໆ 5 ປີ
- 3.8. ການຊຳລະເງິນຄັ້ງທຳອິດ(ປີທຳອິດ)ແມ່ນຊຳລະໃຫ້ “ຜູ້ໃຫ້ເຊົ່າ” ໃນມື້ລົງລາຍເຊັນສັນຍາເຊົ່າຮ່ວມກັນ, ສ່ວນຄັ້ງຕໍ່ໄປແມ່ນຊຳລະຕາມບົດບັນທຶກຊຳລະຄ່າເຊົ່າທີ່ໄດ້ຄັດຕິດມາພ້ອມສັນຍາສະບັບນີ້.
- 3.9. ການຊຳລະເງິນຄ່າເຊົ່າໃນແຕ່ລະປີໃຫ້ຖືເອົາເງິນໂດລາສະຫະລັດເປັນຫຼັກ ແຕ່ເວລາຊຳລະຕົວຈິງນັ້ນສາມາດຊຳລະເປັນເງິນໂດລາສະຫະລັດຫຼືເປັນເງິນກີບກໍໄດ້ໂດຍອີງຕາມອັດຕາແລກປ່ຽນ(ອັດຕາຂາຍ)ຂອງທະນາຄານໃນມື້ຊຳລະຕົວຈິງ.
- 3.10. ການຊຳລະຄ່າເຊົ່າແມ່ນໃຫ້ໂອນເຂົ້າບັນຊີທະນາຄານຂອງຜູ້ໃຫ້ເຊົ່າ ຫຼື ຊຳລະເປັນເງິນລົດໂດຍຜ່ານການສົ່ງມອບຂອງທ່ອງການການເງິນເມືອງ (ໜ່ວຍງານຄຸ້ມຄອງຊັບສິນຂອງລັດ).
- 3.11. ພາຍຫຼັງ “ຜູ້ໃຫ້ເຊົ່າ” ແລະ “ຜູ້ເຊົ່າ” ລົງລາຍເຊັນຮ່ວມກັນເປັນທີ່ຮຽບຮ້ອຍແລ້ວ “ຜູ້ເຊົ່າ” ຕ້ອງນຳສັນຍາໄປຈົດທະບຽນນຳໜ່ວຍງານຄຸ້ມຄອງຊັບສິນຂອງລັດເມືອງຫົນເຫີບພ້ອມທັງຮັບຜິດຊອບຄ່າທຳນຽມ, ຄ່າບໍລິການ, ພັນທະຕ່າງໆຕາມກົດໝາຍທີ່ວາງອອກ ແລະ ນຳໃຊ້ຢູ່ໃນປັດຈຸບັນ.

ມາດຕາ 4: ການບໍ່ຊຳລະຄ່າເຊົ່າ.

ໃນກໍລະນີ “ຜູ້ເຊົ່າ” ບໍ່ຈ່າຍຄ່າເຊົ່າ ຕາມທີ່ໄດ້ກຳນົດໄວ້ໃນມາດຕາ 3 ຂອງສັນຍາສະບັບນີ້ “ຜູ້ໃຫ້ເຊົ່າ” ຈະຄິດໄລ່ດອກເບ້ຍປັບໄໝຄ່າເຊົ່າຕາມດອກເບ້ຍສິນເຊື້ອຂອງທະນາຄານ. ໃນກໍລະນີ ຊຳລະຄ່າເຊົ່າຫາກຊັກຊ້າໄປເປັນປີ “ຜູ້ໃຫ້ເຊົ່າ” ມີສິດສະເໜີຫາອຳນາດການປົກຄອງເມືອງເພື່ອຄົ້ນຄວ້າແກ້ໄຂບັນຫາທີ່ເກີດຂຶ້ນຕາມລະບຽບຫຼັກການ.

ມາດຕາ 5: ສິດ ແລະ ພັນທະຂອງ “ຜູ້ໃຫ້ເຊົ່າ” ແລະ “ຜູ້ເຊົ່າ”.

- 5.1. “ຜູ້ໃຫ້ເຊົ່າ” ມີສິດກວດກາຕິດຕາມການນຳໃຊ້ດິນຂອງ “ຜູ້ເຊົ່າ” ຕາມຈຸດປະສົງໃຫ້ຖືກຕ້ອງຕາມເປົ້າໝາຍເປັນແຕ່ລະໄລຍະໂດຍການແຈ້ງໃຫ້ “ຜູ້ເຊົ່າ” ຮັບຊາບ.
- 5.2. “ຜູ້ໃຫ້ເຊົ່າ” ມີຄວາມຮັບຜິດຊອບໃນການປະສານສົມທົບກັບພາກສ່ວນທີ່ກ່ຽວຂ້ອງ ແລະ ບຸກຄົນນິຕິບຸກຄົນໃນການແກ້ໄຂບັນຫາຕ່າງໆທີ່ເກີດຂຶ້ນຕໍ່ເນື້ອທີ່ດິນທີ່ “ຜູ້ເຊົ່າ” ໄດ້ເຊົ່າຕົວຈິງ.



- 5.3. ໃນກໍລະນີທີ່ "ຜູ້ເຊົ່າ" ມີຈຸດປະສົງປ່ຽນເປົ້າໝາຍໃນການນໍາໃຊ້ຜູ້ເຊົ່າຕ້ອງແຈ້ງເປັນລາຍລັກອັກສອນໃຫ້ "ຜູ້ໃຫ້ເຊົ່າ" ຊາບກ່ອນລ່ວງໜ້າຢ່າງໜ້ອຍ 120 ວັນ ເມື່ອໃຫ້ "ຜູ້ໃຫ້ເຊົ່າ" ກວດກາ ເອກະສານຕ່າງໆຖ້າເຫັນວ່າມີເຫດຜົນພຽງພໍບໍ່ຂັດກັບລະບຽບກົດໝາຍ ແລະ ເປັນຜົນດີແກ່ທຸກ ຝ່າຍ "ຜູ້ໃຫ້ເຊົ່າ" ຈະແຈ້ງຕອບໃຫ້ "ຜູ້ເຊົ່າ" ຊາບຢ່າງເປັນທາງການແລ້ວຈຶ່ງສາມາດດໍາເນີນໄດ້.
- 5.4. ຫ້າມ "ຜູ້ເຊົ່າ" ນໍາໃຊ້ສະຖານທີ່ດັ່ງກ່າວເຄື່ອນໄຫວສິ່ງທີ່ຜິດກັບລະບຽບກົດໝາຍຂອງ ສປປ ລາວ.
- 5.5. "ຜູ້ໃຫ້ເຊົ່າ" ເຫັນດີໃຫ້ "ຜູ້ເຊົ່າ" ສາມາດໂອນ ຫຼື ຂາຍຮຸ້ນຂອງຕົນທັງໝົດ ຫຼື ບາງສ່ວນໄດ້ ແຕ່ຕ້ອງໄດ້ຮັບການເຫັນດີຈາກ "ຜູ້ໃຫ້ເຊົ່າ" ຢ່າງເປັນລາຍລັກອັກສອນ ແລະ ຜູ້ທີ່ຈະຊື້ຮຸ້ນນັ້ນຈະໄດ້ຮັບສິດ ແລະ ມີພັນທະຕາມທີ່ໄດ້ກໍານົດໄວ້ໃນສັນຍາເຊົ່າສະບັບນີ້, ຜູ້ຂາຍຮຸ້ນຕ້ອງໄດ້ປະຕິບັດພັນທະທາງດ້ານອາກອນກ່ຽວກັບການຂາຍຮຸ້ນຕາມລະບຽບກົດໝາຍ.
- 5.6. "ຜູ້ເຊົ່າ" ບໍ່ສາມາດນໍາເອົາທີ່ດິນຕອນນີ້ໄປຈໍານອງ, ຈໍານໍາ, ຄໍ້າປະກັນ, ມອບໂອນ ຫຼື ໃຫ້ຜູ້ອື່ນເຊົ່າຕໍ່ຢ່າງເດັດຂາດຖ້າບໍ່ໄດ້ຮັບອະນຸຍາດຈາກ "ຜູ້ໃຫ້ເຊົ່າ" ເສຍກ່ອນ.
- 5.7. ການກະທໍາໃດໆທີ່ບໍ່ເປັນໄປຕາມຈຸດປະສົງຂອງສັນຍາສະບັບນີ້ ຖືວ່າເປັນການລ່ວງລະເມີດຕໍ່ສັນຍາ ແລະ "ຜູ້ໃຫ້ເຊົ່າ" ມີສິດຕັກເຕືອນ ແລະ ຍົກເລີກສັນຍາແຕ່ພຽງຝ່າຍດຽວ.

ມາດຕາ 6: ພັນທະຂອງ "ຜູ້ເຊົ່າ"

- 6.1. ຄຸ້ມຄອງ, ນໍາໃຊ້, ປົກປັກຮັກສາເນື້ອທີ່ດິນທີ່ເຊົ່າບໍ່ໃຫ້ມີການເຊາະເຈື່ອນ ເປັນບວກ-ເປັນໜອງ, ຫຍຸບລົງ ແລະ ບໍ່ເຮັດໃຫ້ເນື້ອທີ່ຫຼຸດລົງໂດຍບໍ່ໄດ້ຮັບອະນຸຍາດ.
- 6.2. ບໍ່ສ້າງຜົນເສຍຫາຍໃຫ້ແກ່ຄຸນນະພາບດິນ, ບໍ່ສ້າງຜົນກະທົບອັນບໍ່ດີໃຫ້ແກ່ສະພາບແວດລ້ອມ, ທໍາມະຊາດ ແລະ ສັງຄົມ.
- 6.3. ບໍ່ລະເມີດສິດ ແລະ ຜົນປະໂຫຍດຂອງຜູ້ອື່ນ.
- 6.4. ປະຕິບັດສະພາວະຄວາມເປັນຈິງຕ້ອງຍອມຮັບຕາມທີ່ກົດໝາຍໄດ້ວາງໄວ້.
- 6.5. ເສຍຄ່າເຊົ່າທີ່ດິນ, ຄ່າຊັບພະຍາກອນທໍາມະຊາດ, ອາກອນ ແລະ ຄ່າທໍານຽມອື່ນໆ ທີ່ກ່ຽວຂ້ອງຢ່າງຄົບຖ້ວນຕາມລະບຽບຫຼັກການ.

ມາດຕາ 7: ເງື່ອນໄຂການຍົກເລີກສັນຍາ.

- 7.1. ຄຸ້ມຄອງມີຄວາມສະໝັກໃຈຍົກເລີກສັນຍາກ່ອນກໍານົດ.
- 7.2. ການດໍາເນີນທຸລະກິດຂອງ "ຜູ້ເຊົ່າ" ຖືກຫຼຸບທົນພາໃຫ້ລົ້ມລະລາຍຕາມກົດໝາຍວ່າດ້ວຍວິສະຫະກິດ ແລະ ກົດໝາຍລົ້ມລະລາຍຂອງ ສປປ ລາວ.
- 7.3. ການຍົກເລີກສັນຍາຈະມີຂັ້ນໄດ້ສໍາລັບກໍລະນີທີ່ມີການລະເມີດຕໍ່ມາດຕາໃດໜຶ່ງຂອງສັນຍາສະບັບນີ້ ແລະ ຝ່າຍທີ່ລະເມີດບໍ່ສາມາດປົວແປງແກ້ໄຂໄດ້ ພາຍໃນກໍານົດ 24 ເດືອນ ພາຍຫຼັງທີ່ໄດ້ຮັບການກ່າວເຕືອນເປັນລາຍລັກອັກສອນຈາກຝ່າຍໃດຝ່າຍໜຶ່ງ.
- 7.4. ເມື່ອຍົກເລີກສັນຍາກ່ອນກໍານົດດ້ວຍຄວາມຈໍາເປັນພາວະວິໄສໃດໜຶ່ງທັງສອງຝ່າຍຕ້ອງພ້ອມກັນແຕ່ງຕັ້ງຄະນະກໍາມະການເພື່ອລົງກວດກາການຊໍາລະສະສາງຊັບສິນ ແລະ ພັນທະຕ່າງໆຕາມລະບຽບການ.

ມາດຕາ 8: ການປ່ຽນແປງບາງເນື້ອໃນຂອງສັນຍາ.

ການປ່ຽນແປງບາງຂໍ້ມາດຕາຂອງສັນຍາສະບັບນີ້ຕ້ອງດຳເນີນໄປບົນພື້ນຖານທີ່ທັງ 2 ຝ່າຍໄດ້ຄົ້ນຄວ້າ ແລະ ເຫັນດີເຫັນພ້ອມນຳກັນ.

ມາດຕາ 9: ຜົນສັກສິດຂອງສັນຍາ

ສັນຍາສະບັບນີ້ມີຜົນບັງຄັບໃຊ້ນັບແຕ່ມີທັງສອງຝ່າຍໄດ້ລົງລາຍເຊັນເປັນຕົ້ນໄປ ແລະ ສິບຕໍ່ມີຜົນສັກສິດໄປ ຈົນເຖິງວັນໝົດອາຍຸຂອງສັນຍາ ຫຼື ການຢຸດຕິສັນຍາຕາມທີ່ໄດ້ລະບຸໄວ້ໃນສັນຍາສະບັບນີ້. ສັນຍາສະບັບນີ້ເຮັດເປັນ ພາສາລາວ ແລະ ພາສາອັງກິດ ທີ່ມີເນື້ອໃນ ແລະ ຄວາມໝາຍອັນດຽວກັນ ລວມມີ 9 ມາດຕາ ທຸກຂໍ້ຄວາມເນື້ອໃນທີ່ ລະບຸໄວ້ໃນແຕ່ລະມາດຕາແມ່ນທັງສອງຝ່າຍໄດ້ອ່ານຄົ້ນຄວ້າເນື້ອໃນ ແລະ ໄດ້ຕົກລົງເປັນເອກະພາບກັນທັງໝົດຈຶ່ງໄດ້ ລົງນາມຮ່ວມກັນຢ່າງເປັນທາງການ, ສັນຍານີ້ໄດ້ສ້າງຂຶ້ນເປັນ 03 ສະບັບຕົ້ນ, ທຸກສະບັບມີຄຸນຄ່າເທົ່າທຽມກັນທາງ ດ້ານກົດໝາຍ. ("ຜູ້ໃຫ້ເຊົ່າ" ແລະ "ຜູ້ເຊົ່າ" ເກັບມ້ຽນຝ່າຍລະ 01 ສະບັບ, ສຳເນົາຈົດທະບຽນສັນຍາ 01 ສະບັບ). *BT*

ຜູ້ເຊົ່າ
ບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ

ສຸໂພວັນ ຫຼ່ຽງຈັນໄຊ

ຜູ້ໃຫ້ເຊົ່າ
ໜ່ວຍງານຄຸ້ມຄອງຊັບສິນຂອງລັດ

ບຸດສະດີ ສິລັດຕະນະ

ຢັ້ງຢືນຮັບຮູ້ຢັ້ງຢືນຮັບຮູ້
ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ ແລະ ສຳແວດລ້ອມ

ໂຂລິດ ສິສຸນທອນ

ຢັ້ງຢືນຮັບຮູ້ຢັ້ງຢືນຮັບຮູ້
ຫ້ອງການ-ການເງິນເມືອງຫົນເທີບ

ບຸນລ່ຽມ ເລືອງມະນີ

ໜ່ວຍງານຄຸ້ມຄອງຊັບສິນຂອງລັດ
ຈົດທະບຽນທີ່ເມືອງຫົນເທີບ
ວັນທີ 29 ເດືອນ 7 ປີ 2016
ສະເລດເງິນ 11 ໂບດີ 2 ເລກທີ 30
ຄ່າອາໄສເມືອງ 300000 ກີບ
ເປັນປັ້ງຜູ້ ສາລາ//ເລຂາ
ໂບສັບເງິນເລກທີ 001303227 ວັນທີ 29.7.16

ບຸດສະດີ ສິລັດຕະນະ

ບັນທຶກການຊໍາລະຄ່າເຊົ່າ ຂອງບໍລິສັດ ປົວລະມາ ກະສິກໍາ-ປ່າໄມ້ຈໍາກັດ

ລ/ດ ປີ	ສົກປີຊໍາລະ	ວັນທີ ຊໍາລະ	ເງື່ອນໄຂ(ໄດ)	ຄ່າເຊົ່າ/ເຮັກຕາ/ປີ (ໄດລາ)	ມູນຄ່າຊໍາລະທັງໝົດຕໍ່ປີ (ໄດລາ)	ໝາຍເຫດ
1	2016-2017	29/07/2016	7.0058	2,000	14,012	ມອບມືເຊັນລັນຍາ
2	2017-2018	29/03/2017	7.0058	2,000	14,012	
3	2018-2019	29/03/2018	7.0058	2,000	14,012	
4	2019-2020	29/03/2019	7.0058	2,000	14,012	
5	2020-2021	29/03/2020	7.0058	2,000	14,012	
6	2021-2022	29/03/2021	7.0058	2,100	14,712	ຄ່າເຊົ່າເພີ່ມຂຶ້ນ 5%
7	2022-2023	29/03/2022	7.0058	2,100	14,712	
8	2023-2024	29/03/2023	7.0058	2,100	14,712	
9	2024-2025	29/03/2024	7.0058	2,100	14,712	
10	2025-2026	29/03/2025	7.0058	2,100	14,712	
11	2026-2027	29/03/2026	7.0058	2,205	15,448	ຄ່າເຊົ່າເພີ່ມຂຶ້ນ 5%
12	2027-2028	29/03/2027	7.0058	2,205	15,448	
13	2028-2029	29/03/2028	7.0058	2,205	15,448	
14	2029-2030	29/03/2029	7.0058	2,205	15,448	
15	2030-2031	29/03/2030	7.0058	2,205	15,448	
16	2031-2032	29/03/2031	7.0058	2,315	16,218	ຄ່າເຊົ່າເພີ່ມຂຶ້ນ 5%
17	2032-2033	29/03/2032	7.0058	2,315	16,218	
18	2033-2034	29/03/2033	7.0058	2,315	16,218	
19	2034-2035	29/03/2034	7.0058	2,315	16,218	
20	2035-2036	29/03/2035	7.0058	2,315	16,218	
21	2036-2037	29/03/2036	7.0058	2,431	17,031	ຄ່າເຊົ່າເພີ່ມຂຶ້ນ 5%
22	2037-2038	29/03/2037	7.0058	2,431	17,031	
23	2038-2039	29/03/2038	7.0058	2,431	17,031	
24	2039-2040	29/03/2039	7.0058	2,431	17,031	
25	2040-2041	29/03/2040	7.0058	2,431	17,031	
26	2041-2042	29/03/2041	7.0058	2,553	17,886	ຄ່າເຊົ່າເພີ່ມຂຶ້ນ 5%
27	2042-2043	29/03/2042	7.0058	2,553	17,886	
28	2043-2044	29/03/2043	7.0058	2,553	17,886	
29	2044-2045	29/03/2044	7.0058	2,553	17,886	
30	2045-2046	29/03/2045	7.0058	2,553	17,886	
ລວມ					476534.516	

ນະຄອນຫລວງວຽງຈັນ, ວັນທີ 29...10.7. 2016

ໜ່ວຍງານຄຸ້ມຄອງຊັບສິນຂອງລັດ

ບຸດສະດີ ສິລິດຕະນະນ

ບໍລິສັດປົວລະມາກະສິກໍາ-ປ່າໄມ້ຈໍາກັດ

ສຸໂພວັນ ຫ່ຽງຈັນໄຊ



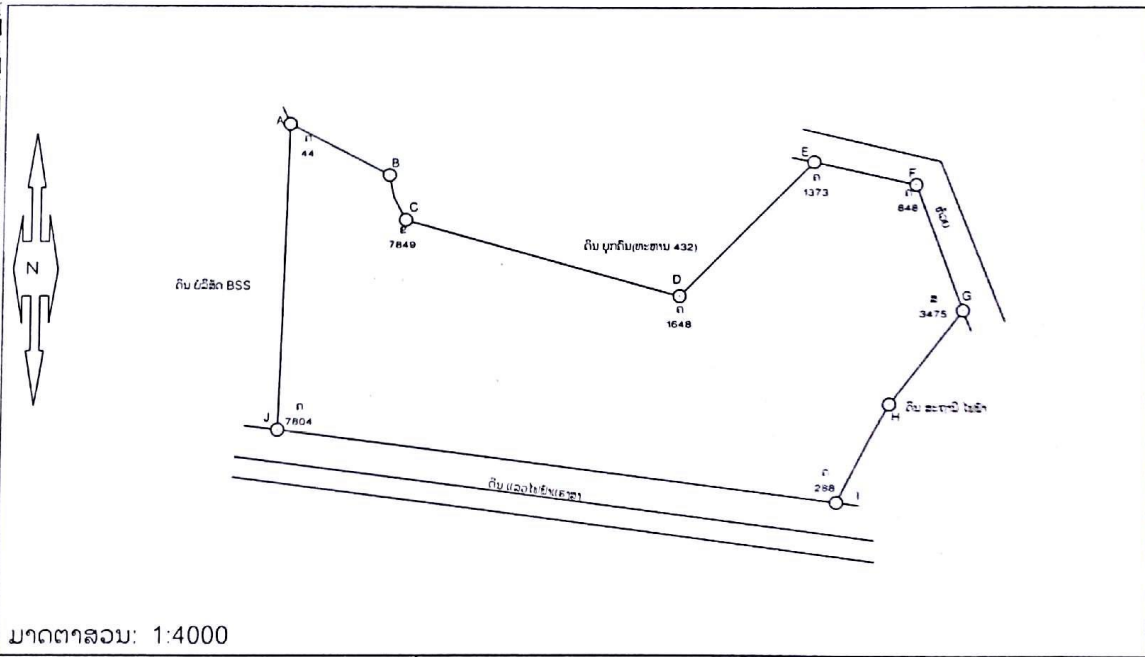
ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນາຖາວອນ

ເມືອງຫີນເທີບ
ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ
ແລະສິ່ງແວດລ້ອມປະຈຳເມືອງ

ແຜນທີ່ດິນລັດຄຸ້ມຄອງ

ເຊົ່າ/ສຳປະທານທີ່ດິນນຳໃຊ້ໂດຍ : ບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ
ຕາມເອກະສານຢັ້ງຢືນ: ຂໍ້ຕົກລົງຂອງທ່ານເຈົ້າເມືອງຫີນເທີບເລກທີ187/ຈມ.ທຫ,ລົງວັນທີ19/07/2016
ວ່າດ້ວຍ: ການອານຸຍາດເຊົ່າສຳປະທານເນື້ອທີ່ດິນລັດຄຸ້ມຄອງ,ທີ່ຕັ້ງຢູ່ຊາຍແດນບ້ານໂພນສູງ+ຄອນພຸກ
ເມືອງ ຫີນເທີບ ແຂວງ ວຽງຈັນ.

ທີ່ຕັ້ງຂອງຕອນດິນ: ຖະໜົນ.....ເຂດ ເດີນໄຮ່ປ່າ ບ້ານ ໂພນສູງ+ຄອນພຸກ ເມືອງຫີນເທີບ ແຂວງວຽງຈັນ
ປະເພດການນຳໃຊ້ທີ່ດິນ: ປຸກສ້າງ
ເນື້ອທີ່ 7,0058 ເຮັກຕ່າ 70.058 ຕາແມັດ



ມາດຕາສວນ: 1:4000

ຫົວໜ້າຫ້ອງການຊັບພະຍາກອນທຳມະ
ຊາດແລະສິ່ງແວດລ້ອມ ເມືອງ ຫີນເທີບ

(Red circular official stamp and signature)
ໄອລິດ ວິສຸນທອນ

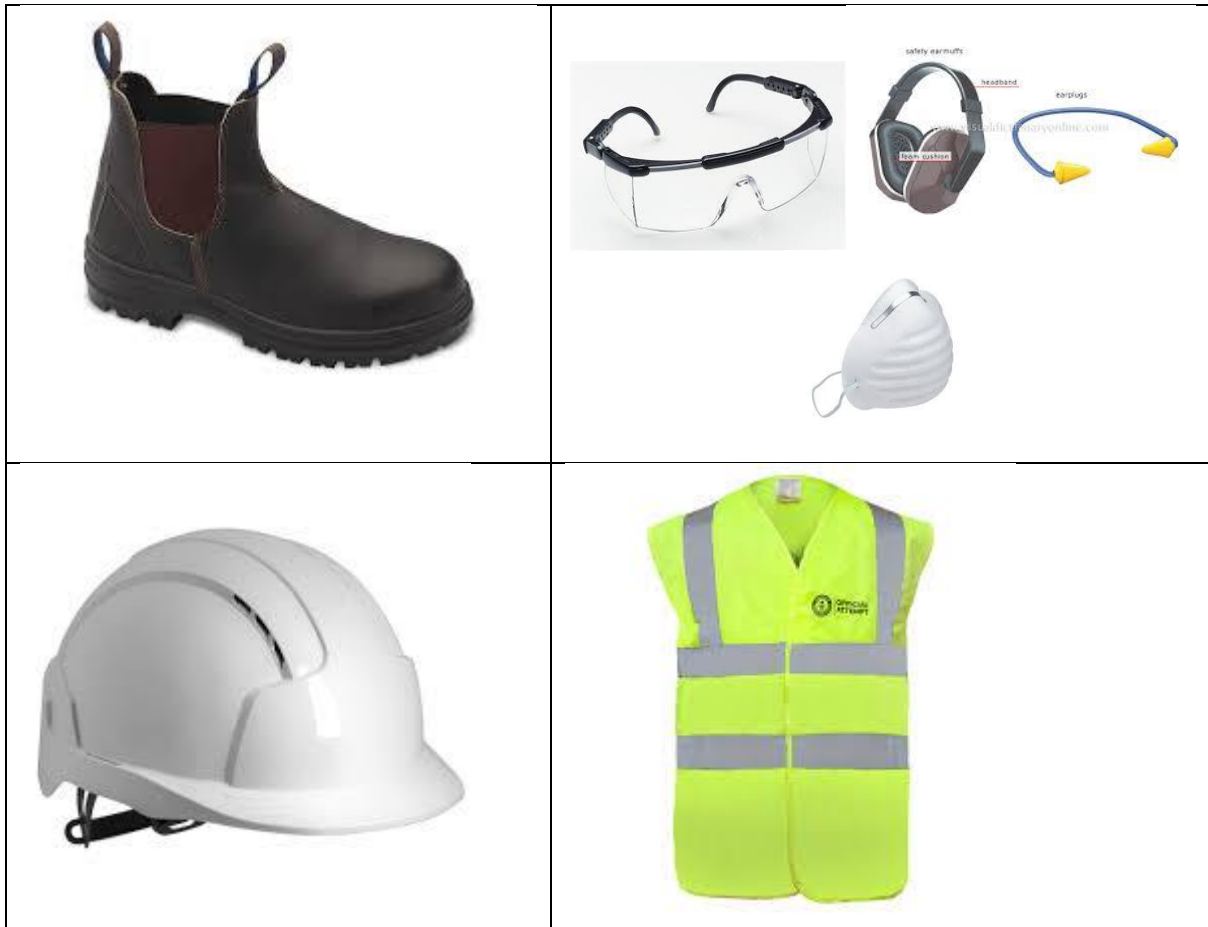
ຈຸດເຂດແດນເປັນແມັດ	
A- B= 74 ;B-C= 32 ;C-D= 190 ; D-E= 126 ;E-F= 69 ;	
F-G= 90; G-H=79; H-I=74; I-J= 373 ; J-A = 205	

ສຳຫລວດຄັ້ງວັນທີ 20/11/2014
ຫົວໜ້າໜ່ວຍງານຄຸ້ມຄອງທີ່ດິນ ພະນັກງານສຳຫລວດວັດແທກ

(Signatures and stamps)
ພູນເຊັ່ງ ແກ່ນດາລາ
ສຳຫລວດວັດແທກ

15.3 Annex 3: Main PPE to be used in the Mill

- Safety Glasses
- Ear Protection (plugs or ear muffs)
- Dust Masks
- Steel capped safety boots
- High visibility shirts / jackets
- Safety helmets)



15.4 BURAPHA PLYWOOD PRODUCTION PROCESS

15.4.1 Step 1 DEBARKING – Machine Name: Cambio 460 (Sweden)

- At the plantation logs are cut into from 2.5 to 7.5-meter lengths and transported to the plywood mill.
- At the mill the debarking machine removes all external bark.
- Waste type and waste processing: Wood waste that is used in the boiler furnace.

15.4.2 Step 2 SCANNING – (undertaken by specialist staff)

- Once debarked, each log is individually scanned for defects and quality and then classed.
- Waste type and waste processing: nil.

15.4.3 Step 3 CROSS CUTTING – Machine Name: Cross Cutter Saw (Chinese supplied machine)

- i. Logs are cut into two lengths to match cross veneer machine specifications
 - 1.3 (4ft) meters for cross veneer.
 - 2.5 (8ft) for surface veneer
- ii. Waste type and waste processing: Wood waste that is used in the boiler furnace.

15.4.4 Step 4 PEELING – Machine Name: Raute 4/8 feet (Finland)

- i. Logs are peeled into 1.5 mm – 4.5 mm veneer sheets.
- ii. The veneer is then graded:
 - Sap or,
 - Core
- iii. Waste type and waste processing: Wood waste that is used in the boiler furnace.

15.4.5 Step 5 DRYER – Machine Name: Raute Dryer (Finland)

- i. Veneer sheets are then feed into the dryer until their moisture content is between 6-8 %
- ii. Waste type and waste processing: Steam. Refer also to section 6.6 Air Quality

15.4.6 Step 6 GRADING – (undertaken by specialist staff)

- i. The veneer is graded into different grade.
 - Surface
 - Backside
 - Cross veneer
 - Veneer for upgrading
 - Waste
- ii. Waste type and waste processing: Wood waste that is used in the boiler furnace.

15.4.7 Step 7 UP GRADING VENEER (Chinese supplied machine)

- i. SCARF JOINTING / COMPOSING / PATCHING
 - short pieces of veneer joined to create a full-sheets
- ii. Waste type and waste processing: Wood waste that is used in the boiler furnace.

15.4.8 Step 8 GLUING, Plywood Panel Production (Chinese supplied machine)

- i. Veneer sheets are placed and glued into plywood panels.
- ii. Waste type and waste processing: Wood waste and glue residue to be used in the boiler furnace.

15.4.9 Step 9 PRESSING (Chinese supplied machine)

- i. Prepress: used to get the glue in contact with the wood fiber prior to hot press.
- ii. Hot press: hot press is applied to the plywood until the temperature in the middle reaches 104°C which increases the glues effectiveness.
- iii. Waste type and waste processing: Wood waste and glue residue to be used in the boiler furnace.

15.4.10 Step 10 SAWING – (Chinese supplied machine)

- i. The plywood panels cut to shape.

- ii. Waste type and waste processing: Wood waste to be used in the boiler furnace.

15.4.11 Step 11 SANDING – (Chinese supplied machine)

- i. The front and backside are sanded.
ii. Waste type and waste processing: Wood waste to be used in the boiler furnace.

15.4.12 Step 12 GRADING – (undertaken by specialist)

- i. Plywood panel surfaces assessed according to quality of finished.

15.4.13 Step 14 EDGE SEALING – (Chinese supplied machine)

- i. Wood fiber is sealed into the edges of plywood panels.
ii. Waste type and waste processing: Wood waste and glue residue to be used in the boiler furnace.

15.4.14 Step 15 PLYWOOD PRODUCT PACKAGING

- i. Labor teams package and prepare plywood products for transport to customers.
ii. Waste type and waste processing: Packaging waste to be used in the boiler furnace.

15.5 Annex 5: Village Formal ESIA Consultation Meeting Minutes and Attendance Sheets

Date	6 th October 2016
Village	Ban Viengthong
Participants (Refer to the attendance registration sheet)	<ul style="list-style-type: none"> • Two MONRE representatives; • Two PONRE representatives; • Two District representatives (one DONRE; and one District Administration Office); • One Khoum Ban (Sub-district) representative. • Two Burapha staff; • Four ES staff; • 82 village people (50 females).
Discussion Topic	Comment and action
Drainage and wastewater treatment pond	<ul style="list-style-type: none"> • Wastewater treatment pond should be identified and provided with detailed design including the size, methods and procedures for wastewater treatment. Documents regarding this issue should be attached with the ESIA Report.
Chemical use and management	<ul style="list-style-type: none"> • List of chemicals and its required quantity must be identified and described in the ESIA Report as well as its management plan.
Water quality monitoring	<ul style="list-style-type: none"> • Ground water and surface water quality monitoring plan shall involve district, province and central level at appropriate period of time with sufficient budget.
Community health and safety	<ul style="list-style-type: none"> • It would be difficult for the villagers to anticipate potential impacts associated with the Mill's operations in future. However, unfavourable experiences from other industries suggest that the Company (Burapha) needs to ensure no air emissions affect nearby communities;

	<ul style="list-style-type: none"> If possible, health impact assessment should be integrated in the ESIA study of these direct impacted villages.
ESMMP	<ul style="list-style-type: none"> Key stakeholders involved in the implementation of the ESMMP should be defined with budget for each level of village, district, province, and ministry.
Community development support	<ul style="list-style-type: none"> How community development support will be implemented? Would it be possible to define development initiatives that the Company can support in each phase of the Project?
Employment	<ul style="list-style-type: none"> Employment opportunities should be prioritized to the direct impacted communities. The village people are afraid that the Company may not commit to this policy when it comes into practice like other companies operating in the region.
Potential benefits	<ul style="list-style-type: none"> Employment opportunities; Promote outgrower plantation scheme; Village development support opportunities such as: specific CDF for women's group, kindergarten, village market, teacher's office.
Potential impacts	<ul style="list-style-type: none"> Potential impacts from wastes and wastewater discharge; Potential impacts on land use in proximity to the Mill area; Community health impacts from emissions discharge; increased land use pressures (collection of NTFP, grazing area); unfair compensation if impacted; water quality in Houay Miang seasonal stream.
Mitigation measures	<ul style="list-style-type: none"> Establish and implement waste and wastewater management plan to avoid potential risks and impacts as experienced by other industries in the region; Provide appropriate and acceptable compensation, if required; Establish CDF to help mitigate the impacts; Provide job opportunities to the local people as much as possible.
Comments	<ul style="list-style-type: none"> In general, the village authorities and village people support the construction and operations of the Mill project of Burapha by seeing that this Project will provide greater employments and develop the area more industrialized as per the district and provincial development objectives. Some village development support requests: provide standing fans for the village meeting halls, upgrade / construction of school and kindergarten, teacher's office, construction and installation of power grid to Ban Phiengdy sub-village settlement, improve access road to Ban Phiengdy.

15.6 Annex 6: Examples of Village Consultation Meeting Outcomes

Earth Systems

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Meeting Record

ບົດບັນທຶກກອງປະຊຸມປຶກສາຫາລືຊັ້ນບ້ານ
(Meeting Notes of village consultation)

1. ວັນເດືອນປີ (Date):	06 ຕຸລາ 2016
2. ບ້ານ (Village)	ບ້ານ ພູມສາດ
3. ຜູ້ເຂົ້າຮ່ວມ (Participants)-(refer to the attendance sheet)	
4. (ຂໍ້ສະເໜີຕ່າງໆ) Notes: (Try to note under different topics/issues)	
ຫົວຂໍ້ (Topics)	ຄໍາເຫັນ-ຂໍ້ສະເໜີຕ່າງໆ ແລະ ຕິດຕອບ (comments and actions)
- ອາຍຸກຳມະ	ບໍ່ມີສິດທິທີ່ຈະຮັບການທຳນຽມທີ່ຈະມາແຜ່ນທີ່ ຫ້າແຜ່ນທີ່ ທີ່ກ່ຽວຂ້ອງກັບ ຕາຍຸກຳມະ
- ຜົນປະໂຫຍດ	<ul style="list-style-type: none"> - ສ້າງອຸປະກອນແກ້ໄຂບັນຫາທີ່ຕ້ອງ ຈຳນວນ - ພັດທະນາໂຄງລ່າງສາຍພົວພັນ - ລຸດແຜ່ນທີ່ ລາຍ ທີ່ກ່ຽວຂ້ອງຂຶ້ນ
- ຜົນກະທົບ	<ul style="list-style-type: none"> - ຄຳເຫັນທີ່ຢູ່ໃກ້ ກຽມພ້ອມ ທີ່ ຜົນກະທົບ ຕະຫຼອດ ທີ່ ກຽມພ້ອມ ທີ່ ກຽມພ້ອມ ທີ່ ກຽມພ້ອມ - ການທຳອາການຂອງ ຊຸມ ຊົນ (ພູມ, ພູມ, ເຫັດ) - ສ້າງ ສູງ ສູງ ກຽມພ້ອມ - ການ ສູງ ສູງ ພູມ ພູມ ປະຊາຊົນ ທີ່ ກຽມພ້ອມ ທີ່ ກຽມພ້ອມ ທີ່ ກຽມພ້ອມ - ຊຸມ ຊົນ ພູມ ພູມ (ພູມ ພູມ) ທີ່ ຢູ່ ກຽມພ້ອມ - ຈຸດ ຂະ ພາຍ ພູມ ພູມ ກຽມພ້ອມ ທີ່ ກຽມພ້ອມ ທີ່ ກຽມພ້ອມ

Q&A Meeting Notes_Village_Consultation_Draft

Earth Systems

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Meeting Record

<p>- ສະເໝີ</p>	<p>- ບ້ານ ສຳເລັດງານ ທີ່ ບໍລິສັດ ກຸ່ມ ສັງຄົມ ທີ່ ມີ ບ້ານ - ສັງຄົມ ຄຽມ ອາດ ບາດ</p>
<p>- ສາທາລະນະ ກຸ່ມ ສາມ</p>	<p>- ສາທາລະນະ / ກຸ່ມ ບໍລິສັດ ທີ່ ອາດ ຈະ ບາດ ດາດ ດຽງ ກຸ່ມ ທີ່ ບໍ່ ຈຳ ຄື ມີ ທາງ ທາງ ທາງ ທາງ ທາງ ທາງ, ແຕ່ ບໍ່ ມີ ຈັດ ກຸ່ມ ທາງ ທາງ ທາງ ທາງ ທາງ - ກຸ່ມ ຈະ ທາງ ທາງ ທາງ ທາງ (ທາງ ທາງ, ທາງ ທາງ, ທາງ ທາງ, ທາງ ທາງ ທາງ ທາງ) - ທາງ ທາງ ທາງ ທາງ ທາງ ທາງ ທາງ</p>

ເຊັນ ແລະ ປະທັບກາ ນາຍບ້ານ
(Sign and stamp)



Q&A Meeting Notes_Village_Consultation_Draft

ອຸ່ນຄຳ ຈັນທະວົງສັກ
Oumkham CHANHITHAVONGSAK

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ (Participants list)

ສະຖານທີ່ (Location): Ban Khone phouk

ເວລາ (Date): 6.10.2016

ລຳດັບ (No.)	ລາຍຊື່ແລະນາມສະກຸນ (Name)	ໜ້າທີ່ຮັບຜິດຊອບ (Responsibility)	ເບີຕິດຕໍ່ (Contact No)	ລາຍເຊັນ (Signature)
1	ພັດ ພອນໄຫວ້	ຫົວໜ້າປະກອບ	55165009	ພັດ ພອນໄຫວ້
2	ສອນ ສິມ	ປະກອບ	0305804531	ສອນ ສິມ
3	ສາ ສິມສິງ ພອນສິ	ເລຂາຄູ່ມືປະກອບ	05457908	ສອນ ສິມ
4	ສອ. ສິມສິງ ພອນສິ	ປະກອບ	54334782	ສອນ ສິມ
5	ສາ ສິມສິງ	ປະກອບ	030578108	ສອນ ສິມ
6	ທ. ສິມສິງ ສິ	ປະກອບ	0305156104	ສອນ ສິມ
7	ທ. ສິມສິງ ສິ	ປະກອບ	0305781861	ສອນ ສິມ
8	ສາ ສິມສິງ	ປະກອບ	52817601	ສອນ ສິມ
9	ທ. ສິມສິງ			ສອນ ສິມ
10	ທ. ສິມສິງ			ສອນ ສິມ
11	ສ. ສິມ		95002879	ສອນ ສິມ
12	ສ. ສິມ		56199763	ສອນ ສິມ
13	ສ. ສິມ			ສອນ ສິມ
14	ທ. ສິມສິງ ພອນສິ	ປະກອບ	22411757	ສອນ ສິມ
15	ທ. ສິມສິງ ພອນສິ	ປະກອບ	99770156	ສອນ ສິມ
16	ທ. ສິມສິງ	ປະກອບ	99706324	ສອນ ສິມ
17	ທ. ສິມສິງ ພອນສິ	ປະກອບ	22071181	ສອນ ສິມ
18	ທ. ສິມສິງ ພອນສິ	ປະກອບ	52365419	ສອນ ສິມ
19	ທ. ສິມສິງ ພອນສິ	ປະກອບ	56099931	ສອນ ສິມ
20	ທ. ສິມສິງ ພອນສິ	ປະກອບ	54666688	ສອນ ສິມ

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ (Participants list)

ສະຖານທີ່ (Location): Ban Khone phouk

ເວລາ (Date): 6.10.2016

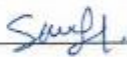


ລຳດັບ (No.)	ລາຍຊື່ແລະນາມສະກຸນ (Name)	ໜ້າທີ່ຮັບຜິດຊອບ (Responsibility)	ເບີຕິດຕໍ່ (Contact No)	ລາຍເຊັນ (Signature)
1	ວ. ດຸກ	ປ/ກ		
2	ນາງ ພິນ	ປ/ກ		
3	ສິ ຂົນ	ປ/ກ		ສິ ຂົນ
4	ນາງ ລັດ	ປ/ກ		ນາງ ລັດ
5	ນາງ ສະວັນ	ປ/ກ		ນາງ ສະວັນ
6	ສິ ລິ	ປ/ກ		ສິ ລິ
7	ນາງ ພອນ	ປ/ກ		ນາງ ພອນ
8	ນາງ ສິດສິດ	ປ/ກ		ນາງ ສິດສິດ
9	ນ. ພອນ	ປ/ກ		ນ. ພອນ
10	ສາ. ພິນ	ປ/ກ		ສາ. ພິນ
11	ວ. ຫັ້ນ	ປ/ກ		ວ. ຫັ້ນ
12	ພິ ພິ	ປ/ກ		ພິ ພິ
13	ສິ ພິ	ປ/ກ		ສິ ພິ
14	ນ. ພອນ	ປ/ກ		ນ. ພອນ
15	ວ. ສິດ	ປ/ກ		ວ. ສິດ
16	ສາ. ພິນ	ຫົວໜ້າກຸ່ມ 6	991032119	ສາ. ພິນ
17	ວ. ສິດ	ປ/ກ		ວ. ສິດ
18	ນ. ພິນ	ປ/ກ		ນ. ພິນ
19	ນ. ພິນ	ປ/ກ		ນ. ພິນ
20	ນ. ພິນ	ປ-ກ-3		ນ. ພິນ



ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ (Participants list)

ສະຖານທີ່ (Location): Ban khone phook

ເວລາ (Date): 6 Oct 2016

ລຳດັບ (No.)	ລາຍຊື່ແລະນາມສະກຸນ (Name)	ໜ້າທີ່ຮັບຜິດຊອບ (Responsibility)	ເບີຕິດຕໍ່ (Contact No)	ລາຍເຊັນ (Signature)
1	ທ. ແສງພິດ	ປ.ກ.ຊ		
2	ນ. ດີ	ປ/ຊ		
3	ທ. ຈິວ ບຸນມາ	ປ/ຊ		
4	ພິ. ດຳລຸ້ນ	ປ/ຊ		
5	ສາມ ວຽງ ວຽງ	ປ/ຊ		
6	ທ. ດຳລຸ້ນ	ປ/ຊ		
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Earth Systems

DRAFT

Meeting Record

ບົດບັນທຶກກອງປະຊຸມປຶກສາຫາຫລິ້ນບ້ານ
(Meeting Notes of village consultation)

1. ວັນເດືອນປີ (Date):	07 . 10 . 2016
2. ບ້ານ (Village)	ໂພນສູງ Phonsoung
3. ຜູ້ເຂົ້າຮ່ວມ (Participants)-(refer to the attendance sheet)	
4. (ຂໍສະເໜີຕ່າງໆ) Notes: (Try to note under different topics/issues)	
ຫົວຂໍ້ (Topics)	ຄຳເຫັນ-ຂໍສະເໜີຕ່າງໆ ແລະ ວິຕຳຕອບ (comments and actions)
- ແຮງງານ	- ທັງໝົດ ຄົນໃນ ທ່ງກຸ່ມໂດຍລະເພາະ ປ່າຂອງເຮົາ ຈັດຮັບ ແລະ ຫາຄາຍ ທີ່ ດອບຄົວ ທີ່ ບໍ່ ຈັດຮັບ ແລະ ຫາຄາຍ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ ຂອງເຮົາ (ເຈົ້າ, ພັນ ຫລື ການ ຫາຄາຍ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ) ແລະ ມັກ ເກີດ ຕົວ ຂອງ ຫາຄາຍ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ ຂອງ ເຮົາ ມາ ສູງ ມາ ດຸກ ທີ່ ມາ ສູງ ເພື່ອ ຫາຄາຍ ແລະ ມັກ ເກີດ ເຮົາ ແລະ ແລ້ວ ລັກ ຕາມ ທີ່ (BAFEO ຈະ ຈັດ ຍຸ ລິ ພ ລະ ສິດ ບາງ ທີ່ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ ຕາມ ທີ່ ທີ່ ບໍ່ ຈັດຮັບ) - ບໍ່ ຈັດ ຮັບ ມະ ສິດ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ ຂອງ ເຮົາ ພ້ອມ ກັນ ບາງ ທີ່ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ ຂອງ ເຮົາ ເພື່ອ ເວັດ ຈຸ ທ ປົກ ກະ (3 ທ່ານ / ຊັ້)
ຜົນປະໂຫຍດ	- ສັງ ຊາ ເວັດ ຈຸ ທ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ ຂອງ ເຮົາ ແລະ ສັງ ຊາ ເວັດ ຈຸ ທ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ ຂອງ ເຮົາ - ບາງ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ ຂອງ ເຮົາ - ຈັດ ຮັບ ມະ ສິດ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ ຂອງ ເຮົາ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ ຂອງ ເຮົາ ແລະ ມັກ ເກີດ ຕົວ ຂອງ ເຮົາ
ເພື່ອ ຫາຄາຍ	- ມັກ ເກີດ ມາ ແລະ ມັກ ເກີດ ມາ ຈາກ ການ ຫາຄາຍ - ບໍ່ ຈັດຮັບ ມະ ສິດ, ບໍ່ ຈັດຮັບ ມາ ຫາ ທີ່ ມາ (ພົມ, ຜົນ, ເນີນ ...) ມີ ອົງ ກົດ - ສຸ ຂະ ພາ ບ ຂອງ ຄົນ ທີ່ ບໍ່ ຈັດຮັບ ມະ ສິດ

Q&A Meeting Notes_Village_Consultation_Draft

Earth Systems

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Meeting Record

<p>ສາທາລະນະການ ຊື່ພວກລູກ</p>	<ul style="list-style-type: none"> - ກົມວິຊາສາດປ່າໄມ້ ດົນຕີ ແລະ ຕັດໄມ້ ການປັບປຸງ ການປະຕິບັດ ການປ່າໄມ້ ທີ່ ບໍ່ ຈຳ ພັດ ທີ່ ບໍ່ ຈຳ ພັດ ທີ່ ບໍ່ ຈຳ ພັດ - (ເວັບ ສ໌ ທີ່ 111111) ອຸປະ ກອນ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ - ເວັບ ສ໌ ທີ່ 111111 ບໍ່ ຈຳ ພັດ , ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ສຳ ລັດ ດີ ຂອງ ປະ ຊາ ຊົນ ອັນ ສຳ ຈັດ - ສະ ພາ ບຸ ດ ຈຶງ ງານ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ - ພົບ ອັນ ຂອງ ພືດ ສີ ມັນ ສຳ ຈັດ ດາວ ພຸ້ນ ແລະ ສີ ມັນ ຈຶງ ງານ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ - ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ
<p>ຄຳ ສື່ ຄວາມ ແນະ ນຳ ແລະ ຄຳ ຖາມ (ຈາກ ບາດ)</p>	<ul style="list-style-type: none"> - ຄຳ ສື່ ຄວາມ ແນະ ນຳ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ? (ຄຳ ສື່ ຄວາມ ແນະ ນຳ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ) - ຄຳ ຖາມ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ - ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ - ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ
<p>ຄຳ ຖາມ ຈາກ ທ່ານ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ</p>	<ul style="list-style-type: none"> - ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ - ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ - ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ - ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ - ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ
	<ul style="list-style-type: none"> - ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ - ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ ແລະ ສັດ ທີ່ ບໍ່ ຈຳ ພັດ ທາງ ມາ ທີ່ ສ້າງ ຈຶງ ງານ

ເຊັນ ແລະ ປະທັບກາ ນາຍບ້ານ
(Sign and stamp)



ບຸນຍູ ພິມມະວິງສາ

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ (Participants list)

ສະຖານທີ່ (Location): Ban phonsoumy

ເວລາ (Date): 07 - 10 - 2016


ລຳດັບ (No.)	ລາຍຊື່ແລະນາມສະກຸນ (Name)	ໜ້າທີ່ຮັບຜິດຊອບ (Responsibility)	ເບີຕິດຕໍ່ (Contact No)	ລາຍຮຸ້ນ (Signature)
1	ພັດ ບຸນທິມະພັນ	ປະທານ ບັນດາ	5516509	
2	ທ.ບຸນຍຸ້ງ ພິມມະຈຸນ	ສາທິປະໄຕ	98519433	
3	ທ. ທາດ ປະສິດທິ	ສະມາຊິກ	95295184	
4	ທ. ທາ.	ສະມາຊິກ		
5	ທ. ສິມ	✓		
6	ທ. ສິມ	✓		
7	ທ. ສິມ	✓		
8	ທ. ສິມ	✓		
9	ທ. ສິມ	✓		
10	ທ. ສິມ	✓		
11	ທ. ສິມ	✓		
12	ທ. ສິມ	✓		
13	ທ. ສິມ	✓		
14	ທ. ສິມ	✓		
15	ທ. ສິມ	✓		
16	ທ. ສິມ	✓		
17	ທ. ສິມ	✓		
18	ທ. ສິມ	✓		
19	ທ. ສິມ	ສະມາຊິກ	55039308	



ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ (Participants list)

ສະຖານທີ່ (Location): Ban phonsoung

ເວລາ (Date): 7.10.16

ລຳດັບ (No.)	ລາຍຊື່ແລະນາມສະກຸນ (Name)	ໜ້າທີ່ຮັບຜິດຊອບ (Responsibility)	ເບີຕິດຕໍ່ (Contact No)	ລາຍເຊັນ (Signature)
1	ນ. ໂພ	✓/		
2	ອາ ສິມວຸນ	✓/		
3	ອາ ຈິງ	✓/		
4	ທ. ສິມວຸນ ດົງ ສິມ	ສ. ສິມວຸນ	962944008	
5	ນ. ວິໄນ	✓/		
6	ນ. ດວງ ສິມ	✓/		
7	ນ. ສິມ	✓/		
8	ທ. ສິມ	✓/		
9	ທ. ສິມ	✓/		
10	ທ. ສິມ	ທ. ສິມ		
11	ທ. ສິມ	ສ. ສິມ		
12	ນ. ສິມ	✓/		
13	ທ. ສິມ	ທ. ສິມ		
14	ທ. ສິມ	✓/		
15	ທ. ສິມ	✓/		
16	ທ. ສິມ	✓/		
17	ທ. ສິມ	ທ. ສິມ		
18	ທ. ສິມ			
19	ທ. ສິມ			
20	ທ. ສິມ	ສ. ສິມ		



ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ (Participants list)

ສະຖານທີ່ (Location): Ban Phonsoung

ເວລາ (Date): 7.10.16


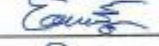

ລຳດັບ (No.)	ລາຍຊື່ແລະນາມສະກຸນ (Name)	ໜ້າທີ່ຮັບຜິດຊອບ (Responsibility)	ເບີຕິດຕໍ່ (Contact No)	ລາຍເຊັນ (Signature)
1	ນ. ຂອງ	5 ພັນນາ ພັນນາ		
2	ນ. ສິງ	✓		
3	ນ. ສິງ	✓		
4	ນ. ສິງ	✓		
5	ນ. ສິງ	✓		
6	ນ. ກຸມ ສິງ	✓		
7	ນ. ສິງ	✓		
8	ນ. ສິງ	✓		
9	ນ. ສິງ	✓		
10	ນ. ສິງ	✓		
11	ນ. ສິງ	ກາງ/ນາງ/ນາງ		
12	ນ. ສິງ	✓		
13	ນ. ສິງ	ຫົວໜ້າ ກອງປະຊຸມ		
14	ນ. ສິງ	✓		
15	ນ. ສິງ	✓		
16	ນ. ສິງ	✓		
17	ນ. ສິງ	✓		
18	ນ. ສິງ	✓		
19	ນ. ສິງ	✓		
20	ນ. ສິງ	5 ສະ: ນາງ ສິງ		



ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກວດກາປະຊາຊົນ (Participants list)

ສະຖານທີ່ (Location): Ban phonsoung

ເວລາ (Date): 7.10.2016

ລຳດັບ (No.)	ລາຍຊື່ແລະນາມສະກຸນ (Name)	ໜ້າທີ່ຊັບື້ນຊອບ (Responsibility)	ເບີຕິດຕໍ່ (Contact No)	ລາຍເຊັນ (Signature)
1	ທ. ສິມສິມ	ນັກວິທະຍາສາດ	55338424	
2	ທ. ສິມສິມ ພັນທະສຸກ	ນັກວິທະຍາສາດ	59776956	
3	ທ. ບົວສິມສິມ ພັນທະສຸກ	ນັກວິທະຍາສາດ	59565419	B.
4	ທ. ສິມສິມ ພັນທະສຸກ	ນັກວິທະຍາສາດ	56099931	
5				
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Earth Systems

DRAFT

Meeting Record

ບົດບັນທຶກກອງປະຊຸມປຶກສາຫາລືຂັ້ນບ້ານ
(Meeting Notes of village consultation)

1. ວັນເດືອນປີ (Date):	6 ທຸລາ 2016
2. ບ້ານ (Village)	ຈຽງຍາງ
3. ຜູ້ເຂົ້າຮ່ວມ (Participants)-(refer to the attendance sheet)	
4. (ຂໍສະເໜີຕ່າງໆ) Notes: (Try to note under different topics/issues)	
ຫົວຂໍ້ (Topics)	ຄໍາເຫັນ-ຂໍສະເໜີຕ່າງໆ ແລະ ວິຖໍາຕອບ (comments and actions)
- ຮ່ອງຄະບາຍສັກ ແລະ ຮ່ອງເກັບນໍ້າ ນົມໂຮງງາມ ແລະ ສູ້ເສດຖະກິດ	- ຢ່າກົດໄກ້ ສັດຕະຫຼານ ແລະ ວິກິດກາມ ນົມ ຊ່ວຍສອງ ບໍລິຫານ ຕໍ່ກັບ ລະບົບ (ຮູ້ໜ້າ ນັບ ນໍ້າ ບົດ ແລະ ຜູ້ມາກູ້) - ຢ່າກົດ ລະບຸ ກູ້ ຫາກເສຍ, ເພາະ ກະທົບ ດາກ ຫາກ ເສຍ ຕໍ່ ກັບ ນໍ້າ ເອົາ ໃຈ ໃຈ ໂດຍ ລະ ເພາະ ແລະ ບໍລິຫານ ເພິ່ນ ກໍ່ ມີ ເສັ້ນ ຫາກ ກູ້ ໂຮງງາມ
- ການ ຕິດຕາມ ກວດ ກາ ຊຸມ ມະ ພາບ ນໍ້າ - ຄວາມ ບໍ່ ອາດ ຄົງ ຂອງ ຊຸມ ຊຸມ	- ຢ່າກົດໄກ້ ສັດຕະຫຼານ ຫຼື ບາງ ກາມ ເບິ່ງ ຕົວ ຂອງ ນໍ້າ (ກວດ ແລະ ບຸກ) ການ ກໍ່ ສັດ ໂຮງງາມ. ຕໍ່ ຕໍ່ ນັບ ປະ ນາມ ນົມ ການ ຕິດຕາມ ຕວດ ຕາ ນໍ້າ ຫຼື ຫຼາຍ ສິດ ພັນ ແລະ ກໍ່ ກິດ ລະ ບຸກ ການ ນັບ ກັບ ກໍ່ ຂໍ ມູນ - ຄວາມ ສາມ ຕິດຕາມ ກວດ ຕາ ຕໍ່ ຂະ ພາບ ຂອງ ສິດ ຕິດ ຕາ ແລະ ບຸກ ໂຮງງາມ (ເພິ່ນ ເພິ່ນ ຂໍ ມູນ ຫຼື ບາງ ກາມ)
- ການ ຊ່ວຍ ສອງ ແລະ ສິດຕາມ ກວດ ການ ການ ປະ ຕິ ໂຮງງາມ	- ຄວາມ ລະ ບຸກ ຕໍ່ ຫຼື ບາງ ສິດ ແລະ ບຸກ ແລະ ບຸກ ຕະ ສັດ ການ ເບິ່ງ ຕົວ ນັບ ຕິດ ດະ ກັບ ແນວ ວິດ. ນັບ ລະ ບຸກ ຕິດ ຕະ ກັບ ແລະ ຫຼື ບາງ ຂະ ພາບ ບໍ່ ຕິດ ແທ້.

Q&A Meeting Notes_Village_Consultation_Draft

Earth Systems

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Meeting Record

<p>- ແຮງງານ</p>	<p>- ຢາກໃຫ້ ທຸກຄົນມາໃຫ້ ບຸລິມະສິດປາກົມ ລາມ ການ ດຳ ກຳ ນຳ ແຮງງານ ທີ່ ກໍ່ ເພີ່ມ ສູງ ມາ ສົມ. (BAFO) : ຮັບ ຢາກ ວ່າ ທຸກຄົນມາ ເພີ່ມ ການ ບຸລິມະສິດ ຕົວ ຈິນ ມາ ບາດ ກໍ່ ໃຫ້ ຮັບ ແລະ ການ ດຳ ກຳ ນຳ ແລະ ຈັດ ກຳ ນຳ.</p>
<p>+ ຜົນປະໂຫຍດ</p>	<p>- ອຸ ທາ ສິ ທ າ ມ ທ ັ ກ ັ ມ ແຮງ ງານ , ປ າ ກ ີ ກ ີ ກ ີ ກ ີ ກ ີ ກ ີ ກ ີ ກ ີ ກ ີ ກ ີ ກ ີ ກ ີ ກ ີ - ຄ່າ ເຮັດ ສິ ມ (ຕົວ ຈິນ ມາ ບາດ ກໍ່ ໃຫ້ ເພີ່ມ) ກ ັ ມ າ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ - ກ ັ ມ າ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ</p>
<p>• ຜົນກະທົບ + ນາຄານະໂຫຍດ + ຂີ້ສະເພາະ</p>	<p>- ສູ ຂ ັ ເລ ບ າ ບ , ກ ັ ມ າ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ - ຄ່າ ເຮັດ ສິ ມ (ຕົວ ຈິນ ມາ ບາດ ກໍ່ ໃຫ້ ເພີ່ມ) ກ ັ ມ າ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ - ປ່າ ສົມ ຜົນ ກະ ທ ັ ບ ຕໍາ ກ ັ ມ າ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ - ພັດ ດ ວ ລ ັ ໃ ມ ທ ັ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ - ທ ັ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ ກ ັ ມ ປ າ</p>

ເຊັນ ແລະ ປະທັບກຳ ນາຍບ້ານ

(Sign and stamp)



ນ.ມອນ ບຸດທະວິງ
Mon BOUDTHAVONG

Q&A Meeting Notes_Village_Consultation_Draft

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ (Participants list)

ສະຖານທີ່ (Location): Ban Viengkong

ເວລາ (Date): 6.10.16


ລຳດັບ (No.)	ລາຍຊື່ແລະນາມສະກຸນ (Name)	ໜ້າທີ່ຮັບຜິດຊອບ (Responsibility)	ເບີຕິດຕໍ່ (Contact No)	ລາຍເຊັນ (Signature)
1	ນ. ສິ	ປ/ກວດຄຸນ		ນ. ສິ
2	ນ. ສິ	— — —		ນ. ສິ
3	ແມ່ ແພງ	— — —		ແມ່ ແພງ
4	ທ. ສິມພັດ ພິສິດ	ປ/ກ		ສິມພັດ
5	ນ. ສິ	ປ/ກ		ນ. ສິ
6	ນ. ສິມພັດ ພິສິດ	ປ/ກ		ນ. ສິມພັດ ພິສິດ
7	ທ. ບຸນນາ	ປ/ກ		Bunna
8	ສິມພັດ	ປ/ກ		ສິມພັດ
9	ສິມພັດ ວິໄນ	ປ/ກ	22254838	ສິມພັດ
10	ນ. ສິມພັດ ພິສິດ	ສະໜັບສະໜູນ (ບໍ່ມີ)	552442039	ສິມພັດ
11	ນ. ພູ ສິມພັດ ວິໄນ	ນັກຮຽນ		ນ. ພູ
12	ນ. ສິ ພິສິດ ພິສິດ	ປ/ກ	0305462637	ນ. ສິ
13	ນ. ສິມພັດ ພິສິດ	ປ/ກ	09145499	ສິມພັດ ພິສິດ
14	ທ. ສິມພັດ ພິສິດ	ປ/ກ		ສິມພັດ
15	ທ. ສິມພັດ ພິສິດ	ປ/ກ	0304989084	ສິມພັດ
16	ນ. ສິ	ປ/ກ		—
17	ນ. ສິ	ປ/ກ		—
18	ນ. ສິມພັດ ພິສິດ	ປ/ກ		ສິມພັດ
19	ທ. ສິມພັດ ພິສິດ	ຫົວໜ້າໝວຍ. ອ.	98710315	ສິມພັດ
20	ທ. ສິມພັດ ພິສິດ	ປ/ກ	55013726	—



ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກຸ່ມປະຊຸມ (Participants list)

ສະຖານທີ່ (Location): Ban Viengkhong

ເວລາ (Date): 6.10.16

ລຳດັບ (No.)	ລາຍຊື່ແລະນາມສະກຸນ (Name)	ໜ້າທີ່ຮັບຜິດຊອບ (Responsibility)	ເບີຕິດຕໍ່ (Contact No)	ລາຍເຊັນ (Signature)
1	ພິດາ ບຸນເລັກມພິມ.ອ.ສາ	ຜູ້ຮັບ: ປາກວ່າບໍ່ທັນ	55165009	
2	ນາງ ພິມ	ເປັນຝ່າຍ-ຊາວບ້ານ		
3	ນາງ ວິ	ເປັນຝ່າຍ-ຊາວບ້ານ	99869757	
4	ນາງ ອຳພວງ	ເປັນຝ່າຍ-ຊາວບ້ານ		
5	ນາງ ລາວາ	ເປັນຝ່າຍ-ຊາວບ້ານ	0309429008	
6	ຟັກ ທວນ	ເປັນຝ່າຍ-ຊາວບ້ານ		
7	ທ. ບຸນເພີ	ປ/ມ.		
8	ທ. ທາ	ປ/ຊ.		
9	ທ. ພິມ	ປ/ຊ.		
10	ນ. ອອນພິມ			
11	ນ. ສິມພິມ			
12	ນ. ພິມ			
13	ນາງ ວິ			ນາງ ວິ.
14	ນາງ ພິມ	-/-		ນາງ ພິມ
15	ນາງ ພິມ	-/-		ນາງ ພິມ
16	ນາງ ພິມ	-/-		ນາງ ພິມ
17	ນາງ ພິມ	-/-		ນາງ ພິມ
18	ນາງ ພິມ	-/-		ນາງ ພິມ
19	ນາງ ພິມ	-/-		ນາງ ພິມ
20	ນ. ພິມ	-/-		ນ. ພິມ.



ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກາງປະຊຸມ (Participants list)

ສະຖານທີ່ (Location): Ban Vonghong

ເວລາ (Date): 6. 10. 16

ລຳດັບ (No.)	ລາຍຊື່ແລະນາມສະກຸນ (Name)	ໜ້າທີ່ຮັບຜິດຊອບ (Responsibility)	ເບີຕິດຕໍ່ (Contact No)	ລາຍເຊັນ (Signature)
1	ຂ. ວອນ	ໜີ້ສິນ ທ່ານ	030.9201179	ຂ. ວອນ
2	ແມ່ ແອັງ	ປ/ຊ		ແມ່ ແອັງ
3	ແມ່ ງາ	ປ/ຊ		ແມ່ ງາ
4	ແມ່ ແກ້ວ	ປ/ຊ		ແມ່ ແກ້ວ
5	ແມ່ ສິມ	ປ/ຊ		ແມ່ ສິມ
6	ແມ່ ພອນ	ປ/ຊ		ແມ່ ພອນ
7	ແມ່ ສິ	ປ/ຊ		ແມ່ ສິ
8	ແມ່ ພອນ ພອນ	ປ/ຊ		
9	ແມ່ ສິມ	ປ/ຊ		ແມ່ ສິມ
10	ແມ່ ສິ	ປ/ຊ		ແມ່ ສິ
11	ສາຍ ສາ ພອນ	ປ/ຊ	5502-4402	ສາຍ ສາ ພອນ
12	ທ. ວິໄສ	ປ/ຊ		ທ. ວິໄສ
13	ແມ່ ແອັງ	ປ/ຊ		ແມ່ ແອັງ
14	ແມ່ ວອນ	ປ/ຊ		ແມ່ ວອນ
15	ແມ່ ແອັງ	ປ/ຊ		ແມ່ ແອັງ
16	ແມ່ ວິ	ປ/ຊ		ແມ່ ວິ
17	ແມ່ ສິ	ປ/ຊ		ແມ່ ສິ
18	ຂ. ວິ	ປ/ຊ		ຂ. ວິ
19	ທ. ພອນ	ປ/ຊ		ທ. ພອນ
20	ທ. ສິມ	ປ/ຊ		ທ. ສິມ



15.7 Annex 7: Formal District Consultation Workshop



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນາຖາວອນ

ບົດບັນທຶກ

ກອງປະຊຸມ ເຜີຍແຜ່ຂໍ້ມູນ ແລະ ປຶກສາຫາລື ຂັ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງມວນຊົນ ຕໍ່ຮ່າງບົດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ສັງຄົມ ແລະ ທຳມະຊາດ ໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝານ ແລະ ໂຄງການ ກະສິກຳ-ປ່າໄມ້ ຂອງ ບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ, ທີ່ເມືອງຫີນເຫີບ, ແຂວງວຽງຈັນ, ຄັ້ງວັນທີ 06 ກັນຍາ 2017.

ກອງປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ (ກປສສ), ກະຊວງຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ (ກຊສ) ໄດ້ຈັດກອງປະຊຸມ ເຜີຍແຜ່ຂໍ້ມູນ ແລະ ປຶກສາຫາລື ຂັ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງ ມວນຊົນ ຕໍ່ຮ່າງບົດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ສັງຄົມ ແລະ ທຳມະຊາດ ໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝານ ແລະ ໂຄງການ ກະສິກຳ-ປ່າໄມ້ ຂອງ ບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ, ໃນວັນ ທີ 06 ກັນຍາ 2017, ບຸູ່ທີ່ຫ້ອງວ່າການປົກຄອງເມືອງຫີນເຫີບ, ແຂວງວຽງຈັນ. ໂດຍການເປັນປະທານຮ່ວມ ຂອງ ທ່ານ ຖາວອນ ວົງໂພສີ ຮອງຫົວໜ້າ ກອງປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ, ທ່ານ ວອນ ວິລະສານ ຮອງເຈົ້າເມືອງ ເມືອງຫີນເຫີບ ແລະ ທ່ານ ບຸນຮຽງ ໄຊຍະແສງ ຮອງຫົວໜ້າ ພະແນກຊັບພະຍາກອນ ທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ແຂວງວຽງຈັນ, ຊຶ່ງມີຜູ້ເຂົ້າຮ່ວມຈາກພາກສ່ວນກອງປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ, ພະແນກ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ນະຄອນຫຼວງ, ແຂວງວຽງຈັນ, ແຂວງໄຊສົມບູນ, ແຂວງໄຊ ຍະບູລີ, ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ພ້ອມດ້ວຍຂະແໜງການທີ່ກ່ຽວຂ້ອງຂັ້ນສູນກາງ, ແຂວງ, ເມືອງ ແລະ ຜູ້ຕາງໜ້າປະຊາຊົນທີ່ຖືກຜົນກະທົບເຂົ້າຮ່ວມທັງໝົດ 101 ທ່ານ ເປັນຍິງ 21 ທ່ານ(ລາຍຊື່ຜູ້ເຂົ້າ ຮ່ວມໄດ້ດັດດິດມາພ້ອມນີ້).

ຈຸດປະສົງຂອງກອງປະຊຸມໃນຄັ້ງນີ້ ແມ່ນເພື່ອຮັບຟັງການມີສ່ວນຮ່ວມຂອງມວນຊົນ ໃນຂະບວນການປະເມີນ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ຂອງໂຄງການລົງທຶນ ແລະ ປຶກສາຫາລື ກ່ຽວກັບ ຮ່າງບົດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ສັງຄົມ ແລະ ທຳມະຊາດ ໃຫ້ມວນຊົນໄດ້ມີສ່ວນຮ່ວມ ຕໍ່ບົດລາຍງານ ດັ່ງກ່າວ ລຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝານ ແລະ ໂຄງການ ກະສິກຳ-ປ່າໄມ້ ຂອງ ບໍລິສັດ ບົວລະພາ ກະສິກຳ- ປ່າໄມ້ ຈຳກັດ ລວມທັງສັງລວມເອົາບັນດາຄຳຄິດເຫັນ ຂອງຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ ເພື່ອນຳສະເໜີໃຫ້ຜູ້ພັດທະນາ ໂຄງການ ແລະ ບໍລິສັດທີ່ປຶກສາ ນຳເອົາໄປຄົ້ນຄວ້າ ປັບປຸງ ເນື້ອໃນບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ສັງຄົມ ແລະ ທຳມະຊາດ ຂອງໂຄງການດັ່ງກ່າວ ໃຫ້ຖືກຕ້ອງ, ຄົບຖ້ວນສົມບູນ, ຈະແຈ້ງ ແລະ ສາມາດຈັດຕັ້ງປະຕິບັດ ໄດ້ຢ່າງມີປະສິດທິຜົນ. ກອງປະຊຸມຄັ້ງນີ້ ໄດ້ຮັບຟັງການສະເໜີ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງມວນຊົນ, ແຜນ ພັດທະນາໂຄງການ, ຄວາມຄືບໜ້າໃນການກະກຽມແຜນການຕໍ່ໜ້າຂອງໂຄງການ, ບົດສະເໜີຫຍໍ້ ກ່ຽວກັບ ສະພາບ ລວມຂອງໂຄງການ, ສະພາບເສດຖະກິດ-ສັງຄົມ ຂອງປະຊາຊົນທີ່ອາໄສຢູ່ຂອບເຂດໂຄງການ, ຜົນກະທົບຕໍ່ສິ່ງແວດ ລ້ອມສັງຄົມ ແລະ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມທຳມະຊາດ ທີ່ຄາດຄະເນວ່າຈະເກີດຂຶ້ນມາຈາກການຈັດຕັ້ງປະຕິບັດ ໂຄງການ ລວມທັງ ແຜນການຄຸ້ມຄອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ, ການກຳນົດມາດ ຕະການແກ້ໄຂຫຼຸດຜ່ອນ ແລະ ແຜນງົບປະມານຕ່າງໆ;

ຫລັງຈາກນັ້ນ ຜູ້ແທນກອງປະຊຸມ ກໍໄດ້ປຶກສາຫາລື ແລະ ປະກອບຄໍາຄິດເຫັນ ຕໍ່ບົດລາຍງານ ການປະເມີນ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ແລະ ແຜນພັດທະນາຂອງໂຄງການດັ່ງກ່າວ, ຈາກນັ້ນ ຜູ້ພັດທະນາ ໂຄງການ ແລະ ບໍລິສັດທີ່ປຶກສາສິ່ງແວດລ້ອມ ກໍໄດ້ມີການຊີ້ແຈງອະທິບາຍຄືນຢ່າງຈະແຈ້ງພໍສົມຄວນ ເພື່ອໃຫ້ຜູ້ເຂົ້າ ຮ່ວມກອງປະຊຸມໄດ້ມີຄວາມຮັບຮູ້ ແລະ ຄວາມເຂົ້າໃຈຫລາຍຂຶ້ນ. ຜ່ານການປຶກສາຫາລືໃນກອງປະຊຸມຄັ້ງນີ້ ໂດຍລວມແລ້ວ ຜູ້ແທນກອງປະຊຸມ ແມ່ນມີຄວາມເຫັນດີເປັນເອກະພາບ ຕໍ່ກັບແຜນພັດທະນາໂຄງການດັ່ງກ່າວ, ແຕ່ ເຖິງຢ່າງໃດກໍຕາມ ກໍຍັງມີຄໍາຄິດເຫັນເພື່ອສະເໜີໃຫ້ ເຈົ້າຂອງໂຄງການ ແລະ ບໍລິສັດທີ່ປຶກສາ ນຳໄປພິຈາລະນາ ແລະ ປັບປຸງບົດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ, ຊຶ່ງຄຳເຫັນສ່ວນໃຫຍ່ມີດັ່ງນີ້:

1. ໃຫ້ກວດຄືນ ຂໍ້ມູນເຕັກນິກ ແລະ ຂໍ້ມູນຕ່າງໆ ໃຫ້ສອດຄ່ອງກັບບົດວິພາກເສດຖະກິດເຕັກນິກ ແລະ ສັນຍາ ສຳປະທານ ແລະ ປະສານສົບທົບກັບຂະແໜງການທີ່ກ່ຽວຂ້ອງ ເພື່ອຢັ້ງຢືນຄວາມຖືກຕ້ອງຂອງຂໍ້ມູນດ້ານ ຕ່າງໆເປັນຕົ້ນ ຂໍ້ມູນທີ່ດິນປະເພດຕ່າງໆ, ຖ້າຫາກໂຮງງານເກີດຂຶ້ນຈະມີຜົນກະທົບທາງ ນ້ຳ, ສຽງ, ກິ່ນ, ຄວັນ ປ່າໄມ້ ແລະ ອື່ນໆ ທີ່ຈະເກີດຈາກໂຮງງານຜະລິດ;
2. ຕໍ່ກັບຮ່າງບົດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ຂອງໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝານ ເຫັນວ່າບົດແມ່ນເປັນອັນລວມໆ ສະເໜີໃຫ້ ໂຄງການຕ້ອງໄດ້ເຮັດບົດປະເມີນ ຜົນສະເພາະເປັນອັນລະອຽດຕື່ມ ກ່ຽວກັບ ການຄຸ້ມຄອງໃນການນຳໃຊ້ສານເຄມີທີ່ເປັນອັນຕະລາຍ ແລະ ບັນຫາສິ່ງເສດເຫຼືອ ທີ່ເກີດຈາກການຜະລິດເປັນຕົ້ນ ເປືອກໄມ້, ນ້ຳເສຍ, ມົນລະພິດ, ສຽງ ແລະ ອື່ນໆ ຕ້ອງ ເວົ້າເຖິງການບຳບັດ, ການກຳຈັດສິ່ງເສດເຫຼືອ ແລະ ມາດຕະການ, ວິທີປ້ອງກັນຜົນກະທົບຕ່າງໆ ທີ່ອາດຈະ ເກີດຂຶ້ນກັບໂຄງການ ທີ່ເກີດຈາກໂຮງງານ ແລະ ເກີດຈາກການຕັດໄມ້ຈາກສວນປູກຂອງໂຄງການ ເພື່ອໃຫ້ມີ ຜົນກະທົບໜ້ອຍທີ່ສຸດຈາກໂຄງການ;
3. ສະເໜີໃຫ້ ໂຄງການ ສຶກສາທາງເລືອກໃນການກໍ່ສ້າງໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝານຄືນ ເພາະວ່າເນື້ອທີ່ ທີ່ ບໍລິສັດ ຈະກໍ່ສ້າງໃນປະຈຸບັນ ເຫັນວ່າຂອບເຂດດັ່ງກ່າວຍັງບໍ່ມີຄວາມເໝາະສົມໃນການສ້າງໂຮງງານ ເນື່ອງ ຈາກວ່າເຂດດັ່ງກ່າວແມ່ນຈຸດລວມສູນຂອງອຸດສາຫະກຳຂະໜາດນ້ອຍ ແລະ ເປັນເຂດຂອງ ກອງທັບ 432 ແລະ ໃຫ້ອີງຕາມຄຳສັ່ງເລກທີ 17/ນຍ, ລົງວັນທີ 22 ກັນຍາ 2008 ຂໍ້ 12.1 ໂຮງງານປຸງແຕ່ງໄມ້ ແມ່ນບໍ່ໃຫ້ ຕັ້ງຢູ່ໃນຂອບເຂດ ຫຼື ຕິດກັບປ່າສະຫງວນ, ປ່າປ້ອງການ ແລະ ມີແຕ່ລັດຖະບານເທົ່ານັ້ນມີສິດຕິກລິງໃຫ້ ສ້າງຕັ້ງໂຮງງານປຸງແຕ່ງໄມ້ໃໝ່ ແລະ ສຶກສາ ລະບຽບ ແລະ ຫຼັກການ ໃນການປູກໄມ້ ທີ່ ກະຊວງກະສິກຳ ແລະ ປ່າໄມ້ ກຳນົດໄວ້ໃຫ້ລະອຽດ ເພື່ອໃຫ້ມີຄວາມສະດວກ, ປອດໄພ ແລະ ຖືກຕ້ອງຕາມຂໍ້ກຳນົດ ແລະ ລະບຽບຫລັກການ;
4. ໃຫ້ບໍລິສັດ ຍັບຍ້າຍເນື້ອທີ່ປູກໄມ້ຂອງບໍລິສັດ ອອກຈາກປ່າສະຫງວນ ເພາະປະຈຸບັນເຫັນວ່າ ເນື້ອທີ່ປູກໄມ້ ຂອງບໍລິສັດ ກວມເອົາເຂດປ່າສະຫງວນ ປະມານ 2,173 ເຮັກຕາ ເຊິ່ງເຮັດໃຫ້ ປະຊາຊົນຈຳນວນໜຶ່ງ ສວຍໂອກາດບຸກລຸກພື້ນທີ່ປ່າສະຫງວນດັ່ງກ່າວ ພ້ອມທັງໃຫ້ມີຂໍ້ມູນລະອຽດ, ຊັດເຈນ ແລະ ຈະແຈ້ງຕື່ມ ກ່ຽວກັບ ເນື້ອທີ່ດິນປູກໄມ້ຂອງໂຄງການ;
5. ໃຫ້ບໍລິສັດ ປະສານສົບທົບກັບຂະແໜງການກ່ຽວຂ້ອງ ໂດຍສະຫຼຸບສັງລວມ, ລົງເກັບກຳຂໍ້ມູນເນື້ອທີ່ດິນທັງ ໝົດຂອງໂຄງການຄືນທັງໝົດ, ແຍກເປັນປະເພດທີ່ດິນອອກເປັນແຕ່ລະປະເພດເຊັ່ນ: ດິນທີ່ສັນຍາກັບ

ປະຊາຊົນ, ດິນທີ່ສັນຍາເຊົ່າ ແລະ ສໍາປະທານນໍາລັດ ແລະ ອື່ນໆ ມີເທົ່າໃດ ພ້ອມມີເອກະສານທີ່ກ່ຽວຂ້ອງ ການໄດ້ມາຂອງເນື້ອທີ່ດິນດັ່ງກ່າວ ເພື່ອຮັບປະກັນ ໃຫ້ມີຄວາມຖືກຕ້ອງ ແລະ ຊັດເຈນ ໂດຍໃຫ້ມີຂະແໜງ ການກ່ຽວຂ້ອງໄດ້ເຂົ້າຮ່ວມນໍາ ແລະ ໃຫ້ກວດກາຄືນເນື້ອທີ່ດັ່ງກ່າວ ໃນຮູບແບບ 1+4 ລວມເຖິງຂະບວນການ ຂຶ້ນຕອນເອກະສານຕ່າງໆເປັນໄປຄືແນວໃດ ເພາະວ່າເນື້ອທີ່ຈໍານວນໜຶ່ງກໍ່ກວມເອົາເຂດປ່າສະຫງວນຂອງ ແຂວງ;

6. ໃຫ້ບໍລິສັດ ເບິ່ງຄືນ ເນື້ອທີ່ດິນສວນປູກໄມ້ຂອງບໍລິສັດ ທີ່ຈະມີການບຸກເບີກ ໃຫ້ມີຜົນກະທົບໜ້ອຍທີ່ສຸດຕໍ່ ທາງດ້ານສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທໍາມະຊາດ ແລະ ໃຫ້ຫຼີກລ້ຽງເຊັ່ນ: ດິນປ່າສະຫງວນ, ດິນປ່າປ້ອງກັນ, ດິນປ່າຜະລິດ ແລະ ໃຫ້ເນັ້ນ ກ່ຽວກັບ ການປູກໄມ້ແບບມີສ່ວນຮ່ວມຂອງປະຊາຊົນຕໍ່ໂຄງການ ແລະ ຕໍ່ກັບ ດ້ານວັດຖຸດິບທີ່ຈະປ້ອນເຂົ້າໂຮງງານເຫັນວ່າ ໂຮງງານແມ່ນນໍາໃຊ້ວັດຖຸດິບຫຼາຍພໍສົມຄວນ(124.300 ແມັດ ກ້ອນຕໍ່ປີ ວັດຖຸດິບອາດຈະບໍ່ພຽງພໍ ຄວນສົ່ງເສີມການປູກແບບມີສ່ວນຮ່ວມກັບປະຊາຊົນຜູ້ທີ່ມີດິນ ລັກ ຊະນະ 1+2 ຫຼື 2+3 ແລະ ອື່ນໆ ເພື່ອໃຫ້ໂຮງງານໄດ້ທໍາການຜະລິດເປັນປົກກະຕິ ແລະ ຕໍ່ເນື່ອງ;
7. ສະເໜີໃຫ້ບໍລິສັດ ຈົ່ງເຂດສະຫງວນແຄມນໍ້າ ຖ້າຫາກພື້ນທີ່ປູກໄມ້ຂອງບໍລິສັດຕອນໃຕ້ຫາກຢູ່ໄກ້ແຄມນໍ້າ ແລະ ປູກໄມ້ຊະນິດອື່ນເພື່ອເປັນເຂດກັນຊົນ;
8. ບໍລິສັດ ຈະຕ້ອງປະຕິບັດຕາມລະບຽບຂອງກົມກ່ຽວຂ້ອງ ຂອງກະຊວງກະສິກໍາ ແລະ ປ່າໄມ້ວາງອອກ ໃນ ການຄຸ້ມຄອງ, ການນໍາເຂົ້າປັດໃຈການຜະລິດ ແນວພັນ, ຝຸ່ນ, ປູຍ, ຢາປາບລັດຕຸພິດ ແລະ ອື່ນໆ;
9. ສະເໜີໃຫ້ບໍລິສັດ ແກ້ໄຂບັນຫາຕ່າງໆ ທີ່ຕິດພັນກັບການພັດທະນາໂຄງການ ທີ່ໄດ້ສະເໜີມາໃຫ້ສໍາເລັດ ແລ້ວ ລາຍງານ ໃຫ້ອໍານາດການປົກຄອງແຂວງ, ຂະແໜງການຂອງແຂວງ, ອໍານາດການປົກຄອງເມືອງ ແລະ ບ້ານ ທີ່ ກ່ຽວຂ້ອງ ຮັບຊາບ ແລະ ຈັດກອງປະຊຸມຮ່ວມກັນ ເພື່ອຄວາມເປັນເອກະພາບ;
10. ໃຫ້ບໍລິສັດ ບົວລະພາ ກະສິກໍາປ່າໄມ້ ເອົາບົດຮຽນ ແລະ ບັນຫາ ຈາກບໍລິສັດ ທີ່ເຄີຍລົງທຶນຜ່ານມາ ເຊັ່ນ: ບໍລິສັດ ປູກໄມ້ຂອງ ໂອຈີ, ຈີນຕວງຕາເວັນ ຫຼື ໂຄງການອື່ນ ທີ່ລັດຖະບານເຄີຍອານຸມັດໃຫ້ຈັດຕັ້ງປະຕິບັດ ຜ່ານມາ ເພື່ອນໍາມາເປັນຂໍ້ມູນຕົວແບບໃນການຈັດຕັ້ງປະຕິບັດໂຄງການ ເປັນຕົ້ນແມ່ນການຊົດເຊີຍ ແລະ ທົດ ແທນຄ່າເສຍຫາຍ ທາງດ້ານຊັບສິນຂອງປະຊາຊົນຜູ້ໄດ້ຮັບຜົນກະທົບໃຫ້ເໝາະສົມ ແລະ ມີຄວາມເປັນເອກະ ພາບ ລະຫວ່າງ ຜູ້ໄດ້ຮັບຜົນກະທົບ ແລະ ຜູ້ພັດທະນາໂຄງການ ແລະ ການຈ່າຍຄ່າຊົດເຊີຍ ຕ້ອງຊົດເຊີຍກ່ອນ ການເລີ່ມກໍ່ສ້າງໂຄງການ ລວມທັງ ຂໍ້ມູນລາຍລະອຽດພື້ນທີ່ ທີ່ດິນຂອງປະຊາຊົນ ແລະ ທີ່ດິນສໍາປະທານຈາກ ລັດຖະບານ;
11. ໃຫ້ບໍລິສັດ ນໍາເອົານະໂຍບາຍແຫ່ງຊາດ ໃນການນໍາໃຊ້ທີ່ດິນແຕ່ລະຊະນິດ ໄປເຜີຍແຜ່ໃຫ້ ປະຊາຊົນໄດ້ຮັບ ຊາບ ແລະ ເຂົ້າໃຈຈະແຈ້ງຕື່ມ ພ້ອມທັງໃຫ້ມີມາດຕະການ ແກ້ໄຂຂັ້ນຕ່ຳ ລະຫວ່າງ ຂອບເຂດດິນແດນ ບ້ານຕໍ່ບ້ານ, ເມືອງຕໍ່ເມືອງ ແລະ ຕໍ່ປະຊາຊົນ ຜູ້ທີ່ມີສັນຍາລົງທຶນກັບບໍລິສັດ;
12. ໃຫ້ບໍລິສັດ ຮ່ວມມື ແລະ ປະສານສົມທົບຢ່າງລະອຽດ ກັບຫ້ອງການຂອງຂະແໜງການ ທີ່ກ່ຽວຂ້ອງ ໃຫ້ ຈະແຈ້ງ ກ່ອນຈະດໍາເນີນກິດຈະກໍາຕ່າງໆຂອງໂຄງການ ເພື່ອຮັບປະກັນໃຫ້ມີຄວາມຖືກຕ້ອງ;

13. ສະເໜີໃຫ້ບໍລິສັດ ພິຈາລະນາ ເພີ່ມກອງທຶນພັດທະນາທ້ອງຖິ່ນໃຫ້ແຂວງ, ເມືອງ ແລະ ບ້ານ ຕາມກົດໝາຍຂອງການລົງທຶນ ເພື່ອຊ່ວຍຊຸກຍູ້ໃນການພັດທະນາ ແລະ ສ້າງຄວາມເຂັ້ມແຂງໃຫ້ແກ່ທ້ອງຖິ່ນ ແລະ ໃຫ້ຖືສຳຄັນການປົກສາຫາລິກັນ ເພື່ອແກ້ໄຂບັນຫາຕ່າງໆ ທີ່ກ່ຽວຂ້ອງກັບໂຄງການ;
14. ໃຫ້ບໍລິສັດ ມີຂໍ້ມູນລະອຽດ ແລະ ຈະແຈ້ງ ກ່ຽວກັບ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດຂອງໂຄງການ ຢູ່ໃນໄລຍະຂອງການດຳເນີນໂຄງການ ແລະ ກິດຈະການ ລວມທັງມາດຕະການປ້ອງກັນ ແລະ ຫຼຸດຜ່ອນຜົນກະທົບຕ່າງໆ ວ່າມີກິດຈະກຳໃດແດ່;
15. ໃຫ້ທາງໂຄງການ ກຳນົດລະອຽດ ກ່ຽວກັບ ບົດບາດຂອງພາກລັດໃນການຕິດຕາມກວດກາມາດຕະການຄຸ້ມຄອງສິ່ງແວດລ້ອມໃນສ່ວນປູກ ແລະ ໂຮງງານ ຂອງບໍລິສັດ ພ້ອມທັງປະມານໃນການຕິດຕາມກວດກາສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ຂອງພາກສ່ວນສູນກາງ, ແຂວງ ແລະ ເມືອງ ໃຫ້ລະອຽດຈະແຈ້ງແຕ່ລະໜ້າວຽກ ເພື່ອຄວາມສະດວກໃນການຈັດຕັ້ງປະຕິບັດຕົວຈິງ ລວມທັງປະມານໃນການພັດທະນາທ້ອງຖິ່ນ;
16. ສະເໜີໃຫ້ ບໍລິສັດ ພິຈາລະນາ ນຳໃຊ້ແຮງງານທ້ອງຖິ່ນ ຈັດເປັນບຸລິມະສິດ ໂດຍສະເພາະແມ່ນຄອບຄົວທີ່ໄດ້ເອົາດິນໃຫ້ບໍລິສັດເຊົ່າປູກໄມ້ເປັນອັນດັບທຳອິດ;
17. ໃຫ້ມີການປະຊາສຳພັນເຜີຍແຜ່ຂໍ້ມູນຂ່າວສານ ກ່ຽວກັບ ແຜນພັດທະນາໂຄງການ ແລະ ຂໍ້ມູນທາງດ້ານຜົນກະທົບທີ່ຈະເກີດຂຶ້ນ ແລະ ຜົນປະໂຫຍດທີ່ຈະໄດ້ຮັບ ໃຫ້ປະຊາຊົນ ແລະ ພາກສ່ວນທີ່ກ່ຽວຂ້ອງໄດ້ຮັບຊາບ ແລະ ເຂົ້າໃຈຈະແຈ້ງຂຶ້ນຕື່ມ;
18. ໃຫ້ຜູ້ພັດທະນາໂຄງການ ສ້າງແຜນການທົດແທນຄ່າເສຍຫາຍ ໂດຍສອດຄ່ອງກັບດຳລັດ ວ່າດ້ວຍ ການທົດແທນຄ່າເສຍຫາຍ ແລະ ການຈັດສັນຍົກຍ້າຍປະຊາຊົນຈາກໂຄງການພັດທະນາ ສະບັບເລກທີ 84/ລບ, ລົງວັນທີ 5 ເມສາ 2016 ແລະ ລະບຽບກົດໝາຍທີ່ກ່ຽວຂ້ອງ;
19. ສະເໜີໃຫ້ບໍລິສັດ ແກ້ໄຂບັນຫາຕ່າງໆທີ່ໄດ້ສະເໜີມາໃຫ້ສຳເລັດ ແລ້ວລາຍງານໃຫ້ ເມືອງ, ແຂວງ ແລະ ຂະແໜງການທີ່ກ່ຽວຂ້ອງຮັບຊາບ ແລະ ຈັດກອງປະຊຸມປຶກສາຫາລືຮ່ວມກັນ ເພື່ອຄວາມເປັນເອກະພາບ;
20. ໃຫ້ປັບປຸງບົດລາຍງານ ຕາມບົດແນະນຳ ວ່າດ້ວຍ ການສ້າງບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ຂອງໂຄງການລົງທຶນ ແລະ ກິດຈະການຕ່າງໆ , ສະບັບເລກທີ 2796.1/ກຊສ.ກປສສ.ພຄຕ, ລົງວັນທີ 19 ທັນວາ 2016, ໃຫ້ຖືກຕ້ອງ ແລະ ສອດຄ່ອງຕາມລະບຽບກົດໝາຍຕ່າງໆທີ່ກ່ຽວຂ້ອງ;
21. ໃຫ້ເຈົ້າຂອງໂຄງການກໍ່ຕີ ບໍລິສັດ ທີ່ປຶກສາບໍລິການສິ່ງແວດລ້ອມ ນຳເອົາຄຳຄິດຄຳເຫັນຂອງກອງປະຊຸມໄປຄົ້ນຄ້ວາພິຈາລະນາ ແລະ ປັບປຸງເຂົ້າໃນ ບົດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ.

ຈາກນັ້ນ, ຕາງໜ້າຄະນະປະທານກອງປະຊຸມ ກໍໄດ້ສະຫຼຸບຕີລາຄາກອງປະຊຸມຄັ້ງນີ້ ແມ່ນໄດ້ບັນລຸຜົນ ຕາມ
ຈຸດປະສົງ ແລະ ຄາດໝາຍຂອງກອງປະຊຸມທີ່ວາງໄວ້, ພ້ອມນັ້ນ ປະທານກອງປະຊຸມ ຍັງເນັ້ນໜັກໃຫ້ ອຳນາດການ
ປົກຄອງບ້ານ ນຳເອົາເນື້ອໃນຈິດໃຈ ແລະ ຜົນຂອງການປຶກສາຫາລືໃນກອງປະຊຸມຄັ້ງນີ້ ໄປເຜີຍແຜ່ໃຫ້ປະຊາຊົນພາຍ
ໃນບ້ານຂອງຕົນໃຫ້ຮັບຊາບ ແລະ ປຶກສາຫາລືກັບປະຊາຊົນ ແລະ ເຖິງແກ່ແນວໂຮມ ພາຍໃນບ້ານ ກ່ຽວກັບ ແຜນ
ພັດທະນາຂອງໂຄງການ ແລະ ການມີສ່ວນຮ່ວມຂອງປະຊາຊົນຕໍ່ໂຄງການພ້ອມທັງເນັ້ນໜັກໃຫ້ ບໍລິສັດທີ່ປຶກສາສິ່ງ
ແວດລ້ອມ ສືບຕໍ່ສົມທົບແທ້ໆກັບຜູ້ພັດທະນາໂຄງການ ນຳເອົາບັນຫາສຳຄັນທີ່ໄດ້ມີຄວາມເປັນເອກະພາບກັນໃນທີ່
ປະຊຸມໄປພິຈາລະນາສືບຕໍ່ປັບປຸງ ຍົດລາຍງານ ໃຫ້ສົມບູນ, ຄົບຖ້ວນ ທັງໃຫ້ລະອຽດ ແລະ ຈະແຈ້ງ ເປັນທີ່ຮັບຮອງ
ເອົາໄດ້ໃນຕໍ່ໜ້າ.

ກອງປະຊຸມໄດ້ປິດລົງຢ່າງເປັນທາງການໃນເວລາ 12:00 ຂອງວັນທີ 06 ກັນຍາ 2017.

ທີ່ແຂວງວຽງຈັນ, ວັນທີ 06 ກັນຍາ 2017.

ບໍລິສັດ ທີ່ປຶກສາ
ເອິດ ຊິສສະເຕີມ ຈຳກັດ

ຜູ້ພັດທະນາໂຄງການ
ບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ

ຜູ້ບັນທຶກ

ບົວແກ້ວ ພູນສະຫວັດ

ຄະນະ ປະທານຮ່ວມກອງປະຊຸມ

1. ຮອງຫົວໜ້າ ກອງປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ

ທ່ານ ຖາວອນ ວົງໄພສີ

2. ຮອງເຈົ້າເມືອງ ເມືອງຫີນເຫີບ

ທ່ານ ວອນ ວໍລະສານ

3. ຮອງຫົວໜ້າ ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ແຂວງວຽງຈັນ

ທ່ານ ບຸນຮຽງ ໄຊຍະແສງ

II

ຈັດກອງປະຊຸມເພີ່ມແຜ່ຮູ້ບຸກຄົນສ່ວນສານ ແລະ ປົກສາທາລະນະເມືອງ ກ່ຽວກັບການມີສ່ວນຮ່ວມຂອງນວນຊົນ ໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ, ໄມ້ແກນ ແລະ ໂຮງງານ ກະສິກໍາປ່າໄມ້ ຂອງບໍລິສັດ ບົວລະພາກະສິກໍາ-ປ່າໄມ້ ຈຳກັດ, ທີ່ເມືອງຫີນຫີບ, ແຂວງວຽງຈັນ ຄັ້ງວັນທີ 05-06/09/2017.

ກອງປະຊຸມເພີ່ມກະທົບຕໍ່ສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ

ສົງຄະນະ

ພາກສ່ວນ: ແຂວງວຽງຈັນ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕໍາແໜ່ງ	ເບີໂທລະສັບ	ລາຍຊື່
1	ທ່ານ ມະນີ ສິມສິມາ	ພະຊາດ ແຂວງວຽງຈັນ	ຮຽນສູນ ພະນັກງານ	22209503	
2	ທ່ານ ພ. ບໍລິເວນ ພະນັກສູນ	ພະຊາດ ແຂວງ	ອຳນາດ	28309683	
3	ທ່ານ ນ. ໂທກາດ ສິມສິມາ	ພະຊາດ ແຂວງ	ອຳນາດສູນ	02098091091	
4	ທ່ານ ຂ. ລາງທອງ ໄຊຍາວຽງ	ພະແນກອຸດສາຫະກຳ ແລະ ການຄ້າ	ຮຽນສູນສູນກະຊວງ	02055625577	
5	ທ່ານ ສ. ໄກສອນ ສິມສິມາ	ພະແນກກະສິກໍາ-ປ່າໄມ້	ຮຽນສູນສູນກະຊວງ	92101619	
6	ທ່ານ ພ. ສາວິມະ ສິມສິມາ	ພະແນກແຜນການ ແລະ ການລິງຫິນ	ທ່ານ ສາວິມະ ສິມສິມາ	02444808	
7	ທ່ານ ສິມສິມາ ສິມສິມາ	ພະນັກງານສັບສິດ	-	22411457	
8	ທ່ານ	ພະນັກງານສັບສິດ			

III

ຈັດກອງປະຊຸມເຜີຍແຜ່ຂໍ້ມູນຂ່າວສານ ແລະ ປຶກສາຫາລືຂັ້ນເມືອງ ກ່ຽວກັບການມີສ່ວນຮ່ວມຂອງບ່ອນຊົນ ໃດກາງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ, ໄມ້ຜ່ານ ແລະ ໂຮງງານ
ກະສິກໍາປ່າໄມ້ ຂອງບໍລິສັດ ປົວລະພາກະສິກໍາປ່າໄມ້ ຈຳກັດ, ທີ່ເມືອງຫີນເຫີຍ, ແຂວງວຽງຈັນ ຄັ້ງວັນທີ 05-06/09/2017.

ກອງປະຊຸມເຜີຍແຜ່ກະທົບຕໍ່ສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ

ລູກຂະບຽນ

ພາກສ່ວນ: ເມືອງຫີນເຫີຍ

ນະຄອນຫຼວງວຽງຈັນ,

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ຜົນໂທລະສັບ	ລາຍເຊັນ
1	ທ່ານ ສິມພັນ ວິລະສາວ	ຫ້ອງວ່າການປົກຄອງເມືອງ	ສອນທິກິມເຊຍ	5552.5522	
2	ທ່ານ ຄຳຜູ້ ຊຸລະວິທະຍາ	ຫ້ອງວ່າການປົກຄອງເມືອງ	ວິວາລາ	567837993	
3	ທ່ານ ທຳວິພວດ ສິມພັນທຸກຸ້າ	ຫ້ອງການ ຊຸສ ເມືອງ	ຮຽນທິສິມພັນ	55304925	
4	ທ່ານ ທຳວິພວດ ສິມພັນທຸກຸ້າ	ຫ້ອງການ ຊຸສ	ທຳ	55422222	
5	ທ່ານ ສິມພັນ ວິລະສາວ	ຫ້ອງການ ຊຸສ	ທຳ	55464209	
6	ທ່ານ ສິມພັນ ວິລະສາວ	ຫ້ອງການ ຊຸສ ທະຫວ່າງ ແລະ ການຄ້າ	ທຳ	54433525	
7	ທ່ານ ອາກິນ ຜົນເພັດ	ຫ້ອງການ ກະສິກໍາປ່າໄມ້	ທຳ	44242111	
8	ທ່ານ ສິມພັນ ວິລະສາວ	ຫ້ອງການ ໂຍທາທິການ ຂົນສົ່ງ	ທຳ	55928399	
9	ທ່ານ ສິມພັນ ວິລະສາວ	ຫ້ອງການ ແຜນການ ແລະ ການລົງທຶນ	ທຳ	5525999	
10	ທ່ານ ສິມພັນ ວິລະສາວ	ຫ້ອງການ ຊຸສ ທະຫວ່າງ ຊຸສ ແລະ ການຄ້າ	ທຳ	55422222	
11	ທ່ານ ສິມພັນ ວິລະສາວ	ຫ້ອງການ ສະຫະພັນແຜ່ນດິນລາວ	ທຳ	020553323323	

12	ทำนบ หนองน้ำ	ทำนบกั้นน้ำ	25/1/2562	5960198240	[Signature]
13	ทำนบ หนองน้ำ	ทำนบกั้นน้ำ	25/1/2562	5960198240	[Signature]
14	ทำนบ หนองน้ำ	ทำนบกั้นน้ำ	25/1/2562	5960198240	[Signature]
15	ทำนบ หนองน้ำ	ทำนบกั้นน้ำ	25/1/2562	5960198240	[Signature]
16	ทำนบ หนองน้ำ	ทำนบกั้นน้ำ	25/1/2562	5960198240	[Signature]
17	ทำนบ หนองน้ำ	ทำนบกั้นน้ำ	25/1/2562	5960198240	[Signature]
18	ทำนบ หนองน้ำ	ทำนบกั้นน้ำ	25/1/2562	5960198240	[Signature]

IV



ຈັດກອງປະຊຸມເຕີຍແຕ່ຂຶ້ນຊ່ວຍສາມ ແລະ ປຶກສາຫາລືຂຶ້ນເມືອງ ກ່ຽວກັບການມີສ່ວນຮ່ວມຂອງບັນດາຊົນ ໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ, ໄມ້ຝານ ແລະ ໂຮງງານ ກະສິກຳປ່າໄມ້ ຂອງບໍລິສັດ ບົວລະພາກະສິກຳປ່າໄມ້ ຈຳກັດ, ທີ່ເມືອງຫົນເຫີນ, ແຂວງວຽງຈັນ ຄັ້ງວັນທີ 05-06/09/2017.

ກອງປະຊຸມເຕີຍກະທົບຕໍ່ສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ

ລົງທະບຽນ

ພາກສ່ວນ: ບ້ານຂອງເມືອງຫົນເຫີນ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍເຊັນ
1	ທ່ານ ເຂັດ ວິໄລ	ບ້ານ ຄອນພູກ	ນາຍບາບາ	095457908	
2	ທ່ານ ມາໄຮ່	ບ້ານ ຄອນພູກ	ບໍລິຫານສາທາລະນະ	09566613	
3	ທ່ານ ສຸພິດ ພອນສິວ	ບ້ານ ໂພນສູງ	ນາຍບາບາ	08518439	
4	ທ່ານ ວິໄລ ວິມວິນ	ບ້ານ ໂພນສູງ	ນາຍບາບາ	59745526	ວິໄລ
5	ທ່ານ ວິໄລ ພອນສິວ	ບ້ານ ວຽງທອງ	ນາຍບາບາ	98917914	
6	ທ່ານ ວິໄລ ພອນສິວ	ບ້ານ ວຽງທອງ	ສາທາລະນະ	56003852	ວິໄລ ພອນສິວ
7	ທ່ານ ສິດທິ ສິດທິ	ບ້ານ ບໍ່ຈານ	ນາຍບາບາ	50569422	
8	ທ່ານ ວິໄລ ພອນສິວ	ບ້ານ ບໍ່ຈານ	ປະທານພະຍາຍາມ		
9	ທ່ານ ວິໄລ ພອນສິວ	ບ້ານ ຫົນງູນ	ນາຍບາບາ	159931213	
10	ທ່ານ ວິໄລ ພອນສິວ	ບ້ານ ຫົນງູນ	ບໍລິຫານສາທາລະນະ	030579493	ວິໄລ ພອນສິວ
11	ທ່ານ ວິໄລ ພອນສິວ	ບ້ານ ຫົນຕິດ	ນາຍບາບາ	544397844	

28	ທ່ານ		ບ້ານ ໂພນສະຫວັນ			
29	ທ່ານ ວິມະວິໄນ ສິມສິດ		ບ້ານ ໂພນທອງເໝີອ	ສອນເຮືອນ	SS246536	
30	ທ່ານ		ບ້ານ ໂພນທອງເໝີອ			
31	ທ່ານ		ຕ້າງຫ້າງບ້ານ			
32	ທ່ານ ທິພິນ ສິມສິດ		ຕ້າງຫ້າງບ້ານ	ຮູບສະແດງ	SS096248	



ແຜນຈັດກອງປະຊຸມເຜີຍແຜ່ຂໍ້ມູນ ແລະ ປຶກສາຫາລື ຂັ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງພວນຊົນ ຕໍ່ຮ່າງປັດລາຍງານ ການປະເມີນຕົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝານ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ປົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ທີ່ຕ້ອງວ່າການປົກຄອງເມືອງຫີນເຫີບ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາກສ່ວນ ເມືອງໃໝ່ໂຮງ








ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍເຊັນ
1.	ທ່ານ ອຸດອວ ສິງວິໄສວຽງ	ເຈົ້າເມືອງເມືອງໃໝ່ໂຮງ	ຮຽງ ເລີ້ ສີສິງ	໑໑໑໑1848	
2.	ທ່ານ ຊາວິມາ ແອັດໂສໂພນ	ຫ້ອງວ່າການປົກຄອງເມືອງໃໝ່ໂຮງ	ໂຍ/ແ ແລ້ວ ສຸນ	໗໕໗໗7໗໗6	
3.	ທ່ານ ວົງສັກ ອຸໄປະເລີ	ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມເມືອງ	ອຸ ໂອ ກະ ຊຸ ມ ຊ ມ ກ ມ ຣ	໑໑໑໑1໑18	
4.	ທ່ານ ສົງທຸກ ວອດທະວິຈາ	ຫ້ອງການ ແຜນການ ແລະ ການລິງທິນ	ວິ ກ ັ ລ ກ ມ ນ	໑5໔25໔໑	
5.	ທ່ານ ແກ່ທຸ ວິຈິສຸດ	ຫ້ອງການ ກະສິກຳ-ປ່າໄມ້	ສຸ ກ ັ ມ ນ ມ ນ ສ ມ	໑580211໘	
6.	ທ່ານ ອາ. ພິ. ອຸ.	ພະນັກງານຂັບລົດ		໑521005໓	
7.	ທ່ານ	ພະນັກງານຂັບລົດ			

ຜູ້ບັນທຶກ

VI

ແຜນຈັດການປະຊາມາດເພີ່ມແຕ່ຂຶ້ນ ແລະ ປົກສາຫາລື ຂັ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງນວນຊົນ ຕໍ່ຮ່ຳປັດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່
ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝາກ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-
ປ່າໄມ້ ຈຳກັດ ທີ່ຫ້ອງວ່າການປົກຄອງເມືອງຫົນຫີນ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາກສ່ວນ ບ້ານເມືອງໂພນໂຮງ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍຊື່ນ
1.	ທ່ານ ສິມສິດ ທິມວົງ	ບ້ານຫ້ວຍເຕືອ	2110 ບົນ	96965016	
2.	ທ່ານ	ບ້ານຫ້ວຍເຕືອ			
3.	ທ່ານ	ບ້ານໜອງຂອນ	ບ້ານໜອງຂອນ	55088425	
4.	ທ່ານ ກຳມະ ລັດທະນະນະນຸນ	ບ້ານໜອງຂອນ	6021 ພັກ ບົນ	54221446	
5.	ທ່ານ ສິມສິດ ລາດທະນາດ	ບ້ານໂພນເງິນ	ພາຍຍາວ	034993537	
6.	ທ່ານ ສິມສິດ	ບ້ານໂພນເງິນ	ບ້ານໂພນເງິນ 9	59170133	
7.	ທ່ານ	ບ້ານສະກຳ	ບ້ານສະກຳ	55110753	
8.	ທ່ານ	ບ້ານສະກຳ			
9.	ທ່ານ	ບ້ານວັງມົນ			
10.	ທ່ານ ລາດທະນາ	ບ້ານວັງມົນ	ວຽງຈັນ ບົນ	55969222	

11.	ឃុំ ស្រុក ស្រុក	ព្រះវិហារ	ស្រុក	554 384 65	ផ្លូវ
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ផ្លូវ

VIII

ແຜນຈັດການປະຊຸມເພີ່ມເຕີມແລະ ປັບປຸງສາທາລະນະ ຂັ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງບ່ອນຊົມ ຕໍ່ຮ່າງປັດລາຍການ ການປະເມີນຜົນກະທົບຕໍ່
ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄຟຮັດ ແລະ ໄຟຟ້າ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ປົວລະພາ ກະສິກຳ-
ປ່າໄມ້ ຈຳກັດ ທີ່ຫ້ອງວ່າການປົກຄອງເມືອງຫີນຫີບ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາສາສ່ວນ ເມືອງແຕ້ວອຸດົມ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາສາສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍຊື່
1.	ທ່ານ ປິວລາ ປະກາດີ	ເຈົ້າເມືອງເມືອງແຕ້ວອຸດົມ	ສາເລີ້ ແຮງ	໘໕໕໐໓໑໑໑	
2.	ທ່ານ ສິມສອນ ພິມມະສິດີ	ຫ້ອງວ່າການປົກຄອງເມືອງແຕ້ວອຸດົມ	ສາທິວ ພິມມະສິດີ	໐໒໒໒ ໒໒໒໒	
3.	ທ່ານ ສາວະລີ	ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມເມືອງ	ສາ ພິມມະສິດີ	໕໕໕໕໕໕	
4.	ທ່ານ ສະຫວັນ ສິລະສິດສິດ	ຫ້ອງການ ແຜນການ ແລະ ການລົງທຶນ	ສິລະສິດ	໐໐໐໐໐໐໐໐	
5.	ທ່ານ ພິມມະສິດ ພິມມະສິດ	ຫ້ອງການ ກະສິກຳ-ປ່າໄມ້	ສິມສອນ	໐໐໐໐໐໐໐໐	
6.	ທ່ານ ພິມມະສິດ ພິມມະສິດ	ພະນັກງານຊັບສິດ	ສິມສອນ ພິມມະສິດ	໐໐໐໐໐໐໐໐	
7.	ທ່ານ ສິມສອນ ພິມມະສິດ	ພະນັກງານຊັບສິດ	ສິມສອນ ພິມມະສິດ	໐໐໐໐໐໐໐໐	

໔ ກິ ລາ ພິມມະສິດ
໘ ສາ ພິມມະສິດ
໑໒ ສິມສອນ ພິມມະສິດ
໑໕ ສິມສອນ
໑໘ ສິມສອນ
໒໑ ສິມສອນ
໒໔ ສິມສອນ
໒໗ ສິມສອນ
໓໐ ສິມສອນ

VIII

ແຜນຈັດກອງປະຊຸມເຕີຍແຜ່ຂໍ້ມູນ ແລະ ປຶກສາຫາລື ຂຶ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງນວນຊົນ ຕໍ່ຮ່າງບົດລາຍງານ ການປະເມີນເຕີຍກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານເມັຍັດ ແລະ ໄມ້ຝາຍ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-

ປ່າໄມ້ ຈຳກັດ ທີ່ຕ້ອງວ່າການປົກຄອງເມືອງຫົນເຫີບ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາກສ່ວນ ປ່າໄມ້ເມືອງແຕ້ວອຸດົມ







ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍຊື່
1.	ທ່ານ ວະນິສະຖານ	ບ້ານດານສະຫວັນ			
2.	ທ່ານ ບໍາເລງ	ບ້ານດານສະຫວັນ		511239168	

ຜູ້ບັນທຶກ



ແຜນຈັດກອງປະຊຸມເພື່ອແຕ່ງຂໍ້ມູນ ແລະ ປຶກສາຫາລື ຂຶ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງນວນຊົນ ຕໍ່ຮ່າງບົດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄຟຮັດ ແລະ ໄມ້ຝາຍ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ທີ່ຕ້ອງວ່າການປົກຄອງເມືອງຫົນຫົນ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາກສ່ວນ ແຂວງເຊສີມບູນ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍເຊັນ
1.	ທ່ານ ທາງປາກ ສັດຕະນະນຸງ	ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ	ຮັກສາພື້ນທີ່ພະຍາກອນ	22215836	
2.	ທ່ານ ສິງຄິ່ງ ເຜີ້ນກົວ.	ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ	ຮັກສາພື້ນທີ່	99455501	
3.	ທ່ານ ສຸວັນ	ພະແນກ ແຜນການ ແລະ ການລົງທຶນ	ຮັກສາພື້ນທີ່	56009981	
4.	ທ່ານ ສິສິວອັນ	ພະແນກ ກະສິກຳ-ປ່າໄມ້	ຮັກສາພື້ນທີ່	29164542	
5.	ທ່ານ ສິງຄິ່ງ ສິງຄິ່ງ	ພະນັກງານຂັບລົດ	ຮັກສາພື້ນທີ່	9600448	
6.	ທ່ານ ສິງຄິ່ງ ສິງຄິ່ງ	ພະນັກງານຂັບລົດ	ຮັກສາພື້ນທີ່	96663604	

ຜູ້ບັນທຶກ



ແຜນຈັດການປະຊາມາດແຜ່ຂຶ້ນ ແລະ ປົກສາຫາລື ຂຶ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງພວນຊົນ ຕໍ່ຮ່າງປັດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການໄຟ້ອັດ ແລະ ໄຟ້ຝາງ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ທີ່ຕ້ອງວ່າການປົກຄອງເມືອງຫົນທົບ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາກສ່ວນ ເມືອງອານຸວັງ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍຊື່ນ
1.	ທ່ານ ສິນທິ ພອນສິນ	5 ເຈົ້າເມືອງເມືອງອານຸວັງ	ສຳນັກເມືອງ	99860372	Cluek
2.	ທ່ານ ທິນທິພອນ	ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມເມືອງ	ຫົວໜ້າ	99259891	ceana
3.	ທ່ານ ທິນທິພອນ	ຫ້ອງການ ແຜນການ ແລະ ການລົງທຶນ	ພ.ນ.ສ.	54009524	Cony
4.	ທ່ານ ອິວະສາ ແຮງສິນທິ	ຫ້ອງການ ກະສິກຳ-ປ່າໄມ້	ສຳນັກເມືອງ	99259140	Cony
5.	ທ່ານ ອາວຸຊິ ສິນທິພອນ	ພະນັກງານຊັບສິດ	ສຳນັກ ທ່ອງທ່ຽວ	0905758860	Cony
6.	ທ່ານ ອິວະສາ ພອນ	ພະນັກງານຊັບສິດ	ອຸຍທນ	92445234	Cony

ຜູ້ບັນທຶກ



ແຜນຈັດການປະຊາມາດຕິຍະແຕ່ຂໍ້ມູນ ແລະ ປຶກສາຫາລື ຂັ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງບ່ອນຊົມ ຕໍ່ສ່ຽງປັດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝາຍ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ປົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ທີ່ຫ້ອງວ່າການປົກຄອງເມືອງຫົນເຫີຍ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາກສ່ວນ ບ້ານເມືອງອານຸວົງ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍເຊັນ
1.	ທ່ານ ບຸນ ແອນ	ບ້ານນ້ອງຊຸມ	ບຸນ ບຸນ ບຸນ	020 5119450	
2.	ທ່ານ ແອນ ໄລ	ຕ່າງໜ້າບ້ານ	ທ້າວ ພິ ສິ ພິ	030 9144270	

3 ທ້າວ ພິ ສິ ພິ

ສົງ ສາຍ ພິ




02098880717

ຜູ້ບັນທຶກ

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ແຜນຈັດການປະຊາມາດພິເສດແຕ່ຂັ້ນນຳ ແລະ ປຶກສາຫາລື ຂັ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງພວນຊື່ນ ຕໍ່ຮ່າງປັດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄຟຮັດ ແລະ ໄມ້ຝາງ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ປົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ທີ່ຕ້ອງວ່າການປົກຄອງເມືອງຫົນເຫີນ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາກສ່ວນ ແຂວງໄຊຍະບູລີ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍຊື່ນ
1.	ທ່ານ ຈິນທາວົງ ສິດພະສອນ	ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ	ອຳເພີ	56935400	
2.	ທ່ານ	ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ			
3.	ທ່ານ	ພະແນກ ແຜນການ ແລະ ການລົງທຶນ			
4.	ທ່ານ ສິດພິດ ສິດສິດສິດ	ພະແນກ ກະສິກຳ-ປ່າໄມ້	ອຳເພີ	58246798	
5.	ທ່ານ ຈິນທາວົງ ສິດພະສອນ	ໂຄງການກະສິກຳ-ປ່າໄມ້ ພະນັກງານຂັບລົດ	ອຳເພີ	59567610	
6.	ທ່ານ				

ຕື່ມທຳ

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ແຜນຈັດກອງປະຊຸມເຕີຍແຕ່ຂໍ້ມູນ ແລະ ປຶກສາຫາລື ຂຶ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງບ່ວນຊົນ ຕໍ່ຮ່າງບົດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝານ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-

ປ່າໄມ້ ຈຳກັດ ທີ່ຕ້ອງວ່າການປົກຄອງເມືອງຫົນເຫີບ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາກສ່ວນ ເມືອງປາກລາຍ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍຊື່
1.	ທ່ານ ທະນາຄອ ວິຫານລາຍ	ເຈົ້າເມືອງເມືອງປາກລາຍ	ທ່ານ ວິຫານລາຍ	08222299	
2.	ທ່ານ ນາຍ ທະນາຄອ ວິຫານລາຍ	ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມເມືອງ	ທ່ານ ນາຍ ທະນາຄອ	02365529	
3.	ທ່ານ ສິງຄອນ ທະນາຄອ	ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມເມືອງ	ທ່ານ ສິງຄອນ ທະນາຄອ	02046659	
4.	ທ່ານ ສິງຄອນ ທະນາຄອ	ຫ້ອງການ ກະສິກຳ-ປ່າໄມ້	ທ່ານ ສິງຄອນ ທະນາຄອ	02146666	
5.	ທ່ານ ນາຍ ທະນາຄອ	ຫ້ອງການ ແຜນການ ແລະ ການລົງທຶນ	ທ່ານ ນາຍ ທະນາຄອ	029982693	
6.	ທ່ານ ທະນາຄອ	ພະນັກງານຂັບລົດ	ທ່ານ ທະນາຄອ	-	
7.	ທ່ານ ທະນາຄອ	ພະນັກງານຂັບລົດ	ທ່ານ ທະນາຄອ	-	
8.	ທ່ານ ທະນາຄອ	ພະນັກງານຂັບລົດ	ທ່ານ ທະນາຄອ	-	

ຜູ້ບັນທຶກ

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ແຜນຈັດຕັ້ງປະຊາບເຕີຍແຕ່ຂໍ້ມູນ ແລະ ປຶກສາຫາລື ຂັ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງບາງຊົນ ຕໍ່ຮ່າງປັດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝານ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ປົວລະພາ ກະສິກຳ-

ປ່າໄມ້ ຈຳກັດ ທີ່ໜ້ອງວ່າການປົກຄອງເມືອງຫົນທົນ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາສ່ວນ ປ້ານເມືອງປາກລາຍ






ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍເຊັນ
1.	ທ່ານ ສິມພາວໄຈ ລຽມິນ	ບ້ານໂຄກສະຫວັນ	ນາຍບາດ	55569190	
2.	ທ່ານ ສິມພາ ທວນະວິໄຈ	ບ້ານກາງ	ແມ່ນາ	231162444	
3.	ທ່ານ ສິມພາ ພອນສິ	ບ້ານກວ້າງ	ສາຍຮັບໄຟ	030993022	
4.	ທ່ານ ສິມພາ ສິມພາ	ບ້ານກວ້າງ	ນາຍບາດ	48450321	
5.	ທ່ານ ສິມພາ ພອນສິ	ບ້ານນາງ	ຊາຍຮັບໄຟ	0305522000	
6.	ທ່ານ ສິມພາ	ຕ່າງໜ້າກຸ່ມບ້ານ		0304564355	

ຜູ້ບັນທຶກ



ແຜນຈັດກອງປະຊຸມເຕີຍແຕ່ຂໍ້ມູນ ແລະ ປຶກສາຫາລື ຂັ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງມວນຊົນ ຕໍ່ຮ່າງບົດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄຟ້ອັດ ແລະ ໄມ້ເຕນ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ທີ່ຫ້ອງວ່າການປົກຄອງເມືອງຫີນເຕີຍ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາກສ່ວນ ນະຄອນຫຼວງວຽງຈັນ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍຮຸ້ນ
1.	ທ່ານ ສິມສິນ ຫຸ້ນ ສິມສິນ ຫຸ້ນ	ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມສັງຄົມ	ຮຽງ ພະ ພົນ	22225000	
2.	ທ່ານ ສິມສິນ ຫຸ້ນ	ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ	ສິມສິນ ຫຸ້ນ	92219551	
3.	ທ່ານ	ພະແນກ ແຜນການ ແລະ ການລົງທຶນ			
4.	ທ່ານ ສິມສິນ ຫຸ້ນ	ຫ້ອງກະສິກຳ-ປ່າໄມ້	ສິມສິນ ຫຸ້ນ	54488199	
5.	ທ່ານ ສິມສິນ ຫຸ້ນ	ພະນັກງານຂັບລົດ	ສິມສິນ ຫຸ້ນ	29906005	
6.	ທ່ານ ສິມສິນ ຫຸ້ນ	ພະນັກງານຂັບລົດ	ສິມສິນ ຫຸ້ນ	22225000	

ຜູ້ບັນທຶກ

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ແຜນຈັດການອຸປະຊຸມເພີ່ມແຕ່ຂຶ້ນ ແລະ ປົກສາຫາລື ຂຶ້ນເມືອງ ກ່ຽວກັບ ການມີສ່ວນຮ່ວມຂອງພວນຊົນ ຕໍ່ຮ່າງບົດລາຍງານ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝານ ແລະ ໂຄງການກະສິກຳ-ປ່າໄມ້ ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-


ປ່າໄມ້ ຈຳກັດ ທີ່ຫ້ອງວ່າການປົກຄອງເມືອງຫົນແຫຼ້ນ, ແຂວງວຽງຈັນ ລະຫວ່າງວັນທີ 05-07/09/2017

ພາກສ່ວນ ເມືອງໄຊທານີ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທລະສັບ	ລາຍຊື່
1.	ທ່ານ	ເຈົ້າເມືອງເມືອງໄຊທານີ			
2.	ທ່ານ ສຸວັນ ສິມສິນ ສິມສິນ	ຫ້ອງການຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມເມືອງ	ຫົວໜ້າຫ້ອງການສິ່ງແວດລ້ອມ	55412859	
3.	ທ່ານ ສຸວັນ ສິມສິນ ສິມສິນ	ຫ້ອງການ ກະສິກຳ-ປ່າໄມ້	ຫົວໜ້າຫ້ອງການກະສິກຳ-ປ່າໄມ້	5950508	
4.	ທ່ານ	ຫ້ອງການ ແຜນການ ແລະ ການລິງທິນ			
5.	ທ່ານ ທ່ານ ທ່ານ ສິມສິນ ສິມສິນ	ພະນັກງານຂັບລົດ		22401246	
6.	ທ່ານ ສິມສິນ ສິມສິນ	ພະນັກງານຂັບລົດ			
7.	ທ່ານ	ພະນັກງານຂັບລົດ			

ຜູ້ບັນທຶກ

15.8 Annex 8: Formal District/Provincial ESIA Consultation Minutes and List of Participants



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນະຖາວອນ

ບົດບັນທຶກ

ກອງປະຊຸມປຶກສາຫາລື ຂຶ້ນວິຊາການ ກ່ຽວກັບ ບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ໂຄງການປູກໄມ້ວິກ ແລະ ໂຮງງານໄມ້ຝາຍ ແລະ ໄມ້ອັດ ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ຕັ້ງວັນທີ 5 ເມສາ 2018 ທີ່ຫ້ອງປະຊຸມ ຫ້ອງວ່າການປົກຄອງ ເມືອງໂພນໂຮງ ແຂວງວຽງຈັນ

ວັນທີ 5/4/2018 ເວລາ 08:30 ໂມງ ກົມນະໂຍບາຍຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ (ກນຊສ), ກະຊວງຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ (ກຊສ) ໄດ້ສົມທົບກັບ ອຳນາດການປົກຄອງບ້ານ 16 ບ້ານທີ່ຂຶ້ນກັບເມືອງຫີນເຫີຍ ແລະ 5 ບ້ານ ທີ່ຂຶ້ນກັບເມືອງໂພນໂຮງ, ຂະແໜງການທີ່ກ່ຽວຂ້ອງ ເມືອງຫີນເຫີຍ ແລະ ເມືອງໂພນໂຮງ ຂະແໜງການຂອງແຂວງ ພ້ອມດ້ວຍ ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ແຂວງວຽງຈັນ ຈັດກອງປະຊຸມປຶກສາຫາລືຂຶ້ນວິຊາການ ກ່ຽວກັບ ບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ໂຄງການປູກໄມ້ວິກ ແລະ ໂຮງງານໄມ້ຝາຍ ແລະ ໄມ້ອັດ ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ. ເຊິ່ງມີຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ ທັງໝົດ 85 ທ່ານ (ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມໄດ້ຕັດຕົດມາພ້ອມນີ້).

ກອງປະຊຸມຈັດຂຶ້ນ ໂດຍມີຈຸດປະສົງເພື່ອປຶກສາຫາລື ກ່ຽວກັບ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ເຊິ່ງໄດ້ສັບຟັງການນຳສະເໜີ ກ່ຽວກັບ ແຜນການພັດທະນາໂຄງການ ປະຫວັດຄວາມເປັນມາ ແລະ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ທີ່ອາດຈະເກີດຂຶ້ນ, ມາດຕະການຫຼຸດຜ່ອນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມຂອງໂຄງການ ພາບຮູ້ງົບຮົມໄດ້ດ້ວຍບົດສະເໜີແລ້ວ ຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມກໍ່ໄດ້ປະກອບຄຳເຫັນ ຕໍ່ ບົດລາຍງານດັ່ງກ່າວ ຢ່າງກົງໄປກົງມາ, ຜ່ານການປຶກສາຫາລື ກອງປະຊຸມໄດ້ມີຂໍ້ສະເໜີ ແລະ ຄຳເຫັນ ຕໍ່ບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ທັງສອງໂຄງການດັ່ງນີ້:

I. ຄຳເຫັນວິຊາການກ່ຽວກັບ ບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ

1. ໃຫ້ບໍລິສັດ ສ້າງແຜນພັດທະນາຊຸມຊົນ ແລະ ສ້າງອາຊີບໃຫ້ກັບປະຊາຊົນ ບ້ານບາກາງ ເມືອງຫີນເຫີຍ ເນື່ອງຈາກການປູກເຂົ້າຊັບຫວ່າງສວນປູກໄມ້ວິກ ຂອງບໍລິສັດ ແມ່ນສາມາດເຮັດໄດ້ ແຕ່ບໍ່ມີ ກໍ່ ສ່ວນບົດໄປແມ່ນເພີ່ມໄດ້ປະຈຸບັນປະຊາຊົນ ແມ່ນບໍ່ມີເນື້ອທີ່ທຳການຜະລິດ;
2. ໃຫ້ບໍລິສັດ ເຮັດສັນຍາ ຊື້-ຂາຍ ໄມ້ກັບປະຊາຊົນ ແລະ ກຳນົດລາຄາ ຊື້-ຂາຍ ໄມ້ ຈາກສວນປູກຂອງປະຊາຊົນ ທີ່ຈະສະໜອງວັດຖຸດິບ ໃຫ້ໂຄງການ ໂດຍກຳນົດຫົວໜ່ວຍລາຄາ ແລະ ປະເພດໄມ້ໃຫ້ລະອຽດ (ອີງຕາມແຈ້ງການສະບັບເລກທີ 449/ຫລບ.ກລຂ, ລົງວັນທີ 22/3/2016);
3. ໃຫ້ລະບຸ ແຜນການນຳໃຊ້ນ້ຳເຂົ້າໃນຂະບວນການຫຼໍ່ເປັນ, ແຜນການສ້າງອ່າງບໍ່ນັດນ້ຳເສຍ ຈາກແຕ້ມພັກ ແລະ ຈາກຂະບວນການຫຼໍ່ເປັນ ມີຕີແນວໃດ
4. ອະທິບາຍ ລະອຽດ ກ່ຽວກັບ ເຕັກໂນໂລຊີ ທີ່ຈະນຳມາໃຊ້ ໃນການສ້າງຕັ້ງໂຮງງານ ແມ່ນເຕັກໂນໂລຊີແບບໃດ;
5. ໃຫ້ລະບຸແຫຼ່ງນ້ຳທີ່ຈະນຳມາໃຊ້ໃນຂະບວນການຜະລິດຂອງໂຮງງານ ແມ່ນຈະເອົາມາຈາກໃສ່ ພ້ອມທັງປະເມີນຜົນກະທົບ ຕໍ່ແຫຼ່ງນ້ຳທີ່ຈະເອົາມາໃຊ້;

6. ໃຫ້ກຳນົດມາດຕະການປ້ອງກັນການຫຼຸດຜົນ ຂອງສັດນ້ຳ-ສັດປ່າ ແລະ ກຳນົດແຜນການປ່ອຍປາໃນແຕ່ລະປີ ໃຫ້ມີການຈັດສັນພື້ນທີ່ ເຂດທຳມາຫາກິນຂອງປະຊາຊົນ ແລະ ທີ່ຢູ່ອາໄສຂອງສັດປ່າ;
7. ໃຫ້ກຳນົດງົບປະມານ ເຂົ້າໃນຕິດຕາມກວດກາການຈັດຕັ້ງປະຕິບັດ ແຜນການຄຸ້ມຄອງສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ຂອງພາກສ່ວນສູນກາງ, ພາກສ່ວນແຂວງ ແລະ ພາກສ່ວນເມືອງ ຢ່າງລະອຽດ ໂດຍປະສານກັບກນຊສ;
8. ສຳລັບຄຳເຫັນ ທາງດ້ານວິຊາການ ຕໍ່ບົດລາຍງານ ທາງ ກນຊສ ຈະໄດ້ສັງລວມ ແລະ ສົ່ງໃຫ້ບໍລິສັດ ປັບປຸງບົດລາຍງານຕາມພາຍຫຼັງ;

II. ຄຳເຫັນ ອື່ນໆ ກ່ຽວກັບ ໂຄງການ

1. ໃຫ້ອະທິບາຍຊື່ແຈງບັນຫາ ການໄດ້ມາຂອງເນື້ອທີ່ດິນໃນແຕ່ລະບ້ານ ແມ່ນມີການໄດ້ມາຄືແນວໃດ ເພາະທາງຂະແໜງການທີ່ກ່ຽວຂ້ອງຂອງເມືອງ ແມ່ນຍັງບໍ່ທັນຮັບຮູ້ຂໍ້ມູນດັ່ງກ່າວ;
2. ໃຫ້ບໍລິສັດ ປະສານຫາ ກົມທີ່ດິນ ເພື່ອລົງສຳຫຼວດບັດແທກ ແລະ ອອກແຜນທີ່ດິນລັດດິນ ແລະ ສະເໜີຂໍສຳປະທານໄປຕາມລະບຽບຫຼັກການ;
3. ຂອບເຂດພື້ນທີ່ງ່ອນໃນເຂດປ່າສະຫງວນ ແມ່ນໃຫ້ບໍລິສັດ ສະເໜີຂໍຮັບປຽນປະເພດປ່າບຳນານຂະແໜງການທີ່ກ່ຽວຂ້ອງກ່ອນ ແລ້ວຈຶ່ງສືບຕໍ່ເນີນການປູກ;
4. ໃຫ້ກວດກາຄືນ ແລະ ໃຫ້ອະທິບາຍລະອຽດ ຈຳນວນເນື້ອທີ່ຂອງໂຄງການ ທີ່ດຳເນີນການປູກໄມ້ຢູ່ແຂວງວຽງຈັນ ແມ່ນນອນຢູ່ໃນພື້ນທີ່ ປ່າສະຫງວນຈັກເຮັກຕາ ແລະ ຢູ່ໃນພື້ນທີ່ ຍຸດທະສາດຈັກເຮັກຕາ ເພາະໃນບົດລາຍງານ ແມ່ນມີຈຳນວນທັງໝົດ 5.734 ເຮັກຕາ, ໃນບົດສະເໜີ ແມ່ນມີຈຳນວນທັງໝົດ 5.534 ເຮັກຕາ ແລະ ທາງແຂວງວຽງຈັນສະເໜີ ເນື້ອທີ່ມີຄວາມເປັນໄປໄດ້ ພຽງປະມານ 3.000 ກວ່າເຮັກຕາ;

III. ຄຳເຫັນຂອງບໍລິສັດ

ຕໍ່ກັບຄຳຕິດຄຳເຫັນ ທີ່ໄດ້ຍົກຂຶ້ນ ໃນກອງປະຊຸມ ທາງບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ກໍໄດ້ຊີ້ແຈງ ເພີ່ມຕື່ມໂດຍຫຍໍ້ ເພື່ອໃຫ້ກອງປະຊຸມເຂົ້າໃຈ ແລະ ກ້າວໄປສູ່ຄວາມເປັນເອກະພາບກັນ ໃນກອງປະຊຸມ ແລະ ພ້ອມແລ້ວ ທີ່ຈະສະໜອງຂໍ້ມູນໃນລາຍລະອຽດ ຊຶ່ງໄດ້ກະກຽມໄວ້ແລ້ວ ແລະ ຈະສືບຕໍ່ສົມທົບກັບພາກສ່ວນທີ່ກ່ຽວຂ້ອງ ເພື່ອພ້ອມກັນປັບປຸງເນື້ອ ໃນບົດລາຍງານທັງໝົດ ໃຫ້ມີຄວາມສົມບູນຂຶ້ນຕື່ມ.

ກອງປະຊຸມໄດ້ປິດລົງຢ່າງເປັນທາງການໃນເວລາ 14:30 ໂມງຂອງວັນດຽວກັນ ດ້ວຍຜົນສຳເລັດອັນຈິບງາມ.

ທີ່ ເມືອງໂພນໂຮງ ແຂວງວຽງຈັນ, ວັນທີ 5/4/2018

ບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ




ຜູ້ບັນທຶກ



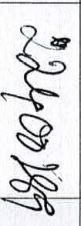
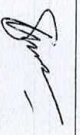
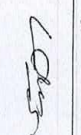



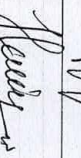
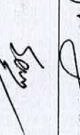
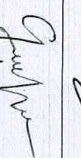


ສຸໂພວັນ ທ່ຽງຈັນໄຊ



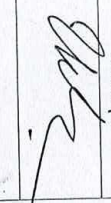
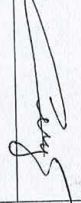



ຖາວອນ ວົງໂພສີ

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມ ລົງກວດກາພາກສະໜາ ແລະ ຈັດກອງປະຊຸມປຶກສາຫາລືໂຄງການປູກໄມ້ ແລະ ໂຮງງານໄມ້ອັດ ແລະ ໄມ້ຝານ ທີ່ເມືອງໂພນໂຮງ ແລະ ເມືອງຫີນເຫີບ ແຂວງວຽງຈັນ, ວັນທີ 03 ເມສາ 2018

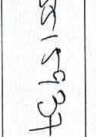








❖ ພາກສ່ວນສູນກາງ

ລ/ດ	ຊື່ແລະນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທ	ລາຍເຊັນ
1	ທ່ານ ຖາລອນ ວົງໃພສີ	ການຊຸສ	ຮອງຫົວໜ້າກົມນະໂຍບາຍ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ	09409189	
2	ທ່ານ ສະເຫຼີມສັກ ໄຊຍະມິນ	ການຊຸສ	ຫົວໜ້າພະແນກປະເມີນສິ່ງແວດລ້ອມແບບຍຸດທະ ສາດ		
3	ທ່ານ ຈິມຕະນາພອນ ອິນທິຈັກ	ການຊຸສ	ຮອງຫົວໜ້າພະແນກປະເມີນສິ່ງແວດລ້ອມແບບ ຍຸດທະສາດ	55926688	
4	ທ່ານ ສຸກວິໄລ ອິນພັນຍາ	ການຊຸສ	ວິຊາການ ພສສ	99833038	
5	ທ່ານ ນ. ສິລອນ ອຸດົມໄຊ	ການຊຸສ	ວິຊາການ ພສສ	23850991	
6	ທ່ານ ນ. ພວງມາລີ ພັນທອນວົງສາ	ການຊຸສ	ວິຊາການ ພສສ	99599929	
7	ທ່ານ ເລ ຈັນທະວິຫານ	ການຊຸສ	ວິຊາການ ພສສ	56582372	
8	ທ່ານ ສິມສະນຸກາ ສັດວງເດັ່ນ	ການຊຸສ	ວິຊາການ ພສສ	54887574	
9	ທ່ານ ອຸທອນ ແພັດທະວົງ	ການຊຸສ	ວິຊາການ ພສສ		
10	ຊາວໂຮງງານໄມ້ອັດ	ການຊຸສ	ພະແນກສັງລວມ	54777690	
11	ນ. ພວງສິງ. ວົງໃພສີ	ການຊຸສ	ສາດ	9975862	


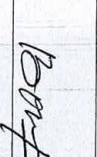



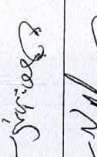

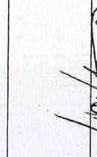
❖ ພາກສ່ວນກ່ຽວຂ້ອງຂັ້ນສູນກາງ

ລ/ດ	ຊື່ແລະນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທ	ລາຍຊື່
1	ທ. ດອນສະຫວັນ ພົມມະວິໄນ	ກົມປ່າໄມ້	ອຸບອນພາກ ປະທັບ-ປະທັບ	55146999	
2	ທ. ວິມາ ປິອາວິທາດີ	ກົມອຸປະກອນ	ອຸປະກອນ	55480254	
3	ທ. ສິມສິມ ພິມມະວິໄນ	ກົມຄຸ້ມຄອງ ທີ່. ພ. ຊ.	ອຸບອນພາກ	030 9056428	
4	ທ. ສິມສິມ ພິມມະວິໄນ	ກົມປ່າໄມ້	ອຸບອນ	22527000	
5	ທ. ສິມສິມ ພິມມະວິໄນ	ກົມຄຸ້ມຄອງ ທີ່. ພ. ຊ.	ອຸບອນ	9929399	
6					
7					
8					

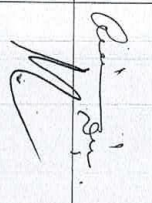



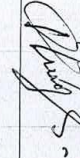
❖ ພາກສ່ວນ ເຈົ້າຂອງໂຄງການ ແລະ ບໍລິສັດທີ່ປຶກສາ

ລ/ດ	ຊື່ແຂວງ/ນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທ	ລາຍຊື່
1	ທ່ານ ສ. ດຳໄພວິນ ຫຼີເຈີວິຈຸ	ສອກ ບໍລິຫານ	ຮອງຫົວໜ້າ	88815937	
2	ທ່ານ Mark Torsen	Burapha Agroforestry	CEO	96603600	Mark Torsen
3	ທ່ານ ສຸວັນທາວົງ	ຜູ້ຮັບ ບໍລິຫານ	ຜູ້ດຳລົງ	99901204	Suwanthawong
4	ທ່ານ Henric Wulms	Burapha Agroforestry	Land manager	5539 8135	
5	ທ່ານ ທິສຸກ ດິນທິວິສັນ	ຜູ້ຮັບ ບໍລິຫານ	ຜູ້ດຳລົງ	29451935	
6	ທ່ານ ສິດທິ	ຜູ້ຮັບ ບໍລິຫານ	ຮອງຫົວໜ້າ	919706324	
7	ທ່ານ ສິເລັດ	ຜູ້ຮັບ ບໍລິຫານ	ຮອງຫົວໜ້າ	525994446	
8	Phanvieng	11	Planning forester	51133963	
9	ນາຍົກ	—	ນາຍົກ	56510046	
10	ນ. ດີນິດ	—	ຮອງຫົວໜ້າ	55322441	
11	ນ. ດອນ ດອນ	—	FA	830506816	

❖ ພາສ່ວນ ແຂວງວຽງຈັນ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ພາສ່ວນ	ຕຳແໜ່ງ	ເບີໂທ	ລາຍເຊັນ
1	ນ. ສິນ/ສິນ ນາວິພິນຍາ	ພ/ນ ສາ. ສິນ/ສິນ ນາວິພິນຍາ	ນ/ນາວິພິນຍາ	໑໑໑ ໑໑໑໑	
2	ນ. ວິໄລ ວິນ ນາວິພິນຍາ	ພ/ນ ວິນ ນາວິພິນຍາ	ວິນ ນາວິພິນຍາ	໑໑໑ ໑໑໑໑	
3	ນ. ສິນ/ສິນ ສິນ ນາວິພິນຍາ	ພ/ນ ສິນ ນາວິພິນຍາ	ສິນ ນາວິພິນຍາ	໑໑໑ ໑໑໑໑	
4	ນ. ສິນ/ສິນ ສິນ ນາວິພິນຍາ	ພ/ນ ສິນ ນາວິພິນຍາ	ສິນ ນາວິພິນຍາ	໑໑໑ ໑໑໑໑	
5	ນ. ສິນ/ສິນ ສິນ ນາວິພິນຍາ	ພ/ນ ສິນ ນາວິພິນຍາ	ສິນ ນາວິພິນຍາ	໑໑໑ ໑໑໑໑	
6	ນ. ສິນ/ສິນ ສິນ ນາວິພິນຍາ	ພ/ນ ສິນ ນາວິພິນຍາ	ສິນ ນາວິພິນຍາ	໑໑໑ ໑໑໑໑	
7	ນ. ສິນ/ສິນ ສິນ ນາວິພິນຍາ	ພ/ນ ສິນ ນາວິພິນຍາ	ສິນ ນາວິພິນຍາ	໑໑໑ ໑໑໑໑	
8	ນ. ສິນ/ສິນ ສິນ ນາວິພິນຍາ	ພ/ນ ສິນ ນາວິພິນຍາ	ສິນ ນາວິພິນຍາ	໑໑໑ ໑໑໑໑	


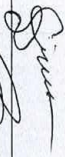
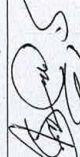
❖ ພາກສ່ວນ ເມືອງໃໝ່ໂຮງ

ລ/ດ	ຊື່ແລະນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທ	ລາຍຊື່
1	ບ. ຊິນຕິ ແກ້ວບຸກຄົນ	ຊຸມນະນາ ບາງຄາມ- ຫ້ອງ ເມັດຊີເມັດ	ຫົວໜ້າ ສິດທິ	99999 8882	
2	ນ. ສີທາ ອຸໂສລິດ	ບາງຄາມ- ຫ້ອງ ເມັດຊີເມັດ	ຮອງຫົວໜ້າ	55729 684	
3	ນ. ພຸດ ລຸນະພິພິດ	ບາງຄາມ- ຫ້ອງ ເມັດຊີເມັດ	ນັກປະຊາກອນ	97777 217	
4	ນ. ພິມມະວິຫານ	ບາງຄາມ- ຫ້ອງ ເມັດຊີເມັດ	ນັກປະຊາກອນ	55810058	
5	ນ. ພິມມະວິຫານ	ບາງຄາມ- ຫ້ອງ ເມັດຊີເມັດ	ນັກປະຊາກອນ	99999 1887	
6					

ພາກສ່ວນ ບ້ານ ຂອງເມືອງໃໝ່ໂຮງ


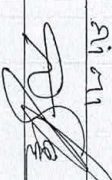
ລ/ດ	ຊື່ແຂວງ/ນາມສະກຸນ	ພາກສ່ວນ	ຕໍາແໜ່ງ	ເບີໂທ	ລາຍຊື່
1	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	58898922	
2	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	4788960	
3	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	99133413	
4	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	805802395	
5	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	0309943037	
6	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	52221246	
7	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	030471174	
8	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	95789868	
9	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	98089887	
10	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	0309043492	
11	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ	54536333	
12	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ		
13	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ		
14	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ		
15	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ		
16	ທ່ານ ສິມພັນ ສິມພັນ	ບ້ານ ສິມພັນ	ບ້ານ ສິມພັນ		

ພາກສ່ວນ ເມືອງຫີນເຫີຍ

ລ/ດ	ຊື່ແລະນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທ	ລາຍເຊັນ
1	ບຸ. ບາດຊິງ ງຸ	ອາ. ສິມຄອນ ສຸພາບາດ ເທດ	ອຳເພີ ງຸ	030 5330291	
2	ທ. ສິມສອນ	ທຸກອາກາດ	ອາ. ກາມ	98883699	
3	ທ. ສິມວິໄນ ພຽນຜົນ	ທຸກອາກາດ	ອາ. ກາມ ພຽນຜົນ	99883999	
4					
5					
6					

ພາກສ່ວນ ບ້ານ ຂອງເມືອງຫີນຕົ້ນ

ລ/ດ	ຊື່ເລຂະນາມສະກຸນ	ພາກສ່ວນ	ຕຳແໜ່ງ	ເບີໂທ	ລາຍເຊັນ
1	ທ່ານ ພິ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	56025346	
2	ທ່ານ ສິມ ພິມ ສິມ	—	ສິມ ພິມ ສິມ	991431550	
3	ທ່ານ ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	55578215	
4	ທ່ານ ສິມ ພິມ ສິມ	ບ. ສິມ ພິມ	ບ. ສິມ ພິມ	56840820	
5	ທ່ານ ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	0258806277	
6	ທ່ານ ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	0304770028	
7	ທ່ານ ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	03092474166	
8	ທ່ານ ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	03059999113	
9	ທ່ານ ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	03048999248	
10	ທ່ານ ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	030198334498	
11	ທ່ານ ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	598544162	
12	ທ່ານ ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	550444291	
13	ທ່ານ ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	54499062	
14	ທ່ານ ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	55380365	
15	ທ່ານ ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	95273114	
16	ທ່ານ ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ	ບ. ສິມ ພິມ ສິມ ສິມ		

38	ก. ๒๒๒๒.๒๒๒๒.๒๒๒๒	๒๒.๒๒๒๒	๒๒๒๒๒๒๒๒	๒๒๒๒๒๒๒๒	๒๒๒๒/๒๒๒๒ ๒๒๒	
39	ก. ๒๒๒๒.๒๒๒๒.๒๒๒๒	๒๒.๒๒๒๒	๒๒๒๒๒๒๒๒	๒๒๒๒๒๒๒๒	๒๒๒๒/๒๒๒๒ ๒๒๒	

15.9 Annex 9: Formal Provincial / Central ESIA Consultation Workshop Minutes and List of Participants



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນະຖາວອນ

ບົດບັນທຶກ

ກອງປະຊຸມປຶກສາຫາລື ຂັ້ນແຂວງ/ສູນກາງ ເພື່ອປຶກສາຫາລື ຜ່ານເນື້ອໃນ ບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່
ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ໂຄງການກໍ່ສ້າງໂຮງງານປຸງແຕ່ງໄມ້ຝານ ແລະ ໄມ້ອັດ ຢູ່ເມືອງຫີນເຫີບ ແຂວງວຽງຈັນ
ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ
ຄັ້ງວັນທີ 19 ຕຸລາ 2018 ທີ່ຫ້ອງປະຊຸມ ສູນກາງແນວລາວສ້າງຊາດ

ວັນທີ 19/10/2018 ເວລາ 08:30 ໂມງ ກົມນະໂຍບາຍຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ (ກນຊສ),
ກະຊວງຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ (ກຊສ) ໄດ້ສົມທົບກັບ ຂະແໜງການທີ່ກ່ຽວຂ້ອງຂັ້ນສູນກາງ,
ຂະແໜງການທີ່ກ່ຽວຂ້ອງ ເມືອງຫີນເຫີບ ພ້ອມດ້ວຍ ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ແຂວງວຽງ
ຈັນ ຈັດກອງປະຊຸມປຶກສາຫາລື ຂັ້ນແຂວງ/ສູນກາງ ເພື່ອປຶກສາຫາລື ຜ່ານເນື້ອໃນ ບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່
ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ໂຄງການກໍ່ສ້າງໂຮງງານປຸງແຕ່ງໄມ້ຝານ ແລະ ໄມ້ອັດ ຢູ່ເມືອງຫີນເຫີບ ແຂວງວຽງ
ຈັນ ຂອງບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ໂດຍການເປັນປະທານຮ່ວມ ຂອງທ່ານ ບຸນສອນ ເພັດດາວັນ ຮອງ
ເຈົ້າແຂວງວຽງຈັນ ແລະ ທ່ານ ພູວິງ ຫຼວງໄຊຊະນະ ຫົວໜ້າກົມນະໂຍບາຍ ຊສ. ເຊິ່ງມີຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ ທັງໝົດ 34
ທ່ານ (ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມໄດ້ຄັດຕິດມາພ້ອມນີ້).

ກອງປະຊຸມຈັດຂຶ້ນ ໂດຍມີຈຸດປະສົງເພື່ອປຶກສາຫາລື ກ່ຽວກັບ ການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ
ແລະ ທຳມະຊາດ ເຊິ່ງໄດ້ຮັບຟັງການນຳສະເໜີ ກ່ຽວກັບ ແຜນການພັດທະນາໂຄງການ ປະຫວັດຄວາມເປັນມາ ແລະ ຜົນ
ກະທົບຕໍ່ສິ່ງແວດລ້ອມ ທີ່ອາດຈະເກີດຂຶ້ນ, ມາດຕະການຫຼຸດຜ່ອນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມຂອງໂຄງການ ພາຍຫຼັງບໍລິສັດ
ໄດ້ຜ່ານບົດສະເໜີແລ້ວ ຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມກໍ່ໄດ້ປະກອບຄຳເຫັນ ຕໍ່ ບົດລາຍງານດັ່ງກ່າວ ຢ່າງກົງໄປກົງມາ, ຜ່ານການ
ປຶກສາຫາລື ກອງປະຊຸມໄດ້ມີຂໍ້ສະເໜີ ແລະ ຄຳເຫັນ ຕໍ່ບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ
ທຳມະຊາດ ຂອງໂຄງການ ດັ່ງນີ້:

1. ໃຫ້ກຳນົດຄືນ ກ່ຽວກັບ ແຜນຜັງຂອງໂຮງງານ ໂດຍໃຫ້ກຳນົດເພີ່ມຈຸດອ່າງບຳບັດນ້ຳເປືອນ ຂອງໂຮງງານ ແລະ
ໃຫ້ປະກອບຂໍ້ມູນ ຄວາມສາມາດບັນຈຸນ້ຳໄດ້ຈັກແມັດກ້ອນ, ນ້ຳໃນອ່າງບຳບັດນ້ຳເປືອນ ແມ່ນມີການລະເຫຍືອຍ
ຈັກແມັດກ້ອນຕໍ່ມື້ ແລະ ນ້ຳເຂົ້າ-ນ້ຳອອກອ່າງບຳບັດ ມີປະລິມານ ຈັກແມັດກ້ອນຕໍ່ມື້ ພ້ອມທັງ ຄັດຕິດບັນດາ
ແຜນຜັງຂອງໂຮງງານ ແລະ ແຜນຜັງຂະບວນການຜະລິດ ທີ່ສະແດງໃຫ້ເຫັນແຕ່ລະກິດຈະກຳ ແລະ ຄຳອະທິບາຍ
ໄດ້ຢ່າງຊັດເຈນ ເຂົ້າໃສ່ໃນ ບປຜສ ຂອງໂຄງການ;
2. ໃຫ້ ບໍລິສັດ ຮິບຮ້ອນກຳນົດຈຸດເກັບມ້ຽນສິ່ງເສດຂອງໂຮງງານ, ຈຸດກອງເສດໄມ້ ທີ່ເໝາະສົມ ພ້ອມທັງ ສະແດງ
ໃຫ້ເຫັນໃນແຜນຜັງຂອງໂຮງງານ ແລ້ວກຳນົດເຂົ້າໃສ່ໃນບົດລາຍງານ;
3. ໃຫ້ ບໍລິສັດ ລະບຸຊື່ເຄື່ອງຈັກທີ່ຈະນຳມາປຸງແຕ່ງໄມ້ ແລະ ປະເທດຜະລິດເຄື່ອງຈັກດັ່ງກ່າວ ພ້ອມທັງ ອະທິບາຍ
ກ່ຽວກັບ ລະດັບຄວາມສາມາດໃນການຄວບຄຸມບັນຫາດ້ານຄຸນນະພາບອາກາດ ແລະ ສຽງ ພາຍໃນໂຮງງານ;
4. ໃຫ້ລະບຸອຸປະກອນ ຮັກສາຄວາມປອດໄພ ທີ່ຈະນຳໃຊ້ຫຼັງ ເຂົ້າໃນການປ້ອງກັນໃນເວລາດຳເນີນການຜະລິດ ຂອງ
ໂຮງງານ;

5. ໃຫ້ ບໍລິສັດ ເອົາໃຈໃສ່ ແລະ ເພີ່ມທະວີ ໃນການປະສານສົມທົບກັບທ້ອງຖິ່ນຕື່ມ ກ່ຽວກັບ ການດຳເນີນກິດຈະການຂອງໂຄງການ ເພາະເຫັນວ່າ ປະຊາຊົນ ສ່ວນໃຫຍ່ ແມ່ນຍັງບໍ່ມີຄວາມເປັນເອກະພາບກັນ ແລະ ຍັງບໍ່ທັນເຂົ້າໃຈແຈ້ງ ຕໍ່ເຈດຈຳນົງຂອງ ບໍລິສັດ;
6. ໃຫ້ບໍລິສັດ ສົມທົບກັບ ກາຕຊສ ເພື່ອກຳນົດງົບປະມານໃນການຕິດຕາມກວດກາການຈັດຕັ້ງປະຕິບັດມານຕະການ ປ້ອງກັນ ຫຼຸດຜ່ອນ ແລະ ແກ້ໄຂ ຜົນກະທົບ ສຳລັບພາກສ່ວນລັດ (ຂັ້ນສູນກາງ, ແຂວງ ແລະ ເມືອງ);
7. ບໍລິສັດ ເຫັນດີຮັບໄປພິຈາລະນາປັບປຸງບົດລາຍງານ ສ່ວນບັນຫາໃດຍັງບໍ່ທັນລະອຽດຈະແຈ້ງ ບໍລິສັດ ຈະນຳໄປແກ້ໄຂ ແລະ ອະທິບາຍເພີ່ມຕື່ມ;

ກອງປະຊຸມໄດ້ປິດລົງຢ່າງເປັນທາງການໃນເວລາ 12:00 ໂມງຂອງວັນດຽວກັນ ດ້ວຍຜົນສຳເລັດອັນຈົບງາມ.

ທີ່ນະຄອນຫຼວງວຽງຈັນ, ວັນທີ 19/10/2018

ບໍລິສັດ ບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ

ຜູ້ບັນທຶກ

ຈິນິຕະພາບອາ

ຮອງເຈົ້າເມືອງຫົນເຫີບ

ພະແນກ ຊສ ແຂວງວຽງຈັນ

ຈຸ ສິກ

ຫົວໜ້າ ກົມນະໂຍບາຍ ຊສ



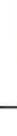



ພູວິງ ຫຼວງໄຊຊະນະ




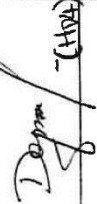
ຮອງເຈົ້າແຂວງ-ແຂວງວຽງຈັນ

ພອນສິມ/ພັດລາວ

ລາຍຊື່ລົງທະບຽນກອງປະຊຸມປຶກສາຫາລືຜ່ານບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສະບັບ
ເດືອນ ກັນຍາ 2018 ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານປຸງແຕ່ງຝານໄມ້ ແລະ ໄມ້ອັດ ຢູ່ເມືອງ ຫີນເທີບ, ແຂວງວຽງຈັນ ຂອງ
ບໍລິສັດບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ທີ່ສູນກາງແນວລາວສ້າງຊາດ 19th Oct 2018

ເມືອງຫີນເທີບ/ Hinherb District





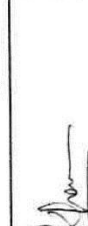
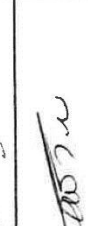
ລດ No	ຊື່ແລະນາມສະກຸນ Name & Surname	ຈາກພາກສ່ວນ From	ເບີໂທ Tel	ລາຍເຊັນ Signature	ໝາຍເຫດ Note
1	ທ. ບຸນຍຸດ ພາຍຸລາດ	ອຳນວນ	596978294	 (HD1)	
2	ທ. ວອນວິນສານ	ອຳນວນ	55555555	 (HD2)	
3	ທ. ສິມສິດ ອຸດົງ	ອຳນວນ	55001048	 (HD2)	
4	ທ. ບຸນຍຸດ ພາຍຸລາດ	ອຳນວນ	55605292	 (HD2)	
5	ທ. ສິມສິດ ອຸດົງ	ອຳນວນ	52910858	 (HD2)	
6	ທ. ອຳນວນ ພາຍຸລາດ	ອຳນວນ	55323727	 (HD2)	





ລດ No	ຊື່ແລະນາມສະກຸນ Name & Surname	ຈາກພາກສ່ວນ From	ເບີໂທ Tel	ລາຍເຊັນ Signature	ໝາຍເຫດ Note
7	ທ. ສິນທິ ສາສຸນທາອຸມ	ທຸກຊະນິດ	54146444	 (HOD)	
8	ທ. ສິນທິ ສາສຸນທາອຸມ	ທຸກຊະນິດ	55461209	 (HOD)	ທຸກຊະນິດ / ທຸກຊະນິດ
9	ທ. ສິນທິ ສາສຸນທາອຸມ	ທຸກຊະນິດ	55542072	 (HOD)	
10	ທ. ສິນທິ ສາສຸນທາອຸມ	ທຸກຊະນິດ		 (HOD)	
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ລາຍຊື່ລົງທະບຽນກອງປະຊຸມປຶກສາຫາລືຜ່ານບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສະບັບ
ເດືອນ ກັນຍາ 2018 ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານປຸງແຕ່ງຝານໄມ້ ແລະ ໄມ້ອັດ ຢູ່ເມືອງ ຫີນເທີບ, ແຂວງວຽງຈັນ ຂອງ

ບໍລິສັດບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ທີ່ສູນກາງແນວລາວສ້າງຊາດ 19th Oct 2018

ນັກຂ່າວJournalist

ລດ No	ຊື່ ແລະ ນາມສະກຸນ Name & Surname	ຈາກພາກສ່ວນ From	ເບີໂທ Tel	ລາຍເຊັນ Signature	ໝາຍເຫດ Note
1	ທ. ພຸດທະ ພິມມະສິດ	ສູນກາງແນວລາວສ້າງຊາດ	98 19276		
2	ທ. ພຸດທະ ພິມມະສິດ	ສູນກາງແນວລາວສ້າງຊາດ	98 19276		
3	ທ. ອງ: ວິໄນ	ສູນກາງແນວລາວສ້າງຊາດ	2812228		
4	ທ. ວິມາຍາ	ໂທລະພາບ	98 11455		
5	ທ. ດີນິທິ ພຸ.	—	55291159		
6	ທ. ວິມາຍາ	ສູນກາງແນວລາວສ້າງຊາດ	98 19276		

ລດ No	ຊື່ແລະນາມສະກຸນ Name & Surname	ຈາກພາກສ່ວນ From	ເບີໂທ Tel	ລາຍເຊັນ Signature	ໝາຍເຫດ Note
7	ທ. ສິມສິມ	ໂຕລະນາມ	56660426		
8	ທ. ສິມສິມ ໄກ	ເປົງກະກິດ-ສິດສິດ	55195240		
9	ທ. ສິມສິມ	Le Remoucku	55228916		
10	ທ. ສິມສິມ	Novitmen	55659234		
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ລດ No	ຊື່ແລະນາມສະກຸນ Name & Surname	ຈາກພາກສ່ວນ From	ເບີໂທ Tel	ລາຍເຊັນ Signature	ໝາຍເຫດ Note
34	ທ້າວ ສັດ ກວຽນ ສີ ທິນ ຂ. ພຽງທານ ສິມສັກທວງສາ	ກມຊຸລ	໐໑໗໕໑໑໑໑		
35	ຄຳປະ: ທມ ໑ ທມ.	ກມຊຸລ ກມສິມສອນ			
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ລາຍຊື່ລົງທະບຽນກອງປະຊຸມປຶກສາຫາລືຜ່ານບົດລາຍງານການປະເມີນຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ ສະບັບ
ເດືອນ ກັນຍາ 2018 ສຳລັບໂຄງການກໍ່ສ້າງ ໂຮງງານປຸງແຕ່ງຝາມໄມ້ ແລະ ໄມ້ອັດ ຢູ່ເມືອງ ຫີນເກີບ, ແຂວງວຽງຈັນ ຂອງ

ບໍລິສັດບົວລະພາ ກະສິກຳ-ປ່າໄມ້ ຈຳກັດ ທີ່ສູນກາງແນວລາວສ້າງຊາດ 19th Oct 2018

ແຂວງວຽງຈັນ/Vientiane Province

ລດ No	ຊື່ແລະນາມສະກຸນ Name & Surname	ຈາກພາກສວນ From	ເບີໂທ Tel	ລາຍເຊັນ Signature	ໝາຍເຫດ Note
1	ສ.ອກ ບຸນລຽນ/ ບົດລາວວິ	ແຂວງວຽງຈັນ	22254502		
2	ທ່ານ ສາຍຮັກ ອິນໂພວະລາ	ແຂວງອຸດົມ	22250106		
3	ທ່ານ ທອນສວນ ວຽງຈັນ	ແຂວງອຸດົມ	58678345		
4	ທ່ານ ທອນສວນ ວຽງຈັນ	ແຂວງອຸດົມ			
5	ທ. ວະສອນ ສະຫຍາລາດ	ແຂວງອຸດົມ	55213444		
6	ທ. ທີ່ ສາມັນ ສິນ	ແຂວງອຸດົມ	92669997		

ລດ No	ຊື່ແລະນາມສະກຸນ Name & Surname	ຈາກພາກສ່ວນ From	ເບີໂທ Tel	ລາຍເຊັນ Signature	ໝາຍເຫດ Note
7	ຂຸນພຽງແກ້ວ ແກ້ວສອນວຽງສາ	ກະຊວງ	97599929		ເສັ້ນ 1 ກວ
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15.10 Annex 10: EIA Permit of the Consultant



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນະຖາວອນ

ກະຊວງ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ
ກົມສິ່ງເສີມຄຸນນະພາບສິ່ງແວດລ້ອມ

ເລກທີ 09 /ກຊສ.ກສສ
ນະຄອນຫຼວງວຽງຈັນ, ວັນທີ 04 ມັງກອນ 2019

ໃບອະນຸຍາດ
ດຳເນີນບໍລິການດ້ານວິຊາການ ກ່ຽວກັບ ສິ່ງແວດລ້ອມ

- ອີງຕາມ ກົດໝາຍ ວ່າດ້ວຍ ການປົກປັກຮັກສາສິ່ງແວດລ້ອມ, ສະບັບເລກທີ 29/ສພຊ, ລົງວັນທີ 18 ທັນວາ 2012;
- ອີງຕາມ ຂໍ້ຕົກລົງ ວ່າດ້ວຍ ລະບຽບການດຳເນີນບໍລິການດ້ານວິຊາການ ກ່ຽວກັບ ສິ່ງແວດລ້ອມ, ສະບັບເລກທີ 0345/ກຊສ, ວັນທີ 22 ມັງກອນ 2015;
- ອີງຕາມ ໃບຄຳຮ້ອງ ຂໍໃບອະນຸຍາດ ດຳເນີນບໍລິການດ້ານວິຊາການ ກ່ຽວກັບ ສິ່ງແວດລ້ອມຂອງ ບໍລິສັດ ເອິດຊິສ ສະເຕີມ ຈຳກັດຜູ້ດຽວ, ສະບັບລົງວັນທີ 17 ກໍລະກົດ 2018;
- ອີງຕາມ ໃບມອບສິດຂອງ ທ່ານ ລັດຖະມົນຕີ ກະຊວງ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ, ສະບັບເລກທີ 0015/ກຊສ, ຄັ້ງວັນທີ 03 ມັງກອນ 2019.

ກົມສິ່ງເສີມຄຸນນະພາບສິ່ງແວດລ້ອມ, ກະຊວງ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ອະນຸຍາດໃຫ້ແກ່:

- ຊື່ບໍລິສັດ: ເອິດ ຊິສສະເຕີມ ຈຳກັດຜູ້ດຽວ.
- ຊື່ບໍລິສັດ ເປັນພາສາສາກົນ: Earth Systems Sole Co., Ltd.
- ທຶນຈົດທະບຽນ: 1.500.000.000 ກີບ (ໜຶ່ງຕື້ຫ້າຮ້ອຍລ້ານກີບ).
- ໃບທະບຽນວິສາຫະກິດ: ເລກທີ 0569/ຈທວ, ລົງວັນທີ 27 ມິຖຸນາ 2018.
- ທີ່ຕັ້ງສຳນັກງານ: ຖະໜົນ 23 ສິງຫາ, ອາຄານໂຄລາວ 2 ຊັ້ນ 8, ບ້ານ ໜອງບອນ.
- ເມືອງ: ໄຊເສດຖາ - ແຂວງ: ນະຄອນຫຼວງວຽງຈັນ.
- ອາຍຸຂອງໃບອະນຸຍາດ: 2 ປີ ນັບແຕ່ວັນລົງລາຍເຊັນເປັນຕົ້ນໄປ.
- ປະເພດທຸລະກິດ: ເບິ່ງໄດ້ທີ່ດ້ານຫຼັງ.

ຫົວໜ້າກົມ




ໂລນຄຳ ອາດສະນາວິງ

ປະເພດທຸລະກິດ

ລ/ດ	ການບໍລິການ	ປະເພດ
1.	ການສຶກສາ, ວິເຄາະ, ປະເມີນຜົນ ແລະ ສ້າງບົດລາຍງານຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ແລະ ທຳມະຊາດ ທີ່ອາດຈະເກີດຂຶ້ນຈາກການຈັດຕັ້ງປະຕິບັດໂຄງການລົງທຶນ ຫຼື ກິດຈະການພັດທະນາຕ່າງໆ ແລະ ທຸລະກິດຄອບຄົວ ພ້ອມທັງສ້າງແຜນຄຸ້ມຄອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມສັງຄົມ ແລະ ທຳມະຊາດ.	✓
2.	ການບໍລິການ ດ້ານເຕັກໂນໂລຊີທີ່ເປັນມິດຕໍ່ສິ່ງແວດລ້ອມ, ອາຄານເຄຫາສະຖານເປັນມິດສິ່ງແວດລ້ອມ.	✓
3.	ການບໍລິການ ການຄຸ້ມຄອງສິ່ງເສດເຫຼືອ, ສິ່ງເສດເຫຼືອທີ່ເປັນອັນຕະລາຍ ແລະ ເປັນພິດ.	✓
4.	ການບໍລິການ ການສ້າງຈິດສຳນຶກ ເພື່ອສິ່ງເສີມຄຸນນະພາບສິ່ງແວດລ້ອມ.	✓
5.	ການບໍລິການ ກ່ຽວກັບ ການວາງແຜນການຄຸ້ມຄອງສິ່ງແວດລ້ອມແບບຮອບດ້ານ.	✓
6.	ການບໍລິການ ປະເມີນສິ່ງແວດລ້ອມແບບຍຸດທະສາດ.	✓
7.	ການບໍລິການ ຈັດຕັ້ງປະຕິບັດພັນທະໃນແຜນຄຸ້ມຄອງສິ່ງແວດລ້ອມ ແລະ ສັງຄົມຂອງໂຄງການ.	✓
8.	ການບໍລິການຕິດຕາມຄຸນນະພາບສິ່ງແວດລ້ອມ (ອາກາດ, ນໍ້າ, ສຽງ)	✓
9.	ບໍລິການ ດ້ານການສ້າງແຜນພື້ນຟູຊີວິດການເປັນຢູ່, ການພັດທະນາຊຸມນະບົດ ແລະ ຊຸມຊົນແບບຍືນຍົງ.	✓

ໝາຍເຫດ: ການຍົກເລີກ ຫລື ຖອນ ໃບອະນຸຍາດ ມີເງື່ອນໄຂດັ່ງນີ້:

- ບໍ່ໃຫ້ບຸກຄົນ ຫຼື ນິຕິບຸກຄົນຍືມ, ປອມແປງ ແລະ ຂາຍສິດໃນການນຳໃຊ້ເດັດຂາດ;
- ກາຍກຳນົດ ເກົ່າສິບວັນ ລັດຖະການ ໃນການຂໍຕໍ່ໃບອະນຸຍາດ;
- ນຳໃຊ້ຜິດເປົ້າໝາຍ ທີ່ບໍ່ແມ່ນ ການບໍລິການວິຊາການດ້ານສິ່ງແວດລ້ອມ;
- ນຳໃຊ້ຂໍ້ມູນ ແລະ ບົດລາຍງານ ທີ່ຜິດກັບຄວາມເປັນຈິງ ຈາກຜົນການສຶກສາທີ່ພາໃຫ້ເກີດມີຜົນເສຍຫາຍຕໍ່ສິ່ງແວດລ້ອມ;
- ບໍ່ປະຕິບັດຕາມຂັ້ນຕອນ, ເງື່ອນໄຂ ແລະ ຫລັກການທີ່ໄດ້ລະບຸໃນ ຂໍ້ຕົກລົງ ວ່າດ້ວຍ ລະບຽບການດຳເນີນບໍລິການດ້ານວິຊາການກ່ຽວກັບ ສິ່ງແວດລ້ອມ.

ຈຳນວນປະເພດ

09 ປະເພດ



Volume C | Public Consultation and Disclosure Plan

1.1 Introduction

This Public Consultation and Disclosure Plan (PCDP) has been designed to provide a framework for consultation and information disclosure for the Burapha Veneer and Plywood Mill Environmental and Social Impact Assessment (ESIA). The PCDP has been developed in accordance with GOL environmental and social legislation and the Company's commitments to international standards (i.e. International Finance Corporation (IFC) Performance Standards and Forest Stewardship Council (FSC) Principles and Criteria). The PCDP builds on information collected throughout formal and informal consultations undertaken with national, provincial and district government officials, as well as local communities during the drafting of the ESIA (refer to Chapter 13).

1.1.1 Brief Project Description

Burapha proposes to construct and operate a Veneer and Plywood Manufacturing Facility (Mill) in Hin Heup District of Vientiane Province. The Project, preliminarily planned for commencement of operations in August 2018, would involve the processing of primarily small diameter Eucalyptus logs into veneer and plywood products. The raw timber will be sourced from Burapha Agroforestry operations and potentially other large-scale plantation operators, boutique plantation operators, and small farmer owned out-grower schemes. The development of the Project is currently at the Feasibility Stage.

The Mill will process approximately 112,000 – 124,000 m³ of sawlogs per annum, providing approximately 43,200 – 48,000 m³ of finished project per annum at 90% utilisation and full capacity, respectively. The Mill would be comprised of two primary facilities: a veneer-manufacturing unit and a plywood-manufacturing unit. Approximately 366 people will be employed to operate the Mill, with 122 people working per shift. Approximately 59 people will work the veneer line (per shift) and 63 people on the plywood line (per shift). An additional 20 people will haul logs to the Mill and finished products to end markets.

The Mill will be comprised of the processing facilities, a maintenance department, offices, a log stockyard, an access road, and ancillary facilities (electricity, water and sewage services). The Project will require approximately 9.4 hectares of land for all of the above. The Mill will produce various grades of plywood products for sale in Lao PDR and export, as significant demand has been identified in Asia and abroad.

A map of the proposed Mill location is provided in Figure 1-1. A detailed description of the Project is provided in Chapter 4 of the ESIA.



<p>Burapha Mill Project</p>	<p>Legend</p> <ul style="list-style-type: none"> Proposed Mill Location Villages BAFCO Planted Area (2015) BAFCO Land Holdings (2015) Provincial Boundaries District Boundaries National Biodiversity Conservation Area (NBCA) Provincial Protected Areas Watershed Areas Major Water Bodies 	<p>Revision: Draft</p>
<p>Project Location</p>		<p>Date: August 2016</p>
<p>Map Scale @ A4: 1:500,000</p> <p>Coordinate System: WGS 1984 UTM Zone 48N Projection: Transverse Mercator Datum: WGS 1984</p>	<p>Author : Earth Systems</p> <p>EARTH SYSTEMS Environment Water Sustainability Suite 801, 23 Singha Road Ban Nongbone, Vientiane, Lao PDR Email: enviro@earthsystems.com.au Website: www.earthsystems.com.au</p>	

Figure 1-1 Burapha Veneer and Plywood Mill Location

1.2 Regulations and Requirements

1.2.1 Lao Legislative Framework

Public consultation and information disclosure is a core requirement in the legislative framework governing project development and ESIA in Lao PDR. Key documents for the ESIA implementation phase include:

- Constitution of Lao PDR (2015);
- Law on Environment Protection (2013);
- Decree on Environment and Social Impact Assessment (2010);
- Public Involvement Guidelines (2012);
- Environmental Impact Assessment Guidelines (2012); and
- Ministerial Instruction on the Process of EIA for Investment Projects and Activities (2013).

1.2.2 International Guidelines

International Standards for stakeholder engagement and information disclosure relevant to this Project include:

- IFC's Stakeholder Engagement: A good practice handbook for companies doing business in emerging markets (2007);
- IFC's Guide to Designing and Implementing Grievance Mechanisms (2008); and
- World Bank Guidance Note on Tools for Pollution Management – Stakeholder Engagement and Grievance Mechanisms (2012).

Specific requirements from the above listed regulations and standards have been reviewed and incorporated into relevant sections of this framework.

1.3 Previous Public Consultation and Disclosure

Throughout the ESIA process, formal and informal consultations were undertaken with national, provincial and district government officials, as well as the local community. Informal consultation has included regular discussions and the dissemination of project information to local residents and government staff. Formal consultations have included meetings with relevant government authorities and environmental and socio-economic studies at the village level. Structured consultation workshops were also conducted with government, communities and other stakeholders to present the draft ESIA, share information about the Project and obtain feedback from Project stakeholders. A detailed description of the above activities is provided in Chapter 13 of the ESIA.

1.4 Objectives of the Consultation and Disclosure

The overall goal of public consultation and disclosure for the Burapha Mill Project is to improve decision-making, build understanding to ensure the long-term viability of the Project, and enhancement of Project benefits. The specific objectives of stakeholder consultation for the Project are to:

- Build two-way communications between Burapha, the affected communities and other Project stakeholders for the ESIA process;
- Ensure that Project affected communities and other stakeholders are well informed of the Project, potential associated environmental and social impacts, and proposed management measures;

- Collect relevant information on the Project Area from key stakeholders for use in the ESIA and associated management plans as well as development of the Project;
- Ensure stakeholder feedback on the Project and its impacts is gained through simple and effective communication processes; and
- Promote inclusive and informed decision-making on the development and management of the Project.

1.5 Stakeholder Identification

Table 1-1 provides a list and description of project stakeholders including their role during the ESIA processes and an indicative analysis of their interests and influence in relation to the Burapha Mill Project.

Table 1-1 Stakeholder Identification and Indicative Analysis

Stakeholder Category	Relevant Stakeholders	Description	Role during the ESIA process	Interest / Influence	Ranking	
					Interest Influence / Stake / Power	1 = High - 5 = Low
Project Owners	Burapha Agroforestry Company Limited (Burapha)	Burapha is a Lao-Swedish agroforestry company operating in Lao PDR. The company currently has agroforestry plantations, nursery, and sawmill / furniture manufacturing plant in four provinces of central Lao PDR (Vientiane Prefecture, Vientiane Province, Xayabouly Province and Saysomboun Province).	Burapha as the project developer is required by law to conduct an ESIA for the project. Burapha has contracted ES to complete this assessment. Burapha will assist ES with all necessary information and will lead formal ESIA consultations with ES.	As the project owner and key financial beneficiary of the project Burapha has very high interest in the project going ahead. It is a key player in the Lao forestry sector and has a strong relationship with the Government of Lao PDR.	1	1
Project Financiers	FinnFund	FinnFund (Finnish Fund for Industrial Cooperation Ltd.) is a Finnish development finance company that provides long-term risk capital for private projects in developing countries.	FinnFund as the project financier requires ESIA to be conducted as per IFC performance standards. FinnFund will review and approve the ESIA.	As an investor for the project FinnFund has very high interest in the project going ahead. It also has a strong influence of the ESIA process.	1	1
Consultants	Earth Systems Group (including Associates)	Earth Systems Group is an Australian environmental consulting firm with a head office in Melbourne and subsidiary offices in Asia, Africa and Europe. Earth Systems Sole Ltd, based in Vientiane is a EIA licensed consultant with GOL.	Earth Systems are leading development of the ESIA from its office in Vientiane. ES staff hold the roles of Project Director (technical QA); Project Manager; and provides lead specialists for specific areas of the ESIA. The company is responsible for the conduct of all aspects of the ESIA.	ES has a high interest in the Burapha projects being developed using best environmental and social practices. The company is also professionally liable for the ESIA and advice it provides Burapha. ES has a high degree of influence over the direction of the project's environmental and social mitigation / management program and its reputation as an industry leader in Lao PDR gives it strong influence over other stakeholders.	2	2
	Engineering team (TBC)	Lead engineering consultant to be confirmed	The consultant conducting the mill feasibility study holds a great deal of information about the Mill project. It is responsible for providing information to ES for use in the ESIA. It will also be responsible for presenting at formal ESIA consultations.	The engineering / construction consultant is professionally liable for the accuracy of the information and advice it provides Burapha. As the project's lead engineering consultant, it has strong influence over the development of the Mill project.	2	2

Stakeholder Category	Relevant Stakeholders	Description	Role during the ESIA process	Interest / Influence	Ranking	
					Interest Influence / Stake / Power	1 = High - 5 = Low
Government of Lao PDR	Ministry of Natural Resources and Environment (MONRE), Department for Environmental and Social Impact Assessment, PONRE, DONRE	MONRE is the central governing agency for environment, land, forest, water, air, biodiversity, including minerals, natural disaster management, climate change, meteorology and hydrology.	MONRE (and PONRE, DONRE at provincial and district levels) are responsible for assisting with coordinating information gathering during the ESIA and providing feedback on the ESIA and associated management plans.	MONRE is responsible for granting approval to the Burapha Mill and Plantation Projects project and for overseeing its implementation and operation. As the lead energy agency, MONRE has very strong influence over the development of the project.	2	1
	Ministry of Agriculture and Forestry (MAF), Department of Planning, Department of Forestry, Department of Agriculture, PAFO, DAFO	MAF is the government's peak agriculture and forestry agency and is responsible for the management of the country's protected areas and watersheds. It is also responsible for issuing land use areas for villages and individuals.	MAF is required to engage and make information available about forestry, biodiversity and agriculture conditions and programs in the project area throughout the ESIA process. The Ministry is also required to attend ESIA consultations and provide feedback on the draft ESIA documents.	MAF has an interest and influence over the development of land concessions, clearance of vegetation and the management of biodiversity, land and agricultural mitigation measures for the project.	3	2
	Ministry of Planning and Investment (MPI), Department of Foreign Investment, Provincial MPI	Government's peak planning and investment agency.	MPI is required to engage and make information available throughout the ESIA process. The Ministry is also required to attend ESIA consultations and provide feedback on the draft ESIA documents.	MPI provides the Project's investment licence. The ministry holds important information on direct investment in the country. It will also be a key contact in the coordination of development planning activities for the Burapha project.	2	1
	Ministry of Industry and Commerce (MOIC), Provincial, District Industry and Commerce	Government's peak body for industry and commerce	MOIC has provided industrial land for the mill project and is required to oversee mill construction and operations and industrial pollution control.	MOIC provides the Project's industry licence.	2	1
	Various sector line agencies at the Central, Provincial, District and village level (i.e. health, education, roads, culture, labour and social welfare)	Sector line agencies overseeing key aspects of the government's socio-economic development program.	Line agencies are required to be engaged throughout the EISA process and provide comments and feedback relating to their relevant work.	Sector line agencies have an interest in the development of the project and its contribution to socio-economic development outcomes.	4	3
	Vientiane Provincial Government, Governor's office, Cabinet	Provincial Government	Provincial governments are required to assist throughout the ESIA process with the provision of staff and information. Provincial staff will assist ES in	Provincial Governments will have a high interest in projects that are located in their boundaries. The Lao Government is decentralised giving Provincial	1	1

Stakeholder Category	Relevant Stakeholders	Description	Role during the ESIA process	Interest / Influence	Ranking	
					Interest Influence / Stake / Power	1 = High - 5 = Low
			the coordination of consultation and disclosure and accompany ES during district consultations. The Province will host a formal ESIA consultation meeting on the draft ESIA and ensure that any feedback on the project is relayed to Burapha / ES.	Government's strong authority and responsibility for coordinating with project developers and monitoring development projects.		
	Hin Heup District Government, Governor's office, Cabinet	District Government	District governments are required to assist throughout the ESIA process with the provision of staff and information. District governments will assist ES in the coordination of consultation and disclosure at the district and village levels. and accompany ES during village consultations. Districts will host formal draft ESIA consultation meetings and ensure that any feedback on the project is relayed to Burapha / ES in a timely manner.	District Governments will have a high interest in projects that are located in their boundaries. The Lao Government is decentralised giving District Government's responsibility for coordinating with project developers and monitoring development projects.	1	2
	Village Group Authorities	Village groups often referred to as Ket's or Khoumban's are administrative groupings of between 5 and 10 villages.	Village group heads are required to assist throughout the ESIA process with the provision of staff and information. Village Group heads will assist in the coordination of consultation and disclosure at the group / village levels. The VG Head will usually accompany ES during village consultations. VG heads will usually act as a key contact for people in affected villages and ensure that any feedback on the project is relayed to Burapha / ES in a timely manner.	Village group's form the broader impacted community. They are therefore very interested in the project. As coordinators of service delivery in the local area they will have strong interests in socio-economic development impacts and mitigation measures.	1	2
	Village Authorities (Village chief, Village committee)	Village chiefs and committees are appointed government officials responsible for the administration of the village.	Village chiefs and committees will be required to assist throughout the ESIA process with coordination of village level consultation and information provision. Village chiefs / committee members also act as important contacts for villagers to convey feedback during the ESIA process.	Chiefs and Committees represent the interest of all peoples in the impacted village. They provide a formal means for raising community concerns / grievances up through the GOL governance structure.	1	3
Project Affected	Project affected villages (Mill Project areas)	Project affected villages are defined as all people in those villages (Ban	Project affected villages will be involved during informal (meetings, surveying, focus groups) and	Project affected villages will experience a range of social and environmental impacts. Under Lao	1	3

Stakeholder Category	Relevant Stakeholders	Description	Role during the ESIA process	Interest / Influence	Ranking	
					Interest Influence / Stake / Power	1 = High - 5 = Low
Villages / Peoples		Phonesoung, Ban Khone Phook, Ban Viengthong).	providing information and feedback for the formal ESIA consultation.	legislation these people have the right to engage in the ESIA consultation process; raise concerns / give feedback; and have the right to fair compensation. PAV, if unhappy with the development process can formally and informally impact the project's development.		
	Project affected villages (transportation route)	Project affected (transportation route) villages are defined as all people in those villages potentially impacted by the Mill transportation route.	Project affected villages will be involved during informal (meetings, surveying, focus groups) and providing information and feedback for the formal ESIA consultation.		1	3
	Project affected People	Project affected people are people within project affected villages that will have land or assets impacted by the project.	Project affected villages will be involved during informal (meetings, surveying, focus groups) and providing information and feedback for the formal ESIA consultation.		1	3
Organisations	Lao Women's Union	LWU is a GOL organisation representing the affairs of women across Laos. The LWU has representatives at central, provincial, district and village levels.	Mass Organisation representatives have the opportunity to access information about the project and ESIA process; engage during ESIA consultations and provide information / feedback on the ESIA	LWU implements a range of development and capacity building projects in the Mill Project area. It is a highly respected and influential organisation within the GOL structure.	3	4
	Lao Youth Union	LYU is a GOL organisation representing the affairs of young people across Laos. The LYU has representatives at central, provincial, district and village levels.		The LYU are likely to be operating in the Mill and Plantation Project areas	3	4
	Lao Front for National Construction (LFNC)	The LFNC is a GOL organisation representing the Lao national interest and culture in Laos. The LFNC is represented at central, provincial, district and village levels.		The LFNC are likely to be operating in the Mill and Plantation Project areas	3	4
	Key companies in close proximity to the Mill	Companies in close proximity to the Mill site include BKN White charcoal factory, Layfarm Organic Fertiliser, EDL Hin Heup Substation, Burapha eucalypt plantation (not planted), Asian Nived Agarwood / Teak plantation, Tapioca	Companies will be provided the opportunity to engage during the ESIA process.	This group may experience indirect impacts. Under Lao legislation these people have the right to engage in the ESIA consultation process; raise concerns and give feedback.	4	4

Stakeholder Category	Relevant Stakeholders	Description	Role during the ESIA process	Interest / Influence	Ranking	
					Interest Influence / Stake / Power	1 = High - 5 = Low
		factory, BSS Cassava factory, Lilieng Rubber Plantation, Cement Factor II Concession (not built), Rice mill, White limestone factory and Ketsana timber oil refinery.				
NGO's	World Wide Fund for Nature	WWF is a global environment NGO. Its Mekong region and Lao country offices are based in Vientiane.	NGOs will have the opportunity to access information about the project and ESIA process; engage during ESIA consultations and provide information / feedback on the ESIA	WWF has a protected areas management projects and livelihood projects in Lao PDR. WWF is also part of "Responsible Asia Forestry and Trade" initiative. WWF is implementing programs in the Mill project area (Hin Heup)	2	3
	Oxfam	International development NGO operating in Laos		Oxfam has several programs in the Mill Project area. More information is needed on these programs.	3	3
	Village Focus International	International development NGO operating in Laos		VFI is implementing several programs in the Mill project area (Hin Heup)	3	3
	INGO Network	A Network of all major INGOs operating in Lao PDR		The Projects' information can be disseminated through the INGOs network. Feedback on the project from the INGO Network will reflect the Project's performance.	3	3
Multilateral and Bilateral Organisations	World Bank / IFC	A multilateral investment bank with a country office in Vientiane Laos.	Multilateral and Bilateral organisation will have the opportunity to access information about the project and ESIA process; engage during ESIA consultations and provide information / feedback	World Bank is likely to be a stakeholder. Further research needs to be conducted to determine their likely interest. World Bank supports the Participatory Forest Management project in Lao PDR which supports REDD+ activities.	3	2
Other External Stakeholders	General public	All members of the general public in Laos	General public will have the opportunity to access information about the project and ESIA process; and provide information / feedback	General public are beneficiaries of the mill and plantation projects which will provide wood products and through government revenue, development of the countries services and infrastructure	4	4

Stakeholder Category	Relevant Stakeholders	Description	Role during the ESIA process	Interest / Influence	Ranking	
					Interest Influence / Stake / Power	1 = High - 5 = Low
	Forest Stewardship Council	FSC is an international, non-profit organisation dedicated to developing standards based on the '10 Principles for Forest Stewardship' by which responsible forest practice can be measured. FSC provide certification services for forest products to ensure that environmental, social and economic needs are balanced, and long-term forest management plans are implemented.	FSC will have the opportunity to access information about the project and ESIA process; engage during ESIA consultations and provide information / feedback on the ESIA	Burapha are seeking FSC COC Certification across their wood supply chain. FSC will have an interest in ensuring that Burapha operations meet the required standard and will have strong influence through regular auditing. t	2	2
Media	Vientiane Times	Vientiane Times is the leading English newspaper in the country.	Will report on the implementation of the ESIA and results presented at the ESIA consultation. Can be utilised to inform public about the ESIA process	VT reports all major development news in Laos. It targets the international sector in Laos and has a wide distribution to government, development organisations and foreign companies operating in Laos.	3	3
	Vientiane Mai	Vientiane Mai – the leading Lao language newspaper.	Will report on the implementation of the ESIA and results presented at the ESIA consultation. Can be utilised to inform public about the ESIA process	VM targets the general Lao public and has a wide distribution to government, development organisations and foreign companies operating in Laos.	3	3
	KPL	Khaosan Pathet Lao (KPL) – The Pathet Lao newspaper.	Will report on the implementation of the ESIA and results presented at the ESIA consultation. Can be utilised to inform public about the ESIA process	KPL has a distribution to all key Government Ministry's and associated agencies.	3	3
	Lao Radio		TBC	TBC		

Source: Earth Systems 2016

1.5.1 Stakeholder Mapping

Figure 1-2 outlines the stakeholder mapping which visualizes the levels of interest and influence of key stakeholders on the Burapha Mill Project.

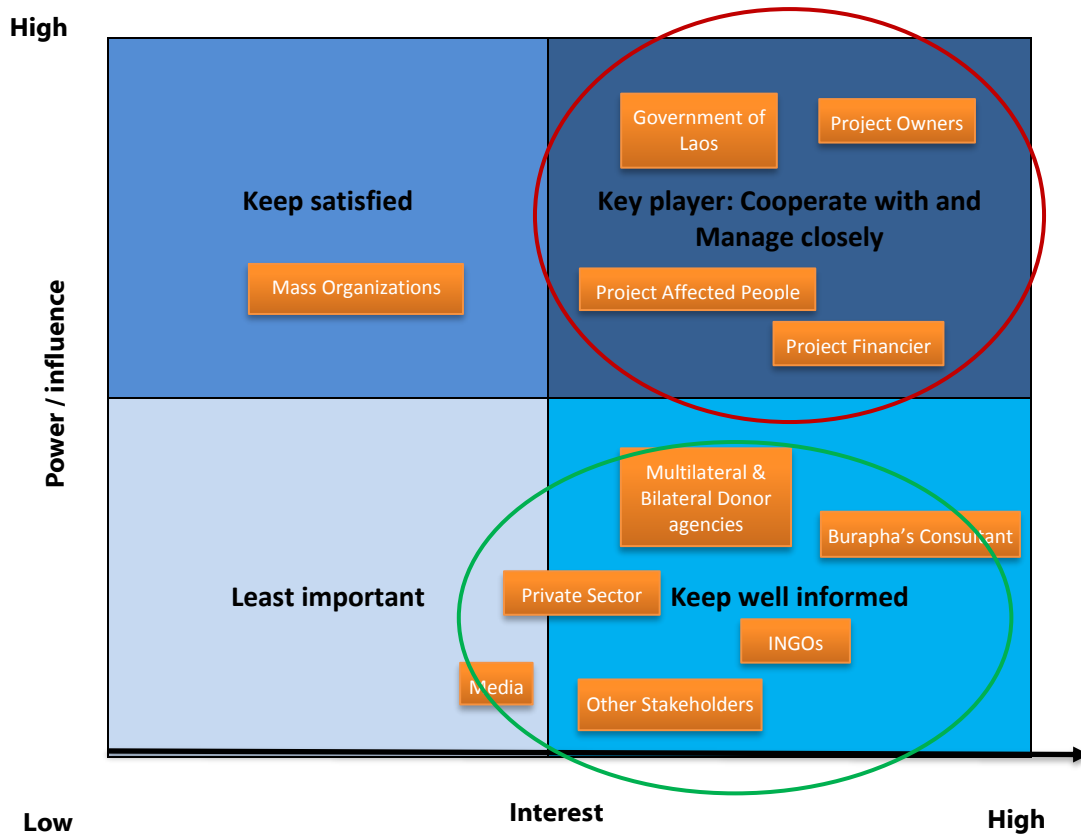


Figure 1-2 Stakeholder mapping for the Burapha Mill Project

1.6 ESIA Communication and disclosure process

An outline of the ESIA communication and disclosure process is provided in Figure 2. The process draws on two communication and disclosure mechanisms:

1.6.1 Project Developer ESIA communication and feedback mechanism

As the Project owner/developer Burapha is responsible for all communication with project stakeholders. The company is a first point of contact for all stakeholders wishing to obtain information or provide feedback on the project.

During the ESIA process, Earth Systems (ES) will act on behalf of Burapha as the ESIA C&D coordinator – planning and implementing consultations, information disclosure and the management and incorporation of stakeholder information, opinions and feedback. ES will establish direct lines of communication between all project stakeholders on behalf of Burapha and utilise Company and Government resources where appropriate to ensure the most effective C&D outcomes. Earth Systems must ensure that stakeholders understand ES's role as an independent ESIA consultant.

1.6.2 Existing Government of Lao communication and feedback mechanism

Project ESIA phase communication processes, based on the GOL communication and feedback mechanism, is illustrated in Figure 1-3. MONRE is responsible for facilitating communication between project stakeholders and Burapha. During the ESIA process, ES will utilise / strengthen existing GOL governance mechanisms to provide information to project stakeholders and source feedback about the project.

The GOL at central, provincial, district, group and village levels will nominate officials to act as key C&D contacts. ES will then brief these officials on: a) the importance of communication and disclosure during the ESIA process; and b) their roles as C&D representatives. A per diem and resources (phone cards, petrol) will be provided to ensure that officials can conduct this role in an effective manner.

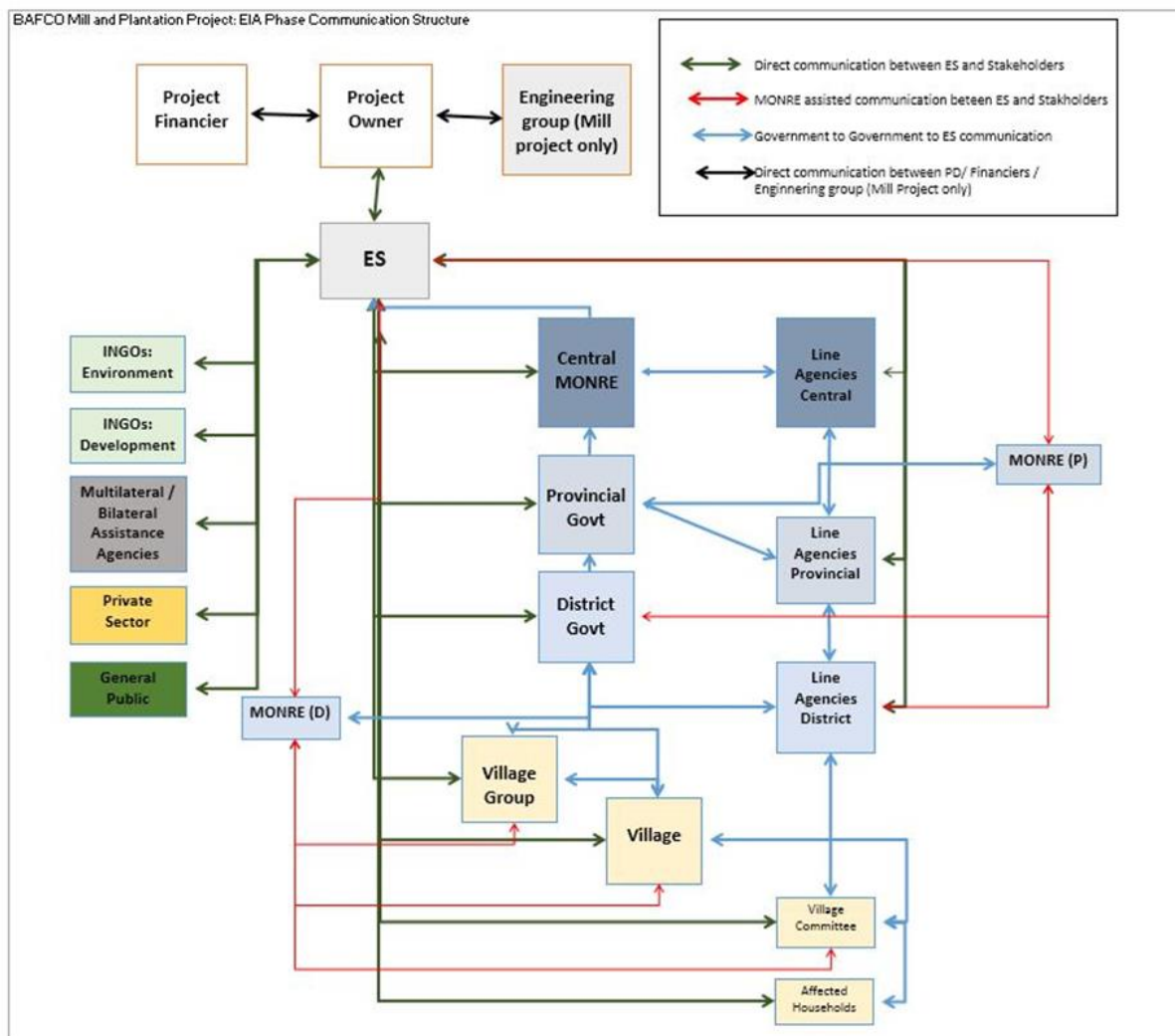


Figure 1-3 ESIA communication and disclosure process

1.7 Communication Methods and Strategies

Table 1-2 provides an overview of methods for communication, disclosure and feedback across five ESIA stages:

1. Initial consultation and information gathering;
2. Ongoing feedback;

3. Formal Consultation;
4. Draft ESIA and management documents presented to GOL; and
5. Final ESIA and management documents disseminated.

Table 1-2 also provides information on participants, communication tools, language, intended outcomes and assigned responsibility. Further detail on the communication tools used to support the implementation of these methods is provided in Table 1-3.

Table 1-2 ESIA Phase Communication Methods

Schedule (month)	Method	Description	Participants	Tools (also see Table 1-3 below)	Language	Outcomes	Responsibilities
Initial consultation / Information collection							
1	Central kick off meeting	Either joint or separate meetings to: a) present project information and ESIA process (including potential impacts) b) discuss / agree on the implementation of the ESIA process; c) discuss the availability of information from the central level. d) get initial feedback on the project	DG / DDG ESIA Department, MONRE DG / DDG Ministry of Agriculture, MIC Project Manager, ES and ES staff	Kick-off PowerPoint Presentation Project information flyer Project maps	Lao / English	GOL officials informed about project, potential impacts and ESIA process; Agreement on ESIA process (including ESIA consultation requirements); Commitment to provide information (and list of information); and Commitment to ongoing communication between ES and GOL contacts during the ESIA process (contact information obtained)	PM / APM, ES
1	Provincial Government meeting	Meet with Governor's Office and Cabinet to: a) present project information and ESIA process (including potential impacts) b) coordinate date collecting and meetings in the province; and c) discuss the availability of relevant information d) get initial feedback on the project	Governor / VG of Province Head Governor's Office Representatives of Cabinet Project Manager, Burapha Project Manager, ES and ES staff	Kick-off PowerPoint Presentation Project information flyer Project maps	Lao / English	GOL officials informed about project, potential impacts and ESIA process; Agreement on ESIA process (including ESIA consultation requirements); Commitment to provide information (and list of information) and Commitment to ongoing communication between ES and GOL contacts during the ESIA process (contact information obtained)	PM / APM, ES
2-3	Provincial line agency meetings (including mass organisations)	Meet with key line agencies to: a) present project information; b) discuss / secure line agency involvement in the ESIA process b) discuss the availability of relevant information	Representatives from: MONRE, MPI, MAF, MOH, Cultural Heritage ES specialists	Project information flyer Project maps	Lao (translation by ES staff for int. Consultants)	GOL officials informed about project, potential impacts and ESIA process; Commitment to provide information (and list of information); and Commitment to ongoing communication between ES and GOL contacts during the ESIA process (contact information obtained)	PM / APM, ES
2-5	Provincial involvement	Involve provincial staff in meetings at the district level.	Officials assigned by Provincial Governor's office / PONRE	Detailed oral briefing about aims and objectives of the	Lao	Provincial officials assist in coordination of ESIA process; Provincial officials exposed to the ESIA process	PM / APM, ES

Schedule (month)	Method	Description	Participants	Tools (also see Table 1-3 below)	Language	Outcomes	Responsibilities
	during districts visits			district level consultations		and more informed about project and stakeholder feedback; Establishment of a line of communication between district MONRE and impacted villages	
2-5	District Government Meetings	Meet with Governor's Office to: a) present project information and ESIA process (including potential impacts) b) Coordinate on data collecting and meetings in the district and villages c) discuss the availability of relevant information d) get initial feedback on the project	Provincial MONRE Governor / VG of District Head District Office Representatives of Cabinet Project Manager / APM, ES	Oral presentation Project information flyer Project maps	Lao	GOL officials informed about project, potential impacts and ESIA process; Commitment to provide information (and list of information); Commitment to ongoing communication between ES and GOL contacts during the ESIA process (contact information obtained)	PM / APM, ES Field Team Leaders, ES
2-5	District line agency meetings (inc.. Mass orgs)	Meet with key line agencies to: a) present project information; b) discuss / secure line agency involvement in the ESIA process b) discuss the availability of relevant information	Representatives from key line agencies. ES specialists	Project information flyer Project maps	Lao	GOL officials informed about project, potential impacts and ESIA process; Commitment to provide information (and list of information); Commitment to ongoing communication between ES and GOL contacts during the ESIA process (contact information obtained)	PM / APM, ES Field Team Leaders, ES
2-5	District involvement during village visits	Involve DONRE staff in meetings at the village level	Officials assigned by District Governor's Office / DONRE	Detailed oral briefing about aims and objectives of the district level consultations	Lao	District officials assist in coordination of ESIA process; District officials exposed to the ESIA process and more informed about project and stakeholder feedback; and Establishment of a line of communication between district MONRE and impacted villages	PM / APM, ES Field Team Leaders, ES
3-5	Village chief and committee meeting	Meet with impacted village chiefs and committees to: a) present project information and ESIA process (including potential impacts to the village) b) collaborate on village level	District MONRE, Group Head, Village Chief, Vice Chief Village Elders, Village representatives for Agriculture, Security,	Oral presentation Project information flyer Village survey form Photos, pictures	Lao (requirement to translate into Local language)	Village officials informed about project, potential impacts and ESIA process; Village survey completed; Initial feedback on project obtained; Commitment to ongoing communication between ES and GOL contacts during the ESIA process (contact information obtained);	PM / APM, ES Field Team Leaders, ES

Schedule (month)	Method	Description	Participants	Tools (also see Table 1-3 below)	Language	Outcomes	Responsibilities
		<p>consultations (village, households and focus groups)</p> <p>c) conduct village level survey for basic socio-economic and environment data</p> <p>d) obtain village land information (boundary & use)</p> <p>e) get initial feedback on the project</p> <p>f) outline feedback process</p>	Education, Health, LWU, LYU, LFNC and Team Leader, ES and ES staff			Village representative identified for village feedback process	
3-5	Village meeting	<p>Full village meeting held in communal meeting area to:</p> <p>a) present project information and ESIA process (including potential impacts to the village)</p> <p>b) Outline consultation process</p> <p>c) Outline feedback process</p>	All villages (ensure representation in terms of gender, age and disadvantaged household)	<p>Oral presentation</p> <p>Canvas Maps</p> <p>Information board (laminated info flyer)</p>	Lao (requirement to translate into Local language)	Villagers informed about the project and the ESIA, consultation and feedback processes.	PM / APM, ES Field Team Leaders, ES
3-5	Village focus groups	Surveying of distinct groups within a village to ensure all groups have opportunity to engage in the consultation process.	<p>Groups may include but not limited to:</p> <p>a) women / men</p> <p>b) elderly / youth</p> <p>c) farmers / fishermen</p>	Focal group survey	Lao (requirement to translate into Local language)	Participants provide information and express their opinions / feedback about the project	PM / APM, ES Field Team Leaders, ES
3-5	Household surveys	<p>Surveying a representative sample of households within a village to:</p> <p>a) gather socio-economic data</p> <p>b) gain opinion / feedback about the project</p> <p>Surveys should be conducted in households where feasible</p>	representative sample of households (effort made to include women in this surveying)	Household survey	Lao (requirement to translate into Local language)	Participants provide information and express their opinions / feedback about the project	PM / APM, ES Field Team Leaders, ES

Schedule (month)	Method	Description	Participants	Tools (also see Table 1-3 below)	Language	Outcomes	Responsibilities
6	Meetings with other stakeholders	Meetings with interested parties to: a) present project information and ESIA process b) Outline consultation and feedback process c) Collect relevant information for ESIA	International NGOs Multilateral and Bilateral Assistance Agencies Other stakeholders	Project information flyer Meeting record	English / Lao	Participants provide information and express their opinions / feedback about the project	PM / APM, ES
Ongoing feedback							
1-12	Feedback mechanism	A feedback mechanism which utilises existing GOL governance structure while at the same time offering direct lines of communication with the project developer and ESIA consultant.	All stakeholders	Information flyer with contact details Meeting record / stakeholder feedback form	English / Lao / local language	Feedback from stakeholders recorded and incorporated into ESIA process.	PM / APM, ES
Formal ESIA consultation meetings							
7	Village level ESIA workshops	Village level consultation meeting to present findings of the ESIA and invite feedback / comment. At the completion of the workshop, the final village meeting agreement needs to be shown to the participants for final consensus.	DONRE, Group Head, Village Chief, Vice Chief, Village Elders, Village representatives for Agriculture, Security, Education, Health, LWU, LYU, LFNC, Project Manager, Burapha, Project Manager, ES and ES specialists	ESIA presentation, Technical presentation, Maps, Updated project info sheet, Gender focus group survey, Meeting record / stakeholder feedback form DONRE officer will record the meeting minutes	Lao	Stakeholders provide information and express their opinions / feedback about the project.	DONRE, PM, Burapha PM, ES and ES specialists

Schedule (month)	Method	Description	Participants	Tools (also see Table 1-3 below)	Language	Outcomes	Responsibilities
7	District level ESIA workshops	District consultation meeting to present findings of the ESIA and invite feedback / comment. The final consensus from the village meeting is presented in the district workshop, seeking for further comments and questions. The project developer is responsible for introducing the final consensus to the district meeting.	DESIA (MONRE), PONRE, Governor / VG of District, Head District Office, Representatives of Cabinet, District line agencies (coordinated by PONRE), Heads of district from Mass Orgs, Group heads, Village Chiefs, Sample of Project affected people, Project Manager, Burapha, Project Manager, ES and ES specialists	ESIA presentation, Technical presentation, Maps, Updated project info sheet, Gender focus group survey, Meeting record / stakeholder feedback form PONRE officer will record the meeting minutes	English / Lao	Stakeholders provide information and express their opinions / feedback about the project.	DESIA (MONRE), PONRE, PM, Burapha PM, ES and ES specialists
7-8	Central / Provincial ESIA Workshops	Central level consultation meeting to present findings of the ESIA and invite feedback / comment. Meeting will include technical and consultation activities and a site visit	DG / DDG DESIA, MONRE, Head Division of Environment, MONRE, DG / DDG Department of Investment Promotion, MPI, DG / DDG Department of Industry and Commerce, MOIC, DG / DDG Department of Forestry, MAF, DG / DDGs of other applicable line agencies, Provincial Governors / Vice Governors, Heads of provincial line agencies, Heads of provincial mass orgs, District Governors / Vice Governors, Village Group Heads, Sample of Project affected people, Project Manager, Burapha,	ESIA presentation, Technical presentation, Maps, Updated project info sheet, Gender focus group survey, Meeting record / stakeholder feedback form MONRE officer will record the meeting minute	English / Lao	Stakeholders provide information and express their opinions / feedback about the project.	DESIA, PM, Burapha PM, ES and ES specialists

Schedule (month)	Method	Description	Participants	Tools (also see Table 1-3 below)	Language	Outcomes	Responsibilities
			Project Manager, ES, and ES Specialists				
8	Open Stakeholder Forum	Open Stakeholder forum to present the ESIA to targeted stakeholders from the forestry sector and civil society and invite feedback / comment.	DG / DDG DESIA, MONRE, Head Division of Environment, MONRE, DG / DDG Department of Investment Promotion, MPI, DG / DDG Department of Industry and Commerce, MOIC, DG / DDG Department of Forestry, MAF, DG / DDGs of other applicable line agencies, Provincial Governors / Vice Governors, Heads of provincial line agencies, Heads of provincial mass orgs, District Governors / Vice Governors, Village Group Heads, Sample of Project affected people, Villagers from Project villages, Project Manager, Burapha, Project Manager, ES, and ES Specialists	ESIA presentation, Technical presentation, Maps, Updated project info sheet, Meeting record / stakeholder feedback form	English / Lao	Stakeholders provide information and express their opinions / feedback about the project.	PM, Burapha PM, ES and ES specialists
Draft ESIA and management documents presented to GOL							
7	Draft ESIA documents presented to GOL	Draft ESIA documents presented to GOL before district, provincial and central ESIA consultations	MONRE Central (will manage distribution to other GOL agencies)	Draft ESIA docs Draft ESIA docs executive summary (Lao)	English / Lao	Government stakeholders are given opportunity to read draft ESIA documents and prepare for consultation meetings	Director, ES PM / APM, ES

Schedule (month)	Method	Description	Participants	Tools (also see Table 1-3 below)	Language	Outcomes	Responsibilities
Final ESIA and management document dissemination							
12	Final ESIA documents presented to GOL	Final ESIA documents presented to GOL	MONRE Central (will manage distribution to other GOL agencies)	Draft ESIA docs (Lao) Draft ESIA docs executive summary (Lao)	English / Lao	Government stakeholders have 60 working days to review the ESIA and either: a) request further information / clarifications / corrections; or b) approve / disapprove ESIA. ESIA approval will come in the form of an Environment Certificate for the project and may contain additional requirements.	Director, ES PM / APM, ES
14	Final ESIA documents and approval documents published	Final ESIA documents and approval documents made available.	MONRE (at all levels) will manage access to these documents; Burapha will make documents available on its website	Final ESIA docs (Lao) Final ESIA docs executive summary (Lao) Burapha website; MONRE website Information centres at provincial and district levels	English / Lao	All stakeholders given access to ESIA documents and to engage the project developer on implementation of environmental and social management plan	PM Burapha DG, ESIA MONRE

Table 1-3 ESIA Phase Communication Tools

Tool	Description	Language	Target													
			Project Owners	Project Financiers	Consultants	GOL	Mass Organisations	Village Chiefs and Committees	Project Affected Villages / Peoples	General Public	Private sector	International NGOs (Environment)	International NGOs (Development)	Multilateral and Bilateral Donors	Other External Stakeholders	Media
Information flyer / invitation for feedback*	Printed flyer providing information on the project developer; project details; ESIA process; potential impacts; consultation schedule and communication / feedback channels	English / Lao				x	x	x	x**	x	x	x	x	x	x	x
Kick-off PowerPoint Presentation	PowerPoint presentation providing text/graphic/photo information on the developer; project details; ESIA process; potential impacts; and consultation schedule	English (presented in Lao)	x	x		x	x									
Oral Presentation	Oral presentation (using other communication tools such as maps, pictures, photos etc.) providing information on the project developer; project details; ESIA process; potential impacts; consultation schedule and communication / feedback channels	Lao (translated into ethnic language as necessary)				x		x	x							
Project maps (handout)	Maps (including general locational, land use and topographic) on the project area. Maps to be included in information flyer and PowerPoint presentations.	NA	x	x		x	x	x	x							
Project maps (Canvas)	Canvas Maps (including general locational, land use and topographic) on the project area upon which information can be recorded	NA				x		x	x							
Photos / pictures (presentation)	Photos and picture aids for example: - species (flora, fauna, aquatic) to aid in biodiversity assessment	NA							x	x						

Tool	Description	Language	Target												
			Project Owners	Project Financiers	Consultants	GOL	Mass Organisations	Village Chiefs and Committees	Project Affected Villages / Peoples	General Public	Private sector	International NGOs (Environment)	International NGOs (Development)	Multilateral and Bilateral Donors	Other External Stakeholders
	- similar developments (to aid in communities understanding of planned project)														
Photos (taken during consultations)	Photos taken during consultation exercise to be used in reports: - Photos as a record of meetings that have taken place - Photos of sites of interest in the project site - Photos to support impact assessment	NA	x			x									
Village survey forms	Village survey forms for collecting village level socio-economic and environmental information; views / initial feedback about the project from village chief and committee; and contact information	English / Lao							x						
Household survey forms	Household survey forms for collecting household level socio-economic and environmental information; views / initial feedback about the project from household members; and contact information	English / Lao													
Meeting Record / Stakeholder feedback form	Dual meeting record / stakeholder feedback form to record details of stakeholders; information; and views / feedback about the project.	English / Lao					x	x	x						
Village information board*	Laminated project information flyer posted on village board on wall of village meeting area which provides information on the project developer; project details; ESIA process;	Lao							x	x					

Tool	Description	Language	Target													
			Project Owners	Project Financiers	Consultants	GOL	Mass Organisations	Village Chiefs and Committees	Project Affected Villages / Peoples	General Public	Private sector	International NGOs (Environment)	International NGOs (Development)	Multilateral and Bilateral Donors	Other External Stakeholders	Media
	potential impacts; consultation schedule and communication / feedback channels															
Phone / fax / email communication	Phone / fax / email communication with stakeholders.	English / Lao		x		x			x		x	x	x	x	x	x
Information email / invitation for feedback*	General email sent to stakeholders providing information on the project developer; project details; ESIA process; potential impacts; consultation schedule and communication / feedback channels	English / Lao								x	x	x	x	x	x	x
Website information*	Website page providing information on the project developer; project details; ESIA process; potential impacts; consultation schedule and communication / feedback channels; and key ESIA documents when available.	English								x	x	x	x	x	x	x
Media advertising (directing reader to where information can be obtained*)	Advertisements in local papers and radio providing brief information about the project and ongoing ESIA process - directing audience on how to obtain further information.	English / Lao								x	x	x	x	x	x	x
ESIA presentation	Formal PowerPoint presentation providing text/graphic/photo information on the project; ESIA process; project impacts; and mitigation / management.	English / Lao	x			x	x	x		x	x	x	x	x	x	x
ESIA documents	Formal ESIA documents including: ESIA; EMMP; SAMP / RAP; Ethnic Peoples Development Plan; and PCDP	English/Lao	x	x	x	x	x				x	x	x	x	x	x

Tool	Description	Language	Target													
			Project Owners	Project Financiers	Consultants	GOL	Mass Organisations	Village Chiefs and Committees	Project Affected Villages / Peoples	General Public	Private sector	International NGOs (Environment)	International NGOs (Development)	Multilateral and Bilateral Donors	Other External Stakeholders	Media
ESIA document summaries	Executive summaries of ESIA, EMMP and SAMP	English/Lao							X	X	X					
Information Centres	Information centres established by Burapha at central, provincial and district levels. Centres contain information about project including ESIA documents and are staffed by officials who act as key contacts for stakeholders.	NA			X	X	X	X	X	X	X	X	X	X	X	X

* According to GOL guidelines all mass media tools must contain following information:

- Name and address of a developer(s);
- Objectives of a development project including; types and location of a project;
- Information of venue (village) and date where a consultation meeting will take place;
- Information of contact person; such as name, address, contact details. This is a person who is responsible for gathering concerns, recommendations from local residents and passes them to developers.

** Information will be provided in Lao language and may not be suitable for other ethnic groups. In such cases, oral translation will be provided.

1.8 Grievance Mechanism

A grievance mechanism has been developed as part of the Project ESMMP. The grievance mechanism builds on and further refines Burapha's existing Standard Operating Procedure (SOP) for grievance management, Burapha-SOP-010-Dispute Resolution.

1.9 Reporting

All records of public consultation sessions will be maintained and made available for public access. The ESMMP will prescribe both routine and incident / grievance reporting relevant to the Public Consultation and Disclosure Plan (PCDP). Burapha sustainability reporting will also cover public consultation and disclosure.



BURAPHA PLYWOOD MILL

ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

OPERATION PHASE

Prepared by Burapha Agroforestry Co Ltd.



June 2022

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This report is not to be used for purposes other than those for which it was intended. Environmental conditions change with time. The site conditions described in this report are based on observations made during site visits and on subsequent monitoring results. Burapha does not imply that the site conditions described in this report are representative of past or future conditions. Where this report is to be made available, either in part or in its entirety, to a third party, Burapha reserves the right to review the information and documentation contained in the report and revisit and update findings, conclusions and recommendations.

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TERMS AND DEFINITIONS

Term	Definition
Burapha	Burapha Agroforestry Company
CEMP	Construction Environmental Management Plan
COOHS	Corporate Environmental and Occupational Health and Safety
COO	Chief Operations Officer
CSER	Social & Environmental Compliance
DCOO	Deputy Chief Operations Officer
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESSMS	Environmental, Social and Safety Management System
FSC	Forest Stewardship Council
GOL	Government of Lao PDR
IAIA	International Association for Impact Assessment
IFC	International Finance Corporation
ILO	International Labour Organization
IMA	Independent Monitoring Agency
ISO	International Organisation for Standardisation
KPI	Key Performance Indicator
MAF	Ministry of Agriculture and Forestry
MOF	Ministry of Finance
MOIC	Ministry of Industry and Commerce
MONRE	Ministry of Natural Resources and Environment
NGOs	Non-Governmental Organisation
OHS	Occupational Health and Safety
Project	Burapha Mill Project
WHO	World Health Organisation

PART I GENERAL MATTERS

INTRODUCTION

1.1 General Overview

This *Environmental and Social Management and Monitoring Plan* (ESMMP) for the Burapha Plywood Mill Project has been prepared by Burapha Agroforestry Co., Ltd (Burapha) and is based on the government approved ESMMP (Rev 3) Earth Systems, January 2019 developed for both the construction and operation phases.

The ESMMP has been prepared based on the requirements of relevant Government of Lao (GOL) legislation, the Environmental Impact Assessment Guidelines (2016).

The document incorporates the findings and recommendations of the ESIA Report (Volume B) and describes environmental and social management and monitoring measures required during mill operation (only) based on information since commissioning was completed 1st June 2021 and the subsequent commencement of operations.

Mitigation and management measures prescribed in this ESMMP apply to all Burapha employees, contractors and service providers working for or at the mill.

The Plan is a dynamic document and will be reviewed and updated at least every 2 to 5 years during operations to reflect changes to Project activities, Company commitments, newly acquired information environmental and social conditions and legislative requirements.

This ESMMP comprises the following:

- A brief overview of the project;
- Burapha's environmental and social management policies, legislative requirements, and commitments for the Project;
- Environmental and social management measures to avoid, minimise or mitigate impacts during Project operations; and
- A proposed environmental and social monitoring and reporting program.

2 PROJECT DEVELOPER – ENVIRONMENTAL AND SOCIAL POLICIES AND COMMITMENTS

2.1 Project Developer

Burapha Agroforestry Co., Ltd.

Burapha Agroforestry was established in 1993 by a Lao-Swedish joint venture. The Company currently operates its agroforestry operations in Vientiane Prefecture, Vientiane Province, Xayabouly Province, and Xaysomboun Province in central Lao PDR. Burapha also operates a tree nursery and sawmill / furniture manufacturing facility in Xaythany District, Vientiane Prefecture.

Burapha is comprised of the following departments:

1. Senior Executive and Administration.
2. Corporate Social and Environment Responsibility;
3. Occupational Health and Safety
4. Forestry Department;
5. Industry Department (Plywood Mill and Nabong Sawmill);
6. Human Resources;
7. Finance Department; and
8. Land Department;

2.1.1 Burapha Contact Details

Burapha Agroforestry

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2.2 Burapha Environmental and Social Commitments

Burapha is committed to operating its Mill to meet national and international standards for environmental and social sustainability (refer to Chapter 4). In summary, Burapha will operate the Mill to meet obligations of the following:

- Lao PDR law and legislation;
- Forest Steward Council Chain of Custody Certification Standard (FSC-STD-40-004) – the Mill was FSC COC certified (TSUD-COC-001779) on the 28th July 2021.
- International Finance Corporation Performance Standards on Environmental and Social Responsibility January 2012;
- International Labor Organisation Standards

- World Bank General Environmental, Health, and Safety Guidelines (2007) and EHS Guidelines for Board and Particle Based Products (2007), which specify best practices for environmental and social considerations; and

Sustainability is a key component of Burapha's wood manufacturing facility. The Company only sources wood from sustainably managed plantations of eucalyptus, acacia and teak. Burapha operates a sawmill according to the requirements for FSC Chain of Custody certification. The Company also supports the European Union's *Forest Law Enforcement Governance and Trade* (FLEGT) initiative to counter trade in illegal wood.

Burapha does not purchase any wood that falls under any of the following criteria:

- Illegally harvested wood;
- Wood harvested in violation of traditional or civil rights;
- Wood harvested from forests in which high conservation values are threatened by management activities;
- Wood harvested from areas being converted from forests and other wooded ecosystems to plantations or non-forest uses; or
- Wood from forests in which genetically modified (GM) trees are planted.

2.3 Corporate Social Policies

Burapha is committed to adherence to national labour policies / requirements and IFC Performance Standards for full-time staff, casual employees and contractors. The Company articulates its labour policies in a number of documents, including the Environmental, Social and Safety Management System (ESSMS), Burapha Staff Rules, *Code of Conduct*, *Human Resource Policy*, *Burapha Employee Handbook*, *Employee Representatives Manual*, and in signed contracts.

The *Burapha Staff Rules* and its *Corporate Code of Conduct* clearly identifies Company policies with respect to promotion of international human and labour rights; promotion of a workplace that is safe, healthy and free of discrimination; and policies regarding honesty, transparency, ethics, and equal opportunity.

Burapha is committed to standards / guidelines of the UN's Universal Declaration of Human Rights and the Core Conventions of the International Labour Organization (ILO).

3 PRESENTATION OF THE PROJECT

The Burapha plywood mill (mill) processes small diameter eucalyptus logs into veneer and plywood products. The raw timber is sourced from Burapha Agroforestry operations and other large-scale plantation operators, boutique plantation operators, and small farmer owned out-grower schemes.

The Mill produces various grades of plywood, including:

- Construction grade plywood used for wood construction, concrete forms, furniture;
- Packaging plywood used for packaging material; and
- Sub-floor plywood used in floor construction.

Finished products are sold in Lao PDR and also exported abroad.

The Mill will continue to operate for the foreseeable future and therefore there is currently no management planning for decommissioning / closure. Burapha will update the ESMMP before closure and will submit the revised Closure ESMMP to the Government of Lao PDR at decommissioning.

3.1 Project Setting

3.1.1 Mill Site

The mill is located in Hinheup District of Vientiane Province, approximately 80km north northwest of Vientiane, bordering the village boundaries of Ban Phonesoung and Ban Khone Phook. The mill concession site is seven hectares.

The site had been previously cleared of native forests and graded for industrial activity. There is no quality terrestrial habitat within the footprint. May 2016 botanical surveys identified a dominance of native and non-native grasses and herbs with scattered small trees on the northern fringe. No internationally or nationally threatened flora were identified within the Mill site. Animal occurrences are likely to be transient with the possible exception of burrowing animals. No vertebrates were observed within the Mill site during May 2016 biodiversity surveys (with the exception of livestock).

The Mill site drains to a number of small unnamed ephemeral canals that converge off-site and drain to the Nam Lik River (reservoir) via a circuitous and sometimes sub-surface channel. The channels are not natural streams, but are artefacts of historic grading (i.e. natural drainage to the southwest now flows to the northwest). The drainages do not support aquatic biodiversity, with no quality aquatic habitat on-site. However, discharge from the site may reach the Nam Lik River during the wetseason, which is a high value habitat for a number of aquatic species and an important fishery for local residents. The Nam Lik in the vicinity of the plywood mill is regulated by the Nam Lik hydropower dam located 14.3km downstream (east).

3.1.2 Transport Network

Raw logs are transported from Burapha plantations to the Mill and finished wood products are transported to Vientiane for domestic and international sales.

The Mill site is centrally located with respect to Burapha plantation landholdings and the new Lao China Freeway (L-C F) and National Road 13, minimising the cumulative log hauling distances to the extent practicable.

Throughout the year raw logs and finished products are shipped to and from the plywood mill via the new Lao China Freeway.

3.2 Mill Design

3.2.1 Veneer and Plywood Production

Plywood production is comprised of six (6) primary processes, namely: log cutting; veneer peeling and clipping; veneer drying; plywood assembly; plywood pressing; and plywood finishing.

Log cutting – 5.4 m long logs are harvested and transported to the factory log yard. The logs are loaded into the cutting line and cut into two sizes for plywood production; 2.62m and 1.31 m. The logs are cut into these lengths based on log diameter, form, and volume requirements.

Veneer peeling and clipping - plywood veneer is rotary cut (veneer peeling), with the peeler block rotated around its axis in a lathe whilst the veneer sheet is cut by a knife which is mounted parallel to the block's axis. The veneer sheets are then conveyed to a multi-tray system for storage. The green veneer is then stored for drying for a maximum of 16 hours. The mill is outfitted with 2' and 4' peeling lines.

Veneer drying – drying of veneer to between approximately 3 - 10 percent moisture content aids the gluing process during plywood manufacture. Veneer drying accounts for approximately 70 percent of the thermal energy consumed in the plywood production and approximately 60 percent of the Mill's total energy requirement.

Plywood assembly - assembly of the plywood prior to pressing entails the joining of the narrow strips of veneer, which are edge-glued to make sheets of the required size. Veneer grading and pre-layup for subsequent gluing also occurs in this operation. This operation accounts for a large share of the manual labour employed in the production process.

Plywood manufacturing mills typically use one of three types of resin / adhesive (or a combination of the three): urea-formaldehyde glue; phenol-formaldehyde glue; or melamine-urea-formaldehyde glue. Glues are mixed at the mill and applied on roller spreaders during assembly.

Plywood pressing – once veneers are laid-up as pre-assembled plywood sheets, they are fed into hydraulic presses to bring the veneer into contact with the adhesive. Burapha uses a cold press followed by a hot press that cures the glue. The hot press platens are heated by steam.

Finishing – primary finishing, which involves trimming, puttying, sanding, to upgrade the plywood after pressing, is undertaken to enhance the marketability of the product. Trimming saws cut the boards to the required size, which are then sanded with drum sanders to the desired surface smoothness and plywood thickness. Damage or imperfections to the face of veneers were manually repaired by plugging with a non-shrinking putty.

3.2.2 Ancillary Facilities

The following facilities are also included at the site:

- **Haulage Service Centre:** Linfox Transport contracted to supply harvesting and haulage, and mobile services at the mill have established a vehicle service bay at the site.
- **Log stockyards** – trucks offload logs to one of two stockyards for sorting and storage. The stockyards may in future have sprinkler systems to prevent logs from warping as they dry.
- **Power supply** – electricity required for mill operations is planned to be supplied from the local Hinheup Sub-Station. At a later stage it is proposed that a heating centre will be equipped at the boiler to generate requisite heat / steam for processing combusted off cuts for steam generated electricity.
- **Air compressing and ventilation** – a dust removal room houses air compression and ventilation equipment to extract dust from applicable areas. Local exhaust ventilation, extraction and

collection systems vacuum wood dust from various facilities (e.g. sanding, sawing / clipping, etc.). The factory itself is opened to air circulation on all sides.

- **Water supply and drainage system** – Approximately 23,040 m³ per annum of groundwater is abstracted via a pump / well to supply operational and firefighting tank water. The drainage system will recycle wash-water from the glue spreaders and veneer dryers. Water from other areas will drain via pipes and channels to the passive water management pond.

Surface water from the Nam Lik may replace groundwater to service future operation requirements.

- **Water management pond** – water runoff is conveyed from the Mill, log stockyards, and the remainder of the footprint to a pond for passive treatment.
- **Firefighting pump room** – A firefighting pool is positioned next to the firefighting pump in a standalone facility.
- **Factory roads** – One external site access road (gravel) and internal roads (concrete) service the site. Stormwater diversion channels align each side of the roads.

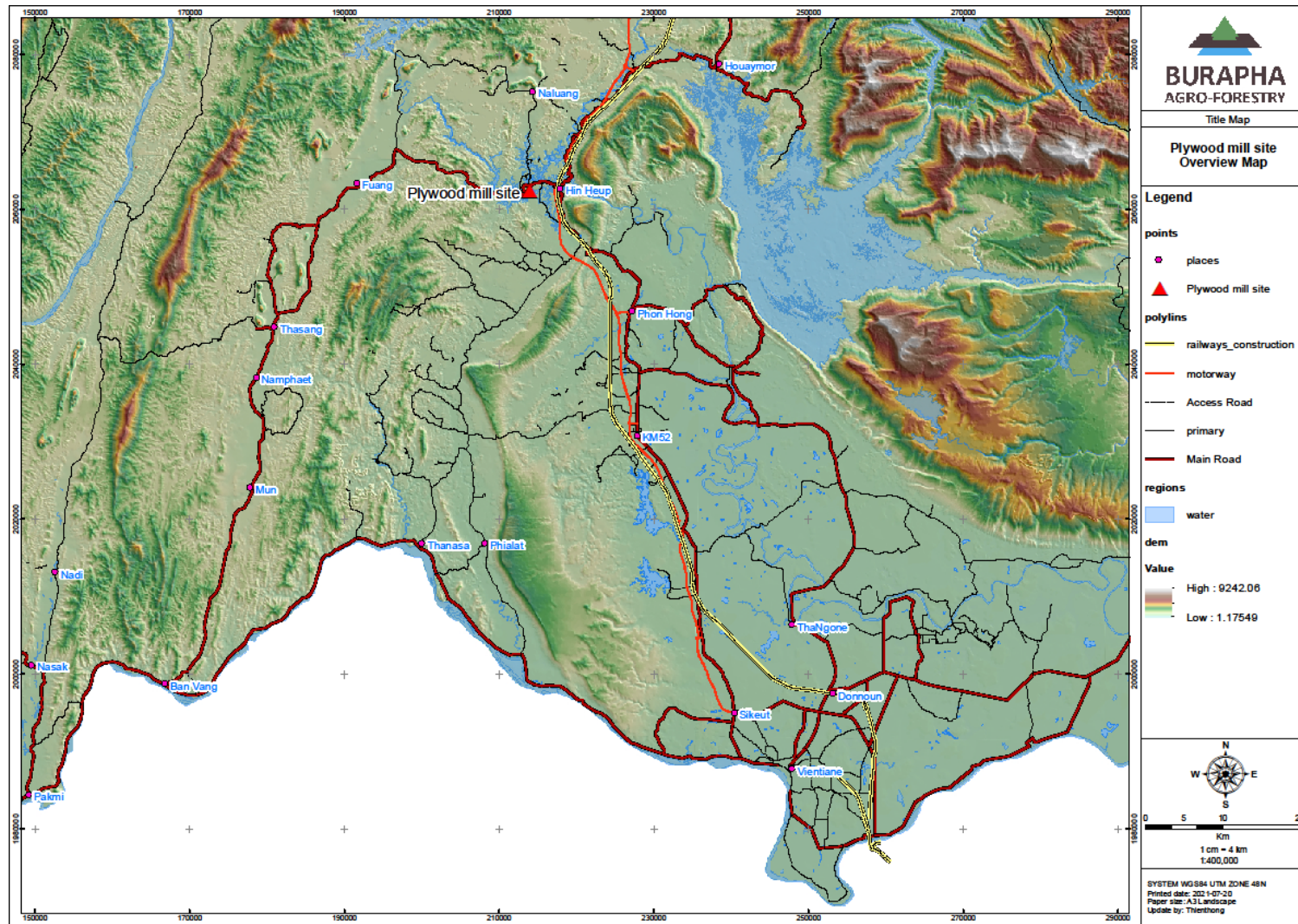


Figure 1 Burapha Plywood Mill Location

4 LEGAL REQUIREMENTS AND ENVIRONMENTAL AND SOCIAL POLICIES AND COMMITMENTS

4.1 National Legislation and Guidelines

4.1.1 Relevant Legislation and Guidelines

Table 4-1 lists the main decrees, laws, regulations and policies relevant to the permitting of a mill project in Lao PDR.

Table 4-1 Relevant Lao PDR laws, regulations and policies for the Burapha Plywood Mill

Title	Year
Laws	
Law on Forestry	2019
Law on Processing Industry	2013
Environmental Protection Law	2013
Land Law	2019
Law on Labour Protection	2013
Law on Investment Promotion	2016
Law on Water and Water Resources	2017
Law on Land Transport, No. 24/NA, dated 12 December 2012	2012
Law on Tax, No. 05/NA, dated 20 December 2011	2011
Law on Value-added Tax, No. 52/NA, dated 23 July 2014	2014
Decree	
Decree on the Promulgation and Enforcement of National Environmental Standards, No. 81/PMO, dated 21 February 2017	2017
Decree on Environmental Protection Fund, No. 94/PMO, dated 08 March 2017	2017
Decree on Compensation and Resettlement of People Affected by Development Projects	2016
Decree on State Land Leases and Concessions	2009
Decisions, Directives, Regulations, and other Legislation	
Environmental Impact Assessment Guidelines	2016
Order of the Prime Minister on Strickness the Management and Inspection of Logging, Wood Transport and Timber Business	2016
Decision on the Approval of List of Eligible and Prohibited Wooden Products for Export	2016
Instruction on the List of Eligible and Prohibited Wooden Products for Export	2016
Decision on Timber Product Standards	2015
Instruction on Pollution Control, No. 0745/MONRE, dated 11 February 2015	2015
Ministerial Instruction of ESIA Process of Investment Projects and Activities	2013
Guideline on Public Involvement in Environmental and Social Impact Assessment Process	2013
Decision on Timber Processing Management	2007
Decision concerning the Standard of Wood, Rattan and Bamboo Processing Industry Factories (No. 1140/MOIC)	2007
Regulation Regarding Buying and Selling Timber from Plantations, (No. 1862/MOIC)	2008
Notification on the Management of Wood Transport Vehicle, Wood Extraction Machinery, and Wood Processing Machinery, No. 1440/MOIC.DIMEX, dated 04 September 2008	2008
Agreement on Standards of Wood Manufacturing Facility, No. 0719/MOIC, dated 03 March 2009	2009
Regulation on Wastewater Discharge from Processing Industry	2006

Title	Year
Notification on the Management of wood transport vehicle, wood extraction machinery, and wood processing machinery.	2008
Standard on Wood Processing Factory, No. 0719/MOIC, dated 03 April 2009	2009
Notice No. 1791/MOICDIME regulating the import and export of plantation grown timber	2011
Joint Agreement on the Transportation of Logs, Sawn timber, Stumps, Burl/weed fall and Wood products	2008

4.2 International Policies, Guidelines and Standards

Burapha is committed to developing and operating the Mill to international standards. Key international policies, guidelines, and standards relevant to operations include:

- IFC *Sustainability Framework* (2012).
- World Bank General Environmental, Health, and Safety Guidelines (2007) and EHS Guidelines for Board and Particle Based Products (2007).

The ESIA and associated reporting incorporates international best practices and aligns with relevant certification requirements, including:

- Forest Stewardship Council (FSC) Chain of Custody Standard (FSC-STD-40-004);
- International Association for Impact Assessment (IAIA) Guidelines and Standards;
- Occupational Health and Safety Management Systems (e.g. OHSAS 18001 and / or ISO 45001); and
- Social Accountability International (SA8000).

4.2.1 IFC Sustainability Policy and Safeguard Procedures

In addition to compliance with national environmental and social standards and regulations for Lao PDR, Burapha aligns with the requirements of the IFC *Sustainability Framework* (2012).

The IFC EHS Guidelines are technical reference documents that provide guidance for projects in relation to key environmental, health and safety issues and parameters. Key EHS guidelines relevant to the Mill include:

- General Environmental Health and Safety Guidelines (2007); and
- EHS Guidelines for Board and Particle Based Products (2007);

Other IFC guidelines potentially relevant to the social impacts of the Mill include:

- Environmental Health and Safety Guidelines for Water and Sanitation (2007);
- Addressing Grievances from Mill-Affected Communities (2009);
- Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets (2007);
- A Guide to Biodiversity for the Private Sector (2006); and
- Sections I and II of the World Bank Group Pollution Prevention and Abatement Handbook (PPAH, 1999) (note: Section III was superseded by the revised IFC Environmental, Health and Safety Guidelines in 2007).

4.2.2 Forest Stewardship Council (FSC) Chain of Custody

On the 28th July 2021 Burapha achieved FSC Chain of Custody certification for the Mill: Certificate Registration Code: TSUD-COC-001779.

4.3 Discharge and Ambient Monitoring Standards

In developing the environmental and social management and monitoring program for the Mill, the following has been considered:

- Discharge / emissions guidelines for off-site releases of water, waste and potential airborne contaminants; and
- Ambient guidelines for the protection of beneficial uses and environmental values (e.g. aquatic fauna / fisheries protection, drinking water protection, etc.).

Applicable standards are provided in Table 2, with the more stringent guideline / value applied where discrepancies occur:

Table 2 Project Emissions Standards and Guidelines

Parameter	Guideline
Air Quality	Decree on the National Environmental Standards (MONRE, 2017)
	General EHS Guidelines: Air Emissions and Ambient Air Quality (IFC, 2007)
	Ambient Air Quality Guidelines (WHO, 2005)
Water Quality	Decree on the National Environmental Standards (MONRE, 2017)
	Lao PDR General Industrial Wastewater Discharge Standards
	EHS Guidelines for Board and Particle-Based Products (IFC, 2007)
	Guidelines for Drinking water quality 3rd edition (WHO, 2008)
Noise	Decree on the National Environmental Standards (MONRE, 2017)
	General EHS Guidelines: Noise. (IFC, 2007)

5 STAKEHOLDERS

5.1 Identification of Key Stakeholders

Stakeholders associated with the Mill include:

Villages in Close Proximity to the Mill

The concession area abuts village land of Ban Khone Phook and Ban Phonesoung and is within three km of Ban Viengthong (referred to as Project villages). No individuals nor communal lands are required for development of the Project. Households may be impacted by noise, air quality, water quality and availability, increased traffic, community safety and associated impacts.

Villages Along the Transportation Routes

The villages of Ban Hinheup, Ban Viengthong, Ban Khone Phook, Ban Phonesoung, and Ban Mouang are located on Provincial Road 4501, the key access road connecting Lao China Freeway to the Mill site.

Villages along haulage roads in the vicinity of plantations.

Government of Lao PDR

Government of Lao PDR stakeholders include:

- Hinheup District government and line offices;
- Vientiane Provincial government and line departments; and
- Central Government line agencies (particularly MONRE, Ministry of Planning and Investment, and Ministry of Industry and Commerce).

Other Stakeholders

Other stakeholders identified for the Mill include:

- Residents of other villages in Hinheup District along transport routes;
- Residents of Vientiane Province along transport routes;
- Private companies operating in the vicinity of the Project; and
- NGOs and aid projects working in the province.

The list of stakeholders will continue to evolve over the life of the Mill.

5.2 Consultation Methods

A detailed description of consultation methods and activities is provided in the main **ESIA** (Volume B).

6 ESMMP ORGANISATIONAL STRUCTURE, ROLES AND RESPONSIBILITIES

6.1 Function of the ESMMP

The ESMMP provides a link between policy and implementation, acting as a planning document. The Plan summarises environmental and social commitments and provides the management measures and monitoring programs to be undertaken to achieve these commitments.

Priority and continual improvement targets are set in this ESMMP. These targets will be used to guide the environmental and social work program and will be included in developed or updated Standard Operating Procedures (SOPs) of the site.

In accordance with regulatory requirement, the ESMMP will be updated to incorporate any significant changes or at least every 2 to 5 years. This will ensure that the ESMMP stays current as the Project evolves. This version represents the first update since the commencement of operations in June 2021.

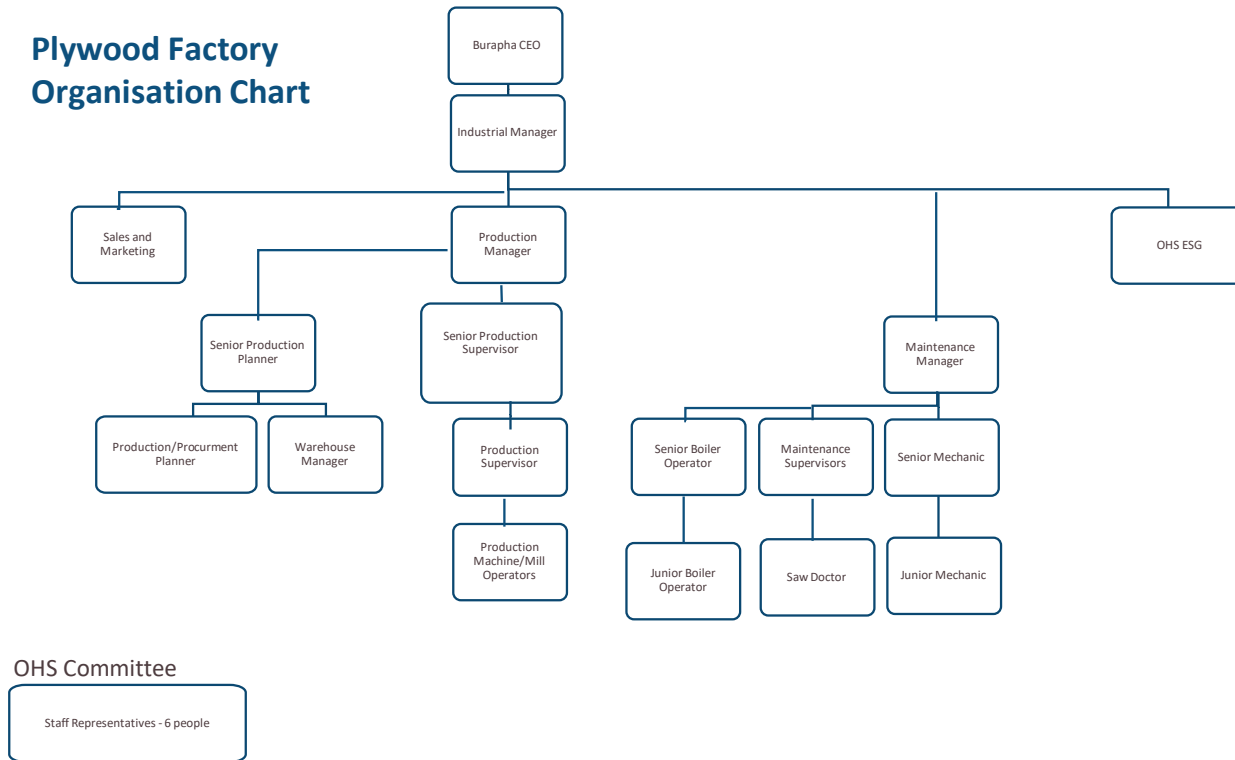
6.2 Links between this ESMMP and the Burapha ESSMS

The Environmental, Social and Safety Management Systems (ESSMS manual) is the umbrella document guiding Burapha's activities intended to protect the environment and provide a safe work environment. The manual defines obligatory standards of the company across all departments functions, including the Mill, and provides guidance and direction for ESSMS implementation to all staff. The system is designed to cover environmental and social management (E&S), and occupational health and safety (OH&S) aspects across the business. The Plywood Mill ESMMP sits as a second-tier document to the ESSMS. All ESSMS requirements are considered within the ESMMP and vice versa.

6.3 Organisation

Burapha's management structure is outlined in Figure 2 below. This structure includes an Executive Management Team consisting of the Chief Executive Officer (CEO) and the Deputy Chief Operations Officer (DCOO), supported by the Community, Social, and Environmental Compliance Department (CSER); regional managers and department heads (e.g. Human Resources, Finance, Forestry, Land and Government Relations, Machinery, Industry (plywood mill and sawmill), etc.).

Figure 2 Burapha Plywood Mill Organisational Structure



6.4 Staff responsibility as defined in the ESSMS

The Plywood Mill Manager has the responsibility for the overall management of safety, environmental and social aspects of operations. For the complete list of his/her staff responsibilities and mill staff generally, as well as external supporting functions refer to the related ESSMS sections provided in Appendix.

6.5 Monitoring and Reporting Systems

6.5.1 Monitoring

Burapha will implement a monitoring program for the life of the Mill. The monitoring program, detailed in Chapter 11, is summarised as follows:

- » Routine compliance monitoring (regular intervals)
- » Emissions / Discharge monitoring (prescribed intervals);
- » Ambient environmental monitoring (prescribed intervals);
- » Ambient social monitoring (regular intervals);
- » Investigations (event-based).

6.5.2 Internal Reporting

Burapha has employed the following reporting system:

- Incident and hazard reporting;
- Non-compliance reporting;
- Monthly and quarterly reporting; and
- Annual reporting.

6.6 Auditing and Review

6.6.1 ESMMP Review

Regular audits of the Mill ESMMP and its associated management systems will be undertaken internally and externally. The audits will assess:

- Adequacy of the ESMMP and associated plans with respect to the scale and nature of impacts and during operations;
- Workforce awareness, competence and compliance with the ESMMP and associated plans and procedures;
- Performance of managers and operators in implementing, maintaining and enforcing the ESMMP and associated plans; and
- Suitability of allocated resources, equipment and budget for implementation of the ESMMP.

All audit recommendations will be discussed with the relevant division managers, where appropriate. Corrective actions will be documented and progress towards resolution reported.

Continuous Improvement Targets

Continuous improvement of the various management systems in place will be an ongoing effort to ensure the Mill is implemented appropriately and effectively. These efforts can seek 'incremental' improvement over time or 'breakthrough' improvement all at once.

Continuous improvement of social, environment, and health, safety and security matters associated with the Mill will be managed in accordance to the ESSMS and be based on the 'Plan-Do-Check-Act' model. The model broadly follows an iterative process for continuous improvement as follows:

- **Plan:** Identify an opportunity and plan for change.
- **Do:** Implement the change on a small scale.
- **Check:** Use data to analyse the results of the change and determine whether it made a difference.
- **Act:** If the change was successful, implement it on a wider scale and continuously assess your results. If the change did not work, begin the cycle again.

6.6.2 Forest Stewardship Council External Audits

An FSC accredited certification body will conduct annual surveillance audits to verify compliance under the FSC requirements. An FSC accredited body will assess the Chain of Custody operations against relevant FSC standards.

Annual environmental, social and safety audits are conducted by Company investors. Investors audits and FSC provide reports at the conclusion of audits which define corrective actions that improve Mill performance. The corrective actions set the environmental, social and safety improvement work programs for the following year.

PART II RISK ASSESSMENT

6.7 Risk Assessment Methodology

A risk assessment approach has been used to conduct an analysis of environmental impacts and mitigation measures. The methodology is based upon ISO13000 Risk management — Principles and Guidelines, 2009 and ISO13010 Risk Management – Risk Assessment Techniques, 2009.

Following the assessment of the risk ranking, proposed controls were identified to avoid, minimise or mitigate the identified risks. Measures focus on either reducing the likelihood of occurrence or on decreasing the magnitude of the consequence in order to reduce the residual risk ranking to acceptable levels.

The risks associated with the Project only considers operation phase thematic areas i.e. the physical environment, biological aspects and social issues.

6.8 Risk Assessment Criteria

The risk assessment criteria used for the assessment are provided in Table 8-1. These are based on standard ISO31000 risk criteria (2009) and have been adapted for the Project.

Likelihood

As per ISO13000, Likelihood is defined as ‘the chance of occurrence’. Likelihood is used to refer to the probability of something occurring, whether defined, measured or determined objectively or subjectively, qualitatively or quantitatively, and described using general terms or mathematically (such as a probability or a frequency over a given time period). Further definition of Likelihood rankings is provided in Table 8-2.

Consequence

As per ISO31000, Consequence is defined as ‘the outcome of an event affecting objectives’. As outlined in the ISO standards:

- An event can lead to a range of consequences;
- Consequence can be certain or uncertain and can have positive or negative effects on objectives;
- Consequences can be expressed qualitatively or quantitatively; and
- The initial consequences can escalate through knock-on effects.

The descriptions of each of the numerical consequence rankings used in the initial assessment are described in their respective environmental and social and contexts (Table 8-3).

Table 8-1 Risk assessment criteria matrix with Likelihood and Consequence rankings

Likelihood		Consequence				
		1	2	3	4	5
Level		Slight	Low	Medium	High	Extreme
5	Almost	Medium	High	High	Very High	Very High
4	Likely	Medium	Medium	High	High	Very High
3	Possible -	Low	Medium	Medium	High	High
2	Unlikely	Low	Low	Medium	Medium	High
1	Rare	Low	Low	Low	Medium	High

Table 8-2 Summarised descriptions of Likelihood rankings

Likelihood		Summary
1	Rare	Very unlikely in the current or in a changing environment. Conceivable but highly improbable. The aspect / event may occur in very exceptional circumstances.
2	Unlikely	Less likely to happen in the current or a changing environment. The impact could occur at some time. The aspect / event has happened elsewhere under slightly similar circumstances.
3	Possible	It could happen in the current or a changing environment. The aspect / event has occurred before here or in similar circumstances elsewhere.
4	Likely	It probably will happen in the current or in a changing environment. The aspect / event is expected to occur. The aspect / event occurs in most circumstances.
5	Almost Certain	Frequent occurrence in current or in a changing environment. The aspect / event has occurred. The aspect / event occurs in almost all circumstances.

The descriptions of each of the numerical consequence rankings used are described in their respective environmental and social and contexts in Table 8-3.

Table 8-3 Consequence description

Consequence		Environmental	Social
1	Slight	Slight / temporary impact on physical or biological receptor(s). Corrected < 1 day. Any amount contained within design requirements without additional impact.	Slight impact on community well-being. Written / verbal complaint from community. Immediately rectifiable.
2	Low	Minor non-compliance resolved quickly. Low impacts on biophysical environment. Easily compensated loss of some non-endangered flora / fauna.	Low but ongoing impact on community health / well-being. Takes some time to resolve.
3	Medium	Non-compliance(s). Impacts on biophysical environment, managed locally. Loss of non-endangered flora / fauna. Quickly contained & corrected hazardous spills or emission on or off site.	Impacts that go beyond the local concerns but are recovered quickly and without significant lasting reputational or relationship impacts.
4	High	Significant non-compliance. (Against local or recognised international standards.) High local impacts on biophysical environment. Loss of endangered flora / fauna. Significant contaminant outside containment but on-site.	National and international concerns. Sustained NGO / stakeholder activism resulting in reputational damage. Difficult to resolve quickly.
5	Extreme	Severe impacts on biophysical environment. Very difficult to resolve and remediate. Significant loss of endangered / highly regarded flora / fauna (including aquatic life). Acutely hazardous spill or equivalent emission on or off site.	Complete breakdown of relationship with key stakeholders. Sustained negative media coverage on a national international level. Cessation or severe restriction of operations. Public outrage.

6.9 Risk Assessment Process

The method used for each step in the risk assessment process is outlined below. Figure 8- shows how the risk assessment process fits within the overall Risk Management Process.

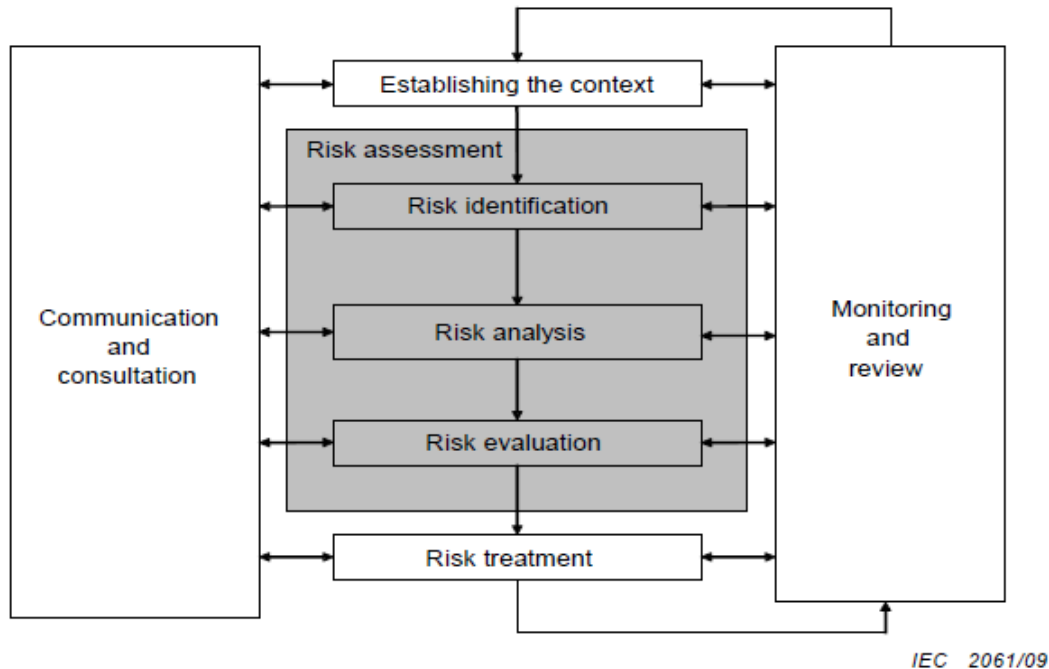


Figure 8-1 Risk Assessment Process (shaded) within the overall Risk Management Process (ISO13010)

6.9.1 Establishing the Context

ISO13000

“Before starting the design and implementation of the framework for managing risk, it is important to evaluate and understand both the external and internal context of the organization, since these can significantly influence the design of the framework.”

A comprehensive review was conducted of internal and external factors to be considered when managing risk. This enabled the scope and risk criteria to be established for the rest of the risk assessment. The process included the following:

- Conducting site visits;
- Conducting consultations with relevant stakeholders (refer Chapter 13 of the ESIA Report);
- Compiling and reviewing available information on the mill, including:
 - » Burapha scoping studies and feasibility reports;
 - » Existing Burapha policies, plans and procedures;
 - » Specialist environmental and social technical studies; and
 - » Compiling additional baseline information relevant to the mill.

6.9.2 Communication and Consultation

ISO13010

“Communication and consultation with external and internal stakeholders should take place during all stages of the risk management process.

Therefore, plans for communication and consultation should be developed at an early stage. These should address issues relating to the risk itself, its causes, its consequences (if known), and the measures being taken to treat it. Effective external and internal communication and consultation should take place to ensure that those accountable for implementing the risk management process and stakeholders understand the basis on which decisions are made, and the reasons why particular actions are required.”

Communication and consultation have been conducted with a variety of stakeholders during the ESIA process. These have included consultations with:

- Villages potentially affected by the Project (e.g. through formal village consultations, refer to Chapter 13 of the ESIA Report);
- Burapha;
- GOL authorities (Provincial and District); and
- Local NGOs.

These stakeholders and consultations are described in further detail in the ESIA.

6.9.3 Risk Identification

ISO13010

“The purpose of risk identification is to identify what might happen or what situations might exist that might affect the achievement of the objectives of the system or organization. Once a risk is identified, the organization should identify any existing controls such as design features, people, processes and systems.

The risk identification process includes identifying the causes and source of the risk (hazard in the context of physical harm), events, situations or circumstances which could have a material impact upon objectives and the nature of that impact”

The risk identification process involved the compilation of a comprehensive list of potentially significant environmental and social risks based on events that might create, enhance, prevent, degrade, accelerate or delay the achievement of Project objectives. For the current risk assessment, this process included:

- A review of risks previously identified in:
 - » Consultations with relevant stakeholders (refer to above);
 - » Burapha operational reports;
 - » Specialist environmental and social technical studies.
- Benchmarking against international standards and checklists, including those of the Equator Principles and World Bank/IFC; and
- Development of a Project Risk Register.

6.9.4 Risk Analysis

ISO13010

“Risk analysis consists of determining the consequences and their probabilities for identified risk events, taking into account the presence (or not) and the effectiveness of any existing controls. The consequences and their probabilities are then combined to determine a level of risk.

Risk analysis involves consideration of the causes and sources of risk, their consequences and the probability that those consequences can occur. Factors that affect consequences and probability should be identified. An event can have multiple consequences and can affect multiple objectives.”

For this step, causes and source of risk were considered, including their positive and negative consequences, and the likelihood that those consequences would occur. This involved an assessment of expected likelihood and consequences, based upon:

- A thorough understanding of the Project environmental and social baseline;
- The presence/absence of existing controls;
- Forecasts based upon common risks experienced by other similar projects;
- Expert knowledge regarding the potential impacts of agroforestry, as well as the likely effectiveness of mitigation measures.

This process was used to inform risk evaluation and guide risk treatment.

6.9.5 Risk Evaluation

ISO13010

“Risk evaluation involves comparing estimated levels of risk with risk criteria defined when the context was established, in order to determine the significance of the level and type of risk.

Risk evaluation uses the understanding of risk obtained during risk analysis to make decisions about future actions. Ethical, legal, financial and other considerations, including perceptions of risk, are also inputs to the decision.”

Based on the results of previous steps, risks were evaluated by allocating a ‘Level of Likelihood’ and ‘Level of Consequence’ to each of the risks. The evaluation of Likelihood and Consequence were based on criteria outlined in Table 8-2 and Table 8-3 respectively. Risk exposure is then calculated based on the formula below, to identify the level of risk exposure as either Low, Moderate or High as per Table 8-1.

Risk Exposure = Level of Likelihood x Level of Consequence

6.9.6 Treatment

ISO13010

“Having completed a risk assessment, risk treatment involves selecting and agreeing to one or more relevant options for changing the probability of occurrence, the effect of risks, or both, and implementing these options.

This is followed by a cyclical process of reassessing the new level of risk, with a view to determining its tolerability against the criteria previously set, in order to decide whether further treatment is required.”

For this part of the risk assessment process, additional controls have been identified for the mitigation and/or reduction of risk, after careful evaluation of anticipated Project risks from a ‘business as usual’ scenario. Upon implementation of these controls, the consequences and likelihood of the risk have been re-evaluated to assess the anticipated residual level of overall risk exposure.

6.10 Results

The summary findings of the medium and high environmental and social risks (pre-mitigation) for the Project are provided in Table 8-5 below.

Table 8-4 Summary of High and Moderate environmental and social risks (prior to mitigation) associated with the Burapha Mill Project

Activity / Aspect	Construction	Operations	Likely Primary Causes	Pre-Control Ranking			Potential Key Controls / Management Measures for the Project Development	Post-Control Ranking		
				Consequence	Likelihood	Risk		Consequence	Likelihood	Risk
Physical Risks and Proposed Management Measures										
Increased suspended solids; topsoil loss	✓	✓	Vegetation clearance; major earthworks; unsealed areas	3	5	15	Implement and monitor erosion and sediment control measures	2	4	8
Adverse impacts on downstream water quality		✓	Nutrient loading in waters – organic	4	4	16	Install waste water treatment system, zero discharge; handle/dispose of hazardous/chemical waste to best practices	4	2	8
	✓	✓	Discharge of hazardous materials	5	2	10		5	1	5
Air quality impacts; quality standards breach	✓	✓	Dust and vehicle emissions from road traffic and earthworks	3	3	9	Minimise dust; speed limits; grievance redress; vehicle maintenance	2	3	6
Occupational health and safety impacted		✓	Particulate generated from sawing and operations	3	5	15	Dust control facilities implemented in Mill; enforcement of PPE	2	1	2
		✓	Formaldehyde or other gaseous emissions	5	3	15	Training for Hazmat; PPE, adequate ventilation; emergency preparedness	4	1	4
		✓	Emissions of Volatile Organic Compounds (VOCs), NOx, CO, etc.	3	3	9	Low emissions equipment selected, where practicable	3	2	6
Noise impacts; regulatory breach	✓	✓	Construction and operations; increased traffic	3	3	9	Construct daylight hrs; low-noise equipment, natural buffers; grievance redress	2	2	4
Impacted visual amenity; pests, excess waste	✓	✓	Lack of adequate waste storage, and enforcement	2	3	6	Proper waste management; education of project workforce	2	1	2
Natural disasters	✓	✓	Floods, fire, earthquake; inadequate training	5	2	10	Best practice for natural hazards; appropriate emergency response	3	2	6
Biological Risks and Proposed Management Measures										
Introduction or spread of invasive flora and fauna	✓	✓	Introduction of species; improper pest control	3	2	6	Pre-treat vehicles; use local species for revegetation; monitor eucalyptus invasiveness	2	2	4
Increased sediment impacting habitat	✓	✓	Inadequate erosion, sediment, hazardous control	2	4	8	Effective erosion, sediment control, disposal of hazardous materials	2	3	6
Social Risks and Proposed Management Measures										
Operation injuries e.g. saws, presses		✓	Unsuitable equipment controls; improper training	5	3	15	Safeguards on equipment; training; provide, enforce PPE use	4	1	4
Vehicular accident	✓	✓	Poor training, conditions; speeding; drug or alcohol use	5	3	15	Enforce speed limits; Concentrate transport to daylight hours to the extent practicable.	5	1	5

Activity / Aspect	Construction	Operations	Likely Primary Causes	Pre-Control Ranking			Potential Key Controls / Management Measures for the Project Development	Post-Control Ranking		
				Consequence	Likelihood	Risk		Consequence	Likelihood	Risk
Exposure to hazardous chemicals	✓	✓	Improper training plans for chemical handling, PPE	4	4	16	Training; MSDS; suitable storage, handling; provide, enforce PPE use	4	1	4
Exposure to particulates and air pollutants	✓	✓	Lack of suitable PPE; improper Mill design	3	5	15	Appropriate Mill design; provide and enforce PPE use (dust masks)	3	1	3
Impacted air quality	✓	✓	Particulate matter from unsealed roads, timber milling	2	3	6	Water application to unsealed roads; design for particulate capture	2	2	4
Impacted air quality		✓	Stack emissions (e.g. NOx, SO2, CO)	3	2	6	Mill equipment selection and design	2	2	4
Perceived inequitable employment, training for locals		✓	Inequitable employment policies; lack of training and low skill level of locals	3	3	9	Preferential employment to locals; equal recruitment; ensure community have realistic expectations	3	1	3
Failure to meet economic improvement expectations		✓	Real or perceived lack of employment and training opportunities	3	3	9	Local sourcing; business development; national/international standards; community consultation	3	1	3
Increased noise along haul routes	✓	✓	Hauling raw logs and finished product	2	5	10	Concentrate transport to daylight hours to the extent practicable; plan routes; Grievance Redress mechanism	2	3	6
Increased dust; breach of regulatory requirements	✓	✓	Nuisance dust generated from road traffic / timber milling	3	4	12	Dust minimisation; plan transport routes; enforce speed limits; grievance mechanism	3	3	9
Damage to road infrastructure		✓	Hauling on unsealed roads	2	4	8	Haul on sealed roads to the extent practicable; Grievance Redress; maintain roads	2	2	4
Inequitable impact on vulnerable groups		✓	Improperly implement employment policies, compensation, social development	4	2	8	Consult particular attention to vulnerable groups; implement Lao policies; prioritise fair, equitable hiring	4	1	4
Ethnic conflict due to inequitable impact (real or perceived)		✓	Inconsistent compensation/consultation between groups, employment policies	4	3	12	Consult ethnic groups with attention to minorities; implement Lao policies; prioritise fair, equitable hiring	4	1	4
Adverse impacts on cultural heritage importance sites; breach of regulatory requirements	✓		Land disturbance and inappropriate cultural heritage management, lack of implementation of chance find procedures	4	1	4	Consult communities /GOL to avoid culture; implement Chance Find Procedure; appeasement ceremonies; educate staff; grievance mechanism	1	1	1
Community dissatisfaction with grievance process	✓	✓	Lack of consultation; lack of adequate resourcing by Company	3	3	9	Develop a grievance procedure to an international and national standard	3	2	6

6.11 Risk Management Summary

6.11.1 Approach to Risk Management in ESIA

Management and mitigation measures have been proposed for each key risk associated with the Project. These are summarized in Table 8-45 and are described in detail in the relevant sections in the **ESIA**. The risks will be managed and mitigated in accordance with the level of risk exposure and with due consideration of the nature and scale of the potential impacts.

6.11.2 Residual Risks

The implementation of proposed management and mitigation measures is expected to reduce the anticipated residual level of overall risk exposure for most of the identified risks (refer to Table 8-4). Although two residual risks are ranked as High, the likelihood of impacts are ranked Very Low for each (a consequence rating of very high necessitates a High or Very High-risk ranking. Table 8-5 summarises the key High and Moderate residual risks that remain.

Table 8-5 Summary of key risks prior to mitigation and post mitigation

High Risks (Prior to Mitigation)	Residual Risk with Mitigation
Discharge of hazardous materials used during transport of materials to Mill and associated impacts to surface and / or groundwater (i.e. formaldehyde, diesel fuel, etc.)	High
Increased frequency of accidents along transportation routes	High
Increased total suspended solids in surface waters and sediment deposition downstream of Project. Loss of topsoil	Moderate
Nutrient loading in receiving waters from organic materials / constituents of resin (e.g. formaldehyde) elevating BOD, COD and decreasing dissolved oxygen concentrations, impact aquatic biodiversity	Moderate
Formaldehyde or other gaseous emissions impacting workforce	Moderate
Natural disasters	Moderate
Injuries associated with construction activity - completed	Moderate
Injuries associated with saws, presses, and additional equipment for Mill operations	Moderate
Increased noise along haul routes	Moderate
Exposure to airborne hazardous chemicals (OHS)	Moderate
Exposure to particulates and additional air quality pollutants (OHS)	Moderate
Increased dust generated during dry season (from transportation); breach of regulatory requirements	Moderate
Particulate generated from sawing, Mill operations and associated OH&S issues	Low
Ethnic conflict due to inequitable impact (real or perceived) on different ethnic groups	Low

6.11.3 Risk Monitoring and Review

ISO13010

'As part of the risk management process, risks and controls should be monitored and reviewed on a regular basis to verify that:

- *Assumptions about risks remain valid;*
- *Assumptions on which the risk assessment is based, including the external and internal*
- *Context, remain valid;*
- *Expected results are being achieved;*
- *Results of risk assessment are in line with actual experience;*

- *Risk assessment techniques are being properly applied; [and]*
- *Risk treatments are effective.*

Accountability for monitoring and performing reviews should be established.'

Periodic risk monitoring and review are critical to managing environmental and social risks effectively over the Project life, and feed into all steps in the risk management process (refer Figure 8-).

Risk

As part of its Occupational Health and Safety System, Burapha will develop a risk management system for the Project consistent with ISO31000 *Risk Management — Principles and Guidelines* (2009). This should include:

- Ensuring that there is accountability, authority and appropriate competence for managing risk;
- Development of a Mill Risk Management Plan to ensure that the risk management policy is implemented, and that risk management is embedded in all of the organization's practices and processes;
- Allocation of appropriate resources for risk management;
- Establishing appropriate internal and external communication and reporting mechanisms; and
- Monitoring and review of the risk management framework.

6.11.4 Risk Management Framework

Based on the ISO31000 *Risk Management — Principles and Guidelines* (2009), key elements of the risk management framework are:

- Risk hierarchy;
- Risk governance and accountabilities;
- Risk System.

To ensure that the risk management framework is effective and continues to support organizational performance, Burapha should:

- Regularly assess the quality of risk management processes to identify opportunities for improvement;
- Measure risk management performance for the Project against indicators, which are periodically reviewed for appropriateness;
- Periodically measure progress against, and deviation from, a Project-specific risk management plan;
- Periodically review whether the risk management framework, policy and plan are still appropriate for the Project, given the organizations' external and internal context;
- Report on risk, progress with the risk management plan and how well the risk management policy is being followed; and
- Review the effectiveness of the risk management framework.

Decision relating to the improvement of the risk management framework, policy and plans will be made based on the results of monitoring and reviews. These decisions will aim to improve the organization's management of risk and its risk management culture. Burapha should periodically monitor and review the risk assessment conducted for the Project for the purposes of:

- Ensuring that controls are effective and efficient in both design and operation;

- Obtaining further information to improve risk assessment;
- Analysing and learning lessons from events (including near-misses), changes, trends, successes and failures;
- Detecting changes in the external and internal context, including changes to risk criteria and the risk itself which can require revision of risk treatments and priorities; and
- Identifying emerging risks.

Progress in implementing risk treatment measures and plans provides a performance measure. The results of the monitoring and review processes should be incorporated into Burapha's overall performance management, measurement and external and internal reporting activities.

The results of monitoring and review should be recorded and externally and internally reported as appropriate, and also be used as an input to the review of the risk management framework.

6.11.5 Risk Management Records

ISO13010

'Risk management activities should be traceable. In the risk management process, records provide the foundation for improvement in methods and tools, as well as in the overall process.'

Recording risk information that is concise, accurate and timely enables reports to be generated, which build corporate knowledge and contributes significantly to informed discussion on risk and uncertainty.

In accordance with ISO31000 Risk management — Principles and Guidelines (2009), Burapha that "Systems are in place to ensure that sustainability related records are established and maintained, accurate, legible, identifiable, securely stored and have established retention times based on legal requirements." All environmental and social risk assessments conducted, and associated documentation will be recorded and stored. As appropriate these records will include:

- Internal risk assessments;
- External risk assessments;
- Relevant Company procedures, standards, policies and plans;
- Relevant international guidelines and standards;
- Audit results; and
- Incident reports.

7 PRIORITY ACTIONS

Action	Responsibility
<i>Water Balance</i> - investigate process water requirements, groundwater availability, and complete Project water balance	Site Management with CSER
Develop <i>Waste Management Plan</i> that identifies hazardous and non-hazardous waste streams and suitable disposal methods and locations	Site Management with CSER
Develop and maintain a <i>Hazardous Materials / Hazardous Waste Register</i> that identifies name and classification of materials, quantities, characteristics that make them hazardous, etc.	Site Management
Nominate members of the Emergency Response Team, including senior staff in Vientiane and on-site personnel.	Site Management with OHS Manager
Ensure all heavy machinery and equipment has appropriate safety guards, control devices and systems and are subject to regular inspection and maintenance	Site Management with OHS Manager
Identify appropriate PPE specific to the hazards for each job.	Site Management with OHS Manager
Refine the Occupational Health and Safety Plan, specific to Mill Project hazards.	Site Management with OHS Manager
Prepare training modules for specific working responsibilities, OH&S, and emergency preparedness and response.	Site Management with OHS
Develop maintenance SOP for all equipment associated with the Project.	Site Management
Design and Implement a participatory Community Development Program specific to the Mill Project in coordination with affected villages and the District government designed to support local development initiatives and entrepreneurial enterprise	Site Management with CSER / HR

PART IV PROCEDURES AND SUPPORT PROGRAMS

MANAGEMENT PROCEDURES

7.1 Competence, Training and Awareness

Burapha will train employees to ensure the necessary knowledge and skills are available on site to achieve environmental and community relations policies, objectives, commitments, and targets. The ESMMP content will be communicated to all Project employees, consultants and contractors through an initial site induction program that is mandatory. The scope of this induction will include, as a minimum:

- Obligations under Burapha's policies and management plans;
- Project risks, potential impacts and mitigation measures;
- Site layout and environmental sensitivities of affected areas;
- Social sensitivities and cultural awareness;
- Project-specific procedures and environmental management documentation;
- Safe work and emergency response procedures;
- Incident reporting and investigation protocol;
- *Grievance Management Procedure*.

The induction program will provide general environmental and community awareness as well as occupation specific training. Occupation specific training will cover technical aspects relating to the contents of each relevant plan and site-specific plan, including:

The overall induction program will be updated when required to reflect changes in the Project scope, legislation, or other circumstances.

7.2 Internal and External Communication

The ESMMP content will be communicated to all employees, contractors, and consultants via mandatory inductions. The ESMMP will be made available on-site to facilitate access for all Project employees. Where applicable, the ESMMP will be utilised to generate site-specific management plans and standard operating procedures (SOP) that are distributed to all Mill employees.

7.3 Document Control

A range of environmental and social management documentation will be developed to support the mill operations. The associated documentation is likely to comprise the following items:

- ESMMP management plans and contractor specific CEMPs;
- Standard operating procedures and protocols, including but not limited to:
 - » Occupational Health and Safety Plan;
 - » Emergency Preparedness and Response Plan; and
 - » Waste Management Plan;
- Incident and Accident Register;

- Hazardous Materials / Hazardous Waste Register
- Induction, training and competence records;
- Monitoring records and reports;
- Auditing reports; and
- Complaints received, and actions taken. (Grievance Management/Mechanism)

A copy of the original ESMMP document and subsequent versions will be kept and maintained for the Project records in Burapha's document control system. All major revisions of the Project ESMMP will be provided to GOL (via MONRE) for review and approval, which is separate from reporting to the GOL.

7.4 Grievance Mechanism

As per FSC and IFC Performance Standards, a grievance mechanism is required as part of the management system to ensure consultation, disclosure and community engagement continue throughout the life of the project.

Despite best practice community engagement, it is likely that grievances will arise throughout the life of the Project, and it is important that these are dealt with in a fair and transparent manner before they escalate. The grievance mechanism is commensurate with the risks and impacts of the Project and aim to resolve concerns promptly, using a consultative process that is culturally appropriate, accessible and transparent. Affected communities are informed about the mechanism during the stakeholder engagement process.

The different phases of conflict development and appropriate interventions are summarised as follows:

- Conflict avoidance → Consultation and participation in planning, decision making;
- Simple disagreements → Informal negotiation, discussion and mediation;
- Early conflict development → Refer to Village Grievance Committee;
- Conflicting positions taken → Refer to Grievance Committee at District level;
- Conflicting positions hardened → Refer to Grievance Committee at Provincial level; and
- Intractable conflict → Refer conflict to National Court.

Conflict avoidance is a key goal of the stakeholder consultation process and the community engagement program. Regular consultation and engagement with local community members will effectively reduce the occurrence of disagreements and conflicting positions. However, should conflict avoidance not work, informal and formal dispute resolution will be employed to the satisfaction of all parties as per Burapha Grievance Management Procedure SOP. Refer to following sections.

Principles

According to the FSC Dispute Resolution System, the principles of Burapha's Grievance Mechanism are:

- Disputes will be resolved by firstly discussing and negotiating or through mediation. Formal procedures, including committees, should only be adopted as a last resort.
- Disputes will always be addressed at the lowest level possible (only escalated as last resort) and stakeholders are strongly encouraged to follow this principle.
- A person or organisation, who is the subject of a complaint, will be given adequate notice about the proceedings (including details of the complaint).
- A person making a decision will declare any personal interest they may have in the proceedings (i.e. conflict of interest).

- A person who makes a decision will be unbiased and act in good faith. Therefore, decision-makers cannot be one of the Parties to the Complaint or Appeal, nor have an interest in the outcome.
- Proceedings will be conducted with fairness to all the Parties to the Complaint or Appeal.
- Each party to a proceeding is entitled to ask questions and contradict the evidence of the opposing party.
- A decision-maker will take into account relevant considerations and mitigating circumstances and ignore irrelevant considerations.
- All grievances will be treated with confidentiality

7.5 Community Grievance Management

What is a grievance?

A grievance is a real or imagined cause of complaint, generally a perception of unfair treatment of a community member by Burapha. If a community member lodges a complaint they will receive a fair hearing by company, whatever the nature of the complaint.

Purpose and application

Disputes are almost always resolved without the need to for a formal process, but on occasion formality is necessary This document provides guidance to villages and farmers on the steps they can make to assist them manage cases of grievances with the company.

Who can lodge a grievance?

Any village authority or individual that is impacted by the company's operations or feels they have been unfairly treated.

7.5.1 Procedure Step 1 – Verbal Communication

In most cases grievances can be resolved quickly and amicably through verbal communication. As such, the first step is to hold discussions or a phone call between the aggrieved and the local company representative. The company representative can advise line managers as required to resolve the issue. Burapha local contact details are available from village authorities and Burapha notice boards installed at each partner village.

Alternatively, villages authorities and farmers can call Burapha Head Office directly: Telephone +856 21 451 841

7.5.2 Procedure Step 2 – Written Submission

If the verbal communication fails to provide adequate closure on the issue, the villager or village authority can submit a written letter to the company either personally or via the village authority. The letter should state the issue that causes concern and how they would like that issue resolved. The letter can also include witness statements and photographs but should be signed and dated by the complainant.

7.5.3 How will Burapha respond?

All grievances will be taken seriously by the company. The company guarantees that no one will be mistreated or disadvantaged for making a complaint regardless of its nature or outcome. The company will ensure it:

- Grievances are addressed promptly.
- Hears the complainant and impartially investigate the allegations or concerns.
- Identify the issue and in negotiation with the farmer and or village come up with an agreed solution.

7.5.4 Procedure Step 3 – Lao PDR Legal System

Any grievance that can't be resolved by Step 1 or Step 2 can be brought to the legal civil court system of Lao PDR. This can involve raising the issue at district level, and then subsequent levels (provincial and central) as required. The allotted government agent will represent the villager or village in negotiations with Burapha. Again, all grievances will be taken seriously by the company. The company guarantees that no one will be mistreated or disadvantaged for making a complaint regardless of its nature or outcome. Costs for this step will be the responsibility of the aggrieved.

All legal and administrative costs will be covered by the Company, if the complaint is upheld and genuine, if not otherwise agreed.

7.6 Staff Grievance Management

The following procedures have been formulated to manage cases of grievances within the organization brought up from employees, staff member, daily labourers or other individuals involved in company operations. The grievance process is intended to investigate and, where possible, resolve complaints. The procedures should assist complainants in arriving at fair resolutions. The grievance process is comprised of two procedures, 1) informal procedure, and 2) formal procedure.

7.6.1 Informal Procedure

In many cases, disputes can be resolved through communications within a particular department or work area. As such, the first step in the grievance process is a discussion between the employee and the supervisor or their immediate supervisor or the Human Resources Department. The employee can initiate this step in one of two ways:

1. Talk with his or her supervisor. The employee should promptly bring the matter to the attention of the immediate supervisor, explaining the nature of the problem and the relief sought. The supervisor should respond within three (3) working days, if possible. If the supervisor provides an oral response to the employee, the supervisor should prepare a written record of the response.
2. Talk with Department Managers or Human Resources If an employee cannot decide whether or not to initiate a grievance or is reluctant to discuss the matter with the supervisor, he/she may seek the advice from the department manager or HR who may seek to resolve the issue by discussions with the complainant supervisor. The HR department must provide a written response to the employee at the completion of this process.

7.6.2 Formal Procedure

If the matter is not resolved through the informal procedure, or the informal procedure is no alternative, the employee may proceed to formal procedure. The employee shall submit a written grievance report or submit a written statement to HR (in Form HR 05 or handwritten letter). This statement should outline the relevant facts that form the basis of the employee's grievance, stating the resolution sought.

Upon receipt of the employee's written report or statement, the HR will take appropriate measures and may use the following procedures:

- a) Investigation of the allegations;
- b) Making a finding as to whether discrimination or harassment occurred, or whether it is likely it occurred;
- c) Submit a report with a recommended course of action to the management;
- d) Implementation of appropriate solution;
- e) Hearing of the accused and the complainant.

Outcomes can include any combination of the following:

- Counselling for one or both parties;
- Disciplinary action (e.g. warning, transfer, suspension, dismissal);
- Formal apology;
- If the complainant wishes, and they believe that the grievance has not been addressed, they can file the dispute with the GOL, as per the Formal Procedure for Community Grievances (as above).

7.6.3 Lao PDR Legal System

Where a worker, or trade union or workers' representative claims that an employer has acted in a way which is considered not to be in conformity with labour law, regulations, the employment contract, labour unit work rules or any other labour rule, the aggrieved may bring the matter to arbitration before the Lao Workers Union or other designated authority. Refer to the complete set of workers' rights and grievance redress processes in the Lao Labor Law 2018

Again, all grievances will be taken seriously by the company. The company guarantees that no one will be mistreated or disadvantaged for making a complaint regardless of its nature or outcome.

Costs for this step will be the responsibility of the aggrieved.

7.6.4 Confidentiality

Throughout the grievance process, confidentiality is maintained with those people directly involved and only those investigating and/or finding a solution to the grievance will have access to the relevant information. The company guarantees that no person will be mistreated or disadvantaged for making a complaint.

8 REPORTING AND MONITORING SYSTEMS

Results from environmental and social monitoring programs will be captured in Burapha's ESSMS and database management systems and reviewed internally.

The objectives of the monitoring program are to:

- Identify and quantify the direct and indirect impacts of the Project on the surrounding environment and community;
- Provide early warning of potential impacts, estimate the extent of predicted impacts and identify any unforeseen impacts associated with Project activities;
- Detect and measure trends or changes in ambient conditions to evaluate causes and potential remediation measures;
- Provide feedback on the adequacy of environmental and community management practices and allow improved practices to be developed for continuous improvement of management measures; and
- Confirm whether the Project is compliant with relevant national, international and Company environmental and social legislation and licensing commitments.

9 MONITORING

The Project's overall monitoring program will include the following categories of monitoring. A brief definition of these types is included below.

- **Operation Monitoring:** A suitably qualified monitor and or appointed site staff will conduct periodic monitoring of the Mill and ancillary infrastructure to ensure design controls are effective and proposed management measures are implemented and will prescribe corrective actions, when required.
- **Discharge (emission) monitoring:** The monitoring of discharge to identify potential contaminants discharged or emitted from the mill, measured at the point of discharge.
- **Ambient monitoring:** Ambient monitoring will be required if discharge monitoring identifies that effluent / emissions exceed Project guidelines. Ambient water quality monitoring would be conducted in the Nam Lik River, immediately downstream of discharge from the Project area. Air / noise emissions would be monitored near the closest sensitive receptor.
- **Investigation monitoring** is undertaken to determine the extent of impacts following an environmental incident (oil leakage, etc.), to verify that corrective actions have been implemented satisfactorily, or to verify / refute third-party claims of environmental impact.

9.1 Operations Monitoring

Site management, CSER and OHS Manager along with delegated site staff will undertake regular formal and informal inspections of sites and activities. Inspections will compare performance and implementation against the management strategies and targets in the ESMMP. Site inspections will visually assess work compliance and evidence that recommended mitigation measures are implemented and effective.

Where an issue, incident or non-conformance is observed and documented at a particular site in a previous inspection, the inspector will note the effectiveness of the corrective actions implemented at the subsequent visit. The findings of site inspections will be incorporated into the Project Monthly Reports.

9.1.1 Emissions and Ambient Monitoring

The following direct sampling will be conducted, in addition to applicable visual observation detailed in the respective management plans (above).

Water Quality

Surface water quality will be sampled in effluent immediately downstream of discharge from the water management pond. Surface water will be monitored **monthly** for field parameters and quarterly for laboratory parameters, as follows:

- *Field parameters - MONTHLY*
 - » pH;
 - » Redox potential (ORP);
 - » Dissolved Oxygen (DO);
 - » Electrical conductivity (EC);
 - » Total dissolved Solids (TDS);

- » Turbidity or Total Suspended Solids; and
- » Temperature.
- *Laboratory parameters - QUARTERLY*
 - » pH,
 - » Biological oxygen demand (BOD₅);
 - » Chemical oxygen demand (COD);
 - » phenolic substances;
 - » total suspended solids (TSS);
 - » Total phosphorous,
 - » Oil & Grease, and
 - » Pathogens (faecal coliform).

If water quality discharged from site is found to be compliant with national and international standards for the Project, monitoring will be reduced to quarterly for field parameters and annually during the rainy season for laboratory parameters.

Air Quality

The Boiler Stack will be sampled for NO_x, SO_x, PM₁₀ (particulate matter smaller than 10 microns in diameter). Sampling will be annual for the first three (3) years of operations, then will be conducted every five (5) years if concentrations are below national and international emissions standards. Suitable handheld equipment or gas capture will be employed (i.e. capable of assessing to applicable thresholds).

Noise

Burapha will employ noise monitoring equipment between the Mill and the nearest social receptors (i.e. Ban Khone Phook Sub-Village) on an annual basis to determine ambient noise conditions during the day and night. The monitoring equipment will log measurements (dB(A)) continuously (e.g. every 10 seconds) for 72 consecutive hours (three consecutive days) to compare it to national and international standards.

If standards are not exceeded or are not greater than ambient emissions identified in the ESIA (Chapter 6), Burapha may discontinue noise monitoring after three years of operation.

10 REPORTING

10.1 Monthly and Quarterly Reporting

The Company will prepare a monthly and quarterly operations report to summarise its environmental and social performance and significant activities, incidents and events for that period. The report will include a brief presentation of the Company environmental and social management systems; results from routine or investigation monitoring; and assessment of results against Company commitments, continuous improvement targets, and key performance indicators (KPIs), as follows:

Environmental Aspects

- Progress against the implementation of environmental measures listed in the ESMMP;
- Any difficulties encountered in implementation of the environmental measures and recommendations for corrective action;
- The number and type of non-conformances with the environmental measures and proposed remedial measures;
- Discussion of corrective actions from previously identified non-compliance issues;
- All Project-related accidents or incidents that relate to the health, safety, and welfare of stakeholders and the environment; and
- Monitoring data of environmental parameters and conditions, including any significant issues or changes.

Social and Community Aspects

- Results of ongoing stakeholder engagement;
- Any difficulties encountered in implementation of the social measures and recommendations for corrective action;
- The number and type of non-conformances with the social measures and proposed remedial measures;
- All Project-related accidents or incidents that relate to the health, safety, and welfare of stakeholders;
- Reported grievances and corrective actions taken; and
- Monitoring data of social parameters and conditions, including any significant issues or changes.

10.2 Annual Reporting

Burapha will prepare an *Annual Report* that summarises business and sustainability performance for each calendar year. The contents of the annual report are expected to include:

- Discussion of environmental and social performance;
- Detailed discussion of performance relative to commitments with focus on:
 - » Longer lead indicators; and
 - » Overview of significant findings of audits and facility inspections.
- A broad overview of monitoring activities carried out during the year with results compared to relevant guidelines;

- Discussion of any breach of compliance requirements, including the cause of the breach, and the corrective measures planned or underway to remediate the issue and prevent future occurrences;
- A discussion of significant incidents that have occurred;
- Overview of significant findings of audits and facility inspections;
- Results of Community Development Initiatives; and
- Identification of any deviation, revisions and updates from the ESMMP.

The finding of audit reports and recommendations for continuous improvements will be presented to the COO and the GOL in the Annual Report.

10.3 Incident Reporting

An incident is defined as any event that impacts, or may potentially impact the safety, health, environment or community, or any activity resulting in regulatory non-compliance or the breach of company policies, standards or commitments. The following situations will constitute an incident:

- Injury;
- Accident or near miss;
- Chemical spill;
- Spills of fuel or oil greater than 50 litres within workshop areas and bunds (safety event);
- Spills of fuel or oil outside of workshop areas and bunds (environment event);
- Near-miss environmental incidents;
- Fires;
- Uncontrolled air emissions.
- Community incidents - primarily related to community grievances.

All environment or community-related incidents or issues will be reported by the Project workforce, including contractors to their direct Supervisor. The Supervisor is responsible for reporting the incident to the site manager, CSER and OHS Departments. All incidents of a safety nature will be reported as soon as practicable to OHS Manager within 24 hours of incident occurrence.

The CSER Auditor / OHS Manager will track all incidents in the **Incident and Accident Register**. The register will be maintained to track all incidents (including near-misses and community complaints through the Grievance Mechanism), recommended corrective actions, timelines for completion of corrective actions, and efficacy of corrective actions.

The CSER Auditor / OHS Manager will generate an Incident Report for all serious incidents (injuries, discharges exceeding regulatory guidelines). At a minimum, the following details will be required for incident reporting:

- Description of the event and its causes;
- Risk rating of the event;
- Description of corrective and preventative actions;
- Description of repairs, clean-up or other remedial measures;
- Identification of person / group responsible for remediation;
- Timeline for corrective action; and
- Actual or estimated costs of repair, clean-up or other remedial measures.

In the event of a significant incident, the relevant Government Authority will be notified within 24 hours of the event.

10.4 Non-Compliance Reporting

Non-Compliance Procedure

In the event that monitors identify non-compliance with management measures identified in the ESMMP or Company Policies (with no incident), an internal non-compliance report will be prepared. The report will include:

- Description of the non-compliance issue;
- Description of corrective action required;
- Identification of person / group required for corrective action;
- Timeline for completion of corrective action; and
- Measures required to reduce the likelihood of similar non-compliance events in the future.

Non-Compliance Communication

The provisions for a non-compliance procedure will be communicated to the Project workforce via the initial site induction and general training.

10.5 Audit and Inspection

Internal Audits

In accordance with regulatory requirements, it is expected that the ESMMP will be updated as required to incorporate any significant changes or at least at 2- 5-year intervals during the life of the Project.

Regular audits of the Project ESMMP and associated management systems will be undertaken internally and externally. The audits will assess:

- Adequacy of the ESMMP and associated plans with respect to the scale and nature of anticipated impacts and current development stage of the Project;
- Workforce awareness, competence and compliance with the ESMMP and associated plans and procedures;
- Performance of managers and operators in implementing, maintaining and enforcing the ESMMP and associated plans; and
- Suitability of allocated resources, equipment and budget for implementation of the ESMMP.

All audit recommendations will be discussed with the relevant division managers, where appropriate. Corrective actions will be documented and progress towards resolution reported.

All major revisions to the ESMMP will be provided to MONRE for review and approval. The following instances typically trigger major revisions:

- Changes in legislation, policies or standards applying to the Project;
- Insufficient or inadequate measures for mitigation, i.e. environmental performance does not meet acceptable levels despite implemented controls;
- New information available about the Project's impacts that indicate impacts are either greater than anticipated or at an unacceptable level;
- Changes in Project scope, design, or work methods;

- New techniques or technologies available that meet the definition for 'best available techniques', and would significantly reduce the impacts or increase the benefits of the Project;
- New best practices available that would reduce the impacts without commercially significant extra cost; and
- Measures of the ESMPP or conditions for the Project deemed unnecessary or ineffective in mitigating the adverse impacts.

FSC Audits

FSC certificates are valid for 5 years and the FSC accredited certification body will conduct annual surveillance audits to verify compliance under the FSC requirements. An FSC accredited body will assess the Chain of Custody operations against relevant FSC standards. Only accredited bodies are authorised to issue FSC certificates and undertake audits.

11 MANAGEMENT REVIEW

The ESMMP will be continually updated or adapted to new Project information and circumstances. Internal management reviews will be undertaken at least every two (2) to five (5) years at a minimum for the life of the Mill.

These internal management reviews and updates will be separate from updates that may be triggered by the following:

- Changes in legislation, policies or standards applying to the Project;
- Insufficient or inadequate measures for mitigation, i.e. environmental performance does not meet acceptable levels despite implemented controls;
- New information available about the Project's impacts that indicate impacts are either greater than anticipated or at an unacceptable level, i.e. via environmental or social monitoring data or grievance mechanism;
- Changes in Project scope, design, or work methods;
- New techniques or technologies available that meet the definition for 'best available techniques', and would significantly reduce the impacts or increase the benefits of the Project;
- New best practices available that would reduce the impacts without commercially significant extra cost; and
- Measures of the ESMPP or conditions for the Project deemed unnecessary or ineffective in mitigating the adverse impacts.

All major revisions to the ESMMP will be provided to MONRE for review and approval.

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13 APPENDIX: ENVIRONMENTAL, SOCIAL AND SAFETY MANAGEMENT SYSTEM (ESSMS)

Purpose

This Environmental, Social and Safety Management Systems (ESSMS) manual (this document) is the umbrella document guiding Burapha's activities in Lao PDR intended to protect the environment, advance the livelihoods of partner villagers and provide a safe work environment. The manual defines obligatory standards and provides guidance and direction for ESSMS implementation to all personnel.

The ESSMS is intended to create:

- Enhancement of the Company's environmental performance;
- Fulfilment of its compliance obligations; and
- Achievement of environmental, social and safety objectives.

ESSMS Framework

The framework for the ESSMS is based upon the IFC Performance Standard requirements as well as the International Standards *ISO 14001: 2015 Environmental Management Systems* and *ISO 45001: 2018 Occupational Health and Safety Management Systems*.

Scope of the ESSMS

Burapha's ESSMS applies to all operations of the Company in Lao PDR and is applicable for the years 2020 and 2021. Future years will be subject to a revision of this system. The system is designed to cover environmental and social management (E&S), and occupational health and safety (OH&S) aspects that the Company can control and directly manage, and those that it does not directly control or manage but over which it can be expected to have an influence.

Project components include plantation areas, sawmill, plywood mill, nursery, offices and supporting infrastructure such as workshops and worker camps.

Burapha's Environmental and Social Corporate Policy

Burapha places the highest importance on protecting the environment and enhancing the livelihoods of local communities. The Company is committed to providing a safe workplace; transparent governance; to being in compliance with laws and regulations of Lao PDR; and adhering to the IFC Performance Standards and to the FSC Principles.

Staff Responsibilities

The ESMMS requires Burapha to define roles, responsibilities and authorities of key personnel, commit to staff training, maintain effective communication channels, adopt effective document and operational controls, and maintain continuous awareness of the ESMMS function.

ESSMS roles, responsibilities and authorities are defined below.

Executive Management

Executive management include the CEO, COO and DCOO are responsible and accountable for:

- Endorsing all policies related to operation of the ESSMS;
- Ensuring appropriate resource allocation to enable the effective operation and continual improvement of the ESSMS;
- That there are adequate, qualified and competent people to implement the organization's environment and health and safety management systems; and
- Integration of the social and environmental management and OH&S requirements into Burapha's business processes.

The CEO, COO and DCOO are responsible and accountable for ensuring that operations are conducted in accordance with the Company's overall safety, environmental and social obligations.

CSER Department

The CSER department oversees the company's compliance to the agreed international standards and laws of Lao PDR. Specifically, CSER is responsible to:

- i. Identify inter-department matters and coordinate with related managers to create out-puts to meet ESSMS requirements;
- ii. Monitoring of the ESSMS in compliance with relevant legislation, Company policies and standards;
- iii. Review SOPs and OMs by managers to ensure detail and coverage is adequate;
- iv. Contribute to and review sustainability and health and safety policies of the Company;
- v. Provide policies and procedures to stakeholders including regulatory authorities, suppliers, contractors, and those visiting the workplace;
- vi. In consultation with department managers identify environment, social and safety risks;
- vii. Through auditing, ensure the environmental and social management practices described in the ESMMPs (Plywood Mill and Forest Operations), ESAP, OMs, and SOPs are implemented effectively and achieve intended outcomes;
- viii. Coordinate the Burapha Safety Committee;
- ix. Report externally to investors the government and public on environmental and OH&S performance;
- x. In consultation with department managers, identify training requirements to meet operational needs;
- xi. In consultation with department managers establish reporting procedures for both internal and external stakeholders;
- xii. Ensuring that all staff are informed of their ESSMS obligations;
- xiii. Control document structure for ESMMS related matters;
- xiv. Coordinate across departments on ESSMS matters to eliminate duplication and enhance business wide adoption of successful programs and policies;
- xv. Periodically review ESMMS documents and update according to changes in law and the operations of the Company.

Safety and Sustainability Committee

The Safety and Sustainability Committee (SSC) will provide oversight and coordination of the implementation of the safety aspects of the ESSMS. The SSC will confirm the appropriateness of practices and initiatives directed towards preserving and enhancing the company's reputation.

The Committee will meet a minimum of four times a calendar year and report to the COO. SSC members are responsible for internal monitoring of the ESSMS performance under the coordination the CSER Department.

Regarding OH&S the SSC is responsible for:

- i. The committee will advise and make recommendations to the company executive on matters that will improve safety performances across the business;
- ii. Setting annual targets to improve OH&S - continuous improvements;
- iii. The establishment and review of objectives, targets, and programmes;
- iv. The internal communication of OH&S matters between management and employees;
- v. The review of complaint records, nonconformity, corrective action and preventive action reports and the adoption of preventive actions as necessary;
- vi. Providing leadership in the pursuit of OH&S issues;
- vii. Any other ESSMS safety activities that are assigned by the COO.

Regarding sustainability aspects the SSC:

- i. Addresses key challenges in aligning the business towards sustainability;
- ii. Generally, review the effectiveness of the company's policies, practices and programs to optimize efforts to achieve sustainability;
- iii. Provide oversight in relation to CSER social policies and their effectiveness to improve community livelihoods;
- iv. Advise / recommend to the CEO and COO adjustments to social policies to achieve improved community livelihoods;
- v. Reviewing the findings of any significant report (internal or external) concerning the company's performance in the areas of environment and social impacts. Review any necessary corrective measures taken to address issues and risks identified;
- vi. In collaboration with the appropriate line manager, provide guidance to address issues within the Grievance Register;
- vii. Reviewing the company's communication with stakeholders on social and sustainability issues; and
- viii. Any other ESSMS E&S activities that are assigned by the COO.

Membership composition of the SSC may include:

- COO (Chair)
- Manager, CSER (Co Chair)
- Union / Labour Representatives
- Chief Forester
- Manager Machinery Department
- Manager, Human Resources
- Business Unit Manager – Sawmill and Factory
- Facility Manager, Nursery
- Site Safety Manager, Plywood Mill
- (Finance Manager, for items that relate to budget planning requirements.)

Delegations from manager to subordinates to participate on committee issues are accepted so long as the delegation has relevant experience and capacity to contribute too and make decisions on topics being tabled.

Health and Safety Representatives - HSRs (pertains to plywood mill site management)

At each Burapha facility, namely Head Office and regional offices, the plywood mill, sawmill and nursey, HSRs can be established in order to implement Company procedures and manage day-to-day risks unique to the site operations.

Typical HSR functions may include:

- I. Identify situations that may be unhealthy or unsafe for workers / community and advise, lead and implement effective responses to those situations;
- II. Consider and expeditiously deal with complaints relating to the occupational health and safety of site workers and nearby community;
- III. Consider and expeditiously deal with community grievances and complaints relating to the impacts of Burapha operations;
- IV. Consult with workers and community on issues related to safety and environmental matters generally;
- V. Make recommendations to Site Management¹ on programs promoting the health and safety of workers / community and compliance with the regulations;
- VI. Advise the Site Management on proposed changes to the workplace or the work processes that may affect safety and environmental aspects. Implement safeguards accordingly;
- VII. Record and report all matter that come before it;
- VIII. Promote continuous improvement across the site;
- IX. Establish policy and procedures for aforementioned items. Review and update as required.

Department Managers (pertains to plywood mill site management)

Department Managers have the responsibility for the overall management of safety, environmental and social aspects of the Company. The roles and responsibilities below pertain to all department managers as well as the facility managers of Nabong Sawmill, Nabong Nursery and Plywood Mill. Department managers can delegate responsibility to subordinate staff as required and are accountable for the outputs of delegated persons.

Department managers are responsible for ensuring for their departments:

- i. In consultations with CSER and Safety ensure implementation of the ESSMS in compliance with Company policies and standards;
- ii. Environmental and social management practices achieve intended outcomes;
- iii. Identification and management of indirect environment, social and health and safety risks;
- iv. Identify and implement ESSMS training needs, including from 3rd party service providers, of staff as required;
- v. Establishing controls for environmental and safety aspects for his / her department;
- vi. Critically evaluate the performance of the management measures and adjust accordingly to maximise effect;
- vii. Prepare Operations Manuals (OMs), SOPs and WIs for common activities that present potential environmental, social and safety issues;
- viii. Prepare Job Safety Assessment for uncommon activities not covered by SOPs and WIs;
- ix. Ensure contractors are in compliance with the Company's safety, environmental and social obligations;
- x. Report internally to the CSER Department on matters pertaining to social, environmental and safety;
- xi. Identify and conduct training to meet operational needs;
- xii. In conjunction with the CSER Department participate / lead in audits on issues related to the department and respond to audit requests and requirements;
- xiii. Provide relevant department inputs to the SSC;

¹ Site Management refers to the department manager, executive management and or SSC. Refer to the organizational structure.

- xiv. Contribute to sustainability and health and safety policies of the Company;
- xv. Coordinate between departments on ESSMS matters to eliminate duplication and enhance business wide adoption of successful programs and policies;
- xvi. Support other managers in implementing relevant environmental and OH&S responsibilities as required;
- xvii. Ensuring that all staff under their care are given ample opportunity to actively participate in continued improvement of the ESSMS.

Human Resources

- i. The Human Resources Department performs the following tasks:
- ii. With CSER provide the Company's first line of assistance to accidents and injuries in the workplace;
- iii. Provide OH&S inductions to new staff;
- iv. Coordinating ongoing whole-company generic training programs;
- v. Liaise with hospitals about work related injuries through the SSO system;
- vi. Oversee and manage the Company's Accident Register;
- vii. Provide periodic reports on the Company's accident performance;
- viii. Maintain a data base of company employee sizes of standard PPE;
- ix. Liaise with Department managers about specific trainings for the year;
- x. Manage the Training Record for centralized use.

All Employees

All employees are responsible for:

- I. Working in accordance with the documented environmental / OH&S procedures and instructions including specific responsibilities defined as part of their individual role;
- II. Actively contributing ideas to improve management of the ESSMS; and
- III. Reporting environmental or health and safety issues through their relevant managers.

Contractors and Service Provider Obligations

Contractors and service providers are obligated to adhere to Burapha's occupational health and safety, environmental sustainability and social management standards and policies. Contracts are to include a *statement of compliance*. CSER Department will audit for compliance.



ESIA Executive Summary



Executive Summary

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1 INTRODUCTION

Burapha Agroforestry Co Ltd ('Burapha') is proposing to construct and operate the Burapha Veneer and Plywood Mill (hereafter 'the Project') in Hin Heup District, Vientiane Province approximately 80km north northwest of Vientiane. The Company has negotiated a concession agreement for approximately seven ha of land in the Hin Heup Light Industrial Zone in proximity to the villages of Ban Viengthong, Ban Phonesoung and Ban Khone Phook.

An Environmental and Social Impact Assessment (ESIA) for the Project has been prepared by Earth Systems on behalf of Burapha Agroforestry Co Ltd. This Executive Summary forms a part of the suite of ESIA documents.

1.1 Project Context

Planted forests are an important source of wood and fibre, making up seven percent of global forest area and with the potential to contribute an estimated two-thirds of the current round wood market internationally. Global consumption of wood products continues to rise, and planted forest areas are expected to double across Asia over the next four decades.

Lao PDR has the potential to develop its expanding plantation sector and capture the potential benefits of this global demand.

While the establishment of large scale plantations has stalled in recent years due to moratoriums on land concessions in 2007 and 2012, the government is now working on policy to promote sustainable plantation forestry. The government, through the National Socio-Economic Development Plan (NSED) 2016 – 2020 has also placed an emphasis on the promotion of processing industries to realise high value wood products and furniture production.

In light of these policy developments, Burapha intends to expand its agroforestry plantations throughout the four Provinces it operates in and is conducting a separate Environmental and Social Impact Assessment (ESIA) for plantation expansion. The success of the expanded agroforestry operations is reliant on a suitable processing unit to produce high value products at a higher production rate than are currently produced by Burapha's sawmill / wood manufacturing unit in Nabong, Vientiane Province. Similarly, the success of the Burapha Veneer and Plywood Mill is reliant on the expansion of Burapha landholdings for plantation forestry.

1.2 Project Overview

1.2.1 Project Proponent

The Proponent is Burapha Agroforestry Co. Ltd. Burapha Agroforestry was established in 1993 by a Lao-Swedish joint venture. The Company currently operates its agroforestry operations in the Provinces of Vientiane Prefecture, Vientiane Province, Xayabouly Province, and Saysomboun Province in central Lao PDR. The Company operates a tree nursery and sawmill / furniture manufacturing facility in Xaythany District, Vientiane Prefecture.

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1.2.2 Brief Project Description

The Mill

The Burapha Veneer and Plywood Mill (Mill) will process primarily small diameter Eucalyptus logs into veneer and plywood products.

The Mill will process approximately 112,000 m³ of sawlogs per annum at full capacity, providing approximately 48,000 m³ of finished product per annum. The raw timber will be sourced from Burapha Agroforestry operations from which are located across four Provinces / prefectures in central Lao PDR (Vientiane Prefecture, Vientiane Province, Xayabouly Province and Saysomboun Province). These plantations will be certified for environmental and social sustainability, a requirement of the Mill's Forest Stewardship Council (FSC) Chain of Custody Certification. The Mill may also process logs from other plantation owners, if the plantation operations meet sustainability criteria for the Mill.

Approximately 366 people will be employed to operate the Mill, with approximately 120 people working per shift. Approximately 59 people will work the veneer line (per shift) and 63 people on the plywood line (per shift).

The wood processing will be comprised of two primary facilities: a veneer-manufacturing unit and a plywood-manufacturing unit. Veneer processing will comprise:

- Debarking and cutting into unit lengths;
- Peeling into veneer sheets; and
- Veneer drying.

The plywood manufacturing line will comprise:

- Gluing veneers together and pressing in hot presses; and
- Finishing processes such as sanding and trimming.

Finished products will comprise:

- Construction grade plywood (approximately 60% of output), used for wood construction, concrete forms, furniture;
- Packaging plywood (approximately 25% of output), used for packaging material; and
- Sub-floor plywood (approximately 15% of output), used in floor construction.

The Transportation Network

The proposed Mill site is centrally located with respect to Burapha plantation landholdings and to National Road 13. Raw logs will be transported from Burapha plantations to the Mill and finished wood products will be transported from the Mill to Vientiane for domestic sales and for export to Thailand, Vietnam, and Myanmar (refer to Figure 1-2).

Proposed inbound and outbound transportation routes are provided in Table 1-1:

Table 1-1 Primary (proposed) log and plywood transport routes

Transport Route	Roads
Mill Access Route	4501
North East inbound route	13N and 5
North West inbound route	4544 and 13N
West / South West inbound	4501, 4502, 11, 4
South East in-bound and out-bound route	13N and 10
Southern inbound	120 13N

Approximately 14 trucks will each haul 30 m³ of raw logs to the Mill per day throughout the year at full operational capacity. Plywood will be shipped via Highway 13 to Vientiane, with an average of three trucks carrying 50 m³ of finished product per day. An additional 17 personnel will be employed or contracted to haul logs to the Mill and finished products to end markets.

1.2.3 Project Objectives

Commercial Objective

The commercial objective of the Project is the provision of a plywood manufacturing facility to support Burapha's expanding agroforestry operations. Mill operations will provide value added benefit to the Company and the plantation forestry sector. The operation of the Project will be undertaken in accordance with best industry practice and will comply with the conditions and standards prescribed by the GOL. Further, the operation will be undertaken according to the socio-economic and environmental objectives presented below.

Environmental Objectives

The environmental objective of the Project is to avoid any potentially adverse environmental impacts that may result from the Project, and mitigate impacts where they are unavoidable. Detrimental environmental impacts will be minimised through the use of industry best practice, and adherence to GOL and international environmental standards and regulations.

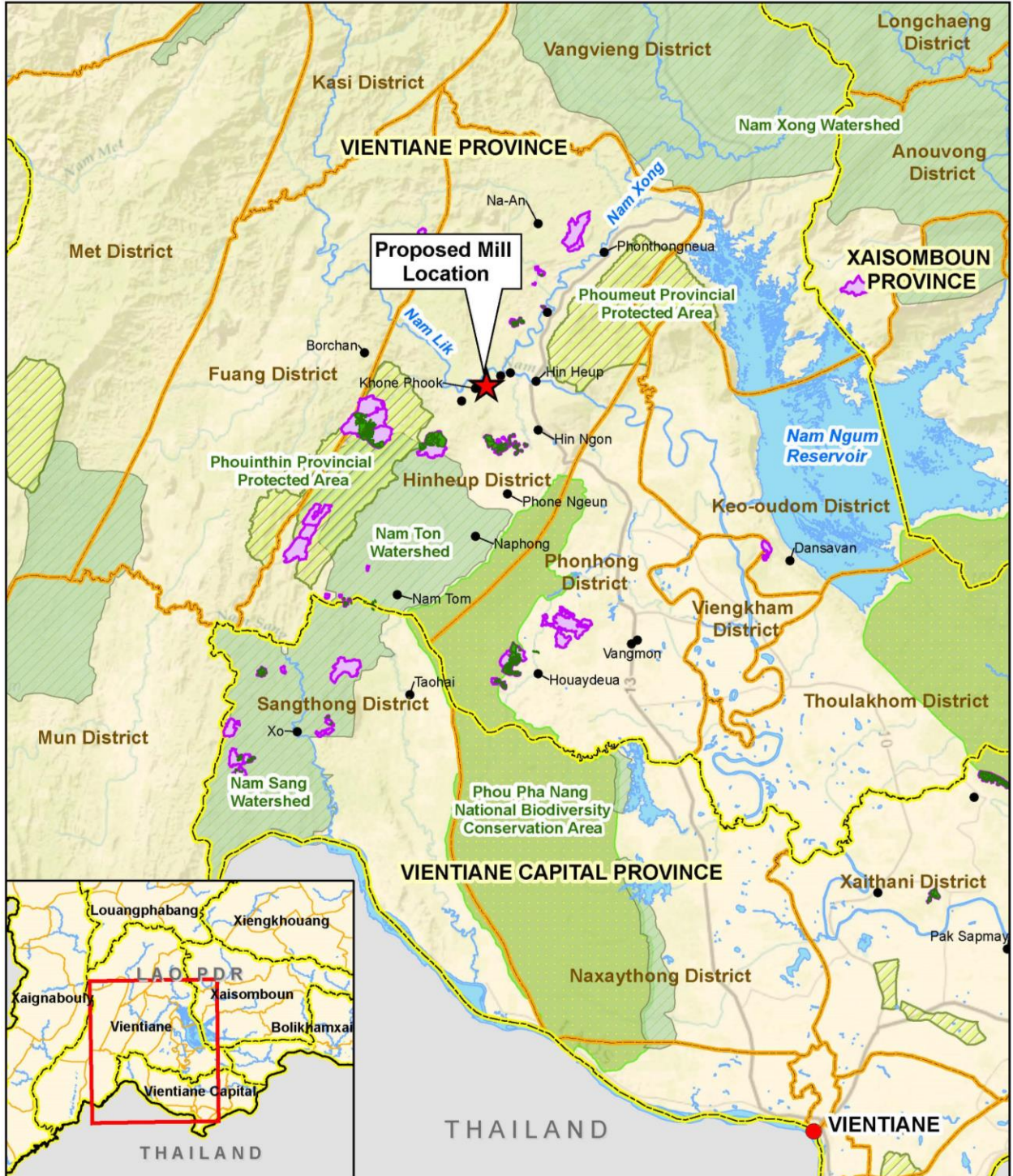
Socio-Economic Objectives

The socio-economic objectives of the Project are to (i) further develop the wood manufacturing potential of the region to support the expanding plantation forestry sector; (ii) generate revenue for the Company and tax benefits / royalties for the GOL; and (iii) provide employment opportunities for local residents.

1.2.4 Project Benefits

The Project supports the GOL's economic development plans for the region and is expected to generate substantial national, regional and local benefits including an initial US\$ 26 million foreign capital investment and resulting construction jobs and spin-off benefits; approximately 366 full time positions (during mill operations) with a priority on the recruitment and skills development of local workers; and an estimated US\$ 15.5 million per annum in revenue (at full production) and over US\$2 million per annum in GOL tax revenue.

The Mill will also facilitate the expansion of Burapha's agroforestry project to an initial 5000 ha, resulting in a further US\$ 11 million of foreign capital; 896 full-time positions and US\$ 200,000 government revenue in the form of land fees and taxes.




<p>Burapha Mill Project</p>	<p>Legend</p> <ul style="list-style-type: none"> ★ Proposed Mill Location ● Villages BAFCO Planted Area (2015) BAFCO Land Holdings (2015) Provincial Boundaries District Boundaries National Biodiversity Conservation Area (NBCA) Provincial Protected Areas Watershed Areas Major Water Bodies 	<p>Revision: Draft</p>
<p>Project Location</p>		<p>Date: August 2016</p>
<p>Map Scale @ A4: 1:500,000</p> <p>0 2.5 5 10 Kilometres</p> <p>Coordinate System: WGS 1984 UTM Zone 48N Projection: Transverse Mercator Datum: WGS 1984</p>		<p>Author : Earth Systems</p> <p style="text-align: center;">  EARTH SYSTEMS <small>Environment Water Sustainability</small> EARTH SYSTEMS Suite 801, 23 Singha Road Ban Nongbone, Vientiane, Lao PDR Email: enviro@earthsystems.com.au Website: www.earthsystems.com.au </p>

Figure 1-1 Proposed Mill Location

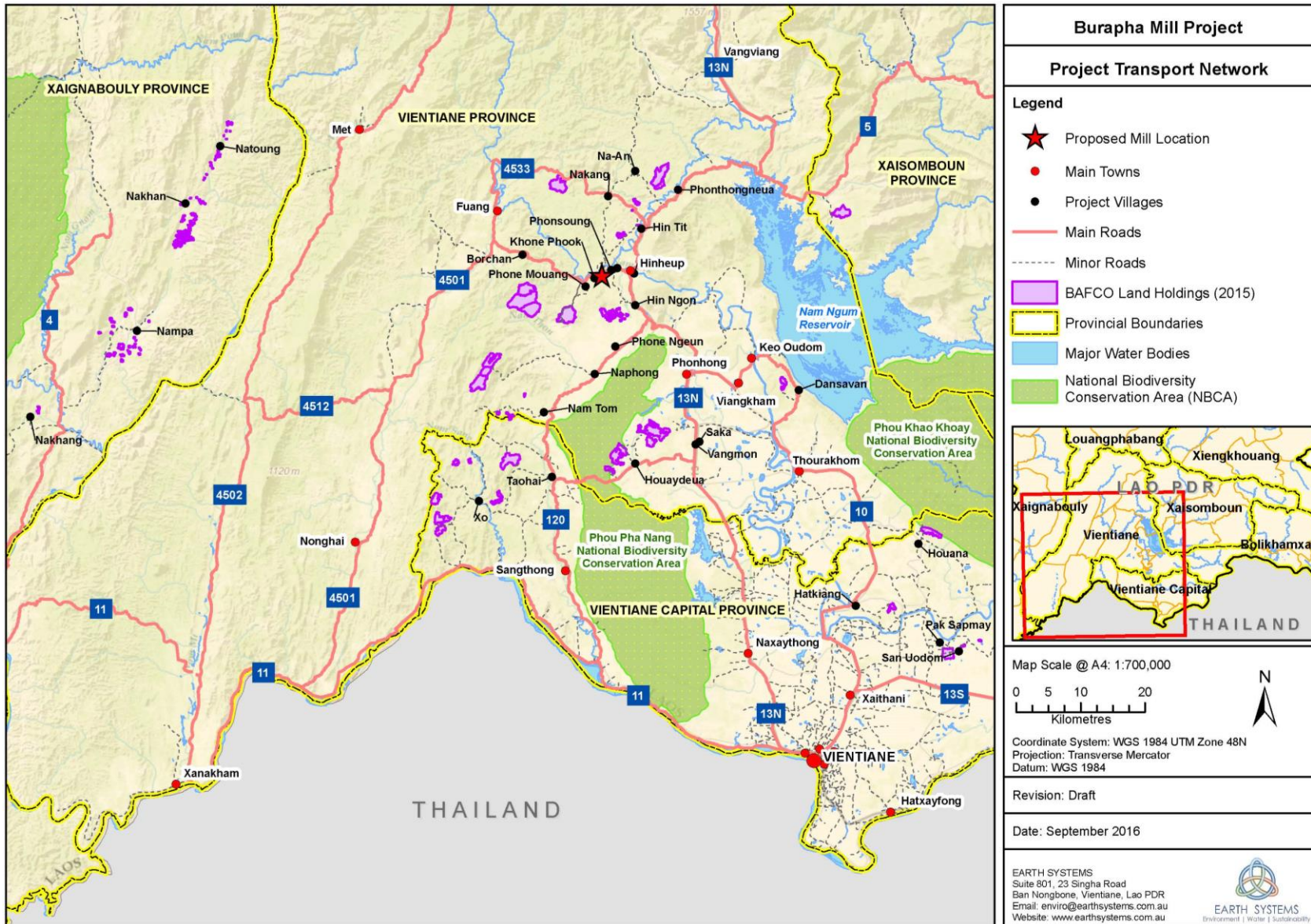


Figure 1-2 Proposed Transportation Network

1.3 Environmental and Social Impact Assessment

1.3.1 ESIA Objectives

The ESIA for the Burapha Veneer and Plywood Mill Project has been prepared by Earth Systems on behalf of Burapha Agroforestry Co Ltd.

The ESIA identifies the baseline conditions, the environmental and social risks and benefits of Project implementation, and the potential impacts associated with Project construction and operation. The likelihood and magnitude of these impacts are assessed based on available Project information. A framework for further community and Government consultation is also provided.

Consistent with Lao PDR legislation, this ESIA includes consideration of environmental and social aspects and impacts. A stand-alone Environmental and Social Management and Monitoring Plan (ESMMP) is provided as part of the ESIA (refer to Volume C).

1.3.2 Scope of the ESIA

The ESIA considers the benefits, risks, and potential impacts of constructing and operating the veneer and plywood mill as well as the transport of raw logs to the site and finished product to market.

A separate ESIA is being conducted in parallel to this ESIA to account for Burapha's intended expansion of its Agroforestry Plantation Operations.

Burapha currently has 8,000 ha of concession area for plantations, with approximately 3,000 ha planted with primarily Eucalyptus and a comparatively smaller area of Acacia. The Company will continue to plant suitable areas within the remaining 5,000 ha of its current concessions. It is estimated that approximately 5,000 ha of plantation lands are required to provide adequate raw material to continuously operate the Mill.

1.3.3 Environmental and Social Consultant

The Earth Systems Group is a multidisciplinary environmental and social engineering and science firm that develops and implements innovative and effective environment, water, and sustainability solutions throughout the world. Established in 1993, they have successfully completed over 500 major projects in Australia, Asia, Africa, South America, North America and the Pacific. Earth Systems has been operating in Lao PDR for more than 15 years, competing a range of environmental and social consultancy projects including EIAs for some of the country's most significant mining and hydropower project.

The Earth Systems Group is comprised of Earth Systems Sole Co. Ltd. and Earth Systems Consulting, as follows:

- Earth Systems Sole Co. Ltd, a licensed EIA consultant in Lao PDR with considerable experience conducting environmental and social assessments in the region; and
- Earth Systems Consulting, with offices located throughout the world, has technical experts in their respective fields to provide specialist inputs where required. These social and environmental specialists have considerable experience of working in Lao PDR for a range of assessments, including environmental and social assessment for a number of large agroforestry operations.

Box 1-2 Consultant Contact Details

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1.3.4 Structure of the ESIA

The ESIA is comprised of four volumes:

- **Volume A: Executive Summary (this report);**
- Volume B: ESIA Report;
- Volume C: ESIA Appendices; and
- Volume D: Environmental and Social Management and Monitoring Plan and Public Consultation and Disclosure Plan

2 LEGISLATION AND GUIDELINES

2.1 Lao PDR Government Institutional Guidelines

2.1.1 Environmental and Social Impact Assessment

The key government agency responsible for environmental and social assessment of the Project via the EIA process is the Department of Natural Resources and Environmental Policy (DNREP), and Department of Natural Resources and Environmental Monitoring (DNREM) Ministry of Natural Resources and Environment (MONRE). The **Ministerial Instructions for the Conduct of ESIA's (No. 8030 – December 2013)** and the **Guideline on Public Involvement in the Environmental and Social Impact Assessment Process (2013)** currently guides the environmental and social assessment process in Lao PDR, which has considerably strengthened the associated permitting requirements and applicable industry requirements. Recently released **Environmental Assessment Guidelines (2016)** outline the updated format and procedural requirements of this process.

2.2 National Legislation and Guidelines

Wood Processing facilities operate in accordance with the **Law on Industrial Processing No. 48 / NA (2013)** and are more broadly governed by the **Law on Forestry (2007)**. The Ministry of Industry and Commerce (MOIC) is responsible for regulating and promoting manufacturing, trade, and import and export activity of finished wood products. MONRE, Ministry of Agriculture and Forestry, Ministry of Planning and Investment, Ministry of Finance and their Provincial and District offices provide additional oversight.

Table 2-1 Relevant Lao PDR laws, regulations and policies for the Burapha Veneer and Plywood Mill Project

Title	Year
Laws	
Law on Forestry	2007
Law on Processing Industry	2013
Environmental Protection Law	2013
Land Law	2003
Law on Labour Protection	2013
Law on Investment Production	2009
Law on Water and Water Resources	2017
Law on Land Transport, No. 24/NA, dated 12 December 2012	2012
Law on Tax, No. 05/NA, dated 20 December 2011	2011
Law on Value-added Tax, No. 52/NA, dated 23 July 2014	2014
Decree	
Decree on the Promulgation and Enforcement of National Environmental Standards, No. 81/PMO, dated 21 February 2017	2017
Decree on Environmental Protection Fund, No. 94/PMO, dated 08 March 2017	2017
Decree on Compensation and Resettlement of People Affected by Development Projects	2016
Decree on State Land Leases and Concessions	2009
Decisions, Directives, Regulations, and other Legislation	
Environmental Impact Assessment Guidelines	2016
Order of the Prime Minister on Strickness the Management and Inspection of Logging, Wood Transport and Timber Business	2016
Decision on the Approval of List of Eligible and Prohibited Wooden Products for Export	2016
Instruction on the List of Eligible and Prohibited Wooden Products for Export	2016
Decision on Timber Product Standards	2015

Instruction on Pollution Control, No. 0745/MONRE, dated 11 February 2015	2015
Ministerial Instruction of ESIA Process of Investment Projects and Activities	2013
Guideline on Public Involvement in Environmental and Social Impact Assessment Process	2013
Decision on Timber Processing Management	2007
Decision concerning the Standard of Wood, Rattan and Bamboo Processing Industry Factories (No. 1140/MOIC)	2007
Regulation Regarding Buying and Selling Timber from Plantations, (No. 1862/MOIC)	2008
Notification on the Management of Wood Transport Vehicle, Wood Extraction Machinery, and Wood Processing Machinery, No. 1440/MOIC.DIMEX, dated 04 September 2008	2008
Agreement on Standards of Wood Manufacturing Facility, No. 0719/MOIC, dated 03 March 2009	2009
Regulation on Wastewater Discharge from Processing Industry	2006
Notification on the Management of wood transport vehicle, wood extraction machinery, and wood processing machinery.	2008
Standard on Wood Processing Factory, No. 0719/MOIC, dated 03 April 2009	2009
Notice No. 1791/MOICDIME regulating the import and export of plantation grown timber	2011
Joint Agreement on the Transportation of Logs, Sawn timber, Stumps, Burl/weed fall and Wood products	2008

2.3 Project Emissions and Discharge Standards

Burapha is committed to meeting national and applicable international discharge and emissions standards throughout construction and Mill operations. Applicable standards are provided in Table 2-2, with the more stringent guideline / value applied where discrepancies occur:

Table 2-2 Project Emissions Standards and Guidelines

Parameter	Guideline
Air Quality	Decree on the National Environmental Standards (MONRE, 2017)
	General EHS Guidelines: Air Emissions and Ambient Air Quality (IFC, 2007)
	Ambient Air Quality Guidelines (WHO, 2005)
Water Quality	Decree on the National Environmental Standards (MONRE, 2017)
	Lao PDR General Industrial Wastewater Discharge Standards
	IFC EHS Board and Particle-Based Products (2007)
Noise	Decree on the National Environmental Standards (MONRE, 2017)
	General EHS Guidelines: Noise. (IFC, 2007)

2.4 International Policies, Guidelines, and Standards

Burapha is committed to developing and operating the Mill to an international standard. Key international policies, guidelines, and standards relevant to the Project include:

- IFC *Sustainability Framework* (2012). The updated Sustainability Framework reflects the evolution in good practice for sustainability, risk mitigation, and transparency. It consists of the revised **IFC Policy on Environmental and Social Sustainability**, a newly introduced **Access to Information Policy**, and revised **Performance Standards**, and
- World Bank *General Environmental, Health, and Safety Guidelines* (2007) and *EHS Guidelines for Board and Particle Based Products* (2007).

The ESIA and associated reporting will incorporate international best practices and will align with relevant certification requirements, including:

- Forest Stewardship Council (FSC) Chain of Custody Standard (FSC-STD-40-004);
- International Association for Impact Assessment (IAIA) Guidelines and Standards;

- International Organisation for Standardisation, environmental and social management systems (ISO 14001);
- Occupational Health and Safety Management Systems (e.g. OHSAS 18001 and / or ISO 45001); and
- Social Accountability International (SA8000).

3 DETAILED PROJECT DESIGN AND ANALYSIS OF ALTERNATIVES

3.1 Mill Layout and Design

3.1.1 Veneer and Plywood Production

Plywood production is comprised of six (6) primary processes, namely: log sorting and debarking; veneer peeling and clipping; veneer drying; plywood assembly; plywood pressing; and plywood finishing.

Log sorting, conditioning, and debarking – logs of suitable dimension and quality for peeling will be sorted according to size in the log stockyard upon arrival. After sorting, Burapha will employ a mechanised log rounder debarker to peel off the Eucalyptus bark, remove the dirt / debris, and round the log. Logs will then be cut to length to fit the lathe (~125 – 270 cm).

Veneer peeling and clipping - plywood veneer will be rotary cut (veneer peeling) with a veneer lathe. The green veneer will then be clipped to size, graded and stored for drying. Defects, such as knots and splits are then cut out of the sheet. The Mill will be outfitted with 2' and 4' peeling lines.

Veneer drying – drying of veneer to between approximately 8 - 12 percent moisture content aids the gluing process during plywood manufacture.

Plywood assembly - assembly of the plywood prior to pressing entails the jointing of the narrow strips of veneer, which are edge-glued to make sheets of the required size. Glue is then applied to the inner plies or core, which in turn, are laid between the outer veneers ready for bonding. It is understood that Burapha will utilise a melamine modified urea formaldehyde resin, comprised of phenol formaldehyde (60 %) and urea formaldehyde (approximately 40%), with ammonium sulfate for a curing agent.

Plywood pressing – once veneers are laid-up as assembly plywood sheets, they will be fed into hydraulic presses to bring the veneer into contact with the adhesive. Burapha will use a cold press followed by a hot press that will cure the glue. The hot press platens are heated by steam.

Finishing – primary finishing, which involves the trimming, sanding, and upgrading of the plywood after pressing, is undertaken to enhance the marketability of the product. Trimming saws will cut the boards to the required size, which will then be sanded with drum sanders to the desired surface smoothness. Damage or imperfections to the face of veneers will then be manually repaired by plugging and patch application.

Burapha plywood specifications have been identified as: size - 1220mm x 2400mm or 1220mm x 2440mm; average thickness – 16mm; density – 550 kg/m³ – 680 kg/m³.

3.1.2 Ancillary Facilities

The final design for the Mill layout, including ancillary facilities is currently being determined during the Feasibility study. The following facilities will be included within the Project concession:

- **Log stockyards** – trucks will offload logs to one of two stockyards for sorting and storage. The stockyards may have sprinkler systems to prevent logs from warping as they dry.
- **Power** – the Mill will use electricity and steam to power operations. At least 10kV electricity is required for Mill operations, which will be supplied from the adjacent Hin Heup Sub-Station. A number of power poles will be implemented, and transmission lines extended from the current infrastructure. A heating centre will be equipped with a boiler to generate requisite heat / steam for processing, with offcuts combusted for steam generation.
- **Air compressing and ventilation** – a dust removal room will house air compression and ventilation equipment to extract dust from applicable areas. Local exhaust ventilation, extraction and collection

systems will vacuum wood dust from various facilities (e.g. sanding, sawing / clipping, etc.). The system will also provide ventilation for the formaldehyde mixing station.

- **Water supply and drainage system** – groundwater will be abstracted via a pump / well to supply operational and firefighting tank water. The drainage system will recycle washwater from the glue spreaders and veneer dryers. Water from other areas will drain via pipes and channels to the passive water treatment pond.
- **Firefighting pump room** – A firefighting pool will be positioned next to the firefighting pump in a standalone facility.
- **Factory roads** – there will be two site access roads, one concrete and the second gravel, totalling approximately 500m of road length, with 400 mm wide stormwater diversion channels on each side of the roads.
- **Security** – A steel wire mesh fence (1.8m x 1500m) will surround the Mill, with a security room / guard manning the Mill gate.
- **Communication and security emergency system** – the Mill will be outfitted with a communication system to provide warning in the event of an emergency and isolation (emergency shut-off) for equipment from a centralised location.
- **Water treatment pond** – water will be conveyed from the Mill, log stockyards, and the remainder of the footprint to a pond for passive treatment. The basin will be designed to have a 15-day hydraulic resident time and will accommodate peak flows from at least the 1:10 average return interval storm.

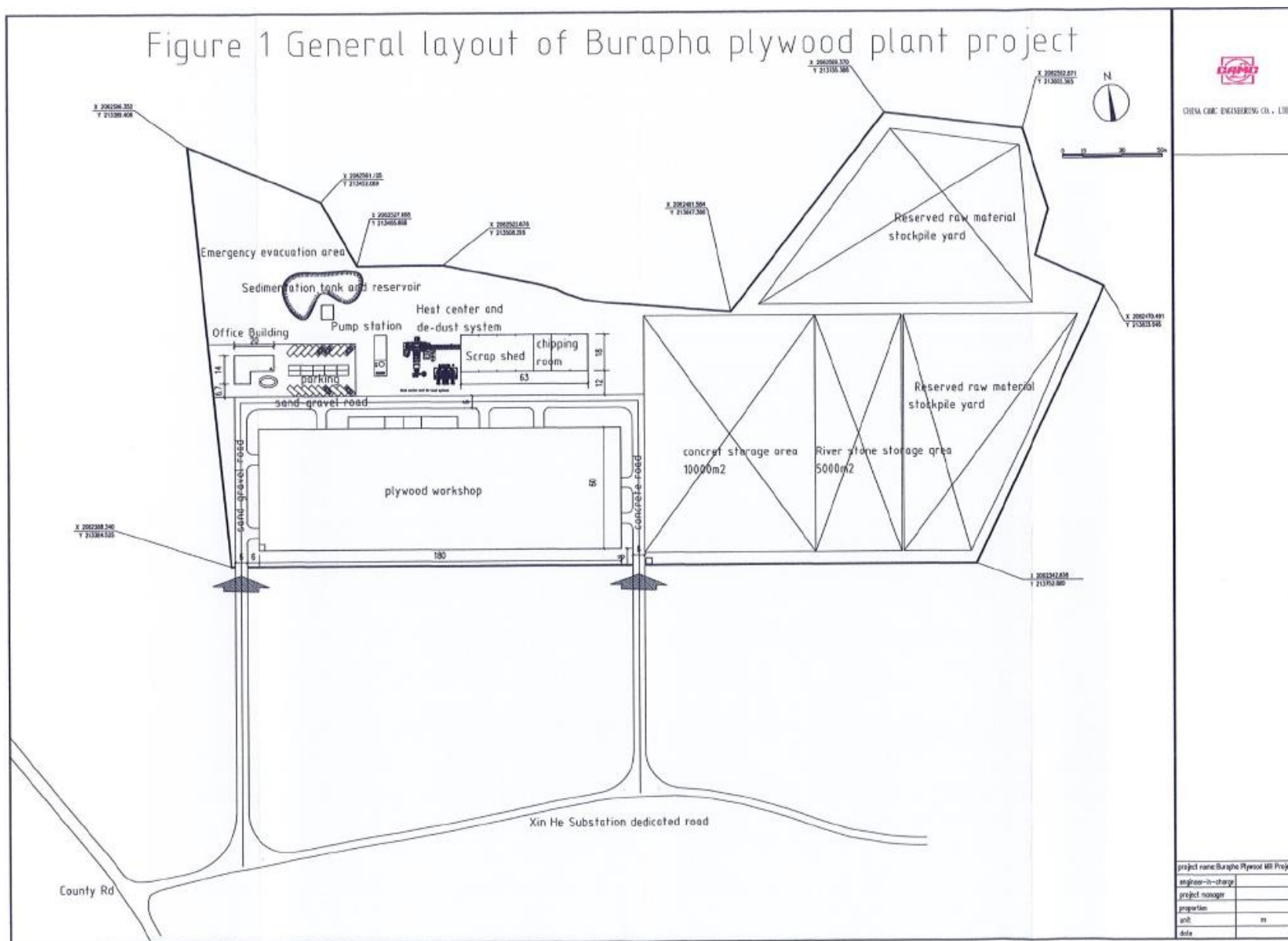
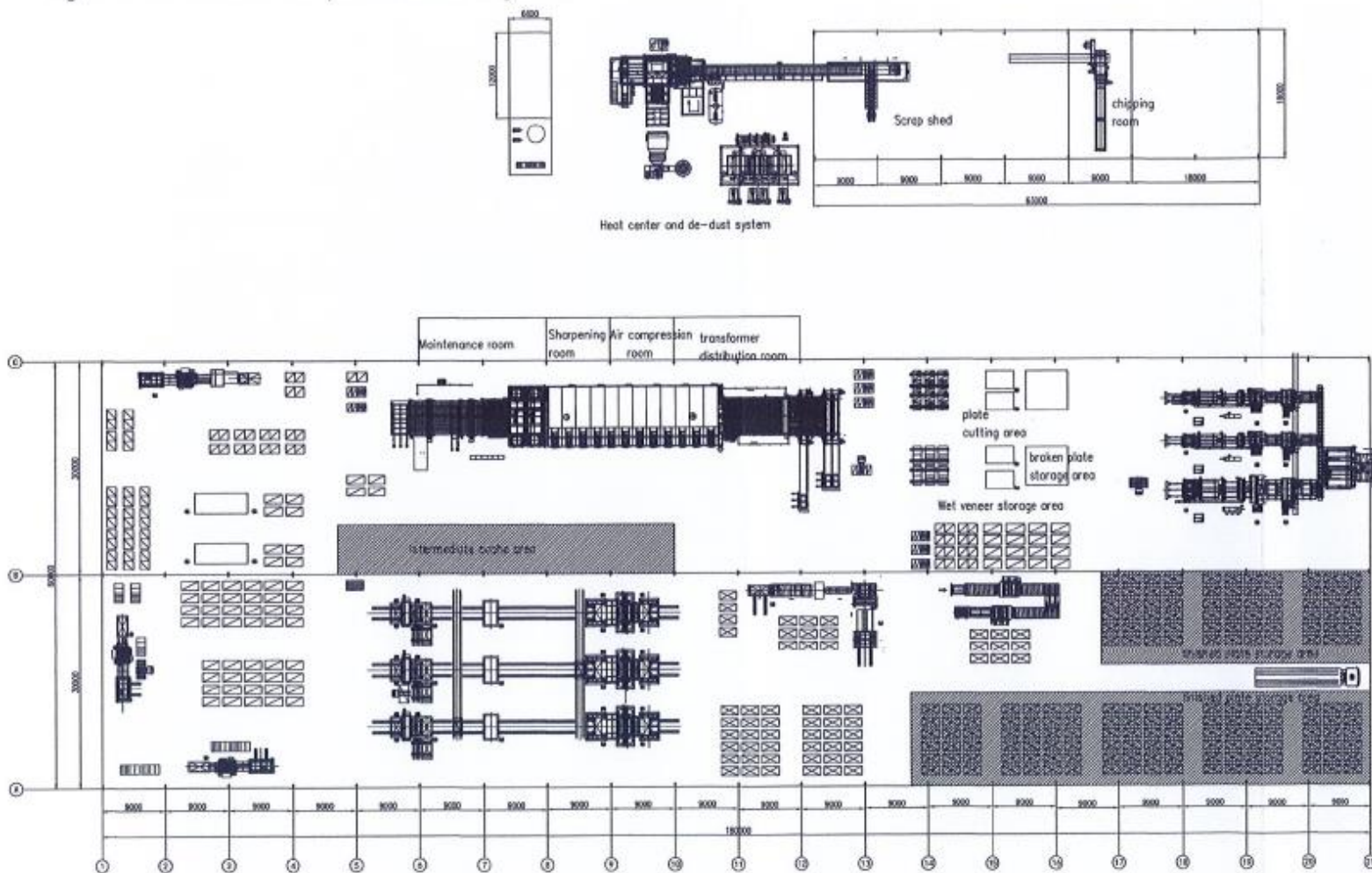


Figure 3-1 Mill and Ancillary Facilities Layout

Figure 2 General process layout



OTEC OGC ENGINEERING CO., LTD.

Project name: Burapha Plywood Mill Project	
engineer-in-charge	
project manager	
pages	250
unit	mm
date	

Figure 3-2 Mill Process Layout

3.2 Transportation Network Description

Raw logs will be transported from Burapha plantations to the Mill and finished wood products will be transported from the Mill to Vientiane, Thailand, and likely China for domestic sales and export, respectively. The proposed Mill site is centrally located with respect to Burapha plantation landholdings, minimising the cumulative log hauling distances the extent practicable.

The Project Area is serviced by Provincial Road No. 4501 that connects to National Road 13 at Ban Hin Heup Tai and is the main thoroughfare linking Hin Heup, Feuang and Sanakan District capitals. The section of Road 4501 near the Project site was sealed in 2009 and is accessible year-round.

3.3 Alternatives Considered in Project Planning

Two locations were evaluated for implementation of the Mill, namely:

- Hin Heup District (Preferred Alternative); and
- Xaythany District (Nabong Site), adjacent Burapha's sawmill and wood manufacturing facility.

Separate alternatives analysis for the Project Feasibility Study and the ESIA identified the Hin Heup Option as the preferred alternative primarily because of the lower transport costs and lower risks for environmental and social impacts during transport and operations.

Additional alternatives analyses were conducted during the Feasibility Study. Burapha and its consulting engineers considered a number of equipment options and Mill design options to maximise productivity, meet financial objectives, and meet performance objectives for environmental and social outcomes.

3.4 No Project Alternative

By not constructing and operating the Mill, Burapha (and other regional plantation operators) would have very few options for the raw material they are currently growing or intend to grow. Further benefits as well as potential impacts would not occur, including:

- The approximately 366 jobs that are expected to be generated through Project operations would not be available, hindering the economic growth in the region;
- The secondary jobs created through expansion of the Burapha Agroforestry Operations would not be available;
- Potential impacts derived from Project construction (e.g. noise, dust, erosion and sedimentation) would not occur (refer to below and Section 5.3); and
- Potential impacts from Project operations (e.g. potential for water quality impacts, air quality impacts, etc.) would be avoided (refer to below and Section 5.3).

4 ENVIRONMENTAL AND SOCIAL SETTING

4.1 Physical Components

4.1.1 Land

The proposed Burapha Mill site abuts the village boundaries of Ban Phonesoung and Ban Khone Phook in Hin Heup District. Burapha is negotiating a concession agreement for approximately seven ha of land that was previously granted to a Malaysian logging company (HIPA) approximately 10 years ago.

The concession is immediately adjacent the Hin Heup Substation and Ray Farm Bio-Organic Fertiliser Factory. The entire area (including village lands) has been zoned for light industry by the GOL (totalling approximately 1,950 ha of light industrial zone).

Approximately 70% of the Project footprint was previously graded, and is still largely devoid of vegetation (due to compaction) with the exception of scattered native and non-native grasses. Native vegetation was previously cleared from the entire footprint, with some natural revegetation having occurred recently. The Project area is relatively flat, with some slight undulation to the north and northwest where the area has not yet been graded.

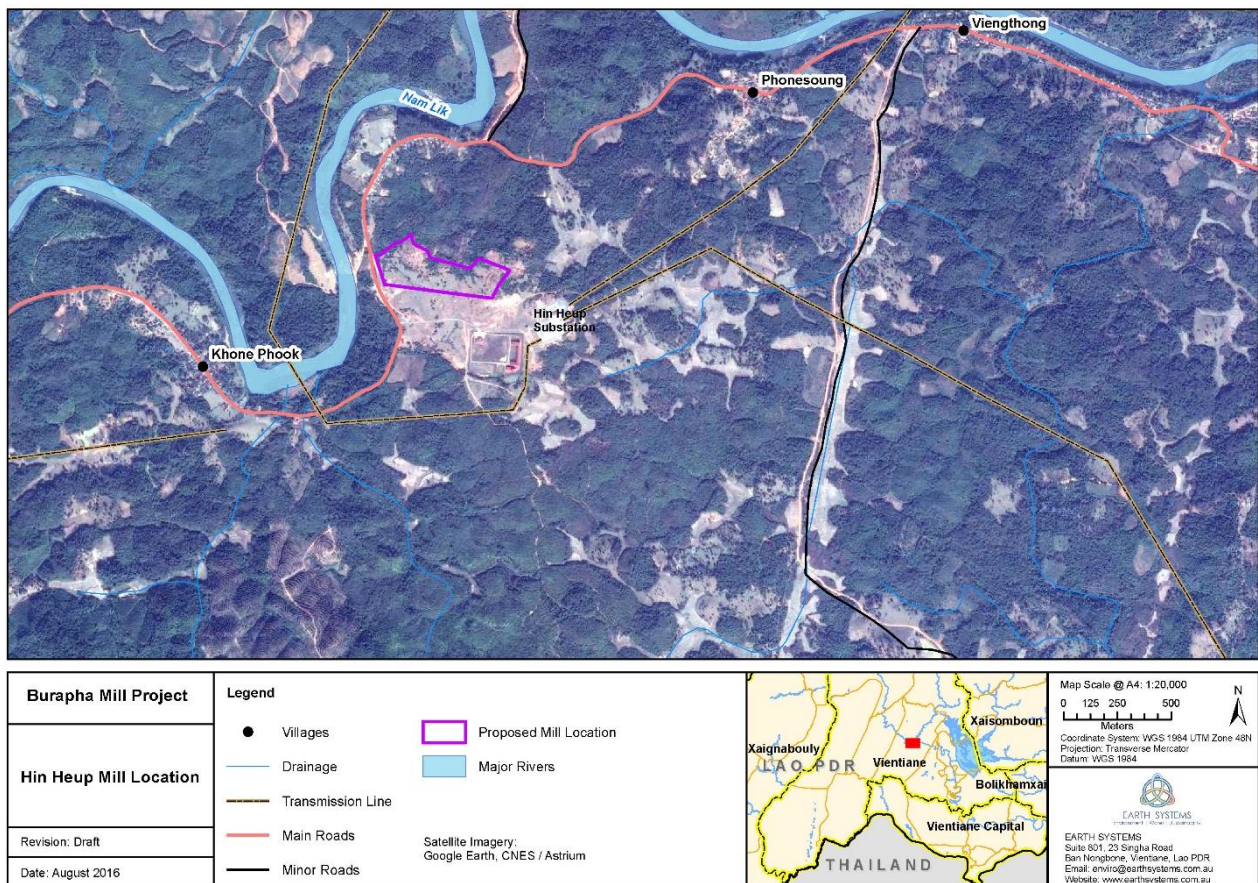


Figure 4-1 Satellite Image of proposed Project footprint

4.1.2 Topography, Geology, and Soils

The Mill site is quite flat and varies between 211 and 221 metres above sea level (masl). The western edge of the site, closest to the Nam Lik River, sits at 211 masl and slopes slightly (1°) upwards to the east. The eastern edge of the site is at 221 masl.

The majority of rock beneath the site is shallow marine sediments of Triassic age, intruded by volcanic rocks. The Mill will be built on a combination Ferric/Haplic Acrisol soils. Acrisol soils are clay-rich / strongly weathered acid soils found on moderately to well-drained hilly or undulating topography. The shallow A horizon of an Acrisol is normally characterised by dark, acidic organic matter which gradually transitions to a lighter leached Eluvial (E) horizon.

The Haplic Acrisol meets the central concept of its Reference Soil Group and that there are no particular soil features that deserve to be separately mentioned. Therefore a Haplic Acrisol is best described through the general description of an Acrisol. Ferric Acrisol are characterised by reddish to blackish concretions or nodules, coarse mottles, and typical accumulations of Fe (and Mn) oxides.

4.1.3 Drainage and Hydrology

The Mill site drains to a number of small unnamed ephemeral channels that converge off-site and drain to the Nam Lik River via a circuitous and sometimes sub-surface channel. The channels are not natural streams, but artefacts of historic grading from previous land use of the concession area.

The Mill will be located approximately 150 m east of the Nam Lik River. The Nam Lik, a major perennial river, reaches a depth of nearly 15m and discharges 3,500 m³ during rainy years at Ban Hin Heup approximately three river km east of the Mill site. The Nam Lik is now partially regulated by the Nam Lik 2 hydropower scheme upstream of the mill site, decreasing mean monthly streamflow during the rainy season. Within a few years, the Nam Lik 1 Hydropower Project will impound the river directly to the north and west of the Mill. The reservoir will not extend beyond the deeply incised river channel (for that portion of the reservoir in proximity to the Mill site).

There are several small perennial tributaries of the Nam Lik that are to the east and south of the site, including the Houay Mieng, Houay Karng, Houay Larn, and Houay Lai. The Nam Xong River discharges into the Nam Lik approximately four km downstream of the proposed Mill site.

4.1.4 Water Quality

Nam Lik River surface water is good quality with little apparent impact from industry in the region. March 2016 water quality sampling of the Nam Lik (conducted for this ESIA) found that the water was very clear (low turbidity and TSS) with near neutral pH, and temperature typical of the region. A moderate dissolved oxygen concentration (6.15ppm), low nutrient concentration, and an absence of measured pollutants indicate that the water quality is suitable for a range of aquatic biodiversity and water uses

Total coliform was found to be high (as is typical of surface waters in proximity to human settlement in the region). The potential contaminants from veneer and plywood manufacturing (fat, oil, and grease; formaldehyde; ammonia) and associated by-products (COD, and BOD) were either below laboratory detection limits or had very low concentrations. The exception was phenolic substances, where the Nam Lik sample had a concentration of 0.047 mg/L, above the Lao ambient water quality guideline of 0.005 mg/L.

4.1.5 Air Quality

Air quality in the Project region is generally very good, given the distance from significant industry. Seasonal burning of vegetation for agricultural site preparation is likely the greatest contributor to pollution (generally from February – May.) Emissions from the few small to moderate size industrial facilities and vehicles as well as dust from unsealed roads / cleared areas are secondary contributors to air pollution.

March 2016 monitoring of dust concentrations over a 3-day period (continuous measurement) at the Mill site found total particulate matter and finer fraction concentrations (TSP, PM₁₀, and PM_{2.5}) were high for two of the three days, with peaks and troughs throughout the sampling period. Baseline monitoring likely captured some of the worst air quality conditions for the year, as vegetation burning for agricultural site preparation was observed to be widespread. A minor rain event on March 26 (day 3) dropped dust concentrations considerably.

For the majority of the 3-day period, particulates were above WHO particulate size guidelines. Lao PDR guidelines for TSP ($\geq 330 \mu\text{g}/\text{m}^3$) and PM₁₀ ($\geq 120 \mu\text{g}/\text{m}^3$) were exceeded during the first half of the sampling period. On average, PM₁₀ and PM_{2.5} exceeded relevant criteria, while TSP was below Lao PDR guidelines.

4.1.6 Noise

Noise emissions in the Project area vary considerably with distance from the Road 4501 and settlements. Ambient noise conditions were high adjacent road 4501 and within settlements during the day and moderate for much of the night. Noise abates incrementally with distance from the road and settlements.

Noise was monitored continuously for three days starting on March 23 at the nearest social receptor from the proposed Mill site, in Ban Phonesoung Sub-Village, approximately 0.5 km from the proposed Mill site. Ambient noise was found to be very high during the day, due to heavy traffic and social activity (e.g. music). Noise levels appear to follow normal trends for a busy road during the day that experiences frequent truck and car traffic. However, night-time noise appears to resemble a busy urban area (i.e. higher than a typical rural setting).

Noise levels often exceeded WHO day and night-time dB criteria over the 3-day sampling period, while on average noise was below WHO day and Lao PDR guidelines. There were occasional peaks during daylight hours that exceeded Lao PDR levels, but noise levels were generally below the national guidelines, and more frequently exceeding WHO guidelines.

4.2 Biological Components

4.2.1 Terrestrial Flora

The proposed Mill site has been cleared of native forests, graded for industrial activity, and occasionally supports grazing livestock. There is no quality habitat in the area.

May 2016 botanical surveys identified a dominance of native and non-native grasses and herbs with scattered small trees on the northern fringe. No internationally or nationally threatened flora were identified within the Mill site. Of the species that have been assessed, all are considered as Least Concern or Lower Risk (IUCN, 2016).

4.2.2 Terrestrial Fauna

Due to the lack of habitat and industrial activity in the immediate area, animal occurrences are likely to be transient, with the possible exception of burrowing animals. No vertebrates were observed within the Mill site during May 2016 biodiversity surveys (with the exception of livestock).

The results of site surveys, local knowledge surveys, and assessment of secondary information indicates that it is highly unlikely that any fauna species of conservation significance inhabit the site. The majority of mammals seen in the vicinity of the Mill site by villagers are considered globally Least Concern (IUCN), with their populations stable. All mammals reported by villagers are common to Lao PDR and the region.

4.2.3 Aquatic Biodiversity

The ephemeral drainages to the immediate north of the Project footprint do not support aquatic biodiversity. They are artefacts of historic grading (essentially man-made) with no quality habitat. However, discharge from the site will reach the Nam Lik River, which is high value habitat for a number of aquatic species.

Local residents routinely collect fish, aquatic snails, eel, shrimp, crustaceans, and aquatic invertebrates from the river during all seasons. During local knowledge surveys, residents of Ban Khone Phook, Ban Phonesoung, and Ban Viengthong identified 13 fish that are commonly caught. An additional 21 fish species were found in secondary data that may inhabit the river in the region. Ten of these fish are threatened according to IUCN. While secondary data generated from field sampling of the Nam Lik River was not found to be publicly available, it is reasonable to assume that one or more of the 10 threatened fish inhabit the river, at least seasonally as migrating fish make their way up from the Mekong / Nam Ngum, generally during the rainy season.

4.3 Social Setting

4.3.1 Overview

For the purpose of the social setting, the study scope consists of:

1. The Project Area - including villages with land directly impacted by the Project and / or within a three kilometre radius of the proposed Project Footprint; and
2. The Transportation Route – settlements located directly on key in-bound and out-bound transportation routes.

Three villages (hereafter the Project Villages) have been identified in close proximity to the Project site including:

1. Ban Khone Phook (including a main village settlement, sub-village and military camp);
2. Ban Phonesoung (including a main village settlement); and
3. Ban Viengthong (including a main village, resettlement site and Phiengdy sub-village settlement).

Approximately 47 villages (hereafter the Transport Villages) are located within 50 metres of the key inbound and outbound transportation routes in Vientiane Province.

4.3.2 History, Population and Growth

There are approximately 36,825 people living in the 47 villages along the proposed transportation routes in Vientiane Province. The Province is one of the most densely populated in the country with a total population of 419,100 people, consisting of 80,400 households and a population density of 27 people per km² (NSC, 2015). The Province has grown by 7% over the last decade including modest positive net migration - the majority to Vientiane Capital. Migrants are predominately young (between 15 and 29) and a key driver is unemployment or underemployment (Phouxay 2010).

The three Project Area villages have a total of 346 households and 1,856 inhabitants. Ban Khone Phook is the oldest village in the Project Area, established in 1756. Ban Phonesoung and Ban Viengthong villages relocated here after the end of the Indochina war (mid 1970s). More recent changes include:

- Consolidation of Ban Phongthong, Ban Phonthan and Ban Phonxay into Ban Viengthong (1989);
- Establishment of a military residence in Ban Khone Phook (2006);
- Resettlement of 16 Hmong families to Ban Khone Phook (2008); and
- Planned relocation (within village lands) of 59 households within Ban Viengthong that will be affected by the Nam Lik 1 Hydropower Project (2017).

The Project Area has experienced 2.42% population growth over the last 12 months. This includes a natural growth rate of 1.46% and migration rate of 0.96% – the majority of migrants attracted by better infrastructure and services in the area.

Table 4-1 Demographic indicators of Project Area villages

Village Name	No. HH	No. Families	No. People		Avg. Household Size	Gender Ratio
			Female	Total		
Ban Khone Phook	116	126	322	629	5.4	0.95
Ban Phonesoung	90	111	229	487	5.4	1.12
Ban Viengthong	140	145	361	740	5.3	1.05
TOTAL PROJECT AREA	346	382	912	1856	5.4	1.04

Source: ES Village Surveys, 2016

4.3.3 Ethnicity and Religion

The majority (88%) of people living in the Project Area villages are Lao Loum (Lao-Tai). The remaining population consist of Khmu (Mon-Khmer) (9.6%) and Hmong (Hmong-Mien) (2.7%). Approximately 90% of the population in the Project Area are Buddhist, with a small minority (10%) practicing Animism.

4.3.4 Wealth, Poverty, and Vulnerable Populations

Wealth and Poverty

Vientiane Province has one of the lowest rates of poverty in the country with an average of 12% in 2012-2013. Those Districts closest to Vientiane Capital and serviced by National Road No. 13 tend to have lower poverty rates than others.

According to information obtained during village surveys for this ESIA, the majority of households in the Project Area villages are reportedly 'very well off' (20%) and earning an average of 50 million LAK (USD 6,250) per annum; or 'sufficiently well off' (72%) earning an average of 19 million LAK (USD 2,375) per annum. Poverty incidence is reportedly low with 4% of families perceived as poor (with land), earning an average of 6 million LAK (USD 750) per annum or 16,438 LAK (USD 2.05) per person, per day.

Disadvantaged

During village surveying for this ESIA, a total of 50 households (or 14%) within the Project Area were identified as vulnerable. The majority (68%) of these households are located in Ban Viengthong. The most common group of vulnerable households are single female headed households. One household was identified as landless and with income below the national poverty line.

4.3.5 Housing and Community Infrastructure

Housing

The majority of houses in Vientiane Province are single or double story wooden houses with corrugated iron roofs (NSC 2015). Concrete single-story cement houses are becoming more common in more wealthy villages across the Province.

Consistent with the Provincial trend, most (87%) houses in the Project Area are single story cement houses. Approximately 6% are wooden houses – the largest proportion in Ban Phonesoung and in the Viengthong sub-settlement of Phiengdy, and 5% are semi-concrete structure with two storeys. Only 1% of houses are constructed with wood / bamboo.

Community Infrastructure

The percentage of villages with critical community infrastructure in Vientiane Province is well above the national average. In addition, 89% of villages in Vientiane Province have year-round access to road infrastructure and in turn access to health, education and market infrastructure and services in other villages and the District and Provincial centre.

All Project Area villages are connected to the electricity grid (with the exception of Phiengdy sub-village), have a primary school located in the village, and have good road access. Project villages do not have government health facilities or markets, and instead access District facilities in Hin Heup (~5 km away).

4.3.6 Accessibility and Transportation

The Project Area is serviced by Provincial Road 4501. This road connects to National Road 13 at Ban Hin Heup Tai and is the main thoroughfare linking Hin Heup, Feuang, and Sanakham District capitals.

The section of Road 4051 near the Project site was sealed in 2009 and is accessible all year-round. The main settlements of each of the Project villages, as well as an army camp and one (1) sub-settlement are located on this road (refer to Figure 1-2). Local vehicles, pedestrians and livestock utilise this road as a key route within and

between Project villages and the District Capital. Traffic on this road including trucks, buses, cars, tuk-tuks and motorbikes is generally frequent during the day and moderate during the evening.

4.3.7 Electricity and Energy Use

Approximately 98% of villages in Vientiane Province have access to electricity. The majority of households are connected. The main source of energy for cooking is fuel wood (92%) followed by charcoal (11.5%).

All villages and most households in the Project Area are connected to the grid with the exception of Phiengdy sub-village. All households in the Project area reportedly use wood and charcoal cooktop stoves as their primary means of cooking. Wood fuel is generally collected from residential land, upland areas and plantation areas. All households in Ban Phonesoung and 20 percent of households in Ban Khone Phook also use charcoal. Fuel wood for charcoal production is also sourced in nearby village lands.

4.3.8 Health and Food Security

Health Access

Approximately 73% of villages in Vientiane Province are located within 30 km of a District or Provincial hospital and 67% are located less than 10 km from a village health centre (WFP 2013). Year-round road access for 83% of villages in Vientiane Province facilitates good access to these facilities and services.

All Project Area villages have a health representative and medicine box located in the village. A small private clinic operates in Ban Viengthong. The majority of households in the Project Area seek medical treatment from the Hin Heup District Hospital which is located a short distance away. The hospital currently has 10 beds and 14 qualified doctors and nursing staff.

Morbidity and Mortality

Hin Heup District hospital recorded a total of 9,157 out-patient and 593 in-patient cases during the period 2014-2015. The most prevalent illnesses included throat infections, common cold and other nose, and ear infections; followed by digestion disease, mental illness, injuries and accidents and diarrhoea / simple dehydration.

Common illnesses reported in the Project Area over the last 12 months include fever, diarrhoea and sore throats. Incidence of tropical disease (i.e. dengue and malaria) and in Project villages is low. There are no recorded cases of HIV/AIDS. The main cause of death in the Project Area was reported as 'old age'. Specific causes of death could not be determined.

Nutrition and Food Security

Approximately 96% of the population in Vientiane Province have acceptable food consumption / nutrition (WFP 2013). Key nutrition indicators for children under five years old (i.e. stunting, weight, wasting) for the Province are below national average.

Village level surveying indicates that nutrition and food security in the Project Area is generally good. Rice sufficiency is high; villages are close to the District market; and most households are engaged in a mixture of subsistence agriculture and natural resource collection, and cash generating activities (i.e. trading, skilled and salaried work).

4.3.9 Education, Literacy and Communication

Vientiane Province has 422 primary schools and 91 secondary schools. General education indicators (attendance rates, literacy) for the Province are well above the national average.

There are three primary schools in the Project Area – one in each village. The secondary school is located in Hin Heup District Capital. Approximately 98.75%, 83.10% and 25.16% of children are enrolled in primary, lower

secondary and higher secondary schools respectively. Primary school completion rates amongst adults is relatively high (81%).

Less than half of adults and in the Project Area villages have completed secondary school. Completion rates for females are low for both primary (50%) and secondary (29%).

Lao is the most commonly spoken language in the Project Area. Other languages spoken include Khmu and Hmong. Adult literacy rates (Lao language) are generally high (93%). Female literacy is also reportedly high with the exception of Ban Khone Phook (50%). Despite these relatively high literacy levels, villagers reported lower levels of comprehension of language spoken by outsiders – indicating a degree of functional illiteracy.

4.3.10 Unexploded Ordnance

UXO risk is low in the Project Area. None of the Project villages reported land affected by UXO or UXO related incidents (deaths or injuries) in the last five years. Analysis of US aerial bombing data indicates that the closest known bombing was over 21 km to the south in Phonhong District.

4.3.11 Gender Dimensions

Development projects can disproportionately impact women. Gender disaggregated data has been provided, where applicable, throughout the ESIA. Key observations on gender dimensions in the Project area include:

- **Division of Labour:** Both men and women are involved in agricultural activities although there is often a division of tasks. In general, men undertake hunting and fishing livelihood activities. Labouring is also male dominated. Women undertake most household duties (i.e. cooking and cleaning) and lead the collection of NTFP. The handicraft industry is a particularly important income generating activity in the region, and most women are engaged in this activity. Reported daily income (~50,000 LAK) is below rates for male dominated activities (i.e. unskilled to skilled labouring) which are reportedly between 50,000 to 100,000 LAK.
- **Education:** Adult education and literacy, rates amongst females in the Project Area is fairly high (76%), although female education achievement is relatively low (just under half of the women in the Project Area had attended primary school).
- **Vulnerable Groups:** There is a high number (25) of female headed households in the Project Area, particularly Ban Viengthong.

4.4 Economies, Livelihoods, and Natural Resource Use

4.4.1 Regional Economy

Vientiane Province is a fast-developing region due to its natural and mineral resources, relatively good road infrastructure and proximity to Vientiane Capital. The Province's GDP grew by an average of 8% per annum between 2011-2015 and was valued at 5,075 billion Kip in 2015. Hin Heup District is the gateway to the North of Lao PDR and like the rest of Vientiane Province is experiencing rapid growth (average of 7% per annum). Key sectors include agriculture and forestry, industry, energy and mines, and trade.

4.4.2 Local Economies and Livelihoods

Local economies are transitioning to market-based economies and include a mixture of subsistence and cash-income agriculture, and cottage industry including handicrafts and charcoal production. Two industrial zones are present in the Project region and employment opportunities are being created through the growth of light and heavy industry.

Agriculture

Agriculture is the primary livelihood activity for households in the Project Area. This includes lowland rice cultivation (79% households); vegetable cultivation (83% households); livestock rearing (30% households) and commercial tree / orchid plantations (16% households). Agriculture is also a main income generating activities for 49% of households in the Project area.

Local Handicrafts

The local handicrafts industry is the largest generator of employment, with approximately 313 households or 91% engaged in this sector. The majority of those engaged are women. Villagers have relationships with handicraft traders who supply material and purchase finished products (most Sinh's). Women earn an average of LAK 54,000 (USD 6.75) per day while also completing the bulk of household activities. Handicrafts were reported as one of the top two income generating activities in all Project Area Villages.

Factory Work and Casual Labour

Factory work and casual labour are important income generating activities for households in each of the Project Area villages.

Approximately 25 people (seven women) hold full time employment with local factories. Another 20-30 labourers (mostly men) are employed on a casual basis. On average, the factory workers earn 1.2 to 2 million kip (\$150 to \$250) per month. Factories in the area include cassava factories, a white charcoal production plant; an organic fertiliser factory; and an agarwood oil refinery.

Other casual labour opportunities (again mostly men) include general construction, farm labouring and logging labouring. Daily rates vary between agricultural labouring (LAK 50,000 or USD 6.25); construction (LAK 80,000; or USD 10.00); logging (LAK 100,000 or USD 12.50) and highly skilled labour (150,000 or USD 18.75).

Villagers in Ban Phonesoung and Ban Khone Phook reported that there are not ample employment opportunities in the area and to ensure a sufficient income, some families migrate seasonally in search of work.

Local charcoal production

There is a small charcoal production industry in Ban Phonesoung. The white charcoal factory was established in 2005 and comprises 30 kilns with 10 m³ input capacity for each kiln. Approximately 25 households are directly involved. The factory remains operation approximately 10 kilns during wet season due to lack of wood supply (Mai Tew or *Cratoxylum formosum*) and runs full operations during dry season. The white charcoal production factory purchases Mai Tew from villagers with a price of 180,000 kip/m³ (\$22.50) and 90,000 kip/m³ (\$11.25) for mixed firewood. The village people source Mai Tew in individually allocated degraded forest land and also in the Lao Yunmu Forestry Development Company's land which remains undeveloped

Government employment

Income generated through employment with village and Hin Heup District Government was also reported as an important income generating activity in the Project Area Villages. Ban Viengthong was reported as having the highest government employment (42% of total households) while Ban Phonesoung was 17% and Ban Khone Phook was 11%.

4.4.3 Land Allocation, Ownership and Use

Village land allocation and use

Since 1996, the Ministry of Agriculture and Forests (MAF), has been aimed at devolving most decisions about land use and land allocation to the village level through its Land and Forest Allocation Program (LAFA). Village lands (predominately upland cultivation areas) are commonly being reallocated to concessions and villagers are turning to employment and small enterprise, whilst maintaining paddy rice production; livestock; and vegetable gardens.

Land allocation and zoning for Project Area villages is presented in Table 4-2

Table 4-2 Land allocation in the Project Area

Village	Total Area (ha)	Land Allocation (ha)											
		Residential land	Garden land	Lowland ag. Land	Upland ag. Land	Orchard / plantation	Production Forest	Protection Forest	Conservation Forest	Company Land	Degraded / Regeneration Forest	Grazing land	Concession land
Phonesoung	753	39	0	24	0	136	0	0	8	0	376	0	170
Viengthong	524	8	0	46	0	190	50	0	4	76*	86	0	64
Khone Phook	1,566	17	10	49	124	107	659	70	8	0	0	71	451
TOTAL	2,843	64	10	119	124	433	709	70	20	76	462	71	685

Source: ES Village Survey (2016)

*Land purchased by Lao Yunmu Forestry Development Company covering three villages

Villagers commonly hold land certificates for agricultural land, with the exception of Ban Phonesoung, who have land tax documents (receipts) only. Only two households in the Project Area have a land use certificate for residential land. Documents are generally held jointly between male and female heads of households, with the exception of Ban Phonesoung (male only).

Industrial Zones and Concession Areas

A significant amount of land in the Project region has recently been rezoned as a Light Industrial Zone (1,950 ha) by the District Governor (District Agreement, 2016). The Light Industrial Zone affects the village land of Ban Phonesoung and Ban Khone Phook. Villagers continue to use this land until concessions are awarded and lands have been developed. Current concessions / developments are listed in Table 4-3. Several large plantation concessions are also present in Ban Khone Phook and Ban Phonesoung.

Table 4-3 Industrial and Plantation Concessions in the Project Area

Zone / Concession	Land Holding (Ha)	Village Lands
Heavy Industrial Zone		
BSS Cassava factory	17 ha	B. Khone Phook
Light Industrial Zone		
Agarwood Plantation	15 ha	B Phonesoung
BKN White Charcoal Factory	0.6 ha	B Phonesoung
Lay farm Organic Fertiliser	1 ha	B Phonesoung
Hin Heup Substation	2 ha	B Phonesoung
Lao Yunming Eaglewood Agarwood Plantation	380 ha	B. Viengthong, B. Phonesoung, B. Khone Phook
Lao Yunming Eaglewood Perfume Extraction Factory	-	as above
Rubber Plantation of Mr. Douangchanh	140	B. Khone Phook
Lao Yunmu Forestry Development Co., Ltd	73 ha	B. Viengthong, B. Phonesoung, Khone Phook
Lilieng Rubber Plantation	100 ha	B. Khone Phook
Burapha Mill site	9 ha	B Phonesoung

4.4.4 Agricultural Land Use and Activity

The primary agricultural land uses in the Project Area include lowland agriculture, orchard / plantations and grazing. Small areas are also allocated to vegetable gardens – mostly within residential areas. There is also a limited amount of upland (permanent) agriculture).

Rain fed rice cultivation

Lowland rice cultivation is most important to households in Ban Khone Phook and Ban Viengthong where 229 households manage approximately 98 ha of rain-fed lowland rice fields (0.4 ha per household) with average yields of between 4-5 tonnes per ha. Only 30 households (33%) households cultivate lowland rice in Phonesoung on approximately 28 ha of land (0.9 ha per household). Reported yields in Ban Phonesoung are much lower at 2.8 tonnes per ha.

Orchids and Plantation forestry

Approximately 16% of households in the Project region are developing small-holder commercial tree plantations. This includes teak (10ha) and rubber (50 ha) in Ban Khone Phook; and agarwood (15 ha), rubber (4ha) and eucalypt (0.5 ha) in Ban Phonesoung. Most of these plantations are yet to reach maturity and provide income for households involved.

Eight households in Ban Phonesoung manage a five ha plantation of Mai Tew (or Pink Empat) which is sold to the BKN Company's white charcoal production plant. Villagers reportedly supply approximately 150 – 200m³/ per week. A small number of households manage fruit orchards including orange (5ha) in Ban Viengthong and orange / lemon (2.5ha) in Ban Phonesoung.

Livestock and Poultry

Approximately 134 (30%) households manage approximately 500 head of cattle and 27 (8%) households manage approximately 213 buffalo in the three Project area villages. Grazing lands total 71 ha. Ban Viengthong has the highest number of households (108), livestock (363 head) and grazing land (224ha). Numbers of livestock have increased steadily in all the Project Area villages over the last three years as households become wealthier.

All households in the Project area manage poultry with average holdings per household high in Viengthong (50) an average in Khone Phook (22) and Ban Phonesoung (17). Goats are not common in the Project Area as they are reportedly harder to manage, susceptible to disease, and destroy vegetable gardens.

Vegetable cultivation

The cultivation of vegetables is an important activity in Ban Viengthong where each household manages a garden plot (1 rai or 1600m² plots) mainly located along the Nam Lik River bank. Approximately half of the households in Ban Khone Phook and Ban Phonesoung also cultivate vegetables on much smaller plots (25m² to 100m²) within the village settlement area. Production includes green leafed vegetables, cucumber, long beans and chill.

Upland agriculture

There is reportedly no shifting cultivation in the Project area villages. Permanent upland agriculture cultivation is practiced by 70% of households in Ban Viengthong on approximately 64 ha of land. Crops include cassava, sugar cane and maize. A small area (4ha) of sugar cane is managed by four households in Ban Phonesoung. Villagers in Ban Khone Phook have converted upland agricultural areas to orchards and plantations.

4.4.5 Forest Resource Use

Forest resources including timber and non-timber forest products (NTFP) are commonly collected and used by villages in Lao PDR. Such forest resources are often important in allowing villagers to meet their subsistence nutritional needs, and provide a safety net during times of food scarcity. NTFP are also an important source of income for rural households, particularly for disadvantaged groups such as women and ethnic minorities (SNV, 2006).

Non-Timber Forest Products

Approximately 94% of households in Project Area villages collect NTFPs, primarily for personal / household consumption. All households in Ban Khone Phook also reportedly earn an income from this activity. NTFPs are mainly collected within village lands including paddy fields, fallow forests, ponds or streams. A total of 19 NTFP plant species were identified during focus group discussions for this ESIA, including edible and medicinal plants.

All households in the Project Area collect fuel wood from degraded / fallow land, plantation areas and upland areas and use it for household cooking. Ten households in Ban Phonesoung produce charcoal and source fuel wood from the same areas. Fuel wood resources are reportedly plentiful.

Timber Forest Products (TFPs)

Almost all households in the Project Area collect timber from village lands. The most common tree species harvested by villages in the Project Area include *Aporosa ficifolia* (Mai Meud), *Peltophorum dasyrrhachis* (Mai Sa Phang), *Lagerstroemia* (Mai Peuay), *Cephalostachyum virgatum* (Mai Hia), *Trema orientalis* (Mai Por Hou), and *Oxytenanthera parvifolia* (Mai Zord). These are reportedly sourced from within village boundaries, along Phuthing Mountain, within grazing areas, along paddy fields and fallow forests.

Whilst villagers in Ban Viengthong and Ban Khone Phook reported that TFPs were plentiful in their villages as they regenerate easily, villagers in Ban Phonesoung reported a decrease in these forest resources.

Hunting

Hunting is reportedly not very common in the Project Area. Only a few households are engaged in hunting activities. During focus group discussions, villagers reported that animals (both large and small) are found less frequently due to the decrease of forest cover / declining habitat value.

4.4.6 Water Resource Use

The major waterbodies in the region include the Nam Lik River, the Nam Ngum River and reservoirs for both rivers where water was compounded for hydropower generation. The largest tributary of the Nam Ngum is the Nam Lik River. As for most rural parts of Lao PDR, local surface and ground water resources (rivers, streams, lakes, wetlands, aquifers etc.) play a significant role in the day to day lives of people living in rural areas. With limited infrastructure, these villagers often rely on nearby water resources for their drinking water and to a lesser extent, electricity generation. The same waterways are important sources of fish and other aquatic resources. They are also often used for washing, bathing and swimming.

The most important water resources for local villages are the Nam Lik River, nearby streams and wells or bores. Residents in the Project Area mainly drink from bottled water, although it was reported that residents in Ban Khone Phook drink water from wells or bores (after boiling it first). There are reportedly no water shortages experienced in the Project Area.

4.4.7 Fisheries and Aquatic Resource Use

More than 90% of households in the Project Area are engaged in fishing and the collection of aquatic resources, primarily for their own consumption. In Ban Viengthong approximately 50 households also sell their catch to other people in other villages or at the local market.

The Nam Lik River, the Nam Som River, and the small perennial tributaries of the Nam Lik are known habitat for a number of aquatic species. Villagers of Ban Khone Phook, Ban Phonesoung, and Ban Viengthong identified 14 fish that are commonly caught in the region, most of which in the Nam Lik.

4.5 Cultural Heritage, Archaeology, and National Heritage

There are no sites of cultural or archaeological significance within or directly adjacent to the Project footprint, though significant sites do occur in each of the three Project area villages (e.g. spirit forests, temples, cemeteries, etc.).

4.6 Visual Amenity

The Project Area is a mosaic of built up settlement areas, industrial concessions, agricultural plots and degraded regeneration forests lying on undulating land overlooking the Nam Lik River.

The District GOL intends to develop the wider area around Ban Hin Heup for tourism adjacent the Nam Lik 1 reservoir after it is impounded. This area is considered likely to draw tourism given the potential for leisure activities on the reservoir and the location being a mid-way point for road transport on Highway 13 between Vientiane and Vang Vieng / Luang Prabang to the north, two of the more popular tourist attractions in the country.

5 RISK ASSESSMENT

5.1 ESIA Risk Assessment

A Risk Assessment was conducted for the ESIA based upon the International Risk Management Standard (ISO31000). Key environmental and social risks potentially resulting from Project development were identified using the risk assessment framework. The risk assessment was initially conducted without consideration to implementation of any management and mitigation with the goal of identifying the most significant potential risks in the absence of mitigation.

Following the assessment and initial risk ranking, proposed management and mitigation measures were identified to avoid or minimise the identified risks and a revised risk ranking provided to identify residual risks.

The assessment identified 14 High risks and 16 Medium risks **prior** to the implementation of proposed Project management and mitigation measures. For each of these key risks, detailed mitigation, management and monitoring measures have been developed.

The implementation of proposed management measures is expected to result in a significant reduction of risk. The residual risk assessment identified two High residual risks, 19 Moderate risks with the remaining 18 risks identified as Low. The High residual risks include potential for injury / death from traffic related incidences and discharge of hazardous materials during transport (e.g. road accident and spillage).

Detailed management and mitigation measures have been outlined in the ESIA Report and ESMMP to ensure the residual risks are minimised wherever possible.

5.2 Risk Monitoring and Review

Risk monitoring and review is critical to managing environmental and social risks effectively for the Project life, and feed into all steps in the risk management process. Burapha is committed to a risk management approach and has developed a series of policies and procedures to guide management strategies which will be implemented for the Burapha Project. Burapha will undertake annual internal audits for all significantly ranked risks, and will also commission annual independent external reviews of the ESR Department's risk management via Forest Stewardship Council (FSC) audits.

6 ASSESSMENT OF IMPACTS AND OPPORTUNITIES

6.1 Revenue and Economic Development

On a regional and local level, the Project is expected to generate significant direct and indirect benefits, including:

- Investment - The establishment of the Mill Project will require an initial investment of \$26.5 million USD into the Lao economy.
- Direct Employment - Approximately 383 full-time positions will be created for Mill and transport operations. Skilled labour requirements will provide training / skills enhancement opportunities. Preference will be given to the recruitment of local workers. Additional jobs will be created for construction.
- Government Revenue - The Project will provide a significant contribution to GOL tax revenues with an estimated annual tax revenue of more than \$2 million USD when the mill reaches full production (BAFCO Mill Feasibility 2016).
- Spin-off benefits – The construction and operation of the Project is expected to provide local supplier opportunities. Project development in the Hin Heup light industrial zone is expected to provide further impotence to the development of the area. The Eucalyptus plantation forestry sector will benefit as a whole from Mill operations through the development of a higher value export alternative; the technological advances in introducing a modern manufacturing unit; and incentive to expand sustainable / certified plantation operations.

The Mill will also facilitate the expansion of Burapha’s agroforestry project to an initial 5000 ha, resulting in further foreign capital expenditure; 896 full-time positions and government revenue in the form of land fees and taxes.

Revenue and Economic Development Impact Assessment

The Project is expected to generate significant direct and indirect economic benefits for the local, regional and national economy.

6.2 Land Use and Resettlement and Displacement of People

The proposed Mill site is located on a concession area previously granted to a Malaysian logging company (HIPA) that was returned to the Government of Lao (GOL) approximately 10 years ago. The land is within an area zoned for Light Industry by the Province.

The site does not affect any village land. No resettlement is required for the Project.

Land Use Impact Assessment

The Project does not affect any village land and no resettlement will be required. Impacts will be **Negligible**.

6.3 Employment

The Project will create approximately 383 full time positions. This includes approximately 366 full-time positions for Mill operations - 182 people working per shift (59 people for the veneer line and 63 people on the plywood line; and 17 full-time truck drivers for in and out-bound haulage). Mill operations will require

training of the local workforce to fulfil skilled labour opportunities. Recruitment of the Burapha workforce will target people from the local communities.

Securing employment with the Project will be one of the greatest concerns among the local population. Surveying conducted for this ESIA in the three nearest villages has highlighted the growing importance of wage-based work as the area transitions to a market based industrialised economy. There are currently limited full-time employment opportunities and many villagers are forced to seek seasonal employment in other areas of the country.

There is the risk of potential issues associated with employment which may include:

- Unequal opportunity for employment, either perceived or actual, between different villages, ethnic groups, genders and recent migrants versus long-term residents;
- Frustration arising from inadequate employable skills among the local workforce and ability to obtain skilled labour positions;
- Social impacts resulting from shift work and changes to the family dynamic; and
- Occupational health and safety (refer to Section 6.4).

Management measures are identified in the ESIA and ESMMP (Volume C) including strong community engagement and grievance resolution; local first and equal opportunity employment practices and training and skills development programs are expected to greatly reduce the likelihood and consequence of these potential impacts.

Employment Impact Assessment

The Project is expected to generate approximately 383 full time positions – the majority for people in the local area. This is expected to be a benefit to the local community and region.

6.4 Occupational Health and Safety

Occupational health and safety risks are inherent in mill and transport operations. Some of the primary risks include:

- Hazards associated with loading, transport and unloading logs;
- Hazards associated with the use of and working in proximity to heavy equipment and machinery;
- Exposure to dust and potentially noxious chemicals; and
- Explosion / fire hazards from flammable materials.

Burapha has an existing OHS Policy and Principals Manual which provides targets, specifies integrating OH&S into daily activities through proactive and preventative measures, and documents requirements to actively renew health and safety programs through continuous improvement and monitoring. The Burapha OHS manual will be updated to address specific risks proposed by the Mill and transport operation and management / mitigation obligations identified in the ESMMP.

Occupational health and safety aspects will be incorporated into the Mill design.

Occupational Health and Safety Impact Assessment

Though OH&S risk cannot be entirely avoided, the likelihood and consequence of potential impacts is expected to be **Low** with diligent implementation of OH&S measures described in the ESMMP and BAFCO OH&S Policy and Principals Manual.

6.5 Transport and Traffic Safety

Approximately 82,700 m³ of raw logs will be harvested in Burapha plantations in Vientiane Province, Xayabouly Province, Saysomboun Province and Vientiane Capital annually. An average of 14 in-bound haulage trucks will operate each day, hauling as much as 30m³ of raw logs per truck. An average of three trucks per day will haul approximately 50m³ per truck of finished product to market (Vientiane, Thailand, Myanmar, China). The Mill will produce approximately 32,000 m³ annually.

Forty-six villages with a total of 36,825 people (hereafter the Transport Villages) are located on six (6) key inbound and outbound transportation routes in Vientiane Province (Table 6-1):

Table 6-1 Primary (proposed) log and plywood transport routes

Transport Route	Roads
Mill Access Route	4501
North East inbound route	13N and 5
North West inbound route	4533 and 13N
West / South West inbound	4501, 4502, 11, 4
South East in-bound and out-bound route	13N and 10
Southern inbound	120 13N

The most heavily impacted villages will include those with settlements located on Provincial Road No.4501 and in close proximity to the Mill. These include settlements in Ban Phonesoung and Ban Viengthong for haul trucks utilising the transportation routes above.

Ambient traffic conditions on the haul roads are quite heavy, particularly for Highway 13 and Provincial Road 4501. Traffic on Road 4501, comprised of trucks, buses, cards, motorbikes, and tuk-tuks, is frequent during the day and moderate during the evening.

The addition of Burapha trucks on the road will have negligible impact on ambient conditions on national, Provincial and District arterials. Burapha transport on smaller unsealed roads associated with plantations will be very infrequent, associated with harvest every seven years. However, there are several associated physical, biological, and social risks associated with hauling raw timber and the finished product that must be diligently mitigated, including:

- Community health and safety – people living near or travelling on transportation routes will be at risk for vehicle strike resulting in injury or death. This risk will increase in locations that have relatively high population density; where Burapha trucks most frequently use; and where road infrastructure condition is poor. There is increased risk for children who typically do not have the same awareness of hazards associated with roads and transport.
- Biological receptors – flora and fauna may be impacted in the event of an accident leading to hazardous materials discharge, including native fauna as well as livestock;
- Soil and water quality – soil and water quality may be impacted by hazardous materials discharge during vehicle refuelling or maintenance or in the event of a road-side accident; and
- Air quality – vehicles will emit pollutants and generate dust, which may prove a nuisance for people living in proximity to the access roads.

The risks and potential impacts are assessed in the ESIA for each of the above receptors. Management measures identified in the ESIA and ESMMP (Volume C) will significantly reduce the potential for significant impacts (e.g. driver safety training, vehicle maintenance, speed limits, travel hours, emergency preparedness and response requirement, etc.). However, nuisance level impacts cannot be entirely avoided or mitigated.

Traffic and Traffic Safety Impact Assessment

Though risks from transportation cannot be entirely avoided, impacts to community health and safety is expected to be **Low** with diligent implementation of transportation safety measures described in the ESMMP

6.6 Community Safety, Health and Nutrition

The primary threat to community health and safety from Project implementation will be associated with transportation of logs / finished product to and from the site, respectively (as above). Vehicle transport poses a risk for the greatest number of people / villages as well as the most serious safety risk.

Effluent from the Mill will not pose a threat to community health and safety as the primary pollutants of concern from veneer and plywood manufacturing (nutrients and other organic materials) are not a threat to human life. Design controls and management measures will minimise effluent concentrations to meet national and IFC guidelines for effluent discharge. Hazardous materials (primarily hydrocarbons) pose a more significant risk, however management measures are expected to minimise the chance of discharge to Nil from Mill operations. Risk for discharge during transport of hazardous materials must be carefully managed.

While air quality and noise will require diligent management to ensure occupational health and safety, impacts to nearby residents will be limited to nuisance emissions during transport of materials. Air and noise emissions from the Mill are not expected to impact the nearest community due to design controls and distance of potential receptors.

The economic development and employment opportunities created for local residents will increase household incomes and their ability to purchase food (improving nutrition) and access better medical services and treatment.

Community Safety, Health and Nutrition Impact Assessment

Though risks from traffic, hazardous materials, etc. cannot be entirely avoided, impacts to community health and safety is expected to be **Low** with diligent application of management measures described in the ESMMP.

6.7 Community Water Use

The most important water resources for local villages are the Nam Lik River, nearby perennial streams, and wells or bores. Water from these sources is utilised for household garden irrigation, washing, and other beneficial uses (whereas local communities use bottled water for drinking).

With design controls and diligent application of management / mitigation measures to avoid discharge of potentially toxic materials, effluent is unlikely to contribute pollutants that would affect community water use.

The Mill is expected to abstract approximately 23,000 m³ per year (m³/a) of groundwater to meet operational requirements at full capacity. Due to the distance from village bores / wells and the location of the proposed Mill bore, impacts to village groundwater availability are not anticipated. If impacts occur, Burapha will provide an alternate water source for those affected.

Community Water Use Impact Assessment

With appropriate design controls and passive water quality treatment, impacts to community water from effluent will be **Low**. Impacts to groundwater hydrology are expected to be **Very Low**.

6.8 Effluent

Without proper management, there is significant risk that discharge from the Mill would affect water quality, with potential impacts on downstream aquatic biodiversity. Unmanaged / untreated discharge during the various phases of veneer and plywood manufacturing may be high in nutrients / organic material which may increase biological oxygen demand (BOD) and / or chemical oxygen demand (COD) to the extent that dissolved oxygen levels in receiving waters may be depleted, and benthic organisms consequently stressed or killed. Discharge of such materials in excess of national and international guidelines would directly impact aquatic habitat. With the exception of potential discharge of hazardous materials, potential water quality pollutants are not considered hazardous for human health.

Burapha is committed to meeting national and international standards for effluent discharge. Diligent management and mitigation measures will be required to ensure the Company meets these standards. Process water from washing glue spreader and air dryer will be recycled, with zero discharge from these facilities. A water treatment pond will be constructed to allow for passive microbial treatment of surface water prior to its discharge from the site. Water from the log stockyard and the remainder of the Mill footprint would be routed to this pond (which will serve as a settling pond for suspended sediments).

The quality of liquid waste from plywood manufacturing is monitored by analysing the following characteristics: pH, biological oxygen demand, chemical oxygen demand, total suspended solids, phenol, and total ammonia. The water quality monitoring regime specified in the ESMMP will identify whether discharge meets applicable standards, and provide for adaptive management to avoid impacts to downstream water bodies / receptors.

Water Quality Impact Assessment

With appropriate design controls and passive water quality treatment and a commitment to meeting National and International Standards, impacts from effluent discharge will be **Low**.

6.9 Terrestrial Biodiversity and Use

The risks for impacts to terrestrial biodiversity are very low during Project construction and operations. No quality habitat exists on the site, with vegetation having been previously cleared and much of the site graded and the soil compacted. During May 2016 biodiversity surveys on the site, no threatened or High Conservation Value flora or fauna were found. Impacts to terrestrial biodiversity will be Very Low.

Natural resources (NTFP, TFP, etc.) utilised by local residents will not be impacted.

Indirect impacts, mainly associated with employment and increased incomes in the Project area are expected to be positive (i.e. reduced reliance on natural resources).

Terrestrial Biodiversity and Resource Use Impact Assessment

Impacts to terrestrial biodiversity, forest resources and resource use will be **Very Low**.

6.10 Aquatic Biodiversity and Use

Effluent may impact water quality in the absence of suitable management measures. Though aquatic habitat and biodiversity are absent on-site, drainage will reach the Nam Lik River, which has quality habitat for a range of aquatic species (likely including some threatened fish species) and is an important fishery for local residents.

The river will significantly dilute effluent from the site. Unmitigated risk is therefore Moderate. Cumulative discharge of nutrients / organic matter from industry in the region may elevate biological oxygen demand and

chemical oxygen demand, decreasing dissolved oxygen concentrations to levels that may prove deleterious to aquatic species, particularly following impoundment of the river for the Nam Lik 1 Hydropower Project.

Burapha is committed to managing effluent discharge with design controls (recycling glue spreader / veneer dryer washwater) and management measures (passive water quality treatment) to ensure discharge meets applicable standards, reducing potential impacts to aquatic biodiversity and aquatic resource use to Low.

Routine water quality monitoring of effluent will be conducted to ensure discharge meets applicable standards and inform adaptive management strategies, if necessary.

Aquatic Biodiversity and Use Impact Assessment

With appropriate design controls and passive water quality treatment, impacts to aquatic biodiversity and aquatic resource use will be **Low**. Water quality monitoring will ensure downstream biodiversity / water users are protected and inform adaptive management strategies, if necessary.

6.11 Erosion and Sediment Transport

Due to (i) the highly dispersive nature of the soil at the Mill site; (ii) the precipitation regime in the region (i.e. moderately high seasonal volumes and high intensity rains during the height of the rainy season); and (iii) the need to clear approximately seven ha for construction, the topsoil and subsoil at the site will be susceptible to significant erosion and sedimentation of neighbouring seasonal streams and potentially the Nam Lik River during construction.

This is mitigated by the flat topography of the site. Stormwater control and erosion / sediment control facilities will be implemented in advance of ground disturbing activities. Proper controls will minimise sediment inputs to a level that is satisfactory to stakeholders.

A sedimentation basin (which will be converted to the Water Treatment Pond during operations) will retain surface water from the Project footprint, allowing coarser sediments to settle. Some of the finer fraction will discharge from the site.

Erosion and Sediment Transport Impact Assessment

With effective stormwater, erosion, and sediment control; construction phase impacts to water quality from erosion and sedimentation will be **Moderate** and operations phase impacts will be **Low**.

6.12 Hazardous Materials

The Project will be required the transport, storage, handling, and disposal (where applicable) of hazardous materials / hazardous waste throughout operations and during construction to a lesser extent. The formaldehyde utilised in the wood adhesive presents a significant occupational health and safety risk for the workforce if inhaled. The remainder of the materials used in the adhesive (i.e. urea / phenol, ammonium sulfate) may impact aquatic habitat if discharged from the site (as above).

In addition, diesel fuel and other hydrocarbons; sewage and greywater, and medical waste would impact groundwater and surface water quality in the event of accidental discharge. Burapha is committed to International best practices for transport, storage, handling of hazardous materials and appropriate disposal of hazardous waste including design controls, provision of Personal Protective Equipment, training, record keeping, and emergency preparedness and response planning. Though the potential for accidental discharge cannot be entirely removed, it is anticipated that this impact will be Low.

Burapha will develop, implement, communicate, adhere to and maintain a relevant and current **Waste Management Plan** which defines all on-site and off-site strategies, operational controls and management

practices relating to hazardous and non-hazardous waste management. Potential waste streams and their sources will be identified, classified and managed during operations and incorporated into the Waste Management Plan and the design of on-site facilities.

The Company will develop and implement an **Emergency Preparedness and Response Plan**, incorporating requirements identified in the Project ESMMP, Emergency Preparedness and Response Sub-Plan. Burapha will also develop an **Occupational Health and Safety Plan** or Standard Operating Procedure that ensures their workforce is adequately trained to avoid exposure to potentially toxic substances and is provided appropriate personal protective equipment (PPE).

Routine monitoring of hazardous materials storage, handling, and disposal areas will be conducted throughout construction and operations to ensure personnel are effectively managing potential pollutants, as per the ESMMP. Where applicable, non-compliances will be documented with corrective action reports and remedial measures implemented.

Hazardous Materials Impact Assessment

Though risks from hazardous materials cannot be entirely avoided, impacts to communities, the workforce, water quality, soil quality, and biodiversity will be **Low** with diligent application of management measures and monitoring provided in the ESMMP.

6.13 Non-Hazardous Materials

Waste management at the Project will require the construction of several specifically designed facilities (i.e. storage and separation area for recyclables; residue waste landfill for non-recyclables and non-hazardous materials; sewage and grey water treatment plants). The first priority for the management of wastes generated by the Project will be to reduce the volume of waste generated, which will be achieved by procuring supplies that produce less waste by virtue of the way they are produced, packaged, or consumed; procuring supplies that have been produced from recycled materials, if possible; and maximising the efficiency of all on site production processes.

All non-hazardous waste will be managed in a manner that avoids impacts to surface and air quality, soil and surface / groundwater, visual amenity, and prohibits animal forage.

Routine monitoring of all waste containment and disposal areas will be conducted throughout construction and operations, as per the ESMMP. Where applicable, non-compliances will be documented with corrective action reports and remedial measures implemented.

Non-Hazardous Materials Impact Assessment

Impacts to receptors from non-hazardous waste will be **Low**.

6.14 Site Contamination

Burapha is committed to operating the facility in a manner that avoids site contamination. The Company will develop a *Waste Management Plan* (WMP) that identifies appropriate disposal methods for hazardous and non-hazardous wastes, and certified facilities for off-site disposal. Volumes of hazardous waste will be tracked and recorded with a Hazardous Materials Register. Measures to contain discharge in the event of accidental spillage will be identified in the Project *Emergency Preparedness and Response Plan* (EPRP). Management measures provided in the ESMMP will be incorporated into the WMP and EPRP.

All on and off-site disposal facilities will be appropriately designed to ensure that surface water, groundwater, and soils are not contaminated. Non-hazardous waste disposal areas will be routinely covered to avoid wildlife egress and disease spread through such potential vectors.

Routine monitoring will include all waste containment and disposal areas, to ensure contractors / Burapha staff are managing waste consistent with Company / Project policies.

Site Contamination Impact Assessment

Impacts to surface water, groundwater, soil and downstream receptors are expected to be **Low** with development and implementation of an effective waste management strategy, routine monitoring of facilities, and corrective action plans.

6.15 Air Quality

Air emissions from veneer and plywood plants typically include: dust, nitrogen oxide gases (NO_x); sulfur dioxide gas (SO₂); carbon monoxide gas (CO); and a number of volatile organic compounds (VOCs). VOCs, including formaldehyde (CH₂O), are likely to be emitted from the processing of veneer and use of glues, solvents, fuels and other hydrocarbons on-site. Combustion gases SO₂, CO and NO_x originate from the exhaust of diesel and petrol fuelled vehicles, and from generators and boilers on-site. In addition, the formaldehyde utilised in the resin for gluing veneer panels into plywood poses an occupational health and safety risk for the workforce if inhaled (refer to Section 8.6).

The Mill will be designed to meet IFC emissions guidelines for Board and Particle-Based Products (2007), the staff outfitted with appropriate personal protective equipment (PPE), and the use of PPE required for applicable jobs. It is anticipated that emissions will not present a risk for nearby communities due to the distance from receptors and design controls.

Similarly, air emissions during construction will likely only be an issue for workers due to the distance of the site from villages (i.e. > 0.5 km). Dust will be generated during vegetation clearance / earthworks, road construction, and during travel on the unsealed access roads.

Air Quality Impact Assessment

With appropriate design controls, PPE, and application of additional management measures provided in the ESIA, residual impacts for receptors will be **Low**.

6.16 Noise

During construction, vegetation clearance / grading, other heavy machinery, and transport activities will emit noise. During the operations, primary noise emissions will occur where sawing, milling, processing, drying, loading and transport activities. Noise at the Mill site will be high and will require strict adherence to hearing protection requirements for all staff.

Impacts to communities from noise generated at the Mill are expected to be Low. Sensitive human receptors are topographically shielded from the Mill site and residences are more than 0.5 km away, with the majority more than 1 km away. Burapha will either plant a number of rows of Eucalyptus surrounding the Mill to attenuate noise emissions or will build a noise attenuating wall. Night-time shift activities will not include noise generating activities that exceed national / international guidelines.

Log trucks will pass through villages during materials transport. Trucks may provide nuisance level noise impacts. Speed limits though town will be strictly enforced, thus only Moderate level impacts are anticipated.

Noise will be indirectly monitored through implementation of the Project Grievance Mechanism, whereby complains will be registered, and adaptive management measures evaluated and implemented in the event of impacts.

Noise Impact Assessment

Noise impacts from haul trucks will be short-duration **Moderate** impacts. With design controls and noise attenuation, impacts from the Mill will be **Low**.

6.17 Archaeology and Cultural Heritage

There are no known sites of cultural or archaeological significance within or directly adjacent to the Project footprint. Known areas of cultural (e.g. spirit forests, temples, and cemeteries) and archaeological importance are outside of the area of influence from the Project.

A Chance Find Procedure (ESMMP, Volume C) has been developed that identifies the communications protocol and procedures that will be undertaken if an artefact or significant site is found during Project construction. Impacts are expected to be Very Low.

Archaeology and Cultural Heritage Impact Assessment

Residual impacts will be **Very Low** with the implementation of the chance find procedure.

6.18 Gender, Ethnic Minorities and Vulnerable Groups

Ensuring Project benefits are equally accessible to women, vulnerable groups and ethnic minorities will help minimise the potential for disproportionate impacts on these groups.

Whilst there are low levels of vulnerability in the Project Area, there are a relatively high number (36) of single female headed households and households (10) with members that have disabilities. There are also a small number of ethnic minorities in the three villages including Khmu households (9.6% of the population) and 10 Hmong households (2.7% of the population).

Implementing equal opportunity policies and targeting gender / ethnic balance in hiring will minimise the risk of exacerbating existing inequalities affecting vulnerable groups and ethnic minorities and ensure that Project benefits are equally accessible to all groups.

Gender, Ethnic Minorities and Vulnerable Groups Impact Assessment

Residual impacts will be **Very Low** with the implementation of equal opportunity employment policies, and community consultation.

6.19 Visual Amenity

The Mill site is considered the best location in the immediate area to minimise impacts to visual amenity. The Mill will be constructed adjacent the Hin Heup Substation and an organic fertiliser manufacturing facility (industrial area) and the area is topographically shielded on three sides from direct line of site.

The Mill will not be visible from neighbouring Ban Hin Heup, Ban Viengthong, Ban Phonesoung, Ban Khone Phook, and Ban Phone Mouang. Viewshed analysis conducted for this ESIA indicate that the primary areas that will have direct line of site to the Mill are the slopes / plateaus in the distance and ridge-tops to the north, south, and west. None of these areas are populated. The visual amenity of the area planned for tourism development (adjacent the reservoir in the Ban Hin Heup area) will not be impacted. Impacts to visual amenity are considered Very Low.

In the absence of vegetative screening, the Mill will be visible from the primary access road to the west of the Mill site. Burapha will plant trees (likely Eucalyptus) for noise attenuation to shield direct line of site from the road and river area.

Visual Amenity Impact Assessment

Impacts to visual amenity will be **Low**.

6.20 Cumulative Impacts

The Burapha Mill Project will make a significant contribution to the Hin Heup District Government's plan to develop the Project Area. This project, along with other existing and planned projects in the area are expected to have a multiplier effect, generating government revenue, employment and spin-off economic opportunities in the Project region and cumulatively boosting the regional economy.

Key potential cumulative impacts include:

- Surface and ground water hydrology - The Mill will source operational water from groundwater (or surface water if necessary). Current and future industrial developments in the area may have similar operational water requirements. This has the potential to draw down the regional aquifer or reduce surface water in the Nam Lik river and its tributaries, potentially affected other water users.
- Water quality - In the absence of adequate management, there is a risk that discharge from the Project Area will have elevated BOD and COD concentrations, moderately high sediment loads (during construction), and hazardous materials / waste, each of which may have implications for the health of aquatic biodiversity and beneficial uses of water. With effective design controls and management measures impacts will be low. Similar risks are likely in other industrial developments across the area. Failure to properly manage these risks could contribute to diminished water quality in and around the Project area.
- Transport – Project vehicles will contribute to increased traffic on local and regional roads. Key issues include road / community safety, degradation of road infrastructure; the transport of hazardous materials, nuisance noise and vibration, and air quality relating to dust generation and vehicle emissions. Transport related impacts of the Mill project will be low with effective management. Continued development of the area is expected to increase use of local and regional roads and related transport impacts.

Cumulative Impact Assessment

Cumulative benefits for the regional economy will be **Moderate**; Cumulative impacts to water quality will be **Low**; and cumulative impacts to traffic will be **Low – Moderate**.

7 STAKEHOLDER CONSULTATION AND PUBLIC INVOLVEMENT

Throughout the ESIA process, formal and informal consultations were undertaken with Central, Provincial, and District Government Officials and the local communities.

7.1 Objectives

The overall objective of stakeholder consultation for the Project is to improve decision-making, build understanding to ensure the long-term viability of the Project, to enhance potential Project benefits, and to ensure stakeholders have a voice in the assessment and outcomes.

7.2 Stakeholder Identification

Lao legislation defines stakeholders as “any person, legal entity or organisation who / which are interested in, involved in or have interests in an investment project, in an activity or a manner (related to the project) because they are involved in or (are likely to be) affected by the investment project” (MONRE, 2010).

The following key stakeholder groups have been identified for the Project:

Villages in Close Proximity to the Mill

Villages in close proximity to the Mill include Ban Khone Phook, Ban Phonesoung and Ban Viengthong. No individuals nor communal lands are required for development of the Project. Households may be impacted by noise, air quality, water quality and availability, increased traffic, community safety and associated impacts.

Villages along the Transportation Network

Forty-seven (47) villages are located on key roads along the Company’s planned transportation network. It is expected that the Mill operation will require a minimum of 14 trucks to the site daily to support operations and households in these villages may be impacted by increased traffic, community safety and associated impacts.

Government of Lao PDR

Government of Lao PDR stakeholders include:

- Hin Heup District government and line offices;
- Vientiane Province government and line departments;
- Central Government line agencies (particularly MONRE, Ministry of Planning and Investment and Ministry of Industry and Commerce).

Other Stakeholders

Other stakeholders identified for the Project include:

- Residents along transport routes from plantations, scattered throughout Vientiane Prefecture, Vientiane Province, Xayabouly Province and Saysomboun Province;
- Private companies operating in the vicinity of the Project, such as those having land concessions for Ray Organic Fertiliser factory, Naly Jalernsub Cassava Factory, Ban Phonesoung White Charcoal Factory; Lao Yunmu Forestry Development Company, and Lao Yunming Eaglewood Processing Import & Export Company; and
- NGOs and aid projects working in Hin Heup District, including Oxfam, Village Focus International.

7.3 Summary of ESIA Consultation Activities

A series of initial consultations have been conducted during the ESIA period (refer to Table 7-1). These included meetings with central, Provincial and District level representatives; village meetings and surveying; technical studies and site visits. The purpose of these engagements was to introduce the Project; collect information on the Project Area; and seek feedback from key stakeholders. Key outcomes of the consultations and how these issues are addressed in the ESIA are outlined in the ESIA Report (Volume B).

Table 7-1 Summary of Consultation Conducted during the ESIA

Date	Consultation	Stakeholders
Kick-Off Meeting		
21 March 2016	Central meeting (ESIA Kick off)	Department of Environment and Social Impact Assessment
Initial ESIA / Scoping Study Consultations		
1 April 2016	Vientiane Provincial Meetings	Provincial Cabinet Office; Provincial Department of Natural Resources and Environment (Head of Forest Resource Extraction Section and Deputy Head of Resettlement Section), Provincial Department of Industry and Commerce, Provincial Department of Agriculture and Forestry, Provincial Department of Planning and Investment
24 March 2016	Hin Heup District Meetings	District Administration Office, District Office of Planning and Investment, District Office of Natural Resources and Environment, District Office of Industry and Commerce, DONRE
24-26 March 2016	Village level meetings and village socio-economic and land use surveys	Village authorities and other village representatives in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook
ESIA Field Studies		
17-18 May	Biodiversity Technical Study consultations	Focus group meetings with a selection of community members in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook.
15-16 June 2016	Village level focus groups and household surveys	Focus group meetings with a selection of community members in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook
17-18 May 2016	Cultural heritage and archaeology consultations	Focus group meetings with a selection of community members in representatives in Ban Viengthong, Ban Phonesoung, and Ban Khone Phook.
Draft ESIA Formal Consultations		
3-4 October 2016	Village level consultations	Village level consultation meeting to present findings of the ESIA and invite feedback / comment.
10 October 2016	Hin Heup District level consultations	District consultation meeting to present findings of the ESIA and invite feedback / comment.
TBC	Central / Provincial level consultations	Central level consultation meeting to present findings of the ESIA and invite feedback / comment.

Source: Earth Systems 2016

7.4 Continuing Consultation

The Company will be expected to continue formal and informal consultation with stakeholders as the Project continues into the operational phase. Procedures for grievance management throughout the Project life have been outlined in the ESMMP that are designed to provide an open and transparent channel for communication between the community and the Company.

The Public Consultation and Disclosure Plan (Volume C) will provide a framework for consultation and information disclosure for the implementation of the Burapha Mill Environmental and Social Impact Assessment (ESIA) processes throughout the construction and operational phases of the project. The PCDP has been developed using international best practice and Burapha's existing Operational Manual for communications (2012) which sets out methods of communication as well as roles and responsibilities for information dissemination.

7.5 Grievance Management

The first step in conflict resolution is conflict avoidance. Conflict avoidance is a key goal of the stakeholder consultation process for the ESIA and for the ongoing community engagement program. Regular consultation and engagement with local community members will effectively reduce the occurrence of disagreements and conflicting positions.

Despite the best practice community engagement, it is likely that grievances will arise throughout the life of the Project, and it is important that these are dealt with in a fair and transparent manner before they escalate. The phases of conflict development and appropriate interventions can be summarized as follows:

- Conflict avoidance → Consultation & participation in planning, decision making;
- Simple disagreements → Informal negotiation, discussion and mediation;
- Early conflict development → Reference to Village Grievance Committee;
- Conflicting positions taken → Reference to Grievance Committee at District level;
- Conflicting positions hardened → Reference to Grievance Committee at Provincial level; and
- Intractable conflict → Refer conflict to National Court.

Burapha Agroforestry Co., Ltd has an established Standard Operating Procedure (SOP) for grievance management, *BAFCO-SOP-010-Dispute Resolution*. This procedure is designed to provide an open and transparent channel for communication between the community and the company. It has been developed to meet the requirements of the FSC Forest Management Standard utilising the Global Forestry Services (GFS) Forestry Support Program and is considered applicable for the Burapha Veneer and Plywood Mill Project. The procedure is summarised below.

Communication

Burapha's grievance mechanism, *BAFCO-SOP-010-Dispute Resolution*, prescribes a proactive approach to conflict avoidance, promoting regular formal and informal communication to minimise areas of conflict arising from the Project. Types of communication include:

- Establishment of a Conflict/Dispute Resolution Committee that includes both the management and adequate representation of all critical groups of the community including women. Committee meetings should be held regularly about every 3-4 months;
- Consultation on forest resource usage by communities;
- Ongoing consultation on village level socio-economic development;
- Communication on the establishment and progress of any social programmes; and
- Provision of relevant information on the type, scope, potential impacts and timing of operations to affected local communities.

Conflict Management and Dispute Resolution

The Conflict Management and Dispute Resolution is a 4-step process as follows:

1. All conflicts or disputes shall also be raised formally within the Conflict / Dispute Resolution Committee;
 - » The committee shall try to resolve the conflict through consensual negotiation;
 - » All information relating to the conflict (meeting notes, maps, photos, agreed corrective actions etc.) shall be recorded for company records and distribution to relevant stakeholders;
 - » Corrective actions, where applicable, are agreed upon by the committee;

2. Any conflict that cannot be resolved within the committee needs to be raised with the company's District Manager. The District Manager shall consider the records / results of the committee resolution process and propose a resolution;
 - » The parties directly involved in the conflict shall then have the opportunity to meet and discuss the issues directly with the Company's District Manager in efforts to come to an agreement. This meeting should be facilitated by an independent third-party mediator;
3. Conflicts that still cannot be resolved are then referred to the company's Regional Director. The process at this step is the same as step 2.
4. Any conflict that cannot be resolved in steps 1-3 is then referred to the civil court system in Lao PDR. The party raising the unresolved conflict shall be responsible for their own representation in the Lao PDR Court system.

8 MANAGEMENT AND MONITORING

8.1 Environmental and Social Management System

The ESIA has outlined the likely environmental impacts based on the current Project design options and has outlined a professional management and monitoring program consistent with Lao PDR legislation and international industry best practices for wood processing operations. The proposed management strategy for the construction and operation phases of the Burapha Veneer and Plywood Mill Project has been documented in the ***Environmental and Social Management and Monitoring Plan***, a separate stand-alone document (Volume C). In accordance with regulatory requirements, during the construction and operations phases of the Project it is expected that the ESMMPs will be updated as required to incorporate any significant changes during the life of the Project.

A site-specific ***Emergency Preparedness and Response Plan*** (EPRP) will be developed for the Project (in addition to Burapha's current EPRP) to specify preventative measures, communication protocols, and response procedures in the event of an emergency. This plan will incorporate national and international best practices that address the key risks associated with veneer and plywood manufacturing in the context of the Project region.

The effective implementation and regular updating of these Plans in response to changing needs will ensure that environmental impacts attributable to the Project are minimised and potential environmental and social benefits are maximised. Ongoing consultation with the GOL, local communities and other stakeholders will be important to ensure consideration of stakeholder interests in the planning and development of the Project.

8.2 Monitoring and Reporting

The implementation of an appropriate monitoring strategy as part of the ESMMP is important to ensure that existing management measures are effective, and to identify the need for improved or additional measures. The environmental monitoring program for the Project will include six categories of monitoring:

- **Routine construction monitoring** - conducted weekly throughout construction to evaluate the efficacy of design controls and management measures (e.g. stormwater, erosion, and sediment controls structures), hazardous materials storage and handling facilities, safe work practices, etc.;
- **Routine operation monitoring** - monthly monitoring to evaluate occupational health and safety measures, hazardous and non-hazardous materials / waste storage facilities and handling practices;
- **Community engagement and social monitoring** – regular engagement with and biennial socio-economic monitoring of affected communities
- **Discharge monitoring** – quarterly water quality monitoring at the siltation basin / water treatment pond to measure pH, BOD₅, COD, total suspended solids, dissolved solids, phenols, Kjeldahl nitrogen, total phosphorous, and oils / grease;
- **Ambient monitoring** – conducted if discharge monitoring identifies exceedances in effluent guidelines. Nam Lik River water measured (same parameters as discharge monitoring) immediately downstream of discharge point to evaluate influence on ambient conditions; and
- **Investigation monitoring** – conducted when routine monitoring identifies potential non-compliance issues or affected communities provide complaints via the Grievance Mechanism.

The Burapha environmental and social compliance officer will provide Quarterly Monitoring Reports and an ***Annual Environmental and Social Monitoring Report*** that records the results of monitoring and identifies adaptive management strategies, where required.

Non-compliances identified during any of the above monitoring will trigger the development of a **Non-Compliance Report** that identifies the issue, provides corrective actions to remedy the issue, a timeline for completion, and person / people responsible for corrective actions.

8.3 Budget for Environmental and Social Monitoring

Burapha will provide a budget estimate for annual environmental and social monitoring that will be included in the Final **Environmental and Social Management and Monitoring Plan**.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

The development of the Burapha Veneer and Plywood Mill will provide an important processing plant to value add plantation forestry grown in the region. It will add to the local economy by providing jobs and local supplier opportunities. It will also provide important export income to Lao PDR.

The siting of the Mill is low impact from an ecological perspective being in a cleared industrial zone.

The Mill can generate wastes and discharges that will need to be carefully managed to ensure that discharge requirements are met, and the downstream environment protected.

9.2 Recommendations

The following are recommended to ensure the Mill meets national and international guidelines and stakeholder expectations:

- Update and implement Burapha's human resource policies to reflect a commitment to local employment, training and skills development and ensure equal opportunity and employment practices for all people in the Project Area
- Design and Implement a participatory Community Development Program specific to the Mill Project in coordination with affected villages and the District government to support local development initiatives and entrepreneurial enterprise;
- Implement designed controls for glue spreader and veneer dryer washwater to ensure zero discharge from the site. Recycle washwater to avoid or minimise water treatment requirements;
- Implement the designed passive water treatment pond (with a dual purpose to capture and retain course sediment) to allow for microbial degradation of organic materials in surface water to protect downstream aquatic biodiversity;
- Develop a comprehensive **hazardous materials register** (with MSDS) to continuously track volumes;
- Develop and implement a **Waste Management Plan** (refer to ESMMP Sub-Plan, Volume C) that identifies hazardous and non-hazardous waste streams and suitable disposal methods and locations;
- Develop and implement an **Emergency Preparedness and Response Plan** (refer to ESMMP Sub-Plan, Volume C) that identifies communication protocols, hazardous materials handling and storage procedures, training requirements, and clean-up materials;
- Develop and implement an **Occupational Health and Safety Plan** (refer to ESMMP Sub-Plan) that identifies training requirements, PPE requirements, design / safety controls, etc. to protect the Mill workforce;
- Identify budgeting requirements for environmental and social monitoring and reporting.